

Guide YVL A.10, Operating experience feedback of a nuclear facility

1 Introduction

The objective of the Guide is to promote the efficiency and effectiveness of the operating experience feedback procedures. The requirements emphasise the significance of operating experience feedback, especially for learning in the organisation.

In the previous YVL Guide update, the instructions concerning operating experience feedback were completely reformed. The new Guide YVL A.10 has functioned well. This Guide update was minor.

2 Scope of application

Guide YVL A.10 presents the grounds and requirements for operating experience feedback at nuclear facilities, especially for the utilisation of accumulated construction and operating experience. The requirements of the Guide concern all phases of the life cycle of a nuclear facility. This Guide is primarily intended for nuclear power plants, and it shall be applied to other nuclear facilities considering the special characteristics of these facilities. The Guide is applied to nuclear facilities under construction with due consideration given to the requirements of Guide YVL A.5 “Construction and commissioning of a nuclear facility”. Guide YVL D.2 “Transport of nuclear materials and nuclear waste” is applied to events relating to transports.

3 Justifications of the requirements

3.1 Section 1 Introduction

The section presents the starting points and grounds for Guide YVL A.10 “Operating experience feedback of a nuclear facility”. The introduction is based on the Nuclear Energy Act (990/1987) and Regulation STUK Y/1/2018. The introduction describes what operating experience feedback means. It justifies the significance of operating experience feedback for continuous improvement and accident prevention.

3.2 Section 2 Scope

The section presents the scope of the Guide and its interfaces with other Guides. Requirements 201–203 concern the licensee’s operating experience feedback and reporting it. Requirements 204–205 concern international reporting and communication procedures relating to events.

3.3 Section 3 Organising operating experience feedback

302. The requirement is based on the WENRA requirement J1.1. “IAEA Safety of Nuclear Power Plants: Commissioning and Operation Specific Safety Requirements No. SSR-2/2” requirement 24 also sets requirements for operating experience feedback.

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303. The requirement is based on the requirements of “IAEA Safety of Nuclear Power Plants: Commissioning and Operation Specific Safety Requirements No. SSR-2/2”.

304. The requirement is based on the traceability of the organisation of operating experience feedback. A clear division of responsibilities guarantees the prerequisites for operating experience feedback.

305. The requirement is based on the WENRA requirement J1.5. It is also important to utilise successes and positive things (for example, things that contributed to survival).

306. The requirement is based on the WENRA requirements J1.3 and 1.4.

307. The requirement is based on the WENRA requirement J4.4 and the requirements of “IAEA Safety of Nuclear Power Plants: Commissioning and Operation Specific Safety Requirements No. SSR-2/2”.

3.4 Section 4 Events at other nuclear facilities

401–402. The section presents which parts of the operating experience feedback procedures concern the handling of events at other facilities. Requirement 401 indicates the parts applied to the handling of events at other facilities. Requirement 402 is based on WENRA J1.1, and it also requires quick assessment of very significant events. This is based on the fact that in terms of safety, it is important to quickly react to received information. It is also important to communicate to the media whether the event is possible at the plant. The Requirements are also based on the requirements of “IAEA Safety of Nuclear Power Plants: Commissioning and Operation Specific Safety Requirements No. SSR-2/2”.

403. The requirement is based on “IAEA Guide NS-G-2.11, Section 3.7: The use of external operating experience”.

405. The requirement is based on the WENRA requirement J1.5 requiring that events at other facilities are processed, conclusions are drawn, good practices are taken into account and necessary measures are taken. The implementation of the measures shall be monitored because that is the only way to ensure that the measures have really been taken.

3.5 Section 5 Event analysis and investigation

Section 5.1 Identifying and selecting events for further processing

501. The requirement is based on the WENRA requirement J3.2 for the personnel’s obligation to report abnormal and unwanted situations relevant to the safety, and on “IAEA Safety of Nuclear Power Plants: Commissioning and Operation Specific Safety Requirements No. SSR-2/2”. It shall be taken into account that people are different, so it is recommended to have different channels for feedback enabling deviations to be reported anonymously.

