

IAEA-NSNI/ISCA

ORIGINAL: ENGLISH

DISTRIBUTION: ~~RESTRICTED~~



REPORT OF THE

**FOLLOW-UP INDEPENDENT SAFETY CULTURE  
ASSESSMENT (ISCA)**

TO THE

**Nuclear Research and Consultancy Group (NRG)**

**Petten, The Netherlands**  
**8-11 April 2019**

INDEPENDENT SAFETY CULTURE ASSESSMENT

DEPARTMENT OF NUCLEAR SAFETY  
AND SECURITY

DIVISION OF NUCLEAR INSTALLATION  
SAFETY

## TABLE OF CONTENTS

EXECUTIVE SUMMARY.....	3
MAIN CONCLUSIONS .....	5
SUMMARY: 2017 ISCA CONCLUSIONS.....	5
2019 ISCA FOLLOW-UP MAIN CONCLUSIONS .....	5
INTRODUCTION .....	7
BACKGROUND .....	7
ISCA METHODOLOGY .....	7
ISCA FOLLOW-UP METHODOLOGY .....	7
1. LEADERSHIP – SUMMARY AND FOLLOW-UP.....	8
1.1 SENIOR MANAGEMENT .....	8
2. MANAGEMENT SYSTEM .....	10
2.2 MANAGEMENT SYSTEM COMPREHENSIVENESS.....	10
2.3 SAFETY CULTURE MANAGEMENT .....	11
3. CONSIDERATION OF ALL TYPES OF SAFETY – SUMMARY AND FOLLOW-UP.....	12
3.1 NUCLEAR SAFETY AND SAFETY CULTURE ATTENTION .....	12
4. TRAINING AND COMPETENCE .....	14
5. COMMUNICATION.....	15
5.1 SAFETY COMMUNICATION BETWEEN DIFFERENT LEVELS OF THE ORGANIZATION .....	15
6. INTERACTIONS.....	17
6.1 INTERACTIONS BETWEEN FACILITIES .....	17
6.2 INTERACTIONS BETWEEN NRG AND THE REGULATORY .....	17
7. WORKLOAD AND RESOURCES .....	19
7.1 WORKLOAD AND RESOURCE MANAGEMENT .....	19
8. SAFETY COMMITTEES .....	21
8.1 SAFETY COMMITTEES ROLES AND INDEPENDENT REVIEWS.....	21
8.2 SAFETY COMMITTEE ADVICE AND QUALITY ASSURANCE .....	22
ANNEX 1: REVIEWED DOCUMENTS.....	23
ANNEX 2: DEFINITIONS.....	24
DEFINITIONS – ISCA .....	24
DEFINITIONS – ISCA FOLLOW UP.....	24
ANNEX 3: LIST OF IAEA REFERENCES (BASES).....	26
ANNEX 4: LIST OF PARTICIPANTS OF THE 2019 INDEPENDENT SAFETY CULTURE ASSESSMENT FOLLOW-UP .....	27

## 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) a Follow-up Independent Safety Culture Assessment (ISCA) mission was conducted by the IAEA at Petten in April 2019. An ISCA was conducted in June 2017 and the operating organization NRG agreed that the scope would 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 follow-up findings.

The overall goal of the ISCA was to support the organization to create a common image of the organization’s safety culture and identify strengths and potential areas needing attention. The main objective with the follow-up ISCA was to review the implementation of the recommendations and suggestions provided by the ISCA mission.

The follow-up ISCA mission was conducted by an IAEA Team Leader and an external consultant from Belgium. A follow-up Integrated Safety Assessment of Research Reactors (INSARR) mission was conducted at the same time as the ISCA follow-up and the teams cooperated during the follow-ups. The mission purpose was to follow-up on how the organization had dealt with the original findings and assess the progress.

Eight areas in need of attention were identified during the 2017 ISCA. 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.

