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MARCH 25, 1966

ATOMIC ENERGY COMMISSION

SUMMARY NOTES OF BRIEFING ON SAFEGUARDS AND DOMESTIC
MATERIAL ACCOUNTABILITY

Monday, February 14, 1966, 11:30 a.m., Room 1113-B
D. C. Office

Commissioners

Glenn T. Seaborg, Chairman
John G. Palfrey
James T. Ramey
Gerald F. Tapp

General Manager

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CLASSIFICATION CANCELLED
BY AUTHORITY OF [unclear] 2/17/77
REVIEWED BY Leonard M. [unclear] DATE 2/17/77

H-6126



Briefing on Safeguards and Domestic Material Accountability

Mr. Brown began with the general observation that the Commission should approach the Nuclear Materials and Equipment Corporation (NUMEC) situation in the context of the present system of domestic material accountability. To an extent, the NUMEC losses were traceable to features of that system for which it would be unfair to make the firm a "whipping boy". Nevertheless, the case had convincingly demonstrated that fulfillment of a financial responsibility requirement might not really satisfy the AEC's interest in special nuclear materials unaccounted for. Although the criterion remained valid in the sense that good SNM management was also good business, an accountability system based wholly on this criterion was, pari passu, also based on a presumption of honesty. In this framework the Commission's safeguards and material accountability system could be characterized as reasonably good. If, however, the presumption of honesty were removed the system did not present itself in the most credible light. This was a policy question which the Commission might desire to address.

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Mr. Brown reviewed in detail the specific features of the NUMEC situation. He noted the following data:



| <u>Total Plant</u> <u>(8 Years)</u> | | <u>WANL Contract</u> | |
|--|-------------|----------------------|-----------------------|
| Total Losses | 178 kgs. U | Received from WANL | 1012 kgs. U |
| Total known losses | 84.2 kgs. U | Product returned | 713 kgs. U |
| Unknown | 93.8 kgs. U | Scrap | 206 kgs. U |
| | | Inventory | 32 kgs. U |
| Reported losses | 149 kgs. U | Total | 951 kgs. U |
| Additional | 29 kgs. U | | 1012 |
| Total | 178 kgs. U | | -951 |
| | | | 61 |
| | | | + 32 |
| | | | 93 = \$1.1348 million |

In explaining this materials loss, Mr. Brown noted that in November 1965, AEC Materials Management staff had performed a further detailed survey of NUMEC and as a result had determined that of the 178 kgs. of uranium lost over the company's 8 years of operation, 84.2 kgs. could be accounted for through known loss mechanisms. During this period, NUMEC had reported the loss of 149 kgs. and had made appropriate financial restitution for much of it. Following the April 1965 and November 1965 surveys, AEC staff had determined that NUMEC had lost an additional 29 kgs. over the 8 year period which had not been reported, and possibly not realized by NUMEC.

Mr. Brown stressed there was no way specifically to relate the losses ascribed to the WANL contract to the total plant figures over the period. He reviewed the WANL data for the Commissioners noting the company had been billed \$1.1348 for the 61 kgs. of unaccounted-for material plus the 32 kgs. in inventory. He reiterated that although the 61 kilogram loss under the WANL contract was part of the total plant loss of 178 kgs., it was impossible precisely to establish the relationship between the two sets of data. The material received from WANL had all been 93 percent U²³⁵. The 178 kgs. total included material of various degrees of enrichment.

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Mr. Brown noted the Commission could anticipate questions on this matter from the Joint Committee in the forthcoming Authorization Hearings. The General Manager said Mr. Conway had informed him he planned to raise it first in the Executive session devoted to the production program.

In answer to questions by Commissioner Ramey, Mr. Brown said NUMEC management had now agreed to adjust its own books to the results of the AEC November survey.

Commissioner Ramey asked if staff possessed data on the amount of material shipped abroad by NUMEC during the past eight years. Mr. Brown indicated staff did have such data but that it was based only on NUMEC records; that the present safeguards system did not provide for, or require independent AEC physical checks of shipments. He noted in this regard that if collusion between a shipper and a foreign government were assumed it would be theoretically possible to ship material abroad in excess of the amounts indicated in the company's records. Because it was based upon a presumption of honesty and financial responsibility, the AEC material accountability system might not reveal a deliberate and systematic attempt to divert material in this manner. In addressing the system, however, Mr. Brown said it was important to bear in mind that the presumption of honesty was not a mindless assumption. Specifically, the Atomic Energy Act provided severe criminal penalties for violation of accountability procedures. The deterrent value of these penalties had been considered fundamental to the entire system of domestic safeguards. Analogously, the international safeguards system relied upon formal sovereign guarantees of

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of foreign governments. These principles - the concept of deterrence through severe penalty, financial responsibility, and the solemn nature of international instruments -- had provided the basis for the Commission's accountability systems.

There was general discussion during which Mr. Brown noted that relative to other U.S. companies NUMEC shipped rather small amounts of material abroad. The Chairman observed that Westinghouse and General Electric tended to concentrate on shipments of slightly enriched material. Commissioner Ramey observed that most of the NUMEC material had gone to France, Japan, and Australia.

