

**"47 PROCESS"
OPERATING INSTRUCTIONS
TUCKER PLANT**

I. INTRODUCTION:

The following list of operating instructions are the basic manipulations necessary for making a complete production run including wash cycle, starting with the grinding vessel loaded with solvent washed and drained sand. Instructions for other conditions such as: a new sand load; multiple-pass processing, etc. are covered under Specification IV-C, Special Operating Instructions (page 21 of "47P" Specification booklet). For simplification purposes, each valve is numbered on the attached schematic piping diagram. Plug cocks will either be in the open or closed position whereas 3-way valves may have one of four positions. These various positions are illustrated in the attached sketch on valve designations and each valve should be properly painted to indicate direction of flow.

II. NORMAL OPERATING INSTRUCTIONS:

Following completion of the premix cycle, (assuming we are making in Tank A) the batch is ready for processing through the unit and the following step-wise procedure should be carried out:

1. Check all valves to be sure that they are set properly before starting any flow of material.
 - a.) The flush bottom valve, the CO₂ valve, and drain valve of each premix tank should be closed.
 - b.) 3-way valve #1 should be set so as to allow material to flow from premix Tank A to the feed pump.
 - c.) Feed valve #2 is closed.
 - d.) 3-way valve #3 is set so that material will flow from the hopper to the take-away pump.
 - e.) 3-way valve #4 should be set to recirculate back to the premix tanks.
 - f.) 3-way valve #5 is set so as to recycle to Tank A.
 - g.) 3-way valve #6 is set to go either to the transfer station or drums as desired.
 - h.) By-pass valve #7 is closed.
2. Turn cooling water valve to wide open position.
3. Turn agitator drive off and on to make sure it is free before pumping premix into the unit.

4. Open flush bottom valve A, valve #2 and while observing the level through use of a flash light and observation mirror, start pumps, setting vari-drive speed control at mid-range position. After a short time interval (15 seconds or so) the sand level should begin to rise in the unit.
5. Turn agitator drive on and continue to watch level rise. As material begins to discharge through the screen, close the observation port until the level is above the top disc so as to prevent sand particles from being batted out. If any sizable amount of residual solvent is coming through the discharge screen it may be necessary to run this solvent through the drum filling spout into a 5 gallon pail to prevent contaminating the batch.
6. Adjust vari-drive speed control to position determined by previous batches or if this information is not available to a setting that will give a sand-base level approximately 3 to 4 inches from the top of the unit.
7. Observe inside premix tank to make sure discharge material is recirculating.
8. While the unit comes up to temperature, and reaches the equilibrium condition desired, necessary piping connections at the transfer station to permit pumping to the proper let-down tank can be made.
9. After approximately 10 minutes of recirculating (depending upon the rate of flow through the unit) a sample can be checked for fineness. When this sample is taken, the temperature of the exit stream, the liquid level in inches from the top of the unit and the rate in gallons per hour should also be noted. This check will determine whether material passing through the unit is OK to transfer to the finished product let-down tank. Depending on whether the material is above or below the required fineness specification, a rate adjustment should be made, turning the vari-drive speed control either down or up.
10. As soon as OK material is obtained, change position of 3-way valve #1 so that material will go to the transfer station and grind batch to let-down tank. A visual check should be made to be sure that the mill base is being ground to the proper tank.
11. Generally, the unit should continue operating without further attention, however, periodic observations to check quantity of flow, condition of discharge and hopper screens, temperature of the exit stream, level of sand-base mixture and the level in the premix tank should be made. At this time the premix agitator should be turned over a few revolutions to prevent any possible settling. Knowing the

throughput rates in gallons per hour the time length of running the batch can be estimated so that the operator need not spend considerable time checking the level on the premix tank. He should also prepare in advance for his method of cleaning the unit which is covered in the next section.

III. CLEAN UP OPERATION

The clean up operation will vary considerably depending on the type and source of cleaning solvent and the condition in which the "47P" unit is to be left:

A. Cleaning With Wash Solvent:

1. Towards the end of the batch, the wash solvent supply lines should be hooked up in the transfer station so as to pump into Tank A and the flowmeter set for the appropriate lbs. of solvent to be used (1200 lbs. currently used for a 500 gallon tank).
2. Just as the last bit of premix is drained, solvent should be pumped to the premix tank and the agitator turned on.
3. As the sand-base level in the top of the unit drops, several quarts of solvent from the batch should be added through the observation port to aid in cleaning the screen from the inside (safety goggles should be worn at this time and the fume guards should be in place).
4. The discharge screen should be observed for a marked change in viscosity indicating that wash solvent has pushed all the remaining base out of the unit. At this time, the hopper valve #3 should be placed in the blanked off position and the agitator drive shut off allowing the pumps to continue running.
5. Close the flush bottom valve to Tank A to starve solvent feed to the vessel.
6. Close feed valve #2.
7. The agitator in the premix tank can be started to aid in washing down the tank walls and the agitator blades but it is necessary to shut down whenever attempting to pump solvent from the premix tank because of the extreme vortexing which develops.
8. Open the CO₂ valve #6 slowly bleeding CO₂ purge into the line to force all the remaining mill-base to the finished product tank. Observation in the appropriate finished product tank should indicate when the line has finished purging (1 or 2 minutes).

