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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

OFFICE OF SECRETARY  
DOCKETING & SERVICE  
BRANCH

In the Matter of )  
 )  
THE REGENTS OF THE UNIVERSITY ) Docket No. 50-142  
OF CALIFORNIA ) (Proposed Renewal of Facility  
 ) License Number R-71)  
 )  
(UCLA Research Reactor) ) September 9, 1983  
 )

UNIVERSITY'S RESPONSE TO CBG'S  
COMMENTS ON FUEL INVENTORY

DONALD L. REIDHAAR  
GLENN R. WOODS  
CHRISTINE HELWICK  
590 University Hall  
2200 University Avenue  
Berkeley, California 94720  
Telephone: (415) 642-2822

Attorneys for Applicant

THE REGENTS OF THE UNIVERSITY  
OF CALIFORNIA

DS03

## I. INTRODUCTION

In its May 11, 1983 Order<sup>1/</sup> the Board directed Staff to physically inventory the SNM on hand at the Nuclear Energy Laboratory (NEL) at UCLA in order to resolve an apparent discrepancy between the inventory reported by UCLA (and Staff) and a certain inspection report of the UCLA facility. The parties were to be given an opportunity to comment on Staff's inventory report and responses to the comments could be made by any other party.

On July 28, 1983 Staff transmitted copies of the I&E Inspection conducted on June 28, 1983 which determined that the NEL possessed 4921.13 grams of U-235 and one Pu-Be neutron source containing (nominally) 32 grams of Pu, confirming the amounts previously reported by UCLA and Staff. CBG commented on Staff's report on August 30, 1983<sup>2/</sup> alleging that discrepancies in the reported U-235 content for the average plate suggested to CBG that UCLA still possesses more than a formula quantity (5073.5 grams, according to CBG's calculations). As before CBG's argument is formed on conjecture and the misinterpretation of reported information. Once again CBG reaches an erroneous conclusion.

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<sup>1/</sup>"Memorandum and Order (Ruling on Staff's Motion for Summary Disposition of Contention XX)" (Order), at 26.

<sup>2/</sup>"Intervenor Committee to Bridge the Gap's Response and Comment on NRC Staff SNM Inventory Inspection Report 50-142/83-02, 70-223/83-01", (CBG's Comment).

## II. DISCUSSION

CBG notes that the Staff inspectors determined that the 9 fresh fuel assemblies (elements) contain a total of 1389.96 grams of U-235. CBG then calculates that each of the 11 plates per fuel element must contain, on average, 14.04 grams of U-235. Relying on the representation of University's counsel that the core is fully loaded, meaning there are 264 plates in the core, CBG concludes that the core must contain about 3683.56 grams (264 plates x 14.04 grams/plate less 23 grams burn-up), more than the 3531.17 grams reported in the inventory. CBG also calculates that the three shipments of 55 plates each that were made in July 1982 had a per plate U-235 content varying from 14.14 to 14.47 grams for each shipment. According to CBG, this information tends to confirm its conclusion that the inventory report erroneously underestimates the U-235 content of the core. As CBG states, its argument is based on the assumption that the core plates have the same average U-235 content as the fresh plates.

Of course, CGG's assumption is incorrect as CBG had reason to know. In its February 8, 1983 response<sup>3/</sup> CBG includes as its "Exhibit G" a one page inventory which CBG describes as being attached to the December 12, 1974 letter of UCLA's Ashbaugh to the NRC's Goller. This inventory sheet was prepared by the

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<sup>3/</sup> "Intervenor's Supplemental Response to NRC Staff's Motion for Summary Disposition as to the Issue of the Applicability of 10 CFR 73.60 and the Need to Protect Against Sabotage" (Supplemental Response).

UCLA staff. The apparent discrepancy is readily explained with reference to the "Exhibit G" inventory. (For the Board's convenience a copy of the "Exhibit G" inventory sheet is attached with certain notations made by Ostrander which explain several of the apparent discrepancies.)

UCLA's original fuel loading was acquired in the early 1960's. In 1971, UCLA acquired an additional "fresh core" (actually 29 fuel elements). Five of the new (that is, 1971) fuel elements were loaded into the core in the early 1970's as noted on the attachment by their serial numbers in the left-hand "reactor" core column. The remaining 24 fuel elements were stored as "fresh" (right-hand column) until 1982 when 15 elements were transferred off-site.

As can be seen, the U-235 content of the new fuel elements varies from 151 to 162 grams per element, or an average of approximately 156 grams per element (approximately 14.2 grams per plate). By contrast, the U-235 content of the fuel acquired in the early 1960's was less than 150 grams per fuel element and actually averaged about 13.3 grams per plate.<sup>4/</sup>

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<sup>4/</sup>Two fuel elements were inadvertently omitted from the listing in the left column of in-core fuel; they have been added back in at the bottom of the column to give the total U-235 content of the core (before burn-up) in 1974.

The "Exhibit G" inventory also explains the apparent discrepancy previously noted by the Board at page 11 of its Order. The Board rejected UCLA's explanation that the 9.0 kg estimate that appeared in the October, 1978 inspection report (Exhibit I to CBG's Supplemental Response) included the two Pu-Be neutron sources, stating

. . . CBG correctly points out that its Exhibit I recites the existence of 3.6, 4.7, and 0.7 kg U-235, a total of 9.0 kg. The neutron sources thus constitute an additional quantity of SNM in this inventory. (Order, at 11; emphasis added.)

