



EUROPEAN COMMISSION
5th EURATOM FRAMEWORK PROGRAMME 1998-2002
KEY ACTION : NUCLEAR FISSION

HTR-M1

**European Project for the development of HTR Technology -
Materials for the HTR**

CONTRACT N°

FIKI-CT-2001-0135

**Technological Implementation Plan
(Final)**

D.Buckthorpe

Project Coordinator

NNC Ltd.

UK

Dissemination level : **CO**
Document Number: HTR-M1-04/11-D-0-0-31

TECHNOLOGICAL IMPLEMENTATION PLAN

*A Framework for the further development, dissemination and use of
the results of EC RTD Projects (including also thematic networks and concerted actions)*

DATA SHEETS



Preliminary version at mid-term (optional, programme per programme)

X Final version before final term (contractual obligation)

Part 1: Overview and description of your project and its results*One form per project***Publishable**

1.1: Executive summary (to be used for an accurate update of the programme synopsis of projects)

1.2: Overview of all results

1.3: Quantified data on the project

1.4.: Assessment of the European interests : This section enables the co-ordinator to explain the interest for the European Union (the competitiveness of its industries, the usefulness for (part of) its population,...) of the achieved results and of their foreseen impacts.

1.5.: Expected project impact

Part 2: Description of each Result - Search for collaboration through Commission services*One form per Result***Publishable**

This section will be used to document your result(s) in CORDIS and to inform any appropriate audience

2.1 : Description of the result(s)

2.2 : Quantified data about the result

2.3 : Further collaboration, dissemination and use of the result : This section enables each partner – individually or as a consortium – to describe its needs in further collaboration in view of the dissemination and use of its results(s).

Part 3: Description of the intentions by each partner*One form per partner***Confidential**

This section enables each partner – individually or as a consortium – to describe its use and dissemination intentions (including a timetable of its future activities).

3.1 : Description of the use and the dissemination of result(s), partner per partner

3.2 : Quantified data for each partner's main result

- ❑ The Technological Implementation Plan data sheets are available as a predefined form in Microsoft Word format. The file may be downloaded from the European Commission's CORDIS web site at: <http://www.cordis.lu/fp5/tip.htm> or may be obtained by e-mail from your EC programme help desk or your Project Officer.
- ❑ The form should be completed electronically and returned preferably by e-mail to your project officer (Firstname.Lastname@cec.eu.int). Alternatively it can be sent on a diskette to the address provided by your Project Officer :
 - ✓ Part 1, 2 by the project co-ordinator;
 - ✓ Part 3 by the project co-ordinator or by each partner individually, as preferred.

Part 1 Overview and description of your project and its results

EC PROGRAMME :	5th EURATOM RTD Framework Programme
PROJECT TITLE & ACRONYM:	European Project for the Development of HTR Technology - Materials for HTR - (HTR-M1)
CONTRACT NUMBER :	FIKI CT2001-0135
PROJECT WEB SITE (if any) :	SINTER - Forum HTR-M & HTR-M1
PARTNERS NAMES :	NNC Ltd Framatome ANP. Commissariat a Energie Atomic (CEA) European Directorate General Joint Research Centre (JRC-IE) Nuclear Research and Consultancy Group (NRG) Forschungszentrum Juuelich GmbH (FZJ) Empresario Agrupados Internacional s.a. (EA)

Executive summary

Please, synthesise (in 1 or 2 pages) your project original objectives and final outcome.

a) Original research objectives.

- 1. To investigate materials for the high temperature regions of the HTR under simulated environments for the turbine (blades) including medium term creep tests.**
- 2. To perform work to establish graphite materials information for future prioritising of work and carry out testing under irradiated conditions on currently available graphites.**

b) Expected deliverables

- 1. Report on high temperature materials for turbine (blades) covering new test results for chosen alloy steel materials including tests in simulated environments.**
- 2. Report on graphite materials including data-base and graphite selection and test results for effects of irradiation on properties.**

c) Project's actual outcome (in terms of technical achievements or if appropriate task per task)

TO BE COMPLETED AT THE END OF PROJECT.

All Technical Deliverables were achieved

d) Broad dissemination and use intentions for the expected outputs (*such as industrial development, standards, regulations and norms, improvement of environment, health, working conditions, employment, net economic benefits, etc*)

The partners will exploit the results of this study in the development of a European based HTR addressing feasibility issues connected with material options for high temperature metal structures and graphite structures, maintaining a level for recording and retaining experience within Europe.

It is expected to deliver an improved basis for the selection of materials for the High Temperature Reactor system and its major components

1.2 Overview of all your main project results

No.	Self-descriptive title of the result	Category A, B or C*	Partner(s) owning the result(s) (referring in particular to specific patents, copyrights, etc.) & involved in their further use
1	Investigations and Testing of materials for the turbine (blades) of HTR under medium term conditions.	B	All Partners
2	Summary Report of high temperature material investigations for HTR	B	All Partners
3	Selection of graphite materials plus testing for effects of irradiation and oxidation on graphite properties	B	All Partners
4	Summary Report of graphite material investigations for HTR	B	All Partners
5	Overall Technical Report	B	All Partners

* A: results usable outside the consortium / B: results usable within the consortium / C: non usable results

1.3	Quantified Data on the dissemination and use of the project results
------------	--

Items about the dissemination and use of the project results (consolidated numbers)	Currently achieved quantity	Estimated future* quantity
# of product innovations (commercial)		
# of process innovations (commercial)		
# of new services (commercial)		
# of new services (public)		
# of new methods (academic)		
# of scientific breakthrough		
# of technical standards to which this project has contributed		
# of EU regulations/directives to which this project has contributed		
# of international regulations to which this project has contributed		
# of PhDs generated by the project		
# of grantees/trainees including transnational exchange of personnel		

= number of ... / * “Future” means expectations within the next 3 years following the end of the project

1.4. Comment on European Interest

All projects are expected to meet European interests. This section should provide an appraisal of your project in terms of European added value and support to the implementation of European Union policies.

1.4.1. Community added value and contribution to EU policies

a. European dimension of the problem

(The extent to which the project has contributed to solve problems at European level)

Sustainable energy supply for Europe addresses the issues of safety, resource protection, waste reduction, waste disposal, proliferations resistance and economics. The HTR-M and M1 projects deal with all of these aspects by investigating materials which are going to be used in future plant.

The large participation of European nuclear industry in international projects, in the European Project of Development of HTR Technology and in HTR-TN shows that there is an increasing interest of the European nuclear industry for the industrial development of this type of reactor, both for the European market and for export.

The work is done in collaboration with European partners to take benefit from their expertise. Sustainability of energy systems is a supra-national challenge of European and global dimension.

b. Contribution to developing S&T co-operation at international level. European added value

(Development of critical mass in human and financial terms; combination of complementary expertise and resources available Europe-wide)

In the past, HTR development in Europe has already been performed on an international level and reached a leading role, worldwide. The OECD-funded DRAGON reactor project in UK, as being the very first HTR at all, included most EURATOM members as well as non-European countries (US, Japan). The 300 MWel demonstration reactor THTR also had the status of a European project.

However, most European R&D activities in the HTR field were reduced in the 1990s although international interest in this technology still persisted which lead to the construction of two new HTR test reactors (HTTR, HTR 10) and two commercial projects (PBMR, GT-MHR).

The European HTR-Technology Network (HTR-TN) has been established to recover the European know-how from the past and to advance the HTR-related key technologies. This complementary European collaboration has created a critical mass in human and financial terms that is internationally acknowledged.

c. Contribution to policy design or implementation

(Contribution to one or more EU policies; RTD connected with standardisation and regulation at Community and/or national levels)

The Specific Programme on Energy, Environment and Sustainable Development (EESD) focuses directly on a sustainable development perspective, which addresses objectives like use of natural resources and ecosystems, threats of global climate change, quality of life, and the impact of the production and use of the energy which is essential to European economies, standard of living and environmental issues.

Making use of the knowledge and technologies developed by the HTR development programme will make it possible to contribute to a wide range of social and economic needs so reconciling economic development with environmental sustainability. The results will support policies formulated at Community level or deriving from international commitments by including advanced nuclear energy into the energy supply options. In addition, HTR can supply process heat for highly effective decentralised combined heat and power (CHP) and for hydrogen generation.

1.4.2. Contribution to Community social objectives

a. Improving the quality of life in the Community :

Environmentally benign, safe, secure and economic energy supply is a precondition for quality of life in the Community. CO₂-free, low cost electricity from nuclear power plants allows more capacity of regenerative energy within the European energy mix by compensating their still more expensive electricity generating cost. This strategy should be continued in future by construction of innovative and advanced nuclear stations. Thus, CO₂-free nuclear energy will keep affordable for the European population and enhance quality of life. Modular HTR are designed in a way that radioactive fission products can be kept within the fuel elements even under extreme accident scenarios. They have a very clean primary circuit with very low radiological impact on the plant personnel and the environment. HTR can also provide combined heat and power for heating or process use. Long-lived waste can be burned in HTR without multiple reprocessing. HTR fuel is also very resistant for long-term final disposal.

b. Provision of appropriate incentives for monitoring and creating jobs in the Community (including use and development of skills) :

Same as for regenerative energy systems (e.g. water, wind, solar, biomass), advanced nuclear energy which complies to the criteria of sustainability and of public acceptance will face a considerable market in the future if the CO₂-free energy share in Europe does not imply economic burdens endangering competitiveness of European economy. A 'coalition' of regenerative energy and advanced nuclear energy leading to reasonable cost within the energy mix will therefore contribute to keep jobs in energy intensive manufacturing processes and to create more jobs in the field of CO₂-free energy system construction and application, both for regenerative and nuclear energy.

The present European HTR RTD programme helps to preserve existing know-how and to transfer it to a new generation of engineers and scientists. This paves the way for a broader industrial deployment of HTR in Europe and for participation of European experts in international programmes.

c. Supporting sustainable development, preserving and/or enhancing the environment (including use/conservation of resources) :

Enhanced safety standards - as typical for modular HTR - directly contribute to the preservation of the environment in case of severe accidents. High burn-up, good neutron economy and high thermal efficacy are effective measures to make better use of nuclear fuel resources, both natural uranium, thorium and reprocessed actinides. Combined Heat and Power generation additionally reduces waste heat discharges. Large scale hydrogen production by HTR heat will also contribute to the introduction of an hydrogen-based energy system. Currently, there is a general public perception that the wastes generated, decommissioning activities and the liabilities involved, are one of the major weak links of the nuclear industry. A successful waste management solution to HTRs will help to sustain a viable nuclear programme in the decades to come. In turn, this will maintain fuel diversity and promote nuclear power that is currently the predominant practical way of limiting greenhouse gas emission.

1.5. Expected project impact (to be filled in by the project coordinator)

Remark: by replying to the following questions, the coordinator is asked to express his best estimation regarding the impact of the project.

Overall Policy Impact¹

EU Policy Goals		I		II	
		SCALE OF EXPECTED IMPACT OVER THE NEXT 10 YEARS ²		other	
		-1 0 1 2 3		Not applicable to project	Project Impact too difficult to estimate
1. Improved sustainable economic development and growth, competitiveness Θ			2		
2. Improved employment Θ			2		
3. Improved quality of life and health and safety Θ			3		
4. Improved education Θ			2		
5. Improved preservation and enhancement of the environment Θ			3		
6. Improved scientific and technological quality Θ			3		
7. Regulatory and legislative environment Θ			3		
8. Other _____ Θ					

¹ Coordinator should respond to section I or, if appropriate, to section II. If the project has had no impact, a "0" should be entered in section I. Scores other than zero in section I will prompt a more detailed subquestion on a separate screen. However, you may access in any case the subquestions by clicking on the symbol" Θ "following each main question.

² Indication for scale as follows: -1 represents negative impact, 0 no impact, 1 small positive impact, 2 medium positive impact , 3 is a strong positive impact

Indicate your replies below by putting in each box the number corresponding to the score you chose:

1. Economic development and growth, competitiveness		Scale of Expected Impacts over the next 10 years (2)	
		By Project End -1 0 1 2 3	After Project End -1 0 1 2 3
a)	Increased Turnover for project participants - national markets - international markets	0	2
b)	Increased Productivity for project participants	1	2
c)	Reduced costs for project participants	0	1
d)	Improved output quality/high technology	0	1
e)			

2. Employment		Scale of Expected Impacts over the next 10 years (2)	
		By Project End -1 0 1 2 3	After Project End -1 0 1 2 3
a)	Safeguarding of jobs	2	3
b)	Net employment growth in projects participants staff	0	3
c)	Net employment growth in customer and supply chains	0	3
d)	Net employment growth in the European economy at large	0	2

3. Quality of Life and health and safety		Scale of Expected Impacts over the next 10 years (2)	
		By Project End -1 0 1 2 3	After Project End -1 0 1 2 3
a)	Improved health care	0	1
b)	Improved food, nutrition	0	0
c)	Improved safety (incl. consumers and workers safety)	0	3
d)	Improved quality of life for the elderly and disabled	0	1
e)	Improved life expectancy	0	1
f)	Improved working conditions	0	2
g)	Improved child care	0	2
h)	Improved mobility of persons	0	2

4. Improved education		Scale of Expected Impacts over the next 10 years (2)	
		By Project End -1 0 1 2 3	After Project End -1 0 1 2 3
a)	Improved learning processes including lifelong learning	1	1
b)	Development of new university curricula	1	3

5. Preservation and enhancement of the environment		Scale of Expected Impacts over the next 10 years (2)	
		By Project End -1 0 1 2 3	After Project End -1 0 1 2 3
a)	Improved prevention of emissions	0	3
b)	Improved treatment of emissions	0	2
c)	Improved preservation of natural resources and cultural heritage	0	2
d)	Reduced energy consumption	0	3

6. S&T quality		Scale of Expected Impacts over the next 10 years (2)	
		By Project End -1 0 1 2 3	After Project End -1 0 1 2 3
a)	Production of new knowledge	2	3
b)	Safeguarding or development of expertise in a research area	2	2
c)	Acceleration of RTD, transfer or uptake	2	3
d)	Enhance skills of RTD staff	2	3
e)	Transfer expertise/know-how/technology	2	3
f)	Improved access to knowledge-based networks	2	3
g)	Identifying appropriate partners and expertise	2	3
h)	Develop international S&T co-operation	2	3
i)	Increased gender equality	1	1

7. Regulatory and legislative environment		Scale of Expected Impacts over the next 10 years (2)	
		By Project End -1 0 1 2 3	After Project End -1 0 1 2 3
a)	Contribution to EU policy formulation	2	3
b)	Contribution to EU policy implementation	2	3

8. Other (please specify)		Scale of Expected Impacts over the next 10 years (2)	
		By Project End -1 0 1 2 3	After Project End -1 0 1 2 3

I, **project co-ordinator**, confirm the published information contained in this part 1 of the TIP.

Signature: D. Buckthorpe

Name: D. Buckthorpe

Date: 20th December 2005

Organisation: NNC Ltd.

Part 2 Description of each result

A separate part 2 must be completed for each result. This may be done by the partner responsible for the result or by the project co-ordinator.

The part 2 must be consolidated at the consortium level and transmitted to the Commission by the co-ordinator.

PARTS 2 WILL BE DISSEMINATED BY THE COMMISSION

2.1 : Description of the result(s), one form per result**2.1 : Description of the result(s), one form per result**

No. & TITLE OF RESULT (same as in table 1.2)

No.	Self-descriptive title of the result
1	Investigations and Testing of materials for the turbine (blades))of HTR under medium term conditions.

CONTACT PERSON FOR THIS RESULT

Name	Derek Buckthorpe
Position	Senior Consultant Engineer
Organisation	National Nuclear Corporation Limited
Address	Booths Hall, Chelford Road, Knutsford, Cheshire, UK
Telephone	00 44 1565 84 3845
Fax	00 44 1565 84 3878
E-mail	Derek.buckthorpe@nnc.co.uk
URL	
Specific Result URL	

SUMMARY (200 words maximum)

Provide an overview of the result which gives the reader an immediate impression of the nature of the result, its relevance and its potential; Briefly describe the current status/applications of the result (if appropriate) with non confidential information on entities potentially involved.

The work covers investigation of turbine (blade) materials in HTR simulated environments. Effects of creep and environment are key issues in the selection of materials for the turbine when used in the HTR with direct cycle. The requirement is to confirm the selections made within HTR-M and conclude on the short term test results including tests under treated and corrosive conditions and extend the tests to cover the medium term duration.

This result covers tests up to intermediate creep conditions on selected blade materials in air and under simulated environments. The work identifies effects on properties and future test requirements for long term use of the selected materials

The results are provided over a series of technical Reports (see below) and summarised within Deliverables D1 to D5 of the Project

Please categorise the result using codes from Annex 1

Subject descriptors	373 Materials	531 Reactor	436 Nuc E & T	611 Testing	373 Materials
----------------------------	----------------------	--------------------	----------------------	--------------------	----------------------

CURRENT STAGE OF DEVELOPMENT

Please tick one category only 4

Scientific and/or Technical knowledge (Basic research)	☐ Y
Guidelines, methodologies, technical drawings	☐
Software code	☐
Experimental development stage (laboratory prototype)	☐
Prototype/demonstrator available for testing	☐
Results of demonstration trials available	☐
Other (please specify.):	☐

DOCUMENTATION AND INFORMATION ON THE RESULT

List main information and documentation, stating whether public or confidential.