502. The requirement is based on the WENRA J1.2 requirement for the identification of potential problems. The requirement also concerns the classification of events

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based on how they shall be investigated. This is a commonly used method in, for example, U.S. NRC (Nuclear Regulatory Commission), in which a risk matrix is used to define the investigation need of events. The MANOR project subreport "Ydinvoima-alan organisaatioiden käyttökokemustoiminta organisaation oppimisen näkökulmasta" (Operating experience feedback of nuclear power organisations from the perspective of learning in the organisation) emphasises that the need to report to the authorities is not the only thing that defines how events are investigated.

503. The requirement is based on section "Investigation and analysis of events" of "IAEA Guide NS-G-2.11" section III.2 of its Appendix III, providing recommendations to ensure sufficient expertise in analysing and investigating events, and section "treatment of human errors in event analysis" of its Annex I (I-16–I-20). The MANOR project subreport recommends advanced training on event investigation methods based on safety and accident theories for the personnel of nuclear facilities.

504. The requirement is based on section 5.1 of "IAEA Guide NS-G-2.11", which specifies that the depth of the investigation depends on the safety significance of the event.

505. The requirement is based on section 4.3 of "IAEA Guide NS-G-2.11", which lists the criteria for the depth of the investigation of events. The recommendations of the MANOR project subreport on the starting of the investigation are also used if it is of benefit for learning in the organisation. Technical safety significance should not be the only criterion for the identification of events to be investigated.

506. The requirement is based on the WENRA requirement J4.3, which specifies the content of the analysis or investigation. The analysis or investigation of an event shall be carried out on a time scale consistent with its significance.

Section 5.2 Investigation of events

507 and 507a. The requirement is based on WENRA J4.2 and sections 4.2 and 4.10 of "IAEA Guide NS-G-2.11". In accordance with the general practice, standardised methods ensuring the quality of the investigation are used for the assessment. The methods are presented in, for example, "IAEA-TECDOC-1600, Best Practices in the Organization, Management and Conduct of an Effective Investigation of Events at Nuclear Power Plants". Item a of requirement 507a is connected to requirements 708 and 709, item b to requirements 503 and 509, item c to requirements 507 and 711 and item d to requirements 707, 709, 602 and 508–510.

508. Root cause analyses are performed in several countries, and it is a requirement in U.S. NRC, for example.

509. The requirement is based on section 4 "Investigation and analysis of events" of "IAEA Guide NS-G-2.11" and sections III.2–3 of its Appendix III, including recommendations relating to the training of a person participating in and leading the investigation. As regards competence in investigation and analysis methods, section 2.44 of "IAEA Guide NS-G-2.11 draft 4/2017" has been taken into account (does not require competence specifically from the team leader).

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510. The requirement is based on WENRA J1.4, which requires sufficient resources for the persons participating in the investigation. Sufficient authorisations are a condition for performing the investigation at the depth necessary in order to clarify the basic reasons.

511. The requirement is based on section 4.9 of "IAEA Guide NS-G-2.11". The safety significance of the event may change, and in this case, the investigation and measures shall be re-assessed.

Section 5.3 Corrective and preventive actions and their effectiveness

512. The requirement is based on the WENRA requirement J4.5 on the corrective actions taken on the basis of the analysis in order to prevent similar events and improve safety.

513. The requirement is based on section 5.2 of "IAEA Guide NS-G-2.11", which emphasises the connection between resolved causes and corrective actions. The effectiveness of corrective actions is based on targeting them correctly.

514. The requirement is based on the requirements of "IAEA Guide NS-G-2.11" for corrective actions for which responsibilities and schedules have been allocated.

515. The requirement is based on the requirements of section 5.6 of "IAEA Guide NS-G-2.11" for prioritising corrective actions according to their safety significance. The prioritisation guarantees that the actions with the most significance are implemented at a faster pace.

516–517. The implementation of the actions shall be monitored and documented because that is the only way to ensure that the measures have really been taken. Any changes shall be processed in the same way as the original actions in order to ensure similar procedures and communication within the organisation and to the authorities.

3.6 Section 6 Utilization of operating experience data

Section 6.1 Generic investigation and trend analysis

601. The requirement is based on the WENRA requirement J2.1 for recording operating experience data in a usable format and the requirements of "IAEA Safety of Nuclear Power Plant Commissioning and Operation, IAEA Safety Standards Series No. SSR-2/2".

602. The requirement is based, among other things, on the IAEA's IRS system that recognises both an investigation conducted on the basis of one event (standard report) and a theme investigation conducted on the basis of several events (generic report). It is justified to utilise information accumulated during several events and thus observe the extent of the problem as well.

