

ATOMIC ENERGY COMMISSION

SUMMARY NOTES OF MEETING WITH REPRESENTATIVES OF THE  
NUCLEAR MATERIALS EQUIPMENT CORPORATION

Tuesday, August 10, 1965, 2:20 p.m., Room A-410  
Germantown, Maryland

Commissioners

Glenn T. Seaborg, Chairman  
James T. Ramey  
Gerald F. Tape

Acting General Manager

E. J. Bloch

General Counsel

Joseph F. Hennessey

Acting Secretary

F. T. Hobbs

Staff

William C. Bartels  
Howard C. Brown  
Vincent J. D'Amico  
Leo Dubinski  
Gordon Fowler  
Douglas E. George  
Thomas J. Haycock  
John C. Hoyle —  
Dwight A. Ink  
Antionette Joseph  
Milton Klein  
Ragnwald Muller  
Julius H. Rubin  
William L. Woodard  
James R. Yore

Oak Ridge National Laboratory

Charles A. Keller

Representatives of NUMEC

Zalman Shapiro  
Oscar Gray

The Chairman noted that the Commissioners had been informed several weeks ago, and in further detail at a Meeting on the prior afternoon, of the matter involving a lack of accountability on the part of NUMEC regarding a sizable amount of U-235. He said the Commission viewed this matter with extreme concern and thought NUMEC should be given an opportunity to be heard prior to any Commission decision on a course of action.

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Mr. Shapiro said he appreciated the time and effort the Atomic Energy Commission, and the Commissioners themselves, had spent on this matter. He noted the NUMEC contract was actually the first contract let by Westinghouse-Astro Nuclear Laboratory for the production of enriched material for NERVA fuel elements. He also noted this purchase order represented NUMEC's first production experience. The work, generally, had not gone as well as expected based on prior laboratory experience. During the course of the contract it was brought to Mr. Shapiro's attention that losses higher than anticipated were being experienced. He said he ordered an internal investigation at that time.

Mr. Shapiro then briefly described the method of production used by NUMEC for the coated uranium carbide particles. He stressed that the yield of the production system was considerably less than anticipated and more material had to be recycled than planned. Since the facilities were generally tied up with additional unanticipated work on the contract, it was impossible to keep up with the normal recovery of scrap as would ordinarily have been accomplished. He said he had warned the operating personnel of the hazard associated with highly enriched uranium and therefore a great deal of cleaning up was accomplished. Kimwipes and Kleenex tissues were used in great quantities and, after use, were accumulated in disposal drums. He stated he was informed by NUMEC health physicists and production personnel that the material accumulated in these drums was of little consequence and suitable for burial. However, when he was told that the losses appeared to be in excess of those anticipated, he ordered the burial of the drums halted, so that the matter could be thoroughly investigated.



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Mr. Shapiro said he was told that possibly a gram of material (enriched uranium-235) could be contained in each used kimwipe. He added each shift of eight attendants used about three kimwipes. There were, of course, three shifts operating seven days a week during the contract period.

Mr. Shapiro said he was also told that it was possible that NUMEC could be experiencing great losses in the uranium raffination. However, NUMEC monitored this system closely and it now appeared that the loss could only be approximately 1 1/2 kg's of material. In answer to a question by the Chairman, Mr. Shapiro described the manner in which the U-raffinate was dumped into holding tanks and thence into the river near the plant. Mr. Shapiro added that NUMEC's records indicated that no more than 1 or 1 1/2 kg's could have been lost in this manner.

Commissioner Ramey noted it was possible that NUMEC's records could be in error. Mr. Shapiro agreed, but noted that there was a double checking method employed and it was unlikely that the records were erroneous. Mr. Klein inquired whether the raffinate was sampled routinely. Mr. Shapiro replied that it was checked routinely in the columns. He added the liquid was kept in the holding tanks to precipitate the solids. The solids were then removed for burial and the filtrate was moved to another holding tank and checked before being dumped into the river.

