



ORIGINAL: English

**EXPERT MISSION TO ASSESS THE
PROGRESS MADE IN ADDRESSING THE
FINDINGS FROM THE IRRS MISSIONS TO
THE UNITED KINGDOM**

Liverpool, United Kingdom

4-7 November 2014

DEPARTMENT OF NUCLEAR SAFETY AND SECURITY

**EXPERT MISSION REPORT ON THE PROGRESS MADE IN ADDRESSING THE FINDINGS
FROM THE IRRS MISSIONS TO THE UNITED KINGDOM**

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TABLE OF CONTENTS

EXECUTIVE SUMMARY	4
Module 1. LEGAL AND GOVERNMENTAL RESPONSIBILITIES	6
Module 3. RESPONSIBILITIES AND FUNCTIONS OF THE REGULATORY BODY	7
Module 4. MANAGEMENT SYSTEM OF THE REGULATORY BODY	11
Module 5. AUTHORIZATION	14
Module 11. ADDITIONAL AREAS	15
Module 12. SUPERVISION OF NON-NPP FACILITIES AND ACTIVITIES	18
APPENDIX I – LIST OF EXPERTS:	23
APPENDIX II – MISSION PROGRAMME	25
APPENDIX III – ONR REFERENCE MATERIAL USED FOR THE REVIEW	26
APPENDIX IV – IAEA REFERENCE MATERIAL USED FOR THE REVIEW	34

EXECUTIVE SUMMARY

At the request of the Government of the United Kingdom, in 2013, an international team of senior regulatory experts conducted a third IRRS extended follow-up mission to the UK after the two earlier IRRS-missions to UK, which took place in March 2006 and February 2009. The purpose of the 2013 peer review mission was to review measures undertaken following the recommendations and suggestions of the 2006 and 2009 IRRS missions and to review the areas of waste management and decommissioning, occupational radiation protection and radiation sources application in order to ensure ONR had received an IRRS mission covering all ONR regulatory functions. The IAEA was also requested to review ONR's approach to openness and transparency as well as the recently implemented ONR operating model. All except one of the suggestions from 2009 were closed and the 2013 IRRS mission resulted in 12 new suggestions and 13 new recommendations. The IRRS team at that time identified this as a 'commendable' result by the ONR.

In June 2014, the UK Government requested the International Atomic Energy Agency to carry out a progress review mission to the UK, following on from the series of missions to the UK in 2006, 2009 and 2013. This request is the first time a member state has requested assessment against findings within a year of a peer review mission, and again the expert mission commends ONR for the support they have shown to the process, and its findings. The expert mission took place from 4 to 7 November 2014 at the ONR headquarters in Liverpool. The expert team consisted of three senior regulatory experts from three IAEA Member States and three IAEA staff members. The team carried out a review of the progress made with actions to address the findings from the previous IAEA regulatory-peer-review missions in the following areas: legislative and governmental responsibilities, responsibilities and functions of the regulatory body, management system of the regulatory body, authorization, and the additional areas of occupational radiation protection, control of discharges, radiation source applications, waste management facilities and decommissioning.

The expert team made the following general observations:

Since the 2013 Mission, a new Chief Nuclear Inspector was appointed in November 2013 and ONR has become an independent Public Corporation as of 1 April 2014. The UK nuclear regulatory body has been in a state of transition from the first 2006 IRRS mission until its establishment as an independent Public Corporation in April 2014. The change of responsibilities with a broader remit in the nuclear sector, the generational shift in the nuclear sector and the turnover of key staff, the change to a new operational model and the response to external factors like the Fukushima Daiichi accident all contributed to this. The ONR Chief Executive Officer and the other executive ONR members, with the support of the Board have further developed and consolidated the ONR operating model and taken steps to create an integrated "One ONR" by developing an ONR Strategy and Annual Plan together with strategies and procedures in the areas of human resources, communications, policy and objectives. Together with the relevant Government departments and other UK authorities, a comprehensive review of the adequacy and effectiveness of the existing nuclear regulatory framework has started. As a Public Corporation, the ONR is accountable for efficient and effective use of resources, and to assure that the interface with relevant government departments remains effective. It was also required to step up its internal and external communication, including out-reach activities to interested parties and the general public. Substantial measures have been taken in enhancing the ONR activities in order to meet these requirements.

Of the 26 reviewed findings from the 2009 and 2013 IRRS missions, the expert team found that 21 could be closed based on evidence or based on progress made and confidence of the full implementation. This highlights the extent of progress made since 2013 and demonstrates the continuous effort to improve. The 2013 Mission had identified 12 findings specific to radioactive waste and decommissioning, all of which have been closed. The closure of some of these findings also involved measures taken by the Government or measures taken by ONR with support of the Government or in collaboration with other UK authorities. This represents a significant achievement and demonstrates the UK and ONR's commitment to high standards of nuclear safety and the benefits of the IRRS process.

The expert team identified good performance and areas where further improvements could be envisaged although not resulting in new findings or good practices, as this was outside the scope of the mission. For the recommendations and suggestions which remain open, the expert team wants in particular to highlight the following:

ONR, with support of its Board and the UK Government, started a project to review the existing Standard Licence Conditions and broader regulatory framework and suggest ways to make it more effective, efficient, stable and sustainable in the long term. This is commended by the expert team and it appears to be timely and proper, given the future tasks of new-build, decommissioning and also reflecting the changes in the nuclear industry. However, this is a long term programme that is still in progress, and the suggestion from 2013 to complete a full review of the existing Standard Licence Conditions is part of this process and therefore was not closed.

Regarding the further development of the ONR integrated management system, good practice was recognised in this area, although not enough progress was shown to close the finding. There is a need for further management commitment to embed an integrated operational management system. The expert team emphasises the need for the management system manual to clearly reflect that safety is the prime driver of ONR's regulatory work.

Regarding safety culture, the expert team recognises that ONR fosters and supports good safety attitudes and behaviour in its own staff and in its duty holders. However, this is not yet reflected in the management system, so this suggestion remains open.

Regarding radiation protection, the expert team took note that ONR revised its guidance in order to improve compliance with IAEA standards, and that other improvement will take place when implementing Council Directive 2013/59/EURATOM. The recommendation relating to the absence of a clear requirement, consistent with GSR Part 3, relating to dose assessment and dose records maintenance for workers who regularly work in supervised areas and are not considered as "classified persons", deserves further consideration.

The expert team noted that following the 2013 IRRS Mission, ONR developed an action plan and identified specific responsibilities in order to address the findings in an efficient and effective manner. For the recommendations and suggestions which remain open, the expert team noted that the UK authorities and ONR have a good understanding of the issues and the path forward on how they will be addressed. The team noted the strong support of ONR Senior Management, the UK Government and other stakeholders in this work and considers this contributed to achieving the successful closure of a significant number of findings. The experts appreciated the extensive preparation undertaken by ONR, as well as the open and constructive discussions during the review. The advance reference material contained all the relevant information and allowed for the review to be conducted in a very efficient and effective manner. The UK Government has committed to its next IRRS Mission taking place in 2019.

Module 1. LEGAL AND GOVERNMENTAL RESPONSIBILITIES

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

SFF1	Suggestion: ONR should ensure sufficient resources with the appropriate skillsets are available to meet planned timescales and provide effective regulatory oversight of the GDF (Geological Disposal Facility) project.
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Changes since the 2013 IRRS missions

Suggestion SFF1:

ONR presented detailed material (programme and project plans, gap analysis, and procurement strategies) indicating a good understanding of resource needs specific to GDF type projects.

Status of the findings

Recommendation SFF1 is closed. The ONR maintains a scope of work for 2014/15 (ONR – DFW - 2014/15 – GDF009) which covers the development of a forward plan for identifying the necessary medium/long term skills and resources for regulation of a geological disposal programme. ONR recognises the disposal programme is currently not in its statutory authority, but is planning a resource loaded programme in anticipation of future disposal projects.

Module 3. RESPONSIBILITIES AND FUNCTIONS OF THE REGULATORY BODY

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
SF2	Suggestion: ND should institute a programme for the reconstitution of an advisory committee on nuclear safety.
SFF2	Suggestion: ONR should consider developing a timetable with milestones for when all of the previously separate organizations will be fully integrated within ONR.
SFF3	Suggestion: ONR should follow through to publish the revised communications strategy document when it is completed.
SFF4	Suggestion: ONR should develop a process to administer refresher training for Inspectors once they have been re-warranted and to take appropriate action should an Inspector fail to take or fail to pass such training within the prescribed period.
SFF5	Suggestion: ONR should continue to assess whether it has the necessary human resources to fulfil its statutory obligations.

Changes since the 2013 IRRS missions

2009 Suggestion SF2

In response to the 2009 suggestion, ND developed a plan to reconstitute an advisory committee, but this activity was placed on hold during the reorganization activities in 2010 and 2011. Following the appointment of the ONR's new Chief Nuclear Inspector in 2013, ONR has established an Independent Advisory Panel (IAP) to obtain external independent expert advice on a range of nuclear safety and security matters that ONR may face moving forward. The role of the IAP is to provide strategic advice and the panel will not be involved in regulatory decisions. The panel is chaired by ONR's Chief Nuclear Inspector. Membership of the panel consists of senior scientists, engineers and security professionals with backgrounds from a wide range of scientific, engineering, academic, and industry experience.

Selection of the panel members was conducted via a process, which took into account candidates' technical ability and proven record of operating at the highest professional levels. Measures have been established to ensure no potential conflict of interest arises from members' outside interests, ensuring advice provided by the panel remains independent from organisations whose interests may be incompatible with ONR's statutory functions. These measures include:

Collective Independence

The membership of the IAP will be drawn from a broad range of sectors in order to provide credible, authoritative and expert advice. This is intended to ensure that no one sector or individual dominates discussion and guarantees the collective independence of the IAP. Members are appointed as individuals with recognised expertise and are expected to represent the wider interests of their sector and not just their employer.

Code of Conduct

The IAP will operate in accordance with the Principles of Scientific Advice to Government. All members will be expected to adhere to these principles, as indicated in the Terms of Reference and Ways of Working for ONR's Independent Advisory Panel.

Register of Members Interests

Members will be asked to declare business or personal interests that might be relevant to the work of the ONR IAP or which could lead to a real or perceived conflict of interest. Advice to the panel shall be periodically monitored against this register for any perceived conflicts of interest.

The inaugural IAP meeting took place in October 2014 and two of the topics discussed were the Review of ONR's Regulatory Framework and ONR's Approach to Nuclear Safety and Security Research. The panel will meet twice a year. The IRRS team was informed that a webpage will be established to explain the work of the IAP to stakeholders. This webpage will provide details of IAP members and their backgrounds and provide further details of how ONR will manage potential or perceived conflict of interests. Notes of the IAP meetings will be published on the webpage.