The ISCA follow-up team noted the good level of implementation of the recommendations and suggestions and acknowledge that the organizations also had taken actions on the encouragements received during the 2017 ISCA.

The ISCA follow-up team assessed that all the ISCA recommendations and suggestions had been addressed and actions taken. Three recommendations were considered having ‘satisfactory progress to date’, one recommendation was considered having ‘insufficient progress to date’ and one recommendation was divided in two parts and given two different grades. Three suggestions were considered being ‘resolved’, two suggestions were considered as having made ‘satisfactory to date’ and one was considered as having ‘insufficient progress to date’.

The recommendations and suggestions that were considered having satisfactory progress to date were mainly related to:

- The development of expectations and practices on leadership for safety for senior leaders
- The development of a leadership profile and leadership development programme
- The establishment of safety culture assessment procedures and plans
- Several different communication efforts

Some of the ISCA recommendations and suggestions were considered having ‘insufficient progress to date’ although some actions have been taken in this regard. These recommendations and suggestions, which are important to the development of a strong safety culture remain valid and actions need to be taken by the organization. These recommendations and suggestions are related to:

- The arrangements to keep the management system up to date within the organization
- The understanding of roles and responsibilities of the reactor safety committee
- The organizations assessment and management of the perceived workload

## MAIN CONCLUSIONS

### SUMMARY: 2017 ISCA CONCLUSIONS

During the ISCA in 2017, 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 characteristics 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 the 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 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 culture for safety and signal the organization’s expectations with respect to standards and behaviours to be achieved.

The ISCA team also noted that NRG had three strong independent cultures all of which have the technical knowledge to maintain safe operation. The organization must handle this independence 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.

### 2019 ISCA FOLLOW-UP MAIN CONCLUSIONS

Culturally related issues are not always easy to address and require long term and persistent work to improve. Continuous efforts are necessary to maintain and strengthen safety culture. Therefore, it is important that the organization continues the implementation of the defined actions and conducts assessments on a regular basis. Improvement requires participation from all levels of the organization and all individuals should contribute to foster and sustain a strong safety culture.

The ISCA follow-up team noted a good level of implementation of the recommendations and suggestions of the ISCA mission.

A new leadership profile and a leadership development programme have been established to clarify and communicate the expectations on leadership for safety. By implementing a ‘management in the field programme’ for senior managers, the organization expects to improve the communication between the senior managers and the work force.

Actions have been taken both by the installations (HFR, HCL and DWT) and the NRG staff to reduce the number of expired documents in the management system. However, more efforts are

needed to ensure that all documents of the organization, especially within the NRG staff group (which consists of the departments HR, QHSE, Finance, ICT and security), are up-to-date.

Several communication efforts and meeting forums have been established by the organization. Although most of these were implemented recently, positive effects such as increased exchange of new ideas and lessons learned between the installations' management teams and closer cooperation between the NRG staff and the installations were evident.

To ensure the continuous improvement of safety culture a new procedure for self-assessment has been established in the management system. The process includes a description of the self-assessment, and also entails a learning loop. A nuclear professionalism programme is currently running to increase awareness on nuclear safety and discuss personal accountability and individual influence on nuclear safety.

In the 2017 ISCA it was noted that each facility was like a 'village' with strong communication and trust inside each 'village'. Peers did not have the opportunity to exchange ideas and experiences developed within the other facilities due to their strong self-reliance. The ISCA follow-up team acknowledged that the ongoing actions, if implemented effectively, will not only lead to improvement within the different areas, but will also contribute to the establishment of a companywide NRG spirit which allows better communication and cooperation throughout the organization.

Some of the ISCA recommendations and one suggestion have not yet been implemented, although some actions have been taken in this regard. The team concluded that these recommendations, which are important to safety culture, remain valid.

- The insufficient arrangements to keep the management system up to date within the organization
- The insufficient understanding of roles and responsibilities of the reactor safety committee
- The insufficient progress of understanding and reducing the perceived work load.