Documentation type	Details (Title, ref. number, general description, language)	Status: PU=Public CO=Confidential
Technical Report	HTR-M1 02/9 D-2.2.7 Report on selection of materials & testing requirements for the Turbine	CO
Technical Report	HTR-M1 03/03 D 1 0 12 Report on specimen fabrication, procurement and testing requirements for the turbine blade material	CO
Technical Report	HTR-M1 05/07 D 1 2 30 Intermediate Report on Material Testing of Turbine Materials	CO
Technical Report	HTR-M1 05/11 D 1 2 34 Report on results of heavily carburised U720 disk material	CO
Technical Report	HTR-M1 05/11 D 1 2 35 Final HTR-M1 Report on HTR blade alloy properties	CO
Technical Report	HTR-M1 05/12 D 1 2 43 HTR-M1 Turbine Results data provided on CD-Rom	CO

INTELLECTUAL PROPERTY RIGHTS

<u>Type of IPR</u>	<u>KNOWLEDGE:</u> Tick a box and give the corresponding details (reference numbers, etc) if appropriate				<u>Pre-existing know-how</u> Tick a box and give the corresponding details(reference numbers, etc) if appropriate		
	Current				Foreseen	Tick	Details
	Tick	NoP ¹⁾	NoI ²⁾	Details	Tick		
Patent applied for	☐				☐	☐	
Patent granted	☐				☐	☐	
Patent search carried out	☐				☐	☐	
Registered design	☐				☐	☐	
Trademark applications	☐				☐	☐	
Copyrights	☐				☐	☐	
Secret know-how	☐				☐	☐	
Other - please specify :	☐				☐	☐	

1) Number of **P**riority (national) applications/patents

2) Number of **I**nternationally extended applications/patents

MARKET APPLICATION SECTORS

Please describe the possible sectors for application using the NACE classification in Annex 2.

Market application sectors	40				
----------------------------	----	--	--	--	--

2.2. Quantified data about the result

Items (about the results)	Actual current quantity ^a	Estimated (or future) quantity ^b
Time to application / market (in months from the end of the research project)	immediate	Applicable to FP6 and beyond
Number of (public or private) entities potentially involved in the implementation of the result :	7 partners	21
of which : number of SMEs :	0	
of which : number of entities in third countries (outside EU) :	0	1
Targeted user audience: # of reachable people	50-100: HTR-TN & Eurocourse, related ISTC projects	Gen IV Members
# of S&T publications (referenced publications only)		
# of publications addressing general public (e.g. CD-ROMs, WEB sites)	0	
# of publications addressing decision takers / public authorities / etc.	0	
Visibility for the general public	No	

^a Actual current quantity = the number of items already achieved to date.

^b Estimated quantity = estimation of the quantity of the corresponding item or the number of items that you foresee to achieve within the next 3 years.

2.3. Further collaboration, dissemination and use of the result

(Optional; to be completed if partner is willing to set up new collaborations, and seeking dissemination support from the CORDIS services.)

COLLABORATIONS SOUGHT

Please tick appropriate boxes (4) corresponding to your needs.

R&D	Further research or development	☐ Y	FIN	Financial support	☐ Y
LIC	Licence agreement	☐	VC	Venture capital/spin-off funding	☐
MAN	Manufacturing agreement	☐	PPP	Private-public partnership	☐
MKT	Marketing agreement/Franchising	☐	INFO	Information exchange	☐ Y
JV	Joint venture	☐ ?	CONS	Available for consultancy	☐ Y
			Other	(please specify)	☐

POTENTIAL OFFERED FOR FURTHER DISSEMINATION AND USE

Please, clearly describe your input, the value and interest of the applications and the dissemination and use opportunities that you can offer to your potential partner.

Further R & D within the 6th Framework partnership of Raphael-IP

PROFILE OF ADDITIONAL PARTNER(S) FOR FURTHER DISSEMINATION AND USE

Please, clearly describe the profile and the expected input from the external partner(s).

Raphael-IP partnership within Sub project on high temperature materials

I confirm the information contained in part 2 of this Technological Implementation Plan and I authorise its dissemination to assist this search for collaboration.

Signature: Derek Buckthorpe

Name: Derek Buckthorpe

Date: 20th December 2005

Organisation: National Nuclear Corporation Limited

2.1 : Description of the result(s), one form per result**No. & TITLE OF RESULT** (same as in table 1.2)

No.	Self-descriptive title of the result
6	Summary report of high temperature materials for the high temperature structures (turbine) of HTR.

CONTACT PERSON FOR THIS RESULT

Name	Derek Buckthorpe
Position	Senior Consultant Engineer
Organisation	National Nuclear Corporation Limited
Address	Booths Hall, Chelford Road, Knutsford, Cheshire, UK
Telephone	00 44 1565 84 3845
Fax	00 44 1565 84 3878
E-mail	Derek.buckthorpe@nnc.co.uk
URL	
Specific Result URL	

SUMMARY (200 words maximum)

Provide an overview of the result which gives the reader an immediate impression of the nature of the result, its relevance and its potential; Briefly describe the current status/applications of the result (if appropriate) with non confidential information on entities potentially involved.

This reports the results of the high temperature material investigations and covers a review of the results regarding selection and testing in air and simulated environments. The results of the test programmes are summarised and transferred to the database as appropriate:

The work on turbine materials yields the following results:

- Review of selection for turbine blades and disc and conclusion of short term tests in air and simulated environments
- Results on tests under medium term conditions
- Recommendations for HTR, choice of material, development and material processing

Recommendations for future work to quantify long term capability of the chosen materials

Please categorise the result using codes from Annex 1

Subject descriptors	373 Materials	531 Reactor	436 Nuc E & T	150 Data	373 Materials
----------------------------	----------------------	--------------------	----------------------	-----------------	----------------------

CURRENT STAGE OF DEVELOPMENT

Please tick one category only 4

Scientific and/or Technical knowledge (Basic research)	☐ Y
Guidelines, methodologies, technical drawings	☐
Software code	☐
Experimental development stage (laboratory prototype)	☐
Prototype/demonstrator available for testing	☐
Results of demonstration trials available	☐
Other (please specify.):	☐

DOCUMENTATION AND INFORMATION ON THE RESULT

List main information and documentation, stating whether public or confidential.

Documentation type	Details (Title, ref. number, general description, language)	Status: <i>PU</i> =Public <i>CO</i> =Confidential
Technical Report	HTR-M1 05/12 D 1 2 44 HTR-M1 Turbine Materials – Final Summary Report	CO

INTELLECTUAL PROPERTY RIGHTS

<u>Type of IPR</u>	<u>KNOWLEDGE:</u> Tick a box and give the corresponding details (reference numbers, etc) if appropriate				<u>Pre-existing know-how</u> Tick a box and give the corresponding details(reference numbers, etc) if appropriate		
	Current				Foreseen	Tick	Details
	Tick	NoP ¹⁾	NoI ²⁾	Details	Tick		
Patent applied for	☐				☐	☐	
Patent granted	☐				☐	☐	
Patent search carried out	☐				☐	☐	
Registered design	☐				☐	☐	
Trademark applications	☐				☐	☐	
Copyrights	☐				☐	☐	
Secret know-how	☐				☐	☐	
Other - please specify :	☐				☐	☐	

1) Number of **P**riority (national) applications/patents

2) Number of **I**nternationally extended applications/patents

MARKET APPLICATION SECTORS

Please describe the possible sectors for application using the NACE classification in Annex 2.

Market application sectors	40				
----------------------------	----	--	--	--	--

2.2. Quantified data about the result

Items (about the results)	Actual current quantity ^a	Estimated (or future) quantity ^b
Time to application / market (in months from the end of the research project)	immediate	Applicable to FP6 and beyond
Number of (public or private) entities potentially involved in the implementation of the result :	7 partners	21
of which : number of SMEs :	0	
of which : number of entities in third countries (outside EU) :	0	1
Targeted user audience: # of reachable people	50-100:	Gen IV Members
# of S&T publications (referenced publications only)		
# of publications addressing general public (e.g. CD-ROMs, WEB sites)	0	
# of publications addressing decision takers / public authorities / etc.	0	
Visibility for the general public	No	

^a Actual current quantity = the number of items already achieved to date.

^b Estimated quantity = estimation of the quantity of the corresponding item or the number of items that you foresee to achieve within the next 3 years.

2.3. Further collaboration, dissemination and use of the result

(Optional; to be completed if partner is willing to set up new collaborations, and seeking dissemination support from the CORDIS services.)

COLLABORATIONS SOUGHT

Please tick appropriate boxes (4) corresponding to your needs.

R&D	Further research or development	☐ Y	FIN	Financial support	☐ Y
LIC	Licence agreement	☐	VC	Venture capital/spin-off funding	☐
MAN	Manufacturing agreement	☐	PPP	Private-public partnership	☐
MKT	Marketing agreement/Franchising	☐	INFO	Information exchange	☐ Y
JV	Joint venture	☐ ?	CONS	Available for consultancy	☐ Y
			Other	(please specify)	☐

POTENTIAL OFFERED FOR FURTHER DISSEMINATION AND USE

Please, clearly describe your input, the value and interest of the applications and the dissemination and use opportunities that you can offer to your potential partner.

Further R & D on High Temperature Materials within the 6th Framework partnerships of Raphael-IP and Extremat-IP

Further R & D within the 6th Framework partnership of Raphael-IP

Further R & D within the 7th Framework Programme.

Collaborative development of HTR-10, PBMR, ANTARES

PROFILE OF ADDITIONAL PARTNER(S) FOR FURTHER DISSEMINATION AND USE

Please, clearly describe the profile and the expected input from the external partner(s).

Raphael-IP partnership within Sub project on high temperature materials

Extremat-IP partnership involved in Fission Technology

I confirm the information contained in part 2 of this Technological Implementation Plan and I authorise its dissemination to assist this search for collaboration.

Signature: Derek Buckthorpe

Name: Derek Buckthorpe

Date: 20th December 2005

Organisation: National Nuclear Corporation Limited

2.1 : Description of the result(s), one form per result**No. & TITLE OF RESULT** (same as in table 1.2)

No.	Self-descriptive title of the result
3	Selection of graphite materials plus testing for effects of irradiation and oxidation on graphite properties.

CONTACT PERSON FOR THIS RESULT

Name	Derek Buckthorpe
Position	Senior Consultant Engineer
Organisation	National Nuclear Corporation Limited
Address	Booths Hall, Chelford Road, Knutsford, Cheshire, UK
Telephone	00 44 1565 84 3845
Fax	00 44 1565 84 3878
E-mail	Derek.buckthorpe@nnc.co.uk
URL	
Specific Result URL	

SUMMARY (200 words maximum)

Provide an overview of the result which gives the reader an immediate impression of the nature of the result, its relevance and its potential; Briefly describe the current status/applications of the result (if appropriate) with non confidential information on entities potentially involved.

The tasks of the HTR-M1 project includes test work on graphite irradiation, graphite oxidation plus the investigation of coatings used for pebble bed graphites.

Graphite acts as a moderator and structural component and has important safety implications because of structural and other property changes that occur when it is irradiated. The work considers available experience on HTR's and currently operating gas cooled reactors in the assessment of new graphites to provide a starting point for future HTR's. The established database also provides a means for assessing the suitability or otherwise of any potential candidates and of any testing requirements needed to confirm these properties.

Graphite selection must consider the effects of irradiation and oxidation:

Effects of oxidation has to consider an understanding of severe air ingress with core burning which is relevant to safety analysis and licensing for normal operation. Results are provided from tests on selected graphites and investigations of potential coating materials when considering the pebble bed type reactor.

Many of the graphites used in previous core designs are no longer available. The main questions are on the availability of the coke and manufacturing procedure. The graphite irradiation work covers testing of a limited number of available graphites in the High Flux Reactor. The graphites used were selected following discussions with manufacturers. The results are to be inserted in the data base.

The selection of the graphite grades for the HTR-M1 test programme has been based on factors such as properties, impurity levels and availability. Five major grades were chosen in such a way as to cover a variety of microstructures, raw materials (coal tar pitch coke and petroleum coke) and manufacturing methods (extrusion and iso-moulding). Three graphite manufacturers were selected: GrafTech (UCAR), SGL-Carbon and Toyo Tanso, to supply the materials. Cylindrical specimens of 8mm diameter, six or twelve mm length, were mounted in a specially developed rig (INNOGRAPH) and inserted in the HFR. The INNOGRAPH irradiation rig consists of 8 drums made of TZM steel. Each drum has 4 columns (for insertion of graphite specimens) with a stacking height of 60 mm. Around 200 specimens were irradiated. After the irradiation preliminary measurements were carried out to assess the influence of the irradiation on properties with a much fuller investigation planned for the 6FP. The results have been assessed for dimensional change, density, Dynamic Young's Modulus, coefficient of thermal expansion (CTE) and thermal diffusivity. The results have been assessed in light of database and design requirements and for continuation of the testing (within the 6FP) to cover the definition of full curve behaviour for the available graphites. Although initial trends have been established, no firm conclusions on individual graphite grades can be made at this stage as this will await the outcome of the RAPHAEL experiments.

Graphite Oxidation tests have been carried out to support the graphite selection with testing carried out using the THERA test rig (as for HTR-M) on each of the chosen reference grades. The graphite's ability to resist corrosion (in the event of large air ingress accident) is an important additional requirement in assessing its suitability for use in the reactor core. The work done in Germany on the development of SiC coatings for graphite materials (mainly pebbles) for protecting against oxidation from air or steam ingress under severe accident has been reviewed and reported. Tests supported the potential of a SiC coating for the Japanese IG 110 graphite.

The results are provided over a series of technical Reports (see below) and summarised within Deliverables D7 to D9 of the Project

Please categorise the result using codes from Annex 1

Subject descriptors	373 Materials	531 Reactor	436 Nuc E & T	611 Testing	373 Materials
----------------------------	----------------------	--------------------	----------------------	--------------------	----------------------

CURRENT STAGE OF DEVELOPMENT

Please tick one category only 4

Scientific and/or Technical knowledge (Basic research)	☐ Y
Guidelines, methodologies, technical drawings	☐
Software code	☐
Experimental development stage (laboratory prototype)	☐
Prototype/demonstrator available for testing	☐
Results of demonstration trials available	☐
Other (please specify.):	☐

DOCUMENTATION AND INFORMATION ON THE RESULT

List main information and documentation, stating whether public or confidential.

Documentation type	Details (Title, ref. number, general description, language)	Status: PU=Public CO=Confidential
Technical Meeting Notes	HTR-M1 02/1 M 2.0.1 Minutes of 1 st Technical meeting on graphite held on 13 th Nov. 2001 at NRG Petten, Netherlands	CO
Technical Meeting Notes	HTR-M1 02/5 M 2.0.3 Minutes of meeting with graphite manufacturer UCAR on 26 th March 2002, Notre Dame, France	CO
Technical Meeting Notes	HTR-M1 02/5 M 2.0.4 Minutes of meeting with graphite manufacturer SGL on 27 th March 2002, Chedde, France	CO
Technical Report	HTR-M1 02/11 D 2 1 9 Report on selection of graphites and testing requirements	CO
Technical Report	HTR-M1 03/ 04 D 2 2 13 Report on specimen fabrication and procurement for the graphite irradiation tests.	CO
Technical Report	HTR-M1 03/09 D 2 5 14 Graphite with SiC coatings	CO
Technical Meeting Notes	HTR-M1 04/04 M 2 0 22 Meeting on Nuclear Graphite Selection – 16 February 2004	CO
Technical Report	HTR-M1 04/12 D 2 0 27 Comparison of oxidation behaviour of 8 HTR Graphites	CO
Technical Meeting Notes	HTR-M1 05/04 M 0 0 28 Notes of a technical meeting on nuclear graphite selection held at NRG Petten	CO
Technical Report	HTR-M1 05/12 D 2 3 39 HTR-M1 Report on preliminary irradiation testing of selected graphites for HTR – report on irradiation and post irradiation tests	CO
Technical Report	HTR-M1 05/12 D 2 4 40 HTR-M1 Report on preliminary irradiation testing of selected graphites for HTR – Review of results and updating of database	CO
Technical Report	HTR-M1 05/12 D 2 4 41 HTR-M1 Report on preliminary irradiation testing of selected graphites for HTR – Assessment of the results and suitability	CO

INTELLECTUAL PROPERTY RIGHTS

<u>Type of IPR</u>	<u>KNOWLEDGE:</u> Tick a box and give the corresponding details (reference numbers, etc) if appropriate				<u>Pre-existing know-how</u> Tick a box and give the corresponding details(reference numbers, etc) if appropriate		
	Current				Foreseen	Tick	Details
	Tick	NoP ¹⁾	NoI ²⁾	Details	Tick		
Patent applied for	☐				☐	☐	
Patent granted	☐				☐	☐	
Patent search carried out	☐				☐	☐	
Registered design	☐				☐	☐	
Trademark applications	☐				☐	☐	
Copyrights	☐				☐	☐	
Secret know-how	☐				☐	☐	
Other - please specify :	☐				☐	☐	

1) Number of **P**riority (national) applications/patents

2) Number of **I**nternationally extended applications/patents

MARKET APPLICATION SECTORS

Please describe the possible sectors for application using the NACE classification in Annex 2.

Market application sectors	40				
----------------------------	----	--	--	--	--

2.2. Quantified data about the result

Items (about the results)	Actual current quantity ^a	Estimated (or future) quantity ^b
Time to application / market (in months from the end of the research project)	immediate	Applicable to FP6 and beyond
Number of (public or private) entities potentially involved in the implementation of the result :	7 partners	21
of which : number of SMEs :	0	
of which : number of entities in third countries (outside EU) :	0	1
Targeted user audience: # of reachable people	50-100: HTR-TN & Eurocourse, related ISTC projects	Gen IV Members
# of S&T publications (referenced publications only)		
# of publications addressing general public (e.g. CD-ROMs, WEB sites)	0	
# of publications addressing decision takers / public authorities / etc.	0	
Visibility for the general public	No	

^a Actual current quantity = the number of items already achieved to date.

^b Estimated quantity = estimation of the quantity of the corresponding item or the number of items that you foresee to achieve within the next 3 years.

2.3. Further collaboration, dissemination and use of the result

(Optional; to be completed if partner is willing to set up new collaborations, and seeking dissemination support from the CORDIS services.)

COLLABORATIONS SOUGHT

Please tick appropriate boxes (4) corresponding to your needs.

