

Guidelines for regulatory assessment of licensees' safety culture

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With the issuance of the safety guides on management systems for nuclear installations, the IAEA has provided a framework for the assessment of safety culture, based on a set of 37 attributes, grouped into 5 areas corresponding to safety culture characteristics:

- (A) Safety is a clearly recognised value;
- (B) Leadership for safety is clear;
- (C) Accountability for safety is clear;
- (D) Safety is integrated into all activities;
- (E) Safety is learning driven.

As stressed in the IAEA guidance, a strong safety culture has the following important attributes:

#	SC Attributes (GS-G-3.1)
A.1.	The high priority given to safety is shown in documentation, communications and decision making
A.2.	Safety is a primary consideration in the allocation of resources
A.3.	The strategic business importance of safety is reflected in the business plan
A.4.	Individuals are convinced that safety and production go hand in hand
A.5.	A proactive and long term approach to safety issues is shown in decision making
A.6.	Safety conscious behaviour is socially accepted and supported (both formally and informally)
B.1.	Senior management is clearly committed to safety
B.2.	Commitment to safety is evident at all management levels
B.3.	There is visible leadership showing the involvement of management in safety related activities
B.4.	Leadership skills are systematically developed
B.5.	Management ensures that there are sufficient competent individuals
B.6.	Management seeks the active involvement of individuals in improving safety
B.7.	Safety implications are considered in change management processes
B.8.	Management shows a continual effort to strive for openness and good communication throughout the organization
B.9.	Management has the ability to resolve conflicts as necessary
B.10.	Relationships between managers and individuals are built on trust
C.1.	An appropriate relationship with the regulatory body exists, which ensures that the accountability for safety remains with the licensee
C.2.	Roles and responsibilities are clearly defined and understood
C.3.	There is a high level of compliance with regulations and procedures
C.4.	Management delegate responsibility with appropriate authority to enable clear accountabilities to be established
C.5.	'Ownership' for safety is evident at all organizational levels and for all individuals
D.1.	Trust permeates the organization
D.2.	Consideration for all types of safety, including industrial safety and environmental safety, and of security is evident
D.3.	The quality of documentation and procedures is good
D.4.	The quality of processes, from planning to implementation and review, is

#	SC Attributes (GS-G-3.1)
	good
D.5.	Individuals have the necessary knowledge and understanding of the work processes
D.6.	Factors affecting work motivation and job satisfaction are considered
D.7.	Good working conditions exist with regard to time pressures, work load and stress
D.8.	Cross-functional and interdisciplinary cooperation and teamwork are present
D.9.	Housekeeping and material conditions reflect commitment to excellence
E.1.	A questioning attitude prevails at all organizational levels
E.2.	Open reporting of deviations and errors is encouraged
E.3.	Internal and external assessments, including self-assessments, are used
E.4.	Organizational and operating experience (both internal and external to the facility) are used
E.5.	Learning is facilitated through the ability to recognize and diagnose deviations, to formulate and implement solutions and to monitor the effects of corrective actions
E.6.	Safety performance indicators are tracked, trended, evaluated and acted upon
E.7.	There is systematic development of individual competences

The findings on the usual review and inspection activities conducted by the regulatory body can be linked with / interpreted in the light of the safety culture attributes. This would allow a qualitative judgement on the extent to which a safety culture attribute is fulfilled in a certain area of activity of the licensee.

References:

Application of the Management System for Facilities and Activities
Safety Guide

IAEA Safety Standards Series No. GS-G-3.1, IAEA, Vienna, 2006

(see para. 2.32 – 2.36 for the attributes of a strong safety culture)

<http://www-pub.iaea.org/MTCD/publications/PubDetails.asp?pubId=7467>

The Management System for Nuclear Installations
Safety Guide

IAEA Safety Standards Series No. GS-G-3.5, IAEA, Vienna, 2009

(see para. 2.6 – 2.37 and Appendix I)

<http://www-pub.iaea.org/MTCD/publications/PubDetails.asp?pubId=8090>

IAEA SCART Guidelines

Reference report for IAEA Safety Culture Assessment Review Team (SCART)

IAEA Services Series No. 16, IAEA, Vienna, 2008

<http://www-ns.iaea.org/downloads/ni/s-reviews/scart-guidelines.pdf>

IAEA OSART Guidelines (2005 Edition)

http://www-pub.iaea.org/MTCD/publications/PDF/svs_012_web.pdf

Appendix # – Detailed guidelines for the assessment of the safety culture attributes

Characteristic A: Safety is a clearly recognized value

Attribute A.1: The high priority given to safety is shown in documentation, communications and decision making.

Areas for review (ALL):

- **Management, Organisation & Administration**
- **Training and qualification**
- **Operation and Maintenance**
- **Technical support**
- **Operational experience feedback**
- **Radiation protection**
- **Emergency planning and preparedness**

1) General Expectations:

- The licensee has established a policy which states that nuclear safety shall be given first priority in all activities, overriding, if necessary demands related to budget and schedule;
- The nuclear safety policy is communicated to all site personnel, including contractors; the staff in all plant departments is aware of the nuclear safety policy and is able to explain how this applies to their particular area of work;
- The management system of the licensee enables the identification of conflicting requirements;
- The licensee has in place a documented decision-making process applicable to all matters that may affect safety; the decision-making process is know to the plant staff;
- The rationale for significant decisions relating to safety is communicated regularly to site personnel;
- The prioritisation of corrective actions is based on their safety significance and the criteria for prioritisation are clear, with nuclear safety as the most important factor;
- Key decisions relating to safety are reviewed periodically and assumptions and conclusions are challenged in the light of new information, operating experience or changes in circumstances.

2) Guidelines for specific areas of review:

2.1) Management, Organisation & Administration

Documentation to be reviewed:

- the Nuclear Safety Policy (or a similar document stating the safety expectations of the senior management);
- the description of the decision-making process;
- the attributions and the responsibilities of those involved in decision-making on safety related matters;

- the guidelines for internal reporting of abnormal conditions (deviations, non-conformances, "low level events", etc.) and the criteria for judging their safety significance;
- the criteria for the prioritisation of corrective actions;
- the criteria for grading the application of the management system requirements;

Observations: It is recommended that the inspectors attend meetings where they can observe the decision-making process, like for example:

- daily planning meetings (the CNCAN site inspectors can participate in these meetings as observers);
- planning meetings for the preparation of plant outages;
- meetings organised for discussing technical operability evaluations;
- meetings of the plant committee for the review of design modification proposals;
- meetings of the plant safety oversight committee.

Examples of questions to be asked:

(note: these are applicable to all areas of review)

- In what way is current safety policy being brought to the attention of staff members and contractors? Who decides on the information strategy?
- If a safety policy statement has been issued, what is its content?
- How does the safety policy statement affect the day to day work of staff members and contractors at the nuclear facility?
- Can staff members and contractors cite examples from the safety policy statement that illustrate its meaning?
- In what way do daily or weekly management meetings at the nuclear facility cover safety significant items?
- Can senior managers describe how safety is discussed, when it is on the agenda of the board meeting?
- Can staff members and contractors cite examples of meetings at corporate (or facility) level when agenda items on safety were included?
- What are the opportunities for non-management staff to participate in meetings devoted to safety?
- During periods of heavy work-load, in what way do managers ensure that staff members and contractors are reminded that unnecessary haste and shortcuts are inappropriate?
- Can staff members and contractors describe situations when the rationale for significant decisions related to safety was communicated to a large group of individuals in the nuclear facility?
- Can staff members and contractors describe situations when assumptions and conclusions of earlier safety decisions were challenged in the light of new information, operating experience or changes in context?

The inspectors should try to ascertain:

- whether the nuclear safety policy is generally known to the plant staff and whether the people interviewed are familiar with the principles in the nuclear safety policy and are able to relate them to their specific area of activity;
- whether the management system integrates elements relevant to nuclear safety, radiological protection, occupational health and safety, environment, security and physical protection and economic performance and how it allows for the recognition of conflicting goals;
- whether the graded application of the management system requirements takes account of nuclear safety as the most important factor;

- whether the decision making process is formalised in a procedure and implemented in practice;
- whether those involved in the decision-making process have sufficient authority to discharge the responsibilities assigned to them;
- whether the corrective actions given a high priority based on their safety significance are implemented in the required time frame.

2.2) Training and qualification

Documentation to be reviewed:

- Training policy – commitment to the implementation of the systematic approach to training; statements on the role of training in ensuring safety;
- Training materials specifically addressing safety culture (including any that is provided to contractors working on site – e.g. communication of the nuclear safety policy);
- Training curricula for the various categories of staff, including contractors (in order to see how the principles in the safety policy are embedded into training);
- Records of training conducted to address significant operational events and lessons learned.

Observations:

- Observation of classroom training for various categories of staff (with a focus on how is the nuclear safety policy communicated to the trainees);
- Observation of oral examinations and of practical examinations on the full-scope simulator;
- Observation of pre-job and post-job briefs.

Examples of questions to be asked:

- How does the training support priority to safety?
- Which elements of the training programme are aimed at promoting a strong safety culture?
- What are the criteria for scheduling training activities?
- What practical examples / case studies are used in the training programme to illustrate the principle of priority to safety?

The inspectors should try to ascertain:

- what are the main criteria for the scheduling of the training activities and whether safety considerations are given priority;
- whether significant operational occurrences at the plant or at other stations worldwide are promptly addressed in the training programme to prevent the occurrence of similar situations;
- whether the principles of a strong safety culture (e.g. as outlined in the nuclear safety policy and in the industry good practice documents) are constantly brought to the attention of the staff during the training sessions.

2.3) Operation and Maintenance

Documentation to be reviewed:

- operating policies and principles for the station / operational limits and conditions;
- nuclear safety policy;
- description of the operational decision making process (ODM);
- general procedure for responding to transients / unplanned operational events;
- procedure for shift operation (including the shift turnover process);
- guidelines for the conduct in the main control room (including communication protocols);
- documentation governing the planning of work, outages, modifications and tests and the criteria used for the scheduling of activities;
- general procedures governing the maintenance activities;

Observations:

- Observation of operations in the control room during power manoeuvres (start-up, shutdown, refuelling);
- Observation of shift turnover;
- Observations of tests and maintenance work in the field.

Examples of questions to be asked:

- How is priority to safety reflected in the decisions in the main control room? (e.g. question addressed to shift supervisors and main control room operations during regulatory examinations);
- Who has the right to stop work and based on what criteria?
- What are the safety relevant criteria used in the scheduling of maintenance activities?

The inspectors should try to ascertain:

- whether there is a general a requirement to stop and review safety before starting work or beginning to carry out a procedure;
- whether there are clear expectations for operations staff to be conservative in safety related matters by checking their understanding of a situation;
- whether operations and maintenance staff are able to explain how safety considerations are given first priority in their day to day activities.

2.4) Technical Support

Documentation to be reviewed:

- operating policies and principles for the station;
- nuclear safety policy;
- roles and responsibilities of the technical support units (incl. job descriptions of technical support staff);
- the general procedures describing the main safety-related activities carried out by the technical support units.

Observations:

- the inspectors should take part, as observers, in various meetings of the technical units, e.g. meetings for discussing the proposals for plant modifications, meetings for discussing

the status of the periodic safety review programme, meetings for the preparation of planned outages, etc.

Examples of questions:

- how does the staff of the technical units understand "priority to safety" in their activities?
- how do the heads of the technical support units reinforce the principles in the nuclear safety policy?

The inspectors should try to ascertain:

- whether the technical support staff are able to explain how safety considerations are given first priority in their day to day activities;
- whether the criteria for categorising work activities based on their safety importance are established, understood by technical support staff and implemented (e.g. in the control of plant modifications, etc.)

2.5) Operational experience feedback

Documentation to be reviewed:

- nuclear safety policy – principles dealing with the use of operational experience feedback (OEF);
- description of the OEF process
- descriptions of the roles, responsibilities and authorities of managers in the implementation of the OEF process;
- procedures and guidelines (incl. criteria) on event reporting;

Observations:

- the inspectors should take part, as observers, in meetings of OEF unit and observe how analysis of events and the elaboration of proposals for corrective actions;

Examples of questions:

- how is it ensured that event analysis is conducted on a timescale consistent with the safety significance of the event?
- How is it ensured that the safety significance of the event determines the type of corrective actions and the time limit for their implementation?
- How are corrective actions prioritised based on their importance to safety?

The inspectors should try to ascertain:

- whether the nuclear safety policy emphasises the importance of OEF; whether the nuclear safety policy is implemented in the activities of the OEF unit;
- whether the reporting procedures and the corresponding criteria enable the timely identification of potential safety issues;
- whether the operational experience information (both internal and external) is appropriately screened to select and prioritize those items requiring further investigation, based on their safety significance;
- whether there are clear criteria for the selection of events to be analysed, depending of their severity or frequency, to ensure root causes and corrective actions are identified; whether the level of the investigations is commensurate with the consequences of an event and the frequency of recurring events;

- whether priority to safety is reflected in the criteria for the prioritisation of corrective actions.

2.6) Radiation protection – to be completed

Documentation to be reviewed:

- ALARA policy documents;
- Nuclear safety policy – to see how radiological protection is addressed;
- the procedures governing the planning of activities at the plant involving risk of significant radiation exposures,

Observations:

- the inspectors should take part, as observers, in meetings of the ALARA committee, for example in the preparation for an outage;

Examples of questions:

- how does the decision-making process account for situations where there might be a conflict between requirements on radiological protection of workers and the nuclear safety requirements (e.g. implementation of modifications aimed at decreasing risk from the plant which would lead to the increase of collective exposure of the workers)?
- how is the principle of “priority to safety” understood and applied as regards the implementation of radiological protection requirements?
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The inspectors should try to ascertain:

- whether the performance indicators and significant radiological events are reported to plant management and the plant safety committee;

2.7) Emergency planning and preparedness

Documentation to be reviewed:

- on-site emergency response plan;
- emergency response procedures;
- general procedure for response to transients;

Observations:

- the inspectors should take part, as observers, in the periodic emergency response exercises and observe activities in the main control room, in the field and in the on-site emergency response centre;
- the inspectors should observe, during the practical exams for operators on the full-scope simulator, that the procedures for classifying and declaring an emergency are followed promptly (e.g. in the dynamic part of the simulator scenario, where the shift crew is expected to respond to a transient or accident)

Examples of questions:

- How do the emergency response procedures prioritise the actions to be taken in an emergency as to reflect their importance to safety?

- How does the classification of events for the purpose of emergency response and the criteria for declaring an emergency reflect the safety significance of the events?

The inspectors should try to ascertain:

- whether the criteria for classifying events for the purpose of emergency response are clear and include nuclear safety considerations;
- whether the operating staff understands the importance of timely declaring an emergency situations when conditions are met and if this is reflected in the emergency preparedness exercises and exercises on the full-scope simulator;

Characteristic A : Safety is a clearly recognized value

Attributes

A.2: Safety is a primary consideration in the allocation of resources

A.3: The strategic business importance of safety is reflected in the business plan

A.4: Individuals are convinced that safety and production go hand in hand

Areas for review: ALL

- **Management, Organisation & Administration**
- **Training and qualification**
- **Operation and Maintenance**
- **Technical support**
- **Operational experience feedback**
- **Radiation protection**
- **Emergency planning and preparedness**

1) General Expectations:

- Resource allocation should be in line with the stated priorities and goals, strategies, plans and objectives of the organization;
- Goals, strategies, plans and objectives relating to safety should be clearly identified and integrated into the business plan;
- Managers should be especially sensitive to decisions that may seem to place production or other factors above safety and should take care to explain such decisions to personnel;
- Managers and supervisors should regularly communicate the importance of ensuring safety while meeting requirements for production and performance.

2) Guidelines for review:

Documentation to be reviewed:

- Internal process for allocation of resources (including those for each department);
- Business plans and strategic objectives;
- Procedures documenting the operational decision making process.

Observations (all areas of review):

The inspectors should observe planning meetings, including those for the preparation and execution of planned outages.

Examples of questions to be asked (in all areas of review):

- How do resources allocated to safety relate to the allocations of other nuclear facilities?
- In what way are the resource requirements for the safety function reviewed periodically at corporate level? With what results?
- When staff members and contractors have a safety relevant need, what is the procedure, so that staff members and contractors receive the needed resources?
- In what way is time considered a resource to do a job safely?
- How do resources allocated to training relate to the allocations of other nuclear facilities?
- How much of the training budget is allocated to special tools, mock-ups and video equipment per year?

- Can staff members and contractors describe examples when the allocation of resources affected the backlog of maintenance tasks and nuclear facility modifications? What was the process to resolve the conflict?
- In what way are staff members and contractors being informed about the content of the business plan? What do staff members and contractors know about it?
- Can staff members and contractors site examples about the integration of safety performance goals, strategies, plans and objectives into the business plan?
- Can staff members and contractors describe cases where there was apparent conflict between safety and cost or between safety and operation? What was the behaviour of managers in such cases? What about the behaviour of respected and experienced colleagues who are not managers?
- When safety considerations introduce a delay in the start-up of the nuclear facility, in what way do managers use the occasion to illustrate that safety comes first?
- Can staff members and contractors site a positive example that the managers or other specialists are really committed to the view that a 'safety first' facility is also a well run facility? What about a negative example?
- What happens if somebody allows shortcuts to be taken in cases, where the unit is behind schedule?
- Are the schedules and content of work for annual shutdowns examined by an internal safety review process?
- When safety considerations introduce a delay in the startup of a plant, do managers use the occasion to illustrate that safety comes first?
- During periods of heavy work-load, do managers ensure that staff are reminded that unnecessary haste and shortcuts are inappropriate?

