

Dounreay Report

Progress report, July 2016

Site decommissioning programme

The Nuclear Decommissioning Authority (NDA) has agreed additional funding for the Dounreay site for the next two years totalling £36M (£22M for this year and £14M for 2017/18) in addition to the assured funding of £177M. Additional funding was requested because of the re-prioritisation of the decommissioning programme and the additional funding will allow other decommissioning activities to continue in parallel and will be aimed at continuing hazard reduction. The NDA has also challenged the site to make 4% efficiencies for this year and a further 3% next year.

Dounreay Improvement Team update

The Dounreay Improvement Team (DIT) continues to address a number of safety and environmental behaviours and the information below shows the benefits that are beginning to show through the various initiatives on site.

DIT Action	Benefits (tangible and intangible)
Safety culture scoring assessment (using the Hudson Model) completed.	Has identified the key areas where action is required to improve site safety culture from current level of "calculative".
Champion and monitor the Project Supervisor ILM 3 and Conduct of Operations training programmes to improve performance.	Currently 78% of supervisors who have attended the training, with a target of 100% by March 2017. By next March all supervisors will have the tools for their critical leadership role.
Support the Second Nature Observation in the Workplace (SNOW) scheme by championing the process and undertaking a regular review and feedback of those that are raised.	Comparing first quarter last calendar year with this year has seen recorded SNOW's increase from 266 to 499. Having a workforce comfortable with doing safety interventions/conversations is an important part of a proactive safety culture.
Implemented and continuing the 'Leaders for Safety' monthly seminar; and currently involved in the roll-out of the extended leadership team periodic meeting in July.	Provides a well attended (and increasing) forum for the sharing of lessons learned (LfE), roll-out of new programmes, and sharing of performance successes across the site; thereby reinforcing the "One Dounreay" message.
Holding regular feedback sessions with TU Safety Reps (DIT sponsoring a full-time Safety Rep).	TU Safety Rep engagement has improved with more visibility, greater attendance at walk downs, and increased willingness to support the culture improvement programme.
Holding regular feedback sessions with Authority to Operate (ATO) holders.	ATO holders have the opportunity to share experiences and learning across directorates and support the "One Dounreay" ethos. It is the first time they have met across directorates.

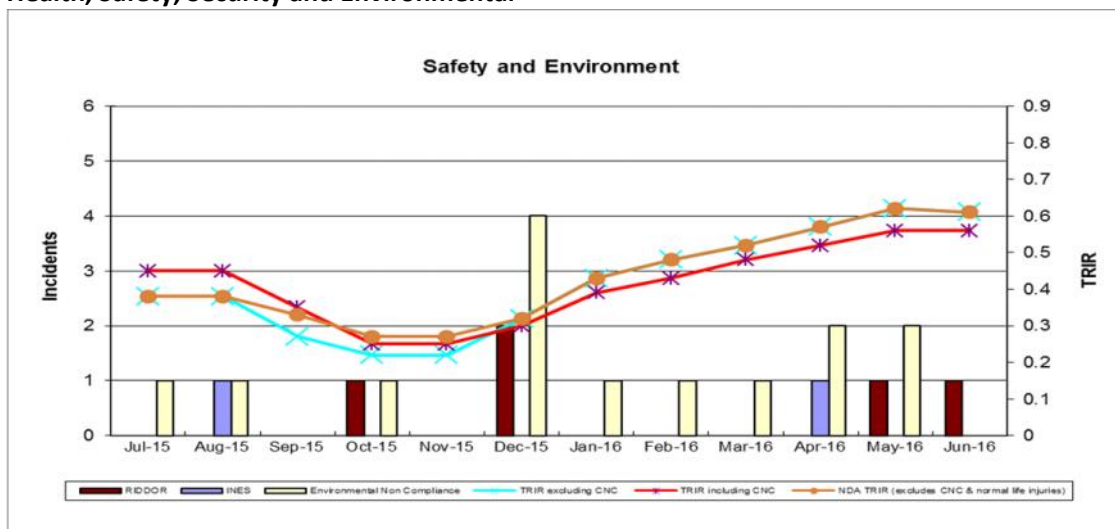
DIT Action	Benefits (tangible and intangible)
Completed causal analysis of 2015 site injuries, significant theme was the large number of spatial awareness injuries.	Additional actions have been directed to key area of spatial awareness injuries and communicating this to the workforce.
Undertaken causal analysis of significant events and environmental non-compliances (2012 – 2015).	Will allow <u>targeted</u> improvement actions to be identified to reduce the number of significant events in the future.
Involved in the 'Decommissioning Excellence' scoring process and helping to promote it to the site.	Allows site personnel input and ownership of the monthly self assessment of our performance, thereby enhancing our safety culture and helping to drive performance improvements.

