
**HSE Seminar
on the
Revised Safety Assessment
Principles
For Nuclear Facilities**

26th January 2007

Aim of Seminar



- Provide an overview of the revised SAPs and how they will be used
- Evaluate stakeholders views on the process of revision
- Allow stakeholders to comment on the final version

Principles of Good Regulation

- Transparency
- Consistency
- Targetting
- Accountability
- Proportionality

Structure of Seminar



- Overview of the revision process
- SAPs – the main features
- Views from other regulators
- Views from the industry
- Identification of main issues for discussion
- Discussion Forum
- Summary of main discussion points
- what's next?
- TAGs / TIGs Programme
- Final summary

Overview of Revision Process

**Alun Williams
(Project Director)**

Scope



- Overview of revision process
- Reflections on lessons learnt so far
- Update on what is published

Status of SAPs



- Internal guidance for NII inspectors
- **Not** 'HSE Guidance' to industry

International Dimension



- IAEA Safety Standards
- WENRA Reference levels

Approach taken



- Conscious inclusion of wider range of stakeholders
- A steep learning curve for us, with iterative drafts, and handling large volumes of comments

Co-operation with Other Regulators



- Environment Agency
- Defence Nuclear Safety Regulator

Chronology(1)



- First drafts (mid 2005) onwards
 - incomplete, very uneven in style, length, detail
 - you told us so, very forcefully
 - IMechE seminar in November 2005

Chronology(2)



- Main redraft (open April - May for comments)
 - Included structured questionnaire
 - nationwide open-forum meetings (BNES/IMechE)

Outcome

- Attracted responses from over 50 organisations, containing about a thousand comments
 - very valuable
 - many taken on board
 - others showed we needed to explain things better

Present Position



- Revised SAPs Publication was delayed several months
- Now on website:
 - Revised SAPs
 - Explanatory Note on Numerical Targets and Legal Limits
 - TAG on Demonstration of ALARP
 - Cross-over table ; old 1992 SAPs to new 2006 SAPs
 - Nii's responses to comments received (coming shortly)
 - Website version is the authorized version
 - will need audit/history trail as/when corrections/changes made

SAPs – The Main Features

**Geoff Vaughan
(Project Manager)**

SAPs



Are

Goals

Guidance for inspectors
for use in assessment

Assistance in judging if
legal duties are met

To be applied using
reasonable practicability
where relevant

To be considered
holistically

Are Not

Design Guides

HSE Guidance

Mandatory standards, nor
a recipe for licensees,

To be met unconditionally
in all situations

To be considered as
separate good practices

Features of revised SAPs - 1



Emphasis on meeting legal duties

Higher level principles, simplified where possible, with supporting guidance

Philosophy/reasons for specific content set out

Engineering brought forward

Analysis methods separated from Numerical Targets

Consistent approach to dose targets in line with IRR99

Consideration of multi-facility sites

Removal of ambiguities and ill-defined terms

SAPs numbered in sections to ease future changes

Features of revised SAPs - 2



Content extended - new sections on:

- Leadership and Management of Safety
- Regulatory Assessment for Safety Cases
- Radiation Protection
- Accident Management and Emergency Preparedness
- Radioactive Waste Management
- Decommissioning
- Control and Remediation of Radioactively Contaminated Land

Legal Duties

Dutyholders must meet legal duties:

Health and Safety at Work etc Act 1974, and

- statutory provisions eg Nuclear Installations Act 1965 & Licence Conditions
- regulations relevant to radiation protection ie IRRs, REPPiR
- other regulations eg MHSWR, PUWER, COMAH etc

Regulatory Assessment is to judge compliance with these legal duties has been demonstrated:

- SAPs & TAGs are to assist decision-making in relation to nuclear safety and radioactive waste management
- ToR provides a framework for this decision-making

Reasonable Practicability



Reasonable practicability is fundamental requirement of UK H&S law
ALARP is HSE policy and sets equivalent requirements

Dutyholders must demonstrate that they have
controlled and reduced risks ALARP

ALARP is not just a risk- based CBA -
meeting good practice in Engineering, Operation and Safety
Management is equally important

SAPs set out good practices which NII expect will be met with no
difficulty by new facilities and are a benchmark for existing facilities

Key Engineering Principles



- EKP1: Inherent Safety – underpinning safety aims
- EKP2: Fault Tolerance – minimise sensitivity to potential faults
- EKP3: Defence in Depth – requirement for several levels of protection
- EKP4: Safety Function – identification of safety functions that must be delivered
- EKP5: Safety Measures – identification of safety measures to deliver safety functions

