ENERGY MATERIALS TOWN MEETING, 24TH NOVEMBER 2006

NUCLEAR POWER PLANT MATERIALS –BREAKOUT SESSION

Chairman:- Steve Garwood

Process

The following issues 4 questions were discussed relating to Fossil power plant materials:-

1. KEY DRIVERS? (3)
2. R & D CHALLENGES?(1)
3. BARRIERS? (3)
4. RECOMMENDATIONS? (1)

Individuals were asked to submit a number of answers (shown in brackets) which indicated their key points for each question.

The answers were then divided into 4 generic ‘categories’, shown on the following pages and the answers grouped under the most relevant category. (or across categories)

The output of the breakout session is summarised in the following pages and the priority areas highlighted in green.

Volunteers for the core working group and advisory group are also highlighted.

KEY MESSAGES/PRIORITIES

Drivers

* "must be affordable" (materials solutions to reduce cost)
* Balanced energy mix essential (importance of Plex)
* Keeping nuclear options open (more fission plus fusion)
* Big factor on CO2 reduction

R&D

* A 'match fit'
* Material infrastructure
* Plex and new build (40-60 year timescales)

Barriers

* "Continuity" of funding
* Regulator/planning issues
* Waste/decommissioning positioning - material developments supporting + 200 years storage
* Skill base refreshment (intelligent customer)

Recommendations

* Generic 'virtual' centre of technical excellence (industry/regional development agencies/universities)
* Long term funding to retain skills
* Worldwide communicate and interact

DRIVERS

COST

- Must be affordable
- Narrow down options
- Pipeline of supply
- Regulatory framework
- Central guidance on reactor types
- Life extension of current plant
- Stable business environment

SEC. OF SUPPLY

- Balanced energy mix essential
- Material capability to plex existing as well as new build
- Security of appropriate level of support (knowledge management)
- Life extension
- New build nuclear gives future options
- Fast breeder/fusion future if uranium shortages
- Development of carbon based composites to replace unsuitable metallics
- Maintenance/development of UK base of expertise
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ENVIRONMENT

- Big factor - CO2
- Plex helps with waste management
- Maintenance of CO2 baseload
- Enhances use of renewables via baseload
- Gives head room on future reduction targets
- Reconciling world economic development with mitigation of climate change
- Performance
  total output
  power/weight/volume etc.

OTHER

- Next generation
- Improved safety
- Easier to demonstrate total safety
- Maintainability - ability to repair/damage tolerance
- Difficulties in securing research funding
- Ageing fleet/declining capacity. Urgent need to extend life of existing plant and build new ones
- Ability to decommission in a reasonable period

R & D CHALLENGES

NEW MATERIALS SYSTEMS

- Irrespective of reactor design material + surprise
- Need to understand existing materials plex issues (material substitution)
- Importance of prototypes for next generation
  (geniv and fusion)
  (link to intelligent customer)
- Linking with the global network to make correct choices - procurement (huge material challenges)

GENERIC (modelling, lifing, NDE)

- Understanding plant and fuel issues - modelling life extension
- Post irradiation experience link to decommissioning
- Structural integrity link to regulatory environment
- 'inspection' implications. Damage tolerant design. Link to plex

HOSTILE ENVIRONMENT

- Prediction of lifetime (plex)
- Understanding next gen/fusion environment
- Hydrogen economy more complex
- Total environments

OTHER

- Developing necessary skilled workforce.

BARRIERS

FUNDING/POLICY	RESOURCES (skills & equipment)
- Continuity of funding + level, generic & specific - Material supply (security) - Overall cost of technology unitised - Regulatory/planning issues not defined well, new build/plex - Lack of stable business encironment	- Immediate lack of skill base (world wide issue) - Next generation of skills need developing - materials/science - Security of supply
TECHNICAL	**OTHER**
- Waste disposal/decommissioning (materials issues need funding for long term, not an issue for fusion - Knowledge management of existing and future plant, mechanistic understanding and modelling. progotyping	-

RECOMMENDATIONS

R&D RELATED	POLICY/REGULATION
- overall 'virtual' centre of technical excellence for energy - must be linked to skill development - industry/regional university networked	) -
RESOURCES	**OTHER**
- long term funding for above - continuous strategic plan for material research, encourage and stimulate skills	- communication (MAT UK) + link in with Europe + global

VOLUNTEERS

Core Team

P Hewitt
Ian Cook

Advisory Team

Andrew Baker
Paul Woollin
Andrew Wilson
Peter Christie
Jonathan James