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STATUS REPORT ON WRL MOBILE WATER TREATMENT PLANT

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STATUS REPORT ON THE WRL MOBILE WATER TREATMENT PLANT
June 30, 1979 to October 31, 1979

by

K.A. Hashmi* and H.A. Hamza**

ABSTRACT

This is a status report on the mobile water treatment plant designed and being constructed at the Western Research Laboratory, Edmonton. First stage of the construction phase, comprising modification of the trailer unit was completed on time (June 1979). Equipment installation which constitutes the second stage, is nearing completion with only piping and electrical work still in progress at the time of writing. To date work has progressed close to schedule, but some delays are anticipated in completion of the remaining work.

To transport the unit, in the city or highway, a permit will be required from the local department of highways and Motor Transport Board.

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INTRODUCTION

One of the main in-house projects presently underway at the Western Research Laboratory (WRL) is the construction of a mobile water (effluent) treatment plant and its subsequent use in the field for purpose of scale-up and demonstration to industry of related technology developed at WRL. During a recent visit (October 1979) by WRL staff to several western Canadian coal washeries, high interest was shown by the operators in hosting trials of the mobile plant at their locations. Testing would be aimed at scale-up of results obtained from WRL's laboratory and pilot plant studies as well as for finding solutions to existing problems in industrial water recovery circuits. Because of the versatility of the mobile plant. Other mineral processing industries have shown interest in using mobile plant for process development, scale-up, optimization and environmental clean-up. This project has very high potential benefits in terms of improving process water quality and predicting operating conditions and parameters of the unit operation involved.

The mobile plant consists of two main sections and utilizes some equipment developed at WRL as well as standard commercial equipment. The flocculation section of the system consists of a two-stage atomizer for rapidly dissolving flocculants, mixing tanks, and positive displacement pumps. The solid-liquid separation section is equipped with a classifying cyclone, a bottom-feed thickener, and a Kruger solid-bowl centrifuge. This unit is capable of treating $40 \text{ m}^3/\text{hr}$ (150 gpm) of effluent.

Following construction and assembly, the mobile unit will be tested at WRL by using an effluent stream from the existing 10 tph pilot wash plant at the feed.

WORK COMPLETED

TRAILER MODIFICATION

Because of equipment and operating needs to meet the objectives of this project it was determined that the trailer had to be modified. The modifications, including structural strengthening, insulating and construction of hydraulically-operated doors, has been completed and are shown in Fig. 1.

EQUIPMENT LAYOUT

The process flowsheet is shown in Fig. 2 and layout of the major pieces of equipment with their dimensions is shown in Fig. 3 and 4. Equipment layout has been completed, except for the in-line mixer and hydrosieve which will be provided by the National Research Council of Canada, Ottawa, for tests on oil agglomeration of fine coal to be run concurrently with water treatment.

The proposed piping layout including valve locations is shown in Fig. 5. Some changes in piping will be required to accommodate the oil agglomeration work because it was added subsequent to the original design. The piping and electrical work are in progress.

TRANSPORTATION

The method and cost of transportation remain to be finalized. A permit from the Provincial Motor Transport Board and the City Transport Board will be required for moving the unit by road within the city or on the highway. A "wide load" and yellow or orange flag and lights at the extreme corners will be required. Driving restrictions are in effect on Friday (3:00 pm to mid-night) and all day Sunday. The maximum allowable road weight is 70,000 lb (estimated weight of the unit when completed is 60,000 lb). Railway transportation has also been considered. CP and CN rail and several interested moving companies will be providing estimates of costs for transportation between WRL and coal preparation plants in Alberta and B.C.

WORK PLAN

The work remaining is scheduled as follows:

November 1979

1. Piping work
2. Install - Blender
Atomizer
Cyclone
Agitators
Belt Conveyor
3. Acquisition of monitors and controls.

4. Continue electrical wiring

December 1979

1. Install 3 slurry pumps (P1, P2, P3-see Fig. 5).
2. Continue piping
3. Continue electrical wiring

January 1980

1. Complete piping and electrical work
2. Complete centrifuge installation and testing
3. Test equipment
4. Install monitors and controls (if delivered)

