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Summary Report of Consultants' Meeting

IAEA International Database on Irradiated Nuclear Graphite Properties

8th Meeting of the Technical Steering Committee

IAEA Headquarters, Vienna, Austria
15-16 March 2006

Prepared by

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May 2006

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May 2006

Summary Report of Consultants' Meeting

**IAEA International Database on Irradiated Nuclear
Graphite Properties**

8th Meeting of the Technical Steering Committee

Prepared by

D. Humbert and A.J. Wickham

Abstract

The "8th Meeting of the Technical Steering Committee for the International Database on Irradiated Nuclear Graphite Properties" was held on 15-16 March 2006 at the IAEA Headquarters, Vienna, Austria. All discussions, recommendations and actions of this Consultants' Meeting are recorded in this report. The purposes of the meeting were to review the matters and actions identified in the previous meeting, undertake a review of the current status of the database and make recommendations for actions for the next year. This report contains the current status of the identified actions as well as a summary of the recommendations on enhancements to the database.

May 2006

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Minutes of 8th Meeting of the Technical Steering Committee for the International Database on Irradiated Nuclear Graphite Properties

15-16 March 2006, IAEA Headquarters, Vienna, Austria

Present

Mr. A.J. Wickham, United Kingdom (*Chairman*)

Mr. D. Humbert, IAEA (*Scientific Secretary*)

Other Members:

Mr. T.D. Burchell, United States

Mr. S.-H. Chi, Republic of Korea

Mr. G. Haag, FZJ, Germany

Mr. T. Shibata, Japan

Mr. A. Smaizys, Lithuania

Mr. R.E.H. Clark, IAEA

Mr. A. Trkov, IAEA (*part-time*)

Observer:

Mr. P. Homerin, Graftech International Inc.

Apologies for Absence:

Mr. J.G. Van der Laan, The Netherlands

Mr. F. Gerstgrasser, SGL Carbon Ltd

Mr. T. Konishi, Toyo Tanso Co. Ltd

Mr. M. Mitchell, PBMR

Welcome and Opening Remarks

The meeting was welcomed to the IAEA by Mr. Trkov on behalf of the Nuclear Data Section, and by Mr. Clark as officer responsible for the Database project within the IAEA. Mr. Clark was joined by the meeting Chairman Mr. Wickham in formally welcoming Dr. Chi as the representative of the Republic of Korea, a new member for the Database activity.

The Chairman then welcomed delegates and also Mr. Homerin, representing the sponsoring Company Graftech International Inc, as observer. The Chairman invited Mr. Homerin to participate fully in the debates. Finally he thanked IAEA representatives, together with Mr. K. Sheikh, for the efficient arrangements for the meeting.

Chairman's Remarks

The Chairman commented that at the previous meeting in March 2005, the Committee had set itself a demanding Agenda. It was evident that all of the work planned for the intervening period, or an equivalent amount of work, had been successfully completed. However, he continued to be concerned about the poor state of funding for the project, and requested that Members consider how they might find resources within their own Member States to assist in the completion of the remaining tasks in the work programme.

Minutes and Actions

The Chairman moved the adoption of the Agenda for the meeting and this was carried *nem con* with the addition of a standing item on Database Security, which had been overlooked.

The Minutes of the previous Committee Meeting (March 2005, IAEA Vienna), published as INDC(NDS)-472, were accepted without amendment.

In regard to Actions from the previous meeting which were not to be discussed elsewhere in the Agenda, the meeting noted:

Action 1: Mr. Neighbour to instigate an e-mail discussion list. This had now been done. The e-mail address for the discussion list is: graphite@jiscmail.ac.uk

Action 2: Mr. Haag to meet informally with Mr. Gerstgrasser (SGL Carbon Bonn) to discuss options for a comprehensive relational software development. The initiative for this activity had been left with SGL Carbon at the committee's suggestion, and this matter had not been significantly progressed although it was clear that SGL Carbon would like to be in a position to integrate the IAEA Database with other Company databases. It was agreed that the development of relational software remained a low priority and that the initiative should be left with SGL Carbon if they wished to pursue this matter.

Action 4: Incompatible Characters in Japanese Data Sets. Mr. Shibata stated that the question was one of the number of 'bits' per character, and he would now resolve this within JAEA as soon as possible and transmit an unambiguous data set to Mr. Haag, probably using text descriptions of terms such as 'perpendicular' instead of symbols which became corrupted on western computers. He stated that JAEA, in cooperation with Toyo Tanso Co., will try to resolve the problem without specific funding from the IAEA.