R&D	Further research or development	☐ Y	FIN	Financial support	☐ Y
LIC	Licence agreement	☐	VC	Venture capital/spin-off funding	☐
MAN	Manufacturing agreement	☐	PPP	Private-public partnership	☐
MKT	Marketing agreement/Franchising	☐	INFO	Information exchange	☐ Y
JV	Joint venture	☐ ?	CONS	Available for consultancy	☐ Y
			Other	(please specify)	☐

POTENTIAL OFFERED FOR FURTHER DISSEMINATION AND USE

Please, clearly describe your input, the value and interest of the applications and the dissemination and use opportunities that you can offer to your potential partner.

Further R & D within the 6th Framework partnerships of Raphael-IP and Extremat-IP

Further R & D within the 6th Framework partnership of Raphael-IP

Further R & D within the 7th Framework Programme.

Collaborative development of HTR-10, PBMR, ANTARES

PROFILE OF ADDITIONAL PARTNER(S) FOR FURTHER DISSEMINATION AND USE

Please, clearly describe the profile and the expected input from the external partner(s).

Further R & D within the 6th Framework partnership of Raphael-IP

Partnership within Extremat-IP interested in Gas reactor Fission technology, C-Composites and graphite development

I confirm the information contained in part 2 of this Technological Implementation Plan and I authorise its dissemination to assist this search for collaboration.

Signature: Derek Buckthorpe

Name: Derek Buckthorpe

Date: 20th December 2005

Organisation: National Nuclear Corporation Limited

2.1 : Description of the result(s), one form per result**No. & TITLE OF RESULT** (same as in table 1.2)

No.	Self-descriptive title of the result
9	Summary Report of graphite material investigations for HTR

CONTACT PERSON FOR THIS RESULT

Name	Derek Buckthorpe
Position	Senior Consultant Engineer
Organisation	National Nuclear Corporation Limited
Address	Booths Hall, Chelford Road, Knutsford, Cheshire, UK
Telephone	00 44 1565 84 3845
Fax	00 44 1565 84 3878
E-mail	Derek.buckthorpe@nnc.co.uk
URL	
Specific Result URL	

SUMMARY (200 words maximum)

Provide an overview of the result which gives the reader an immediate impression of the nature of the result, its relevance and its potential; Briefly describe the current status/applications of the result (if appropriate) with non confidential information on entities potentially involved.

This reports the results of the graphite material investigations and covers a review and synthesis of the work on properties and oxidation tests and investigations

The work will yield the following results:

- Recommendations for feasibility, choice of graphite, and testing.
- Results of tests on selected graphites under irradiated conditions.
- Results of tests on selected graphites under oxidising conditions.
- Results of investigations on coatings for protection against oxidation
- Assessment of results in light of needs for HTR

Please categorise the result using codes from Annex 1

Subject descriptors	373 Materials	531 Reactor	436 Nuc E & T	150 Data	373 Materials
----------------------------	----------------------	--------------------	----------------------	-----------------	----------------------

CURRENT STAGE OF DEVELOPMENT

Please tick one category only 4

Scientific and/or Technical knowledge (Basic research)	☐ Y
Guidelines, methodologies, technical drawings	☐
Software code	☐
Experimental development stage (laboratory prototype)	☐
Prototype/demonstrator available for testing	☐
Results of demonstration trials available	☐
Other (please specify.):	☐

DOCUMENTATION AND INFORMATION ON THE RESULT

List main information and documentation, stating whether public or confidential.

Documentation type	Details (Title, ref. number, general description, language)	Status: <i>PU</i> =Public <i>CO</i> =Confidential
Technical Report	HTR-M1 05/12 D 2 5 42 HTR-M1 Graphite – Final Summary report	CO

INTELLECTUAL PROPERTY RIGHTS

<u>Type of IPR</u>	<u>KNOWLEDGE:</u> Tick a box and give the corresponding details (reference numbers, etc) if appropriate				<u>Pre-existing know-how</u> Tick a box and give the corresponding details(reference numbers, etc) if appropriate		
	Current				Foreseen	Tick	Details
	Tick	NoP ¹⁾	NoI ²⁾	Details	Tick		
Patent applied for	☐				☐	☐	
Patent granted	☐				☐	☐	
Patent search carried out	☐				☐	☐	
Registered design	☐				☐	☐	
Trademark applications	☐				☐	☐	
Copyrights	☐				☐	☐	
Secret know-how	☐				☐	☐	
Other - please specify :	☐				☐	☐	

1) Number of **P**riority (national) applications/patents

2) Number of **I**nternationally extended applications/patents

MARKET APPLICATION SECTORS

Please describe the possible sectors for application using the NACE classification in Annex 2.

Market application sectors	40				
----------------------------	----	--	--	--	--

2.2. Quantified data about the result

Items (about the results)	Actual current quantity ^a	Estimated (or future) quantity ^b
Time to application / market (in months from the end of the research project)	immediate	Applicable to FP6 and beyond
Number of (public or private) entities potentially involved in the implementation of the result :	7 partners	21
of which : number of SMEs :	0	
of which : number of entities in third countries (outside EU) :	0	1
Targeted user audience: # of reachable people	50-100: HTR-TN & Eurocourse, related ISTC projects	Gen IV Members
# of S&T publications (referenced publications only)		
# of publications addressing general public (e.g. CD-ROMs, WEB sites)	0	
# of publications addressing decision takers / public authorities / etc.	0	
Visibility for the general public	No	

^a Actual current quantity = the number of items already achieved to date.

^b Estimated quantity = estimation of the quantity of the corresponding item or the number of items that you foresee to achieve within the next 3 years.

2.3. Further collaboration, dissemination and use of the result

(Optional; to be completed if partner is willing to set up new collaborations, and seeking dissemination support from the CORDIS services.)

COLLABORATIONS SOUGHT

Please tick appropriate boxes (4) corresponding to your needs.

R&D	Further research or development	☐ Y	FIN	Financial support	☐ Y
LIC	Licence agreement	☐	VC	Venture capital/spin-off funding	☐
MAN	Manufacturing agreement	☐	PPP	Private-public partnership	☐
MKT	Marketing agreement/Franchising	☐	INFO	Information exchange	☐ Y
JV	Joint venture	☐	CONS	Available for consultancy	☐ Y
			Other	(please specify)	☐

POTENTIAL OFFERED FOR FURTHER DISSEMINATION AND USE

Please, clearly describe your input, the value and interest of the applications and the dissemination and use opportunities that you can offer to your potential partner.

Further R & D within the 6th Framework partnerships of Raphael-IP and Extremat-IP

Further R & D within the 6th Framework partnership of Raphael-IP

Further R & D within the 7th Framework Programme.

Collaborative development of HTR-10, PBMR, ANTARES

PROFILE OF ADDITIONAL PARTNER(S) FOR FURTHER DISSEMINATION AND USE

Please, clearly describe the profile and the expected input from the external partner(s).

Further R & D within the 6th Framework partnership of Raphael-IP

Partnership within Extremat-IP interested in Gas reactor Fission technology, C-Composites and graphite development

I confirm the information contained in part 2 of this Technological Implementation Plan and I authorise its dissemination to assist this search for collaboration.

Signature: Derek Buckthorpe

Name: Derek Buckthorpe

Date: 20th December 2005

Organisation: National Nuclear Corporation Limited

2.1 : Description of the result(s), one form per result**No. & TITLE OF RESULT** (same as in table 1.2)

No.	Self-descriptive title of the result
5	Overall Summary Report

CONTACT PERSON FOR THIS RESULT

Name	Derek Buckthorpe
Position	Senior Consultant Engineer
Organisation	National Nuclear Corporation Limited
Address	Booths Hall, Chelford Road, Knutsford, Cheshire, UK
Telephone	00 44 1565 84 3845
Fax	00 44 1565 84 3878
E-mail	Derek.buckthorpe@nnc.co.uk
URL	
Specific Result URL	

SUMMARY (200 words maximum)

Provide an overview of the result which gives the reader an immediate impression of the nature of the result, its relevance and its potential; Briefly describe the current status/applications of the result (if appropriate) with non confidential information on entities potentially involved.

This project on materials for the HTR involves two main areas of activity: The first covering selection and extension of data-base to establish a firm platform of information on which to assess the needs for future HTR's. The second covers materials testing including irradiation tests in the High Flux Reactor at Petten.

The activities are:

1. To investigate materials for the high temperature regions of the turbine (blades) for application to HTR under simulated environments including medium term creep tests.
2. To perform work to establish graphite materials information for future prioritising of work and carry out testing under irradiated and oxidation conditions on currently available graphites.

Please categorise the result using codes from Annex 1

Subject descriptors	373 Materials	531 Reactor	436 Nuc E & T	150 Data	373 Materials
----------------------------	----------------------	--------------------	----------------------	-----------------	----------------------

CURRENT STAGE OF DEVELOPMENT

Please tick one category only 4

Scientific and/or Technical knowledge (Basic research)	☐ Y
Guidelines, methodologies, technical drawings	☐
Software code	☐
Experimental development stage (laboratory prototype)	☐
Prototype/demonstrator available for testing	☐
Results of demonstration trials available	☐
Other (please specify.):	☐

DOCUMENTATION AND INFORMATION ON THE RESULT

List main information and documentation, stating whether public or confidential.

Documentation type	Details (Title, ref. number, general description, language)	Status: PU=Public CO=Confidential
Conference paper	HTR-M 01/5 D-0.0.6 Materials for the High Temperature Reactor, Smirt 16 paper No. 1941, Div S. Washington D.C. , U.S.A. Aug 2001 (English)	PU
Conference paper	HTR-M 01/10 D-0.0.16 Investigation of High Temperature Reactor (HTR) Materials (English)	PU
Conference (poster) paper	HTR-M 02/4 D-0.0.29 Materials for the High Temperature Reactor, HTR2002 Conference, Petten, 22-24 th April 2002 (English)	PU
Conference (poster) paper	HTR-M 02/4 D-0.0.30 High Temperature Reactor (HTR) Materials, Liege Conference, 30 th Sept. to 2 nd Oct., 2002 (English)	PU
Conference paper	HTR-M 02/11 D-0.0.46 European Project on Materials for Modular HTR's, ENC2002 Conference, Lille, France, 7-9 th October 2002	PU
Conference paper	HTR-M ¾ D 0 0 64 Research and Development Programme on HTR materials, paper 3174, ICAPP03 Conference, Cordoba, Spain, 4-7 th May, 2003	PU
Conference paper	HTR-M ¾ D 0 0 67 Progress on HTR-M projects for HTR, paper S443, 17 th SMIRT Conference, Prague, Czech Republic, 12-17 TH august 2003	PU
HTR Eurocourse	HTR-M ¾ D 0 0 68 HTR Materials & Technologies, Review of Metallic Materials used in HTR's – HTR Eurocourse, CEA, Cadarache, 4-8 th November 2002	CO
Conference paper	HTR-M 03/10 D 0 0 79 High Temperature Reactor Materials: Progress of HTR-M Projects, NEA/OECD, 3 rd Information Exchange Meeting on High Temperature Engineering, JEARI, Ibaraki-ken, Japan, 11-12 th September 2003	PU
Conference paper	HTR-M 04/9 D 0 0 96 Results from EU 5 th Framework HTR Projects –HTR-M & HTR-M1, paper E12, HTR2004 Conference, Beijing, China, 22-24 th September 2004	PU
Conference Paper	HTR-M1 05/10 D 0 0 36 Presentation of results for VHTR – results from HTR-M & HTR-M1 Projects plus future programme, EUROMAT Conference, Prague, Czech Republic, 5–7 th September 2005	PU

Technical Report	HTR-M1 05/12 P 0 0 46 Final Report for HTR-M1 Project	CO
------------------	--	----

INTELLECTUAL PROPERTY RIGHTS

<u>Type of IPR</u>	<u>KNOWLEDGE:</u> Tick a box and give the corresponding details (reference numbers, etc) if appropriate				<u>Pre-existing know-how</u> Tick a box and give the corresponding details(reference numbers, etc) if appropriate	
	Current				Foreseen	
	Tick	NoP ¹⁾	NoI ²⁾	Details	Tick	Details
Patent applied for	☐				☐	
Patent granted	☐				☐	
Patent search carried out	☐				☐	
Registered design	☐				☐	
Trademark applications	☐				☐	
Copyrights	☐				☐	
Secret know-how	☐				☐	
Other - please specify :	☐				☐	

1) Number of **P**riority (national) applications/patents

2) Number of **I**nternationally extended applications/patents

MARKET APPLICATION SECTORS

Please describe the possible sectors for application using the NACE classification in Annex 2.

Market application sectors	40				
----------------------------	----	--	--	--	--

2.2. Quantified data about the result

Items (about the results)	Actual current quantity ^a	Estimated (or future) quantity ^b
Time to application / market (in months from the end of the research project)	immediate	Applicable to FP6 and beyond
Number of (public or private) entities potentially involved in the implementation of the result :	7 partners	21
of which : number of SMEs :	0	
of which : number of entities in third countries (outside EU) :	0	1
Targeted user audience: # of reachable people	50-100: HTR-TN & Eurocourse, related ISTC projects	Gen IV Members
# of S&T publications (referenced publications only)	10	
# of publications addressing general public (e.g. CD-ROMs, WEB sites)	0	
# of publications addressing decision takers / public authorities / etc.	0	
Visibility for the general public	No	

^a Actual current quantity = the number of items already achieved to date.

^b Estimated quantity = estimation of the quantity of the corresponding item or the number of items that you foresee to achieve within the next 3 years.

2.3. Further collaboration, dissemination and use of the result

(Optional; to be completed if partner is willing to set up new collaborations, and seeking dissemination support from the CORDIS services.)

COLLABORATIONS SOUGHT

Please tick appropriate boxes (4) corresponding to your needs.

R&D	Further research or development	☐ Y	FIN	Financial support	☐ Y
LIC	Licence agreement	☐	VC	Venture capital/spin-off funding	☐
MAN	Manufacturing agreement	☐	PPP	Private-public partnership	☐
MKT	Marketing agreement/Franchising	☐	INFO	Information exchange	☐ Y
JV	Joint venture	☐ ?	CONS	Available for consultancy	☐ Y
			Other	(please specify)	☐

POTENTIAL OFFERED FOR FURTHER DISSEMINATION AND USE

Please, clearly describe your input, the value and interest of the applications and the dissemination and use opportunities that you can offer to your potential partner.

Further R & D within the 6th Framework partnerships of Raphael-IP and Extremat-IP

Further R & D within the 6th Framework partnership of Raphael-IP

Further R & D within the 7th Framework Programme.

Collaborative development of HTR-10, PBMR

PROFILE OF ADDITIONAL PARTNER(S) FOR FURTHER DISSEMINATION AND USE

Please, clearly describe the profile and the expected input from the external partner(s).

Further R & D within the 6th Framework partnership of Raphael-IP

Partnership within Extremat-IP interested in Gas reactor Fission technology, C-Composites and graphite development

I confirm the information contained in part 2 of this Technological Implementation Plan and I authorise its dissemination to assist this search for collaboration.

Signature: Derek Buckthorpe

Name: Derek Buckthorpe

Date: 20th December 2005

Organisation: National Nuclear Corporation Limited

Part 3 Description of the intentions by each partner

This part 3 must be completed by each partner who is essential for the dissemination and use (i.e. result owners and/or major project contributors and/or major dissemination and use contributors). Each will detail its own use and dissemination intentions concerning the result(s) they are involved with. This description must be made result by result.

These different parts may be transmitted to the Commission either assembled at the consortium level, or individually by each partner to safeguard confidential matters if necessary (through any appropriate media). Obviously, when all partners are implementing a single dissemination and use scheme all together, a single part 3 is needed.

**PARTS 3 WILL ALWAYS BE KEPT CONFIDENTIAL BY THE
COMMISSION**

3.1 : Description of the use and the dissemination of result(s), partner per partner

MANDATORY INFORMATION :

CONTRACT NUMBER :

FIKS-CT2000-00032 & FIKS-CT2001- 135

PARTNER's NAME :

National Nuclear Corporation Limited

CONTACT PERSON(S):

Name	Mr. D. E. Buckthorpe
Position/Title	Senior Consultant Engineer
Organisation	National Nuclear Corporation Limited
Address	Booths Hall, Chelford Road, Knutsford, Cheshire WA16 8QZ, United Kingdom
Telephone	44 1565 843845
Fax	44 1565 843878
E-mail	Derek.buckthorpe@nnc.co.uk

No, TITLE AND BRIEF DESCRIPTION OF MAIN RESULT(S)

1	Medium term testing of materials for turbine (blades)) of HTR. Information on and suitability of selected materials to be assessed from medium strength tests. Resulting experimental data to be incorporated in developing data base. Results to be assessed with respect to suitability of material for application on direct cycle components.
2	Summary Report of high temperature material investigations for HTR Main findings on outcome of the high temperature materials work including applicability to future HTR's.
3	Graphite test results for effects of irradiation & oxidation Only a small number of irradiation programmes have been performed to determine irradiation behaviour of graphites at high temperatures. Irradiation to be performed at temperature on current available graphites in the High Flux Reactor. Effect of irradiation on graphite properties to be assessed for a series of tests and compared to shortlist candidates. Assessment and development of results for database. Results on parameters for oxidation behaviour in air and steam at high temperature to be provided for selected materials and assessed for HTR application.
4	Summary Report of graphite material investigations for HTR Main findings on outcome of the graphite materials work including applicability to future HTR's.
5	Overall Summary Report Main findings on outcome of the whole project with respect to materials requirements and availability for future HTR's.

FOR EACH MAIN RESULT:**TIMETABLE OF THE USE AND DISSEMINATION ACTIVITIES WITHIN THE NEXT 3 YEARS AFTER THE END OF THE PROJECT**

<i>Mention the use and dissemination related activities, the main associated partners, the related milestones and give an indicative timescale</i>		
Activity	Brief description of the activity, including main milestones and deliverables (and how it relates to data in sections 2.2 and 3.2).	Timescale (months)
1	Public presentation of the outcome of the technology	24
2	Results to be used to future activities within HTR-TN on European HTR Development	12
3	Results to be used to support UK, European and International collaboration activities on advanced projects	12
4	Information and results to be used in other R & D projects and to underline future R & D activities.	24
5	Training in the technology within company and Eurocourse activities	6 th Framework

FORESEEN COLLABORATIONS WITH OTHER ENTITIES

Please tick appropriate boxes (4) corresponding to your most probable follow-up.