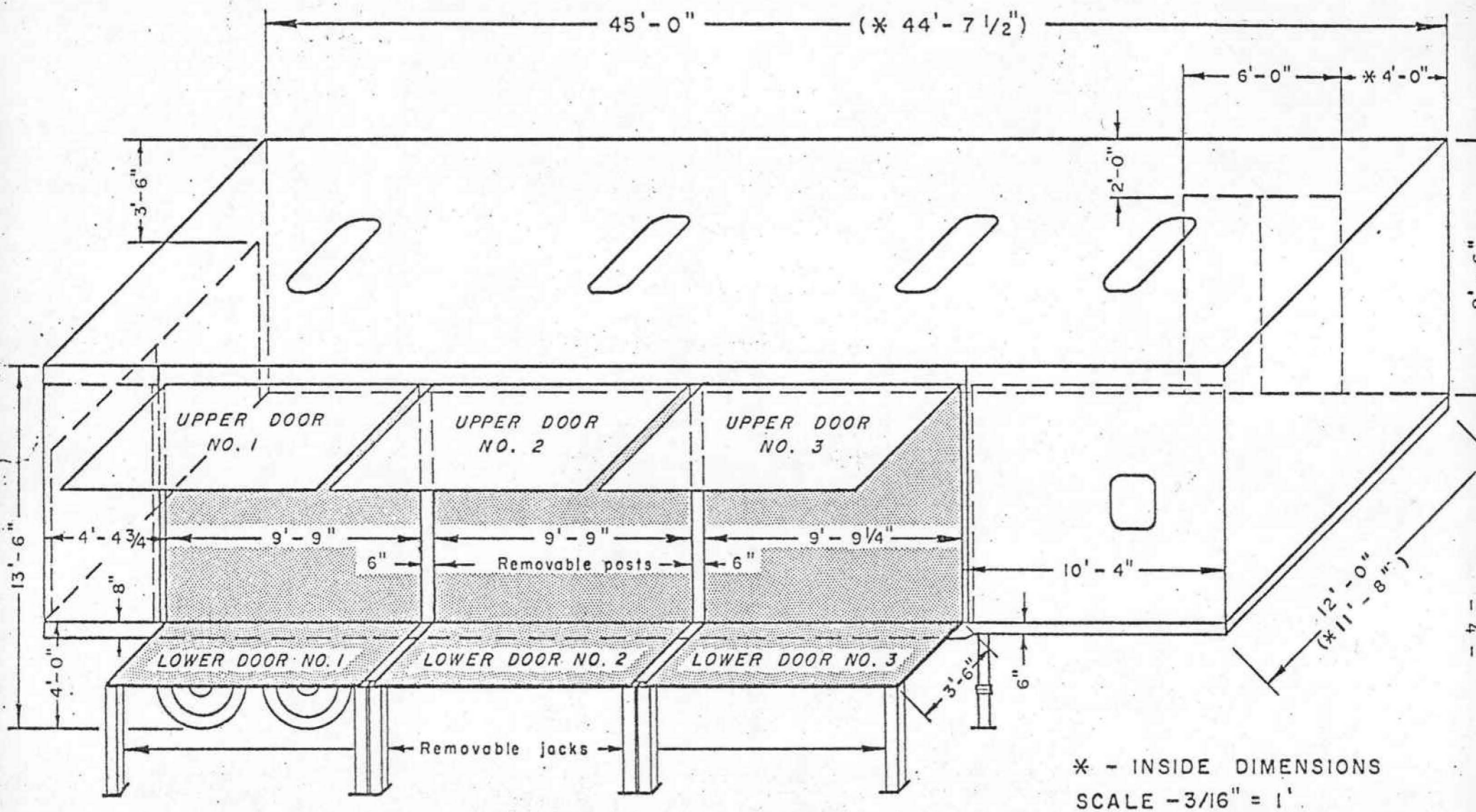
OVERALL APPRAISAL OF PROGRESS

Work progress to date has been satisfactory, as shown in Fig. 6 and

7. Delays in completion may occur because of:
 1. Shortage of manpower availability from Alberta Government Services (AGS) who are providing labour for plant construction, electrical and piping work, and also fabrication of small equipment such delays are beyond our control.
 2. Delays in ordering which consequently mean delays in obtaining monitors and controls. To date items have not yet been ordered. Long delivery times (10-16 weeks) are expected.

CONCLUSION

Overall progress of the construction phase has so far been satisfactory. If the work continues to proceed at the same pace, the project will be completed as scheduled and will be ready for field testing at coal washeries in spring-summer, 1980. The unit will have the capability for testing the oil agglomeration process independently or as an aid to water treatment of coal effluents. Because of the trailer dimensions and road restrictions it may not be possible to visit all the coal washeries in western Canada.

