

International
Nuclear
Fuel
Cycle
Evaluation

XA8007254

INFCE

INFCE/DEP/WG.4/20

RECORD OF THE FOURTH MEETING OF SUB-GROUP B, VIENNA, 20-21 SEPTEMBER 1978

International Nuclear Fuel Cycle Evaluation

INFCE/WG.4/46 (B)
13 October 1978

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WORKING GROUP 4
Sub Group B

INFCE WORKING GROUP 4, SUB-GROUP B: PLUTONIUM

MANAGEMENT AND RECYCLE

RECORD OF FOURTH MEETING OF THE SUB-GROUP

VIENNA: 20-21 SEPTEMBER 1978

1. OPENING OF SESSION BY MR SHIGEFUMI TAMIYA
 - 1.1 Mr Tamiya opened the meeting and welcomed all delegates* on behalf of the UK and Japan.

2. OPENING REMARKS BY CO-CHAIRMEN
 - 2.1 Mr Buck said that it was with regret that he had to announce that this would be Mr Michael James' last meeting as UK Technical Secretary of the Sub-Group. On 1 October Mr James would be joining IAEA as Director of the Agency Programme on Plutonium Management. Mr Tamiya thanked Mr James warmly for the excellent services he had given to the Sub-Group since its establishment; and wished him success in the difficult and important task he was taking on.
 - 2.2 Mr James replied that he had enjoyed working with the Sub-Group and was sorry to be leaving; he thanked the delegates for the support and cooperation they had given him. The Sub-Group welcomed Mr Peter Crowfoot of UKAEA** who was to succeed Mr James as UK Technical Secretary.

3. ADOPTION OF THE AGENDA
 - 3.1 The provisional agenda was adopted and is attached as Annex A.

* List of delegates at Annex B

** Mr Crowfoot's address is given in Annex E

4. RECORD OF THE THIRD MEETING OF THE SUB-GROUP
Paper INFCE WG.4/33(B)
- 4.1 The Sub-Group took note of the record of the third meeting held on 17 May 1978.
5. CO-CHAIRMEN'S REPORT ON THE JUNE 1978 TECHNICAL CO-ORDINATING COMMITTEE MEETING
Paper INFCE TCC/2/6
- 5.1 Mr Tamiya drew delegates' attention to the record of the June Technical Co-ordinating Committee meeting (INFCE TCC/2/6), in particular Paras 7, 10, 12, 14, 15 and 20. The meeting noted that a draft report by the Group was required by the TCC by the end of May 1979. Mr Buck stressed that to meet this timetable the process of preparation would need to begin at once.
6. TASK 1 - COLLECTION OF BASIC DATA
Paper Co-Chairmen WG.4/31(A,B)
- 6.1 The UK Technical Secretariat presented this paper, which analysed the present situation and future programmes of participants in reprocessing, plutonium handling and recycle, on the basis of replies to the questionnaire issued in April. It incorporated replies received by the end of July 1978. The meeting noted that limited comparisons with the OECD Yellow Book could be made and for this purpose OECD area breakdowns appeared in the paper. The meeting welcomed the paper and agreed that, after the incorporation of certain minor textual amendments, it should be circulated to other Working Groups as an INFCE paper with a covering note.
7. TASK 2 - CURRENT METHODS OF PU STORAGE: BASE CASE
Papers Co-Chairmen WG.4/15(B)Rev 1
INFCE WG.4/32(B)
- 7.1 The meeting completed its discussion of papers Co-Chairmen WG.4/15(B)Rev 1 and INFCE WG.4/32(B) with its supplement of a diagram.
It was agreed that these papers should be adopted as the base case on plutonium storage and that Co-Chairmen WG/15(B)Rev 1 should become an INFCE Paper.
- 7.2 The meeting noted that a paper from FRG on conversion would be presented at the November meeting.
- 7.3 It was also noted that the GESMO report to be presented later (Co-Chairmen WG.4/44(A,B)) would have some relevance to the assessment of the storage and transport base cases.

