50-387
388

PP&L Pennsylvania Power & Light Company
Two North Ninth Street • Allentown, PA 18101 • 215 / 770-5151

January 27, 1986

Mr. James P. LaBuz
Sanitary Engineer
Bureau of Community Environmental Control
Pennsylvania Department of Environmental Resources
90 East Union Street, Second Floor
Wilkes-Barre, PA 18701-3296

SUSQUEHANNA STEAM ELECTRIC STATION
DRINKING WATER PERMIT APPLICATION PWS 4085504 -
RESPONSE TO PA. DER COMMENTS
CCN 741326 FILE 012-3
PLE- 7980

Dear Mr. LaBuz:

This letter is in response to your preliminary comments on the Susquehanna SES drinking water permit application for surface source, EPA ID number 2400998. In your letter dated December 20, 1985, (Attachment 1) you indicated that there were eleven (11) items which needed further clarification. We will address each item individually as follows:

1. Enclosed please find a coversheet for each set of drawings reviewed by the Professional Engineer (PE). The coversheet is signed and sealed by the PE and binders are provided to attach each set of drawings together.

   Enclosed are two bound copies of the specifications. The fly leaf of each specification has been signed and sealed by the reviewing PE. These bound specifications will replace the unbound copies originally submitted with the permit application.

2. Enclosed please find two (2) clear copies of sheet T-21257-B entitled "Internal Assembly Reactivator with Clearwell."

3. Drawing numbers 18149-D and 18543-C enclosed with this letter are the most detailed drawings we have of the gravity filters. This is proprietary information and Ecodyne Corporation, Graver Water Division did not supply us with more detailed prints. The following narration and attached sketches should provide much of the information required.

   The Raw Water Treatment Subsystem is designed to treat river water to a quality suitable for plant usage within the normal range of raw river water quality barring extreme conditions.

IE25
1/1

8602050153 860127
PDR ADOCK 05000387
P PDR

Two mono-valve gravity filters are used to filter the clarified water leaving the reactivator before it enters the clearwell storage area. Each filter unit is a cylindrical carbon steel vessel, approximately ten feet in diameter and houses a backwash storage compartment, filter section, and strainers as shown in Attachment 2.

Each filter consists of a bed of anthracite, 18" deep, on top of a 6" deep bed of sand. Currently it would be very difficult to add an additional 3" of anthracite filter media. In the past these filters have consistently produced water of acceptable turbidity. Below are listed a number of parameters describing the filters.

Mono-valve Gravity Filters

- o Number — 2
- o Height — 15'9"
- o Diameter — 10'0"
- o Filter Bed Material — Anthracite
- o Filter Bed Volume — 118 ft^3
- o Filter Bed Depth — 18"
- o Supporting Bed Material — Sand
- o Supporting Bed Depth — 6"
- o Supporting Bed Volume — 40 ft^3
- o Flowrate (Clarified Water) — 300 gpm
- o Flowrate (Backwash) — 943 gpm
- o Backwash Duration — 5 min.
- o Construction Material — Carbon Steel

The gravity filters have been designed to automatically backwash themselves with internally-stored water. After the backwash cycle, the backwash water storage compartment refills and the filter returns to service automatically.

The backwash controls for both gravity filters are identical and consist of an internal timer adjustable from 0-60 hours, a backwash timer adjustable from 0-15 minutes, a manual start pushbutton, a differential pressure switch, and a level switch interlock.

The level switch interlock prevents simultaneous backflushing of both filters. In order for either filter to undergo a backflush cycle, the other filter must have a water level equal to that of its outlet weir, as sensed by a level switch. If at least one filter does not have the proper level, the other filter backwash cycle cannot be initiated by any control method.

The backflush cycle may be initiated by a filter differential pressure of 6.5 psid, the interval timer, or manually with a pushbutton on the control panel. Either the differential pressure switch or interval timer will automatically initiate backflush and energize the backflush timer. When the backflush timer energizes, the filter backflush solenoid valve opens, allowing the filter to backflush itself as shown in Attachment 3.

After the preset time of the backflush timer has elapsed, the backflush solenoid valve closes, the backwash water compartment refills, and filtered water once again passes through the outlet weir. Each filter has a backflush counter on the control panel that registers the number of backwash cycles for the respective filter.