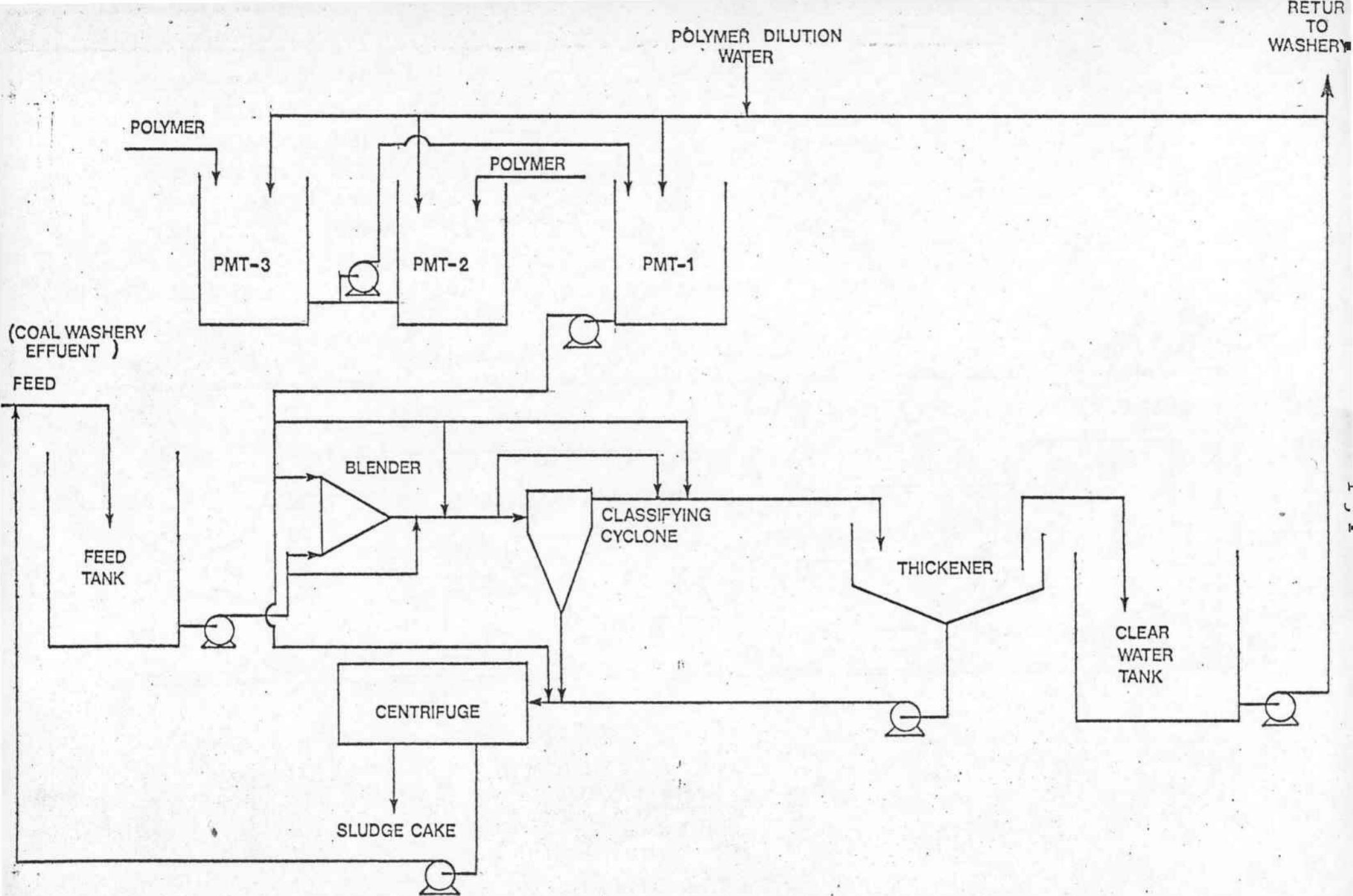


* - INSIDE DIMENSIONS
 SCALE - 3/16" = 1'

MOBILE WATER TREATMENT PLANT

TRAILER MODIFICATION PLAN

Figure 1.