3. TASK 3 - CURRENT METHODS OF PLUTONIUM TRANSPORT : BASE CASE
Papers Co-Chairmen WG.4/16(B)Rev 1
Co-Chairmen WG.4/28(B)
- 8.1 The CEC delegate introduced paper Co-Chairmen WG.4/16(B)Rev 1. Chapter I had been revised as agreed at the third meeting of the Working Group. Chapter II was new, and described the consequences of plutonium transport on general traffic, the radiation doses delivered to transport workers and the amount of heat discharged during transport. The effect on general traffic and the heat discharged were insignificant, but transport workers (especially drivers) might receive a radiation dose as high as 1.7 rem/man/year. It was noted that the paper related to projected plutonium transport in the 1990s, but using present-day methods.
- 8.2 In discussion the following points were made:
- a. Radiation doses to drivers could be considerably reduced by additional shielding.
 - b. The difference in dosage between the surface of a container and the walls of a truck was because a truck carried a number of containers.
 - c. Allowance had been made in the dose levels for the build-up of fission products in the period between reprocessing and transport.
- 8.3 It was agreed that CEC would revise the paper to reflect points made in discussion and then the paper would receive general INFCE circulation. Chapters III and IV, describing the impact on the environment in the event of accidents and the radiological consequences on the general public, would be introduced as a separate paper or papers at a later date.
- 8.4 The UK delegate introduced paper Co-Chairmen WG.4/28(B), describing the UK's experience in transporting plutonium both domestically and overseas over the past 20 years.
- 8.5 In discussion it was noted that:
- a. Fixed costs were very high. The weight of material transported had only a slight effect on overall costs.

- b. Transport of MOX might be slightly more expensive than PuO_2 . This would depend on the dilution factor and, therefore, the number of new containers required. It might also create operational difficulties for the customer.
- 8.6 It was agreed that the paper was a most valuable contribution to the base case and should now be given general INFCE circulation.
9. TASK 7 - PLUTONIUM RECYCLE : BASE CASE
(b) Definition of Reactor
Paper Co-Chairmen WG.4/4(B)Rev 1
- 9.1 The Japanese delegation introduced this revision of their earlier papers (Co-Chairmen WG.4/4(B) and Co-Chairmen WG.4/4 (B) Rev 1), which incorporated comments proposed by other delegations. In particular, the figures for PWR/BWR load factor (revised to 100%), enrichment tails assay (revised to 2.5%) and the PWR:BWR ratio (revised to 2:1) had been changed to accord with the data being used by other Working Groups.
- 9.2 After discussion it was agreed that this paper was a most valuable contribution to the base case, should be given an INFCE number and circulated to other Working Groups for their information.
- (c) Fuel Fabrication Facility
Paper Co-Chairmen WG.4/1(B)
Co-Chairmen WG.4/1(B)Mod.
- 9.3 The Belgian delegate introduced paper Co-Chairman WG.4/1(B) Mod which listed amendments based on comments received since the last meeting.
- 9.4 After discussion it was agreed that the paper, incorporating the proposed revisions, should be circulated for the information of other Working Groups with an INFCE number.
- (d) Cost Data
Paper Co-Chairmen WG.4/20(B)
Co-Chairmen WG.4/3(B)Rev 2
- 9.5 These papers were introduced by the IAEA delegate and the Technical Secretariat (Japan). The Technical Secretariat paper took note of the data in the IAEA paper and the comments made by delegates at the Tokyo meeting.

9.6 In reply to questions the Technical Secretariat confirmed that all unit costs related to the base case size of reprocessing plant, assumed to be of 300 tonnes per year capacity or more and explained that the cost of plutonium storage had not been considered significant in uranium/plutonium recycle since the figures were based on a self-generating recycle case in which any period of storage would be very short.

9.7 In discussion of the Technical Secretariat paper the following points were made:

- a. It would be helpful if an explanation of the basis of the figure for spent fuel permanent storage cost could be included. A recent publication by the US Department of Energy^{*} might provide a useful reference document for this purpose.
- b. Plutonium shipping costs might be expressed in US \$ per shipment rather than per Kg of plutonium transported. The information given in the UK paper on plutonium transport considered earlier in the meeting should be taken into account.
- c. A major difficulty was presented by the considerable range in estimated costs for some items, in particular for plutonium storage. At least to some extent this reflected differing situations (eg size of plants, safety standards and market conditions), but it would be helpful if the Technical Secretariat could achieve some narrowing of the range or an indication of where the reference point might be taken.
- d. In extrapolating the figures for future years, account might be taken of previous experience of the escalation or otherwise in the cost of particular items.
- e. Some of the items related to a specific reactor type (ie LWR) whereas others were of general applicability. This should be made clear in Table III.

