

International Co-operation in Waste Management and Decommissioning

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Overview



- Introduction of the World Nuclear Association (WNA)
- Low Level Radioactive Material management: needs and challenges at the international level
- Example opportunities and successes

World Nuclear Association



TRANSPORT, LEGAL. FINANCIAL, INSURANCE & BROKERAGE COMPANIES VIRTUALLY ALL URANIUM MINING, CONVERSION, ENRICHMENT & FUEL FABRICATION

OPERATORS GENERATING SOME 85% OF WORLD NUCLEAR POWER 200 Members

MAJOR REACTOR VENDORS

MAJOR NUCLEAR ENGINEERING, CONSTRUCTION & WASTE MANAGEMENT COMPANIES

WNA Roles & Activities

4. Providing Public Information and News

3. Nuclear Fuel Market and Supply Chain

2. Enabling Industry Contacts and Cooperation

1. Representation in Key International Forums

Representation in Key International Forums





International Atomic Energy Agency



Nuclear Energy Agency of the OECD



UN Framework Convention on Climate Change



International Commission on Radiological Protection

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Nuclear Fuel Market & Supply Chain



- WNA remains the world's expert forum on developments in nuclear fuel and trade
- Biennial market report is an authoritative projection of the global fuel market





WNA analysis is supporting WNA members as they build complex international supply chains. Focus:

- Determine market potential for key components
- Develop database of leading companies worldwide
- Identify "pinch points" in supply

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- 200 Information Papers updated regularly
- A 'hit' every 5 seconds round the clock
- Used by the public, policymakers & industry

Public Information & News



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IAEA reviews Japan's nuclear resta

25 January 2012

A team of international nuclear safety experts has reviewed A team of internadianal nuclear survey superty two to determine the safety of its nucleon plants as dire projectory to confirm the safety of its nucleon plants as dire control of courses whether the safety of its nucleon plants as direction of courses and a determine the safety of its nucleon plants as direction of courses and a determine the safety of its nucleon plants as direction of courses and a determine the safety of its nucleon plants as direction of courses and a determine the safety of its nucleon plants as direction of courses and a determine the safety of its nucleon plants as direction of courses and a determine the safety of its nucleon plants and direction of courses and a determine the safety of its nucleon plants are direction of courses and a determine the safety of its nucleon plants are direction of courses and a determine the safety of its nucleon plants are direction of courses and a determine the safety of its nucleon plants are direction of courses and a determine the safety of its nucleon plants are direction of courses and a determine the safety of its nucleon plants are direction of courses and a determine the safety of its nucleon plants are direction of courses and a determine the safety of its nucleon plants are direction of courses and a determine the safety of its nucleon plants are direction of courses and a determine the safety of its nucleon plants are direction of courses and a determine the safety of its nucleon plants are direction of courses and a determine the safety of its nucleon plants are direction plants are direction of courses are direction plants are direction plants are direction plants. The safety of its nucleon plants are direction conditions grip the country's power industry.

A masser to Japan lasting from 20 to DL January any a basis separat from the international storaic lineary Agency (ASA) a member storage great time with lapan's marginal callery regular devices. which is conducting a two-stage assessment process to ensu plants have adequate protection against extreme external ex

While MSA continues its work to review the preliminary assess supported by the sudery safety completion and the square Execute Sufficie Organizations, evaluation are still desired one by mandatory substyle appactance. Currently only three are in opa potential operating feet of 44, not counting the ten Fukuth and maini units.

the preliminary report from the task team to the Japanese I Sand MISA and nuclear operation had "promotly addressed" addey reasoned after the accident of Priorithms Datch. It e range of recommendations to MINA to ensure thorough and incrovements in safety are made.



erer & Environment, New Nuclear, Recolution & Safety, Nuclear Po

Privatisation of Russian state nuclear gia Approval for first nuclear new build in America

Baving spent live years combining its nuclear power, engineering and research enterprises into the single entity of Reagton, the Ressian government new sees privatisation of the firm as part of a plan for ndustrial modernisation

companies fluxes established to "discourage the dedine of the more fertual sectors of national industry! in the post Soviet era, wrote Viadem Public in the Webshooth new spaper on 30 January.

Correctly in the role of prime minister. Putin served the readmum two terms as president from 2000 to 2008 and is new compationing to return to that powbon in March 2012. He used the lengthy article to set out a range of government targets for Russia to velop its infrastructure, innovation and private enterprise while curbing corruption and improving the legal and

twentment environment for business- widow ever specifing of sectors such as accorpany, shipholding and nuclear energy

Putin wrote: "We had to consolidate these assets which were efficially poverment-owned but managed disjointedly, and which had lost all links with their respective research and design centres.⁷ ioversment efforts "were focused on restoring Russia's ability to tempete in those sectors which involved only a few players on the Imarket." Public wrote, emphasismo that the "expansion of state capitalism" only occured because there was no private initiative in the sectors. He stressed the scale of state action had no bearing on "our



the vote by the five member complexion brought to an end a regulatory

American sofely regulators gove the go ahead today for the

construction of two new nuclear power reactors,

The newleys work of the NRC staff was celebrated by the commissioners The relation where we are the product of the second second second to protect the is a configuration of the second recommendations developed in response to the existentiana and terr in Aspan last year and suid he "could not support assumption loans as if Fukushing had not happened." The other commissioners spoke to respectfully desures with trades, tristing swinish cald. "th ammana individually or collectively requiring the events of 11 Minut

