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TO: File
FROM: Working Committees - RDA DC-4 and RDA DC-7

REVIEW AND RECOMMENDATIONS CONCERNING THE LOCATION OF PROPOSED ADDITIONAL SEPARATION PLANT

EAST VERSUS WEST AREAS

INTRODUCTION

It is the purpose of this report to: (a) review the factors which should be considered in selecting either the 200 West Area or the 200 East Area of Hanford Works as the site for a proposed separations facility, particularly from the standpoint of economics, operating convenience, and assurance of continuity of production; (b) make recommendations as to the location of the proposed facility.

SUMMARY

The factors affecting the selection of a plant location are summarized as follows:

... The capital investment required for a new separations facility located in the 200 East Area will be $500,000 less than that required for a similar plant located in the 200 West Area.
2. The operating cost is estimated to be $378,000 per year less if the facility is located in the 200 West Area.

3. The need for plant dispersion for purposes of assurance of production continuity is sufficient to overshadow items (1) and (2) above.

RECOMMENDATIONS

It is recommended that the proposed new separations facility be located in the Southeast Quadrant of the 200 East Area, as shown on attached SK-2-1260. The exact orientation of the buildings within the 202-A Area, as shown in this sketch, is considered preliminary pending additional detailed layout studies.

ASSUMPTIONS

The following assumptions have been used for the basis of this report:

1. The proposed facility will be similar to the existing 202-B Area, except that the capacity of the plant will be 275 tons of uranium per month, average flow rate.

2. The operation of the B and T bismuth-phosphate plants will not normally be required after the new facility is placed in service, but these plants will be maintained in standby condition.

3. The distribution cost of steam, water and power will be essentially the same for either a West or East Area location.

4. The cost of the required radioactive waste tank farm will be essentially the same for either an East or West Area location.

5. The operation of the metal recovery plant now being installed in the 221-U Area will either be drastically reduced or completely stopped by the time the new facility is placed into service.

FACTORs CONSIDERED

1. Steam Supply

   An analysis of the existing steam capacity of the 264-W and 264-V boiler houses, including the additional boiler now being installed in 264-V, and assuming that the B and U plants will be in standby after the new plant is placed in service, shows the following:

   [Additional analysis details would follow here, but are not visible in the image provided.]
284-W

| Expected Load | 320,000 $/hr. | 264-E
| New Purex Plant | 224,000 | 224,000
| TOTAL LOAD | 544,000 | 289,700
| Capacity | 400,000 | 240,000
| Additional Capacity Required | 144,000 $/hr. | 49,700 $/hr.

Therefore, the addition of the new separations plant to the East Area would require the installation of approximately 50,000 $/hr. of steam generation equipment, while addition of the plant to the West Area would require the installation of approximately 144,000 $/hr. of steam generation equipment.

It is estimated that the installed cost of the equipment which would be required in the West Area will be $600,000 greater than for East Area. This estimate is based on the cost of steam generation equipment now being installed in the West Area.


2. Water Supply

A review of the raw water supply shows that the addition of one raw water pump would be required if the new separations plant is located in either the East or West Area.

An analysis of the filtered water capacity and demand of the East and West Areas, assuming U, T, and B plants to be on standby after the new plant is placed in service, shows the following:

<table>
<thead>
<tr>
<th></th>
<th>200-W</th>
<th>200-E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected Load</td>
<td>1800 GPM</td>
<td>300 GPM</td>
</tr>
<tr>
<td>New Plant</td>
<td>775</td>
<td>775</td>
</tr>
<tr>
<td>TOTAL LOAD</td>
<td>2575</td>
<td>1075</td>
</tr>
<tr>
<td>Existing Capacity</td>
<td>2600</td>
<td>800</td>
</tr>
<tr>
<td>Excess GPM (Excess)</td>
<td>225 (Excess)</td>
<td>275 GPM (Additional Capacity Required)</td>
</tr>
</tbody>
</table>

Therefore, the addition of 275 GPM filter plant capacity would be required if the new plant is located in the East Area, while no additional capacity would be required for the West Area. It is estimated that the installed cost of the additional 275 GPM capacity would be $100,000.

* See Memorandum by P. D. Atkinson to File, "Predicted Raw and Filtered Water Demand for 200 East and West Areas for Period 31 July, 1952 to 1957."
3. Laboratory Facilities

The Analytical Laboratory required for process control of the proposed new plant is estimated to contain 20,000 square feet of laboratory working space. This additional laboratory facility will be essentially the same if the proposed separations facility is located in either the East or the West Area.

4. Miscellaneous Facilities

The cost of all other auxiliary facilities required for the proposed new separations facility such as power lines, sewer systems, etc., is considered to be the same for either the East or the West Area.

5. Radiological Science Comments

It is the opinion of the Radiological Sciences group that there are no particular advantages to the location of the proposed new facility in either the East or the West Area.

6. Construction Overhead Cost

It is expected that no other large construction project will be carried on in either the East or West Area during the time that the proposed new separations facility is under construction. Therefore, there is no advantage to be gained in construction overhead cost from location in either of the two areas.