R&D	Further research or development	☐ Y	FIN	Financial support	☐ Y
LIC	Licence agreement	☐	VC	Venture capital/spin-off funding	☐
MAN	Manufacturing agreement	☐	PPP	Private-public partnership	☐
MKT	Marketing agreement/Franchising	☐	INFO	Information exchange, training	☐ Y
JV	Joint venture	☐ ?	CONS	Available for consultancy	☐ Y
				Other (please specify)	☐

3.2 : Quantified data for each partner's main result

Items	Currently achieved quantity ^a	Estimated future quantity ^b
Economic impacts (in EURO)		
# of licenses issued (within EU)		
# of licenses issued (outside EU)		
Total value of licenses (in EURO)		
# of entrepreneurial actions (start-up company, joint ventures...)	0	?
# of direct jobs created ^c	1	?
# of direct jobs safeguarded ^c	2	?
# of direct jobs lost	?	?

^a The added value or the number of items already achieved to date.

^b Estimated quantity = estimation of the quantity of the corresponding item or the number of items that you foresee to achieve in the future (i.e. expectations within the next 3 years following the end of the project).

^c "Direct jobs" means jobs within the partner involved. Research posts are to be excluded from the jobs calculation

= number of ...

I confirm the information contained in part 3 of this Technological Implementation Plan and I certify that these are our exploitation intentions

Signature: Derek Buckthorpe

Name: D.E.Buckthorpe

Date: 20th December 2005

3.1 : Description of the use and the dissemination of result(s), partner per partner

MANDATORY INFORMATION :

CONTRACT NUMBER :

FIKS-CT2000-00032 & FIKS-CT2001- 135

PARTNER's NAME :

Framatome ANP

CONTACT PERSON(S):

Name	Mr Bernard Riou/ Mrs. Odile Gelineau
Position/Title	Senior Engineer
Organisation	Framatome s.a.
Address	France
Telephone	33 4 7274 7360
Fax	33 4 7274 7325
E-mail	riou@framatome.fr

No, TITLE AND BRIEF DESCRIPTION OF MAIN RESULT(S)

1	Investigations and Medium term testing of materials for the turbine (blades) of HTR. Review of requirements for experimental programme. Performance of potential high temperature materials for HTR direct cycle application. Support to database actions
2	Summary Report of high temperature ,material investigations for HTR Main findings on outcome of the turbine materials work including applicability to future HTR's
3	Graphite test results for effects of irradiation & oxidation Review of requirements for irradiation and oxidation experimental programmes. Performance of potential graphite materials for HTR application. Support to database actions
4	Summary Report of graphite material investigations for HTR Support to conclusions on main findings on outcome of the graphite materials work including applicability to future HTR's
5	Short Overall Summary Report Support to conclusions on main findings from the whole project with respect to materials requirements and availability for future HTR's.

FOR EACH MAIN RESULT:**TIMETABLE OF THE USE AND DISSEMINATION ACTIVITIES WITHIN THE NEXT 3 YEARS AFTER THE END OF THE PROJECT**

<i>Mention the use and dissemination related activities, the main associated partners, the related milestones and give an indicative timescale</i>		
Activity	Brief description of the activity, including main milestones and deliverables (and how it relates to data in sections 2.2 and 3.2).	Timescale (months)
1	Public presentation of the outcome of the technology	24
2	Results to be used to future activities within HTR-TN on European HTR Development	12
3	Results to be used to support UK, European and International collaboration activities on advanced projects	12
4	Information and results to be used in other R & D projects and to underline future R & D activities.	24
5	Training in the technology within company and Eurocourse activities	6 th Framework

FORESEEN COLLABORATIONS WITH OTHER ENTITIES

Please tick appropriate boxes (4) corresponding to your most probable follow-up.

R&D	Further research or development	☐ Y	FIN	Financial support	☐ Y
LIC	Licence agreement	☐	VC	Venture capital/spin-off funding	☐
MAN	Manufacturing agreement	☐ ?	PPP	Private-public partnership	☐ ?
MKT	Marketing agreement/Franchising	☐	INFO	Information exchange, training	☐ Y
JV	Joint venture	☐ ?	CONS	Available for consultancy	☐ Y
				Other (please specify)	☐

3.2 : Quantified data for each partner's main result

Items	Currently achieved quantity ^a	Estimated future quantity ^b
Economic impacts (in EURO)		
# of licenses issued (within EU)		
# of licenses issued (outside EU)		
Total value of licenses (in EURO)		
# of entrepreneurial actions (start-up company, joint ventures...)		
# of direct jobs created ^c		
# of direct jobs safeguarded ^c		
# of direct jobs lost		

^a The added value or the number of items already achieved to date.

^b Estimated quantity = estimation of the quantity of the corresponding item or the number of items that you foresee to achieve in the future (i.e. expectations within the next 3 years following the end of the project).

^c "Direct jobs" means jobs within the partner involved. Research posts are to be excluded from the jobs calculation

= number of ...

I confirm the information contained in part 3 of this Technological Implementation Plan and I certify that these are our exploitation intentions

Signature: O Gelineau

Name: O Gelineau

Date: 20th December 2005

3.1 : Description of the use and the dissemination of result(s), partner per partner

MANDATORY INFORMATION :

CONTRACT NUMBER :

FIKS-CT2000-00032 & FIKS-CT2001- 135

PARTNER's NAME :

Commissariat a l' Energie Atomique (CEA)

CONTACT PERSON(S):

Name	Mr. Raphael Couturier
Position/Title	Senior Research Engineer
Organisation	Commissariat a l' Energie Atomique (CEA
Address	CEREM DEM/SGM/L3M, CEA 38054 Grenoble, cedex 9, France
Telephone	33 4 7688 3559
Fax	33 4 7688 5891
E-mail	Couturier@chartreuse.cea.fr

No, TITLE AND BRIEF DESCRIPTION OF MAIN RESULT(S)

1	Investigations and Medium term testing of materials for the turbine (blades) of HTR. Review of requirements for experimental programme. Perform tests on selected high temperature turbine blade materials for HTR direct cycle application in air. Support to database actions
2	Summary Report of high temperature ,material investigations for HTR Main findings on outcome of the turbine materials work including applicability to future HTR's
3	Graphite test results for effects of irradiation & oxidation Review of requirements for irradiation and oxidation experimental programmes. Review performance of potential graphite materials for HTR application. Support to database actions
4	Summary Report of graphite material investigations for HTR Support to conclusions on main findings on outcome of the graphite materials work including applicability to future HTR's
5	Short Overall Summary Report Support to conclusions on main findings from the whole project with respect to materials requirements and availability for future HTR's.

FOR EACH MAIN RESULT:**TIMETABLE OF THE USE AND DISSEMINATION ACTIVITIES WITHIN THE NEXT 3 YEARS AFTER THE END OF THE PROJECT**

<i>Mention the use and dissemination related activities, the main associated partners, the related milestones and give an indicative timescale</i>		
Activity	Brief description of the activity, including main milestones and deliverables (and how it relates to data in sections 2.2 and 3.2).	Timescale (months)
1	Public presentation of the outcome of the technology	24
2	Results to be used to future activities within HTR-TN on European HTR Development	12
3	Results to be used to support UK, European and International collaboration activities on advanced projects	12
4	Information and results to be used in other R & D projects and to underline future R & D activities.	24
5	Training in the technology within company and Eurocourse activities	6 th Framework

FORESEEN COLLABORATIONS WITH OTHER ENTITIES

Please tick appropriate boxes (4) corresponding to your most probable follow-up.

R&D	Further research or development	☐ Y	FIN	Financial support	☐
LIC	Licence agreement	☐	VC	Venture capital/spin-off funding	☐
MAN	Manufacturing agreement	☐	PPP	Private-public partnership	☐
MKT	Marketing agreement/Franchising	☐	INFO	Information exchange, training	☐
JV	Joint venture	☐	CONS	Available for consultancy	☐
				Other (please specify)	☐

3.2 : Quantified data for each partner's main result

Items	Currently achieved quantity ^a	Estimated future quantity ^b
Economic impacts (in EURO)		
# of licenses issued (within EU)		
# of licenses issued (outside EU)		
Total value of licenses (in EURO)		
# of entrepreneurial actions (start-up company, joint ventures...)		
# of direct jobs created ^c		
# of direct jobs safeguarded ^c		
# of direct jobs lost		

^a The added value or the number of items already achieved to date.

^b Estimated quantity = estimation of the quantity of the corresponding item or the number of items that you foresee to achieve in the future (i.e. expectations within the next 3 years following the end of the project).

^c "Direct jobs" means jobs within the partner involved. Research posts are to be excluded from the jobs calculation

= number of ...

I confirm the information contained in part 3 of this Technological Implementation Plan and I certify that these are our exploitation intentions

Signature: R Couturier

Name: R Couturier

Date: 20th December 2005

3.1 : Description of the use and the dissemination of result(s), partner per partner**MANDATORY INFORMATION :****CONTRACT NUMBER :****FIKS-CT2000-00032 & FIKS-CT2001- 00135****PARTNER's NAME :****Nuclear Research and Consultancy Group (NRG, Petten)****CONTACT PERSON(S):**

Name	B. van der Schaaf, J.B.J. Hegeman
Position/Title	Group-manager, Project leader
Organisation	NRG, Petten
Address	Westerduinweg 3, P.O. Box 25, 1755 ZG, Petten, The Netherlands
Telephone	+ 31 224 564246
Fax	+ 31 224 568886
E-mail	hegeman@nrg-nl.com

No, TITLE AND BRIEF DESCRIPTION OF MAIN RESULT(S)

1	Graphite test results for effects of irradiation & oxidation Review of requirements for irradiation and oxidation experimental programmes. Design of rig and Performance of graphite irradiation tests in HFR. Support to database actions
2	Summary Report of graphite material investigations for HTR Support to conclusions on main findings on outcome of the graphite materials work including applicability to future HTR's
3	Short Overall Summary Report Support to conclusions on main findings from the whole project with respect to materials requirements and availability for future HTR's.

FOR EACH MAIN RESULT:**TIMETABLE OF THE USE AND DISSEMINATION ACTIVITIES WITHIN THE NEXT 3 YEARS AFTER THE END OF THE PROJECT**

<i>Mention the use and dissemination related activities, the main associated partners, the related milestones and give an indicative timescale</i>		
Activity	Brief description of the activity, including main milestones and deliverables (and how it relates to data in sections 2.2 and 3.2).	Timescale (months)
1	Use of the final database for design tasks in FP6	36
2	Final Report, baseline for project definition for FP6	12
3	Use of the final report for HTR related graphite design tasks by NRG	36
4	Design and Safety Report and analysis of the capsule will be used for irradiation and capsule improvements	36
5	Final PIE results will be used for external publication on seminar and/or conference	12

FORESEEN COLLABORATIONS WITH OTHER ENTITIES

Please tick appropriate boxes (4) corresponding to your most probable follow-up.

R&D	Further research or development	Y	FIN	Financial support	?
LIC	Licence agreement	☐	VC	Venture capital/spin-off funding	☐
MAN	Manufacturing agreement	☐	PPP	Private-public partnership	☐
MKT	Marketing agreement/Franchising	☐	INFO	Information exchange, training	?
JV	Joint venture	?	CONS	Available for consultancy	?
			Other	(please specify)	☐

3.2 : Quantified data for each partner's main result

Items	Currently achieved quantity ^a	Estimated future quantity ^b
Economic impacts (in EURO)	-	-
# of licenses issued (within EU)	-	-
# of licenses issued (outside EU)	-	-
Total value of licenses (in EURO)	0	0
# of entrepreneurial actions (start-up company, joint ventures...)	0	2
# of direct jobs created ^c	?	?
# of direct jobs safeguarded ^c	?	?
# of direct jobs lost	?	2

^a The added value or the number of items already achieved to date.

^b Estimated quantity = estimation of the quantity of the corresponding item or the number of items that you foresee to achieve in the future (i.e. expectations within the next 3 years following the end of the project).

^c "Direct jobs" means jobs within the partner involved. Research posts are to be excluded from the jobs calculation

= number of ...

I confirm the information contained in part 3 of this Technological Implementation Plan and I certify that these are our exploitation intentions

Signature: B van der Schaaf

Name: B van der Schaaf

Date: 20th December 2005

3.1 : Description of the use and the dissemination of result(s), partner per partner**MANDATORY INFORMATION :****CONTRACT NUMBER :****FIKS-CT2000-00032 & FIKS-CT2001- 135****PARTNER's NAME :****Joint Research Centre Directorate General - Institute of****CONTACT PERSON(S):**

Name	Mr. Henrik Rantala/Nigel Taylor
Position/Title	Senior Research Engineer
Organisation	Joint Research Centre Directorate General
Address	Institute for Energy P.O.Box 2 NL1755 ZG Petten, Westerduinweg 3 Netherlands
Telephone	31 224 56 53 06
Fax	31 224 56 1568
E-mail	rantala@jrc.nl

No, TITLE AND BRIEF DESCRIPTION OF MAIN RESULT(S)

1	Investigations and Medium term testing of materials for the turbine (blades) of HTR. Information on and suitability of selected materials to be assessed from short and medium strength tests. Procurement of material for the Turbine blades. Construction of corrosion facility. Perform experiments in simulated atmospheres on disc and blade materials (project tests in this area to be shared with CEA). Data to be incorporated in developing database. Results to assessed with respect to suitability of material for application on direct cycle components
2	Summary Report of high temperature ,material investigations for HTR Contribution to main findings on outcome of the high temperature materials work including applicability to future HTR's
5	Short Overall Summary Report Support to conclusions on main findings from the whole project with respect to materials requirements and availability for future HTR's.

FOR EACH MAIN RESULT:**TIMETABLE OF THE USE AND DISSEMINATION ACTIVITIES WITHIN THE NEXT 3 YEARS AFTER THE END OF THE PROJECT**

<i>Mention the use and dissemination related activities, the main associated partners, the related milestones and give an indicative timescale</i>		
Activity	Brief description of the activity, including main milestones and deliverables (and how it relates to data in sections 2.2 and 3.2).	Timescale (months)
1	Public presentation of the outcome of the technology	24
2	Results to be used to future activities within HTR-TN on European HTR Development	12
3	Results to be used to support UK, European and International collaboration activities on advanced projects	12
4	Information and results to be used in other R & D projects and to underline future R& D activities.	24
5	Training in the technology within company and Eurocourse activities	6 th Framework

FORESEEN COLLABORATIONS WITH OTHER ENTITIES

Please tick appropriate boxes (4) corresponding to your most probable follow-up.

R&D	Further research or development	☐ Y	FIN	Financial support	☐
LIC	Licence agreement	☐	VC	Venture capital/spin-off funding	☐
MAN	Manufacturing agreement	☐	PPP	Private-public partnership	☐
MKT	Marketing agreement/Franchising	☐	INFO	Information exchange, training	☐
JV	Joint venture	☐	CONS	Available for consultancy	☐
				Other (please specify)	☐

3.2 : Quantified data for each partner's main result

Items	Currently achieved quantity ^a	Estimated future quantity ^b
Economic impacts (in EURO)		
# of licenses issued (within EU)		
# of licenses issued (outside EU)		
Total value of licenses (in EURO)		
# of entrepreneurial actions (start-up company, joint ventures...)		
# of direct jobs created ^c		
# of direct jobs safeguarded ^c		
# of direct jobs lost		

^a The added value or the number of items already achieved to date.

^b Estimated quantity = estimation of the quantity of the corresponding item or the number of items that you foresee to achieve in the future (i.e. expectations within the next 3 years following the end of the project).

^c "Direct jobs" means jobs within the partner involved. Research posts are to be excluded from the jobs calculation

= number of ...

I confirm the information contained in part 3 of this Technological Implementation Plan and I certify that these are our exploitation intentions

Signature: N Taylor

Name: N Taylor

Date: 20th December 2005

3.1 : Description of the use and the dissemination of result(s), partner per partner**MANDATORY INFORMATION :****CONTRACT NUMBER :****FIKS-CT2000-00032 & FIKS-CT2001- 135****PARTNER's NAME :****Forschungszentrum Juelich GmbH (FZJ)****CONTACT PERSON(S):**

Name	Kertsyn Kuehn
Position/Title	Senior Researcher
Organisation	Forschungszentrum Juelich GmbH
Address	ESS-Project 52425 Jülich
Telephone	49 2461 61 4644
Fax	49 2461 61 8255
E-mail	k.kuehn@fz-juelich.de

No, TITLE AND BRIEF DESCRIPTION OF MAIN RESULT(S)

1	Investigations and Medium term testing of materials for the turbine (blades) of HTR. Information on and suitability of selected materials to be assessed from short and medium strength tests. Advice/ experience regarding experiments and corrosion in helium environment. Resulting experimental data to be incorporated in developing data base. Results to be assessed with respect to suitability of material for application on direct cycle components.
2	Summary Report of high temperature ,material investigations for HTR Main findings on outcome of the high temperature materials work including applicability to future HTR's.
3	Graphite test results for effects of irradiation & oxidation Selection of graphites for irradiation and oxidation tests Experimental tests performed at FZJ at temperature to provide results on oxidation behaviour of graphites used in irradiation experiments
4	Summary Report of graphite material investigations for HTR Contribution to main findings on outcome of the graphite materials work including applicability to future HTR's.
5	Overall Summary Report Contribution to main findings on outcome of the whole project with respect to materials requirements and availability for future HTR's.