## INTRODUCTION

### BACKGROUND

The production of medical isotopes is the primary activity of the reactor and several facilities in Petten and Arnhem, which is managed by NRG. The organization employs about 700 employees. It strives for the development of new applications of medical isotopes used to treat life-threatening diseases. NRG performs this mission in collaboration with academic medical centers and pharmaceutical companies. NRG is an internationally operating nuclear service provider. It conducts nuclear technological research, is a consultant for the safety and reliability of nuclear plants and provides services in the field of radiation protection. It also conducts research for governments aimed at developing knowledge about nuclear technology. NRG operates the High Flux Reactor owned by the European Union. The company works for and with partners in the health sector, the energy market, the industrial sector, government and the science sector.

### ISCA METHODOLOGY

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.

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.

### ISCA FOLLOW-UP METHODOLOGY

The ISCA follow-up was conducted from 8 to 11 April 2019. An expert team of two performed a document review, observations, focus groups and group interviews in order to assess progress made within each area. Daily feedback ensured mutual understanding between the assessors and the organization. The conclusions were presented during an exit meeting with participants from NRG and the regulatory body.

## 1. LEADERSHIP – SUMMARY AND FOLLOW-UP

### *Summary 2017 ISCA findings*

During the ISCA, 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. In turn, the managers associated with the operating groups were also seen and engaged the workforce on the plants. 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.

*Summary:* During the ISCA, it was described that not all the NRG senior managers demonstrated 'presence in the field', and managers were described as 'distant and non-communicative'. Most people interviewed would have welcomed more engagement with the NRG senior managers and their visits to the field as part of that process. Discussions with NRG revealed that, after an NRG 3-year safety leadership and culture development programme (part of the 'Herstel' plan), safety culture awareness within senior management had 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.

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

### *2019 ISCA follow-up findings*

**Actions performed:** The organization has developed a leadership profile based on IAEA GSR Part 2 requirements and the Humble Leadership approach and it is being implemented through the new leadership development programme (see below).

In February 2019, NRG invited the IAEA to conduct a Leadership and Culture for Safety workshop for their senior managers. Representatives from another licensee and the regulatory body were also invited to the workshop.

**Actions in progress:** The first leadership development programme, based on 10 sessions, started in September 2018 and will end in May 2019. Approximately 20 randomly selected managers are currently participating in the programme and a new group of managers will begin the training once the current participant have finished their training. In the upcoming years a total of about 70 identified managers will have gone through the programme.

Operational managers have conducted safety observations since 2017. However, to increase senior management presence in the field, a Management in the field programme has been developed specifically for senior management, and small groups of senior managers conduct



observations and engage with employees to discuss safety every month. The managers are obliged to document their field observations and conversations and an analysis of the results will be conducted on regular basis.

**Results:** Since the first leadership development programme is still running and the management in the field programme has just started, but all procedures are in place, the ISCA team considered the actions taken have led to satisfactory progress to date.

## 2. MANAGEMENT SYSTEM

### *Summary 2017 ISCA findings:*

The Organization presented several policies related to safety during the ISCA and all of them were up to date and signed by the general director and relevant experts in the different areas. There was also a companywide procedure in place which stated the internal requirements for reviewing the management system.

The management system had been modified to clarify roles, responsibilities, and accountabilities and all but 18 of 600 HFR documents in the management system had 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.

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

Also, during the ISCA, the organization did not show how safety goals, strategies, and objectives were integrated in the business plan and interviewees referred to the QHSE annual plan as the plan which states the organization's overall safety goals. After the assessment, the organization stated that safety goals, strategies and objectives were integrated in the business plan but 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.

### *2019 ISCA follow-up findings*

**Actions performed:** The process of the annual plan has been updated, the main change is that it is no longer exclusively financially oriented. The scope has been broadened with, among others, safety and quality elements. It is now perceived as a summary of the detailed plans of each department. The annual plan is now published in the management system and communicated to all employees to support transparent management.