* Preliminary Estimates of Changes for Interim Storage and Disposal of Spent LWR Fuel - July 1978

9.8 After discussion it was agreed that the Technical Secretariat paper was now sufficiently complete for use as the initial basis for economic assessments. In order to have a full understanding of the basis of the individual figures quoted and thereby to understand the reason for the large variations which appeared in some items, the Technical Secretariat would hold discussions with those delegations which had contributed information on which the paper was based. Where relevant information was available from other Working Groups, this too would be incorporated in a further revision of the paper. The paper would be a useful working document for the Sub-Group but would not be circulated to other Working Groups at this stage.

TASK 8 - ASSESSMENT OF BASE CASE FOR PLUTONIUM RECYCLE

Paper Co-Chairmen WG.4/24 (B)

9.9 It was agreed that this paper by the Italian delegation, which had been discussed at the third meeting, should now be given an INFCE number and circulated to other Working Groups.

10. ASSESSMENT OF BASE CASES

Papers Co-Chairmen WG.4/35
Co-Chairmen WG.4/42 (A,B)
Co-Chairmen WG.4/44 (A,B)

10.1 The meeting noted that the UK Technical Secretariat would start immediately on summaries of the base cases for plutonium transport and plutonium storage using the technical information which had now been assembled. The Japanese Technical Secretariat would similarly begin work on summarising the plutonium recycle base case. The objective was to complete drafts for submission to the January Sub-Group meeting. It was agreed that, to help in this work, the Technical Secretariat would consult countries which had provided input for the base cases and others which had expressed particular interest in them.

10.2 The meeting also noted that the parametric study proposed by the Technical Secretariat for Sub-Group 4A would also be relevant to the work of Sub-Group B. A draft outline of the study would be available for consideration at the next Sub-Group meeting.

US Contribution on Assessment of Proliferation Resistance: Co-Chairmen
WG.4/42(A,B)

- 10.3 The US delegation explained that this paper was offered to the meeting as a discussion paper only at this stage. The paper examined civil nuclear programmes and research reactors in respect of their susceptibility to proliferation. Although the paper was particularly relevant to Sub-Group 4A, Section 4 on thermal recycle was important to the work of Sub-Group 4B. It was noted that the paper had also been presented to Working Groups 5 and 8.
- 10.4 In discussion, delegates thanked the US for a valuable contribution to the work of making assessments. The Sub-Group welcomed its general methodology. However it was suggested that the paper lacked objectivity in analysis of some of the aspects of proliferation and safeguards: for example there was too great a concentration on materials accountancy and not enough attention to containment and surveillance. Also enrichment, the once-through cycle and the application of international safeguards had not been dealt with in sufficient detail.
- 10.5 It was agreed that it would be desirable for further discussion of this paper to be at a joint meeting of Sub-Group 4A and 4B.

US Contribution on Safeguarding a Domestic Mixed Oxide Industry against a
Hypothetical Subnational Threat: Co-Chairmen WG.4/44(A,B)

- 10.6 The US delegate presented this paper. He explained that it was offered as a technical paper and had not yet received the approval of the US Nuclear Regulatory Commission. The US delegate pointed out that the paper considered only the US domestic industry and did not specifically consider international nuclear proliferation. The projections of the size of the US industry were based on 1974 figures and were considerably larger than would now be estimated. Documents referred to in the paper could be provided to INFCE delegates if requested.
- 10.7 It was agreed that the paper would be discussed in detail at a future meeting of the Working Group.

IAEA Contribution on Present Status of IAEA Safeguards on Nuclear Fuel Cycle Facilities: Co-Chairmen WG.4/35(A,B)

