M E M O R A N D U M

DATE: July 13, 1989

TO: Vanport Township Municipal Authority

FROM: Dennis E. Graham

SUBJECT: VANPORT TOWNSHIP
TCE REMOVAL SYSTEM
PROPOSAL PREPARED BY JORDAN, JONES & GOULDING, INC.

I have reviewed the drawing and equipment data submitted by Westinghouse and Jordan, Jones & Goulding, Inc. at the Board's meeting of July 10, 1989. I offer the following comments for your consideration:

PROCESS & INSTRUMENTATION DIAGRAM

1. The diagram shows six (6) existing well pumps in service. It should be noted that the pump in Well House No. 3 has been removed from service.

2. I suggest that a connection from the well pumps' force main directly to the clearwell be provided in the event both air stripping towers are out of service or are no longer required.

3. The pressure reducing valve has been eliminated from the well pumps' force main. In accordance with Westinghouse Corporation's letter of June 26, 1989, Westinghouse will destage the well field pumps using the existing motors and controls at the well field.

4. The height of packing required by each air stripping tower to treat the future demand of 3.5 MGD at a TCE influent concentration of 1000 PPB should be confirmed. Structural design of the towers and their foundations should account for this additional loading. The shell of each tower should be flanged to permit packing addition for increased performance. The influent piping of each tower should be arranged to permit its extension with increased tower height.

5. The two tower system has been promoted as being capable of providing an uninterrupted supply of water based on the fact that only one tower is required to meet current demand and TCE contamination levels. However, this evaluation has been based on an average daily production of 1.4 MGD. The treatment capacity of the tower should be evaluated at an average rate of 1.7 MGD, which represents two well pumps in service. The TCE removal capability of one tower at 1.7 MGD represents the limitations of the proposed system to provide an "uninterrupted" supply of water.

6. The size of the suction line for the tower transfer pumps has been increased from 12" to 16" diameter. While the 16" size line appears suitable for the future demand of 3.5 MGD, it is not possible to evaluate its suitability without knowledge of the water level elevation in the sump of Tower No. 1. The Hydrualic grade line between the sump of Tower No. 1 and the tower transfer pumps' suction connections must not drop below the elevation of the top of the pumps' 16" suction line.

7. The removal of the silencer from the tower fans filter intake should be questioned.

8. I suggest that a provision be made to permit the diversion of the effluent from each tower to a blowdown storage tank in the event acid cleaning of the packing is required. The system layout should anticipate the potential installation of the required piping, valves and fittings, and the potential installation of the storage tank.

SITE & PIPING PLAN

1. The laying length of the valves and fittings in "Detail 2" may require the removal and replacement of the manhole which provides access to the connection of the chlorine diffuser to the force main.

2. The cross connection of the well pumps' force main to the distribution system between Pump House Nos. 2 and 3 should be removed.

3. I question the capability to extend a gravity plumbing drain from the Fan/Tower Transfer Pump Building to the gravity sewer on the north side of the Authority's office. I have assumed that the invert of the gravity sewer at the point of connection of the building drain is elevation 752. The minimum slope of a 4" diameter pipe (for 2 ft. sec. velocity) is 1.2 ft/100 ft. Based on this slope, I estimate that the invert of the plumbing drain at the face of the Fan/Tower Transfer Pump Building is elevation 753.69. Assuming ground level elevation of 755, the ground cover over top of the pipe is 0.98 feet, which is insufficient for protection against freezing and frost damage.

4. The gravel driveway should be replaced with bituminous concrete pavement to be comparable to the Authority's proposed facilities. In addition, I suggest that a driveway be provided to access the clearwell pumps and that a walkway be extended to the door of the Clearwell Building.

5. I question the capability to connect the 20" diameter clearwell overflow to the 15" diameter storm drain at the location shown on drawing. The 15" diameter storm drain is too shallow within the limits of the well field fence. A copy of the Michael Baker Jr, Inc. drawing showing the profile of the storm drain is attached for Mr. T. Miller's reference.