603. The requirement is based on the WENRA requirement J1.2 and the IAEA Safety Requirements publication "Safety of Nuclear Power Plants: Operation" (No. NS-R-2), section 2.23 *operating experience shall be carefully examined by designated*

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competent persons for any precursors of conditions adverse to safety, so that any necessary corrective action can be taken before serious conditions arise. Section 6 of "NS-G-2.11" "Trending and review to recognize emergent problems", presents instructions on observing trends and procedures to utilise them.

Section 6.2 Continuous improvement

604. The requirement is based on WENRA J3.3, which requires that operating experience data be distributed within the organisation, and IAEA **Safety of Nuclear Power Plants: Commissioning and Operation Specific Safety Requirements No. SSR-2/2.**

605. The requirement is based on WENRA J3.4, which requires training on events for those carrying out tasks significant to safety.

606. The requirement is based on WENRA J5.1 and section 8.4 of NS-G-2.11, which require annual reporting.

607. The requirement is based on WENRA J5.1 and section "Self-Assessment" (8.2.–8.4.) of IAEA Guide NS-G-2.11, providing instructions on assessing operating experience feedback in connection with self-assessments.

608. The requirement is based on WENRA J5.1 and section "Peer Review" (8.5.–8.7) of IAEA Guide NS-G-2.11, which describes the assessment of the peer review group. These reviews are made by OSART and WANO, among others.

3.7

Section 7 Notification of events and reporting

Section 7 is based on WENRA J2.1, J3.1 and J3.2, which require the specification of procedures and criteria concerning the reporting of events relating to safety. The justifications also include comparison with the corresponding guide of the Swedish nuclear safety authority: "*Strålsäkerhetsmyndighetens föreskrifter om säkerhet i kärntekniska anläggningar; Strålsäkerhetsmyndighetens allmänna råd om tillämpningen av föreskrifterna (SSMFS 2008:1) om säkerhet i kärntekniska anläggningar*".

Section 7.1 Prompt notification of events

701. The requirement demands immediate notification of events affecting nuclear and radiation safety so that STUK can start the actions required by the event (at least the actions to assess the safety significance of the event and the appropriateness of the licensee's actions). A separate Guide YVL C.5 has been prepared concerning on-call duty and preparedness activities.

Section 7.2 Preliminary operational event report and INES scale

702. The requirement is based on the WENRA requirement J4.1 for the assessment of the safety significance of an event and the performance of immediate actions.

703. The requirement is based on the fact that the situation at the plant shall be analysed and the necessary actions shall be taken as soon as possible. The

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resources needed for this shall be available. The on-call duty officer or shift manager, for example, shall make an assessment of plant safety.

704. The requirement is based on "IAEA Guide NS-G-2.11 Appendix II" requirement II.1 Preliminary report": *The preliminary report (sometimes termed the early notification report) should be submitted by the operating organization to the regulatory body electronically or by telephone or facsimile.* Submitting the INES assessment in 8 hours is based on INES, the International Nuclear and Radiological Event Scale system. To be able to complete reporting in the required schedule, the authority shall receive a preliminary assessment of the event in sufficient time. Sufficient time to consider the final classification should be reserved. The effect of the time of day or weekend on regulatory activities shall also be considered.

705–706. The requirements are based on IAEA's and OECD/NEA's INES procedures (International Nuclear and Radiological Event Scale) and the national specification of their practices. The classification shall comply with the latest published INES User's Manual, and when new versions of the manual are published, they can be adopted without a separate decision. In the new manual, the idea is that the English manual is not translated. No need for translation is seen, because the users are relatively few and the appointed persons are trained to conduct an INES assessment.

Section 7.3 Operational event report

707. The requirement is based on the requirements of "IAEA Guide NS-G-2.11" Appendix I "Reporting Criteria and Categories".

708. The requirement is based on the requirements of "IAEA Guide NS-G-2.11" Appendix II: *A main report should then be prepared by the operating organization. This report should be submitted to the regulatory body as soon as practicable.* In the investigation of events, it is important to collect information as soon as possible after the event, because recollections may change and information may disappear. Therefore, fixed time limits are justified.