- 10.8 The IAEA delegate presented this paper reflecting the Agency's current thinking on the application of safeguards to industrial fuel cycle facilities. This subject was still under discussion within the Agency. The paper was in two parts and pages 34-36 and Section B2 of Part II were noted as being of particular relevance to Working Group 4B. It was agreed that these sections would be discussed in detail at a future meeting of the Sub-Group. The IAEA delegate also agreed to find out whether it would be possible to present a summary of further discussions convened by the Agency.
11. TASKS 4 AND 5 : TECHNOLOGICAL ALTERNATIVES FOR PLUTONIUM STORAGE AND TRANSPORT
Paper Co-Chairmen WG.4/29(B)
- 11.1 The Co-Chairmen presented paper Co-Chairmen WG.4/29(B) which invited contributions from delegates on Tasks 4 and 5 on technological alternatives for plutonium storage and transport for presentation at the January 1979 meeting. Delegates agreed to notify the UK Technical Secretariat of their intended contributions as soon as possible.
12. TASK 9 : PLUTONIUM RECYCLE - REACTOR ALTERNATIVES
Paper Co-Chairmen WG.4/36(B)
- 12.1 The Japanese delegate presented this paper on "Fuel Cycle in Japanese Fugen-HWR" and explained that Japan planned to proceed from the HWR presented in the paper to a demonstration reactor. The paper was welcomed by delegates as a valuable contribution to the discussion of reactor alternatives, particularly since this type of reactor used plutonium in its initial fuel core. It was agreed to defer substantial discussion of the paper until the next meeting.
- 12.2 The meeting noted that a paper by Canada on HWR would be presented at the next meeting.
13. TASK 6 - ALTERNATIVE INSTITUTIONAL ARRANGEMENTS
Papers IAEA Study on the International Management and Storage of Plutonium and Spent Fuel (Co-Chairmen/WG.4/47 (A,B)
Co-Chairmen WG.4/41(A,B)
- 13.1 The IAEA delegate presented their paper which had been sent to INFCE Working Groups 4 and 6 for information. The study was begun before the establishment

of INFCE, initially as an examination of the prospects for international plutonium storage under Article XII.A.5 of the IAEA Statute; subsequently it had been broadened to cover spent fuel. The paper had been distributed by the Director General to all Member States and the Agency was encouraged by the response received. The first part of the document, on international storage of plutonium, was relevant to the work of Sub Group 4B.

- 13.2 International plutonium storage would be considered in more detail at a meeting of experts from Member States in the week of 4 December 1978, as a first step in the process of defining proposals for submission in due course to the Board of Governors. Sub-Group 4B would be kept in touch with the outcome of this meeting and of progress in the Agency's future programme of work on international plutonium storage.
- 13.3 It was agreed that this constructive and valuable paper would be considered further at the meeting of the Sub-Group in January 1979, when account could be taken of the results of the IAEA expert meeting planned for December.
- 13.4 The US delegate tabled paper Co-Chairmen WG.4/41(A,B), which had also been presented to Working Group 4A. The paper set out a number of possible institutional alternatives for reprocessing and plutonium management, ranging from delayed reprocessing and the deferral of plutonium separation, to the setting up of reprocessing and plutonium storage facilities under international auspices and the establishment of an international nuclear fuel authority. He pointed out that present day multi-national arrangements, such as EUROCHEMIC and EURODIF, were considered in greater detail in paper Co-Chairmen WG.4/43(A,B).
- 13.5 Following discussion it was agreed that the paper was a valuable contribution to the work of the Sub-Group and should be considered in detail at the next meeting, when delegates had had time to consider it. The US would consider submitting the paper to Working Group 3 also, although to do so would require augmentation, since in its present form the paper concentrated specifically on the back-end of the fuel cycle.
14. PREPARATION OF REPORT ON THE TASKS
Papers Co-Chairmen WG.4/45(A,B)Rev 1
Co-Chairmen WG.4/46(B)
- 14.1 The Co-Chairmen introduced the paper Co-Chairmen WG.4/45(A,B)Rev 1, proposing a format for the final report, which was agreed.