A tool to signal when documents are out of date has been developed and implemented. The back log at HCL is reduced and a positive culture is being implemented to have good quality, up to date documents. However, a back log (229 documents at date) is still seen in the NRG staff group documentation, with some of them being related to safety and/or security.

Actions in progress: The organization is currently developing a strategic plan (business plan) for multiple years and is considering how to optimally promote safety into the plan. Some aspects have been communicated internally but it is still in draft. In the future the annual plan will be aligned with the strategic plan.

The installations have appointed dedicated document controllers. However, the role of the document controller is not yet described in a dedicated role description to ensure a certain level of quality throughout the organization. This is in progress.

**Results:** The organization has incorporated safety and ensured alignment between the company wide annual plan and the departmental annual plans, this is considered by the ISCA team to be satisfactory progress to date. However there has been an insufficient progress to date in keeping the management system within the whole organization up-to-date although some arrangements were made by the organization and improvement was seen in the installations.

## 2.3 SAFETY CULTURE MANAGEMENT

### *Summary 2017 ISCA findings:*

**Issue 2.3(1):** During the ISCA, it was noted that there was 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, were being carried out but there was no structured plan for safety culture self-assessments and/or continuous improvement activities described in the management system.

**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).

### *2019 ISCA follow-up findings*

Actions performed: The organization has implemented a process, including a detailed work instruction, for safety and security culture assessments in the management system. The first independent safety culture assessment was conducted in 2017 and a follow-up mission in 2019. The next step is to conduct a self-assessment and a decision has been made to conduct a self-assessment in 2020.

Actions in progress: An assessment team will be put together shortly and will receive training before they begin to collect and analyse data.

**Results:** An independent assessment and a follow-up mission have already been conducted. The self-assessment is not yet conducted, but all procedures and work instructions are in place, and the ISCA team considers the actions taken represent satisfactory progress to date.

### 3. CONSIDERATION OF ALL TYPES OF SAFETY – SUMMARY AND FOLLOW-UP

#### *Summary 2017 ISCA findings:*

During the ISCA, the team noted a high level of technical understanding among the workforce. The team observed a good standard of housekeeping within all the reviewed installations and outside areas. It was evident that the safety culture programme had put attention on industrial and personal safety and approximately 40 employees had been trained to become good safety observers when the ISCA was conducted. The interviewees expressed that this observation programme had raised their awareness regarding industrial safety. However, the team also identified room for improvements regarding the workforces' understanding of their impact on nuclear safety in the everyday work.

#### 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

At the time of the ISCA, the company-wide safety culture activities so far had mainly been behaviour based and focused on industrial safety. The safety culture questionnaire, for example mainly focused on industrial safety, and nuclear safety had a lower profile.

Interviewees and respondents in focus groups couldn't remember participating in any other safety culture activity except the 'VIP' (peer to peer observation programme) and there was a common limited understanding of what safety culture meant to the organization.

The safety culture activities were implemented as discrete events rather than a continuous improvement programme and several managers had not participated in the leadership programme which was launched as a part of the 'Herstelplan'.

**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.

#### *2019 ISCA follow-up findings*

**Actions performed:** As seen in other chapters in this follow-up report, multiple actions have been taken to address safety culture in a broader sense, which originated from a generic NRG Management Team action plan based on various assessments done at NRG between 2014 and 2017 (please see Actions in progress).

The organization has also established a safety culture improvement team, led by an external consultant and with members from different departments which has developed an NRG Safety Culture vision and created a draft of a safety culture framework.

Furthermore, on-boarding training for new employees has been developed to ensure new employees get a good understanding of the facilities and related tasks within the organization.

**Actions in progress:** As mentioned above, several actions have been taken to address safety in a broader sense. One example is the nuclear professional training which is being implemented,

in which nuclear incidents and individual accountability are discussed, and another example is the leadership programme that has been developed.