The inspectors should try to ascertain:

- Whether the managers and supervisors in the licensee's organisation are actively communicating to the workforce important decisions and their basis;
- Whether there is clear evidence of safety being given priority in the business plans and objectives;
- Whether resources needed for maintaining and improving safety are approved and provided as required, in a sufficient amount and in a timely manner (e.g. resources requested for implementation of maintenance programmes and for safety related modifications, resources requested for training programmes and materials, etc.);
- Whether the employees are convinced that production is not given priority over safety and can give examples of situations in which conservative decisions have been taken by the management in spite of production losses.

Warning flags:

- Resource mismatch: resource mismatch may reveal itself in the form of excessive project slippage, excessive overtime worked by employees, lack of suitably qualified and experienced persons, increased use of contractors in key organizational roles for long periods of time, and repeated requests to regulators for dispensations to regulatory requirements. No allowance is made in the planning process for unanticipated problems, with the consequent lack of margins for completing work. When considering resource mismatch, attention must be given to both the quantity and quality of resource, and whether the mismatch is short or long term. Resource mismatch is often present after a period of organizational downsizing;
- An increasing backlog of corrective actions — an increase in the number of corrective actions that have exceeded their target date for implementation and an increase in the length of the delay.

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- Adherence to schedules is viewed as more important than following procedures step by step; schedule adherence is valued more than taking the time to do the right thing;
- Lack of proper verification of readiness for operation — plant systems not properly verified before the startup of equipment, systems or plant after shutdowns for maintenance;
- Lack of corporate oversight — lack of awareness of safety issues at the corporate level, with safety issues being ignored in making business decisions.
- The organization seems overconfident and isn't striving for continuous improvement —the numbers look good and the plant is living off past successes;
- Executives seem only to recognize/reward actions that kept the plant on line or contributed to quick resumption of operations;
- Managers and workers don't make suggestions that cost money because of perceived budget constraints;
- Workers (including non-station personnel) are unsure if they will be rewarded or criticized for stopping an activity in the face of uncertainty.

Characteristic A : Safety is a clearly recognized value

Attribute A.5: A proactive and long term approach to safety issues is shown in decision making

Areas for review: ALL

- **Management, Organisation & Administration**
- **Training and qualification**
- **Operation and Maintenance**
- **Technical support**
- **Operational experience feedback**
- **Radiation protection**
- **Emergency planning and preparedness**

1) General Expectations:

- In strategic and long range planning, account should be taken of known and potential safety issues;
- The priorities of, and incentives for, senior management should not be concerned exclusively with short term goals, strategies, plans and objectives;
- Processes are established to identify and resolve latent organizational weaknesses that can aggravate relatively minor events if not corrected;
- There is a strong operational experience feedback process implemented (which covers all elements outlined in the attributes corresponding to Characteristic E – Safety is learning driven).

2) Guidelines for review:

Documentation to be reviewed:

- Procedures documenting the operational decision making process;
- Main programmatic documents for Training and Qualification, Ageing Management, Operational Experience Feedback;
- Strategic plans and objectives established at corporate level and at site level;
- Evidence of safety improvement initiatives implemented voluntarily by the licensee.

Examples of questions to be asked (in all areas of review):

- How do strategic and longer range planning processes take account of known and potential safety issues?
- How are schedules and content of work for annual shutdowns examined in the nuclear facility? How does the internal safety review process look like?
- What is the approach of managers at all levels when they have to cope with an unforeseen event requiring more staff at short notice?
- What happens if, for any reason, production requirements are permitted to interfere with scheduled training modules?
- What kind of a system for prioritizing maintenance work along safety requirements is established?
- What arrangements are there for staff members and contractors to catch up on missed training modules?
- What is the major focus of incentives and priorities for senior management? How are management incentive strategies discussed on the corporate level?
- Have there been any decisions focused on solving problems on the short term which have proven detrimental in the long run?

The inspectors should try to ascertain:

- Whether there is adequate implementation of programmes that support safe operation on the long term, such as training programmes, ageing management programmes, periodic safety reviews, provision of sufficient numbers of qualified staff (e.g. recruitment, selection and staff retention), etc.
- Whether periodic safety reviews are performed which include also an evaluation of the capability for safe operation on the long term (e.g. 10-years outlook);
- Whether the formalised decision-making process takes account of long-term consequences of the decisions taken.

Warning flags:

- Inadequate implementation of ageing management programmes;
- Lack of a long-term staffing plan;
- There is no formalised process for managing organisational change;
- Failure of corporate memory — a lack of historical data and lack of a knowledge management programme to manage staff turnover. Disproportionate number of experienced individuals leaving the organization, e.g. when reorganizing and/or downsizing;
- Lack of learning — unwillingness to share knowledge and experience with others, or to use the experience of others to improve safety at the installation. Organizations become complacent and focus on the successes of the past, and are reluctant to invest in acquiring new knowledge and skills for the future;
- Lack of self-assessment processes — the organization not recognizing deficiencies in attitudes to safety and behaviour and being unable to adopt a philosophy of continual improvement;
- Decisions are taken with a focus on fixing problems in the short term, without taking account of potential implications for the long term.

Characteristic A : Safety is a clearly recognized value

Characteristic B: Leadership for safety is clear

Characteristic D: Safety is integrated into all activities

Attributes

A.6: Safety conscious behaviour is socially accepted and supported (both formally and informally)

B.6: Management seeks the active involvement of individuals in improving safety

B.10: Relationships between managers and individuals are built on trust

D.1: Trust permeates the organization

D.6: Factors affecting work motivation and job satisfaction are considered

Areas for review: ALL

- **Management, Organisation & Administration**
- **Training and qualification**
- **Operation and Maintenance**
- **Technical support**
- **Operational experience feedback**
- **Radiation protection**
- **Emergency planning and preparedness**

1) General Expectations:

- People are treated with dignity and respect; they are expected and encouraged to offer innovative ideas to help solve problems;
- Personnel can raise nuclear safety concerns without fear of retribution and have confidence their concerns will be addressed; they are kept informed of steps taken in response to their concerns;
- Managers should encourage the raising of concerns by personnel and should take action or else explain why no action was taken;
- Managers should actively seek dissenting views and diverse perspectives and should encourage open and frank discussion to support independent thinking; differing opinions should be welcomed and respected; when needed, fair and objective methods are used to resolve conflict and unsettled differing professional opinions.
- Supervisors are skilled in responding to employee questions in an open, honest manner. They are recognized as an important part of the management team, crucial to translating safety culture into practical terms;
- The performance appraisal process should recognize and reward safety conscious behaviour;
- Peers should encourage each other to engage in safety conscious behaviour;
- Managers should carry out what they undertake to do in their communications;
- Personnel should adhere to the management system;
- Managers should be able to be trusted by personnel to act professionally when personnel raise safety concerns or report near miss events;
- Managers should ensure that safety consciousness prevails in the working environment throughout the organization;
- Managers should ensure that communication is not stifled in the organization and should take prompt action to counter any such effect;

- Individuals and their professional capabilities, values and experience should be considered the organization's most valuable strategic asset for safety.
- The reward system should be aligned with safety policies and should reinforce the desired behaviour and outcomes;
- Recognition should be given to individuals and teams for exemplary performance;
- Individuals should take pride in their work and should feel that their tasks and performance are important contributors to the success of the organization;
- Managers should be trained and should have appropriate knowledge of the factors influencing human performance;
- Managers, supervisors, and staff clearly understand and respect each other's roles in decision-making; candid dialogue and debate are encouraged when safety issues are being evaluated. Robust discussion and healthy conflict are recognized as a natural result of diversity of expertise and experience.

2) Guidelines for review:

Documentation to be reviewed:

Examples: Safety policy, code of ethics, training materials pertaining to the human performance improvement programme, evidence of the implementation of a management of organisational change process, reports of non-conformances/low level events/near-misses raised by plant staff (check also the proportion of self-reported issues), etc.

Observations:

The inspectors should observe planning meetings, meetings of the plant safety oversight committee, interviews during the internal selection and promotion process, training sessions in the framework of the human performance improvement programme, etc.

Examples of questions to be asked (in all areas of review):

- In what way do managers ensure that a safety conscious working environment prevails throughout the nuclear facility?
- What kinds of systems exist to appraise managers of safety accomplishments or shortcomings? How effective are such systems?
- In what way are staff members and contractors aware of the system of rewards and sanctions relating to safety matters?
- Can staff members and contractors give examples where individuals who transmit safety related concerns or potential improvements are rewarded and given public recognition? What about fear of retribution, if errors are reported or safety concerns are raised?
- In what way do annual performance appraisals include a specific section on hazard awareness and safety conscious attitude?
- Can cases be identified in which safety conscious attitude was a significant factor in approving or rejecting a promotion to management level?
- In what way do managers or older, experienced employees give informal recognition to staff members and contractors who take actions beneficial to safety?
- What is the unofficial, informal response of management to safety infringements and violations of safety related technical specifications?
- In what way are good practices praised and poor ones challenged, especially in informal settings?
- How do first line supervisors deal with unsafe acts and/or conditions when they see them or when they are pointed out to them? Do supervisors say 'well done' when subordinates are doing something in a safe way?

- In what way do staff members and contractors point out to others in the nuclear facility when they see them doing something unsafe, even if it is not part of their job?
- In what way do training programmes at the nuclear facility address social acceptance of safety conscious behaviour? Can staff members and contractors find examples when people are joking about it? What can be the eventual reasons for the lack of acceptance?
- Can staff members and contractors describe whether managers are trusted by their subordinates to act professionally?
- How is the trust between managers and subordinates felt or experienced in the nuclear facility?
- Can staff members and contractors describe any management interventions that have built trust in the nuclear facility?
- Can staff members and contractors list "moments of truth" that have occurred in the past few months, and show that management responded by principle and not by expediency?
- How would a safety concern or improvement be brought to the attention of the management?
- What mechanisms are in place for highlighting safety suggestions? Can staff members and contractors cite examples when their individual opinion mattered, when their input has led to positive change?
- Who do staff members and contractors look to for technical guidance on safety issues? Why?
- Can staff members and contractors cite examples when senior managers actively seek dissenting views and diverse perspectives and encourage robust discussion of pending issues? When there is apparent conflict between safety and cost or between safety and operation, in what way do managers discuss the situation with staff members and contractors?
- How do managers involve their staff in discussions about what the real safety priorities are? How do managers discuss with their staff the results and the means by which deficiencies may be corrected?
- What is the attitude of managers to safety reviews and audits affecting their activities?
- In what way are operating staff involved in board meetings when these discuss the safety performance and look for principally new solutions? In what way do managers lead brainstorming sessions, for example in the investigation of safety problems, to assist effectively in seeking the causes and implementing improvements?
- How does the senior management show that professional capabilities, values and experience of staff are the facility's most valuable strategic asset for safety?
- How is the reward system aligned with safety policies? In what way does the reward system reinforce the desired behaviour and outcomes?
- How is recognition for exemplary performance given to individuals or teams?
- In what way are managers trained in order to have the appropriate knowledge of factors influencing human performance?
- Can staff members and contractors identify cases in which safety conscious attitude was a significant factor in approving or rejecting a promotion to management level?
- What is the staff turnover within the facility? What are the major motivating factors for staff members? What about contractors? What kind of differences in work motivation between staff members and contractors are perceived in the nuclear facility?

The inspectors should try to ascertain:

- Whether there is a high rate of reporting of low level events and near-misses and whether employees are convinced that they will not be punished for errors they have made and reported;
- Whether employees have confidence that issues with nuclear safety implications which they have reported are prioritized, tracked, and resolved in a timely manner;
- Whether differing opinions are welcomed and respected and taken into account in the decision making process;
- Whether the management rewards individuals who show leadership for safety by proposing safety improvement and / or by highlighting potential safety problems;
- Whether, where practicable, managers involve personnel in decision making and activities that affect them, for example, by involving individuals in writing their own procedures and instructions;
- Whether individuals feel that their opinion matters and are able to cite instances of their input leading to positive change;
- Whether the criteria for selection and promotion of supervisors and managers take account of their leadership for safety skills and attitudes;
- Whether the factors affecting work motivation and job satisfaction are considered in the implementation of a process for the management of organisational changes;
- Whether the self-assessment performed by managers include a measure of the safety conscious environment in the organisation;
- Whether periodic surveys are conducted to evaluate work motivation and job satisfaction and whether the management acts upon the results of such reviews.

Warning flags:

- Safety concerns of personnel not dealt with promptly — safety concerns are ignored or have to be raised repeatedly before action is taken, e.g. lack of a process to allow or encourage individuals to raise safety concerns that results in actions being taken;
- Individuals who question current practices or provide alternative points of view are not considered team players;
- The initial management reaction to a plant event is to “find the guilty”;
- “Good catches” (situations where a problem was discovered and addressed promptly, before it could lead to an event) are not celebrated and publicized;
- Workers exhibit symptoms of “malicious compliance” (they might follow orders and procedures in spite of having doubts about their correctness and impact on safety, they might not show a questioning attitude because of fear of retribution for not following orders; they might act upon an order which they consider wrong simply because the supervisors would be held accountable ultimately, etc.);
- Workers are reluctant to speak candidly from fear of retribution or criticism;
- Unresolved conflicts among groups or individuals are prevalent;
- Minority opinions are not encouraged or are stifled;
- Managers and supervisors are not in the plant personally looking at equipment problems; they do not maintain a continuous communication with the workers or are not available for advice when this is requested by workers);
- The “burden of proof” for resolving important safety questions is inverted (i.e., when a safety question is identified, rather than requiring the organization to prove safety margins remain adequate, management forces individuals to prove the problem creates undue risk);

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- Changes in employee concern program metrics go unnoticed or are not investigated for possible degradations in the culture;
- Workers have a perception that managers only want to hear positive reports;
- Executives seem only to recognize/reward actions that kept the plant on line or contributed to quick resumption of operations;
- Workers (including non-station personnel) are unsure if they will be rewarded or criticized for stopping an activity in the face of uncertainty;
- Low status of individuals or units conducting assessments — lack of respect for findings of assessments, findings being ignored or not addressed in a timely manner;
- Disproportionate focus on technical issues — insufficient attention to issues of human performance, problems being perceived as technical challenges to be solved by engineering means only, without considering that the solution may involve aspects of human performance.

Characteristic B: Leadership for safety is clear

Attributes

B.1: Senior management is clearly committed to safety

B.2: Commitment to safety is evident at all management levels

B.3: There is visible leadership showing the involvement of management in safety related activities

Areas for review: ALL

- **Management, Organisation & Administration**
- **Training and qualification**
- **Operation and Maintenance**
- **Technical support**
- **Operational experience feedback**
- **Radiation protection**
- **Emergency planning and preparedness**

1) General Expectations:

- Executive and senior managers are the leading advocates of nuclear safety and demonstrate their commitment both in word and action;
- Leaders throughout the nuclear organization set an example for safety;
- Senior managers should treat supervisors as a crucial part of the management team as they translate safety culture into practice and should give them their full support;
- Senior corporate managers should periodically visit operating installations to assess at first hand the effectiveness of management;
- Managers should establish clear expectations of performance in areas that affect safety and these should be documented where appropriate;
- Managers should adhere strictly to policies and procedures in their own conduct and should not expect or accept special treatment;
- Managers should not tolerate or ignore substandard performance in relation to safety for any reason;
- Managers should exhibit a sense of urgency in remedying significant weaknesses or vulnerabilities;
- Managers should be able to recognize conditions of degraded safety (physical or organizational);
- Managers should individually note performance and inspect conditions in the field by walking around the installation and observing and listening to individuals, and should intervene vigorously to remedy safety issues ('walk, look, listen and fix');
- Managers should ensure that situations adverse to safety are remedied;
- Supervisors should spend time observing and coaching individuals at their workplaces and should encourage and reinforce expected behaviour;
- Supervisors should discuss safety issues frequently with their teams or work groups.

2) Guidelines for review:

Documentation to be reviewed:

Examples: Safety policy, code of ethics, training materials pertaining to the human performance improvement programme, documents pertaining to the "Managers in the Field" programme, evidence of self-assessment performed by managers and of corrective actions / proposals for improvement resulting from self-assessment, etc.

Observations:

The inspectors should observe planning meetings, meetings of the plant safety oversight committee, interviews during the internal selection and promotion process, training sessions in the framework of the human performance improvement programme, important tests (to see how managers witness these) and milestones during planned outages (and also during construction and commissioning when the plant is in these phases), etc.

