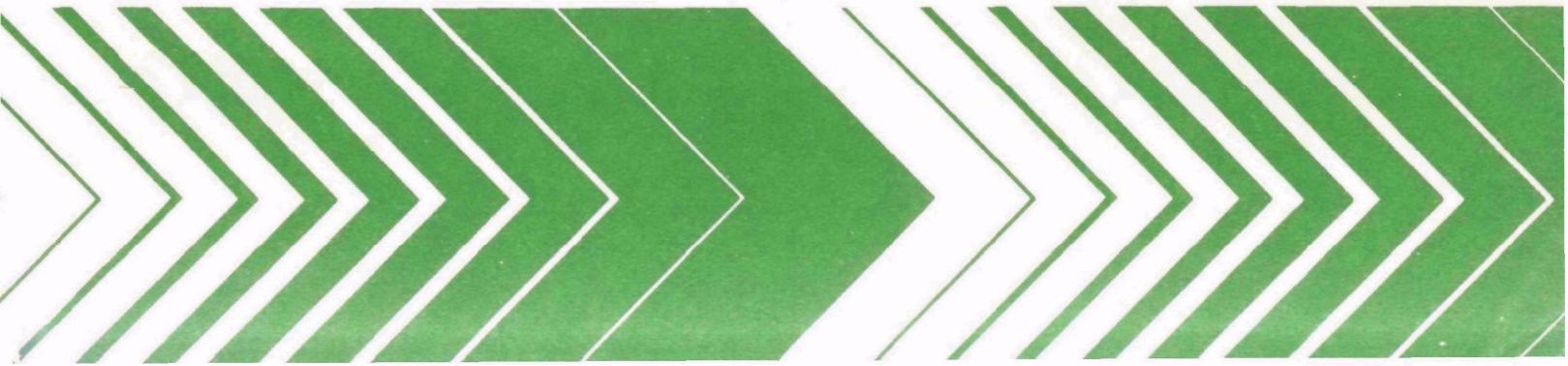


Research and Development



Seattle Tolt Water Supply Mixed Asbestiform Removal Study

Appendices B and C



RESEARCH REPORTING SERIES

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EPA-600/2-79-153
December 1979

SEATTLE TOLT WATER SUPPLY
MIXED ASBESTIFORM REMOVAL STUDY

Appendices B and C

by

Gregory J. Kirmeyer
Water Quality Division
Seattle Water Department
Seattle, Washington 98144

Grant No. 804422

Project Officer

Gary S. Logsdon
Drinking Water Research Division
Municipal Environmental Research Laboratory
Cincinnati, Ohio 45268

MUNICIPAL ENVIRONMENTAL RESEARCH LABORATORY
OFFICE OF RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY
CINCINNATI, OHIO 45268

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FOREWORD

The Environmental Protection Agency was created because of increasing public and government concern about the dangers of pollution to the health and welfare of the American people. Noxious air, foul water, and spoiled land are tragic testimony to the deterioration of our natural environment. The complexity of that environment and the interplay between its components require a concentrated and integrated attack on the problem.

Research and development is that necessary first step in problem solution and it involves defining the problem, measuring its impact, and searching for solutions. The Municipal Environmental Research Laboratory develops new and improved technology and systems for the prevention, treatment, and management of wastewater and solid and hazardous waste pollutant discharges from municipal and community sources, for the preservation and treatment of public drinking water supplies, and to minimize the adverse economic, social, health, and aesthetic effects of pollution. This publication is one of the products of that research; a most vital communications link between the researcher and the user community.

This report presents the results obtained and conclusions drawn from pilot plant filtration research on the removal of naturally occurring asbestosiform fibers from a protected mountain water source. Appendix B contains photographs of equipment; data on operating conditions, water quality, fiber counting, and filter media; information on treatment of turbid water; results of sludge generation studies; and detailed documentation of cost estimating information. Appendix C presents information on environmental conditions of each filter run.

Francis T. Mayo, Director
Municipal Environmental Research
Laboratory

ABSTRACT

Pilot plant research conducted during 1977 and 1978 demonstrated that both amphibole and chrysotile asbestos can be removed using direct filtration techniques at filter loading rates as high as 10 gpm/ft². Since asbestos fibers, especially chrysotile, were found to be quite sensitive to changes in the treatment process, vigilant control over chemical additions and finished water turbidity is a necessity. During the study, engineering data were also obtained for making cost estimates for construction and operation of a 100 MGD granular media filtration plant.

Photographs of pilot plant apparatus are contained in Appendix B-1. It includes pictures of the existing facilities on the Tolt, the Waterboy pilot plant and piping, mixers, storage tanks and sludge settling basins. Weather and operating conditions at the South Fork Tolt Reservoir are presented in Appendix B-2. It contains water and air temperatures, valve operations and flow conditions. Appendix B-3 includes information from the manufacturers on granular media filters and various graphs of water production efficiencies.

Both amphibole and chrysotile asbestos fibers are in the micron size range and require that electron microscopy techniques be used for counting. Appendix B-4 contains micrographs of these fibers. Appendix B-5 contains information on particle counts and turbidity from various filter runs.

To determine the capabilities of direct filtration treatment techniques at treating water with abnormally high raw water turbidities, tests were conducted on water with a turbidity as high as 34 NTU. The treatment techniques could consistently remove turbidity from 20 NTU down to < 0.5 NTU. Appendix B-6 contains a description of these pilot tests.

Water pollution laws now require treatment of wastes generated at water filtration facilities. Pilot settling tests were conducted on sludge generated from backwashing the Waterboy granular media filter. The tests indicate that a sludge with a concentration of 2-3% can be produced by gravity settling. Appendix B-7 contains details of the settling tests.

Based on design criteria developed during the filtration studies, CH2M/Hill Consulting Engineers developed treatment plant costs. Construction costs were estimated at \$24,747,000 and annual operation and maintenance costs were \$1,212,000. Appendix B-8 contains details on the development of the costs.

To document the conditions surrounding each pilot filter run, Appendix C contains a description of the treatment trains, mixing intensities, physical and chemical properties of the water and data on water production efficiencies.

This report was submitted in fulfillment of Grant No. 804422 by the Seattle Water Department under the sponsorship of the U.S. Environmental Protection Agency. This report covers a period from May, 1976 to November, 1978 and work was completed March, 1979.

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APPENDIX B-1
PHOTOGRAPHS OF PILOT PLANT APPARATUS



Figure B1-1. Ring gate and intake tower on South Fork Tolt Reservoir.



Figure Bl-2. Tolt Regulating Basin.

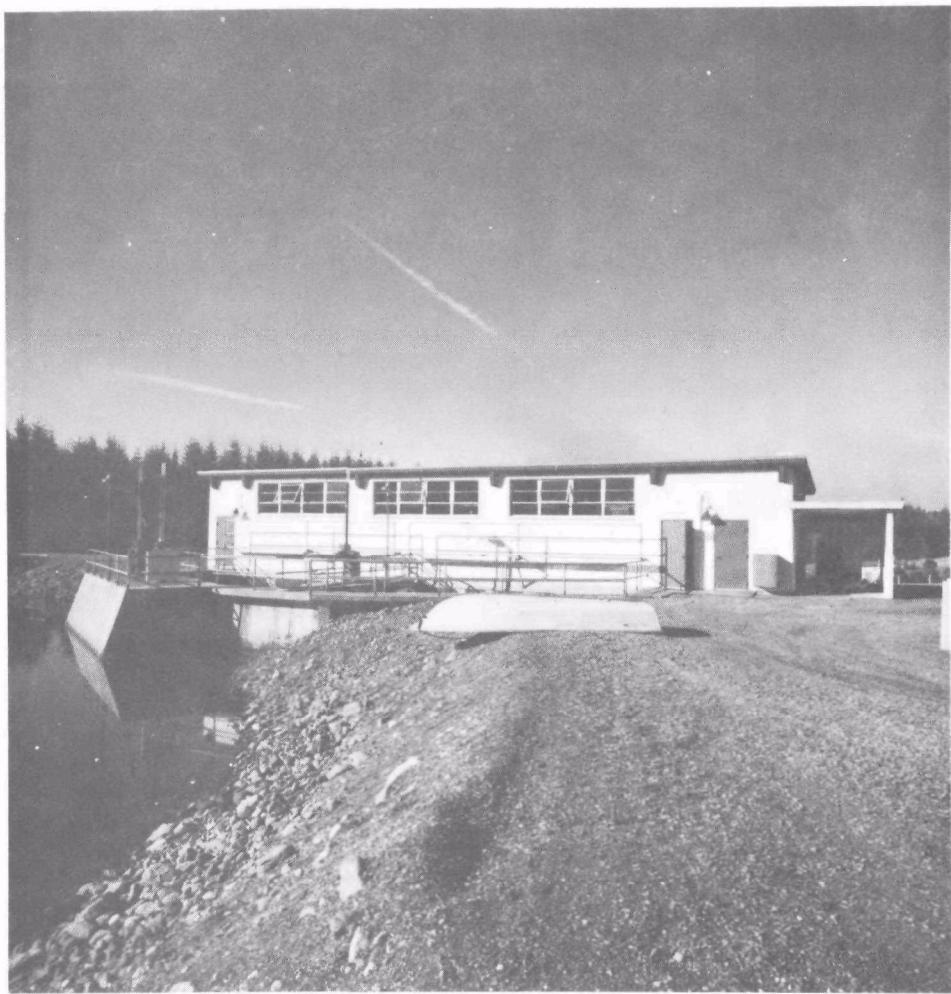


Figure Bl-3. Screen house at Tolt Regulating Basin.



Figure B1-4. Tolt Regulating Building.

Note: Pilot plant located inside this structure.

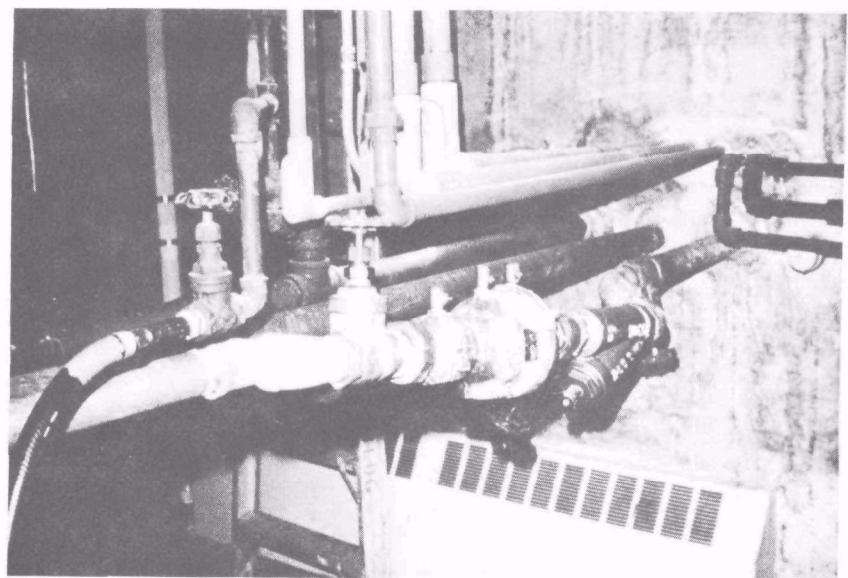


Figure Bl-5. Backflow preventor on service to pilot plant.

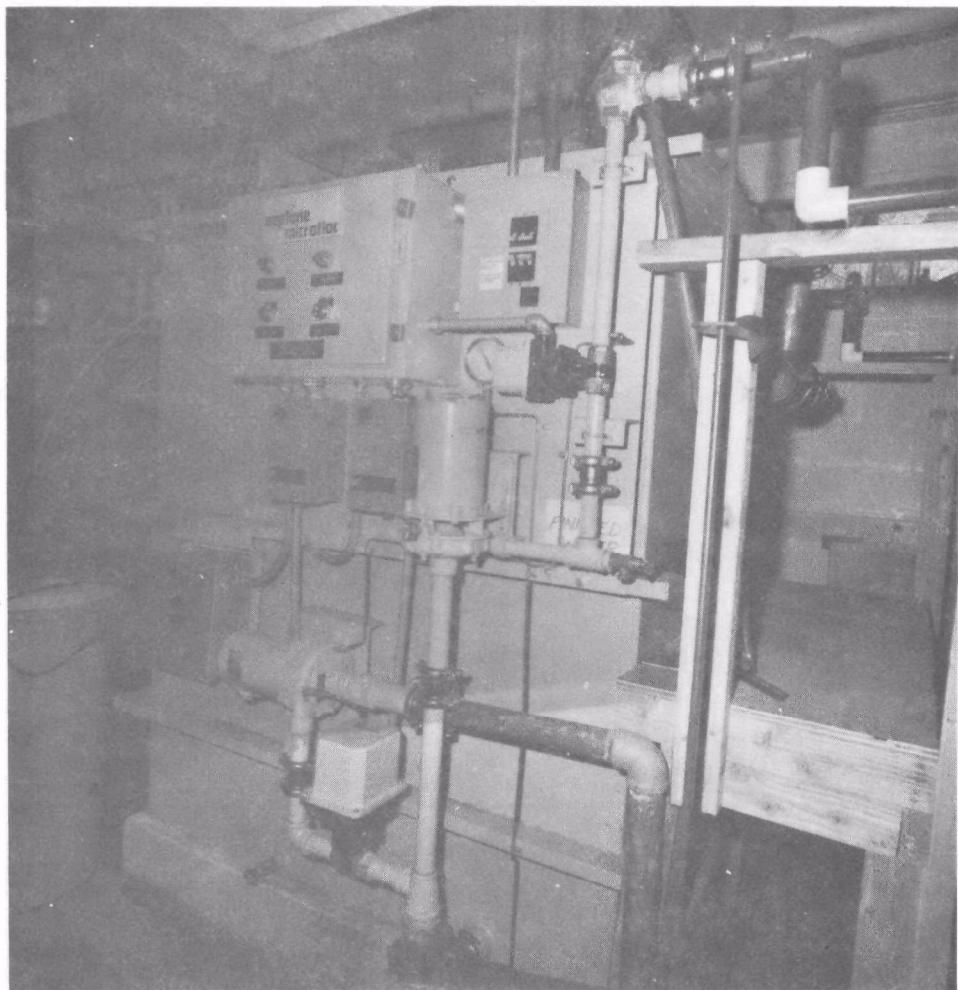


Figure Bl-6. Front view of Neptune Microfloc Waterboy-27 pilot plant.

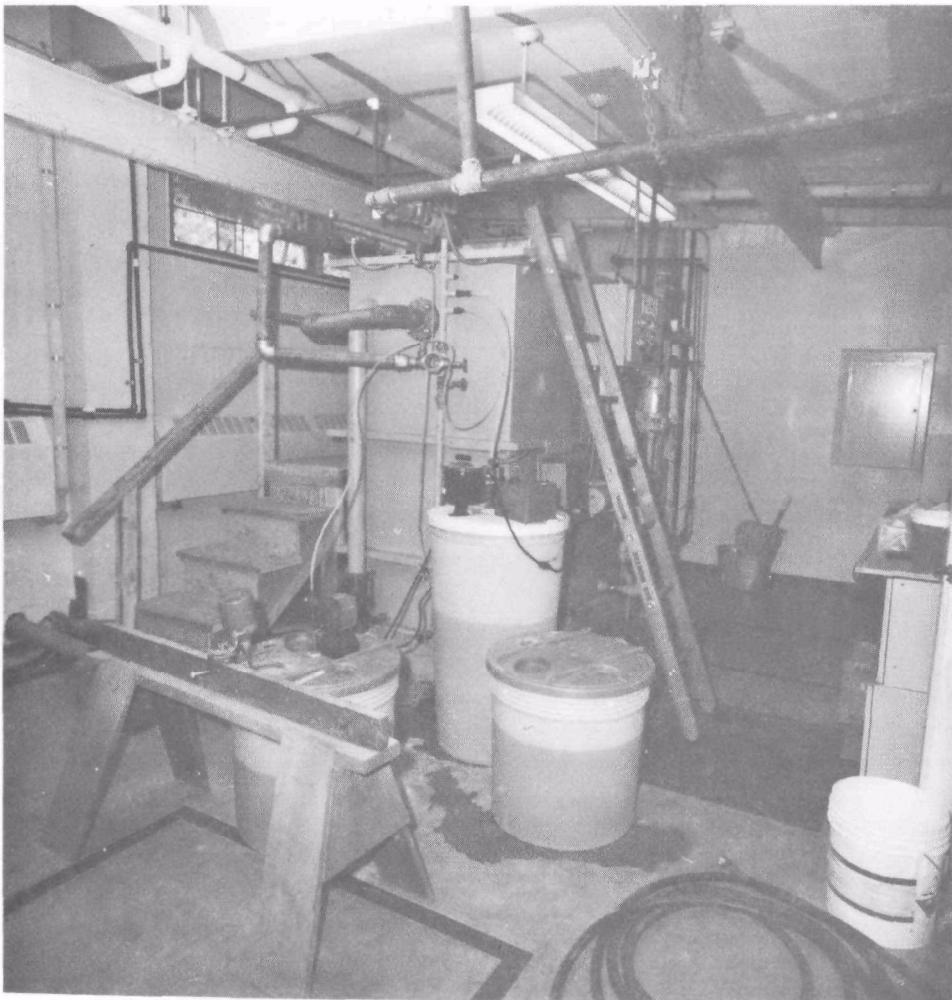


Figure Bl-7. Pilot plant and chemical solution barrels.

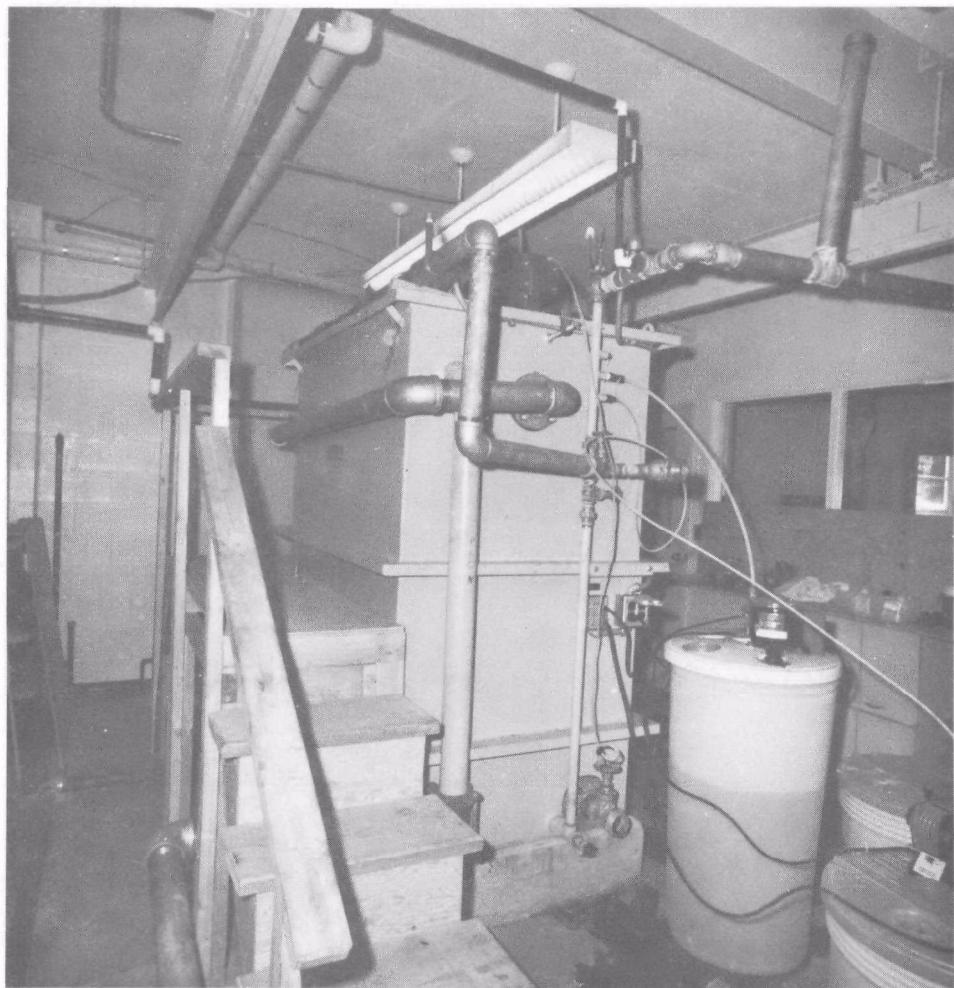


Figure Bl-8. Pilot plant with platform and by-pass pipes.

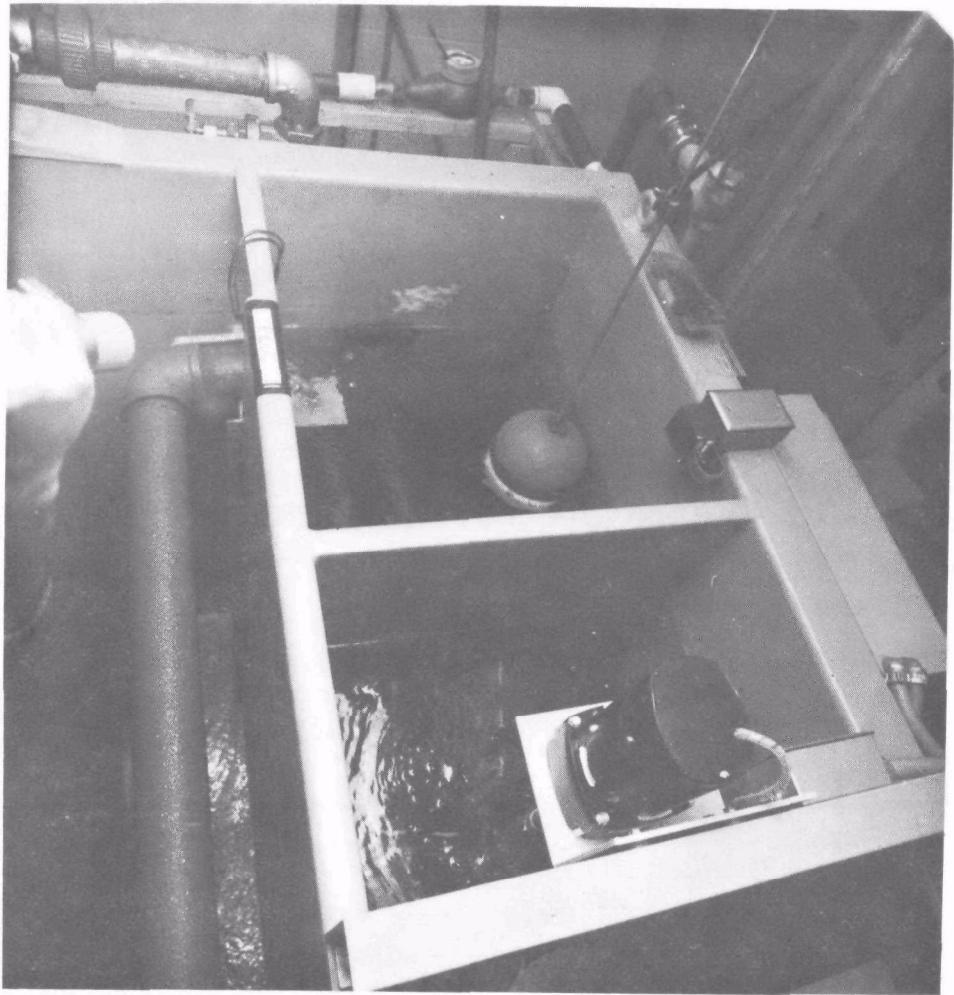


Figure Bl-9. Top view of pilot plant.

Note: Settling chamber by-pass line.

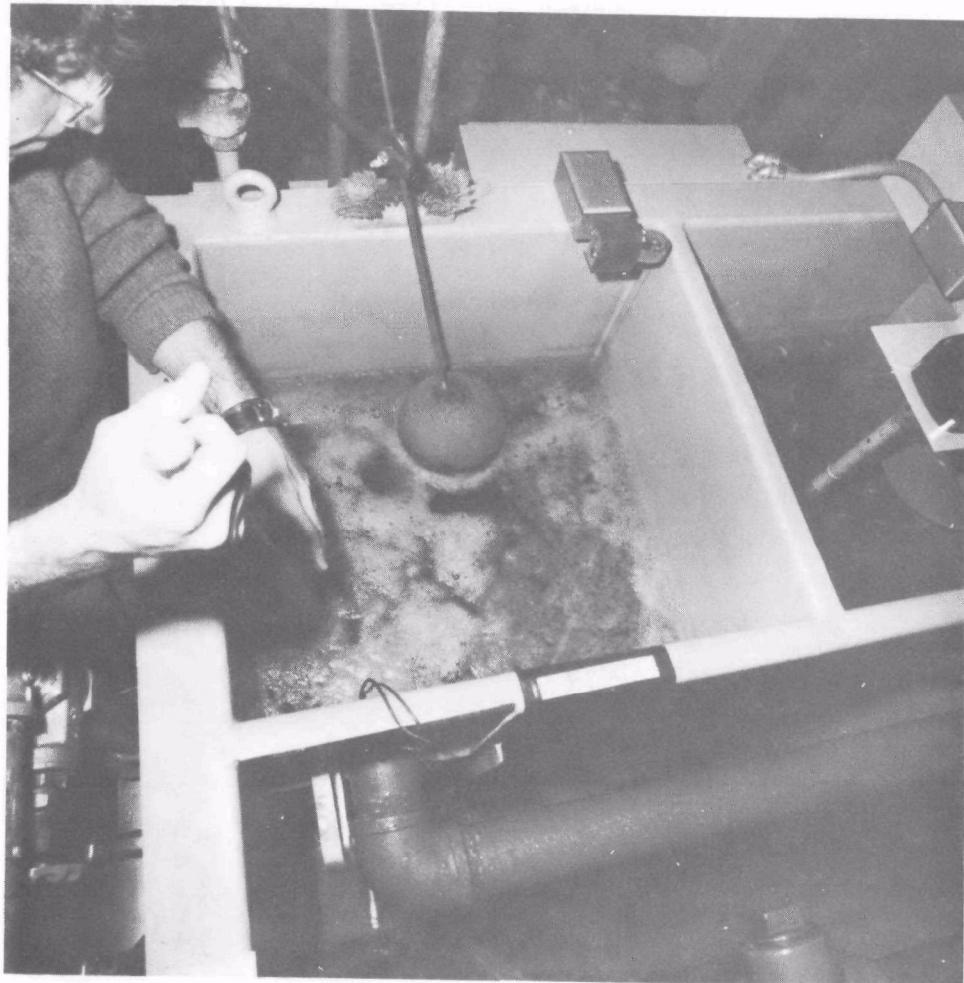


Figure Bl-10. Mechanical surface wash of filter media.

Note: Purpose of mechanical wash to release air prior to backwashing.

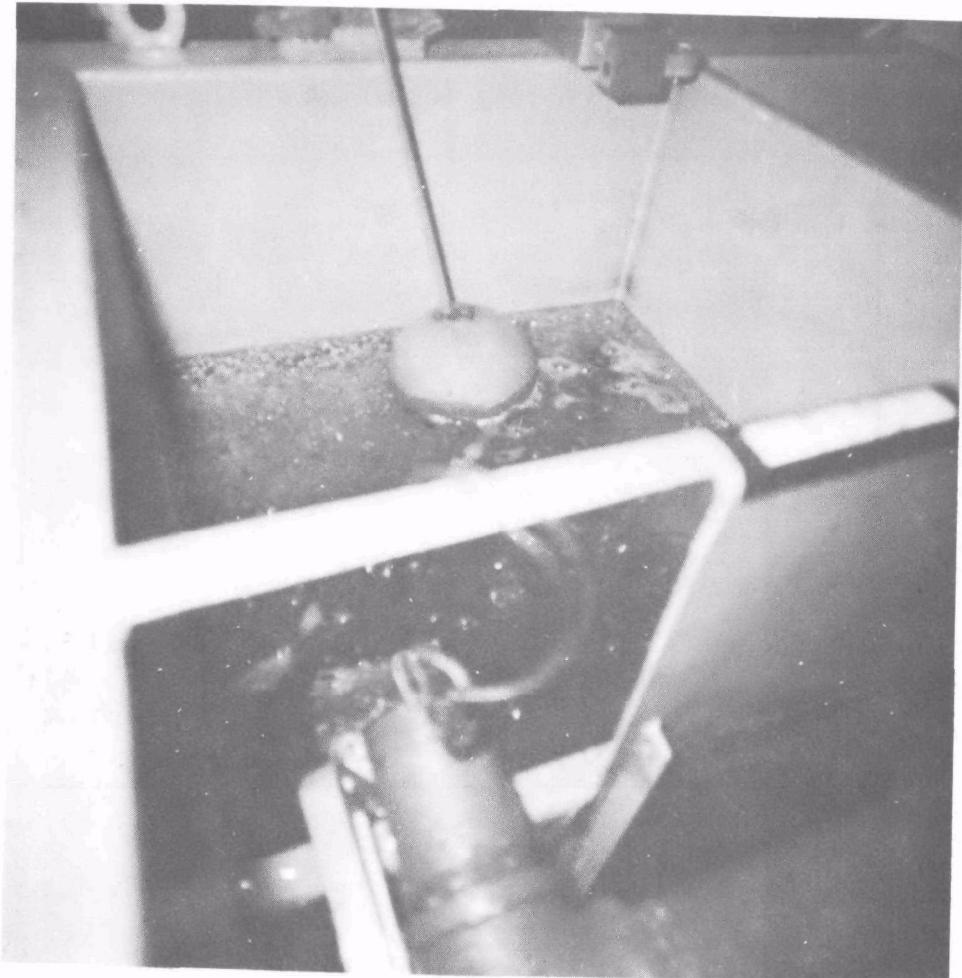


Figure Bl-11. Top view of pilot filter.

Note: Air bubbles rising to surface.

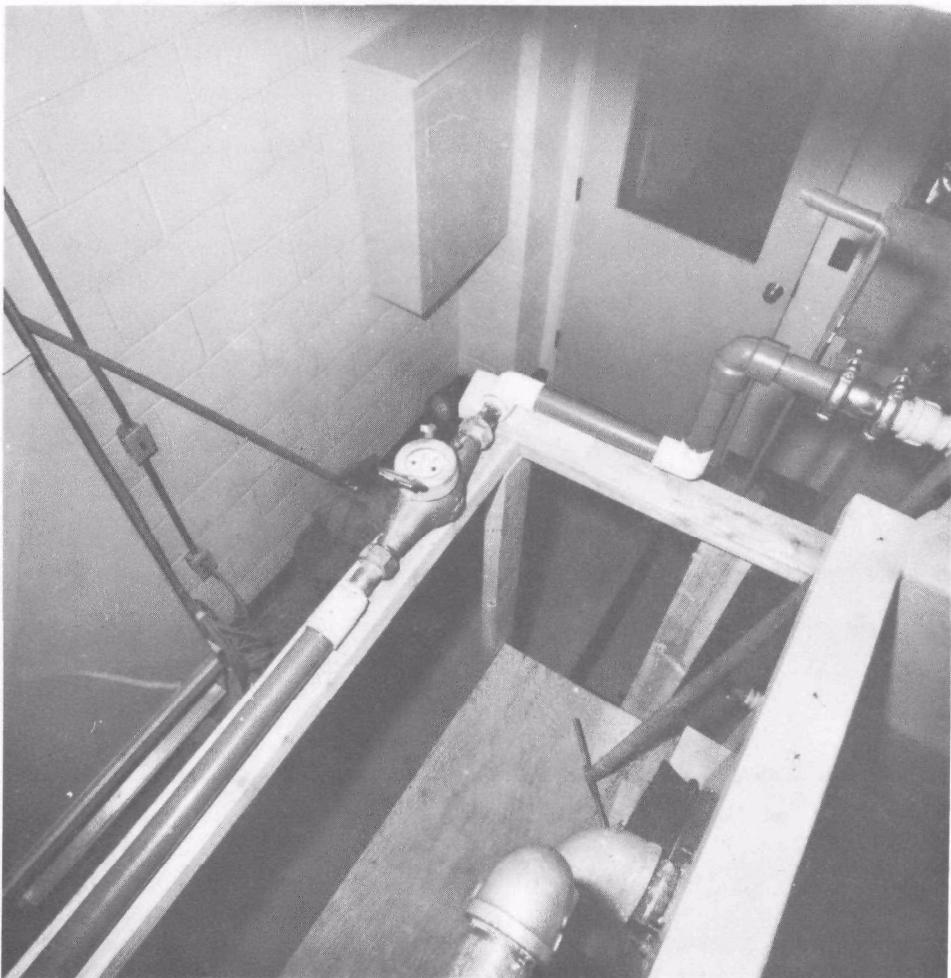


Figure Bl-12. Meter on effluent from filter.

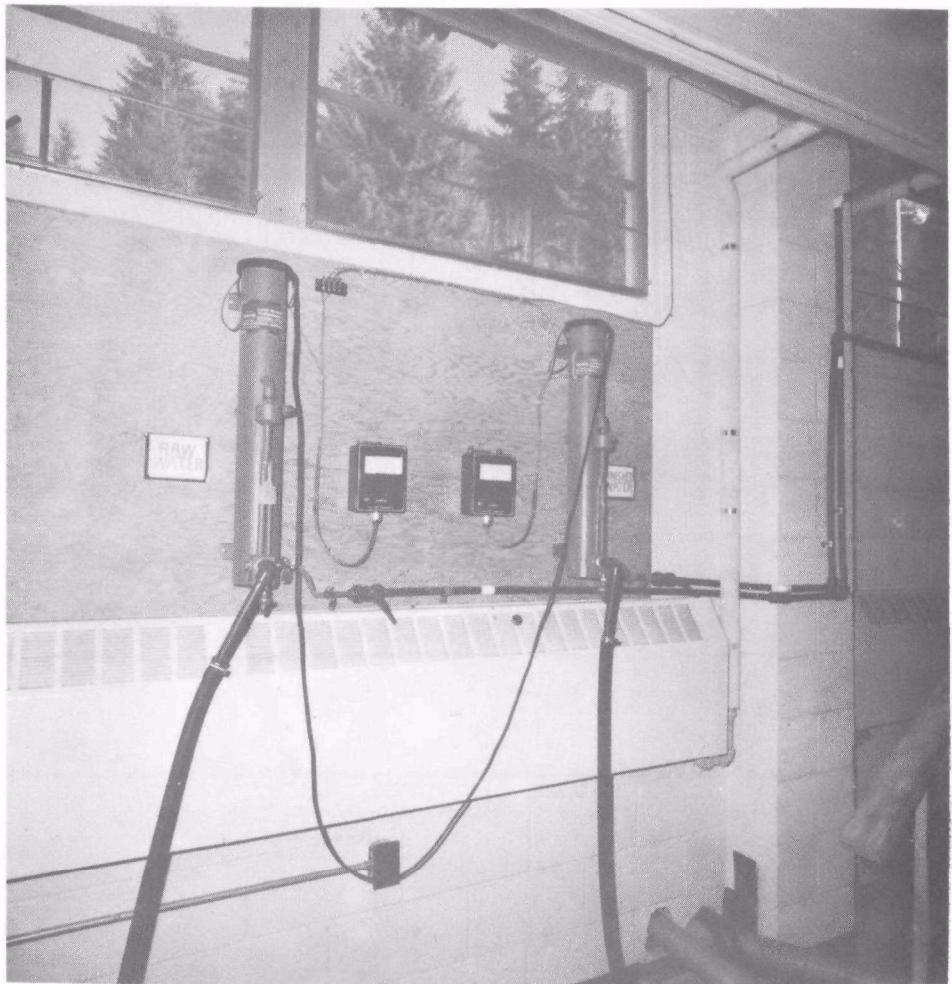


Figure Bl-13. Continuous turbidimeters on raw and finished water.



Figure Bl-14. Backwash water storage tank.

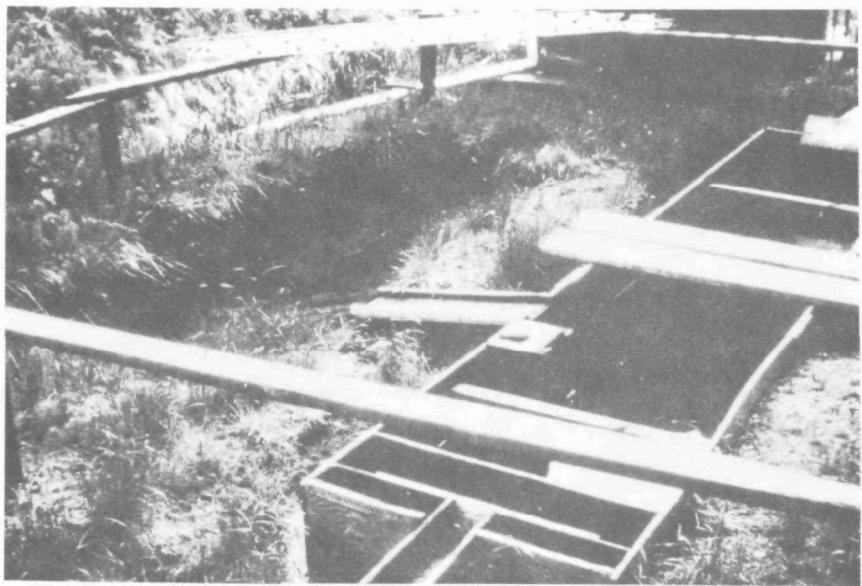


Figure Bl-15. Plywood backwash wastewater settling basin.

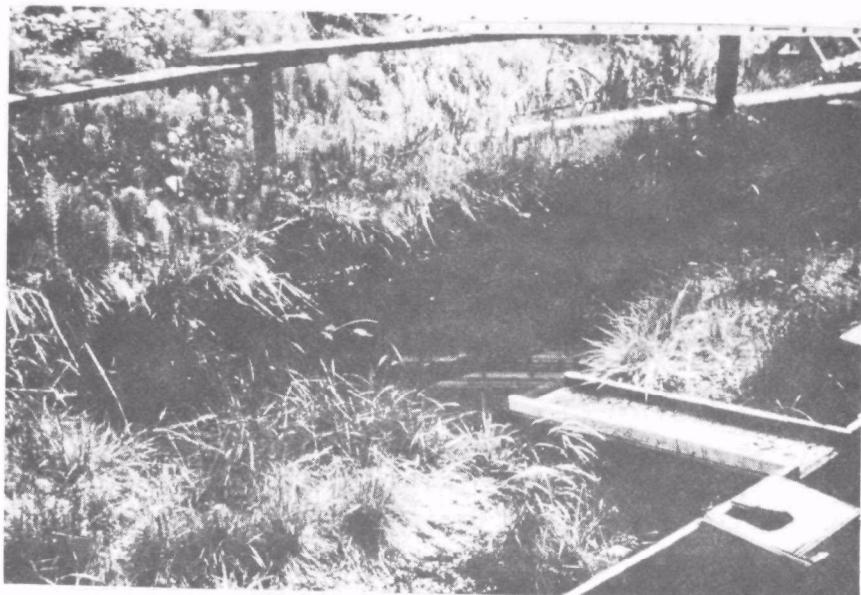


Figure Bl-16. Earthen emergency overflow settling basin.