**Results:** Since the actions are still being implemented and not all employees have received the nuclear professional training yet, the ISCA-team considered the actions taken represent satisfactory progress to date.

## 4. TRAINING AND COMPETENCE

### *Summary 2017 ISCA findings:*

**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 during the ISCA was the perception that the ratio of trainees to experienced persons was too high considering the workload. This unbalanced ratio placed 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 were already in place by the time of the ISCA, the team considered that it was not fully implemented at NRG. The IAEA team **encouraged the organization** to more fully implement CPD and teamwork development.

### *2019 ISCA follow-up findings*

**Actions performed:** To reduce the workload of mentoring shift managers, a new way of training has been introduced. New employees will now participate in some of the training in classrooms with dedicated trainers.

**Actions in progress:** To further enhance structured training and competence for NRG employees, a learning management system (LuMoS) has been developed and piloted with good results. The system will be gradually implemented starting from Q3 2019. It offers a better overview of available training modules, an easier registration process and more efficient follow-up of the training plans.

**Results:** Encouragements are not graded in ISCA follow-up missions. However, the ISCA team considered the efforts made within this area as important to mention since they have a positive effect not only within this area but also on some of the other issues and the safety culture in general.

## 5. COMMUNICATION

### *Summary 2017 ISCA findings:*

During the ISCA it was noted that 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**.

### 5.1 SAFETY COMMUNICATION BETWEEN DIFFERENT LEVELS OF THE ORGANIZATION

**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.

During the ISCA, the IAEA team identified 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 relied on intranet, newsletters and town hall meetings and did not take part in workplace visits. Communication, including safety expectations, policies and standards was not always being delivered in an engaging manner.

Communication routes to ‘out of day hour’ shifts, including event communication, was recognised as difficult, and ensuring messages and information were received and understood was perceived to be challenging under current arrangements.

**Suggestion:** The organization 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.

### *2019 ISCA follow-up findings on the suggestion related to face-to-face communication:*

Actions performed: HFR and HCL/DWT have implemented a joint operational management meeting every month to learn from each other, resolve common problems, discuss (potential) issues and search for synergies with current programmes. The involved managers agreed that this formalized meeting has helped them to improve the communication and exchange of experiences between the installations. A two-way communication meeting between management and staff has also been implemented and is held every two weeks to discuss safety related issues, ongoing projects, changes in legislation etc. Employees considered this to be a good initiative and the meetings are well-attended.

Actions in progress: Other communication initiatives to improve safety communication are under implementation. Coffee table meetings, where open conversations on specific (safety) culture topics will be facilitated by members of the executive committee, will start in May 2019. Voluntary nuclear professional training (200 employees participated up to date) is being conducted regularly. The organization has also implemented ‘Thinking Forward’ meetings, chaired by an employee, to discuss the NRG strategy, the annual plans, topics concerning the collective labour agreement and important projects.

**Results:** The organization has implemented several new methods to improve the face-to-face communication on safety related issues, strategies, potential problems and to learn from each other. The issue is resolved.

***ISCA follow-up 2019 findings on the suggestion related to the communication with shift teams:***

Actions performed: An extra meeting is conducted by management with shift teams to ensure they get the information from the two-way communication meetings. The meetings are appreciated by the shift teams and give the shift workers the opportunity to receive the same information as the other employees, something that was missing before.

Actions in progress: Meetings are implemented and ongoing.

**Results:** Issue resolved



## 6. INTERACTIONS

### *Summary 2017 ISCA findings:*

During the ISCA it was noted that the organization had a complex interaction with many other organizations e.g. the owner of the buildings (ECN), the company Curium that run a process in an NRG facility, customers and service providers (e.g. 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

It was identified in the ISCA that the different facilities (HFR, HCL, DWT) were run like a group of ‘villages’ with strong communication and trust inside each ‘village’. However, a strong village mentality can cause barriers to cross-company sharing of good practices. 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.

