



IAEA
International Atomic Energy Agency

REPORT OF THE

INDEPENDENT SAFETY CULTURE ASSESSMENT (ISCA)

TO THE

Nuclear Research and Consultancy Group (NRG)

Petten, The Netherlands
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INDEPENDENT SAFETY CULTURE ASSESSMENT

DEPARTMENT OF NUCLEAR SAFETY AND SECURITY DIVISION OF NUCLEAR INSTALLATION SAFETY

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EXECUTIVE SUMMARY

At the request of the regulatory body of the Netherlands (ANVS) and with the agreement of the Operating Company of NRG (Nuclear Research and Consultancy Group) an independent safety culture assessment (ISCA) mission was conducted by the IAEA at Petten in June 2017. The operating organization NRG agreed a scope of the ISCA to include the Research Reactor (HFR), the isotope production facility (HCL) and the waste treatment and handling facility (DWT). These three facilities are, together with NRG, hereafter referred to as “the organization”. This report presents the findings of the IAEA team.

The overall goal with an ISCA is to support the plant in creating a common image of the organization’s safety culture and identify strengths and potential areas in needing attention. The mission team led by Ms D. Engström (Nuclear Safety Officer at IAEA) was composed of two IAEA staff members and one external expert. The conduct of the mission included interviews with NRG, HFR, HCL and DWT staff, focus groups, observations, a document review, a questionnaire and earlier review findings.

The IAEA team noted several efforts to enhance safety and safety culture within the organization and found the workforce at all levels open, approachable and willing to discuss safety. Middle managers (local managers on HFR, HCL and DWT) presence in the field and the openness within the workforce was considered as good performance and so were HFR’s efforts to revise the documents in the management system. Another example of a good performance was the reviewed facilities interactions with the owner of the buildings, the company Curium that run a process in an NRG facility, customers and service providers and experiment engineers.

Eight areas in need of attention were identified by the IAEA team. The areas were: Leadership, Management System, Nuclear Safety and Safety Culture Attention, Training and Competence, Communication, Interactions, Workload and Resources and Committee roles, independent review and quality assurance.

NRG is committed to use the findings from this ISCA along with other safety culture assessments to determine an improvement programme aligned with the needs of the changing commercial business and changes to the organisation in order to promote and strengthen NRGs culture for safety. This will be reviewed at the follow-up mission in 18 months to 2 years’ time.

MAIN CONCLUSIONS AND DISCUSSION

The two primary cultural themes within NRG were analysed to be the cultural characteristics of “Leadership for safety is clear” and “Safety is integrated into all activities”. The team identified specific aspects of these characteristic which if strengthened could develop the NRG community’s culture to be ready for any business changes or other major changes and maintain safety in operations.

The first primary theme identified for improvement was “Leadership for safety”. The analysis identified that the senior leadership (NRG leadership) for safety could be developed further and this in turn would strongly support the existing leadership for safety at facility level. A supportive cycle should exist between leadership levels to develop a consistent approach to safety which all persons can recognise, and standards and expectations are reinforced and meet continuous improvement goals.

The recommendations in the leadership for safety and the nuclear safety and safety culture attention section, and suggestion in the communication section of this report is focused on this goal. Communications directly feed into this area of culture for safety, as good communication both inside and outside the organisation aligns people and informs on the standards and behaviours expected of all persons inside the organisation. It also feeds into the characteristic of “safety is learning driven”, as one of the prime cultural effects of good communication is an informed and learning community. Self-assessment processes, such as quality assurance, also assist in this self-examination and inform improvement. Culturally an organization is primed to pay attention to what its leaders focus on or pay attention to – these overt messages are often unintentional and can strengthen or weaken a company’s culture for safety.

The second primary theme identified for improvement was aligned with the characteristic of “Safety is integrated into all activities”. This keys into a systemic approach to the design of management for safety and is associated with how the inclusion and integration of all hazards is dealt with. Good, effective management systems and their application are a strong support to leadership and the culture for safety and signal the organization’s expectations with respect to standards and behaviours to be achieved. At NRG the management system has been improved to clarify roles and responsibilities and ensure the quality of the documentation but there are aspects where NRG might benefit from improvements. The cultural aspect that drives improvement is how nuclear safety is included in the system such that it is visible to the workforce as a day to day safety topic, requiring integration with the other safety hazards managed through their systems and processes. Also, the understanding of “independent review” requires clarifying – a recommendation is made on this topic. At NRG goals, strategies, and objectives are currently not integrated in the business plan, instead they are separated into the QHSE (Quality, Health, Safety and Environment) annual plan. The plan quality is not the issue, it is the separation of the two plans that may signal that it is separate from business, and therefore the ownership may not be clear as the senior leader team’s overall plan. Four recommendations and two suggestions are included in this report associated with management for safety.

The IAEA team noted that NRG has three strong independent cultures all of which has the technical knowledge to maintain safe operation. However, the organization must handle this independency carefully, as experience with culture for safety has shown worldwide that strong independence can lead to isolation however the team also note the active seeking and adoption of new external methods and knowledge, which will counter this. The organization should encourage the cross facility engagement between personnel to enable the development of an innovative and learning culture and the development of one NRG culture for safety.