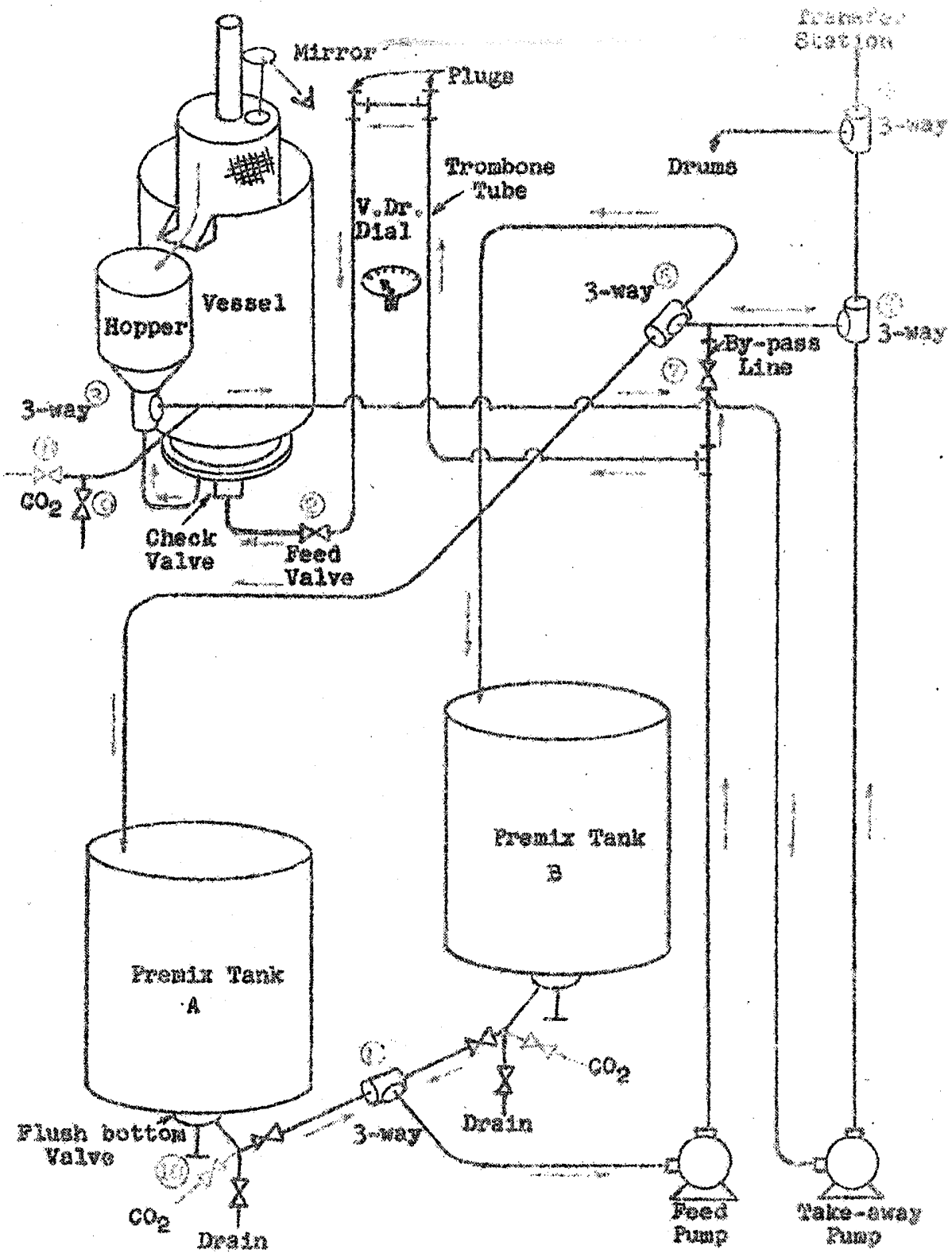
9. Close CO₂ valve #3 and bleed remaining pressure, if any, into small can through use of bleed valve #9.
10. Change valve #4 so as to recirculate and reset valve #3 so as to once again drain material from the hopper to the take-away line.
11. Open feed valve #2, flush bottom valve A, start agitator drive and turn vari-drive to highest rate.
12. While solvent is recirculating, change connections at transfer station to permit wash solvent to go to recovery system and start wash solvent pump on 1st floor.
13. Reset valve #4 to transfer line position.
14. While wash solvent is running through the vessel, brush down discharge screen and spillway as necessary.
15. Forward wash through the unit for approximately 10 minutes to thoroughly clean sand charge.
16. Since it is not necessary to pump the entire wash solvent load through the vessel, blank valve #5, open valve #1, set valve #4 for by-passing and close valve #2 to permit by-pass direct to transfer station.
17. Shut down agitator drive.
18. When premix Tank A is empty, CO₂ blow (valve #10) from the bottom of the tank by closing flush bottom valve A.
19. Close valve #7, change valve #4 to transfer line position, change valve #3 to the drain position and drain solvent from vessel (approx. 3 minutes).
20. Blank valve #3 and blow take-away line to solvent recovery system.
21. Turn off pumps and unit is secure.
22. Finish clean-up by removing hopper basket, spillway extension and discharge screens for solvent soaking as necessary.