- 14.2 The Co-Chairmen then introduced paper Co-Chairmen WG.4/46(B), illustrating the way in which the first drafts of the Sub-Group's contributions to the final report might be prepared. It was proposed that the Technical Secretariat should prepare the first drafts in consultation with those delegations which had contributed relevant input or which had otherwise indicated that they were willing to assist. Drafts of Chapters I, II and III would be considered at the meeting in January 1979.
- 14.3 After discussion, the Sub-Group agreed these proposals for initiating the drafting of the final report.
15. TASK 11 - PLUTONIUM RECYCLE - REPROCESSING ALTERNATIVES
Papers Co-Chairmen WG.4/39(B)
Co-Chairmen WG.4/40(B)
- 15.1 The US delegate presented these papers setting out proposals for increasing the proliferation resistance of plutonium recycle. An additional and related paper (Co-Chairmen WG.4/38(A,B)) had already been presented to Working Group 4A. He explained that the two papers compared the new techniques with the base case described in the Belgium study on co-processing (Co-Chairmen WG.4/1(B)).
- 15.2 Paper Co-Chairmen WG.4/39(A,B) described for a MOX fuel fabrication facility using co-processed feed and pelletized fuel fabrication process, the lay-out operation and organisation of the plant, protection measures and the status of the technology. Future R & D needs indicated by the study were shown in Table 3. The modifications required to the plant to produce spiked fuel were also set out. Paper Co-Chairmen WG.4/40(B) was similarly arranged but also contained a description of the preparation of gel spheres.
- 15.3 In discussion the following points were made:
- a. It would be important to consider the timescale on which possible modifications to the reference case could be introduced. This might be of the order of 20 years for some options.
 - b. To avoid confusion with nomenclature the Sub-Group should consider whether to adopt the definitions of co-precipitation, co-processing partial processing etc., tabled in Working Group 5B.
 - c. Environmental impacts of spiking were being considered in greater detail in other US studies.

d. The effect of different spiking and reprocessing methods on the fission product content of fuel elements would need to be examined further because of the potentially adverse effects on the operation of the reactor and the fuel cladding.

15.4 It was agreed that these papers would be of relevance to Task 11 and that they should be discussed further at the next meeting. The Working Group 5B definitions (See 15.3b above) would be distributed to the Sub-Group for information.

16. PROGRAMME OF FUTURE MEETINGS

16.1 It was agreed that the next meeting of the Sub-Group should be held in Vienna on 1 December and if possible preceding this on 30 November there should be a joint meeting with Sub-Group 4A to consider matters affecting both Sub-Groups. Future meetings would be held in January, April and May 1979 (see Annex C). The Sub-Group thanked the US delegation for their offer to host the January meeting in San Francisco, which was accepted.

16.2 It was noted that the proposed meeting of Working Group 4 in October had been cancelled. The report to the next TCC would be the report presented to the June TCC (INFCE WG.4/31) with a short addendum covering the format of the final report and the timetable of future meetings.

Vienna

21 September 1978

Annexes

- Annex A - Agenda as adopted
- Annex B - List of delegates
- Annex C - Dates of future meetings
- Annex D - List of papers relevant to Sub-Group 4B
as at 21 September 1978
- Annex E - Addresses of Technical Secretariat

INFCE

International Nuclear Fuel Cycle Evaluation

INFCE/WG.4/36 (B). Rev 1

August 1978

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PROVISIONAL AGENDA FOR THE FOURTH MEETING OF INFCE
WORKING GROUP 4, SUB-GROUP B (20-21 SEPTEMBER 1978
IAEA HEADQUARTERS, VIENNA AT 0.9.30 HOURS).

1. Opening of session by Mr Shigefumi TAMIYA
2. Opening remarks by Co-Chairmen:
 - Mr Shigefumi TAMIYA (The Federation of Electric Power Companies)
 - Mr Cyril BUCK (British Nuclear Fuels Limited)
3. Adoption of the agenda.
4. Record of the third meeting of the Sub-group
To note INFCE/WG.4/33 (B).
5. Co-Chairman's report on the June 1978 Technical Coordinating
Committee meeting.
6. Task 1 - Collection of basic data:
Progress report from the Technical Secretariat and presentation
of preliminary analysis.
7. Task 2 - Current methods of plutonium storage: base case.
Completion of discussion of papers from the Federal Republic of
Germany (CO-CHAIRMEN/WG.4/15 (B) Rev 1) and France (INFCE WG.4/32 (B)).
8. Task 3 - Current methods of plutonium transport: base case
 - (a) Completion of discussion of papers from the CEC
(CO-CHAIRMEN/WG.4/16 (B)).
 - (b) Discussion of paper from the UK
(CO-CHAIRMEN/WG.4/28 (B)).
9. Task 7 - Plutonium recycle: base case
Completion of discussion of papers from Japan (CO-CHAIRMEN/WG.4/4(B)Rev.
Belgium (CO-CHAIRMEN/WG.4/1 (B)), IAEA (CO-CHAIRMEN/WG.4/20 (B)),
and Technical Secretariat (CO-CHAIRMEN/WG.4/3 (B) Rev 1).

