Society for Radiological Protection and Partner Societies

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Improving the Radiation Protection Safety Culture in the UK

Abstract

In the UK, as elsewhere there is potential to improve how radiological challenges are addressed through improvement in, or development of, a strong Radiation Protection (RP) Safety Culture. SRP and IRPA have recognised the need for this and have established workshops and working groups to assist their development. In the UK, two areas have been identified as having a particularly strong influence on UK Society, the Medical and Nuclear Industry sectors. Each has specific challenges.

The mean dose uptake from UK medical exposure has now increased to 0.4mSv per year for every person in the UK (Health Protection Agency, January 2011) equivalent to about 24,000 person Sv. At a fatal cancer rate of about 5-6% per Sv, the risk of radiation induced cancers is significant and the potential impact of even small reductions in dose could save a significant number of lives from radiation induced cancers.

The nuclear industry also faces major challenges, particularly as work moves from operations to decommissioning on many sites. Not only does this involve restarting work in the plants responsible for the much higher radiation doses of the 1960s and 70s, but also performing tasks which are considerably more difficult and hazardous than those original performed in these plants.

SRP has set up a working group to examine the factors which influence RP Safety Culture in the workplace and has proposed a series of measures we believe could assist a reduction in dose in many areas. These actions include proposals to develop improved safety culture designed to improve knowledge and awareness and ways to influence management and colleagues at the workplace.

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1. Introduction

1.1. The importance of a strong Safety Culture for minimising dose to as low as reasonably practicable (ALARP) and preventing the occurrence of radiation Incidents is hard to overstate. Safety Culture is at the root of all our behaviours in the workplace and in the home. A good Safety Culture in an organisation will manifest itself as all employees striving to adopt safe behaviours and prevent harm to colleagues simply because that 'is the way we do things here'.

1.2. Achieving this is a challenging task however. The pressures of cost and productivity, essential to the survival of a business, often appear to compete with the desire for high levels of safety. Yet experience shows that far from being in competition, good safety culture and good, cost effective performance and customer care are complementary. The same priorities and behaviours inherent in a good safety culture also support high quality operations and productivity.

1.3. This paper discusses the features common to a good safety culture and proposes means to assist improvement. It should be added that overconfidence and denial of the need to improve is often a symptom of a declining safety culture – we all have need to improve our safety culture whatever the starting point.

2. Factors affecting Safety Culture

2.1. In the area of RP Safety Culture, two areas dominate due to their impact on dose to employees and the public; the Medical and Industrial sectors. The two sectors are obviously very different in scope and purpose, and will display the influences of safety culture in different ways. However, in terms of behaviours and outcomes, a number of features are common to a good safety culture in any organisation.

2.2. Radiation Protection (RP) Culture is effectively a sub-set of the wider safety culture, and it must integrate with these wider cultural considerations in any workplace. It is particularly important that RP culture considerations do not start from a blank sheet of paper – almost all of the thoughts already developed on nuclear safety or process safety culture are directly relevant to RP culture. In particular, the authors were attracted to the views on Nuclear Safety Culture expressed by INPO and the IAEA INSAG-15 reports (refs 1 & 2).

Some of the key features of a strong Safety Culture are shown below;

- Everyone is personally responsible for safety
- Leaders demonstrate commitment to safety
- Trust permeates the organization
- Decision-making reflects safety first
- A questioning attitude is cultivated, including challenge of potentially unsafe acts and decisions at all levels of an organisation without deference to seniority
- Open reporting of problems and errors, including admission of error without the allocation of blame
- Organisational learning is embraced
- Employee involvement at all levels in improving safety and performance
- Safety undergoes constant examination
- And, usually, good operational performance

2.3. SRP has sponsored work to seek practical methods and ideas to assist improvement in Safety Culture in the Medical and Industrial sectors which is summarised in this paper. Although these areas are addressed specifically due to their significance in UK society, the issues are often generic and transferrable to other fields.

3. Background

UK Medical Exposures

3.1. A study by the Health Protection Agency (HPA) in the United Kingdom (UK) published in 2010 (ref 4) has estimated that about 46 million medical and dental X-ray examinations were carried out across the UK in 2008, an increase of 10 per cent since 1997. Approximately two-thirds of the procedures were carried out in NHS hospitals whilst one quarter were performed by dentists.