BACKGROUND

Safety culture assessment differs from other types of assessment in that it requires a deeper understanding of the underlying organizational and cultural issues behind what is explicitly observed and reported. A safety culture assessment does not lead to a clear-cut and easily actionable result, but will lead to an increased understanding of why different issues related to safety appear.

Safety culture needs to be understood in the light of its complexity. No safety culture is perfect; every organization has its areas for improvements. The objective of an independent safety culture assessment is to identify positive practices and areas that need attention.

OBJECTIVES

The overall goal of an ISCA is to support high levels of safety performance by:

- Supporting the plant in creating a common image of the organization's safety culture;
- Reviewing the interaction between individuals, technology and the organization;
- Highlighting the underlying causes of the identified safety issues
- Identifying strengths and potential areas needing attention by comparing cultural aspects to what they should be based on the IAEA Safety Culture Framework;
- Determining strengths and improvement opportunities.

METHODOLOGY

The methodology used for the ISCA is divided into two parts, which are sequential:

- A descriptive part to identify the cultural expressions (facts¹) and themes and
- A normative part to evaluate the normative cultural themes (issues²) against the IAEA framework of safety culture.

The critical aspect of the methodology is to hold the descriptive and the normative analyses separate until the final part of the assessment. This ensures the identification of the themes are not influenced by the framework before the comparison against the safety culture characteristics. It is essential to avoid a check-list-type-of-audit, where the assessors are directly comparing the findings against the normative framework in the initial part of the assessment.

Five methods are used to collect data. The methods are:

- Document review – (how the company presents its approach to safety to itself and the outside world)

¹ To align with the INSARR terminology cultural expressions will be named **facts**

² To align with the INSARR terminology normative cultural themes will be named **issues**.

- Questionnaire – (a perception survey that identifies high level cultural aspect and themes but where the analysis is dependent on the demographics chosen and the safety culture framework used)
- Interviews- (key individuals answer questions and identify how they perceive and integrate safety into their work and responsibilities)
- Focus groups – (where a group of peers can test assumptions and agree or disagree with the approach to safety of their company or their client)
- Observations – (where the safety culture assessors observe and look at the artefacts and values demonstrated on the operating premises and task level)

All 5 data streams were used in the case of NRG Petten.

BASIS OF THE RESULTS

The results of the safety culture assessment at NRG are based on:

- Document review of the Advanced Information Package for the ISCA as well as additional documentation requested during the on-site data collection.
- The Safety Culture Perception Questionnaire offered to all the employees in the targeted facilities. The response rate was approx. 60 % of the invited participants.
- Interviews were conducted representing all different functions and organizational levels with 26 individuals of NRG, as well as an interview with two representatives from ANVS.
- There were seven focus groups conducted across the organization representing all departments and levels with between 8 and 12 people in each group.
- Observations including regularly scheduled meetings (eg morning meeting, Town hall meeting), HFR control room and pond activities, work activities at HCL and the Molybdenum plant, waste treatment and drum storage and plant tours through all facilities.
- The INSARR report findings from October 2016 were also considered as one of the team members for the ISCA had also been part of the INSARR team.

1. LEADERSHIP

Strengths within the area: The workforce of HCL/HFR/DWT indicated that, through the current leadership of the Reactor manager, and Installation managers' safety culture had improved during the past 2 years. Their engagement and presence in the field was noticed, and all workers who were asked, indicated they were approachable and would offer help and advice when needed. They used proven tools for the communication of standards and expectations such as toolbox talks, pre-job and post job briefs. People also stated they trusted them to maintain safety on the plants.

In turn, the managers associated with the operating groups were also seen and engaged the workforce on the plants. This aligned with the expectations of the reactor manager and installation managers.

The IAEA team found the workforce at all levels open and approachable and willing to discuss safety and their personal input and/or their responsibilities with respect to safety. Most interviewees expressed that they take personal responsibility not only for their own safety, but also for watching for the safety of others.

A "VIP" process (Dutch abbreviation of Veiligheid Integratie Process), which has been the NRG's process to observe safety (behavioural and conditions) on plant, was implemented two years ago. It includes communication of safety and rejuvenation is planned to take it to the next level. What the next level will look like will be defined once the ISCA mission, and other safety culture assessments, is conducted and the results reviewed.

The IAEA team considered this leadership engagement and personal responsibility felt by the workforce on the facilities to be **a good performance**.

1.1 SENIOR MANAGEMENT

Issue 1.1 (1): Leadership for safety is not fully integrated into the senior managers' activities, and they do not all conduct regular field visits.

Not all the NRG senior managers demonstrated 'presence in the field', and some were described as "distant and non-communicative". However, the CEO recognises that increasing NRG senior managers 'presence in the field' by visits to plant and other workplaces, will be necessary to support safety during the coming changes to the organization. Most people interviewed would welcome more engagement with the NRG senior managers and would welcome their visits to the field as part of that process. The NRG leadership hold 'Town Hall' meetings and these are used to discuss external and internal information impacting on NRG. The January meeting was used to announce the 'dream' for NRG i.e. the intent to move from a research organisation to medical isotope innovation and manufacturing organisation. However, discussions to give further information and discuss the impact of the changes on the workforce/workplace have not been carried out yet. This was described as unsettling as many interviewees had questions around the safety of increasing throughput with existing arrangements and equipment.