2013 Suggestion SFF2

As part of the UK Government's creation of a statutory independent ONR, a number of organizational changes took place during the last few years, including the assignment of new responsibilities to ONR and integration of new regulatory functions in the area of transport, industrial safety at nuclear facilities, security, safeguards, etc. The 2013 IRRS mission suggested that the ONR establishes a timetable with milestones for when all of the newer regulatory functions will be fully integrated into the organization.

In order to achieve effective integration and establish a One-ONR culture, a number of aspects have been identified and are being addressed by ONR. These include the ONR People Strategy, the implementation of the Radioactive Materials Transport integration plan, ONR reward and pay strategy, implementation of a consistent set of terms and conditions for employment, etc.

The ONR People Strategy, which is setting out principles for harmonisation across ONR, was launched in December 2013 and is supported by a three year implementation plan, with over 50 actions, grouped in four key themes (organisation and culture, developing our people, performance and reward and resourcing). The strategy, through delivery of its actions, should address the main challenges of recruitment, retention and development, securing highly competent and motivated staff and providing reassurance to Government and society. A number of challenges have been identified in the strategy, including operating for a period between April 2014 and March 2016, in an environment of two employers (HSE and ONR) covering some staff within ONR. The strategy document is available on the ONR website and quarterly updates on progress against the implementation plan are provided to the ONR Board, ONR wider Leadership Team and staff.

The Energy Act 2013 provided ONR with the duty to set pay and terms and conditions for its entire staff, to ensure that its mandate can be delivered. It was recognised that inherited disparate terms and conditions within ONR and the outdated legacy pay structure create barriers to recruitment and deployment. In addition, a new pay spine should be developed to address the current disparities in pay between groups of specialists. ONR looks to introduce more of a market based and performance oriented pay structure to help it attract and retain the necessary human resources. ONR prepared a 2014 Pay Offer, which covers the period 1 October 2014 to 31 March 2018 and proposes a number of important changes to pay in ONR. This document was agreed by the ONR Board and Trades Unions and implemented from 1 October 2014. ONR has committed to delivering a new pay structure, in place and fully operational, by April 2016.

2013 Suggestion SFF3

ONR has revised and updated its communication strategy with information about ONR becoming a public corporation and to better map the ONR stakeholders and communities of interest. The strategy states that effective communications is an important part of ONR's success and supports its reputation as a trusted, independent nuclear safety and security regulator, and a source of public information. The strategy informs on the ONR mission, the ONR overarching goals and lists the primary audiences for the communication activities and how these will be reached. Both the ONR internal and external communications are addressed. It then states the manner in which the strategy will be delivered: honest and with integrity, open and transparent, cost effective, proactive and responsible, clear and consistent and in approachable way. The evaluation of the communication performance is also addressed.

The revised strategy was presented to the ONR Board in October 2013 and published on the ONR website during November 2013. The strategy is a living document which is annually revised and updated as needed to ensure its consistency with ONR wider strategy and direction. An annual communication plan and key objectives are set out in ONR's published Annual Plans.

A digital communications expert was permanently recruited to provide ONR with greater flexibility and control over its website and social media channels. Through a monthly e-bulletin more than 17,000 stakeholders are reached on a regular basis. Evidence was given on strategic communication planning, for example in

connection with the on-going ONR Site License Condition's and Regulatory Framework Review. Internal communication was exemplified through the autumn 2014 edition of Core Matters, published on the ONR intranet Nucleus.

2013 Suggestion SFF4

The ONR implemented a re-warranting process for all inspectors who held a Full Warrant, as part of the vesting process before ONR was established as a public corporation under the 2013 Energy Act on the 1st of April 2014. Mandatory training - Legal Update Course and specific energy act training - was delivered to all inspectors before attending the re-warranting panel. Approximately 90 % of the attendees achieved the required standard at the first panel while the remaining 10 % subsequently passed after further coaching and training. ONR has furthermore established a Limited to Full Warrant process for all new inspectors joining the organisation. This is linked to attendance on six mandatory training courses plus successful completion of subsequent competence assessment process.

The mandatory Legal Update refresher course will move to a three year time period. Accounting for the recent re-warranting of inspectors, the starting point is set to the 1st of April 2014, the inauguration date for ONR as an independent public corporation. The refresher course will comprise a one-day event with a subsequent assessment test. Eleven courses are planned to run each year, starting in April 2015 (to avoid a cliff-edge effect in 2017) and they can accommodate about 130 inspectors each year. The ONR Learning and Development team will have a central role in selecting inspectors for attendance and avoiding back-log.

If inspectors fail to attend the course, or where they fail to meet the required assessment competence standard, they will revert to a Limited Warrant status if they fail to achieve the standard in a three month recovery period, although appropriate considerations will be taken specific to the individual situation. Inspectors will be required to re-attend the course and pass a subsequent competence assessment process to regain their Full Warrant status.

Presently, the existing HOW 2 process will have to be updated to reflect the change to a three-year cycle and the competence assessment elements. The ONR Leadership Team Meeting has noted the ONR Inspector Warrant Process.

Suggestion SFF5

Recognizing that the organization may face serious difficulties in sustaining organizational capability to regulate the UK nuclear industry efficiently and effectively, taking into account the current and the expected duties (with consideration of the expected new builds and the anticipated retirement rate of ONR staff), ONR has undertaken a study (ONR Resilience Project) on the medium and long term challenges and identified its resource requirements against a number of scenarios. As part of this project, ONR determined the size of the baseline organization, including distribution of resources for each technical area and identification of key positions, which represents the minimum human resources necessary to discharge its mandate under the current workload. In addition, it should be noted that some administrative/corporate support functions (e.g. procurement, etc.) continue to be provided by HSE and other third parties

Based on this study, a proposal for workforce planning was submitted to the UK government, which resulted in a ministerial agreement to exemption to external specialist recruitment for ONR. Based on this agreement, ONR is allowed to recruit 65 specialists by April 2015.

A number of specific actions have been taken to support the recruitment process, as well as integration of the new staff in the organizational environment. ONR's People Strategy, which is setting out principles for harmonisation across ONR, was launched in December 2013; this document is further discussed under Suggestion SFF2 in this report. The Expert Mission team was informed about a number of actions including: targeted recruitment, diversification of ONR recruitment pools, using recruitment head-hunters on a pilot basis, graduate recruitment and sponsorship, development of more robust processes for succession planning and knowledge management, and more collaborative approaches with the supply chain. The more collaborative approaches adopted by ONR with the supply change include better integration of identification for external support at the business planning stage and setting up a framework providing for mechanism of pre-qualification (based on a set of pre-defined criteria) of a number of service providers in various technical areas. HSE is managing the procurement process regarding the issuing of contracts and ONR designated staff are monitoring service providers' compliance with contract requirements, including all aspects of performance monitoring,

which are fed back to HSE. A number of over 25 companies/ service providers were pre-qualified using this approach. This process is described in the ONR Management System Manual/ Commissioning Research and Technical Support.

The implementation of these approaches has currently yielded positive results, including the recruitment of 46 specialists since January 2014 and redirecting the equivalent of 23 FTE (Full Time Equivalents) via the new ONR operating model. The next ONR recruitment campaign, targeting a number of about 20 positions, is planned for early 2015. In addition, a new IT recruitment system should be in place by December 2014. This will further support ONR's efforts in this area.

The review of the human resources needs is conducted on an annual basis, as part of the overall ONR planning process, starting from the identification of human resources needs in various organizational units and programme level, using a graded approach, followed by analysis and consolidation at organizational level, and approval by the ONR Board, prior to implementation. This process takes place under the budget envelope approved at the Governmental level, which is also done on a yearly basis. It should be noted that the identification of human resources needs is done for 3 to 5 years in advance, to allow for sufficient time for the recruitment process and training programmes to be implemented. The Expert Mission team was informed that the existing ONR baseline organization will be reviewed every two years.

Status of the findings

2009 Suggestion SF2 is closed. ONR has established an Independent Advisory Panel (IAP) to obtain external independent expert advice on nuclear safety and security matters and to provide strategic advice to the Chief Nuclear Inspector on the range of issues that ONR may face moving forward.

2013 Suggestion SFF2 is closed. ONR has established its People Strategy, which is setting out principles for harmonisation across ONR and should provide for integration within ONR of the previously separate regulatory functions and organizations. The strategy is supported by a three year implementation plan, with over 50 actions.

Suggestion SFF3 is closed. ONR has published a revised communication strategy and ONR has started to apply this strategy, both internally and externally. A digital communications expert was recruited.

Suggestion SFF4 is closed on the basis of progress made and confidence in effective completion. ONR has developed processes to deliver training to new and existing inspectors for warranting and re-warranting purposes. ONR has established the procedures for actions to be taken should an inspector fail to pass the training. The HOW-2 process will be updated to reflect the established changes.

2013 Suggestion SFF5 is closed. ONR has established a process for assessing the human resources needs, on a regular basis, in order to fulfil its statutory obligations and has implemented a number of approaches to sustain recruitment and succession planning.

Module 4. MANAGEMENT SYSTEM OF THE REGULATORY BODY

2013 MISSION RECOMMENDATIONS, SUGGESTIONS	
RFF1	Recommendation: The management system should be completed and fully implemented as quickly as possible. This should include all the requirements for managing the organization, in particular those mentioned in the earlier Recommendations and Suggestions that have been closed.
SFF8	<p>Suggestion: A high-level timeline should be prepared to affirm Senior Management’s determination to complete the preparation of the Management System by showing the steps involved, such as:</p> <ul style="list-style-type: none"> - Issuing the Management System Manual - Approving the Policy Framework - Issuing the Policy Document - Populating HOW2 with the existing processes - Reconciling and updating HOW2 to make the processes consistent <p>The Management System may then be used to support the goal of continuous improvement, such as by performing audits/evaluations of HOW2 usage.</p>
SFF9	Suggestion: Changes should be made to relevant parts of the management system to indicate that one of its purposes is to promote and support a strong safety culture.

Changes since the 2013 IRRS missions

Recommendation RFF1 and Suggestion SFF8:

ONR has embraced matrix management as their operating model, under which all staff are deployed to a program, based on work plans and their specialism. The Management System which describes this is an online tool called HOW2, into which the operating model, which manages the deployment of people between different parts of the business, has been embedded. The matrix is complex but in brief, each program is headed by a Deputy Chief Inspector, who is also a Head of Specialism, under which can be found multiple separate specialisms, each headed by a Professional Lead, who also plays a separate role as a Career Development Manager.

The Management System Manual (MSM), of which staff were largely unaware at the time of the previous 2013 IRRS mission, is now more widely known but it has not yet been finalized. The version provided to the expert team, dated September 2014, was inconsistent externally with the landing page of HOW2 with regard to the processes that make up the Management System. It was also inconsistent internally between the Figure which shows the processes, and the text which describes them. For example, Research and Technical Support was shown as a Core Process in the Figure, but was described as a Support Function in the text.