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In answer to a question by Commissioner Tape, Mr. Shapiro said both the production and health physics personnel took measurements for materials balance. Mr. Shapiro described the method of computing the materials balance by areas rather than by operation. He said he instituted this technique because

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the other accounting method was so time consuming. Mr. Shapiro stressed that at the time he learned it was possible that NUMEC had a significant amount of material in the burnable waste, he ordered all burial of this waste halted, the waste combusted, and all material collected. This procedure has been followed since April 1964. Since that time, 17,000 pounds of such burnable waste had been combusted from which \$111,000 worth of material, with an average enrichment of 10%, had been recovered. This much waste was equivalent to 500 drums such as those filled with burnable waste which had been buried.

In answer to a question by the Chairman Mr. Shapiro said the recovered material had an average enrichment of 10% because during the last year when the recovery procedure had been in effect, NUMEC was handling primarily low enrichment materials. Mr. Shapiro added that 27,000 pounds of combustible waste were estimated to be contained in the buried drums.

In response to a further question by the Chairman Mr. Shapiro agreed that the material recovered from the 17,000 pounds of burnable waste was not relevant to the material under discussion because of its low enrichment. However, Mr. Shapiro pointed out the recovery operation did demonstrate that there was a sizeable amount of uranium in the burnable waste and it was now calculated that 27,000 pounds of such waste were buried in the drums.

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During a brief discussion of the number of buried drums involved, Mr. Shapiro noted there were a total of 905 drums, 555 of which had been on hand and used. An additional 350 drums were purchased specifically for the accumulation of the burnable waste.

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The Chairman inquired if all 905 drums were filled with material from the WANL contract work. Mr. Shapiro replied that all of the drums were filled during the contract period. He admitted that some waste was generated by work on Navy fuels. He said it was possible only to give the total number of drums buried during the period, not a specific number for drums buried containing only waste material from the WANL contract. In answer to a question by the Chairman, Mr. Shapiro said NUMEC had not kept any records which would indicate the specific number of drums associated solely with the WANL contract.

The Chairman asked if responsibility for the recovery of the buried waste was that of the Atomic Energy Commission or NUMEC. Mr. Shapiro replied it was NUMEC's responsibility. The Chairman suggested that if this were the case, it would seem appropriate for AEC to bill NUMEC at this time for the unaccounted for 52 kilograms of uranium, allowing NUMEC to apply material against the bill as it was recovered from the buried waste. It would seem appropriate for NUMEC to pay the bill in full in a reasonable amount of time either in cash or in material. Mr. Shapiro stressed that NUMEC did have the material on hand (in the buried waste) and would be paying the AEC use charges on the material until it was recovered. Commissioner Ramey pointed out that the Chairman's suggestion was only one of a number of possible alternatives; the Commission had not yet agreed on a specific course of action.

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Mr. Shapiro stated that in accordance with the Chairman's suggestion, the AEC would receive the same amount of dollars or material as it would under a scheme which would allow NUMEC

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additional time to recover the waste material. In addition, if the Commission should pursue the Chairman's suggestion it would place NUMEC in a very difficult position in terms of meeting its balance sheet liabilities. He said NUMEC could not balance the ledger by showing the amount owed in the "accounts payable" column as against 52 kilograms of material on hand in the assets column. This would not be compatible with the company's present auditing system. However Mr. Shapiro stressed his belief that he could prove the proper amount of uranium could be recovered and he could demonstrate that the company could account for all of the material and possibly even additional amounts. He noted that in earlier years NUMEC had paid AEC up to \$1 million for material losses. The company had never taken a position that it would not pay for such losses.

Commissioner Ramey said it appeared that AEC staff had been somewhat surprised by Mr. Shapiro's recent contention that the material in question was actually contained in the buried waste. He suggested that Mr. Shapiro explain his actions in this regard.

