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OSART
Independent Safety Culture Assessment (ISCA) Guidelines

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IAEA SAFETY STANDARDS AND RELATED PUBLICATIONS

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OSART
INDEPENDENT SAFETY CULTURE
ASSESSMENT (ISCA) GUIDELINES

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FOREWORD

Safety culture is understood as an important part of nuclear safety performance. This has been demonstrated by the analysis of significant events such as Chernobyl, Davis Besse, Vandellos II, Asco, Paks, Mihamma and Forsmark, among others. In order to enhance safety culture, one essential activity is to perform assessments. IAEA Safety Standard Series No. GS-R-3, The Management System for Facilitites and Activities, states requirements for continuous improvement of safety culture, of which self, peer and independent safety culture assessments constitute an essential part.

In line with this requirement, the Independent Safety Culture Assessment (ISCA) module is offered as an add-on module to the IAEA Operational Safety Review Team (OSART) programme. The OSART programme provides advice and assistance to Member States to enhance the safety of nuclear power plants during commissioning and operation. By including the ISCA module in an OSART mission, the receiving organization benefits from the synergy between the technical and the safety culture aspects of the safety review. The joint operational safety and safety culture assessment provides the organization with the opportunity to better understand the interactions between technical, human, organizational and cultural aspects, helping the organization to take a systemic approach to safety through identifying actions that fully address the root causes of any identified issue.

Safety culture assessments provide insight into the fundamental drivers that shape organizational patterns of behaviour, safety consciousness and safety performance. The complex nature of safety culture means that the analysis of the results of such assessments is not as straightforward as for other types of assessment. The benefits of the results of nuclear safety culture assessments are maximized only if appropriate tools and guidance for these assessments is used; hence, this comprehensive guideline has been developed. The methodology explained in this publication follows the same principles as the IAEA methodology for safety culture self-assessments, but has one more essential data collection source, as it includes the OSART team's data findings in the analysis.

This publication can also be used whenever independent safety culture assessments are performed as a standalone or as add-on modules for other types of safety review service. Nevertheless, an integrated approach helps to ensure diversity of competences, and so the assessment addresses all aspects of nuclear safety. This publication updates IAEA Services Series No. 16, SCART Guidelines.

The IAEA expresses its gratitude to all those who assisted in the drafting and review of this publication. The IAEA officer responsible for this publication was M. Haage of the Division of Nuclear Installation Safety.

CONTENTS

1. INTRODUCTION

1.1. PURPOSE OF THE GUIDELINE

The purpose of this guideline is to provide practical guidance on how to carry out an Independent Safety Culture Assessment. The guideline is written from the perspective of an OSART independent safety culture assessment in order to highlight the benefits of this combination. The guideline can also be used as guidance whenever an independent safety culture assessment is performed as a standalone assessment or as add-on module for other types of safety review services.

1.2. SCOPE OF THE GUIDELINE

The guide focuses on how to:

- Plan and conduct an OSART independent safety culture assessment;

- Analyse and communicate the results of the assessment.

It should be supplemented by training materials on safety culture assessment for OSART team members, including the safety culture assessors and peers in the facility targeted for the review.

This guideline can be integrated into other review and assessment processes. For example, regulatory authority oversight of licensees, safety assessments conducted by corporate bodies.

1.3. SAFETY CULTURE ASSESSMENT COMBINED WITH AN OSART MISSION

Safety culture assessments provide insight of the drivers that shape organizational patterns of behaviours, safety consciousness and safety performance. By combining a safety culture assessment with an OSART mission [1], facilities gain a snapshot in time of their operating safety performance and the cultural dimensions that influence these results. By exploring the connection between OSART findings and SC findings, facilities can begin to identify and systematically address systemic challenges to safety performance.

1.4. IAEA SAFETY CULTURE FRAMEWORK

In order to complete a safety culture assessment, the results of a cultural analysis must be related to a framework that helps assessors compare the different aspects of an operating culture to a strong safety culture. Safety culture is defined in the IAEA Safety Glossary [2] as "The assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, protection and safety issues receive the attention warranted by their significance." Providing guidance on the characteristics and attributes referred to in this definition, the IAEA has established a normative framework for strong safety culture in the IAEA Safety Standards. The IAEA Safety Culture Framework consists

of five Safety Culture characteristics and corresponding attributes (see Appendix I and also [3, 4, 5]).

Figure 1 below shows the internationally agreed upon normative framework containing five characteristics that provide the basis for what a strong safety culture looks like in practice.

FIG.1. The IAEA normative safety culture framework.

1.5. PURPOSE OF SAFETY CULTURE ASSESSMENT

The overall goal of an OSART Independent Safety Culture Assessment 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 cultural causes of the identified safety issues during the OSART;

- 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.

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While the results of a safety culture assessment in themselves are important, managing the communication of the results to the organization is of equal importance. The purpose of a safety culture assessment is to create an understanding in the organization about cultural patterns, thereby creating an opportunity to continually identify as well as shape these patterns in support of high safety performance.

Investigations into events in the nuclear and other industries consistently highlight organizational and cultural root causes. Common themes that have been identified include:

- Insufficient understanding of 'operational reality by leaders (good news culture, failure to encourage constructive challenge);

- Inadequate oversight and supervision of contractors;

- Insufficient understanding of nuclear/process safety issues in decision making and actions;

- Normalization of risks;

- Failure to learn from previous events.

These and other culturally related issues are not easy to address and require long-term and persistent work in order to improve results. As noted above, culture is an effect of long-term processes and underlying reasoning and behavioural preferences of the workforce. It is impossible to totally control such processes, but through activities such as safety culture assessment and improvement programming, it is possible to influence them.

Safety culture assessment plays a key role in developing and maintaining an awareness of organizational strengths and necessary improvements, including insight into how and why the organization behaves in certain ways. Other types of assessment methods, such as peer and self-assessment, should also be used to obtain different perspectives and views. In addition to periodic in-depth assessments (self, peer and independent), it is also important to carry out on-going monitoring of safety culture as part of the plant oversight.

1.6. SAFETY CULTURE ASSESSMENT METHODOLOGY

Gaining an understanding of underlying safety culture issues requires involvement and participation from all levels of the organization [6]. The safety culture assessment methodology focuses heavily on the perceptions, views and behaviours of people at all levels of the organization. This is in contrast to audit-type assessments where the focus is on 'facts' and evaluations of these facts. **A core idea in safety culture assessment is to create a thorough image of the organization's safety culture to serve as a basis for enhancement activities.** The methodology thus places equal value on interpretation and communication about the culture as it does on its outcomes in terms of safety issues and safety performance.

The safety culture assessment methodology is based on Edgar Schein's theory of culture [7] and thus aims to assess all levels of safety culture as described in Fig. 2. In particular, it is essential to examine the basic assumptions of the culture as they drive the organizational behaviours.
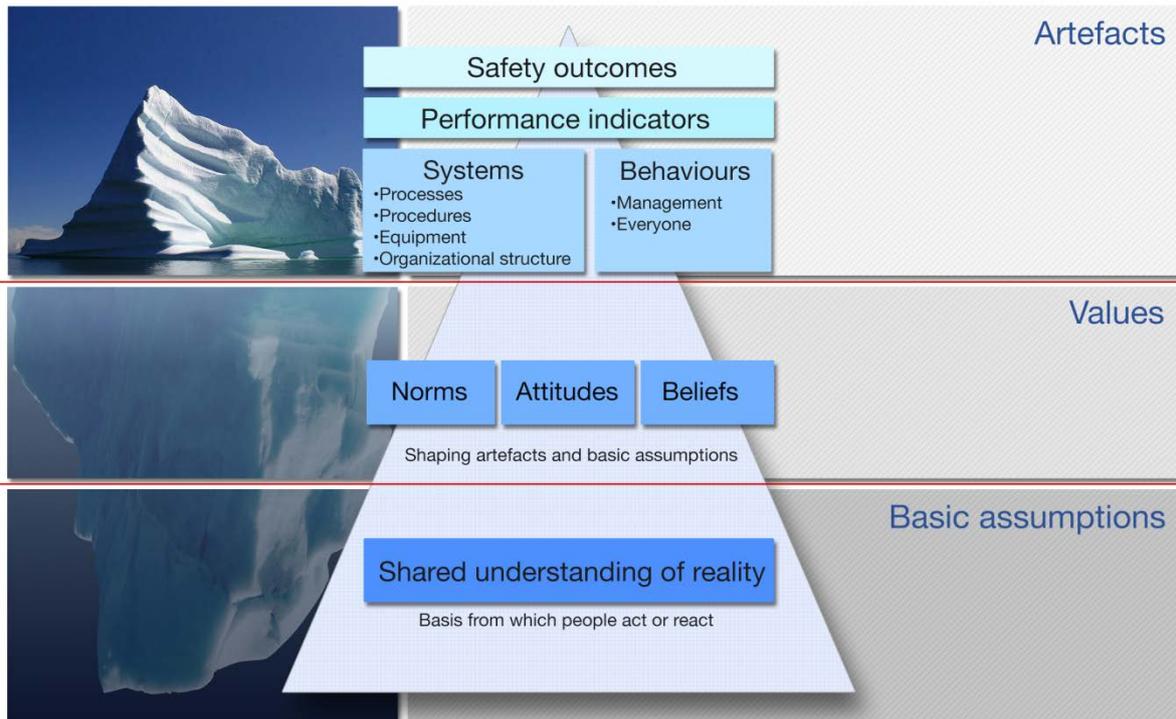
FIG.2. The 'iceberg' model of safety culture.

The validity of the methodology depends in part upon two parameters:

- The six methods to capture information which is kept separate in the initial stages of the analysis;
- The separation and sequencing of descriptive and normative approach to capture and analyse the data.

The first strength of the methodology is that it entails six different methods to capture data, i.e. document review, survey, focus groups, interviews, observations and team findings. The initial analyses of the data captured by these methods are conducted separately to avoid biases and to provide rigor to the validly to the result of the assessment.

The second strength of the methodology is the rigour with which the descriptive and normative parts are kept separate until the final analysis. A descriptive view of culture means to try to describe what the culture *is* like and how it operates in the organization, while a normative view of culture refers to what the culture *should* be like. It is therefore of utmost importance to separate the 'is' from the 'should' in the process of capturing data and in the analysis of culture. If the image of how the culture 'is' becomes affected by what the interpreter thinks it 'should be', it is more difficult to carry out a well-founded analysis of the relation between 'is' and 'should'.