LEAN

The LEAN team continues to look at all types of activities and processes across the site with a view to suggesting improvements with workable solutions. These activities are developed in conjunction with DIT to ensure there is a consistency in approach. During the last three months, these include:

- A workshop to look at improvements for the sodium inventory disposal process.
- A workshop to identify suppliers, inputs, process, outputs and customers (SIPOC) for the commercial procurement process was carried out. This was well attended by commercial and project teams. The output will be produced shortly.
- A final workshop to discuss electrical sub permits was held with a cross section of Technical Directorate staff.
- The 6th LEAN awareness training session was held at the end of June.

Health, Safety, Security and Environmental



Safety

- As of 7 July, the site had gone 92 days without a lost time accident.
- During this period two injuries were reported through TRIRs:
 - a contractor's employee was injured when they fell whilst closing a gate, causing slight injury to both wrists and left knee.
 - A DSRL employee was injured whilst undertaking preparatory work to remove a manipulator from a cell. The individual sustained a flap laceration to their finger, although they were wearing the appropriate protective gloves. Following treatment at OHD the individual returned to work.
- Two RIDDORs have been reported during this period:
 - On 7 May 2016 a fire occurred in an unoccupied temporary facility due to the failure of a ventilation extractor fan located high on the wall of the shower/toilet room. There is currently communication with the manufacturer in respect to determining the underlying cause of the fan failure. A Level 2 investigation was held.
 - An employee has been diagnosed with "cramp of the hand or forearm" by the site Occupational Health Physician. The individual had been attending the site physiotherapist on a regular basis in relation to pain in right (dominant) hand. Additional ergonomic remedial actions were implemented.
- The annual site demonstration exercise was held on 8 June and witnessed by the Office for Nuclear Regulation (ONR). ONR deemed the exercise to be an adequate demonstration of the site's emergency arrangements.
- The July safety topic of the month within the Dounreay site concentrates on non-active discharges.

Environment

- Scottish Environment Protection Agency (SEPA) issued a warning letter relating to exceeding sewage discharges. The site is connected to septic tanks which manage the sewage discharges which complied with the Waste Management Licence. Recently the site discovered that newly constructed facilities were not connected to the septic tank and therefore the agreed limits were exceeded. A septic tank has now been installed to manage the sewage discharges.
- In November 2015, 15 bags of demolition low level waste were prepared for consignment to the vault. The bags were assayed as part of the consignment process and it was identified that the authorised disposal limit for Europium-152 had been exceeded for the demolition low level waste vault. The waste was retrieved from the vault (as per RSA Authorisation requirements) and returned to site. SEPA was notified and an investigation was convened which led to the identification of a number of actions to prevent this recurring again.

As an example of the actions being taken:

- Monthly analysis report is to be replaced by a real-time accountancy.
- Additional checks will be taken before verification of waste consignment goes for disposal.

- In April, seven compacted drums of low level waste were not compliant with plant limits on the quantity of material allowed in each drum. It had not breached the authorised limits but an investigation has been carried out to learn lessons from this.
- During routine operations, staff in a fuel processing facility in the Fuel Cycle Area were carrying out decommissioning activities and inspecting a vessel. They were cleaning out a tank with acidic liquor which came into contact with a tissue resulting in a small chemical reaction. The team acted quickly, the Fire Brigade attended and Health Physics carried out a check. There were no radiation or contamination issues and this was reported to ONR and SEPA quickly. An investigation was convened.
- During a meeting prior to an inspection within the fissile stores in April 2016 agreement had been given by Euratom for the removal of a maximum of nine seals to allow material to be used for the calibration of new NDA equipment. It had subsequently been identified that a total of 37 seals were removed. A strategy was agreed with Euratom for revalidation and resealing of the D2580 compartments.
- At DFR the reactor is kept under a nitrogen gas blanket, and from time to time requires to be vented to maintain a positive pressure in the reactor vessel. The gas is vented into an authorised discharge point, where it is sampled for a number of elements. While undertaking a plant walk down it was identified that the gas had not been sampled for krypton-85, a radioactive isotope present in the breeder blanket material. SEPA was immediately informed and an investigation was convened which identified actions to prevent recurrence. The overall krypton release from DFR was a very small fraction of the amount of krypton released from the site and therefore posed no significant impact to the environment.