Mr. Shapiro said NUMEC had had some difficulty in the past with its accountability system. He noted the company had a difficult time maintaining qualified people on the job and several changes had to be made. In the past year, however, the company's accountability system had been reshaped and improved significantly. He commented that at the time of the AEC inventory in April 1965, he could and should have told AEC staff of the existence of the buried waste. However, he was embarrassed to make such an announcement because he knew it was completely out of order to allow this type of material in

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these amounts to be buried in combustible waste. Mr. Bloch noted that such an action could hardly foster staff's confidence in the company. Mr. Shapiro generally agreed, but stressed that the company's past record was a completely honest one and there was no intention to deceive the Commission. He recalled that in the early days of scrap recovery operations NUMEC developed a new more accurate method of recovering material which was eventually adopted by others in the scrap recovery program.

Mr. Shapiro commented that at the present time he was not at all sure that NUMEC should still be held accountable for 52 kilograms of material. He recalled that there were examples of discrepancies between the amount of material estimated by NUMEC to be in the NERVA elements and the amount actually shown on the invoice. He noted that out of 100 lots there had been full agreement on the total uranium content in only two. With the others, discrepancies were as large as 5 percent. He said it was possible that significant biases on such analysis were possible. The Chairman said that it certainly seemed desirable to give consideration to an investigation of that matter. He asked if NUMEC felt that the 52 kilograms of material under discussion might already have been delivered to the Commission in the NERVA element batches. Mr. Shapiro replied that it was possible.

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Mr. Shapiro stressed that NUMEC did make a serious error when it did not inform the Commission of the material in the buried waste. However, NUMEC did have an honest record. He recalled in one instance NUMEC had reported to AEC that a fuel element delivered for scrap recovery from the Bettis Laboratory actually contained as much as 1.3 kilograms more U-235 than Bettis had indicated. He pointed out also that in the past six years



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With regard to timing of the recovery schedule, Mr. Shapiro said it was the company's intention to continue recovery operations until the ground began to freeze. He said it was hoped that by that time all of the buried containers would have been exhumed. He said a definitive schedule could not be given because it was dependent upon the rate the material could be combusted which itself depended upon the enrichment of the material involved.

Commissioner Ramey noted that it should be possible for AEC staff to work with NUMEC staff in establishing an agreed procedure to obtain a suitable sample from which a determination of the amount of material contained in the buried drums might be made. Mr. Shapiro agreed but said there would be problems in acquiring such a sample. The best method, of course, would be to recover and rework all of the material. Short of that, his company would keep the Commission informed and work as diligently as possible on the project. He added the Company would experience other problems. Specifically NUMEC was involved in other contract scrap recovery operations, and in a business sense would have to time-share its facilities to keep the commercial work going while it was performing the recovery operations on its own material.

Commissioner Tape said he could understand the company's position but would personally feel more comfortable if he <sup>DOE ARCHIVES</sup> knew precisely how much material was contained in the buried waste. He thought it more important that NUMEC be able to say with confidence that the material was in a certain location, than to worry immediately about the outcome of other business ventures.

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In response to a question by Commissioner Ramey regarding access to the recovery operations by AEC staff, Mr. George said members of his staff were even now on location and would continue there throughout the recovery operation.

In reply to a question by the Chairman Mr. Shapiro said it was now estimated that it would cost \$100,000 for recovery of the 52 kilograms of material. Mr. Shapiro added that while he certainly would not condone what has now happened in this matter, he had known it to happen in other well known installations. He recalled one example involving the burial of material as silicone carbide which represented a fairly large loss and may in fact not be recoverable. Mr. George pointed out that the example chosen by Mr. Shapiro involved a Bettis contract, and was an in-house operation.

The Chairman noted the Commission could be faced with several problems in this matter. He pointed out that NUMEC had obtained this particular contract through a competitive bid. It was possible a competitor could charge that for a higher cost it could have performed all of the contract provisions including full recovery of the material during the time period specified in the contract.

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Commissioner Ramey asked if the settlement requirement in the NUMEC contract was one of the historical provisions of such contracts. Mr. George replied it had only been since 1962 that such a provision had been included in the scrap recovery contracts. In reply to a further question by Commissioner Ramey Mr. Shapiro said the 180 day period had on occasion presented a problem to NUMEC. In fact, it had paid penalties before for not meeting the contract terms.

