

## Nuclear Intelligence Update

### Note of SAFESPUR Meeting

Ramada Encore Hotel, Birchwood Park, Warrington, 10 August 2011

This meeting was chaired by Peter Booth, who is Senior Technical Director at WSP Environment & Energy. It included five presentations on very different subjects:

- low level waste (LLW) developments on Nuclear Decommissioning Authority (NDA) sites
- the Auger plc East Northants Resource Management Facility
- destruction and disposal of radioactively contaminated TNT
- use of remotely operated vehicles (ROVs) in decommissioning projects
- UK progress in implementing geological disposal of higher activity radioactive wastes (HAW).

Peter explained in his introduction that CIRIA would welcome feedback on whether any of the subjects should be explored in more detail in future workshops. There were Q&A opportunities after each presentation. In the afternoon there was a tour of the AMEC Analytical Services laboratory complex.

### ***Overview of LLW Developments on NDA Sites***

This presentation was given by Jo Van Straaten of NDA. She began by reminding the audience of the key elements of the UK Nuclear Industry LLW Strategy, particularly the Waste Hierarchy and the need to do more at each of the steps of the hierarchy prior to disposal.

Jo said an important aim for NDA in implementing the LLW Strategy was to change the perception that the Low Level Waste Repository (LLWR) is a “one size fits all” solution to the management of LLW. NDA wished to reduce the volume of LLW consigned to the LLWR for disposal, while at the same time increasing the LLWR’s capacity. The ambition was to avoid having to build a second national LLW disposal facility, and thus save the UK tax payer about £2 billion. Achieving this would require more focus on sorting and segregation, and on using LLW management routes other than disposal at LLWR. It was also necessary to make estimates of the future inventory of LLW more reliable. Better estimates would help with planning and with assessments of progress in reducing the amounts of LLW generated.

The NDA’s National Programme for LLW was led by LLWR Ltd. It included work on metals recycling, dealing with combustible wastes, supercompaction, opening new disposal routes for very low level wastes (VLLW), waste characterisation, packaging and transport. LLWR Ltd now had a number of framework agreements in place with other waste management organisations. These gave its customers easier access to management routes other than disposal in the LLWR. The National Programme would enable the best use to be made of all UK assets for the management of LLW, and to improve and add to the assets when required.

Jo gave a number of examples of the considerable progress was being made by NDA’s Site Licence Companies (SLCs) in implementing the LLW Strategy. These included:

- at Dounreay, start of construction of the new LLW Disposal Facilities and work to increase metals recycling
- at Sellafield, greater recycling on site and via the supply chain, and the use of various routes for VLLW and exempt waste
- at Magnox sites, programmes that map into the National LLW Plan and investigation of the possibility of recycling Magnox station boilers, rather than sending them to the LLWR for disposal

- at Harwell, the intention to send VLLW to the Augean Northants site (see next presentation), and at Winfrith the continued use of a local VLLW route.

One of the results of this progress had been that in the period April to July 2011 a volume of LLW corresponding to 75 ISO containers worth of vault space had been diverted from the LLWR. (For perspective, the volume of LLW requiring disposal in LLWR in 2010-11 corresponded to about 300 ISO containers.)

NDA's aims for the future included better collaborative working, national management of risks and contingencies, developing better methods of measuring SLC performance in LLW management and sustaining all LLW management routes so that they are available when needed.

Issues raised in Q&A included the following:

*Influence of delays in decommissioning:* a participant asked how much of the recent reduction in volume of LLW generated was the result of delays in decommissioning. Jo replied that delays had been a factor but there had also been real progress in better LLW management. In the future NDA planned to introduce 5 year forecasts of LLW volumes made jointly by LLWR and the other SLCs and to use these in setting goals.

*Regulatory changes:* it was noted that the Office for Nuclear Regulation consultation on the definition of "bulk quantities" was about to begin and that the new exemption regime, which would be fully in place by April 2012, would have a major impact on management of LLW. Further ahead, some changes to the exemption regime might be needed when the new European Basic Safety Standards came into force. There could also be EU pressure to change the UK definition of LLW, which is not risk-based.