Examples of questions to be asked (in all areas of review):

- In what way are safety issues included in periodic meetings of the facility manager with his senior staff?
- In what way is safety mentioned in official communication from senior corporate and facility management?
- How would staff members and contractors describe the major worries of senior managers in their day to day work?
- How often do senior corporate managers visit operating facilities to assess management effectiveness first hand? How are these visits conducted?
- In what way do senior managers encourage middle-level managers and supervisors to look at other nuclear organizations and other parts of the own nuclear facility to see what they can learn from them?
- How do senior managers explain their commitment to safety to their staff?
- Can staff members and contractors describe how senior managers disseminate relevant information (such as objectives, expectations, expenditures, accomplishments and shortcomings) to middle-level managers and supervisors?
- In what way did senior managers support their middle-level managers and supervisors the last time that they stopped operations for safety reasons?
- What are the safety expectations of the facility manager, and how are these translated into the daily job of staff members and contractors? What is the role of middle management in communicating these expectations?
- In what way do middle-level managers and supervisors communicate their expectations on safety to their subordinates? How are these understood by the subordinates?
- How do middle-level managers and supervisors decide what kind of safety courses staff members and contractors should attend?
- In what situations would middle-level managers and supervisors consider deviations or shortcuts to be acceptable?
- In what way do senior managers show that they are committed to correct significant weaknesses or vulnerabilities?
- What action do middle-level managers and supervisors take after they learn of deviations and non-compliance situations?
- How do middle-level managers and supervisors react to negative remarks about safety-conscious behaviour, when middle-level managers and supervisors hear them or when they are pointed out to them?
- In what way do subordinates inform middle-level managers and supervisors about poor procedures and what do middle-level managers and supervisors do about it?
- How do managers inspect performance and conditions at the work-place? In what way do managers give attention to the physical working environment of their staff?
- What is the working style of the senior supervisors on shift? How do they seek information? Do they visit routinely the areas where safety related work is being done? Are they interested in the problems or solely the schedules?
- Do middle managers often make first hand inspections of the conduct of safety related work for which they are responsible?

- Does the plant manager from time to time inspect the conduct of safety related work?
- How do supervisors discuss safety issues with their teams/work groups for which they are responsible?
- Can staff members and contractors describe situations, when seeing a manager at the work-place is considered an integral part of his/her work? What about situations where seeing a manager at the work-place is considered an indication of trouble?
- In what way do managers participate in staff training courses at which safety policies and procedures are explained? How do they present the training material?
- Can staff members and contractors describe situations where managers spend time observing and coaching individuals at their work locations or provide constructive feedback to reinforce expected behaviour?
- Can staff members and contractors describe situations where managers encourage talented colleagues to spend time as instructors?
- How do senior managers identify safety issues and contribute to fixing them?
- Can staff members and contractors judge whether middle-level managers and supervisors have the necessary experience and knowledge of safety, in order to take action on the issues before them?

The inspectors should try to ascertain whether:

- Managers and supervisors act as role models and promote the principles in the nuclear safety policy; employees are convinced that managers' actions and decisions are fully in line with the principles in the nuclear safety policy;
- Managers and supervisors practice visible leadership in the field by placing "eyes on the problem" (observing work activities), coaching, mentoring, and reinforcing standards. Deviations from station expectations are corrected promptly.
- Managers and supervisors provide appropriate oversight during safety-significant tests or evolutions (including in construction and commissioning where applicable);
- Managers and supervisors are personally involved in training activities to consistently reinforces expected worker behaviours;
- Management considers the employee perspective in understanding and analyzing issues;
- Employees respect managers and supervisors for their professionalism and commitment to safety;
- Managers conduct periodic self-assessments and act upon the results of the self-assessment to correct problems and improve safety;
- Selection and evaluation of managers and supervisors consider their abilities to contribute to a strong nuclear safety culture.

Warning flags:

- Safety concerns raised by workers are dismissed by the managers without explanation;
- Management decisions seem to be made without a thorough understanding of the facts or without staff input;
- Managers and supervisors are rarely seen in the plant personally looking at equipment problems;
- Operations shift managers aren't viewed as key members of the station management team;
- When evaluating problems, managers appear interested only in satisfying "requirements";
- Managers overly focus on the near-term, with crisis management being the rule;
- Managers send mixed messages about priorities given to safety and production;

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- Site managers aren't adept at withstanding overemphasis from corporate management on reducing costs, cutting resources, and shortening schedules.
- Personnel are not informed of the basis for important decisions that impact them;
- Managers are changed too frequently;
- Managers (including senior managers) are not actively involved in the performance of the self-assessment process.

Characteristic B: Leadership for safety is clear

Attribute B.4: Leadership skills are systematically developed

Areas for review: ALL

- **Management, Organisation & Administration**
- **Training and qualification**
- **Operation and Maintenance**
- **Technical support**
- **Operational experience feedback**
- **Radiation protection**
- **Emergency planning and preparedness**

1) General Expectations:

- Managers and supervisors should be selected and evaluated with due consideration of their demonstrated ability to foster a strong safety culture.
- Skills in change management should be taught to individuals in leadership roles.
- A succession plan that includes aspects of safety culture should be put in place for developing future managers.

2) Guidelines for review:

Documentation to be reviewed:

Examples: Safety policy, code of ethics, training materials pertaining to the human performance improvement programme, documents pertaining to the "Managers in the Field" programme, evidence of self-assessment performed by managers and of corrective actions / proposals for improvement resulting from self-assessment, training records relevant to specific training provided to managers and supervisors, job descriptions and competence requirements for managerial positions, etc.

Observations:

The inspectors should observe planning meetings, meetings of the plant safety oversight committee, interviews during the internal selection and promotion process, training sessions in the framework of the human performance improvement programme, important tests (to see how managers witness these) and milestones during planned outages (and also during construction and commissioning when the plant is in these phases), etc.

Examples of questions to be asked (in all areas of review):

- In what way do managers recognize that safety conscious attitude is important in the selection and promotion of staff? How is this recognition fostered?
- Can cases be identified in which safety conscious attitude was a significant factor in approving or rejecting a promotion to management level?
- Can senior managers describe how succession plans relate to safety?
- In what way is safety leadership reflected in succession plans?
- In what way are leadership skills and techniques included in training programmes for managers and supervisors?
- In what way are change management skills taught to individuals in leadership roles?
- Is there evidence of managers having taken initiatives to improve safety performance in the area(s) for which they are responsible?

The inspectors should try to ascertain whether:

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- The competences specific for managerial and supervisory positions have been identified (eg. in the job descriptions);
- The competences identified for managerial and supervisory positions include leadership skills;
- The ability to foster safety culture and to act as a role model has been taken into account in the selection of potential candidates for managerial and supervisory positions;
- Managers and supervisors are familiar with the requirements and good practices regarding the management of organisational change, the operational experience feedback process, the self-assessment process, etc.
- A succession plan is in place and the selection and promotion criteria include specific provisions related to attitudes and behaviours that promote safety culture.

Warning flags:

- The competence criteria for managerial and supervisory positions are not documented;
- There is no specific leadership training provided for managers and supervisors.
- There is evidence of individuals being promoted to positions for which they do not have the necessary training and qualifications;
- There is no evidence of succession planning;
- Managers are changed too frequently.

Characteristic B: Leadership for safety is clear

Attribute B.5: Management ensures that there are sufficient competent individuals

Note: This attribute should be analysed in conjunction with attributes D.5 and E.7 (D.5: Individuals have the necessary knowledge and understanding of the work processes; E.7: There is systematic development of individual competences)

Areas for review: ALL

- **Management, Organisation & Administration**
- **Training and qualification**
- **Operation and Maintenance**
- **Technical support**
- **Operational experience feedback**
- **Radiation protection**
- **Emergency planning and preparedness**

1) General Expectations:

- Personnel should only perform work for which they are trained and qualified.
- There is a systematic approach to training and qualification.
- Attendance at training by personnel is given a high priority.
- Staffing levels are consistent with the demands of ensuring safety and reliability.

2) Guidelines for review:

Documentation to be reviewed:

Examples: job and task analyses; staffing plans (including for the long term); staff recruitment, selection, promotion and retention strategies; training policy and procedures;

Examples of questions to be asked (in all areas of review):

- In what do managers ensure that staff members and contractors only perform work for which they are trained and qualified?
- In what way do managers identify weaknesses in their staff in order to specify training requirements or to provide other support?
- What is done by the senior management to prevent staff downsizing even if there are financial restraints on the corporate level?
- What resources are allocated to training? How does this compare with the allocations of other nuclear facilities?
- Who is responsible for following-up the training of staff?
- How frequently are production requirements permitted to interfere with scheduled training?
- How are training needs assessed and training content established?
- What specific training have staff members and contractors received in the areas of process safety, radiological protection, and industrial safety practices?
- What is the minimum training schedule in order to maintain the qualification of staff members and contractors?
- What kind of preparations do staff members and contractors have to make before attending training?

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- How are issues that may have come up on shift recorded so that staff members and contractors discuss them in training settings, including simulator training?

The inspectors should try to ascertain whether:

- A job and task analysis has been performed and documented;
- There is evidence of management assessing periodically the provision of sufficient numbers of competent staff for all safety related job positions;
- A long term staffing strategy / plan for safety related job positions has been established;
- There is a good adherence to the training activities scheduled for the staff.

Warning flags:

- The basis for the current staffing plan are not documented;
- There is no evidence of job and task analyses;
- There is no evidence of a long-term staffing strategy;
- Training activities are frequently re-scheduled due to other activities being given priority.

Characteristic B: Leadership for safety is clear

Attribute B.6: Management seeks the active involvement of individuals in improving safety

Note: Attribute B.6 has been previously addressed together with attributes A.6, B.10, D.1, and D.6.

Characteristic B: Leadership for safety is clear

Attribute B.7: Safety implications are considered in change management processes

Areas for review: ALL

- **Management, Organisation & Administration**
- **Training and qualification**
- **Operation and Maintenance**
- **Technical support**
- **Operational experience feedback**
- **Radiation protection**
- **Emergency planning and preparedness**

1) General Expectations:

- Processes for change management and control should be put in place so that account is taken of the possible effects on safety of changes to procedures and equipment and other managed changes.
- Personnel should be informed of impending changes in ways that uphold trust within the organisation.

2) Guidelines for review:

Documentation to be reviewed:

Examples: procedure(s) describing the process for management of organisational change.

Note: Organisational changes can take many forms and have various degrees of complexity. These are just a few examples:

- Changes to the mission, vision, business model, policies of the organisation;
- Changes to the organisational structure and resources (acquisitions & mergers, re-engineering, downsizing, expansion, outsourcing, privatisation, etc.);
- Changes to the organisation's processes and working practices (changes to the maintenance strategy, changes to shift patterns, changes to the training programmes, changes to the information management systems, etc.);
- Changes to the supply chain, etc.

Examples of questions to be asked (in all areas of review):

- Is the licensee's organisational structure based on clearly defined principles? Has the licensee set out key organisational design principles (e.g. range of hierarchical layers, spans of control)? Ask for examples of how the principles have been applied to organisational changes.

- What kind of change management process is established when changes to procedures, equipment, or organization are considered?
- How do senior/facility managers determine changes to the organisational structure? How does senior management relate necessary change with safety issues?
- In what way are impending changes communicated to individuals so that high level of mutual trust is maintained throughout the nuclear facility?
- What kind of communication process is established to counter rumours and other undesirable influences on staff members and contractors?
- Are senior/facility managers aware of the potentially detrimental effects of continual change?
- After changes have been undertaken, are post-implementation reviews undertaken? Are the scope and format of such reviews adequate to identify detrimental effects on safety?

The inspectors should try to ascertain whether:

- There is a formal process for identifying organisational changes and for analysing their impact on the safety performance of the organisation;
- The process for management of organisational change is defined, documented and implemented;
- Organisational changes are categorised with regard to their impact on safety;
- The implications of the change (benefits as well as risks) are assessed prior to the implementation (the implications include both those for the short-term and for the longer term);
- The implementation of the change is planned and all those involved are informed of their (new) roles and responsibilities (the planning should address all related changes to documentation, training, etc.);
- There is a process for monitoring the implementation of the change to see whether its objectives are being achieved.
- There is evidence of organisational changes implemented in accordance with the requirements specified in the applicable procedures (i.e. all steps have been followed, the analysis has been performed, the staff has been informed, the implementation has been monitored to ensure that its objectives have been achieved and safety has not been compromised);
- Senior managers maintain an overview (big picture) of the all organisational changes to monitor the collective impact and unexpected interactions between changes.

Warning flags:

- There is no formal process for the management of organisational change (or there is one but it is not followed);
- Organisational changes are performed without adequate assessments and preparation; organisational changes are announced by managers without having an already prepared strategy to manage the change;
- Numerous and successive changes are being made, without an assessment of their collective impact on safety (this may lead to "Organisational Drift" - a gradual and undetected decline in safety standards arising from a period of continual change).

Characteristic B: Leadership for safety is clear

Attributes

B.8: Management shows a continual effort to strive for openness and good communication throughout the organization

B.9: Management has the ability to resolve conflicts as necessary

Areas for review: ALL

- **Management, Organisation & Administration**
- **Training and qualification**
- **Operation and Maintenance**
- **Technical support**
- **Operational experience feedback**
- **Radiation protection**
- **Emergency planning and preparedness**

1) General Expectations:

- Supervisors respond to individuals' questions openly and honestly and should maintain good relations with personnel;
- Managers ensure that open communication is valued and preserved;
- Managers visit personnel at their workplaces and, where possible, should hold open meetings to explain issues and decisions in context;
- Managers and others who may influence the behaviour of personnel encourage a questioning attitude;
- Management has the capability to resolve conflicts as necessary;
- When necessary, fair and impartial methods are used to resolve conflicts and to settle disputes.

2) Guidelines for review:

Documentation to be reviewed:

Examples: Safety policy and management system manual (to check any provisions related to communication, to see whether openness in communication is emphasized as a value, etc.); any available procedures describing the process for dealing with differing professional opinions; messages from the CEO and senior management to staff in the company newsletter, web-site and other communications.

Observations:

The inspectors should observe planning meetings, meetings of the plant safety oversight committee, important tests (to see how managers witness these) and milestones during planned outages (and also during construction and commissioning when the plant is in these phases), etc.

Examples of questions to be asked (in all areas of review):

- How skilled are managers in responding to questions in an open and honest manner?
- Do management consult with staff on key issues and use the input obtained? What form does this take (e.g. working groups, surveys)? What is the perception of staff on the level of consultation?

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- How well are managers prepared to facilitate open forum meetings to explain the context for issues and decisions on safety-sensitive matters, and to address potential blockages of communication?
- How well do managers encourage staff members and contractors to deliver ideas for improvement? How do managers act on the improvement proposals?
- How do managers communicate with staff members and contractors when they have doubts about safety?
- How do managers explain to staff members and contractors the current safety priorities?
- How do managers involve staff members and contractors in discussions about safety?
- What strategies may be applied by a senior manager, if middle-level managers in his/her responsibility area are in interpersonal conflict and don't communicate satisfactorily?
- In what way is conflict management part of leadership training curricula at the nuclear facility?
- In what way do free-time activities help to resolve interpersonal conflicts?
- How often senior managers (including representatives from the corporate company) visit work areas, what they do when they are there and what follow up actions they take as a result? (ask also for examples where directors/senior managers have encouraged or praised staff to put nuclear safety first)
- How do managers handle conflicts between safety and other goals? Are the conflicts highlighted (e.g. in reports, briefs to senior management, etc.)?
- How do Board members and senior managers engage with staff? Are staff genuinely consulted and involved (not just informed)?

The inspectors should try to ascertain whether:

- There is evidence of managers involving / consulting staff in the decision making;
- There is evidence of any decisions that have been changed as a result of consultation with staff (e.g. on significant safety issues or organisational changes);
- Conflicts are identified and managed explicitly (it should be clear that there is a conflict and how it is being resolved; the management system should allow for the identification of conflicting requirements; as for interpersonal conflicts, there should be a process to manage differing professional opinions);
- Managers seek out alternative views on key decisions, without dismissing contrary viewpoints (look for examples where alternative views have been sought out and acted upon).

Warning flags:

- Staff are not consulted when important decisions are taken which may affect them; management decisions seem to be made without a thorough understanding of the facts or without staff input.
- There is a tendency for managers to avoid, downplay or discount 'contrary' views; there is no established process for managing differing professional opinions; Individuals who question current practices or provide alternative points of view are not considered team players;
- Workers are reluctant to speak candidly from fear of retribution or criticism; minority opinions are not encouraged or are stifled; workers have a perception that managers only want to hear positive reports;
- There are "clay layers" in the organization where downward and/or upward communication stops.

Characteristic B: Leadership for safety is clear

Attribute B.10: Management seeks the active involvement of individuals in improving safety

Note: Attribute B.10 has been previously addressed together with attributes A.6, B.6, D.1, and D.6.

Characteristic C : Accountability for safety is clear

Attribute C.1: An appropriate relationship with the regulatory body exists that the accountability for safety remains with the licensee

Areas for review: ALL

- **Management, Organisation & Administration**
- **Training and qualification**
- **Operation and Maintenance**
- **Technical support**
- **Operational experience feedback**
- **Radiation protection**
- **Emergency planning and preparedness**

1) General Expectations:

- The licensee has a well established set of internal regulations and standards for ensuring compliance with regulatory requirements;
- Interfaces are well defined for all levels of interaction between the licensee and the regulatory body;
- The regulatory body is consulted, in a proactive manner, to obtain any necessary clarification of, and guidance on, regulatory matters;
- The licensee actively seeks guidance regarding the regulatory expectations, promotes communication with regulators in an open manner and informs the regulator on voluntary initiatives for improving safety and reliability.
- The licensee has implemented an effective self-assessment process;
- The licensee implements safety improvement programmes voluntarily, going beyond simple compliance with regulatory requirements;
- The licensee should be open and timely in its reporting and interactions.
- Complete and accurate information is provided to the regulatory body.