Security

- As part of the site's security arrangements enhanced search capabilities have been introduced at the main site entrance.

Site Performance: Appendix 1 provides information of the key project milestones for 2016/17. Specific performance achievements are:

Dounreay Fast Reactor (DFR):

- The DFR team completed the removal of accessible NaK from the hot traps and reactor vessel. This completes a significant effort to remove the bulk NaK from the reactor and circuits. The NaK Disposal Plant is now in the process of treating four batches of eutectic NaK before the plant is shut down.
- Via offsite sub-contractor AMEC, a test section of the DFR reactor bottom has been constructed. Amec will use this equipment to conduct water vapour nitrogen (WVN) trials underpinning design assumptions on the NaK WVN process.
- Twelve ion chambers were removed from outside of the DFR reactor vessel. Characterisation of the ion chamber liner tubes to better understand axial and radial radiation levels have also been completed.

- The installation of the water shield blocks in the DFR pond is now complete.

Prototype Fast Reactor (PFR):

- PFR completed the clean-out of Tank 3 in the PFR Tank Farm. The Sodium Inventory Destruction Plant (SID) restarted in early June after completing its statutory maintenance.
- Installation of the decontamination vessel safety control panel and cable runs have commenced. This allows the completion of the plant modifications and pre-commissioning work. The neutron shield rod was also inspected and its lifting arrangements modified in preparation for processing through the wet area size reduction facility.

Fuel Cycle Area (FCA):

- **D1200:** Decommissioning of Lab 111 in D1200 is continuing with fume cupboard removal.
- **D1206:** The decommissioning of the Centrifugal Contactor Facility (CCF) sample station was completed.
- **D1211:** Pit 2 sludge removal is now complete.
- **D1217:** The removal of the upper row of roof blocks in both the north and south cells is now completed.
- **D1251:** The team is continuing with the internal building soft strip and any voids are being backfilled.
- **D1250:** The DMTR team has completed an internal radiation survey of the reactor block. The survey showed that the radiation levels are in line with the previous reactor block survey completed in 2004 and the site's calculations.

Fuels:

- Nuclear material transports continue.

Waste:

- A total of 213.4m³ of DFR raffinate has been successfully processed (as of end May 2016).
- Cementation trials on full scale 500 litre drums were completed and data collated to support the preparation of a letter of compliance for PFR raffinate immobilisation.
- Assessment is currently underway on the in-cell gamma scan characterisation surveys of the HALS tanks.
- As of the end of June, 11,000 drums of low level waste have been compacted.
- Relocation of the effluent analysis service, medium active/particle lab and noseblow lab is now complete. The second stage is to move the instrumentation lab which is also complete.

- The installation of the new Ultrasonic level instrument in the Low Level Effluent Treatment Plant (LLETP) process vessels is now complete.

Environmental Closure and Demolition

• Site End State Review

DSRL, supported by Amec Foster Wheeler, has been undertaking a Site End State Review. This review aims to provide a more focussed definition of the Site End State by building on the existing definitions from the 2007 Best Practicable Environmental Option study and the current NDA Client Specification. The review also aims to identify constraints, such as conflicting regulation or policy that may prevent DSRL achieving the optimal end state. Initial workshops were held in March to agree the scope of the study, identify options and also assessment attributes. A third workshop was held on 15 and 16 June in order to assess the various options. The workshops were attended by DSRL and Amec Foster Wheeler technical staff along with representatives from NDA and Magnox. Observers from DSG (Bob Earnshaw) and SEPA (Richard Macleod) also attended.

The final workshop recognised that wholesale excavation and removal of very low levels of residual contamination could actually result in more detriment than good. Work is now being undertaken to look at how sensitive the workshop conclusions are to different factors. Further work will also be undertaken to integrate the results of the workshop with the current understanding of residual contamination on the site. It is expected that this will conclude that large areas of the site will be available for re-use at Interim End State. While these preliminary results are broadly consistent with the 2007 BPEO, the workshop did recognise that the low levels of residual contamination may need to be regulated under the Radioactive Substances Act. SEPA has recently issued guidance on how they would intend to regulate such residual contamination. The workshop also recognised that the most significant challenge to the re-use of the site was not associated with residual contamination, but with the current lack of economic drivers. An assessment report is due in the next couple of months.