Therefore it is a vital aspect of the methodology to be open minded and only describe the culture, before the scope of inquiry is narrowed to compare the description with the fixed normative framework. In this way, an inquiring attitude is maintained throughout the process, from capturing the data until normative analysis. This is essential in order to avoid the pitfalls of a check-list audit approach whereby assessors seek evidence of elements of the normative

framework and do not look for the unique cultural patterns giving rise to the safety performance.

The safety culture assessment analysis process is divided into two parts of analysis; a *descriptive* part that serves to describe cultural expressions[1] and cultural themes[2] and a *normative* part that evaluates the cultural conclusions in relation to the IAEA Safety Culture Framework.

In addition to maintaining the rigour of the two-part analysis within the assessment methodology, it is important for plant personnel and OSART team members to clearly understand the process, and have confidence in the cultural expressions and themes identified. Visual displays and standardized forms are used and made available to OSART team members and host peers to support this learning.

1.7. RESOURCES

The OSART Safety Culture Assessment requires a minimum of two safety culture experts to be members of an OSART mission.

These safety culture reviewers/assessors must have formal behavioural/social science backgrounds and several years of experience in safety culture assessment. In addition, the assessors require good nuclear technology and nuclear organizational understanding.

Specific competencies required by safety culture assessors include:

- Survey data analysis;

- Interviewing and facilitation skills;

- Skills in organizing and interpreting qualitative data, including the capacity to perceive patterns from large volumes of disparate information.

Safety culture assessors collaborate with the whole OSART team, and report directly to the deputy team leader.

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[1] Cultural expressions are aspects of the culture, e.g. verbal expressions, espoused values and norms, physical artefacts, behaviours, etc.

[2] Cultural themes are the patterns identified through analysing the cultural expressions.

2. PROCESS

The Safety Culture Assessment process consists of a series of data gathering, sorting and analysis steps:

1. Administration of a safety culture survey in the plant prior to the OSART mission.

2. Analysis of the survey data and results.

3. Document review and analysis.

4. Delivery of high level training on safety culture assessment to the OSART team members on the first day of the mission.

5. Standardized data gathering during the first five days of the mission to get an overall picture of the organization's culture using the following methods:

- Interviews;

- Observations;

- Focus groups;

- OSART team findings.

6. Review of the OSART team findings during the final three days to surface underpinning cultural aspects giving rise to the findings.

7. Analysis in five steps:

- Descriptive analysis for each method (see pt. 5 above) to extract *cultural expressions* from the data;

- Descriptive analysis to draw conclusions of *cultural themes* from the cultural expressions;

- Comparative analysis to contrast and combine the cultural themes surfaced by the various data sources, and formulate *overarching cultural themes*;

- Normative analysis to evaluate the overarching cultural themes against the IAEA normative safety culture framework [3, 4];

- Determination of safety culture strengths and areas for improvement.

8. Integration of the safety culture assessment findings into the OSART report and verbal presentation to the senior management.

2.1. STANDARD STRUCTURED PLAN

A structured safety culture assessment plan is used and provided in advance to facilitate the administrative and logistical challenges arising out of this multi-step, multi-data gathering methodology. For example, focus groups involve scheduling of up to 50 participants in groups of 12, in suitable rooms. Many of the management personnel included in the focus groups will also be engaged in interviews and plant walk-downs by other reviewers. This standard plan establishes the timing, duration and engagement of plant personnel required to complete the safety culture assessment. Fig. 3 below illustrates an example of a standard structured plan.

Assessment of an organization's safety culture requires a high degree of interaction with plant leaders and personnel in order to surface meaningful data on how the organization thinks and behaves. To the extent practical, participation by safety culture assessors in the review activities of other OSART team members builds shared understanding of the plant's safety culture and safety performance. The standard plan is provided to the OSART team, host peers, and assigned administrative support personnel to facilitate coordination of activities and minimize scheduling conflicts.

Regular sharing of cultural expressions and emerging cultural issues throughout the review process is used to increase the opportunity for fruitful cooperation between the safety culture assessors, team leaders, OSART team members and safety culture counterparts.

All data gathered throughout the assessment process are transcribed and saved electronically in a systematic manner that ensures ease of access and confidentiality. See Appendix II for the standard coding and tagging approach.

Three workshops with the plant senior management team will be part of the plan to create shared understanding about the safety culture assessment process, preliminary cultural results, and the summary findings of the safety culture assessment. To achieve this objective, these workshops are conducted in an open and interactive manner that invites questions and dialogue. To aid this process, a hand out explaining the IAEA developed concept of Shared Space is included in Appendix III. For more information on Shared Space, see [8].

Phase bands: **STANDARD SC REVIEW** (D3–D8) · **IN-DEPTH SC REVIEW** (D9–D10)

Day	Schedule content
D1 Mo	TRAINING
D2 Tu	ENTRANCE MEETING / PLANT TOUR · ENTRANCE MEETING / PLAN TOUR
D3 We	Review OSART Team Finding (TF); JOINT SC and LM; Interviews 13.00–14.00 / 14.15–15.15; SM WS 1 15.30–16.30; Interviews 08.30–09.30 / 09.45–10.45 / 11.00–12.00; JOINT SC and LM; SM WS1 15.30–16.30
D4 Th	Review OSART TF; Interviews 09.45–10.45 / 11.00–12.00; Prep. FG 13.00–13.30, FG 1: Mngmnt. 13.30–15.30; Interviews 09.45–10.45 / 11.00–12.00; Prep. FG 13.00–13.30, FG 1: Mngmnt. 13.30–15.30
D5 Fr	Review OSART TF; FG 2: SM 10.00–12.00; Interviews 13.00–14.00 / 14.15–15.15; FG 2: SM 10.00–12.00; Interviews 13.00–14.00 / 14.15–15.15
D6 Mo	Review OSART TF; Interviews 09.45–10.45 / 11.00–12.00; FG 3: Cross-functional 13.15–15.15; Interviews 09.45–0.45 / 11.00–12.00; FG 3: Cross-functional 13.15–15.15
D7 Tu	Review OSART TF; Interview 09.45–10.45; FG 4: MA 11.00–12.00; OBS 13.00–15.15, Control Room 14.30–15.15; Interview 09.45–10.45; FG 4: MA 11.00–12.00; Interviews 13.00–14.00 / 14.15–15.15
D8 We	Review OSART TF; FG 5: OPS 09.45–10.45; SM WS 2 11.00–12.00; Interviews 09.45–10.45 / 11.00–12.00; OBS (Evening shift turn over); FG 5: OPS 09.45–10.45; SM WS2 11.00–12.00; OBS; OBS (Evening shift turn over)
D9 Th	Review OSART TF; Interviews 09.45–10.45 / 11.00–12.00; FG 6: TBD 13.15–15.15; Interviews 09.45–10.45 / 11.00–12.00; FG 7: TBD 13.15–15.15
D10 Fr	Review OSART TF; Interview 09.45–10.45; SM WS 3 11.00–12.00; Starting issue writing; Interview 09.45–10.45; SM WS3 11.00–12.00; Starting issue writing
D11 Sa	Write issues; Write issues
D12 Mo	Draft TN; Draft TN
D13 Tu	TEAM MEETING
D14 We	Finalize Technical Notes (TN); Prep.Exit; Finalize TN; Prep Exit
D15 Th	EXIT MEETING; EXIT MEETING

Legend: SC1 · SC2 · Joint SC1 and SC2 · Joint SC and LM · Joint SC1, SC2 and OSART team

FIG.3. Standard structured plan (for List of abbreviations, see Appendix IV)

2.2. SURVEY

2.2.1. Background and purpose

The IAEA Safety Culture Perception Questionnaire is a survey consisting of questions designed to elicit peoples' perceptions of the IAEA Safety Culture characteristics and attributes outlined in Appendix I.

In addition to gathering perceptions, the survey collects key demographic data (department, organizational level, years of service, work group) to assist in identifying patterns and potential sub-cultures. This also makes focused feedback to departments or levels in the organization possibly, thereby supporting deeper learning by senior management and personnel.

It is recommended to distribute the survey to the entire organization, including managers, employees, contractors, plant, and head office or administration personnel. If this is not possible, a 20% stratified sample of the organization is recommended to ensure that representative data is obtained.

2.2.2. Survey administration process

The survey is administered before the OSART mission. To ensure validity of the results, it is important to achieve a high response rate; a response rate of 80-90% should be strived for. The following approach is recommended to encourage participation while honouring confidentiality of the information:

1. Define the total population to be surveyed, and include appropriate demographics (e.g. department, job level, years of service, office or plant worker etc.) so the response rates can be easily tracked by department. In this way management can encourage input from areas where the response rate is lagging.

2. Communicate the purpose and process clearly, and request participation and input through on site newsletters, electronic messages, and Plant Director and leadership messages.

3. Administer the survey online wherever possible to minimize data entry, and to make it accessible to individuals that may not be onsite but included in the survey process.

4. Facilitate group sessions where possible to increase participation and ensure a good response rate.

5. Make paper copies of the survey available for those who are not able or comfortable using the online version.

6. Monitor response rate and encourage participation where necessary.

2.2.3. Confidentiality

Survey responses should not be flagged with a time or date when they are submitted and the computer from which the response is sent should not be identified. It should also be ensured

that individuals cannot be identified from the demographic data. For example, there may be a department with only one manager, so if the demographics ask for information by department and by organizational level it is theoretically possible to identify the responses from that individual. Analysis of the data and reporting of the results must prevent this from happening.

2.2.4. Analysis of results

The survey results will be analysed by personnel with expertise in statistical data analysis (e.g. behavioural/social scientists), using a recognized statistics package such as Superior Performing Software System (SPSS). Values obtained are relative, not absolute, and the most prominent contribution of the survey is gained from comparison over time. The analysis consists of statistical methods such as regression, factor and cluster analyses. Differences between various organizational functions and levels are analysed to identify potential patterns within the total population. Cultural issues are captured systematically using a standardized form.

