WANL-TME-246

Ground Support Engineering

Date: January 17, 1963

Subject: Hot Cell Configuration for
E-MAD Facility, Phase II

ASTRONUCLEAR LABORATORY

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I. Purpose

The purpose is to delineate certain facts about the decision on the 7 and 5 versus the 6 and 6 hot cell configuration in designing the E-MAD Facility, Phase II.

Since the pertinent minutes of the meetings and the cost estimates therein contained presented in the attachment are detailed and confusing, a synopsis is presented.

II. Synopsis of Attachment

MASTER

The reason for the decision to accept as the preliminary design the 6 and 6 hot cell configuration, (i.e., two banks, each of which contains two double and four single width hot cells, separated by a cell service area) was to decrease the overall cost of the Phase II of the E-MAD Facility. It is very apparent from cost estimates supplied WANL by SNPO-C, that this decision to change the facility configuration from the 7 and 5 hot cell array (i.e., two banks separated by a cell service area, one of which contains two double and five single width cells and the other two double and three single width cells) actually increased the facility cost.

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III Conclusions

It is apparent from the attachment that the cost savings obtained by eliminating cells are paper, and not actual, savings. Indeed the cost of making a major design change at this time is expensive since most of the previous engineering must be re-calculated, therefore increasing the overall cost.

We are not attempting to cast aspersions on the A. and E. Contractor or to reopen this decision, since more engineering effort would have to be discarded. We however wish to prevent the consequences of a similar decision concerning a suggested 5 and 5 cell configuration from once again causing an increase in cost and a decrease in facilities for the E-MAD.

A. J. Svasek
Ground Support Engineering

AJS/kes

Attachment

ATTACHMENT

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1. Meeting at Aerojet-General Corporation on 11/9/62

Due to inadequate funding for construction of the facilities of the E-MAD Facility, Phase II, it was necessary to defer or rescope the facilities. This information was discussed at a meeting held at Aerojet-General Corporation on November 9, 1962. This meeting was attended by representatives of AGC, SNPO-C and WANL. The decisions reached here concerned a rescoping of the facilities.

A. The figures below indicated the cost of the E-MAD, Phase II Facilities and were compiled by Vitro Engineering Company and presented by SNPO-C representatives.

1. Post-operative cells

a. Scheme 5	\$2,156,000
Scheme 4	2,438,000
Scheme 2	2,193,000
Scheme 5, Alternate 1	Cost Unknown

2. Critical parts storage building	\$ 135,000
3. Engine Transfer and Maintenance Building	160,000
4. Office area	118,000
5. Turntable, transfer drawers and railroad controls	110,000
6. Radioactive waste tile field	21,000
7. Cost of funding the 29 alternates of package G of Phase I, E-MAD Facility	1,300,000
8. Previously deferred government equipment	1,250,000
TOTAL (Using Scheme 5)	5,250,000

B. The funds available in the budget, according to SNPO-C representatives, 4.4 million dollars.

C. The following savings were agreed upon during the meeting:

1. Continue deferral of 15 shielding windows (GFE) from Phase I	375,000
2. Continue deferral of 9 pairs of Master/Slave Manipulators from Phase I	90,000
3. Defer office area	90,000
4. Defer critical parts storage building	135,000
5. Defer engine transfer and maintenance building	160,000
6. Defer radioactive waste tile field	21,000
7. Increase size of Phase II shielded windows	<u>40,000</u>

TOTAL SAVING	\$ 831,000
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D. The cost of the E-MAD, Phase II Facilities, in accordance with the above deletions, was therefore 4,419 million dollars. This cost was for the 7 and 5 cell configuration.

II. Meeting at Vitro Engineering Company on November 13 and 14, 1962

A. During the meeting, there was quite a bit of discussion concerning the layout of the post-mortem cells. The WANL representative was of the opinion that as late as the end of the meeting on Friday, November 9, at Vitro Engineering Company that all 13 cells that may eventually be supplied for us at the E-MAD Facility would be in one straight line.