Safety Case



- Primarily to provide operator with information required to enable safe management of the site and facilities
- Specifically it should define
 - Safe Operating Envelope
 - Limits and Conditions of Safe Operation
 - Maintenance, inspection and testing regimes

Fault Analysis



SAPs emphasises the importance of Engineering, Operational and Safety Management good practices

Fault Analysis provides a check whether required high level of nuclear safety has been achieved

Three strands: Design Basis Analysis
 Probabilistic Safety Analysis
 Severe Accident Analysis

Principles describe requirements and outputs of each strand

All Numerical Targets are gathered in separate section as these are independent of methodology

Numerical Targets – 1



Targets follow Tolerability of Risk framework

Basic Safety Level – {BSL}

Basic Safety Objective – {BSO}

Legal levels denoted by BSL (LL)

Numerical Targets - 2



BSL: Policy that a new facility or activity should meet BSLs

ALARP drives lower:

- higher risks, greater disproportion required

Policy for existing facilities, case-by-case consideration:

unless LL, to continue short term operation above BSL
expect very robust argument and longer term plan to
reduce risks

BSO: Level at which further assessment by NII considered of little
benefit compared with other tasks: only need to confirm
validity of arguments.

Duty holders cannot stop at this level if further safety
measures are reasonably practicable

Holistic Application - 1



ALARP should be demonstrated in a comprehensive manner, balancing all the risks

SAPs should be considered as a combined set
– not as separate principles

However, only those relevant should be considered
– judgement must be made in any particular situation

Specific guidance is given in relation to situations where the MOD/HSE agreement applies

Holistic Application - 2



- Lifecycle: safety cases for each stage of the facility lifecycle should show that the safety intent for subsequent stages can be achieved
- Multi-facility sites: All facilities, services and activities need to be considered so that interfaces and interdependencies are accounted for
- Time at risk: risks which only occur for short time periods should be assessed to avoid errors in using average risks

Proportionality - 1



MHSWR99 defines nuclear installations as requiring the highest level of risk assessment using ‘the most developed and sophisticated techniques’

but

the depth and rigour of analysis will vary depending on the magnitude of the hazard in line with HSC’s Enforcement Policy Statement

Similarly our regulatory attention should be commensurate with the magnitude of the hazard, all other factors being equal

Proportionality - 2



Safety cases do not have to follow the expectations in the SAPs

Safety Cases do not have to list the SAPs, nor show compliance or not with them individually

Safety Cases do not make a facility safe: proper understanding by the operator and implementation of the technical requirements are vital

Conclusion



SAPs are not new in sense of changes of expectations:

- no new law
- much of new material already in use
- they clarify and simplify, and
- improve assessment process by enhancing:
consistency, targeting and proportionality and
make transparent through publication

THEY ARE LIVE NOW

Break

1996
2006



Env
Age



Safety Assessment Principles 2006

The Environment Agency's Perspective

Alan McGoff

Radioactive Substances Regulation Policy

SAPs Seminar,

Liverpool, 26 January 2007

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Our perspective

- SAPs generally consistent with UK goal setting, non-prescriptive approach;
- High safety performance helps protect the environment;
- Integrated approach - seek to achieve all regulatory and business objectives - good safety and environmental performance is good business!

Energy Review 2006:

“We do not take a position for or against nuclear power, but we insist that nuclear installations must achieve high standards of safety, security, environmental performance and waste management.

Key to Successful Joint Regulation

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- Safety optimisation - SFAIRP/ALARA - takes the environment fully into account together with all other relevant matters;
- Environmental optimisation - BPM/ALARA - takes safety fully into account together with all the other relevant matters.
- Seek consistency within *and* between regulators.

Radioactive Substances Regulation Environmental Principles

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- Development ongoing
- Objective - technical guidance to help underpin decisions relating to radioactive substances regulation. Including:
 - permitting and compliance where we regulate directly; and
 - where we are consultees or have influence.

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REPs - Structure

Environment Agency	IAEA
RSR Objective	Safety Objective
Fundamental Environmental Principles for RSR	Safety Fundamentals
Developed Principles – Generic	Thematic
Regulatory Framework	Legal and Governmental Infrastructure
Emergency Preparedness and Response	Emergency Preparedness and Response
Management Systems	Management Systems
Compliance Assessment	Assessment and Verification
Enforcement	<i>(none)</i>
Site Evaluation	Site Evaluation
Radiation Protection and Monitoring– People and Environment	Radiation Protection
Radioactive Substance Management (including Waste Disposal)	Radioactive Waste Management
Decommissioning	Decommissioning
Contaminated Land and Groundwater	Rehabilitation of Contaminated Areas
Evaluation and Information	<i>(none)</i>
Developed Principles – Sector/Site Specific	Facility Specific

REPs - Example

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Radioactive Substance Management

(including Waste Disposal)

A strategy shall be produced for the management of all radioactive substances.