7. Operating Cost

It is economically favorable to concentrate all separations production facilities in one area. The savings resulting from unified services and production organizations, including Health Monitoring, Patrol, Maintenance, Accounting, etc., would result in an estimated $378,000 annual savings if the proposed new facility were to be located in the 200 West Area. The basis of this operating cost estimate is shown in the attached "Exhibit A".

8. Transfer of URE Solution to the 24 Metal Conversion Plant and Product Solution to 234-5 Building

Location of the proposed separations facility in the West Area would shorten the distance required for transferring URE solutions to the metal conversion facility. However, a new transfer line would be required in the West Area. If the proposed new unit is located in the East Area, it is proposed that one of the existing cross-country lines, be utilized to transport the decontaminated URE solution to the metal conversion plant. This would require the installation of a connecting line from the proposed 24-A Area to the existing cross-country lines. The cost of this connecting line is estimated to be approximately the same as the new line which would be required in the West Area.
The cost of transportation of product solution from the new facilities to the plutonium fabrication facilities, from either the East or West Area, is not considered significant.

9. Assurance of Continuity of Production

Reasonable assurance of the continuity of production of fissionable material at Hanford Works is considered to be essential to the National Defense. The shipment of irradiated slugs to any other site for processing is considered impractical. Therefore, it is imperative that the separations facilities at Hanford Works be so arranged and constructed as to minimize the effect of military action or plant catastrophe on the continuity of production.

At the present time 72% of the installed separations capacity of Hanford Works is concentrated in the 200 West Area. This area, which also includes 100% of the plutonium fabrication capacity, is served by a single service system, consisting of one steam plant, one water filtration plant, and one electrical distribution system. Should the proposed new separations plant be located in the 200 West Area, 80% of the installed separations capacity of Hanford Works would then be located in one area, along with 100% of the plutonium fabrication capacity, and unless additional service facilities were furnished, would continue to be served by a single system. Should the proposed new separations facility be located in 200 East Area, 68% of the separations capacity would then be located in the East Area and 30% in the West Area, with each area being serviced by a completely independent service system. (Capacities are based on uranium at 4.20 MWD/T.)

Damage resulting from either a military attack or a plant catastrophe in the 200 Areas would probably be in the form of one or all of the following:

a. Direct blast damage to primary process facilities.
b. Direct blast damage to service facilities.
c. The spread of radioactivity from a primary process facility or waste storage facility.

To minimize damage which would result from the above, it is considered essential that:

a. Primary process facilities be located a minimum of one mile apart.
b. Insofar as practical, primary process facilities be serviced by completely independent service systems.
## EXHIBIT I

**DECLASSIFIED**

Differential analysis of the area operating costs if a new separations plant is located in 200 west or 200 east area.

**Basis** - Personnel released by placing the 200 East Area in a standby condition. This personnel reduction is the result of servicing one centralized operating area rather than two areas of similar size.

<table>
<thead>
<tr>
<th>Section or Group</th>
<th>Estimated Area Manpower Requirement if New Plant Located in East Area (B Plant Shutdown)*</th>
<th>Reduction in Area Personnel if New Plant Locate in West Area (East Area Standby)**</th>
<th>Average Annual Rate Dollars Including 12% DMC***</th>
<th>Annual Savings Dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td>147</td>
<td>0</td>
<td>$---</td>
<td>$---</td>
</tr>
<tr>
<td>Technical</td>
<td>69</td>
<td>0</td>
<td>$---</td>
<td>$---</td>
</tr>
<tr>
<td>Radiological Sc.</td>
<td>30</td>
<td>6</td>
<td>3366</td>
<td>20,200</td>
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<tr>
<td>Patrol</td>
<td>60</td>
<td>24</td>
<td>4691</td>
<td>112,600</td>
</tr>
<tr>
<td>Janitors &amp; Laundry</td>
<td>20</td>
<td>2</td>
<td>3483</td>
<td>7,000</td>
</tr>
<tr>
<td>Medical</td>
<td>8</td>
<td>4</td>
<td>4415</td>
<td>17,600</td>
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<tr>
<td>Power</td>
<td>43</td>
<td>15</td>
<td>4997</td>
<td>75,000</td>
</tr>
<tr>
<td>Electrical</td>
<td>15</td>
<td>7</td>
<td>4997</td>
<td>33,000</td>
</tr>
<tr>
<td>Transportation Labor</td>
<td>15</td>
<td>8</td>
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<td>35,800</td>
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<tr>
<td>Maintenance</td>
<td>46</td>
<td>15</td>
<td>4997</td>
<td>75,000</td>
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<tr>
<td>Instrument</td>
<td>25</td>
<td>0</td>
<td>4997</td>
<td>---</td>
</tr>
<tr>
<td>Project Engineering</td>
<td>3</td>
<td>0</td>
<td>$---</td>
<td>$---</td>
</tr>
</tbody>
</table>

**Total Annual Savings**

$375,200

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*Based on "8" Operating Report, second quarter of fiscal 1950, which was used as basis for Process Comparisons - by G. A. Rohrman and Committee.

**Based on Report, Selection of Canyon Plant to be Operated in Conjunction with Redor, dated 9-1-50 - by the Industrial Engineering Group, G. F. Cabell, head.