In fact, the UCLA explanation was correct: it is the 4.7 kg described as "unirradiated fuel" that includes the Pu-Be sources. Note that the inspector states that he relied on the representations of the licensee's employees.<sup>5/</sup> The representations of UCLA's staff were based on the "Exhibit G" inventory which identifies the 3.6, 0.7 and 4.7 kg amounts. The 4.7 kg amount clearly includes the Pu-Be sources measured at their gram-equivalent weights as noted in the attachment. No changes in fuel inventory occurred between the December, 1974 inventory (Exhibit G") and the October, 1978 inspection, except a small amount of burn-up.

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<sup>5/</sup> It is also to be noted that the inspector was conducting a security inspection, not a physical inventory, which accounts for the fact that he rounded off his estimates to two significant figures. The inspector certainly did not say "9000 grams" implying an accurate accounting, as CBG asserted.

III. CONCLUSION

As explained above, CBG assertions that discrepancies exist in the UCLA SNM accounting are groundless. University respectfully requests that the Board find that the UCLA facility possesses less than a formula quantity of SNM.

Dated: September 9, 1983.

DONALD L. REIDHAAR  
GLENN R. WOODS  
CHRISTINE HELWICK

By W. H. Cormier  
WILLIAM H. CORMIER  
Representing UCLA

SPECIAL NUCLEAR MATERIAL INVENTORY  
(gms)

A. <u>Reactor</u>	B. <u>Pits</u>	A/B. <u>Unknowns Reactor/Pits</u>	C. <u>Fuel Storage Non Exempt Inventory</u>
142.78	148.87	← 146.54	160.40 " 1**
147.95	148.32	145.34	161.28 " 2
145.83	149.18	144.37	157.43 " 3
152.07 - # 29**	145.40	146.11	160.83 " 4
149.18	<u>591.77</u>	148.86	156.36 " 5
141.81	146.54 ← Y	<u>731.22</u>	154.23 " 6
156.07 - # 24	738.31	584.68	154.89 " 7
149.04	↑		156.16 " 8
146.41	Removed		156.64 " 9
159.56 - # 26	June 1980		156.08 " 10
144.89			156.29 " 11
155.64 - # 28			156.06 " 12
147.29			157.17 " 13
145.24			156.68 " 14
144.89			154.81 " 15
146.40			152.94 " 16
146.76			154.80 " 17
145.32			151.62 " 18
<del>2971.88</del>			152.38 " 19
159.29 - # 27			153.68 " 20
584.68 old (4 elements) ← Y			154.41 " 21
145.37 old			153.43 " 22
<u>3556.47</u> Total Core			154.88 " 23
			<u>161.82</u> " 25
			3745.27

Removed July 1982

\*\* Serial numbers of "New" fuel,  
"Fresh Core" acquired in 1971

old scrap 19.12  
New scrap can = 421.36  
New scrap plates = 154.54  
Uranyl nitrate = 250\*  
Pu = (2)(32) 2.5 = 160

- A. Reactor Exempt Inventory = 2971.88 + 4/5 (731.22) = 3556.86 gms.\*
- B. Storage Pits Exempt Inventory = 591.77 + 1/5 (731.22) = 738.01 gms.\*
- Total Exempt Inventory = 4294.87 gms.\*
- C. Fuel Storage Total Non Exempt = 3745.27 + 421.31 + 154.54 + 250 + 160 = 4731.12 gms.  
+ 19.12
- D. Total SNM Inventory = 9025.99
- Removed  
April 1981

\* These numbers do not take into account burn-up, radiative capture or loss due to chemical manipulations.

"EXHIBIT G"  
CBG Exhibit, Reproduced from  
original copy for improved  
legibility.

n.c. Ostrander  
9-9-83

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CERTIFICATE OF SERVICE

I hereby certify that copies of the attached: UNIVERSITY'S  
RESPONSE TO CBG'S COMMENTS ON FUEL INVENTORY.

in the above-captioned proceeding have been served on the following  
by deposit in the United States mail, first class, postage prepaid,  
addressed as indicated, on this date: September 9, 1983

John H. Frye, III, Chairman  
Administrative Judge  
ATOMIC SAFETY AND LICENSING BOARD  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dr. Emmeth A. Luebke  
Administrative Judge  
ATOMIC SAFETY AND LICENSING BOARD  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Mr. Glenn O. Bright  
Administrative Judge  
ATOMIC SAFETY AND LICENSING BOARD  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Counsel for the NRC Staff  
OFFICE OF THE EXECUTIVE LEGAL DIRECTOR  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Chief, Docketing and Service Section  
OFFICE OF THE SECRETARY  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Ms. Carole F. Kagan, Esq.  
ATOMIC SAFETY AND LICENSING BOARD  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Mr. Daniel Hirsch  
Cte. to Bridge the Gap  
1637 Butler Avenue, #203  
Los Angeles, CA 90025

Mr. John Bay, Esq.  
3755 Divisadero #203  
San Francisco, CA 94123

Mr. Daniel Hirsch  
Box 1186  
Ben Lomond, CA 95005

Nuclear Law Center  
c/o Dorothy Thompson  
6300 Wilshire Blvd., #1200  
Los Angeles, CA 90048

Ms. Lynn G. Naliboff  
Deputy City Attorney  
City Hall  
1685 Main Street  
Santa Monica, CA 90401

  
WILLIAM H. CORMIER  
UCLA Representative

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OF CALIFORNIA