FOR EACH MAIN RESULT:**TIMETABLE OF THE USE AND DISSEMINATION ACTIVITIES WITHIN THE NEXT 3 YEARS AFTER THE END OF THE PROJECT**

<i>Mention the use and dissemination related activities, the main associated partners, the related milestones and give an indicative timescale</i>		
Activity	Brief description of the activity, including main milestones and deliverables (and how it relates to data in sections 2.2 and 3.2).	Timescale (months)
1	Public presentation of the outcome of the technology	24
2	Results to be used to future activities within HTR-TN on European HTR Development	12
3	Results to be used to support UK, European and International collaboration activities on advanced projects	12
4	Information and results to be used in other R & D projects and to underline future R & D activities.	24
5	Training in the technology within company and Eurocourse activities	6 th Framework

FORESEEN COLLABORATIONS WITH OTHER ENTITIES

Please tick appropriate boxes (4) corresponding to your most probable follow-up.

R&D	Further research or development	☐ Y	FIN	Financial support	☐
LIC	Licence agreement	☐	VC	Venture capital/spin-off funding	☐
MAN	Manufacturing agreement	☐	PPP	Private-public partnership	☐
MKT	Marketing agreement/Franchising	☐	INFO	Information exchange, training	☐
JV	Joint venture	☐	CONS	Available for consultancy	☐
				Other (please specify)	☐

3.2 : Quantified data for each partner's main result

Items	Currently achieved quantity ^a	Estimated future quantity ^b
Economic impacts (in EURO)		
# of licenses issued (within EU)		
# of licenses issued (outside EU)		
Total value of licenses (in EURO)		
# of entrepreneurial actions (start-up company, joint ventures...)		
# of direct jobs created ^c		
# of direct jobs safeguarded ^c		
# of direct jobs lost		

^a The added value or the number of items already achieved to date.

^b Estimated quantity = estimation of the quantity of the corresponding item or the number of items that you foresee to achieve in the future (i.e. expectations within the next 3 years following the end of the project).

^c "Direct jobs" means jobs within the partner involved. Research posts are to be excluded from the jobs calculation

= number of ...

I confirm the information contained in part 3 of this Technological Implementation Plan and I certify that these are our exploitation intentions

Signature: K. Kuhn

Name: K. Kuhn

Date: 20th December 2005

3.1 : Description of the use and the dissemination of result(s), partner per partner**MANDATORY INFORMATION :****CONTRACT NUMBER :****FIKS-CT2000-00032 & FIKS-CT2001-00135****PARTNER's NAME :****Empresarios Agrupados Internacional s.a. (E.A.S.A. MD)****CONTACT PERSON(S):**

Name	Mr. A. Buenaventura/ Mr. D De Lorenzo
Position/Title	Expert
Organisation	Empresarios Agrupados Internacional s.a. (E.A.S.A. MD)
Address	Spain
Telephone	34 91 309 8000
Fax	34 91 591 2655
E-mail	Faz@empre.es

No, TITLE AND BRIEF DESCRIPTION OF MAIN RESULT(S)

1	Investigations and Medium term testing of materials for the turbine (blades) of HTR. Support to resulting experimental data to be incorporated in developing data base. Results to be assessed with respect to suitability of material for application on direct cycle components.
2	Summary Report of high temperature ,material investigations for HTR Contribution to main findings on outcome of the high temperature materials work including applicability to future HTR's.
5	Short Overall Summary Report Contribution to main findings on outcome of the whole project with respect to materials requirements and availability for future HTR's.

FOR EACH MAIN RESULT:**TIMETABLE OF THE USE AND DISSEMINATION ACTIVITIES WITHIN THE NEXT 3 YEARS AFTER THE END OF THE PROJECT**

<i>Mention the use and dissemination related activities, the main associated partners, the related milestones and give an indicative timescale</i>		
Activity	Brief description of the activity, including main milestones and deliverables (and how it relates to data in sections 2.2 and 3.2).	Timescale (months)
1	Public presentation of the outcome of the technology	24
2	Results to be used to future activities within HTR-TN on European HTR Development	12
3	Results to be used to support UK, European and International collaboration activities on advanced projects	12
4	Information and results to be used in other R & D projects and to underline future R & D activities.	24
5	Training in the technology within company and Eurocourse activities	6 th Framework

FORESEEN COLLABORATIONS WITH OTHER ENTITIES

Please tick appropriate boxes (4) corresponding to your most probable follow-up.

R&D	Further research or development	☐ Y	FIN	Financial support	☐
LIC	Licence agreement	☐	VC	Venture capital/spin-off funding	☐
MAN	Manufacturing agreement	☐	PPP	Private-public partnership	☐
MKT	Marketing agreement/Franchising	☐	INFO	Information exchange, training	☐
JV	Joint venture	☐	CONS	Available for consultancy	☐
				Other (please specify)	☐

3.2 : Quantified data for each partner's main result

Items	Currently achieved quantity ^a	Estimated future quantity ^b
Economic impacts (in EURO)		
# of licenses issued (within EU)		
# of licenses issued (outside EU)		
Total value of licenses (in EURO)		
# of entrepreneurial actions (start-up company, joint ventures...)		
# of direct jobs created ^c		
# of direct jobs safeguarded ^c		
# of direct jobs lost		

^a The added value or the number of items already achieved to date.

^b Estimated quantity = estimation of the quantity of the corresponding item or the number of items that you foresee to achieve in the future (i.e. expectations within the next 3 years following the end of the project).

^c "Direct jobs" means jobs within the partner involved. Research posts are to be excluded from the jobs calculation

= number of ...

I confirm the information contained in part 3 of this Technological Implementation Plan and I certify that these are our exploitation intentions

Signature: D De Lorenzo

Name: D De Lorenzo

Date: 20th December 2005

ANNEX 1: SUBJECT DESCRIPTOR CODES

1	ACARIANS	67	BIOLOGICAL COLLECTIONS: MUSEA AND RELATED INFORMATION RESOURCES
2	ACCIDENTOLOGY	68	BIOLOGICAL ENGINEERING
3	ACCOUNTING	69	BIOLOGICAL MONITORING/RISK FACTORS AND ASSESSMENT
4	ACOUSTICS	70	BIOLOGICAL SCIENCES, BIOLOGY
5	ADMINISTRATIVE SCIENCES, ADMINISTRATION	71	BIOMASS PROCESS INTEGRATION AND ENVIRONMENTAL IMPACTS
6	ADULT EDUCATION, PERMANENT EDUCATION	72	BIOMECHANICS, BIOMEDICAL ENGINEERING
7	AERONAUTICS	73	BIOMEDICAL ETHICS
8	AGEING	74	BIOMEDICAL SCIENCES
9	AGRICULTURAL CHEMISTRY	75	BIOMOLECULES, BIOPLASTICS, BIOPOLYMERS
10	AGRICULTURAL ECONOMICS	76	BIOPHYSICS, MEDICAL PHYSICS
11	AGRICULTURAL ENGINEERING/TECHNOLOGY	77	BIOREACTORS
12	AGRICULTURAL MARKETING/TRADE	78	BIOREMEDIATION
13	AGRICULTURAL PRODUCTION SYSTEMS	79	BIOSAFETY
14	AGRICULTURAL SCIENCES, AGRICULTURE	80	BIOSENSORS
15	AGRI-FOOD, AGRI-ENVIRONMENT	81	BIOTECHNOLOGY, BIOENGINEERING
16	AGRONOMY	82	BIOTRANSFORMATION
17	AIR TRAFFIC CONTROL OPERATIONS/PROCEDURES/SLOT ALLOCATION	83	BOREAL FOREST
18	AIR TRAFFIC MANAGEMENT/FLOW MANAGEMENT	84	BRAIN DEVELOPMENT
19	AIR TRANSPORT TECHNOLOGY	85	BRAIN THEORY, BRAIN MAPPING
20	AIRCRAFT	86	BROADBAND TECHNOLOGIES
21	AIRPORT OPERATIONS/PROCEDURES	87	BROADCASTING
22	ALGAE	88	BROKERAGE SERVICES
23	ALGEBRA	89	BUILDING CONSTRUCTION, SHELL SUSTAINABILITY
24	ALGEBRAIC TOPOLOGY	90	BUSINESS COMMUNICATION
25	ALGORITHMS AND COMPLEXITY	91	BUSINESS ECONOMICS/STUDIES, ORGANISATION AND PROCESSES
26	ALLERGOLOGY	92	CARBOCHEMISTRY, PETROCHEMISTRY, FUELS AND EXPLOSIVES TECHNOLOGY
27	ALTERNATIVE PROPULSION SYSTEMS	93	CARBOHYDRATES AND OTHER MACROMOLECULES METABOLISM
28	ANALYTICAL CHEMISTRY	94	CARBON DIOXIDE CAPTURE/STORAGE/DISPOSAL
29	ANIMAL BANKS AND REPOSITORIES	95	CARDIOVASCULAR SYSTEM
30	ANIMAL BIOTECHNOLOGY	96	CARE AND HEALTH SERVICES, HELP TO THE HANDICAPPED
31	ANIMAL BREEDING/REPRODUCTION/NUTRITION	97	CELL COMMUNICATION
32	ANIMAL FEED, ANIMAL PRODUCTION	98	CENTRAL AND EASTERN EUROPEAN COUNTRIES
33	ANIMAL HEALTH, ANIMAL WELFARE	99	CERAMIC MATERIALS AND POWDERS
34	ANIMAL PARASITIC DISEASES	100	CERTIFICATION
35	ANIMAL PHYSIOLOGY	101	CHEMICAL METROLOGY
36	ANIMAL PRODUCTS	102	CHEMICAL TECHNOLOGY AND ENGINEERING
37	ANTHROPOGENIC IMPACT ON ECOSYSTEMS	103	CHEMISTRY/HOMOGENEOUS AND HETEROGENEOUS CATALYSIS/THEORETICAL/NANOCHEMISTRY
38	ANTHROPOLOGY	104	CHRONOLOGY, DATATION TECHNOLOGY
39	ANTIBIOTICS	105	CIVIL ENGINEERING (INCL PAVEMENTS AND STRUCTURES)
40	ANTICANCER THERAPIES	106	CLINICAL GENETICS, BIOLOGY
41	ANTI-FRAUD	107	CLINICAL PHYSICS, RADIOLOGY, TOMOGRAPHY, MEDICAL INSTRUMENTATION, MEDICAL IMAGING
42	APPLIED MATHEMATICS	108	CLINICAL RESEARCH, CLINICAL TRIALS, COMPUTERISED CLINICAL SYSTEMS
43	APPLIED PHYSICS	109	COAL MINING TECHNOLOGIES
44	AQUACULTURE, AQUACULTURE TECHNOLOGY	110	COASTAL MORPHOLOGICAL CHANGES AND COASTAL DEFENSE MECHANISMS
45	ARCHIVISTICS/DOCUMENTATION/TECHNICAL DOCUMENTATION	111	COASTAL ZONE ECOSYSTEMS AND MANAGEMENT
46	ARCTIC ENVIRONMENT	112	COATS AND SURFACE TREATMENT
47	ARTIFICIAL INTELLIGENCE	113	COGNITIVE SCIENCE
48	ARTS	114	COLLOIDS
49	ASSESSMENT AND MANAGEMENT OF LIVING RESOURCES	115	COMBINATORIAL CHEMISTRY
50	ASTRONOMY	116	COMBINED HEAT AND POWER SYSTEMS
51	ASTROPHYSICS/PLANETARY GEOLOGY	117	COMBUSTION BASICS AND EFFICIENCY
52	ATOMIC AND MOLECULAR PHYSICS	118	COMMERCIAL AND INDUSTRIAL ECONOMICS
53	AUDIOVISUAL COMMUNICATION	119	COMMON AGRICULTURAL POLICY
54	AUTOMATION, ROBOTIC CONTROL SYSTEMS	120	COMMUNICATION ENGINEERING/TECHNOLOGY
55	BACTERIOLOGY	121	COMMUNICATION SCIENCES/HUMAN COMPUTER INTERACTIONS
56	BANKING	122	COMMUNITY DEVELOPMENT, COMMUNITY STUDIES
57	BENCHMARKING TECHNIQUES		
58	BIOASSAYS		
59	BIOCATALYSTS		
60	BIOCHEMICAL TECHNOLOGY		
61	BIOCHEMISTRY, METABOLISM		
62	BIOCOMPUTING, MEDICAL INFORMATICS, BIOMATHEMATICS, BIOMETRICS		
63	BIODEGRADATION		
64	BIODIVERSITY		
65	BIOFERTILIZERS		
66	BIOGAS PRODUCTION		

123	COMPANY RE-ENGINEERING/ORGANISATIONAL DEVELOPMENT	178	ECONOMICS IN AGRICULTURE/FORESTRY/RURAL DEVELOPMENT
124	COMPOSITE MATERIALS	179	ECONOMICS OF DEVELOPMENT/GROWTH/INNOVATION
125	COMPUTATIONAL BIOLOGY	180	ECONOMICS, ECONOMIC PLANNING
126	COMPUTATIONAL CHEMISTRY AND MODELING	181	ECOSYSTEM RESEARCH AND CONSERVATION
127	COMPUTATIONAL MATHEMATICS/DISCRETE MATHEMATICS	182	ECOTOXICOLOGY
128	COMPUTATIONAL PHYSICS	183	EDUCATION AND TRAINING, LIFELONG LEARNING, REMOTE LEARNING
129	COMPUTER SCIENCE/ENGINEERING, NUMERICAL ANALYSIS, SYSTEMS, CONTROL	184	EDUCATIONAL MULTIMEDIA
130	COMPUTER TECHNOLOGY/GRAPHICS, META COMPUTING	185	EDUCATIONAL SCIENCES
131	COMPUTER-BASED TRAINING	186	ELECTRICAL ENGINEERING/TECHNOLOGY
132	CONDENSED MATTER: ELECTRONIC, MAGNETIC AND SUPERCONDUCTIVE PROPERTIES	187	ELECTROMAGNETISM
133	CONDENSED MATTER: MECHANICAL AND THERMAL PROPERTIES	188	ELECTRONIC COMMERCE, ELECTRONIC PAYMENT, ELECTRONIC SIGNATURE
134	CONDENSED MATTER: OPTICAL AND DIELECTRIC PROPERTIES	189	ELECTRONIC DATA INTERCHANGE
135	CONDENSED MATTER: SOFT MATTER AND POLYMER PHYSICS	190	ELECTRONIC HEALTH RECORDS
136	CONSUMER SCIENCES, CONSUMERS' RIGHTS	191	ELECTRONIC PUBLISHING, AUTHORING TOOLS
137	CONTROL ENGINEERING	192	ELECTRONICS, ELECTRONIC ENGINEERING
138	COOPERATIVE WORKING	193	EMERGENCY MANAGEMENT
139	CORROSION	194	EMISSION
140	COSMOLOGY	195	EMPLOYMENT STUDIES
141	CRIMINOLOGY	196	ENDOCRINOLOGY, SECRETING SYSTEMS, DIABETOLOGY
142	CROP, CROP INPUTS/MANAGEMENT/YIELD ESTIMATION	197	ENERGY AND CLIMATE CHANGE
143	CULTURAL HERITAGE: PRESERVATION AND RESTORATION/CULTURAL STUDIES	198	ENERGY CONVERSION PROCESSES OR CYCLES/CONVERSION FROM COAL
144	CULTURE COLLECTIONS: MICROBIAL, CELL, TISSUE, GERMLASM	199	ENERGY MANAGEMENT SYSTEM
145	CURRICULUM STUDIES	200	ENERGY MARKET ANALYSIS
146	CYBERNETICS	201	ENERGY PRODUCTION FROM BIOMASS / WASTE
147	CYTOGENETICS	202	ENERGY RESEARCH/RTD POLICY
148	CYTOLOGY, CANCEROLOGY, ONCOLOGY	203	ENERGY, RENEWABLE ENERGIES, ELECTRICITY STORAGE
149	DATA PROTECTION, STORAGE TECHNOLOGY, CRYPTOGRAPHY	204	ENGINEERING, CONCURRENT ENGINEERING
150	DATABASES, DATABASE MANAGEMENT, DATA MINING	205	ENTOMOLOGY, PLANT PARASITOLOGY
151	DECENTRALISED GENERATION OF ELECTRICITY/HEAT	206	ENTREPRENEURSHIP, SPIN OFFS, NEW TECHNOLOGY BASED BUSINESS
152	DECISION SUPPORT TOOLS	207	ENVIRONMENT, ENVIRONMENTAL SCIENCE
153	DEEP WATER EXPLOITATION	208	ENVIRONMENTAL ECONOMICS/NATURAL RESOURCES ECONOMICS
154	DEMOGRAPHY	209	ENVIRONMENTAL HEALTH
155	DESIGN, DESIGN ENGINEERING	210	ENVIRONMENTAL IMPACTS/INTERACTIONS
156	DEVELOPMENT OF CLEAN FUELS FOR TRANSPORT	211	ENVIRONMENTAL INDICATORS/MONITORING/RISK ASSESSMENT
157	DEVELOPMENT POLICIES AND STUDIES	212	ENVIRONMENTAL LAW/TREATIES/POLICY
158	DEVELOPMENT TECHNOLOGY, ANIMAL GROWTH, ONTOLOGY, EMBRYOLOGY	213	ENVIRONMENTAL TECHNOLOGY/ENGINEERING, POLLUTION CONTROL
159	DIAGNOSTICS, DIAGNOSIS	214	EPIDEMIOLOGY
160	DIGITAL SYSTEMS, DIGITAL REPRESENTATION	215	ERGONOMICS
161	DISABILITIES, HANDICAPS AND HANDICAPPED	216	EROSION
162	DISEASES: RARE/CHRONIC/DEGENERATIVE, ETIOLOGIC FACTORS	217	EUROPEAN INTEGRATION
163	DIVERSIFICATION IN AGRICULTURE/FORESTRY	218	EUROPEAN LAW
164	DNA CHIP	219	EUROPEAN STUDIES
165	DNA THERAPIES	220	EVALUATION
166	DOWNSTREAM PROCESSING	221	EXPLOITATION OF RESEARCH RESULTS
167	"DRILLING TECHNOLOGY; DEEP DRILLING"	222	EXTENSIFICATION
168	DRUG ABUSE, ADDICTION	223	EXTERNALITIES
169	DRUG DISCOVERY, PROFILING, TARGETING	224	FARMHOUSE CONSTRUCTION
170	DRYLAND AND ARID ZONE ECOSYSTEMS	225	FARMING SYSTEMS
171	EARTH OBSERVATION APPLICATIONS AND POLICY	226	FERMENTATION
172	EARTH OBSERVATION TECHNOLOGY AND INFORMATION EXTRACTION	227	FINANCIAL SCIENCE, FINANCE
173	EARTH SCIENCE, EARTH OBSERVATION/STRATIGRAPHY/SEDIMENTARY PROCESSES	228	FINE CHEMICALS, DYES AND INKS
174	EARTH SCIENCES FOR CLIMATE RESEARCH	229	FISH/FISHERIES
175	ECOLOGY, ECOSYSTEMS, ECOLOGICAL EVOLUTION/DYNAMICS	230	FISHING METHODOLOGIES/SELECTIVITY
176	ECONOMIC AND ENVIRONMENT IMPACTS	231	FOOD AND DRINK TECHNOLOGY
177	ECONOMIC AND SOCIAL SCIENCES	232	FOOD CHEMISTRY, FOOD INGREDIENTS
		233	FOOD MICROBIOLOGY
		234	FOOD PROCESSING/PACKAGING
		235	FOOD QUALITY MANAGEMENT/POLICY/LABELLING
		236	FOOD TOXICOLOGY
		237	FOREST ECOSYSTEMS
		238	FOREST GENETICS
		239	FOREST PHYSIOLOGY AND PATHOLOGY
		240	FOREST POLICY, FOREST MANAGEMENT