3.2. Medical X-rays remain the largest single artificial source of radiation exposure for the UK population by a considerable margin. The average radiation dose from all sources of ionising radiation is about 2.7mSv per person year and medical x-rays contribute 15 per cent of this total (the biggest single contribution is from naturally occurring Radon gas, at about 50%). The breakdown of average radiation dose to the UK population is shown in Annex 1.

3.3. The HPA study reveals that the average annual radiation dose to each member of the public from all diagnostic X-rays has increased by about 20% from 0.33 millisieverts (mSv) in 1997 to 0.4 mSv in 2008. Most of this increase is due to the growth in the number of higher dose computed tomography (CT) examinations. In summary, the study indicated that;

- CT scanning now accounts for around 68 per cent of the dose to the UK public from all X-ray procedures. About 1.4 million CT scans were performed in 1997 and 3.4 million in 2008 - a rise of 140 per cent. Around 20,000 (0.6%) of these CT scans were performed on individuals who did not show any symptoms, as part of self-initiated health assessment. In the UK the Committee on Medical Aspects of Radiation in the Environment (COMARE) have ruled that whole body CT scanning on asymptomatic patients is unacceptable.

- The NHS Breast Screening Programme accounted for 2.03 million X-ray mammography examinations in 2008, an increase of 45 per cent since 1997 when 1.4 million examinations were carried out. This increase is due to widening of the age range for screening to cover women aged 50-70, instead of those aged 50-64. The average dose to the breast from each mammography X-ray is about 0.2 mSv.

- About 1.2 million X-ray examinations were taken in independent hospitals in 2008, a rise of 40 per cent since 1997.

- The total collective dose for all medical examinations in the UK in 2008 was about 24,000 person Sv.

3.4. Based on ICRP risk factors of about 6% per Sv for a population, a collective dose of about 24,000 person Sv equates to a large number of potential cancers of the order of 1400 per year, although the effect would clearly be delayed for a number of years after exposure.

3.5. Minimising these doses to as low as reasonably practicable (ALARP) given the large number of people involved and the consequential high collective dose could potentially save many people from radiation induced cancer and therefore gain significant benefit to the UK population.

3.6. Achieving this is a challenging task however due to the large numbers of people involved, both professionals and patients. A fundamental shift in the perceived risks and benefits of the diagnostic examinations and the doses resulting from them would be needed to introduce a culture of greater assessment and challenge of their need. While it is recognised that the benefits of good diagnostic evaluation is huge for a symptomatic patient, better awareness of the associated risks could reduce dose with little or no impact on the value of the diagnosis for certain types of assessment.

UK Nuclear Industry

3.7. The issues in the UK Nuclear Industry are very different but no less important. In general, the operations at most UK Sites can be split into two activities – operation of current facilities and decommissioning of redundant facilities.

3.8. Radiation doses from operating facilities in the nuclear industry have dropped dramatically from the very high levels seen in some Sites in the 1960s and 1970s. In the main, this is due to significantly improved design of plant and better dose control arrangements. Typical average radiation dose for a current generation plant (ie a plant commissioned in the last ~25 years) is typically well below the average radiation dose to a UK resident from natural radioactivity of ~2.7mSv/year, and often <1mSv/year. While the need to optimise dose must always continue, the priority for the allocation of limited funding is clearly likely to be low where doses are already below 1mSv/year.

3.9. The growth in the decommissioning of redundant facilities poses a far greater challenge to both radiation dose levels and avoidance of accidents however. Many of these redundant facilities were designed in the 1950s and 60s with limited technology and in some cases with a strong military input to the operating priorities. Decommissioning in these areas involves not only restarting work in the facilities responsible for the very high radiation doses on some sites in the 1970's, but often doing work which is more difficult than those original operations. Examples include the dismantling of Gamma caves, Alpha glovebox cells and the

emptying of redundant, often very contaminated fuel storage ponds.