2.2.5. Reporting and communication of survey results

A survey report will be produced including the survey data and conclusions from the analysis. Statistics will be presented carefully to avoid giving a misleading and/or over-confident picture. However, the survey results and conclusions are not communicated to the organization as a stand-alone report or presentation. Potential issues are considered along with issues surfaced through the other data gathering methodologies and used to form overarching conclusions about the culture. Specific cultural expressions may be included in the final presentation of the assessment results to illustrate the conclusions, with care to ensure confidentiality.

2.2.6. Retention of survey results

Survey results will be retained on an anonymous basis to build a database that can support research and trend analysis on a global level over time.

2.3. DOCUMENT ANALYSIS

2.3.1. Background and purpose

The document review serves to familiarize assessors with the full breadth of an organization's documentation, as well as its language and the terminology specific to various groups. The document analysis should be carried out in advance of the OSART mission.

Typically document reviews include historical performance data and identify areas to explore for alignment between documented intent and actual practices. They also provide insight into

basic assumptions by showing common reasoning patterns, preferred solutions, overlooked perspectives. They reveal the adequacy of guidance and rigour in important safety areas.

2.3.2. Documents to be reviewed in addition to the advance information package (AIP)

- 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.

2.3.3. Document analysis process

To capture useful information through a document analysis the safety culture assessors:

1. Establish a consistent approach for capturing findings and:

   - Make descriptive notes, taking care to avoid judgmental or evaluative statements;

   - Highlight document elements that substantiate observations of cultural aspects;

   - Tag the findings with key words for easy reference.

2. Extract relevant examples of observations including, but not limited to:

- Consistency of documented messages;

- How safety is represented across the organization;

- Themes or patterns related to safety focus;

- Whether the documents reflect an on-going effort to provide consistent, accurate and up to date information, including alignment with international practices;

- Gaps in the documentation, e.g. missing procedures, work instructions, flowcharts;

- Indications that procedures provide adequate configuration control for operation, maintenance, and design;

- Available trend information and how it is supposed to be used;

- Quality or tone of regulatory or stakeholder messages;

- Depth of root cause analyses in terms of organizational issues;

- Budgetary allocations for safety and safety culture enhancement;

- Backlogs of procedure revisions;

- Actions taken to address safety concerns.

3. Review additional documentation during the OSART mission based on facts gathered by other reviewers that may give insight into cultural aspects.

2.3.4. Analysis of results

The extracted descriptive document analysis data is analysed to identify cultural expressions, and then grouped further to identify cultural themes. Because it is an iterative process, this descriptive analysis is typically carried out using yellow stickers on a wall or table-top. Preliminary conclusions are discussed with the team leader, deputy team leader, counterparts and the rest of the OSART team during the review process or when findings are shared from onsite exploration of possible themes identified through the document analysis process.

2.4. INTERVIEWS

2.4.1. Background and purpose

Interviews are one of the most important methods in a Safety Culture Assessment, as they bring to the forefront how employees reason about important issues in their work and workplace. They also give insight into cultural indicators such as common stories expressing important organizational values.

Several different interview methodologies exist. Exploratory interviews are used for Safety Culture Assessments because they encourage respondent storytelling and allow the interviewee to choose topics and express points of view with as little interference from the interviewer as possible. Semi-structured and open-ended questions are used to minimize the risk that the interviewer takes too much control of the conversation, thereby biasing the information gathered. See Appendix V for examples of interview questions.

Exploratory interviews typically take between 45 minutes and one hour during which the interviewer listens attentively and takes copious notes using the respondent's wording as much as possible.

Typically, 20 exploratory interviews are performed during the first 5 days of the OSART mission, and an additional 10–15 in-depth interviews involving both SC assessors, are conducted during the final three days to capture more data in relation to the preliminary OSART findings.

2.4.2. Standard interviews performed during a safety culture assessment include

- Senior Management;

- Trade unions representatives;

- Contractors at management, supervisor and worker levels;

- Procurement;

- Responsible of root cause analysis;

- Quality manager;

- Maintenance all levels;

- Safety culture and/or Human Performance programme responsible;

- Operations all levels.

2.4.3. Interviews specifically conducted in collaboration with the LM reviewer include

- Safety manager;

- Industrial safety manager;

- Finance department;

- Regulatory body.

2.4.4. Interview process

To capture useful information through interviews the safety culture assessors:

1. Welcome the individual and briefly confirm her or his position in the organization and willingness to participate in the interview.

2. Explain that the interview is confidential and that notes will be taken, but nothing will be attributed to the individual.

3. Explain that the purpose of the interview is to capture cultural aspects of safety in terms of how safety is conducted in the organization.

4. Explain that there will be an opportunity to ask questions at the end of the session and also to provide feedback on the experience. Interviewees should; however, feel free to ask questions at any time during the interview.

5. Reassure the interviewee that there are no right or wrong answers to the questions. It is not a test of their knowledge. The assessment results will present collective issues, not individual responses.

6. Initiate the dialogue with a wide open question such as: "Tell me about your role and what you do in a typical day". Encourage free-flow of dialogue beyond that point with minimal interference except to keep the exploratory nature of the conversation moving.

2.4.5. Capturing interviews

Interviewers capture as much of the conversation as possible, paying particular attention to key phrases, examples, and stories. Brief descriptions of prevalent behaviours and mannerisms are also noted. Audio or video recorders are only used with the explicit permission of the respondents.

2.4.6. Analysis of results

Interview data are reviewed and elements are coded to identify cultural expressions, i.e., compelling and recurring cultural expressions that provide insight into how the organization explains itself to itself: what it values in its interactions; how it decides what is 'true' and important; why decision-making patterns flow the way they do; what people take for granted in their reasoning without clarity or reflection on where it came from or its potential impact on their point of view, and evidence of power dynamics within the organization that determine who and what gets paid attention to, or conversely what may be ignored or suppressed.

Once these cultural expressions have been extracted, they are successively grouped into cultural themes. To visualize this theming and give transparency to this descriptive analysis, the key information and cross-references to the source notes may be posted on a wall or on white boards. Emerging themes and preliminary issues are discussed with the team leader,

deputy team leader, and counterparts, and made available for the rest of the OSART team for comment.

2.4.7. Reporting of interview findings

Interview notes are rich sources of diverse information. This information can be used in an OSART report or presentation to help plant personnel recognize their own cultural patterns. However, utmost care must be taken to avoid using quotations or anecdotes that can in any way be traced back to specific individuals.

2.5. FOCUS GROUPS

2.5.1. Background and purpose

Focus groups provide a means for exploring and observing the social dynamics and meaning making within a group, and for answering qualitative questions, such as 'why' rather than 'how many' hold a particular view. They provide an opportunity to observe the culture in action, i.e., the relational aspects of social dynamics, the interpersonal behaviours that are considered acceptable, the diversity of feelings about issues, and the impact of positional power on self-expression.

Focus groups provide insight into people's perceptions of how the organization functions. Because they are interactive and consist of free-flowing conversation, they can surface information that is not apparent through more structured methods.

Focus groups help to elicit information in a way that allows facilitators to see why an issue or topic is relevant, and what is important about it. As a result, the gap between what people may say, and what they may do, can be better understood.

Focus groups typically take between 90 and 120 minutes during which the safety culture assessors pose a few general questions to the group and take copious notes capturing wording of participants as closely as possible (see Appendix VI for further guidance on conducting focus groups, including sample questions). Prevalent behaviours and mannerisms are noted, as are interaction patterns and impacts of participants on one another.

Typically, five focus groups of 8-12 participants each are conducted during the first 5 days of the OSART mission, and an additional one is conducted during the final three days to capture more data in relation to the preliminary OSART findings. The team lead and deputy team lead are encouraged to participate in the focus group to build understanding of the methodology as well as emerging potential cultural themes.

2.5.2. Five standard focus groups performed during an assessment[3]

Focus Group 1: Senior management level

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[3] The conficuration of focus groups will be adjusted to the organizational structure.

Plant manager

Head of Maintenance department

Head of Operational department

Head of Safety manager department

Head of Engineering department

Head of Human resource department

Head of Administration department

Focus Group 2: Management level

Maintenance manager

Operational manager

Plant modifications (engineering/technical department)

Radiation Protection manager or supervisor

Work Management coordinator

Maintenance supervisor (mechanical)

Radiation protection manager or supervisor

Conventional safety manager or supervisor

Shift Supervisor

Focus Group 3: Cross functional non-management level

Maintenance – mechanical

Maintenance – electrical

Maintenance – trainer

Radiation protection

Finance

Reactor hall – fuel loading

Engineering – fuel configuration

Safety department – safety reviewer

Operations – field operator

Human performance

Focus Group 4: Field workers

Maintenance

Maintenance

Maintenance

Maintenance

Maintenance

Maintenance

Contracted worker

Contracted worker

Focus Group 5: Operations

Operations

Operations

Operations

Operations

Operations

Operations

Operations

Operations

Focus Groups 6 and 7: To be decided after review day 5

2.5.3. Focus group process

To capture useful information through focus groups the safety culture assessors:

1. Welcome the group and have each person give their name, where they work, and how long they have been in the organization.

2. Explain that the session is confidential. Notes will be taken, but nothing will be attributed to specific individuals.

3. Explain that the purpose of the focus group is to capture cultural aspects of safety in terms of how safety is conducted in the organization.

4. Explain the process for the session. Pose questions and encourage free-flow of dialogue within the group.

5. Reassure participants that there are no right or wrong answers to the questions. This is not a test of their knowledge.

6. Remind participants that the assessment will present collective issues, not individual responses.

7. Use reflection and silent spaces during the session to encourage participants to reveal more.

8. Explore marked differences or inconsistencies in reasoning, understanding, and relationships. How pervasive are they?

9. Explore connections that go beyond general comments or observations (use the multiple 'why' approach).

10. Capture the conversation as precise as much as possible.

11. Document personal and interpersonal behaviours such as who speaks, who is silent, who frames the conversation, language, facial expressions, emotional tone, and other non-verbal communication.

12. Capture the nature of interactions, key points, anecdotes, stories, scope of discussion and specific outputs or ideas. Capture recurring phrases, images, concerns, nature of improvement messages, and emotional tone.