Discussions with NRG revealed that, after an NRG 3-year safety leadership and culture development program (part of the 'Herstel' plan), safety culture awareness within senior management has improved. However, the leadership practices were not sufficiently implemented in senior management activities that are perceived as non-technical. Therefore,

the integration of safety requirements and safety culture awareness was not visible enough in senior level activities, and requires extra attention.

The internal safety culture programme improved the focus on safety and QHSE metrics such as safety event notification and severity classification have improved in the last 2 years. The activities require a follow-up plan, as new managers have not participated in the past safety culture development. This will need specific attention to management visibility, credibility, engagement, safety communication, and alignment of goals within the management team.

Recommendation: Senior managers should develop expectations and practices on leadership for safety for senior leaders inside the organization.

IAEA Bases

GSR PART 2

3 Leadership for safety

Requirement 2: Demonstration of leadership for safety by manager.

Managers shall demonstrate leadership for safety and commitment to safety.

3.1. The senior management of the organization shall demonstrate leadership for safety by:

(a) Establishing, advocating and adhering to an organizational approach to safety that stipulates that, as an overriding priority, issues relating to protection and safety receive the attention warranted by their significance;

(b) Acknowledging that safety encompasses interactions between people, technology and the organization

(c) Establishing behavioural expectations and fostering a strong safety culture

(d) Establishing the acceptance of personal accountability in relation to safety on the part of all individuals in the organization and establishing that decisions taken at all levels take account of the priorities and accountabilities for safety.

3.2. Managers at all levels in the organization, taking into account their duties, shall ensure that their leadership includes:

(a) Setting goals for safety that are consistent with the organization's policy for safety, actively seeking information on safety performance within their area of responsibility and demonstrating commitment to improving safety performance; (b) Development of individual and institutional values and expectations for safety throughout the organization by means of their decisions, statements and actions; (c) Ensuring that their actions serve to encourage the reporting of safety related problems, to develop questioning and learning attitudes, and to correct acts or conditions that are adverse to safety.

3.3. Managers at all levels in the organization:

(a) Shall encourage and support all individuals in achieving safety goals and performing their tasks safely

(b) Shall engage all individuals in enhancing safety performance

(c) Shall communicate clearly the basis for decisions relevant to safety.

GS-G-3.5 THE MANAGEMENT SYSTEM FOR NUCLEAR INSTALLTION

Appendix 1

2 Leadership for safety is clear

Senior corporate managers should periodically visit operation installations to assess 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 actively seek dissenting views and diverse perspectives

Managers should encourage the raising of concerns

Individuals should feel that their opinion matters

Personnel should be informed of impending changes in ways that upholds trust within the organization

2. MANAGEMENT SYSTEM

Strengths within the area: The Organization has several policies related to safety and all of them are up to date and signed by the general director and relevant experts in the different areas.

There is a companywide procedure in place which states the internal requirements for reviewing the management system.

The management system has been modified to clarify roles, responsibilities, and accountabilities. The aim was also to improve the quality of documentation and make it more user-friendly.

A first step to assess safety culture was taken in 2014 with a follow up in 2017. Safety culture activities have been carried out to address the identified gaps 2014 and a new plan will be implemented based on the 2017 results.

All but 18 of 600 HFR documents in the management system have been revised and updated. The IAEA team considered HFR's efforts to revise the documents in the management system as a **good performance**.

2.2 MANAGEMENT SYSTEM COMPREHENSIVENESS

Issue 2.2(1): The management system does not always support safety in a comprehensive manner.

HCL has a backlog of documents in the management system which must be revised and updated (169 out of 372 documents). NRG as a whole also has a backlog, 400 of 2676 documents that should have been revised in accordance with internal requirements (this includes the documents within the nuclear installations).

During the mission, the organization did not show how Safety goals, strategies, and objectives are integrated in the business plan and interviewees referred to the QHSE annual plan as the plan which states the organization's overall safety goals³. However, the four focus areas in the QHSE annual plan were not comprehensive in their application to be considered as the NRG organization's safety goals for two main reasons:

1. The QHSE plan mainly focuses on issues directly linked to the QHSE Department (Quality, Nuclear safety, Radiation safety, Occupational Safety and Health, Environment, License Management, and Emergency Organization) and does not consider matters such as training, staffing or procurement.
2. The safety goals presented in the QHSE annual plan are not in the NRG business plan and that, together with bullet 1 above, indicates that there is a weak link between the NRG business plan and the safety goals.

³ After the assessment, the organization stated that safety goals, strategies and objectives are integrated in the business plan. This will be reviewed during the follow-up mission, as requested evidence for this was not provided during the assessment.

Recommendation: NRG senior management should ensure adequate arrangements to keep the management system within the whole organization up to date, and ensure that all aspects of safety are fully integrated into the NRG business plan.

Suggestion: Senior management should consider including nuclear safety goals, strategies and objectives in the business plan.

2.3 SAFETY CULTURE MANAGEMENT

Issue 2.3(1): There is an insufficient documentation of safety culture activities in the management system and limited ownership of safety culture assessments within the organization.