Mr. Kratzer discussed the differences between the domestic and foreign accountability systems. A point which to him seemed important was that in order for domestic industry successfully to divert material, substantial numbers of presumably loyal citizens would have to be deceived. Moreover, collusion between a U.S. and a foreign firm would also necessarily require collusion between the foreign plant management and the foreign government.

Mr. Brown raised the matter of the probable line of questioning the Joint Committee would take. The basic Commission position should be that AEC had no evidence or suspicion that diversion had occurred; neither could the Commission say unequivocally that the material had not been diverted. Staff did, though, have a theory to support its lack of suspicion. Specifically, staff had determined during its two surveys of NUMEC that the company had consistently underestimated its actual process losses. Additionally, the



difference between actual and estimated losses appeared to have been passed on from completed jobs to new jobs. Thus the losses attributable to the WANL contract probably included an accumulation of deferred losses over an eight year period. There was evidence to support this theory. The book inventory at NUMEC carried values of material in residue and on filters higher than those which resulted from physical analysis. For example, NUMEC reflected in its inventory estimates of approximately 31 grams of U-235 per filter. Gamma spectrometry of over 700 such filters, verified by chemical analysis of samples, supported only an average of about 12 grams per filter. NUMEC estimated that more than 50 kilograms of U-235 were contained in equipment and various combustible wastes which had been discarded in burial grounds. In connection with staff examination of the burial pits NUMEC incinerated and analyzed representative samples and concluded that only 5 to 6 kilograms would be recovered from these burial pits. Independent analysis by AEC confirmed this lower estimate. Additionally, the consistently high rate of return on scrap recovery contracts contributed to the theory that NUMEC did not take full account of losses as they occurred and compounded them through successive contracts. In short, NUMEC now appeared to be suffering from inadequate attention to generally recognized materials management methods.

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Following a question by Commissioner Ramey, Mr. McDowell of the Division of Nuclear Materials Management, commented in greater detail on the procedures described by Mr. Brown. He agreed with Mr. Brown's conclusion that NUMEC simply had never taken the time and trouble to develop methods





adequate to determine the amounts of material being lost through fabricating processes.

In answer to a question by the Chairman, Mr. Brown said the WANL contract had been for the fabrication of uranium-carbide fuel elements for the NRYX (Rover Program). He noted that this was an extremely difficult job and was generally indicative of the complexity of the jobs for which NUMEC made it a practice to bid.

The Chairman asked about the comparison between NUMEC's total losses and losses typically experienced in AEC plants. Mr. George said AEC process losses during the fabrication of fuel elements averaged between _____ of inventory: In absolute amounts the largest single loss had been the loss of _____ of uranium in one month at Y-12. This, however, still represented both less than 1 percent of the material on hand and less than 1 percent on a "throughput" basis. As was evident from the data noted by Mr. Brown, NUMEC's total losses were approximately 1.2 percent. In other words NUMEC's losses over the eight year period were high but not exorbitantly high. The percentage loss under the WANL contract was of course substantially higher. It was however, staff's theory that this contract had become the "banker" for the other losses.

Mr. Brown circulated to the Commissioners a security report on NUMEC.

Mr. Brown next turned to the general question of why AEC had "permitted" such a condition to persist at NUMEC.



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A satisfactory answer was not easy. An attempt to deal with the question had to be made in recognition of the circumstances which had pertained when the procedures had been established. At the time AEC had possessed a plethora of material. There had been a real desire to accelerate the development of peaceful uses of nuclear energy both at home and abroad. Particularly with regard to the latter, the "peaceful atom" had been seen as an important, even vital, element of U.S. foreign policy. And most significantly, proliferation of a military nuclear capability had not been a decisive consideration. However, both circumstances and personnel change. There was, for example, now practically universal acknowledgement of the seriousness of the "Nth" country problem. Additionally, within the AEC there did appear to have been a possible misconception by staff of the Commission's intent with regard to the financial responsibility criterion. The record did not fully support the contention that financial responsibility alone had been thought at the time of the adoption of the policy to have been a sufficient basis for the domestic system. It had nevertheless apparently been assumed to have been such at various levels. The record would support that.

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Another anomaly was the significant difference between the security standards adopted for material under AEC control and that held by fixed-price contractor licensees. The former had systematically been transported under armed escort. Such an escort was not a requirement for licensee held material. In short, the Commission's accountability procedures had been ambivalent and even now were not completely understood, As a result, clear answers to really searching questions were not always obvious.



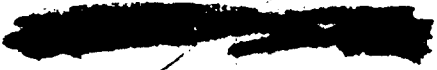
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Commissioner Ramey asked if staff had considered the desirability of interviewing the personnel at NUMEC who had been responsible for material accountability during the past eight years.

