



Demonstrating ALARA Across the UK Nuclear Industry

Implementation of the CORE Regulatory Inspection Project

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Purpose

- Control of Occupational Radiation Exposure (CORE)
- To provide assurance that licensees are complying with relevant UK regulations
- To identify any industry-wide themes that could be considered to be areas for improvement
- To identify examples of relevant good practice (RGP) and to communicate them in the form of a summary report

Approach

- 3 year inspection project
- All UK nuclear sites (licensed and authorised)
- Each inspection requires
 - Completion of CORE questionnaire
 - Site visit
- Performance rated against 8 CORE criteria
- Report issued upon completion of project



CORE Criteria

1. ALARA Strategy
2. Dose Limits, Dose Targets / Budgets / Objectives / Action Levels
3. Trending and Analysis
4. Learning from Experience/Radiological Incidents and Near Misses
5. Targeting of ALARA measures
6. Work Scheduling
7. Provision of information, instruction and training to workers on radiological protection
8. Benchmarking and sharing of relevant good practice

ONR Rating System

| Rating | |
|--------|-----------------------------------|
| Purple | Exemplar 1 |
| Blue | Good Standard 2 |
| Green | Adequate 3 |
| Yellow | Below Standard 4 |
| Orange | Significantly Below Standard 5 |
| Red | Unacceptable 6 |

Findings to Date

- ~24 assessments completed
- All nuclear site operators complying with relevant UK regulations
- Arrangements are generally of a good standard, with many examples of relevant good practice being demonstrated
- Several industry-wide themes for improvement

Criteria (1) ALARA Strategy

- ALARA policy and arrangements for communicating it to workers and keeping it under review

Is there a clear ALARA policy and strategy set out in documentation?

How is the strategy communicated to the workforce and was it consulted during its development?

Criteria (1) ALARA Strategy

- Policy for restricting exposure clearly set out in documentation
- Communicated to and understood by workers
- Good practice
 - Traceability of policy from top level management documents to specific RP instructions
 - Included in training courses

Criteria (2) Dose limits, Dose Targets / Budgets / Objectives / Action Levels

- Numerical indicators of ALARA performance

How does the licensee ensure that dose limits are not exceeded?

What dose investigation levels are in place in order to ensure that exposures are ALARA?

Does the licensee use any other dose targets / budgets / objectives / action levels for assuring itself that doses are being restricted?

What process is used for setting and reviewing these for both new and routine tasks?

Criteria (2) Dose limits, Dose Targets / Budgets / Objectives / Action Levels

- Sites use a range of indicators for managing dose uptake
- Good practices
 - Dose investigation levels set below 15 mSv
 - Effective use of Electronic Personal Dosimeter (EPD) task codes to set dose action levels and budgets
 - Derivation of task-specific dose action levels in risk assessments

Criteria (2) Dose limits, Dose Targets / Budgets / Objectives / Action Levels



Criteria (2) Dose limits, Dose Targets / Budgets / Objectives / Action Levels

- Areas for improvement
 - Issues with the setting and review of dose investigation levels
 - Set at such a high level that they will never be exceeded
 - Regarded as a dose limit and amended throughout year
 - Inconsistent recording of investigations when action levels are exceeded

Criteria (3) – Trending and Analysis

- Monitoring and analysis of radiological protection data to inform the arrangements

Does the licensee trend doses over time?

Does the licensee trend results from radiological surveys over time?

