

Questionnaire for WASSC Members on IAEA Safety Standards Series No. SF-1: Fundamental Safety Principles – Consolidated responses

Conclusions and recommendation

On the basis of a clear majority of the responses from WASSC Members to the Questionnaire circulated by the WASSC Chair, we conclude that the Fundamental Safety Objective and all of the ten Principles contained within SF-1 do not require to be changed at this point in time. The majority view is that SF-1 continues to fulfil its role as the most important document within the IAEA Safety Standards framework; it is a useful and applicable document that remains clear and unambiguous.

Whilst recognising that some suggestions have been made for future improvements to SF-1, they are considered to be neither urgent nor to result in immediate tangible benefit. WASSC therefore recommends to CSS that it does not initiate a revision of SF-1 at this point in time.

In April 2018, the Commission on Safety Standards (CSS) recommended that each of the five Safety Standards Committees should undertake a review of the IAEA Safety Fundamentals SF-1: Fundamental Safety Principles, and report back about the findings in a future CSS meeting. In December 2018 the WASSC Chair, Dr Mina Golshan, circulated a Questionnaire on SF-1 to WASSC Members to fulfil the mandate given by the CSS. The purpose of the review was to inform decisions on the need to review SF-1 and on which aspects any potential revision should focus.

The responses to the Questionnaire provided feedback from WASSC Members on the usefulness, strengths and weaknesses of SF-1 as well as of their views on the needs for SF-1 revision and on aspects in SF-1 that can be improved. The responses to the Questionnaire have been analysed and documented in this summary report for submission to CSS-45 (April 2019) and WASSC-47 (June 2019). In total 24 WASSC members and observers responded to the questionnaire, representing the following Member States and international organizations:

Argentina	Australia	Belgium
Bulgaria	Canada	ENISS
France	Georgia	Germany
Iran	Japan	Pakistan
Poland	Republic of Korea	Russian Federation
Slovakia	Slovenia	Spain
Sweden	Switzerland	Turkey
United Kingdom	United States of America	World Nuclear Association

Overall a clear majority of respondents concluded that SF-1 does not require revision; 17 respondents felt that the document should remain in its current form, while 6 respondents consider that revision is needed. One respondent did not give a view and instead noted that a statement with respect to the review of SF-1 will be provided through RASSC.

Consolidated responses to key questions

Question 2.2 Do you find SF-1 useful?

Very useful	Useful	Not very useful	Not useful at all
15	13	0	0

Question 2.3 Do you find SF-1 applicable for the whole lifetime of facilities and activities present in your country?

Yes	Partially	Not
26	2	0

A single written response was provided, which gave the view that SF-1 is more relevant to nuclear installations than fuel cycle facilities, medical and other uses of radiation. The example of design and operation of Post Irradiation Examination (PIE) facilities for fuel testing was given and the respondent noted that they did not feel it is practical to apply SF-1 for this type of facility.

Question 2.4 Do you find SF-1 applicable for any exposure situation?

Yes	Partially	Not
23	6	0

Four written responses were provided, three of which relate to the applicability of SF-1 to emergency situations:

- One response gave the view that whilst SF-1 is primarily focused on planned exposure situations, accident prevention and emergency response are also adequately addressed, particularly in principles 8 and 9.
- Two responses noted that work is required to strengthen the applicability of SF-1 principles to emergency exposure situations.

The other response reflected that “space travel should be considered”.

Question 2.5 Do you find the language and terminology of SF-1 adequately clear and unambiguous?

Yes	Good enough	Partially	Not
12	11	4	0

Several free text responses were recorded. Lack of clarity and consistency in the definition and/or use of key terms were common themes. The following specific examples were provided:

- There is no clear definition of “risk limits” (paragraph 3.26) or “radiation risk” (page 1 footnote 2);
- It is not clear whether the term “radioactive waste management” also covers spent fuel;
- The terms “risk”, “safety” and “health” are not always applied consistently

In general the comments suggested that the language and terminology is sufficiently clear, even for non-experts. A small number of respondents noted that the language and terminology of SF-1 should be harmonized with GSR Part 3.