3.10. The difficulties inherent in this decommissioning work has led to a significant split in typical radiation doses between those involved in current operations with low doses and those involved in decommissioning operations with significantly higher doses. Radiation doses close to 10mSv/year can be seen in the most challenging facilities. There have also been a number of incidents involving additional radiation dose to workers, breaches of Regulations and impact on plant. This has inevitably had an impact on public confidence in the Industry.

3.11. Against this very challenging background, avoidance of unnecessarily high radiation doses and accidents (known as 'Incidents' in the UK) can only be achieved with a strong safety culture displaying all of the features listed in paragraph 2.1.

4. The SRP and IRPA Safety Culture Initiative

4.1. SRP and IRPA have concluded that improvement in RP Safety Culture should be a priority in seeking to achieve the goals outlined above. We have embarked upon projects aimed at fostering belief in the success of cultural approaches and in developing guidance to help equip radiation protection professionals to promote a successful RP culture in their workplace.

4.2. SRP held an initial workshop of professionals from the Nuclear Industry and Medical arenas (including members of our Partner Societies in the medical field) in the autumn of 2011 to seek to identify the key issues and to map a route forward. The workshop identified ideas and suggested actions relevant to the Medical and Industrial sectors. However, many of the suggested actions are generic and would therefore are potentially beneficial to other sectors not directly represented at the meeting, such as universities and general industry.

5. Analysis of the Issues - Factors Common to all Areas

SRP and the Partner Societies believe that there are a number of common issues or factors which can limit the development of a strong safety culture. These are summarised below;

5.1. As stated earlier, decisions or actions which lead to negative RP consequences are often made with the best of intentions in order to achieve other objectives important to the person making the decision without a clear vision of the total impact. This leads to a number of conclusions

5.2. **Knowledge of radiation risks and impact**

Knowledge and understanding of the real radiation risks relative to their benefits are critical. A significant improvement in awareness and technical knowledge would greatly assist the development of a strong safety culture - the lack of proper understanding of radiation risks by some key players is considered to be a current major hurdle to establishing an effective RP culture. However, the knowledge needs to be matched to the needs of the profession and the role of each individual within it. A Board member, Director or senior generalist manager needs a different subset of knowledge compared to a nurse, front line worker or technician. Several of these key roles are not always identified in current training programmes. It is important to identify the key roles involved, the knowledge requirements for each role and how that knowledge can be effectively imparted.

5.3. **The role of the Radiation Protection Advisor**

A key central player in developing and embedding a strong RP culture is the Radiation Protection Adviser (RPA – internationally referred to as a 'Qualified Expert'). However, this is a role which is not well understood in many areas. Amongst RP specialists it is clear that the role is intended to assist the employer to optimise radiation dose and to maintain compliance with the law. However, seen from the perspective of an employer who is under pressure to deliver difficult goals, it can appear that the role is about creating hurdles to getting the job done simply and effectively.

5.4. In order to succeed in this difficult task, the RPA has to act as a facilitator and change agent within his/her organisation, working persuasively at all levels from very senior management to the shop floor. The demands of this role require good 'soft skills' such as high levels of persuasive skills which RPAs may need help to develop. In particular, it is important that RPAs learn to speak 'the language of senior management' to facilitate communication on radiation protection matters with the upper echelons of the organisation. The opposite will not happen. Very few relevant training opportunities are normally available to support RPAs in this endeavour. Almost all training and updating facilities available through SRP and the Partner Societies

(PS) are of a more technical nature. It is therefore important that SRP and the PS review how to help RPAs develop these softer skills which are vital to success in driving a successful RP culture.

5.5. **The role of the Radiation Protection Supervisor (RPS)**

The RPS is usually a front line Supervisor responsible for the management and radiological safety of Teams working with radiation and has a crucial role in developing and maintaining a strong Safety Culture. However, the workload of this group is often high with competing pressures on time and priorities, which can result in operational priorities taking precedence over control and optimisation of avoidable dose. It is important that support is given to this group by employers and professional bodies, for example to enable the sharing of experience and good practice and assist the implementation of simple ways to minimise dose without affecting operational delivery.