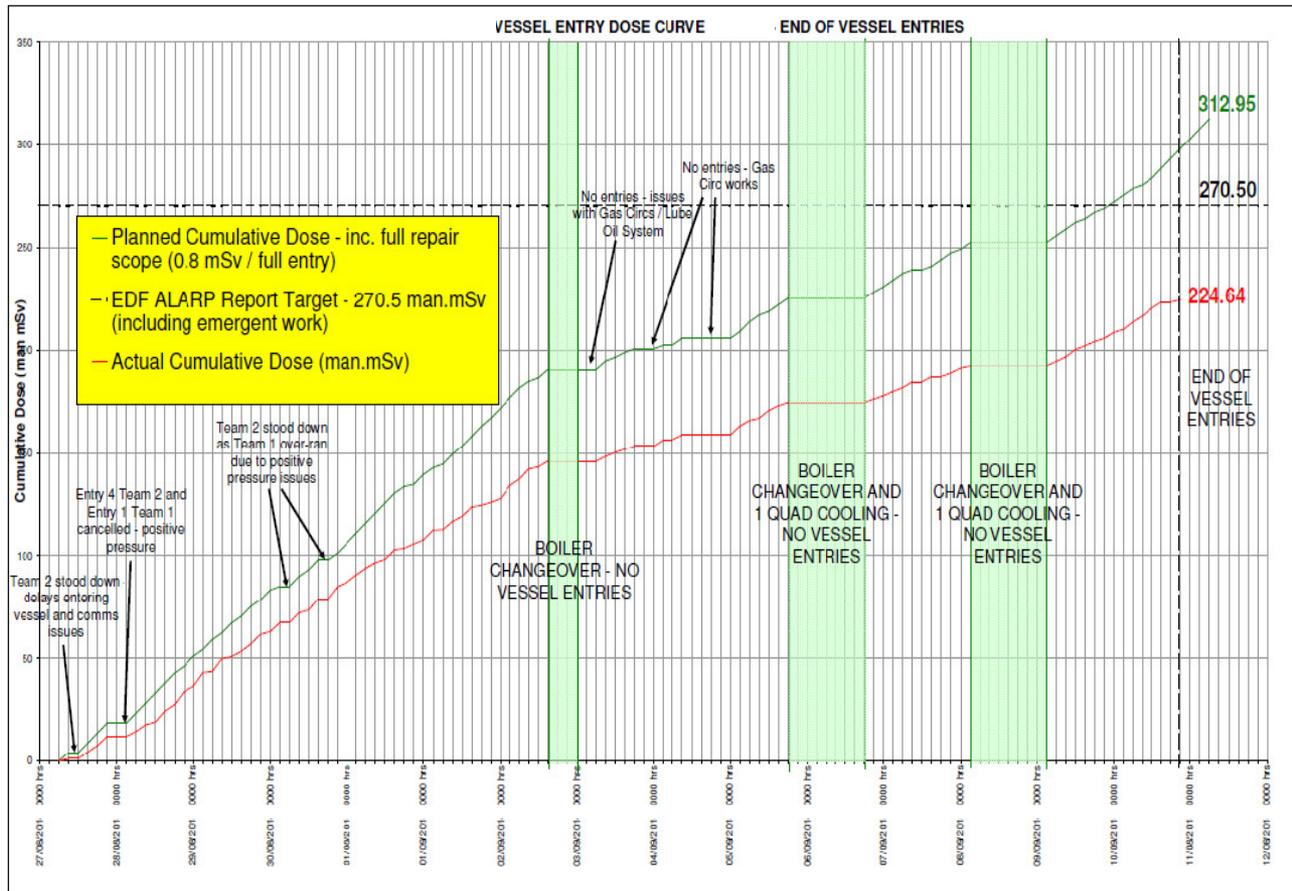
Is the data reviewed to identify any potential patterns?

Are the findings from the review used to inform ALARA arrangements?

Criteria (3) – Trending and Analysis

- Good practices
 - Level of scrutiny on doses proportionate to radiological risk
 - ALARA Committees review dose data in order to identify potential patterns
 - Examples of action being taken in response to adverse trends
 - Trending of radiological survey data to identify significant changes in radiological conditions

Criteria (3) – Trending and Analysis



Criteria (4) – Learning from Experience/ Radiological Incidents and Near Misses

Does the licensee monitor and record radiological incidents and near misses?

Is there a positive culture for the reporting of incidents and near misses?

Is there a process for reviewing events in order to identify potential common issues and take measures to address them?

Does the licensee carry out reviews at the end of work activities in order to identify good practice and areas for improvement? Is there a process for applying the lessons learnt to future work?

Are good practices and areas for improvement communicated to workers?