*Minor consignors:* the question asked was whether organisations that produced relatively small volumes of LLW were fully involved in the national programmes. Jo indicated that NDA and LLWR were participating in the development of LLW strategies for the non-nuclear industries. In particular, they were members of the Scottish Government's Project Board for the NORM Strategy. In future there might be a need for more awareness raising and training of staff in various non-nuclear industry organisations.

### ***Situation at the Augean plc East Northants Resource Management Facility***

Gene Wilson of Augean plc gave this presentation. As background, he said that Augean was a fairly new company (about five years old) that specialised in management of the more difficult – to – handle wastes. It had four specialist landfill sites, six waste treatment facilities, two industrial service centres and an analytical laboratory. Augean had made considerable investments in new technologies, for example for soil treatment and for the recovery of hazardous wastes.

The East Northants Resource Management Facility, where Augean proposed to accept LLW for disposal, had been open since about 2002. It was a hazardous waste landfill and treatment facility. It had planning consent to operate until 2013 and Augean would soon be making a planning application to operate it until 2026. Discussions with the nuclear sector (particularly Harwell and NDA) about disposal of LLW had begun in mid-2007. Preparation of applications for planning and permitting had begun in mid-2008. Community engagement began in May 2009 and there was a formal public consultation in June 2009. Planning and permitting applications were submitted in July 2009. The proposal was to dispose of LLW with an activity concentration up to 200 Bq/g, mixed with hazardous waste. The site capacity had been calculated to be 300 TBq but the initial permit application was for only 17 TBq.

The local planning authority, Northamptonshire County Council, refused the planning application in March 2010. The refusal was not unexpected, although prior to it the Environment Agency had produced a draft Environmental Permit, the independent expert for Northamptonshire County Council had concluded that the proposal was acceptable, and the Planning Officer's report to the Council had recommended approval. Reasons given for the decision to refuse the application included that the proposal conflicted with the proximity principle, that there was no relevant local or national planning policy that favoured the proposal, and that a significant number of people had a perception that LLW disposal at the site would cause harm. Augean appealed, the application was called in and a three week public inquiry was held in November 2010. Community engagement continued throughout the application period up until the public inquiry and included newsletters, public meetings, site visits and a telephone poll.

In May 2011 the Secretary of State for Communities and Local Government decided in favour of the application. He rejected the technical objections to the proposal put forward by Waste Watchers, the local group that had been formed to oppose the planning application, and the policy and public consultation/perception objections put forward by Northamptonshire County Council and Waste Watchers.

In rejecting the technical objections the Secretary of State accepted the advice of the Environment Agency, as experts in these matters. In rejecting the policy objections he gave considerable weight to the national importance of the facility for implementing Government policy and NDA strategy. He also accepted the argument that the proximity principle means that waste producers should use the most appropriate of the nearest sites for waste management, not necessarily the sites that are closest to them.

There were also challenges on the adequacy of public consultation, in particular that this had not addressed sufficiently perceptions of harm. The Secretary of State concluded that the consultation had been thorough and comprehensive, given the nature of the proposal. In general he appeared to give limited weight to perception issues. (For example, the local referenda, in which the vast majority of people who voted were against the proposal, did not seem to influence his decision.)

The Environment Agency issued the Environmental Permit for LLW disposal at the East Northants Resource Management Facility on the same day as the Secretary of State's decision was announced. A local resident had since challenged the decision on a narrow point of environmental impact law. Augean had requested an early hearing on the challenge. Meanwhile, it was continuing with contract negotiations and aims to start accepting LLW in the fourth quarter of 2011.

Issues raised in Q&A included the following:

*BAT*: a questioner asked whether Augean needed to satisfy itself that disposal of LLW from each consignor was BAT. The answer was that Augean was aware that BAT/BPEO studies were routinely carried out in the nuclear industry and only needed to know that consignors had carried out BAT studies for their wastes, not see the detailed results.