Considerations:

- The strategy shall ensure that for human health and the environment:
 - ◆ An acceptable level of protection is achieved; and
 - ◆ That impact and risks have been minimised taking into account all relevant factors including:
 - Worker and public safety;
 - Cost;
 - Security;
 - Technical capability;
 - Burdens on future generations;
 - Precautionary principle;
 - Use of resources;
 - Stakeholder views. (etc)

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REPs - Progress

- Structure, Radioactive Substances Regulation Objective and Fundamental Principles published as working document;
- Developed principles for the sector Radioactive Substances Management (including waste disposal) also published in same document;
- Other sectors being developed with contractor support;
- Issue as working document over next few months;
- Continue to use SAPs as starting point.

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2006



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Safety Assessment Principles 2006

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Liverpool, 26 January 2007

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Adoption of SAPs for Regulation of the Defence Nuclear Propulsion Programmes

**Commodore Andrew L McFarlane
Defence Nuclear Safety Regulator**

Where are we now?



- DNSR's requirements for the regulation of the propulsion programme are laid down in JSP 518
 - Authorisation Conditions (ACs)
 - Safety Principles (SPs)
 - Safety Criteria (SCs)
- SPSC philosophy
 - Broadly similar to SAPs and based on IAEA guidance, but...
 - structure, positioning and level of detail very different to SAPs
 - Nuclear Weapon SPSCs issued in 2002
- SAPs – NII internal **guidance for NII Inspectors**
- SPSCs – **DNSR regulatory requirements**, duty holders must address
- Joint regulation – different approach to principles is not ideal when sharing assessment and inspection tasks
- Perception of different standards with duty holders

DNSR NWP Regulatory Requirements



- 1958 Ordnance Board independent assessment of nuclear weapon system safety
- OB Proceedings N392 1984 used for Trident entry into service Approval
- OB Proceedings N446 1995 introduced ALARP concept, - Trident assessed against 446 together with an ALARP case
- 1997 NWSA agreed with President OB replace N446 with document taking account NII SAP's, HSE TOR and ESTC Presc No2
- New document Safety Principles and Safety Criteria (SPSC's) for Nuclear Weapon Systems endorsed DNSB November 2002

Alignment with NII SAPs 1



- Objective
 - To advise the NII's revision of their SAPs to improve the relevance to nuclear installations in the defence nuclear propulsion programme.
 - To achieve greater clarity in the coherence between SAPs and MoD's Nuclear Propulsion and Nuclear Weapon Safety Principles and Safety Criteria (SPSCs)
- DNSR Process
 - Reviewed and commented on iterations of revised SAPs – formal process.
 - Attended stakeholder workshops, Nuclear Topic Groups and NII Editorial Boards.
 - Commented on public consultation draft
 - Attended Nuclear Topic Groups and NII Editorial Boards to formally address stakeholder comments.

Alignment with NII SAPs 2



- **Current intent NNPP**– DNSR view is that most principles are fit for use by DNSR for assessment of the NNPP. So subject to consultation;
 - DNSR plan to adopt the NII SAPs, with a “Preface” providing context for assessment of the NNPP.
 - Focus DNSR resources into joint working with NII to produce updated Technical Assessment Guides (where the detail is really important).
- DNSR policy for adoption of NII SAPs in the assessment of the NWP under review.

Benefits



- Duty holders have one set of regulatory expectations expressed in one common document.
- Improved consistency of regulatory assessment.
- Improved clarity and understanding of the application of the principles for activities in the defence environment.
- Develop further the joined-up processes between NII and DNSR

What Next?



- Production of a regulatory impact assessment on the adoption of SAPs for the NNPP
- Draft DNSR “Preface” context for assessment of NNPP
- Issue Preface, RIA and transitional arrangements for consultation
- DNSR Preface to NII SAPs published (coordinated with reissue of JSP 518)
- DNSR and NII to agree joint working arrangements for TAG review project (2 -3 yrs)
- NWR policy for adoption to follow



Demonstrably safe defence nuclear programmes,
providing effective, available, capability.

MISSION

To regulate the nuclear and radiological safety of
the defence nuclear programmes so that they are
managed with due regard for the protection of the
workforce, the public and the environment.

Joint Regulation

- DNSR is recognised by NII as a **competent authority**, which provides assurance and information to NII relating to the Naval Reactor Plant and Nuclear Weapons. Letter of understanding builds on formal MoD/HSE agreements.
- Therefore NII and DNSR operate a system of **joint regulation** which ensures complete and seamless oversight over all relevant activities, agreeing:
 - to share information provided by operators
 - to share assessment plans
 - to jointly determine and agree any action to be taken.