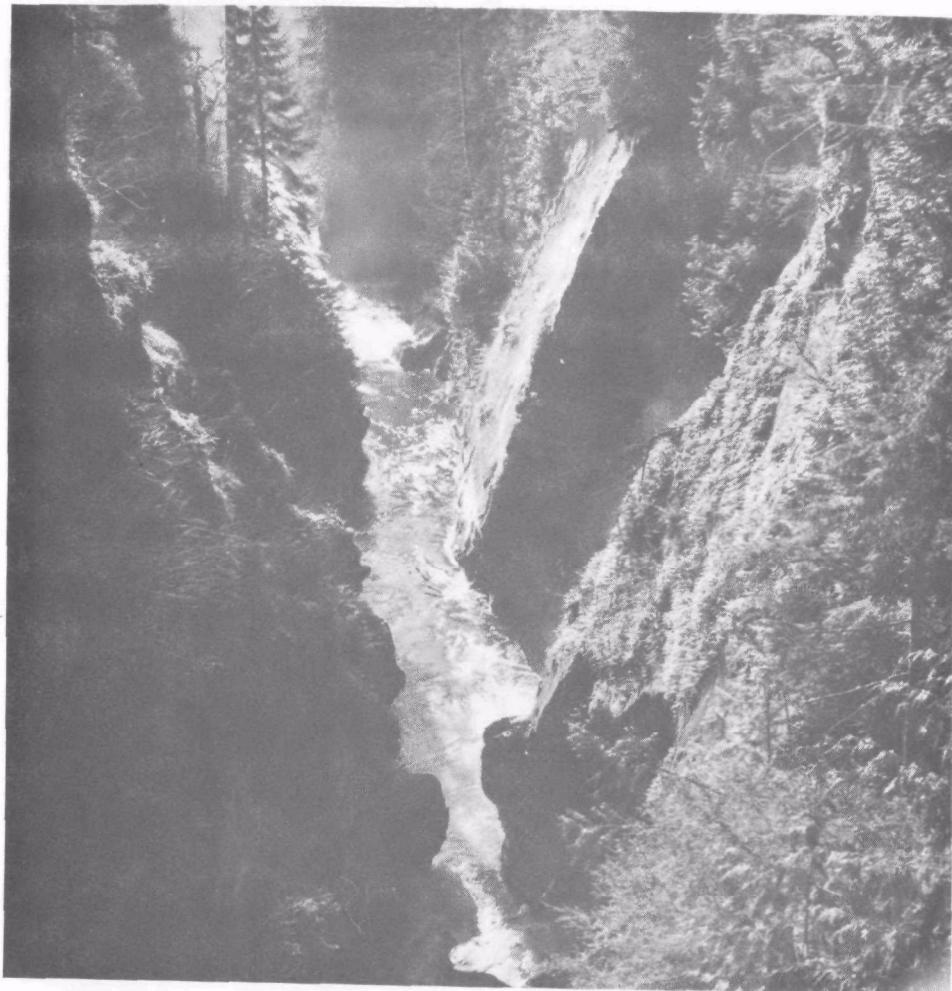


Figure Bl-17. Top view of North Fork Tolt River from bridge.

Note: All plant wastes and surface drainage discharge to this receiving stream.

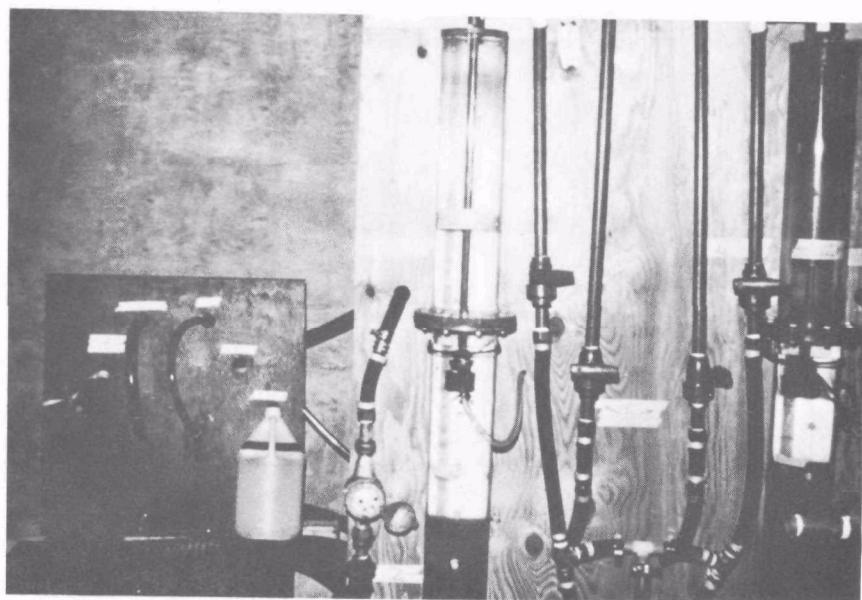


Figure Bl-18. Pilot filter columns constructed by Seattle Water Department.

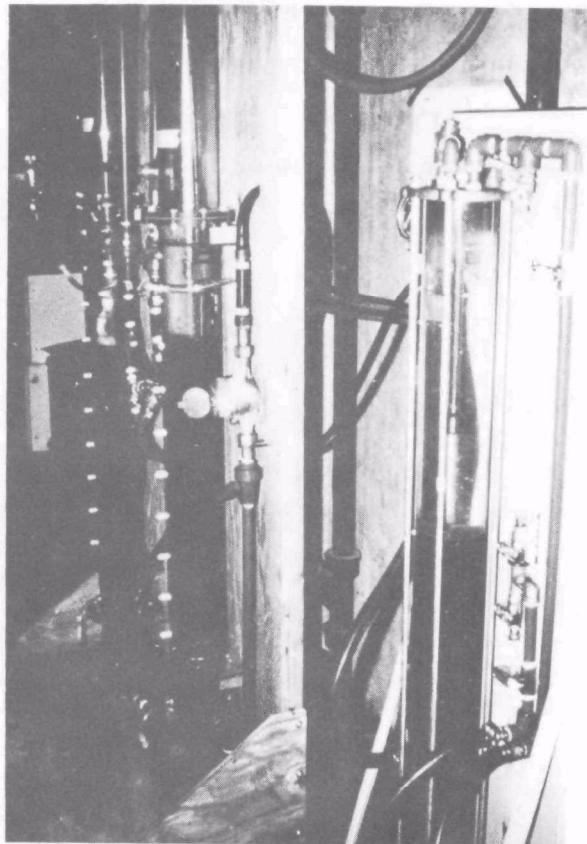


Figure B1-19. Pilot filter column purchased from Neptune Microfloc, Inc.

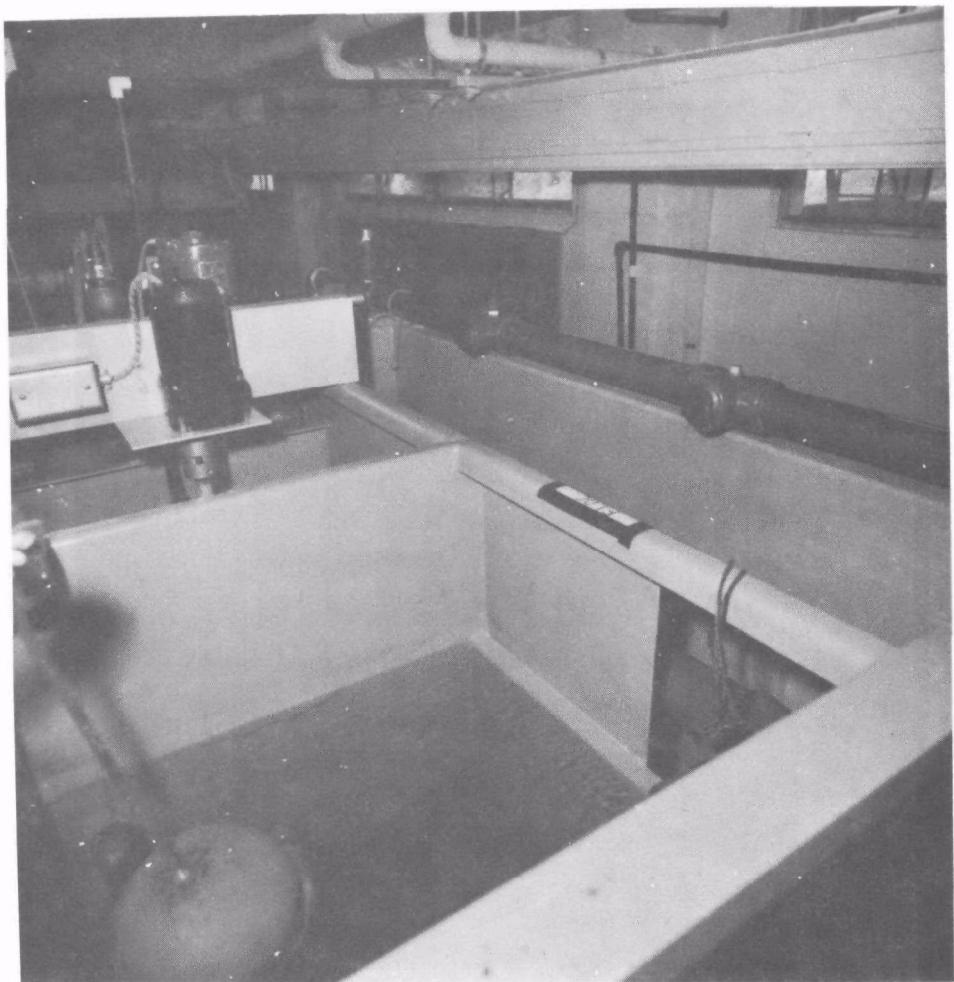


Figure Bl-20. Static mixers on pilot plant.

Note: Mixers were loaned to Seattle Water Department by USEPA.

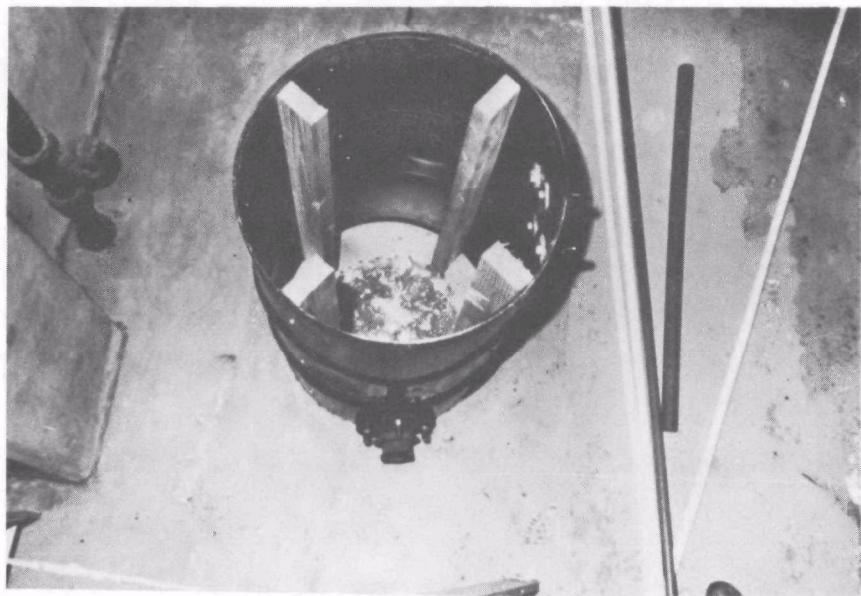


Figure Bl-21. Mixing barrels.

Note: Baffles to prevent vortex.

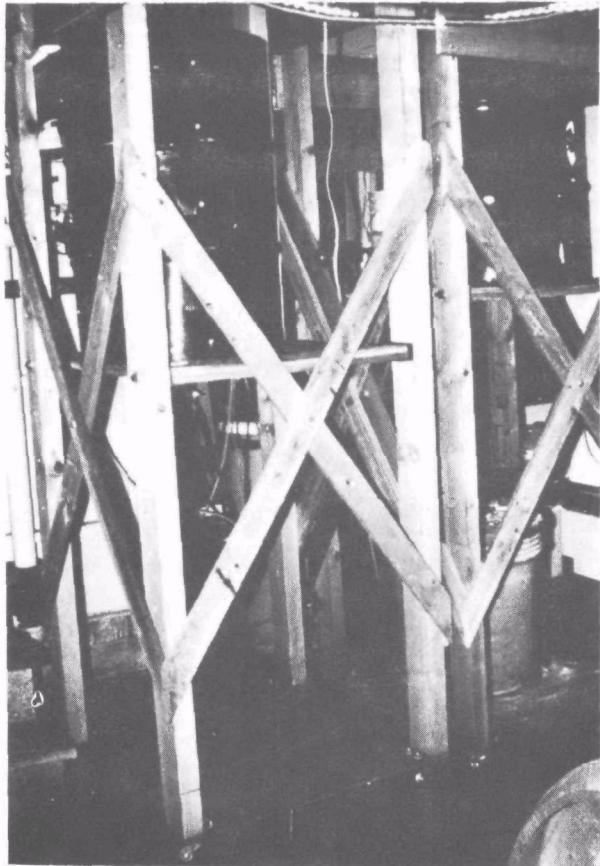


Figure Bl-22. Adjustable platforms supporting mixing barrels.

APPENDIX B-2

**WEATHER AND OPERATING CONDITIONS AT THE SOUTH FORK TOLT RESERVOIR
AND TOLT REGULATING BASIN**

APPENDIX B-2. WEATHER AND OPERATING CONDITIONS AT THE SOUTH FORK TOLT RESERVOIR AND TOLT REGULATING BASIN -
MONTH OF JANUARY, 1977.

| Date | South Fork Tolt Reservoir | | | | | | | | Regulating Basin | | | | | |
|------|---------------------------|----------------------|--------------|-----------------|----------------------|-----------------------|-----------------------|----------------------|------------------|-----------------|-----------------------|----------------------|-----------------------|--|
| | Elev., ft | Wind Vel., mph | Wind Dir. | Precip., in. | Avg. Temp., °F | Water Temp., °C | Max. Turb., NTU | Valve #15, % Open | Elev., ft | Precip., in. | Max. Turb., NTU | Valve #25, % Open | Total Flow, MGD | |
| 1 | 1751.35 | 18 | NE | 0 | 34.0 | 5.0 | 1.50 | 0 | 759.8 | 0 | 1.20 | 35 | 68 | |
| 2 | 1751.25 | 36 | NE | 0.13 | 36.5 | 5.0 | 1.80 | 0 | 759.8 | 0.09 | 1.20 | 35 | 66 | |
| 3 | *1750.98 | 0 | - | 0.03 | 29.0 | 4.5 | 1.60 | 0 | 759.5 | 0.02 | 1.20 | 35 | 67 | |
| 4 | *1750.70 | 3 | NE | 0.02 | 27.0 | 4.5 | 1.30 | 0 | 759.1 | 0.02 | 1.10 | 35 | 71 | |
| 5 | *1750.42 | 3 | NW | 0 | 27.5 | 4.0 | 1.10 | 0 | 758.9 | 0 | 1.20 | 35 | 64 | |
| 6 | *1750.14 | 4 | NE | 0 | 27.5 | 3.5 | 1.40 | 0 | 760.1 | 0 | 1.10 | 35 | 50 | |
| 7 | 1749.86 | 5 | NE | 0 | 22.5 | 3.5 | 1.50 | 0 | 760.4 | 0 | 1.10 | 35 | 55 | |
| 8 | 1750.12 | 0 | - | 0 | 21.5 | 3.0 | 1.20 | 0 | 759.3 | 0 | 1.10 | 15 | 51 | |
| 9 | 1750.18 | 5 | SE | 0 | 32.0 | 3.0 | 1.20 | 0 | 758.3 | 0 | 1.00 | 15 | 53 | |
| 10 | 1750.11 | 3 | SE | 0 | 31.5 | 3.0 | 1.00 | 0 | 756.7 | 0 | 1.00 | - | 51 | |
| 11 | 1749.83 | 10 | NE | 0.10 | 33.5 | 3.0 | 1.00 | 0 | 756.5 | 0.08 | 0.90 | 25 | 59 | |
| 12 | 1749.75 | 8 | SW | 1.30 | 39.0 | 3.0 | 2.50 | 0 | 758.1 | 1.05 | 0.90 | 35 | 54 | |
| 13 | 1749.82 | 8 | NE | 0.98 | 38.5 | 3.5 | 0.90 | 0 | 759.3 | 0.47 | 1.10 | 35 | 51 | |
| 14 | 1749.83 | 6 | NE | 0.34 | 38.0 | 3.5 | 1.20 | 0 | 760.2 | 0.18 | 1.20 | 30 | 55 | |
| 15 | 1749.81 | 0 | - | 0.18 | 39.5 | 3.5 | 1.20 | 0 | 760.4 | 0.13 | 1.20 | 30 | 48 | |
| 16 | 1750.15 | 10 | SE | 0.40 | 40.5 | 4.0 | 1.10 | 0 | 760.2 | 0.21 | 1.20 | 15 | 52 | |
| 17 | 1751.63 | 0 | - | 1.10 | 44.5 | 4.0 | 1.20 | 0 | 758.5 | 0.69 | 1.20 | 15 | 50 | |
| 18 | 1753.55 | 20 | NE | 0.90 | 45.0 | 4.0 | 1.80 | 0 | 758.3 | 0.65 | 1.40 | 20 | 54 | |
| 19 | 1755.14 | 20 | SE | 0.66 | 45.0 | 4.5 | 1.60 | 0 | 758.1 | 0.53 | 1.45 | 20 | 48 | |
| 20 | 1755.45 | 34 | NE | 0 | 44.0 | 4.0 | 1.50 | 0 | 758.5 | 0 | 1.70 | 25 | 52 | |
| 21 | 1755.48 | 0 | - | 0 | 44.5 | 4.0 | 1.50 | 0 | 757.4 | 0 | 1.20 | 25 | 65 | |
| 22 | 1755.43 | 5 | NE | 0.10 | 35.5 | 4.0 | 1.30 | 0 | 758.7 | 0.05 | 1.40 | 75 | 66 | |
| 23 | 1755.32 | 3 | NW | 0 | 38.5 | 4.0 | 1.30 | 0 | 760.0 | 0 | 1.40 | 75 | 68 | |
| 24 | 1755.21 | 5 | SE | 0 | 39.5 | 4.0 | 1.20 | 0 | 759.6 | 0 | 1.20 | 30 | 67 | |
| 25 | 1755.08 | 0 | - | 0 | 38.0 | 4.0 | 1.20 | 0 | 760.1 | 0 | 1.40 | 30 | 63 | |
| 26 | 1754.96 | 8 | NE | 0 | 37.5 | 3.5 | 1.20 | 0 | 760.3 | 0 | 1.20 | 30 | 52 | |
| 27 | 1754.87 | 8 | NE | 0 | 39.0 | 4.0 | 1.20 | 0 | 759.4 | 0 | 1.20 | 15 | 48 | |
| 28 | 1754.78 | 5 | NE | 0 | 40.0 | 4.0 | 1.10 | 0 | 759.7 | 0 | 1.20 | 15 | 38 | |
| 29 | 1754.70 | 0 | - | 0 | 34.0 | 4.0 | 1.10 | 0 | 760.1 | 0 | 1.10 | 15 | 30 | |
| 30 | 1754.68 | 16 | NE | 0 | 36.0 | 4.0 | 1.10 | 0 | 759.7 | 0 | 1.10 | 0 | 31 | |
| 31 | 1754.71 | 12 | NE | 0.32 | 39.0 | 4.0 | 1.10 | 0 | 755.0 | 0.22 | 1.20 | 30 | 31 | |

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

*Estimated reading. Gage malfunction (frozen).

APPENDIX B-2 (CONTINUED) MONTH OF FEBRUARY, 1977.

| Date | South Fork Tolt Reservoir | | | | | | | | Regulating Basin | | | | | |
|------|---------------------------|----------------|-----------|--------------|--------------------|-----------------|-----------------|-------------------|------------------|--------------|-----------------|-------------------|-----------------|--|
| | Elev., ft | Wind Vel., mph | Wind Dir. | Precip., in. | Avg. Air Temp., °F | Water Temp., °C | Max. Turb., NTU | Valve #15, % Open | Elev., ft | Precip., in. | Max. Turb., NTU | Valve #25, % Open | Total Flow, MGD | |
| 1 | 1754.66 | 4 | SE | 0.43 | 44.0 | 4.0 | 1.10 | 0 | 757.6 | 0.21 | 1.10 | 30 | 31 | |
| 2 | 1754.50 | 0 | - | 0.12 | 42.0 | 4.0 | 1.10 | 0 | 760.1 | 0.05 | 1.10 | 15 | 31 | |
| 3 | 1754.47 | 36 | NE | 0 | 48.0 | 4.0 | 1.30 | 0 | 757.2 | 0 | 1.10 | 0 | 41 | |
| 4 | 1754.37 | 8 | NE | 0 | 47.0 | 4.0 | 1.20 | 0 | 757.8 | 0 | 1.10 | 20 | 40 | |
| 5 | 1754.26 | 28 | NE | 0 | 46.5 | 4.0 | 1.10 | 0 | 758.2 | 0.02 | 1.20 | - | 45 | |
| 6 | 1754.15 | 10 | NE | 0 | 46.5 | 4.0 | 1.10 | 0 | 758.5 | 0.03 | 1.20 | 20 | 47 | |
| 7 | 1754.06 | 50 | SE | 0 | 48.5 | 4.5 | 1.20 | 0 | 758.8 | 0 | 1.40 | 20 | 44 | |
| 8 | 1753.91 | 28 | NE | 0 | 49.0 | 4.5 | 1.20 | 0 | 758.7 | 0 | 1.40 | 20 | 51 | |
| 9 | 1753.77 | 5 | SW | 0.03 | 47.5 | 4.5 | 1.00 | 0 | 757.9 | 0.02 | 1.40 | 20 | 50 | |
| 10 | 1753.70 | 18 | SW | 0.43 | 45.0 | 4.5 | 1.00 | 0 | 756.5 | 0.23 | 1.40 | 20 | 66 | |
| 11 | 1753.88 | 0 | - | 0.28 | 44.0 | 4.5 | 1.00 | 0 | 755.6 | 0.27 | 1.70 | 20 | 60 | |
| 12 | 1753.93 | 5 | SW | 0.16 | 46.0 | 4.5 | 1.00 | 0 | 755.5 | 0.10 | 1.70 | 20 | 52 | |
| 13 | 1754.47 | 4 | NE | 0.38 | 42.5 | 4.5 | 1.00 | 0 | 756.4 | 0.23 | 1.40 | 30 | 56 | |
| 14 | 1754.55 | 8 | NE | 0 | 43.0 | 5.0 | 1.00 | 0 | 756.8 | 0 | 1.50 | 30 | 56 | |
| 15 | 1754.52 | 3 | NE | 0.03 | 46.5 | 5.0 | 1.00 | 0 | 757.2 | 0.02 | 1.10 | 30 | 59 | |
| 16 | 1754.47 | 5 | NE | 0.02 | 46.5 | 5.0 | 1.00 | 0 | 757.6 | 0.02 | 1.10 | 30 | 58 | |
| 17 | 1754.45 | 5 | SW | 0.23 | 47.0 | 5.0 | 0.85 | 0 | 758.1 | 0.12 | 0.90 | 30 | 55 | |
| 18 | 1754.54 | 6 | NE | 0.43 | 42.0 | 5.0 | 0.90 | 0 | 758.7 | 0.16 | 1.30 | 30 | 58 | |
| 19 | 1754.63 | 38 | NE | 0 | 49.0 | 5.0 | 1.00 | 0 | 758.5 | 0 | 1.20 | 20 | 55 | |
| 20 | 1754.62 | 5 | NE | 0 | 52.5 | 5.0 | 1.00 | 0 | 758.0 | 0 | 1.10 | 20 | 54 | |
| 21 | 1754.66 | 40 | SW | 0.27 | 48.5 | 5.0 | 1.00 | 0 | 757.6 | 0.26 | 1.10 | 20 | 55 | |
| 22 | 1754.65 | 26 | NW | 0.20 | 57.0 | 5.0 | 1.00 | 0 | 756.6 | 0.12 | 1.10 | 30 | 60 | |
| 23 | 1754.66 | 5 | NE | 0.35 | 43.5 | 5.0 | 1.00 | 0 | 756.9 | 0.60 | 1.00 | 30 | 59 | |
| 24 | 1754.63 | 5 | NE | 0 | 44.0 | 5.0 | 0.90 | 0 | 757.5 | 0 | 1.15 | 15 | 47 | |
| 25 | 1754.66 | 6 | SW | 0.65 | 37.0 | 5.0 | 0.90 | 0 | 758.2 | 0.38 | 1.15 | 15 | 28 | |
| 26 | 1754.68 | 3 | SW | 0.30 | 34.0 | 4.5 | 1.00 | 0 | 758.9 | 0.16 | 1.50 | 15 | 27 | |
| 27 | 1754.73 | 6 | SW | 0.63 | 37.0 | 4.5 | 1.00 | 0 | 759.5 | 0.33 | 1.15 | 15 | 30 | |
| 28 | 1755.15 | 3 | NW | 0.53 | 39.5 | 5.0 | 1.00 | 0 | 757.4 | 0.35 | 1.00 | 0 | 28 | |
| 29 | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | |

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF MARCH, 1977.

| Date | South Fork Tolt Reservoir | | | | | | | | Regulating Basin | | | | | |
|------|---------------------------|----------------|-----------|--------------|----------------|-----------------|-----------------|-------------------|------------------|--------------|-----------------|-------------------|-----------------|--|
| | Elev., ft | Wind Vel., mph | Wind Dir. | Precip., in. | Avg. Temp., °F | Water Temp., °C | Max. Turb., NTU | Valve #15, % Open | Elev., ft | Precip., in. | Max. Turb., NTU | Valve #25, % Open | Total Flow, MGD | |
| 1 | 1755.45 | 0 | - | 0.37 | 39.0 | 5.0 | 1.00 | 0 | 757.1 | 0.45 | 0.90 | 15 | 28 | |
| 2 | 1755.56 | 5 | SW | 0.18 | 36.0 | 5.0 | 1.00 | 0 | 757.7 | 0.12 | 1.20 | 15 | 28 | |
| 3 | 1755.65 | 5 | SW | 0.64 | 39.0 | 5.0 | 0.75 | 0 | 758.3 | 0.75 | 1.00 | 15 | 30 | |
| 4 | 1755.68 | 5 | NE | 0.10 | 35.0 | 5.0 | 0.70 | 0 | 758.9 | 0.06 | 1.00 | 15 | 27 | |
| 5 | 1755.88 | 8 | NE | 0 | 39.0 | 5.0 | 0.90 | 0 | 757.3 | 0 | 1.10 | 0 | 28 | |
| 6 | 1755.98 | 1 | N | 0 | 44.0 | 5.0 | 0.70 | 0 | 754.8 | 0.01 | 1.00 | 0 | 29 | |
| 7 | 1756.06 | 5 | SE | 0.48 | 44.0 | 5.0 | 0.90 | 0 | 756.2 | 0.27 | 1.00 | 15 | 27 | |
| 8 | 1756.36 | 8 | NW | 0.84 | 43.5 | 5.0 | 0.90 | 0 | 757.3 | 0.53 | 1.00 | 15 | 27 | |
| 9 | 1756.77 | 5 | NW | 0.90 | 37.5 | 5.0 | 0.90 | 0 | 755.9 | 0.50 | 1.00 | 0 | 25 | |
| 10 | 1757.04 | 4 | W | 0.36 | 43.0 | 5.0 | 0.60 | 0 | 754.4 | 0.13 | 1.10 | 0 | 18 | |
| 11 | 1757.24 | 42 | NE | 0 | 36.0 | 5.0 | 1.10 | 0 | 755.7 | 0 | 1.20 | 15 | 12 | |
| 12 | 1757.27 | 3 | NW | 0.60 | 40.0 | 5.0 | 0.90 | 0 | 757.5 | 0.50 | 1.00 | 0 | 12 | |
| 13 | 1757.42 | 0 | - | 0.17 | 38.0 | 5.0 | 0.90 | 0 | 756.4 | 0.13 | 1.00 | 0 | 12 | |
| 14 | 1757.53 | 5 | NE | 0.45 | 38.0 | 4.5 | 0.90 | 0 | 755.3 | 0.20 | 1.00 | 0 | 12 | |
| 15 | 1757.65 | 10 | SE | 0.28 | 38.0 | 4.5 | 0.80 | 0 | 756.4 | 0.17 | 1.00 | 15 | 12 | |
| 16 | 1757.67 | 0 | - | 0.18 | 28.0 | 4.5 | 0.80 | 0 | 758.2 | 0.12 | 1.00 | 15 | 12 | |
| 17 | 1757.71 | 4 | NE | 0.04 | 38.0 | 5.0 | 0.60 | 0 | 758.0 | 0.03 | 1.00 | 0 | 12 | |
| 18 | 1757.80 | 4 | SW | 0.31 | 39.0 | 5.0 | 0.60 | 0 | 756.8 | 0.11 | 1.00 | 0 | 12 | |
| 19 | 1757.87 | 10 | SW | 0.35 | 36.0 | 5.0 | 0.60 | 0 | 755.7 | 0.47 | 1.00 | 15 | 12 | |
| 20 | 1757.93 | 8 | NW | 0.21 | 37.5 | 4.5 | 0.80 | 0 | 757.7 | 0.08 | 0.90 | 15 | 12 | |
| 21 | 1757.94 | 5 | NW | 0.34 | 38.0 | 4.5 | 0.80 | 0 | 759.6 | 0.23 | 1.00 | 0 | 12 | |
| 22 | 1758.11 | 8 | NE | 0.27 | 39.0 | 5.0 | 0.80 | 0 | 758.8 | 0.18 | 0.90 | 0 | 12 | |
| 23 | 1758.49 | 3 | SE | 0.48 | 43.0 | 5.0 | 0.70 | 0 | 757.5 | 0.34 | 0.90 | 0 | 13 | |
| 24 | 1758.87 | 4 | SW | 0.27 | 45.0 | 5.5 | 0.50 | 0 | 756.3 | 0.20 | 0.85 | 0 | 13 | |
| 25 | 1759.10 | 4 | NE | 0.24 | 40.0 | 5.0 | 0.50 | 0 | 755.0 | 0.06 | 0.85 | 0 | 11 | |
| 26 | 1759.31 | 20 | NW | 0.15 | 39.0 | 5.0 | 0.60 | 0 | 754.0 | 0.12 | 0.80 | 15 | 12 | |
| 27 | 1759.70 | 3 | SW | 1.20 | 37.0 | 5.0 | 0.60 | 0 | 755.9 | 0.66 | 0.80 | 15 | 11 | |
| 28 | 1759.94 | 0 | - | 0.38 | 37.5 | 5.0 | 0.60 | 0 | 758.0 | 0.25 | 0.90 | 15 | 11 | |
| 29 | 1760.03 | 0 | - | 0.10 | 38.0 | 5.0 | 0.60 | 0 | 759.7 | 0.08 | 0.90 | 0 | 11 | |
| 30 | 1760.15 | 9 | NE | 0.02 | 35.5 | 5.0 | 1.00 | 0 | 757.0 | 0 | 0.85 | 0 | 12 | |
| 31 | 1760.32 | 3 | NW | 0 | 42.5 | 5.0 | 0.90 | 0 | 757.5 | 0 | 0.80 | 0 | 13 | |

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF APRIL, 1977.

| Date | South Fork Tolt Reservoir | | | | | | | | Regulating Basin | | | | | |
|------|---------------------------|----------------|-----------|--------------|--------------------|-----------------|-----------------|-------------------|------------------|--------------|-----------------|-------------------|-----------------|--|
| | Elev., ft | Wind Vel., mph | Wind Dir. | Precip., in. | Avg. Air Temp., °F | Water Temp., °C | Max. Turb., NTU | Valve #15, % Open | Elev., ft | Precip., in. | Max. Turb., NTU | Valve #25, % Open | Total Flow, MGD | |
| 1 | 1760.49 | 0 | - | 0.57 | 43.5 | 5.0 | 0.90 | 0 | 756.5 | 0.44 | 0.80 | 0 | 12 | |
| 2 | 1760.67 | 5 | N | 0 | 41.5 | 5.0 | 0.95 | 0 | 755.2 | 0.01 | 0.80 | 0 | 11 | |
| 3 | 1760.80 | 7 | NE | 0 | 41.5 | 5.0 | 0.92 | 0 | 754.0 | 0 | 0.80 | 0 | 12 | |
| 4 | 1760.93 | 9 | NE | 0.02 | 46.0 | 5.5 | 0.88 | 0 | 752.8 | 0 | 0.80 | 0 | 11 | |
| 5 | 1761.04 | 9 | NE | 0 | 51.0 | 5.5 | 0.89 | 0 | 754.4 | 0 | 0.80 | 15 | 10 | |
| 6 | 1761.35 | 15 | N | 0 | 60.0 | 6.0 | 0.94 | 0 | 756.2 | 0 | 0.80 | 15 | 10 | |
| 7 | 1761.87 | 36 | SE | 0 | 61.5 | 7.0 | 1.10 | 0 | 757.9 | 0 | 0.80 | 15 | 11 | |
| 8 | 1762.47 | 0 | - | 0.17 | 60.0 | 7.0 | 1.00 | 0 | 757.7 | 0.14 | 0.80 | 0 | 10 | |
| 9 | 1763.30 | 3 | SW | 0.75 | 56.0 | 6.4 | 0.97 | 0 | 756.6 | 0.56 | 0.80 | 0 | 10 | |
| 10 | 1763.38 | 11 | NE | 0.24 | 40.5 | 6.0 | 0.95 | 0 | 755.2 | 0.09 | 0.70 | 0 | 11 | |
| 11 | 1763.64 | 0 | - | 0.24 | 39.0 | 6.0 | 1.00 | 0 | 754.1 | 0.04 | 0.70 | 0 | 11 | |
| 12 | 1763.81 | 9 | NE | 0 | 45.5 | 6.0 | 1.00 | 0 | 755.5 | 0 | 0.70 | 15 | 12 | |
| 13 | 1764.00 | 10 | SW | 0.44 | 49.5 | 6.0 | 0.98 | 0 | 757.6 | 0.19 | 0.70 | 15 | 12 | |
| 14 | 1764.37 | 0 | - | 0.79 | 35.5 | 5.5 | 1.00 | 0 | 757.4 | 0.59 | 0.70 | 0 | 12 | |
| 15 | 1764.64 | 20 | NE | 0.30 | 37.5 | 6.0 | 1.10 | 0 | 756.2 | 0.23 | 0.70 | 0 | 12 | |
| 16 | 1764.86 | 5 | S | 0.71 | 43.0 | 6.1 | 1.00 | 0 | 758.3 | 0.60 | 0.70 | 35 | 32 | |
| 17 | 1765.03 | 0 | - | 0.74 | 36.0 | 6.0 | 1.00 | 0 | 760.0 | 0.19 | 0.70 | 35 | 47 | |
| 18 | 1765.08 | 5 | S | 0.19 | 41.0 | 6.0 | 1.00 | 0 | 759.2 | 0.10 | 0.70 | 35 | 59 | |
| 19 | 1765.08 | 0 | - | 0 | 39.0 | 6.0 | 1.00 | 0 | 758.2 | 0 | 0.60 | 35 | 75 | |
| 20 | 1765.04 | 13 | NE | 0.06 | 39.0 | 6.5 | 0.60 | 0 | 758.5 | 0.01 | 0.65 | 35 | 72 | |
| 21 | 1765.00 | 7 | N | 0 | 47.0 | 6.5 | 0.74 | 0 | 758.0 | 0 | 0.65 | 35 | 72 | |
| 22 | 1764.98 | 25 | NE | 0.08 | 48.0 | 7.5 | 1.00 | 0 | 758.5 | 0.06 | 0.65 | 35 | 62 | |
| 23 | 1765.10 | 0 | - | 0 | 56.0 | 7.0 | 0.75 | 0 | 759.5 | 0 | 0.65 | 35 | 61 | |
| 24 | 1765.40 | 6 | NE | 0 | 59.0 | 8.0 | 0.65 | 0 | 759.8 | 0 | 0.65 | 35 | 59 | |
| 25 | 1765.68 | 8 | NE | 0 | 62.5 | 8.0 | 0.65 | 0 | 759.0 | 0 | 0.60 | 35 | 71 | |
| 26 | 1765.77 | 3 | S | 0.82 | 50.5 | 7.5 | 0.68 | 0 | 759.4 | 0.50 | 0.60 | 75 | 77 | |
| 27 | 1765.70 | 9 | E | 0.04 | 47.0 | 7.5 | 0.70 | 0 | 760.0 | 0.01 | 0.60 | 75 | 67 | |
| 28 | 1765.62 | 6 | NE | 0 | 55.5 | 7.5 | 0.80 | 0 | 759.4 | 0 | 0.60 | 75 | 76 | |
| 29 | 1765.54 | 6 | E | 0 | 56.0 | 8.0 | 0.60 | 0 | 759.2 | 0 | 0.60 | 75 | 82 | |
| 30 | 1765.45 | 9 | N | 0 | 56.5 | 8.0 | 0.60 | 0 | 759.1 | 0 | 0.60 | 75 | 76 | |

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Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF MAY, 1977.