4. Turbidity analysis is performed continuously at three locations in the water treatment system: reactivator inlet, reactivator outlet, and gravity filter outlet. The output of each turbidity sensing device is used for a pen recorder indicator and a high turbidity alarm function on the water treatment control panel located in the water treatment building. These turbidity measurements are used by an operator for process control and to evaluate the performance of the reactivator and gravity filters. A pH meter mounted on the reactivator outlet performs continuous analysis of reactivator outflow. The pH instrument has a high/low alarm set at pH 6 and pH 8 on the treatment plant control panel.

   The piping and instrument drawing for the water treatment system (drawing number E 106222-1), provided as part of the original application package, indicates the location of the turbidity (Tb) and pH (pH) meters on the six-inch inlet and outlet line from the reactivator and on the outlet header from the gravity filters.

5. A. Water for the treatment plant is supplied by the river water makeup pumps. Normal operation is to have three of the four make-up pumps running continuously. During the infrequent occasion when both Unit 1 and Unit 2 are shutdown simultaneously, at least one make-up pump is kept in operation to provide continuous flow of water to several different in-plant systems including the raw water treatment system.

   The flow of raw river water to the reactivator is controlled by a four-inch flow modulating valve operated by a level controller mounted in the clearwell (Spec. M-31 Section 5.2.2). The opening of this valve is limited to prevent exceeding the maximum design flowrate of the reactivator. The level controller in the clearwell opens and closes the modulating valve slowly to prevent sludge carryover.

B. All treatment chemicals are metered in proportion to flow. The reactivator was designed with sufficient capacity to handle normal fluctuations in river water turbidity. Any high turbidity out of the clarifier is annunciated on the treatment system control panel and requires operator attention.

6. There is a variable speed impeller pump which positively mixes raw water, treatment chemicals, and previously-formed precipitates in the draft tube or primary mixing zone and recirculates this mixture through the secondary flocculation zone located beneath the hood suspended in the reactivator. (Attachment 4 and 5). The recirculation system is designed to recirculate three to five times the design output flow. Detention time within this hooded section is approximately 30 minutes at the design maximum flow of 300 GPM.

7. The reactivator is a positive, internal recirculation, upflow unit of the high-rate solids contact type. A cut-away view of the reactivator is shown in Attachment 4. Water to be treated enters the central uptake draft tube where it is mixed with chemicals, previously formed precipitates and recirculated sludge. The recirculating flow path is shown in Attachment 5. The recirculation impeller/agitator mixes the chemicals, water, and precipitates thoroughly while imparting an upward flow in the draft tube. The mixture then passes out of the top of the draft tube into the slow mixing zone where maximum chemical contact is achieved. From this zone, the water and precipitates may re-enter the draft tube at the bottom for further mixing and treatment, or may enter the quiescent separation zone.

8. A sample of finished water from the Service and Administration Building (S&A) has been collected. Results of this analysis are given below.

Chloroform	8.7 ug/L (PPB)
Dichlorobromomethane	1.7 ug/L (PPB)
Dibromochloromethane	None Detected
Bromoform	None Detected
Total Triholomethanes	10.4 ug/L (PPB) or 0.01 Mg/L (PPM)

9. The unit is equipped with a two-inch automatic sludge blowdown line. Upon initiation from the reactivator inlet flow monitor this line is automatically backflushed and opened to allow sludge to flow to the waste treatment facility. A three-inch manual drain is provided in the reactivator which could allow removal of sludge in the event of a blockage in the two-inch center drain. This arrangement is consistent with information given in drawing M-117, Sh. 1 and Section 6.1.1 of the specifications. The two-inch automatic blowdown replaces the flush jet system and manual quick opening center sludge blowdown deleted from Section 6.1.1 of the specifications.

10. The brief descriptive forms for the wells surrounding the Susquehanna SES were submitted to Walter Gilbert of Pa. DER.

11. Presently, there is no physical connection between the wells at the site and the surface water treatment/distribution system. This tie-in was removed at the end of construction activity in 1983. A modification has been proposed to install permanent piping which would tie-in well water to the surface water system. PP&L will complete the appropriate well application modules before such a modification is undertaken.

If you have any questions or comments on the information submitted in this letter or on our drinking water applications please contact Curt Saxton at (215) 770-7891 or me at (215) 770-7889.