Defence Characteristics



- Mobility of plant
- Constraints on space and weight
- Challenging environment
- Need for integrity
- Juxtaposition of explosives and radioactive materials



Break

The Revised Safety Assessment Principles:

A Defence Licensee's Perspective

Adam Hearnden

Head of Nuclear Safety Regulation

BAE Systems Submarine Solutions



Content



- Context & Need for Change
- Review Process
- The Finished Product
- Implementation/Application
- Relationships & Behaviours
- Moving Forward
- Conclusion



Context & Need for Change – A Defence Industry View



- Requirements vs. Guidance
- Consistency & Coherence in Application
- Visibility of Process for Application
- Scope of Application – Safety Cases
- Lack of Balance – Driven by New Build
- Appropriateness to Defence Projects



Observation on Review Process



- Clarity of Aims & Objectives
- Stakeholder Identification
- Requirements Capture
- Drafting Strategy (sub-contract)
- Project & Technical Management
- Stakeholder Engagement & Consultation
- Closure



The Final Product



- Structure & Format
- Introduction & Context
- Good Overall Balance
- No Major Changes in Philosophy
- New Management Principles Welcome
- Applicable to Wider Range of 'Submissions'
- Overlap With Environment Agency
- No Universal Application
- Weighting



Implementation/Application



- Industry Impact Assessment & Response
- Clear Leadership in Management of Change
- Implementation Plan?
- Training
- Evolutionary not Revolutionary
- Technical Assessment Guides
 - Balanced Application
 - Consistency & Coherence?
 - Avoidance of Cherry Picking & Axe Grinding?
- Closure of Consultation Process



Relationships & Behaviours



- Open & Constructive Dialogue
- Full Formal Consultation
- Mutual Empathy
- Cultural Change
- Positive Behaviours & Improved Relationships
- **Challenge:**
 - Remain Engaged, Open & Positive
 - Develop Relationships



Moving Forward



- The Proof of the Pudding....
- Continue Dialogue on Development of Principles
- Industry Engagement in TAGs?
- Build on Behaviours & Relationships
- Periodic Review of SAPs



Conclusion



- Reflect Relevant Good Practice/Best Practice
- Nothing to Fear
- Seamless Transition
- Cost to Industry?
- A Model for Cooperative Working
- Basis for Developing Behaviours & Relationships into New Directions



Break

Safety Directors Forum: Industry Working Group on SAPs Revision

A Civil Licensees Perspective

Andrew Buchan
British Nuclear Group
Sellafield Ltd

Background To Working Group



- SDF provides a cross Nuclear Industry Forum
- SAPs input from British Nuclear Group, UKAEA, AWE, British Energy, RRA, DML, GE Healthcare, BAE Systems, Babcock
- Group comprised specialists in safety management systems, safety cases and methods
- New Build interests also considered

Initial Issues and Interactions



- Initial issues identified with 1992 SAPs
- Issues summarised and prioritised for the Industry as a whole
- Issues also identified as sector or licensee specific
- Comments provided on draft versions
- Workshops held with NII re Numerical criteria, Decommissioning and Safety Management SAPs

Key Enhancements (1)



- Not Design or Operational standards
- Balance of Safety overall across all SAPs
- Safety Case and regulation should be proportionate to the hazard.
- Improved Balance: people and management vs. engineering and processes

Key Enhancements (2)



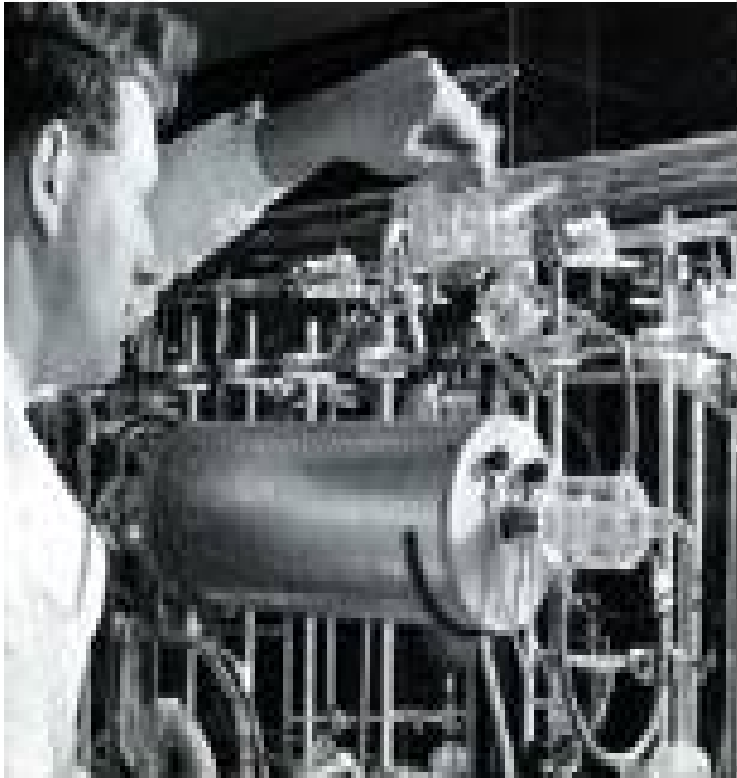
- If Risks are broadly acceptable then no further regulatory pressure required
- Safety cases are for operators and managers also-not just regulators
- Not all SAPs apply to all facilities or industries