10. **Assessment of base cases**
Discussion of suggestions from the Co-Chairmen of a framework for the assessments and of how the work should proceed.
11. **Tasks 4 and 5: Technological alternatives for plutonium storage and transport.**
12. **Task 9: Plutonium Recycle - Reactor Alternatives.**
Presentation of Japanese paper on ATR.
13. **Task 6: Alternative Institutional Arrangements.**
International storage of plutonium: to receive the IAEA study on the international management and storage of plutonium and spent fuel.
14. **Preparation of reports on the Tasks**
Discussion of the format and compilation of the report and integration of the Sub-group's work into the Group 4 Report.
15. **Any other business.**

Date: 1978-09-21

Issue No. 3

NOTIFICATION OF A MEETING HELD AT HEADQUARTERS

Title of Meeting: International Nuclear Fuel Cycle Evaluation (INFCE)
Working Group IV on Reprocessing Pu, handling recycles
Sub-Groups A and B on

Opening Meeting: 10 a.m.
Enquiries: INFCE OFFICE
Ext. 551 or 276

Dates, inclusive: 18 to 21 September, 1978

Place: Boardroom IAEA Headquarters, Ext. 701

Note: A list showing names of participants is attached. The delegates names appear in alphabetical order and the delegation leader is underlined.

Sub-Group A	Co-Chairmen:	Japan U.K.	S. Tamiya W. Marshall
	Technical Secretaries:	Japan U.K.	S. Sato J.G. Collier
Sub-Group B	Co-Chairmen:	Japan U.K.	S. Tamiya C. Buck
	Technical Secretaries:	Japan U.K.	K. Uematsu M.L. James

Participation at the INFCE 4 A and 4 B Meetings
18 - 21 September, 1978 Vienna

A. COUNTRIES

AUSTRALIA

Hardy, C.J.

BELGIUM

Detilleux, E.J.
Flipot, A.J.
Leblanc, J.M.

CANADA

McLean, D.R.
Slater, J.B.

EGYPT

Morsy, S.

FRANCE

Lefevre, J.F.
Regnier, J.P.

GERMANY, FED. REP. OF

Diefenbacher, W.
Hagen, M.
Huppert, K.L.
Jocher, W.
Rehnelt, J.
Schneider, V.W.

INDIA

Prasad, A.N.
Ramaniah, M.V.

ITALY

Ghilardotti, G.
Zaffiro, B.
Zifferero, M.

JAPAN

Haga, T.
Nakamura, Y.
Sato, S.
Tamiya, S.
Tanaka, H.
Toyota M.

JAPAN contd

Uematsu, K.

MEXICO

Gonzalez-Romo, J.G.

NETHERLANDS

Bruyns, V.
Meerburg, A.Y.
Mostert, P.
Walgrave, W.

SWEDEN

Hultgren, A.V.

SWITZERLAND

Colomb, A.
Hauser, G.
Peter, J.

UNITED KINGDOM

Bate, G.
Buck, C.
Crowfoot, P.H.
Fullerton, P.G.P.D.
Hutchins, N.M.
James, M.L.
Marshall, W.
Probyn, G.A.
Sellers, P.S.
Stanley, M.
Thorn, J.D.
Wilson, P.W.

UNITED STATES OF AMERICA

Anschutz, E.E.
Ferguson, D.E.
Harms, W.O.
Hebel, L.C.
Leary, J.A.
Lowenberg, H.

B. ORGANIZATIONS

CEC

Cadelli, N.
Lafontaine, F.

IAEA

Bennett, L.L.
Filatkin, O.
Larson, K.
Pushkov, A.

Annex C

Dates of Future Meetings

	<u>Date</u>	<u>Group</u>	<u>Place</u>
Wed	29 November 1978	4A	Vienna
Thurs	30 " "	Joint 4A and 4B	"
Fri	1 December "	4B	"
Wed	24 January 1979	4A	San Francisco
Thurs	25 " "	"	" "
Fri	26 " "	Joint 4A and 4B	" "
Mon	29 " "	4B	" "
Tues	30 " "	"	" "
Wed	31 " "	spare	" "
Thurs	1 February 1979	4	" "
Mon	2 April 1979	4A	Vienna
Tues	3 " "	"	"
Wed	4 " "	4B	"
Thurs	5 " "	"	"
Fri	6 " "	Joint 4A and 4B	"