PRELIMINARY SYSTEM LAYOUT

1. The door sizes of the Fan/Tower Transfer Pump Building should be adequate to permit the removal of the enclosed equipment.

2. Fire extinguishers should be provided in the Fan/Tower Transfer Pump Building and the Clearwell Building.

3. Roof scuttles should be provided at the Clearwell Building for installation and removal of the high service pumps.

4. The operating nut for each gate valve in the "Valve Box" should be extended to a floor box in the concrete slab which covers the box. This will eliminate the need to enter the box to operate the valves.

5. Aluminum floor doors should be furnished with all stainless steel hardware throughout, including all parts of the latch and lifting mechanisms, hold open arms and guides, hinges, etc.

6. Clearwell

   A. The bottom of the clearwell tank should be sloped to a sump beneath the aluminum floor door, to facilitate dewatering and cleaning the tank.

   B. The baffle wall at the tank's inlet should be provided with bottom outlets to allow drainage of the area behind the wall and to prevent the wall from acting as an overflow weir during low water level elevations in the clearwell.

   C. A floor door is needed to provide access to the area between the inlet pipe and baffle wall.

D. The pump suction bells are located some distance from the rear wall (East Wall) of the Clearwell. Therefore, to prevent flow past the suction bell, a false backwall may be necessary closer to the pump suction.

7. High Service Pumps

A. I suggest the use of lateral fittings in lieu of the 12x12x10 tees on the pumps' discharge header.

B. The manufacturer's quotation for the high service pumps indicates a type "FDH" discharge head. The catalog cut for the pumps indicates a type "BCL" discharge head. This discrepancy should be clarified.

C. The Start/Stop water level elevations for the lead and lag pumps should be indicated. The volume of water between start and stop elevations for each pump should be sufficient to prevent excessive cycling.

8. Tower Transfer Pumps

A. The reducer at the suction connection of each pump hould be of the eccentric type.

B. I suggest the use of lateral fittings in lieu of the 16x16x10 tees in the suction header piping. In addition, it is my opinion that the size reduction to 10" on the branch is too small and should not be less than 12".

C. I suggest the use of flexible coupled pumps with separate pump bearing frames in lieu of the close coupled pumps proposed. In a close coupled pump, the impeller is hung directly on an extension of the motor shaft and is supported by the motor shaft bearings.

D. I suggest the use of lateral fittings in lieu of the 12x12x10 tees in the discharge header piping.

E. The minimum water level elevation in the sump of Tower No. 1 and the centerline elevation of the pump casing should be confirmed in order that the hydraulics of the pumps suction piping may be evaluated.

F. In accordance with the data attached to the Preliminary Engineering Report, two tower transfer pumps operating in parallel are capable of a combined output of 2200 GPM (3.17 MGD). I suggest that the pump impellers and motors be selected to achieve a combined output of 2430 GPM (3.5 MGD), which will meet the future demand capacity requirement.

9. Tower Fans

   A. I question the deletion of the silencer from the inlet filter.

   B. Size of the inlet filter should be confirmed. Servicing requirements for the inlet filter should be confirmed.

   C. Brake horsepower requirements for the fans under winter temperature conditions should be confirmed.

10. Tower No. 2

    The invert elevation of the 20" effluent connection must exceed the crown elevation of the 16" equalization line connection to effect recycle to Tower No. 1.

11. A slop sink or mop basin with hot and cold water supply should be provided in the Fan/Tower Transfer Pump Building.

12. Permitting

    It should be noted that the Fan/Tower Transfer Pump Building and the Clearwell Building may be subject to Pennsylvania Department of Labor and Industry fire and panic regulations and permitting requirements.

DEG:dy/0294G

cc: Thomas N. Miller - Jordan, Jones & Goulding, Inc.
Edward M. Walker - Westinghouse