Several different safety culture activities, such as a peer to peer observation programmes and leadership development, are being carried out but there is no structured plan for safety culture self-assessments and/or continuous improvement activities described in the management system.

NRG has limited access to some of the raw data used for internal safety culture assessments and relies on summaries made by external companies without reviewing the data collected or the results (undetected errors were found by the IAEA team in the 2017 summary of the survey results)⁴.

Recommendation: NRG senior management should ensure that self-assessments and independent assessments of leadership for safety and safety culture are conducted regularly, a range of different tools are used during the assessment and that all data is available for review by NRG. (A similar recommendation was given to the organization in the 2016 INSARR mission).

IAEA Bases

GSR PART 2

Requirement 4; Goals, strategies, plans and objectives

Senior management shall establish goals, strategies, plans, and objectives for the organization that are consistent with the organization's safety policy.

4.3 Goals, strategies, plans and objectives for the organization shall be developed in such manner that safety is not compromised by other priorities

4.4 Senior management shall ensure that measurable safety goals that are in line with these strategies, plans and objectives are established at various levels in the organization

⁴ At the time of the ISCA, the organization did not have access to the survey's base data – the ISCA team obtained the data directly from the external company.

4.5 Senior management shall ensure that goals, strategies and plans are periodically reviewed against safety objectives, and that actions are taken where necessary to address any deviations

Requirement 14; Measurement, assessment and improvement of leadership for safety and of safety culture

Senior management shall regularly commission assessments of leadership for safety and safety culture in its own organization

6.9 Senior management shall ensure that self-assessment of leadership for safety and of safety culture includes assessment at all organizational levels and for all functions in the organization. Senior management shall ensure that such self-assessment makes use of recognized experts in the assessment of leadership and of safety culture.

6.10 Senior management shall ensure that an independent assessment of leadership for safety and of safety culture is conducted for enhancement of the organizational culture for safety (i.e. the organizational culture as it relates to safety and as it fosters a strong safety culture in the organization).

6.11 The results of self-assessments and independent assessments of leadership for safety and of safety culture shall be communicated at all levels in the organization. The results of such assessments shall be acted upon to foster and sustain a strong safety culture, to improve leadership for safety and to foster a learning attitude within the organization.

SSR-3 SAFETY OF RESEARCH REACTORS

Management System

Requirement 4; Integrated management system

The operating organization for a research reactor facility shall establish, implement, assess and continuously improve an integrated management system.

4.12. The documentation of the management system shall be reviewed and made subject to approval at appropriate levels of management in the operating organization and shall be submitted to the regulatory body for review and assessment as requested.

GS-G-3.5 THE MANAGEMENT SYSTEM FOR NUCLEAR INSTALLATIONS

Appendix 1

1 Safety is a clearly recognized value

(c) The strategic business importance of safety is reflected in the business plan:

Goals, strategies, plans and objectives relating to safety should be clearly identified and integrated into the business plan.

6 Measurement, Assessment, and Improvement

Assessment of Safety Culture, Self-assessment of safety culture

6.35. The self-assessment of safety culture should include the entire organization. Several different self-assessment tools should be used to determine the status of the safety culture of the organization. Possible self-assessment tools include interviews, focus groups, questionnaires, observations and document reviews. The safety culture should be assessed on the basis of its characteristics and attributes. These characteristics and attributes should all be covered when developing interview questions, items for inclusion in a questionnaire or issues for discussion in focus groups.

3. CONSIDERATION OF ALL TYPES OF SAFETY

Strengths within the area: There is a lot of technical understanding among the workforce and several individuals within the organization have an in-depth knowledge regarding technology and processes within the different installations.

The team observed a good standard of housekeeping within all the reviewed installations and outside areas.

As stated in the chapter on Leadership, all levels of the workforce were perceived as open and willing to discuss their influence on safety and take responsibility for safety. However there is room for improvements regarding the workforces understanding of their impact on nuclear safety in the everyday work, and the team made a recommendation in this area.

The new management of change process is comprehensive and if rigorously applied will be helpful to the organization. It is not unwieldy as some of the interviewees suggested. In the team's view it is demanding, in the interest of safety.

Middle management show commitment to safety (see chapter "Leadership"), all meetings begin with a safety message/dialogue and the organization sends out "safety alerts" to all employees after incidents for people to learn from.

The current safety culture programme has put attention on industrial and personal safety and approximately 40 employees have been trained to become good safety observers. The interviewees expressed that this observation programme has raised their awareness regarding industrial safety. It was evident to the team that personal/industrial safety is now a focus area within the organization and that the activities have been successful.

3.1 NUCLEAR SAFETY AND SAFETY CULTURE ATTENTION

Issue 3.1(1): Nuclear safety and safety culture is not always seen and understood in a broader context

The company-wide safety culture activities so far, have mainly been behaviour based and focused on industrial safety. The safety culture questionnaire does for example mainly focus on industrial safety, and nuclear safety does not have much profile.

Interviewees and respondents in focus groups cannot remember participating in any other safety culture activity except the "VIP" (peer to peer observation programme) and there is currently a common limited understanding of what safety culture means to the organization.

