

The future of radioactive waste management

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Imperfect crystal ball

- Our view of the future is very much influenced by where we see it from
- This is true for both time and space
- Set the time as “today” but change the space

Three regions

- The view of the future can be very different depending on the starting place
- The future is viewed from three regions:
 - The former Soviet Union
 - The Countries of Central and Eastern Europe
 - The European Union

Local variations

- Making sweeping generalisations about large regions will introduce some errors
- Not all the following generalisations will be true about all the region
- There may be significant variations within each region
- Some local differences are highlighted

The Former Soviet Union

- The culture of safe management of radioactive waste lags far behind the West.
- Quantities of spent fuel and radioactive waste are very high - partly as a result of the technologies used
- Desperate economic situation
- Environmental disasters waiting to happen

The Former Soviet Union - 2

- There are many problem areas
- The more information we collect the bleaker the picture
- Three high profile problems
 - North West Russia (Kola Peninsula)
 - Mayak
 - Chernobyl

North West Russia

- Much of the problem is a result of the nuclear fuel for the submarines
- Many submarines taken out of service but their reactors are still fuelled
- Very large quantities of fuel that were earlier removed are now stored in dangerous conditions
- Large quantities of associated wastes

North West Russia - 2

- Some of the spent fuel is badly damaged
- The problem of the “Lepse” and similar vessels
- No way to unload - Nowhere to store in region - No way to transport out of region - Nowhere to store outside region - No disposal sites

Mayak

- The “home” of over 70% of all Russian radioactive waste
- The site of at least one major nuclear accident
- The site of a lake of intermediate level liquid waste
- Old decaying facilities at or approaching full capacity

Chernobyl

- While the accident distributed a significant part of reactor-4's radionuclide inventory over much of Europe, a great deal still remains on site.
- Much of it is still inside the sarcophagus from which it could be impossible to remove ("fuel containing masses" - FCMs)

Chernobyl - 2

- Lumps of spent fuel are buried just below the surface of the ground
- Very large quantities of radioactive waste are scattered around the site
- Heavily contaminated vehicles are buried in shallow graves
- Much radioactive material covers the bottom of the very large “cooling pond”

The Former Soviet Union -3

- The magnitude of the existing problems are enormous
- The cost burden of improving the situation is far too high for the countries to support alone
- One bright spot - acknowledgement of problem by countries concerned
- However, the future is extremely bleak

Central and Eastern Europe

- Strong Soviet influence in past led to inadequate safety and environmental culture
- Outdated Soviet nuclear technology used
- Poor economic performance resulted in too little investment
- Situation generally superior to that in Former Soviet Union - and, in some instances, close the Western standard.

Central and Eastern Europe - 2

- Problems vary in type and severity from one country to another
- Progress towards improvement also variable
- Different levels of institutional and legislative reform
- All countries in region have a problem in at least one of the following:

Central and Eastern Europe - 3

- deficiencies in management of spent nuclear fuel, including from research reactors;
- insufficient or inadequate treatment and conditioning facilities;
- storage and disposal facilities of unacceptable design and construction, with unknown contents or with insufficient capacity;

Central and Eastern Europe - 4

- lack of identified disposal sites
- lack of plans or financial provisions for radioactive waste management and decommissioning of ageing facilities
- uncertainties over the management of spent sealed radioactive sources;

Central and Eastern Europe - 5

- environmental contamination from past uranium mining and milling activities;
- inadequacies within the institutional, legislative and regulatory infrastructure

Czech Republic

- Considerable legacy of wastes from uranium mining and milling in need of remediation
- no repository for high level wastes - *BUT*
- only CEEC with a repository for operational nuclear waste
- well established fund for management of waste
- has set up a radioactive waste agency (RAWRA) responsible for management of all the wastes

Lithuania

- No disposal facility for any types of wastes
- all spent nuclear fuel stored in ponds at Ignalina reactors - these ponds close to saturation
- storage space for low and intermediate level wastes is now limited
- closed repository contains many undefined packages including biological wastes and possibly military wastes. These need to be recovered.
- funds to finance waste management very limited
- no waste management agency

Central and Eastern Europe - 6

- All countries have some problems
- Many of the problems are a legacy of the past
- Some countries are well on way to addressing their problems
- In other countries the problems are still growing and could be further added to by decommissioning of plants

The European Union

- There is good news - *and bad news*
 - For example:
- Like the Former Soviet Union and the CEECs we have a legacy caused by past poor practices
 - the **good news** is that we realise it - and we can afford (unlike the NIS) to do something about it
 - the *bad news* is that we still have a lot of clearing up to do

The European Union - 2

- The **good news** is that we have successfully disposed of around 2 million cubic metres of low and intermediate level waste
- there is still lots of capacity in the repositories
- The *bad news* is that we have not yet disposed of any spent fuel or high level waste

The European Union - 3

- Low and intermediate level waste
 - disposal of such waste is common practice in many Member States, Finland, France, Germany, Spain and the UK all operate facilities with available capacities for many more years
 - the *bad news* is that one country with a nuclear power programme, Belgium, has so far failed to identify a disposal site for such wastes

The European Union - 4

- High-level waste and spent nuclear fuel
 - High level waste and spent nuclear fuel have continued to accumulate now for close to 50 years
 - No definitive decision has yet been taken by a Member State concerning a site for disposal of such wastes.
 - The **good news** is that significant progress has been made in Finland and France towards a decision on a site

The European Union - 5

- It would be overly optimistic to say that the future for radioactive waste management in the EU is bright
- A great deal needs to be done
 - cleaning up the legacy of the past
 - identifying disposal site for low and intermediate level waste in Belgium (and the Netherlands)
 - and we are still a long way from final decisions on high level waste repositories in all Member States

Safety Culture

- The EU is in a better position than the CEECs and the NIS as it faces the future
- WHY?
 - Economically more successful therefore can afford to address the problems sooner
 - The EU has a better safety culture and environmental awareness - mainly as a result of pressure on the nuclear sector by others

Safety Culture - 2

- The NIS and the CEEC nuclear sectors were not exposed to the same public pressures to “clean up their act” as in the EU.
- However, this pressure is now growing and we must continue to play our part by encouraging it in all our contacts with the countries whenever we undertake co-operation or assistance projects

Public Acceptance

- Acceptance of the Public is critical in future in all three regions reviewed.
- We rely very much on the Public to drive forward the Safety Culture and Environmental Awareness - to drastically improve the situation in the NIS; to maintain the new momentum in the CEECs; and to safeguard the situation in the EU.

Environmental Impact Assessments

- A major tool for driving safety culture and environmental awareness is the EIA
- EIAs are mandatory for all radioactive waste disposal facilities in the EU and for other nuclear installations
- They are necessary outside the EU if financial support is requested from the Community

Conclusion

- The future of radioactive waste management depends where you view it from
- Whatever its future - in whichever region - it will depend on involving the Public and obtaining their acceptance
- The environmental impact assessment (EIA) will occupy a critical role in the process