### *2019 ISCA follow-up findings*

**Actions performed:** As mentioned in chapter 5.1 several actions have been implemented to improve the interactions between the different departments.

**Actions in progress:** See chapter 5.1

**Results:** It was evident that new meeting forums and the efforts made to improve communication, leadership and on-boarding for new employees have had a positive effect on the cross functional cooperation and communication between the facilities (villages). The villages interact better with each other and now exchange experiences and ideas both in formal and informal ways. The ISCA follow-up team noted a new ‘NRG’ spirit which was not present during the ISCA. Encouragements are not graded in ISCA follow-up missions. However, the ISCA team consider the efforts made within this area being important to mention since they have a positive effect not only within this area but also on some of the other issues and the safety culture in general.

### 6.2 INTERACTIONS BETWEEN NRG AND THE REGULATOR

#### *Summary 2017 ISCA findings:*

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

During the ISCA, the team noted that the interaction with the regulators was considered being complicated because of ‘special supervision’ activities. The perception at all levels within NRG was that the relationship between NRG and Regulators was difficult. The regulatory deadlines had been perceived by NRG as challenging, particularly when completion dates clashed. These were perceived to exacerbate workload issues and, in addition, the level of detail of the actions requested by the regulators was also of concern. Both the regulator and NRG employees stated that the interactions and communication had been challenging in recent times, but progress was being made and interactions are developing and maturing.

**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.

### **2019 ISCA follow-up findings**

Actions performed: Meetings facilitated by an independent facilitator to increase the mutual understanding of each other’s viewpoints have been conducted between ANVS and NRG four times since 2017.

Senior managers participated together with the ANVS in an IAEA workshop on Leadership for Safety recently. Interviewees from NRG and ANVS agreed on the positive effects of the actions.

Actions in progress: NRG and ANVS will continue their efforts to understand each other’s role and perspectives.

**Results:** Issue resolved

## 7. WORKLOAD AND RESOURCES

### *Summary 2017 ISCA findings:*

The 2016 INSARR mission recognised that a procedure for critical functions identification and management had been implemented to ensure the availability of in-house resources. The 2017 ISCA noted that the procedure was still valid and considered as an important tool for resource management and succession planning by the managers. However, despite the measures taken to ensure the availability of resources, some employees expressed that the workload was too high.

### 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 the past 2 years before the ISCA, 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 might 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’. The ISCA team identified one indicator that may have supported this perception, namely 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 effects.

### *2019 ISCA follow-up findings*

**Actions performed:** A Sales and Operations process (S&OP) was implemented in 2015 to ensure volumes of business and available resources are aligned three years ahead. This results in a work load plan and is considered having a positive effect on a worker level. An ‘info board’ is implemented at HCL on which the tasks and the training per worker are visualised. This is being discussed at an end of the day meeting to ensure all tasks are covered and understood by the employees.

**Actions in progress:** The absenteeism has increased on an organizational level, and particularly within the fire brigade. An organization change for the fire department is considered as the main reason since the suggested change causes concerns about the effect on the work life balance. The organization is aware of the high absence rate and monitor statistics and reasons behind the numbers.

**Results:** The business demand is constantly rising, and the number of employees within the installations was increased by 72 people in 2018. More people are needed but the organization has decided to only employ as many as they can train without stretching the organization. The

ISCA team did not reach a definite conclusion on why the absenteeism has risen among employees working in support functions and if it is related to workload or other aspects.

Within the installations the perception of high workload remains. The evolution from a research facility into a production focussed facility and the maintenance process not being fully integrated are mentioned as the main reasons by the interviewees. Although, it is evident that the organization has implemented better planning, and managers expressed they see the benefits of it, the results are not yet obvious to the workforce. The ISCA team considered this represented insufficient progress to date.