2) Guidelines for review:

Documentation to be reviewed:

- Policy statements (e.g. nuclear safety policy) – for the statement on licensee's responsibility for safety;
- Management System manuals and procedures - in particular the procedure(s) dealing with the interface(s) between the licensee and the regulatory authorities;

- Internal process of the licensee for ensuring verifying compliance with the regulatory requirements, including management of conflicting requirements (e.g. self-assessment reports);
- Evidence of measures taken by the licensee to improve safety (e.g. Human Performance Improvement Programmes, peer-reviews, etc.);
- Reports from past inspections and the corrective actions implemented to address regulatory dispositions in any particular area.

Observations (all areas of review):

The inspectors should observe:

- the licensee's staff openness to participation of regulatory representatives in plant meetings;
- the licensee's staff attitudes towards resident inspectors;
- the licensee's staff attitudes towards senior regulators.

Examples of questions to be asked (in all areas of review):

- How do the managers in the licensee's organisation understand the responsibility and accountability for safety that are placed on the licensee?
- How has the licensee developed its own management system and its own nuclear safety requirements? Are people generally confident that all requirements are well understood and implemented?
- Do all the managers in the licensee's organisation know the conditions set in the relevant licences?
- How are the role and authority of the regulatory body understood by managers, staff, and contractors in the nuclear facility?
- In what way is the regulatory body consulted to obtain clarification and regulatory guidance?
- In what way do staff members and contractors view the regulatory presence on site (more as a help or hindrance)?
- How much appreciation is there in the nuclear facility of the professional competence of the resident representatives of the regulatory body at the nuclear facility?
- How is the perception among staff members and contractors about political and other restraints in the work of the regulatory body? Is it considered really independent?
- Are there any regulatory requirements which are not fully clear to the licensee?
- Have there been any instances on non-compliance with regulatory requirements that were due to misinterpretation of the requirements?

The inspectors should try to ascertain:

- Whether the licensee's prime responsibility for safety is clearly stated in policy documents and communicated to all site personnel;
- Whether the Management System Manual and procedures cover / address all processes and activities relevant to safety;
- Whether the management system implemented by the licensee is well defined, identifies all applicable regulatory requirements in an integrated manner (nuclear as well as from other authorities), supports compliance with them and allows for identification of potentially conflicting requirements;
- Whether the licensee has implemented voluntary safety improvement processes and good practices of other organisations are analysed for applicability in order to identify opportunities for improvement;
- Whether the interfaces with regulatory authorities are defined at all levels of interaction and whether there are any (formal or informal) guidelines on how to interact with the regulatory representatives during meetings, inspections, etc.;

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- Whether there are instances of non-compliance with regulatory requirements set in regulations and / or in the licences which are due to a lack of understanding by the licensee of what was required (for such instances the expectations are on the licensee to ask for guidance rather than disregard requirements).

Warning flags:

- The licensee's management system does not take account of all applicable requirements and /or does not address them in an integrated manner;
- The licensee has a policy of minimum compliance with regulatory requirements and does not identify / does not implement opportunities for improvement;
- The licensee does not perform a systematic self-assessment process;
- The licensee is not proactive in providing timely information to the regulatory body in relation to safety relevant events.

Characteristic C : Accountability for safety is clear

Attribute C.2: Roles and responsibilities are clearly defined and understood

Areas for review: ALL

- **Management, Organisation & Administration**
- **Training and qualification**
- **Operation and Maintenance**
- **Technical support**
- **Operational experience feedback**
- **Radiation protection**
- **Emergency planning and preparedness**

1) General Expectations:

- The licensee's organization has defined and documented the functions and responsibilities for all aspects of safety that are under its control;
- Individuals understand their functions and responsibilities for safety and how their work may affect safety;
- Individuals know where to obtain help with safety related issues and should seek clarification if necessary;
- When contractors are used, their functions and their responsibilities for safety are specified in contractual documents and known to those involved in the performance and supervision of contracted work.

2) Guidelines for review:

Documentation to be reviewed:

- Policy statements (e.g. nuclear safety policy);
- Management System Manual
- Organisational structure and the description of the job positions together with the roles and responsibilities;
- Various procedures defining/describing processes (e.g. maintenance, configuration management, shift operation, etc.) - to verify the definition of specific responsibilities;
- Emergency response procedures – to verify the definition of specific roles and responsibilities in the implementation of emergency response measures;
- Documentation of the training programmes for various job positions (job related training requirements for ensuring the competence needed for the respective role and responsibilities); information on the process that supports the assignment of roles and responsibilities and the necessary training (e.g. when an individual changes job); training records and records of work assignments;

Observations (all areas of review):

The inspectors should observe:

- How does the licensee ensure the supervision of activities performed in the field (including of activities performed by contractors);
- How are the responsibilities exercised in the decision-making process (this can be observed in the daily planning meetings, in the outage planning meetings, in the meetings of the plant safety oversight committee, etc.)?
- How are responsibilities for emergency response exercised in the control room, simulator and emergency control centre during the periodic emergency drills?

Examples of questions to be asked (in all areas of review):

- How do the managers in the licensee's organisation understand the responsibility and accountability for safety that are placed on the licensee?
- Who is responsible for safety within the nuclear facility?
- How are safety responsibilities assigned?
- How visible is the overall responsibility of the nuclear facility manager for safety?
- What are the documents which identify safety responsibilities?
- What is the procedure to review documents which identify safety responsibilities?
- To what extent are staff members and contractors able to clearly enunciate their own responsibilities? Can they cite the documents that define those safety responsibilities?
- When contractors are involved in the work, how are their roles and responsibilities for safety defined in contractual documents?
- To what extent are staff members and contractors qualified to understand their responsibilities, especially concerning safety? Do they understand the specific hazards in their work area?
- How well do staff members and contractors, especially at the shop floor level, understand what could go wrong and what could happen if the job requirements are not carried out properly?
- Who do staff members and contractors look for technical guidance on safety issues?
- What is the procedure for handling safety and other employee concerns at the nuclear facility?

The inspectors should try to ascertain:

- Whether there is a formal definition of roles, responsibilities and levels of authority for the licensee's managers, supervisors and other staff (incl. for normal operation and emergency response) in the management system documentation;
- Whether the responsibilities for reporting to line managers are clear (e.g. a person does not have to report to or receive tasks more than 1 line manager – "one man management");
- Whether the job descriptions are up to date and reflect the current organisational structure;
- Whether the job related training requirements are defined, up to date and implemented;
- Whether the process for management of organisational change is defined, documented and implemented;
- Whether the staff interviewed knows their responsibilities and are able to explain them.

Warning flags:

- Inconsistencies between the responsibilities and authorities assigned through different documents; lack of clear accountabilities;
- Individuals are assigned responsibilities for activities or projects without being given also the necessary authority (and resources);
- The job-related training and qualification requirements for various positions do not match the responsibilities associated with those positions;
- Individuals are not aware of the responsibilities formally assigned to them and / or do not have the necessary training and qualification required for effectively discharging those responsibilities.

Characteristic C : Accountability for safety is clear

Attribute C.3: There is a high level of compliance with regulations and procedures

Areas for review: ALL

- **Management, Organisation & Administration**
- **Training and qualification**
- **Operation and Maintenance**
- **Technical support**
- **Operational experience feedback**
- **Radiation protection**
- **Emergency planning and preparedness**

1) General Expectations:

- The expectations of the management for the use of procedures (i.e. when procedures are to be in the hands of the user and are to be used) and adherence to procedures (i.e. the degree of compliance expected) are clear and made well known to personnel.
- Managers and supervisors inspect workplaces frequently to ensure that procedures are being used and being followed in accordance with expectations;
- There is good adherence to procedures in the licensee's organisation and the instances of non-compliance are isolated cases;
- Licensee's personnel is encouraged to review procedures and instructions in use and to suggest improvements where appropriate;
- The licensee's record of compliance with regulatory requirements is good.

2) Guidelines for review:

Documentation to be reviewed:

- Internal process for identifying, reporting, recording, analysing & correcting non-compliances;
- Records of past non-compliances with regulatory requirements and of their severity, and of the actions taken to prevent re-occurrence (incl. of non-compliances due to misunderstanding/misinterpretation of requirements);
- Samples of abnormal condition reports relevant to situations of non-compliance with procedures and to procedure deficiencies.

Observations (all areas of review):

The inspectors should observe:

- The use of procedures in the field (during maintenance activities, during tests, etc.);
- The use of emergency operating procedures during the practical examinations on the full-scope simulator;
- The issuance of the work permits;
- The use of event-free tools (pre-job briefing, self-checks, peer checks, post-job briefs, etc.).

Examples of questions to be asked (in all areas of review):

- How do the managers and supervisors reinforce the expectations regarding adherence to procedures?
- In what way are staff members and contractors reminded about the importance of following procedures strictly?
- How are staff members and contractors trained to understand the rationale and the safety basis of the procedures?

- Can staff members and contractors give examples what could happen to the nuclear facility or to people if a procedure is not followed?
- How much trust in procedures do staff members and contractors show when discussing them?
- Can staff members and contractors describe how supervisors and managers inspect worksites to ensure that procedures are being used and followed in accordance with expectations?
- Can staff members and contractors describe how are they encouraged to critically review procedures and instructions through their use and suggest improvements where appropriate?
- Can staff members and contractors give examples when laid down procedures are followed strictly even in cases when quicker methods are available?
- How common is the feeling that procedures frustrate staff members and contractors when production pressure is applied?
- What would happen to a worker who ignored the procedure in order to achieve production targets?
- What are the most likely causes of non-compliance with procedures?

The inspectors should try to ascertain:

- Whether the managers and supervisors in the licensee's organisation are actively promoting adherence to procedures;
- Whether there is evidence of non-compliances with procedures and whether this relates to isolated cases or it is a wide spread practice;
- Whether the licensee's staff is confident in the quality of the procedures and are committed to improve them in case they don't meet their needs, rather than disregard them;
- Whether the corrective actions resulting from regulatory dispositions from past inspections have been adequately implemented.

Warning flags:

- Numerous instances of procedures violations, no assessment of the causes and no corrective actions taken;
- Procedures are not consistently used –they are considered guidelines only;
- Adherence to schedules is viewed as more important than following procedures step by step.

Characteristic C : Accountability for safety is clear

Attribute C.4: Management delegates responsibility with appropriate authority to enable clear accountabilities to be established

Areas for review: ALL

- **Management, Organisation & Administration**
- **Training and qualification**
- **Operation and Maintenance**
- **Technical support**
- **Operational experience feedback**
- **Radiation protection**
- **Emergency planning and preparedness**

1) General Expectations:

- Functional responsibilities, levels of delegated authority and lines of internal and external communication for the safe operation of the plants in all operational states, for mitigating the consequences of accident conditions and for ensuring an appropriate response in emergencies, are clearly defined in writing;
- The transfer of responsibility across interfaces is clearly defined and understood;
- Responsibilities are delegated only to individuals who have the necessary authority (and the resources) and qualifications required for the specific tasks assigned to them;
- Accountable behaviour is positively reinforced by managers and peers;
- Accountability is perceived positively (not negatively as a way to apportion blame);
- The accountability for every operational decision is clear before its execution;
- The way authority is exercised does not discourage individuals from maintaining open communication or reporting concerns or unusual observations;
- "The line organization, starting with the chief executive officer, is the primary source of information and the only source of direction; other parties, such as oversight organizations and committees, review boards, and outside advisors, who provide management information essential to effective self-evaluation, are not allowed to dilute or undermine line authority and accountability" (taken from Principles for a Strong Nuclear Safety Culture, INPO, 2004)

2) Guidelines for review:

Documentation to be reviewed:

- Policy statements (e.g. nuclear safety policy);
- Management System Manual – descriptions of general responsibilities of the senior management and the delegation of responsibilities for specific processes and activities;
- Organisational structure and the description of the job positions together with the roles and responsibilities;
- Various procedures defining/describing processes (e.g. maintenance, configuration management, shift operation, etc.) - to verify the definition of specific responsibilities and the way these are delegated;
- Emergency response procedures – to verify the definition of specific roles and responsibilities in the implementation of emergency response measures.

Observations (all areas of review):

The inspectors should observe how are the responsibilities exercised in the decision-making process (this can be observed in the daily planning meetings, in the outage planning meetings, in the meetings of the plant safety oversight committee, etc.).

Examples of questions to be asked (in all areas of review):

- What procedures and processes exist to ensure clear single-point accountability before execution?
- Can staff members and contractors give examples when accountability is perceived as a good thing? What about examples when accountability is viewed as a way to apportion blame?
- How do managers and peers reinforce accountable behaviour?
- How are staff members and contractors encouraged to maintain open communication or to report concerns or unusual observations?

The inspectors should try to ascertain:

- Whether there is well-understood division between the responsibilities of the corporate and plant management; whether the corporate management, while delegating the operating authority to the plant management, maintains the responsibility to monitor the effectiveness of the plant management in particular management of safety at the plant;
- Whether the responsibilities and levels of delegated authority are clearly specified and those in decision-making positions are fully aware of their roles and responsibilities;
- Whether responsibilities are delegated only to individuals who have the necessary authority (and the resources) and qualifications required for the specific tasks assigned to them (including temporary delegations of responsibilities due to leave taking).

Warning flags:

- Responsibilities are delegated to individuals who lack the authority to implement the delegated processes and activities;
- Inconsistencies between the responsibilities and authorities assigned through different documents; lack of clear accountabilities.

Characteristic C : Accountability for safety is clear

Attribute C.5: 'Ownership' for safety is evident at all organizational levels and for all individuals

Areas for review: ALL

- **Management, Organisation & Administration**
- **Training and qualification**
- **Operation and Maintenance**
- **Technical support**
- **Operational experience feedback**
- **Radiation protection**
- **Emergency planning and preparedness**

1) General Expectations:

- Individuals have their own targets in relation to safety and continually seek improvement.
- Individuals take care of safety in their own working environment;
- Supervisors promote good safety practices;
- "Managers and supervisors practice visible leadership in the field by placing "eyes on the problem," coaching, mentoring, and reinforcing standards. Deviations from station expectations are corrected promptly" (taken from Principles for a Strong Nuclear Safety Culture, INPO, 2004);
- "Support groups, such as human resources, labour relations, and business and financial planning, also understand their roles in contributing to nuclear safety" (taken from Principles for a Strong Nuclear Safety Culture, INPO, 2004).

2) Guidelines for review:

Documentation to be reviewed:

- Policy statements (e.g. nuclear safety policy);
- Evidence of safety improvement initiatives implemented voluntarily by the licensee;
- Evidence of opportunities for improvement identified by licensee's staff;
- Self-assessment guidelines and reports;
- Evidence of licensee's staff involvement in reporting of low-level events and near misses;
- Guidelines on the implementation of "managers in the field" programmes (observations of activities by managers).

Observations (all areas of review):

The inspectors should observe

- the supervision of activities performed in the field (including of activities performed by contractors);
- plant inspections performed by the plant managers;
- the meetings of the plant safety oversight committee.

Examples of questions to be asked (in all areas of review):

- In what way do staff members and contractors show that they understand what could go wrong and what could happen if their work is not carried out properly?
- How do staff members and contractors follow the rule to 'stop and think' when a problem arises?

- In what way do staff members and contractors take care of the safety of their own working environment?
- Can staff members and contractors give examples about proposed improvements of procedures and processes?
- In what way do supervisors promote good safety practices?
- Can operating and maintenance personnel list any recent deviations of operating limits of the nuclear facility, describe the way they happened and state what has been done to prevent repetition?
- How does the control room staff understand the requirement for a 'watchful and alert attitude at all times'?

The inspectors should try to ascertain:

- Whether the staff at all levels is actively involved in performing self-assessments;
- Whether the staff at all levels is actively involved in reporting low-level events and near misses;
- Whether there is evidence of opportunities for improvement identified by licensee's staff and of safety improvement initiatives implemented voluntarily by the licensee.

Warning flags:

- Lack of self-assessment;
- Increasing numbers of violations of rules (an increase in conscious deviations from rules, e.g. short cuts); instances of malicious compliance (e.g. workers comply with deficient procedures because they think it is not their responsibility to raise concerns about procedures especially since they've been asked to adhere to procedures);
- Poor housekeeping - indicating lack of interest on the part of management and a poorly motivated workforce with little pride in the working environment;
- Managers and workers don't make suggestions that cost money because of perceived budget constraints;
- Lack of proper verification of readiness for operation — plant systems not properly verified before the start-up of equipment, systems or plant after shutdowns for maintenance;
- Workers and managers tolerate longstanding equipment problems, process deficiencies, and human errors;
- When evaluating problems, managers appear interested only in satisfying "requirements";
- Managers and supervisors are not in the plant personally looking at equipment problems;
- People don't intervene and correct co-workers when they observe rules not being followed or standards not being met.

