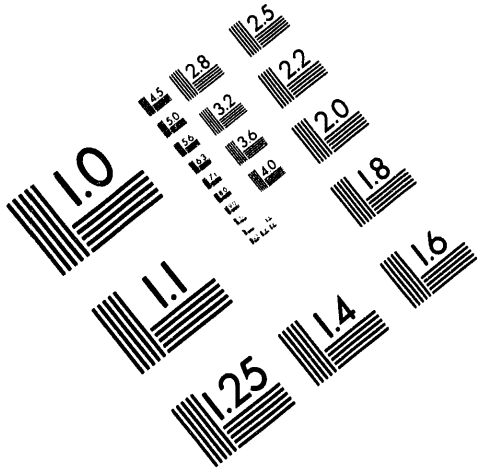

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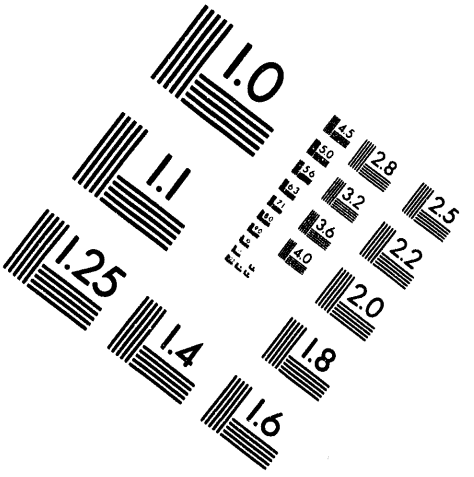

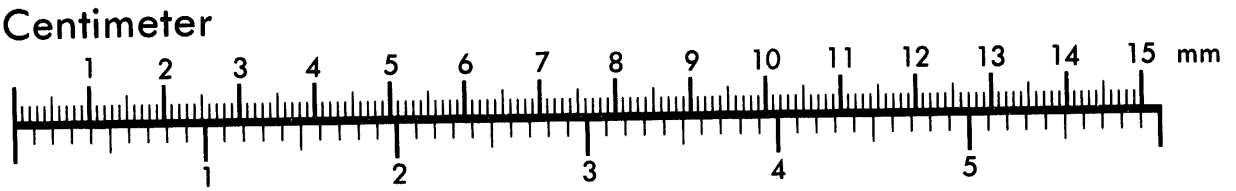

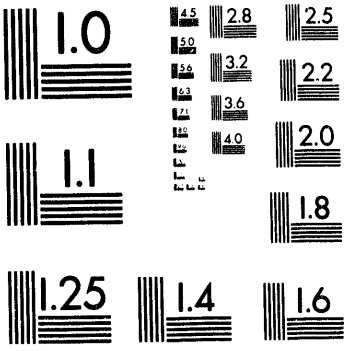

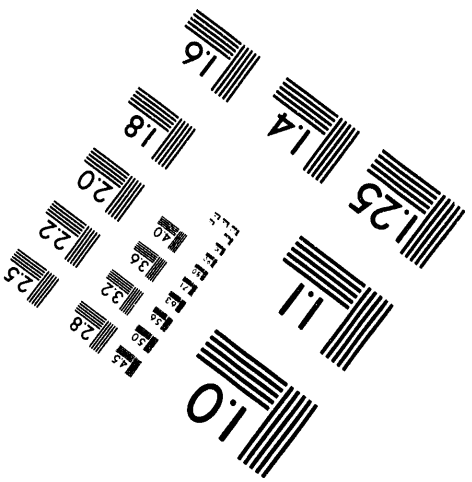

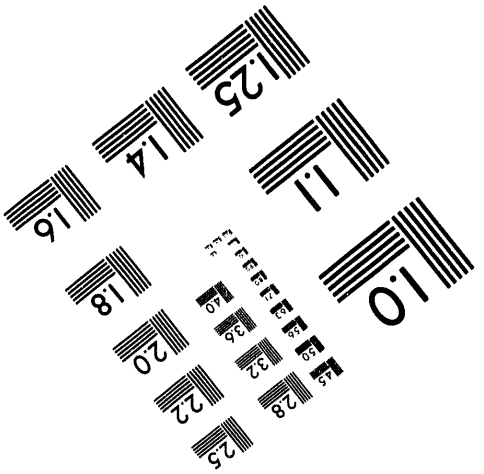

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TITLE

EXPANSION PROGRAM
190 BUILDING STUDIES RESULTS

AUTHOR

C. F. Quackenbush

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EXPANSION PROGRAM

190 BUILDING STUDIES RESULTS

1. C. R. Barker
2. L. B. Brinkman
3. D. L. Condotta
4. H. W. Heacock
5. R. T. Jessen
6. W. W. Winds eimer
7. C. F. Quackenbush
8. Records Center
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EXPANSION PROGRAM