The safety culture activities are implemented as discrete events rather than a continuous improvement programme and several managers have not participated in the leadership programme which was launched as a part of the "Herstel plan".

When asked about their influence on safety in the everyday work, most respondents referred to personal safety and not nuclear safety. When asked, employees on all levels within the non-technical departments were unable to give any examples of activities where their impact on nuclear safety has been highlighted or discussed.

Recommendation: Senior and middle management should promote a broader understanding of safety and ensure nuclear safety and safety culture is included in activities, training, leadership development and safety communications.

IAEA Bases

GSR PART 2 LEADERSHIP AND MANAGEMENT FOR SAFETY

Requirement 12: Fostering a culture for safety

5.2 Senior managers and all other managers shall advocate and support the following:

(a) A common understanding of safety and safety culture, including: awareness of radiation risks and hazards relating to work and to the working environment; and understanding of the significance of radiation risks and hazards for safety; and a collective commitment to safety by teams and individuals

SSR-3 SAFETY OF RESEARCH REACTORS

7. Operation of research reactor facilities

Requirement 67: Responsibilities of the operating organization

The operating organization for a research reactor facility shall have the prime responsibility for safety in the operation of the facility.

7.9. It shall be the responsibility of the operating organization to ensure the following:

...

(l) Safety culture is fostered in the organization to ensure that the attitudes of personnel and the actions and interactions of all individuals and organizations are conducive to safe conduct of activities during operation of the facility

GS-G-3.5 THE MANAGEMENT SYSTEM FOR NUCLEAR INSTALLATION

2.6 The management system shall be used to promote and support a strong safety culture by:

Ensuring a common understanding of the key aspects of safety culture within the organization

2.19. A common understanding of what is meant by safety culture should be established. Training is one of the means by which individuals can achieve this understanding. Such training should not be considered a 'one-off' event but should be provided regularly to all individuals, including senior management.

Appendix 1

3 Accountability for safety is clear

(b) Roles and responsibilities are clearly defined and understood

Individuals should understand their functions and responsibilities for safety and how their work may affect safety.

4. TRAINING AND COMPETENCE

Strengths within the area: The training and competence framework used by the organization is well developed and training for all key roles related to safety is established.

A specific matter raised across interviews and focus groups was the perception that the ratio of trainees to experienced persons was too high considering the workload. This unbalanced ratio, places a burden of mentoring and supervision on experienced workers at the task level. In addition, there was a question raised around available mentors for young new personnel as they perceived a difficulty in their assignment. **The organization is encouraged** to review these perceptions in relation to availability and effectiveness of mentors for trainees.

Although continuous personal development (CPD) of workers and the development of teams are in place, the team considers that it is not fully implemented at NRG. The IAEA team **encouraged the organization** to more fully implement CPD and teamwork development.

IAEA Bases

GSR PART 2 LEADERSHIP AND MANAGEMENT FOR SAFETY

Requirement 9: Provision of resources - Senior management shall determine the competences and resources necessary to carry out the activities of the organization safely and shall provide them.

4.21. Senior management shall make arrangements to ensure that the organization has in-house, or maintains access to, the full range of competences and the resources necessary to conduct its activities and to discharge its responsibilities for ensuring safety at each stage in the lifetime of the facility or activity, and during an emergency response.

GS-G-3.5 THE MANAGEMENT SYSTEM FOR NUCLEAR INSTALLATION

Appendix 1

4 Safety is learning driven

...

(g) There is systematic development of individual competences:

Individual development programmes, including succession planning, should be put in place.

...

5. COMMUNICATION

Strengths within the area: Direct communication on safety takes place in the workplace through the Reactor Manager, and the Installation Managers, and through their supervisors in the line. Good communication, to establish an understanding of their direct safety risks was identified within working teams. Regular meetings are held on plant which facilitates discussions on both safety and production.

Many of the workforce use STAR (stop, think, act, review) and feel empowered to stop their task if conditions are of concern or information is not available or incorrect. The team were given examples where this had occurred.

The IAEA team considered the communication practices of the Reactor manager and Installation Managers to be a **good performance**.

The plant has used the “VIP” process to enable cross plant visits focusing on safety. However, these visits have been irregular in the HCL in recent months as the “VIP” process is not being used or refreshed. These visits allow good practice sharing and the opportunity to develop cross organization communication. The IAEA team **encouraged** the organisation to find ways of cross plant communication that allows exchanges of experiences and good practice.

5.1 SAFETY COMMUNICATION BETWEEN DIFFERENT LEVELS OF THE ORGANISATION

Issue 5.1(1): There is a gap in safety communication between senior managers and the workforce so that situations and decisions at the corporate level affecting safety are not discussed and communicated effectively.

There is a gap in direct safety communication from the senior managers in NRG to the workforce on the local sites (HFR, HCL and DWT). Senior managers rely on intranet, newsletters and ‘town hall meetings and do not take part in workplace visits. This means that communication including safety expectations policy and standards is not always being delivered in an engaging manner. It was also identified that at a senior level, the functions that are not involved in technical aspects of the operations, were not always clear of their impact on safety and so were unsure of their role in safety communications.