Provisional

Mon	14 or 21 May 1979	{	separate and	Vienna
Tues	15 " 22 " "		joint meetings of	"
Wed	16 " 23 " "		4A and 4B, and a	"
Thurs	17 " 24 " "		meeting of the main	"
Fri	18 " 25 " "		group	"

(preferred dates 14 to 18 May 1979)

LIST OF PAPERS RELEVANT TO SUB-GROUP B

(as at 21 September 1978)

1. Records, Agendas and Working Documents

INFCE/WG.4/1	Provisional Agenda, Working Group 4 Meeting 6-7 December 1977
INFCE/WG.4/2	Working Paper - London
INFCE/WG.4/3	Record of London Meeting
INFCE/WG.4/5 (B) INFCE/WG.4/5 (B) Rev. 1)	Provisional Agenda Sub-group 4B, 23 Jan. 1977
INFCE/WG.4/7	Organisational Arrangements
INFCE/WG.4/8 (B) INFCE/WG.4/8 (B) Rev. 1)	Note by Co-Chairmen of Sub-group B
INFCE/WG.4/14 (B)	Record of First Meeting of Sub-group 4B
INFCE/WG.4/23 (B)	Provisional Agenda, Sub-group 4B, 3 April 1978
INFCE/WG.4/27 (B)	Record of Second Meeting of Sub-group 4B
INFCE/WG.4/28 (B) INFCE/WG.4/28 (B) Rev. 1)	Provisional Agenda, Sub-group 4B, 17 May 1978
INFCE/WG.4/31	Progress Report for Submission to the TCC
INFCE/WG.4/33 (B)	Record of Third Meeting of Sub-group 4B 17 May 1978
INFCE/WG.4/36 (B) Rev. 1	Provisional Agenda for the Fourth Meeting of Sub-group 4B, 20-21 September 1978
INFCE TCC 2/6	Summary report of Technical Coordination Committee Meeting, 12-14 June 1978

2. TASKS

Task 1 : Collection of basic data

INFCE/WG.15 (B)	Interim Report on December Questionnaire
INFCE/WG.4/18 (A,B)	Questionnaire issued by the Co-Chairmen in April 1978
INFCE/WG.4/22 (B) INFCE/WG.4/22 (B) Rev. 1)	Present status and future programme of reprocessing, Pu handling and recycle

Task 1 : (cont'd)

CO-CHAIRMEN/WG.4/5 (B)	Answers to December Questionnaire
CO-CHAIRMEN/WG.4/5 (B) Add. 1	Additional Answers
CO-CHAIRMEN/WG.4/13 (A,B)	Answers to Questionnaire INFCE/WG.4/18 (A,B)
CO-CHAIRMEN/WG.4/13 (A,B) Add. 1	Additional Answers
CO-CHAIRMEN/WG.4/ 13 (A,B)Add. 2	" "
CO-CHAIRMEN/WG.4/31 (A,B)	Present Situation and Future Programs
now INFCE/WG.4/44 (A,B)	for Reprocessing, Plutonium Handling and Recycle - Technical Secretariat

Task 2 : Current method of plutonium storage: base case

CO-CHAIRMEN/WG.4/14 (B)	Principles of long-term storage
(now INFCE/WG.4/32 (B))	of plutonium oxide - France
CO-CHAIRMEN/WG.4/15 (B)	Base Case - Definition of Pu Storage - FRG
CO-CHAIRMEN/WG.4/15 (B) Rev. 1	Base Case - Integrated short-term Pu-oxide
now INFCE/WG.4/40 (B) Part I	storage in a mixed oxide fuel fabrication plant - FRG
CO-CHAIRMEN/WG.4/15 (B) Rev. 1	Base Case - Integrated short-term Pu-nitrate
now INFCE/WG.4/40 (B) Part II	storage in a mixed oxide fuel fabrication plant - FRG

Task 3 : Current method of plutonium transport: base case

CO-CHAIRMEN/WG.4/2 (B)	Current Methods of Transport
	Progress Report - UK
CO-CHAIRMEN/WG.4/6 (B)	Task 3 Pu Transport
	Progress Report - CEC
CO-CHAIRMEN/WG.4/16 (B)) Assessment of the Environmental Impact
CO-CHAIRMEN/WG.4/16 (B) Rev. 1	
now INFCE/WG.4/41 (B)	European Community - CEC
CO-CHAIRMEN/WG.4/28 (B)	UK experience in plutonium transportation - UK
now INFCE/WG.4/43 (B)	