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OF February 2012

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Enabling Industry Contacts & Cooperation





- Annual WNA Symposium each September in London (800 nuclear executives)
- Joint WNA-NEI World Nuclear Fuel Cycle conference (350-400 experts) Rotates: Europe, Asia, USA
- WNA Working Groups meet regularly

Enabling Industry Contacts & Cooperation: WNA Working Groups



Waste Management and Decommissioning WG



Participation

- Nuclear Power Utilities
 - Operation
 - Decommissioning
- Waste Management and Treatment Companies
- Uranium Mining

Participation

- Europe
- North America
- •Asia
- Australasia

Current Focus

•Recycling of Low Level Radioactive Material from Nuclear Power Sites

Waste and Decommissioning Working Group



Background:

• Early 2011: Position Paper published

"Towards Greater Efficiency in the Management of Low-Level Radioactive Material that Concurrently Supports Reuse, Recycling and Disposal"

• Early 2012: Project started to promote the issue of recycling of valuable low level radioactive materials, primarily metals



Essential Messages:

• All three options are essential:

- Reuse, Recycling and Disposal

•All three options have proven technical solutions implemented in countries around the world

•The foundation and fundamental driver of a given option is the industrial business case





- Source: not originally radioactive, isolated from nuclear process
- •90% of the volume < 1% of the radioactivity
- Established techniques can separate radioactive component

The Process

- •Reuse and Recycling is about a **controlled process**, defined specifications on the **input material** and output **products**
- Restricting this case to the notion of 'clearance' falls well short of the complete picture



Unsustainable Inefficiency

- Loss of valuable raw materials
- Disproportionate resource spent on recycling low volume or low value material
- Disproportionate demand for interim storage and potential double-treatment

•This inefficiency comes at a high price for both industry and society as a whole



Driving the availability of the route:

• A viable industrial business case built on a sufficient volume of material

- Viability of a reuse/recycling facility:
 - Supply volumes
 - Demand volumes
- Viability of a Disposal Facility
 - Capacity (one key factor in defining unit cost)



Overcoming Barriers to Viability

• Disproportionate emphasis is often put on a series of technical parameters

- Another key success factor:
 - trust and confidence in the business case
 - maintained by responsible operators and regulatory buy-in



Metals – Studsvik

- •Metals accepted from around the world and recycled in Sweden
- •Large Components (e.g. Steam Generators)
- •Radioactive component separated and returned to customer for disposal (volume reduction)
- •Remaining material recycled into the conventional metal industry







Metals – Studsvik

Developed domestically in partnership with Ringhalls (Vatenfall) then offered internationally

•Treatment of steam generators from Stade decommissioning NPP in Germany

•Boilers from Berkeley decommissioning NPP in the UK

•Future: Steam Generators Bruce Power in Canada







Energy Solutions – Magnox Ltd.

•Radioactive metal treated and size reduced in the UK – recycled in the USA

- •Pond Skips from Hinkley Point A
- •Energy Solutions Bear Creek facility, USA
- •Metals re-used within the nuclear industry







EdF

Recognised that decommissioning cannot be done effectively without benefitting from internationally shared experience.

Treatment of resins through co-operation with a German operating plant
Close links with NDA and Magnox in the UK : development of decommissioning plans for proposed new build at Sizewell and Hinckley Point

•Bringing in knowledge and techniques through subsidiaries

- UK Robotics company for remote handling tools, though INTRA group

EdF have been recognised internationally for sharing experience gained in decommissioning at the international level

EPRI Technology Transfer Awards 2011

Opportunity



Metals – Siempelkamp

•Development of techniques and technologies for dealing with contaminated metals

- Sorting and segregation
- Decontamination
- Decay Storage

•Re-use of metals within the industry – self shielding containers for storage, transport or disposal of radioactive waste



Opportunity



Concrete – Japan

•Concrete from NPP buildings is well suited to for recycled aggregate

Potential for improved strength, durability and cracking resistance compared to ordinary concrete aggregate

•Cost for reuse in buildings can be competitive with the cost of other options (e.g. roadbed recycling)

- Demonstrated success outside the nuclear industry:
 - Recycled aggregate from dismantled buildings has been used for new construction
 - Potential for aggregate from NPP buildings to meet requirements for new plant buildings



Summary



- Focus of WNA's Working Group on Waste Management and Decommissioning: achieving greater efficiency in the management of LLRM from Nuclear Sites
 - Position Paper highlights key issues to be addressed for success
- International collaboration can and has achieved success
- There remains a big opportunity to achieve a sustainable system with concurrent availability of Reuse, Recycling and Disposal
- WNA seeks to support the industry in providing a common platform to raise this issue more widely and in a coordinated way



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