## 8. SAFETY COMMITTEES

### *Summary 2017 ISCA findings:*

The ISCA team noted that the personal skills and comprehensive knowledge in the three reviewed safety committees (Reactor Safety Committee, HCL safety Committee and HFR Safety Committee) created a good basis for advice and decisions in safety related matters. The open atmosphere within the different committees allowed 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 indicated inconsistencies in how they perceived the reactor safety committees' role and responsibilities when asked during the ISCA. Several of the interviewees and focus groups told the IAEA team, on a direct question, that the Reactor Safety Committee (RSC) was responsible for the independent review of safety related documents. However, according to managers within HFR and HCL, the installation committees (HSC and LSC) were responsible for the independent review while RSC was supposed to have a general advising role on nuclear safety related issues. The independent advising role of RSC was supported by the rules and regulations of RSC but the independent review role of HSC and LSC was not documented in the management system even though HSC's role and responsibilities were described in a procedure. The procedure for LSC roles and responsibilities were not yet approved during the ISCA and had recently been drafted. The regulators did 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 suggested that there was a general belief that the RSC was not important; there was for example low attendance at some meetings, no annual report was written and there was a lack of follow up by senior management and the RSC on the implementation of actions associated with recommendations.

**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).

### *2019 ISCA follow-up findings*

**Actions performed:** The 'rules, regulations and working procedure of the reactor safety Committee' (RSC) has been revised and updated to clarify the committee's responsibilities. These revisions were approved on 1 April 2019. The Terms of Reference of the Laboratory Safety Committee (LSC) was approved in September 2017.

**Actions in progress:** The RSC will conduct a self-assessment and present the results to directors and improvement actions will be taken if necessary.

**Results:** Two procedures have been updated to clarify the different safety committees' responsibilities. However, some lack of clarity regarding what kinds of documents the RSC should review as well as the depth of the review remains. The quorum requirements are contradictory. Many different competences are expected to be represented in the meeting, the minimum number of members representing the parties involved is seven (according to chapter 3.1), and the quorum is considered being met if the chair and four other members are present (according to chapter 5.2). The ISCA follow-up team reviewed the minutes from 11 randomly chosen meetings of the RSC and it was evident that human factors was not represented in any meeting and the chair was absent 3 of the 11 meetings. Based on these facts, the ISCA follow-up team considered this as insufficient progress to date.

## 8.2 SAFETY COMMITTEE ADVICE AND QUALITY ASSURANCE

### *Summary 2017 ISCA findings:*

**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 ISCA was that the RSC reviews often were very detailed, and this had become a common subject for discussions among managers within the installations, who wished 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 were not approved on first review, did 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.

### *2019 ISCA follow-up findings*

**Actions performed:** During the 2017 ISCA, it was unclear on what grounds the Reactor Safety Committee could reject a document or project. After discussions the organization clarified that the RSC only may reject documents/projects if their concerns are safety related. This decision was mirrored in the updated Rules, Regulations and Working Procedure of the Reactor Safety Committee.

**Actions in progress:** The installations have, through conversations on what good quality means and improved quality assurance, increased the quality of documentation submitted to the RSC, and the work is still going on.

**Results:** The number of documents/projects submitted to the RSC and rejected has been reduced from approximately 30% in 2017 to approximately 20% at the time of the follow-up. The committee representatives and managers interviewed stated that this reduction was a result of the increased quality of documentation submitted to the RSC and the clarifications to RSC procedure. The team therefore concluded that the changes made by the organization and the installations have had a positive outcome. The ISCA follow-up team considered this as satisfactory progress to date.