2.6 What do you consider are the main strengths of SF-1?

The responses to question 2.6 can be summarised as follows:

- Several respondents noted that SF-1 is well structured, concise, and understandable even for non-experts;
- Several respondents thought that SF-1 is applicable to all facilities and activities at all stages of their lifecycle, and in all exposure situations;
- One respondent noted that identifying the functions and responsibilities of regulatory bodies, licensees and other organisations as a key strength of the document.

2.7 What do you consider are the main shortfalls or weaknesses of SF-1?

The responses to question 2.7 can be summarised as follows:

- Several respondents noted that SF-1 is not consistent with ICRP 103 or IAEA GSRs developed after SF-1 was published;
- Several respondents felt that SF-1 does not consider all exposure situations e.g. medical uses of radiation;
- Two responses noted inconsistencies in terminology, including definitions of risk, radiation risk and risk limits;
- Other responses noted the following perceived gaps in SF-1:
 - A lack of emphasis on communication with the public;
 - Lack of consideration of “international cooperation and assistance” as an important principle;
 - No reference to sharing of facilities, knowledge or resources;
 - Does not address the safety and security interface;
 - Does not address financial arrangements to ensure safety of facilities from cradle to grave.
- Several respondents referred to aspects of SF-1 which they felt require further detail:
 - Risk assessment approaches and the balance between safety and costs, as well as the balance in consideration of other social factors, particularly existing exposure situations, in decision-making;
 - How to deal with low-doses, uncertainties, and minimizing extreme conservatism in use of models and input data;
 - Risk communication and stakeholders’ involvement in risk assessments and decision-making.

2.8 Can you share any views on how can SF-1 be improved to be more applicable and useful to your country?

The following suggestions for improvement were noted in the responses to 2.8:

- Consider introducing the lessons learned from the Fukushima accident;
- Consider strengthening the treatment of low dose and low dose rate exposure situations to ensure a graded approach to radiation protection;
- Consider the full life cycle of planned exposure situations. For instance waste generation needs to be considered at the start of any proposed facility of activity;
- Strengthening how different exposure situations (planned, emergency and existing) apply to relevant principles;
- Harmonize SF-1 with GSR, ICRP and UNSCEAR reports;

- The presentation of SF-1 could be improved, for example by providing, on a single page in a prominent position in the document, a list of: (a) the Fundamental Safety Objective; and (b) the ten Safety Principles. This would facilitate communication of these important objectives and principles.
- Consider including the principles of sharing of facilities, knowledge, and international cooperation to help small or early stage programmes;
- Consider a better clarification on the effects of low dose radiation and the limitations of using the Linear No Threshold (LNT) theory to determine any perceived harm associated with low dose exposure over an extended period of time.

2.9 In the table below, for the Fundamental Safety Objective and for each SF-1 principle, indicate your view.

	Principle requires no change	Principle is good enough	Some improvement is desirable	Improvement is essential / urgent
Fundamental Safety Objective	20	5	1	1
P1: Responsibility for safety	16	10	1	
P2: Role of government	14	10	3	
P3: Leadership & management for safety	12	11	4	
P4: Justification	11	10	6	
P5: Optimisation	11	11	5	
P6: Limitation	13	10	5	
P7: Protection of present & future generations	12	11	3	1
P8: Prevention of accidents	12	10	3	1
P9: Emergency preparedness & response	10	12	4	1
P10: Protective actions	11	13	4	

In summary, the majority view for the Fundamental Safety Objective and for each SF-1 principle is that either no change is required or the principle is 'good enough'.

Suggested improvements were provided by some respondents against some of the principles:

- P1 Descriptions for implementation of the principles should be updated in accordance with General Safety Requirements.
- P2 The role of government as a promoter of the peaceful use of nuclear energy should be mentioned.
- P3 This principle is biased towards nuclear installations and should be modified to include medical and radiation facilities and activities.
Leadership plays vital role in receiving high level of safety in all nuclear facilities, but there is no paragraph regarding descriptions, elements and how this concept should be applied in the principle.
The interface between safety and security should be mentioned.

