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Dr. John Deutch
Defense Science Board
ODDR&E
Room 3D1040, The Pentagon
Washington, D.C. 20301

Dear John:

Here are some comments regarding the last meeting and the next meeting of the Non-Proliferation DSB Task Force.

Last Meeting.

The following were the main points that came out of our last meeting, in my opinion.

1. U.S. centrifuge technology embodies major engineering advances over the original Zippe centrifuge designs of 20 or so years ago. These advances are not needed, however, by a nation which desires to separate enough uranium to make 50 or 100 weapons per year. Such a nation would need a plant about 1/100 the size and cost of our planned Portsmouth add-on. It could utilize early, relatively well-known centrifuge technology, at cost penalties that would be small in relation to the total weapons program costs.

2. Laser isotope separation is from 5 to 15 years away from being the technology of choice for a nation planning to separate uranium for weapons materials, in the opinion of two of the leading experts in the field in the U.S. (It may never be the clandestine route of choice, John Emmett points out, as provering high power lasers and electro optical control systems is less easily camouflaged than provering the Al tubing and fiberglass necessary for centrifuge.) The problems are developmental rather than basic and particularly concern obtaining sufficiently powerful and reliable lasers with adequate repetition rates. When fully developed, the laser isotope method promises to cut the costs of separating uranium by a factor of 5 to 10. Every review of this technology that I know about has led to generally similar conclusions.

3. The plasma-ion cyclotron resonance process was not far enough along to be evaluated in relation to the other two processes. I do not believe that it has received as careful scrutiny from outside scientific reviewing groups as have both the centrifuge and laser isotope processes.

4. The intelligence reports seemed somewhat amateurish. They may not represent the best of the U.S. capability to evaluate isotope separation status abroad. ERDA has more effort in this field, which we did not hear about at our last meeting. In any case, the continuing worldwide improvements in available lasers and in spectroscopic knowledge limit the value of such appraisal for the purpose of determining U.S. non-proliferation policy.

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW
REVIEW-DATE: 2/29/04
HORITY: DC DD
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DETERMINATION [CIRCLE NUMBER(S)]
1. CLASSIFICATION RETAINED
2. CLASSIFICATION CHANGED TO:
3. CONTAINS NO DOE CLASSIFIED INFO
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Next meeting.

The first day of the next meeting might be split between the following two topics:

1. A presentation of reprocessing technology as it has been practiced here and abroad, together with an evaluation of the various technical possibilities. This might take half a day.

2. A presentation of the work on alternative fuel cycles which is now going on in ERDA. This work is in an early stage and many of the likely candidates for alternate fuel cycles have not been carefully examined to date. Nevertheless, since the work will constitute a major part of any study of the fuel cycle that may take place in the next year, it would be useful to go over it, even in its present stage. This could take the rest of the first day.

The second day of the meeting could then be devoted to a review and analysis of the proposed U.S. input to or plan for an international study of the nuclear fuel cycle, if it continues to be felt that our panel can be of use in this connection.

If we follow that plan for the next meeting, the meeting to be devoted to evaluating the military, technical and security factors bearing on proliferation in a specific country or region should probably be deferred until the next time we get together. I would be extremely interested in such a meeting, and believe it would be useful to members and guests. It would give some foundation for proceeding toward fulfilling our charter in the area of evaluating the security implications of proliferation and what U.S. defense policy should be in this regard. However, doing that job as well as the review of the reprocessing and fuel cycle alternatives in one meeting is probably too much.

With best regards,

Mike

Michael M. May

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