Implementation Issues (1)



- SDF encourage a joint approach to training, education and review
- Implementation by industry needs to be considered – not the end of the process
- Legally bound to follow our "own arrangements"
- Behaviours
 - Industry
 - NII
 - Other Regulators

Implementation Issues (2)



- Apply to safety cases only once new LC compliance arrangements in place
- TAGs – detailed issues to be resolved – industry is keen to input
- Annual review process – industry inputs key
- Some evidence of “enthusiasm”

Conclusions



- Useful Interactions
- Safe Today- Safe Tomorrow
- Risk of “Jumping the Gun”
- Licensees need to review SAPs, their processes and then amend their “own arrangements“
- Evolutionary Implementation

Break



NIA's Perspective on New Reactor Build

**HSE Seminar on SAPs for Nuclear Facilities
Liverpool, 27 January 2007**

Keith Parker, Chief Executive
Nuclear Industry Association

“We have concluded that new nuclear power stations would make a significant contribution to meeting our energy policy goals”

July 2006
Energy Review



Why new nuclear?

“By 2025, if current policy is unchanged, there will be a dramatic gap on our targets to reduce CO₂ emissions;

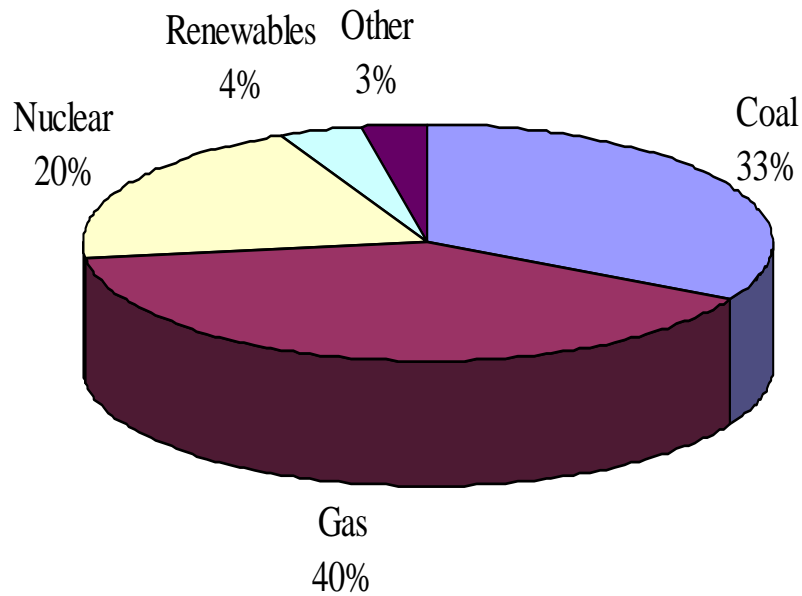
...we will become heavily dependent on gas; and at the same time move from being 80/90% self-reliant in gas to 80/90% dependent on foreign imports,

These facts put the replacement of nuclear power stations, a big push on renewables and a step-change on energy efficiency, engaging both business and consumers, back on the agenda with a vengeance.”