- P4 Consider addressing how the principle of justification applies to all exposure situations. Consider expanding the principle to include what happens when something is not justified. Consider that justification may need to be re-examined as new information or technology becomes available.
Consider addressing how security also needs to fulfil the requirements for justification as required (e.g. human imaging for security screening).
Judgment regarding justification is based on only Risk, it is suggested the text is extended to include Radiation risks associated with doses from which risks can be inferred.
It should be clarified which concept of dose would be used in decisions on justification, for example, collective dose shall not be used for making decision on justification.
Should be emphasized that justification for deep geological disposal facilities should be made at the highest levels of government together with embarking on a nuclear power programme.
Include financial arrangement to ensure safety for the facilities and activities from cradle to grave.
- P5 Strengthen the way in which the optimisation process should be implemented more broadly to reflect the increasing role of individual equity, safety culture, and stakeholder involvement in our modern societies.
Clarify how optimisation processes are considered in low dose and low dose rate situations. Different exposure situations could be considered here.
- P6 This principle should be expanded to all exposure situations, not only planned exposure situations, in particular when different values for dose restrictions or dose reference level are used in different exposure situations.
Define risk limits in para 3.26
- P7 Include a provision for dealing with potential exposure, such as those related to probabilistic safety/risk assessments and the safety case for waste disposal facilities.
Health effects are not well understood at low dose and low dose rates. Refer to UNSCEAR approach to attributing health effects.
Consider the concept of Cradle-to-Grave. That means that everything from harvesting raw materials to disposal is considered at the start of planning of facilities and activities.
Global issues with siting of radioactive waste disposal facilities and obtaining a social license needs to be addressed. Should include communication.
Need to consider treatment options for managing and minimizing radioactive waste generated from an emergency situation.
Protection beyond the national borders also should be considered
- P8 Clarify the broad terms of harmful consequences and harmful effects. Does it include all health consequence, including wellbeing?
The principle should be extended to include medical and other uses of radiation than nuclear installations.
Principles 8 and 9 need to be strengthened after Fukushima.

- P9 Principle 9 should be harmonized with GSR Part 7
Should include transition and termination from an emergency situation to an existing or planned situation.
Need to consider treatment options for managing and minimizing radioactive waste generated from an emergency situation.
Should include communication and medical response.
Consider how to address designation of emergency workers and helpers who are not always considered occupationally exposed prior to an emergency.
Consideration of how exposure limits and reference levels apply to emergency workers and helpers at the preparedness stage.
It is suggested that communication with the public and interested parties should be considered in this principle.
The reference level concept as defined in the last ICRP recommendations should be mentioned in 3.36. In 3.37, severe accident with very low probability should be considered, as mentioned in GSR Part 7.
- P10 Clarify “radiation risks are high” by providing context since many existing exposures situations are low dose exposure situations. Link back to UNSCEAR 2012.
Could be updated in accordance with the current General Safety Requirements

2.10 General comments on SF-1

Respondents were invited to provide any further general comments on SF-1. Many respondents repeated the view that the document is useful, easy to understand, and applicable to nuclear and non-nuclear countries in its current form. Several member states also noted that SF-1 would benefit from update to ensure consistency with more recently published related IAEA documents, and the three exposure situations defined in ICRP 103 (planned exposure, existing exposure and emergency exposure situations).

The following further suggestions for improvement were also provided:

- Improvements could be made to SF-1 to recognise developments in environmental protection principles;
- SF-1 could be modified slightly in a future revision to reflect recent experience in decommissioning of facilities;
- SF-1 would benefit in a future revision from some clarification regarding transparency, knowledge management and communication with affected populations of radiation safety issues;
- A future revision of SF-1 could address the need to avoid considering radiation & nuclear safety risks in isolation from non-radiation-related aspects of safety;
- SF-1 may need further elaboration on overlap of safety and security, existing exposure situations, and international collaboration and consultation;
- Public safety for NORM and medical exposure may need further elaboration.

3.1 Question on respondents' overall views

As noted above a clear majority of respondents concluded that SF-1 does not require revision; 17 respondents felt that the document should remain in its current form, while 6 respondents consider that revision is needed.

Some member states provided further clarification on their overall view:

- Two respondents noted that revision of SF-1 is not justified due to the expense and effort that would be involved, and concluded that there would be no added value for safety;
- Three respondents noted that due to the time that has elapsed since the publication of SF-1, there is a need for minor revisions to ensure that the document is up to date and consistent with other more recently published IAEA documents;
- Two respondents noted that the scope and level of detail of the SF-1 publication are appropriate in its current state.