709. The root cause analysis is considered to be a "main report", so in this case, a separate operational event report is not necessarily needed. According to the IRS Guidelines, Joint IAEA/NEA, International Reporting System for Operating Experience, generic investigations may include analyses made on the basis of several events. In this case, the time requirements are justifiably different than for investigations based on one event.

710. The requirement is based on the requirements of "IAEA Guide NS-G-2.11" Appendix II "Types of Event Report, Timing, Format and Content".

Section 7.4 Other reporting

712. The requirement is based on the requirements of "IAEA Guide NS-G-2.11" Appendix II: *The operating organization should submit follow-up reports if the initial report is known to be incomplete or if significant additional information becomes available.*

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713. The requirement is based on WENRA J5.1 and section 8.4 of “IAEA Guide NS-G-2.11”, which require an annual summary report.

3.8 Section 8 Regulatory oversight by the Radiation and Nuclear Safety Authority

803. The requirement is based on “IAEA Safety Standards Safety of Nuclear Power Plant Commissioning and Operation, IAEA Safety Standards Series No. SSR-2/2”.

805–806. The requirements are based, among other things, on INSAG-23 Improving the International System for Operating Experience Feedback. It emphasises the significance of the activities of authorities in making the exchange of operating experience data more effective.

807. The requirement is based on the national need for up-to-date, correct and focused information on events.

3.9 Definitions and abbreviations used in the Guide

This presents the definitions and abbreviations used in the Guide. IAEA terminology, current practices, when possible, and current terminology of the ISO 9000 quality system and accident investigation are used in the definitions. ‘Root causes’ are defined using terms presented in IAEA Guide NS-G-2.11, Annex 1. Data management for the feedback of operating experience, Tools for causal analysis. The definition corresponds to the idea, also occurring in other sources, of factors behind immediate reasons that can be identified and affected. These factors may be technical or related the work of the organisation.

4 International provisions concerning the scope of the Guide

“Safety of Nuclear Power Plant Commissioning and Operation, IAEA Safety Standards Series No. SSR-2/2. Vienna, 2016, Requirement 24”. Guide YVL A.10 covers these requirements.

Guide YVL A.10 is based on recommendations in accordance with “IAEA Safety Standards Series No. NS-G-2.11, A System for the Feedback of Experience from Events in Nuclear Installations Safety Guide, Vienna, 2006”. Guide YVL A.10 covers the recommendations of this Guide but includes guiding text as background material. “NS-G-2.11” was updated at the same time as Guide YVL A.10.

Additional information: SSG-50 superseded NS-G-2.11 (YVL A.10 reference 5) until YVL A.10 revision was ready (YVL A.10 revision was on hold for publishing):

- A System for the Feedback of Experience from Events in Nuclear Installations. Safety Guide IAEA Safety Standards Series No. NS-G-2.11. Vienna, 2006.
- Operating Experience Feedback for Nuclear Installations. Specific Safety Guide IAEA Safety Standards Series No. SSG-50. Vienna, 2018

STUK did not start new YVL A.10 revision because: STUK was aware that YVL A.10 revision overlaps with NS-G-2.11 revision. It was also

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known that national requirement level correspond with SSG-50 also. Comprehensive analysis will be done in next revision.

Guide YVL A.10 takes into account "WENRA Reactor Safety Reference Levels J: System for Investigation of Events and Operational Experience Feedback, September 2014". Guide YVL A.10 covers these requirements.

"IAEA Safety Standards, Governmental, Legal and Regulatory Framework for Safety, General Safety Requirements Part 1, (No. GSR Part 1) requirement 1, Sharing of operating experience and regulatory experience" are taken into account in this Guide.

"Safety of Nuclear Power Plant Design, IAEA Safety Standards Series No. SSR-2/1, Vienna, 2012" requirement 3 and other operating experience matters relating to service life.

Other international references:

- Improving the International System for Operating Experience Feedback, INSAG-23, a report by the International Nuclear Safety Group, Vienna, 2008
- IRS Guidelines, Joint IAEA/NEA, International Reporting System for Operating Experience, Services Series 19, Vienna, March 2010
- INES The International Nuclear and Radiological Event Scale. User's Manual, 2008 Edition, IAEA and OECD/NEA, Vienna, 2013

Swedish requirements for the classification and reporting of events are presented in "Strålsäkerhetsmyndighetens föreskrifter om säkerhet i kärntekniska anläggningar; Strålsäkerhetsmyndighetens allmänna råd om tillämpningen av föreskrifterna (SSMFS 2008:1) om säkerhet i kärntekniska anläggningar".