13. Describe the prevalent conduct in the room and what this implies regarding hierarchy, cross departmental relationships, status, or other 'group' distinctions.

2.5.4. Analysis of results

Focus group data are analysed to identify cultural expressions – for example: common behaviours such as enthusiasm, tension, helpfulness; recurring phrases, images, and concerns in stories; prevalent body language and tone; frequent or marked demonstrations of power through hierarchy, cross departmental relationships or expert status; recognizable patterns in reasoning, communicating and decision making.

Once these cultural expressions have been extracted, they are successively grouped into cultural themes. To visualize this theming and give transparency to this descriptive analysis, yellow stickers with key information and cross-references to the source notes may be posted on a wall or table-top. Emerging patterns and preliminary conclusions are discussed with the

team leader, deputy team leader, and counterparts, and made available for the rest of the OSART team for comment.

2.5.5. Reporting of focus group findings

Focus group notes are rich sources of diverse information providing histories and examples from daily work life. This information can be used in an OSART report or presentation to help plant personnel recognize their own cultural patterns. However, utmost care must be taken to avoid making references to expressions or descriptions of interactions that can be traced back to specific focus group participants.

2.6. OBSERVATIONS

2.6.1. Background and purpose

Cultural observations provide insight into how individuals behave while immersed in their normal settings and day to day activities. They are useful for noticing cultural aspects that may be of a sensitive nature and therefore at risk of inauthentic responses when explored through direct conversation or interaction. They provide rich *descriptive data*, e.g. incidences of fire doors being left open, personal protective equipment not being worn; *inferential data*, e.g. inconsistent treatment of personnel of different rank, or patterns of positioning that give insight into where people experience themselves relative to others; and *evaluative data*, e.g. failure to use methods or approaches that are common to the performance of a task or role.

Observations are typically carried out in a way that minimizes distraction to the work in progress and respects the wishes of those performers to ensure safety. Where unsafe acts or conditions are observed, steps are immediately taken to mitigate and report risks.

Observations typically cover a spectrum of situations such as meetings, field activities, training, and informal interactions such as breaks, lunches, and even celebrations or social events. Where practical, scheduling of observations may be coordinated with the work of other reviewers to minimize disruption to plant personnel and to build shared understanding of the cultural dimensions of safety performance.

2.6.2. Standard observations performed during a safety culture assessment

- TQ/OPS – Simulator training, shift turn-over, morning meeting, field operator performance;

- MA – Work performance, pre job briefing, post job briefing, coaching;

- TS – Meeting, offices;

- CH – Meeting, offices, cold and hot labs;

- RP – Reactor hall, RP borders.

2.6.3. Observation process

To capture useful information through observations the safety culture assessors:

1. Plan and schedule their observations.

2. If applicable, inform people why they are there.

3. Minimize interference with the team or work process.

4. Observe:

    -   General atmosphere and relations between people including interaction patterns, emotional tone and impacts on behaviours;

    -   Outcomes of interactions, decisions, or task performance;

    -   Use of tools, procedures and other relevant means of work;

    -   Spatial organization, layout, work conditions and material condition;

5. Record observations with as much detail as possible.

6. Provide feedback post-observation only if requested, ensuring that it is balanced and descriptive rather than evaluative. Use an interactive process between the observer and participants to promote reflection and learning.

2.6.4. Analysis of results

Observation data are analysed to identify cultural **expressions** − for example, what happens in team meetings; how do people use power; what in the situations prompts noticeable behaviours; are noticeable behaviours accepted, ignored, or discouraged; what is the impact of these behaviours on the atmosphere and behaviour of others; is it a single incident of a behaviour or a recurring pattern?

Next, the cultural expressions are successively grouped into potential cultural themes. For example, individuals in positions of power use their status to control problem solving and decision-making processes. To visualize this theming and give transparency to this descriptive analysis, yellow stickers with key information and cross-references to the source notes may be posted on a wall or table top. Emerging patterns and preliminary conclusions are discussed with the team leader, deputy team leader, and counterparts, and made available for the rest of the OSART team for comment.

2.7. TEAM FINDINGS

2.7.1. Background and purpose

OSART team findings provide a rich source of information on actual safety performance across the full range of review areas. They provide examples of reasoning and behavioural patterns and their impacts or consequences within operating contexts.

Team Daily Reports and FACT sheets are reviewed to identify cultural aspects of the fact data specialists have gathered. In this way, possible ties between cultural aspects and operational impacts and safety outcomes become evident.

2.7.2. Team finding review process

To capture useful information through the review of the OSART team findings, the safety culture assessors:

1. Apply the standard approach for tagging relevant team findings.

2. Extract examples from daily reports including, but not limited to:

    - Themes or patterns related to safety focus;

    - How safety is represented in different areas;

    - Recurring gaps in documentation or practices;

    - Indications of the adequacy of work methods;

    - References to how information is used versus should be used;

    - Indications of the quality or tone of management, regulatory or stakeholder messages;

    - Evidence of longstanding issues;

    - Indications of organizational issues;

    - Implications of budgetary allocations for safety;

    - Concerns about backlogs or work-arounds;

    - Actions or inactions related to safety concerns including those highlighted directly by OSART team members.

3. Share cultural expressions and emerging cultural themes and verify through specialist review and comment.

In addition, the safety culture assessors seek first impressions and insights from reviewers on what stands out for them as they experience interaction with plant personnel and management. (Appendix VII can be used as a template to aid OSART team reviewers in noting such cultural impressions and insights.) By gathering these first-hand experiences and reactions, the safety culture assessors gain rich clues to the norms and values of the plant culture.

2.7.3. Analysis of results

Team finding data is analysed to identify cultural **expressions** – for example, high backlogs and frequent use of work-arounds are viewed downplayed, or improvement efforts are pursued using a find and fix approach.

Next, the cultural **expressions** are successively grouped into potential cultural **themes**. For example, acceptance of backlogs, work-arounds, unavailability of backup, rescheduling of planned work may all be indications that deviations are tolerated within the culture. Opinions from specialist reviewers are considered to establish the degree of importance or prevalence of such patterns when formulating potential cultural **themes**.

To visualize this theming and give transparency to this descriptive analysis, yellow stickers with key information and cross-references to the source notes may be posted on a wall or table-top. Emerging patterns and preliminary conclusions are discussed with the team leader, deputy team leader, and counterparts, and made available to the rest of the OSART team for comment.

3. ANALYSIS

The analysis of safety culture happens in two parts:

Part 1 A *descriptive* analysis that is made for the purpose of *describing* the culture and creating a clear and valid image of its state.

Part 2 A *normative* analysis that is made for the purpose of evaluating the data and conclusions against a normative framework such as the *IAEA Safety Culture Framework,* thereby making it possible to suggest changes.

Safety culture assessors complete the analysis in five steps.

1. *Data analysis:* Separate analysis of the information captured by each individual data source to identify cultural expressions.

2. *Data conclusions:* Separate analysis of the information captured by each individual data source to identify cultural themes.

3. *Overarching analysis:* Compare the different cultural themes derived from the different data sources and *s*ummarize and draw conclusions.

4. *Normative analysis:* Compare the descriptive conclusions with the *IAEA Safety Culture Framework.*

5. *Evaluation:* Identify strengths and areas for improvement. This should be presented as an input to continuous improvement, not a programme of mechanistic corrective actions.

Steps 1 to 3 constitute the descriptive part of this process, while steps 4 and 5 are the normative component.

3.1. DATA ANALYSIS

Analysis in step 1 should be conducted on the basis of the information captured from each of the methods that have been used (i.e. interviews, focus groups, survey, document analysis, observations, team findings). It is important at this stage to make sure that the results are analysed in an appropriate way for the specific method. This means that, for example, statistical tools are used to analyse the survey results, and thematic analysis is used for interview and focus groups (for more details, see section 2). The aim of the analysis is to identify cultural expressions.

3.2. DATA CONCLUSIONS

In step 2 the aim is to extract conclusions in the form of cultural themes – **issues** for each of the data analysis methods. It is important that this analysis is performed in a descriptive manner, and normative conclusions are avoided. Cultural **themes** can consist of patterns, paradoxes, or other cues found in the data.

3.3. OVERARCHING ANALYSIS

In this step, the conclusions from the analysis in step 2 are put together in an overall, comparative analysis. Here, the cultural themes appearing across the various data sources are of vital importance. This step in the analysis is about discovering patterns across all of the material gathered. It includes but is not limited to:

- Identifying *similarities*, such as homogeneous values or behaviours that can be explained by espoused values;

- Identifying *differences*, e.g. where different sources point in different directions, as values and behaviours can very well be heterogeneous or even contradictory;

- Identifying *differences and similarities between groups* (such as hierarchical level, different functional groups, gender, etc.) and analysing the content of these.

At this stage, it may be necessary to re-visit the original analyses in order to clarify what the conclusions are based on, and sometimes the assessors have to collect additional material (e.g. conducting a few more interviews or focus groups on specific topics). Typically this takes place during the last three days of the review.

A cultural analysis cannot be undertaken without a developed analytical framework. As the iceberg metaphor suggests, the point of doing a safety culture assessment is to get 'beneath the surface'. This means an act of active *interpretation* takes place. Interpretations are always based on a framework, conscious or not. In culture analysis, this framework must be made explicit and include knowledge of how culture operates. This means that what has been said in interviews, focus groups and so on is information to be analysed, *not* ready made conclusions.

The assessment team has a valuable role to play in this process in terms of seeing patterns and challenging the analysis. Keeping a creative, tolerant and open atmosphere is important. A well-functioning team contributes to the quality of the safety culture analysis. It is essential to give full transparency to each aspect of the analysis as it is carried out to build both understanding and rigour. The more dialogue, the better the analysis will be.

The findings in step 3 are written up and finalized before moving on to step 4, taking care to remain descriptive rather than normative.

3.4. NORMATIVE ANALYSIS

Step 4 is the first normative analysis. Only now does the analysis move to an evaluative mode. The results from step 3 are now being compared to the normative framework of the *IAEA Safety Culture characteristics and attributes* (see Appendix I).