• Liquid Effluent Discharge System

As part of the closure programme, DSRL has also been looking at closure options for the radioactive liquid effluent discharge system, which includes the sub-seabed tunnel, along with the old and new discharge pipework. This study is building on the 2009 work that assessed closure options for the old sub-seabed diffuser chamber. The study will be informed by the ongoing pipeline characterisation work and will result in an action plan being submitted to SEPA by April 2017. Initial workshops were held on 21 and 23 June. These workshops agreed the scope of the study and identified options that should be considered. It was evident that different options will apply to the land, sub-seabed and seabed components of the system. It was also recognised that several of the options, such as total removal of the system would challenge current constraints such as the Interim End State date. The workshop was attended by DSRL, Amec Foster Wheeler and Magnox technical staff, with an observer from SEPA (Linda Buchan) also in attendance. Marine Scotland was unable to attend the event, but DSRL plans to engage with them throughout the study. DSG representation on the options assessment panel is invited.

Heritage

- The PFR granite sculpture located in the PFR admin building foyer, was dismantled, packaged and transported to the new nuclear archive in Wick. It is due to be erected just outside the archive's main entrance, in August or September.

- Photographic images and information about Dounreay were given to the National Museum of Scotland for inclusion in their new Energise gallery, which will feature many objects from Dounreay. The gallery opened on 8 July 2016. Heritage Officer, James Gunn and Socio Economic Manager, June Love attended the private viewing on 6th July.
- A chain barrier was erected around the Dounreay Castle using moveable concrete pads and wooden posts. The barrier has warning signs about the castle's unstable condition and restricted access. Historic Environment Scotland endorsed the work.
- Two heritage objects were collected in the period – An airbrush pen and a water bottle that was given to staff who participated in the 2016 work out at work day.
- One leaver completed a Dounreay Memories form.
- A Dounreay worker with nearly 50 years' experience in the nuclear industry was interviewed for the oral history project during their last week at work.

General

- **Staffing (as at end of June 2016)**

	FTE Target	FTE Actual /Forecast
Current - DSRL	1,240 (LTP)	1109.8
Current – ASW	N/A	168

- April 2016: 17 new starts (10 contractor conversions); one resignation
- May 2016: 12 new starts (6 contractor conversions); five resignations.
- June 2016: 10 new starts (8 contractor conversions); 3 resignations

Dounreay is continuing to invest by providing employment opportunities for young people through the graduate and apprentice schemes. This year recruitment is underway for 10 apprentices and 10 graduates.

Organisational changes:

Since the last written report the following organisation changes have taken place:

- Project Director Shaft and Silo (Mike Gearhart) secondment has now come to a close. The remaining Shaft and Silo work now sits within the Waste Directorate.
- Project Director Security: George Foster left Dounreay in May and is now replaced with Matt Fox.
- Director of Assurance: James Gray left Dounreay in March and is replaced by Steve Beckitt who has taken on this role as part of the responsibilities for Chief Nuclear Officer.

- FCA Project Director: Due to Steve Beckett's changing role, Gordon Tait has been appointed interim FCA Project manager.
- Strategic Programme Director: Glenn Ellcock has been appointed to this new role within the organisational structure starting in June.
- Head of Communications: Paul Hetherington joined Dounreay in June from Magnox.

Contracts

- The preferred contractor for the catering and cleaning contract has been selected and successfully concluded on 1 June with the new contract commencing in July 2016.
- A contract was placed with MM Miler to repair site paths and road repairs within the FCA.
- CS Automation has been awarded a contract for the design and consultancy support for the D1204 pond bridge.
- The OJEU notice has been published for the framework agreement for scaffolding services to support minor projects.
- The contract for design and build of the effluent treatment plant (Shaft and Silo) is now finalised and contract has been awarded to Amec Foster Wheeler. The OJEU notice including tender documents and pre-qualification questionnaire has been issued for the design and build of the Silo Retrieval system.
- The OJEU notice has been issued for the framework agreement for mechanical services (minor).
- DSRL was involved in the Nuclear Supply Chain event held on 22 June in Dunblane. Dounreay Contracts Manager Rob McDonald provided a presentation on the contract opportunities coming up at Dounreay. There was a lot of interest from the companies who were attending.
- Overall, national companies are encouraged to work with the Caithness Chamber of Commerce to identify the local supply chain capabilities as potential for sub contracts come forward.