Characteristic D: Safety is integrated into all activities

Attribute D.1: Trust permeates the organization

Note: Attribute D.1 has been addressed previously, together with attributes A.6, B.6, B.10 and D.6.

Characteristic D : Safety is integrated into all activities

Attributes

D.2: Consideration for all types of safety, including industrial safety and environmental safety, and of security is evident

D.8: Cross-functional and interdisciplinary cooperation and teamwork are present

Areas for review: ALL

- **Management, Organisation & Administration**
- **Training and qualification**
- **Operation and Maintenance**
- **Technical support**
- **Operational experience feedback**
- **Radiation protection**
- **Emergency planning and preparedness**

1) General Expectations:

- The licensee has implemented an integrated management system, with the aim of ensuring that health, environmental, security, quality and economic requirements are not considered separately from nuclear safety requirements, to help preclude their possible negative impact on safety;
- Consideration for all types of safety, including industrial safety and environmental safety, and of security is evident in all procedures documenting processes, as well as in the working procedures (e.g. consideration of different types of hazards);
- Multidisciplinary teams (drawn from different work groups and different levels) should be used when appropriate to develop solutions to problems;
- Individuals should interact with openness and trust and should routinely offer support to each other;

2) Guidelines for review:

Documentation to be reviewed:

- Policy statements regarding nuclear safety, quality, occupational health and safety, environmental protection, security, etc. ;
- Management System manuals and procedures, including procedures documenting the interfaces and cooperation between various organisational units (inter-departmental procedures);
- Internal process of the licensee for ensuring verifying compliance with the regulatory requirements, including management of conflicting requirements (e.g. self-assessment reports);
- Operating manuals and procedures;

- Documented processes for operational decision-making, technical operability evaluations, evaluation and approval of plant modifications, etc.;
- Self-assessment reports and reports from internal audits.

Observations:

- daily planning meetings (the CNCAN site inspectors can participate in these meetings as observers);
- planning meetings for the preparation of plant outages;
- meetings organised for discussing technical operability evaluations;
- meetings of the plant committee for the review of design modification proposals;
- meetings of the plant safety oversight committee;
- internal audits performed by the licensee.

Examples of questions to be asked (in all areas of review):

- How is it ensured that all applicable requirements for a process or for activity are identified and addressed in an integrated manner?
- How do managers include industrial safety in their discussions and meetings?
- In what way do managers ensure that a safety conscious working environment prevails throughout the nuclear facility?
- What kind of specific knowledge about industrial safety is considered important by staff members and contractors? And what is considered not so important?
- How do managers include environmental safety in their discussions and meetings?
- What kind of specific knowledge about environmental safety is considered important by staff members and contractors? And what is considered not so important?
- Can staff members and contractors list examples of synergies between measures to improve safety and measures to improve security?
- Can staff members and contractors list examples of contradictions between safety and security? What should be the proper behaviour in such cases?
- What kinds of opportunities are provided, e.g. workplace forums to discuss issues of mutual interest between operations and maintenance staff?
- How are interdepartmental meetings organized and implemented? How high is their acceptance? Are they considered efficient enough?
- In what way are outside stakeholders consistently involved when problems are being solved and decisions are made?

The inspectors should try to ascertain whether:

- The management system and the procedures documenting the processes of the organisation provide for the identification of all applicable requirements, so that they are implemented in an integrated manner, to ensure that safety is not compromised by other considerations;
- Consideration for all types of safety, including industrial safety and environmental safety, and of security is evident in all procedures documenting processes, as well as in the working procedures and in their implementation (e.g. all types of safety are considered in the evaluation and approval of plant modifications, in the elaboration of operating manuals for systems, in the elaboration of operating procedures, in training, etc.);
- The decision-making process and the safety evaluations performed to support decisions provide for the involvement of specialists from all relevant areas;
- Mechanisms enabling the cross-functional and interdisciplinary cooperation and teamwork are formalised in procedures, with clear responsibilities assigned.

Warning flags:

- The licensee's management system does not take account of all applicable requirements and /or does not address them in an integrated manner;
- There is evidence of situations where conflicting requirements (e.g. between safety and security considerations) have not been properly addressed (including situations where work on physical protection systems located in safety related areas has not been performed in accordance with authorisation procedures for safety-related work);
- There is evidence of safety reviews and safety assessments performed which have not taken account of all relevant hazards;
- The mechanisms for interdisciplinary cooperation and the roles and responsibilities of the different specialist units in the decision-making process are not documented / formalised.

Characteristic D: Safety is integrated into all activities

Attribute D.3: The quality of documentation and procedures is good

Areas for review: ALL

- **Management, Organisation & Administration**
- **Training and qualification**
- **Operation and Maintenance**
- **Technical support**
- **Operational experience feedback**
- **Radiation protection**
- **Emergency planning and preparedness**

1) General Expectations:

- Procedures are controlled, clear, understandable and up to date and easy to find, use and revise;
- Documentation is comprehensive, easy to understand and easily accessible;
- Responsibilities for preparing documentation and the scope of reviews are clearly defined and understood;
- Modifications to procedures are subject to the same level of review and approval as the initial issues;
- The facility documentation and procedures are adequate with regard to their technical content, reflect the current configuration and status of the installation and the design bases for its systems, structures and components.

2) Guidelines for review:

Documentation to be reviewed:

- general procedures for the control of documents and guidelines for writing procedures;
- a representative sample of procedures for review (representative for the area being reviewed); the sample should reflect any instances where problems with procedures have been documented in event reports, inspection reports, or licensee assessments or audits; examples of procedures include: general plant operating procedures, administrative procedures, maintenance procedures, alarm response procedures, emergency operating procedures, etc.; temporary procedures should also be reviewed; also, the inspectors should verify that the backlog of procedure change requests has been evaluated to ensure that safety significant changes are acted upon in a timely manner;
- procedures (including checklists, and related forms) in the plant working files, usually kept in the control room, and in mechanical, electrical, instrumentation, or radiochemistry offices;
- other technical documentation relevant for the area being reviewed (e.g. technical reports, vendor manuals, drawings, etc.).

Observations:

Where possible, the inspectors should observe how the licensee' staff are using the procedures. For example, the use of the alarm response procedures and emergency operating procedures can be observed during the practical exams on the full-scope simulator; the use of operating manuals and of maintenance and testing procedures can be observed in the installation, when work on equipment is performed, etc.

Examples of questions to be asked (in all areas of review):

- What inputs are considered when reviewing a procedure?
- How easy are procedures to understand and to follow?
- Can managers describe cases where it appeared necessary to give additional (informal) explanation on the procedures that they or their subordinates use?
- Can staff members and contractors describe cases, where they received written procedures that were not useful for their job?
- How are procedures made easily available to the users?
- How often are procedures reviewed to ensure that they are currently valid?
- How are the temporary changes to procedures issued, and what are the appropriate controls that limit their area of application and their period of validity?
- In what way are staff members and contractors, who are going to use procedures, involved in writing them?
- How do staff members and contractors deliver feedback whether procedures are properly formulated?
- How are managers informed about poor procedures and have managers taken any action?
- What would an operator or a member of the maintenance staff do if, when following a written procedure, he/she comes upon a step that he/she thinks is a mistake?

The inspectors should try to ascertain whether:

- The elaboration, review and approval of procedures are in accordance with the applicable requirements (e.g. management system requirements, including document control procedure(s); applicable regulatory requirements); changes to documents are subject to the same level of review and approval as the initial documents;
- The (technical) content of the procedures corresponds to the expectations (sufficient information is given on applicable requirements, work methods, hazards, control parameters etc. and more detailed technical documents are referenced where necessary);
- Procedures and their related forms, attachments, and referenced documents are current with respect to revision and temporary change; the current state and configuration of the systems, structures and components of the installation is reflected in the procedures (e.g. documentation is updated when a modification is implemented);
- Human factors considerations have been taken into account in the development of the procedures; the level of detail is appropriate for the complexity of the task and the expected ability of the users; the writing style is consistent among procedures within a department and within the same procedure type; the procedure identification information is adequate to ensure the procedures are complete and current; procedures are legible in the worst expected conditions for use (type is readable (1) at an expected distance within which the procedure is used, (2) after copying and (3) under degraded lighting); aids are used to help users to track their progress through a procedure where appropriate;
- Operating procedures are written in a manner that is easy to follow (e.g. making use of flowcharts, with clearly identified steps, whenever possible, rather than using too much descriptive text; short, simple sentences are used; instructions are clear and unambiguous; multiple actions are written in order of sequence and clearly identify when actions must be completed in order of occurrence; warnings and special cautions are highlighted/emphasized in the procedures; acronyms and other abbreviations are used consistently and are defined explicitly, etc.);

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- References to equipment or documents contain complete identification information, including plant unit applicability, and exactly match equipment labels; numerical units used in procedures correspond to the units on the related instrumentation.
- Temporary procedures or temporary changes to procedures are subject to review and approval to ensure that they do not conflict with technical specifications and / or other applicable requirements;
- In cases where documents, such as vendor manuals, equipment operating and maintenance instructions, or approved drawings with acceptance criteria, are (by reference) part of a procedure, these documents (or applicable portions) require the same level of review and approval as the procedure that references them;
- For procedures containing technical specifications, limiting conditions for operation, FSAR descriptions, vendor manuals, design information, piping and instrumentation drawings, instrumentation and electrical wiring and control diagrams, etc., the appropriate technical specification and vendor or design operating limitations (such as heatup/cooldown rates, pressure/temperature limits, reactivity limits, safety limits, limiting conditions of operation, and limiting safety system settings) have been incorporated into the procedures;
- The administrative controls in place assure that documents are distributed in accordance with current distribution lists and are used by those who perform the prescribed activity; the administrative controls prevent the inappropriate use of outdated documents;
- The licensee has procedural limitations on how long a temporary procedure or a temporary procedure change can be in effect and what the situation is in practice;

Warning flags:

- A significant backlog of procedures requiring revision (past the revision date or which needed revision due to plant modifications, for example);
- A significant number of events having had inadequate procedures as one of the direct causes;
- An increasing trend in low level events and non-conformances related to the quality of procedures;

Characteristic D: Safety is integrated into all activities

Attribute D.4: The quality of processes, from planning to implementation and review, is good

Areas for review: ALL

- **Management, Organisation & Administration**
- **Training and qualification**
- **Operation and Maintenance**
- **Technical support**
- **Operational experience feedback**
- **Radiation protection**
- **Emergency planning and preparedness**

1) General Expectations:

- The processes of the management system that are needed to achieve the goals, provide the means to meet all requirements and deliver the products of the licensee's organization are identified, and their development is planned, implemented, assessed and continually improved;
- The sequence and interactions of the processes are determined;
- The methods necessary to ensure the effectiveness of both the implementation and the control of the processes are determined and implemented;
- Specific indicators are established to monitor the effectiveness of the implementation of each process;
- Work is planned (including plans for contingencies) to ensure that all safety functions are effective at all times and to ensure that safety is not compromised;
- Individuals should follow the approved plans and should seek proper approvals before deviating from the approved plans;
- Work should be planned in sufficient detail to allow personnel to work effectively and efficiently (e.g. resources should be matched to demands, and spares and tools should be available when needed);

2) Guidelines for review:

Documentation to be reviewed:

- Management system manual;
- Process map, procedures describing management, core and support processes, lower level procedures and instructions (defining sub-processes, activities and tasks);
- Self-assessment reports on different processes; performance indicators used;
- Work control procedures.

Examples of questions to be asked (in all areas of review):

- Can staff members and contractors describe how work is planned (including plans for contingencies) to ensure that all safety functions are maintained effective at all time and to ensure that safety is not impaired?
- Are managers and supervisors aware of activities that impact planning? To what extent are the approved plans followed?
- What is the process for approval before necessary deviating from the already approved plans?
- In what way are resources matched to demands, so that for example spare parts and tools are available when needed?
- How are processes defined, so that they are easy to understand and to follow?

- What inputs are considered when designing or modifying a process?
- Can staff members and contractors describe cases where it appeared necessary to give additional (informal) explanation on a process that they or their subordinates use?
- How often is process documentation reviewed to ensure that it is currently valid?
- How are the temporary changes to processes handled, so that safety aspects are considered as well?
- In what way are staff members and contractors, who are going to implement processes, involved in developing them?
- Are activities that involve multiple groups appropriately co-ordinated?
- How do managers learn whether processes are properly followed?
- How are managers informed about poor processes and have they taken any action to improve them?

The inspectors should try to ascertain whether:

- The processes of the management system are defined and documented;
- The development of each process ensures that the following are achieved:
 - Process requirements, such as applicable regulatory, statutory, legal, safety, health, environmental, security, quality and economic requirements, are specified and addressed;
 - Hazards and risks are identified, together with any necessary mitigatory actions;
 - Interactions with interfacing processes are identified;
 - Process inputs are identified;
 - The process flow is described;
 - Process outputs (products) are identified;
 - Process measurement criteria are established.
- The activities of and interfaces between different individuals or groups involved in a single process are planned, controlled and managed in a manner that ensures effective communication and the clear assignment of responsibilities;
- For each process, any activities for inspection, testing, verification and validation, their acceptance criteria and the responsibilities for carrying out these activities are specified; for each process, it is specified if and when these activities are to be performed by designated individuals or groups other than those who originally performed the work;
- Evaluations are performed to verify the effectiveness of the processes;
- The work performed in each process is carried out under controlled conditions, by using approved current procedures, instructions, drawings or other appropriate means that are periodically reviewed to ensure their adequacy and effectiveness; results shall be compared with expected values;
- The control of processes contracted to external organisations are identified within the management system; the licensee retains overall responsibility when contracting any processes.

Warning flags:

- The responsibilities for process development and implementation are not clearly assigned; the sequences and interactions between processes are not identified;
- The effectiveness of the processes is not reviewed;
- A significant number of events having had inadequate planning as one of the direct causes; an increasing trend in low level events and non-conformances related to the planning of work;

Characteristic D: Safety is integrated into all activities

Attribute D.5: Individuals have the necessary knowledge and understanding of the work processes

See also Attribute E.7: There is systematic development of individual competences.

Areas for review: ALL

- **Management, Organisation & Administration**
- **Training and qualification**
- **Operation and Maintenance**
- **Technical support**
- **Operational experience feedback**
- **Radiation protection**
- **Emergency planning and preparedness**

1) General Expectations:

- There is a Systematic Approach to Training implemented in licensee's organisation in respect of all activities that may affect safety; all elements of the systematic approach to training are properly implemented;
- Individuals are assigned only work for which they are adequately qualified;
- Individuals have a good understanding not only of their own work processes, but also of how these processes interact with other processes;
- When contractors are used, the licensee verifies that the contractor staff has the necessary knowledge and understanding of the conditions applicable to work on a nuclear site;
- The competences of licensee's own staff, and also those of the contractors, are reviewed periodically against specified requirements and expectations; opportunities for improvement and corrective actions arising from such reviews are identified and implemented.

2) Guidelines for review:

Documentation to be reviewed:

- Job descriptions;
- Job and task analyses;
- Records of competence assessments;
- Records of operational events, including low-level events, near-misses, non-conformances, etc. which had as a direct cause or are relevant to insufficient knowledge and inadequate understanding of the work processes.

Observations:

- maintenance, repair, testing, inspection activities in the installation;
- daily planning meetings (the CNCAN site inspectors can participate in these meetings as observers);
- exams on the full-scope simulator.

Examples of questions to be asked (in all areas of review):

- In what way do staff members and contractors show that they understand what could happen to the nuclear facility or to people if they modify their work processes?

- In what way do staff members and contractors show a good understanding, not only of their own work processes, but also how these processes interact with other processes?
- Can staff members and contractors give examples of cases, where the task was not understood before carrying it out? What was the reason for it?
- How aware are staff members and contractors, especially at the shop floor level, of the particular cautions or safety limits they have to observe in their job?
- How aware are staff members and contractors, especially at the shop floor level, what would happen if safety limits (pressures, temperature, tank level...) were desecrated?
- For maintenance personnel, how do mock-ups and video recordings support staff before a complex maintenance activity is performed?
- Examples of questions for individual workers:
 - What specific training or qualification have you received to perform this job? Has this or similar task been covered in your continuing training?
 - How familiar are you with the job? How often do you perform this job?
 - Has the job changed since your training? Have you changed equipment or have any significant procedure changes occurred?
 - After having completed your initial or continuing training on this job, did you feel prepared to perform the job correctly without assistance? Do you perform the job the same in the plant as you have been taught during training? If not, have you provided feedback into the training? If yes, was this followed-up?

The inspectors should try to ascertain whether:

- The competences of licensee's staff and contractors are ensured using a systematic approach to training and qualification (including periodic review);
- Work is assigned only to individuals who have the necessary knowledge and understanding for the job;
- Training and qualification programmes are reviewed to take account of experience feedback.

Warning flags:

- A significant number of events having had inadequate training and qualification as one of the direct causes; an increasing trend in low level events and non-conformances related to training and qualification;
- Individuals are assigned jobs for which they have not been trained and qualified; Lack of evidence to show that operations personnel have been formally trained and certified to perform the job required of them;
- Competences needed for various job positions are not documented;
- There is no formal review process for ensuring the availability of the necessary competences.