For each of the five safety culture characteristics, a thorough analysis determines where and how the organization meets the standard. It is important not to over-simplify this step as the comparison between the organization's safety culture and the *IAEA Safety Culture Framework* can be complex. It is not always clear-cut since the issues identified may relate to multiple characteristics and attributes. Again, expressing the character of the culture is the priority since this will be most effective in terms of supporting organizational learning in the long run. Appendix VIII provides additional guidance for performing a safety culture normative analysis, including questions for exploring safety implications of cultural themes.

3.5. IDENTIFY STRENGTHS AND AREAS FOR IMPROVEMENTS

Step 5 involves identifying the areas where the safety culture of the organization deviates from the targeted state, as well as identifying those aspects of the safety culture that are in line with the normative standard. A balanced picture enables the organization to recognise and build on strengths as well as act on areas for improvements.

In line with the view of culture expressed in this guideline, suggestions for 'quick fixes' and easily implemented corrective actions should be avoided. The intent of the assessment is not to prescribe actions, but rather to help the organization develop attitudes, behaviours and approaches that will, in the long run, become part of its safety culture.

3.6. SUMMARY OF ANALYSIS METHOD

Figure 4 below shows the previously explained five steps of the analysis process and moves from the bottom to the top of the diagramme.
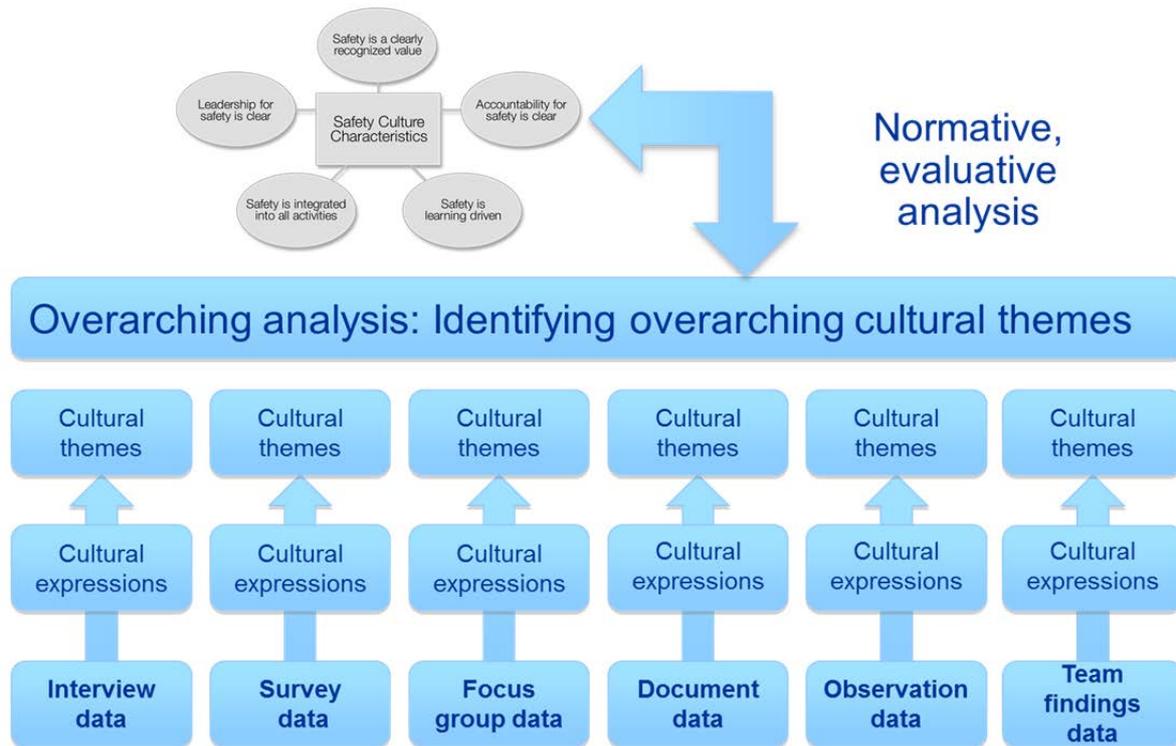
FIG.4. Summary of the safety culture analysis methodology.

The first step (*data analysis*) involves identification of the cultural expressions in each of the available data sources (e.g. interview data, survey data, etc.).

The second step (*data conclusion analysis*) involves extraction of cultural themes from each of the data sources.

In the third step *(overarching analysis)* the different data analyses are compared and descriptive conclusions are drawn to identify overarching cultural themes.

In the fourth step *(normative analysis)* conclusions drawn from the overarching analysis are compared to the normative *IAEA Safety Culture Framework*.

Finally, in the fifth step *(evaluation),* strengths and areas for improvements are identified.

This structured analysis process provides both rigour and a clear trail, from findings to strengths and areas in need of attention, that can be easily retraced in order to support learning by OSART team members and plant personnel.

4. OPTIMIZING THE VALUE OF AN OSART-ISCA

The results of an interpretive study, such as a safety culture assessment, are always subject to interpreter bias. This does not, however, mean that it is arbitrary. A well-functioning OSART team that has the ability to reflect and challenge, is an important counter-balance to this risk.

Transparency of the evolving assessment results helps both the safety culture assessors and the rest of the OSART team to come to a balanced and coherent view of the organization's safety culture and its implications for safety performance.

Having said this, the assessment will always be an interpretation, not a final truth, and therefore subject to change as the organization begins to work with the findings. The results of a Safety Culture Assessment should be treated by the organization as an *input to further organizational development processes*, not as a prescription for corrective actions. Ideally, the results serve as an eye-opener that starts a reflective process of learning, facilitating new ways of asking questions about how and why the organizational members act and think the way they do, and in the context of the OSART findings, what the implications are for the safety performance of the organization.

5. REPORTING OF RESULTS

When an ISCA is performed in conjunction with an OSART mission, the safety culture assessment results are presented within the OSART report. The findings are presented as issues, providing examples of strong safety culture and areas in need of attention. The safety culture strengths can also be included in the section on good practices.

In addition, a full safety culture assessment report[4] is drafted that provides clear and specific explanations so that the assessment findings are easy for non-specialists to understand. Quotes from interviews or focus groups, or examples from observation notes are used to make the abstract lines of reasoning tangible and accessible. Care is taken to make sure that the anonymity of respondents is maintained, since failure to do this would seriously compromise future assessments in the organization. A dialogue of culture is typically also included since different readers often understand this concept differently. See Appendix IX for a sample outline of an Independent Safety Culture Assessment Report/ Final Safety Culture Assessment Working Notes.

The safety culture assessment findings are presented for the senior management in an interactive workshop conducted by the safety culture assessors. As with the report, this presentation covers the strengths and areas in need of attention and includes specific examples from across the different data gathering methods to help comprehension. The workshop is facilitated in an interactive manner to building understanding of the themes, and as appropriate, making ties to other OSART recommendations or suggestions in order demonstrate the way in which culture contributes to safety consciousness and safety performance of the plant. The language of the full safety culture assessment report may be clarified based on new understandings gained during this final management team workshop.

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[4] When an ISCA is performed in conjunction with an OSART mission, the eloborated safety culture assessment results are presented as Working Notes.

IAEA NORMATIVE FRAMEWORK FOR STRONG SAFETY CULTURE

Note: The Characteristics and Attributes below are taken from IAEA GS-G-3.5 [5].

I SAFETY IS A CLEARLY RECOGNIZED VALUE		
(a) The high priority given to safety is shown in documentation, communications and decision making**:**	i.	The safety policy should be documented and should be communicated to personnel.
	ii.	The rationale for significant decisions relating to safety should be communicated regularly to personnel.
	iii.	Decisions that affect safety should be made in a timely manner.
	iv.	Multiple methods should be used to communicate the importance of safety throughout the organization.
	v.	Key decisions relating to safety should be periodically revisited and assumptions and conclusions should be challenged in the light of new information, operating experience or changes in circumstances.
(b) Safety is a primary consideration in the allocation of resources:	i.	Resource allocation should be in line with the stated priorities and goals, strategies, plans and objectives of the organization.
(c) The strategic business importance of safety is reflected in the business plan:	i.	Goals, strategies, plans and objectives relating to safety should be clearly identified and integrated into the business plan.
(d) Individuals are convinced that safety and production go hand in hand:	i.	Managers should be especially sensitive to decisions that may seem to place production or other factors above safety and should take care to explain such decisions to personnel.
	ii.	Managers and supervisors should regularly communicate the importance of ensuring safety while meeting requirements for production and performance.
(e) A proactive and long term approach to safety issues is shown in decision making:	i.	In strategic and long range planning, account should be taken of known and potential safety issues.
	ii.	The priorities of, and incentives for, senior management should not be concerned exclusively with short term goals, strategies, plans and objectives.
(f) Safety conscious behaviour is socially accepted and supported (both formally and informally):	i.	The performance appraisal process should recognize and reward safety conscious behaviour.
	ii.	Peers should encourage each other to engage in safety conscious behaviour.