New Action 1: Mr. Shibata to determine whether to re-issue the Japanese data set with text descriptions or whether to re-template it in full.

Action 8: Template Structure for a Separate Database on Decommissioning Data. Mr. Wickham said that no progress had been made on this because it was becoming increasingly obvious that isotopics data were widely variable and inconsistent with prediction in many cases. Examples of this problem would be given later in the meeting.

Action 9: Identification of remaining GA Reports to be Input. Mr. Burchell provided a list of reports to members.

All other Actions from the previous meeting have been resolved or had become so through discussion in the present meeting.

Review of National Database Users' Meetings and Interests

Mr. Wickham said that the UK had established a twice-yearly meeting with representatives from the numerous users. This had proved extremely valuable in getting agreement to the strategy agreed at the previous CM, in shaping the QA report contents, and in voting some additional UK funding for upgrading data from Version 1. An extremely important

development was that the two blocks of “Level 2 Restricted” data had now been downgraded – to completely Unclassified in the case of data from British Energy, and to the standard “Restricted” category for data from BNG / Magnox. He said that this would also apply to future data inputs from these sources, and that this represented a clear move towards data declassification which he welcomed because it might open a door towards some partial direct Agency funding for the project in due time. He added that, on a personal basis, he would like to see the end of *all* “Level 2 Restricted” data from the Database because it sent the wrong signals to potential Member States about the project, a point with which Mr. Clark concurred.

A final point from the UK concerned the evident importance of data on irradiation creep, both in connection with existing reactor lifetime extension and with new projects.

Mr. Burchell noted that the USA did not hold user-group meetings specifically, but that there was increasing interest in the project through Gen IV activities, and also in connection with a NASA nuclear powered propulsion system. Other organisations and laboratories with an interest included the Department of Energy (ORNL, INL and naval research labs) and the Nuclear Regulatory Commission. Mr. Burchell noted minor corrections to USA-related entries in the project work plan (current version appended to these Minutes).

Mr. Chi commented that a number of research and development organisations within Korea would have an interest in the project. These included the KAERI HTR design team, KAIST, and KOPEC (Korea Power Engineering Company), a reactor design company.

Mr. Haag advised that, in addition to himself, SGL Carbon was a potential database user in Germany.

Mr. Shibata enumerated the interests of JAEA, which included the assessment of isotropic graphites for GEN IV (especially IG-430 as well as IG-110), relevant high-dose data for other graphites, and the employment of the JOYO fast reactor for high-flux irradiations. He added that some Japanese companies may have stronger interests in the Database than Toyo Tanso Co.

Mr. Smaizys confirmed that the interests of Lithuania remained limited to decommissioning the Ignalina reactors.

For completion, it was noted that the PBMR Co. were using the information, possibly along with the South African nuclear regulator.

Review of Progress on Project Plan

Module 1

Mr. Haag reported that all the data identified in Module 1 had been processed, with the exception of some small outstanding issues with the ‘Beavan’ H451 data which he needed to discuss with Mr. Burchell. As a ‘replacement’ activity, a start had been made on extraction of data from Petten on the Dragon project (Module 4), a matter which was becoming more urgent because the printed records were fading rapidly with age and no other database of the information exists. He noted that important data from the UK DFR irradiations were missing from the original documents, especially irradiation temperatures, but these probably could not now be recovered.

Module 2

Mr. Wickham reported that the UK HSE (Nuclear Safety Directorate) was willing to fund the upgrading of the remaining UK data, and a start had been made on this although progress had been slow due to work pressures¹. Mr. Haag and Mr. Shibata indicated that problems with interpretation of Japanese data would be addressed quickly through JAEA. Meanwhile, Mr. Haag advised the meeting that the ‘Bordeaux Conference’ data input was completed, as were the ATR-2E and ASR-1R data (also with some residual inconsistencies).

In terms of the issue of the CD-ROM due end-March, the following was agreed:

- The new data file, in Excel format, would obviously be included.
- Previous data which had NOT been upgraded would be included in the disk in folders appropriately marked.
- The Working Arrangement would appear on the disk.
- Restricted files would be password protected (no L2R data will appear on this version)².
- Mr. Haag would complete the compilation of the new Excel file and pass it to Mr. Wickham, who would add the former files from Version 1 and produce multiple copies of the CD, suitably labelled, for the Agency to distribute by the formal route.