Characteristic D: Safety is integrated into all activities

Attribute D.6: Factors affecting work motivation and job satisfaction are considered

Note: Attribute D.6 has been addressed previously, together with attributes A.6, B.6, B.10 and D.1.

Characteristic D: Safety is integrated into all activities

Attribute D.7: Good working conditions exist with regard to time pressures, workload and stress

Areas for review: ALL

- **Management, Organisation & Administration**
- **Training and qualification**
- **Operation and Maintenance**
- **Technical support**
- **Operational experience feedback**
- **Radiation protection**
- **Emergency planning and preparedness**

1) General Expectations:

- The scheduling of work on safety critical tasks at night is avoided;
- Shift schedules are based on up to date knowledge of best solutions with regard to human performance and capabilities;
- Records of overtime are kept, trended and acted upon; planned overtime is kept within regulated limits;
- Managers are sensitive to stress affecting individuals under their control by, for example, undertaking stress awareness training;
- The physical working environment is conducive to high standards of safety and performance (e.g. standards of housekeeping, provision of equipment and tools, including response equipment, and guarding and signposting of hazards);
- Individuals are consulted about the ergonomics and the effectiveness of their working environment;
- Human factor specialists are made available to the organisation.

2) Guidelines for review:

Documentation to be reviewed: e.g. reviews of the work conditions and infrastructure; documents related to fitness-for-duty programmes

Observations:

- various work activities in the installation;
- inspections to the control room;
- planning meetings.

Examples of questions to be asked (in all areas of review):

- What is the policy on limits to overtime work? To which staff and contractor groups does it apply?
- How is overtime controlled, monitored and reported to the facility manager?
- What is the attitude of higher (corporate) management to overtime?
- What is the attitude of staff representatives (trade unions) to overtime?
- How difficult is it to find enough qualified staff and contractors?
- How do shift schedules apply up to date knowledge of best solutions with regard to human performance capabilities?
- How are shift schedules discussed with those involved?
- What is the level of absenteeism, especially for operational and maintenance staff?
- Can managers give examples of severe stress syndromes or burn-out cases among staff members and contractors recently?
- What type of stress awareness training is offered to managers in the nuclear facility (especially middle-level managers and supervisors)?
- How are human performance issues treated in the nuclear facility?
- What types of analysis are applied to identify causes of unsatisfactory human performance? What kind of improvement strategy is followed? On which criteria is the improvement strategy based?
- In what way are human factors specialists and psychologists engaged with the nuclear facility?

The inspectors should try to ascertain whether:

- The licensee has in place policies forbidding excessive workload and these are followed; records of overtime are kept, trended and acted upon; planned overtime is kept within regulated limits;
- Fitness-for-duty programmes are implemented and the stress level of the employees is verified periodically;

Warning flags:

- Frequent overtime is required to support normal operations;
- Operations personnel miss or do not attend continuing training because of excessive work loads, or other requirements;

Characteristic D: Safety is integrated into all activities

Attribute D.8: Cross-functional and interdisciplinary cooperation and teamwork are present

Note: Attribute D.8 has been addressed previously, together with attribute D.2.

Characteristic D: Safety is integrated into all activities

Attribute D.9: Housekeeping and material conditions reflect commitment to excellence

Areas for review: ALL (as applicable)

- **Management, Organisation & Administration**
- **Training and qualification**
- **Operation and Maintenance**
- **Technical support**
- **Operational experience feedback**
- **Radiation protection**
- **Emergency planning and preparedness**

1) General Expectations:

- Managers do not accept long standing problems with items of equipment, systems or processes as 'the way things are'; managers pay careful attention to resolving such problems, even if the solutions are challenging and expensive;
- A process is established for identifying long-standing issues concerning equipment or processes. For example, each issue could have an action plan for its solution;
- The material condition of the plant should be maintained in such a way that its safe, reliable and efficient operation can be ensured; plant managers and supervisors define the required standard and conduct frequent tours of plant areas in order to confirm that high standards are maintained; deficiencies are identified, controlled and eliminated;

2) Guidelines for review:

Documentation to be reviewed:

- reports from review of housekeeping;
- ageing management programme procedures and inspection records, etc.
- plant material condition reports;
- work requests for corrective maintenance;
- schedule for management tours of plant facilities;
- documented follow-up of the results of management tours, and corrective actions issued;
- backlog of corrective actions programme.

Observations:

- routine plant inspections (as performed by the resident inspectors)

Examples of questions to be asked (in all areas of review):

- How would staff members and contractors describe the general state of the nuclear facility in terms of appearance and tidiness?
- How would staff members and contractors describe the general state of log-books and records?
- How is the reporting on housekeeping deficiencies organized? How efficient is it?
- How would staff members and contractors describe the material condition of safety relevant systems in the nuclear facility?
- What programmes and procedures exist to monitor and continuously improve the material condition of safety relevant systems in the nuclear facility?
- Can staff members and contractors describe the process for identifying long-standing problems with pieces of equipment, systems or processes?
- What is the strategy of the management towards such issues?

The inspectors should try to ascertain whether:

- Housekeeping is being maintained as an integral part of every work operation; cleaning and removal of waste, debris, and dust is being performed regularly;
- Work site cleanliness, orderliness, lighting, accessibility and escape routes are clear and hazardous areas identified, neutralized and barriered as needed;
- Cleanliness are maintained throughout the plant including infrequently visited areas, enclosures and cabinets;
- Work sites are cleaned up with tools and scaffolding returned to designated storage locations when no longer needed;
- Work site environment are controlled to ensure satisfactory working conditions exist for the duration of work;
- Minimization and segregation of waste is regularly carried out.
- Systems and equipment are in good working order; examples of this include the following:
 - Temporary modifications and repairs are minimized; a process exists to evaluate, control and track temporary repairs;
 - Fluid system leaks are minimized, identified and controlled leaks are segregated to avoid personnel and equipment harm;
 - Equipment is appropriately protected from adverse environmental conditions; wiring and terminals are protected and undamaged and cable trays are in good condition;
 - A process exists to ensure instruments, controls and associated indicators are calibrated, as required to maintain the appropriate degree of accuracy; Indicators are not out of scale or inoperable; records are functioning correctly and paper is available;
 - Good lubrication practices are evident;
 - Fasteners and supports are properly installed and in the "as designed" position; pipes do not move excessively;
 - Equipment, structures and systems are properly preserved, insulated, free of corrosion and grounding (earthing) cables are securely fastened where necessary; thermal insulation is in good condition;
 - Rotating equipment is appropriately protected and does not vibrate excessively; chain or belt drives are properly adjusted;
 - Filters and strainers are not clogged by observing excessive differential pressure and conducting visual checking when possible;
 - Leaks are collected, tagged and followed;
 - Fire barriers are effective e.g. fire doors able to close, electrical cabinet doors and panels closed and secured;

- Valves have sufficient packing to allow tightening. Valve stems are properly lubricated;
 - Hoses are in good condition and show no evidence of leakage;
 - System and component labelling is consistent, accurate and easy to read;
 - Stairs and ladders are properly secured;
 - Lighting is adequate and in good repair;
 - Painting and coating are in good shape;
 - Access to emergency equipment is clear.
- Deficiencies found are locally identified and reported to the main control room and a structured system exists for this purpose;
 - Deficiencies that may impair personnel and equipment safety are adequately protected from (e.g. steam, oil and chemical leaks);
 - There are established deficiencies/abnormalities reporting criteria for all plant personnel but in particular maintenance and operations and the threshold for the reporting criteria is sufficiently low to detect the poor material conditions and low level deviations.

Warning flags:

- Increasing trend in low-level events and non-conformances relevant to housekeeping;
- Increasing trend in low-level events and non-conformances relevant to material condition;
- Poor housekeeping, indicating lack of interest on the part of management and a poorly motivated workforce with little pride in the working environment;
- Workers and managers tolerate longstanding equipment problems;
- Maintenance backlogs are high.

Characteristic E: Safety is learning driven

Attribute E.1: A questioning attitude prevails at all organizational levels

Areas for review: ALL

- **Management, Organisation & Administration**
- **Training and qualification**
- **Operation and Maintenance**
- **Technical support**
- **Operational experience feedback**
- **Radiation protection**
- **Emergency planning and preparedness**

1) General Expectations:

- Individuals should notice and should be able to question unusual signs and occurrences and should seek guidance when in doubt;
- Individuals at all levels should be encouraged to ask detailed questions in meetings;
- Management should be questioning of its own attitudes and views and should actively seek independent views.

2) Guidelines for review:

The inspectors should use observation and interviews to ascertain whether the above mentioned expectations are met.

Observations:

- daily planning meetings (the CNCAN site inspectors can participate in these meetings as observers);
- planning meetings for the preparation of plant outages;
- meetings organised for discussing technical operability evaluations;
- meetings of the plant committee for the review of design modification proposals;
- meetings of the plant safety oversight committee;
- meetings of the ALARA committee, for example in the preparation for an outage;
- observation of operations in the control room;
- observation of shift turnover;
- observations of tests and maintenance work in the field;
- observation of pre-job and post-job briefs.

Examples of questions to be asked (in all areas of review):

- How do individuals at all levels understand the nature of the nuclear hazards, including worst-case scenarios?
- What measures are taken in the nuclear facility so that group-think is avoided and opposing views are encouraged?
- How is the rule to "stop and think" applied when a problem arises?
- How useful is the current process for bringing up safety related concerns to the attention of higher management?

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- How useful is the current process for suggesting potential improvements to the attention of higher management?
- In what way do managers encourage bringing up safety related concerns or potential improvements?

The inspectors should try and ascertain whether:

- The expectations regarding the questioning attitude are reinforced by managers and supervisors;
- The importance of questioning attitude is emphasized during training;
- People are comfortable in raising questions during meetings;
- A questioning attitude is encouraged in the decision-making process;
- The decision-making process allows for the resolution of differing/diverging opinions;

Warning flags:

- Questions raised during meetings or during various work activities are dismissed without explanation;

Characteristic E: Safety is learning driven

Attribute E.2: Open reporting of deviations and errors is encouraged

Areas for review: ALL

- **Management, Organisation & Administration**
- **Training and qualification**
- **Operation and Maintenance**
- **Technical support**
- **Operational experience feedback**
- **Radiation protection**
- **Emergency planning and preparedness**

1) General Expectations:

- The licensee has established processes to allow and encourage individuals to report abnormal conditions, concerns and events, including near misses;
- Significant events, minor events, low level events, near misses and potential problems are identified and reported, including equipment failures, human performance problems, procedure deficiencies and documentation inconsistencies;
- All site personnel, including contractors, have been trained in the reporting of abnormal conditions and are aware of their responsibilities;
- Individuals should be comfortable raising safety concerns without fear of retribution;
- Recognition is given to individuals and to teams who report abnormal conditions, concerns and events, including near misses;
- Managers should ensure that matters raised are acted upon and that feedback on the outcome is given;

2) Guidelines for review:

Documentation to be reviewed:

- the procedures and guidelines on event reporting, including criteria for internal reporting of events and event report forms;
- records of abnormal condition reports and statistics, trends, etc. showing the level of reporting;
- procedures, guidelines and criteria for reporting of events to the regulator and to other external organisations;

Examples of questions to be asked (in all areas of review):

- How do the line managers and supervisors encourage the staff to report events?
- What arrangements exist for reporting abnormal conditions and safety related events at the nuclear facility?
- Do staff members and contractors who were involved in a significant event receive feedback on the final contents of the event report?
- What kind of recognition, if any, is given to individuals and teams that report abnormal conditions, concerns, actual or near miss events etc.? What about fear of retribution, if errors are reported or safety concerns are raised?
- How comfortable are individuals, generally, in reporting their own errors?
- How is the event reporting process communicated to the staff?
- How easy is it to report? Where are the blank reporting forms stored?

- What is the availability of Event Report Forms/Logs in the field? Where is the initial report processed? How user friendly is the process (reporting easy, available access to results, information is made available to staff)?
- How many reports are raised by each department?
- How systematic/uniform is process across various departments?
- How comprehensive is the event reporting? What is reported - events/deviations/performance shortfalls/QA findings, etc.?

Observations (all areas of review):

The inspectors should check if there is physical evidence in the plant of unreported deficiencies, event precursors or error likely situations (e.g. defective equipment, poor material condition, poor or unsafe working practices, un-controlled operator aids, lack of document control, etc.).

The inspectors should try to ascertain:

- Whether the management has defined their expectations regarding the systematic reporting, screening and use of internal and external operating experience and whether there is a declared policy of no-blame reporting;
- Whether the reporting requirements are communicated to plant personnel during initial and refresher training;
- Whether the training provided to contractors includes guidance on reporting of abnormal conditions;
- Whether the reporting process is "user friendly" (abnormal conditions report forms are easily accessible, the criteria for reporting are clear, assistance for filling in the reports can be easily obtained, etc.);
- Whether reporting of deviations, events, precursors, etc. is carried out by all levels of personnel, sections, departments, etc. throughout the licensees' organization;
- Whether the various groups of staff (operations, maintenance, technical support, chemistry, etc.) contribute to the reporting process in a reasonably uniform manner;
- Whether there is a tendency in reporting either equipment, procedural or personnel deficiencies;
- Whether all events meeting the criteria for reporting to the regulator and to other external organisations have been adequately reported; check whether recent plant events were shared with the external nuclear community.

Warning flags:

- Low level events and near misses are not reported or analyzed;
- The staff is not aware of the reporting requirements;
- The reporting procedure is not user friendly – criteria are not clear, forms are difficult to fill in;
- The staff considers it is not their responsibility to report problems;
- The staff members are afraid to report problems;
- Events that meet the criteria for reporting to the regulatory authority and / or to other organisations have not been reported or have been reported late.

Characteristic E: Safety is learning driven

Attribute E.3: Internal and external assessments, including self-assessments, are used

Areas for review: ALL

- **Management, Organisation & Administration**
- **Training and qualification**
- **Operation and Maintenance**
- **Technical support**
- **Operational experience feedback**
- **Radiation protection**
- **Emergency planning and preparedness**

1) General Expectations:

- Various oversight forums and processes, including self-assessment, are used to review, evaluate and enhance the safety performance of the licensee's organization;
- The number and types of oversight mechanisms are periodically reviewed and adjusted;
- Oversight is viewed positively and constructive and use is made of external or independent opinions;
- Periodic safety culture assessments are conducted and used as the basis for improvement;
- Senior managers are periodically briefed and initiate actions on the basis of the results of oversight activities;
- The feedback from peer-reviews (e.g. WANO, OSART, IPSART, EPREV, etc.) is used to improve the processes and practices of the licensee's organisation;
- The self-assessment process is formalised, implemented and effectively used to improve safety performance.

2) Guidelines for review (applicable to all areas):

Documentation to be reviewed:

- the procedures and guidelines for performing self-assessment;
- self-assessment reports performed by different organisational units;
- the reports from peer-reviews (e.g. OSART, EPREV, etc.) and the action plans for implementing the recommendations therein (for each area of review it should be checked whether there are recommendations from external assessments);
- reports from independent reviews and reports from internal audits;
- reports from the periodic reviews of the management system;
- inspection reports from previous regulatory inspections.

Examples of questions to be asked:

- Who participates in the performance of the self-assessments? How are the self-assessments performed?
- How are the results of the self-assessments presented to the senior management?
- What mechanisms exist to periodically review and adjust internal assessments?
- In what way does the nuclear facility use external or independent opinions?
- Can staff members and contractors give examples when senior management initiated actions based on the results of external assessment activities?
- What is the informal perception of regular external assessments? What external reviews are considered the most useful?

- Have there been any issues first identified by external reviewers, which had not been identified before through the internal assessments?
- What is the attitude of the senior management regarding the self-assessment process? What is the involvement of the different levels of management in the performance of the self-assessment?
- What type of information is considered most useful by the senior management? Does this information include comparisons with the performance of other nuclear facilities?
- When was the last safety culture assessment conducted in the nuclear facility? When was the last questionnaire survey conducted in the nuclear facility?
- What information is fed back to respondents of questionnaire surveys or safety culture assessments? Is this information considered sufficient by the staff involved?
- What is the value of safety improvement programmes developed after internal and external assessments? Is there any added value or is it considered just another campaign?
- What is the attitude of staff members and contractors to safety assessments affecting their area of work?
- How responsive are staff members and contractors to improvements sought as a result of safety assessments?

Observations:

The inspectors should observe the conduct of the self-assessment process, the conduct of the internal audits for different areas and also the preparations for peer-review missions and, where possible, the conduct of peer-reviews.

The inspectors should try to ascertain:

- Whether there is an established process for self-assessment and whether this process is implemented by all departments of the licensee's organisation;
- Whether the licensee has performed periodic and focused self-assessments and whether the corrective actions and opportunities for improvement arising from these have been implemented;
- Whether the regulatory findings from past inspections have been timely and adequately addressed;
- Whether the licensee has received external reviews (e.g. independent reviews, peer-reviews, etc.) and what actions for improvement have been taken as a result of these;

Warning flags:

- Lack of self-assessment processes — the organization not recognizing deficiencies in attitudes to safety and behaviour and being unable to adopt a philosophy of continual improvement;
- Findings from regulatory inspections not addressed in the corrective action programme;
- Opportunities for improvement are not recognised or are acknowledged but not acted upon;
- Significant safety issues identified through external reviews that had not been previously found / acknowledged by the licensee;
- Failure to deal with the findings of independent external safety reviews — reluctance to accept proposals for changes that were not developed internally or lack of a process to monitor progress in implementing the recommendations of external reviews.