Standard logs and handover arrangements are used for communication between shifts and are the prime way to transfer safety information. However, communication routes to ‘out of day hour’ shifts, including event communication, is recognised as difficult, and ensuring messages and information are received and understood is perceived to be challenging under current arrangements. Plants rely on the shifts to actively look at the intranet for communication.

Suggestion: The organisation should consider improving the face-to-face communication from senior managers to the work force, and improving their engagement with the day-to-day operations to facilitate exchanges of experience and communication on corporate decisions.

Suggestion: The organization should consider improving the communication with the shift teams on ‘out of day hours’ shifts.

[It was noted by the team that NRG have developed a communications plan which was approved during the ISCA, and they have also engaged an organization to suggest what NRG can do to develop its internal communication.]

IAEA Bases

GSR PART 2 LEADERSHIP AND MANAGEMENT FOR SAFETY

Communication

5.2. Senior managers and all other managers shall advocate and support the following:

(c) An organizational culture that supports and encourages trust, collaboration, consultation and communication;

3.23. Organizations should promulgate a policy for promoting and managing change that encompasses their vision and values. This policy for change management:

(e) Should promote effective communication

GS-G-3.5 THE MANAGEMENT SYSTEM FOR NUCLEAR INSTALLATION

2.10. Senior management should establish and promote a set of principles to be used in decision making and promoting safety conscious behaviour. Examples of such principles used in some organizations are as follows:

...

(c) Trust and open communication permeate the organization

Appendix 1

1 Safety is a clearly recognized value

(a) The high priority given to safety is shown in documentation, communications and decision making:

...

The rationale for significant decisions relating to safety should be communicated regularly to personnel.

...

6. INTERACTIONS

Strengths within the area: The organization has a complex interaction with many other organisations e.g. the owner of the buildings (ECN), the company Curium that run a process in an NRG facility, customers and service providers (eg transport) and experiment engineers. These interactions were reviewed, seen to run well in terms of maintaining safety, and are adaptable to change. **This IAEA team considered this as a good performance.**

6.1 INTERACTIONS BETWEEN FACILITIES

Analysis of processes inside HFR using human factors engineering principles has taken place and these may assist HCL and DWT to identify equipment and procedure modifications to enhance human reliability, as the organization changes production focus. **The IAEA team consider this to be a good performance.**

The different facilities (HFR, HCL, DWT) run like a group of ‘villages’ with strong communication and trust inside each ‘village’. This strong cohesion helps safety and *the individual* ‘villages’ technical knowledge also helps maintain safe operations within the specific ‘village’.

However, a strong village mentality can cause barriers to cross-company sharing of good practices when. Peers currently do not have an opportunity to see and discuss what other practices are being developed in the other facilities, and they are not actively sought out by the other ‘villages’ due to their strong self-reliance. One example of this was the development of the long-term operation and ageing management processes being developed in HFR. These development activities are seen as a pilot, but a clear plan for the transfer of good practice between ‘villages’ has not yet been developed.

The IAEA team encouraged the organization to develop strong links between the different facilities in order to develop the exchange of operational safety practices to harness the organization’s successful innovations.

6.2 INTERACTIONS BETWEEN NRG AND THE REGULATOR

Issue 6.2(1): The interaction and communication with the regulators is perceived as complicated at all levels of the organization.

The interaction with the regulators is complicated by ‘special supervision’ activities. The perception at all levels within NRG is that the relationship between NRG and Regulators is difficult. The regulatory deadlines have been perceived by NRG as challenging, particularly when completion dates clash. These are perceived to exacerbate workload issues, and in addition, the level of detail of the actions requested by the regulators is also of concern. Both the regulator and NRG employees stated that the interactions and communication has been challenging in recent times, but progress is being made and interactions are developing and maturing. Some employees stated they would welcome feedback on regulatory interactions.

Suggestion: The organization should consider continuing developing their relationship with the regulator, so that both may benefit from a deeper understanding of each other’s responsibilities, and also ensure that the workforce awareness of interactions with the regulator is improved through regular communication. .

[It was noted by the IAEA team that the organization has asked IAEA for LTO assistance]

IAEA Bases

GSR PART 2 LEADERSHIP AND MANAGEMENT FOR SAFETY

Requirement 5: Interaction with interested parties:

Senior management shall ensure that appropriate interaction with interested parties takes place.

4.6. Senior management shall identify interested parties for their organization and shall define an appropriate strategy for interaction with them.

GS-G-3.5 MANAGEMENT SYSTEM FOR NUCLEAR INSTALLATIONS

4.13 For an organization to be able to provide critical information, it should manage pertinent knowledge so that it is easily accessible to those who may need it for carrying out their tasks. An organization should have an integrated, systematic approach to identifying, capturing, managing and sharing its knowledge and, in so doing, enable groups of individuals to acquire 'new' knowledge collectively to help achieve the objectives of the organization. Such a knowledge management system helps an organization to gain insight and understanding from its own experience.

7. WORKLOAD AND RESOURCES

Strengths within the area: The 2016 INSARR mission recognised that a procedure for critical functions identification and management has been implemented to ensure the availability of in-house resources. The procedure is still valid and viewed by managers, an important tool for resource management and succession planning.