Criteria (4) – Learning from Experience/ Radiological Incidents and Near Misses

- Good practices
 - Post task ALARA reviews completed
 - Scope proportionate to level of risk
 - Robust incident reporting and analysis arrangements
 - Positive reporting culture
 - Effective review of incidents with SMART actions being allocated
 - Arrangements for sharing learning both internally and externally

Criteria (4) – Learning from Experience/ Radiological Incidents and Near Misses

- Good practices (continued)
 - ALARA Committee monitors and reviews incidents and takes action where appropriate
 - Evidence of learning from incident investigations and post-task ALARA reviews being used to improve arrangements



Criteria (4) – Learning from Experience/ Radiological Incidents and Near Misses

- Areas for improvement
 - Inconsistency in application of post-task ALARA reviews
 - Generally conducted for very large projects but learning from short-duration tasks not always captured
 - Investigations into some radiological incidents failed to address root causes
 - Missed opportunity to improve arrangements in some cases

Criteria (5) – Targeting of ALARA measures

- Targeting of ALARA measures at those workers and work activities exposed to the highest level of radiological risk

Has the licensee identified work activities with a higher radiological risk and targeted efforts at reducing that risk?

Has the licensee identified working groups with a higher radiological risk and targeted efforts at reducing their risk?

Does the licensee avoid placing undue reliance on dose sharing to restrict exposure?

Criteria (5) – Targeting of ALARA measures

- Good Practices
 - Proportionate approach to risk assessment
 - Robust ALARA assessments produced for activities with higher radiological risk
 - Detailed assessment of available options
 - Effective application of hierarchy of control measures
 - Dose uptake
 - Robust contingency arrangements
 - Consideration of dose to other persons

Criteria (5) – Targeting of ALARA measures



Criteria (5) – Targeting of ALARA measures

- Good Practices
 - Higher level of scrutiny for radiologically significant work
 - Health physicists imbedded in project teams
 - Constant monitoring of doses
- Areas for improvement
 - Occasional reliance on administrative controls rather than engineered controls
 - Limited assessment of full range of options in some cases

Criteria (6) – Work Scheduling

Does the licensee schedule work to restrict doses SFAIRP?

Is work in controlled areas organised so that it takes place when radiological conditions are more favourable?

Is there a planning process to ensure that multiple workstreams / tasks that might impact on each other and present a radiological risk to workers are scheduled in such a way as to reduce that risk?

Criteria (6) – Work Scheduling

- Good Practices
 - Operators generally have mature planning arrangements with input from radiological protection specialists
 - Multi-disciplinary approach to ensure holistic consideration of safety
 - Examples of radiologically significant work being subject to strict planning controls (e.g. radiography)

Criteria (7) – Provision of information, instruction and training to workers on radiological protection

How does the licensee provide information, instruction and training to workers so that they understand the risks associated with work with ionising radiation and understand what measures are required to restrict their exposure?

How does the licensee target this training based on the radiological risk of different workers?

How does the licensee track training requirements and ensure that refresher training is carried out at appropriate intervals?

Criteria (7) – Provision of information, instruction and training to workers on radiological protection

- Good Practices

- Dedicated training requirements for specific work activities
- Scope of training proportionate to level of radiological risk
- Training status linked to access rights for controlled areas
- Use of inactive rehearsals

- Areas for Improvement

- Ensuring that refresher training is in date

Criteria (7) – Provision of information, instruction and training to workers on radiological protection



Criteria (8) – Benchmarking

- Efforts to identify and share relevant good practice

Does the licensee make efforts to benchmark its ALARA performance against other facilities or to share relevant good practice with other facilities?

Criteria (8) – Benchmarking

- Good Practices
 - Demonstration of benchmarking visits across industry
 - Participation in organisations and forums such as WANO, IRPCG, etc
- Areas for Improvement
 - Opportunity for improved sharing of good practice across the nuclear industry – potential role for professional bodies?

Summary

- Nuclear sites broadly demonstrating that worker doses are being restricted so far as is reasonably achievable
- Many examples of good practice and some industry-wide themes for areas for improvement
- Project completion expected 2017

THANK YOU