Presentations/visits/events:

- The Waste directorate hosted a visit to the LLW encapsulation plant by Cavendish Nuclear and AWE.
- The site has welcomed a number of visitors:
 - David Batters, Chief Financial Officer, for NDA.
 - Representatives from Low Level Waste Repository Ltd who were supporting us with looking at our procedures and protocols. A good example of NDA estate wide working.
 - A visit from representatives of the Atomic Energy Canada Limited.
- The 2016 Science Engineering Technology and Innovation exhibition took place on 26 May. There was an increase of exhibitors at what has become an annual event.

- The site participated in the National Women in Engineering Day and ran a social media campaign to raise awareness of the roles of female colleagues and of STEM ambassadors, apprentices and graduates. More than 45,000 people saw the posts across Facebook, Twitter and LinkedIn.
- A lecturer/filmmaker from the University of Dundee visited the site on 23-24 June to film in reactors, WRACS and D3100. He is making a sequel to his previous Dounreay film, 'Atom Town'.
- Dounreay is again sponsoring the Halkirk Highland Games this year.
- Recently we heard the sad news that former Dounreay Director, Gerry Jordan had passed away. A letter of condolences to his family has been sent.

Dounreay Site Restoration Ltd

4 July 2016

APPENDIX 1: PROJECT MILESTONES FOR 2016/17

Directorate	Milestone	Due Date
FCA	D1206 – Decommissioning sample tank annex.	31 st March 2017
	D1217 – Complete cell roof block.	31 st March 2017
DIT	Complete site-wide independent safety culture maturity model assessment.	31 st March 2017
	Conduct Supervisor training for the remaining SERP supervisors (achieve 95% trained).	31 st March 2017
Chief Nuclear Officer	Roll out safety case production workshops.	31 st December 2016
	Establish Corporate Radioactive Waste Advisory (CRWA) arrangements on site.	31 st August 2016
Fuels	Complete trials of the breeder mast at T3, to support Phase 1A of Fuel Retrieval.	30 th November 2016
	Start Cropping HEU metal.	30 th September 2016
Support	Adequate demonstration of the Level 2 Emergency Arrangements Exercise.	30 th June 2016
	Achievement of level 3 Knowledge Management Maturity Assessment (KMMA).	31 st March 2017
Waste	WRACS to compact a cumulative total of 15,000 drums.	30 th September 2016
	Completion of the processing of DFR raffinate.	31 st July 2016
Security	The successful implementation of a Security Assurance Strategy.	31 st March 2017
	The complete revision and update of all security documents in the Security Manual held on the Management System.	31 st March 2017
Reactors	Process 4 components through the PFR Wet Area Size Reduction Facility.	31 st January 2017
	Complete concept design for DFR reactor and circuit dismantlement.	31 st December 2016
Technical	Implementation of the revised DMR process.	31 st October 2016
	First issue of the critical ageing asset register.	30 th September 2016

GLOSSARY

Abbreviation	
DACR	Days Away Case Rate
DCP	Dounreay Cementation Plant
DFR	Dounreay Fast reactor
DIT	Dounreay Improvement Team
DMTR	Dounreay Materials Test Reactor
DPF	Dounreay Planning Framework
DSRL	Dounreay Site Restoration Ltd
EIA	Environmental Impact Assessment
ES	Environmental Statement
IFBS	Irradiated Fuel Buffer Store
IFC	Irradiated Fuel Cave
INF	Incident Notification Form
LLLETP	Low Level Waste Effluent Treatment Plant
LLW	Low level waste
LTA	Lost Time Accident
mSv	milli Sieverts
NDP	NaK Disposal Plant
OJEU	Official Journal of the European Union
ONR	Office for Nuclear Regular
PBO	Parent Body Organisation
PCP	Project Control Procedure
PFA	Pulverised Fly Ash
PFR	Prototype Fast Reactor
PFR	Prototype Fast Reactor
PSR	Preliminary Safety Report
RAMT	Radioactive Material Transport
RIDDOR	Reporting of injuries, Diseases & Dangerous Occurrences Regulations.
RSA	Radioactive Substances Act
SEPA	Scottish Environment Protection Agency
SID	Sodium Inventory Destruction Plant
STA	Sample Tank Annex
TRIR	Total Recordable Incident Rate
WRACS	Waste, Receipt, Assay, Characterisation and Supercompaction