| Date | South Fork Tolt Reservoir | | | | | | | | Regulating Basin | | | | | |
|------|---------------------------|----------------|-----------|--------------|--------------------|-----------------|-----------------|-------------------|------------------|--------------|-----------------|-------------------|-----------------|--|
| | Elev., ft | Wind Vel., mph | Wind Dir. | Precip., in. | Avg. Air Temp., °F | Water Temp., °C | Max. Turb., NTU | Valve #15, % Open | Elev., ft | Precip., in. | Max. Turb., NTU | Valve #25, % Open | Total Flow, MGD | |
| 1 | 1765.42 | 3 | NE | 0 | 59.0 | 8.0 | 0.60 | 0 | 758.8 | 0 | 0.60 | 75 | 82 | |
| 2 | 1765.40 | 8 | S | 0.26 | 55.0 | 8.0 | 0.60 | 0 | 758.7 | 0.25 | 0.60 | 75 | 77 | |
| 3 | 1765.54 | 7 | SW | 1.22 | 45.5 | 9.0 | 0.70 | 0 | 759.1 | 0.67 | 0.60 | 75 | 75 | |
| 4 | 1765.57 | 9 | S | 0.54 | 40.5 | 7.5 | 0.60 | 0 | 759.8 | 0.24 | 0.60 | 75 | 69 | |
| 5 | 1765.55 | 0 | - | 0.35 | 42.0 | 8.0 | 0.60 | 0 | 760.1 | 0.21 | 0.60 | 75 | 67 | |
| 6 | 1765.43 | 4 | NE | 0.09 | 42.0 | 8.0 | 0.60 | 0 | 760.1 | 0.05 | 0.60 | 75 | 67 | |
| 7 | 1765.22 | 8 | NE | 0.10 | 46.0 | 8.0 | 0.60 | 0 | 760.2 | 0.80 | 0.50 | 75 | 71 | |
| 8 | 1765.14 | 5 | S | 0.34 | 53.5 | 8.0 | 0.60 | 0 | 760.2 | 0.32 | 0.40 | 75 | 74 | |
| 9 | 1765.09 | 11 | NE | 0 | 51.5 | 8.0 | 0.60 | 0 | 760.1 | 0 | 0.40 | 75 | 69 | |
| 10 | 1765.08 | 10 | S | 0.02 | 58.0 | 8.5 | 0.60 | 0 | 760.0 | 0.02 | 0.40 | 35 | 72 | |
| 11 | 1765.32 | 5 | S | 1.21 | 41.0 | 8.0 | 0.60 | 0 | 759.0 | 1.10 | 0.50 | 20 | 63 | |
| 12 | 1765.33 | 5 | NE | 0.08 | 42.0 | 8.0 | 0.60 | 0 | 758.7 | 0.05 | 0.50 | 33 | 63 | |
| 13 | 1765.25 | 3 | NE | 0 | 44.5 | 8.0 | 0.60 | 0 | 757.9 | 0 | 0.60 | 35 | 71 | |
| 14 | 1765.23 | 3 | S | 0.18 | 49.0 | 8.0 | 0.60 | 0 | 757.9 | 0.13 | 0.60 | 35 | 74 | |
| 15 | 1765.24 | 1 | S | 0.17 | 45.0 | 8.3 | 0.60 | 0 | 757.6 | 0.05 | 0.53 | 35 | 70 | |
| 16 | 1765.23 | 0 | - | 0.19 | 46.0 | 8.0 | 0.60 | 0 | 756.8 | 0.16 | 0.60 | 35 | 73 | |
| 17 | 1765.17 | 0 | - | 0.16 | 45.0 | 8.0 | 0.60 | 0 | 757.7 | 0.19 | 0.50 | 75 | 75 | |
| 18 | 1765.16 | 0 | - | 0.31 | 42.5 | 8.0 | 0.60 | 0 | 758.7 | 0.20 | 0.47 | 75 | 72 | |
| 19 | 1765.16 | 0 | - | 0 | 46.0 | 8.0 | 0.60 | 0 | 759.4 | 0 | 0.50 | 75 | 73 | |
| 20 | 1765.12 | 5 | NE | 0 | 50.5 | 8.0 | 0.60 | 0 | 759.9 | 0 | 0.50 | 75 | 73 | |
| 21 | 1765.14 | 9 | S | 0.49 | 53.0 | 8.4 | 0.56 | 0 | 760.1 | 0.11 | 0.45 | 35 | 65 | |
| 22 | 1765.27 | 0 | - | 0 | 49.0 | 8.5 | 0.54 | 0 | 760.1 | 0 | 0.45 | 35 | 66 | |
| 23 | 1765.27 | 4 | S | 0.06 | 52.5 | 8.5 | 0.54 | 0 | 759.9 | 0.07 | 0.50 | 35 | 68 | |
| 24 | 1765.41 | 3 | NE | 1.16 | 41.5 | 8.5 | 0.54 | 0 | 759.6 | 0.80 | 0.50 | 35 | 70 | |
| 25 | 1765.47 | 12 | NE | 0.22 | 48.0 | 8.4 | 0.55 | 0 | 759.1 | 0.25 | 0.55 | 35 | 72 | |
| 26 | 1765.45 | 8 | SW | 0.63 | 51.5 | 8.0 | 0.60 | 0 | 758.3 | 0.32 | 0.50 | 35 | 72 | |
| 27 | 1765.43 | 4 | NE | 0.13 | 50.5 | 8.5 | 0.60 | 0 | 759.1 | 0.13 | 0.70 | 35 | 74 | |
| 28 | 1765.43 | 10 | NE | 0.68 | 50.0 | 8.3 | 0.55 | 0 | 759.0 | 0.22 | 0.75 | 30 | 71 | |
| 29 | 1765.46 | 3 | S | 0.55 | 42.0 | 8.0 | 0.50 | 0 | 759.0 | 0.21 | 0.60 | 35 | 66 | |
| 30 | 1765.43 | 14 | NE | 0 | 50.0 | 8.5 | 0.54 | 0 | 759.3 | 0 | 0.60 | 35 | 65 | |
| 31 | 1765.39 | 11 | NE | 0.35 | 52.5 | 8.5 | 0.50 | 0 | 759.1 | 0.39 | 0.60 | 35 | 68 | |

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF JUNE, 1977.

| Date | South Fork Tolt Reservoir | | | | | | | | Regulating Basin | | | | | |
|------|---------------------------|----------------|-----------|--------------|--------------------|-----------------|-----------------|-------------------|------------------|--------------|-----------------|-------------------|-----------------|--|
| | Elev., ft | Wind Vel., mph | Wind Dir. | Precip., in. | Avg. Air Temp., °F | Water Temp., °C | Max. Turb., NTU | Valve #15, % Open | Elev., ft | Precip., in. | Max. Turb., NTU | Valve #25, % Open | Total Flow, MGD | |
| 1 | 1765.50 | 3 | W | 0.71 | 52.0 | 8.5 | 0.50 | 0 | 758.9 | 0.48 | 0.60 | 35 | 71 | |
| 2 | 1765.53 | 6 | SW | 0.05 | 49.5 | 8.5 | 0.60 | 0 | 758.3 | 0.03 | 0.60 | 35 | 70 | |
| 3 | 1765.44 | 0 | - | 0.03 | 52.0 | 8.5 | 0.60 | 0 | 759.1 | 0 | 0.40 | 75 | 71 | |
| 4 | 1765.47 | 5 | N | 0.68 | 50.5 | 8.5 | 0.46 | 0 | 759.3 | 0.48 | 0.40 | 35 | 74 | |
| 5 | 1765.52 | 12 | NE | 0.10 | 54.5 | 8.5 | 0.50 | 0 | 758.8 | 0.16 | 0.40 | 35 | 76 | |
| 6 | 1765.52 | 5 | N | 0 | 68.5 | 9.2 | 0.48 | 0 | 757.7 | 0 | 0.40 | 35 | 78 | |
| 7 | 1765.49 | 7 | N | 0 | 74.5 | 10.5 | 0.50 | 0 | 757.9 | 0 | 0.44 | 75 | 82 | |
| 8 | 1765.42 | 4 | S | 0.12 | 60.0 | 10.0 | 0.50 | 0 | 758.7 | 0 | 0.40 | 75 | 79 | |
| 9 | 1765.35 | 4 | NE | 0 | 52.0 | 9.0 | 0.50 | 0 | 759.8 | 0 | 0.40 | 75 | 69 | |
| 10 | 1765.27 | 2 | NE | 0 | 56.5 | 9.0 | 0.60 | 0 | 759.9 | 0 | 0.40 | 35 | 66 | |
| 11 | 1765.20 | 1 | S | 0 | 58.0 | 9.5 | 0.45 | 0 | 759.7 | 0 | 0.45 | 35 | 70 | |
| 12 | 1765.13 | 0 | - | 0 | 60.0 | 9.5 | 0.45 | 0 | 759.3 | 0 | 0.45 | 35 | 71 | |
| 13 | 1765.02 | 0 | - | 0 | 50.0 | 9.5 | 0.42 | 0 | 758.7 | 0 | 0.45 | 35 | 76 | |
| 14 | 1764.94 | 3 | S | 0 | 61.0 | 10.0 | 0.42 | 0 | 759.4 | 0 | 0.45 | 35 | 68 | |
| 15 | 1764.85 | 4 | S | 0 | 56.0 | 9.5 | 0.40 | 0 | 760.5 | 0 | 0.45 | 20 | 40 | |
| 16 | 1764.78 | 4 | NE | 0 | 54.5 | 9.5 | 0.30 | 0 | 760.2 | 0 | 0.45 | 20 | 38 | |
| 17 | 1764.80 | 4 | NE | 0 | 60.0 | 10.0 | 0.40 | 0 | 754.4 | 0 | 0.45 | 0 | 41 | |
| 18 | 1764.80 | 5 | S | 0 | 66.0 | 10.0 | 0.40 | 0 | 756.0 | 0 | 0.40 | 20 | 51 | |
| 19 | 1764.72 | 6 | SW | 0 | 61.0 | 10.0 | 0.40 | 0 | 756.3 | 0 | 0.40 | 20 | 48 | |
| 20 | 1764.69 | 0 | - | 0 | 58.0 | 10.0 | 0.30 | 0 | 756.7 | 0 | 0.40 | 20 | 43 | |
| 21 | 1764.62 | 4 | SW | 0.29 | 56.0 | 10.0 | 0.30 | 0 | 757.3 | 0.06 | 0.40 | 20 | 42 | |
| 22 | 1764.57 | 5 | S | 0.19 | 58.0 | 9.6 | 0.35 | 0 | 756.3 | 0.06 | 0.40 | 20 | 53 | |
| 23 | 1764.52 | 0 | - | 0.03 | 62.0 | 9.5 | 0.30 | 0 | 755.5 | 0 | 0.40 | 25 | 62 | |
| 24 | 1764.44 | 6 | NE | 0 | 64.5 | 10.0 | 0.30 | 0 | 755.5 | 0 | 0.40 | 75 | 77 | |
| 25 | 1764.17 | 3 | S | 0 | 62.5 | 10.0 | 0.35 | 0 | 756.7 | 0 | 0.40 | 75 | 81 | |
| 26 | 1763.96 | 0 | - | 0 | 58.5 | 10.0 | 0.60 | 0 | 757.1 | 0 | 0.50 | 75 | 71 | |
| 27 | 1763.75 | 0 | - | 0.04 | 60.0 | 10.0 | 0.58 | 0 | 757.7 | 0 | 0.50 | 75 | 80 | |
| 28 | 1763.54 | 1 | NE | 0 | 57.0 | 10.0 | 0.60 | 0 | 758.5 | 0 | 0.50 | 75 | 77 | |
| 29 | 1763.31 | 2 | S | 0 | 56.5 | 10.0 | 0.55 | 0 | 759.7 | 0 | 0.45 | 75 | 73 | |
| 30 | 1763.23 | 5 | NE | 0 | 58.0 | 10.0 | 0.50 | 0 | 758.6 | 0 | 0.40 | 35 | 71 | |
| 31 | | | | | | | | | | | | | | |

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF JULY, 1977.

| Date | South Fork Tolt Reservoir | | | | | | | | Regulating Basin | | | | | |
|------|---------------------------|----------------------|--------------|-----------------|----------------------|-----------------------|-----------------------|----------------------|------------------|-----------------|-----------------------|---------------------|-----------------------|----|
| | Elev., ft | Wind Vel., mph | Wind Dir. | Precip., in. | Avg. Temp., °F | Water Temp., °C | Max. Turb., NTU | Valve #15, % Open | Elev., ft | Precip., in. | Max. Turb., NTU | Valve #25 % Open | Total Flow, MGD | |
| | | | | | | | | | | | | | | |
| 29 | 1 | 1762.90 | 2 | N | 0 | 64.0 | 10.0 | 0.50 | 0 | 758.6 | 0 | 0.50 | 75 | 84 |
| | 2 | 1762.73 | 7 | S | 0.56 | 52.5 | 9.5 | 0.55 | 0 | 759.0 | 0.24 | 0.45 | 35 | 80 |
| | 3 | 1762.62 | 10 | NE | 0.41 | 52.0 | 9.5 | 0.57 | 0 | 760.2 | 0.06 | 0.50 | 15 | 54 |
| | 4 | 1762.56 | 0 | - | 0.40 | 50.0 | 9.5 | 0.55 | 0 | 759.3 | 0.42 | 0.45 | 15 | 50 |
| | 5 | 1762.54 | 0 | - | 0.60 | 51.5 | 9.5 | 0.55 | 0 | 758.4 | 0.63 | 0.45 | 15 | 48 |
| | 6 | 1762.53 | 6 | N | 0.12 | 52.5 | 9.5 | 0.55 | 0 | 759.1 | 0.02 | 0.45 | 20 | 44 |
| | 7 | 1762.43 | 6 | N | 0 | 57.0 | 9.5 | 0.55 | 0 | 757.6 | 0 | 0.45 | 20 | 40 |
| | 8 | 1762.32 | 0 | - | 0 | 61.5 | 11.0 | 0.55 | 0 | 759.3 | 0 | 0.45 | 20 | 50 |
| | 9 | 1762.22 | 2 | S | 0.03 | 59.5 | 11.0 | 0.50 | 0 | 759.2 | 0 | 0.40 | 20 | 52 |
| | 10 | 1762.10 | 4 | SW | 0 | 57.0 | 11.0 | 0.40 | 0 | 759.3 | 0 | 0.40 | 20 | 47 |
| | 11 | 1761.96 | 0 | - | 0.04 | 56.5 | 11.0 | 0.50 | 0 | 758.9 | 0.05 | 0.40 | 20 | 51 |
| | 12 | 1761.87 | 3 | SW | 0.42 | 54.0 | 11.0 | 0.40 | 0 | 759.8 | 0.27 | 0.54 | 20 | 41 |
| | 13 | 1761.88 | 0 | - | 0.16 | 56.5 | 11.0 | 0.40 | 0 | 758.3 | 0.11 | 0.40 | 0 | 31 |
| | 14 | 1761.85 | 3 | S | 0 | 54.0 | 10.0 | 0.40 | 0 | 758.8 | 0 | 0.40 | 20 | 32 |
| | 15 | 1761.71 | 4 | NE | 0 | 59.5 | 10.0 | 0.40 | 0 | 759.2 | 0 | 0.45 | 20 | 40 |
| | 16 | 1761.59 | 2 | S | 0 | 60.5 | 11.0 | 0.40 | 0 | 759.6 | 0 | 0.40 | 20 | 46 |
| | 17 | 1761.54 | 2 | S | 0.30 | 59.0 | 11.0 | 0.40 | 0 | 760.4 | 0.03 | 0.40 | 20 | 37 |
| | 18 | 1761.53 | 4 | NE | 0.07 | 52.0 | 10.0 | 0.40 | 0 | 759.3 | 0 | 0.40 | 10 | 31 |
| | 19 | 1761.49 | 6 | NE | 0 | 57.0 | 10.0 | 0.40 | 0 | 757.9 | 0 | 0.40 | 15 | 43 |
| | 20 | 1761.34 | 3 | NE | 0 | 60.0 | 10.5 | 0.45 | 0 | 758.6 | 0 | 0.40 | 35 | 55 |
| | 21 | 1761.15 | 0 | - | 0 | 63.5 | 11.0 | 0.42 | 0 | 759.1 | 0 | 0.40 | 30 | 62 |
| | 22 | 1761.06 | 2 | NE | 0 | 61.0 | 11.0 | 0.45 | 0 | 759.8 | 0 | 0.45 | 15 | 57 |
| | 23 | 1760.82 | 2 | N | 0 | 65.0 | 11.0 | 0.40 | 0 | 759.3 | 0 | 0.40 | 35 | 66 |
| | 24 | 1760.61 | 4 | NE | 0 | 69.0 | 11.0 | 0.40 | 0 | 759.1 | 0 | 0.40 | 35 | 65 |
| | 25 | 1760.42 | 3 | S | 0 | 68.0 | 11.0 | 0.40 | 0 | 758.8 | 0 | 0.20 | 35 | 71 |
| | 26 | 1760.21 | 4 | S | 0 | 65.5 | 11.0 | 0.55 | 0 | 758.9 | 0 | 0.20 | 35 | 70 |
| | 27 | 1760.01 | 0 | - | 0 | 60.5 | 11.0 | 0.40 | 0 | 759.7 | 0 | 0.20 | 35 | 58 |
| | 28 | 1759.79 | 3 | N | 0.12 | 66.0 | 11.0 | 0.40 | 0 | 758.5 | 0.04 | 0.20 | 35 | 70 |
| | 29 | 1759.57 | 2 | S | 0.03 | 59.5 | 11.0 | 0.40 | 0 | 758.0 | 0.02 | 0.20 | 45 | 81 |
| | 30 | 1759.35 | 5 | S | 0 | 62.0 | 11.0 | 0.40 | 0 | 757.4 | 0 | 0.20 | 45 | 80 |
| | 31 | 1759.12 | 5 | NE | 0 | 68.5 | 11.0 | 0.30 | 0 | 756.8 | 0 | 0.20 | 45 | 84 |

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF AUGUST, 1977.

| Date | South Fork Tolt Reservoir | | | | | | | | Regulating Basin | | | | | |
|------|---------------------------|----------------|-----------|--------------|--------------------|-----------------|-----------------|-------------------|------------------|--------------|-----------------|-------------------|-----------------|--|
| | Elev., ft | Wind Vel., mph | Wind Dir. | Precip., in. | Avg. Air Temp., °F | Water Temp., °C | Max. Turb., NTU | Valve #15, % Open | Elev., ft | Precip., in. | Max. Turb., NTU | Valve #25, % Open | Total Flow, MGD | |
| 1 | 1758.89 | 7 | NE | 0 | 72.0 | 11.5 | 0.40 | 0 | 756.0 | 0 | 0.20 | 45 | 83 | |
| 2 | 1758.62 | 5 | N | 0 | 72.0 | 11.5 | 0.40 | 0 | 756.1 | 0 | 0.20 | 75 | 84 | |
| 3 | 1758.37 | 3 | N | 0 | 72.5 | 12.0 | 0.40 | 0 | 756.1 | 0 | 0.20 | 75 | 83 | |
| 4 | 1758.09 | 0 | - | 0 | 72.5 | 12.0 | 0.40 | 0 | 756.2 | 0 | 0.20 | 75 | 83 | |
| 5 | 1757.84 | 0 | - | 0 | 70.0 | 12.0 | 0.40 | 0 | 756.3 | 0 | 0.20 | 75 | 83 | |
| 6 | 1757.59 | 2 | NE | 0 | 71.0 | 12.0 | 0.40 | 0 | 756.4 | 0 | 0.20 | 75 | 84 | |
| 7 | 1757.30 | 6 | NE | 0 | 72.0 | 12.0 | 0.30 | 0 | 756.5 | 0 | 0.20 | 75 | 84 | |
| 8 | 1757.02 | 4 | N | 0 | 72.0 | 12.0 | 0.40 | 0 | 756.5 | 0 | 0.20 | 75 | 84 | |
| 9 | 1756.74 | 5 | NE | 0 | 68.0 | 12.0 | 0.40 | 0 | 756.6 | 0 | 0.20 | 75 | 85 | |
| 10 | 1756.45 | 6 | NE | 0 | 70.0 | 12.0 | 0.40 | 0 | 756.9 | 0 | 0.20 | 75 | 84 | |
| 11 | 1756.18 | 6 | NE | 0 | 70.5 | 12.0 | 0.40 | 0 | 756.6 | 0 | 0.20 | 75 | 84 | |
| 12 | 1755.91 | 5 | NE | 0 | 72.0 | 12.5 | 0.40 | 0 | 756.6 | 0 | 0.20 | 75 | 84 | |
| 13 | 1755.62 | 6 | NE | 0 | 71.0 | 12.5 | 0.40 | 0 | 756.9 | 0 | 0.20 | 75 | 83 | |
| 14 | 1755.37 | 2 | NE | 0 | 73.5 | 12.0 | 0.42 | 0 | 756.6 | 0 | 0.20 | 75 | 88 | |
| 15 | 1755.07 | 0 | - | 0 | 69.5 | 12.5 | 0.40 | 0 | 756.7 | 0 | 0.20 | 75 | 84 | |
| 16 | 1754.78 | 3 | NE | 0 | 71.5 | 12.5 | 0.40 | 0 | 756.7 | 0 | 0.20 | 75 | 85 | |
| 17 | 1754.51 | 6 | NE | 0 | 75.0 | 12.5 | 0.40 | 0 | 756.7 | 0 | 0.20 | 75 | 85 | |
| 18 | 1754.23 | 0 | - | 0 | 60.0 | 12.5 | 0.40 | 0 | 756.8 | 0 | 0.20 | 75 | 84 | |
| 19 | 1753.93 | 0 | - | 0 | 68.0 | 12.5 | 0.40 | 0 | 756.9 | 0 | 0.20 | 75 | 83 | |
| 20 | 1753.65 | 0 | - | 0 | 62.5 | 12.0 | 0.40 | 0 | 757.1 | 0 | 0.20 | 75 | 84 | |
| 21 | 1753.36 | 2 | S | 0.02 | 63.5 | 12.0 | 0.40 | 0 | 757.2 | 0 | 0.40 | 75 | 83 | |
| 22 | 1753.06 | 3 | SE | 0.10 | 54.5 | 12.0 | 0.40 | 0 | 758.1 | 0.03 | 0.40 | 75 | 80 | |
| 23 | 1752.80 | 0 | - | 0.11 | 56.5 | 12.0 | 0.45 | 0 | 758.7 | 0.15 | 0.40 | 75 | 79 | |
| 24 | 1752.70 | 0 | - | 1.67 | 54.5 | 12.0 | 0.45 | 0 | 759.5 | 1.71 | 0.40 | 75 | 78 | |
| 25 | 1752.71 | 7 | SW | 0.94 | 54.0 | 12.0 | 0.40 | 0 | 759.2 | 1.19 | 0.40 | 35 | 71 | |
| 26 | 1752.83 | 2 | S | 0.50 | 51.0 | 12.0 | 0.45 | 0 | 760.5 | 0.71 | 0.40 | 35 | 59 | |
| 27 | 1753.03 | 0 | - | 0.18 | 52.0 | 12.0 | 0.45 | 0 | 757.6 | 0.25 | 0.40 | 0 | 34 | |
| 28 | 1753.20 | 12 | N | 0.09 | 55.0 | 12.0 | 0.45 | 0 | 754.5 | 0.19 | 0.45 | 0 | 35 | |
| 29 | 1753.42 | 6 | S | 0.32 | 53.5 | 12.0 | 0.40 | 0 | 754.6 | 0.17 | 0.40 | 15 | 33 | |
| 30 | 1753.72 | 0 | - | 0.78 | 49.5 | 12.0 | 0.40 | 0 | 756.6 | 0.83 | 0.40 | 35 | 37 | |
| 31 | 1753.85 | 0 | - | 0.05 | 51.5 | 12.0 | 0.40 | 0 | 759.2 | 0.03 | 0.50 | 35 | 34 | |

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF SEPTEMBER, 1977.

| Date | South Fork Tolt Reservoir | | | | | | | | Regulating Basin | | | | | |
|------|---------------------------|----------------|-----------|--------------|----------------|-----------------|-----------------|-------------------|------------------|--------------|-----------------|-------------------|-----------------|--|
| | Elev., ft | Wind Vel., mph | Wind Dir. | Precip., in. | Avg. Temp., °F | Water Temp., °C | Max. Turb., NTU | Valve #15, % Open | Elev., ft | Precip., in. | Max. Turb., NTU | Valve #25, % Open | Total Flow, MGD | |
| 31 | 1 1753.84 | 4 | NE | 0 | 55.5 | - | 0.40 | 0 | 760.4 | 0 | 0.45 | 25 | 37 | |
| | 2 1753.92 | 0 | - | 0 | 58.0 | - | 0.40 | 0 | 757.1 | 0 | 0.45 | 0 | 37 | |
| | 3 1754.12 | 0 | - | 0.46 | 52.0 | - | 0.35 | 0 | 754.1 | 0.39 | 0.45 | 0 | 36 | |
| | 4 1754.32 | 2 | S | 0.46 | 61.0 | - | 0.40 | 0 | 754.4 | 0.55 | 0.45 | 15 | 35 | |
| | 5 1754.61 | 2 | S | 0.10 | 61.0 | - | 0.40 | 0 | 754.8 | 0.05 | 0.45 | 15 | 32 | |
| | 6 1754.68 | 3 | N | 0 | 59.0 | - | 0.40 | 0 | 754.7 | 0 | 0.45 | 15 | 35 | |
| | 7 1754.69 | 6 | NE | 0 | 59.0 | - | 0.40 | 0 | 754.9 | 0 | 0.45 | 15 | 38 | |
| | 8 1754.71 | 0 | - | 0.35 | 50.5 | - | 0.45 | 0 | 755.5 | 0.29 | 0.45 | 15 | 35 | |
| | 9 1754.68 | 2 | NE | 0 | 53.5 | 13.0 | 0.45 | 0 | 756.0 | 0 | 0.45 | 15 | 37 | |
| | 10 1754.63 | 1 | NE | 0 | 51.5 | 13.0 | 0.45 | 0 | 756.5 | 0 | 0.45 | 15 | 38 | |
| | 11 1754.54 | 4 | N | 0 | 55.0 | 12.0 | 0.45 | 0 | 756.9 | 0 | 0.45 | 15 | 37 | |
| | 12 1754.45 | 4 | N | 0 | 62.0 | 14.0 | 0.45 | 0 | 757.3 | 0 | 0.50 | 15 | 36 | |
| | 13 1754.33 | 4 | N | 0 | 65.0 | 14.0 | 0.50 | 0 | 757.6 | 0 | 0.50 | 15 | 39 | |
| | 14 1754.29 | 4 | SW | 0.02 | 64.0 | 14.0 | 0.50 | 0 | 756.5 | 0.03 | 0.50 | 15 | 38 | |
| | 15 1754.14 | 0 | - | 0.40 | 55.5 | 14.0 | 0.50 | 0 | 757.6 | 0.02 | 0.50 | 35 | 37 | |
| | 16 1753.95 | 0 | - | 0.03 | 52.0 | 13.0 | 0.50 | 0 | 760.3 | 0.02 | 0.50 | 35 | 34 | |
| | 17 1753.84 | 0 | - | 0.02 | 52.5 | 13.0 | 0.45 | 0 | 759.9 | 0 | 0.45 | 15 | 34 | |
| | 18 1753.83 | 8 | E | 0.01 | 55.5 | 13.0 | 0.50 | 0 | 758.0 | 0.03 | 0.50 | 0 | 31 | |
| | 19 1753.82 | 0 | - | 0.06 | 52.0 | 13.0 | 0.45 | 0 | 755.0 | 0.04 | 0.45 | 0 | 31 | |
| | 20 1753.81 | 12 | S | 0.72 | 50.5 | 13.0 | 0.50 | 0 | 755.7 | 0.72 | 0.50 | 35 | 30 | |
| | 21 1753.92 | 0 | - | 1.0 | 47.0 | 13.0 | 0.50 | 0 | 756.4 | 1.50 | 0.50 | 15 | 27 | |
| | 22 1754.03 | 4 | N | 0.08 | 48.0 | 13.0 | 0.60 | 0 | 756.7 | 0.06 | 0.60 | 15 | 33 | |
| | 23 1754.04 | 14 | NE | 0.16 | 50.5 | 13.0 | 0.60 | 0 | 757.4 | 0.18 | 0.60 | 15 | 30 | |
| | 24 1754.10 | 6 | S | 0.62 | 46.0 | 13.0 | 0.55 | 0 | 758.5 | 0.52 | 0.60 | 15 | 26 | |
| | 25 1754.30 | 12 | E | 0.24 | 48.0 | 13.0 | 0.60 | 0 | 759.4 | 0.09 | 0.60 | 15 | 24 | |
| | 26 1754.36 | 3 | N | 0.13 | 46.5 | 13.0 | 0.60 | 0 | 760.1 | 0.11 | 0.60 | 15 | 24 | |
| | 27 1754.44 | 9 | NE | 0 | 52.5 | 13.0 | 0.60 | 0 | 758.3 | 0 | 0.60 | 0 | 27 | |
| | 28 1754.45 | 0 | - | 0.20 | 52.0 | 13.5 | 0.55 | 0 | 758.6 | 0.08 | 0.50 | 10 | 27 | |
| | 29 1754.46 | 4 | W | 0.64 | 53.5 | 13.0 | 0.60 | 0 | 758.6 | 0.43 | 0.50 | 15 | 24 | |
| | 30 1754.54 | 0 | - | 0.62 | 47.0 | 13.0 | 0.60 | 0 | 758.6 | 0.48 | 0.50 | 15 | 24 | |
| 31 | | | | | | | | | | | | | | |

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF OCTOBER, 1977.

| Date | South Fork Tolt Reservoir | | | | | | | | Regulating Basin | | | | | |
|------|---------------------------|----------------|-----------|--------------|----------------|-----------------|-----------------|-------------------|------------------|--------------|-----------------|-------------------|-----------------|--|
| | Elev., ft | Wind Vel., mph | Wind Dir. | Precip., in. | Avg. Temp., °F | Water Temp., °C | Max. Turb., NTU | Valve #15, % Open | Elev., ft | Precip., in. | Max. Turb., NTU | Valve #25, % Open | Total Flow, MGD | |
| 1 | 1754.60 | 6 | N | 0 | 48.0 | 13.0 | 0.60 | 0 | 756.2 | 0 | 0.50 | 0 | 34 | |
| 2 | 1754.66 | 3 | NE | 0 | 50.0 | 13.0 | 0.60 | 0 | 752.6 | 0 | 0.50 | 0 | 42 | |
| 3 | 1754.65 | 6 | NE | 0 | 47.5 | 12.5 | 0.60 | 0 | 751.7 | 0 | 0.50 | 15 | 47 | |
| 4 | 1754.51 | 18 | NE | 0 | 50.0 | 13.0 | 0.60 | 0 | 751.6 | 0 | 0.60 | 35 | 58 | |
| 5 | 1754.30 | 26 | NE | 0 | 47.5 | 13.0 | 0.60 | 0 | 752.2 | 0 | 0.50 | 35 | 61 | |
| 6 | 1754.10 | 14 | NE | 0 | 55.0 | 13.0 | 0.50 | 0 | 752.7 | 0 | 0.50 | 35 | 66 | |
| 7 | 1753.94 | 2 | SW | 0.33 | 49.0 | 12.5 | 0.60 | 0 | 753.9 | 0.20 | 0.50 | 35 | 59 | |
| 8 | 1753.75 | 6 | S | 0 | 51.5 | 13.0 | 0.60 | 0 | 751.8 | 0 | 0.50 | 35 | 54 | |
| 9 | 1753.62 | 2 | S | 0.29 | 45.0 | 12.0 | 0.60 | 0 | 755.2 | 0.20 | 0.50 | 35 | 65 | |
| 10 | 1753.50 | 20 | NE | 0.03 | 45.0 | 12.0 | 0.60 | 0 | 756.0 | 0.02 | 0.50 | 35 | 59 | |
| 11 | 1753.30 | 25 | NE | 0 | 47.0 | 12.0 | 0.60 | 0 | 756.2 | 0 | 0.50 | 35 | 64 | |
| 12 | 1753.10 | 17 | NE | 0 | 63.5 | 12.0 | 0.60 | 0 | 756.8 | 0 | 0.50 | 35 | 64 | |
| 13 | 1753.01 | 0 | - | 0.72 | 53.0 | 12.0 | 0.60 | 0 | 757.3 | 0.51 | 0.50 | 35 | 61 | |
| 14 | 1752.88 | 4 | NE | 0 | 52.5 | 12.0 | 0.60 | 0 | 757.8 | 0 | 0.50 | 35 | 64 | |
| 15 | 1752.68 | 18 | NE | 0 | 53.5 | 12.0 | 0.70 | 0 | 758.2 | 0 | 0.60 | 35 | 64 | |
| 16 | 1752.51 | 4 | N | 0.36 | 53.0 | 12.0 | 0.70 | 0 | 758.5 | 0.24 | 0.60 | 35 | 57 | |
| 17 | 1752.33 | 6 | NE | 0 | 52.5 | 12.0 | 0.60 | 0 | 758.9 | 0 | 0.60 | 35 | 74 | |
| 18 | 1752.13 | 17 | NE | 0 | 52.0 | 12.0 | 0.60 | 0 | 758.7 | 0 | 0.60 | 35 | 70 | |
| 19 | 1751.92 | 0 | - | 0.02 | 52.0 | 12.0 | 0.60 | 0 | 758.8 | 0.03 | 0.50 | 35 | 71 | |
| 20 | 1751.73 | 6 | N | 0 | 44.5 | 12.0 | 0.60 | 0 | 758.2 | 0 | 0.50 | 35 | 69 | |
| 21 | 1751.51 | 12 | NE | 0.05 | 51.0 | 11.5 | 0.60 | 0 | 757.2 | 0.04 | 0.50 | 35 | 78 | |
| 22 | 1751.30 | 22 | NE | 0 | 49.5 | 12.0 | 0.60 | 0 | 756.7 | 0 | 0.50 | 35 | 72 | |
| 23 | 1751.09 | 15 | SW | 0.36 | 50.5 | 12.0 | 0.70 | 0 | 757.2 | 0.20 | 0.50 | 35 | 75 | |
| 24 | 1750.90 | 15 | NE | 0.03 | 46.0 | 11.5 | 0.65 | 0 | 755.2 | 0 | 0.50 | 35 | 77 | |
| 25 | 1750.96 | 5 | NE | 0.90 | 49.5 | 11.5 | 0.75 | 0 | 755.4 | 0.73 | 0.60 | 60 | 78 | |
| 26 | 1751.16 | 2 | SW | 0.65 | 47.0 | 11.0 | 0.70 | 0 | 756.5 | 0.35 | 0.60 | 60 | 67 | |
| 27 | 1751.20 | 38 | NE | 0 | 46.0 | 11.0 | 0.80 | 0 | 757.0 | 0 | 0.60 | 60 | 77 | |
| 28 | 1751.07 | 12 | NE | 0 | 48.0 | 11.0 | 0.75 | 0 | 757.4 | 0 | 0.60 | 60 | 79 | |
| 29 | 1750.98 | 8 | NE | 0.57 | 48.0 | 11.0 | 0.70 | 0 | 758.6 | 0.41 | 0.60 | 60 | 71 | |
| 30 | 1750.90 | 14 | S | 0.86 | 45.0 | 11.0 | 0.80 | 0 | 759.6 | 0.45 | 0.60 | 60 | 72 | |
| 31 | 1751.25 | 0 | - | 0.09 | 41.0 | 10.5 | 0.80 | 0 | 760.1 | 0.05 | 0.70 | 60 | 73 | |

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Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF NOVEMBER, 1977.

| Date | South Fork Tolt Reservoir | | | | | | | | Regulating Basin | | | | | |
|------|---------------------------|----------------|-----------|-------------|--------------------|-----------------|-----------------|-------------------|------------------|--------------|-----------------|-------------------|-----------------|--|
| | Elev., ft | Wind Vel., mph | Wind Dir. | Precip., in | Avg. Air Temp., °F | Water Temp., °C | Max. Turb., NTU | Valve #15, % Open | Elev., ft | Precip., in. | Max. Turb., NTU | Valve #25, % Open | Total Flow, MGD | |
| 1 | 1751.40 | 26 | SW | 0.32 | 44.0 | 10.0 | 0.80 | 0 | 760.0 | 0.41 | 0.70 | 35 | 68 | |
| 2 | 1753.00 | 7 | SW | 0.42 | 46.5 | 10.0 | 0.95 | 0 | 757.2 | 0.42 | 0.70 | 15 | 70 | |
| 3 | 1753.37 | 15 | NE | 0.03 | 39.0 | 10.0 | 1.40 | 0 | 757.0 | 0.04 | 0.70 | 15 | 54 | |
| 4 | 1753.39 | 36 | NE | 0.05 | 39.0 | 9.5 | 1.20 | 0 | 759.9 | 0.07 | 0.70 | 35 | 29 | |
| 5 | 1753.27 | 22 | NE | 0.14 | 40.5 | 9.0 | 1.50 | 0 | 760.9 | 0.11 | 0.80 | 35 | 25 | |
| 6 | 1753.23 | 5 | NE | 0.26 | 40.5 | 9.0 | 1.40 | 0 | 760.9 | 0.31 | 0.90 | 35 | 26 | |
| 7 | 1753.45 | 0 | - | 0.95 | 38.0 | 9.0 | 1.40 | 0 | 760.7 | 0.62 | 0.90 | 35 | 25 | |
| 8 | 1753.75 | 7 | NE | 0.14 | 36.5 | 9.0 | 1.40 | 0 | 758.7 | 0.04 | 1.00 | 0 | 28 | |
| 9 | 1754.00 | 27 | NE | 0.18 | 34.5 | 8.5 | 1.40 | 0 | 756.4 | 0.15 | 1.00 | 0 | 24 | |
| 10 | 1754.80 | 4 | SW | 0.63 | 44.0 | 8.5 | 1.40 | 0 | 759.3 | 0.48 | 1.00 | 35 | 26 | |
| 11 | 1755.44 | 20 | NE | 0.17 | 49.0 | 8.5 | 2.00 | 30 | 760.2 | 0.15 | 1.00 | 15 | 25 | |
| 12 | 1755.50 | 5 | NE | 0.36 | 46.0 | 8.5 | 1.80 | 30 | 760.3 | 0.25 | 1.00 | 15 | 26 | |
| 13 | 1757.14 | 0 | SE | 0.48 | 43.5 | 8.5 | 1.90 | 30 | 760.2 | 0.24 | 1.05 | 15 | 26 | |
| 14 | 1755.5 | 12 | SW | 0.38 | 40.5 | 8.5 | 1.70 | 30 | 760.1 | 0.27 | 1.10 | 15 | 28 | |
| 15 | 1755.70 | 9 | S | 0.41 | 39.0 | 8.5 | 1.20 | 30 | 760.1 | 0.34 | 1.00 | 15 | 27 | |
| 16 | 1755.63 | 1 | S | 0.40 | 38.0 | 8.5 | 1.20 | 40 | 760.2 | 0.43 | 1.00 | 15 | 26 | |
| 17 | 1755.63 | 0 | - | 0.05 | 34.5 | 8.0 | 1.20 | 40 | 760.2 | 0.04 | 0.95 | 15 | 26 | |
| 18 | 1755.11 | 11 | NE | 0.27 | 30.5 | 7.5 | 1.20 | 50 | 760.2 | 0.07 | 0.95 | 15 | 25 | |
| 19 | 1754.52 | 6 | NE | 0 | 29.0 | 7.0 | 1.20 | 50 | 760.3 | 0 | 0.90 | 15 | 25 | |
| 20 | 1753.89 | 35 | NE | 0 | 28.0 | 7.0 | 1.20 | 50 | 760.3 | 0 | 0.90 | 15 | 25 | |
| 21 | 1753.17 | 34 | NE | 0 | 19.5 | 6.0 | 1.50 | 50 | 760.1 | 0 | 0.90 | 15 | 27 | |
| 22 | 1752.55 | 30 | NE | 0 | 18.5 | 5.5 | 1.80 | 50 | 758.8 | 0 | 0.90 | 0 | 30 | |
| 23 | 1751.88 | 9 | NE | 0.03 | 20.0 | 5.5 | 1.70 | 50 | 755.0 | 0.40 | 0.90 | 0 | 32 | |
| 24 | 1751.25 | 7 | SW | 0.65 | 41.5 | 5.5 | 1.60 | 50 | 755.0 | 0.47 | 0.90 | 15 | 35 | |
| 25 | 1750.62 | 26 | NE | 0.53 | 42.5 | 5.5 | 1.60 | 50 | 756.0 | 0.36 | 0.90 | 15 | 27 | |
| 26 | 1753.45 | 8 | NE | 2.10 | 45.5 | 5.5 | 3.50 | 50 | 757.1 | 1.45 | 1.20 | 15 | 71 | |
| 27 | 1753.96 | 16 | N | 0.39 | 40.0 | 5.5 | 2.00 | 50 | 758.2 | 0.20 | 1.10 | 15 | 26 | |
| 28 | 1754.42 | 6 | SW | 0.59 | 41.0 | 5.0 | 1.80 | 50 | 759.0 | 0.15 | 1.40 | 15 | 25 | |
| 29 | 1755.11 | 3 | SW | 0.86 | 42.0 | 4.5 | 1.80 | 50 | 760.0 | 0.34 | 1.40 | 15 | 27 | |
| 30 | 1755.14 | 12 | NE | 0 | 39.5 | 5.0 | 1.60 | 70 | 758.0 | 0 | 1.30 | 0 | 26 | |