It was aimed to achieve this issue to Members and Sponsors by mid-April 2006, slightly late on the schedule. Some questions about the hyperlinking of volumes stored as .jpeg or .pdf files remained to be resolved, and it was important to get this right before production of disks. Mr. Haag and Mr. Humbert were cooperating to resolve these issues.

Module 3

The file on H-451 had been passed to Mr. Haag and questions had largely been resolved. Mr. Burchell had also passed on the remaining items from the USA.

Module 4

As noted earlier, work has begun on the Petten data. Colleagues of Mr. Smaizys had translated two of the five identified Russian language papers: the general view was that the data available were of limited value. Mr. Smaizys subsequently noted that the journal publishers were now offering English translations for some of the previously-identified papers, and it was resolved that the exercise was probably not worth continuing.

¹ Secretary’s Note: UK funding voted for this activity in the financial year 2006 –2007 may now be re-directed to Mr. Haag’s students with agreement from UK HSE NSD.

² A discussion on the simplest way to achieve this objective continued after the formal meeting.

Module 5

Mr. Burchell presented members with a list of the GA papers. Eleven papers had been provided already: the next five would be transmitted to Mr. Haag shortly, and twelve more had been reviewed and found to be worthy of inclusion. All of the GA documents would almost certainly be regarded as Unclassified.

Overall Progress

The overall progress was judged to be highly satisfactory, and Mr. Haag with his students had made an excellent job of the data input. However, it was noted that, except for the UK contribution, no new sources of funding had been identified to contribute towards the total required to complete the project. Funding issues were discussed at the end of the meeting.

Mr. Wickham again commented that it would be useful if members could identify additional inputs within their own member states – either financial or manpower – to assist in achieving the targets.

Mr. Shibata was then invited to comment upon the Japanese proposal for a Data Evaluation Project. He explained that there had been delays in considering this in detail in Japan, caused by the changed organisation of JAEA (formerly JAERI). He noted the draft QA document to be discussed later in the meeting, and that it now included elements of evaluation of input data. He also noted external activities such as the work of introducing ASME and ASTM standards for nuclear graphites and Generation IV initiatives, together with a UK initiative on possible future irradiation experiments. Whilst he considered that these activities needed to be linked formally with the IAEA Database, it was now the Japanese view that no additional activity on data evaluation needed to be undertaken as it was considered that an evaluation was now effectively in progress. Consequently, this item could be withdrawn from the programme. This was agreed.

Mr. Burchell also noted that he had advised those parties engaged in the Gen IV debate and in the wider discussion on irradiation experiments that the IAEA Database should be the ultimate repository for new data. Some delays may need to be built in to this process as a result of commercial sensitivities and intellectual property rights, but there was nonetheless broad agreement with his recommendation from the parties involved. The committee regarded this as excellent news.

Quality Assurance of Data

Mr. Wickham introduced the draft document “Quality Assurance for the IAEA International Database on Irradiated Nuclear Graphite Properties” which will be issued by Mr. Humbert as an INDC Report when fully approved by the committee and the Agency. Its purpose is to provide a clear explanation of the procedures followed when inputting data to the Database, for the reassurance of data users who may wish to utilise such data in safety cases etc. At previous meetings the representatives from regulatory authorities had been particularly keen to see a formal system put in place, as had safety-case authors from the UK industry. The document also proposed a system for categorisation of data, to give a clear indication of its provenance and quality so that users unfamiliar with the source could have a clear indication of its merit based upon the opinions of the graphite specialists (*i.e.* the members of the Database CM).

Useful improvements to the text were discussed, and will be implemented by Mr. Wickham before submitting a final version to the Agency. In particular, the committee was unhappy with the proposed method of categorisation by ‘scoring’, feeling that they would be called accountable by data users to justify a specific numerical ‘score’. It was therefore agreed that the document would offer, instead of awarding ‘marks’ for specific qualities, a ‘tick sheet’ indicating the level at which the committee rated the data in the categories originally proposed in the report. This was the majority view, although certain members expressed concerns about *any* ‘transparency’ in how the assessment of data value had been reached, considering that the committee were the experts and their judgement should be respected. It was suggested that, in the future, regulators or safety-case assessors might insist in investigating and debating the assessment ‘to infinity’. Mr. Burchell pointed out that the ASME code philosophy was to hold the necessary discussions and deliberations about the quality of information ‘off the record’. Both he and Mr. Clark offered the comment that ‘if the data were not adequate, then they should not be in the Database anyway’. However, the ‘tick sheet’ approach was agreed by the majority, and the report will now include this proposal, with the ‘tick sheet’ appended to the data files on the CD-ROM as a ‘Word’ document.