There seems to be no common use of the generic terms of Core, Management and Support processes between the MSM and HOW2. Part of the reason is perhaps the transition between the terminology used in HSE and that now being applied in ONR. This needs to be resolved, consistent use made of such terms and a common approach presented of the processes which make up the Management System. Consistency of approach within the MSM and between the MSM and HOW2 is essential.

The responsibility for the Management System has recently been transferred from one member of the Executive Management Team to another, while responsibility for the Operating Model remains in its original place. However, the two are not separate but must be integrated. The MSM does not currently contain any substantive description of the Operating Model or the means by which the mandate of the organization is to be discharged. This is available on HOW2 and its functioning is widely accepted throughout the organization but it should also be described in the MSM. It would aid acceptance of the MSM if it was to be signed off by all members of the Executive Management Team so that it is seen to be supported by all of them and is not solely issued by the person responsible.

The High Level Plan shows that the MSM is due for approval by end-November 2014; revision to correct the shortcomings noted above is advisable before this is done. Looking ahead, the current intent is to review the MSM after three years of use. Until such time as it can be regarded as stable, a higher frequency may be appropriate, so that it may be kept consistent with HOW2, which is able to be revised quite easily. Once the Management System is stable, the MSM may revert to the review frequency commonly associated with standards and guidance.

Before the MSM may be finalized, the set of policies which sit above it should themselves be finalized. The current intent seems to be to develop (or update) a total of twelve policies. Since the intent of these policies is to describe the principles which underlie the functioning of the organization, it is important that they be consistent and fit for purpose. It is possible that a smaller number of policies may be more appropriate, to assist in this.

The underlying purpose of ONR is to provide assurance that the nuclear facilities and activities that it regulates do not pose unreasonable risk to the public. Safety should be, and is, the primary objective of the organization. However, the MSM does not make clear mention of this. Although it speaks of effective and efficient regulation, it also seems to have as a focus value-for-money which, though valid, must not override the central focus on safety. The MSM would be improved if it made clearer mention of the underlying purpose of the organization.

A recent review has confirmed that there is no need to replace HOW2 with a different tool, which is good since such a change would not help acceptance by staff. The tool was purchased on the advice of a consulting company, for whose kind of work it is intended. An organization like ONR, whose mode of operation requires less frequent modification, does not need such a complex tool to manage its resources. To this end, a number of layers have been removed from HOW2 to make it easier to navigate, so that staff can find information without needing to delve down. The support structures have also been simplified to allow, for example, single data entry of the results from an inspection. An upgrade is being considered to improve the search function, which currently relies on keywords, rather than a Google-type search.

The matrix organization which the Operating Model describes is well understood and accepted by staff, according to a recent internal audit. The review also identified the need to simplify the change control process, by which staff are re-allocated during the year to higher-priority work. This is regarded as being 'over-engineered', which title may also be applied to other parts of the system. A proposal is being considered to have a consultant perform a review of the Operating Model to achieve better outcomes and deliver improved efficiency and effectiveness.

A good link exists from the ONR Strategy to the Annual Plan (like a Business Plan) and then to the Operating Plan. The Strategy is refreshed every three years (most recently in September 2014) and as part of the Annual Plan preparation. Each Program has an Operating Plan comprised of a series of Work Plans. Each Program Director receives a monthly report of time and budget spent, which is followed by a Challenge Meeting with Finance. One aim of this is to avoid 'Self-Tasking', by which staff identify their own work rather than their being applied to corporate priorities and needs, which is a commendable practice.

Although the Management System remains in transition, one positive note is that a regulatory assurance function is already in place to study its operation and to make suggestions for sustaining and continuously improving it. Several evaluations have already been performed, leading to Advice Notes being prepared, which have resulted in modifications being made to processes to improve their effectiveness and efficiency.

Another positive note is the target which has been applied for the delivery of a report on a Site Inspection, which must be written within seven days of its completion. The review and approval of the report must also be complete within seven days.

In conclusion, it is not a simple matter to institute a management system into an organization, nor is it a 'once-through' exercise; several iterations may be required before an appropriate high-level structure may be found onto which the existing processes and procedures can be connected (with modifications) and new processes developed to fill the gaps. ONR has made significant progress and continues to do so, which needs to be encouraged by senior management and maintained by their staff. Setting a clear time by when the Management System and operating model can be regarded as essentially finalized would be beneficial; perhaps approximately one year from now would be achievable. A recent review has recommended seeking accreditation under ISO 9001, once it has been re-issued in 2015; this would be beneficial.

Suggestion SFF9

The current section of the MSM goes some way towards indicating that one of its purposes is to promote and support a strong safety culture but this is not yet sufficient. From the evidence supplied, it is clear that the organization has made significant strides in the conventional health and safety of its staff. The Environmental Health and Safety Committee, headed by a Deputy Chief Inspector, reports to the ONR Board and has placed an emphasis on the physical well-being of staff and on reducing excessive hours, so as to achieve a work/life balance.

Beyond this however, the Management System should clarify the importance of the various elements of Safety Culture, both within the organization and in the organizations which it oversees as part of discharging ONR's mandate. The organization has developed methodologies for inspecting Leadership and Management for Safety, comprising interventions with licensees and internal review teams to collegially derive positions based on evidence. Guidance is about to be published and the next step is to develop the processes and include within the Management System.

Status of the findings

Recommendation RFF1 and Suggestion SFF8 remain open because the management system is still in a state of transition and no clear plan exists to indicate how, or by when, the end-state will be achieved. This transition is especially challenging given the significant change in operating strategy enforced by ONR's change to an Independent Public Corporation.

Suggestion SFF9 remains open because the management system does not yet adequately indicate that one of its purposes is to promote and support a strong safety culture, both within the organization and in its duty holders.

Module 5. AUTHORIZATION

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

SFF10	Suggestion: ONR should complete its first full review of the Standard Licence Conditions as scheduled.
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2013 Suggestion SFF10

The Board of ONR has taken a broad strategic decision, in view of the creation of ONR as a statutory corporation, to assess and review the Standard Licence Conditions (LC's) and wider Regulatory Framework. A project plan was scheduled and approved by the Board in May 2014, with the Chief Nuclear Inspector as Project Senior Responsible Owner, and the Director of Regulatory Assurance as Project Director. The project is run as a series of work streams all reporting into the central project steering group, with membership spanning the whole ONR organisation; including policy, government relations and legal support; but with a focus on operational regulatory matters. Specific areas for review include:

- Legal status of LCs,
- Comparison of ONR's approach with other European and International Regulations/standards,
- Industry changes rendering LCs less effective or inappropriate,
- ONR's use of licence condition primary and derived powers,
- Establishing whether the standard suite of LCs are fit for purpose,
- Overlaps between LCs,
- Introduction of other "regulatory" conditions to cover non-safety (such as transport and security) elements to mirror ONR's remit as a public corporation,
- Economic intelligence gathering on the licence condition compliance costs to industry.

An area of particular interest is the application of the ALARP (As Low as Reasonably Practicable) principle to high risk/high hazard facilities and establishing clarity between hazard and risk in ONR's risk policies. Another issue under consideration is the bespoke versus the generic regulation of the wide range of nuclear facilities in the UK. The project will also look at decommissioning and "de-licensing" points, examining the application of 'no danger' criteria.

The initial stage of the project (Phase 1) will gather information on areas where the framework is still thought to be effective and also identify areas for change and improvement. This will involve collaboration with other Government departments, regulatory bodies, licensees and stakeholders. In a second step (Phase 2) after the ONR Board have approved a way forward based on the Phase 1 results, a formalised consultation process with the involved parties will take place.

The outcomes of the project are dependent on the shortfalls identified. A simple review of the standard licence conditions and framework that leads to some minor rationalisation could be ready in April 2016 while a more thorough review would require a longer timescale. If changes to nuclear regulations are proposed, it would involve UK Government as well as Parliament and require more time for completion (as an estimate, April 2017 was stated) while substantial legislative changes may not be delivered until April 2020.

The completion and outcome of Phase 1 of the project, including preferred options for future implementation, is scheduled to be presented to the ONR Board by autumn 2015.

Status of the findings

Suggestion SFF10 is left open. The review team commend the decision by ONR and the ONR Board to make a more full review of the complete regulatory framework. The team find this as being both responsible, proactive and timely. However, this means that the suggestion to "complete a first full review of the existing Licence Conditions" cannot be closed at this stage.

Module 11. ADDITIONAL AREAS

(OCCUPATIONAL RADIATION PROTECTION - CONTROL OF DISCHARGES, MATERIALS FOR CLEARANCE, AND CHRONIC EXPOSURES; ENVIRONMENTAL MONITORING FOR PUBLIC RADIATION PROTECTION)

2013 MISSION RECOMMENDATIONS, SUGGESTIONS	
RFF2	<p>Recommendation: HSE and ONR should ensure that the allocation of responsibilities is documented when employees are engaged in work involving radiation sources that are not under the control of their employer.</p>
RFF3	<p>Recommendation: HSE and ONR should ensure that the regulatory framework contains specific requirements addressing:</p> <ul style="list-style-type: none"> - consideration of the new dose limits for the lens of the eye, - explicit prohibition concerning the occupational exposure of persons under the age of 16 years, <p>maintenance of records for training provided to all employees in the non-nuclear sector who are engaged in work with ionising radiation.</p>
RFF4	<p>Recommendation: HSE and ONR should define and ensure the implementation of arrangements concerning the assessment of doses received by workers who regularly work in supervised areas, the recording of their occupational exposure and their need for health surveillance.</p>
RFF5	<p>Recommendation: The government should ensure that the operational limits and conditions are based on the latest international standards in GSR Part 3.</p>

Changes since the 2013 IRRS mission

Reminder: HSE is the “owner” of the regulations relating to safety at work in all sectors and has the overall responsibility for issuing and enforcing regulations relating to occupational radiation exposure in medical, industrial and research activities.

The responsibilities of ONR concerning occupational radiation exposure cover licensed nuclear sites and a number of nuclear defence sites which are not licensed under NIA65. ONR is therefore consulted on draft regulations and guides related to this subject. Furthermore, ONR has the responsibility for assessing radiation protection arrangements in the licensing process of nuclear sites.

Inspections on radiation protection on nuclear sites are usually performed by ONR inspectors. However, other organisations also have the competence to enforce regulations relating to radiation protection associated with nuclear sites, for example, the environmental agencies.

Recommendations RFF2 and RFF3:

Recommendation RFF2 was based on the fact that neither the regulations nor the Approved Code of Practice and guidance fully covered the respective responsibilities of the different employers in case of co-activity.

In order to address this recommendation, ONR has updated its guidance. Paragraph 6.36 of Technical Inspection Guide NS-INSP-GD-054 and paragraph 3.2(7) of Technical Assessment Guide NS-TAST-GD-038 have been revised and now require the allocation of responsibility between the employers to be “clear and documented”.