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF DECEMBER, 1977.

| Date | South Fork Tolt Reservoir | | | | | | | | Regulating Basin | | | | | |
|------|---------------------------|----------------|-----------|--------------|--------------------|-----------------|-----------------|-------------------|------------------|--------------|-----------------|-------------------|-----------------|--|
| | Elev., ft | Wind Vel., mph | Wind Dir. | Precip., in. | Avg. Air Temp., °F | Water Temp., °C | Max. Turb., NTU | Valve #15, % Open | Elev., ft | Precip., in. | Max. Turb., NTU | Valve #25, % Open | Total Flow, MGD | |
| 1 | 1754.65 | 9 | SW | 0.70 | 37.5 | 4.5 | 2.20 | 70 | 755.9 | 0.54 | 1.00 | 0 | 26 | |
| 2 | 1758.43 | 30 | SW | 2.00 | 47.0 | 4.5 | 3.80 | 0 | 755.8 | 0.77 | 1.00 | 15 | 27 | |
| 3 | 1758.57 | 30 | SW | 0.28 | 45.5 | 5.0 | 3.20 | 0 | 756.8 | 0.11 | 1.40 | 15 | 22 | |
| 4 | 1758.10 | 6 | S | 0.46 | 37.0 | 5.0 | 3.60 | 0 | 757.9 | 0.61 | 1.30 | 15 | 20 | |
| 5 | 1757.77 | 6 | NE | 0.27 | 35.0 | 4.5 | 3.90 | 0 | 758.9 | 0.24 | 1.30 | 15 | 19 | |
| 6 | 1757.40 | 10 | S | 0.60 | 37.5 | 4.5 | 4.60 | 0 | 758.1 | 0.46 | 1.50 | 0 | 20 | |
| 7 | 1757.70 | 2 | S | 0.32 | 35.0 | 4.5 | 4.80 | 0 | 756.3 | 0.14 | 1.90 | 0 | 19 | |
| 8 | 1757.69 | 15 | NW | 0.08 | 34.0 | 4.0 | 5.00 | 0 | 754.5 | 0.10 | 1.80 | 0 | 20 | |
| 9 | 1757.46 | 12 | SE | 0.12 | 33.5 | 4.0 | 5.00 | 0 | 752.7 | 0.09 | 1.60 | 0 | 18 | |
| 10 | 1756.62 | 4 | SW | 0.67 | 36.5 | 4.0 | 4.90 | 75 | 751.5 | 0.42 | 2.00 | 15 | 19 | |
| 11 | 1758.12 | 12 | NE | 1.47 | 44.5 | 4.0 | 4.50 | 0 | 752.0 | 1.29 | 2.00 | 0 | 20 | |
| 12 | 1758.63 | 21 | SW | 1.28 | 48.0 | 4.4 | 4.60 | 0 | 750.0 | 0.76 | 2.10 | 0 | 19 | |
| 13 | 1758.18 | 3 | SW | 0.50 | 43.5 | 4.0 | 4.40 | 0 | 753.1 | 0.38 | 2.80 | 35 | 20 | |
| 14 | 1758.35 | 20 | NE | 1.01 | 44.0 | 4.5 | 4.20 | 0 | 756.9 | 0.71 | 3.60 | 35 | 18 | |
| 15 | 1758.12 | 10 | SW | 0.51 | 43.0 | 4.5 | 4.00 | 0 | 759.0 | 0.42 | 3.40 | 35 | 28 | |
| 16 | 1757.90 | 3 | NE | 1.60 | 38.5 | 4.0 | 4.00 | 0 | 758.9 | 1.52 | 4.00 | 35 | 59 | |
| 17 | 1757.52 | 2 | SW | 0.03 | 39.0 | 4.0 | 3.16 | 0 | 758.9 | 0.02 | 4.90 | 35 | 68 | |
| 18 | 1757.30 | 4 | NE | 0.24 | 33.5 | 4.0 | 3.50 | 0 | 759.1 | 0.21 | 3.80 | 35 | 58 | |
| 19 | 1757.14 | 0 | - | 0.22 | 33.5 | 4.0 | 3.60 | 0 | 759.5 | 0.07 | 3.90 | 35 | 62 | |
| 20 | 1755.92 | 54 | NE | 0 | 29.0 | 3.5 | 5.20 | 100 | 758.5 | 0 | 4.00 | 35 | 69 | |
| 21 | 1754.46 | 52 | NE | 0 | 39.0 | 3.5 | 5.80 | 100 | 758.9 | 0 | 2.30 | 35 | 63 | |
| 22 | 1753.07 | 15 | NE | 0 | 38.0 | 3.5 | 4.60 | 100 | 755.0 | 0 | 4.00 | 0 | 61 | |
| 23 | 1751.74 | 4 | NE | 0 | 36.0 | 3.5 | 4.20 | 100 | 750.1 | 0 | 4.20 | 0 | 64 | |
| 24 | 1750.24 | 0 | - | 0.10 | 38.0 | 3.0 | 3.90 | 100 | 748.5 | 0.09 | 4.50 | 35 | 57 | |
| 25 | 1748.23 | 2 | NE | 0.22 | 36.5 | 3.0 | 3.00 | 100 | 748.0 | 0.11 | 4.20 | 35 | 59 | |
| 26 | 1748.45 | 34 | NE | 0 | 36.0 | 3.0 | 3.40 | 0 | 751.0 | 0 | 4.00 | 35 | 56 | |
| 27 | 1748.15 | 38 | NE | 0 | 29.0 | 3.0 | 3.40 | 0 | 751.8 | 0 | 3.90 | 35 | 57 | |
| 28 | 1748.84 | 42 | NE | 0 | 33.0 | 2.5 | 3.60 | 0 | 752.8 | 0 | 3.90 | 35 | 51 | |
| 29 | 1747.67 | 11 | NE | 0.42 | 35.0 | 2.5 | 3.40 | 0 | 754.5 | 0.34 | 3.80 | 35 | 46 | |
| 30 | 1747.60 | 0 | - | 0.28 | 34.0 | 2.5 | 3.40 | 0 | 756.2 | 0.07 | 3.80 | 35 | 47 | |
| 31 | 1747.57 | 30 | NE | 0 | 30.5 | 2.5 | 3.00 | 0 | 758.1 | 0 | 3.70 | 20 | 37 | |

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF JANUARY, 1978.

| Date | South Fork Tolt Reservoir | | | | | | | Regulating Basin | | | | | | |
|------|---------------------------|----------------|-----------|--------------|--------------------|-----------------|-----------------|-------------------|-----------|--------------|-----------------|-------------------|-----------------|--|
| | Elev., ft | Wind Vel., mph | Wind Dir. | Precip., in. | Avg. Air Temp., °F | Water Temp., °C | Max. Turb., NTU | Valve #15, % Open | Elev., ft | Precip., in. | Max. Turb., NTU | Valve #25, % Open | Total Flow, MGD | |
| 1 | 1747.46 | 38 | NE | 0 | 24.5 | 2.0 | 6.0 | 0 | 759.9 | 0 | 3.7 | 20 | 27 | |
| 2 | 1746.48 | 37 | NE | 0 | 27.5 | 1.5 | 4.0 | 0 | 758.0 | 0 | 3.5 | 0 | 23 | |
| 3 | 1747.50 | 6 | NE | 1.10 | 25.0 | 1.5 | 4.0 | 0 | 755.4 | 0.78 | 3.5 | 0 | 27 | |
| 4 | 1748.12 | 15 | NW | 1.10 | 41.5 | 3.0 | 3.8 | 0 | 755.9 | 0.53 | 3.5 | 15 | 28 | |
| 5 | 1749.36 | 12 | SE | 0.70 | 43.0 | 2.0 | 3.8 | 0 | 756.8 | 0.40 | 3.5 | 15 | 28 | |
| 6 | 1749.68 | 7 | NW | 0.73 | 39.0 | 2.0 | 3.5 | 50 | 756.9 | 0.43 | 3.7 | 15 | 27 | |
| 7 | 1749.20 | 24 | NE | 0.22 | 41.5 | 1.5 | 3.0 | 50 | 758.8 | 0.30 | 3.7 | 15 | 25 | |
| 8 | 1748.85 | 29 | NE | 0.97 | 38.0 | 1.5 | 3.2 | 50 | 759.7 | 1.16 | 3.6 | 15 | 25 | |
| 9 | 1749.47 | 45 | SE | 0.08 | 40.5 | 3.0 | 3.2 | 0 | 760.1 | 0.05 | 3.6 | 15 | 24 | |
| 10 | 1749.72 | 4 | SE | 0.10 | 42.0 | 2.0 | 2.9 | 0 | 758.3 | 0.08 | 3.6 | 0 | 26 | |
| 11 | 1749.90 | 0 | - | 0.08 | 41.5 | 2.0 | 2.8 | 0 | 755.9 | 0.03 | 3.5 | 0 | 25 | |
| 12 | 1749.55 | 6 | NE | 0.18 | 36.5 | 2.0 | 3.5 | 50 | 753.8 | 0.19 | 3.4 | 0 | 25 | |
| 13 | 1748.88 | 42 | NE | 0.26 | 40.0 | 2.0 | 3.4 | 50 | 754.1 | 0.13 | 3.3 | 15 | 26 | |
| 14 | 1748.51 | 46 | NE | 0.35 | 40.0 | 2.0 | 3.6 | 20 | 757.0 | 0.08 | 3.3 | 35 | 26 | |
| 15 | 1748.29 | 19 | NE | 0.04 | 43.5 | 2.0 | 3.5 | 20 | 760.0 | 0 | 3.2 | 35 | 25 | |
| 16 | 1748.24 | 30 | NE | 0 | 41.0 | 2.0 | 3.6 | 20 | 758.0 | 0 | 3.2 | 0 | 24 | |
| 17 | 1748.14 | 6 | NE | 0.02 | 41.0 | 2.0 | 3.4 | 0 | 758.0 | 0.02 | 3.2 | 15 | 26 | |
| 18 | 1748.04 | 18 | NE | 0.05 | 40.0 | 2.0 | 3.2 | 0 | 758.7 | 0.04 | 3.2 | 15 | 26 | |
| 19 | 1747.91 | 14 | NE | 0.02 | 43.0 | 2.0 | 3.1 | 0 | 759.5 | 0.02 | 3.1 | 15 | 24 | |
| 20 | 1747.78 | 6 | NE | 0.07 | 44.0 | 2.0 | 3.2 | 0 | 760.1 | 0.02 | 2.5 | 15 | 27 | |
| 21 | 1747.80 | 2 | N | 0.70 | 41.5 | 2.5 | 3.0 | 0 | 758.0 | 0.56 | 2.5 | 0 | 25 | |
| 22 | 1748.03 | 7 | SW | 0.40 | 39.0 | 2.5 | 3.0 | 0 | 755.9 | 0.26 | 2.5 | 0 | 25 | |
| 23 | 1748.09 | 4 | NE | 0.20 | 36.0 | 2.0 | 3.0 | 0 | 756.1 | 0.16 | 2.5 | 15 | 24 | |
| 24 | 1748.05 | 4 | NE | 0 | 34.0 | 2.0 | 2.5 | 0 | 757.4 | 0 | 2.4 | 20 | 26 | |
| 25 | 1747.99 | 6 | NE | 0.02 | 40.0 | 2.0 | 2.4 | 0 | 759.0 | 0.02 | 2.2 | 15 | 25 | |
| 26 | 1748.24 | 6 | NE | 1.46 | 36.0 | - | - | 0 | 757.3 | 1.22 | 2.2 | 0 | 23 | |
| 27 | 1748.36 | 4 | NE | 0.19 | 36.0 | 2.0 | 2.2 | 0 | 757.2 | 0.22 | 2.1 | 15 | 23 | |
| 28 | 1748.38 | 11 | NE | 0.01 | 38.5 | 2.0 | 2.2 | 0 | 758.4 | 0.03 | 2.4 | 20 | 28 | |
| 29 | 1748.37 | 0 | - | 0.20 | 37.0 | 2.0 | 2.2 | 0 | 759.9 | 0.05 | 2.0 | 20 | 31 | |
| 30 | 1748.36 | 26 | NE | 0 | 38.0 | 2.0 | 2.2 | 0 | 760.5 | 0 | 2.1 | 20 | 25 | |
| 31 | 1748.32 | 22 | NE | 0.04 | 35.0 | 2.0 | 2.2 | 0 | 760.2 | 0.05 | 2.1 | 15 | 26 | |

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF FEBRUARY, 1978.

| Date | South Fork Tolt Reservoir | | | | | | | | Regulating Basin | | | | | |
|------|---------------------------|----------------|-----------|--------------|--------------------|-----------------|-----------------|-------------------|------------------|--------------|-----------------|-------------------|-----------------|--|
| | Elev., ft | Wind Vel., mph | Wind Dir. | Precip., in. | Avg. Air Temp., °F | Water Temp., °C | Max. Turb., NTU | Valve #15, % Open | Elev., ft | Precip., in. | Max. Turb., NTU | Valve #25, % Open | Total Flow, MGD | |
| 1 | 1748.45 | 26 | NE | 0.26 | 35.0 | 2.0 | 2.0 | 0 | 758.1 | 0.26 | 2.0 | 0 | 27 | |
| 2 | 1748.63 | 6 | SW | 0.86 | 35.0 | 2.0 | 2.0 | 0 | 756.1 | 0.48 | 2.2 | 0 | 24 | |
| 3 | 1749.00 | 6 | SW | 0.70 | 41.0 | 2.0 | 2.4 | 0 | 757.0 | 0.39 | 2.7 | 15 | 22 | |
| 4 | 1749.49 | 38 | NE | 0.04 | 42.5 | 2.0 | 2.4 | 0 | 757.7 | 0.02 | 2.6 | 20 | 25 | |
| 5 | 1749.73 | 39 | NE | 0.02 | 52.5 | 2.0 | 2.4 | 0 | 758.3 | 0 | 2.5 | 20 | 26 | |
| 6 | 1750.07 | 10 | NE | 0.60 | 46.0 | 2.0 | 2.4 | 0 | 759.1 | 0.46 | 2.5 | 15 | 25 | |
| 7 | 1750.32 | 22 | NE | 0.05 | 44.0 | 2.0 | 2.2 | 20 | 759.5 | 0.02 | 2.5 | 15 | 28 | |
| 8 | 1750.26 | 10 | NE | 0.68 | 43.0 | 2.0 | 2.4 | 30 | 760.4 | 0.42 | 2.6 | 15 | 22 | |
| 9 | 1750.90 | 6 | NE | 0.42 | 40.5 | 2.0 | 2.6 | 50 | 757.7 | 0.36 | 2.4 | 0 | 25 | |
| 10 | 1749.35 | 4 | NE | 0.23 | 37.0 | 3.0 | 2.5 | 50 | 755.6 | 0.04 | 2.4 | 0 | 26 | |
| 11 | 1749.60 | 0 | - | 0.07 | 36.0 | 3.0 | 2.4 | 0 | 756.4 | 0.02 | 2.4 | 15 | 25 | |
| 12 | 1748.93 | 46 | NE | 0 | 33.5 | 2.5 | 2.4 | 15 | 757.4 | 0 | 2.3 | 15 | 24 | |
| 13 | 1748.73 | 22 | NE | 0.04 | 35.5 | 3.0 | 2.3 | 15 | 758.0 | 0 | 2.2 | 15 | 24 | |
| 14 | 1748.52 | 12 | NE | 0 | 40.0 | 3.0 | 2.4 | 15 | 758.8 | 0 | 2.4 | 15 | 27 | |
| 15 | 1748.34 | 0 | - | 0.26 | 37.0 | 3.0 | 2.2 | 15 | 758.7 | 0.28 | 2.3 | 15 | 25 | |
| 16 | 1748.17 | 6 | NE | 0.03 | 37.0 | 3.0 | 2.1 | 15 | 760.3 | 0 | 2.3 | 15 | 24 | |
| 17 | 1748.13 | 8 | NE | 0 | 39.0 | 3.0 | 2.0 | 3 | 758.2 | 0.03 | 2.3 | 0 | 24 | |
| 18 | 1748.15 | 4 | S | 0.20 | 39.0 | 2.5 | 2.0 | 0 | 756.0 | 0.17 | 2.2 | 0 | 24 | |
| 19 | 1748.17 | 4 | N | 0.38 | 40.5 | 2.5 | 1.8 | 0 | 757.2 | 0.24 | 2.1 | 15 | 23 | |
| 20 | 1748.19 | 14 | NE | 0 | 49.0 | 3.0 | 1.7 | 0 | 758.4 | 0 | 2.2 | 15 | 23 | |
| 21 | 1748.19 | 3 | NE | 0 | 50.0 | 3.0 | 1.6 | 0 | 759.3 | 0 | 2.2 | 15 | 24 | |
| 22 | 1748.20 | 4 | NE | 0.01 | 47.0 | 3.0 | 1.6 | 0 | 759.9 | 0.01 | 2.0 | 15 | 29 | |
| 23 | 1748.37 | 0 | - | 0.31 | 49.0 | 4.0 | 1.6 | 0 | 758.8 | 0.18 | 1.9 | 0 | 19 | |
| 24 | 1748.69 | 22 | NE | 0.12 | 42.0 | 4.0 | 1.6 | 0 | 757.0 | 0.11 | 1.9 | 0 | 17 | |
| 25 | 1748.77 | 21 | NE | 0.18 | 39.5 | 3.0 | 1.6 | 0 | 757.0 | 0.17 | 1.7 | 15 | 31 | |
| 26 | 1748.81 | 0 | - | 0.42 | 41.0 | 3.0 | 1.6 | 0 | 758.0 | 0.29 | 1.7 | 15 | 28 | |
| 27 | 1748.84 | 4 | NE | 0 | 35.0 | 3.0 | 1.5 | 0 | 759.0 | 0 | 1.7 | 15 | 23 | |
| 28 | 1748.90 | 12 | SW | 0.47 | 35.0 | 3.0 | 1.5 | 0 | 759.9 | 0.18 | 1.8 | 15 | 25 | |
| 29 | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | |

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF MARCH, 1978.

| Date | South Fork Tolt Reservoir | | | | | | | | Regulating Basin | | | | | |
|------|---------------------------|----------------|-----------|--------------|----------------|-----------------|-----------------|-------------------|------------------|--------------|-----------------|-------------------|-----------------|--|
| | Elev., ft | Wind Vel., mph | Wind Dir. | Precip., in. | Avg. Temp., °F | Water Temp., °C | Max. Turb., NTU | Valve #15, % Open | Elev., ft | Precip., in. | Max. Turb., NTU | Valve #25, % Open | Total Flow, MGD | |
| 1 | 1748.90 | 12 | NE | 0.23 | 34.0 | 3.0 | 1.40 | 0 | 760.3 | 0.18 | 1.80 | 15 | 24 | |
| 2 | 1748.95 | 30 | NE | 0 | 35.5 | 3.0 | 1.40 | 0 | 758.2 | 0 | 1.80 | 0 | 24 | |
| 3 | 1748.93 | 26 | NE | 0 | 35.0 | 3.0 | 1.60 | 0 | 758.5 | 0 | 1.80 | 15 | 24 | |
| 4 | 1748.87 | 28 | NE | 0.08 | 35.5 | 2.8 | 1.60 | 0 | 759.6 | 0.07 | 1.80 | 15 | 24 | |
| 5 | 1748.80 | 0 | - | 0 | 41.5 | 2.8 | 1.60 | 0 | 760.2 | 0 | 1.70 | 15 | 26 | |
| 6 | 1748.74 | 8 | NE | 0 | 39.0 | 3.0 | 1.40 | 0 | 760.3 | 0 | 1.70 | 15 | 24 | |
| 7 | 1748.84 | 16 | NE | 0.44 | 44.5 | 3.0 | 1.40 | 0 | 758.3 | 0.42 | 1.70 | 0 | 25 | |
| 8 | 1749.13 | 6 | NE | 0.56 | 42.5 | 3.0 | 1.50 | 0 | 756.2 | 0.36 | 1.50 | 15 | 22 | |
| 9 | 1749.22 | 4 | SW | 0.04 | 46.0 | 3.0 | 1.40 | 0 | 757.2 | 0.08 | 1.50 | 15 | 24 | |
| 10 | 1749.25 | 4 | NE | 0 | 40.0 | 3.0 | 1.40 | 0 | 758.2 | 0 | 1.40 | 15 | 24 | |
| 11 | 1749.25 | 0 | - | 0.11 | 44.5 | 3.2 | 1.40 | 0 | 759.3 | 0.05 | 1.00 | 15 | 23 | |
| 12 | 1749.28 | 0 | - | 0.30 | 39.0 | 3.2 | 1.40 | 0 | 760.2 | 0.28 | 1.60 | 15 | 23 | |
| 13 | 1749.29 | 14 | SW | 0.10 | 38.0 | 3.0 | 1.30 | 0 | 760.4 | 0.12 | 1.80 | 15 | 23 | |
| 14 | 1749.42 | 0 | - | 0.74 | 37.0 | 3.0 | 1.20 | 0 | 758.0 | 0.49 | 1.70 | 0 | 25 | |
| 15 | 1749.48 | 4 | NE | 0 | 37.0 | 3.0 | 1.00 | 0 | 758.9 | 0 | 1.70 | 15 | 26 | |
| 16 | 1749.47 | 12 | NE | 0 | 42.0 | 5.0 | 1.20 | 0 | 759.7 | 0 | 0.17 | 15 | 26 | |
| 17 | 1749.47 | 6 | NE | 0 | 47.0 | 3.0 | 1.20 | 0 | 759.6 | 0 | 1.60 | 15 | 31 | |
| 18 | 1749.47 | 9 | NE | 0 | 51.5 | 4.0 | 1.20 | 0 | 759.8 | 0 | 1.50 | 15 | 41 | |
| 19 | 1749.50 | 3 | NE | 0 | 53.5 | 4.0 | 1.40 | 0 | 760.2 | 0 | 1.50 | 15 | 25 | |
| 20 | 1749.53 | 4 | NE | 0 | 41.0 | 4.0 | 1.40 | 0 | 760.2 | 0 | 1.50 | 15 | 28 | |
| 21 | 1749.65 | 4 | NE | 0 | 51.0 | 5.0 | 1.40 | 0 | 757.4 | 0 | 1.40 | 15 | 32 | |
| 22 | 1748.68 | 6 | NE | 0 | 53.0 | 5.0 | 1.40 | 0 | 758.0 | 0 | 1.40 | 15 | 23 | |
| 23 | 1749.74 | 8 | NE | 0.04 | 52.0 | 5.0 | 1.30 | 0 | 759.6 | 0.05 | 1.40 | 15 | 20 | |
| 24 | 1750.17 | 4 | SW | 1.21 | 43.5 | 5.0 | 1.40 | 0 | 760.2 | 0.66 | 1.40 | 0 | 31 | |
| 25 | 1750.83 | 3 | S | 0.77 | 44.5 | 5.0 | 1.40 | 0 | 758.1 | 0.58 | 1.40 | 0 | 24 | |
| 26 | 1751.79 | 0 | - | 0.87 | 44.5 | 5.0 | 1.20 | 0 | 758.1 | 0.84 | 1.40 | 15 | 25 | |
| 27 | 1752.56 | 8 | SW | 0.08 | 43.5 | 5.0 | 1.40 | 0 | 758.9 | 0.05 | 1.40 | 15 | 27 | |
| 28 | 1752.53 | 4 | NE | 0.29 | 47.0 | 5.0 | 1.30 | 0 | 759.6 | 0.33 | 1.30 | 15 | 26 | |
| 29 | 1752.92 | 6 | NE | 0.15 | 44.0 | 5.0 | 1.30 | 0 | 758.2 | 0.14 | 1.30 | 15 | 24 | |
| 30 | 1753.12 | 0 | - | 0.02 | 50.0 | 5.0 | 1.20 | 0 | 758.9 | 0.07 | 1.30 | 15 | 25 | |
| 31 | 1753.40 | 14 | NE | 0.47 | 39.5 | 5.0 | 1.30 | 0 | 759.6 | 0.20 | 1.30 | 15 | 25 | |

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF APRIL, 1978.

| Date | South Fork Tolt Reservoir | | | | | | | | Regulating Basin | | | | | |
|------|---------------------------|----------------------|--------------|-----------------|----------------------|-----------------------|-----------------------|----------------------|------------------|-----------------|-----------------------|---------------------|-----------------------|----|
| | Elev., ft | Wind Vel., mph | Wind Dir. | Precip., in. | Avg. Temp., °F | Water Temp., °C | Max. Turb., NTU | Valve #15, % Open | Elev., ft | Precip., in. | Max. Turb., NTU | Valve #25 % Open | Total Flow, MGD | |
| | | | | | | | | | | | | | | |
| 30 | 1 | 1753.53 | 2 | S | 0.05 | 49.0 | 5.5 | 1.20 | 0 | 760.2 | 0.05 | 1.3 | 15 | 28 |
| | 2 | 1753.75 | 2 | N | 0.36 | 40.5 | 5.5 | 1.20 | 0 | 758.1 | 0.16 | 1.2 | 0 | 25 |
| | 3 | 1754.01 | 6 | NE | 0.42 | 41.0 | 5.0 | 1.20 | 0 | 755.9 | 0.25 | 1.2 | 15 | 23 |
| | 4 | 1755.11 | 3 | NE | 0.30 | 45.0 | 6.0 | 1.40 | 0 | 756.6 | 0.22 | 1.2 | 15 | 25 |
| | 5 | 1754.28 | 8 | SW | 0.66 | 37.0 | 6.0 | 1.40 | 0 | 757.5 | 0.42 | 1.2 | 15 | 24 |
| | 6 | 1754.40 | 8 | NE | 0.09 | 39.0 | 5.0 | 1.30 | 0 | 758.4 | 0.09 | 1.2 | 15 | 25 |
| | 7 | 1754.47 | 4 | NE | 0 | 44.0 | 5.0 | 1.20 | 0 | 758.5 | 0 | 1.2 | 15 | 30 |
| | 8 | 1754.52 | 2 | E | 0.03 | 48.0 | 6.0 | 1.20 | 0 | 757.2 | 0.03 | 1.2 | 15 | 50 |
| | 9 | 1754.55 | 4 | NE | 0 | 45.0 | 6.0 | 1.20 | 0 | 755.8 | 0 | 1.2 | 25 | 54 |
| | 10 | 1754.53 | 8 | NE | 0 | 51.0 | 6.0 | 1.20 | 0 | 755.8 | 0 | 1.1 | 25 | 53 |
| | 11 | 1754.52 | 6 | SW | 0.51 | 52.0 | 6.0 | 1.20 | 0 | 756.4 | 0.44 | 1.1 | 35 | 58 |
| | 12 | 1754.49 | 3 | NE | 0 | 42.5 | 6.0 | 1.10 | 0 | 756.0 | 0 | 1.0 | 35 | 64 |
| | 13 | 1754.43 | 3 | NE | 0 | 48.0 | 6.0 | 1.10 | 0 | 755.0 | 0 | 1.0 | 35 | 78 |
| | 14 | 1754.35 | 6 | NE | 0.05 | 43.0 | 6.0 | 1.10 | 0 | 754.3 | 0.05 | 1.0 | 45 | 79 |
| | 15 | 1754.22 | 0 | - | 0.23 | 43.5 | 6.0 | 1.10 | 0 | 755.2 | 0.22 | 0.90 | 75 | 79 |
| | 16 | 1754.11 | 0 | - | 0.68 | 44.5 | 6.0 | 1.10 | 0 | 756.1 | 0.56 | 0.90 | 75 | 75 |
| | 17 | 1754.05 | 6 | NE | 0.63 | 35.0 | 6.0 | 1.10 | 0 | 757.0 | 0.49 | 0.90 | 75 | 73 |
| | 18 | 1753.97 | 6 | NE | 0.27 | 42.5 | 6.0 | 1.00 | 0 | 757.8 | 0.25 | 0.90 | 75 | 78 |
| | 19 | 1753.93 | 0 | - | 0.20 | 46.5 | 6.5 | 1.00 | 0 | 758.7 | 0.42 | 0.80 | 75 | 75 |
| | 20 | 1753.98 | 6 | NE | 0.64 | 44.0 | 6.0 | 1.00 | 0 | 759.5 | 0.52 | 0.80 | 75 | 78 |
| | 21 | 1754.02 | 3 | NE | 0.23 | 41.0 | 6.0 | 1.00 | 0 | 758.7 | 0.16 | 0.80 | 35 | 77 |
| | 22 | 1754.10 | 4 | E | 0.36 | 40.5 | 6.0 | 1.00 | 0 | 759.4 | 0.23 | 0.80 | 35 | 71 |
| | 23 | 1754.44 | 4 | E | 0.76 | 39.0 | 6.0 | 0.90 | 0 | 755.6 | 0.60 | 0.75 | 0 | 53 |
| | 24 | 1754.54 | 22 | NE | 0 | 47.0 | 7.0 | 1.00 | 0 | 758.4 | 0 | 0.60 | 35 | 33 |
| | 25 | 1754.56 | 3 | NE | 0 | 53.0 | 7.5 | 1.00 | 0 | 760.7 | 0 | 0.50 | 0 | 29 |
| | 26 | 1754.84 | 4 | NE | 0.12 | 57.0 | 7.5 | 0.90 | 0 | 758.4 | 0.08 | 0.50 | 15 | 25 |
| | 27 | 1755.12 | 3 | SW | 0.98 | 47.0 | 7.0 | 0.90 | 0 | 759.6 | 0.83 | 0.50 | 15 | 22 |
| | 28 | 1755.55 | - | Calm | 0.13 | 45.0 | 7.0 | 0.80 | 0 | 758.3 | 0.10 | 0.50 | 0 | 22 |
| | 29 | 1755.84 | 2 | S | 0.02 | 41.5 | 7.0 | 0.70 | 0 | 756.0 | 0.09 | 0.80 | 0 | 25 |
| | 30 | 1755.92 | 2 | W | 0 | 49.0 | 7.0 | 0.70 | 0 | 757.0 | 0 | 0.80 | 15 | 21 |
| | 31 | | | | | | | | | | | | | |

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF MAY, 1978.

| Date | South Fork Tolt Reservoir | | | | | | | | Regulating Basin | | | | | |
|------|---------------------------|----------------|-----------|--------------|----------------|-----------------|-----------------|-------------------|------------------|--------------|-----------------|-------------------|-----------------|--|
| | Elev., ft | Wind Vel., mph | Wind Dir. | Precip., in. | Avg. Temp., °F | Water Temp., °C | Max. Turb., NTU | Valve #15, % Open | Elev., ft | Precip., in. | Max. Turb., NTU | Valve #25, % Open | Total Flow, MGD | |
| 1 | 1755.98 | - | Calm | 0 | 48.0 | 7.0 | 0.70 | 0 | 757.7 | 0 | 0.80 | 15 | 25 | |
| 2 | 1756.00 | - | Calm | 0.05 | 48.0 | 7.0 | 0.80 | 0 | 758.8 | 0.01 | 0.70 | 15 | 29 | |
| 3 | 1756.04 | 3 | SW | 0.29 | 41.0 | 7.0 | 0.70 | 0 | 760.1 | 0.31 | 0.65 | 0 | 28 | |
| 4 | 1756.24 | 0 | - | 0.43 | 40.0 | 7.0 | 0.60 | 0 | 757.9 | 0.39 | 0.65 | 15 | 25 | |
| 5 | 1756.30 | - | Calm | 0.10 | 41.0 | 7.0 | 0.70 | 0 | 758.6 | 0.19 | 0.60 | 15 | 26 | |
| 6 | 1756.32 | 6 | E | 0 | 47.5 | 7.0 | 0.35 | 0 | 759.4 | 0 | 0.60 | 15 | 25 | |
| 7 | 1756.32 | 4 | NE | 0 | 51.5 | 7.5 | 0.30 | 0 | 760.0 | 0 | 0.60 | 15 | 27 | |
| 8 | 1756.32 | 8 | NE | 0 | 54.0 | 8.0 | 0.60 | 0 | 760.1 | 0 | 0.60 | 0 | 31 | |
| 9 | 1756.43 | - | Calm | 0 | 57.0 | 8.0 | 0.60 | 0 | 757.4 | 0 | 0.60 | 15 | 32 | |
| 10 | 1756.50 | 3 | SW | 0.31 | 45.0 | 7.0 | 0.60 | 0 | 758.3 | 0.28 | 0.60 | 15 | 27 | |
| 11 | 1756.76 | 12 | SW | 1.06 | 50.0 | 7.0 | 0.60 | 0 | 759.3 | 0.49 | 0.50 | 15 | 25 | |
| 12 | 1757.05 | 3 | SW | 0.08 | 46.5 | 7.0 | 0.60 | 0 | 760.0 | 0.03 | 0.50 | 0 | 27 | |
| 13 | 1757.32 | 8 | N | 0.32 | 51.5 | 8.0 | 0.70 | 0 | 757.9 | 0.26 | 0.50 | 0 | 27 | |
| 14 | 1757.70 | 12 | NE | 0.71 | 46.5 | 8.0 | 0.60 | 0 | 758.8 | 0.33 | 0.50 | 15 | 23 | |
| 15 | 1758.12 | - | Calm | 0.62 | 45.0 | 7.0 | 0.60 | 0 | 759.7 | 0.42 | 0.50 | 15 | 23 | |
| 16 | 1758.55 | 5 | SW | 0.73 | 44.0 | 7.0 | 0.60 | 0 | 760.2 | 0.36 | 0.50 | 0 | 27 | |
| 17 | 1759.04 | 6 | SW | 0.52 | 45.0 | 7.0 | 0.60 | 0 | 757.7 | 0.16 | 0.45 | 0 | 26 | |
| 18 | 1759.38 | 6 | NE | 0.03 | 48.0 | 7.0 | 0.60 | 0 | 755.3 | 0.03 | 0.45 | 15 | 30 | |
| 19 | 1759.50 | 10 | NE | 0 | 58.0 | 8.0 | 0.60 | 0 | 757.2 | 0 | 0.45 | 25 | 30 | |
| 20 | 1759.62 | 12 | E | 0 | 65.0 | 8.5 | 0.60 | 0 | 757.9 | 0 | 0.40 | 15 | 32 | |
| 21 | 1759.73 | 10 | SW | 0 | 62.5 | 9.0 | 0.60 | 0 | 757.8 | 0 | 0.40 | 15 | 35 | |
| 22 | 1759.83 | 6 | SW | 0.10 | 48.0 | 8.0 | 0.60 | 0 | 758.4 | 0.01 | 0.40 | 15 | 29 | |
| 23 | 1759.89 | - | Calm | 0.33 | 44.0 | 8.0 | 0.55 | 0 | 758.8 | 0.32 | 0.45 | 15 | 29 | |
| 24 | 1759.89 | 3 | NE | 0 | 49.0 | 8.0 | 0.60 | 0 | 759.2 | 0 | 0.45 | 15 | 28 | |
| 25 | 1759.87 | 4 | SW | 0 | 49.0 | 8.0 | 0.60 | 0 | 759.3 | 0 | 0.40 | 15 | 31 | |
| 26 | 1759.86 | 3 | NE | 0.14 | 50.5 | 8.0 | 0.55 | 0 | 759.7 | 0.04 | 0.40 | 15 | 30 | |
| 27 | 1759.92 | 2 | E | 0.33 | 50.5 | 8.0 | 0.50 | 0 | 757.0 | 0.29 | 0.40 | 0 | 33 | |
| 28 | 1760.20 | 2 | S | 0.44 | 47.5 | 8.0 | 0.60 | 0 | 757.9 | 0.21 | 0.40 | 15 | 27 | |
| 29 | 1760.37 | 3 | SW | 0.55 | 45.0 | 8.0 | 0.55 | 0 | 759.0 | 0.26 | 0.40 | 15 | 21 | |
| 30 | 1760.47 | 8 | NE | 0 | 47.0 | 8.0 | 0.55 | 0 | 759.6 | 0 | 0.40 | 15 | 27 | |
| 31 | 1760.48 | 6 | NE | 0 | 54.0 | 8.0 | 0.55 | 0 | 759.9 | 0 | 0.40 | 15 | 32 | |

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF JUNE, 1978.

| Date | South Fork Tolt Reservoir | | | | | | | | Regulating Basin | | | | | |
|------|---------------------------|----------------|-----------|--------------|--------------------|-----------------|-----------------|-------------------|------------------|--------------|-----------------|-------------------|-----------------|--|
| | Elev., ft | Wind Vel., mph | Wind Dir. | Precip., in. | Avg. Air Temp., °F | Water Temp., °C | Max. Turb., NTU | Valve #15, % Open | Elev., ft | Precip., in. | Max. Turb., NTU | Valve #25, % Open | Total Flow, MGD | |
| 1 | 1760.48 | 8 | NE | 0 | 60.0 | 9.0 | 0.55 | 0 | 759.9 | 0 | 0.40 | 0 | 36 | |
| 2 | 1760.59 | 10 | NE | 0 | 67.5 | 9.0 | 0.55 | 0 | 757.2 | 0 | 0.40 | 25 | 47 | |
| 3 | 1760.57 | 4 | NE | 0 | 81.0 | 10.0 | 0.50 | 0 | 757.2 | 0 | 0.40 | 25 | 55 | |
| 4 | 1760.57 | 6 | NE | 0 | 72.0 | 10.0 | 0.50 | 0 | 756.4 | 0 | 0.40 | 25 | 53 | |
| 5 | 1760.56 | 8 | NE | 0 | 72.5 | 10.0 | 0.55 | 0 | 755.7 | 0 | 0.40 | 35 | 69 | |
| 6 | 1760.49 | 8 | NE | 0 | 69.0 | 10.0 | 0.55 | 0 | 756.0 | 0 | 0.40 | 75 | 77 | |
| 7 | 1760.33 | 3 | NE | 0 | 66.0 | 10.0 | 0.55 | 0 | 756.8 | 0 | 0.35 | 75 | 76 | |
| 8 | 1760.15 | 0 | - | 0 | 51.0 | 9.0 | 0.55 | 0 | 758.7 | 0 | 0.35 | 75 | 64 | |
| 9 | 1760.06 | 14 | SW | 0 | 60.0 | 9.0 | 0.55 | 0 | 760.2 | 0.36 | 0.35 | 0 | 53 | |
| 10 | 1760.16 | 0 | - | 0.11 | 50.5 | 9.0 | 0.50 | 0 | 757.3 | 0.02 | 0.30 | 0 | 37 | |
| 11 | 1760.17 | 10 | NE | 0.11 | 51.0 | 9.0 | 0.50 | 0 | 758.8 | 0.09 | 0.30 | 15 | 33 | |
| 12 | 1760.15 | 8 | W | 0 | 58.0 | 9.0 | 0.55 | 0 | 757.9 | 0 | 0.30 | 25 | 32 | |
| 13 | 1760.13 | 0 | - | 0.43 | 54.0 | 9.0 | 0.55 | 0 | 759.5 | 0.40 | 0.50 | 15 | 37 | |
| 14 | 1760.18 | 4 | NE | 0.23 | 52.0 | 9.0 | 0.55 | 0 | 760.0 | 0.22 | 0.50 | 0 | 31 | |
| 15 | 1760.33 | 4 | SW | 0.23 | 54.0 | 9.0 | 0.55 | 0 | 757.2 | 0.43 | 0.50 | 20 | 33 | |
| 16 | 1760.53 | - | Calm | 0.34 | 50.0 | 9.0 | 0.55 | 0 | 757.8 | 0.11 | 0.50 | 20 | 36 | |
| 17 | 1760.53 | 2 | NE | 0 | 51.5 | 9.0 | 0.50 | 0 | 758.5 | 0 | 0.45 | 20 | 42 | |
| 18 | 1760.57 | 0 | - | 0 | 60.5 | 9.5 | 0.50 | 0 | 758.9 | 0 | 0.45 | 20 | 37 | |
| 19 | 1760.54 | - | Calm | 0 | 60.0 | 9.0 | 0.55 | 0 | 758.9 | 0 | 0.40 | 20 | 45 | |
| 20 | 1760.49 | 6 | NE | 0 | 62.0 | 0.0 | 0.55 | 0 | 757.7 | 0 | 0.40 | 30 | 60 | |
| 21 | 1760.34 | 0 | - | 0 | 65.0 | 9.0 | 0.55 | 0 | 758.0 | 0 | 0.40 | 70 | 60 | |
| 22 | 1760.17 | 6 | SW | 0 | 59.0 | 9.0 | 0.50 | 0 | 760.3 | 0 | 0.40 | 0 | 65 | |
| 23 | 1760.13 | 4 | SW | 0 | 58.0 | 9.0 | 0.50 | 0 | 758.4 | 0 | 0.40 | 15 | 49 | |
| 24 | 1760.03 | 0 | - | 0 | 61.0 | 9.5 | 0.55 | 0 | 757.6 | 0 | 0.40 | 20 | 56 | |
| 25 | 1759.94 | 9 | - | 0.29 | 55.5 | 9.0 | 0.50 | 0 | 757.1 | 0.14 | 0.40 | 20 | 56 | |
| 26 | 1759.86 | 4 | NE | 0.03 | 53.0 | 9.0 | 0.50 | 0 | 757.0 | 0.02 | 0.40 | 20 | 50 | |
| 27 | 1759.75 | 10 | NE | 0 | 63.0 | 9.0 | 0.50 | 0 | 755.5 | 0 | 0.40 | 35 | 60 | |
| 28 | 1759.56 | 8 | NE | 0 | 72.5 | 9.5 | 0.50 | 0 | 755.5 | 0 | 0.40 | 75 | 76 | |
| 29 | 1759.37 | 0 | - | 0 | 72.0 | 10.0 | 0.50 | 0 | 755.6 | 0 | 0.40 | 75 | 81 | |
| 30 | 1759.22 | 3 | SW | 0.54 | 55.0 | 9.5 | 0.50 | 0 | 757.6 | 0.32 | 0.40 | 35 | 70 | |
| 31 | | | | | | | | | | | | | | |