Mr. Brown said staff had given some thought to this possibility. A number of individuals had over the years performed this function for NUMEC. All but one or two had left the Company's employ. However, staff, was prepared should the Commission decide it desirable, to interview these individuals. Mr. Brown's personal belief was that the yield of such interviews probably would be low. Commissioner Ramey agreed, but said they might be marginally helpful. There was further brief discussion of this matter during which Mr. Brown indicated he would work out a suitable procedure with Mr. Hollingsworth to conduct the interviews. The Chairman indicated his agreement noting the Joint Committee would be informed of the Commission's intention.

The Chairman also commented on the desirability of stressing, to the JOAE, staff's theory in support of the belief that no diversion had taken place at NUMEC. The General Manager agreed.

Mr. Brown said a second procedure the Commission might wish to consider would be to request NUMEC to allow the Commission to examine the Company's confidential financial records. Such an examination would give staff some degree of additional confidence that diversion had not occurred. An objection to this procedure was that the impact on both NUMEC itself and the nuclear industry in general would, to say the least, be traumatic.



Commissioner Palfrey suggested that Mr. Brown might informally suggest to Mr. Shapiro, President of NUMEC, that if the Company offered to make its financial records available to AEC, the entire situation might be put in a more favorable light. The General Manager agreed. Mr. Brown said he would telephone Mr. Shapiro.

Mr. Brown summarized staff's views on the NUMEC situation. The theory under which it appeared the losses could be accounted for made it, in Mr. Brown's opinion, unnecessary to involve the FBI formally in the matter. With regard to the more general picture of the Commission's safeguards and accountability procedures, staff intended, on the basis of lessons of the NUMEC experience and a prior concern about the credibility of our total safeguards systems to study measures to tighten the system and make recommendations to the Commission.

Commissioner Palfrey asked about the status of the study he understood to have been undertaken by a committee chaired by Mr. Labowitz. Mr. Ink noted the study was in advanced stages of completion and would be circulated to the Commission shortly.* The final report would be more in the nature of a factual outline of the system than an analysis and not an evaluation of the system's overall defects and strengths.

The General Manager said the NUMEC experience raised substantial policy questions. As increasing numbers of reactors were built and as the nuclear industry continued to burgeon, the problems of accurate and efficient accountability would multiply. The prospect of private ownership of SNM added another complex factor to the situation.

*See AEC 213/107 - Draft Report on Procedures Relating to Accountability and Safeguard of SNM and
 AEC 213/108 - Commission Policy on the Control of Special Nuclear Materials



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In general, continued Mr. Hollingsworth, it was clear that AEC had three major interests in nuclear materials. The agency had a direct financial interest, an interest based upon public health and safety, and an interest in preventing diversion of material in such a manner as to constitute a threat to the national security. He believed it could be fairly argued that AEC's present system was not completely responsive to the latter interest. The Commission must not, though, permit itself to be forced into hasty or ill-considered action on the basis of the NUMEC situation alone. The matter demanded methodical and detailed consideration.

Mr. Henderson noted that Regulatory Staff had been in the process of developing procedures to tighten certain parts of the accountability system. A staff paper regarding reporting of losses and transfer of privately owned material would be submitted for Commission consideration in the near future.* He believed Regulatory Staff was moving away from sole emphasis on the financial responsibility concept.

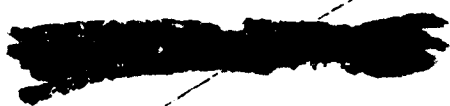
In answer to a question by Commissioner Palfrey, Mr. Henderson said AEC was on record in connection with the 1964 private ownership hearings, that this change would not lessen AEC's interest in special nuclear materials.

Mr. Ink commented that the Joint Committee would doubtless express an interest in a system which included physical checks of material. In this regard physical inspection had, in theory, always been part of the Commission's international safeguards system. Even here, however, problems had developed.

*See AEC-R 123/1 and AEC-R 123/2 and Minutes of Meeting 232 held on March 7, 1966.



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In particular the Euratom safeguards system had never been completely commensurate with the general theory under which international safeguards had been established. This disparity had been recognized at the time and accepted in the context of what were considered sufficiently overriding political considerations. On both the international and the domestic fronts the Commission was vulnerable to the criticism that there was substantial disparity between the provisions of its accountability systems and procedures in practice outside of direct AEC operations.

There was general discussion of the attitude various members of the Joint Committee might be anticipated to take on the matter. There was also brief discussion of the possibility that a premature leak of the NUMEC situation could lead to sensational and probably inaccurate press reports. The Chairman suggested the desirability of a prepared statement for contingency use in the public authorization hearings should the NUMEC matter arise. The General Manager observed he had been informed by Mr. Conway that the staff of the Joint Committee had placed strict limitations on the correspondence regarding NUMEC. Mr. Conway intended to bring the matter up in Executive Session, but stressed that any Committee member could, if he desired, raise the matter in a public hearing.

The Commission agreed it would be desirable to have an appropriate contingency statement. After brief discussion of the points that should be covered in such a statement, the Commission thanked Mr. Brown for an informative presentation.

W. B. McCool
Secretary



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