5.6. **The role of the Professional Bodies**

The professional bodies (SRP and the PS) have a direct role to play in promoting the development of a strong RP culture. In many cases the professional bodies are in a good position to interact with outside bodies representing key stakeholders to help achieve improved understanding and support. The RPAs and RPSs can then build on this platform within their individual organisation. Specific examples include interactions with key Health Service groups, Nuclear Industry Safety Directors, Regulators and other industry groups. SRP and the PSs should seek opportunities to develop these links.

5.7. **Regulators**

The regulators are a critical stakeholder group, and individual regulatory inspectors have a powerful opportunity to offer support and encouragement for developing an effective RP culture. Discussions between the regulators and the above professional bodies could serve to actively promote the right conditions and behaviours by all parties for culture development.

5.8. **Learning from experience**

The development of a true learning organisation is one major attribute of a good culture. Without it we are destined both to repeat the mistakes of the past and ignore the lessons of past success. Effective Operational Experience Feedback (OEF) is therefore critical, but can be difficult to achieve. In some environments this is particularly challenging, with local sensitivities over releasing information for wider sharing and learning and even a perceived risk of prosecution or litigation. Efforts are necessary to encourage the widest and most effective sharing of all learning opportunities.

6. Analysis of the Issues - Factors Specific to the Medical arena

6.1. **The role of the Diagnosing Professional**

The use of diagnostic methods using radiation is increasing. This is influenced by;

- Ionising Radiation diagnostic imaging is seen to be quicker because of its wider availability
- Obesity reduces the effectiveness of less intrusive methods e.g. ultrasound
- Time pressures to create all the possible information in one go (see below)
- The use of modern electronic requesting systems makes the administration easier but also creates a negative effect in that it may reduce discussions with the radiographer in the justification process.

6.2. There are many pressures on diagnosing professionals to achieve a high rate of throughput of patients, both from management and patients. This can lead to a professional asking for every diagnostic radiation imaging technique available to make sure he or she gets all of the necessary information first time round, even if some proves to be duplicated or unnecessary. The alternative is to request a more restricted choice based on professional judgment of need. While this may be adequate in many situations and avoids any redundancy or duplication, it leaves open the risk that the first round of investigation does not yield the expected results. A second round of diagnostic investigation can delay diagnosis and cause stress and frustration in patients, especially if the hospital is remote from their home.

However, requesting every investigative technique available will inevitably lead to duplication and redundancy and therefore unnecessary dose. Over a large population, this can result in a very significant but avoidable collective dose.

6.3. **The role of the Radiography professional**

There is a need to develop a better and wider understanding of the role of medical physicists and radiographers. Their expertise should be involved in the constructive challenge role in the requesting system, especially noting that such systems are more automated than previously. Professional Radiographers can assist the RP culture if they are able to influence how radiography is seen by other medical professionals within the multi-skilled teams. Examples include;

- acting as the 'gatekeeper, conscience and challenge' in the system for requesting scans
- a requirement for the Medical Physics Expert (MPE) or RPA to endorse relevant risk assessments
- the use of 'hold points' in a procedure where the MPE or RPA is required to endorse progression to the next step based on results to date

6.4. In this digital age, there may be good opportunities for better exchange of previous diagnostic information or images thereby reducing the need to repeat radiation exposures for information that already exists

6.5. **Professional Bodies**

The medical professional bodies could develop and promote a small number of key procedures for common application across the UK health service. For example

- The observation that professional use of protection aids in radiography are not routinely used. There may be a need to reinforce professional standards and to introduce nationally agreed protocols on the use of protection aids in radiography.

- Patient exposures tracked as part of single health episode only. Multiple health episodes are not tracked with the exception of breast screening which is tracked as part of the state service

- There is a limited understanding within the UK of requirements of the legislation, namely the Ionising Radiation (Medical Exposure) Regulations 2000 (IRMER) outside the radiography profession. Simple guidance of the key requirements to assist awareness.

6.6. **Technical understanding**

Radiologists receive training in radiation protection, optimisation, and limitation. However, a comparable level of training is not received in other medical professions who request procedures. There is an opportunity to expand this technical training into other medical specialties and a number of the Medical Professional Bodies have already agreed to this.

7. Specific Factors – Industry

7.1. As above, there are great financial and programme pressures on Nuclear Industry Management and employees. Combined with the technical difficulty of some decommissioning operations, the demands within the Nuclear Industry are as great as those of medicine.