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF JULY, 1978.

| Date | South Fork Tolt Reservoir | | | | | | | | | Regulating Basin | | | | | |
|------|---------------------------|----------------|-----------|--------------|--------------------|-----------------|-----------------|-------------------|-----------|------------------|-----------------|-------------------|-----------------|--|--|
| | Elev., ft | Wind Vel., mph | Wind Dir. | Precip., in. | Avg. Air Temp., °F | Water Temp., °C | Max. Turb., NTU | Valve #15, % Open | Elev., ft | Precip., in. | Max. Turb., NTU | Valve #25, % Open | Total Flow, MGD | | |
| 1 | 1759.03 | 3 | S | 0 | 63.5 | 9.5 | 0.25 | 0 | 758.5 | 0 | 0.35 | 75 | 68 | | |
| 2 | 1758.90 | 0 | - | 1.39 | 65.0 | 9.0 | 0.30 | 0 | 759.6 | 0.79 | 0.35 | 75 | 69 | | |
| 3 | 1758.84 | 5 | SW | 0.17 | 54.0 | 9.0 | 0.50 | 0 | 760.7 | 0.06 | 0.40 | 0 | 53 | | |
| 4 | 1758.89 | 6 | SW | 0.45 | 51.5 | 9.0 | 0.50 | 0 | 757.7 | 0.18 | 0.50 | 15 | 33 | | |
| 5 | 1758.90 | 3 | SW | 0.12 | 49.5 | 9.0 | 0.50 | 0 | 757.3 | 0.06 | 0.50 | 15 | 38 | | |
| 6 | 1758.87 | 6 | NE | 0 | 56.0 | 9.0 | 0.50 | 0 | 757.7 | 0 | 0.45 | 20 | 37 | | |
| 7 | 1758.78 | - | Calm | 0 | 62.5 | 9.5 | 0.50 | 0 | 756.6 | 0 | 0.50 | 20 | 56 | | |
| 8 | 1758.64 | 2 | S | 0 | 62.5 | 9.5 | 0.50 | 0 | 758.2 | 0 | 0.45 | 35 | 66 | | |
| 9 | 1758.48 | 0 | - | 0.02 | 54.0 | 9.5 | 0.50 | 0 | 757.3 | 0 | 0.45 | 35 | 54 | | |
| 10 | 1758.33 | 15 | S | 0.15 | 52.5 | 9.0 | 0.65 | 0 | 759.5 | 0.22 | 0.50 | 35 | 49 | | |
| 11 | 1758.31 | 3 | SW | 0.21 | 52.5 | 9.0 | 0.65 | 0 | 758.3 | 0.08 | 0.50 | 0 | 27 | | |
| 12 | 1758.27 | 4 | NE | 0.03 | 51.0 | 9.0 | 0.65 | 0 | 758.3 | 0.01 | 0.50 | 15 | 30 | | |
| 13 | 1758.20 | 8 | NE | 0 | 47.0 | 9.5 | 0.65 | 0 | 757.7 | 0 | 0.50 | 15 | 39 | | |
| 14 | 1758.03 | 11 | NE | 0 | 70.5 | 10.0 | 0.60 | 0 | 757.3 | 0 | 0.50 | 35 | 62 | | |
| 15 | 1757.83 | 2 | N | 0 | 71.0 | 10.0 | 0.50 | 0 | 757.5 | 0 | 0.40 | 35 | 71 | | |
| 16 | 1757.66 | 2 | SW | 0.27 | 62.5 | 10.0 | 0.50 | 0 | 759.2 | 0.26 | 0.40 | 35 | 56 | | |
| 17 | 1757.65 | 3 | S | 0.62 | 51.0 | 9.0 | 0.60 | 0 | 760.3 | 0.56 | 0.45 | 30 | 34 | | |
| 18 | 1757.65 | 0 | - | 0.02 | 54.5 | 9.0 | 0.60 | 0 | 759.4 | 0.01 | 0.40 | 15 | 32 | | |
| 19 | 1757.63 | 3 | NE | 0 | 55.5 | 10.0 | 0.60 | 0 | 757.4 | 0 | 0.40 | 0 | 25 | | |
| 20 | 1757.57 | 4 | NE | 0 | 60.0 | 10.0 | 0.60 | 0 | 758.3 | 0 | 0.40 | 35 | 51 | | |
| 21 | 1757.33 | 9 | NE | 0 | 62.0 | 10.0 | 0.60 | 0 | 758.3 | 0 | 0.50 | 35 | 59 | | |
| 22 | 1757.10 | 8 | NE | 0 | 66.0 | 10.0 | 0.40 | 0 | 759.0 | 0 | 0.40 | 75 | 74 | | |
| 23 | 1756.86 | 12 | NE | 0 | 80.0 | 11.0 | 0.40 | 0 | 758.8 | 0 | 0.40 | 75 | 75 | | |
| 24 | 1756.62 | 0 | - | 0 | 70.0 | 10.0 | 0.60 | 0 | 758.8 | 0 | 0.40 | 75 | 92 | | |
| 25 | 1756.37 | 9 | NE | 0 | 70.5 | 10.5 | 0.60 | 0 | 759.9 | 0 | 0.40 | 75 | 74 | | |
| 26 | 1756.16 | 9 | NE | 0 | 74.0 | 10.0 | 0.60 | 0 | 759.0 | 0 | 0.40 | 35 | 74 | | |
| 27 | 1756.08 | - | Calm | 0.98 | 66.0 | 10.0 | 0.65 | 0 | 760.3 | 0.89 | 0.40 | 35 | 62 | | |
| 28 | 1756.06 | 2 | S | 0 | 61.0 | 10.0 | 0.60 | 0 | 757.2 | 0 | 0.40 | 0 | 38 | | |
| 29 | 1755.95 | 6 | NE | 0 | 62.0 | 10.0 | 0.40 | 0 | 757.4 | 0 | 0.40 | 20 | 35 | | |
| 30 | 1755.76 | 9 | NE | 0 | 69.0 | 11.0 | 0.40 | 0 | 757.9 | 0 | 0.40 | 35 | 46 | | |
| 31 | 1755.55 | 0 | - | 0 | 67.0 | 10.0 | 0.60 | 0 | 757.5 | 0 | 0.40 | 35 | 67 | | |

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF AUGUST, 1978.

| Date | South Fork Tolt Reservoir | | | | | | | | Regulating Basin | | | | | |
|------|---------------------------|----------------------|--------------|-----------------|-----------------------------|-------------------------------|---------------|----------------------|------------------|-----------------|-----------------------|---------------------|-----------------------|--|
| | Elev., ft | Wind Vel., mph | Wind Dir. | Precip., in. | Avg. Air Temp., °F | Water Max. Temp., °C | Turb., NTU | Valve #15, % Open | Elev., ft | Precip., in. | Max. Turb., NTU | Valve #25 % Open | Total Flow, MGD | |
| 1 | 1755.32 | 0 | - | 0 | 62.0 | 10.0 | 0.60 | 0 | 758.2 | 0 | 0.40 | 35 | 57 | |
| 2 | 1755.12 | 0 | - | 0 | 61.5 | 10.0 | 0.60 | 0 | 759.4 | 0 | 0.40 | 35 | 56 | |
| 3 | 1754.95 | 0 | - | 0 | 64.0 | 10.0 | 0.60 | 0 | 759.3 | 0 | 0.40 | 20 | 49 | |
| 4 | 1754.77 | 0 | - | 0 | 67.0 | 11.0 | 0.65 | 0 | 758.1 | 0 | 0.40 | 20 | 61 | |
| 5 | 1754.60 | 5 | NE | 0 | 63.5 | 10.5 | 0.40 | 0 | 757.1 | 0 | 0.40 | 20 | 59 | |
| 6 | 1754.40 | 6 | NE | 0 | 61.5 | 10.5 | 0.40 | 0 | 755.7 | 0 | 0.40 | 30 | 64 | |
| 7 | 1754.22 | 4 | NE | 0 | 71.0 | 11.0 | 0.60 | 0 | 756.2 | 0 | 0.50 | 30 | 67 | |
| 8 | 1753.95 | 12 | NE | 0 | 73.0 | 11.0 | 0.65 | 0 | 754.6 | 0 | 0.50 | 75 | 79 | |
| 9 | 1753.67 | 5 | NE | 0 | 75.5 | 11.0 | 0.65 | 0 | 754.0 | 0 | 0.50 | 75 | 92 | |
| 10 | 1753.37 | 0 | - | 0 | 71.0 | 11.0 | 0.70 | 0 | 754.1 | 0 | 0.50 | 75 | 92 | |
| 11 | 1753.09 | 2 | NW | 0.50 | 70.5 | 11.0 | 0.70 | 0 | 756.8 | 0.01 | 0.50 | 75 | 60 | |
| 12 | 1752.90 | 0 | - | 0.60 | 56.5 | 10.5 | 0.40 | 0 | 758.8 | 0.35 | 0.50 | 30 | 51 | |
| 13 | 1752.74 | 4 | SW | 0.24 | 59.0 | 11.0 | 0.40 | 0 | 760.0 | 0.20 | 0.50 | 20 | 42 | |
| 14 | 1752.59 | 2 | SW | 0.03 | 60.0 | 11.0 | 0.75 | 0 | 759.2 | 0.02 | 0.50 | 20 | 49 | |
| 15 | 1752.72 | 8 | SW | 1.30 | 53.5 | 11.0 | 0.75 | 0 | 758.8 | 1.06 | 0.60 | 20 | 63 | |
| 16 | 1753.28 | 10 | SW | 0.71 | 54.0 | 11.0 | 0.90 | 0 | 759.9 | 0.63 | 0.50 | 20 | 41 | |
| 17 | 1753.66 | 3 | SW | 0.12 | 54.0 | 11.0 | 0.85 | 0 | 758.3 | 0.05 | 0.50 | 0 | 25 | |
| 18 | 1753.70 | 0 | - | 0.04 | 56.0 | 11.0 | 0.85 | 0 | 758.5 | 0.01 | 0.60 | 20 | 36 | |
| 19 | 1753.74 | 0 | - | 0.56 | 55.5 | 11.0 | 2.00 | 0 | 759.6 | 0.53 | 0.60 | 20 | 36 | |
| 20 | 1753.81 | 0 | - | 0.02 | 51.5 | 11.0 | 0.50 | 0 | 760.0 | 0.03 | 0.60 | 0 | 40 | |
| 21 | 1753.84 | 0 | - | 0.06 | 57.5 | 11.0 | 0.70 | 0 | 758.7 | 0.03 | 0.60 | 15 | 43 | |
| 22 | 1753.83 | 3 | SW | 0 | 59.0 | 11.0 | 0.70 | 0 | 758.5 | 0 | 0.50 | 15 | 42 | |
| 23 | 1753.78 | 12 | NE | 0.06 | 59.0 | 11.0 | 0.65 | 0 | 757.8 | 0.03 | 0.50 | 15 | 43 | |
| 24 | 1753.72 | 11 | NE | 0.14 | 59.0 | 11.0 | 0.70 | 0 | 757.1 | 0.12 | 0.50 | 15 | 48 | |
| 25 | 1753.65 | 5 | NE | 0.22 | 55.0 | 12.0 | 0.65 | 0 | 758.5 | 0.11 | 0.50 | 25 | 39 | |
| 26 | 1753.57 | 4 | NE | 0.31 | 57.0 | 11.6 | 0.40 | 0 | 760.2 | 0.29 | 0.50 | 15 | 37 | |
| 27 | 1753.51 | 8 | NE | 0 | 60.5 | 11.0 | 0.40 | 0 | 760.3 | 0 | 0.50 | 0 | 33 | |
| 28 | 1753.51 | 4 | NE | 0.04 | 62.0 | 11.0 | 0.65 | 0 | 758.1 | 0.03 | 0.50 | 0 | 20 | |
| 29 | 1753.51 | 8 | NE | 0 | 53.0 | 12.5 | 0.70 | 0 | 754.9 | 0 | 0.50 | 0 | 35 | |
| 30 | 1753.44 | 0 | - | 0 | 73.0 | 13.0 | 0.70 | 0 | 754.6 | 0 | 0.50 | 20 | 45 | |
| 31 | 1753.33 | 2 | SE | 0.59 | 63.5 | 12.0 | 0.70 | 0 | 755.5 | 0.12 | 0.40 | 30 | 50 | |

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF SEPTEMBER, 1978.

| Date | South Fork Tolt Reservoir | | | | | | | | Regulating Basin | | | | | |
|------|---------------------------|----------------|-----------|--------------|----------------|-----------------|-----------------|-------------------|------------------|--------------|-----------------|-------------------|-----------------|--|
| | Elev., ft | Wind Vel., mph | Wind Dir. | Precip., in. | Avg. Temp., °F | Water Temp., °C | Max. Turb., NTU | Valve #15, % Open | Elev., ft | Precip., in. | Max. Turb., NTU | Valve #25, % Open | Total Flow, MGD | |
| 1 | 1753.39 | 4 | NW | 0.90 | 57.0 | 13.0 | 0.75 | 0 | 758.1 | 0.77 | 0.40 | 30 | 40 | |
| 2 | 1754.00 | 0 | - | 0.93 | 56.5 | 12.5 | 0.40 | 0 | 759.8 | 0.72 | 0.40 | 15 | 26 | |
| 3 | 1754.22 | 4 | NE | 0.13 | 56.5 | 12.0 | 0.50 | 0 | 760.2 | 0.07 | 0.40 | 0 | 26 | |
| 4 | 1754.42 | 12 | NE | 0.28 | 56.5 | 12.0 | 0.70 | 0 | 758.1 | 0.29 | 0.40 | 0 | 24 | |
| 5 | 1754.56 | 4 | S | 0.50 | 52.0 | 12.0 | 0.70 | 0 | 758.9 | 0.45 | 0.50 | 15 | 27 | |
| 6 | 1754.68 | 2 | S | 1.36 | 49.0 | 12.0 | 0.07 | 0 | 758.7 | 0.41 | 0.40 | 15 | 28 | |
| 7 | 1754.76 | 0 | - | 0.13 | 51.5 | 12.0 | 0.70 | 0 | 758.3 | 0.05 | 0.40 | 15 | 34 | |
| 8 | 1754.79 | 8 | NE | 0.05 | 50.5 | 12.0 | 0.75 | 0 | 757.5 | 0.03 | 0.40 | 15 | 47 | |
| 9 | 1754.80 | 10 | NE | 0.24 | 50.5 | 13.5 | 0.60 | 0 | 758.4 | 0.23 | 0.40 | 25 | 44 | |
| 10 | 1754.83 | 4 | SW | 0.75 | 55.0 | 12.0 | 0.60 | 0 | 759.4 | 0.52 | 0.40 | 25 | 50 | |
| 11 | 1755.01 | 0 | - | 0.59 | 54.0 | 13.0 | 0.80 | 0 | 760.1 | 0.43 | 0.50 | 25 | 42 | |
| 12 | 1755.22 | 2 | N | 0.06 | 54.0 | 13.0 | 0.75 | 0 | 756.6 | 0.03 | 0.50 | 0 | 45 | |
| 13 | 1755.25 | 0 | - | 0.01 | 55.5 | 13.0 | 0.75 | 0 | 757.1 | 0.02 | 0.40 | 20 | 43 | |
| 14 | 1755.23 | 3 | N | 0 | 51.5 | 13.0 | 0.75 | 0 | 758.9 | 0 | 0.40 | 20 | 32 | |
| 15 | 1755.24 | 0 | - | 1.10 | 51.5 | 12.0 | 0.70 | 0 | 760.4 | 0.95 | 0.40 | 20 | 28 | |
| 16 | 1755.39 | 5 | SW | 0.10 | 50.0 | 12.0 | 0.95 | 0 | 760.1 | 0.17 | 0.40 | 15 | 40 | |
| 17 | 1755.64 | 0 | - | 0.66 | 51.0 | 12.0 | 0.85 | 0 | 760.3 | 0.57 | 0.40 | 15 | 28 | |
| 18 | 1755.73 | 2 | W | 0.21 | 44.0 | 12.0 | 0.75 | 0 | 760.1 | 0.08 | 0.50 | 15 | 26 | |
| 19 | 1755.83 | 8 | NE | 0 | 48.0 | 12.0 | 0.70 | 0 | 760.1 | 0 | 0.50 | 15 | 31 | |
| 20 | 1755.87 | 10 | N | 0 | 50.5 | 12.0 | 0.70 | 0 | 760.3 | 0 | 0.40 | 15 | 43 | |
| 21 | 1755.98 | 8 | S | 0.59 | 46.0 | 12.0 | 0.65 | 0 | 757.9 | 0.27 | 0.40 | 0 | 30 | |
| 22 | 1756.18 | 6 | SW | 0.67 | 43.0 | 12.0 | 0.70 | 0 | 759.2 | 0.46 | 0.40 | 20 | 31 | |
| 23 | 1757.75 | 8 | NE | 1.95 | 51.0 | 12.0 | 1.50 | 0 | 760.4 | 1.67 | 0.40 | 20 | 32 | |
| 24 | 1757.89 | 6 | NE | 0.30 | 54.0 | 12.0 | 0.60 | 0 | 760.4 | 0.19 | 0.60 | 20 | 29 | |
| 25 | 1757.56 | 12 | NE | 0 | 59.5 | 12.0 | 1.00 | 0 | 760.2 | 0 | 0.70 | 20 | 37 | |
| 26 | 1757.23 | 8 | NE | 0 | 65.5 | 12.0 | 1.00 | 0 | 760.5 | 0 | 0.70 | 35 | 39 | |
| 27 | 1757.00 | 4 | SW | 0.20 | 62.0 | 12.0 | 1.00 | 0 | 760.5 | 0.18 | 0.70 | 35 | 38 | |
| 28 | 1756.37 | 9 | E | 0.08 | 58.0 | 12.0 | 1.00 | 50 | 760.3 | 0.06 | 0.70 | 15 | 31 | |
| 29 | 1755.56 | 5 | NE | 0.03 | 54.0 | 12.0 | 1.00 | 50 | 759.9 | 0.02 | 0.60 | 15 | 34 | |
| 30 | 1754.72 | 4 | S | 0.01 | 62.0 | 13.0 | 0.90 | 50 | 760.2 | 0.05 | 0.60 | 15 | 33 | |
| 31 | | | | | | | | | | | | | | |

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-3

SUMMARY OF INFORMATION ON GRANULAR MEDIA FILTERS

Pages 45 through 48 contain information supplied by the manufacturers on the granular media filters. The graphs on pages 49 through 56 present filter efficiency information for various medias as a function of filter loading rate.



Uniform Dual Media TEST FILTER BED RECOMMENDATION

,415 E Paces Ferry Road N.E.

P.O. Box 12047

Atlanta Georgia 30305

404 262-3491

FOR: Greg Kirmeyer
Seattle Water Department
1509 South Spokane Street
Seattle, Washington 98144

SHIPPED TO: John Marshall
Seattle Water Department
2700 Airport Way South
Seattle, Washington

The following recommendations are made with the best information available at the time. Specific applications may result in various solids loading and filtration characteristics which may necessitate a change in filter bed. For this reason, we request the individual responsible for conducting filtration tests provide periodic data to The Turbitrol Company for complete evaluation. Based on subsequent test analysis and results Turbitrol engineers may recommend changes in filter media bed design or gradation.

Based on the information supplied to Turbitrol the intended filter bed will be utilized for the following test filter description:

Surface area .11 sq. ft. Avg. rate of flow 4 GPM/ft²
Depth top of filter bottom to backwash 6 GPM/ft²
overflow 8 ft. in. Allowable headloss 8 ft.
Filter Bottom _____

Application: Asbestos Removal

The following loadings are expected:

Turbidity 71 NTU Particle Size _____ microns
Suspended Solids mg/l Phosphate mg/l
BOD mg/l Other _____

The following effluent quality is desired: .1 to .06

Based upon previous experience in this application or similar applications, the following media bed is recommended for initial testing:

| | | |
|-------------------|---------------------|------------------|
| Turbitrol UDM Bed | <u>9545</u> | |
| Turbikol No. | <u>9500</u> | <u>20</u> Inches |
| Turbisand No. | <u>4500</u> | <u>10</u> Inches |
| Support Gravel | <u>-</u> x <u>-</u> | Inches |
| Support Gravel | <u>-</u> x <u>-</u> | Inches |
| Support Gravel | <u>-</u> x <u>-</u> | Inches |
| Support Gravel | <u>-</u> x <u>-</u> | Inches |
| Support Gravel | <u>-</u> x <u>-</u> | Inches |

Our recommended backwash rate for the above bed is 17.5 GPM/ft² at 23°.

If any questions arise, do not hesitate to contact The Turbitrol Company for information.

3M 7603.31



**Uniform Dual Media
SCREEN ANALYSIS**

415 E Paces Ferry Road, N.E.

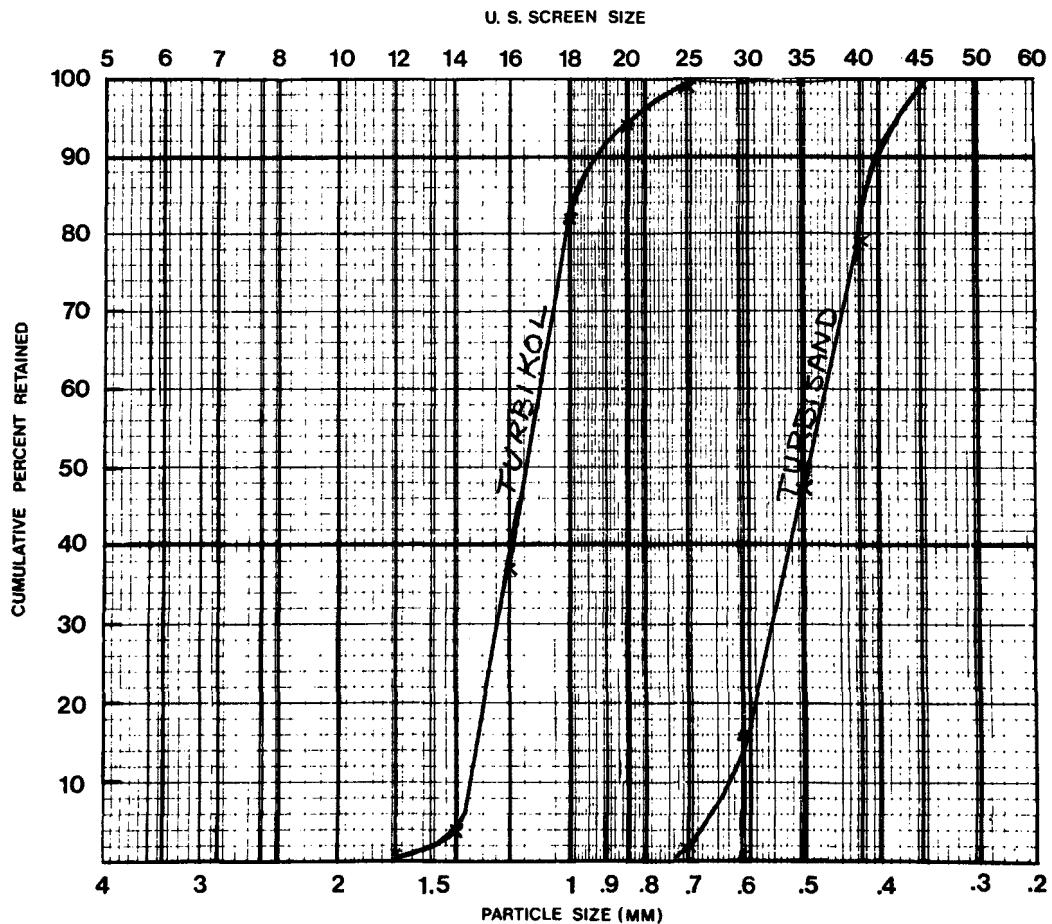
P.O. Box 12047

Atlanta, Georgia 30355

404/262-3491

FINE COAL

| Sample of <u>TURBITROL 9545 UDM</u> <u>TR-15 & TR19</u> | | | SAMPLE 1 <u>TURBIKOL</u> | | | | SAMPLE 2 <u>TURBISAND</u> | | | |
|--|--------|----------|-----------------------------|---------|---------------------------|---------------|------------------------------|---------------------------|--|--|
| TYLER EQUIV. | OPG MM | U.S. NO. | SAMPLE WEIGHT | PERCENT | PERCENT CUMULATIVE WEIGHT | SAMPLE WEIGHT | PERCENT | PERCENT CUMULATIVE WEIGHT | | |
| 4 | 4.760 | 4 | | | | | | | | |
| 5 | 4.000 | 5 | | | | | | | | |
| 6 | 3.360 | 6 | | | | | | | | |
| 7 | 2.830 | 7 | | | | | | | | |
| 8 | 2.380 | 8 | | | | | | | | |
| 9 | 2.000 | 10 | | | | | | | | |
| 10 | 1.680 | 12 | | | | | | | | |
| 12 | 1.410 | 14 | | | | | | | | |
| 14 | 1.190 | 16 | | | | | | | | |
| 16 | 1.000 | 18 | | | | | | | | |
| 20 | .840 | 20 | | | | | | | | |
| 24 | .710 | 25 | | | | | | | | |
| 28 | .590 | 30 | | | | | | | | |
| 32 | .500 | 35 | | | | | | | | |
| 35 | .420 | 40 | | | | | | | | |
| 42 | .350 | 45 | | | | | | | | |
| 48 | .297 | 50 | | | | | | | | |
| 50 | .250 | 60 | | | | | | | | |
| TOTAL | | | | | | | | | | |



3M 760211



**Uniform Dual Media
SCREEN ANALYSIS**

415 E Paces Ferry Road, N.E.

P.O. Box 12047

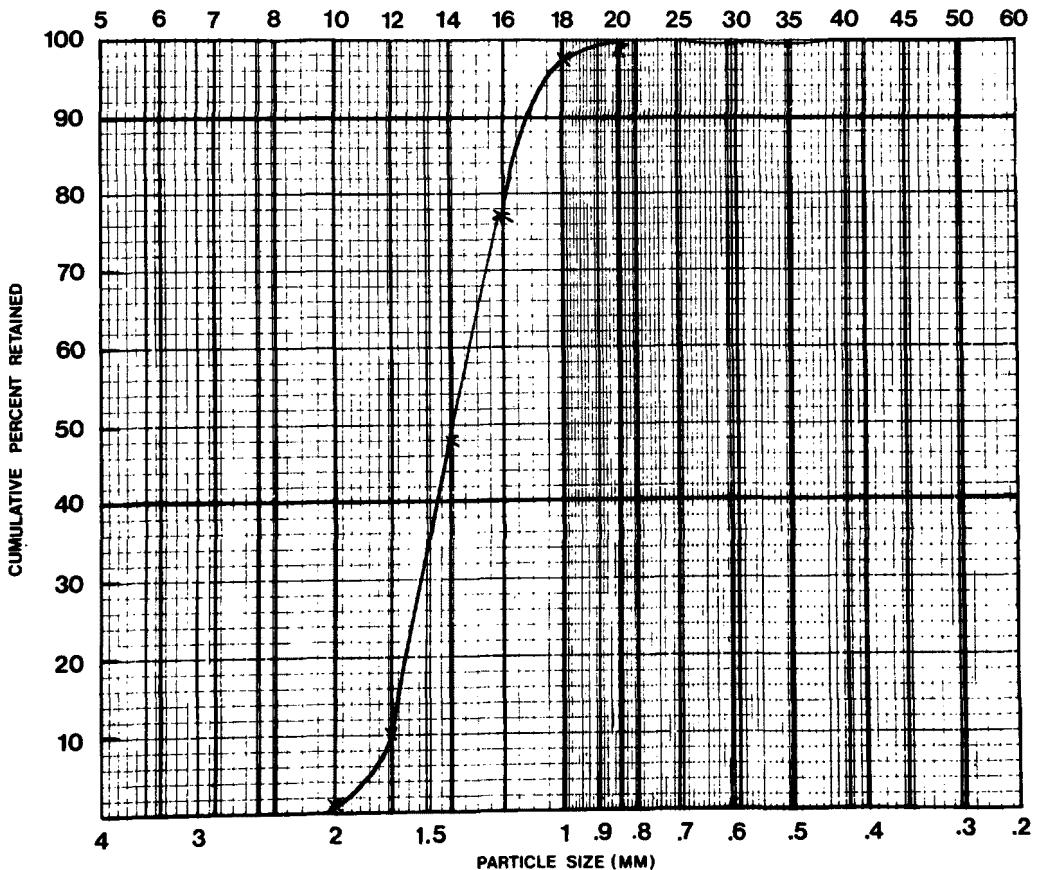
Atlanta, Georgia 30355

404/262-3491

COARSE COAL

| Sample of <u>TURBIKOL 1100 UPM</u> | | SAMPLE 1 | | | | SAMPLE 2 | | |
|------------------------------------|--------|----------|---------------|---------|-------------------|---------------|---------|---------------------------|
| | | TURBIKOL | | | | | | |
| TYLER EQUIV. | OPG MM | U.S. NO. | SAMPLE WEIGHT | PERCENT | CUMULATIVE WEIGHT | SAMPLE WEIGHT | PERCENT | PERCENT CUMULATIVE WEIGHT |
| 4 | 4.760 | 4 | | | | | | |
| 5 | 4.000 | 5 | | | | | | |
| 6 | 3.360 | 6 | | | | | | |
| 7 | 2.830 | 7 | | | | | | |
| 8 | 2.380 | 8 | | | | | | |
| 9 | 2.000 | 10 | | | | | | |
| 10 | 1.680 | 12 | | | | | | |
| 12 | 1.410 | 14 | | | | | | |
| 14 | 1.190 | 16 | | | | | | |
| 16 | 1.000 | 18 | | | | | | |
| 20 | .840 | 20 | | | | | | |
| 24 | .710 | 25 | | | | | | |
| 28 | .590 | 30 | | | | | | |
| 32 | .500 | 35 | | | | | | |
| 35 | .420 | 40 | | | | | | |
| 42 | .350 | 45 | | | | | | |
| 48 | .297 | 50 | | | | | | |
| 60 | .250 | 60 | | | | | | |
| TOTAL | | | | | | | | |

U. S. SCREEN SIZE



3M 750211

MIXED MEDIA INFORMATION

FURNISHED BY NEPTUNE-MICROFLOC

Coal MS-4

Specific Gravity: Not less than 1.55

Uniformity Coefficient <1.7

Effective Size 1.0 - 1.1

Sand MS-6 MS-18

Specific Gravity: 2.6 \pm 0.05 2.6 \pm 0.05

Uniformity Coefficient <1.8 1.4

Effective Size 0.42 - 0.55 0.42 - 0.52

Garnet MS-21

Specific Gravity: Not less than 3.8

Effective Size 0.18 - 0.32

Support High Density Media MS-22

Specific Gravity: Not less than 3.8

Effective Size 1.4 - 2.5

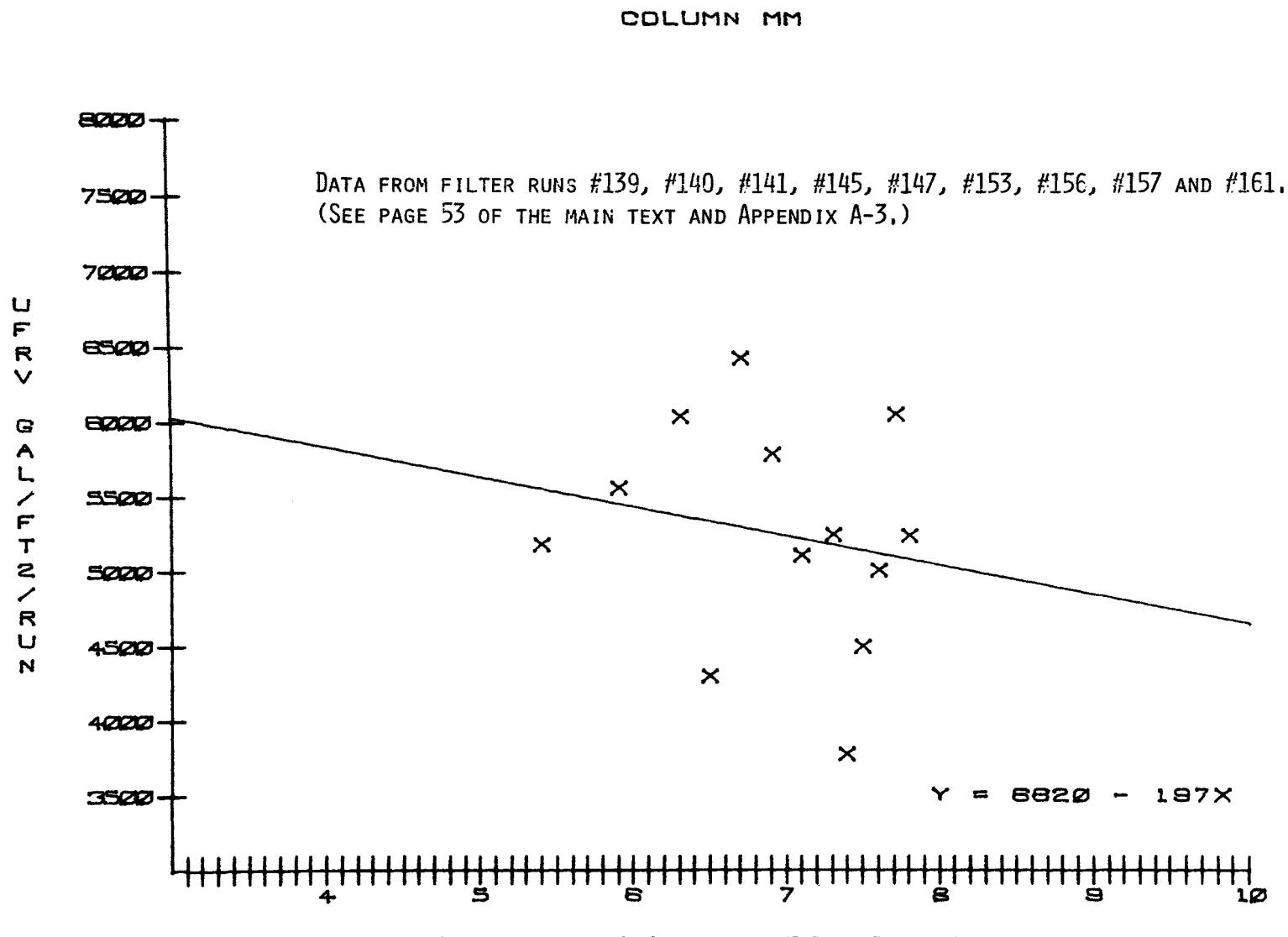


FIGURE B3-1. UFRV VS. FILTER LOADING RATE - COLUMN MM.

COLUMN FC

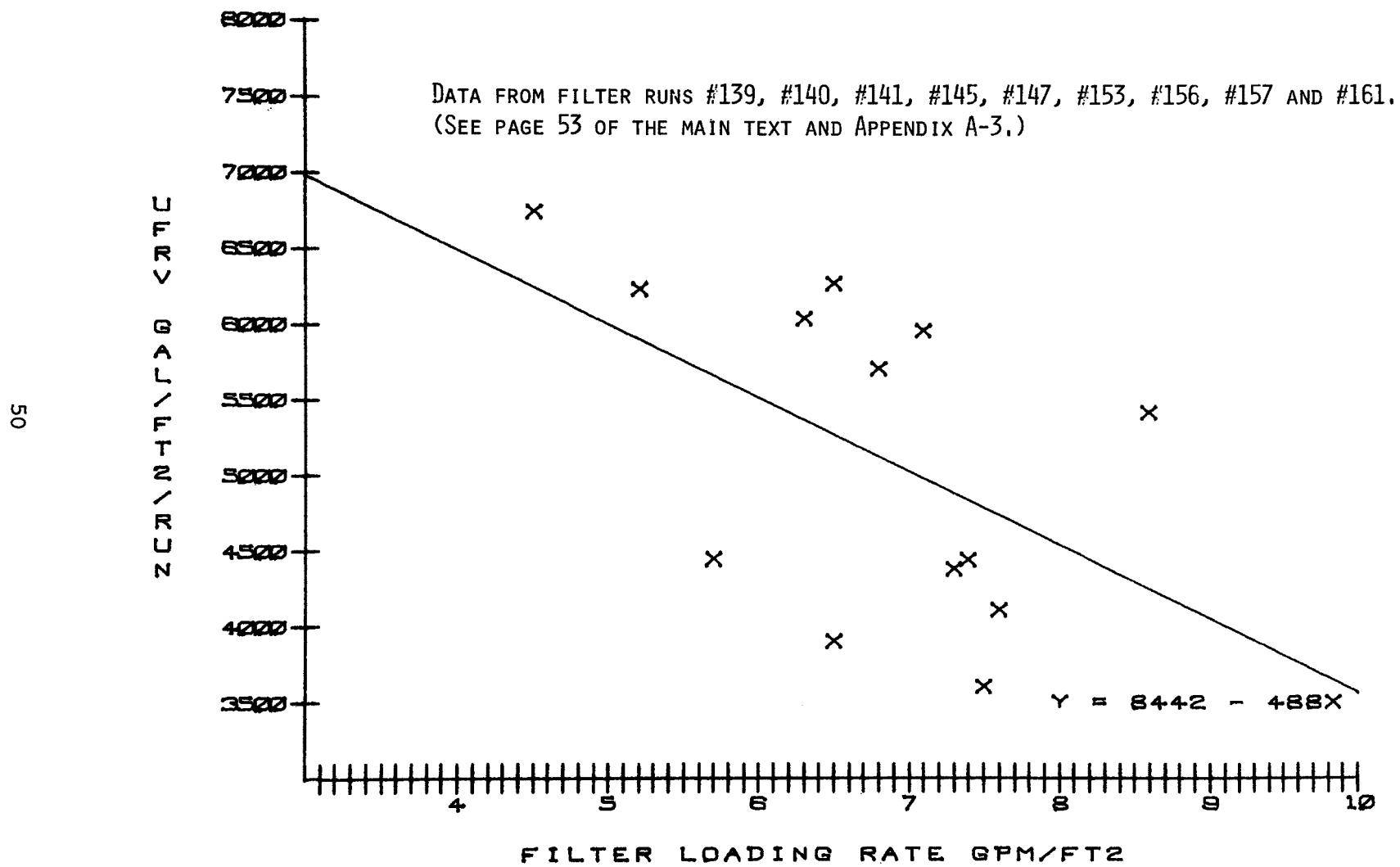


FIGURE B3-2. UFRV vs. FILTER LOADING RATE - COLUMN FC.