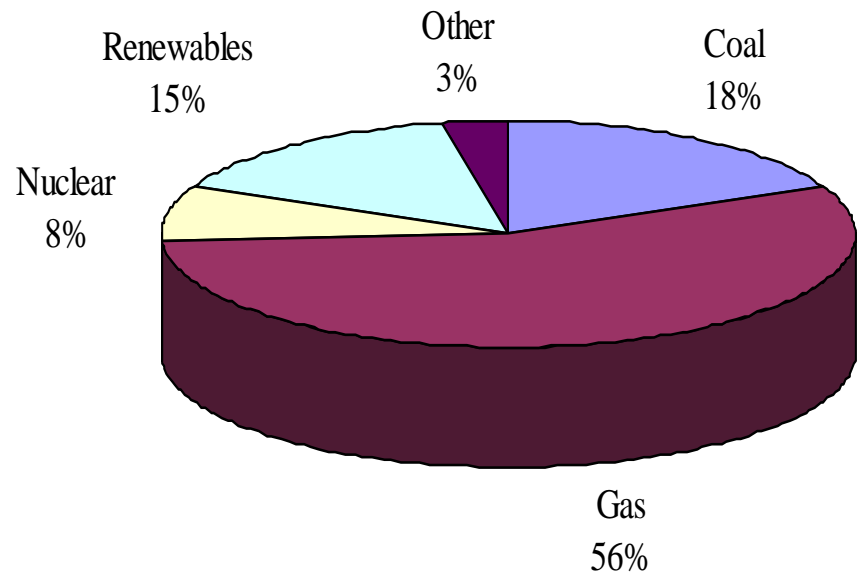


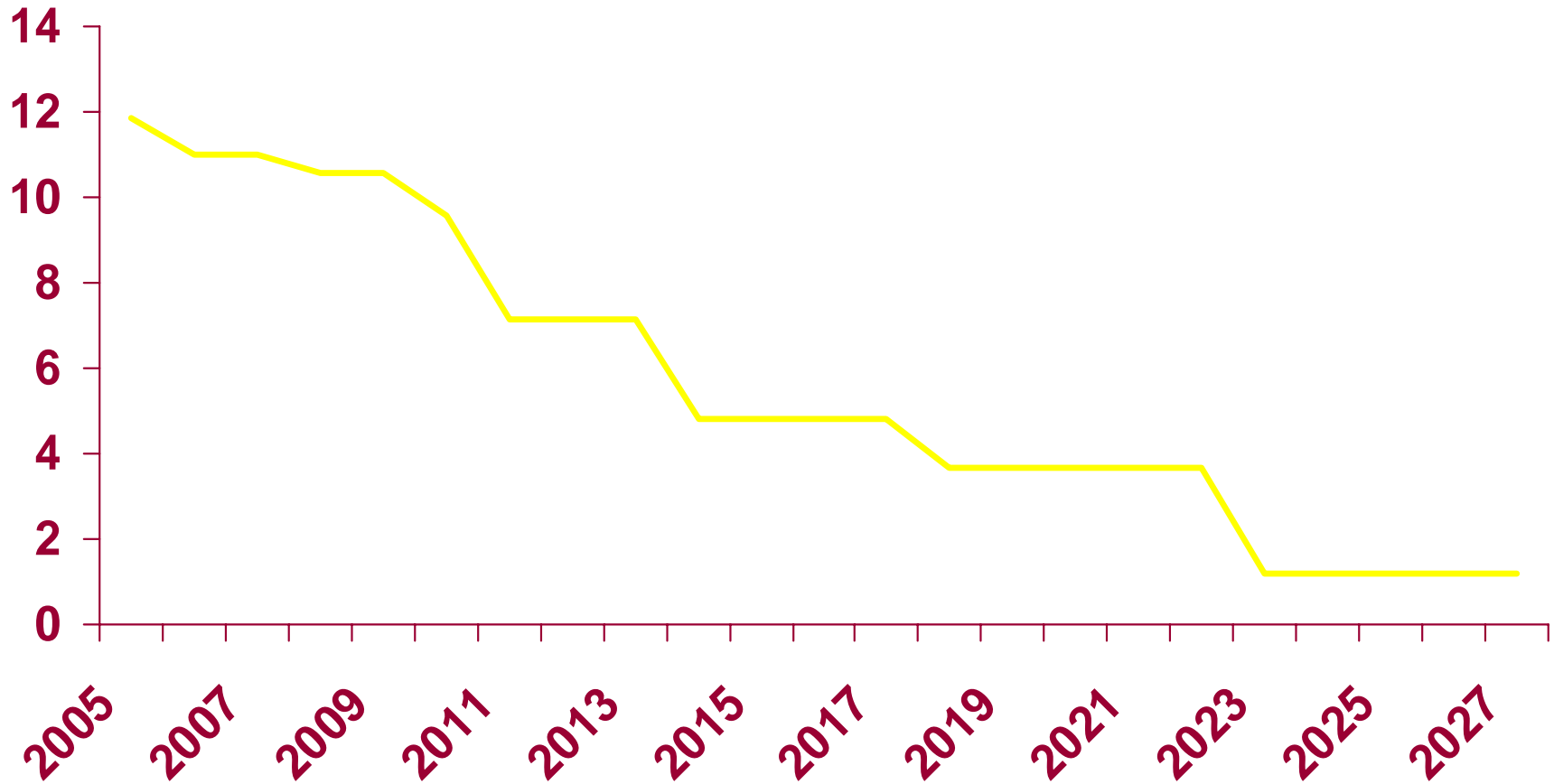
Prime Minister,
Tony Blair 16 May 2006
CBI Annual Dinner