As regards recommendation RFF3, the first two points had already been identified by ONR in the 2013 self-assessment and have therefore been integrated in its guidance:

- Paragraph 3.2(3) of NS-TAST-GD-038 has been amended in order to advise of the reduction of the dose limits for the lens of the eye when implementing Council Directive 2013/59/EURATOM.
- Paragraph 3.2(6) of NS-TAST-GD-038 has been amended to clearly state the prohibition of occupational exposure for persons under the age of 16 years.

The third point, relating to the maintenance of records for training, was already included in ONR guidance. It was directed towards HSE, regarding the use of radiation sources outside nuclear installations.

Technical guides NS-TAST-GD-038 and NS-INSP-GD-054 are available on ONR website. Therefore, although they are not legally binding, they are likely to influence the organisation of nuclear operators and subcontractors. Consequently, they constitute an appropriate answer to recommendations RFF2 and RFF3 for the nuclear sector.

For its part, HSE has confirmed that these recommendations will be considered when implementing Council Directive 2013/59/EURATOM in 2017/2018. This commitment is acceptable, since these points are covered by the directive.

However, HSE does not specify the nature of the text in which these arrangements will be set down (legislation or guidance). New dose limits for the lens of the eye and prohibitions relating to the exposure of persons under the age of 16 should be addressed in binding legislation.

Recommendation RFF4:

This recommendation was based on the fact that the definition of “classified person” in IRR99 only includes workers who are likely to receive an annual effective dose greater than 6 mSv or an equivalent dose which exceeds three-tenths of any relevant dose limit. IRR99 contains no specific arrangement regarding dose estimation and health surveillance for workers regularly working in supervised areas, although they could theoretically receive a maximum annual dose of 6 mSv or an equivalent dose of three-tenths of any relevant dose limit according to the definition of supervised areas.

During the 2014 Expert Mission, ONR has brought evidence that Regulation 6 of MHSWR99 provides for appropriate health surveillance of workers, based on a risk assessment approach. These Regulations cover all occupational activities and include the case of exposed workers who are not considered as “classified persons”.

Moreover, in order to address the recommendation, ONR included additional paragraphs in its guidance. Paragraph 6.66 of Technical Inspection Guide NS-INSP-GD-054 and paragraph 3.2(8) of Technical Assessment Guide NS-TAST-GD-038 indicated that “Employees routinely working in supervised areas need not be designated as classified workers. Monitoring should normally involve an element of individual dose estimation and recording, and where appropriate, medical surveillance”.

During the 2014 Expert Mission, ONR further revised its guidance such that paragraph 6.66 of Technical Inspection Guide NS-INSP-GD-054 and paragraph 3.2(8) of Technical Assessment Guide NS-TAST-GD-038 now indicate that *“Employees routinely working in supervised areas need not be designated as classified workers. Monitoring should normally involve individual dose estimation and recording and health surveillance”*.

These new arrangements constitute an improvement compared to the previous situation. However, they are not fully compliant yet with paragraphs 3.101 and 3.103 to 3.107 of GSR Part 3 concerning in particular the assessment of doses received by workers who regularly work in supervised areas and the maintenance of records relating to occupational exposure for these workers.

This ambiguity partially comes from the lack of clear delineation in IRR99 between non-exposed workers and workers that are liable to exceed the doses limits set down for members of the public without being considered as “classified persons” (although this is partially covered by the ACoP).

Furthermore, HSE’s commitment to consider the recommendation when implementing Council Directive 2013/59/EURATOM is not explicit on the process intended in order to address it.

Recommendation RFF5:

This recommendation came from the fact that the new criteria set down in Schedule III of GRS Part 3 (more particularly tables III-2D, III-2E, III-2F, III-2G and III-2H) had not been integrated in the Regulations.

This recommendation will be addressed when implementing Council Directive 2013/59/EURATOM, since this directive includes criteria that are consistent with those of GSR Part 3. DECC (The Department for Energy and Climate Change) is the coordinating body for the implementation of this part of the directive in the UK.

In a meeting with DECC during the 2014 Expert Mission, it was noted that the UK is committed to full implementation of the new Council Directive 2013/59/EURATOM.

Status of the findings in the 2013 IRRS mission

Recommendation RFF2 is closed on the basis of progress made and confidence in effective completion, as ONR revised its guidance and HSE committed to consider the issue when implementing council directive 2013/59/EURATOM.

Recommendation RFF3 is closed on the basis of progress made and confidence in effective completion, as ONR revised its guidance and HSE committed to consider the three points of the recommendation when implementing Council Directive 2013/59/EURATOM.

Recommendation RFF4 remains open, as although ONR has further revised its guidance, there is still no clear requirement, consistent with GSR Part 3, relating to dose assessment and dose records maintenance for workers who regularly work in supervised areas and are not considered as “classified persons” in IRR99 and its ACoP and guidance.

Recommendation RFF5 is closed on the basis of progress made and confidence in effective completion, as DECC committed to implement all legal obligations within Council Directive 2013/59/EURATOM, which includes new criteria for doses calculation.

Module 12. SUPERVISION OF NON-NPP FACILITIES AND ACTIVITIES

12.1. RADIATION SOURCES APPLICATIONS

2013 MISSION RECOMMENDATIONS, SUGGESTIONS	
RFF6	Recommendation: The interaction between ONR and other regulatory bodies (RBs) should be agreed to and better documented for implementation of effective cooperation in regulating radioactive sources (legislation, authorization, regulatory functions relevant to emergency exposure situations, registration of RS, inspection and enforcement).
SFF6	Suggestion: ONR should review its training programme and revise as necessary to include the full range of duties regarding radioactive sources.
SFF11	Suggestion: ONR should complete development and implementation of training to include the full range of duties regarding radioactive sources.

Changes since the 2013 IRRS missions

Recommendation RFF6:

ONR has updated the existing Memorandum of Understanding (MoUs) with the Environmental Agencies (EA) in order to address this Recommendation. The MoUs provide for high level framework for how the regulatory activities of ONR and the EAs will be coordinated. In September 2014 ONR issued a supporting guidance for the MoUs signed jointly with the EAs. The purpose of this guidance is to provide operational guidance to inspectors and regulators representing ONR and the Environment Agencies concerning the working-level implementation of the MoU between the ONR and the Environment Agencies on matters of mutual interest in England. This guidance is being considered as joint regulatory guidance. The regulatory responsibilities and associated working arrangements on the key topics of mutual interest are described in tables as part of guidance.

A table in the guidance covers the regulation of radioactive sources on the Nuclear Licensed sites. It describes the primary and secondary responsibilities of ONR and the EA and the working arrangements that need to be in place to ensure safety and security of radioactive sources, including sources records and shipments.

The MoUs and the guidance tables are subject to continual revision to reflect any changes in regulations and Government policy.

Suggestions SFF6 and SFF11:

In order to address these two suggestions ONR has modified the existing training material for their inspectors to cover radioactive sources and Transfrontier Shipments of spent fuel and radioactive waste. The new training material for ONR inspectors includes training courses on radiological protection and radioactive sources, namely:

- Course on Ionizing Radiations Regulations (IRR99), covering radiological protection
- Course on HASS (Highly Active Sealed Sources) regulatory schemes and requirements

The new training material covers the implementation of the MoUs and its supporting guidance for regulating radioactive sources on a Nuclear Licensed Site. Two training events were organized in 2014 using the new modified training material. The Team was informed that a number of inspectors from the EAs attended some of these courses. ONR has an established a continuous training program which shows that numbers of training courses will be organized in 2015 using the modified training material.

Status of the findings in the initial mission

Recommendation RFF6 is closed on the basis of progress made and confidence in effective completion, as ONR developed a MoU and comprehensive supporting guidance for its implementations with the EAs for effective control of radioactive sources on the Nuclear Licensed Sites.

Suggestions SFF6 and SFF11 are closed on the basis of progress made and confidence in effective completion, as ONR has modified the existing training material for their inspectors to cover radioactive sources.

12.2. WASTE MANAGEMENT FACILITIES

2013 MISSION RECOMMENDATIONS, SUGGESTIONS	
RFF7	Recommendation: The Government together with devolved Administrations should continue to implement policy and develop strategies as necessary, specifying steps and responsibilities, for all radioactive waste streams in the UK.
RFF8	Recommendation: Regulatory authorities should review their Guidance on Requirements for Authorisation (GRA) to consider a need for passive institutional control of the site of a near surface disposal facility. The responsible legal body should be defined and the process of any transfer of regulatory responsibilities should be established.
RFF9	Recommendation: ONR should further develop their assessment capabilities to be able to review the whole safety case and safety assessment of RAW management facilities.
RFF10	Recommendation: ONR should review the criteria in the use of the Enforcement Management Model to ensure compliance with regulatory requirements in relation to RAW management activities.
RFF11	Recommendation: Considering that the legal arrangements are in place ONR should review the implementation of the present legal arrangements and ensure that all organizations involved in decommissioning activities and in the management of the radioactive waste, responsible for safety, are held accountable for their responsibilities and that their activities are coordinated.
RFF12	Recommendation: The ONR should review its approach to authorising decommissioning plans.
RFF13	Recommendation: ONR should review and update the guidance dealing with decommissioning to ensure that the safety requirements will be in accordance with the latest international safety requirements in this field.
SFF7	Suggestion: As part of its communication strategy, ONR is encouraged to promote the establishment of an appropriate means of informing and consulting interested parties and the public about the possible radiation risks associated with facilities and activities, associated with GDF, and about the processes and decisions of the regulatory body.
SFF12	Suggestion: ONR in collaboration with other relevant regulatory authorities should consider ensuring the coordination of regulatory responsibilities dealing with licensing and permitting/authorization of Low Level Waste disposal facilities such that all safety aspects are comprehensively considered and so that both short and long-term aspects are taken into account.

Changes since the 2013 IRRS missions

Recommendation RFF7:

The UK Government continues to evolve its national policy and strategies, in accord with the 2013 mission recommendation and the EU Spent Fuel and Radioactive Waste Management Directive 2011/70. The UK National Programme is under active development with numerous consultations between and among the devolved Administrations, the Government (DECC, Department of Energy and Climate Change), and relevant stakeholders. The UK National Programme is expected to be published in August 2015.

Existing strategies for certain waste types continue to undergo evaluation and revision as necessary, e.g. revised nuclear LLW strategy (2015), Stocktake of discharge strategy implementation (2015), revised discharge strategy (2016).

The UK government continues to acknowledge certain differences in policy among the UK nations, particularly with regard to high activity waste.

Recommendation RFF8:

The Environment Agencies reviewed the regulatory approach to passive institutional control as manifested in their guidance regarding near-surface disposal facilities. The regulatory principals regarding near-surface disposal were similarly reviewed by EA and ONR. Such guidance was reviewed to ensure authorizations for disposal do not rely upon active controls or other actions by future generations to maintain the integrity of the disposal system, and that the Operator must make substantiated claims for this in the safety assessment.

EA (Environment Agency)/ SEPA (Scottish Environment Protection Agency)/NRW (Natural Resources Wales) continue to keep GRA (Guidance on Requirements for Authorisation) under review. ONR continues to work with environment agencies via MoU.

