

International
Nuclear
Fuel
Cycle
Evaluation

X48007387

INFCE

INFCE/DEP./WG.4/23

PROGRESS REPORT ON THE WORK OF SUB-GROUP B

INTERNATIONAL NUCLEAR FUEL CYCLE EVALUATION

WORKING GROUP 4: Reprocessing, Plutonium Handling, Recycle.

SUB-GROUP B: Plutonium Management and Recycle.

A progress report on the work of Sub-Group 4B

Note by the Co-Chairmen

Introduction

Following the meeting held on 29th/30th January, it may now be helpful to review progress with the eleven tasks on which the Sub-Group originally agreed and to indicate what remains to be done.

Task 1: Collection of basic data.

This task has been largely completed by the analysis of the responses to the questionnaire set out in Co-Chairmen/WG4/31 (A,B) Rev 3; and by the further clarification which has been carried out by the Technical Secretariat of forecasts of spent fuel arisings and the use of plutonium. Some further points need to be clarified but we have agreed that these are now best taken into account in further drafts of our final report, which will be considered in joint sessions of Sub-Groups A and B.

Task 2: Current methods of plutonium storage: base case.

A two-part paper from the delegation from the Federal Republic of Germany on short-term Pu-nitrate and Pu-oxide buffer storage, (Co-Chairmen/WG4/15 (B) Rev 1) has been considered and adopted as part of the base case; we have similarly considered and adopted two papers by the French delegation describing a long-term Pu-oxide store and its cost (INFCE/WG4/32 and INFCE/WG4/32 Add 1).

We have also now concluded our discussion of the paper by the delegation from the Federal Republic of Germany describing a base case plant for converting Pu-nitrate to Pu-oxide. We have, therefore, completed this task.

Task 3: Current methods of plutonium transport: base case.

Two papers on plutonium transport have been discussed and adopted for the purposes of the base case: a paper from the CEC on projected plutonium transport in the EEC in the 1990s (INFCE/WG4/41 (B)) and a paper from the UK delegation on UK experience of plutonium transport (Co-Chairmen/WG4/28 (B)). This task has, therefore, been completed by our adoption of these papers.

Task 4: Plutonium storage; technological alternatives.

Under this item we have discussed a paper (Co-Chairmen/WG4/71 (B)) circulated by the UK Co-Chairmen and a paper introduced by the Spanish delegation (Co-Chairmen/WG4/63 (B) Rev 1). We have also heard the report of a small group of delegates who have considered the costs of Pu storage. We have now, therefore, asked the Technical Secretariat to write this section of the draft report.

Task 5: Plutonium transport: technological alternatives.

We have discussed a paper on this subject prepared by the UK Co-Chairmen (Co-Chairmen/WG4/70 (B)) and have now invited the Technical Secretariat to write this section of the draft report in the light of our discussion.

Task 6: Alternative institutional arrangements.

We originally divided this task into three parts:

- (a) International management of plutonium;
- (b) Plutonium management with improved safeguards;
- (c) Any other institutional alternatives.

The IAEA presented their study on the International Management and Storage of Plutonium and Spent Fuel (Co-Chairmen/WG4/47 (A,B)) to our September meeting and we have now received a progress report from the Expert Group on International Plutonium Storage at this meeting; we have also discussed a paper from the French delegation on plutonium management.

We have agreed that we must keep in close touch with the Expert Group on this subject and have asked the Technical Secretariat to include a section dealing with International Plutonium Storage in the draft chapter of our final report covering alternative institutional arrangements.

That part of item (b) covering improved safeguards for plutonium plants has been included in the safeguards discussions in the joint sessions with Sub-Group A, while item (c) has similarly been covered in the joint sessions on alternative institutional arrangements.

Task 7: Plutonium recycle: base case.

We agreed at the outset that we should focus our attention on the recycle of plutonium with uranium in thermal reactors. We have since considered the base case under four headings:

- national plans for recycle, which has been covered in the answers to the questionnaire;
- definition of the reactor, which has been covered in our discussions of the paper from the Japanese delegation (Co-Chairmen/WG4/4 (B) Rev 1).

- definition of the fuel fabrication facility, which has been covered in our discussions of the paper from the Belgian delegation (INFCE/WG4/38 (B) Rev 1);
- cost data. We have considered a paper from the IAEA (Co-Chairmen/WG4/20 (B)) and a paper from the Technical Secretariat which incorporated the IAEA data (Co-Chairmen/WG4/3 (B) Rev 2) and have given this further consideration in our discussion of the economic assessment of recycle. This task has, therefore, been completed.

Task 8: Assessment of Base Cases.

Our assessments of plutonium management and recycle fall under the following headings:

- economic evaluation, including energy resource utilization;
- environmental and safety evaluation;
- assessment of proliferation resistance.

The assessment of proliferation resistance is being conducted in the joint sessions of Sub-Groups A and B. We have discussed the economic assessment with papers from the Japanese Technical Secretariat (Co-Chairmen/WG4/84 (B)) and the FRG delegation (Co-Chairmen/WG4/83 and 93 (B)) and have concluded that further discussion should be linked with the work being carried out in the joint meetings of Sub-Groups A and B.

We have not considered the environmental assessment of recycle separately but the work done by Sub-Group A on the environmental impact of reprocessing is relevant and we also have the environmental information contained in the base case paper by Japan (Co-Chairmen/WG4/4 (B) Rev 1) and the papers by the Federal Republic of Germany (Co-Chairmen/WG4/83, 93 (B)), which drew particularly on GESMO. We, therefore, now propose that the

Technical Secretariat should draw on this material in writing up this section of the draft report.

Task 9: Plutonium Recycle: Reactor Alternatives.

Under this task we have considered a paper from the Japanese delegation about the Fugen-HWR (Co-Chairmen/WG4/36 (B)), a paper from the Canadian delegation on recycle in CANDU reactors (Co-Chairmen/WG4/64 (B)) and papers from the FRG delegation on their experience with recycle and on proposals for plutonium recycle in improved LWRs (Co-Chairmen/WG4/83 and 93 (B)). We have, therefore, now concluded our discussion of this task.

Task 10: Plutonium Recycle: Technological and Institutional Alternatives.

Our discussion of technological alternatives has been completed under Tasks 9 and 11, while institutional alternatives are best covered by continuing the discussions now begun in the joint sessions with Sub-Group A as mentioned under Task 6 above.

Task 11: Plutonium recycle: reprocessing alternatives.

We have considered several papers relating to this task: a paper from the Technical Secretariat defining various terms (Co-Chairmen/WG4/52 (A,B)), five papers from the US delegation mainly relating to co-processing and spiking (Co-Chairmen/WG4/38, 39, 40, 43 and 87) and a paper from the Belgian delegation on possible improvements to the reference fuel cycle (Co-Chairmen/WG4/66 (B)).

We have now agreed that the Technical Secretariat should draft the appropriate section of the final report in the light of our discussion of these papers.

CONCLUSIONS.

We have now completed the majority of our tasks and have decided that further consideration of our assessment of proliferation resistance, institutional and safeguards questions, and the economic assessment of reprocessing is carried out jointly with Sub-Group A. We have also proposed that any further consideration of the other tasks, including the environmental assessment of recycle, should now be carried out by discussing draft chapters of our final report. Consequently, we have agreed that all further meetings of Sub-Group B should take place jointly with Sub-Group A.

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