190 BUILDING STUDIES RESULTS

Introduction

Consideration of the expansion of Areas B, C, D, DR, F and H indicates that reactor performance is intimately related to the pressure and flow of process water which can be pumped from the 190 Buildings located in each area. The magnitudes of the process water pressure and flow requirements of some of the reactors contemplated in the expansion program are such that it may be possible that some of the equipment now installed in the existing 190 Buildings and their annexes could be used to meet these requirements.

Since the power output of existing 190 Building pump drives is limited, low demands for pumping power at these locations make greater use of existing equipment more probable. This trend is also in the direction of savings in operating costs, as well as capital costs.

It should be recognized, however, that low pump operating costs usually go hand in hand with the considerable capital costs required to install larger sizes of process water piping.

Decision as to profitable areas of investigation, which will lead to the firming of process water system scope, will be guided by striking economic balances between possible production gains, expected operating costs, and capital costs of expansion.

Object

It is the object of this study to investigate preliminary expansion program requirements for process water, as supplied by 190 Building equipment; from the point of view of practical pumping, flywheel and pump suction head requirements. These requirements are to be determined at this time in such a form and accuracy as to be useful in refined estimating for budget study purposes.

Discussion

In order to obtain the objectives of this study at this time it has been decided to consider five different conditions of process water flow to a reactor. These conditions are shown in Table 1.

[redacted]

TABLE 1

Condition	Flow to the reactor under summer conditions of operation in gallongs per minute.	Corresponding top of riser pressure in pounds per square inch, gauge.
1	85,000	580
2	100,000	480
3	130,000	280
4	150,000	280
5	150,000	150

The choice of process water flow conditions has been arbitrary. It has been made in the hope that the spread attained will be wide enough to give indications of the limiting boundaries of the problem of expanding Areas B, C, D, DR, F and H.

Accuracy

Calculations have been made to an accuracy somewhat greater than that to which the controlling flow conditions can be estimated at this time. All results should be interpreted as being relative, order of magnitude, indications sufficient for use in refined estimating for budget purposes only.

Results

For quick inspection of some of the results indicated by these investigations Table 2 has been prepared.

TABLE 2

Condition	1	2	3	4	5
Flow in GPM	85,000	100,000	130,000	150,000	150,000
TORP in PSIG	580	480	280	280	150
Process Pump Driver	Existing Motor	Existing Motor	Existing Motor	Existing Motor	Existing Motor
Gear Set	For new H.P.	Existing Set	Existing Set	For new H.P.	Existing Set
Flywheel Inertia Lb.-ft.^{2}	705,000	625,000	Existing Flywheel (574,400)	705,000	Existing Flywheel (574,400)
Starting Motor					
H.P.	600	600	No starting	600	No start-
R.P.M.	600	600	motor	600	ing motor
Process pumps	Existing pumps	Existing cases with new impellers	All new	All new	All new
Booster pumps					
No. per building	2	2	No booster	No booster	No booster
Head PSIG	50	100	pumps	pumps	pumps
HP of Driver	1,875	4,400			
RPM	720	720			
Flywheel inertia lbs.-ft.^{2}	240,000	570,000			
Minimum suction press.					
PSIG (except DR)	17	17	17	17	17
PSIG at DR	6.5	6.5	6.5	6.5	6.5
Process Piping	20% changed	20% changed	All new low Velocity piping	All new low Velocity piping	All new low Velocity piping

Calculations for these studies have been made in accordance with the methods described in secret document HW-41856 by D. L. Condotta; pump similarity considerations as described by G. F. Wislicenus in "Fluid Mechanics of Turbomachinery", McGraw-Hill Gook Company; and centrifugal pump suction considerations as described by A. J. Stepanoff, "Centrifugal and Axial Flow Pumps", John Wiley and Sons, Inc. Flywheel decay calculations have been checked against the results of the August 1959, trip tests at the B/C Area.