Fundamentally, the ONR and the Environment Agencies provided the review team clarification and evidence that suggests authorizations for near surface disposal facilities are precluded from relying on active institutional controls for the “continuing fulfilment of safety functions” (per SSR-5), and demonstrated efforts to consider the need for additional clarification in the GRA.

Recommendation RFF9:

The ONR reviewed the process and mechanisms in both their guidance and in practice regarding the review of safety cases. ONR presented further detail and clarification on the practice of sampling for safety-cases, specifically applicable to waste management facilities and activities, excepting permanent disposal facilities. ONR reviewed and presented material elaborating its efforts to institutionalize sampling review approaches through training of ONR inspectors, peer review, etc. ONR also demonstrated its approach to the generic Disposal System Safety Case (gDSSC) jointly with the Environment Agency.

Lengthy discussions were held regarding the implementation of sampling in safety case review as a graded approach in managing risk and safety. Within the ONR institution confidence is held that sampling, with proportional scope and depth appropriate to the complexity of the safety case and regulatory decision (i.e. a graded approach), serves as intended to provide a reasonable assurance of quality in regulatory decision-making. The practice held by EA expected for permanent disposal facilities was similarly discussed. With regard to radioactive waste management, and in particular post-closure safety cases for disposal facilities, ONR and EA recognized other approaches to review (e.g. acceptance criteria, greater formality in determining focus and priority) may be appropriate.

Recommendation RFF10:

ONR presented additional material and clarification of the EMM (Enforcement Management Model) and the effectiveness of its implementation, including with regard to the observed Sellafield condition.

The ONR reviewed and presented the most recent version (April 2014) of the Enforcement Policy Statement. ONR confirmed that the EMM is equally relevant to Radioactive Waste (RAW) and has updated its guidance accordingly. ONR also demonstrated significant process improvements for monitoring regulatory issues associated with RAW (updated inspection guidance, issues management, strengthened internal peer review of regulatory enforcement decisions, etc.).

ONR provide the most recent documentation that describes an effective and transparent EMM with exceptionally clear categorization and escalation processes binding on the regulator and the operator. The review team suggests the model used is an exemplar of good practice.

Recommendation RFF11

ONR routinely interacts with staff from the NDA (Nuclear Decommissioning Authority) and its contractors and ensures that the NDA and the licensees continue to be aware of the extent of their safety responsibilities with respect to decommissioning activities and the management of radioactive waste.

ONR reviewed the existing contractual and procedural controls for assuring and accountability and the assigning of responsibility for safety. Coordination among the various parties (e.g. operator, subcontractors, Duty Holder, Administrations, etc.) and their respective efforts is managed by the corresponding contractual mechanisms (i.e. contract terms and conditions) and/or procedural or administrative mechanisms (e.g. the MoU).

The ONR elaborated the role of the various organizations involved in decommissioning and radioactive waste management (NDA, Parent Body Organizations (PBO), site licensee companies (SLCs) and other sub-contractors) and demonstrated how this is extensively documented in separate ONR and NDA guidance. ONR explained how it interacted on a routine basis with NDA at both a strategic and site specific tactical level to ensure these organizations continue awareness of their legal responsibilities for safety, security etc. Since the 2013 Mission, ONR has reviewed and updated an element of its existing law course for inspectors to place more emphasis on the legal responsibilities of NDA, PBO and licensees and sub-contractors.

Finally, it is noted the accountability for safety is effectively back-stopped by the Enforcement Management Model described in RFF10.

ONR described the NDA document NSG 33 entitled “Guidance for NDA Staff on the User of the Site and Intelligent Client in Relation to Nuclear Safety, Security and Environmental Protection” which clarifies the roles and responsibilities of NDA and its principle contractors. NSG 33 sets down respective duties as prescribed in law to ensure that NDA does not infringe on the duties of the SLCs. As a part of the periodic review of such documentation, NSG 33 is due to be reviewed and reissued next year (2015) providing an opportunity for further clarification if needed.

Recommendation RFF12:

ONR provided additional material clarifying the approach to decommissioning plans and authorizations. Specifically, ONR reviewed the approach to the “authorization and approval” of both initial and final decommissioning plans in relation to the requirements of IAEA Safety Requirements No. GSR Part 6 (2014) “Decommissioning of Facilities” fully recognizing GSR Part 6 superseded WS-R-5 (2006) in effect at the time of the 2013 review mission. Key differences in terminology and definitions between the IAEA documentation and the UK regulatory system were identified by ONR, and reviewed to ensure the intents and purposes of GSR Part 6 were satisfied regarding having in place appropriate regulatory control points (i.e. permissions, approvals, licenses and authorizations) to adequately control decommissioning projects.

Recommendation RFF13:

ONR performed a detailed review and comparison of GSR Part 6 and the superseded WS-R-5 (in effect at the time for the 2013 review mission), and the relevant aspects for incorporation into the ONR framework. As a part of this review, ONR mapped the requirements of GSR Part 6 against the ONR requirements within its regulatory framework.

The ONR review notes that the IAEA Requirements mainly map against TAG 26, (Technical Assessment Guide of Decommissioning (NS-TAST-GD-026)) and the Decommissioning Safety Assessment Principals (2006), although ONR also reviewed and considered 13 other relevant TAGs (Technical Assessment Guides)/TIGs (Technical Inspection Guide). In addition ONR checked Part 6 requirements against their updated SAPs (Safety Assessment Principles). It is concluded that the ONR decommissioning guidance is sufficiently current with latest international standards such as GSR Part 6.

With regard to frequency of decommissioning plan reviews, ONR noted the required Periodic Safety Reviews of licensed or authorized facilities and activities include decommissioning plans as appropriate, Decommissioning plan reviews may occur at other intervals or milestones as agreed with ONR. ONR recognizes a graded approach in the frequency of decommissioning plan reviews relative to the type and operational status of a project, its inherent hazards and risks. Specific changes in decommissioning plans or operations that could trigger review are detailed in the Decommissioning TAG.

ONR and NDA have reviewed the applicability and incorporation of GSR Part 6, and have accounted for the different terminology and definitions in the UK regulatory system compared to the IAEA documents (see RFF12). While the UK regulatory system recognizes a single site license covering the entire facility lifecycle through to delicensing (as opposed to separate operational and decommissioning licenses per the IAEA guidance), the UK system does meet the intent to have appropriate regulatory control points (i.e. permissions, approvals, licenses and authorizations) to adequately control decommissioning projects and their various planning reviews.

Suggestion SFF7:

ONR and EA discussed how they are individually and jointly involved in the government's "Managing Radioactive Waste Safely" (MRWS) process for siting a disposal facility. The ONR and EA have, as part of a deliberate outreach effort and through a Joint Communication arrangement, established since 2010 a jointly-managed website (<http://webarchive.nationalarchives.gov.uk/20140328084622/http://www.environment-agency.gov.uk/business/sectors/111766.aspx>) that is structured to communicate their respective activities (providing technical advice, policy consultation, scrutiny of RWMD activities, etc.) towards the establishment of a disposal facility, presumably through the NDA RWMD.

As both ONR and EA are expected to have a role in the regulation of disposal facilities, it is commendable they coordinate the public facing information to be provided and to achieve an equal level of transparency.

At the present time, ONR has an adequate communications strategy with respect to development of a GDF. As ONR and EA support the Government's White Paper on Implementing Geological Disposal and its associated Communication Plan, the ONR is cognizant of the need to work with the Environment Agency to further develop their communication strategy and implementation.

The expert review team wishes to note one caution regarding the need for ONR and EA to maintain their existing credibility and regard as truly independent regulatory authorities. As the ONR/EA website notes; the ONR and EA "...are working together when advising the Government, NDA and communities..." further noting "**The NDA has established a Radioactive Waste Management Directorate (RWMD), which is developing into a delivery organization capable of implementing geological disposal. We [ONR and EA] do not currently regulate the RWMD but we might do in the future.**" The RWMD is currently operating as a prospective site license company under voluntary regulatory scrutiny." [emphasis added]. While an advisory and consultative relationship with a prospective licensee, including scrutiny thereof, is arguably beneficial at the present time, the review team urges the ONR and EA to remain vigilant in maintaining their public credibility and confidence for providing independence as a competent regulatory authority.

Suggestion SFF12:

ONR indicated the IRRS Recommendation was a catalyst for an ONR led review of existing Memoranda of Understanding between ONR, NRW, and Environment Agencies (EA and SEPA), which further led to a revised MoU with NRW. The revised MoU have an overarching strategic level structure for the scope of co-operation, agreed common objectives, and dispute resolution. The supporting "joint guidance" for MoU implementation details responsibilities, working arrangements and interactions with duty-holders.

In accordance with legislation, Government policy and international obligations, the latest revised MoU goals are to jointly deliver effective and efficient regulation of the nuclear industry, maintain and improve standards of protection of people and the environment, and ensure that radioactive wastes are appropriately managed in both the short and long term.

The working level arrangements were revised and amended since the last review mission in 2013 to include 10 new tables of guidance, and specifically call out e.g. Table 8 "Regulation of Highly Active Sealed Sources (HASS) and Similar Sources on a Nuclear Licensed Site", and Table 12 "Provision of Advice on the Management of Higher Activity Radioactive Wastes".

The MoU and the corresponding guidance tables are scheduled for review every three years, with the MoU owned/approved by respective CEOs and the Guidance Tables reviewed by appropriate ONR Professional Leads.

Review concluded that ONR / Environment Agencies' regulatory responsibilities for RAW disposal facilities are the same as those for any other nuclear licensed sites until such time as a disposal facility becomes de-

licensed at which point the environment agencies' General Requirements for Authorization continue to apply. It is recognized that at present this scheme does not include geologic disposal facilities because ONR does not currently have regulatory vires in this area. However, the current MoUs are applicable to any nuclear licensed site.

Status of the findings in the initial mission

Recommendation RFF7 is closed on the basis of continuing and appropriate efforts to develop effective strategies and account for their implementation. The Government is encouraged to seek a harmonized set of strategies between the respective UK countries.

Recommendation RFF8 is closed on the basis of progress made and confidence in effective completion. EA, SEPA and NRW continue to maintain the Guidance on Requirements for Authorization (GRA) and are open to amendments regarding passive institutional controls for near-surface disposal facilities as may be demonstrated from lessons derived by the permitting of the Dounreay LLW facility.

Recommendation RFF9 is closed. ONR appropriately implements a form of a graded approach for safety case reviews with sufficient training and practice (e.g. peer review, use of technical support contracts, etc.) to provide for a reasonable assurance in the quality of regulatory decision making. ONR and EA are aware of the potential advantages (and needed resources) of alternative review processes that may be more appropriate to certain complex systems, in particular to the review of safety cases for post-closure disposal systems, and are encouraged to give the matter further consideration.