Respectfully Submitted,

Jerome S. Fields
Senior Environmental Scientist-Nuclear

Review by

Douglas H. Gordon, F&M Associates, Inc.
1132 Hamilton St., Allentown, PA 18101

Seal

JSF/sml

chsmea004516a

Attachments

cc: Ms. E. Adensam NRC

RECEIVED
JAN 06 1986
NUCLEAR DEPT

PENNSYLVANIA DER

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Community Environmental Control
90 East Union Street - 2nd Floor
Wilkes-Barre, Pennsylvania 18701 (717) 826-2525

December 20, 1985

P. P. & L.
c/o Mr. Jerome S. Fields
Senior Environmental Scientist - Nuclear
Two North 9th Street
Allentown, PA 18101

RE: Public Water Supply 4085504
Susquehanna Stream Electric Station
P. P. & L.
Salem Township, Luzerne County

Dear Mr. Fields,

The permit application is in the process of review and the following items require additional clarification or information:

1. The plans and specifications shall be prepared by or under the supervision of a professional engineer registered to practice in Pennsylvania. The plans must either be bound and the front cover or flyleaf signed and sealed by the P.E. taking responsibility for the design or else each plan sheet submitted for consideration must be signed and sealed by the professional engineer.

2. Please provide two legible copies of sheet T-21257-B entitled "Internal Assembly Reactivator with Clearwell".

3. Please provide a detail sheet of the gravity filters. The drawings should show at a minimum the location of underdrains and the supporting gravel bed depicting appropriate layers and depth. It should also show the depth of sand and anthracite in the filters. The wash water troughs, auxiliary surface wash, rate of flow controllers and all meters, valves, head loss gauge and sample taps should be shown on this filter detail. Our design manual recommends 21 inches of anthracite. Is it possible to add the additional 3 inches or would it be washed away during the backwash cycle?

4. Indicate the location of all turbidity and pH meters. Raw water turbidity and pH meters should be provided so that adjustments in pretreatment chemicals can be made. Turbidity meters should be provided after each filter. You should consider a turbidity meter on the influent to the filters from the clarifier reactivator. A pH meter after the clarifier reactor would be desirable as it would directly measure the effectiveness of the pre-treatment chemical feed.

5. Two major concerns with solids contact clarifiers are their instability during rapid flow changes and turbidity fluctuations:

   a. The flow sheet indicates that water to the treatment plant is water that comes from what is referred to as "makeup pumps discharge". Provide documentation that the flow rate is relatively constant and will not cause the sludge blanket to rise out of the settling zone onto the overflow weirs and then onto the filters. In addition, there are frequent occasions where Unit 1, Unit 2 or both are shut down for repairs or refueling. During these occasions where there is no demand for cooling water, I assume the river intake pumps shut down. How is water then supplied to the raw water treatment system?

   b. I assume the raw water turbidity flucuates significantly. A raw water turbidity meter could be integrated with the chem feed pumps to provide adequate feed of pre-treatment chemicals when the turbidity rapidly increases.

6. Is the detention time in the mixing and flocculation zone greater than 30 minutes? This excludes the detention time in the coagulation zone.

7. I was unable to determine how the sludge was recirculated in the solids contact clarifier from Drawing M-117 SH 1. Perhaps it will be obvious when you provide Drawing T-21257B. If not, please provide an explaination.

8. Please sample for THM's in the finished water from a potable tap supplied by this filtration plant (Administration Building or Radwaste Building).

9. Our manual requires that the sludge pipe in the bottom of the clarifier be not less than 3 inches in order to facilitate cleaning. The specifications indicate in Section 6.1.11 that the drain will be 3 inches. The plan sheet and modules, on the other hand, indicate that the drain is 2 inches. In the modules, you indicate that a manual drain, 3 inches in diameter, is provided in case the automatic 2 inch line plugs up. Yet 6.1.1 of the specifications shows that the manual quick opening center sludge blowdown has been deleted. Please clarify.

10. To date, I have not received the short descriptive form for the wells that was to be submitted under separate cover.

11. I have not yet decided how to handle the wells at this facility. If their intermixing with the piping system from the domestic water storage tank is a rare event, i.e. once per year we can issue "emergency permits" when the well is needed. If it must be used more frequently, it must be considered as a permitted supply. This would necessitate a 48 hour pump test, detailed sampling and a permit application. Since I have to permit the surface water supply, I must similiarly permit the wells to meet our same construction standards. In this case, submittal of a BDF would not be adequate. If however, the well would only service a small number of isolated buildings not interconnected with water from the domestic water storage tank, a BDF is adequate.