241	FOREST PROTECTION	306	HYDROELECTRICITY/SMALL HYDRO/HYDROPOWER
242	FOREST SCIENCES	307	HYDROGEN
243	FORMAL SAFETY AND ENVIRONMENTAL ASSESSMENT	308	HYDROGEOLOGY, GEOGRAPHICAL AND GEOLOGICAL ENGINEERING
244	FREIGHT TRANSPORT	309	IDENTIFICATION SYSTEMS
245	FUEL CELLS	310	IMAGING, IMAGE PROCESSING
246	FUELS: ALTERNATIVE FUELS IN TRANSPORTS	311	IMMUNOLOGY, IMMUNOTHERAPY, IMMUNOASSAYS
247	FUNCTIONAL FOODS	312	IN VITRO TESTING/TRIAL METHODS
248	FUNGI	313	INDUSTRIAL ENGINEERING
249	FUTURE AND EMERGING TECHNOLOGIES	314	INDUSTRIAL POLICY/RELATIONS
250	GAS CONVERSION	315	INDUSTRIAL PSYCHOLOGY/SOCIOLOGY
251	GAS TURBINES FOR ENERGY CONVERSION	316	INDUSTRIAL TECHNOLOGY/ECONOMICS
252	GASES, FLUID DYNAMICS, PLASMAS/ELECTRIC DISCHARGES	317	INFECTIONS
253	GASTRO-ENTEROLOGY	318	INFORMATICS
254	GENDER ISSUES, GENDER STUDIES	319	INFORMATICS LAW
255	GENE THERAPY	320	INFORMATION MANAGEMENT
256	GENERAL PATHOLOGY, PATHOLOGICAL ANATOMY	321	INFORMATION TECHNOLOGY/SCIENCE
257	GENETIC COMPARATIVE ANALYSIS	322	INFRASTRUCTURE MANAGEMENT
258	GENETIC ENGINEERING	323	INLAND NAVIGATION
259	GENETIC MAPPING, GENE SEQUENCE	324	INNOVATION ASSISTANCE
260	GENETIC RESISTANCE	325	INNOVATION FINANCE
261	GENETIC SELECTION	326	INNOVATION MONITORING
262	GENETICALLY MODIFIED ORGANISMS	327	INNOVATION POLICY/STUDIES
263	GENETICS	328	INNOVATION TRAINING
264	GENOMES, GENOMICS	329	INORGANIC CHEMISTRY
265	GEOGRAPHIC INFORMATION SYSTEMS	330	INSECTS
266	GEOGRAPHY	331	INSTRUMENTATION TECHNOLOGY
267	GEOLOGICAL ENGINEERING/GEOTECHNICS	332	INTANGIBLE INVESTMENTS
268	GEOMETRY/TOPOLOGY	333	INTEGRATED ENVIRONMENTAL ASSESSMENT
269	GEOPHYSICS, PHYSICAL OCEANOGRAPHY, METEOROLOGY, GEOCHEMISTRY, TECTONICS	334	INTEGRATED GLOBAL SAFETY
270	GERONTOLOGY AND GERIATRICS	335	INTEGRATION OF RENEWABLE ENERGY SYSTEMS
271	GLOBAL CHANGE: BIOGEOCHEMICAL AND HYDROLOGICAL CYCLES	336	INTELLECTUAL PROPERTY
272	GLOBAL CHANGE: CLIMATE CHANGE	337	INTELLIGENT AGENTS
273	GLOBAL CHANGE: HUMAN HEALTH	338	INTELLIGENT VEHICLES AND WATERBORNE TRANSPORT SYSTEMS
274	GLOBAL CHANGE: LAND COVER AND DEGRADATION	339	INTERMODAL TRANSPORT
275	GLOBAL CHANGE: OZONE AND ATMOSPHERIC COMPOSITION	340	INTERNATIONAL COMMERCE/ECONOMICS
276	GLOBAL CYCLES OF ENERGY AND MATTER	341	INTERNATIONAL TREATIES / MULTILATERAL AGREEMENTS
277	GREEN TECHNOLOGIES/CHEMICALS	342	INTERNET TECHNOLOGIES
278	GRID CONNECTION	343	INVERTEBRATES
279	HAZARDS: INDUSTRIAL	344	JOURNALISM
280	HAZARDS: NATURAL	345	KNOWLEDGE ENGINEERING
281	HEALTH AND POPULATION, HEALTH EDUCATION	346	LABOUR MARKET STUDIES/ECONOMICS
282	HEALTH FINANCING / ECONOMICS	347	LAND USE PLANNING/LANDSCAPE/LANDSCAPE ARCHITECTURE
283	HEALTH RISK EVALUATION	348	LANGUAGE SCIENCES/ENGINEERING/TECHNOLOGY, LINGUISTICS
284	HEALTH SCIENCES/POLICIES/LAW	349	LARGE SCALE GENERATION OF ELECTRICITY/HEAT
285	HEALTH SERVICE MANAGEMENT	350	LASER TECHNOLOGY
286	HEALTH SYSTEMS RESEARCH	351	LAW: INTERNATIONAL / PRIVATE / PUBLIC
287	HEALTH, HEALTH PHYSICS	352	LEARNING MECHANISMS
288	HETEROGENEOUS CATALYSIS	353	LIBRARY SCIENCE/SYSTEMS
289	HIGH CONTAINMENT, HIGH CONTAINMENT FACILITIES	354	LIFE CYCLE MANAGEMENT
290	HIGH FREQUENCY TECHNOLOGY, MICROWAVES	355	LIPIDS, STEROIDS, MEMBRANES
291	HIGH-THROUGHPUT SCREENING	356	LIQUID BIOFUELS
292	HISTOLOGY, CYTOCHEMISTRY, HISTOCHEMISTRY, TISSUE CULTURE	357	LOGISTICS
293	HISTORY	358	LOW INPUT PRODUCTION
294	HISTORY AND PHILOSOPHY OF SCIENCE AND MEDICINE	359	MACROECONOMICS (INCL. MONETARY ECONOMICS)
295	HOME SYSTEMS	360	MACROMOLECULAR CHEMISTRY/NEW MATERIAL/SUPRAMOLECULAR STRUCTURES
296	HORMONES	361	MACROSOCIOLOGY
297	HORTICULTURE, ORNAMENTAL PLANTS	362	MAINTENANCE MANAGEMENT
298	HUMAN FACTORS IN TRANSPORT	363	MANAGEMENT OF ENTERPRISES
299	HUMAN GENETICS	364	MANAGEMENT OF URBAN AREAS
300	HUMAN RIGHTS	365	MANAGEMENT STUDIES
301	HUMAN SCIENCES, HUMANITIES	366	MARINE ECOSYSTEMS
302	HVAC SYSTEMS AND MANAGEMENT	367	MARINE SCIENCES/MARITIME STUDIES
303	HYBRID AND ELECTRIC VEHICLES	368	MARINE: INSTRUMENTATION AND UNDERWATER TECHNOLOGY
304	HYDROBIOLOGY, MARINE BIOLOGY, AQUATIC ECOLOGY, LIMNOLOGY	369	MARINE: OCEANOGRAPHY (PHYSICAL AND OPERATIONAL)
305	HYDROCARBONS EXPLORATION AND PRODUCTION	370	MARITIME SAFETY

371	MARKET ANALYSIS/ECONOMICS/QUANTITATIVE METHODS	437	NUCLEAR MEDICINE, RADIOBIOLOGY
372	MARKET STUDY, MARKETING	438	NUCLEAR PHYSICS
373	MATERIALS TECHNOLOGY/ENGINEERING	439	NUCLEIC ACID METABOLISM
374	MATHEMATICAL ANALYSIS/PARTIAL DIFFERENTIAL EQUATIONS	440	NUCLEIC ACIDS, POLYNUCLEOTIDES, PROTEIN SYNTHESIS
375	MATHEMATICAL LOGIC: SET THEORY, COMBINATORICS/SEMANTICS	441	NUMBER THEORY, FIELD THEORY, ALGEBRAIC GEOMETRY, GROUP THEORY
376	MATHEMATICAL PHYSICS	442	NUTRITION
377	MATHEMATICS	443	OBSERVATION SYSTEMS / CAPACITY / DATASETS / INDICATORS
378	MECHANICAL ENGINEERING, HYDRAULICS, VIBRATION AND ACOUSTIC ENGINEERING	444	OCCUPATIONAL HEALTH, INDUSTRIAL MEDICINE
379	MEDIA STUDIES/LAW/MASS COMMUNICATIONS	445	OCEAN / ENERGY
380	MEDICAL ANTHROPOLOGY	446	ODONTOLOGY, STOMATOLOGY
381	MEDICAL SCIENCES/RESEARCH	447	OFFSHORE TECHNOLOGY, SOIL MECHANICS, HYDRAULIC ENGINEERING
382	MEDICAL TECHNOLOGY	448	ON-LINE INFORMATION SERVICES, ON-LINE DEMOCRACY, ON-LINE BUSINESS
383	MEDICINAL CHEMISTRY	449	OPERATIONS RESEARCH, ACTUARIAL MATHEMATICS
384	MEDICINE (HUMAN AND VERTEBRATES)	450	OPTICAL MATERIALS
385	MEMBRANE TECHNOLOGY	451	OPTICS
386	MENTAL STRESS	452	OPTRONICS
387	METABOLIC REGULATION AND SIGNAL TRANSDUCTION	453	ORGANIC CHEMISTRY
388	METAL TECHNOLOGY AND METAL PRODUCTS	454	ORGANIC FARMING
389	METALLURGY	455	ORGANIC WASTE
390	METROLOGY, PHYSICAL INSTRUMENTATION	456	ORGANOMETALLIC CHEMISTRY
391	MICROBIAL BIOTECHNOLOGY, MICROBIAL MODELLING	457	ORPHAN DRUGS
392	MICROBIAL SYSTEMATICS/DIVERSITY	458	OTHER RENEWABLE ENERGY OPTIONS
393	MICROBIOLOGY	459	OTORHINOLARYNGOLOGY, AUDIOLOGY, AUDITIVE SYSTEM AND SPEECH
394	MICROECONOMICS (THEORETICAL AND APPLIED)	460	PALEOCLIMATOLOGY
395	MICROELECTRONICS	461	PALEONTOLOGY/PALEOECOLOGY
396	MICROENGINEERING, MICROMACHINING	462	PAPER TECHNOLOGY, RECYCLING
397	MICROSYSTEMS	463	PARASITOLOGY (HUMAN AND ANIMAL)
398	MINING	464	PARTICLE PHYSICS/FIELDS THEORY
399	MOBILE COMMUNICATIONS	465	PASSENGER TRANSPORT
400	MODELLING/MODELLING TOOLS, 3-D MODELLING	466	PATENTS, COPYRIGHTS, TRADEMARKS
401	MOLECULAR BIOLOGY	467	PATHOLOGY
402	MOLECULAR BIOPHYSICS	468	PATHOPHYSIOLOGY
403	MOLECULAR DESIGN, DE NOVO DESIGN	469	PERIPHERALS TECHNOLOGIES (MASS DATA STORAGE, DISPLAY TECHNOLOGIES)
404	MOLECULAR EVOLUTION	470	PERI-URBAN AGRICULTURE
405	MOLECULAR GENETICS	471	PESTICIDES, BIOPESTICIDES
406	MOLECULAR MARKERS AND RECOGNITION	472	PETROCHEMISTRY, PETROLEUM ENGINEERING
407	MONOCLONAL ANTIBODIES	473	PETROLOGY, MINERALOGY, GEOCHEMISTRY
408	MOTHER AND CHILD HEALTH	474	PHARMACEUTICALS AND RELATED TECHNOLOGIES
409	MOTORS AND PROPULSION SYSTEMS	475	PHARMACOLOGICAL SCIENCES, PHARMACOGNOSY, TOXICOLOGY
410	MOUNTAIN AND HIGHLAND ECOSYSTEMS	476	PHOTONIC NETWORKS
411	MULTIMEDIA	477	PHOTOVOLTAIC SYSTEMS, CELLS AND MODULES MANUFACTURING, TECHNOLOGY DEVELOPMENT
412	MULTISENSORY TECHNOLOGY, MULTI-SENSING	478	PHYSICAL CHEMISTRY/SOFT MATTER
413	MUSEUM SCIENCE	479	PHYSICAL GEOGRAPHY, CARTOGRAPHY, CLIMATOLOGY
414	MYCOLOGY	480	PHYSICAL MEDICINE, KINESITHERAPY, REVALIDATION, REHABILITATION
415	NANOBIOTECHNOLOGY	481	PHYSICAL SCIENCES
416	NANOFABRICATION, NANOTECHNOLOGY	482	PHYSICAL STRESS
417	NARROW BAND TECHNOLOGIES	483	PHYSICS OF FLUIDS
418	NATURAL GAS	484	PHYSIOLOGICAL DISORDERS
419	NATURAL HISTORY OF DISEASES	485	PHYSIOLOGY
420	NATURAL OILS, FATS AND WAXES	486	PHYTOREMEDIATION
421	NATURAL RESOURCES EXPLORATION	487	PHYTOTECHNOLOGY, PHYTOPATHOLOGY, CROP PROTECTION
422	NATURAL SCIENCES	488	PIPELINE TECHNOLOGY
423	NEMATODS	489	PLANT AND ASSOCIATED MICROORGANISM BIOTECHNOLOGY
424	NETWORK TECHNOLOGY, NETWORK SECURITY	490	PLANT BIOCHEMISTRY
425	NETWORKED ORGANISATIONS	491	PLANT BIOLOGY
426	NEUROBIOLOGY, NEUROCHEMISTRY, NEUROLOGY, NEUROPSYCHOLOGY, NEUROPHYSIOLOGY	492	PLANT GENETICS/SELECTION/BREEDING
427	NEUROINFORMATICS	493	PLANT HEALTH/PROTECTION
428	NEUTRON PHYSICS	494	PLANT INPUTS/NUTRITION/PRODUCTION
429	NEW MEANS OF TRANSPORT	495	PLANT PHYSIOLOGY
430	NITROGEN FIXATION	496	PLANT PRODUCTS
431	NOISE AND VIBRATIONS		
432	NON-COMMUNICABLE DISEASES		
433	NON-LINEAR DYNAMICS AND CHAOS THEORY		
434	NON-METALLIC MINERAL TECHNOLOGY		
435	NUCLEAR CHEMISTRY		
436	NUCLEAR ENGINEERING AND TECHNOLOGY		