Recommendation RFF10 is closed. ONR maintains an effective and well-documented EMM, and provided evidence to the same.

Recommendation RFF11 is closed. ONR, EA and NDA maintain binding instruments that adequately define and delineate the responsibilities of the organizations and specifically between the NDA and operator.

Recommendation RFF12 is closed. ONR recognizes GSR Part 6 has superseded the earlier requirements document WS-R-5 (2006), "Decommissioning of Facilities Using Radioactive Material". Review of ONR guidance (SAPs, TAGs etc.), and of practical examples of ONR's regulatory activities in relation to the licensee's planning for decommissioning provide assurance that decommissioning activities are appropriately and adequately controlled by the regulatory authority through its documented system of license, authorizations and approvals.

Recommendation RFF13 is closed. IAEA requirements for GSR Part 6 were mapped against ONR requirements in its regulatory framework, including SAPS and TAGs, primarily Technical Assessment Guide of Decommissioning (NS-TAST-GD-026) and the Decommissioning Safety Assessment Principals (2006). The review team and the ONR agree on the different terminology and definitions in the UK regulatory system compared to the IAEA documents and are satisfied the UK system provides sufficient regulatory control of decommissioning programmes, including decommissioning plan reviews.

Suggestion SFF7 is closed. Review of the joint coordinated effort by ONR and EA regarding communications appears to satisfy the expectations of GSR Part 1 Req. 36 for the regulator to promote the establishment of an appropriate means of informing and consulting interested parties and the public about possible radiation risks associated with facilities and activities, and about the processes and decisions of the regulatory body.

Suggestion SFF12 is closed. Review concluded that ONR, NDA, and the environment agencies' regulatory responsibilities for disposal facilities are the same as those for any other nuclear licensed sites until such time as a disposal facility becomes de-licensed at which point the environment agencies' General Requirements for Authorization apply. The system of the executive sponsored MoU and corresponding guidance tables provide a sufficient mechanism to provide for the coordination of regulatory responsibilities. The current MoUs are applicable to any nuclear licensed site.

APPENDIX I – LIST OF EXPERTS:

GUILLAUD Pascal	Autorite de Surete Nucleaire (ASN)	pascal.guillaud@asn.fr
LUND Ingemar	Swedish Radiation Safety Authority (SSM)	ingemar.lund@ssm.se
WEBSTER Philip	Canadian Nuclear Safety Commission	philip.webster@international.gc.ca
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ORRELL Andrew	IAEA	a.orrell@iaea.org
SHADAD Ibrahim	IAEA	i.shaddad@iaea.org

APPENDIX II – MISSION PROGRAMME

Time	Monday 03/11/2014	Tuesday 04/11/2014	Wednesday 05/11/2014	Thursday 06/11/2014	Friday 07/11/2014	
08:00 - 09:00	Arrival of IAEA Team Members	Travel to Redgrave Court		Travel to Redgrave Court		
09:00 - 10:00		Entrance Meeting Whittingham Suite		IAEA Draft Report		
10:00 - 11:00		Room 6.1.019. Module 1 Andrew Orrell and Ibrahim Shaddad	Room 6.1.024. Module 4 Philip Webster	Room 6.1.031. Module 5 Ingemar Lund and Adriana Niciu	Room 6.1.033. Module 11 Pascal Guillaud	IAEA Finalise Report Whittingham Suite
11:00 - 12:00		Room 6.1.019. Module 12 Andrew Orrell and Ibrahim Shaddad	Room 6.1.024. Module 4 Philip Webster	Room 6.1.031. Module 3 Ingemar Lund and Adriana Niciu	Room 6.1.033. Module 11 Pascal Guillaud	
12:00 - 13:00		Lunch		Lunch		Lunch
13:00 - 14:00		Room 6.1.019. Module 12 Andrew Orrell and Ibrahim Shaddad	Room 6.1.024. Module 4 Philip Webster	Room 6.1.031. Module 3 Ingemar Lund and Adriana Niciu	Room 6.1.033. Module 11 Pascal Guillaud	Exit Meeting in Whittingham Suite
14:00 - 15:00		Room 6.1.019. Module 12 Andrew Orrell and Ibrahim Shaddad	Room 6.1.024. Module 4 Philip Webster	Room 6.1.031. Module 3 Ingemar Lund and Adriana Niciu	Room 6.1.033. Module 11 Pascal Guillaud	Comms and Photos in The Street
15:00 - 16:00		Room 6.1.019. Module 12 Andrew Orrell and Ibrahim Shaddad	Room 6.1.024. Module 4 Philip Webster	Room 6.1.031. Module 3 Ingemar Lund and Adriana Niciu	Room 6.1.033. Module 11 Pascal Guillaud	ONR Comment on Draft Report
16:00 - 17:00		Room 6.1.019. Module 12 Andrew Orrell and Ibrahim Shaddad	Room 6.1.024. Module 4 Philip Webster	Room 6.1.031. Module 3 Ingemar Lund and Adriana Niciu	Room 6.1.033. Module 11 Pascal Guillaud	
17:00 - 18:00		ONR/IAEA Initial Team Meeting at Hotel	Daily Team Meeting Whittingham Suite		Daily Team Meeting Whittingham Suite	
18:00 - 19:00	ONR/IAEA Dinner Liverpool	Leave Redgrave Court for Hotel		Leave Redgrave Court for Hotel		
19:00 - 20:00		IAEA Dinner		IAEA Dinner		
20:00 - 21:00		IAEA Meeting in Waterloo Room at Hotel		IAEA Meeting in Waterloo Room at Hotel		
					Taxis to Airport	

APPENDIX III – ONR REFERENCE MATERIAL USED FOR THE REVIEW

Module 1 – Legal and Governmental Responsibilities – Andrew Orrell and Ibrahim Shaddad

Finding	Detail
SFF1	ONR should ensure sufficient resources with the appropriate skillsets are available to provide regulatory oversight of the GDF project.
Key References	<ul style="list-style-type: none"> - Finding-specific Action Plan 2013. - Finding-specific close-out report. - White paper programme for the development, construction and operation of a GDF. - Environment Agency scrutiny of NDA RWMD’s work relating to geological disposal of higher-activity solid radioactive waste: Annual review 2009/10. - Regulatory scrutiny of RWMD’s work relating to geological disposal of radioactive waste: Annual review 2012 to 2013. - ONR document - Resources for the regulatory oversight of the GDF project.

Module 3 – Responsibilities and Functions of the Regulatory Body – Ingemar Lund and Adriana Nicic

Finding	Detail
SF2	2009 Suggestion: ND should institute a programme for the reconstitution of an advisory committee on nuclear safety.
Key References	<ul style="list-style-type: none"> - Finding-specific Action Plan 2013. - Finding-specific close-out report. - List of organisations for the IAP. - ONR Independent Advisory Panel – List of appointed members. - Inaugural meeting of the ONR independent advisory panel and Agenda. - ONR Independent advisory panel – Term of Reference. - Letter to Lord Selborne – House of Lords science and technology select committee report into nuclear research and development capabilities.

Module 4 – Management System of the Regulatory Body – Philip Webster

Finding	Detail
RFF1	The management system should be completed and fully implemented as quickly as possible. This should include all the requirements for managing the organization, in particular those mentioned in the earlier Recommendations and Suggestions that have been closed.
Key References	<ul style="list-style-type: none"> - Finding-specific Action Plan 2013. - Finding-specific close-out report. - How 2 management system – The ONR High level plan.
Finding	Detail

SFF8	<p>A high-level timeline should be prepared to affirm Senior Management's determination to complete the preparation of the Management System by showing the steps involved, such as:</p> <ul style="list-style-type: none"> - Issuing the Management System Manual - Approving the Policy Framework - Issuing the Policy Document - Populating HOW2 with the existing processes - Reconciling and updating HOW2 to make the processes consistent <p>The Management System may then be used to support the goal of continuous improvement, such as by performing audits/evaluations of HOW2 usage.</p>
Key References	<ul style="list-style-type: none"> - Finding-specific Action Plan 2013. - Finding-specific close-out report. - Nuclear safety permission – Table. - ONR internal audit of How2 – final report. - ONR Regulatory audit & quality audit plan 2014/15 v.2. - ONR Scoping document – regulatory assurance programme strategy and oversight. - Monthly number of hits on How2 from September 2013-August 2014. - ONR Health and safety plan 2013/16.

Finding	Detail
SFF9	Changes should be made to relevant parts of the management system to indicate that one of its purposes is to promote and support a strong safety culture.
Key References	<ul style="list-style-type: none"> - Finding-specific Action Plan 2013. - Finding-specific close-out report. - ONR Health and safety plan 2013/16.

Module 5 – Authorisation - Ingemar Lund and Adriana Nicic

Finding	Detail
SFF10	ONR should complete its first full review of the Standard Licence Conditions as scheduled.
Key References	<ul style="list-style-type: none"> - Finding-specific Action Plan 2013. - Finding-specific close-out report. - ONR's Regulatory framework review document 2014. - ONR regulatory framework review- project steering group – minutes. - Notes on a proposal as to how ONR might undertake the regulatory framework and LC review. - ONR Review of licence conditions – project steering group – 1st meeting – 11th June 2014. - Licence conditions review – ONR project plan. - Review of regulatory framework – ALARP and risk policy. - ONR Regulatory framework review – project steering group – 2nd meeting

	<p>2 September 2014.</p> <ul style="list-style-type: none"> - Regulatory framework review –ONR staff workshop 2014. - Feedback from Regulatory framework review workshop 3 October 2014.
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Module 11 – Radiological Protection – Pascal Guillaud

Finding	Detail
RFF2	Co-operation between employers
Key References	<ul style="list-style-type: none"> - Finding-specific Action Plan 2013. - Finding-specific close-out report. - Email – IRRS finding on co-operation between employers. - The ionising radiations regulations 1999. - Radiological Protection – Nuclear Safety Technical Assessment Guide.

Finding	Detail
RFF3	Regulatory Framework: Dose Limit for Lens of Eye, 16-year olds and training records
Key References	<ul style="list-style-type: none"> - Finding-specific Action Plan 2013. - Finding-specific close-out report. - Emails – Matters to be addressed in revising IRR99 – ONR/HSE. - Radiological Protection – Nuclear Safety Technical Assessment Guide.

Finding	Detail
RFF4	Dose estimation/recording for non-classified workers in Supervised Areas.
Key References	<ul style="list-style-type: none"> - Finding-specific Action Plan 2013. - Finding-specific close-out report. - Emails – IRRS finding RFF4 – Dose assessment, health surveillance and recording in supervised areas ONR/HSE. - The Ionising radiations regulations 1999. - Radiological Protection – Nuclear Safety Technical Assessment Guide.