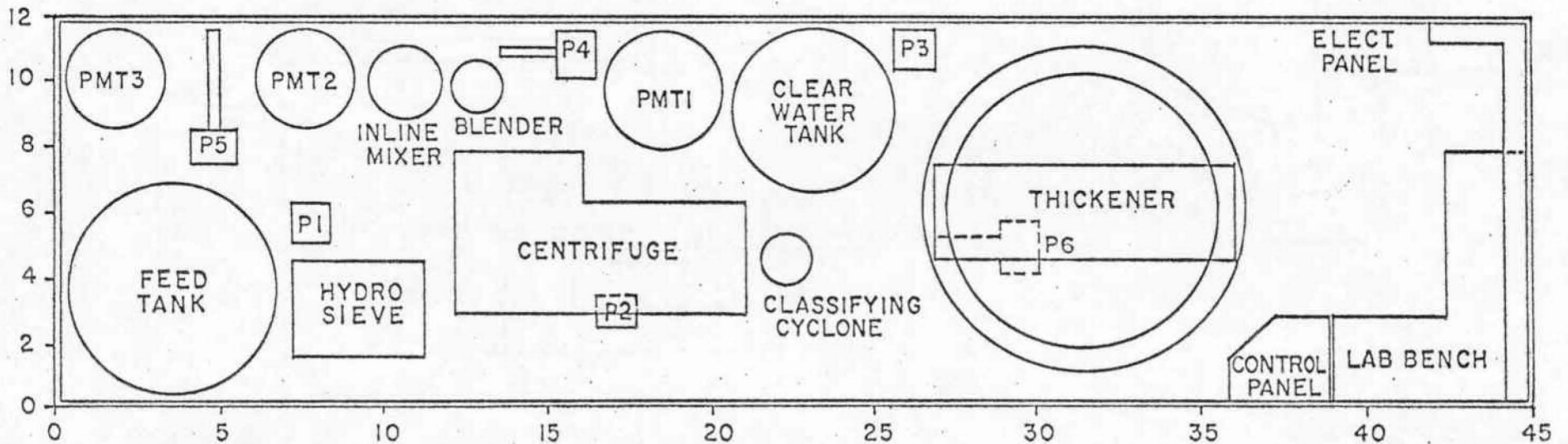
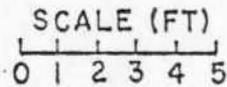


MOBILE WATER TREATMENT PLANT - FLOW SHEET

Figure 2.

MOBILE WATER TREATMENT PLANT

PLOT PLAN

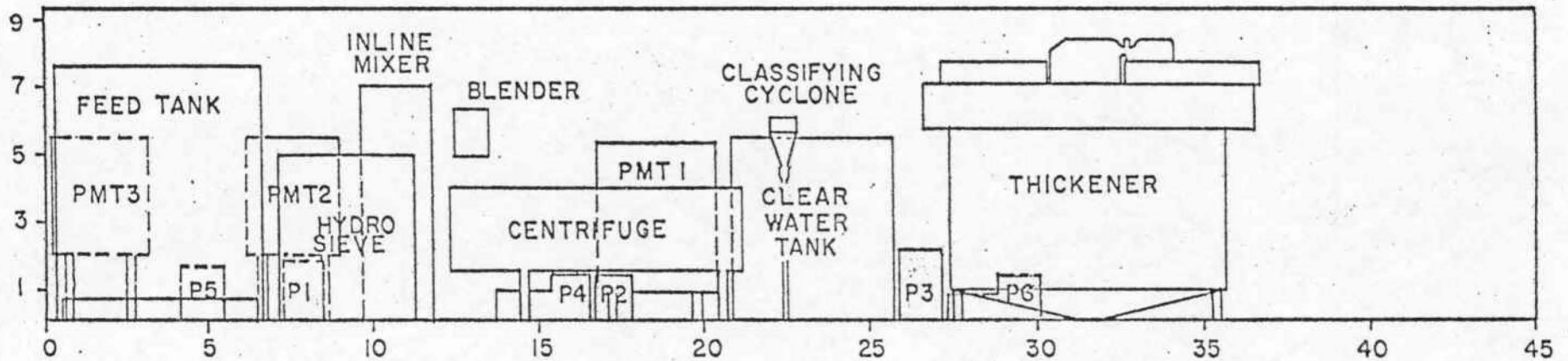
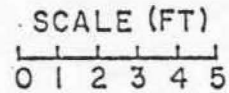


DIMENSIONS

TRAILER	45'-0" X 12'-0"
FEED TANK	7'-6" X 5'-9" DIA
PMT 1	4'-6 1/8" X 3'-6" DIA
PMT 2 & PMT 3	3'-6" X 3'-0" DIA
HYDROSIEVE	4' X 3' X 5'
CLEAR WATER TANK	5'-3" X 5'-2" DIA
INLINE MIXER	2'-2" DIA
THICKENER	8' DIA

Figure 3.