7.2. Considerable effort has been put into safety culture improvement on several of Industry sites and good safety performance is a significant strategic requirement. However, improving and even maintaining a strong culture is an ongoing process. Any apparent change in priorities will discourage progress.

7.3. Trust between senior management and employees is critical to the process and this can be very fragile. Consistent dialogue, openness and the development of common safety goals must be developed and maintained.

7.4. The fundamental driver for a strong safety culture must come from the very top of the organisation, but with strong and active support from the rest of the organisation build on trust.

7.5. **Embedding culture change on a large site**

Embedding culture change on a nuclear site is very challenging due to its size and the number of people

involved in working with radiation. This imposes specific demands

- All management must believe in the process and lead it. Mixed messages, inconsistency and a half-hearted approach will very quickly undermine the efforts of the senior team. This means that the process must cascade consistently from all members of the top team and must involve all levels of management. Front line management is particularly important in setting local priorities and standards, so failure to engage this level of management fully will derail the process.

- Direct involvement of the employees themselves working with local change agents (including Safety representatives) is essential. Looking out for colleagues practicing unsafe behaviours (consciously or unconsciously) often requires constructive challenge and therefore a great deal of mutual trust and confidence.

Clearly this means that top down messages alone are not sufficient to change culture. The process needs to be planned and implemented as a major strategic priority throughout the organisation.

7.6. Role of the Employee

A significant difference in the radiological practices between a Nuclear Site and a Hospital is that while there are few specialist in a hospital who work with radiation, a large proportion of employees will do so on a nuclear site. The radiation dose is received mainly by the worker, in contrast to a hospital where the majority of the radiation will be received by the patients. The importance of individual worker responsibility to ensure the personal application and ownership of ALARP is therefore particularly important. This therefore places the employee in a position where they can have a significant influence on their own dose. For example, awareness of the variations in radiation level around a work area can make a significant difference to the dose received during the task. Historically some workers have always managed to receive consistently lower doses than average for the same work: their skill and awareness needs to be instilled in all colleagues.

8. The Way Forward

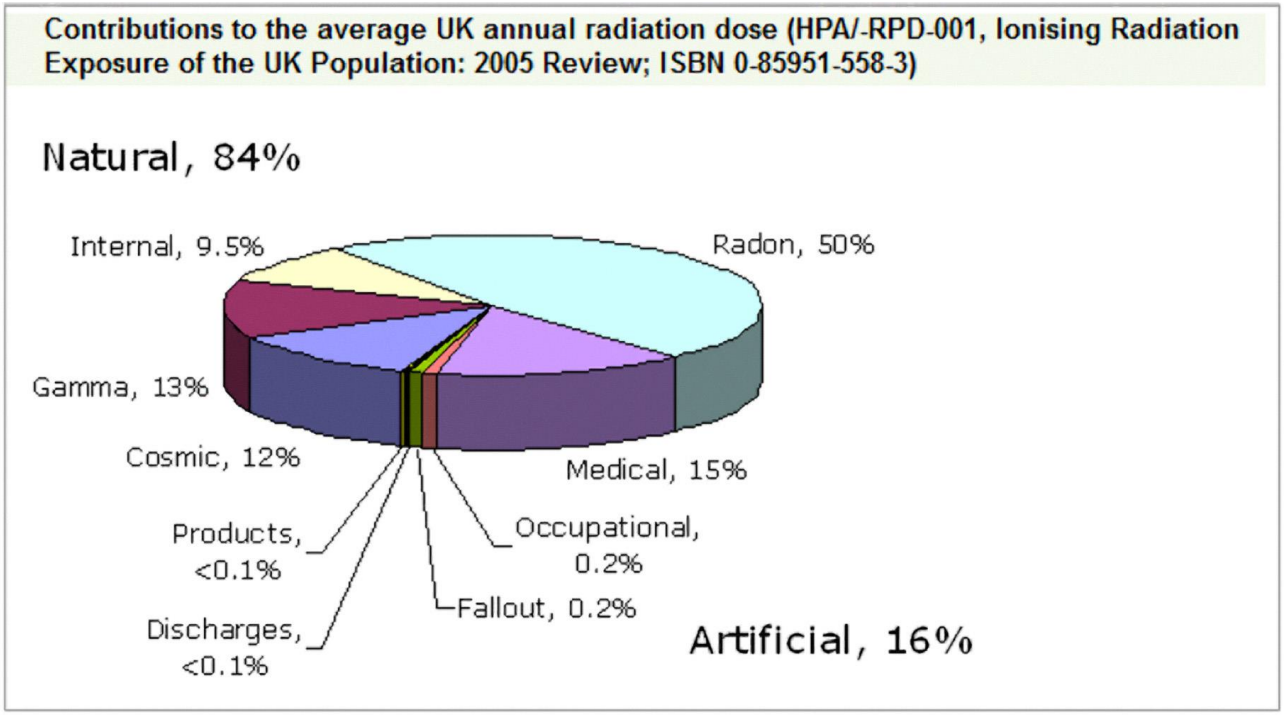
8.1. SRP and the Partner Societies are committed to the task of assisting all relevant parties to develop and implement an effective RP culture in the workplace. The UK views and experiences will also be made available to the ongoing international programme, from which we expect useful input to our work.