Task 4 : Pu Storage, Technological Alternatives

Task 5 : Pu Transport, Technological Alternatives

CO-CHAIRMEN/WG.4/29 (B)	Technological Alternatives and Improve- ments for plutonium storage and transport - note by Co-Chairman
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Task 6 : Alternative Institutional Arrangements

- CO-CHAIRMEN/WG.4/41 (A,B) Contribution to Assessment of Alternative Institutional Arrangements - US
- CO-CHAIRMEN/WG.4/47 (A,B) International Management and Storage of Plutonium and Spent Fuel - IAEA

Task 7 : Definition of the Base Case on Pu Recycle

- CO-CHAIRMEN/WG.4/1 (B) and Mod. Mixed Oxide Fuel Fabrication
now INFCE/WG.4/38 (B) Facility - Belgium
- CO-CHAIRMEN/WG.4/3 (B))
CO-CHAIRMEN/WG.4/3 (B) Rev. 1) Definition of Base Case
CO-CHAIRMEN/WG.4/3 (B) Rev. 2) (d) Cost Data - Technical Secretariat
- CO-CHAIRMEN/WG.4/4 (B))
CO-CHAIRMEN/WG.4/4 (B) Add. 1) Definition of Base Case
CO-CHAIRMEN/WG.4/4 (B) Rev. 1) (b) Definition of Reactor - Japan
now INFCE/WG.4/39 (B))
- CO-CHAIRMEN/WG.4/20 (B) Fuel Cycle Cost Data - IAEA

Task 8 : Assessment of Base Case on Pu Recycle

- CO-CHAIRMEN/WG.4/24 (B) Experience on Pu Recycle - Italy
now INFCE/WG.4/42 (B)

Task 9 : Plutonium Recycle - Reactor Alternatives

- CO-CHAIRMEN/WG.4/36 (B) Fuel Cycle in Japanese Fugen-HWR - Japan

Task 10 : Plutonium Recycle - Technological and Institutional Alternatives and

Task 11 : Plutonium Recycle - Reprocessing Alternatives

- CO-CHAIRMEN/WG.4/43 (A,B) Barnwell Nuclear Fuels Plant Applicability Study - US

3. Assessment of Base Cases

- CO-CHAIRMEN/WG.4/35 (A,B) The present status of IAEA Safeguards on Nuclear Fuel Cycle Facilities - IAEA
- CO-CHAIRMEN/WG.4/42 (A,B) Contribution to Assessment of Proliferation Resistance - US
- CO-CHAIRMEN/WG.4/44 (A,B) Safeguarding a domestic mixed oxide industry against a hypothetical sub-national threat - US

4. Other Papers relevant to Assessment of Base Case and Consideration of Alternatives

- CO-CHAIRMEN/WG.4/38 (A,B) Commercial nuclear fuel reprocessing plants for light water thermal reactor fuel
I. Coprocessed uranium and plutonium
II. Spiked coprocessed uranium and plutonium - US
- CO-CHAIRMEN/WG.4/39 (B) Mixed Uranium, Pu Oxide Fuel Fabrication Facility Coprocessed Feed, Pelletized Fuel - US
- CO-CHAIRMEN/WG.4/40 (B) Mixed Uranium-Plutonium Oxide Fabrication Facility for Gel-Sphere-Pac Fuel - US

5. Papers from Sub-group 4A tabled for information

- INFCE/WG.4/16 (A,B))
INFCE/WG.4/16 (A,B) Rev. 1) Occurrence of Pu at different points in the fuel cycle
- INFCE/WG.4/17 (A,B) Regional differences in energy supplies utilising uranium resources in various fuel cycles
- CO-CHAIRMEN/WG.4/23 (A,B) The revision of the above paper

6. Final Report

- CO-CHAIRMEN/WG.4/45 (A,B))
CO-CHAIRMEN/WG.4/45 (A,B) Rev. 1) Format of Final Report
- CO-CHAIRMEN/WG.4/46 (B) Final Report: Proposed arrangements for first drafts

ANNEX E

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