In reaching these conclusions, the committee took advantage of the experience of the IAEA Nuclear Data Section in assessing and evaluating nuclear data, and Mr. Trkov rejoined the meeting to give a comprehensive presentation of part of his report INDC(SEC)-0107 “Guidelines for Nuclear Data Verification and Validation”. An important difference in philosophy emerged, where by in the evaluation of the nuclear data, an assessor would prescribe the ‘most probable value’ if a particular data item was missing. This is not permitted in the graphite database, only extant data being admitted. Further, Mr. Trkov’s procedure uses existing codes to check data for internal consistency, a methodology not generally available in the case of the graphite Database. Mr. Trkov commented that ‘quality information is very subjective and very difficult to implement’. It was agreed that it is crucial to refer back to original documentation where problems existed. The master file in Mr. Trkov’s situation is an *ascii* library, keyword oriented with software allowing conversion to a relational database. For some users of our database, this would be an ideal outcome. For others, the simple master file approach currently adopted is the preferred solution. The committee strongly agreed with Mr. Trkov’s two-level approach – a simple master file and a separate good functionality which is adequate for purpose but which may change according to the needs of the user. This is the ideal to which the graphite database project now aims, with input to the master file having absolute priority.

New Action 2: Mr. Wickham to revise the QA report, circulate to Members for final review and then submit it to Mr. Humbert for Agency review and issue.

ASTM Standards and Other International Initiatives

Mr. Burchell informed the meeting about progress with standard D7.219.05 relating to new isotropic nuclear-grade graphites and to nuclear graphites suitable for components that receive minimal irradiation damage. He explained the work of his committee on nuclear graphite standards, which included devising standard test methodologies where no existing standard methodology existed – examples are crystallographic parameters by X-ray diffraction, standard air-oxidation rate and fracture toughness. Where existing standard methodologies do exist, the ASTM graphite committee was reviewing the procedures and recommending improvements.

Mr. Wickham reported some concerns with the process. Firstly he commented that the new standards would rule out virtually all of the existing nuclear graphites which had been used perfectly competently since the 1950s, and he considered that the imposition of such standards stifled innovation and thinking ‘outside the box’ which was the key to good research and development. He had also had more specific concerns, one example being a fundamental disagreement with part of the procedure for reporting thermal oxidation rate.

Mr. Burchell noted that the available size of irradiated nuclear graphite samples sometimes violated other standards where minimum test-specimen sizes were specified.

He also advised that there was a standard for reporting irradiation data on specific sample characteristics.

He went on to review briefly other international activities such as the UK initiative to investigate the possibilities for collaborating internationally on graphite research and on the assessment of data. He noted that the UK DTI had agreed to identify a UK interface with Gen IV.

New Action 3: In his capacity as the probable future Chairman of the Graphite Projects Review Panel under this initiative, Mr. Burchell to consider the links with the IAEA Database which could include the invitation of specific representatives to observe Database CMs, widening awareness of the Database activity and perhaps encouraging other members and sponsors.

International Nuclear Graphite Specialists’ Meetings (INGSMs)

INGSM-6 had been hosted by SGL Carbon at Chamonix in September 2005 and had been a very successful meeting. The occasion had been used to present the future strategy for the Database project, and this had been generally well received.

Mr. Burchell presented the arrangement for INGS-7, which will be hosted by the US DoE at Oak Ridge National Laboratories in September 2006. All appropriate information is at <https://www.ms.ornl.gov/INGSM-7/default.htm> . A registration fee of USD 200 will cover all meals and the proceedings and it is suggested that the papers will be published in a special edition of Journal of Nuclear Materials (the fee includes USD 70 to facilitate this process), although this is optional. Papers on all the usual graphite topic areas are now invited. The meeting thanked Mr. Burchell for his work on this activity.

Mr. Wickham reminded the meeting that INGS-8 was tentatively scheduled for South Africa, hosted by PBMR Co, although there had been no recent contact on this point. He also advised an ambition to see a future INGS meeting hosted at the Chateau de Cadarache (CEA, France) and was pursuing the possibility with French colleagues.

Irradiation Data for Large Components

The meeting had been requested to consider the applicability of small-sample data to large components, relating to the problems of taking a small trepanned sample from a full graphite channel block. Mr. Burchell said that the ASTM was also grappling with this problem. The questions were whether properties measured on a small sample were representative of a large component, and whether one expected the effects of irradiation to be any different in the two

cases. Mr. Haag commented that the alternative was to have no data at all for the large component. No useful advance was made on this issue.