2005



2020



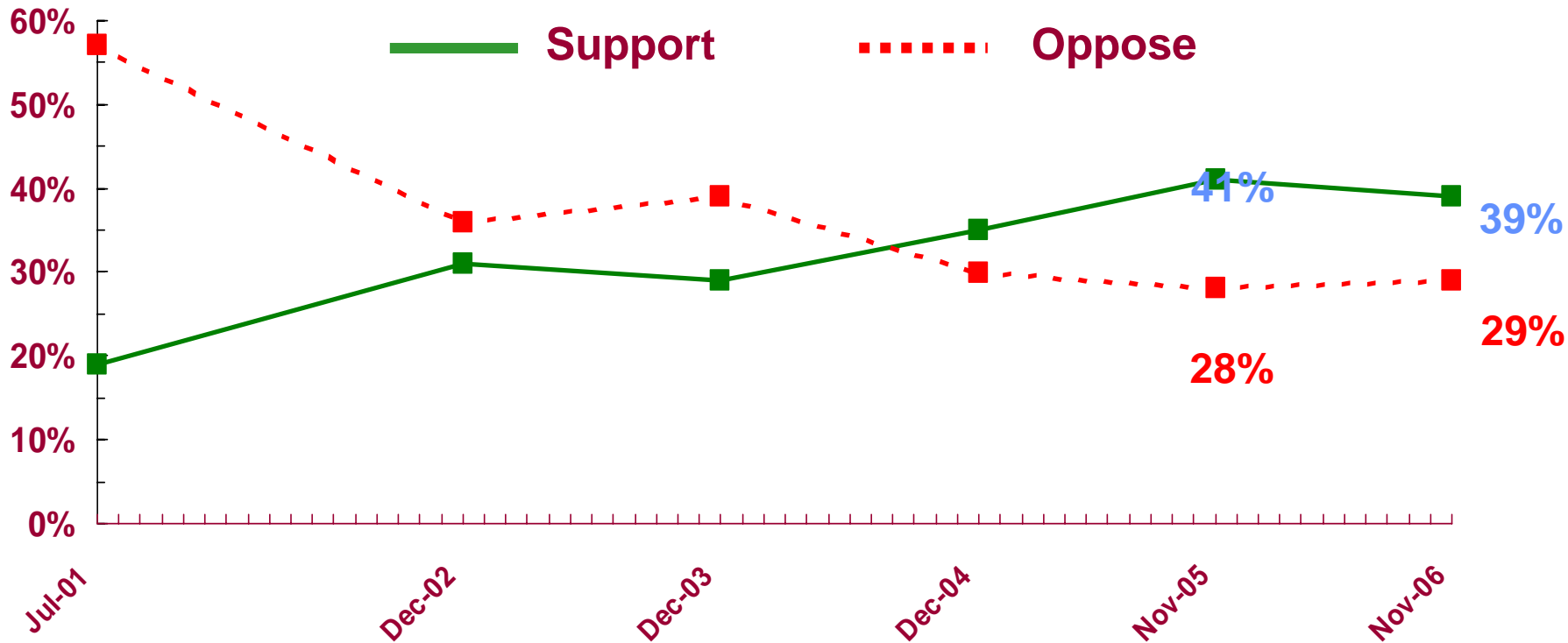


FT FINANCIAL TIMES

Any new generation of reactors would be the first to be built by the private sector, and companies and banks will first want to see Mr Blair's decision win public acceptance before sinking their money into what has been something of an investment black hole in the past.

Financial Times (18 May 2006)

Q *To what extent would you support or oppose the building of new nuclear power stations in Britain TO REPLACE those that are being phased out over the next few years? This would ensure the same proportion of nuclear energy is retained.*



Clarity on:

- Planning
- Licensing
- Long-term value for carbon
- Waste management arrangements



Who might invest?



“I will not make investments in nuclear unless I can see a carbon framework that gives me confidence there will be a price for carbon going forward, but I am not looking for guarantees.”

“...we will look to build plants with a range of technologies, including nuclear if the right environment and framework exist.”

“We will be moving with other technologies of which nuclear is just one, but it will start to make a contribution from the middle of the decade onwards.”

Dr Paul Golby
Chief Executive
E.ON, UK
Evidence to Trade and
Industry Committee
6 June 2006



Another view



Vincent de Rivaz
Chief Executive
EdF Energy
Evidence to Trade and
Industry Committee
6 June 2006

“Added to the power crunch is the CO₂ emissions crunch, and that is why it is very important that we now take the decisions to enable the industry to make the investment in nuclear new build given the time horizon when that emissions crunch may happen.”

