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REVISED RECOMMENDATIONS FOR THE 100-K AREA
PROJECT CG-775 RAW WATER REQUIREMENTS

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N. F. Fifer
Reactor Modification Design
FACILITIES ENGINEERING SECTION

By Authority of RLO-CG-4

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By J. Males, 1-26-94

Verified By J. E. Sawly 2-3-94

June 22, 1959

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REVISED RECOMMENDATIONS FOR THE 100-K AREA
PROJECT CG-775 RAW WATER REQUIREMENTS

I. INTRODUCTION

As a part of Project CG-775, 100-K Area Water Plant Expansion, the capacity of the 181-K river pump installations will be increased. Recommendations for the raw water requirements based on a reactor flow of 175,000 gpm were presented in document HW-55877. Since then a new fuel element has been developed for the K reactors, resulting in a lower reactor system curve.

The purpose of this report is to present a set of revised recommendations for Project CG-775 raw water requirements based upon the new reactor system.

II. SUMMARY

The total raw water requirements for the individual K plants can be broken down as follows:

	<u>5 Pump Operation</u>	<u>6 Pump Operation</u>
Reactor Flow	188,000 gpm	200,000 gpm
Service Water	10,000	12,000
Backwash Water	10,000	15,000
KER and HLO Facilities	<u>5,000</u>	<u>5,000</u>
	213,000	232,000

It is recommended that the design criteria for the 181-K river pumps be based on a total raw water flow of 213,000 gpm with spare pumping units and a maximum flow of 232,000 gpm for each plant.

III. DISCUSSION

A. Process Water

Based upon the new K-III reactor system and the performance of the modified process pumping unit at 190-KE, the reactor flow rates will be approximately 188,000 gpm during five pump operation and 200,000 gpm during six pump operation.⁽¹⁾ These flow rates will achieve the maximum utilization of the existing high lift pump drives and emergency generators and therefore are the economic flow rates obtainable without undertaking major water plant modifications.

B. Service Water

The service water system is maintained by four pumps, rated at 4,000 gpm at 240 feet TDH connected in parallel. The normal service water demand during reactor operation is currently around 6,000 gpm per area, and it is anticipated that the normal demand will reach 8,000 to 10,000 gpm at the proposed reactor flow rates.

1. Schack, M. H., et. al. "Report of Preliminary Testing, Production Test IP-234-AE, Project CG-775 - Prototype Testing of the 190-K Process Pumping Units," HW-60659, June 15, 1959

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Listed below are the major equipment supplied by the service water system and their estimated design flow requirements:

Palmer agitator and valve controls	1,400 gpm
Washdown and sludge pump seals	100
Chlorinators and valve controls	400
Process pump cooling	3,000
Boiler feed makeup	65
Thermal loop and rod cooling	3,000
105 storage basin	600-6,000
Low pressure crosstie system	----

Of these items, only the boiler feed makeup and the thermal loop and rod cooling are metered, and the latter currently demands 1600 gpm. The normal 105 storage basin demand is about 600, while larger flows are utilized to flush out the basins. The only item above which will experience an appreciable increase is the thermal loop and rod cooling.

The anticipated service water demand will require the use of two pumps and perhaps three. No situation is foreseen which would require the use of more than three service water pumps during reactor operation for a significant period of time. Therefore, the recommendation for the service water capacity is 10,000 and 12,000 gpm for five and six pump operation, respectively.

C. Filter Backwash Water

The filter backwash installation consists of automatic equipment controlling two 20,000 gpm pumps, of which one is presently a spare. The pump operates approximately 50 percent of the automatic cycle. Continuous operation of the automatic equipment will sustain minimum filter runs of 8 hours and will require an average flow of some 10,000 gpm for backwashing. This will be adequate for five pump operation during the period of poorest river water quality.⁽²⁾ Six pump operation during this poor water quality period will no doubt require shorter filter runs resulting in a higher average backwashing flow. Since no operating data is available for these conditions, a 50 percent increase in backwash flow will be assumed for the design criteria.

The recommendation for backwashing water is 10,000 gpm for five pump operation and 15,000 gpm for six pump operation.

D. KER Facility and Hanford Laboratory Requirements

The FY-59 forecast for the KER facilities indicated an average requirement of about 4000 gpm, and this estimate remains valid in view of the CGI-839 modifications. Past records have indicated an average demand of 100 to 200 gpm for the HLO laboratory in this area. Therefore, the total KER and HLO facility water requirements will be set at 5,000 gpm.

N. F. Fifer:bsm

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Reactor Modification Design
FACILITIES ENGINEERING SECTION

2. Crose, H. C. "Filter Plant High rate of Flow Test, 183-KE", undocumented, ( ) March, 1959.

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