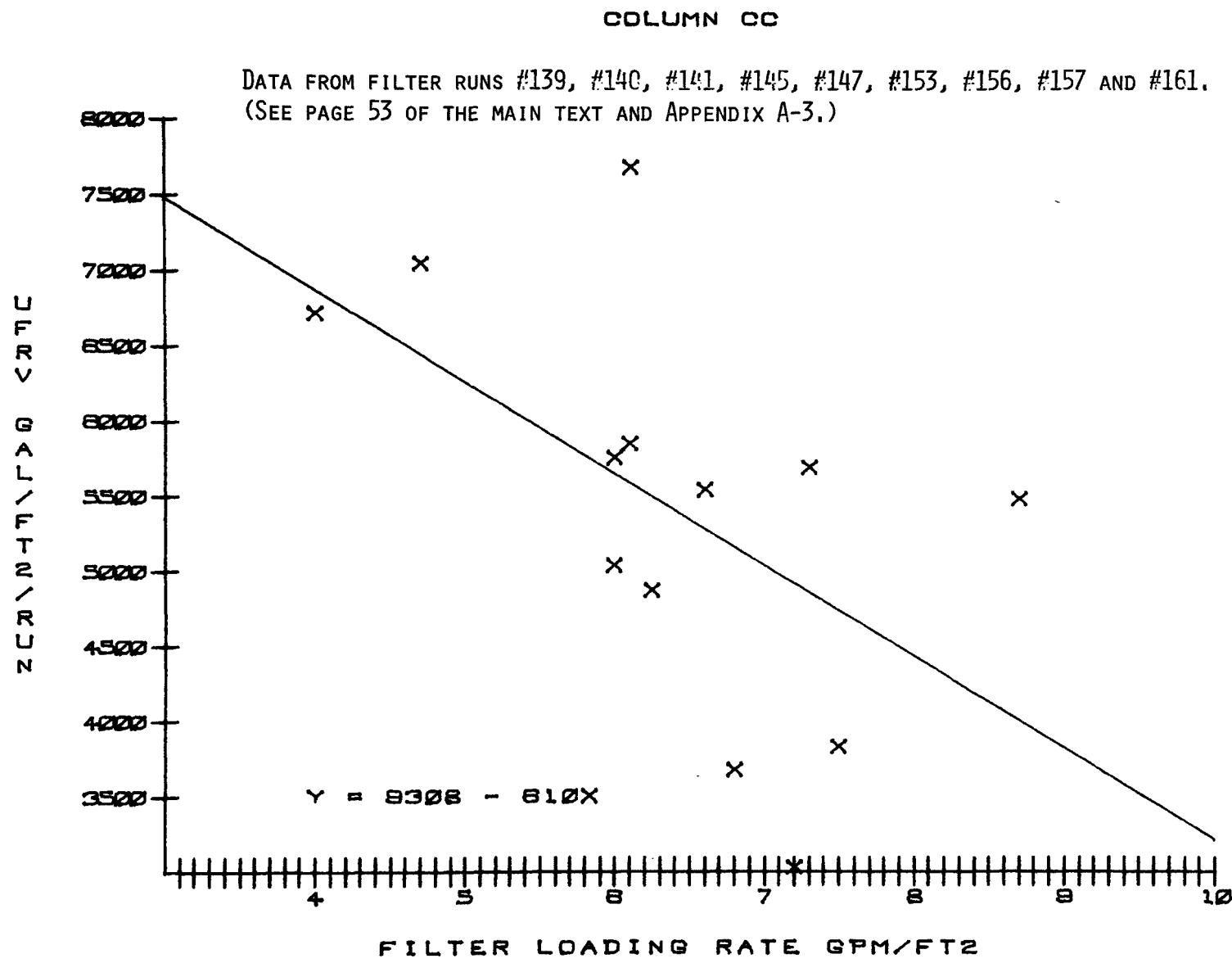


FIGURE B3-3. UFRV VS. FILTER LOADING RATE - COLUMN CC.

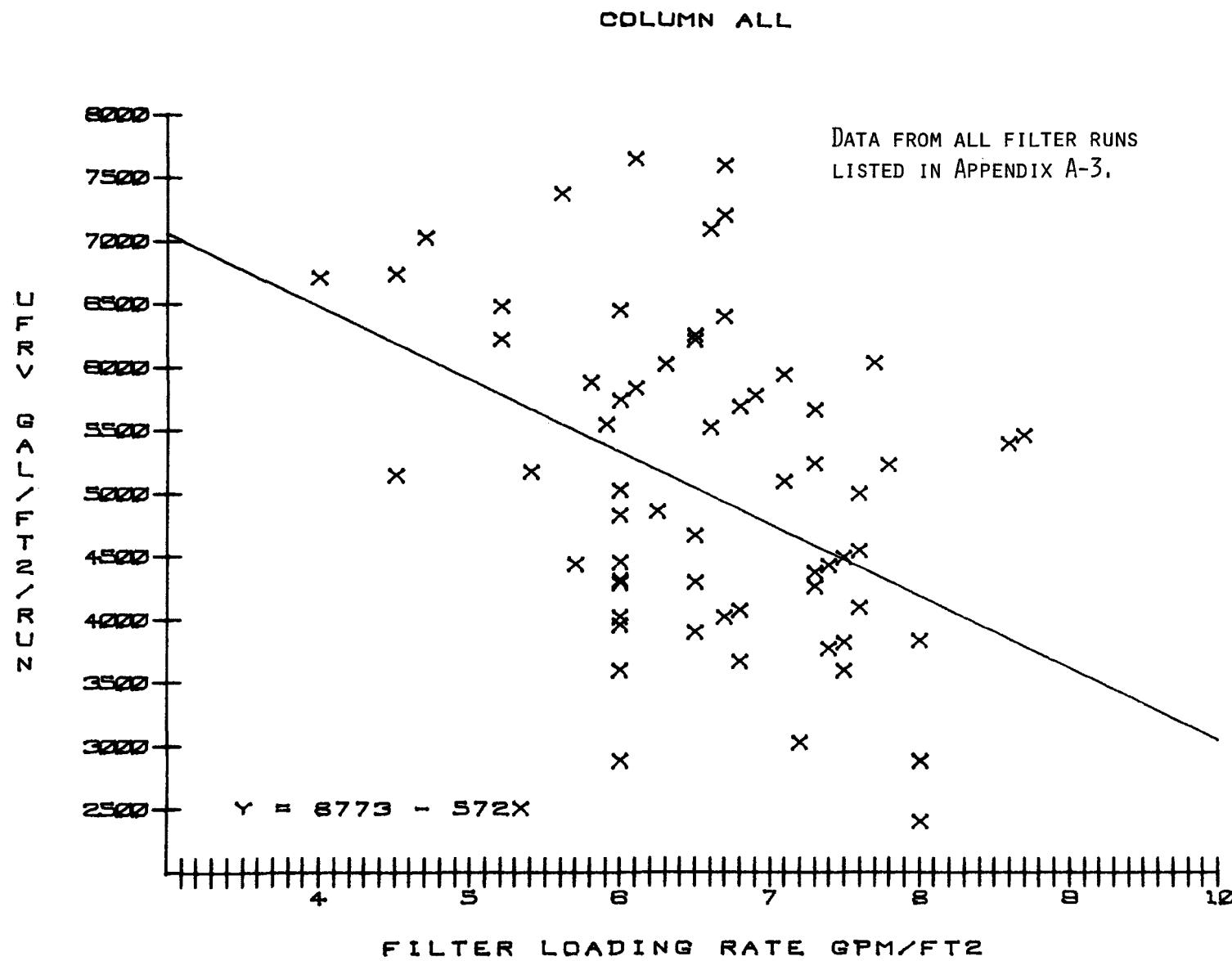


FIGURE B3-4. UFRV vs. FILTER LOADING RATE - ALL COLUMNS COMBINED.

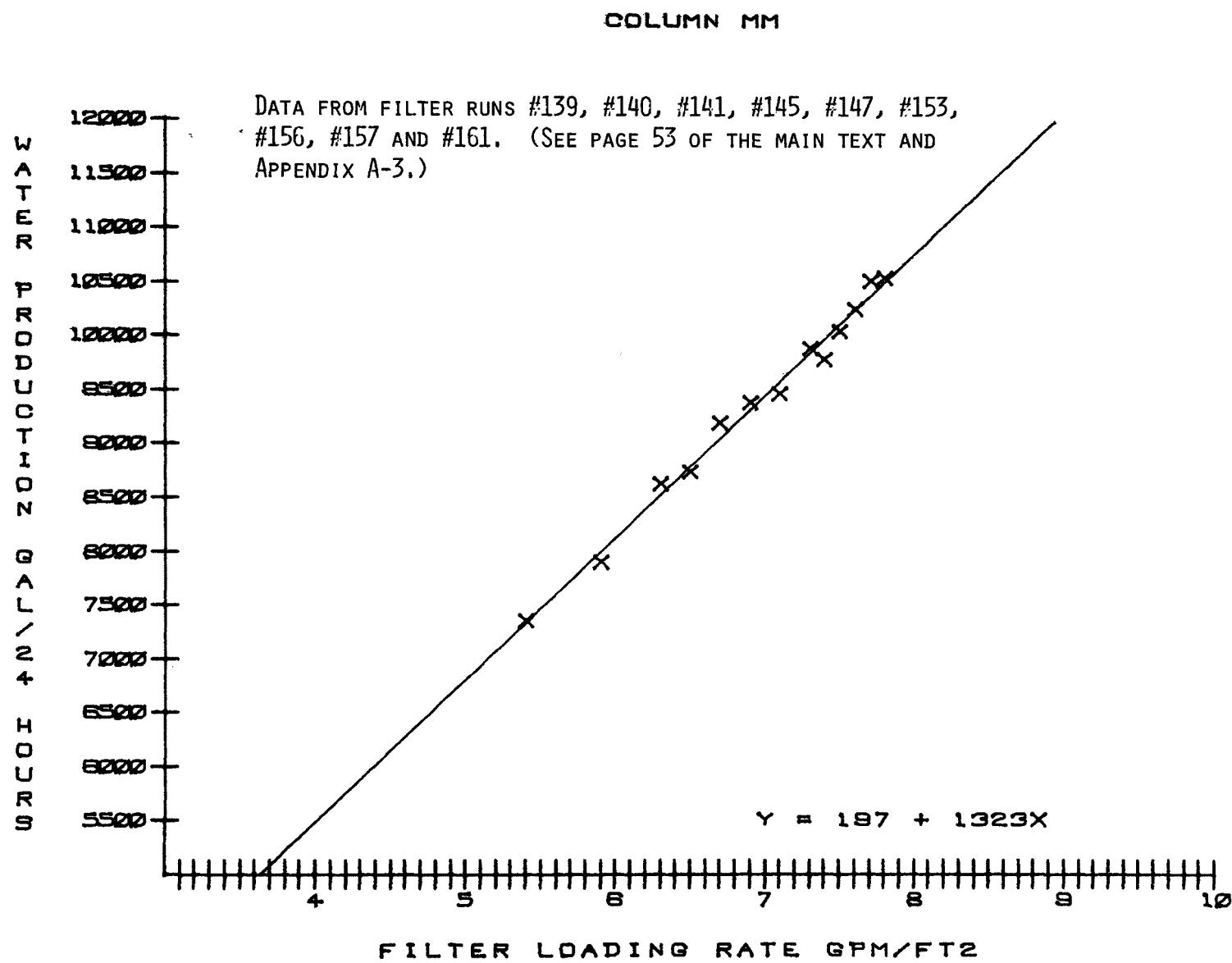


FIGURE B3-5. NET WATER PRODUCED VS. FILTER LOADING RATE - COLUMN MM.

COLUMN FC

54

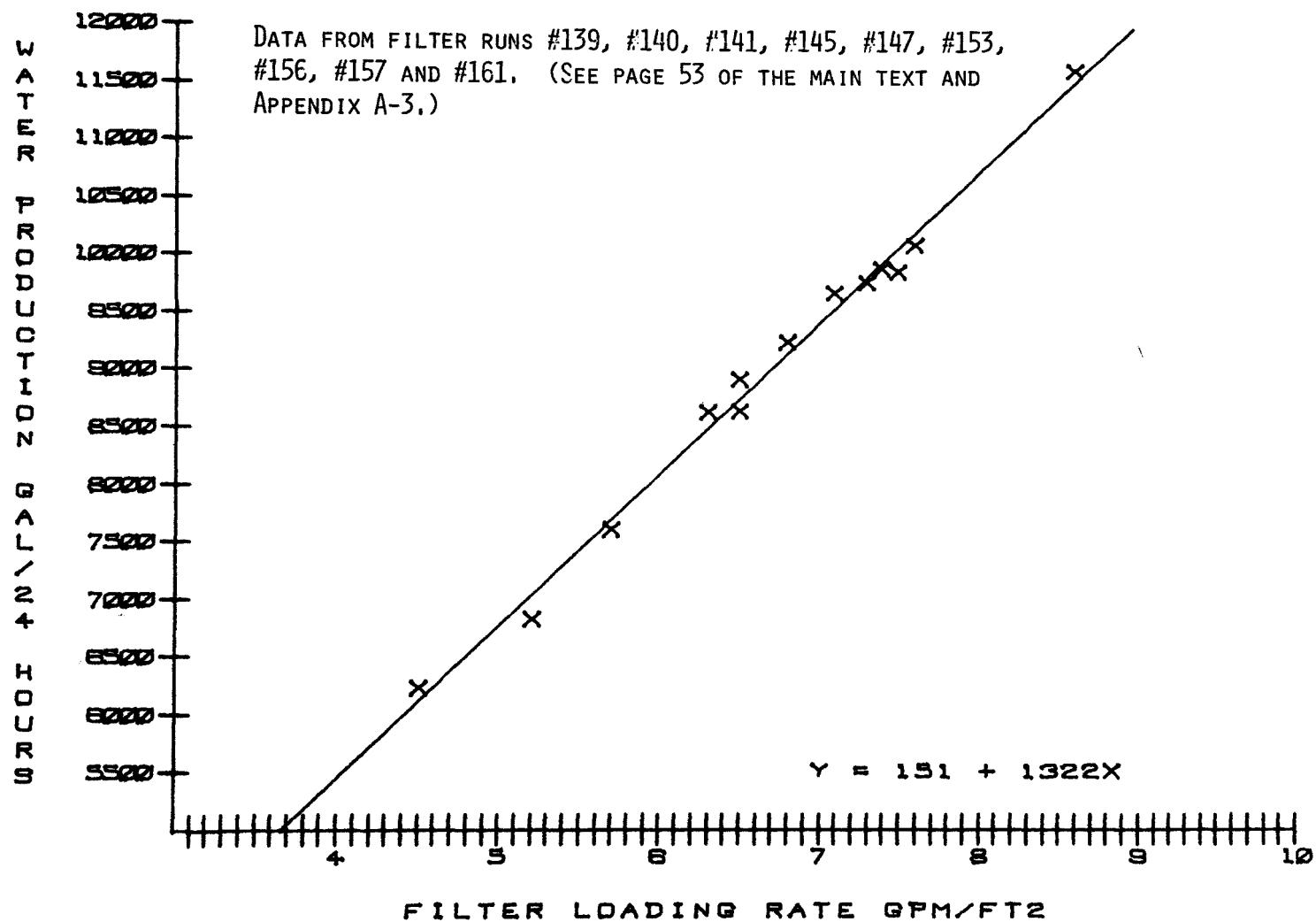


FIGURE B3-6. NET WATER PRODUCED VS. FILTER LOADING RATE - COLUMN FC.

COLUMN CC

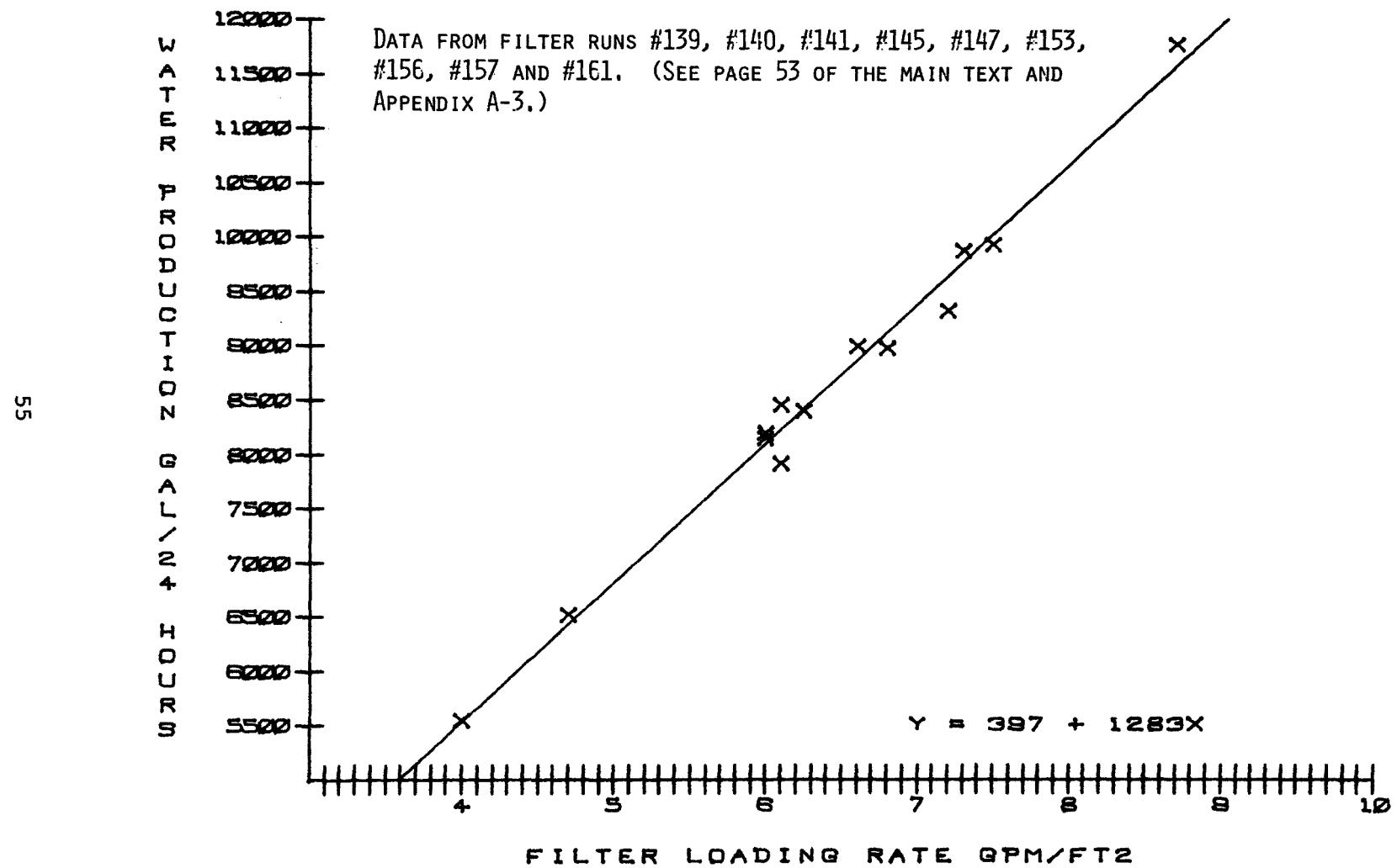


FIGURE B3-7. NET WATER PRODUCED VS. FILTER LOADING RATE - COLUMN CC.

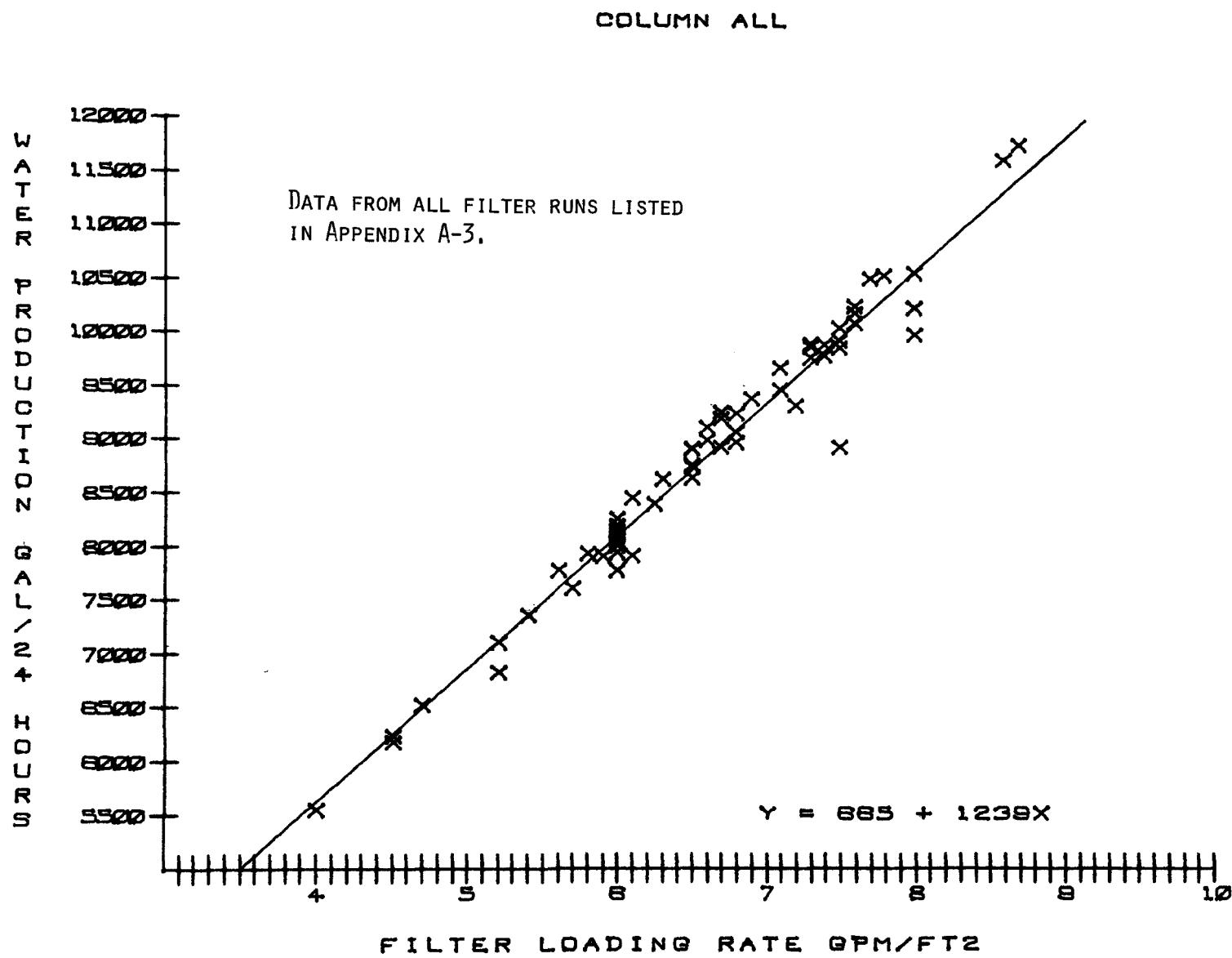


FIGURE B3-8. NET WATER PRODUCED VS. FILTER LOADING RATE - ALL COLUMNS COMBINED.

APPENDIX B-4
MICROGRAPHS OF ASBESTOS FIBERS

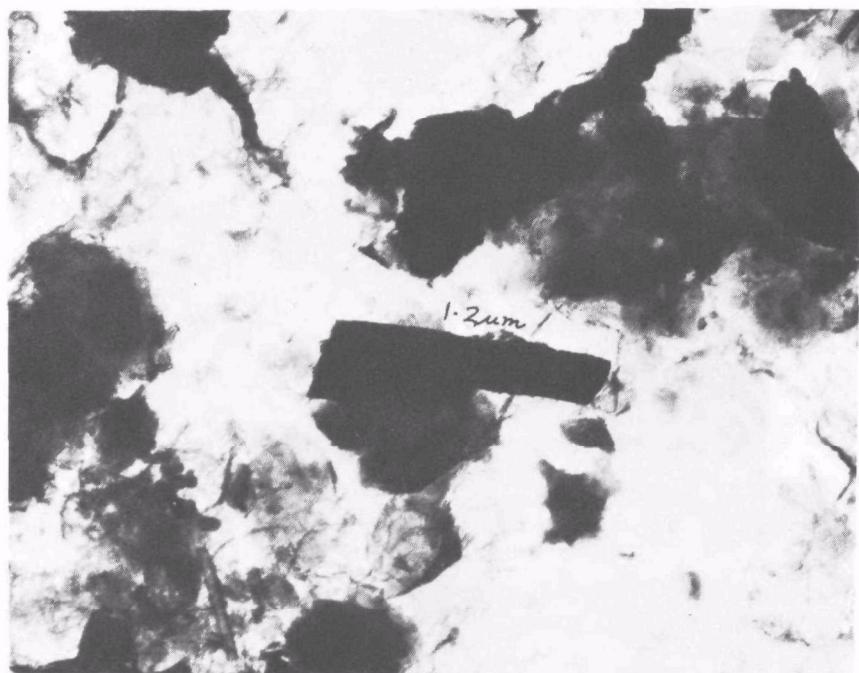


Figure B4-1. Amphibole fiber in raw water.
(magnification 31,500x)

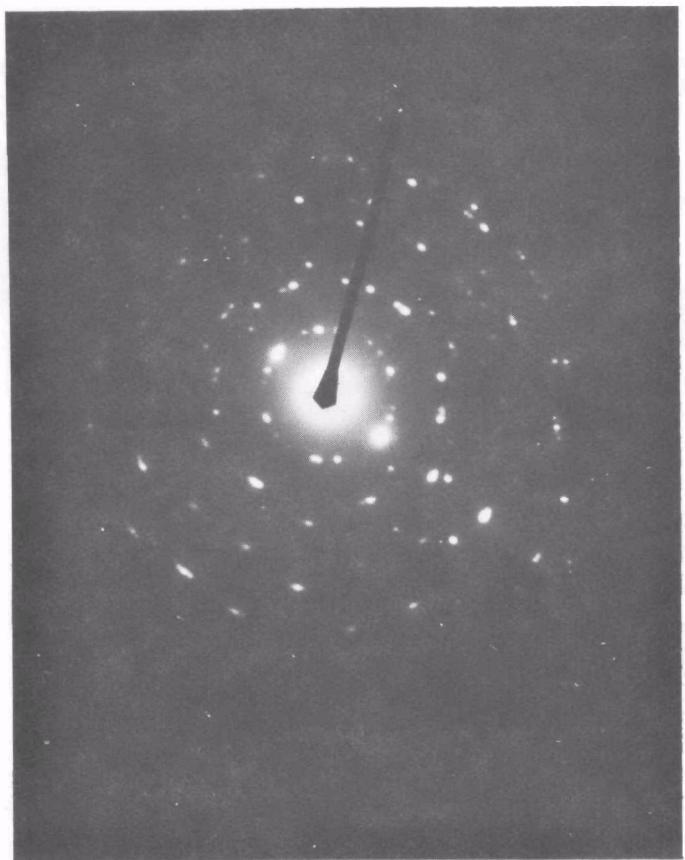


Figure B4-2. Electron diffraction dot pattern.

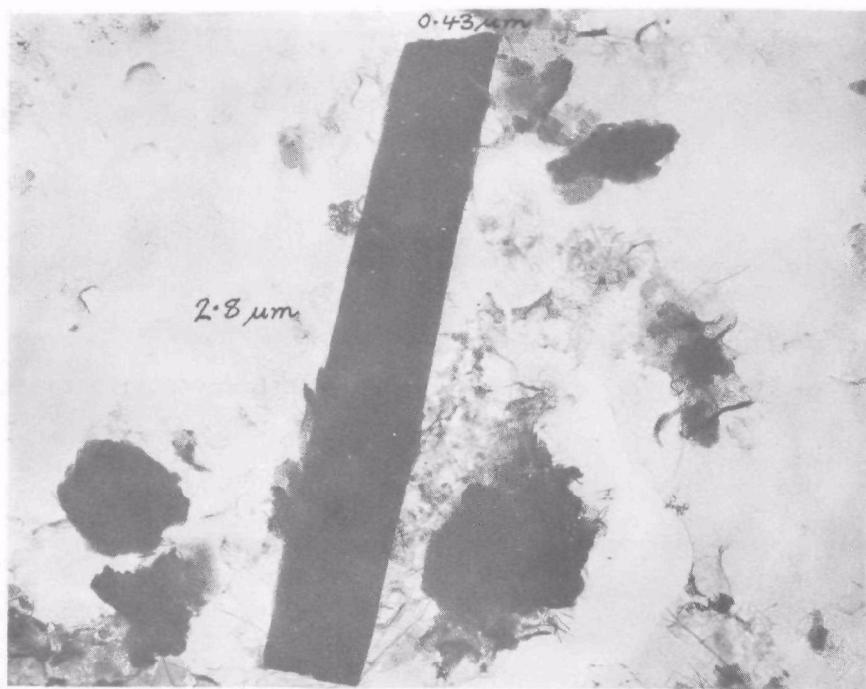


Figure B4-3. Amphibole fiber in raw water.
(magnification 30,450x)

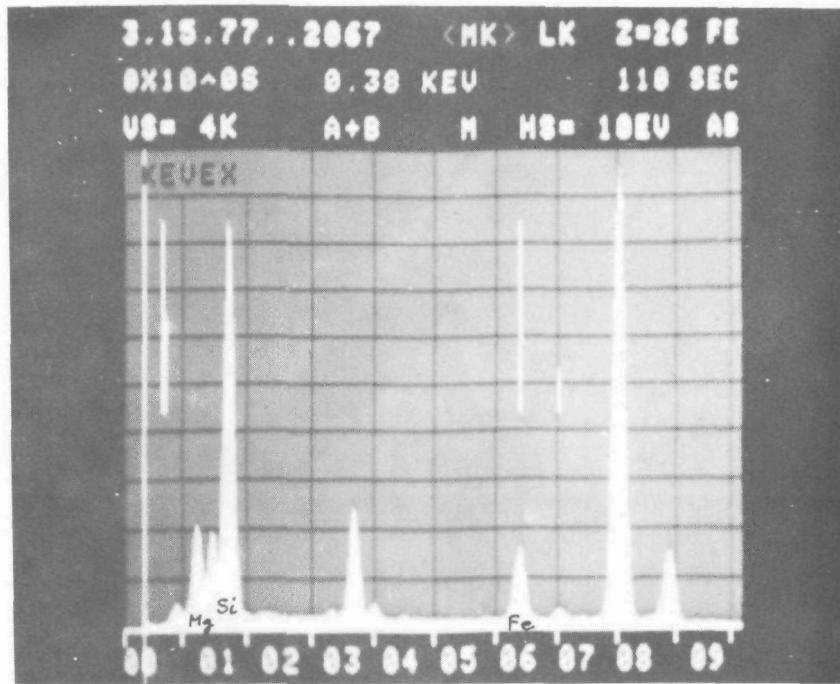


Figure B4-4. X-ray analysis of anthophyllite fiber.

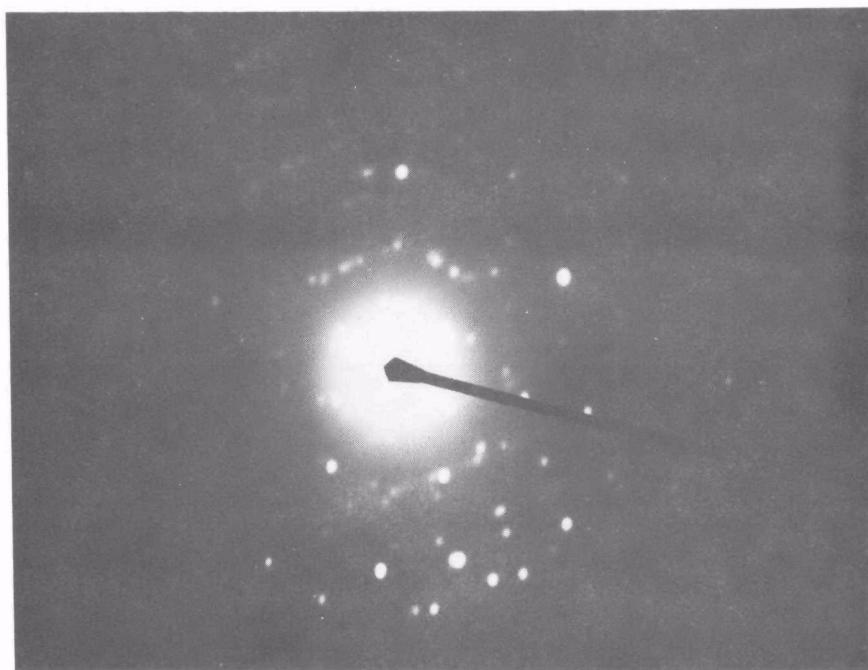


Figure B4-5. Electron diffraction dot pattern for chrysotile fiber.