“If we are welcomed by customers and politicians in this country and by our shareholders we will make the choice to invest in new build in this country.”

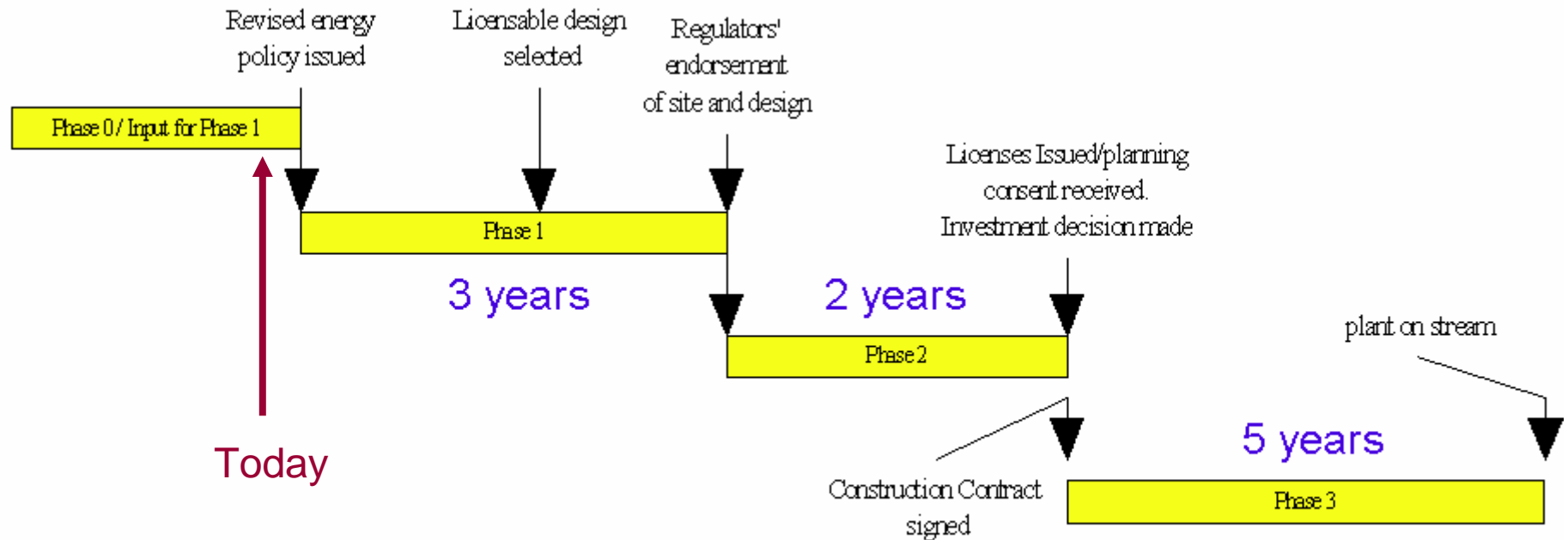
Tony Blair, 16th November 2006

“We need a new generation of nuclear technology to provide our energy security.”

Energy White Paper due March 2007 to set policy framework

Right framework will enable investment

~~5 years for approval : 5 years to construct~~



- Risk to energy security
- Generating gap
- UK at back of queue for nuclear projects and components
- Loss of UK capability

The NIA study in March 2006 of the UK supply chain capability:

Assumed

- 5 twin reactors over 20 years (maintains nuclear at 20%)
- international, approved designs

Concluded

- Much of engineering and construction work is broadly similar to other major projects
- UK nuclear supply chain could supply 70% of a new nuclear plant. With investment this could rise to 80%
- There are a few pinch points

- Policy Framework for investment

- Reactor safety and licensing resources (age profile)
- Programme and project management
- Some specialised plant items due to world upsurge in new nuclear build:
 - Large forgings
 - Reactor pressure vessel manufacture
 - Steam generator manufacture
 - Large turbine/generator manufacture

UK Government must

- Set framework to attract Investors, Utilities and Nuclear System Vendors to the UK market
- Enable UK Regulators to implement streamlined licensing processes for international designs

UK Industry must

- Be competitive in the global supply chain
- Invest in Project Management
- Decide role and invest accordingly
- Prepare to supply resources and equipment

If the UK Government reduces the risk profile for new nuclear build by:

- Delivering political support
- Streamlining planning
- Enabling timely and predictable regulatory approvals
- Encouraging investment in low carbon technology by pricing carbon
- Clarifying policy on long-term storage and disposal of nuclear waste

THEN

- Nuclear will continue to contribute to the diverse, low carbon, affordable energy mix we need

AND

- New private investors will be found