*Hazardous wastes and the proximity principle*: it was noted that there were no proximity principle constraints on the disposal of hazardous wastes but that the limited number of sites that would take such wastes meant that, in practice, waste producers used the nearest one. The East Northants Resource Management Facility was the only site in the south east for disposal of hazardous wastes and Environment Agency figures showed that almost all the wastes disposed of at the site arose in the south east.

*Research Sites Restoration Ltd (RSRL) Harwell*: the question asked was whether RSRL Harwell would be the major consignor of LLW to the East Northants Resource Management Facility. The answer was yes, at least initially.

### ***Safe Destruction and Disposal of Radioactively Contaminated TNT***

This presentation was given by Martha McBarron of Jacobs (the main contractor), Ian Swallow of BAE Systems (the explosives experts) and Frank Taylor of LLWR Ltd (the customer). It was about a four year project to remediate ground contaminated with TNT and plutonium at the LLWR.

The TNT contamination had arisen when the LLWR operated as a Royal Ordnance Factory during the second World War; at that time there were six bunkers at the site that housed TNT production facilities. Before the remediation project it was recognised that there could be solid TNT in the ground (it is produced as a hot slurry that rapidly solidifies as it cools) and TNT residues in soil and mortar. From the 1970s to 1992 redundant plutonium purification vessels from Sellafield had been stored in one bunker. In 2008 remediation was carried out to remove plutonium contamination but there was the potential for residual radioactive contamination to still be present, either mixed with or adjacent to TNT.

The project began with a desk study of old plans of the site and records of previous investigations. These were followed by new site investigations. TNT is explosive if heated or struck; it becomes more reactive when exposed to sunlight. It is toxic when ingested, inhaled or absorbed through the skin. The regulations covering TNT are complex and are enforced by the Health and Safety Executive and the police. There is no regulatory guidance in the UK on threshold levels of TNT in soil. Experimental work, mostly in the US, has shown that 12% by weight is the level below which soil containing TNT is stable. To allow for heterogeneity and sampling error, BAE recommended the use of 1% and HSE

accepted this. Accordingly, an explosive management plan was devised for the remediation in which radioactive materials containing less than 1% TNT would be disposed of as LLW, radioactive materials containing more than 1% TNT would be treated to reduce the TNT concentration, and non-radioactive TNT would be sent off site for destruction.

The assessment of management options for the radioactive wastes containing more than 1% TNT was carried out in two phases. The initial assessment, which was carried out prior to the remediation work, led to the identification of dissolution followed by dispersion in soil as the method that would be the easiest to implement. However, it had a number of disadvantages and it was concluded that the BPEO/BPM could not be determined until after the remediation, when the wastes had been placed in temporary storage and characterised. Washing of the wastes to remove soil and subsequent characterisation of products showed that there was 12kg of solid TNT with an activity of 2.6-14 Bq/g, 2.5kg of sludge and fines with an activity of 103-128 Bq/g and 2kg of filtration sand with an activity of 24 Bq/g.

In the second phase of the assessment the options considered were: burning on site, dissolving and dispersing to a concentration less than 1% TNT, and a two stage process of dissolving and dispersing on to a sand matrix to a concentration less than 10%, then destroying the TNT by chemical or biological treatment. The two stage process was chosen, with destruction by treatment with an alkali and solidification of the treated material. This had the advantages that it was safer to implement and the TNT was destroyed. Its disadvantages were that solvents were needed for pre-treatment and that the volume of waste for disposal was greater.

Overall, about 17kg of TNT was removed and disposed of safely. Furthermore, a method had been developed and demonstrated that could be applied to other areas of the LLWR site, if required, and to other sites.

### ***Use of ROVs in Decommissioning Projects***

Jon Montgomery of AMEC gave a very brief presentation on projects involving the use of ROVs. These included using submersible ROVs to remove sludges and ion exchange resins from vaults, and using ROVs for remote inspections of plant and pipework.