497	POLITICAL SCIENCES/THEORY/ECONOMY/COMPARATIVE POLITICS	564	SILVICULTURE, FORESTRY, FOREST TECHNOLOGY
498	POLYMER TECHNOLOGY, BIOPOLYMERS	565	SIMULATION, SIMULATION ENGINEERING
499	POPULATION GENETICS	566	SIMULATOR TRAINING
500	PORT MANAGEMENT	567	SKELETON, MUSCLE SYSTEM, RHEUMATOLOGY, LOCOMOTION
501	POSITIONING AND GUIDANCE SYSTEMS	568	SMART CARDS
502	POST HARVEST TREATMENT - FOOD	569	SOCIAL ECONOMICS
503	POST HARVEST TREATMENT - NON-FOOD	570	SOCIAL LAW
504	PRECISION ENGINEERING	571	SOCIAL MEDICINE
505	PRION DISEASES	572	SOCIAL SHAPING OF TECHNOLOGY
506	PROBABILITY THEORY	573	SOCIETAL BEHAVIOUR
507	PROCESS EFFICIENCY	574	SOCIO-ECONOMIC ASPECTS OF ENVIRONMENTAL CHANGE
508	PROCESS ENGINEERING	575	SOCIO-ECONOMIC RESEARCH
509	PRODUCTION TECHNOLOGY	576	SOCIO-ECONOMICAL IMPACTS IN AGRICULTURE/FORESTRY/RURAL DEVELOPMENT
510	PROGRAMMING/INFORMATION SYSTEMS	577	SOCIO-ECONOMICS
511	PROJECT ENGINEERING	578	SOCIOLOGY
512	PROTEINS, ENZYMOLOGY, PROTEIN ENGINEERING	579	SOFTWARE ENGINEERING, MIDDLEWARE, GROUPWARE
513	PROTEOMES, PROTEOMICS	580	SOIL SCIENCE, AGRICULTURAL HYDROLOGY, WATER PROCESSES
514	PSYCHIATRY, MEDICAL PSYCHOLOGY, PSYCHOSOMATICS	581	SOLAR CONCENTRATING TECHNOLOGIES AND APPLICATIONS
515	PSYCHOLOGICAL SCIENCES, PSYCHOLOGY	582	SOLID STATE PHYSICS
516	PUBLIC ADMINISTRATION	583	SOUND ENGINEERING/TECHNOLOGY
517	PUBLIC HEALTH	584	SPACE TECHNOLOGY
518	PUBLIC PERCEPTION, PUBLIC RELATIONS	585	SPATIAL INTEGRATION IN BUILT ENVIRONMENT
519	PUBLIC POLICY STUDIES	586	SPEECH COMMUNICATION
520	PUBLISHING	587	SPEECH PROCESSING/TECHNOLOGY
521	PULP TECHNOLOGY	588	STANDARDISATION, STANDARDISATION OF NEW TECHNOLOGIES
522	QUALITY, QUALITY CONTROL, TRACEABILITY	589	STATISTICAL PHYSICS
523	QUANTUM INFORMATION PHYSICS	590	STATISTICS
524	QUANTUM MECHANICS	591	STRUCTURAL BIOLOGY/DETERMINATION/FUNCTION
525	QUANTUM TECHNOLOGY	592	SUPERCONDUCTORS
526	R&D POLICY AND PROGRAMME EVALUATION AND IMPACT ASSESSMENT	593	SURFACE CHEMISTRY
527	RADIO DIAGNOSTICS, RADIATION BIOLOGY	594	SURFACE PHYSICS
528	RADIO ECOLOGY	595	SURVEILLANCE
529	RAILWAY TRANSPORT TECHNOLOGY	596	SURVEYING
530	REACTION MECHANISMS AND DYNAMICS	597	SYNTHESIS AND NEW MOLECULES
531	REACTOR SAFETY	598	SYSTEMS ANALYSIS AND MODELS DEVELOPMENT
532	REFERENCE MATERIALS/METHODS	599	SYSTEMS DESIGN/THEORY
533	REFRIGERATION AND COOLING	600	SYSTEMS ENGINEERING
534	REGIONAL ECONOMICS/STUDIES/DEVELOPMENT	601	SYSTEMS, CONTROL, MODELLING, AND NEURAL NETWORKS
535	REHABILITATION SYSTEMS	602	TECHNOLOGICAL SCIENCES
536	REMOTE SENSING	603	TECHNOLOGY ACCEPTABILITY
537	REPRODUCTIVE HEALTH	604	TECHNOLOGY ASSESSMENT AND FORESIGHT
538	REPRODUCTIVE MECHANISMS	605	TECHNOLOGY EVALUATION/MANAGEMENT
539	RESEARCH METHODOLOGY IN SCIENCE	606	TECHNOLOGY POLICY
540	RESEARCH NETWORKING	607	TECHNOLOGY TRANSFER
541	RESEARCH POLICY	608	TECHNOLOGY WATCH/VALIDATION
542	RESERVOIR CHARACTERISATION AND MONITORING	609	TELECOMMUNICATION ENGINEERING/TECHNOLOGY
543	RESIDUES	610	TELESERVICES, TELE-WORKING, TELE-PAYMENT, TELE-MEDICINE
544	RESPIRATORY SYSTEM	611	TESTING, CONFORMANCE TESTING
545	RE-STRUCTURING OF PUBLIC ADMINISTRATIONS	612	TEXTILES TECHNOLOGY
546	ROAD SAFETY	613	THERAPEUTIC SUBSTANCES
547	ROAD TRANSPORT TECHNOLOGY	614	THERMAL ENGINEERING, APPLIED THERMODYNAMICS
548	RTD SYSTEMS AND POLICIES AND THEIR INTERACTION WITH OTHER RELATED POLICIES	615	THERMODYNAMICS
549	RURAL DEVELOPMENT, RURAL SOCIOLOGY AND SOCIO-ECONOMICS	616	TIMBER ENGINEERING
550	SAFETY TECHNOLOGY	617	TISSUE BANKS/ENGINEERING
551	SAMPLE BANKS	618	TOTAL QUALITY MANAGEMENT
552	SATELLITE (TECHNOLOGY, SYSTEMS, POSITIONING, COMMUNICATION)	619	TOWN AND COUNTRY PLANNING
553	SCIENCE AND TECHNOLOGY INDICATORS	620	TOXICITY AND TOXINOLOGY
554	SCIENCE POLICY	621	TRACTION/PROPULSION SYSTEMS
555	SCIENCE, TECHNOLOGY AND THE MEDIA	622	TRAFFIC CONTROL SYSTEMS
556	SEA FOOD	623	TRAFFIC ENGINEERING/INFRASTRUCTURE/MANAGEMENT SYSTEMS
557	SEARCH AND RESCUE	624	TRANSACTION SYSTEMS
558	SECURITY SYSTEMS	625	TRANSGENE EXPRESSION
559	SEMICONDUCTOR PHYSICS AND TECHNOLOGIES		
560	SENSORY SCIENCE, SENSORS, INSTRUMENTATION		
561	SEROLOGY AND TRANSPLANTATION		
562	SET ASIDE		
563	SIGNAL PROCESSING		

626 TRANSGENIC CROP PLANT
 627 TRANSHIPMENT SYSTEMS
 628 TRANSPORT DEMAND MANAGEMENT
 629 TRANSPORT ECONOMICS
 630 TRANSPORT INFORMATION SYSTEMS, FLEET
 MANAGEMENT
 631 TRANSPORT INFRASTRUCTURE/MANAGEMENT
 SERVICES
 632 TRANSPORT MODELLING/SCENARIOS
 633 TRANSPORT OF GAS AND LIQUID FUELS
 634 TRANSPORT POLICY/LAW
 635 TRANSPORT SAFETY/SECURITY
 636 TRANSPORT TECHNOLOGY/ENGINEERING
 637 TRANSPORT TELEMATICS
 638 TRANSPORT, TRANSMISSION AND DISTRIBUTION OF
 ELECTRICITY
 639 TROPICAL AGRICULTURE
 640 TROPICAL ECOSYSTEMS
 641 TROPICAL FORESTRY
 642 TROPICAL MEDICINE
 643 URBAN DEVELOPMENT/ECONOMICS
 644 URBAN FOREST RY
 645 URBAN GOVERNANCE AND DECISION MAKING
 646 URBAN QUALITY OF LIFE
 647 URBAN SOCIOLOGY
 648 URBAN TRANSPORT
 649 URBAN: SUSTAINABLE CITIES AND RATIONAL
 RESOURCE MANAGEMENT
 650 URBAN: TECHNOLOGIES FOR THE BUILT
 ENVIRONMENT
 651 UROLOGY, NEPHROLOGY
 652 USER CENTRED DESIGN, USABILITY
 653 USER MODELLING
 654 VACCINES
 655 VACUUM/HIGH VACUUM TECHNOLOGY
 656 VEHICLE TECHNOLOGY
 657 VENTURE CAPITAL
 658 VESSEL TRAFFIC MANAGEMENT
 659 VETERINARY MEDICINE
 660 VIRTUAL ORGANISATIONS
 661 VIRTUAL REALITY
 662 VIRUS, VIROLOGY
 663 VULCANOLOGY/SEISMOLOGY
 664 WASTE BIOTREATMENT
 665 WASTE MANAGEMENT/RECYCLING
 666 WATER RESOURCE MANAGEMENT/ENGINEERING
 667 WATER TRANSPORT TECHNOLOGY, SHIPBUILDING
 668 WATER: FRESH WATER ECOSYSTEMS
 669 WATER: HYDROLOGY
 670 WATER: MONITORING / QUALITY / TREATMENT
 671 WATER: RATIONAL AND EFFICIENT USE
 672 WATERBORNE TRANSPORT
 673 WAVE/TIDAL ENERGY
 674 WEEDS
 675 WELFARE STUDIES
 676 WETLAND ECOSYSTEMS
 677 WIND ENERGY MANUFACTURING/TECHNOLOGIES
 678 WIND TURBINE ENVIRONMENTAL IMPACT
 679 WIRELESS SYSTEMS, RADIO TECHNOLOGY
 680 WOMEN'S STUDIES
 681 WOOD ENGINEERED PRODUCTS, PARTICLE AND FIBRE
 BOARDS
 682 WOOD PROCESSING BY MECHANICAL MEANS
 683 WORLD TRADE ORGANISATION

ANNEX 2:

NACE codes for business activities

Division	Description
<i>Section A</i>	<i>Agriculture, hunting and forestry</i>
01	Agriculture, hunting and related service activities
02	Forestry, logging and related service activities
<i>Section B</i>	<i>Fishing</i>
05	Fishing, operation of fish hatcheries and fish farms; service activities incidental to fishing
<i>Section C</i>	<i>Mining and quarrying</i>
10	Mining of coal and lignite; extraction of peat
11	Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction, excluding surveying
12	Mining of uranium and thorium ores
13	Mining of metal ores
14	Other mining and quarrying
<i>Section D</i>	<i>Manufacturing</i>
15	Manufacture of food products and beverages
16	Manufacture of tobacco products
17	Manufacture of textiles
18	Manufacture of wearing apparel; dressing and dyeing of fur
19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear
20	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
21	Manufacture of pulp, paper and paper products
22	Publishing, printing and reproduction of recorded media
23	Manufacture of coke, refined petroleum products and nuclear fuel
24	Manufacture of chemicals and chemical products
25	Manufacture of rubber and plastic products
26	Manufacture of other non-metallic mineral products
27	Manufacture of basic metals
28	Manufacture of fabricated metal products, except machinery and equipment
29	Manufacture of machinery and equipment n.e.c.
30	Manufacture of office machinery and computers
31	Manufacture of electrical machinery and apparatus n.e.c.
32	Manufacture of radio, television and communication equipment and apparatus
33	Manufacture of medical, precision and optical instruments, watches and clocks
34	Manufacture of motor vehicles, trailers and semi-trailers
35	Manufacture of other transport equipment
35.1	Building and repairing of ships and boats
35.2	Manufacture of railway and tramway locomotives and rolling stock
35.3	Manufacture of aircraft and spacecraft
a	<i>Manufacture of helicopter</i>
b	<i>Manufacture of aeroplanes for the transport of goods or passengers, for use by the defence forces, for sports or other purposes</i>

c¹ *Manufacture of parts and accessories of the aircraft of this class*

¹ Includes: major assemblies such as fuselages, wings, doors, control surfaces, landing gear, fuel tanks, nacelles, airscrews, helicopter rotors and propelled rotor blades, motors and engines of a kind typically found on aircraft, parts of turbojets and turbopropellers

TECHNOLOGICAL IMPLEMENTATION PLAN - PRESENTATION

Division	Description
d ²	<i>Others</i>
36	Manufacture of furniture; manufacturing n.e.c.
37	Recycling
<i>Section E</i>	<i>Electricity, gas and water supply</i>
40	Electricity, gas, steam and hot water supply
41	Collection, purification and distribution of water
<i>Section F</i>	<i>Construction</i>
45	Construction
<i>Section G</i>	<i>Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods</i>
50	Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel
51	Wholesale trade and commission trade, except of motor vehicles and motorcycles
52	Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods
<i>Section H</i>	<i>Hotels and restaurants</i>
55	Hotels and restaurants
<i>Section I</i>	<i>Transport, storage and communication</i>
60	Land transport; transport via pipelines
61	Water transport
61.1	Sea and coastal water transport
e	<i>Transport of passenger or freight over water</i>
f	<i>Operation of excursion, cruise or sightseeing boats</i>
g	<i>Operation of ferries, water taxis, etc.</i>
62	Air transport
h	<i>Transport of passenger or freight by airlines</i>
63	Supporting and auxiliary transport activities; activities of travel agencies
63.1	<i>Cargo handling and storage</i>
63.2	<i>Other supporting transport activities</i>
i	<i>Operation of terminal facilities such as harbours and piers, waterway locks etc.</i>
j	<i>Airport and air-traffic control activities</i>
63.3	Activities of travel agencies and tour operators; tourist assistance activities n.e.c.
63.4	Activities of other transport agencies
k	<i>Forwarding of freight</i>
64	Post and telecommunications
<i>Section J</i>	<i>Financial intermediation</i>
65	Financial intermediation, except insurance and pension funding
66	Insurance and pension funding, except compulsory social security
67	Activities auxiliary to financial intermediation
<i>Section K</i>	<i>Real estate, renting and business activities</i>
70	Real estate activities

² This includes: manufacture of gliders, hang-gliders, manufacture of dirigibles and balloons, manufacture of spacecraft and spacecraft launch vehicles, satellites, planetary probes, orbital stations, shuttles, manufacture of aircraft launching gear, deck arresters, etc.

manufacture of ground flying trainers However 35.3 should **exclude**: manufacture of parachutes, military ballistic missiles, ignition parts and other electrical parts for internal combustion engines, instruments used on aircraft, and air navigation systems.

TECHNOLOGICAL IMPLEMENTATION PLAN - PRESENTATION

Division	Description
71	Renting of machinery and equipment without operator and of personal and households goods
72	Computer and related activities
73	Research and development
1	<i>Research and experimental development on natural sciences and engineering</i>
m	<i>Research and experimental development on social sciences and humanities</i>
74	Other business activities
Section L	<i>Public administration and defence; compulsory social security</i>
75	Public administration and defence; compulsory social security
Section M	<i>Education</i>
80	Education
Section N	<i>Health and social work</i>
85	Health and social work
Section O	<i>Other community, social and personal service activities</i>
90	Sewage and refuse disposal, sanitation and similar activities
91	Activities of membership organisations n.e.c.
92	Recreational, cultural and sporting activities
93	Other service activities
Section P	<i>Private households with employed persons</i>
95	Private households with employed persons
Section Q	<i>Extra-territorial organisations and bodies</i>
99	Extra-territorial organisations and bodies

TECHNOLOGICAL IMPLEMENTATION PLAN

*A Framework for the further development and use of
the results of EC RTD Projects (including also thematic networks and concerted actions)*

GUIDELINES



WHAT IS THE TECHNOLOGICAL IMPLEMENTATION PLAN?

Purpose

Activities linked with dissemination and use of RTD results are essential parts associated with the life cycle of Community RTD projects. Therefore, proper documentation of the RTD results is in your and your partners' interest. Also it will benefit European industry and society in general. The datasheets provided here have been designed to support this documentation and dissemination process and assist you in fulfilling your contractual obligations.

Completed forms are requested by the Specific Programmes as a standard tool for describing and detailing the activities planned for the use of the results achieved during RTD projects and ensuring the link with the objectives on which the project was selected. They cater for results from basic research, social actions or upstream RTD projects as well as applied, near-market or demonstration projects.

How can it assist the dissemination and use planning process?

The T.I.P. should cover the intentions of all partners related to the potential knowledge generated under the project. As mentioned in the EC Model Contract³, such a Technological Implementation Plan should be submitted at, or before, the end of the project. It is suggested that, throughout the project duration and especially at mid-term, a draft version of the T.I.P. be regularly used and updated. This practice is particularly useful when results are achieved before the contractual end of the project and/or when the consortium detects the need for additional partners.

The questions raised in the Technological Implementation Plan are also ideally suited to assist the drawing up of a co-operation agreement. They include:

- What are the results (knowledge including information) of your project?
- What needs do they address? What are the potential applications?
- What stage have you reached in the development of the results and what resources do you need for further (market, environment or policy-related) development?
- Are the results usable – either commercially, socially or scientifically?
- What are your dissemination and use intentions and potential routes?
- What part does each of your partners take in the dissemination and use process (manufacturing, sales and marketing, further R&D, licensing, standards, etc.)?
- Do you envisage dissemination and use and/or support from outside the project team?
- What information is useful for attracting potential collaborators?

Extent of information

If you do not intend to use or disseminate all of the results yourself (or not exclusively) or if you are looking for additional partners for further dissemination and use, it is in your interest – and in the interest of the European Union – to provide third parties with adequate information. This of course excludes information which must not be disclosed to safeguard intellectual or industrial property, confidentiality or legitimate commercial interests.

³ see Annex II, General conditions.

TECHNOLOGICAL IMPLEMENTATION PLAN - PRESENTATION

In addition, the information gathered in the Technological Implementation Plan can be used to attract funding for further R&D or market development – be it from venture capitalists or banks, or under national or community programmes. This may apply to results where

- your consortium requires additional resources and expertise to use or disseminate your results fully;
- part of the results might be transferred to other applications outside the consortium's main markets (generic technologies).

Examples for the extent of information to be provided

- For basic research, you should indicate how the project output(s) could lead to applied research.
- If your result offers potential for further economic, environmental or 'quality of life' benefits, this result should be detailed in view of benefitting other social projects.
- If you have a laboratory prototype, you should give detailed information on the financial and human resources necessary for producing an industrial prototype, and the possible risks involved in further development (for example, scaling up).
- If you are at the pre-series stage, you may discuss the risks involved in scaling up the production.
- If you have a generic technology available, you should concentrate on possible additional applications outside the existing ones without forgetting to assess the real needs and risks involved.

How to fill in the form?

The project co-ordinator is responsible for preparing consolidated forms 1 and 2. Individual partners are responsible for preparing part 3.

Be further aware that:

The Community has a number of activities to assist the transfer of your results and their further dissemination and use. The CORDIS RTD Results database and Technology Marketplace Web Service, Programme-specific tools and the Innovation Relay Centres publicise RTD results for technology transfer and assist in finding partners for external dissemination and use. The information required for publication will be extracted by these services directly from Parts 1 and 2 of the Technological Implementation Plan. This cuts down on the amount of form-filling required for projects.

On the Technology Marketplace Web Service we showcase some of the latest and best of the results we receive. It contains technology offers that could be taken up by other companies or organisations. So, if you want to exploit your results through licensing, consultancy, or other agreements you should make every effort to present the information in your TIP so that it maximises the chance of being selected for Technology Marketplace. This means describing the exploitation potential and explaining as much as you can about the applications that are possible.

You can see Technology Marketplace at www.cordis.lu/marketplace.