II LEADERSHIP FOR SAFETY IS CLEAR		
(a) Senior management is clearly committed to safety:	i.	Senior managers should treat supervisors as a crucial part of the management team as they translate Safety Culture into practice and should give them their full support.
	ii.	Senior corporate managers should periodically visit operating installations to assess at first hand the effectiveness of management.
(b) Commitment to safety is evident at all levels of	i.	Managers should establish clear expectations of performance in areas that affect safety and these should be documented where appropriate.
	ii.	Managers should adhere strictly to policies and procedures in their own conduct

management:		and should not expect or accept special treatment.
	iii.	Managers should not tolerate or ignore substandard performance in relation to safety for any reason.
	iv.	Managers should exhibit a sense of urgency in remedying significant weaknesses or vulnerabilities.
(c) There is visible leadership showing the involvement of management in safety related activities:	i.	Managers should be able to recognize conditions of degraded safety (physical or organizational).
	ii.	Managers should individually note performance and inspect conditions in the field by walking around the installation and observing and listening to individuals, and should intervene vigorously to remedy safety issues ('walk, look, listen and fix').
	iii.	Managers should ensure that situations adverse to safety are remedied.
	iv.	Supervisors should spend time observing and coaching individuals at their workplaces and should encourage and reinforce expected behaviour.
	v.	Supervisors should discuss safety issues frequently with their teams or work groups.
	vi.	Managers should visit personnel at their workplaces.
(d) Leadership skills are systematically developed:	i.	Managers and supervisors should be selected and evaluated with due consideration of their demonstrated ability to foster a strong Safety Culture.
	ii.	Skills in change management should be taught to individuals in leadership roles.
	iii.	A succession plan that includes aspects of Safety Culture should be put in place for developing future managers.
(e) Management ensures that there are sufficient competent individuals:	i.	Personnel should only perform work for which they are trained and qualified.
	ii.	A systematic approach should be taken to training and qualification.
	iii.	Attendance at training by personnel should be given a high priority.
	iv.	Staffing levels should be consistent with the demands of ensuring safety and reliability.
(f) Management seeks the active involvement of individuals in improving safety:	i.	Managers should actively seek dissenting views and diverse perspectives and should encourage open and frank discussion to support independent thinking.
	ii.	Managers should encourage the raising of concerns by personnel and should take action or else explain why no action was taken.
	iii.	Where practicable, managers should involve personnel in decision making and activities that affect them, for example, by involving individuals in writing their own procedures and instructions.
	iv.	Individuals should feel that their opinion matters and should be able to cite instances of their input leading to positive change.
(g) Safety implications are considered in change management processes:	i.	Processes for change management and control should be put in place so that account is taken of the possible effects on safety of changes to procedures and equipment and other managed changes.
	ii.	Personnel should be informed of impending changes in ways that uphold trust within the organization.
(h) Management shows a continual effort to strive for openness and good communication throughout the organization:	i.	Supervisors should respond to individuals' questions openly and honestly and should maintain good relations with personnel.
	ii.	Managers should ensure that open communication is valued and preserved.
	iii.	Managers should visit personnel at their workplaces and, where possible, should hold open meetings to explain issues and decisions in context.
	iv.	Managers and others who may influence the behaviour of personnel should encourage a questioning attitude.
	v.	Management has the capability to resolve conflicts as necessary.
(i) Relationships between managers and individuals are built on trust:	i.	Managers should carry out what they undertake to do in their communications.
	ii.	Personnel should adhere to the management system.
	iii.	Managers should be able to be trusted by personnel to act professionally when personnel raise safety concerns or report near miss events.
	iv.	Managers should ensure that safety consciousness prevails in the working environment throughout the organization.
	v.	Managers should ensure that communication is not stifled in the organization and should take prompt action to counter any such effect.

III ACCOUNTABILITY FOR SAFETY IS CLEAR

(a) An appropriate relationship with the regulatory body exists that ensures that the accountability for safety remains with the licensee:	i.	Complete and accurate information should be provided to the regulatory body.
	ii.	The regulatory body should be consulted to obtain any necessary clarification of, and guidance on, regulatory matters.
	iii.	The licensee should be seen by the regulatory body to be open and timely in its reporting and interactions.
(b) Roles and responsibilities are clearly defined and understood:	i.	The organization is required to define and to document functions and responsibilities for all aspects of safety that are under its control,
	ii.	Individuals should understand their functions and responsibilities for safety and how their work may affect safety.
	iii.	Individuals should know where to obtain help with safety related issues and should seek clarification if necessary.
	iv.	When contractors are engaged, their functions and their responsibilities for safety should normally be specified in contractual documents. The individuals affected in the organization and in the contractor organization should be made aware of these arrangements.
(c) There is a high level of compliance with regulations and procedures:	i.	Personnel should adhere to regulations and procedures and instances of non-compliance should be avoided.
	ii.	Management's expectations for the use of procedures (i.e. when procedures are to be in the hands of the user and are to be used) and adherence to procedures (i.e. the degree of compliance expected) should be clear and made well known to personnel.
	iii.	Managers and supervisors should inspect workplaces frequently to ensure that procedures are being used and being followed in accordance with expectations.
	iv.	Personnel should be encouraged to review procedures and instructions critically in use and to suggest improvements where appropriate.
(d) Management delegates responsibility with appropriate authority to enable clear accountabilities to be established:	i.	Accountable behaviour should be positively reinforced by managers and peers.
	ii.	Individuals should help each other to fulfil their accountabilities.
	iii.	Accountability should be perceived positively and not negatively as a way to apportion blame.
	iv.	If possible, the accountability for every operational decision should be clear before its execution.
	v.	The way authority is exercised should not discourage individuals from maintaining open communication or reporting concerns or unusual observations.
(e) 'Ownership' for safety is evident at all organizational levels and for all personnel:	i.	Individuals should have their own targets in relation to safety and should continually seek improvement.
	ii.	Individuals should take care of safety in their own working environment.
	iii.	Supervisors should promote good safety practices.

IV SAFETY IS INTEGRATED INTO ALL ACTIVITIES

(a) Trust permeates the organization.		
(b) Consideration of all types of safety, including industrial safety and environmental safety, and of security is evident.		
(c) The quality of documentation and procedures is good:	i.	Procedures should be controlled, clear, understandable and up to date and should be easy to find, use and revise.
	ii.	Documentation should be comprehensive, easy to understand and easily accessible.
	iii.	Responsibilities for preparing documentation and the scope of reviews should be clearly defined and understood.
(d) The quality of processes, from planning to implementation and review, is good:	i.	Work should be pre-planned (including plans for contingencies) to ensure that all safety functions are effective at all times and to ensure that safety is not compromised.
	ii.	Individuals should follow the approved plans and should seek proper approvals before deviating from the approved plans.

	iii.	Work should be planned in sufficient detail to allow personnel to work effectively and efficiently (e.g. resources should be matched to demands, and spares and tools should be available when needed).
(e) Individuals have the necessary knowledge and understanding of the work processes:	i.	Individuals should have a good understanding not only of their own work processes, but also of how these processes interact with other processes.
(f) Factors affecting work motivation and job satisfaction are considered:	i.	Individuals and their professional capabilities, values and experience should be considered the organization's most valuable strategic asset for safety.
	ii.	The reward system should be aligned with safety policies and should reinforce the desired behaviour and outcomes.
	iii.	Recognition should be given to individuals and teams for exemplary performance.
	iv.	Individuals should take pride in their work and should feel that their tasks and performance are important contributors to the success of the organization.
	v.	Managers should be trained and should have appropriate knowledge of the factors influencing human performance.
(g) Good working conditions exist with regard to time pressures, workload and stress:	i.	The scheduling of work on safety critical tasks at night should be avoided.
	ii.	Shift schedules should be based on up to date knowledge of best solutions with regard to human performance and capabilities.
	iii.	Records of overtime should be kept, trended and acted upon. Planned overtime should be kept within regulated limits.
	iv.	Managers should be sensitive to stress affecting individuals under their control by, for example, undertaking stress awareness training.
	v.	The physical working environment should be conducive to high standards of safety and performance (e.g. standards of housekeeping, provision of equipment and tools, including response equipment, and guarding and signposting of hazards).
	vi.	Individuals should be consulted about the ergonomics and the effectiveness of their working environment.
	vii.	Human factor specialists should be made available to the organization.
(h) There is cross-functional and interdisciplinary cooperation and teamwork:	i.	Multidisciplinary teams (drawn from different work groups and different levels) should be used when appropriate to develop solutions to problems.
	ii.	Individuals should interact with openness and trust and should routinely offer support to each other.
(i) Housekeeping and material conditions reflect commitment to excellence:	i.	Managers should not accept long standing problems with items of equipment, systems or processes as 'the way things are'. Managers should pay careful attention to resolving such problems, even if the solutions are challenging and expensive.
	ii.	There should be a process for identifying long-standing issues concerning equipment or processes. For example, each issue could have an action plan for its solution.

V SAFETY IS LEARNING DRIVEN

(a) A questioning attitude prevails at all organizational levels:	i.	Individuals should notice and should be able to question unusual signs and occurrences and should seek guidance when in doubt.
	ii.	Individuals at all levels should be encouraged to ask detailed questions in meetings.
	iii.	Management should be questioning of its own attitudes and views and should actively seek independent views.
(b) Open reporting of deviations and errors is encouraged:	i.	The organization should have a variety of established processes to allow and encourage individuals to report abnormal conditions, concerns and events, including near misses.
	ii.	Recognition should be given to individuals and to teams who report abnormal conditions, concerns and events, including near misses.
	iii.	Individuals should be comfortable raising safety concerns without fear of retribution.
	iv.	Managers should ensure that matters raised are acted upon and that feedback on the outcome is given.
(c) Internal and external	i.	Various oversight forums and processes, including self-assessment, should be used to

assessments, including self-assessments, are used:		review, evaluate and enhance the safety performance of the organization.
	ii.	The number and types of oversight mechanism should be periodically reviewed and adjusted.
	iii.	Oversight should be viewed positively and constructive use should be made of external or independent opinions.
	iv.	Periodic Safety Culture assessments should be conducted and used as the basis for improvement.
	v.	Senior managers should be periodically briefed and should initiate actions on the basis of the results of oversight activities.
(d) Organizational experience and operating experience (both internal and external to the installation) are used:	i.	Processes should be in place to obtain, review and apply available internal and external information that relates to safety, including information on experience from other industries.
	ii.	Reports on operating experience should be reviewed and actions should be taken to ensure that the organization learns and applies the relevant lessons.
	iii.	There should be no indications of an attitude of "it couldn't happen here".
(e) Learning is facilitated through the ability to recognize and diagnose deviations, to formulate and implement solutions and to monitor the effects of corrective actions:	i.	Personnel should be able to have confidence in the corrective action process and should be able to point to examples of problems that they have reported and which have been solved.
	ii.	Checks should be made to see that corrective actions taken address the real and underlying cause(s) and solve the problem.
	iii.	There should be a low rate of repeat events and errors.
(f) Safety performance indicators are tracked, trended and evaluated, and acted upon:	i.	The causes of safety significant events and adverse trends should be identified and acted upon in accordance with an established time frame.
	ii.	The organization should use measures and targets in order to explain, maintain and improve safety performance at all levels.
	iii.	Results with regard to safety performance should regularly be compared with targets and the results of the comparison should be communicated to personnel.
	iv.	Action should be taken when safety performance does not match its goals, strategies, plans and objectives.
	v.	The pitfalls of focusing on too narrow a set of safety performance indicators should be recognized.
	vi.	The organization should be alert to detect and respond to possible indications of a declining safety performance.
(g) There is systematic development of individual competences:	i.	Individual development programmes, including succession planning, should be put in place.
	ii.	Managers and supervisors should be selected and evaluated on the basis of their demonstrated ability to foster a strong Safety Culture.
	iii.	Appraisals of individual development should be carried out to determine the training needs and development needs of individuals.