Characteristic E: Safety is learning driven

Attribute E.4: Organizational and operating experience (both internal and external to the facility) is used

Areas for review:

- **Operational Experience Feedback**
- **Management, Organisation & Administration**
- **Training and qualification**

The reviews of the other areas (Operation and Maintenance, Technical Support, Radiation Protection, Emergency Planning and Preparedness) should focus on assessing how the operating experience has been taken into account in the implementation of the specific processes and activities.

1) General Expectations:

- The nuclear safety policy emphasizes the importance of OEF;
- Processes are in place to obtain, review and apply available internal and external information that relates to safety, including information on experience from other industries;
- Roles and responsibilities for implementing the OEF process are clearly defined;
- Managers and supervisors demonstrate leadership in the implementation of the OEF process;
- The collection of internal and external operational experience is systematic;
- Reports on operating experience are reviewed and actions are taken to ensure that the organization learns and applies the relevant lessons;
- There should be no indications of an attitude of "it couldn't happen here";
- There is cross-functional and interdisciplinary cooperation and teamwork in the development and implementation of the OEF process; all departments in licensee's organization make effective use of the operating experience to improve their specific processes and activities;
- The effectiveness of the OEF process is reviewed periodically; internal and external assessments, including self-assessments, are used for evaluating the effectiveness of the OEF process; opportunities for improvement are identified and implemented.

2) Guidelines for review:

Documentation to be reviewed:

Programmatic documents and documents relevant to the organisation of the unit in charge of collecting, screening and analysing operational experience:

- Organisational structure – position and staffing of the unit; Description of interfaces between the unit and the other organisational units; Communication protocols with external organisations;
- Sections in the Management System Manual that refer to the operational experience feedback process, including the self-assessment and the corrective actions processes;
- Formal descriptions of the roles, responsibilities and authorities of managers in the implementation of the OEF process;
- Allocation of resources for the implementation of the process;

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- Provisions for keeping records;
- Nuclear Safety Policy;

Internal standards and requirements relevant to OEF:

- Procedures and guidelines on event reporting;
- References used for establishing the requirements for the OEF process (incl. for assessment methodologies);

Documents describing the collection and screening of events:

- Guidelines and criteria for internal reporting of events; event report forms;
- Procedures governing the collection of external operational experience;
- Guidelines and criteria for screening of events;
- Screening process used for selecting events for detailed investigation and analysis;

Documents relevant for the dissemination of operational experience:

- Event reports presented to relevant categories of staff;
- Updates to relevant training programmes and materials;

In addition, the inspector may wish to observe particular training sessions, pre-job briefings and just-in-time training to see how staff is made aware of relevant recent operational experience (if any and if applicable).

Documentation related to evaluations of the effectiveness of the OEF process:

- Process for periodic evaluation of the OEF process;
- Guidelines for self-assessment of the effectiveness of the operational experience feedback process;
- Reports from QA audits and evaluations, including from independent reviews of the OEF process;
- Evidence of external reviews of the OEF process (incl. peer review reports and past inspection reports)
- Corrective actions resulted from self-assessment and / or other reviews of the OEF process;

Examples of questions to be asked:

- What are the expectations of the management regarding the operating experience feedback process?
- How does the management demonstrate commitment to the implementation of the OEF process?
- How do the managers and supervisors encourage and reinforce the effective use of the OEF?
- How does the licensee ensure that the OEF practices take account of the current industry standards and best practices?
- What are the arrangements with outside organisations for ensuring availability of information on events occurred at other plants when such information is deemed necessary for further investigations?
- How is the relevant information from external operational experience disseminated to the various staff groups (e.g. operations, maintenance, etc.)?
- What are the topics relevant to OEF discussed during the plant safety oversight committee meetings?
- How is the organizational and operating experience used in the training programme? (give examples)
- What indicators do you use for monitoring effectiveness of the OEF process?

- Are there any opportunities for improvement of the OEF process identified? Have you received any recommendations from peer reviews in that sense?

The inspectors should try to ascertain:

Organisational and procedural framework for operational experience feedback

- Whether the roles and responsibilities of those in charge of the implementation of the OEF process are clear and consistent;
- Whether the interfaces and lines of communication between the OPEX unit and the other organisational units and external organisations are clearly established and functional;
- Whether the staffing of the unit in charge of collecting, screening and analysing operational experience has been determined taking account of the responsibilities for the OEF process; whether the OPEX unit is staffed with people who meet the necessary competence criteria;
- Whether the procedures for the control of activities at the site for the feedback of operational experience to ensure that they are consistent with the objectives of the management system; whether these procedures are reviewed and approved before issue, and that their subsequent amendment is controlled;
- Whether the regulatory requirements set in applicable regulations and in the licence conditions are adequately reflected in the procedures governing the OEF process;
- Whether the references used for the establishment of internal requirements for the OEF process take account of current international standards and good practices;
- Whether records of events and of event investigations and analysis are kept, are easily retrievable and include all necessary information;
- Whether the management has defined their expectations regarding the systematic reporting, screening and use of internal and external operating experience.

Reporting – is covered in the guidance on Attribute E.2

Screening of internal and external operating experience information

- Whether the personnel involved in the screening process has, in addition to an engineering background, also the necessary training and qualification in the area of human factors;
- Whether the screening process is performed by a multidisciplinary group of plant personnel; personnel who screen operating experience information are familiar with the possible broad operational effects that the particular event or operating information may have on station operation;
- Whether the guidelines and criteria for screening are specified, are clear and are effectively followed in the screening process;
- Whether the events “screened out” are considered for trend analysis;
- Whether the results of the screening are reviewed on the occasion of self-assessments or peer reviews;
- Whether the screening process for operating experience has well-defined thresholds so that events important only for trending or immediate corrective action are distinguished from abnormal events that require further detailed investigations;
- Whether the review of external operating experience includes consideration of aspects such as:
 - generic implications that apply to the plant;
 - whether there is similar equipment at the plant;

- whether there are similar practices at the plant predisposing to similar events;
- the possible prior occurrence of a similar event;
- reported actions taken that are applicable to the plant;
- Whether the screening of external events is undertaken periodically at site level;
- Whether the screening criteria for external events follow the criteria that govern the reporting of internal events, to determine the need for further investigation;
- Whether the results of screening of external events are recorded for evaluation in subsequent periodic self-assessments or peer reviews.

Analysis and Investigation of Events and Corrective Actions – are covered in the guidance on Attribute E.5

Utilisation, dissemination and exchange of information on operating experience

- Whether information on operational experience is made readily available to plant personnel;
- Whether the licensee issues information relating to operating experience when assigning plant work (e.g. in the form of a synopsis of past events, team briefings, work briefings, just-in-time information about events occurred elsewhere and lessons learned);
- How is the OEF used in the refresher training for plant staff with safety related jobs;

Evaluations of the effectiveness of the OEF process

- Whether there is an established process for monitoring the effectiveness of the OEF process and for performing periodic reviews;
- Whether the licensee has performed periodic and focused self-assessments of the OEF process;
- Whether the regulatory findings from past inspections have been timely and adequately addressed;
- Whether there have been external reviews (e.g. independent reviews, peer-reviews, etc.) of the OEF process and what actions for improvement have been taken as a result of these;
- Whether the corrective actions arising from the OEF process are being implemented in a timely manner; whether the continuing need for each of the outstanding corrective actions is considered; whether the effectiveness of the solution of the original problems and the prevention of their recurrence is evaluated;
- Whether recurring events are reviewed to identify whether improvements can be made in the OEF process.

Warning flags:

- Inconsistencies between the responsibilities and authorities in the implementation of the OEF process assigned through different documents; lack of clear accountabilities;
- The internal requirements on OEF do not address the regulatory requirements set in regulations and licences; the internal requirements on OEF do not take account of current standards and industry good practices;
- Low level events and near misses are not reported or analyzed;
- Events screened out without proper justification;
- External operational experience not collected and / or not included in the OEF process;
- No formal process for disseminating information operational experience – this is not done or is done on a case-by-case basis;

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- Training programmes and materials do not take account of relevant operational experience;
- Operating staff is not aware of significant events occurred on site (internal operating experience);
- Lack of learning — unwillingness to share knowledge and experience with others, or to use the experience of others to improve safety;
- Lack of self-assessment of the effectiveness of the OEF process;
- Opportunities for improvement of the OEF process are not recognised or are acknowledged but not acted upon.

Characteristic E: Safety is learning driven

Attribute E.5: Learning is facilitated through the ability to recognize and diagnose deviations, to formulate and implement solutions and to monitor the effects of corrective actions

Areas for review:

- **Operational Experience Feedback**
- **Management, Organisation & Administration**

The reviews of the other areas (Training and qualification, Operation and Maintenance, Technical Support, Radiation Protection, Emergency Planning and Preparedness) should focus on assessing what specific deviations have been identified, how have these been investigated / analysed and what corrective actions have been implemented and how have these been monitored for effectiveness.

1) General Expectations:

- The process for investigation and analysis of events is systematic;
- Appropriate actions are identified, implemented, and monitored to preclude repeat events or more significant subsequent events;
- Corrective actions are prioritised based on their safety significance. Those actions affecting safety are given the highest priority, while the actions that are desirable rather than essential are shown as such;
- A verification process is in place to ensure that corrective actions taken address the real and underlying cause(s) and solve the problem.
- Corrective actions are monitored, and overdue items are brought to the attention of management for increased focus, as necessary;
- Personnel has confidence in the corrective action process and is able to point to examples of problems that they have reported and which have been solved;
- There is a low rate of repeat events and errors.

2) Guidelines for review:

Documentation to be reviewed:

Documents relevant for the investigation and analysis of events:

- Procedures specifying the type of investigation that is appropriate for an event of any particular type;
- Documents describing the event investigation and analysis methodologies (incl. training manuals);
- For selected events, review the documentation of the analysis of the event, storage of the documentation, dissemination of significant results and monitoring of the implementation of corrective actions and assessment of their effectiveness.

Documents relevant for the implementation of the corrective actions programme

- Procedures describing the process for initiating and implementing corrective actions;
- List of corrective actions for the last year or for the period since the last inspection; [these can be in one or more of the following categories:

- modifications to equipment and installation of additional devices and means to prevent recurrence of the same or similar events;
- improvements to procedures and administrative measures, additional checks and controls;
- rectification of deficiencies revealed in the documentation for operation (operating manuals and procedures);
- rectification of normative documents;
- measures for improving training & qualification;
- changes to the working environment;
- changes to the planning and scheduling of work and / or to the individuals assigned to particular duties]
- The process for approval of corrective actions and the documentation and forms to be completed;
- The process for tracking the implementation of approved corrective actions;
- Examples of immediate, interim and long term corrective actions.

Examples of questions to be asked:

- How is it ensured that event analysis is conducted on a timescale consistent with the safety significance of the event?
- What are the methods and techniques used for event analysis; how do these take account of international standards and good practices in the industry?
- What is the process for the feedback of information from event evaluations and investigations to the plant personnel?
- How is it ensured that the safety significance of the event determines the type of corrective actions and the time limit for their implementation?
- What do management believe are the key safety issues identified by OE process for the NPP?
- Does the corrective action plan contain priorities and time schedules for each corrective action?
- Are short term corrective action programmes put in place when the proposed comprehensive actions require considerable time to fully implement? Are corrective actions project managed appropriately? Is the necessary resource/finance/schedule, etc. identified? What action is taken if corrective actions are not completed by the due date?
- Can staff members or contractors point to examples of problems they have reported which have been fixed?
- Are there any corrective actions the implementation of which has been postponed? If so, for what reasons and has there been a reevaluation of the proposed corrective actions?

The inspectors should try to ascertain:

Analysis and Investigation of Events:

- Whether the procedures / guidelines for event investigation outline the conduct of an investigation in terms of means for initiation, duration, composition of the investigation team, terms of reference for the investigation team and format of the final report;
- Whether the guidelines provide for the investigation of abnormal events to establish their direct and root causes;
- Whether consideration of all types of safety is evident in the process for investigation and analysis of events;

- Whether the level of the investigations is commensurate with the consequences of an event and the frequency of recurring events;
[*significant factors that would influence the magnitude of an investigation may include the following:*
 - *the consequences of the event and the extent of damage to systems, structures and components;*
 - *any injury to on-site personnel;*
 - *whether a similar occurrence has taken place earlier at the same installation or at an installation of a similar type;*
 - *whether a significant radiological release or an overexposure of personnel has occurred;*
 - *whether plant operation exceeded the operational limits and conditions or was beyond the design basis of the plant;*
 - *whether there is a pattern that is complex, unique or not well enough understood.*]

- Whether the main phases of event analysis are implemented;
[*the main phases of event analysis include the following:*
 - *establishment of the complete event sequence (what happened);*
 - *determination of the deviations (how it happened);*
 - *cause analysis: direct cause (why it happened) and root cause (why it was possible);*
 - *assessment of the safety significance (what could have happened);*
 - *identification of corrective actions.]*

- Whether the personnel of the OPEX unit has been adequately trained in the event investigation and analysis methods and techniques.
- Whether the investigation and analysis of events is properly documented and auditable;
- Whether root cause analyses are performed also for identified low level precursor events, in order to provide for corrective actions to reduce event recurrence and prevent more significant subsequent events;
- Whether the investigation of events has resulted in clear recommendations to the plant management;

Corrective Actions

- Whether the recommended corrective actions following an event investigation address both the root causes and the contributory causes;
- Consideration of all types of safety is evident in the process for determining corrective actions;
- Whether the members of the organisation's event investigation team are involved in formulating the recommended corrective actions;
- Whether the process for determining the corrective action takes account of the following factors:
 - restoring or maintaining the desired level of safety;
 - addressing human and organisational factors;

- considering the implications on existing documentation and operational aspects;
- How are corrective actions prioritised based on their importance to safety;
- Whether the recommended corrective actions are reviewed and approved at the appropriate level prior to their implementation;
- Whether the corrective actions with long lead times remain valid at the time of their implementation in the light of later experience or more recent developments;
- Whether a periodic evaluation is carried out to review the need for items in the pending corrective actions list and to check the effectiveness of the actions implemented;
- Whether, in addition to the documentation and tracking of actions associated with each single event, a systematic compilation of actions is made to provide a historical information base of lessons learned.

Warning flags:

- Significant backlog of unanalysed events;
- Staff in charge of event investigation and analysis does not have the necessary training;
- Staff in charge of event investigation and analysis does not have support from management and / or has difficulties in the cooperation with other work groups (low status of individuals or units conducting assessments — lack of respect for findings of assessments, findings being ignored or not addressed in a timely manner);
- Incidents not analysed in depth and lessons not learned — the recurrence of a problem indicating that the fundamental cause (or causes) has (have) not been properly identified;
- Disproportionate focus on technical issues — insufficient attention to issues of human performance, problems being perceived as technical challenges to be solved by engineering means only, without considering that the solution may involve aspects of human performance;
- The initial management reaction to an event is to find who is to blame;
- Significant backlog of corrective actions not implemented (e.g. which have exceeded their target date for implementation);
- Documentation, such as operating manuals and procedures, not updated to take account of the operational experience feedback;
- No actions taken or implemented in order to eliminate root causes of past events;
- Lack of corporate oversight — lack of awareness of safety issues at the corporate level, with insufficient support for the implementation of corrective actions;
- Workers and managers tolerate longstanding equipment problems, process deficiencies, and human errors;
- Findings from regulatory inspections not addressed in the corrective action programme;
- Findings of independent external safety reviews not addressed in the corrective action programme; reluctance to accept proposals for changes that were not developed internally or lack of a process to monitor progress in implementing the recommendations of external reviews.

Characteristic E: Safety is learning driven

Attribute E.6: Safety performance indicators are tracked, trended and evaluated and acted upon

Areas for review:

- **Operational Experience Feedback**
- **Management, Organisation & Administration**

The reviews of the other areas (Training and qualification, Operation and Maintenance, Technical Support, Radiation Protection, Emergency Planning and Preparedness) should focus on assessing what specific safety performance indicators are used for each safety related process.

1) General Expectations:

- The causes of safety significant events and adverse trends should be identified and acted upon in accordance with an established time frame.
- The organization should use measures and targets in order to explain, maintain and improve safety performance at all levels.
- Results with regard to safety performance should regularly be compared with targets and the results of the comparison should be communicated to personnel.
- Action should be taken when safety performance does not match its goals, strategies, plans and objectives.
- The pitfalls of focusing on too narrow a set of safety performance indicators should be recognized.
- The organization should be alert to detect and respond to possible indications of a declining safety performance.

2) Guidelines for review:

Documentation to be reviewed:

Documents relevant to trending of operational experience:

- Guidelines for trending causal factors in events, based on the analysis of apparent causes and root causes;
- Safety performance indicators used by various departments, such as operations, maintenance, technical support, chemistry, etc. (e.g. in their self-assessments); analyses of trends in indicators and the use of such information.

