# The UK and nuclear reprocessing: beating a retreat

William Walker

Professor of International Relations
University of St Andrews
Scotland, UK

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## Intrinsic problems with reprocessing/recycling

1. Increased cost & complexity of waste management
2. Difficulty of technical & institutional coordination
3. State-industry nexus: resistance to effective public accountability & control
4. Policy inflexibility, irreversibility
5. Linkage to nuclear weapons
6. Cost and difficulty of safeguarding complex flow processes.

# The UK's reprocessing facilities

Sellafield (Cumbria, England)

- B205 (domestic Magnox reactor fuel). Due to close in 2012.
- THORP (foreign Light-Water Reactor, LWR, fuel; domestic Advanced Gas-Cooled Reactor, AGR, fuel). Due to close in 2011.

Dounreay (north of Scotland):

- Facility for reprocessing prototype fast reactor fuel (closed)

Spent fuel from the UK's only LWRs (Sizewell B) is not reprocessed: stored at reactor site

Spent fuel from submarine reactors is stored at Sellafield

# THORP's history

| | |
|---|---|
| 1977-78 | Windscale Inquiry; Parliament debates & approves |
| 1994 | Operation begins after further Parliamentary debates & a judicial review |
| April 2005 | THORP's closure after accident (leakage of radioactive liquor from accountancy tank) |
| Summer 2007 (?) | Planned reopening |
| March 2011 | Planned final closure after completion of remaining reprocessing contracts |

# Claimed benefits from THORP

1. Future availability of plutonium
   = to fuel over 8 fast breeder reactors in UK (1978)
   = recycling in thermal reactors (from early 90s)

2. More effective waste management & disposal

3. Large earnings from foreign contracts
   = all plutonium & high activity wastes would be returned to customer countries

4. Proliferation benefits: discourages reprocessing in Japan & Germany

# Performance of THORP and SMP

Thorp:

- Design capacity: 1200 THM/yr
- Average throughput, 1994-2005: 520 THM/yr

Sellafield MOX Plant (SMP): constructed in late 1990s to facilitate return of plutonium to foreign customers

- Design capacity: 120 T/yr
- Average MOX throughput, 2002-07: 1 T/yr

Plutonium & wastes have yet to be returned to customers

No MOX contracts with Japanese utilities

# Result of UK's engagement with reprocessing

World's largest surplus stock of civil plutonium
(105 tonnes, end 2005, including 26.5 T of foreign Pu, the majority Japanese)

No domestic recycling of plutonium, no disposition plan

Exacerbation of waste problems:

- multiple waste streams & forms
- radioactive pollution of seas and coastline
- no agreed disposal sites for high activity wastes

Heavy costs of clean-up & decommissioning

# Policy reversal, 2002-07

UK's phased withdrawal from reprocessing by 2012

Why?

- Privatisation of electricity supply industry
- Plutonium fuels always uncompetitive with high burn-up uranium fuels
- Government's and utilities' disillusion with reprocessing & BNFL
- Desire to relaunch nuclear power in the UK: judged to be impossible with reprocessing & without public acceptance
- Post-9/11 worries about terrorist sabotage

Therefore, re-focus policy on decommissioning, waste disposal: deal with the "nuclear legacies"

# Institutional change

Foundation of state-owned Nuclear Decommissioning Authority (NDA), 2005

"to ensure the safe, accelerated and affordable clean-up of the UK's civil nuclear legacy"

NDA assumes ownership of & responsibility for Sellafield, Dounreay and other sites: BNFL dethroned, reduced to operator

Committee on Radioactive Waste Management (CoRWM): Report published in July 2006

= recommends deep disposal of wastes

= proposes ending the "decide-announce-defend" approach to nuclear policy-making

= disposal sites should be selected through negotiation with local authorities & communities

# The UK's waste "legacy"

Arising from:

- abandoned fast reactor programme
- closed power reactors, reprocessing & fuel fabrication plants
- high volumes of waste (est. 478,000 cu. m.) of many kinds & forms, some of it untreated as yet

NDA's most recent cost estimate: £62.7bn undiscounted, £35.4bn discounted (Sellafield accounts for 63%)

Financed primarily by the tax payer: heavy burden on public purse

# Reasons for policy failure

Exaggerated future benefits (wildly unrealistic forecasts)

BNFL's monopoly powers, sheltered by the state; utilities' ability to pass extra costs to electricity consumers unnoticed

History of industrial & political mismanagement

Weak Parliamentary oversight

Inadequate storage capacity outside Sellafield

**Embedded commitments (political, contractual, infrastructural, local employment): 'lock-in', 'technological entrapment'**

Refusal until very recently to consider alternatives & escape routes