7.1 WORKLOAD AND RESOURCE MANAGEMENT

Issue 7.1(1): There is a perception in the workforce that workload is not being assessed and managed.

Despite a steady growth in the number of employees over the past 2 years, comments and statements regarding increased and “too high” workload were made during many interviews and focus groups. The questions around workload started at the senior level of the organization, and were heard through to working teams. This may be a transient effect as the changes to the organization, planned, and implemented, take place. Examples from the focus groups showed a concern with how workload was being assessed and managed. One perception was “we used to have people and no money, now we have money and no people”. One indicator seen that may support this perception is the rise in sickness absence rates inside the organization.

Suggestion: The Organization should consider investigating how it can better assess and manage workload, looking for factors that indicate short term issues and those that may indicate a need to redesign work flow or adjust available resources. The rise in sickness absence rates should be reviewed in relation to workload affects.

IAEA Bases

GSR PART 2 LEADERSHIP AND MANAGEMENT FOR SAFETY

Requirement 9: Provision of resources

Senior management shall determine the competences and resources necessary to carry out the activities of the organization safely and shall provide them.

GS-G-3.5 THE MANAGEMENT SYSTEM FOR NUCLEAR INSTALLATIONS

Safety is integrated into all activities

(g) Good working conditions exist with regard to time pressures, workload and stress.

8. SAFETY COMMITTEES

Strengths within the area: The personal skills and comprehensive knowledge in the three reviewed safety committees (Reactor Safety Committee, HCL safety Committee and HFR Safety Committee) creates a good basis for advice and decisions in safety related matters. The open atmosphere within the different committees allows group deliberations and combined judgment of all the members to be brought to bear on important problems.

8.1 SAFETY COMMITTEES ROLES AND INDEPENDENT REVIEWS

Issue 8.1(1): The different safety committees' roles and responsibilities are not understood consistently across the organization, and there are uncertainties regarding who is responsible for the independent reviews.

The answers from the respondents indicate inconsistencies in how they perceive the reactor safety committees' role and responsibilities. Several of the interviewees and focus groups told the IAEA team, on a direct question, that the Reactor Safety Committee (RSC) is responsible for the independent review of safety related documents. However, according to managers within HFR and HCL, the installation committees (HSC and LSC) are responsible for the independent review while RSC is supposed to have a general advising role on nuclear safety related issues. The independent advising role of RSC is supported by The Rules and regulations of RSC but the independent review role of HSC and LSC is not documented in the management system even though HSC's role and responsibilities are described in a procedure. The procedure for LSC roles and responsibilities are not yet approved (it has recently been drafted). The regulators do not consider the local safety committees (HSC and LSC) to be responsible for the independent review.

A general review, made by the IAEA team, of some of the RSC minutes of meetings and the RSC Rules and regulations suggests that there is a general belief that the RSC is not important; there is for example low attendance at some meetings, no annual report is written and there is a lack of follow up by senior management and the RSC on the implementation of actions associated with recommendations. However, since October 2016, HFR management gives regular updates (twice a year) to RSC on the HFR performance and annual plan (this is an action that was taken by HFR because of a recommendation in the 2016 INSARR report).

Recommendation: Senior management should ensure consistent understanding of the different roles and responsibilities of the safety committees and make the responsibility for independent safety reviews explicit in the management system (an additional IAEA recommendation regarding the follow up of RSC advices can be found in the 2016 INSARR report).

8.2 SAFETY COMMITTEE ADVICE AND QUALITY ASSURANCE

Issue 8.2(1) The organization does not have a common understanding of why 50 % of documents sent to RSC are not approved on first review.

An issue raised by the interviewees during the mission is that the RSC reviews often are very detailed and this has become a common subject for discussions among managers within the installations, who wish to be given more general safety advices. However, the detailed quality assurance made by the RSC, together with the fact that almost 50 % of the documents are not

approved on first review, does also raise a concern regarding the quality assurance within the organization.

Suggestion: Senior management should consider investigating why many documents are being rejected by the RSC despite the applied quality assurance process.

IAEA Bases

GSR PART 2 LEADERSHIP AND MANAGEMENT FOR SAFETY

Requirement 6; Integration of the management system

The management system shall integrate its elements, including safety, health, environmental, security, quality, human-and-organizational-factor, societal and economic elements, so that safety is not compromised.

4.11. The organizational structures, processes, responsibilities, accountabilities, levels of authority and interfaces within the organization and with external organizations shall be clearly specified in the management system.

4.14. Arrangements shall be established in the management system for an independent review to be made before decisions significant for safety are made.

GS-G-3.1 APPLICATION OF MANAGEMENT SYSTEM FOR FACILITIES AND ACTIVITIES

5.68 The individual who has the authority to approve changes to be implemented should be clearly designated. For each change, and on the basis of the significance of the change, controls should be applied to ensure that it is possible to identify the individual in the organization who is authorized to approve the change

GS-G-3.5 THE MANAGEMENT SYSTEM FOR NUCLEAR INSTALLATIONS

Appendix 1

3 Accountability for safety is clear

(b) Roles and responsibilities are clearly defined and understood:

The organization is required to define and document functions and responsibilities for all aspects of safety that is under its control

Individuals should understand their functions and responsibilities for safety and how their work may impact safety

4 Safety is integrated into all activities

(c) The quality of documentation and procedures is good:

—Procedures should be controlled, clear, understandable, and up to date and should be easy to find, use and revise.