Examples of questions to be asked:

- Is there an effective trending/coding process covering equipment, human performance and procedural and organizational failures?
- What do management believe are the key safety issues identified by OE process for the NPP? Are the managers interested in the trending of low level events and in the performance indicators?
- What are the specific performance indicators used by each department in the self-assessment of the specific processes? How are these indicators used and what actions are taken based on the trends of the indicators?
- Are the safety performance indicators communicated to staff members and contractors? How?

The inspectors should try to ascertain:

- Whether the licensee has implemented a process for trending causal factors in events, based on the analysis of apparent causes and root causes;
- Whether the trending process allows for the determination of frequency of occurrence of certain conditions gathered from event reports and investigations (e.g. equipment failures, shortfalls in human performance, situational data that describe conditions at the times of the events);
- Whether trending is used to analyse the performance of various work groups and to identify factors that result in either less than desired or better than expected performance;
- What are the criteria for identifying adverse trends; what are the actions taken upon identification of an abnormal trend; are adverse trends treated as events and subjected to appropriate investigation, including root cause analysis? what provisions are made for corrective actions in such instances? whether the line managers have as responsibility the deployment of necessary resources for identifying the causes of adverse trends and for implementing the necessary corrective actions.
- Whether the trend analysis reports meet the following conditions:
 - provide useful information to line managers at a regular frequency;
 - focus attention on those items in the trend report for which further action may be necessary;
 - provide sufficient detail in the report so that adverse trends can be identified and understood;
 - provide clearly labelled graphs where appropriate;
 - present data in a format that is easy to reference.
- Whether trending is used to provide an “early warning” to the management of the operating organisation of any abnormal trends and to help in gaining an understanding of the factors that may be responsible;
- Whether there is evidence of adverse trends that have been identified, investigated and acted upon – the licensee shows a proactive approach.

Warning flags:

- Recurring events not tracked and / or not acted upon;
- Exclusive use of lagging indicators to characterise safety performance / no use of leading indicators;
- Adverse trends not recognised and / or not investigated;
- Lack of corporate oversight — lack of awareness of safety issues at the corporate level, with safety issues being ignored in making business decisions.

Characteristic E: Safety is learning driven

Attribute E.7: There is systematic development of individual competences.

Note: Attribute D5 is also relevant (D5: Individuals have the necessary knowledge and understanding of the work processes)

Areas for review:

ALL areas, with a particular focus on Training and Qualification

The reviews of the other areas (Management, Organisation & Administration, Operational Experience Feedback, Operation and Maintenance, Technical Support, Radiation Protection, Emergency Planning and Preparedness) should focus on assessing in which way the specific managerial and technical competencies are developed and maintained.

The inspectors should apply a sampling approach. This would imply, for example, checking job & task analysis, job position descriptions, related training requirements, records of training and competence assessment for control room operators, field operators, maintenance staff, technical support staff, various managers, etc. in order to ascertain how the systematic approach to training has been implemented in practice.

1) General Expectations:

- Individual development programmes, including succession planning, are put in place;
- Managers and supervisors receive training in management of safety, leadership, communication, and other supervisory skills (Leadership skills are systematically developed);
- Managers and supervisors are selected and evaluated on the basis of their demonstrated ability to foster a strong safety culture;
- There is a Systematic Approach to Training implemented in licensee's organisation in respect of all activities that may affect safety; all elements of the systematic approach to training are properly implemented; (incl. appraisals of individual development are carried out to determine the training needs and development needs of individuals).
- The identification of competence requirements for all staff with nuclear safety roles takes account of the need for staff to understand the concept of safety culture and to be able to work in such a way that safety is the overriding priority;
- Consideration of all types of safety, including industrial safety and environmental safety, and of security is evident (training programmes cover all these aspects);

2) Guidelines for review:

Processes to be reviewed (examples) in the area of Training and Qualification:

- Definition of job related training requirements;
- Development of training programmes and training materials;
- Initial training;
- Continuing training / Refreshment training / Requalification;
- Authorisation process;
- Evaluation of training effectiveness.

Documentation to be reviewed:

1. Documents relevant to the organisation of the training unit:

- Organisational structure – position and staffing of the training organisation/ unit;
 - Description of interfaces between the training unit and the other organisational units;
 - Section(s) in the Management System Manual that refer to the training programme;
 - Documentation describing the roles, responsibilities and authorities of managers in the development, implementation and assessment of the training programmes;
 - Allocation of budget for the implementation of the training programme, **including trend over the last 5 years**;
 - Provisions for keeping records relevant to training activities and competence evaluations.
2. Policy documents:
- Nuclear Safety Policy;
 - Training policy;
 - Long-term strategy for training.
3. Internal standards and requirements relevant to training:
- Procedures describing the training programme;
 - References used for setting the standards for training;
 - Guidelines for self-assessment of the effectiveness of the training programme.
4. Documents relevant for the identification of training needs:
- Training needs analyses for various categories of staff - identification of learning objectives and training needs
 - Results of job and task analysis or other documents relating the adequacy of training content to job requirements;
 - Job descriptions for various categories of staff.
5. Documents relevant for the training and qualification programmes for various categories of staff with safety related duties:
- Selected training programmes and the individual training plans (initial training & continuing training) for diverse personnel groups;
 - Training programme and plans for control room operators and shift supervisors (both for theoretical training and practical training on the full-scope simulator);
 - Documents describing the authorisation process for staff with safety related duties;
 - Documents relevant to the continuing training for managers;
 - Line management and or training management self assessments;
 - Provisions for on-the-job training.
6. Documents relevant to the assessment of competences:
- Documents describing the process for evaluating competences during and after training for various categories of staff;
 - Simulator scenarios for practical exams for operators and associated marking guidelines;
 - Process for addressing situations where competence criteria are not met;
 - Records pertaining to the completion of various training modules for different staff categories/groups;
 - Records of evaluations of competences / qualification test sheets;
 - Records of in-house exams for operating staff;
 - Records of training conducted in relation with design changes / plant modifications.
7. Training materials:
- Rationale for selection of appropriate training methods and media

- Materials used in the general induction training applicable to all categories of staff;
- Materials used for the training of contractors;
- Training manuals for various plant systems;
- Technical basis documents associated with emergency operating procedures;
- Materials used for training in aspects related to quality assurance / management system.

8. Documents relevant to the competence of the instructors:

- Competence requirements and criteria for selection of training instructors;
- Instructor evaluations dealing with attitude, skill, knowledge, and abilities.

9. Documents relevant for the evaluation of the effectiveness of the training programme:

- Process for periodic evaluation of the training programmes;
- Reports on the training audits and evaluations of training effectiveness and efficiency;
- Evidence of external reviews of the training programme (incl. peer review reports and past inspection reports)
- Corrective actions resulted from self-assessment and / or other reviews of the training programmes;
- Any surveys conducted among staff to assess their satisfaction with the training programme.
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Observations:

The inspectors should observe the following:

- Classroom training for various categories of staff;
- Simulator training;
- Oral examinations and practical examinations on the full-scope simulator;
- Pre-job and post-job briefs;
- Classrooms, workshops, availability of mock-ups;
- Simulator facilities (including full-scope simulator); records of simulator hardware and software updates.

Examples of questions to be asked:

- How does the management demonstrate commitment to the implementation of the training programme?
- How does the licensee ensure that the training practices take account of the current industry standards and best practices?
- How does the training programme take into consideration all types of safety, including industrial safety and environmental safety, and of security?
- What are the provisions made to account for activities which are safety-significant, complex or infrequent and which warrant particular attention during training?
- What are the topics relevant to training discussed during the plant safety oversight committee meetings?
- Can I see evidence of training activities in relation to recent safety-related modifications to plant systems and procedures?
- Can I see the analysis of the impact on training performed as part of the assessment of a recent organisational change?
- Are the training records reviewed periodically to identify training or competence shortfalls or omissions?
- What corrective actions related to training have resulted from self-assessment? What about external reviews? How do the findings of the evaluation processes influence the specification or implementation of the training arrangements?

- What is the feedback received on the implementation of human performance improvement programmes?
- What indicators do you use for monitoring effectiveness of the training programme?
- What are the arrangements for ensuring fitness-for-duty?
- How do the managers and supervisors ensure that production needs do not interfere with the conduct of the training programme?
- How do the line managers and supervisors participate in determining the needs for training, and in ensuring that operating experience is taken into account in the training of their staff?
- How are individual career development programmes, established and implemented in the nuclear facility?
- What methods are applied in the nuclear facility to support the career development of technically potent and safety conscious young engineers?
- How are training needs of individuals and groups determined in the nuclear facility?
- In what way is hazard awareness included in training curricula, especially for shop floor staff and contractors?
- In what way does on-the-job training support the understanding for the significance of the operating limits of the nuclear facility?
- What is the procedure for dealing with situations where staff does not meet required competence standards (e.g. requalification)?
- What is the procedure for ensuring staffing of safety related positions when the holder is temporarily off-duty (i.e. on sick leave or on holiday) and somebody else has to deputise (is the deputy required to have the same competences?)
- What is the procedure for ensuring that a person receives adequate training and possesses adequate competences before being assigned a new job? (e.g. promotion, change of responsibilities, etc.)?
- What is the process for performing routine and focused self-assessments of the effectiveness of the training programme?
- What evidence there is of cross-functional and interdisciplinary cooperation and teamwork in the development and implementation of the training programmes?
- Do the training programmes include presentations of case studies and lessons learned from accidents and significant events both from the nuclear industry and other high hazard industries?
- How is the importance / role of the organisational and cultural factors emphasized as part of the training;
- How is a questioning attitude promoted through training?
- How is the open reporting of deviations and errors is encouraged through training?
- How is it ensured that the quality of training materials is adequate and commensurate with the importance of the required competences? How well the quality of visual aids such as video tapes, films, computer based animations, slides and viewgraphs support the training being conducted?
- Do the training materials include case studies and lessons learned from accidents and significant events both from the nuclear industry and other high hazard industries?
- Have there been any recommendations concerning training received from peer-reviews? How have these been addressed? Are there any other opportunities for improvement in the area of training that have been identified?

The inspectors should try to ascertain:

To what extent do the programmatic documents and the organisational framework for the implementation of the training programme are adequate:

- Whether the nuclear safety policy emphasises the importance of training;
- Whether the training policy emphasises priority to safety / mentions commitment to developing and maintaining safety culture;
- Whether it has been ensured that the training unit has sufficient independence and authority for the development and implementation of the training programmes; whether it is adequately staffed;
- Whether the interfaces and lines of communication are adequate (e.g. formal communication channels between the training group and other plant groups to ensure that the personnel technical knowledge and skills are maintained, training programmes adequately reflect current plant conditions and appropriate modifications are introduced when needed);
- Whether the responsibilities for training specified in various documents (e.g. management system manual, policy documents and general procedures describing the training programme) are clear and consistent;
- Whether the regulatory requirements set in applicable regulations and in the licence conditions are adequately reflected in the internal requirements for training;
- Whether the references used for the establishment of internal requirements for the training programme take account of current international standards and good practices;
- Whether the training policy and high level procedures describing the training programme make reference to and explain the concept of systematic approach to training;
- Whether the objectives of the training programmes are specified and are concrete and measurable and whether any specific safety performance indicators are used for monitoring the overall effectiveness of the training programme;
- The process in place for monitoring the changes in tasks, systems or procedures at the plant and for the implementation of the corresponding revision of the training programmes and material, ensuring the training content reflects the actual status at the work place and that 'negative learning' is avoided;
- Whether there is a formal process for assessing organisational changes from the point of view of impact on training;
- Whether a long term staffing strategy / plan for safety related job positions has been established;

The implementation of the Systematic Approach to Training:

- Whether the job analyses are available for all safety related job positions and whether they are up-to-date;
- Whether the necessary competences have been identified for all categories of staff and job positions; whether they include both technical competences and other skills (e.g. managerial, communication, etc.); whether the competence requirements are kept up to date, as necessary, to reflect changes due to operational experience, plant modifications and organisational changes;
- How are the selection criteria defined for various job positions and how these link with the required competences;
- Whether the training needs analysis is based on job and task analyses and identification of competence requirements;
- Whether the means for assessing competence against required standards are defined and implemented for all categories of staff with safety related duties;

- How is the assessment of competences carried out during and after training and with what periodicity; how is the independence of the assessment ensured (i.e. those carrying the assessment being independent from those providing the training);
- Whether personnel are attending the training for which they are scheduled;
- Whether the training records are up-to-date, complete, easily retrievable and used by plant managers to ensure that the required training is completed;
- Availability of guidelines for the design and implementation of training programmes for various categories of staff (including operations, technical support, maintenance, managers, etc.) – incl. initial and continuing training;
- Whether the training programmes are in line with the training policy;
- Whether training plans are evaluated periodically in order to ensure that it is consistent with current and future needs and goals;
- Scope and content of the induction training programme for all employees; basis and methods used to integrate the topic of quality programmes, nuclear safety, safety culture and ALARA into the training programmes for all groups of personnel;
- Scope and content of initial and refresher training programmes for various categories of staff;
- Scope and content of human performance enhancement programmes for different categories of staff;
- Arrangements for updating training programmes and plans to take account of operational experience feedback, of plant modifications, of organisational changes, etc.;
- Basis for selection of tasks to be included in continuing training;
- Time allocated for continuing training and means to control attendance of individual trainees;
- Training given to complete shift teams, versus individual training;
- Balance between classroom, simulator and other practical training;
- Periodic refreshment of plant systems knowledge;
- Periodic refreshment of emergency operating procedures, safety significant operations, and other important but infrequently used procedures at full scope simulator;
- Training for emergencies;
- Arrangements for the on-the-job training;
- Training arrangements for promoting safety culture;
- Basis and methods used to integrate the insights from probabilistic safety assessment into the training programmes for all relevant groups of personnel; whether important plant risk contributors are considered when establishing the basis for selection of tasks to be included in continuing training (check whether trainers are familiar with the main insights of the plant specific PSA and discuss how do they use this information);
- Arrangements for the training of contractors; if contractors are not subject to the licensee's own training and assessment practices, how do the licensee's arrangements ensure that the contractor's own arrangements for maintaining and demonstrating the competence of its staff are adequate;

The quality of training materials and facilities and competence of training instructors:

- Whether the training materials are kept up to date to reflect the as-built condition of the plant and the approved operating procedures currently in use;

- Whether training materials are available to cover all areas of competence required for the staff with safety related duties;
- Whether detailed technical information is available in the training facilities;
- Whether the training methods are subject to periodic review to ensure that they are appropriate, and reflect current standards and good practices in the industry;
- Whether the personnel who conduct training are provided with instructional skills and guidance so that they can perform their roles effectively;
- Whether the training instructors have adequate education, experience, or training in educational methods and have knowledge consistent with the technical content and requirements of the initial and continuing training programs for which they are responsible;
- Whether the training is conducted in a professional manner, instructors are prepared and trainees behave appropriately; whether there is trainee feedback provided during and after training;
- Whether the training facilities are adequate to support the effective implementation of the training programme; whether the laboratories and workshops used for practical training are equipped with mock-up models and equipment representative of actual equipment used in the plant and are well maintained;
- Whether the computer based training packages and other flexible learning materials are relevant and maintained accurate if they are used;
- Whether the full-scope simulator conforms to current standards in terms of functional and physical fidelity to the plant and whether the simulator models and simulator documentation are kept up to date to reflect plant modifications;

Evaluations of the effectiveness of the training programme

- Whether there is an established process for monitoring the effectiveness of the training programme and for performing periodic reviews of the training programme;
- Whether the evaluation process take account of information gained through factors such as operational experience feedback, trainees, instructors, plant procedures, safety reviews and inspections, other plants etc;
- Whether the licensee has performed periodic and focused self-assessments of the training programme;
- Whether the regulatory findings from past inspections have been timely and adequately addressed;
- Whether there have been external reviews (e.g. independent reviews, peer-reviews, etc.) of the training programme and what actions for improvement have be taken as a result of these;
- Whether the licensee participates in benchmarking activities to compare their training practices with those of other nuclear organisations;
- Whether the corrective actions related to training are properly addressed.

Warning flags:

- Inconsistencies between the responsibilities and authorities assigned through different documents; lack of clear accountabilities;
- The management of organisational change does not formally address impact on training;

- The internal requirements on the training programme do not address the regulatory requirements set in regulations and licences;
- No systematic analysis of training needs for safety related job positions;
- Competences not defined;
- Training programmes do not state objectives in terms of competences to be acquired;
- No systematic process for evaluating competences;
- Individuals promoted to job positions for which they have not been trained;
- Basis for waivers of training not defined (i.e. under what circumstances can be a person exempted from completing a certain training module);
- Significant backlog of training (low attendance to scheduled training, frequent re-scheduling of training activities);
- Training manuals for safety related systems not available or not updated (not reflecting current plant configuration and current/approved operating procedures);
- Technical basis documents for emergency operating procedures not available or not updated (i.e. not reflecting current plant configuration);
- Operational experience not reflected in training materials;
- Training materials are not available for all areas of competences required for safe operation;
- Training instructors do not possess the necessary competences and skills for the roles assigned;
- Low availability and or low fidelity of the simulator facility;
- No self-assessment of training programme effectiveness;
- Findings from regulatory inspections no addressed in the corrective action programme;
- Opportunities for improvement are not recognised or are acknowledged but not acted upon.