8.2. It is proposed that Radiation Protection Professions working in key areas who wish to seek improvement in Safety Culture develop an action plan to achieve this. SRP and the PS have a keen interest in assisting this goal and will offer whatever help and support they can.

Examples of suitable action plans to assist in this process are included in Annex 2 - 4.

Annex 1

Breakdown of Radiation dose to the UK Population



Source - Health Protection Agency, 2005, (Ref 5)

Annex 2 – Draft Improvement Plan for the Medical Sector

Medical Safety Culture Improvement Actions	**Action placed on;**
1. Radiation protection Advisors (RPAs) and Radiation Protection Professionals (RPPs) to become champions of change within their organisation to seek support from all levels in the Organisation for Safety culture improvement	
2. RPAs and (RPPs) to engage with Senior Management to emphasise the benefits of a strong Safety Culture and to seek ownership of the need for continuous improvement.	
3. RPAs and (RPPs) to seek support from Senior Management to engage with Employee Representatives to emphasise the benefits of a strong Safety Culture and to seek their support in direct involvement and participation in a programme of continuous improvement.	
4. RPAs and (RPPs) to assess the current level of Safety Culture on your Site throughout all levels of staff by encouraging Senior Management to use the INSAG-15 Questionnaires	
5. RPAs and (RPPs) to engage with Senior Management to encourage (further) development of the Learning Organisation and establishment or development of Operation Experience Feedback (OEF) procedures	
6. Develop a Plan on how to engage stakeholders i.e. all of the key people round the table when discussing treatment. e.g. Consultants, nurses, patients	
7. Develop consistent procedures for use within all medical facilities. Clearly address 'clinical judgement' situations. There may be opportunities to engage with our professional societies to use work already existing elsewhere.	
8. Develop ways of reinforcing use of clinical aids linked with action 2.	
9. RPAs and (RPPs) to develop training/coaching on soft skills – focus on the benefits of developing professional respect.	
10. Identify technology which requires training and develop standards to determine who can be considered a 'trained operatives'.	
11. Develop simple messages around the Radiation exposure control – concise/consistent/correct (i.e. endorsed by SRP)/ clear on benefits. Messages need to align with stakeholder responsibilities' and roles.	
12. Develop and/or assist in training for stakeholder users/requesters (Referrers) of radiation services at the heart of medical training. a. Target at a sensible point of training i.e. when they become responsible for ordering services e.g. 5th year of doctors training and not before. b. Clear on benefits of dose control for patient and professions e.g. resource use and costs. c. Direct simple and memorable training.	