MOBILE WATER TREATMENT PLANT
ELEVATION PLAN



DIMENSIONS

TRAILER	45'-0" X 12'-0" X 9'-3"
FEED TANK	69" X 84" (DIA X HT)
PMT 1	42" X 54"
PMT 2 & PMT 3	36" X 42"
CLEAR WATER TANK	62" X 63"
INLINE MIXER	26" X 58"
THICKENER	96" X 96"
CENTRIFUGE	L=108" W=67/40" H=48"
HYDROSIEVE	4' X 3' X 5'

Figure 4.

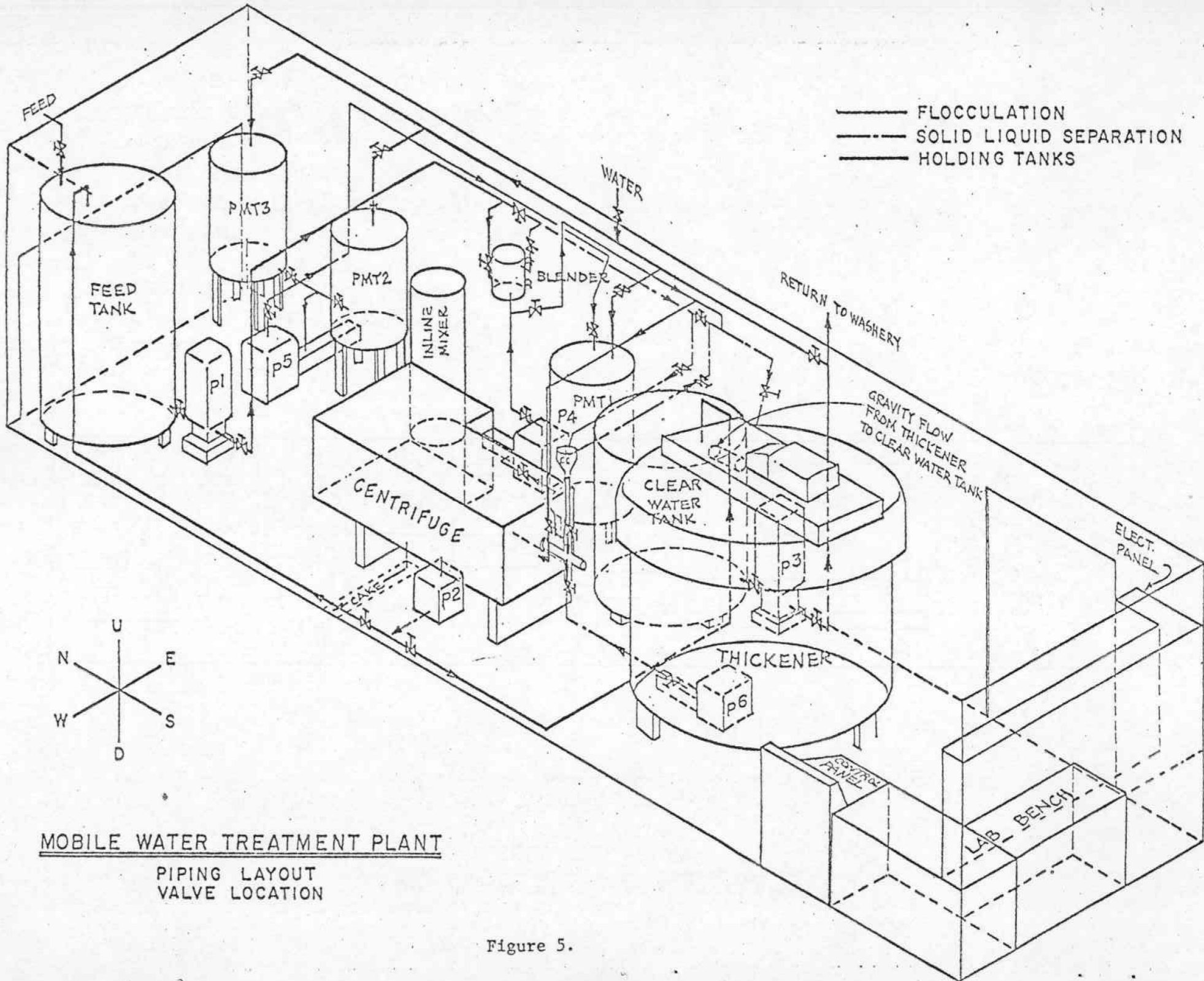
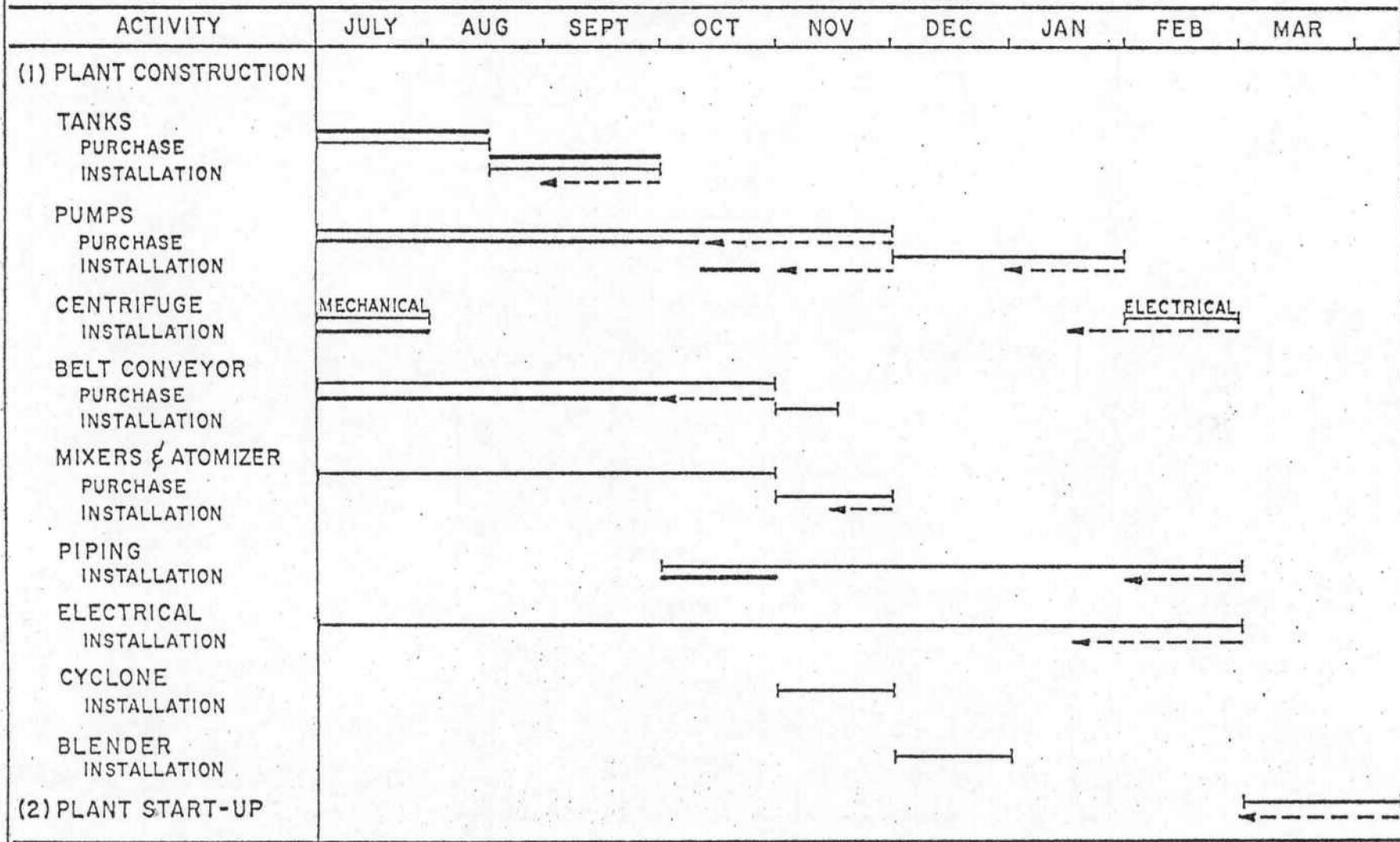


Figure 5.