The outcome of the meeting was that the initial cell area would consist of two banks of hot cells, separated by a cell service area, each bank containing two double size cells and four single size cells. For the initial time period, WANL will obtain two double size hot cells and four single size hot cells connected directly to the Core Disassembly Cell and one single size hot cell on the other side of the Cell Service Area. The WANL representative was directed by the AGC representatives to accept the decision on the cells. The reason for doing this was their opinion that due to the tight funding of the E-MAD Facility, it was questionable whether seven cells on each side could be obtained. However, continuously

throughout the meeting, SNPO-C personnel have been uncertain of the feasibility of the arrangement of two banks of six cells. However, AGC representatives were of the opinion that if we obtained 14 cells, this would be all the cells obtained. However, the WANL representative's opinion was that the present 12 cell arrangement would be all the hot cells that will ever be provided at the E-MAD Facility for the NERVA project. Since AGC had accepted the responsibility for specifying the number of cells, there seemingly is no alternative except in expression of dissatisfaction with the decision. This expression was made in a verbal form to the AGC representatives.

III. Meeting at Vitro Engineering Company on December 11, 1962

- A. The following breakdown was obtained concerning the cost differences between Scheme 5 (7 reactor component cells on one side and 5 engine cells on the opposite side) versus the 6 and 6 cell configuration. This cost presentation precipitated a reopening of the decision on the 6 and 6 over the 7 and 5 cell configuration.

	<u>(6 and 6)</u>	<u>(7 and 5)</u>
1. Civil Works	1,250	1,250
2. Architectural and Structural	474,000	404,450
3. Piping	- - - -	- - - -
4. Electrical	123,450	104,000
5. Heating	197,000	187,000
6. Instrumentation	- - - -	- - - -
7. Equipment (Breakdown below)	827,300	998,880
a. Windows (2 1/2 x 2 1/2)	270,000 (18)	270,000 (18)
b. M/S Manipulators	176,000 (16)	176,000 (16)
c. Doors (swing)	57,600 (4)	57,600 (4)
d. Doors (plug)	48,000 (8)	48,000 (8)
e. Lead Gates	50,000 (20)	50,000 (20)
f. Lead Gates	6,800 (2)	6,800 (2)
g. Steel Shield Door	51,600 (1)	51,600 (1)
h. 25-Ton Monorail and Hoist	10,800 (1)	10,800 (1)
i. 7 1/2-Ton Crane	20,000 (1)	20,000 (1)
j. Rectilinear Manipulator	60,000 (3)	100,000 (5)*
k. 3-Ton Crane	24,000 (3)	32,000 (4)**
l. Sleeves and Plugs	25,000	25,000
m. Intercell Lift Gates	<u>0</u>	<u>118,000(10)***</u>
Total of Direct Costs	1,555,600	1,666,260
Total with Accounting Costs, etc.	2,022,250	2,156,000

() Number of items included in cost estimate

* 40,000 dollars saved regardless of 6 and 6, 7 and 5 decision due to prior agreement

** 8,000 dollars saved regardless of 6 and 6, 7 and 5 decision due to prior agreement

*** 118,000 dollars saved regardless of 6 and 6, 7 and 5 decision due to prior agreement

B. The saving, due to previous decisions, noted by asterisks totaled 166,000 dollars. The 6 and 6 configuration was selected because it was to provide an additional saving of 50,000 dollars over the 7 and 5 configuration. These savings have disappeared due to required engineering changes so that the saving in direct costs is 110,000 dollars instead of 216,000 dollars. Therefore, instead of saving 50,000 dollars, the 6 and 6 cell configuration actually increased the cost of the hot cells by 56,000 dollars. However, because of WANLⁱ representatives being directed at the previous meeting by AGC to accept the 6 and 6 configuration, there was not major comment, other than obtaining backup information, made by the WANL representative. However, the initiation of discussion was made by SNPO-C representatives, but AGC representatives said they would not request the 7 and 5 configuration since they feel the lift type rear doors are needed and the money should be spent on this item.