—Documentation should be comprehensive, easy to understand and easily accessible.

—Responsibilities for preparing documentation and the scope of reviews should be clearly defined and understood.

5 Safety is learning driven

(c) Internal and external assessments, including self-assessments, are used:

Various oversight forums and processes, including self-assessment, should be used to review, evaluate and enhance the safety performance of the organization.

The number and types of oversight mechanism should be periodically reviewed and adjusted.

Oversight should be viewed positively and constructive use should be made of external or independent opinions.

Periodic safety culture assessments should be conducted and used as the basis for improvement.

Senior managers should be periodically briefed and should initiate actions on the basis of the results of oversight activities.

ANNEX 1: REVIEWED DOCUMENTS

Documents related to safety policy, safety culture, human performance, and safety procedures;

- Planning and operational decision-making procedures;
- License event reports and associated documents showing the decisions taken to recover and prevent events from reoccurring;
- Indicators of safety performance and trends;
- Internal event reports, cause analyses, action status and lessons learned;
- Communications to personnel regarding safety and safety culture;
- Internal assessment results;
- Previous safety culture assessments;
- Corrective actions and closure of corrective actions;
- Maintenance backlogs;
- Training attendance records;
- Overtime policy and absentee records;
- Employee concerns programmes;
- Improvement plans;
- Operating experience used by the organization.

ANNEX 2: DEFINITIONS

Issue

An “issue” is normally the statement of the analysed situation that requires addressing as a “recommendation” or “suggestion”.

Recommendation

A recommendation is advice on what improvements in operational safety should be made in order to support or improve culture for safety. It is based on IAEA Safety Standards or proven, good international practices and addresses the root causes rather than the symptoms of the identified concern. It very often illustrates a proven method of striving for excellence, which reaches beyond minimum requirements. Recommendations are specific, realistic and designed to result in tangible improvements.

Suggestion

A suggestion is either an additional proposal in conjunction with a recommendation or may stand on its own following a discussion of the pertinent background. It contributes to improvements in operational safety and culture for safety, but is primarily intended to make a performance more effective, to indicate useful expansions to existing programmes, and to point out possible superior alternatives to ongoing work. In general, it is designed to stimulate the plant management and supporting staff to continue to consider ways and means for enhancing performance.

Encouragement

If an item does not meet the criteria for a suggestion and/or there is in place an existing improvement programme which is seen to be working, and the expert or the team feels that mentioning it is desirable to encourage a continued effort, the given topic will be included in the text of the report as an “encouragement” or “encouraged to....”.

Good performance

A good performance is where the organization has adopted an approach or improvement that is seen to actively support culture for safety to strive for a strong safety culture, and where the performance can be seen or demonstrated and sustained, and keys into the characteristics and attributes of the IAEA safety culture framework.

ANNEX 3: LIST OF IAEA REFERENCES (BASES)

The basis for the ISCA was the IAEA Safety Standards and Guidelines. The following IAEA documents were used as basis of this mission:

- IAEA Safety Standards No. GSR Part 2: Leadership and Management for Safety, 2016
- IAEA Safety Standards No. SSR-3: Safety of Research Reactors, 2016
- IAEA Safety Standards No. GS-G-3.5: The Management System for Nuclear Installations, 2006
- IAEA Safety Standards No. GS-G-3.1 Application of the Management System for Facilities and Activities, 2008

ANNEX 4: LIST OF PARTICIPANTS OF THE 2017 INDEPENDENT SAFETY CULTURE ASSESSMENT

List of Interviewees

1. CEO NRG
2. Business Unit Manager Nuclear Operations
3. Business Unit Manager Irradiation Solutions
4. Manager Quality Health Safety and Environment
5. General Radiation Protection Expert
6. Reactor manager HFR
7. Manager Nuclear Safety HFR
8. Manager Operation HFR
9. Shift supervisor HFR
10. Maintenance engineer HFR
11. Project engineer HFR
12. Operator HFR
13. Operator HFR
14. Radiation protection expert HFR
15. Installation Manager HCL
16. Manager Decontamination and Waste Treatment
17. Manager Nuclear Safety Hot Cell Laboratories
18. Operator 1 HCL
19. Operator 2 HCL/WSF
20. Project engineer HCL
21. Chairman Reactor Safety Committee
22. HR manager/Training manager
23. Security manager
24. Manager Finance/procurement
25. ANVS inspector
26. ANVS inspector

List of Focus groups (8-12 people/group)

1. FG1 – NRG Management
2. FG2 – Nuclear Operations Management
3. FG3 – Team leaders HFR
4. FG 4 – HFR Employees
5. FG5 – HFR Employees
6. FG6 - HCL/DWT Employees
7. FG7 - HCL/DWT Employees

IAEA expert team

- D. Engström Nuclear Safety Officer IAEA
- H. Rycraft Nuclear Safety Officer IAEA
- J.B. Taylor Nuclear Safety Expert (Independent consultant)