My present concern is the cross connection that exists between the well system and the domestic water system which is being permitted by this application. Sheet M 117 SH2 shows the interconnection after the chlorine contact tank. There must be a physical disconnect between both sources with a connection only being allowed by "emergency permit", or the well source must be permitted.

Please respond to the above items as soon as possible so that processing of the permit application may continue. At some point it will be necessary to physically inspect the water treatment plant before the permit can be issued. In addition, we would want to collect finished water samples to submit to our lab. If you have any questions on the above, do not hesitate to contact me.

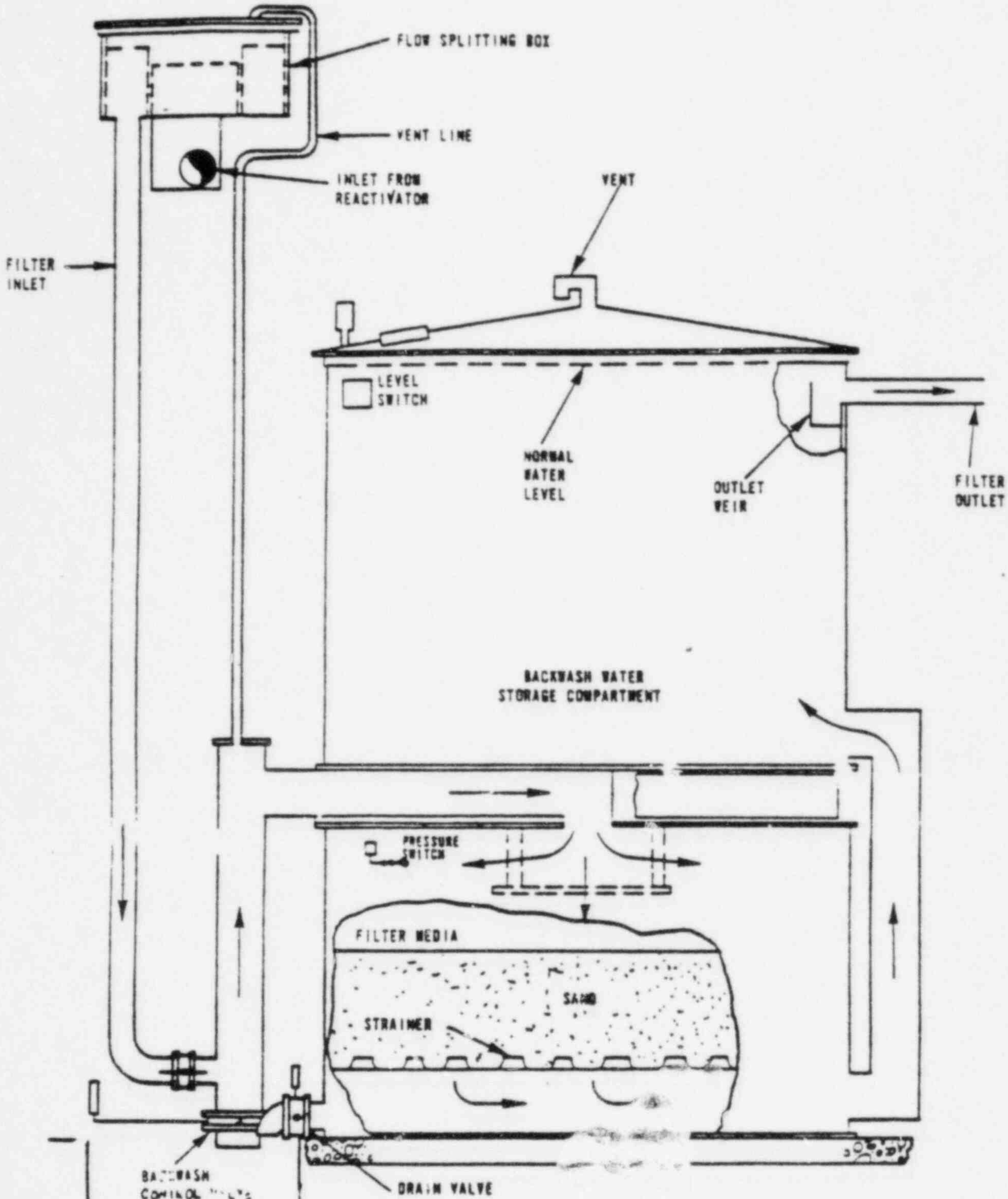
Very truly yours,

James P. Labuz

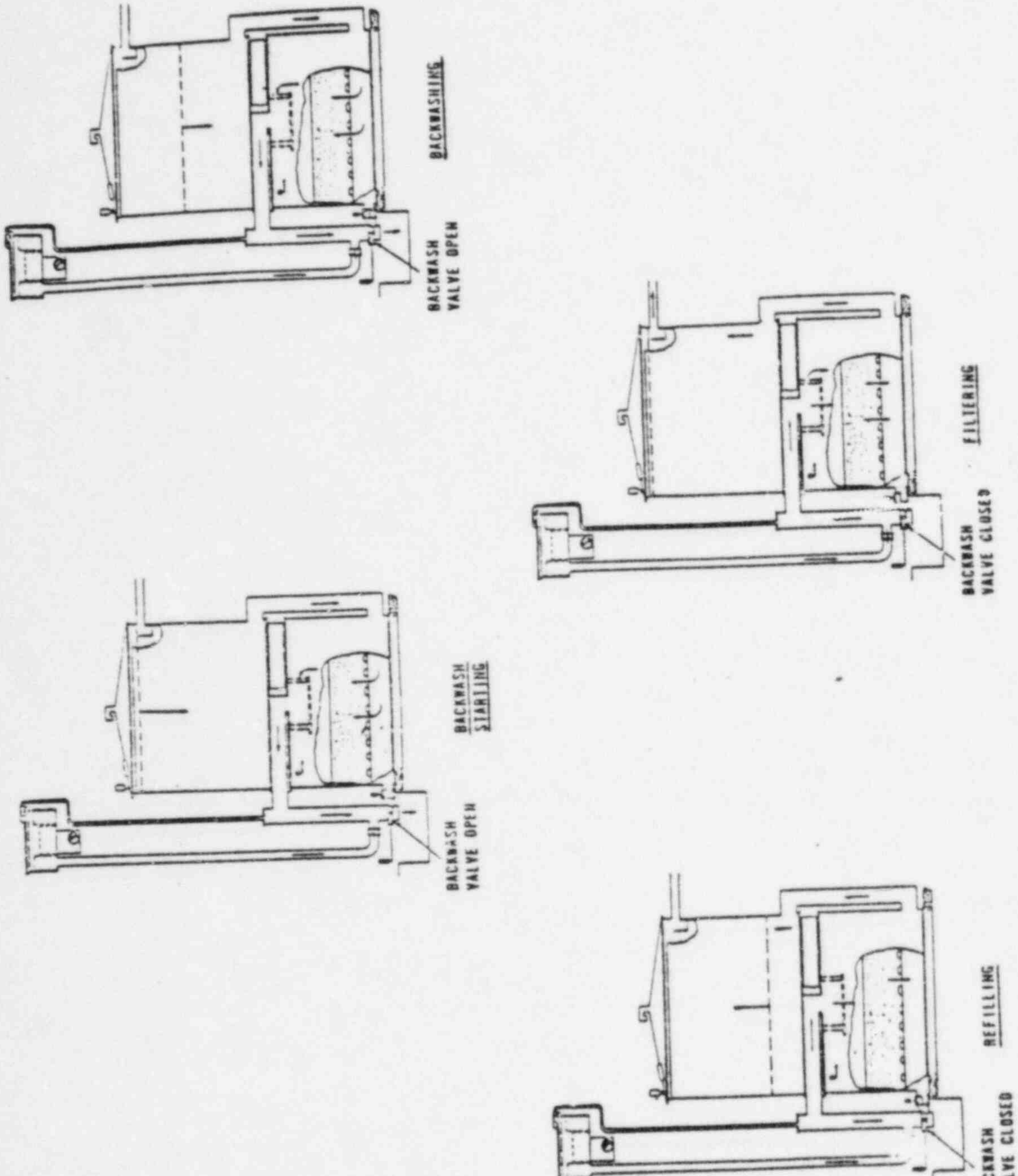
JAMES P. LABUZ
Sanitary Engineer

JPL:kab

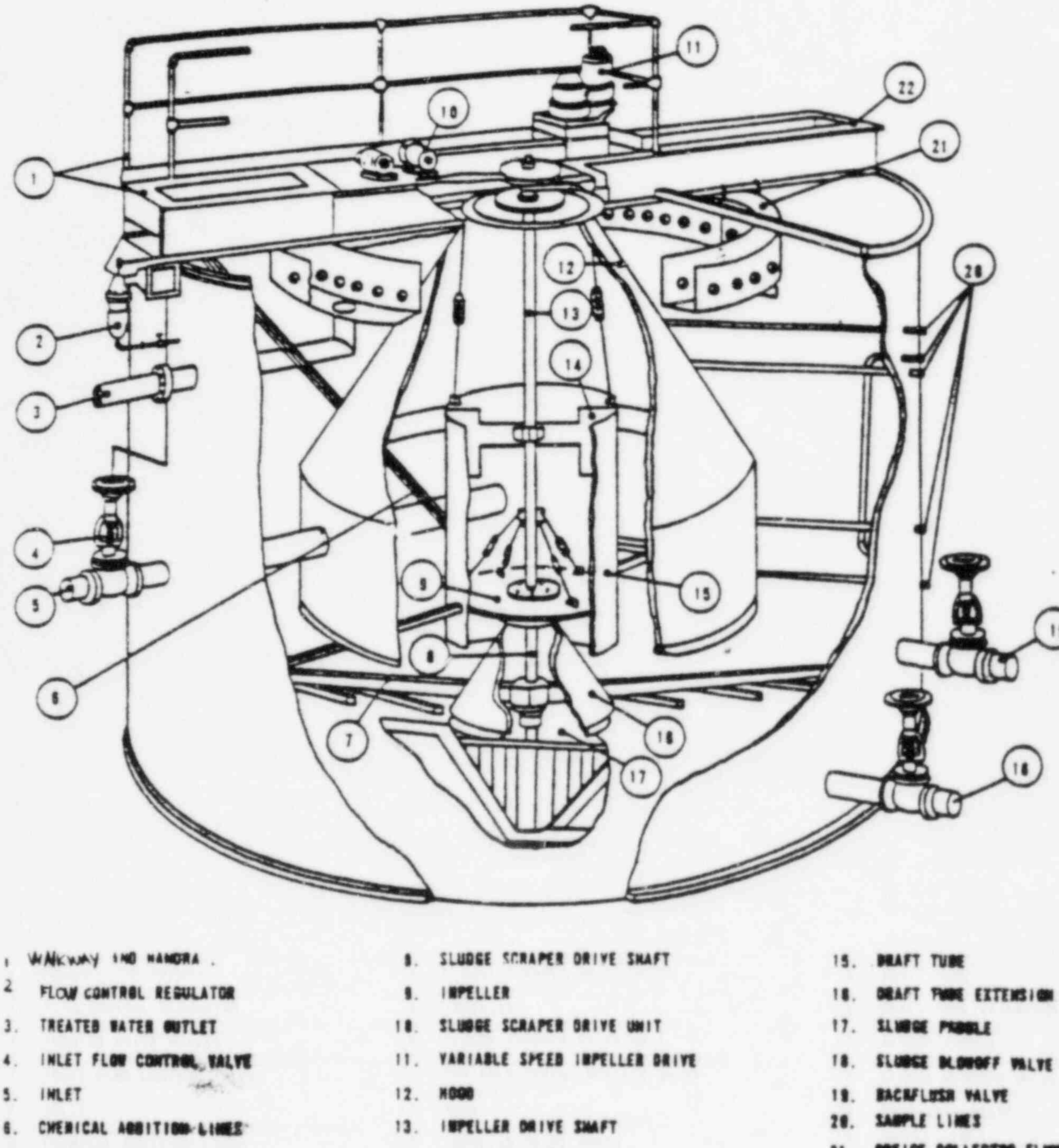
cc: File
Chron.
W. Gilbert
F. & M. Associates
Regional Sanitarian Manager