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The Chairman stressed his point that a competitor might claim that its higher bid, which proved to be unsuccessful in the light of NUMEC's lower bid, was valid, since it was now clear that the costs associated with the contract were higher than those estimated by NUMEC. Mr. Shapiro replied that if a competitor should make such a claim, NUMEC could provide many examples of similar contract actions in the past. He stressed it was not NUMEC's intention to flaunt any of the provisions of the contract or to place itself in the position of suffering the losses that were under discussion. He stressed that before completion of the contract NUMEC had started an extensive in-house scrap recovery program. Additionally, NUMEC had become interested in transferring the book inventory of the remaining enriched uranium to the Supply Agreement. He said the company had Oak Ridge approval of such a transfer provided that AEC Headquarters should give its approval. He said the company had wrongly assumed that the material could have been routinely transferred under the Supply Agreement which would have carried with it a termination of the WANL contract, and payment of use charges during the time the material remained in the possession of NUMEC.

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Mr. Bloch commented that the NUMEC contract required the return or the payment of all material by 180 days after the final delivery of the product to WANL. He noted the 180 day period had already been extended since April 30, 1965. During that time, staff attempted to work out a method by which, if the material could be verified as existing at the NUMEC facilities, the material could then be transferred to the Supply Agreement.



However, to date staff remained unconvinced that the 52 kilograms of material in question could be verified as existing at the NUMEC facility.

Mr. Gray explained the difficulty NUMEC would experience if the Commission should now present it with an invoice for the material due. He concluded that NUMEC's auditors would find great difficulty developing an acceptable financial report if this loss of government property were reported.

Mr. George said the basic question was whether the material actually existed at NUMEC. He stressed it had not been AEC's experience over the years that such a quantity of material had been allowed to remain in burnable waste in the manner described by Mr. Shapiro. If such a claim were now allowed it would establish a precedent relevant to other contractors. He thought NUMEC auditors should be made aware that the contract terms had not been met.

The Chairman inquired about NUMEC's position in the event the burnable waste was exhumed and an amount substantially less than 52 kilograms were found. Mr. Gray responded that NUMEC would be in a position to pay for all unrecovered material, if there had been a definitive demonstration that additional quantities of material were not contained in the burnable waste. Mr. Gray added he would also suggest that if NUMEC's hypothesis regarding the location ~~DOE ARCHIVES~~ of all of the material in the burnable waste could be firmly established, the AEC should be willing to allow a transfer to the Supply Agreement. He reiterated that NUMEC had significantly improved its materials accountability procedures within the past year. Mr. Keller commented that some improvements had been made but he would not say they had been significant. There were still many improvements that could be accomplished.

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Mr. Gray pointed out that NUMEC had spent a considerable amount of time on the recovery of scrap materials. He said private work orders for scrap recovery had now been received. These would have to be given up if the Commission forced NUMEC to make an early settlement on the 52 kilograms.

In response to a question by Mr. Bloch, Mr. George said, if the material were to be transferred to the Supply Agreement immediately, the next inventory, technically, would not be due for 12 months. However, Mr. George said staff based transfers of material to the Supply Agreement on technical evidence. To date staff had not received technical evidence that 52 kilograms of material were contained in the buried waste.

Mr. Shapiro said it was difficult for him to understand why Mr. George believed there was no technical evidence. He reiterated that for the past year NUMEC had burned its waste and had collected good data for establishing the hypothesis that all of the material being sought was, in fact, contained in the buried waste.

Mr. Klein inquired on what evidence NUMEC has ascertained that 27,000 pounds of burnable waste had been buried. Mr. Shapiro replied the evidence was based on the 17,000 pounds of material collected in 500 barrels during the past year.

Mr. George suggested that in view of the present private ownership legislation, it might be possible that NUMEC could reflect the 52 kilograms of material on their books as an asset which could be resold to the Commission at the time the material was recovered from the scrap. Mr. Gray stated that NUMEC would be required to make a significant change in its bookkeeping methods in order to show such material as an asset. Commissioner Ramey noted that there would be problems with respect to private ownership regarding financial reporting by companies which had obtained special nuclear materials. DOE ARCHIVES

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