B. Cleaning With Let-Down Solvent:

Essentially the same procedure as applies for "A. - Cleaning with Wash Solvent", applies to the cleaning operation with let-down solvent. The main difference being: (1) the amount of solvent used; (2) no CO₂ purge (as in step 8 above) is needed before the wash cycle begins; (3) the transfer line hook-up need not be changed (as in step 12 above); (4) and the necessity for a thorough drain of the unit and lines to get a good yield.

C. Procedure for Leaving the Unit Full of Mill-base:

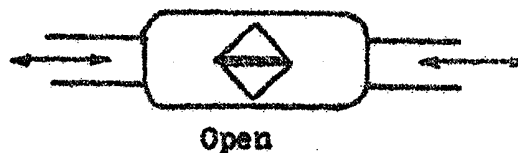
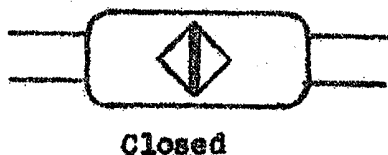
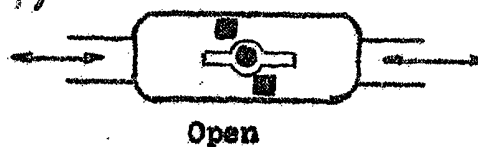
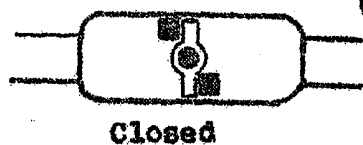
1. Toward the end of the batch have a solvent supply (either wash or let-down solvent) ready to add to the premix tank. Also have a small quantity of solvent from the batch (approximately 1 gallon) on hand for cleaning the screens.
2. As the premix tank is drained, close the flush bottom valve.
3. Add solvent to the premix tank and start agitator.
4. As the level in the top of the unit drops, close valve #2 and add a small amount of batch solvent through the observation port.
5. Use a brush and wash the screens while the level continues to fall, adding additional solvent in the top as necessary.
6. When the liquid level is down to a low enough point so that shut down of the agitator will drop the level below the screen (3 or 4 inches), turn the agitator off.
7. Continue to brush the discharge screen and spillway allowing this small amount of solvent to be pumped to the let-down tank.
8. After the hopper has drained, blank off valve #3 and CO₂ purge (valve #8) the transfer line to the let-down tank. Then release pressure valve #9, reposition valve #3 and shut off pump.
9. Make transfer station hook-up to wash solvent recovery system if wash solvent has been used in cleaning the premix tank. If let-down solvent is being used, no change is necessary.
10. Change valve #5 to blanked off position, open valve #7 and set valve #4 for by-passing.
11. Open flush bottom valve "A", turn pumps on and set variable drive dial setting to highest position.
12. Turn off premix agitator, but periodically spin to aid in tank wall and agitator clean down.
13. When all the solvent has been pumped from the premix tank, close flush bottom valve "A" and purge lines with CO₂ blow (valve #10).
14. Turn off pumps and unit is secure.
15. Finish clean-up by removing hopper basket, spillway extension and discharge screens for solvent soaking as necessary.



"47 PROCESS"
SCHEMATIC PIPING DIAGRAM

Tucker Plant
December 4, 1956
By: J. Nikolich

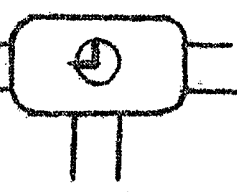
PLUG COCKS
(Valves 2 & 7)



3-WAY 2-PORT VALVES
(Valves 1; 3; 5; & 6)

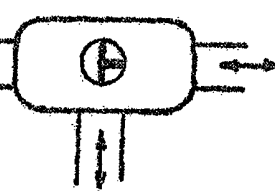
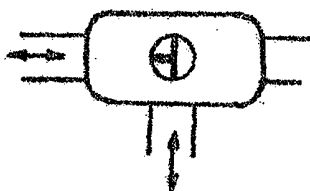


Blanked Off



Blanked Off

3-WAY 3-PORT VALVE
(Valve 4)



VALVE DESIGNATIONS