GRAVITY FILTER

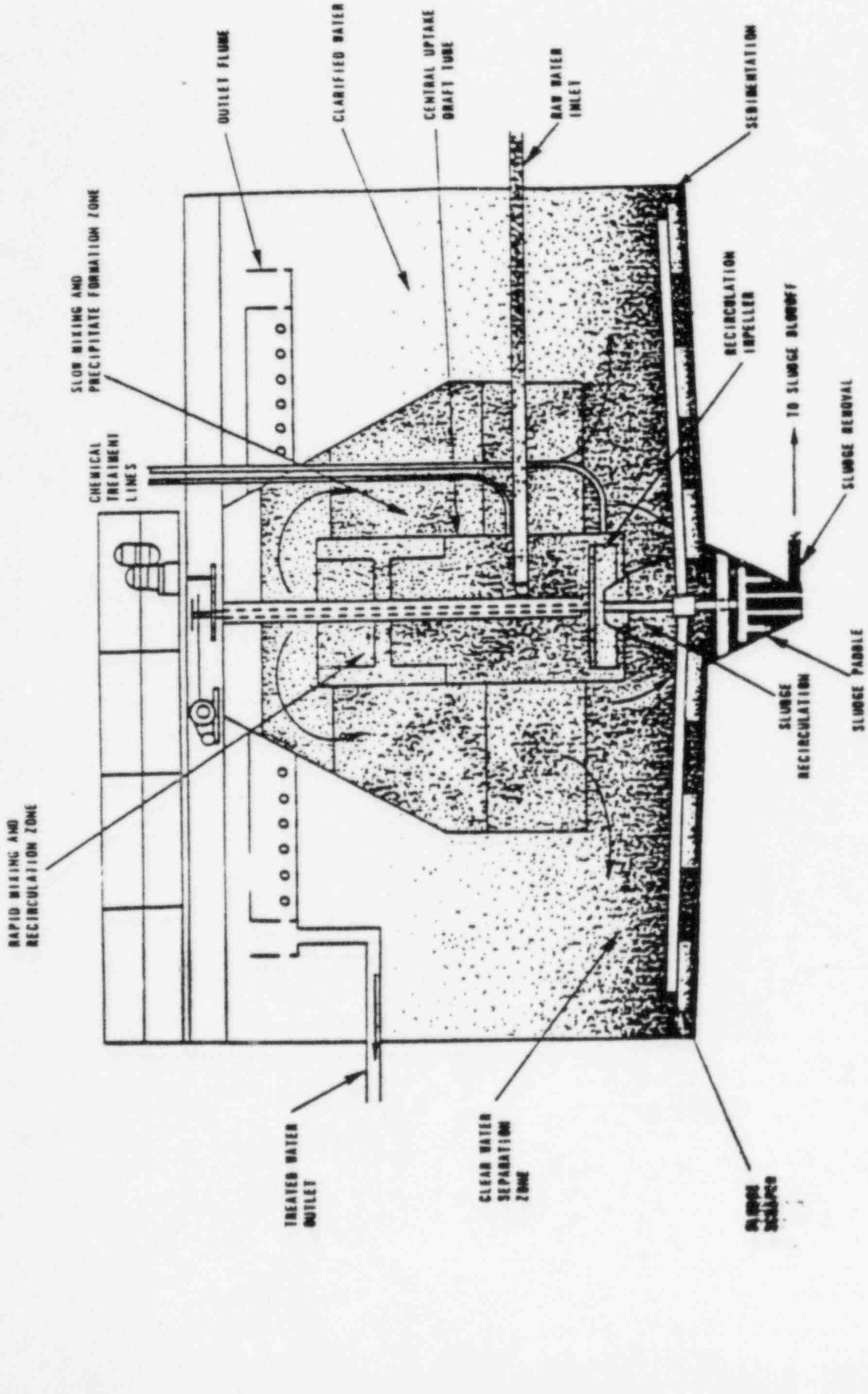


FILTER BACKWASH CYCLE



1. WALKWAY AND HANDRA .
2. FLOW CONTROL REGULATOR
3. TREATED WATER OUTLET
4. INLET FLOW CONTROL VALVE
5. INLET
6. CHEMICAL ADDITION LINES
7. SLUDGE SCRAPER
8. SLUDGE SCRAPER DRIVE SHAFT
9. IMPELLER
10. SLUDGE SCRAPER DRIVE UNIT
11. VARIABLE SPEED IMPELLER DRIVE
12. HOOD
13. IMPELLER DRIVE SHAFT
14. VORTEX BREAKERS
15. DRAFT TUBE
16. DRAFT TUBE EXTENSION
17. SLUDGE PADDLE
18. SLUDGE BLOWOFF VALVE
19. BACKFLUSH VALVE
20. SAMPLE LINES
21. ORFICE COLLECTOR FLUME
22. SUPPORT BRIDGE

SIMPLIFIED DIAGRAM OF REACTIVATOR



SIMPLIFIED DIAGRAM OF REACTIVATOR OPERATION