Data Security (standing item)

There were no issues relating to the security of data. However, the Chairman reminded members of their obligations under the Working Arrangement to keep restricted data confidential to the users within Member States and not to use e-mail for transmission.

Date of Next Meeting

It was agreed to hold the next meeting in Vienna in March 2007, adjacent to a planned IAEA Consultancy for which the working title was “Accelerating the Decommissioning of Graphite-Moderated Plant”. Mr. Wickham was organising this meeting in association with The University of Manchester, UK, on behalf of Mr. Methnani of the IAEA Division of Nuclear Power. It was agreed to separate the two meetings by a weekend for travel between the UK and Austria. The exact dates will be advised shortly, taking account of members travel availability.

The open meeting was then concluded with all delegates and observers thanked for their contributions.

Closed Session

A brief closed session was convened to discuss the financial situation. Outgoings during the year had been solely for data input. There had been no income whatsoever in 2005-2006, since the promised contributions from PBMR, Graftech and SGL Carbon had not been received. In one case the expected contribution for 2004 had not been received either. Toyo Tanso Co. Ltd would be re-starting their contributions shortly, at a level to be finally agreed. Mr. Wickham commented that the inability of the Agency to issue any invoice for a voluntary contribution was unfortunate: members could not understand why a voluntary contribution, once agreed, could not be invoiced in the normal manner especially when the Companies specifically requested it.

Mr. Haag pointed out that he might not be able to retain his ‘trained’ students on the project unless a source of income beyond July 2006 could be guaranteed.

New Action 4: Mr. Humbert and Mr. Wickham to confer on suitable letters to be sent to all sponsoring organisations as soon as possible.

The updated timeline diagram with all agreed targets for inputs and milestones is shown in the **Appendix C**.

Actions from the 8th Meeting

1. Mr. Shibata to determine whether to re-issue the Japanese data set with text descriptions or whether to re-template it in full.
2. Mr. Wickham to revise the QA report, circulate to Members for final review and then submit it to Mr. Humbert for Agency review and issue.
3. Mr. Burchell to consider the links between other international activities and the IAEA Database which could include the invitation of specific representatives to observe Database CMS, widening awareness of the Database activity and perhaps encouraging other members and sponsors.
4. Mr. Humbert and Mr. Wickham to confer on suitable letters to be sent to all sponsoring organisations.

IAEA Consultants' Meeting: 8th Meeting of the Technical Steering Committee for the International Database on Irradiated Nuclear Graphite Properties

15-16 March 2006, Building-A, Floor-4 and Room-18 (A04-18), IAEA Headquarters, Vienna, Austria

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IAEA Consultants' Meeting: 8th Meeting of the Technical Steering Committee for the International Database on Irradiated Nuclear Graphite Properties

15-16 March 2006, Building-A, Floor-4 and Room-18 (A04-18), IAEA Headquarters, Vienna, Austria

MEETING AGENDA

Wednesday March 15th 2006

0900 Welcome (*IAEA, Chairman*)

Welcome to Representative of the Republic of Korea

Welcome to Sponsors' Representatives

Adoption of the Agenda

Chairman's Remarks

Apologies for Absence

Minutes of the Previous Meeting (*March 2005*): INDC(NDS)-472

Matters Arising (*which are not covered elsewhere in the Agenda*)

Review of National Database Users Meetings (*or Report by National Liaison Officers if no national meeting has taken place*)

Coffee Break

Review of Project Plan Agreed at March 2005 Meeting

Presentation to Nuclear Graphite Specialists at INGSM-in Chamonix, September 2005

Funding Requirements (Outline of Position without declaration of specific financial data)

Progress on Module 1 (*planned completion date January 2006*)

Progress on Module 2 (*planned completion date January 2007*)

Lunch Break

Review of Project Plan Agreed at March 2005 Meeting (*continued*)

Progress on Module 5 (identification of GA Reports (*intended completion date January 2006*))

Review of Remaining Modules and Consideration of Amendments (if any)

The Possibility of Undertaking Parts of the Project within Member States

Data from Russian Language Publications (*planned completion date October 2005*)

Issue of Incompatible Data Sets (*Action on Mr. Shibata*)

Issue of Next CD-ROM (Excel file format) (*planned completion date March 2006*)

Available content

Extent of available hyper-linking of source reports

Mechanism for production of CD-ROMs

Coffee Break

Data Evaluation Proposal from Japan “HTR Design Evaluation and Quality Assessment” (*deferred from due date because of reorganisation within JAEA*)