Appendix II

EXAMPLE OF CODING AND TAGGING METHOD FOR COLLECTED DATA

QU – Questionnaire – respondent group, page, item

DA – Document analysis – type, date, section, page, paragraph

IN – Interview – note taker, date, position title

OB – Observations – note taker, date, location, activity

FG – Focus Group – note taker, number

TF – Team Findings – date, review area

**HAND-OUT FOR SENIOR MANAGEMENT WORKSHOP EXPLAINING
SHARED SPACE**

- Shared space defines the space existing between the individual and the people (individuals, groups) in its surrounding

- A good shared space is characterized by

    - Building trust

    - Decreasing power dynamics

    - Mutual respect

    - Openness – free flow in sharing of thoughts and ideas

    - Enabling individuals to express views related to their inner thoughts and feelings about a particular issue without fear of recrimination or exclusion

    - Goes deeper than sharing facts

    - Dialogue instead of discussion/argumentation

- A good shared space is an essential part of a strong safety culture as its characteristics create opportunities to build a shared understanding of safety within the culture.
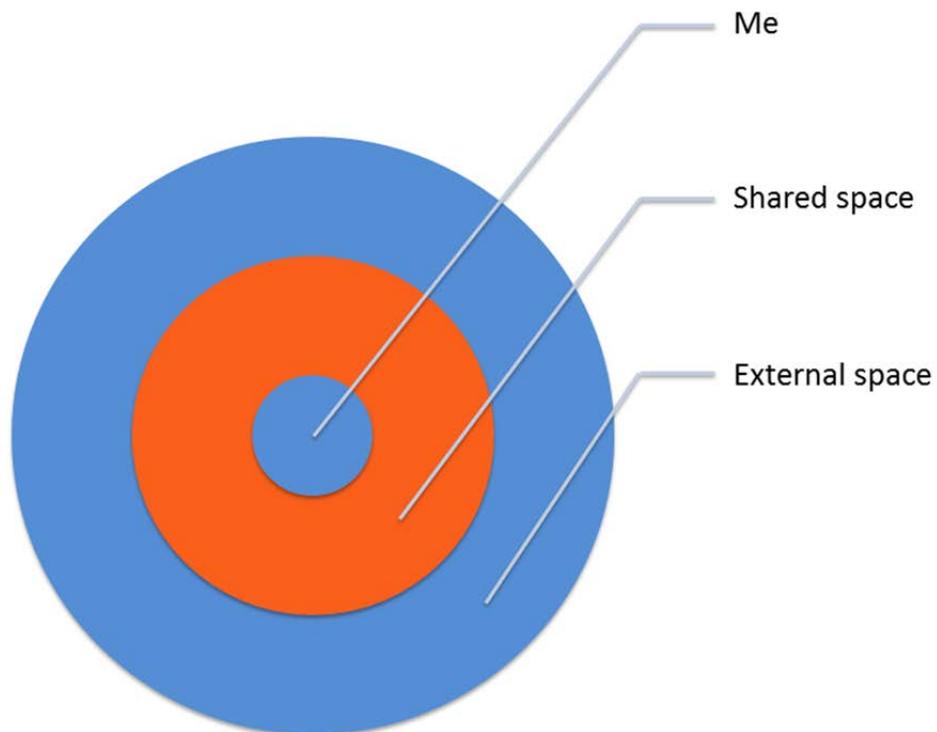
Appendix IV
LIST OF ABBREVIATIONS

CH	Chemistry (OSART review area)
FG	Focus group
LM	Leadership and management (OSART review area)
MA	Maintenance (OSART review area)
OBS	Observation
OPS	Operations (OSART review area)
RP	Radiation protection (OSART review area)
SC	Safety culture
SM	Senior management
TF	Team finding
TN	Technical notes
TQ	Training and qualification (OSART review area)
TS	Technical support (OSART review area)
WS	Workshop

Appendix V

EXAMPLES OF INTERVIEW QUESTIONS

V.1. EXAMPLES OF GENERAL QUESTIONS

- What is your work about? Describe an ordinary day at work

- How does your role relate to safety?

- What do you like about your job?

- What frustrates you?

- If you had unlimited power and resources what would you change?

V.2. EXAMPLES OF THEME QUESTIONS

Learning:

- How do you use learning from within/outside the plant in your work? Examples?

- What have you learnt from event x? (select relevant nuclear or other event/near miss) What changes have been made in response?

Procedures:

- What is your view on procedures?

Leadership:

- Can you give an example of either a good or bad leadership practice that you have experienced during your time working at the plant?

- What works well for the leadership at the plant? What would you change?

Appendix VI

FURTHER GUIDANCE ON CONDUCTING FOCUS GROUPS

VI.1. FOCUS GROUP CONTENT AND QUESTIONS FOR SENIOR MANAGEMENT AND MIDDLE MANAGEMENT

- Login: Ask each participant "how does it feel right now"?

- Introductions: Explain purpose of the focus group, positions, roles and responsibilities, rules, e.g. confidentiality, mobile phones turned off.

- Questions

   Please note: The questions below are sample questions. It is important to only facilitate a dialogue and not to ask too many questions, so only a few of the below questions should be asked. It is suggested to personalize and change the wording to reflect to the name of the organization.

   1. How would you describe [the organization] today?
        a. What is the vision of [the organization]?
        b. How will you reach that vision?
        c. How do you communicate your vision and make sure there is a shared vision?
   2. What does [the organization] do well?
   3. What do you do well?
   4. What do you believe are the shared values that run through [the organization]?
   5. How would you describe communication flow in [the organization]?
   6. What does good leadership look like here?
   7. What does leadership for safety mean to you?
   8. What is the best way to influence employee behavior?
   9. If we asked ten employees in your area, how would they describe the safety culture?
   10. How do you feel the organization has changed over the years?
   11. What is the most frequent concern raised by your employees on safety?
   12. Could you give an example of proactive safety work?
   13. How do you solve cross-functional and larger organizational issues?
   14. If you had unlimited power and resources what would you change? (One wish per participant.)
   15. Is there something that you want to share that we haven't talked about?

- Allow five minutes in the end to evaluate the focus group

   1. How did you experience the focus group?
   2. Anything that could have been done differently which would improve future focus groups?

- Logout: Ask each participant "how does it feel right now"?

- Thank everyone for the participation and contribution

VI.2. GENERIC FOCUS GROUP CONTENT AND QUESTIONS

- Login: Ask each participant "how does it feel right now"?

- Introductions: Explain purpose of the focus group, positions, roles and responsibilities, rules e.g. confidentiality, mobile phones turned off

- Questions

  Please note: The questions below are sample questions. It is important to only facilitate a dialogue and not to ask too many questions, so only a few of the below questions should be asked. It is suggested to personalize and change the wording to reflect to the name of the organization.

  1. How would you describe [the organization] today?
  2. How would you describe the communication flow in [the organization]?
  3. How do you think relationships influence safety? Any examples?
  4. What's the best way of reinforcing safety behaviors?
  5. If you make a mistake that could have had impact on safety, what do you do?
  6. How do you handle violations of good safety practices? Can you give examples?
  7. What does the perfect employee look like in this organization?
  8. What does good leadership look like here?
  9. What stories are circulating in [the organization]? Any examples?
  10. What does [the organization] do well?
  11. What do you do well?
  12. What is positive with working here?
  13. What is the most frequent concern raised by employees?
  14. What do you wish was different in your job?
  15. How do you feel [the organization] has changed over the years?
  16. What do you believe are the shared values that run through [the organization]?
  17. If you had unlimited power and resources what would you change? (One wish per participant.)
  18. Is there something that you want to share that we haven't talked about?

- Allow five minutes to evaluate the focus group

  1. How did you experience the focus group?
  2. Anything that could have been done differently which would improve future focus groups?

- Logout: Ask each participant "how does it feel right now"?

- Thank everyone for the participation and contribution

INDEPENDENT SAFETY CULTURE ASSESSMENT TEMPLATE

The ISCA template is to be used as an aid by OSART reviewers from the different technical areas when collecting information related to safety culture for the ISCA team. The ISCA team can also use it during the analysis of the descriptive themes.

Independent Safety Culture Assessment Template
[*Template to be used by OSART review members collecting information for ISCA team as well as for the ISCA team analysis.*]
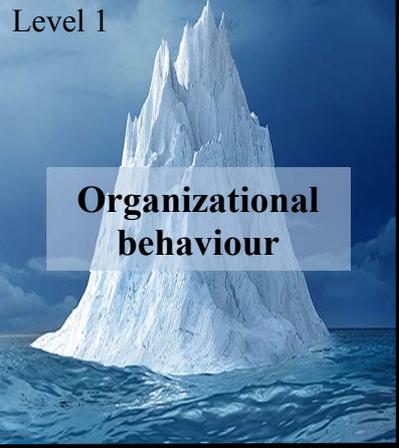
Level 1 **Organizational behaviour**	*Collect: Technical team findings*
Level 2 **Organizational values**	*Ask: Why are technical team findings as they are?*
Level 3 **Organizational basic assumptions**	*Ask: Why are organizational values as they are?*
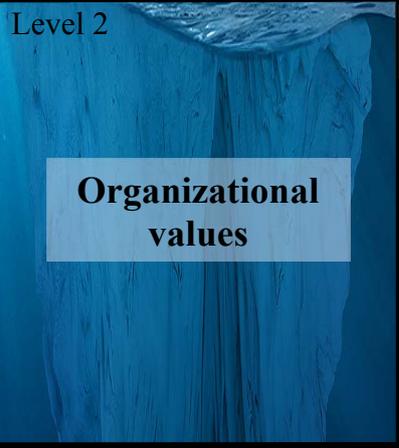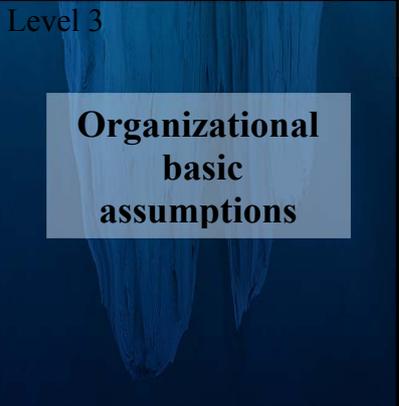
Appendix VIII

SPECIFIC GUIDANCE FOR PERFORMING SAFETY CULTURE NORMATIVE ANALYSIS
−
QUESTIONS FOR EXPLORING SAFETY IMPLICATIONS OF CULTURAL THEMES

Purpose: The purpose of this document is to assist safety culture assessors in determining whether cultural themes warrant specific recommendations based on relevant IAEA guidance documents.