MOBILE WATER TREATMENT PLANT PROJECT (1979-80)



LEGEND:
 ===== ESTIMATED WORK PERIOD
 ----- EARLIEST WORK PERIOD
 ===== WORK COMPLETED

Figure 6.

STATUS ON MOBILE WATER TREATMENT PROJECT

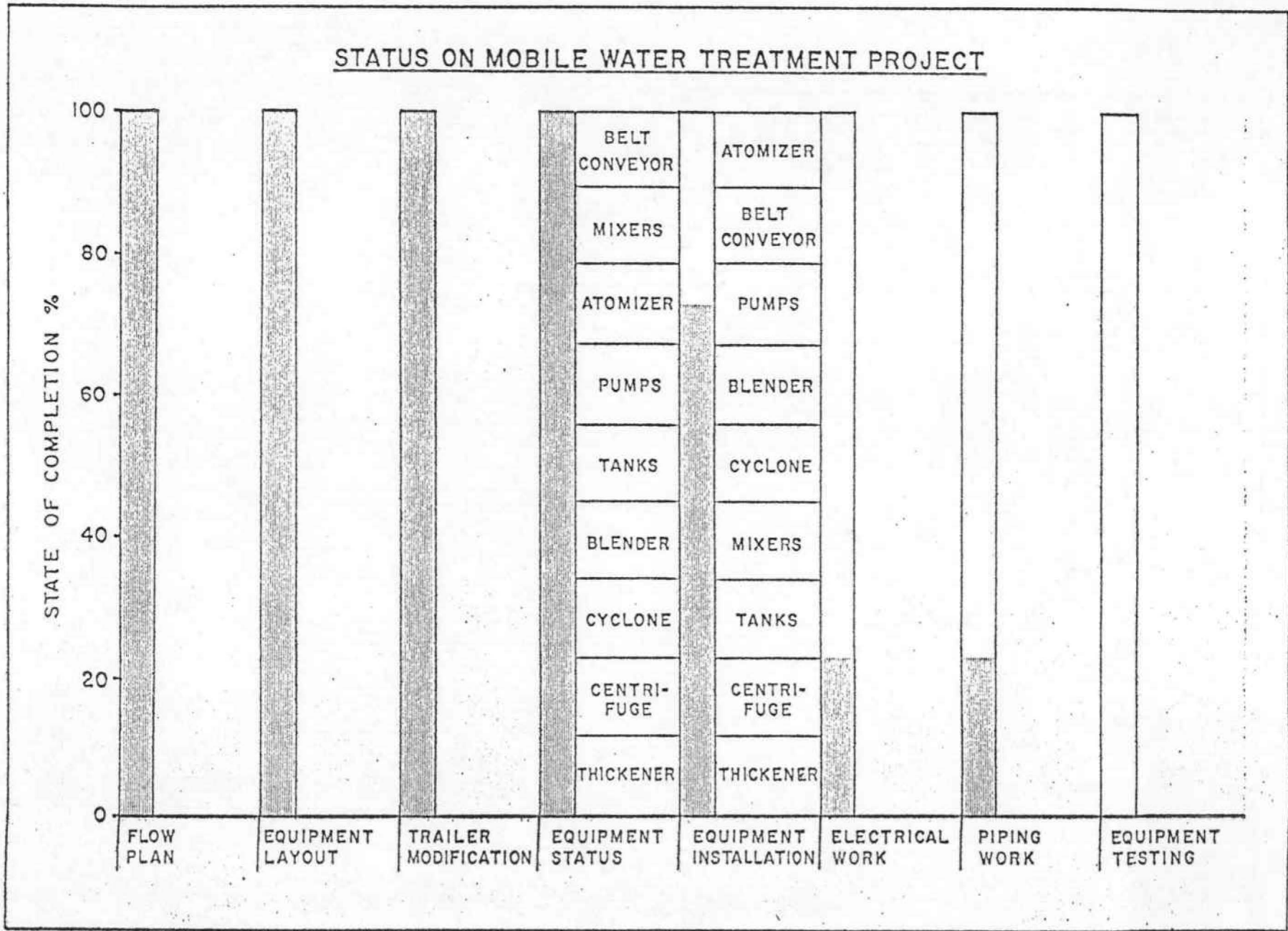


Figure 7.

