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**HEALTH AND SAFETY EXECUTIVE
NUCLEAR SAFETY ADVISORY COMMITTEE
SUB-COMMITTEE ON RESEARCH**

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**DSRL: 2008/9 PROGRAMME OF NUCLEAR SAFETY RELATED
RESEARCH**

PAPER BY DOUNREAY SITE RESTORATION LTD (DSRL)

1 BACKGROUND

Previously, UKAEA provided an overview of its research and development to HSE with the submission of the summary 'UKAEA Technology Plan'. UKAEA was split into separate Site Licensee Companies (SLCs) on 1 April 2008 and Dounreay Site Restoration Ltd (DSRL) is the SLC for Dounreay.

The NDA require transparency of the techniques and processes that are assumed to be used to deliver the Lifetime Plans. In addition the NDA require information on where further research and development activities are required to underpin the Lifetime Plan (LTP) and the site's plan to address these needs. These requirements are met by the Technical Baseline and Underpinning Research and Development (TBURD) document [1].

For Research and Development issues it establishes that activities needed to underpin the LTP are supported, activities are being implemented on timescales required to deliver the LTP and innovative research and development activities are being initiated with a view to optimisation of the LTP. A correlation between Dounreay's R&D tasks and the following are also summarised;

- HSE NSD Research Strategy for Safety Issues
- NDA & HSE Technical Categorisation Scheme for Liabilities Management

2 SUMMARY OF R&D REQUIREMENTS

The total number of R&D tasks identified by all the Dounreay projects is 102 and these are split into the following 23 technology subjects;

Table 1. Technology Subject Summary

	Technology Subject	No. of R&D Entries
1	Waste Characterisation	2
2	Waste retrieval	6
3	Size reduction	4
4	Waste conditioning & encapsulation	12
5	Waste containment/packaging	5
6	Robotics and remote handling/cutting	15
7	Fuels extraction, cleaning and repackaging	8
8	Vessel emptying and cleaning	3
9	Particles monitoring/retrieval	3
10	Contaminated ground remediation	12
11	Alkali metal removal	6
12	Chemical decontamination	3
13	Ion exchange	4
14	Mercury clean-up	4
16	Gaseous discharges	3
16	Liquid discharges	1
17	Sludge removal/conditioning	2
18	Incineration	1
19	Pipe inspection	2
20	Concrete cutting	1
21	Remote viewing & assay	3
22	Compaction	1
23	Remote welding	1
	Total	102

The HSE Nuclear Safety Directorate (NSD) has produced a Waste and Decommissioning Strategy for decommissioning licensees that covers safety related research. The outcome is that there is a requirement to identify safety related research which addresses issues of concern to HSE. The Nuclear Directorate has identified 16 technical categories and a comparison of Dounreay's R&D tasks against each category is detailed below;

Table 2. HSE Safety Strategy Category Summary

HSE Nuclear Directorate Safety Strategy Categories	R&D Tasks
1. Waste Characterisation	7
2. Waste Retrieval	13
3. Decontamination	2
4. Waste Treatment & passivation	22
5. Waste Immobilisation	11
6. Effluent Control	7
7. Waste Packaging	14
8. Plant Dismantling	11
9. Contaminated land remediation	15
10. Radiological Protection	0
11. Fault Modelling	0
12. Probabilistic Safety Analysis	0
13. Human Factors	0
14. Control and Instrumentation	0
15. Essential Skills Capability and Independence	0
16. International Collaboration Activities	0
Total R&D Tasks	102

DSRL recognises the fundamental importance of appropriate nuclear safety research, although it is difficult to separate this from the fundamental development work being undertaken to support waste management and decommissioning. All of these activities are progressing continued hazard reduction. It can be seen that the majority of R&D tasks cover waste issues.

Seven categories have no R&D tasks identified and this means that project teams are content with the current practices/methodologies and see no requirement for specifically identifying research or development work in these areas, i.e. there is no technology gap.

3 SHARING GOOD PRACTICES

Optimisation of the decommissioning programme and meeting the set budgets and timescales depends on experienced and knowledgeable staff/contractors to manage and conduct the work. However, it is recognised that these objectives will probably not be met if people take a blinkered approach and do not broaden their horizons to learn of innovation by others and/or share knowledge of good practices.

In line with established knowledge management principles, Dounreay management encourage the sharing of good practice, in particular the sharing and learning activities between projects, UKAEA sites, other SLC's, national and international organisations. The alliance partnership with AMEC and CH2MHill is proving to be a good vehicle for sharing knowledge.

Dounreay staff attended and participated in various meetings/workshops/seminars of the following;

1. Soil & Groundwater Trades Association
2. SAFEGROUNDS – developing standards for nuclear site remediation
3. World Association of Nuclear Operators (WANO)
4. Criticality Users Group
5. Human Factors Forum
6. National Nuclear Glovebox Forum (NNGF)
7. National Physical Laboratories (NPL) – radiochemical analysis intercomparison
8. PROCORAD – radiochemical analysis inter-comparison
9. Analyst Informal Working group – for radiochemistry
10. Ventilation Standards Improvement Group
11. IChemE seminar - Managing the Risks of Ageing Plant
12. Environment Agency Requirements Working Group (EARWG)
13. Scotland & Northern Ireland Forum for Environmental Research (SNIFFER)
14. Operations Experience Learning Group (OELG)
15. Special Materials Account Committee
16. Freight Transport Association - Safety Issues
17. Manipulators seminar
18. Nuclear materials accountancy
19. Emergency arrangements
20. Radioactive Materials Transport
21. Industry Radiological Protection Co-ordination Group (IRPCG)
22. Plutonium Decommissioning good practice workshop
23. Visit to Dounreay by Magnox North & South Health Physicists
24. NDA Radiological Protection Skills sub-group
25. Society for Radiological Protection & BNES meetings
26. Participation in preparation of the Fresh Fuel options study and report to Government
27. Participation in preparation of the Spent Fuel options study and report to Government
28. Participation in UK – Plutonium disposition study
29. Development of the Clean and Exempt industry standard
30. Development of waste packaging requirements for ILW
31. Work with NDA to review fuel treatment opportunities abroad

In addition to the above, staff have undertaken fact finding visits to other sites in the nuclear industry as well as other industries e.g.

- France – Phenix and Superphenix Fast Reactors
- Germany – KnK
- Japan – Monju and Jojo Fast Reactors
- UK – SGHWR, WAGR, Windscale Piles
- Heathrow Terminal 5 – industrial safety
- Waste recycling industry – retrieval and separation techniques
- Water industry - Sludge removal

The Dounreay site continues to welcome many visitors every year and they come to learn about the technology advances, decommissioning progress and to share any relevant knowledge and experience that they have.

4 CONCLUSIONS

DSRL recognises the fundamental importance of appropriate nuclear safety research, although it is difficult to separate this from the fundamental development work being undertaken to support waste management and decommissioning. All of these activities are progressing continued hazard reduction.

The arrangements are underpinned by close and detailed exchanges with regulators for both technical and co-ordination issues and by continued dialogue with the NDA, other Site Licence Companies, national and international organisations.

5 ACTION REQUIRED

The sub-committee is invited to note and comment on the paper.

6 REFERENCES

1. PMSU(2008)P001, Issue 1, 28 February 2008 – Dounreay Lifetime Plan 2008, Technical Baseline and Underpinning Research and Development (TBURD) Document.