## **ANNEX 1: REVIEWED DOCUMENTS**

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

- NRG ISCA 2017 Status of follow-up report
- NRG INSARR 2016 Status of follow-up report
- Rules, Regulations and working procedures of the RSC
- RSC minutes of meetings
- Terms of reference of the Laboratory safety committee (LSC)
- Sales and Operation Plan
- Leadership profile
- Leadership development programme
- NRG Safety Culture framework (draft)
- Safety Culture Self-assessment procedure
- Safety Culture Self-assessment work instruction
- NRG Annual plan
- Departmental annual plans
- Evaluation action plan MT 2017
- Monthly QHSE dashboard
- Infoboard HCL
- Sickness absence statistics

## **ANNEX 2: DEFINITIONS**

### **DEFINITIONS – ISCA**

#### **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.

### **DEFINITIONS – ISCA FOLLOW UP**

#### **Resolved - Recommendation**

All necessary actions have been taken to deal with the root causes of the issue rather than to just eliminate the examples identified by the team. Management review has been carried out to ensure that actions taken have eliminated the issue. Actions have also been taken to ensure continuous improvements and/or to check that the problem does not recur. Alternatively, the issue is no longer valid due to, for example, changes in the plant organization.



**Satisfactory progress to date - Recommendation**

Actions have been taken, including root cause determination, which lead to a high level of confidence that the issue will be resolved in a reasonable time frame. These actions might include budget commitments, staffing, document preparation, increased or modified training, equipment purchase etc. This category implies that the recommendation could not reasonably have been resolved prior to the follow up visit, either due to its complexity or the need for long term actions to resolve it. This category also includes recommendations which have been resolved using temporary or informal methods, or when their resolution has only recently taken place and its effectiveness has not been fully assessed.

**Insufficient progress to date - Recommendation**

Actions taken or planned do not lead to the conclusion that the issue will be resolved in a reasonable time frame. This category includes recommendations on which no action has been taken, unless this recommendation has been withdrawn.

**Withdrawn - Recommendation**

The recommendation is not appropriate due, for example, to poor or incorrect definition of the original finding or its having minimal impact on safety.

**Resolved - Suggestion**

Consideration of the suggestion has been sufficiently thorough. Action plans for improvement have been fully implemented or the plant has rejected the suggestion for reasons acceptable to the follow-up team.

**Satisfactory progress to date - Suggestion**

Consideration of the suggestion has been sufficiently thorough. Action plans for improvement have been developed but not yet fully implemented.

**Insufficient progress to date - Suggestion**

Consideration of the suggestion has not been sufficiently thorough. Additional consideration of the suggestion or the strengthening of improvement plans is necessary, as described in the IAEA comment.

**Withdrawn - Suggestion**

The suggestion is not appropriate due, for example, to poor or incorrect definition of the original suggestion or its having minimal impact on safety.

**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 2019 INDEPENDENT SAFETY CULTURE ASSESSMENT FOLLOW-UP**

### **List of Interviewees NRG**

1. CEO
2. CFO
3. Director Operations
4. Reactor manager HFR
5. Installation Manager HCL
6. Installation manager HFR
7. Project leader CSO
8. Nuclear engineer C&S
9. Team leader Asset integrity services
10. Manager Maintenance HFR
11. Manager Quality Health Safety and Environment (QHSE)
12. Manager Radioactive Waste Management Program (RWMP)
13. Program manager Quality assurance
14. Manager Sales & Operations
15. Program manager Quality assurance
16. Safety culture consultant

### **List of participants in focus groups NRG**

17. Operator
18. Research technician
19. Maintenance
20. Engineer
21. Radiation protection controller
22. Radiation protection controller in training/house keeping
23. Project engineer
24. Radiation protection controller
25. Planning office HFR
26. Operator HFR
27. Human Factor engineer
28. Safety Officer
29. Training consultant

### **ANVS**

30. Senior inspector nuclear safety
31. Senior consultant international affairs
32. Senior inspector nuclear safety
33. Senior inspector nuclear safety
34. Senior inspector nuclear safety
35. Senior inspector nuclear safety

**IAEA expert team**

- Diana Knutsson Nuclear Safety Officer, IAEA
- Eveline De Wulf Independent Consultant, Belgium