**GUIDELINES FOR COMPLETING THE
TECHNOLOGY IMPLEMENTATION PLAN
DATA SHEETS**

Part 1 Overview and description of your project and its results

1.1 : Executive summary

This summary should be as comprehensive and clear as possible. Its main goal is to inform the Commission, but also appropriate audience on the obtained results and their future uses. It will be incorporated in regularly updated issues of the “Project synopses” of the Programme (via the CORDIS database) and possibly edited on electronic media such as CD-ROM.

1.2 : Overview of all your project results

If your project has generated a number of different results, you should identify those which logically belong together as part of a larger product, process or service and which would therefore be exploited as a single result. Results, which do not logically belong to or depend on each other, should be treated separately.

Examples

A project dealt with improving a production-control process using an innovative new sensor (Partner A) and adapting innovative new process control software (Partner B). The overall system was produced by Company C and tested at end-user sites of Companies D and E. Distinct dissemination and use routes could be:

- 1) Exploitation of overall project result (sensor, software and application know-how) by Partner C (e.g. production of pre-series, marketing, etc.).
- 2) Application of sensor to another market sector via further development by Partner A with additional, external partners X,Y (with possible RTD funding – CRAFT, INNOVATION programme).
- 3) Adaptation of software result to other applications and licensing to third parties by partner B.

Information on all results should contain the following :

- Title of the result:

This should be as informative as possible. Describe what the result is (sensor, process, program, material, device, etc.), what it does (detection, preparation, conservation, etc.) and possibly include elements highlighting the difference from the state of the art (more efficient, resistant, inexpensive, etc.).

- Category

Identify the category (A, B or C) of your result and specify it here. See the glossary for definition of categories.

- Partners (result owners) involved

Identify the partners in the project consortium who are owners of this result and indicate those involved in its dissemination and use. This may include external third parties already identified.

1.3 : Quantified data on the project

The quantities asked for in this table tackle aspects of the dissemination and use of the project results as a whole and not aspects at particular result or partner level. The quantified data collected here (as well as in 2.2 and 3.2) are meant to be aggregated by the Commission services for a large number of projects (be it at sectoral or Key

TECHNOLOGICAL IMPLEMENTATION PLAN - GUIDELINES

Action or Programme levels) and not used individually. They are requested together with your result description in order to avoid contacting you again later for providing them.

1.4 : Comment on European interest

Every project has been selected, not only according to its scientific and technological merit, but also because of its potential interest for the European Union. Here is the place to explain in which respect that interest for Europe has been achieved. You should present the added value brought in, for example in terms of combination of expertise and skills, critical mass, problem-solving approach, reduction of risk, strategic importance for Europe of the problem tackled, influence on standards and regulations, etc.

1.5 : Expected project impact

This part of the e-Tip should allow a more systematic qualitative and statistical exploitation of the results produced by your project, leading to a better global estimate of the programmes. Therefore it is important to fill it in as thoroughly as possible in order to allow valid statistical interpretation. The more answers, the more precise the analysis. We rely on your insight to identify, qualify and possibly quantify your results.

We are aware how difficult it is to estimate socio-economic impact of research. We know that uncertainties will appear when quantifying the relation between results and their multiple causes. This is a well-known problem met in a way or in another when relying on this kind of questionnaire. However, the stipulation of a large number of answers will allow us to establish a good correlation of results, which eliminates partly these uncertainties.

The first table (Overall policy impact) of the questionnaire is rather general and can be filled in by each one, whatever the level of the results. Even if your results are unexpected or more negative than you had expected, it is important that you describe them as precisely as possible. This is very common when assessing a research project - it would no longer be research if results were ensured beforehand. That is why it is important that we have input on deviations from your expectations in order to make a realistic assessment.

The following tables require more detail, and are therefore of the utmost importance for the analysis. It will probably require more effort, but will often prove, for the person who fills in the questionnaire, to be a source of a great deal of satisfaction when discovering a part of the process which was not identified with all its potential impact before the questions were raised.

The impact concept is a dynamic one, which will continue to evolve from the end of your project. We choose a 3-year period as a development basis. It does not mean we will ask you to anticipate on what will be your situation precisely in 3 years but we would request an overall estimate of the expected developments for the coming years. Often indeed, impact at the end of the project is still negligible, but the results are potentially a source of future exploitation: we would like you to quantify impact from this dynamic point of view. This is particularly difficult, as we know, especially in connection with social impact. Even if the forecasts seem still dubious, please fill in the questionnaire: no one can predict the future with certainty but the amount of the results will enable us to identify the most significant tendencies.

Part 2 Description of each result

A separate part 2 must be completed for each result. This may be done by the partner responsible for the result or by the project co-ordinator.

The part 2 must be consolidated at the consortium level and transmitted to the Commission by the co-ordinator.

PARTS 2 WILL BE DISSEMINATED BY THE COMMISSION

2.1. Description of the result

SUMMARY

The summary should provide a concise overview of the commercial, social or scientific result in terms of result description, dissemination and use potential, key innovative features of the result, current status and use of the result and its expected benefits. The following aspects should be tackled in this section:

- **What are the potential applications for this result?**

Depending on the nature and status of your results, there might be only one – clearly defined – application or several applications in different sectors.

Examples

A sensor developed for a special application might be used in a totally different environment if its performance and/or price is competitive. New mathematical algorithms used in a software tool for an expert system in the foundry industry might also be applied in the area of plastic moulding. You, as a technology provider, should reflect on these possible applications and describe the potential use of your technology for these applications.

- **Who are the end-users of this result?**

For each application, there may be several user groups and market sectors. Try to present as many unique – but realistic – combinations of application/user/market-sector as possible so as to give a comprehensive view of the possible end users profile of your result.

- **What are the main innovative features/benefits? (technical/commercial success factors)**

Correlate novel features of your result with expected (commercial) benefits, keeping in mind the critical success factors (user needs, market demands, price, etc.) which apply to your result.

CHECKLIST FOR CRITICAL SUCCESS FACTORS

To find out about critical success factors you should try to see your result from the user (demand) side and ask yourself the following questions:

- Do you have a better solution than the state-of-the-art ?
- How does your technology affect the price of the product/process ?
- Does the product/process save on environmental/energy resources ?
- Is reliability improved / maintenance reduced ?

TECHNOLOGICAL IMPLEMENTATION PLAN - GUIDELINES

- **Analysis of the market or application sectors**

Give a brief analysis of the sector by describing the needs and market size or application potential. If you are at an early innovation stage and you do not have clear market figures available, then try to think about the needs of the users of your usable result: e.g. Why do some products or processes sell well in this market and others not? Are there regulatory, legal or social constraints that could affect the dissemination and use of your result? Describe your strengths and weaknesses compared with other technologies. Give any other information that is relevant to successful dissemination and use of the result.

- **Potential barriers**

Are there potential barriers to overcome? Especially when your results have not yet reached the prototype phase and you are looking for additional partners, you should examine critically possible obstacles to further dissemination and use that could occur in prototyping, pre-series or production phases. The chances for successful market introduction or transfer of a new technology are raised if the technology supplier is aware of the numerous barriers for dissemination and use, and considers these problems by giving a realistic description of the potential advantages of his technology.

Example

For high-speed microelectronic devices, for instance, the GaAs-material was, is, and always will be the most innovative and promising material. However, except from some niche markets, silicon-based devices have always dominated the market. One of the main reasons is that the know-how of the complex and capital-intensive production processes cannot simply be applied to a new material. For the same reason, optical lithography is still used in the production process, despite what the experts thought ten years ago.

DOCUMENTATION AND INFORMATION ON THE RESULT

Note : *This section is important if you want to use the infrastructure (e.g. CORDIS) set up by the Commission. You may also provide promotional material (photographs, video clips, etc.) for publicity use and you might also make interested parties aware that there is more confidential information available (e.g. business plans, patent applications, technical drawings, etc.) that may be disclosed after a confidential disclosure agreement has been signed.*

Examples include technical reports or drawings, patent files, test reports, results of market research, business plans, brochures, user manuals, user surveys, prototypes, samples, video clips and photographs.

<i>Examples</i>		
<i>Documentation type</i>	<i>Details (Title, ref. number, general description, language)</i>	<i>Status: PU=Public IN=Internal</i>
patent application	PCT Appl. No. WO0645 from 01.04.2004	IN
process manual	detailed technical manual (in English)	IN
article	“Advanced semiconductor technologies for above THZ high-frequency, broadband amplifiers”, <i>Scientific American</i> 12/2005, pp.1-10	PU
prototype	laboratory prototype for demonstration	PU
.....		

TECHNOLOGICAL IMPLEMENTATION PLAN - GUIDELINES

INDUSTRIAL AND INTELLECTUAL PROPERTY RIGHTS

These are the rights applying to the result you are currently describing. The “current” column refers to the current actual period : which protection has been achieved so far. The “foreseen” one refers to the expected or intended protections foreseen within the next 3 years.

The “Knowledge/ Pre-existing know-how” column refers to determining to which knowledge this protection applies, whether a previously (to the project) detained knowledge or a newly acquired one (during the project).

2.2 : Quantified data on the result and visibility for the general public

Here, the European Commission requests precise figures, whenever possible. The quantities asked for tackle aspects related to the result just described in chapter 2.1. The question on “Visibility for the general public” aims at detecting those results which:

- ✓ can be “seen”, “touched”, “used”, “experienced”, “understood” by the general public,
- ✓ is an application which can have an impact in the daily life.

Examples

- A former Brite-Euram project achieved a device based on a laser enabling the cleaning of building façades. It has a sufficiently high precision to reach small surfaces such as the details of sculpture on historical monument. It has already been used on several historical sites in Europe, attracting attention from the general public at European level.
- Another project developed a new envelope for drugs making its ingestion and transit through the human digestion organs more efficient and less painful for the patient.

2.3. Further collaboration, dissemination and use of the result

POTENTIAL OFFERED FOR FURTHER DISSEMINATION AND USE

Use the free-text box to describe the business, use and dissemination opportunities that you can offer to potential partners when entering into collaboration. Describe the benefits of using the result as it is or the potential benefits when investing in further development of the result. Describe the terms and conditions for using the results.

PROFILE OF ADDITIONAL PARTNER(S) FOR FURTHER DISSEMINATION AND USE

If you are looking for additional partners and/or you want to have the dissemination and use carried out by third parties, describe in detail the necessary resources, skills and capabilities that these third parties should have to guarantee dissemination and use. Answers to the following topics would be useful:

- **Describe the skills necessary for the dissemination and use of the result**

Describe the necessary steps to be taken in order to use or disseminate your result fully (e.g. building a prototype, market research, product testing, developing new features, adapting the product or process, technology dissemination) and identify the partner to do this – one of the consortium or a third party. If you are searching for additional partners, describe in detail the “ideal profile” of the partner.

TECHNOLOGICAL IMPLEMENTATION PLAN - GUIDELINES

- **Estimate the investments and costs involved**

What are the skills required and the amount of labour? List the equipment, facilities and materials required to develop further the result or to use or disseminate it. This may be equipment that has to be purchased by the consortium, use of external testing services or access to equipment provided by potential collaborators. If the dissemination and use of the result will involve large investments (either in production, marketing or further development) please give a short indication how this is going to be financed (internally from one of the project partners or from a third party).

- **Return on investment**

If the use of results includes commercialisation, compare the investments necessary for further market development, marketing and other costs with the projected total turnover summed over the project lifetime (usually 5-8 years). Compare the cost side with the revenue side. When does the return on investment begin and how high is it going to be at the end ? For any other use, give a cost/benefit analysis of the exploitation activity.

- **What are the potential risks involved ?**

Describe any technological risks involved in further R&D development or prototyping, or any market risks (e.g. minimum market share required for producing at a competitive price). Depending on the stage in development, focus more on technological risks, risks involved in market introduction or others.

Part 3 Description of the intentions by each partner

This part 3 must be completed by each partner who is essential for the dissemination and use (i.e. result owners and/or major project contributors and/or major dissemination and use contributors). Each will detail its own intentions for dissemination and use of the result(s) they are involved with. This description must be made result by result.

These different parts may be transmitted to the Commission either assembled at the consortium level or individually by each partner to safeguard confidential matters if necessary (through any appropriate media). Obviously, when all partners are implementing a single dissemination and use scheme all together, a single part 3 is needed.

PARTS 3 WILL ALWAYS BE KEPT CONFIDENTIAL BY THE COMMISSION

3.1 : Description of the dissemination and use of result(s), partner per partner

MANDATORY INFORMATION

Please make sure that contact details are provided for an appropriate contact person in your company, able to answer questions on the use / dissemination of the result(s).

N°, TITLE AND BRIEF DESCRIPTION OF MAIN RESULT(S)

Please use the same numeration and the same title used in section 1.2. The result(s) concerned here are those for which your organisation is involved for the dissemination and use phase.

FOR EACH MAIN RESULT, TIMETABLE OF THE USE AND DISSEMINATION ACTIVITIES WITHIN THE NEXT THREE YEARS AFTER THE END OF THE PROJECT

Please mention and describe the main activities (and possible partners) foreseen for the use or dissemination of the concerned result (e.g. testing, prototyping, scaling up, market analysis, value analysis, licensing, production of guidelines, web site development, ...). In the description of each activity, please mention its main milestones and the expected deliverables. Mention also, when relevant, the relation between the activity and the quantified data you are providing in section 1.5 and 2.2.

FORESEEN COLLABORATION WITH OTHER ENTITIES

The appropriate dissemination and use strategy depends not only on the structure, financial/human resources and market access of the partners but also on the stage of development of the project and the need for co-operation with additional partners.

3.2 : Quantified data for each partner's main result

Here, the European Commission requests precise figures, whenever possible. The quantities asked for here tackle aspects related to the partner who has just described his dissemination and use intentions.

ANNEX: USEFUL SERVICES AND SUPPORT

The European Commission has developed a range of initiatives and services that are relevant to dissemination and use activities. Some of these are summarised below.

CORDIS – Community Research & Development Information Service

CORDIS promotes participation in European research and the dissemination and use of research results. Through the service you can promote the results of research to potential investors and collaborators. You can also find out about people working in similar areas of interest to your own. There is a service for finding partners and promoting you as a potential partner. The information service is available on-line on the World Wide Web (at <http://www.cordis.lu>). There are also regular printed publications.

Technology Marketplace is CORDIS' virtual marketplace that offers a direct access to latest research results and support for innovators to better connect people with technology: <http://www.cordis.lu/marketplace>

Network of Innovation Relay Centres

The network of Innovation Relay Centres has been established to assist in the identification of technologies, the dissemination and use of results and the promotion of innovation. As well as encouraging participation in EC RTD Programmes, the Relay Centres undertake a range of activities and events designed to improve the supply and flow of technologies – for example, seminars, training, awareness meetings, partner search, confidential and public dissemination of RTD results and networking with other European countries. The IRCs also provide direct support for individual Specific Programmes for their dissemination and promotions activities. More information can be found on the World Wide Web at <http://www.cordis.lu/irc/>.

Help Desk on Intellectual Property Rights

The goals of this service are:

- ☐ to assist project contractors to deal with IPR matters via :
 - ✓ advice by patent lawyers on IPR issues relating to EC funded projects such as how to protect results,
 - ✓ an assistance to search through a network of patent databases (multilingual access to 25 million technical documents).

The service is entirely free of charge. Contractors or assistant contractors of an RTD project can access it. They will be requested to provide their contract number (cross-checked within CORDIS) and the name of the Project Officer (so that a feedback from the service provider to the Commission can be organised). “Future contractors” or organisation intending to submit proposals are also entitled to access the service for information only. Further information and access to this service at : <http://www.cordis.lu/ipr-helpdesk/home.html>

GLOSSARY

<u>Partners:</u>	The term “partners” usually means the contractual partners within a Community-funded RTD project. These are sometimes termed “internal partners” to distinguish them from external partners, sometimes necessary for further dissemination and use
<u>Exploitation:</u>	Use of available results by yourself or others for creating and marketing a product or process or for creating and providing a service
<u>Dissemination:</u>	Divulging of knowledge (other than publication) resulting from knowledge protection formalities with a view to promoting scientific and technical progress
<u>Deliverable:</u>	What is produced during the execution of the contract (be it document, guidelines, software code, product, samples, prototype, certified material, standard, etc.). A deliverable is usually conceived to allow the transition from one workpackage to another or to be exchanged between partners.
<u>Report:</u>	Management tool aiming at informing – the partners and the European Commission – of the progress of the work and of the deliverables.
<u>RTD result:</u>	Product, process, service, know-how, methodology or software achieved thanks to the RTD project and which arises from the completion of all deliverables. This RTD result is described confidentially in the Final Technical Report and, non-confidentially, in the Technological Implementation Plan (TIP), together with the planning for its dissemination and use.
<u>Project outputs:</u>	Set of benefits generated by the project, i.e. the RTD results first, but also patents, publications, standards, etc. This set of outputs is collected through the T.I.P.
<u>Impacts:</u>	Set of direct and indirect consequences – scientific, technical and socio-economic – due to the projects outputs and, furthermore, to their use and dissemination. These impacts will be measured at the end of the projects and 3 to 5 years after with an appropriate methodology (carried out by external experts).
<u>Categories:</u>	Results can be any marketable or transferable product, process, service, standard, know-how, methodology, network experience, result of clinical trial or software. Project results fall into three basic categories, depending on your intention for dissemination and use (you can have a set of results of different categories):
Category A:	<i>Externally usable results.</i> These are of commercial, social or scientific interest, but <u>you</u> do not intend to use them exclusively, or you do not have sufficient resources within your consortium. It is of mutual interest to make information on such results available for dissemination and further use at European level.
Category B:	<i>Internally usable results.</i> These are of commercial, social or scientific interest to all or some partners who will use or disseminate them exclusively <u>themselves</u> . The writing of the Technological Implementation Plan will therefore help the partners to clarify and detail their strategy. The TIP would also help the Commission services to advise and check how they plan to do it
Category C:	<i>Non-usable results.</i> These might be of interest to other researchers in particular if the TIP helps to identify R&D routes that are unfruitful.

NOTE: for more definitions see Annex II of the Model RTD contract.