When to use this guide: Safety culture assessors should use this document to explore the possible safety implications of cultural themes derived through an independent safety culture assessment (ISCA).

How to use these questions: *For each of the cultural themes that your descriptive analysis has identified, explore its safety implications by asking yourself the questions in the following sections.*

1. Does the theme give insight into how much the organization places emphasis on safety in its documentation and communications, long-term planning and resource allocation, or how readily members reinforce and uphold good safety practice? *Is safety a clearly recognized value in the organization?*

    What does the theme tell you about:

    a. How the organization helps members and newcomers develop and maintain a focus on safety?
    b. How effectively the organization understands and manages the relationship between resourcing levels and safety?
    c. How managers and staff receive feedback or share mistakes they have made?
    d. Who and what the safety policy covers?
    e. How people understand the organization's desired safety outcomes?
    f. What approach is taken to encouraging safe work practices by employees?
    g. How much individuals feel responsible for the safety of others?
    h. How safety issues are factored into business decision-making?
    i. What people believe they should do if they are unsure about the appropriateness of an action?
    j. How members of the organization are kept informed about new or changing directions or priorities?
    k. How managers address increasing backlogs or project slippages in work planning?
    l. How commitment to safety is established and monitored from the top level of the organization?
    m. How the organization reinforces good safety performance through formal reward, recognition or compensation programs?

    References:
    [INSAG 4; paras 1, 11, 22, 23, 3.1.1, 3.1.3, 3.1.5, 3.2.4, 4.1 68, 4.2.1 70-73]
    [INSAG 15; 3.1] [GS-G-3.5; 2.10 (a) (b), 2.11, 2.14, 2.21, 2.22 (a) (b) (c) (g) (i), 3.21 (d) Appendix 1 I1 (1) (a)-(f)] [GS-G-3.1; 3.11, 3.14, 4.5, 4.12, 4.13] [GSR Part 3; 1.12, Req. 5, 2.51 (a) (b) (c)] [SSR 2/2; Req. 1, 3.2 (a), Req. 5, 4.1] [GS-R-3; 2.1, 2.2, 3.2, 3.3]

2. Does the theme give insight into how accessible and engaged management is in ensuring competency of staff, effectiveness of problem solving, or cultivating open and trusting relationships that support safety focused thinking, decisions, and actions? *Is leadership for safety clear in the organization?*

    What does the theme tell you about:

    a. How senior leaders support supervisors in the field?
    b. What managers and supervisors think is most important to safe work performance?
    c. What the organization's approach is to learning from the hands-on experiences of staff?
    d. How managers model safety conscious behaviours?
    e. How leaders encourage trust and respond when conflict arises between people?
    f. How managers and supervisors resolve conflicts between emerging work demands and staff training and development needs?
    g. What leaders feel is their most important 'tool' for ensuring safe behaviours in the organization?
    h. How managers and supervisors respond to challenges from peers and direct reports?
    i. How the organization manages changes, big and small, to minimize safety risks?
    j. How comfortable members or the organization feel about raising concerns and needs, or admitting mistakes?
    k. How senior managers build effective presence with frontline workers?
    l. What the organization reinforces as effective leadership through its definition of 'high performing' managers?
    m. How staff feel about the accessibility, integrity, and trustworthiness of management?

    References:
    [INSAG 4; 3.2.1, 3.2.3, 4.2.2.2 80-83] [INSAG 15; 3.3, 3.5] [GS-G-3.5; 2.10 (c) (f) (i), 2.15, 2.23, 2.22 (h), 2.24, 2.25, Appendix 1 I1 (2) (a)-(i)] [GS-G-3.1; 2.16, 2.32, 2.34-35, 4.12, 5.61] [SSR 2/2; 3.2 (a), 4.19] [GS-R-3; Req. 3, 4.3, 4.4, 4.5, 5.26, 6.2]

3. Does the theme give insight into the way in which safety responsibilities at all levels in the organization are clarified, supported, encouraged or internalized by individuals? *Is accountability for safety clear in the organization?*

    What does the theme tell you about:

    a. How management relates to external authorities that have a role in ensuring safety?
    b. How clear people are about their roles and responsibilities, including for safety?
    c. Where people turn to gain guidance on how to perform their roles and responsibilities?
    d. How managers and supervisors respond to human performance problems?
    e. What factors people understand as important to good safety performance?
    f. How managers and supervisors factor safety into decision-making?
    g. What happens when information to support decision-making is not readily available?
    h. What workers believe is their role in shaping safe work practices?
    i. What workers believe will happen to them if they make a mistake?
    j. How deviations from rules and procedures are handled?
    k. How safety expectations are reinforced in the organization?
    l. How leaders invite open dialogue in the organization?
    m. How compliance with procedures is reinforced with contractors?

    References:
    [INSAG 4; 3.2.2, 3.2.6, 3.3 57-63, 4.2.2 74, 4.2.2.1 75, 4.2.2.1. 78-79, 4.2.2.2 80] [INSAG 15; 3.2, 3.3, 3.5] [GS-G-3.5; 2.10 (i) (f), 2.16, Appendix 1 I1 (3) (a)-(e)] [GSR Part 3; Req. 5, 2.51 (d) (e), Req. 21, 3.76 (k)] [GS-R-3; 3.5, 3.13, 5.5, 5.6]

4. Does the theme give insight into the way in which the organization supports individuals through work planning to balance production and safety, up-to-date processes and procedures, teamwork, or responsiveness to issues/concerns identified by staff? *Is safety integrated into all activities in the organization?*

   What does the theme tell you about:

   a. What people think about overtime and its implications for safety?
   b. What importance people give to the effectiveness of their relationships with other work groups?
   c. How managers and supervisors ensure safe execution of work?
   d. How leaders manage work group interactions and cooperation?
   e. What people take pride in – quality, quantity, timeliness, safety?
   f. What is celebrated as an achievement by workgroups or across the whole organization?
   g. How safety is emphasized when handling competing priorities?
   h. What managers and supervisors see as their most important role in supporting good safety performance?
   i. How leaders ensure comprehensiveness of problem-solving?
   j. Who assumes responsibility for good housekeeping?
   k. How readily people share information, call upon each other for assistance, and follow-through on commitments?
   l. What happens when needed tools or materials are not readily available?
   m. How the organization uses specialists to help solve systemic, non-technical challenges?

   References:
   [INSAG 4; 3.2.5, 3.3 55-63] [INSAG 15; 3.4, 3.6] [GS-G-3.5; 2.10 (b) (d), 2.17, 2.32, 2.34, 2.35, Appendix 1 I1 (4) (a)-(i)] [GSR Part 3; 2.51 (f) (g)] [GS-R-3; 2.5, 3.9, 4.1, 4.5, 5.4, 5.28]

5. Does the theme give insight into the organization willingness to addressing real or potential issues, the level of rigour brought to identifying and resolving systemic problems, or ensuring the availability of competent staff who can perform work safely? *Is safety learning driven throughout the organization?*

   What does the theme tell you about:

   a. How senior managers value organizational learning?
   b. How leaders respond to questions from staff?
   c. How managers understand safety risks inherent in their own roles and behaviours?
   d. The emphasis people in the organization give to continual improvement?
   e. How people determine what 'good safety performance' looks like?
   f. How comfortable people feel about asking difficult or controversial questions?
   g. How quickly managers and supervisors use assessment findings to make improvements?
   h. How the organization ensures timely and rigorous knowledge transfer?
   i. How committed people are to making organizational improvements?
   j. How urgent and important improving safety is in day-to-day decision-making?
   k. What workers believe will be done with safety concerns or recommendations they raise with management?
   l. How people draw upon external authorities and experts from other fields to improve safety?
   m. What kinds of information people consider to be relevant, credible and persuasive when planning work or making improvements?
   n. How the organization handles recurring problems?

   References: [INSAG 4; 3.1.4, 4.2.2.1 76-77, 4.3 87-91] [INSAG 15; 3.4, 3.6] [GS-G-3.5; 2.10 (g) (h) (j), 2.18-21, 2.22 (d) (e) (f) (k), 2.26, 6.35-39 Appendix 1 I1 (5) (a)-(g)] [GS-G-3.1; 6.3, 6.7, 6.77] [GSR Part 3; Req. 5, 2.51 (h)] [GS-R-3; 2.1, 2.5, 3.11, 4.3, 4.4, 6.2, 6.3, 6.16, 6.17]

Appendix IX

SAMPLE TEMPLATE OF INDEPENDENT SAFETY CULTURE ASSESSMENT REPORT/FINAL SAFETY CULTURE ASSESSMENT WORKING NOTES

This template can be adjusted depending on whether the ISCA methodology is applied as a stand-alone assessment or as an assessment integrated into OSART.

1. Background

    1.1.   Culture and its relevance to safety
    1.2.   Overall assessment methodology and approach
    1.3.   Presentation of amount of data captured through different methods

2. Assessment results

    2.1.   Descriptive analysis (Description of cultural themes including examples)
           2.1.1.   Description of theme 1
           2.1.2.   Description of theme 2
           2.1.3.   Etc.
    2.2.   Normative analysis (Comparison with IAEA Normative Safety Culture Framework)
    2.3.   Presentation of issues based on cultural themes
           2.3.1.   Positive aspects of descriptive theme(s) in relation to Issue 1
           2.3.2.   Safety implications
           2.3.3.   Recommended/suggested areas in need of attention

3. Suggested next steps

    3.1.   Communication strategy for the whole organization
    3.2.   Development of improvement strategies and plans

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