Quality Assurance Document (*draft circulated in advance*)

Application of Assessment Criteria to Data Reports for next CD-ROM (*Item may continue into second day*)

End of First Day

Thursday March 16th 2006

0900 Version 3 Project (Relational Search Functionality Development): Proposals for Development (*this is currently regarded as a peripheral issue by the Committee, but observers may like to contribute*)

Decommissioning Database

Review Status of Decommissioning Activity and Assessment of Its Importance relative to Operational Reactor Issues and New Reactor Issues

Template for Decommissioning Data (Action 8 from Previous Meeting)

Proposal for IAEA Consultancy (provisional title “Accelerating the Decommissioning of Graphite-Moderated Nuclear Plant”) proposed to be held in the United Kingdom in Spring 2007

Coffee Break

ASTM Graphite Standards Progress and Its Implications for the IAEA Graphite Database Project

Impact upon IAEA Graphite Database of Recent Proposals for International Collaboration on Nuclear Graphite Research (*e.g.* Recent UK Regulatory Initiative, Materials and Components Project Management Board of Generation IV International Forum, etc.) (*contributions from all Members invited*)

INGSM-6 Report

INGSM-7 (Oak Ridge National Laboratory, USA, September 2007)

Lunch Break

Translation of Small-Specimen Data to the behaviour of Large Components

Other Future Activities not presently in the Project Plan (if any)

Any Other Business (*prior notification to the Chairman would be appreciated*)

Dates for Next Committee Meeting

(Close of Open Meeting, Observers take their leave)

Closed Session (Members Only)

Review of Financial Position

Any Other Administrative Matters

Meeting Closed 1630h

Proposed “Worst-Case” Timeline for IAEA Graphite Database Project 2005-2009

Date	Module 1 Data Input (Haag)	Module 2 Data Input (Haag and Wickham)	Module 3 Data Input (Haag)	Module 4 Data Input (Haag)	Module 5 Data Input (Burchell, Haag)	Module 6 Data Input (Haag)	Document QA Procedure for Data Input (Wickham)	Version 3 Project (Relational Search Functionality)	
March 2006		Upgrade files from Version 1.3: UK files – AJW Rest - Haag Upgrade files from Version 2.1, covering missing or incomplete data: BNWL 1672 (USA) Mitsubishi L2R files segregated Doctoral Thesis and Toyo Tanso data	Latest H-451 compilation ex ORNL/NRC HTK7 HFIR Irradiation Data 5 Hanford ETR Irradiation Reports						
April 2006	Issue CD - (Excel)							Revise QA Document and final committee review	
May 2006									
June 2006									
July 2006									
Aug 2006									
Sept 2006								IAEA issues INDC(NDS) Report	
Oct 2006									
Nov 2006									
Dec 2006									
Jan 2007		COMPLETE							
Feb 2007									

March 2007		Issue CD – (Excel)						Review Options at Technical Steering Committee
April 2007			COMPLETE	Conclude input of Petten Data from Dragon Project				
May 2007								
June 2007			Issue CD – (Excel)					
July 2007								
Aug 2007								
Sept 2007								
Oct 2007								
Nov 2007								
Dec 2007								
Jan 2008								
Feb 2008								
March 2008					COMPLETE	OC Series from ORR (USA) Data from Further GA Reports as identified at March 2006 Meeting INET Results		
April 2008								
May 2008								
June 2008				Issue CD – (Excel)				
July 2008								

Aug 2008					Additional Data from Carbon Journal papers			
Sept 2008								
Oct 2008								
Nov 2008								
Dec 2008					COMPLETE	Data on Matrix Materials Any other identified Data		
Jan 2009								
Feb 2009								
March 2009					Issue CD			
April 2009								
May 2009								
June 2009								
July 2009						COMPLETE		
Aug 2009								
Sept 2009								
Oct 2009								
Nov 2009								
Dec 2009								

Jan 2010								
Feb 2010								
March 2010						Issue Final CD		

	Colour indicates Steering Committee Meeting Scheduled
	Colour indicates interim position to be achieved by date
	Colour indicates milestone to be achieved by date

Acceleration on these timescales may be achieved if additional persons are engaged in data preparation; this may in turn be dependent upon the funding rate for the project.

All timelines and milestones subject to annual review by the Technical Steering Committee.

Also to be considered at appropriate point: *form of USER GUIDE for Excel-style CD issues*

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