Finding	Detail
RFF5	Environmental Operational Limits and Conditions
Key References	<ul style="list-style-type: none"> - Finding-specific Action Plan 2013. - Finding-specific close-out report. - Email – IRRS 2014 Return mission – Recommendation RFF5 – Control of discharges, materials for clearance, and chronic exposures; environmental monitoring for public radiation monitoring. Attachments: IRRS 2014 return mission – January Monitoring meetings – template for project plan – (ONR Policy) RFF5 return. - Email – ONR policy action complete – IRRS 2014 Return mission – recommendation RFF5 – control of discharges, materials for clearance and

	<p>chronic exposures; environmental monitoring for public radiation</p> <ul style="list-style-type: none"> - Relevant EC Directives.
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Module 12 – Supervision of Non –NNP Facilities and Activities - Andrew Orrell and Ibrahim Shaddad

Finding	Detail
RFF6	ONR in collaboration with other relevant regulatory authorities should consider ensuring the coordination of regulatory responsibilities dealing with licensing and permitting/authorisation of RAW disposal facilities such that all safety aspects are comprehensively considered and so that both short and long-term aspects are taken into account.
Key References	<ul style="list-style-type: none"> - Finding-specific Action Plan 2013. - Finding-specific close-out report. - Highly active sealed sources regulation (HASS)) and SFF11 (radioactive sources training). - Regulatory interfaces between ONR and Environment Agencies. - MoU/joint guidance/detailed tables matters mutual concern on NLS” update meeting 14 May 2014 – Actions arising. - MoU on matters of mutual concerns on Nuclear Licensed sites (NLS) – 14th January 2014 – Meeting record (Issue 1) (attachments) Kick off meeting with environmental regulators on MoU on matters of mutual concern on Nuclear Licensed. - Contact Report – Kick off meeting with environmental regulators on MoU on matters of Mutual concerns on Nuclear licensed sites (NLS). - Email - MoU/Joint guidance/detailed tables matters mutual concern on NLS update MTG 12 May 2014 – Actions arising. - Memorandum of understanding between ONR and the EA on matters of mutual interest in England. - ONR guidance to support the joint regulatory memorandum of the understanding between ONR and the EA on matters of mutual interest in England. - Memorandum of understanding between ONR and SEPA on matters of mutual interest in Scotland. - Guidance to support the joint regulatory memorandum of the understanding between ONR and SEPA on matters of mutual interest in Scotland. - Memorandum of understanding between ONR and NRW on matters of mutual interest in Wales. - Guidance to support the joint regulatory memorandum of understanding between ONR and NRW on matters interest on Wales.

Finding	Detail
RFF7	The Government together with devolved Administrations should continue to implement policy and develop strategies as necessary, specifying steps and responsibilities, for all radioactive waste streams in the UK.

Key References	<ul style="list-style-type: none"> - Finding-specific Action Plan 2013. - HMG Lines on RFF7. - Finding-specific close-out report. - UK strategy for the management of solid low level radioactive waste from the nuclear industry. - Policy for the long term management of solid low level radioactive waste in the United Kingdom. - Strategy for the management of solid low-level radioactive waste from the non-nuclear industry in the United Kingdom – Part 1 anthropogenic radionuclide. - Strategy of the management of naturally occurring radioactive material (NORM) waste in the United Kingdom. - Consultation document – Review of welsh government policy on the management and disposal of higher activity radioactive waste. - Scotland’s higher activity radioactive waste policy 2011. - Council directive 2011/70/Euratom. Community approach for the responsible and safe management of spent fuel and radioactive waste. - Explanatory note for proposed draft guidelines regarding member states reporting under article 14.1 of council directive 2011/70/EUROTOM of 19 July 2011 establishing a community framework for the responsible and safe management of spent fuel and radioactive waste. - Guidelines for the establishment and notification of national programmes.
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Finding	Detail
RFF8	Regulatory authorities should review their Guidance on Requirements for Authorisation (GRA) to consider a need for passive institutional control of the site of a near surface disposal facility. The responsible legal body should be defined and the process of any transfer of regulatory responsibilities should be established.
Key References	<ul style="list-style-type: none"> - Finding-specific Action Plan 2013. - Review of environment agencies guidance or requirements. - Finding-specific close-out report. - IRRS Report for review email – attachments (RWMC Regulators forum control oversight and related terms July 2013). - RWMC Regulators Forum.

Finding	Detail
RFF9	ONR should further develop their assessment capabilities to be able to review the whole safety case and safety assessment of RAW management facilities.
Key References	<ul style="list-style-type: none"> - Finding-specific Action Plan 2013. - Capabilities for the assessment of RAW management facilities. - Finding-specific close-out report. - Regulating Geological Disposal – Environment Agency. - Joint regulatory scrutiny of RWMD’s work relating to geological disposal of

	higher activity radioactive waste: Regulatory review of the generic disposal system safety case.
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Finding	Detail
RFF10	ONR should review the criteria in the use of the Enforcement Management Model to ensure compliance with regulatory requirements in relation to RAW management activities.
Key References	<ul style="list-style-type: none"> - Finding-specific Action Plan 2013. - Finding-specific close-out report. - ONR Enforcement Policy Statement. - The use of the enforcement management model in ONR. - Management of radioactive materials and radioactive waste on nuclear licensed sites. - LC34: Leakage and escape of radioactive material and radioactive waste. - ONR Guidance for intervention Planning and reporting. - Management of regulatory issues – ONR Guidance.

Finding	Detail
RFF11	Considering that the legal arrangements are in place ONR should review the implementation of the present legal arrangements and ensure that all organizations involved in decommissioning activities and in the management of the radioactive waste, responsible for safety, are held accountable for their responsibilities and that their activities are coordinated.
Key References	<ul style="list-style-type: none"> - Finding-specific Action Plan 2013. - Summary of responsibilities/accountabilities/co-ordination between UK organisations. - Finding-specific close-out report. - Doc No NSG 33 – Guidance for NDA staff. - Licensing Nuclear Installations 3rd Edition: June 2014. - Function and content of Nuclear Baseline – ONR Technical Assessment Guide. - Licensee Core and Intelligent Customer Capabilities – ONR Technical Assessment Guide.

Finding	Detail
RFF12	The ONR should review its approach to authorising decommissioning plans
Key References	<ul style="list-style-type: none"> - Finding-specific Action Plan 2013. - ONR overview of the approach for authorising decommissioning plans. - Finding-specific close-out report. - Decommissioning of facilities – ONR Technical Assessment Guide. - GDA – New civil reactor build – Step 4 Radioactive waste and decommissioning assessment of the EDF and AREVA UK EPR Reactor. - GDA – New civil reactor build- step 4 radioactive waste and

	<p>decommissioning assessment of the Westinghouse AP1000 Reactor.</p> <ul style="list-style-type: none"> - CNRP – NNB GenCo: Hinkley point C Pre-construction safety report 2012. - Milestone MAG 2: Issue a position statement reflecting ONR’s expectations for Magnox sites entering into the C&M phase. Position statement in March 2014.
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Finding	Detail
RFF13	ONR should review and update the guidance dealing with decommissioning to ensure that the safety requirements will be in accordance with the latest international safety requirements in this field.
Key References	<ul style="list-style-type: none"> - Finding-specific Action Plan 2013. - Summary of ONR Review of decommissioning guidance. - Finding-specific close-out report. - IRRS Recommendation RFF13 – Comparison table for IAEA GSR part 6 v ONR guidance. - Decommissioning of Facilities – ONR Technical Assessment Guide.

Finding	Detail
SFF6	ONR should review its training programme and revise as necessary to include the full range of duties regarding radioactive sources.
Key References	<ul style="list-style-type: none"> - Finding-specific Action Plan 2013. - Finding-specific close-out report. - RFF6 (highly active sealed sources regulations HASS)) and SFF11 (radioactive sources training). - Explanatory note on the regulation of radioactive sources Version 1.5.

Finding	Detail
SFF7	As part of its communication strategy, ONR is encouraged to promote the establishment of an appropriate means of informing and consulting interested parties and the public about the possible radiation risks associated with facilities and activities, associated with GDF, and about the processes and decisions of the regulatory body.
Key References	<ul style="list-style-type: none"> - Finding-specific Action Plan 2013. - Finding-specific close-out report. - GDF Communications strategy.

Finding	Detail
SFF11	ONR should complete development and implementation of training to include the full range of duties regarding radioactive sources.
Key References	<ul style="list-style-type: none"> - Finding-specific Action Plan 2013. - Finding-specific close-out report. - RFF6 (highly active sealed sources regulations (HASS)) and SFF11

	<p>(Radioactive sources training).</p> <ul style="list-style-type: none"> - Supervision of non-NPP Facilities and Activities. - Explanatory note on the regulation of radioactive sources Version 1.5. - Regulation of radioactive sources and ONR. - ONR Training – Ionising radiations regulations 1999 sealed sources.
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Finding	Detail
SFF12	<p>ONR in collaboration with other relevant regulatory authorities should consider ensuring the coordination of regulatory responsibilities dealing with licensing and permitting/authorisation of RAW disposal facilities such that all safety aspects are comprehensively considered and so that both short and long-term aspects are taken into account.</p>
Key References	<ul style="list-style-type: none"> - Finding-specific Action Plan 2013. - Regulatory interfaces between ONR and environment agencies. - Finding-specific close-out report. - Contact report – kick off meeting with environmental regulators on MoU on matters of Mutual concern on nuclear licensed sites (NLS). - ONR Email – MoU/joint guidance/detailed tables matters mutual concern on NLS” update meeting 14 May 2014- Actions arising. - Memorandum of understanding between ONR and the EA on the matters of mutual interest in England - ONR Guidance – guidance to support the joint regulatory memorandum of the understanding between ONR and the EA on matters of mutual interest in England. - Memorandum of understanding between ONR and SEPA on matters of mutual interest in Scotland. - Guidance to support the joint regulatory memorandum of understanding between ONR and SEPA on matters of mutual interest in Scotland - Memorandum of understanding between ONR and NRW on matters of mutual interest in Wales - Guidance to support the joint regulatory memorandum of understanding between ONR and NRW on matters of mutual interest in Wales.