13. Examine how communication disconnects can be tackled to prevent poor communication and barriers to developing inter-profession relationships e.g. effects of electronic request systems,	
14. Look at Barriers inside decision making process – resolution of different priorities.	
15. Review and develop actions to make the RPS and RPA/MPE 'gatekeepers' role work.	
16. Discuss with regulators how they can help the development and implementation of actions.	
17. Develop guidance on how to a. encourage a culture of reporting and learning b. how to get feedback to the right place In radiotherapy there is already a national "learning culture" so this could be used as a model for other roles.	
18. Review methods of tracking exposure – are they good enough for informed decision making	
19. SRP to develop Promotion material for advertising Radiographer's role in Radiation protection i.e. not just correct use of equipment and treatment delivery	

Annex 3 – Draft Improvement Plan for the Nuclear Industry

Nuclear industry Safety Culture Improvement Actions	**Action placed on;**
1. Radiation protection Advisors (RPAs) and Radiation Protection Professionals (RPPs) to become champions of change within their organisation to seek support from all levels in the Organisation for Safety culture improvement	
2. RPAs and (RPPs) to engage with Senior Management to emphasise the benefits of a strong Safety Culture and to seek ownership of the need for continuous improvement in this area. This could initially be progressed by RPA presentations to senior management and/or financial management meetings in addition to safety committee meetings.	
3. RPAs and (RPPs) PAs to seek support from Senior Management to engage with Employee Representatives to emphasise the benefits of a strong Safety Culture and to seek their support in direct involvement and participation in a programme of continuous improvement.	
4. RPAs and (RPPs) to assess the current level of Safety Culture on your Site throughout all levels of staff by encouraging Senior Management to use the INSAG-15 Questionnaires	
5. RPAs and (RPPs) to engage with Senior Management to encourage (further) development of the Learning Organisation and establishment or development of Operation Experience Feedback (OEF) procedures	
6. RPAs and (RPPs) to encourage the establishment of links with other sites to share knowledge and experience on Safety culture improvement	
7. RPAs and (RPPs) to consider what additional support and skills will enable us as individuals to deliver our roles most effectively and avoid the perception of erecting hurdles to effective project delivery where these exist. Possible examples include; a. Engaging with our professional societies to seek support and assistance to initiate safety culture improvement b. Benefits in improving soft skills such as persuasion and empathy and where these can be acquired c. Understanding what is involved in becoming a learning organisation and the specifics or OEF	

Annex 4 – Draft Improvement Plan for Professional Societies

General Safety Culture Improvement Actions	**Action placed on;**
1. Use existing work from IAEA, INPO, WANO on safety culture to extract relevant aspects of use and/or relevant for radiation protection.	
2. Connect with other industry institutes who deal with radiation professionals to seek their contribution e.g. Institute of non-destructive testing.	
3. Establish the needs of the professional affiliations of small companies who use industrial radiography and seek to connect into those needs.	
4. Risk perception of exposures – consultation can cause further perception problems and erosion of status i.e. perceived as a blocker not a legitimate risk reduction service.	
5. Risk balance – radiation not seen as 'high risk' until overexposure then seen as a Very 'high risk'. Organisations handling of risk balance crucial in the perception of non-radiation specialists' interaction.	
6. Engage with Regulators to seek assistance, support and advice on implementing local initiatives and support radiation risk management and optimisation by radiation professionals.	
7. Consider expanding advice, training and support and/or strategies to assist a. Soft Skills (e.g. communication, presentation and influencing/assertiveness skills) for Radiation Professionals who desire it. b. Key procedural systems, such as Operation Effectiveness feedback (OEF) c. Front line management such as Radiation Protection Supervisors (RPS) to enable the sharing of experience and good practice and assist the implementation of ways to minimise dose without affecting operational delivery.	
8. **I**nside learning from mistakes – structure the learning from the professional body a. Radiotherapy/Radiology – issues around confidentiality and closed inside the organisation. b. Industry – collation and relevancy needed – "this is what happened and why it happened" straightforward messages needed. c. Both also have potential barriers from litigation activity.	
9. Radiation information is difficult to get over to non-professionals – concepts are difficult – SRP/IRPA could assist with back up advice and support material for the professional to get over the messages.	
10. The ALARP / Optimisation message is difficult to get over to non-professionals and can mean different things to different people in the decision making chain. Support material would assist in cost/benefit discussions.	
11. Discussion is needed on the effects of privatisation and personal accountability. This can create both positive and negative influences on motivation, blame Culture, Litigation, and personal control.	

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