Compared to the Swedish practices, the Finnish instructions are more concerned with the development of operating experience feedback and the structured implementation of operations. The Swedish instructions are based on ensuring regulatory control and creating a set of reporting criteria. The Finnish instructions also cover the set of reporting criteria.

5

Impacts of the Tepco Fukushima Dai-ichi accident

The Guide covers the application of operating experience data and also the utilisation of the experiences of other facilities. Effective operating experience feedback can prevent accidents that have happened at other facilities. Operating experience feedback in accordance with this Guide would have brought up needs for improvement due to these hazardous situations and deficiencies in the operation of the organisation. However, the realisation of several simultaneous serious threats would not necessarily come up when reviewing minor events.

The Guide emphasises operational events. Utilising the results of safety investigations is not included in this Guide.

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6 Needs for changes taken into account in the update

The needs for changes due to changes made to international and national laws/regulations and the change proposals made in connection with the preparation of the YVL Guide implementation decisions (SYLVI) together with others recorded in STUK's change proposal database have been considered when updating the requirements (including experiences from regulatory control). In addition, the possibilities to reduce the so-called administrative burden have been considered.

Summary of changes requiring a new implementing decision for requirements:

- Requirement 507 concerning the planning stage of event investigation was tightened. The last bullet of the requirement was changed into requirement 507a, which is partly new. The objective of the update was to systematise the planning of the implementation of event investigation. The first bullet remains as it was in requirement 507.
- Requirement B04 was tightened so that the essential requirement 305 of Guide YVL A.10 (the procedures applied in operating experience feedback shall yield results) and the connection to requirements 401–405 could be better integrated into event investigation and its results. The licensee shall analyse why the actions specified on the basis of earlier, similar effects at the plant did not prevent a new event from occurring. Any similar events at other nuclear facilities shall also be recognised, and it shall be analysed why the experiences at other facilities did not prevent the event from occurring at the plant.

The following is a summary of changes that do not require a new implementing decision for the requirements. The changes are clarifications that do not significantly change the level of safety of the requirements.

- The validity of the references was reviewed, and they were updated where necessary. The effects of the updated references on the content of the Guide were assessed. No needs for change were recognised. Reference 5 is being updated. STUK monitors the publication of the new version.
- Requirement 704 for the content of the preliminary operational event report was specified based on regulatory experiences (immediate measures shall be presented; safety assessment also includes PRA when it is suitable for use). The delivery method of the preliminary operational event report was also updated to comply with current procedures.
- Requirement 509 was changed so that competence in investigation and analysis methods is not required specifically from the leader of the team performing root cause analysis; instead, the investigation team shall have competence in these methods. The basis for this is the change proposal by licensees and the reductions in international provisions (NS-G-2.11, 2006, section III.6 vs. NS-G-2.11, draft 2017, section 2.44).
- The traceability of the use of the methods required by requirements 503, 507, 507a and 509 was improved by adding the new requirement B01a to the requirements concerning the content of the event investigation result report (requiring the reporting of the composition of the investigation team and the working methods used). Licensees already have procedures to comply with the

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requirement. This concerns documenting data, so the update does not require any significant development work or additional resourcing.

- Requirement B08 concerning the content of the event investigation result report was specified in terms of events relating to the security arrangements. For clarity, a new requirement B09 was prepared instead of including the matter in requirement B08. The specification is based on document inspection experiences.
- One new definition (evaluation of effectiveness) was prepared based on the wish of licensees and included in the Section "Definitions".
- Minor specifications relating to the construction phase were made to requirements 201 and 701 and the beginning of Annex A. The interfaces between Guides YVL A.10 and YVL A.5 were reviewed, and specification were also made to the requirements of Guide YVL A.5. This was based on a change proposal by licensees and an external party.
- Changes (requirements 101, 103 and 107) and specifications (requirements 201, A01, A02 and A08) were made to references to regulations.
- The attribute of requirement 401 was changed (description → requirement).
- A few text edits were made (for example, references 606, 707, A01, A02 and B02).
- To facilitate references to requirements, the items of requirements were numbered (requirements 403, 503, 505, 506, 507a and 606).

The requirements of the Guide do not contain any possibilities for administrative burden reduction.