### ***Geological Disposal: Progress in the UK and Some Other Countries***

This presentation was by Marion Hill, speaking as an individual rather than as a member of the Committee on Radioactive Waste Management (CoRWM). She began with a brief summary of work on geological disposal of radioactive waste in the UK, from the short research drilling programme for high level waste (HLW) in the 1970s, through the unsuccessful attempts by Nirex to establish a disposal facility for intermediate level waste (ILW) in the 1980s and 1990s, to the current "Managing Radioactive Waste Safely" (MRWS) programme for all HAW.

The MRWS programme began in 2001, with a Government consultation paper. This was followed in 2003 by the establishment of the first CoRWM, which had the remit to assess options for the long-term management of HAW and make recommendations. CoRWM issued its report in 2006 and recommended geological disposal as the best available approach. CoRWM's recommendations were accepted by Government, which made NDA responsible for implementing geological disposal. Nirex was absorbed into NDA, becoming its Radioactive Waste Management Directorate (RWMD).

CoRWM was reconstituted in 2007 with a remit to provide independent scrutiny and advice on the long-term management of radioactive waste. In 2008, following a public consultation, Government issued a White Paper (Cm 7386) on the framework for implementing geological disposal. This set out a six stage siting process, based on a voluntarism and partnership approach, starting with an invitation to local authorities to express an interest in entering discussions with Government about hosting a geological disposal facility (GDF). The invitation was sent out when the White Paper was published. Three local authorities in West Cumbria expressed an interest and formed the West Cumbria MRWS Partnership.

Progress since 2008 had included the screening of West Cumbria by the British Geological Survey to identify rock volumes that would not be suitable for a GDF, considerable work by the West Cumbria MRWS Partnership to assess whether the area should proceed to participate in GDF siting, and the publication by NDA of "Steps Towards Implementation" and of its generic Disposal System Safety Case (DSSC). Earlier in 2011 Ministers challenged NDA to speed up the implementation of geological disposal. Accordingly, at the time of the meeting, NDA was examining options for shortening the next

stages of the MRWS GDF siting process and for bringing forward the dates of first emplacement of ILW, HLW and new build spent fuel. The results of this work were expected to be made public in late 2011 or early 2012. The first half of 2012 would also see a decision by local authorities in West Cumbria on whether to participate further in the siting process.

There had been mixed experiences in implementing geological disposal in other countries. In the US, the Waste Isolation Pilot Plant (WIPP) for long-lived ILW had started operating in 1999, 25 years after the choice of the site. This was the first GDF for long-lived wastes in the world. In contrast, the Yucca Mountain project to establish a GDF for spent fuel had been terminated in 2009, after 32 years of site investigations, R&D and safety case work, largely for political reasons. The Blue Ribbon Commission had been established in 2010 to review policies for managing the back of the fuel cycle and was due to issue its final report in January 2012. In its draft report, issued in July 2011 for comment, it had recommended the formation of a new waste management organisation, prompt efforts to establish one or more GDFs and one or more consolidated interim storage facilities and a consent-based approach to siting the disposal and storage facilities.

In Canada the geological disposal programme for spent fuel began in the 1970s and underwent a major review in the 1990s. The current, voluntarist approach to GDF siting had begun in 2010. In Sweden an application to construct a GDF for spent fuel had been submitted to regulators in March 2011, after a programme that began in the late 1970s and included a failed attempt at siting. The programme in Finland had proceeded relatively smoothly: construction of a GDF for spent fuel had started and emplacement was planned to begin in 2020. In France there was an underground research facility and the aim was to apply for a licence for a GDF for HLW at the site of that facility in 2015. However, recent attempts to find a site for a GDF for long-lived ILW and LLW had failed.

## **Conclusions**

Peter Booth thanked everyone who had helped to organise and had participated in the workshop. He emphasised that SAFESPUR was a forum for its members and hoped that everyone would continue to take part and contribute to the development of its forward programme. Peter also said that CIRIA aimed to bring together its three nuclear networks, SAFEGROUNDS, SD:SPUR and SAFESPUR, in order to provide better synergy and allow organisations to gain more value from their membership. The next SAFESPUR event was expected to be on 5 October 2011, to be held with an SD:SPUR event, and to focus on the new exemption regime.

Marion Hill for SAFESPUR.  
30 August 2011