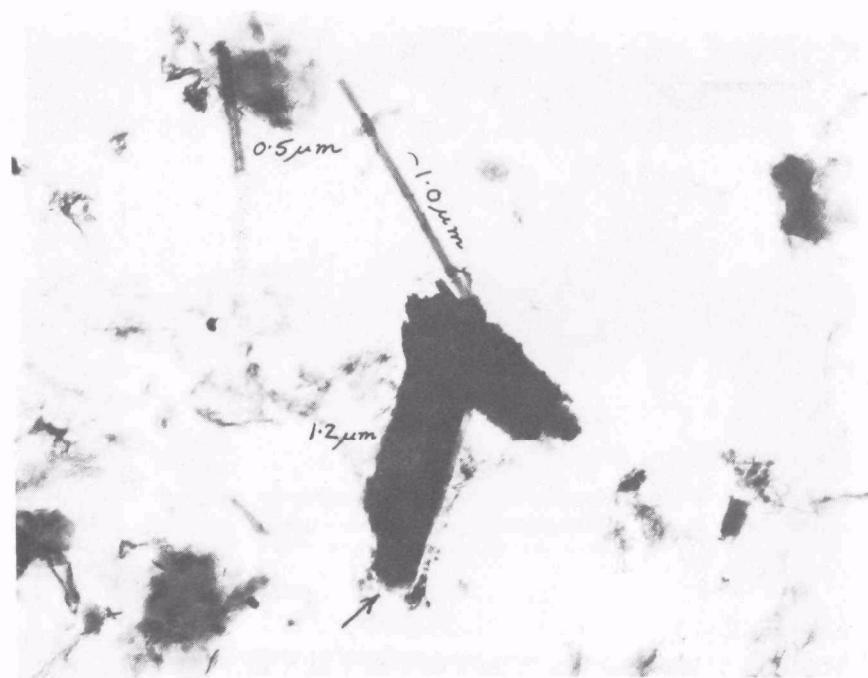


Figure B4-6. Two chrysotile fibers and a possible amphibole.
(magnification 31,500x)

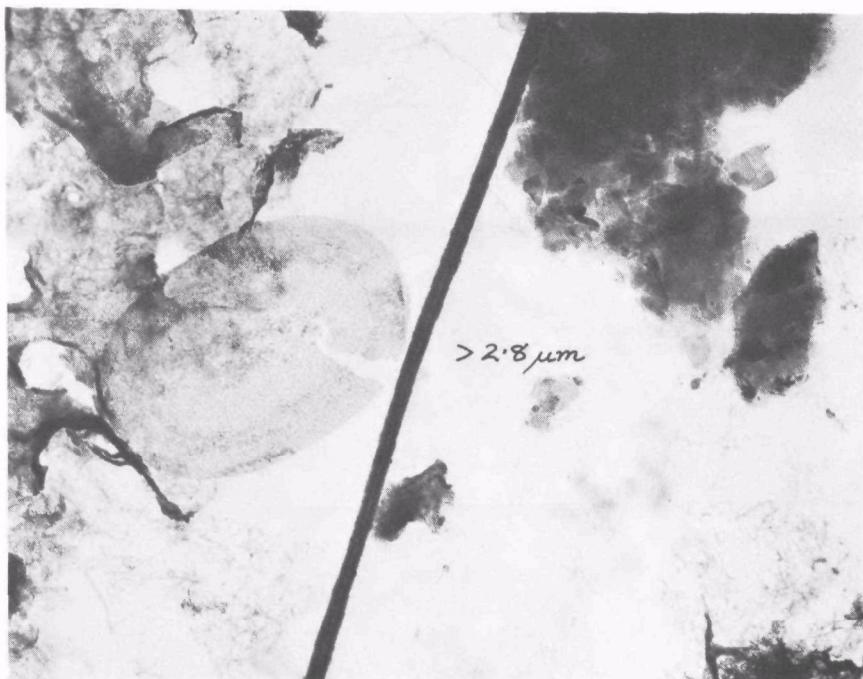


Figure B4-7. Chrysotile fiber in raw water.
(magnification 34,000x)

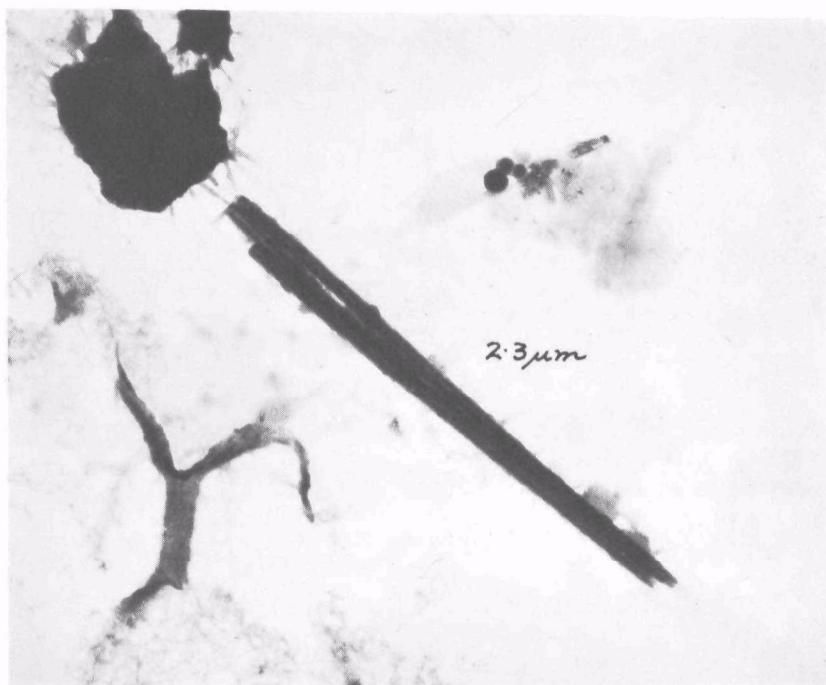


Figure B4-8. Bundle of chrysotile fibers in raw water.
(magnification 34,000x)

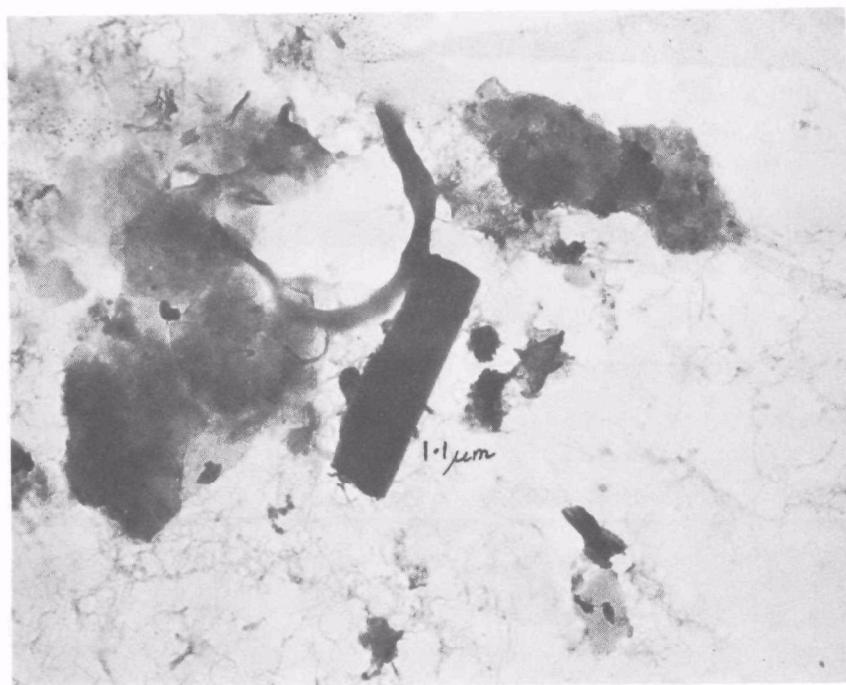


Figure B4-9. Amphibole fiber in raw water.
(magnification 28,350x)

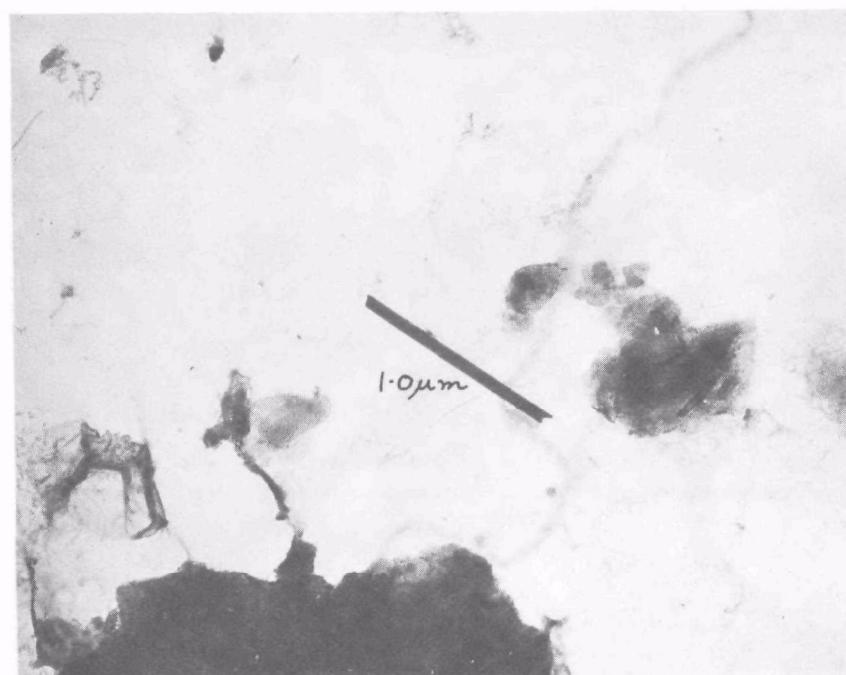


Figure B4-10. Chrysotile fiber in raw water.
(magnification 28,350x)

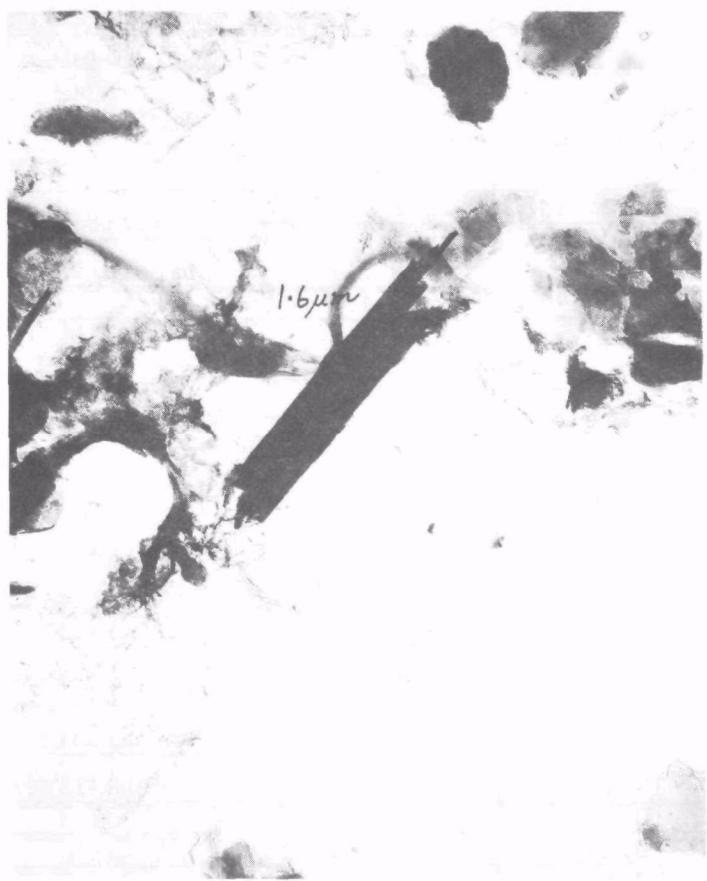


Figure B4-11. Bundle of chrysotile fibers in finished water.
(magnification 28,300x)

APPENDIX B-5

PARTICLE COUNT DATA

Run #3

Raw Water Turbidity = 1.4

Raw Water Particle Count = 4575

| Hour Into Run | Finished Water | | Amphibole fibers/liter | Chrysotile fibers/liter |
|---------------|--------------------|--------------------------|---------------------------|----------------------------|
| | Turbidity (NTU) | Particle Count (#/ml) | | |
| 6 | 0.10 | 43 | | |
| 8 | 0.10 | 146 | 0.04(10 ⁶) | 0.09(10 ⁶) |
| 10 | 0.4 | 2126 | | |
| 12 | 2.0 | 11077 | | |
| 14 | 2.5 | 13432 | | |

Run #4c

Raw Water Turbidity = 1.4

Raw Water Particle Count = 2926

| Hour Into Run | Finished Water | | Amphibole fibers/liter | Chrysotile fibers/liter |
|---------------|--------------------|--------------------------|---------------------------|----------------------------|
| | Turbidity (NTU) | Particle Count (#/ml) | | |
| 0 | 0.5 | 39 | | |
| 1 | 0.13 | 186 | | |
| 2 | 0.10 | 11 | | |
| 3 | 0.10 | 7 | | |
| 4 | 0.10 | 21 | | |
| 5 | 0.10 | 15 | 0.05(10 ⁶) | 0.09(10 ⁶) |
| 6 | 0.10 | 11 | | |
| 7 | 0.10 | 21 | | |
| 8 | 0.10 | 33 | | |
| 9 | 0.10 | 949 | | |
| 10 | 0.10 | 39 | | |
| 11 | 0.10 | 32 | | |
| 12 | 0.60 | 232 | | |

Run #5c

Raw Water Turbidity = 1.4

Raw Water Particle Count = 1262

| Hour Into Run | Finished Water | | Amphibole fibers/liter | Chrysotile fibers/liter |
|---------------|--------------------|--------------------------|---------------------------|----------------------------|
| | Turbidity (NTU) | Particle Count (#/ml) | | |
| 0 | 0.25 | 3078 | | |
| 1 | 0.12 | 27 | | |
| 2 | 0.08 | 24 | | |
| 3 | 0.07 | 23 | | |
| 4 | 0.06 | 26 | | |
| 5 | 0.08 | 51 | <0.01(10 ⁶) | 0.15(10 ⁶) |
| 6 | 0.08 | 312 | | |
| 7 | 0.08 | 65 | | |
| 8 | 0.08 | 30 | | |
| 9 | 0.08 | 17 | | |
| 10 | 0.08 | 11 | | |
| 11 | 0.35 | 414 | | |
| 12 | 0.45 | 692 | | |

Run #6d

Raw Water Turbidity = 1.25

Raw Water Particle Count = 2441

| Hour Into Run | Finished Water | | Amphibole fibers/liter | Chrysotile fibers/liter |
|---------------|--------------------|--------------------------|---------------------------|----------------------------|
| | Turbidity (NTU) | Particle Count (#/ml) | | |
| 0 | 0.95 | 218 | | |
| 1 | 0.08 | 72 | | |
| 2 | 0.08 | 32 | | |
| 3 | 0.07 | 42 | | |
| 4 | 0.07 | 34 | 0.05(10 ⁶) | 0.15(10 ⁶) |
| 5 | 0.07 | 79 | | |
| 6 | 0.06 | 30 | | |
| 7 | 0.06 | 801 | | |
| 8 | 0.07 | 147 | | |
| 9 | 0.07 | 26 | | |
| 10 | 0.15 | 80 | | |
| 11 | 0.10 | 150 | | |
| 12 | 0.10 | 252 | | |
| 13 | 0.13 | 39 | | |

Run #11

Raw Water Turbidity = 1.15

Raw Water Particle Count = 2438

| Hour Into Run | Finished Water | | Amphibole fibers/liter | Chrysotile fibers/liter |
|---------------|--------------------|--------------------------|---------------------------|----------------------------|
| | Turbidity (NTU) | Particle Count (#/ml) | | |
| 0 | 1.6 | 271 | | |
| 1 | 0.83 | 128 | | |
| 2 | 0.45 | 44 | | |
| 3 | 0.33 | 30 | | |
| 4 | 0.31 | 36 | | |
| 5 | 0.28 | 18 | | |
| 6 | 0.28 | 73 | 0.42(10 ⁶) | 1.64(10 ⁶) |
| 7 | 0.26 | 21 | | |
| 8 | 0.26 | 21 | | |
| 9 | 0.24 | 101 | | |
| 10 | 0.20 | 260 | | |
| 11 | 0.18 | 16 | | |
| 12 | 0.24 | 48 | | |
| 13 | 0.24 | 23 | | |
| 14 | 0.24 | 16 | | |
| 15 | 0.24 | 48 | | |
| 16 | 0.19 | 83 | | |
| 17 | 0.18 | 100 | | |

Run #12d

Raw Water Turbidity = 1.0

Raw Water Particle Count = 177

| Hour Into Run | Finished Water | | Amphibole fibers/liter | Chrysotile fibers/liter |
|---------------|--------------------|--------------------------|---------------------------|----------------------------|
| | Turbidity (NTU) | Particle Count (#/ml) | | |
| 0 | 0.95 | 40 | | |
| 1 | 0.10 | 20 | | |
| 2 | 0.098 | 9.7 | | |
| 3 | 0.095 | 11 | | |
| 4 | 0.095 | 23 | | |
| 5 | 0.094 | 29 | | |
| 6 | 0.09 | 6 | | |
| 7 | 0.09 | 20 | 0.01(10 ⁶) | 0.13(10 ⁶) |
| 8 | 0.08 | 14 | | |
| 9 | 0.08 | 40 | | |
| 10 | 0.08 | 160 | | |
| 11 | 0.08 | 15 | | |
| 12 | 0.08 | 40 | | |
| 13 | 0.08 | 22 | | |
| 14 | 0.08 | 43 | | |
| 15 | 0.08 | 46 | | |
| 16 | 0.08 | 21 | | |
| 17 | 0.08 | 382 | | |
| 18 | 0.08 | 53 | | |
| 19 | 0.09 | 196 | | |
| 20 | 0.09 | 366 | | |
| 21 | 0.11 | 331 | | |

Run #21

Raw Water Turbidity = 0.70
 Raw Water Particle Count = 216

| Hour Into Run | Finished Water | | Amphibole fibers/liter | Chrysotile fibers/liter |
|---------------|--------------------|--------------------------|---------------------------|----------------------------|
| | Turbidity (NTU) | Particle Count (#/ml) | | |
| 0 | 0.13 | 10 | | |
| 1 | 0.072 | 10 | | |
| 2 | 0.065 | 16 | 0.01(10 ⁶) | 0.16(10 ⁶) |
| 3 | 0.060 | 38 | | |
| 4 | 0.059 | 15 | | |
| 5 | 0.059 | 75 | | |
| 6 | 0.060 | 4 | 0.01(10 ⁶) | 0.16(10 ⁶) |
| 7 | 0.34 | 22 | 0.72(10 ⁶) | 12.25(10 ⁶) |
| 8 | 0.060 | 7 | <0.01(10 ⁶) | 0.19(10 ⁶) |
| 9 | 0.065 | 16 | | |
| 10 | 0.063 | 31 | | |
| 11 | 0.070 | 33 | | |
| 12 | 0.059 | 8 | <0.01(10 ⁶) | 0.09(10 ⁶) |
| 13 | 0.062 | 17 | | |

Run #24

Raw Water Turbidity = 0.60

Raw Water Particle Count = 107

| Hour Into Run | Finished Water | | Amphibole fibers/liter | Chrysotile fibers/liter |
|---------------|--------------------|--------------------------|---------------------------|----------------------------|
| | Turbidity (NTU) | Particle Count (#/ml) | | |
| 0 | 0.098 | 10 | | |
| 1 | 0.071 | 11 | | |
| 2 | 0.065 | 9 | | |
| 3 | 0.065 | 10 | | |
| 4 | 0.071 | 4 | | |
| 5 | 0.070 | 4 | | |
| 6 | 0.085 | 18 | 0.04(10 ⁶) | 0.34(10 ⁶) |
| 7 | 0.36 | 35 | 0.6 (10 ⁶) | 6.2 (10 ⁶) |
| 8 | 0.41 | 40 | | |
| 9 | 0.08 | 26 | | |
| 10 | 0.072 | 20 | | |
| 11 | 0.062 | 15 | | |
| 12 | 0.060 | 21 | | |
| 13 | 0.062 | 18 | 0.04(10 ⁶) | 0.13(10 ⁶) |
| 14 | 0.058 | 16 | | |
| 15 | 0.060 | 22 | | |
| 16 | 0.091 | 36 | | |
| 17 | 0.059 | 21 | | |
| 18 | 0.059 | 12 | | |
| 19 | 0.059 | 10 | | |
| 20 | 0.06 | 40 | | |

APPENDIX B-6

FILTER RUN PILOT TESTING AT HIGH RAW WATER TURBIDITIES

I. SUMMARY

Pilot tests were conducted to determine if direct filtration techniques could effectively treat water with abnormally high raw water turbidities. These tests indicated that such techniques could produce an acceptable quality finished water when raw water turbidity was less than approximately 20 NTU.

II. INTRODUCTION

Purpose

The purposes of this phase of the asbestos removal study were to determine (1) if the process flow schematic consisting of a static mixer, a flocculation chamber and a granular media filter could effectively remove abnormally high raw water turbidities; (2) what practical upper limit of raw water turbidity could be removed; and (3) which of the test medias was most effective under the stressed conditions.

Goals

To effectively remove asbestos particles from the raw water, the filtration process had to remove turbidity down to levels which were \leq 0.1 NTU. Since turbid water conditions are normally short term phenomena resulting from landslides or flooding, the turbidity goal in the finished water was changed. Rather than attempting to produce a finished water turbidity of \leq 0.1 NTU, the desired goal was increased to 0.5 NTU, which is still well below the maximum contaminant level of 1.0 NTU set forth by the National Interim Primary Drinking Water Regulations. This less stringent goal was justifiable during emergencies since it would be more important to produce a safe water by today's standards rather than removing all asbestos particles from the water.

Methods and Equipment

To achieve the high turbidities, soil from the banks of the South Fork Tolt Reservoir was gathered and mixed with raw Tolt water. The slurry was allowed to settle to remove heavy suspended material and the supernatant was decanted into another container for feeding into the pilot plant. Equipment limitations prohibited the investigator from injecting the slurry at a point upstream of the static mixer and consequently it was fed directly into the head end of the flocculation chamber. Raw water turbidities between 5 and 34 NTU were achieved using these methods.

III. RESULTS

General

Data from filter runs conducted at the abnormally high raw water turbidities is presented in Table B6-1 and plots of headloss and turbidity vs. time are contained in Figures B6-1 through B6-21.

Water Quality

The data indicate that direct filtration techniques using a static mixer, a flocculation chamber and a granular media filter can significantly reduce excessive turbidity present in the raw water. Using 10 mg/l of alum, lime for pH control and a nonionic polymer as a filter aid, direct filtration methods reduced raw water turbidities of 20 NTU down to ≤ 0.5 NTU. Raw water turbidities > 20 NTU could be reduced but finished waters exceeded 0.5 NTU after filtration. It is likely that chemical feed rates could be adjusted to effectively remove raw water turbidities that are > 20 NTU but such an evaluation was beyond the scope of this study.

Water Production

Most of the filter runs were conducted at a moderate filter loading rate of about 4 gpm/ft². Normally, as the raw water turbidities increased, both the length of the filter run and the filter efficiency decreased. Utilizing direct filtration techniques at these high raw water turbidities was not expected to be a very efficient method of operation but the tests demonstrated that an acceptable quality finished water could be produced for short periods of time at moderate loading rates. The coarse coal dual media generally produced more water per filter run than either dual media with fine coal or the mixed media filter.

IV. CONCLUSIONS

Treatment techniques similar to those which remove asbestos fibers from Tolt water can be used to reduce abnormally high raw water turbidities (20 NTU) down to ≤ 0.5 NTU in the finished water. Direct filtration techniques are inefficient under such raw water conditions but can produce potable water for a short period of time until the turbidity recedes. Dual media with coarse coal was the most effective filter media.

TABLE B6-1. DETAILED DATA ON FILTER RUNS AT HIGH RAW WATER TURBIDITIES

| Run No. | Plant Flow gpm | Filter Loading gpm/ft ² | Finished Water | | | Net Water Produced gal/ft ² /24 hrs | Raw Water Turbidity NTU | Temp. °C | Process | pH |
|---------|----------------|------------------------------------|----------------------|----------------------|-------------------------------|--|-------------------------|---------------------|------------------|-----|
| | | | # of Hours ≤ 0.5 NTU | # of Hours 8' to 10' | UFRV gal/ft ² /run | | | | | |
| 150 | 16.00 | 4.00 | 7 | 7 | 1680 | 4869 | 4.0 - 13 | 7.0 | Raw | 7.2 |
| | | | | | | | | | RM | 7.0 |
| | | | | | | | | | Floc | 7.0 |
| | | | | | | | | | Finished | 7.0 |
| | | | | | | | | | Raw | 6.5 |
| 151 | 8.8 | 2.20 | 8 | 8 | 924 | 2469 | 5.0 | 8.5 | RM | 6.6 |
| | | | | | | | | | Floc | 6.4 |
| | | | | | | | | | Finished | 6.5 |
| | | | | | | | | | Raw | 7.2 |
| | | | | | | | | | RM | 7.6 |
| 151MM | 0.43 | 3.94 | 7 | 12 | 1655 | 4785 | 5.0 | SAME AS RUN #151--- | Floc | 7.0 |
| | | | | | | | | | Finished | 7.0 |
| | | | | | | | | | Raw | 6.5 |
| | | | | | | | | | RM | 6.6 |
| | | | | | | | | | Floc | 6.6 |
| 151FC | 0.46 | 4.15 | 7 | 10 | 1743 | 5077 | 5.0 | SAME AS RUN #151--- | Finished | 6.6 |
| | | | | | | | | | Raw | 6.5 |
| | | | | | | | | | RM | 6.6 |
| | | | | | | | | | Floc | 6.6 |
| | | | | | | | | | Raw | 6.5 |
| 151CC | 0.45 | 4.07 | 10 | 10 | 2442 | 5234 | 5.0 | SAME AS RUN #151--- | RM | 6.6 |
| | | | | | | | | | Floc | 6.6 |
| | | | | | | | | | Finished | 6.6 |
| | | | | | | | | | Raw | 6.5 |
| | | | | | | | | | RM | 6.6 |
| 154 | 16.00 | 4.00 | 10 | 10 | 2400 | 5136 | 6.0 | 9.0 | Raw | 6.5 |
| | | | | | | | | | RM | 6.6 |
| | | | | | | | | | Floc | 6.6 |
| | | | | | | | | | Finished | 6.6 |
| | | | | | | | | | Raw | 6.5 |
| 154MM | 0.44 | 4.00 | 10 | 15 | 2400 | 5136 | 6.0 | 9.0 | SAME AS RUN #154 | |
| | | | | | | | | | Raw | |
| | | | | | | | | | RM | |
| | | | | | | | | | Floc | |
| | | | | | | | | | Finished | |
| 154FC | 0.43 | 3.92 | 10 | 12 | 2352 | 5024 | 6.0 | SAME AS RUN #154--- | Raw | 6.5 |
| | | | | | | | | | RM | 6.6 |
| | | | | | | | | | Floc | 6.6 |
| | | | | | | | | | Finished | 6.6 |
| | | | | | | | | | Raw | 6.5 |
| 154CC | 0.44 | 3.96 | 12 | 13 | 2851 | 5184 | 6.0 | SAME AS RUN #154--- | RM | 6.6 |
| | | | | | | | | | Floc | 6.6 |
| | | | | | | | | | Finished | 6.6 |
| | | | | | | | | | Raw | 6.6 |
| | | | | | | | | | RM | 6.6 |
| 159 | 16.00 | 4.00 | 8 | 8 | 1920 | 4980 | 5.0 | 10.5 | Raw | 6.6 |
| | | | | | | | | | RM | 6.6 |
| | | | | | | | | | Floc | 6.6 |
| | | | | | | | | | Finished | 6.6 |
| | | | | | | | | | Raw | 6.8 |
| 160 | 16.00 | 4.00 | 7 | 7 | 1680 | 4869 | 14 - 34 | 13 | Raw | 6.6 |
| | | | | | | | | | RM | 6.6 |
| | | | | | | | | | Floc | 6.6 |
| | | | | | | | | | Finished | 6.8 |
| | | | | | | | | | Raw | |

(continued)

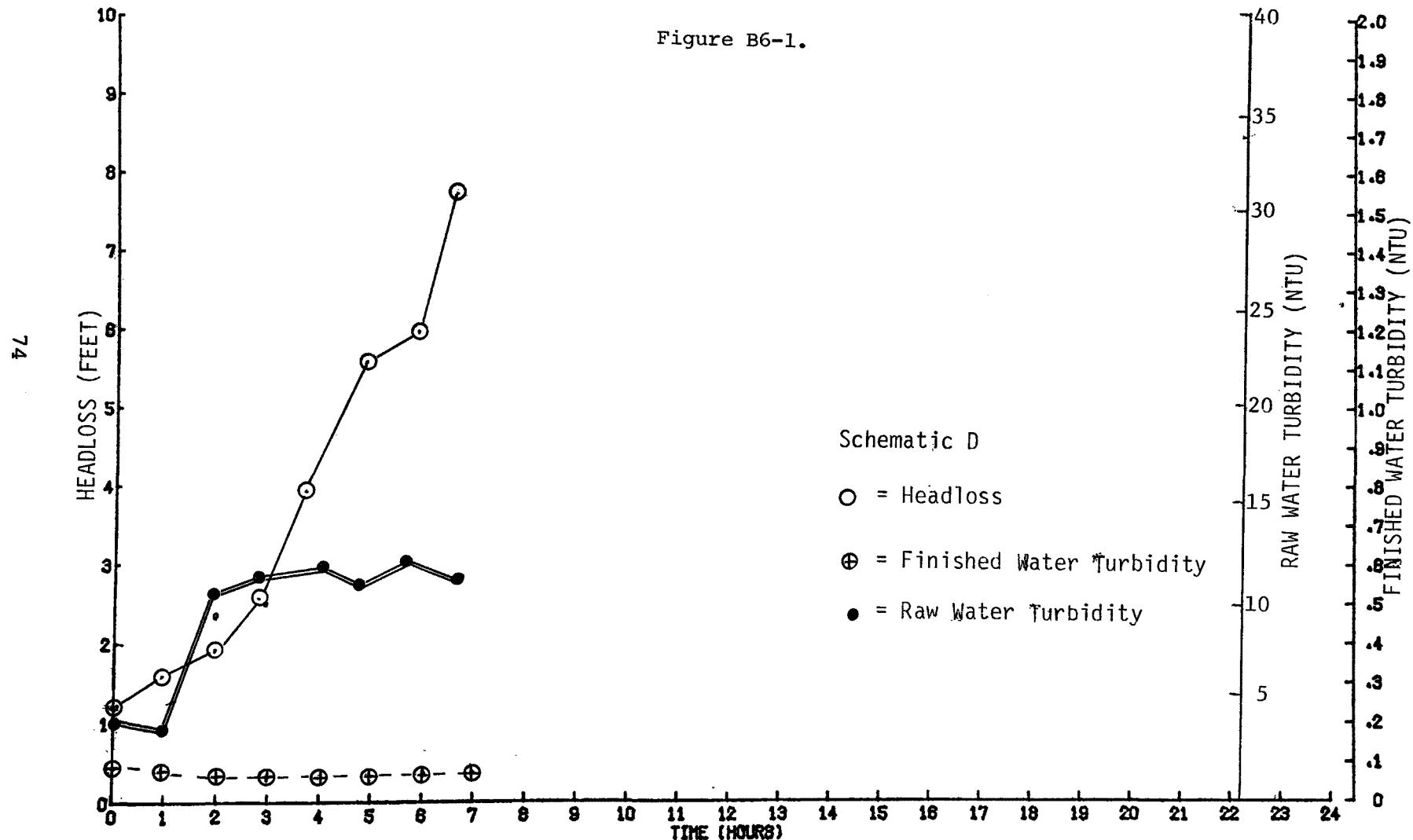
TABLE B6-1 (CONTINUED)

| Run No. | Plant Flow gpm | Filter Loading gpm/ft ² | Finished Water | | | Net Water Produced gal/ft ² /24 hrs | Raw Water Turbidity NTU | Temp. °C | Process | pH |
|---------|--------------------------|------------------------------------|----------------------|----------------------|-------------------------------|--|-------------------------|----------|----------------------|-----------------|
| | | | # of Hours ≤ 0.5 NTU | # of Hours 8' to 10' | UFRV gal/ft ² /run | | | | | |
| 160MM | 0.43 | 3.89 | 9 | 10 | 2101 | 4913 | SAME AS RUN #160----- | | | |
| 160FC | 0.43 | 3.92 | 9 | 10 | 2117 | 4955 | SAME AS RUN #160----- | | | |
| 160CC | 0.43 | 3.88 | 9 | 10 | 2095 | 4899 | SAME AS RUN #160----- | | | |
| 162 | 16.00 | 4.00 | 0 | 2 | 0 | 0 | 5 - 34 | 13 | RAW RM FLOC FINISHED | 6.6 6.6 6.8 6.6 |
| 162MM | Avg.= 0.53 Max.= 0.56 | 4.83 | 1 | 4 | 290 | 416 | 18 - 34 | SAME | AS RUN #162----- | |
| 162FC | Avg.= 0.53 Max.= 0.56 | 4.16 | 0 | 2 | | 0 | 18 - 34 | SAME | AS RUN #162----- | |
| 162CC | Avg.= 0.44 Max.= 0.56 | 3.99 | 3 | 5 | 718 | 3667 | 18 - 34 | SAME | AS RUN #162----- | |
| 163 | 16.00 | 4.00 | 1 | 2 | 240 | 0 | 18 - 34 | 13.1 | RAW RM FLOC FINISHED | 6.7 6.8 6.6 6.7 |
| 163MM | Avg.= 0.48 Max.= 0.56 | 4.33 | 4 | 4 | 1039 | 4646 | SAME AS RUN #163----- | | | |
| 163FC | Avg.= 0.38 Max.= 0.56 | 3.43 | 3 | 3 | 617 | 2928 | SAME AS RUN #163----- | | | |
| 163CC | Avg.= 0.56 Max.= 0.45 | 4.13 | 5 | 5 | 1239 | 4690 | SAME AS RUN #163----- | | | |

HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 150

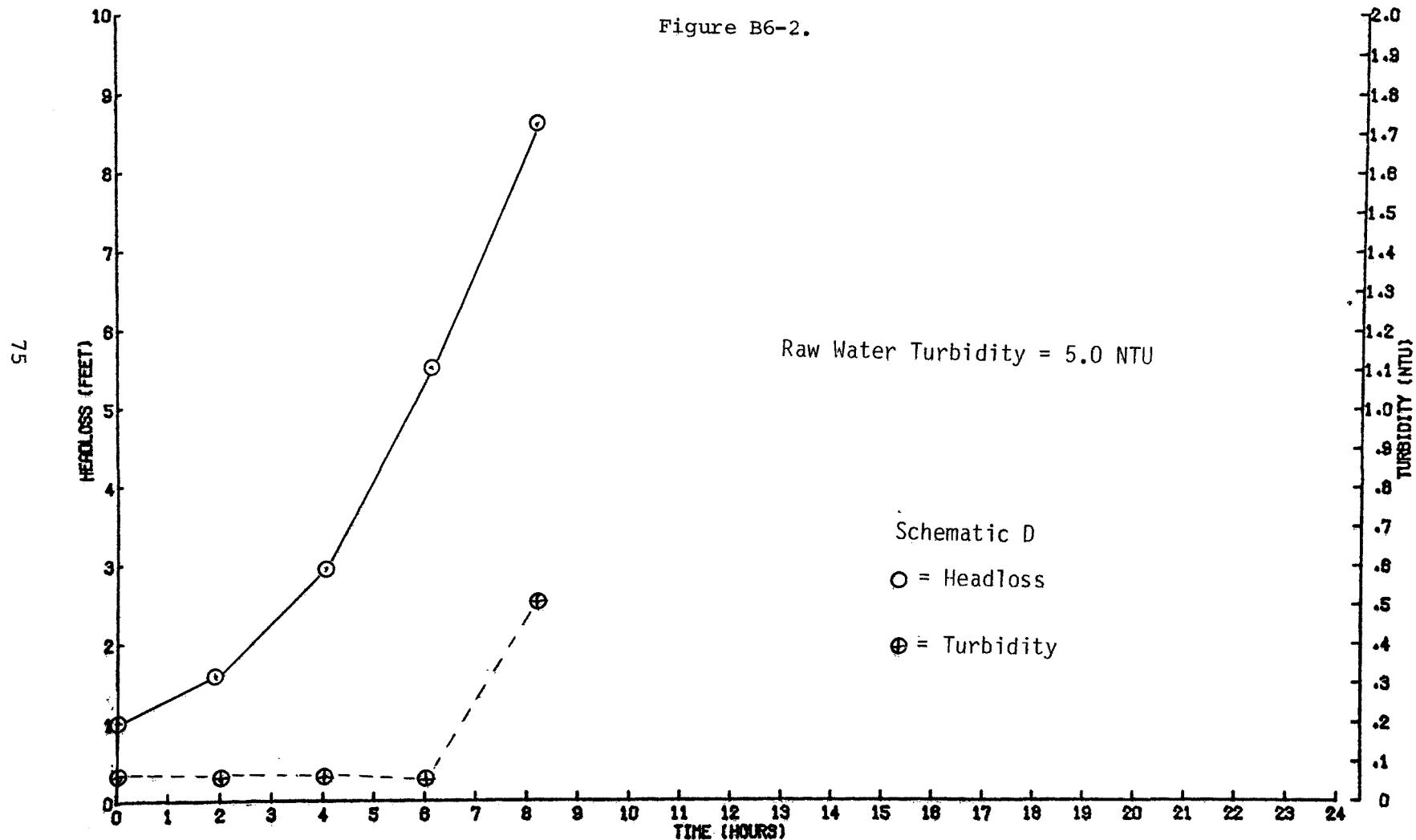
Figure B6-1.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 151

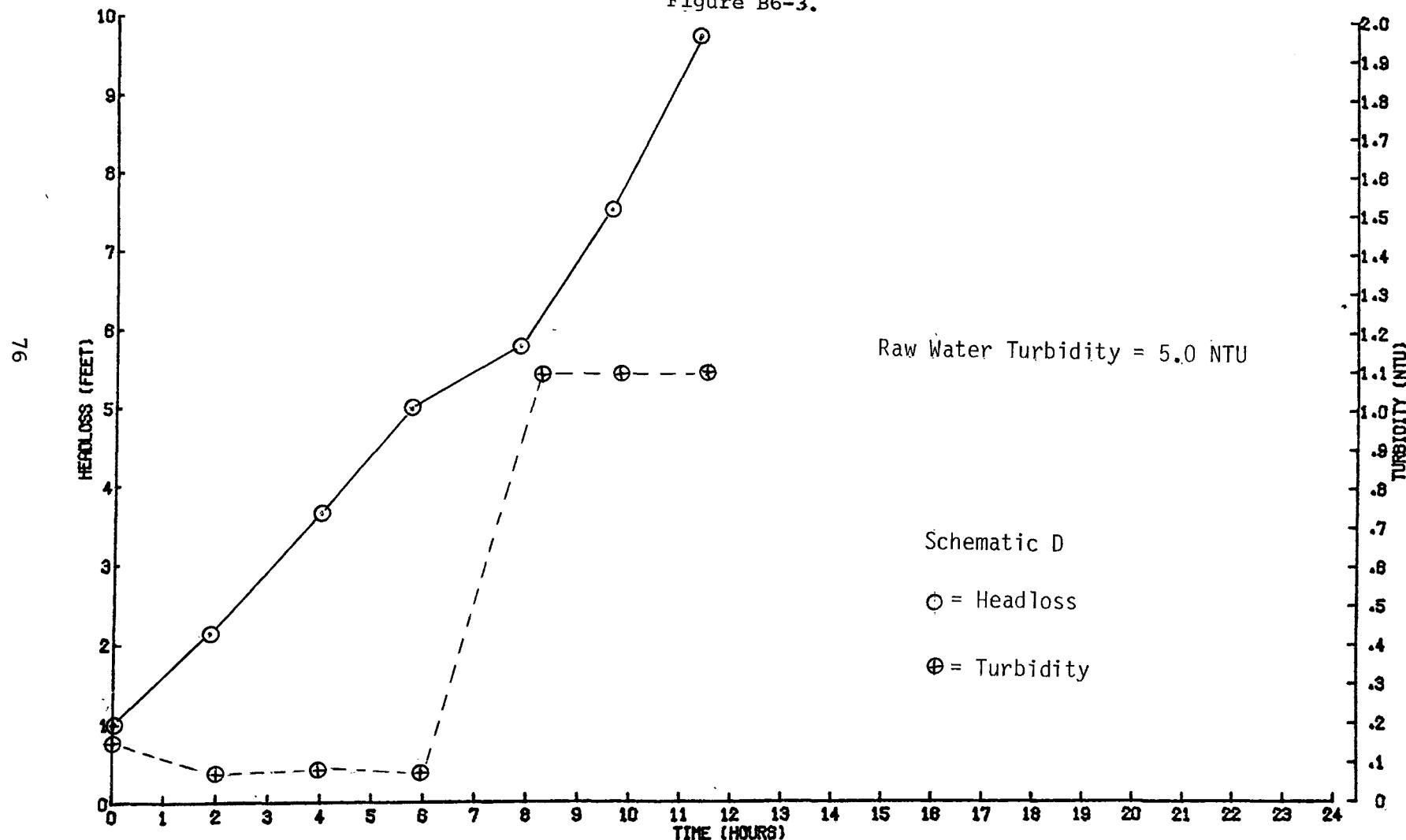
Figure B6-2.



HEADLOSS AND TURBIDITY VS TIME

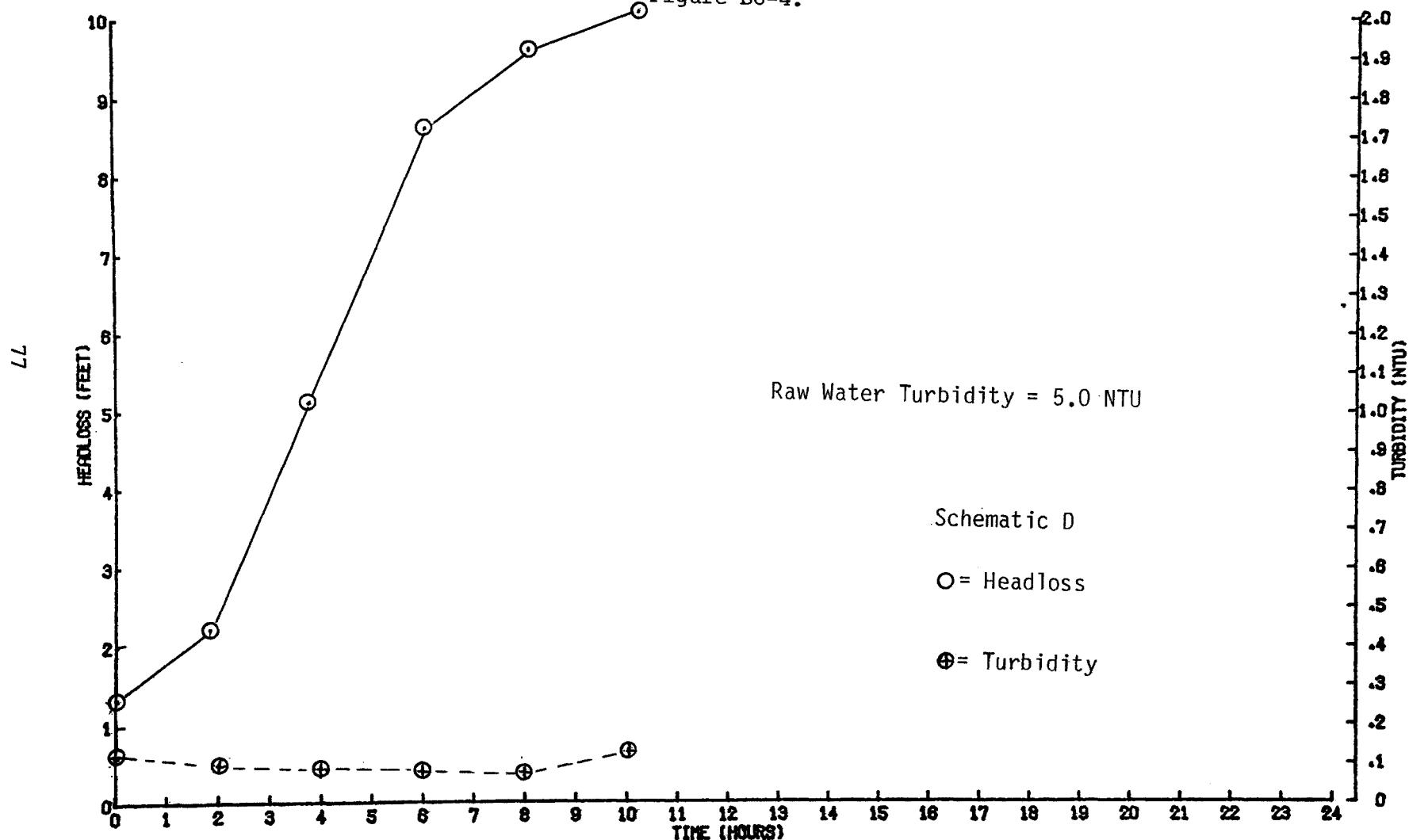
RUN NUMBER 151MM

Figure B6-3.