CF Quackenbush/jwk

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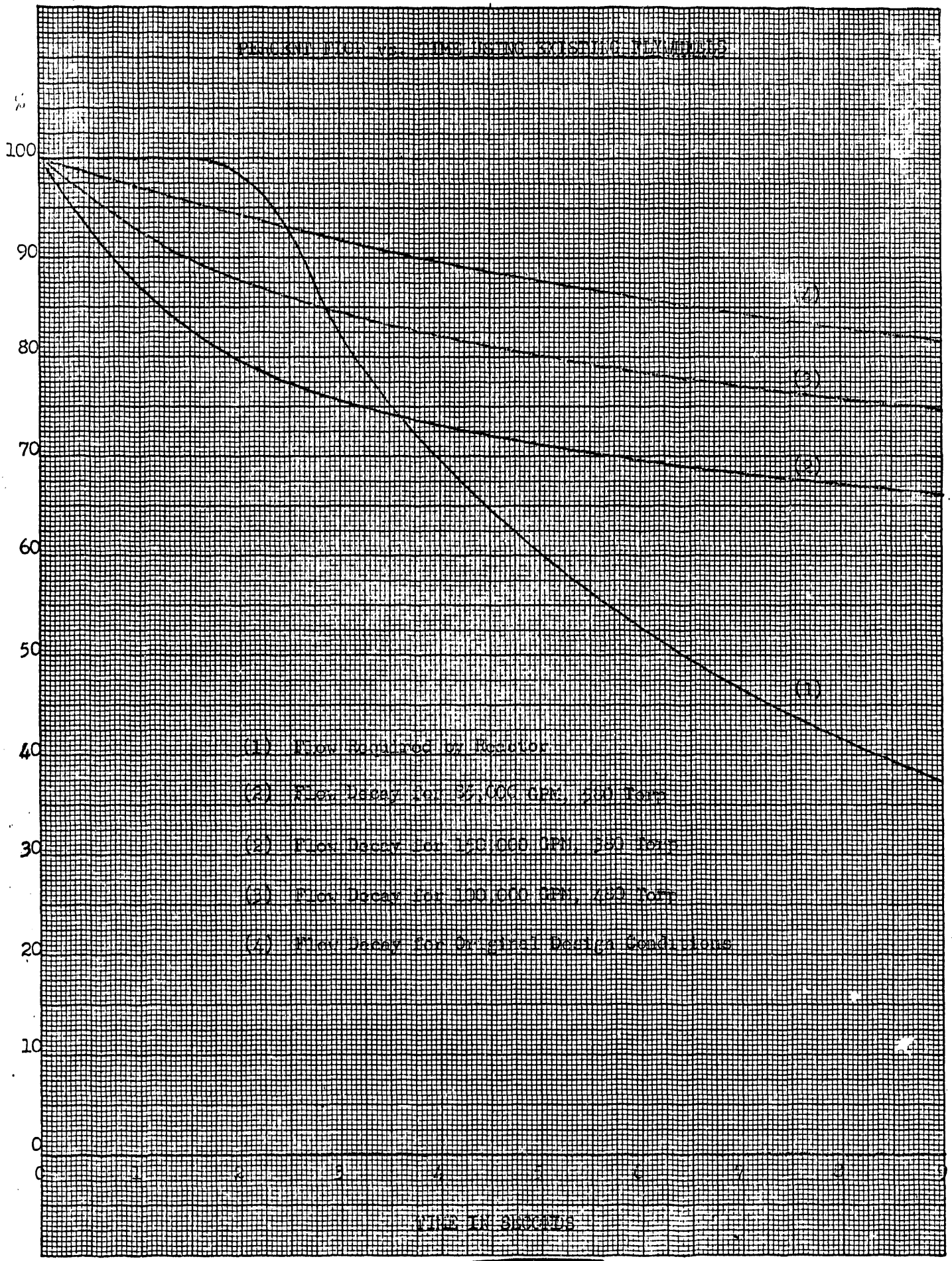

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