APPENDIX IV – IAEA REFERENCE MATERIAL USED FOR THE REVIEW

1.	INTERNATIONAL ATOMIC ENERGY AGENCY - Fundamental Safety Principles, No SF-1, IAEA, Vienna (2006)
2.	INTERNATIONAL ATOMIC ENERGY AGENCY - Governmental, Legal and Regulatory Framework for Safety, General Safety Requirements Part 1, No. GSR Part 1, IAEA, Vienna (2010).
3.	INTERNATIONAL ATOMIC ENERGY AGENCY – The Management System for Facilities and Activities. Safety Requirement Series No. GS-R-3, IAEA, Vienna (2006).
4.	INTERNATIONAL ATOMIC ENERGY AGENCY - Preparedness and Response for Nuclear and Radiological Emergencies, Safety Requirement Series No. GS-R-2, IAEA, Vienna (2002).
5.	INTERNATIONAL ATOMIC ENERGY AGENCY - Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, General Safety Requirements Part 3, No. GSR Part 3, IAEA, Vienna (2014).
6.	INTERNATIONAL ATOMIC ENERGY AGENCY - Safety assessment for facilities and activities, General Safety Requirements Part 4, No. GSR Part 4, IAEA, Vienna (2009)
7.	INTERNATIONAL ATOMIC ENERGY AGENCY - Predisposal Management of Radioactive Waste, General Safety Requirement Part 5, No. GSR Part 5, IAEA, Vienna (2009).
8.	INTERNATIONAL ATOMIC ENERGY AGENCY - Decommissioning of Facilities, Safety Requirement Series No. GSR Part 6, IAEA, Vienna (2014).
9.	INTERNATIONAL ATOMIC ENERGY AGENCY - Safety of Nuclear Power Plants: Design, Specific Safety Requirements No. SSR-2/1, IAEA, Vienna (2012).
10.	INTERNATIONAL ATOMIC ENERGY AGENCY - Safety of Nuclear Power Plants: Commissioning and Operation, Specific Safety Requirements Series No. SSR-2/2, IAEA, Vienna (2011).
11.	INTERNATIONAL ATOMIC ENERGY AGENCY - Site Evaluation for Nuclear Installations, Safety Requirement Series No. NS-R-3, IAEA, Vienna (2003).
12.	INTERNATIONAL ATOMIC ENERGY AGENCY - Safety of Research Reactors, Safety Requirement Series No. NS-R-4, IAEA, Vienna (2005).
13.	INTERNATIONAL ATOMIC ENERGY AGENCY - Safety of Nuclear Fuel Cycle Facilities, Safety Requirement Series No. NS-R-5, IAEA, Vienna (2014)
14.	INTERNATIONAL ATOMIC ENERGY AGENCY - Disposal of Radioactive Waste, Specific Safety Requirements No. SSR-5, IAEA, Vienna (2011)

15.	INTERNATIONAL ATOMIC ENERGY AGENCY – Regulations for the Safe Transport of Radioactive Material, Specific Safety Requirements No. SSR-6, IAEA, Vienna (2012)
16.	INTERNATIONAL ATOMIC ENERGY AGENCY - Organization and Staffing of the Regulatory Body for Nuclear Facilities, Safety Guide Series No. GS-G-1.1, IAEA, Vienna (2002).
17.	INTERNATIONAL ATOMIC ENERGY AGENCY - Review and Assessment of Nuclear Facilities by the Regulatory Body, Safety Guide Series No. GS-G-1.2, IAEA, Vienna (2002).
18.	INTERNATIONAL ATOMIC ENERGY AGENCY - Regulatory Inspection of Nuclear Facilities and Enforcement by the Regulatory Body, Safety Guide Series No. GS-G-1.3, IAEA, Vienna (2002).
19.	INTERNATIONAL ATOMIC ENERGY AGENCY - Documentation Used in Regulating Nuclear Facilities, Safety Guide Series No. GS-G-1.4, IAEA, Vienna (2002).
20.	INTERNATIONAL ATOMIC ENERGY AGENCY - Arrangements for Preparedness for a Nuclear or Radiological Emergency, Safety Guide Series No. GS-G-2.1, IAEA, Vienna (2007)
21.	INTERNATIONAL ATOMIC ENERGY AGENCY - Criteria for use in Preparedness and Response for a Nuclear or Radiological Emergency, General Safety Guide Series No. GSG-2, IAEA, Vienna (2011)
22.	INTERNATIONAL ATOMIC ENERGY AGENCY - Commissioning for Nuclear Power Plants, Safety Guide Series No. SSG-28, IAEA, Vienna (2014)
23.	INTERNATIONAL ATOMIC ENERGY AGENCY - Periodic Safety Review of Nuclear Power Plants, Safety Guide Series No. SSG-25, IAEA, Vienna (2013)
24.	INTERNATIONAL ATOMIC ENERGY AGENCY - A System for the Feedback of Experience from Events in Nuclear Installations, Safety Guide Series No. NS-G-2.11, IAEA, Vienna (2006)
25.	INTERNATIONAL ATOMIC ENERGY AGENCY - Occupational Radiation Protection, Safety Guide Series No. RS-G-1.1, IAEA, Vienna (1999)
26.	INTERNATIONAL ATOMIC ENERGY AGENCY - Assessment of Occupational Exposure Due to Intakes of Radionuclides, Safety Guide Series No. RS-G-1.2, IAEA, Vienna (1999)
27.	INTERNATIONAL ATOMIC ENERGY AGENCY - Assessment of Occupational Exposure Due to External Sources of Radiation, Safety Guide Series No. RS-G-1.3, IAEA, Vienna (1999)
28.	INTERNATIONAL ATOMIC ENERGY AGENCY - Radiological Protection for Medical Exposure to Ionizing Radiation, Safety Guide Series No. RS-G-1.5, IAEA, Vienna (2002)
29.	INTERNATIONAL ATOMIC ENERGY AGENCY - Environmental and Source Monitoring for Purposes of Radiation Protection, Safety Guide Series No. RS-G-1.8, IAEA, Vienna (2005)

30.	INTERNATIONAL ATOMIC ENERGY AGENCY - Safety of Radiation Generators and Sealed Radioactive Sources, Safety Guide Series No. RS-G-1.10, IAEA, Vienna (2006)
31.	INTERNATIONAL ATOMIC ENERGY AGENCY - Deterministic Safety Analysis for Nuclear Power Plants, Specific Safety Guides Series No. SSG-2, IAEA, Vienna (2010)
32.	INTERNATIONAL ATOMIC ENERGY AGENCY - Development and Application of Level 1 Probabilistic Safety Assessment for Nuclear Power Plants, Specific Safety Guide Series No. SSG-3, IAEA, Vienna (2010)
33.	INTERNATIONAL ATOMIC ENERGY AGENCY - Development and Application of Level 2 Probabilistic Safety Assessment for Nuclear Power Plants, Specific Safety Guide Series No. SSG-4, IAEA, Vienna (2010)
34.	INTERNATIONAL ATOMIC ENERGY AGENCY - Safety of Conversion Facilities and Uranium Enrichment Facilities, Specific Safety Guide Series No. SSG-5, IAEA, Vienna (2010)
35.	INTERNATIONAL ATOMIC ENERGY AGENCY - Safety of Uranium Fuel Fabrication Facilities Specific Safety Guide Series No. SSG-6, IAEA, Vienna (2010)
36.	INTERNATIONAL ATOMIC ENERGY AGENCY - Safety of Uranium and Plutonium Mixed Oxide Fuel Fabrication Facilities, Specific Safety Guide Series No. SSG-7, IAEA, Vienna (2010)
37.	INTERNATIONAL ATOMIC ENERGY AGENCY - Licensing Process for Nuclear Installations, Specific Safety Guide Series No. SSG-12, IAEA, Vienna (2010)
38.	INTERNATIONAL ATOMIC ENERGY AGENCY - Geological Disposal Facilities for Radioactive Waste Specific Safety Guide Series No. SSG-14, IAEA, Vienna (2011)
39.	INTERNATIONAL ATOMIC ENERGY AGENCY - Storage of Spent Nuclear Fuel Specific Safety Guide Series No. SSG-15, IAEA, Vienna (2012)
40.	INTERNATIONAL ATOMIC ENERGY AGENCY - Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material, Specific Safety Guide No SSG-26, IAEA, Vienna, (2014)
41.	INTERNATIONAL ATOMIC ENERGY AGENCY - Planning and Preparing for Emergency Response to Transport Accidents Involving Radioactive Material, Safety Guide No TS-G-1.2 (2002)
42.	INTERNATIONAL ATOMIC ENERGY AGENCY - Radiation Protection Programmes for the Transport of Radioactive Material, Safety Guide No TS-G-1.3, IAEA, Vienna, (2007)
43.	INTERNATIONAL ATOMIC ENERGY AGENCY - The Management System for the Safe Transport of Radioactive Material Safety Guide No TS-G-1.4, IAEA, Vienna, (2008)
44.	INTERNATIONAL ATOMIC ENERGY AGENCY - Compliance Assurance for the Safe Transport of Radioactive Material, Safety Guide No TS-G-1.5, IAEA, Vienna, (2009)

45.	INTERNATIONAL ATOMIC ENERGY AGENCY - Schedules of Provisions of the IAEA Regulations for the Safe Transport of Radioactive Material (2009 Edition), Safety Guide No TS-G-1.6 (Rev.1), IAEA, Vienna, (2014)
46.	INTERNATIONAL ATOMIC ENERGY AGENCY - Classification of Radioactive Waste, General Safety Guide No. GSG-1, IAEA, Vienna (2009)
47.	INTERNATIONAL ATOMIC ENERGY AGENCY - Regulatory Control of Radiation Sources, General Safety Guide No. GS-G-1.5, IAEA, Vienna (2004)
48.	INTERNATIONAL ATOMIC ENERGY AGENCY - Decommissioning of Nuclear Power Plants and Research Reactors, Safety Guide Series No.WS-G-2.1, IAEA, Vienna (1999)
49.	INTERNATIONAL ATOMIC ENERGY AGENCY - Decommissioning of Medical, Industrial and Research Facilities (1999) Safety Guide Series No.WS-G-2.2, IAEA, Vienna (1999)
50.	INTERNATIONAL ATOMIC ENERGY AGENCY - Regulatory Control of Radioactive Discharges to the Environment, Safety Guide Series No.WS-G-2.3, IAEA, Vienna (2000)
51.	INTERNATIONAL ATOMIC ENERGY AGENCY - Decommissioning of Nuclear Fuel Cycle Facilities, Safety Guide Series No.WS-G-2.4, IAEA, Vienna (2001)
52.	INTERNATIONAL ATOMIC ENERGY AGENCY - Predisposal Management of Low and Intermediate Level Radioactive Waste, Safety Guide Series No.WS-G-2.5, IAEA, Vienna (2003)
53.	INTERNATIONAL ATOMIC ENERGY AGENCY - Predisposal Management of High Level Radioactive Waste, Safety Guide Series No.WS-G-2.6, IAEA, Vienna (2003)
54.	INTERNATIONAL ATOMIC ENERGY AGENCY - Management of Waste from the Use of Radioactive Materials in Medicine, Industry, Agriculture, Research and Education, Safety Guide Series No.WS-G-2.7, IAEA, Vienna (2005)
55.	INTERNATIONAL ATOMIC ENERGY AGENCY - The Management System for the Disposal of Radioactive Waste, Safety Guide Series No GS-G-3.4, IAEA, Vienna (2008)
56.	INTERNATIONAL ATOMIC ENERGY AGENCY - Safety Assessment for the Decommissioning of Facilities Using Radioactive Material, Safety Guide Series No.WS-G-5.2, IAEA, Vienna (2009)
57.	INTERNATIONAL ATOMIC ENERGY AGENCY - Storage of Radioactive Waste, Safety Guide Series No. WS-G-6.1, IAEA, Vienna (2006)