HEADLOSS AND TURBIDITY
VS TIME
RUN NUMBER 151FC

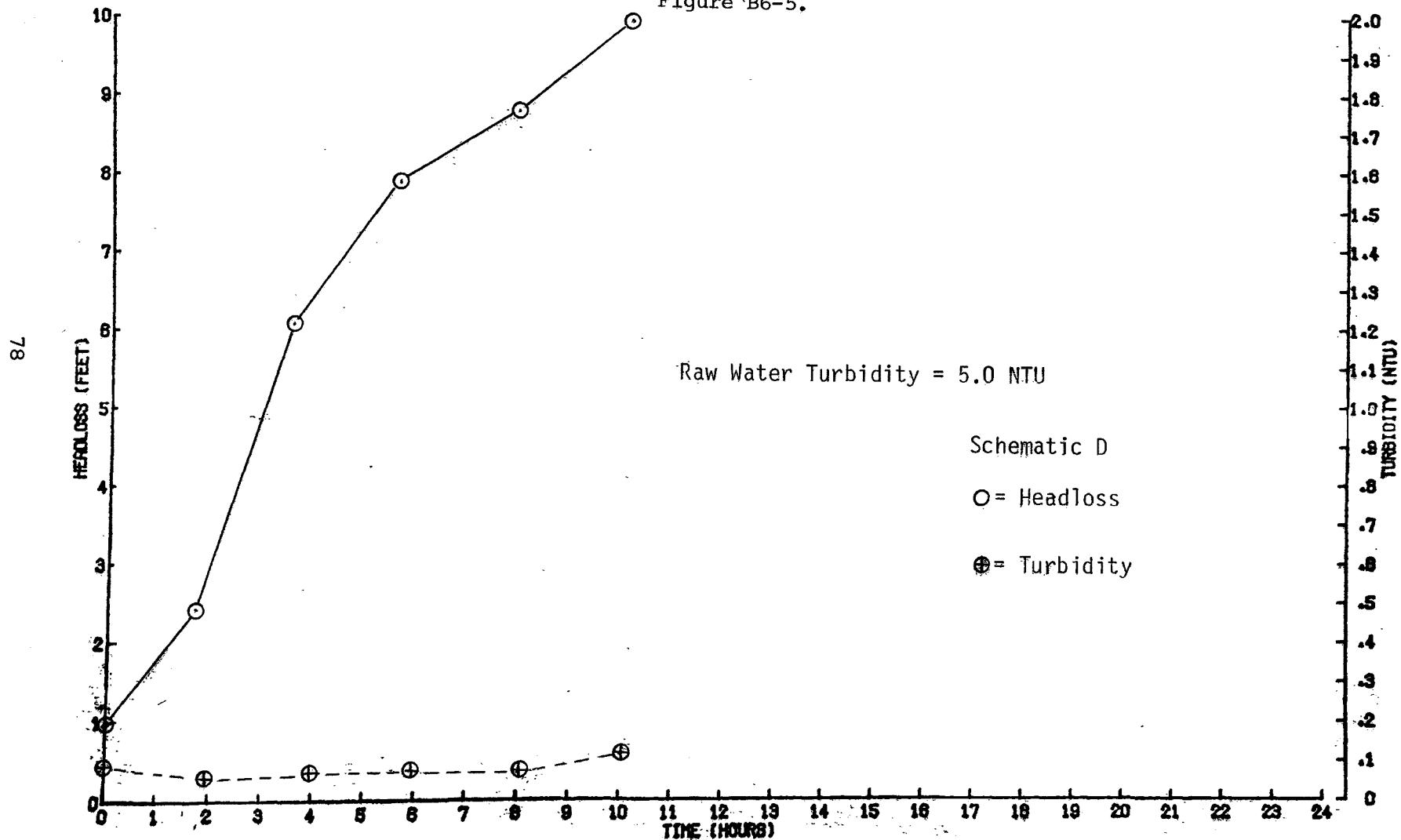
Figure B6-4.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 151CC

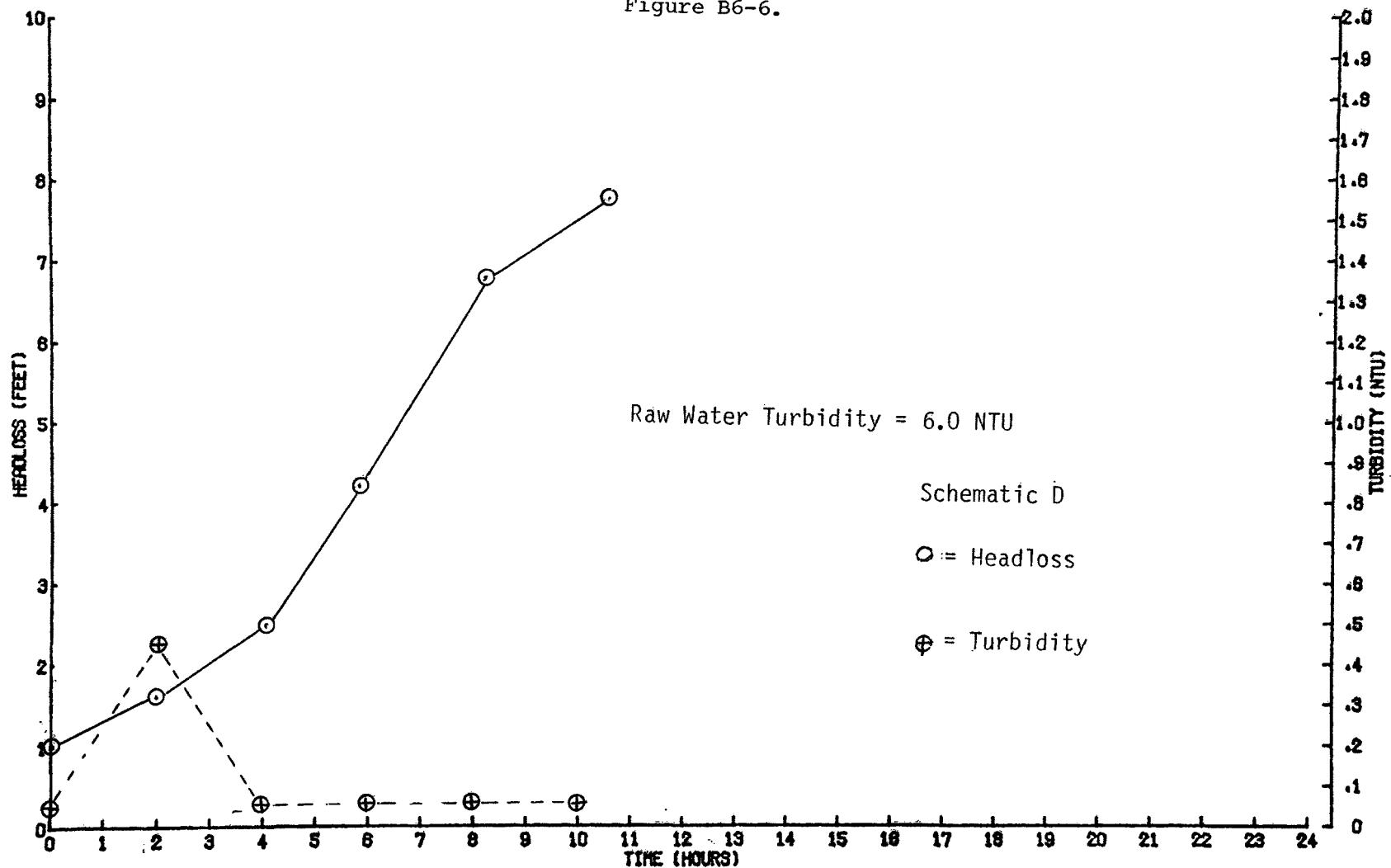
Figure B6-5.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 154

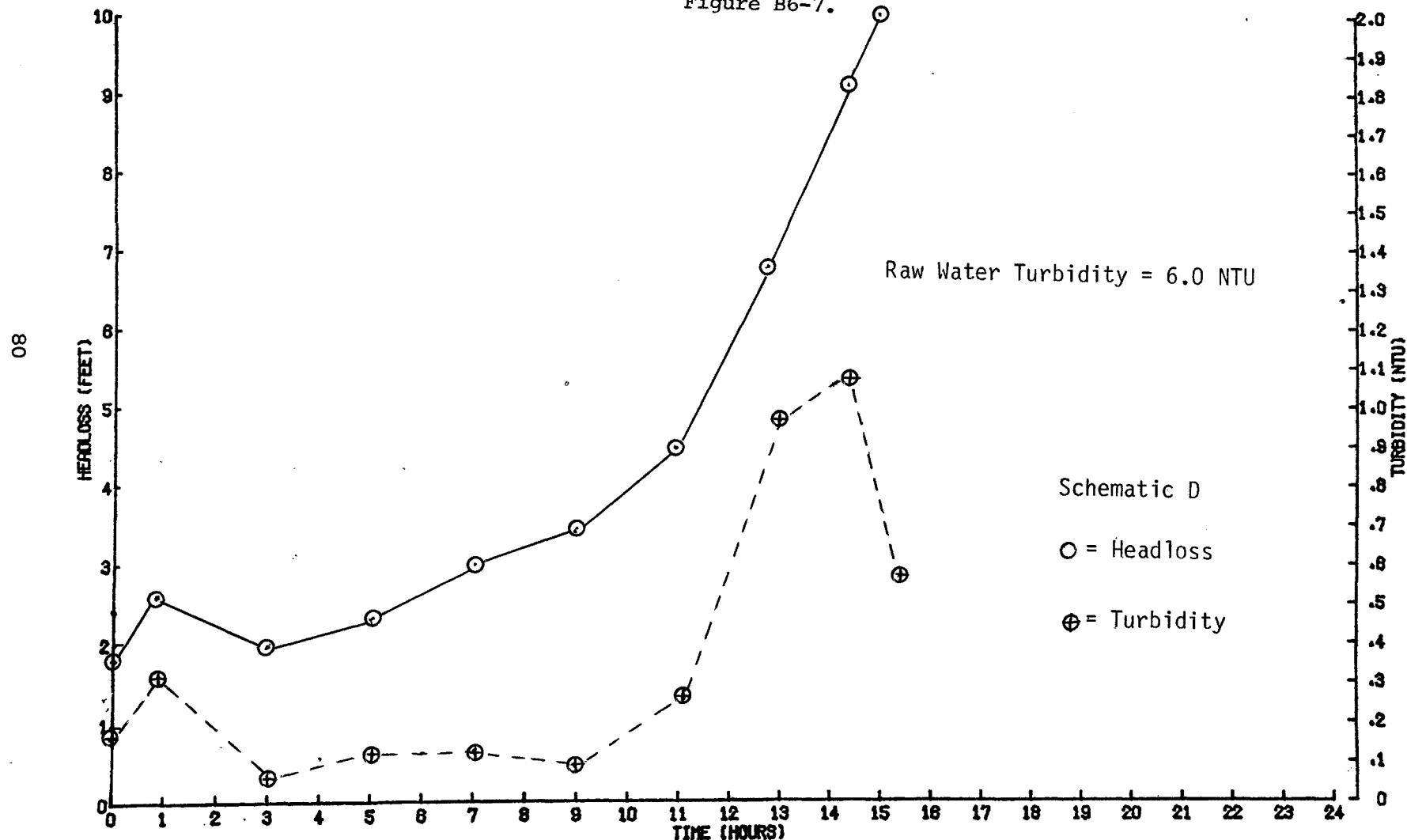
Figure B6-6.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 154MM

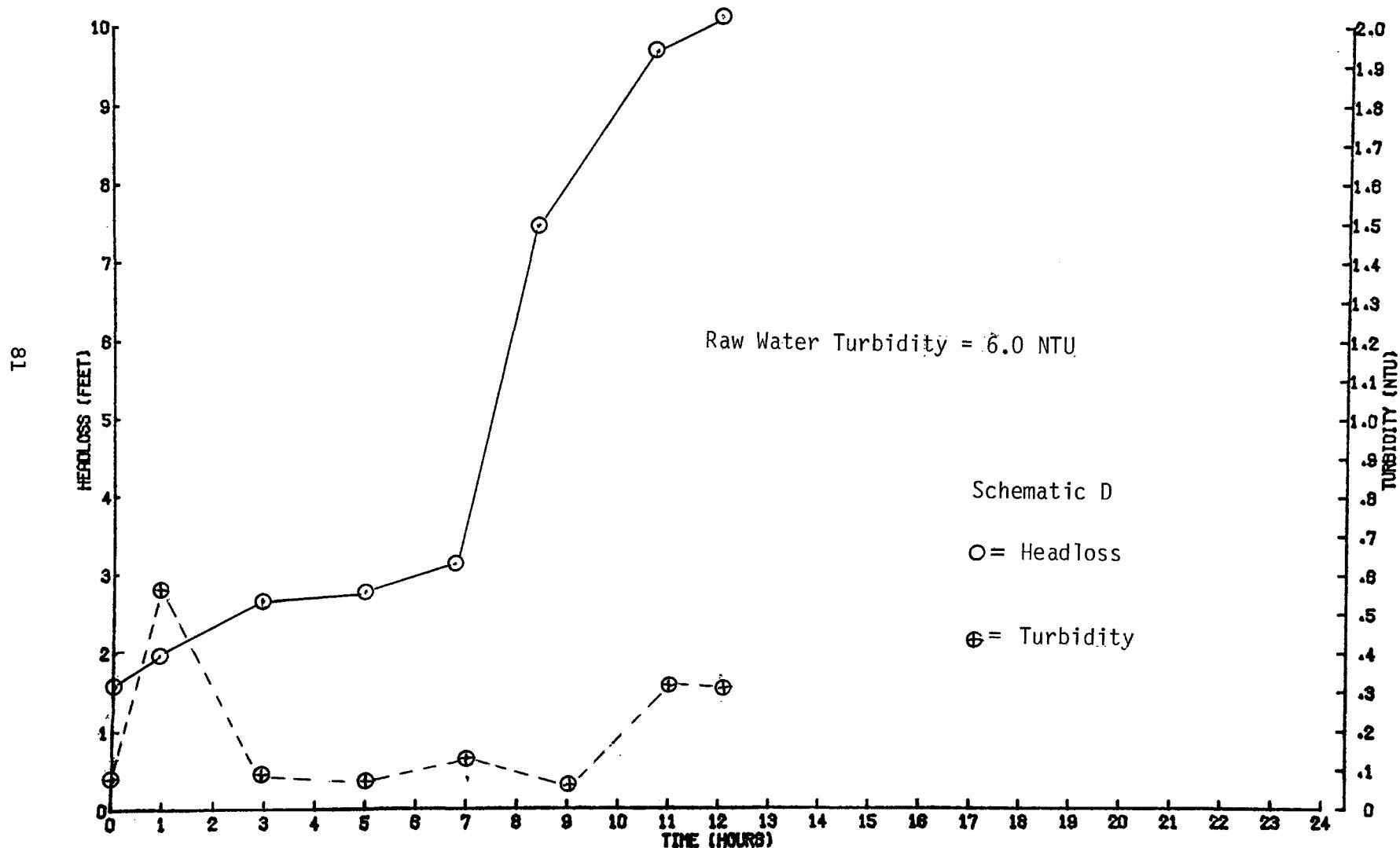
Figure B6-7.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 154FC

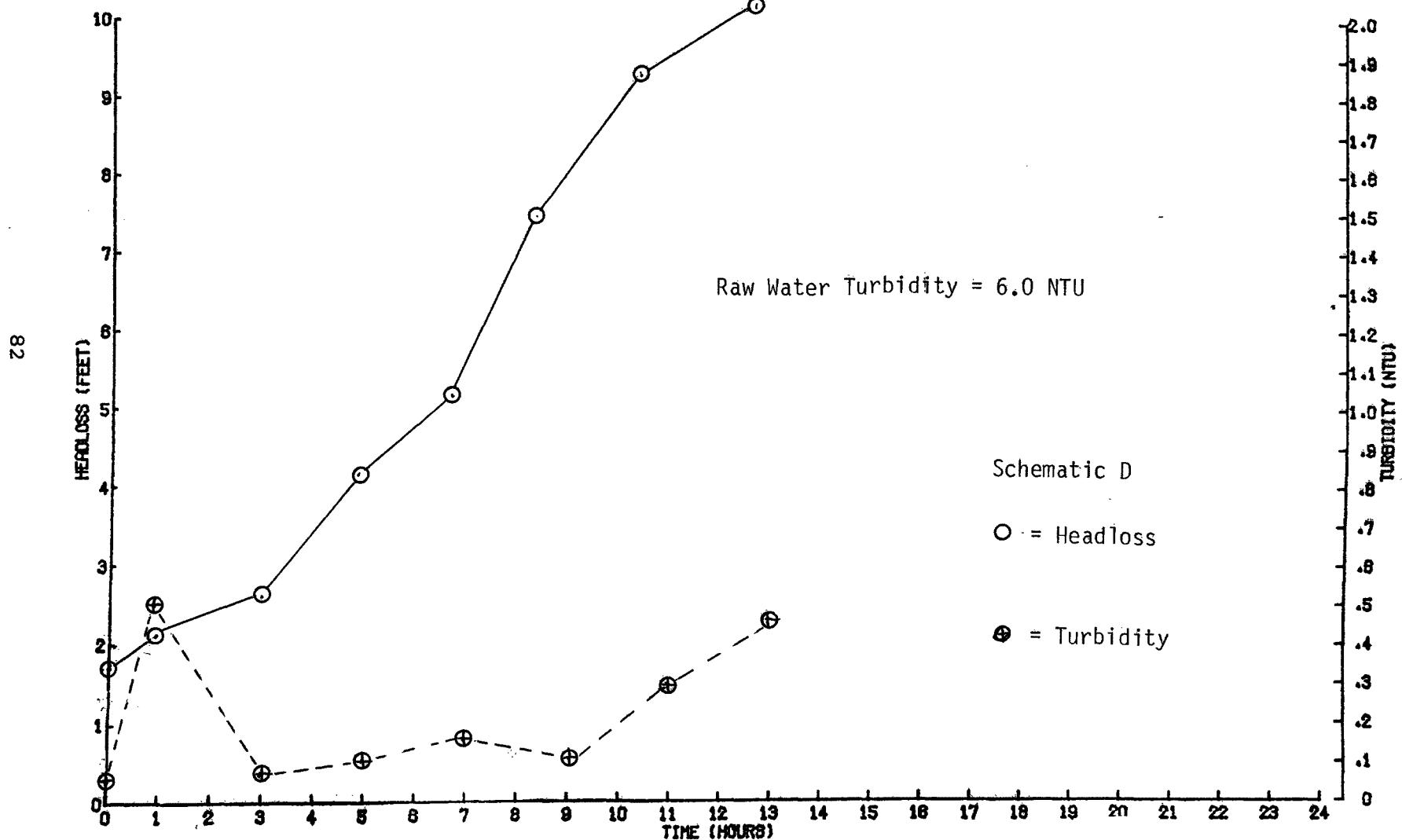
Figure B6-8.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 154CC

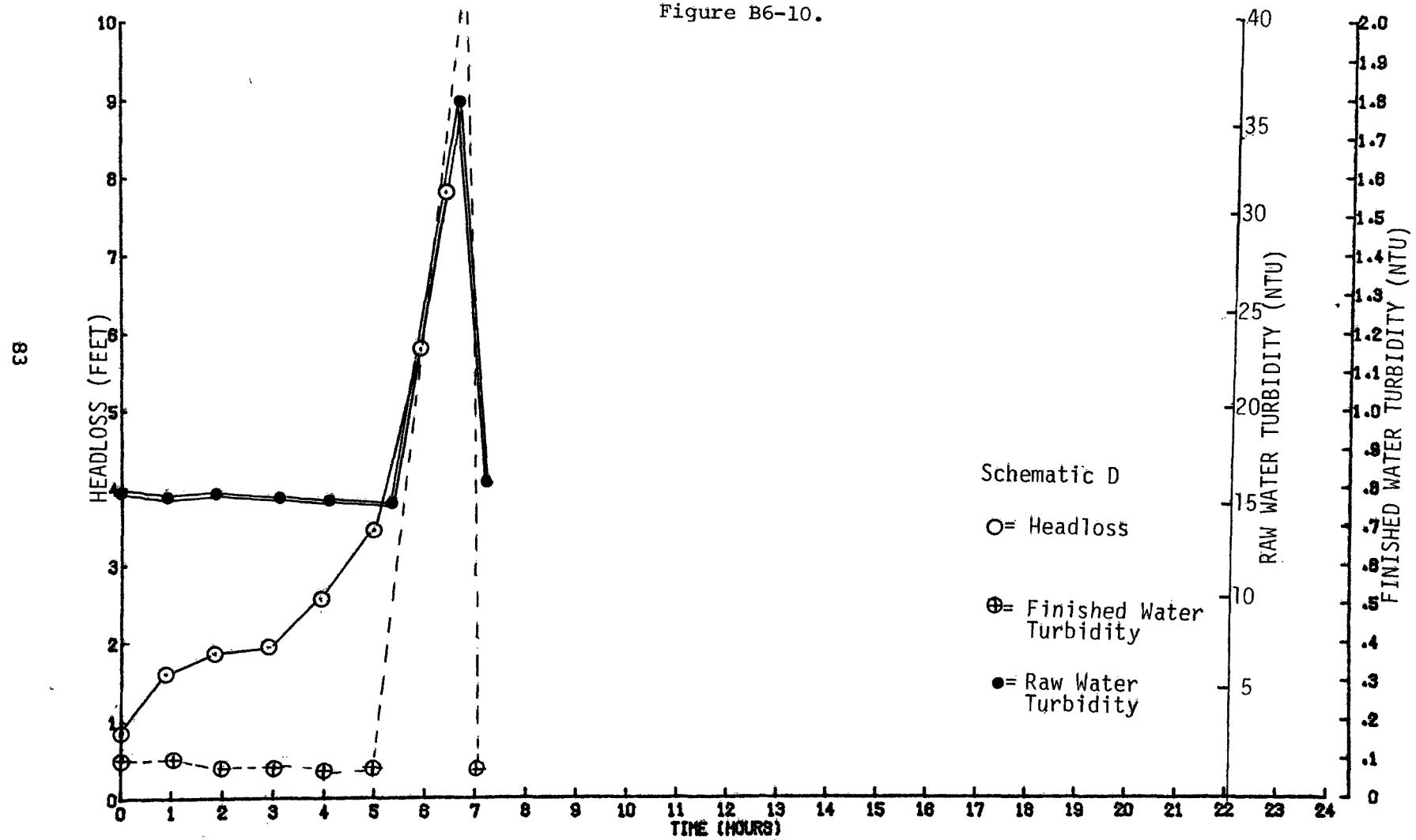
Figure B6-9.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 160

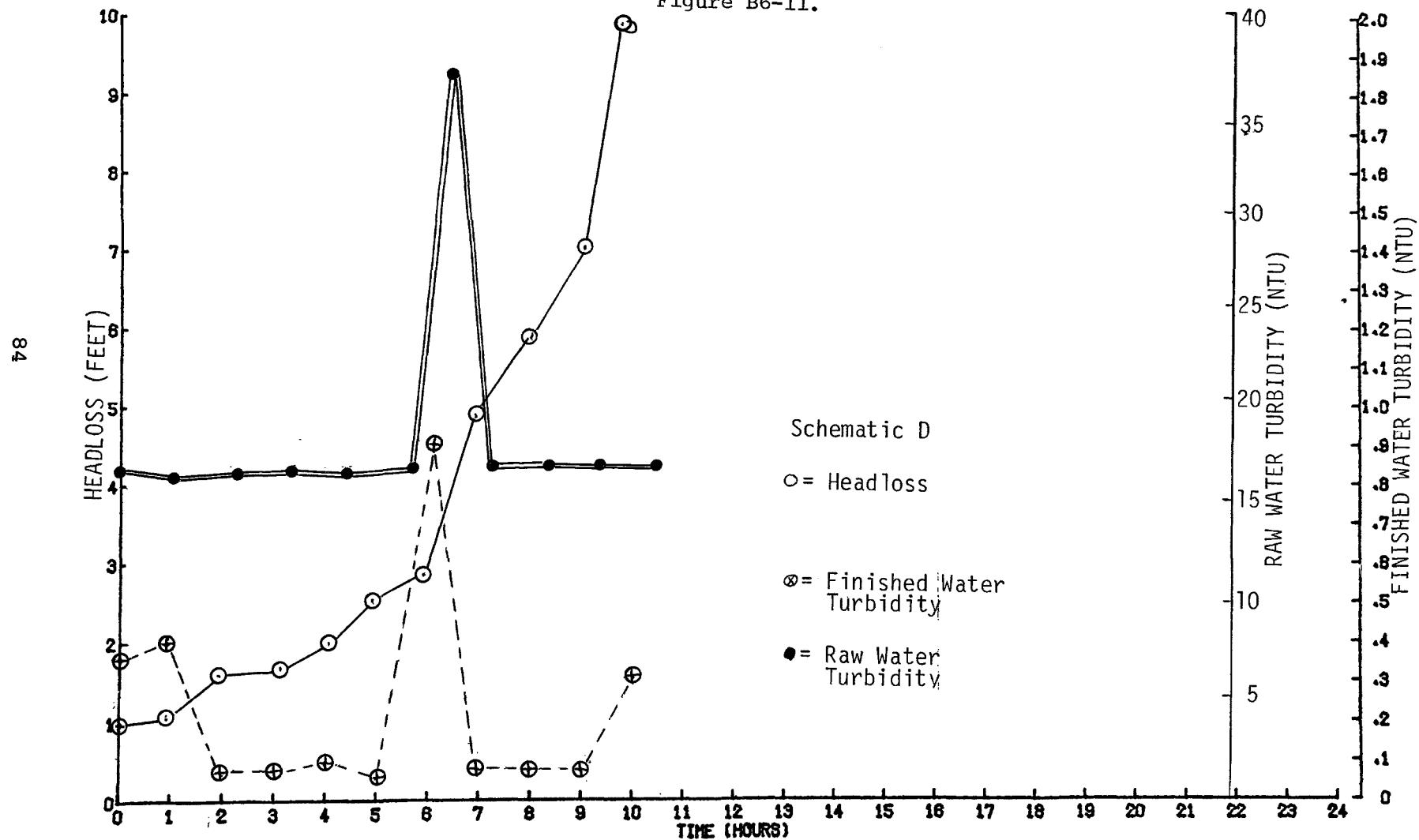
Figure B6-10.



HEADLOSS AND TURBIDITY VS TIME

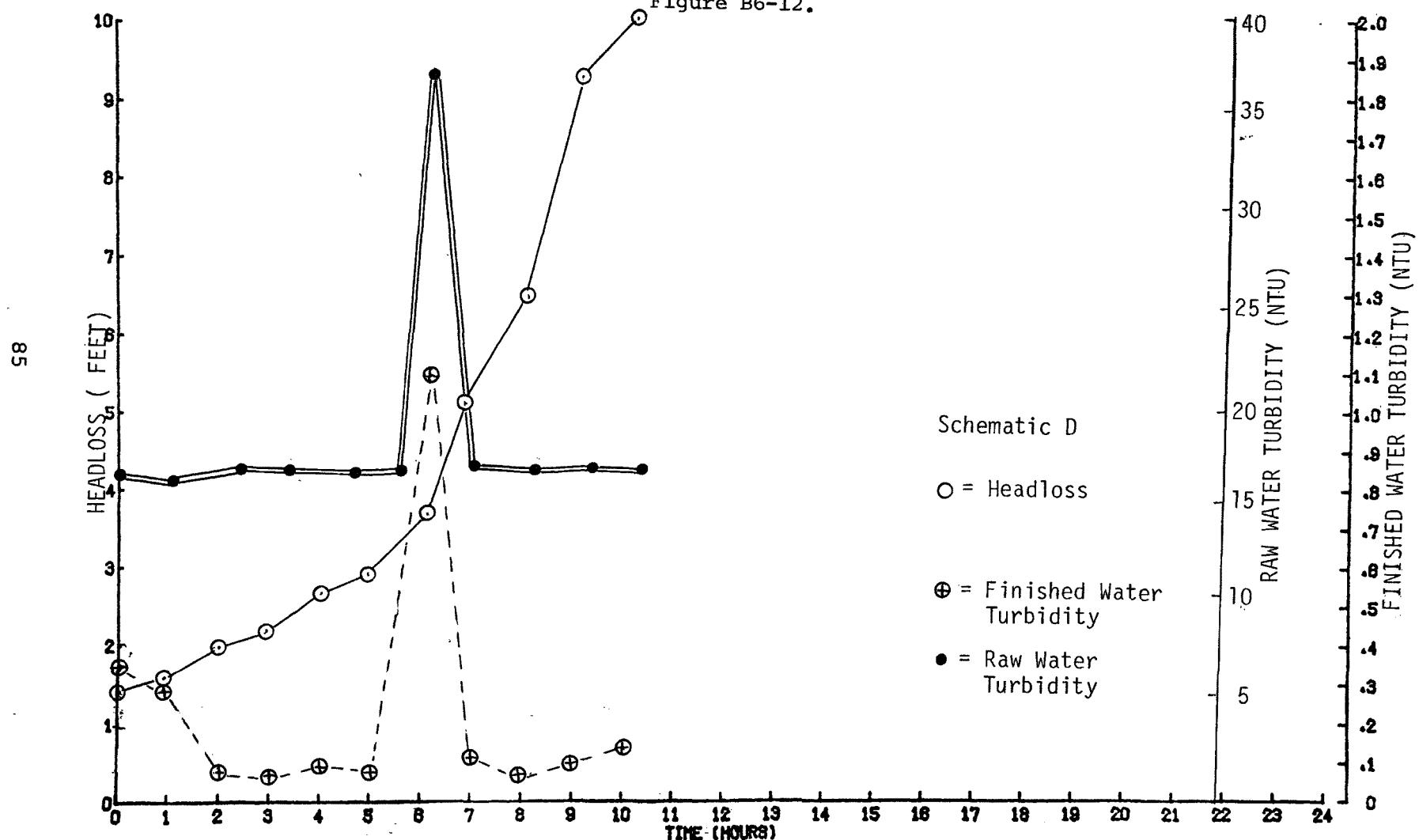
RUN NUMBER 160CC

Figure B6-11.



HEADLOSS AND TURBIDITY
VS TIME
RUN NUMBER 160FC

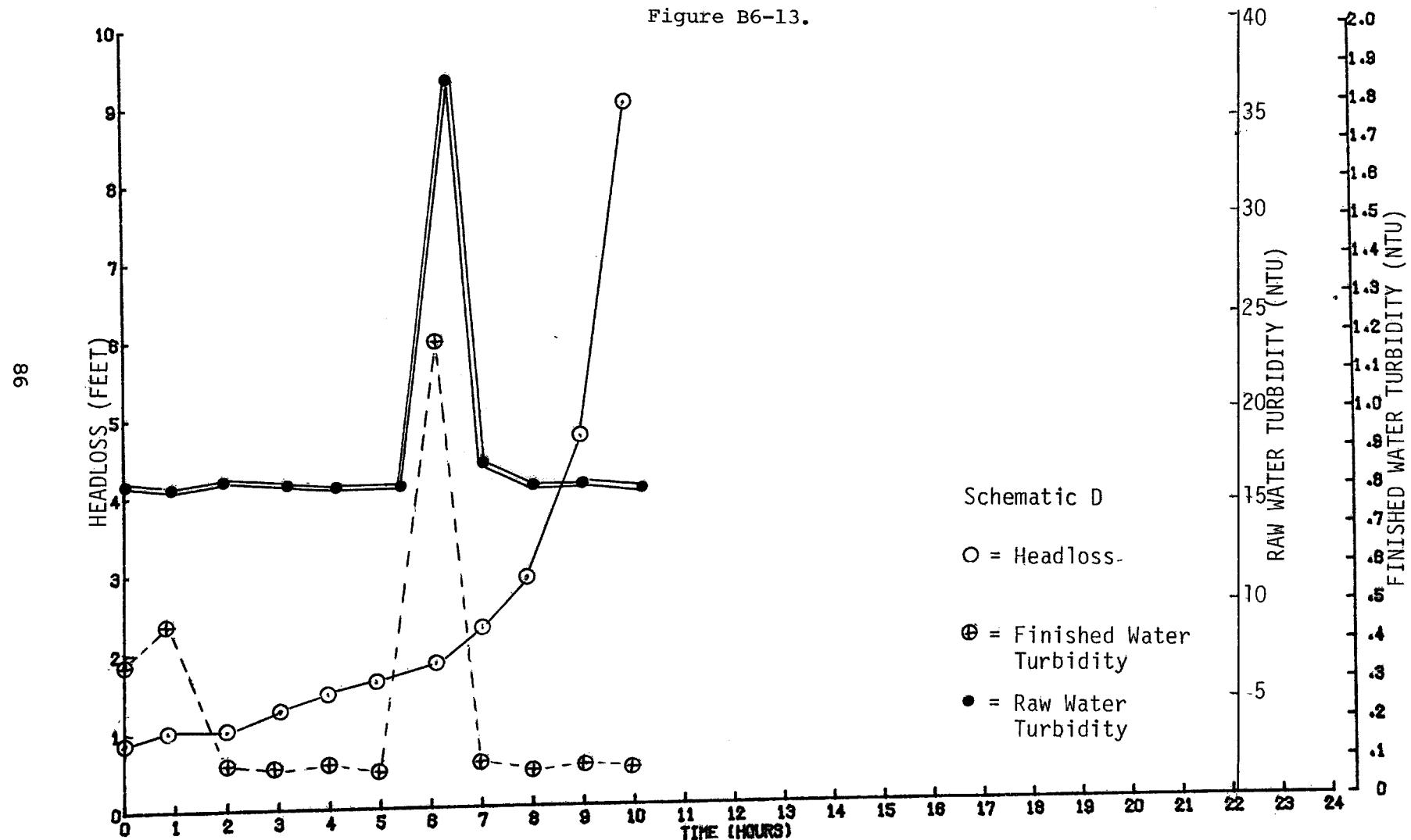
Figure B6-12.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 160MM

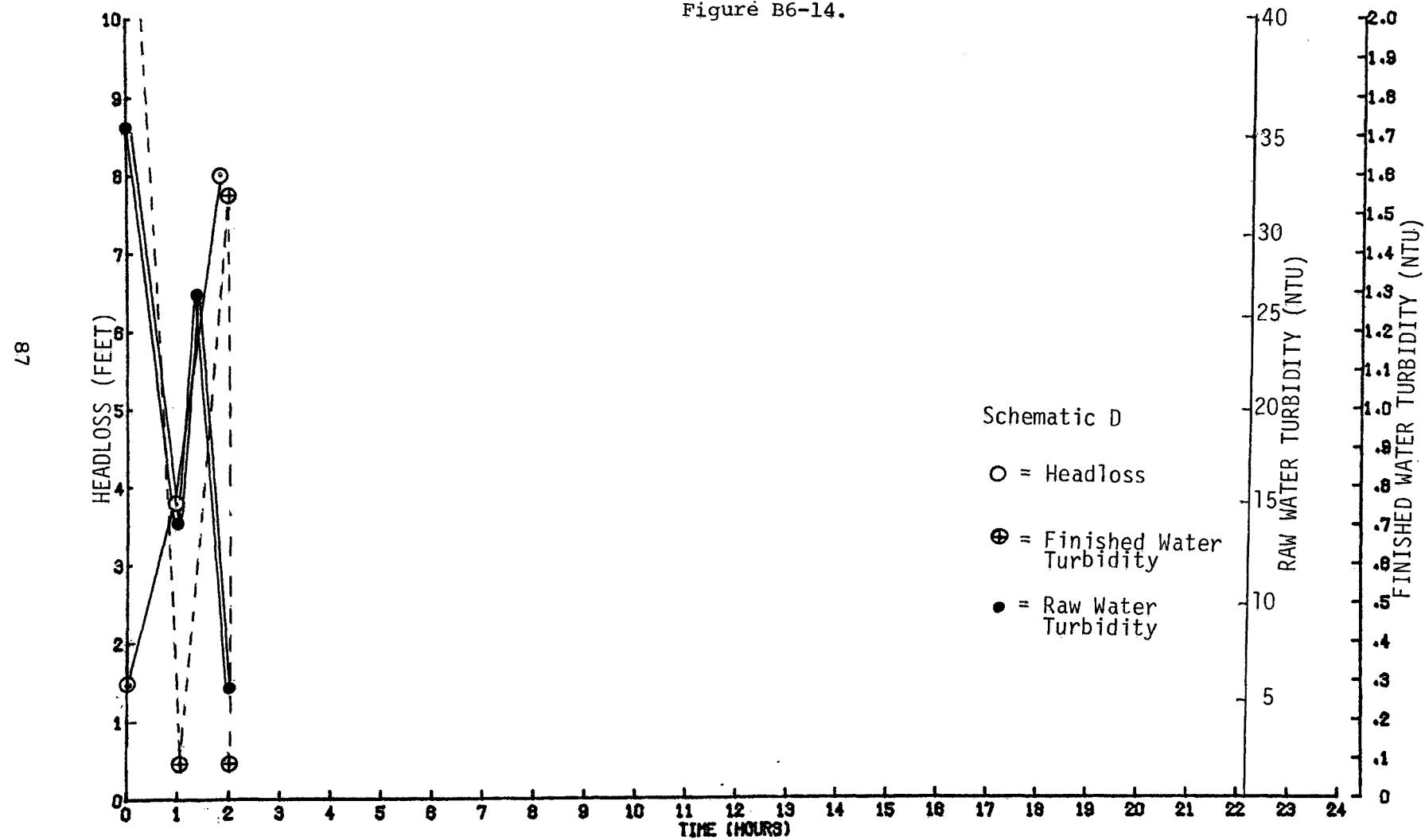
Figure B6-13.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 162

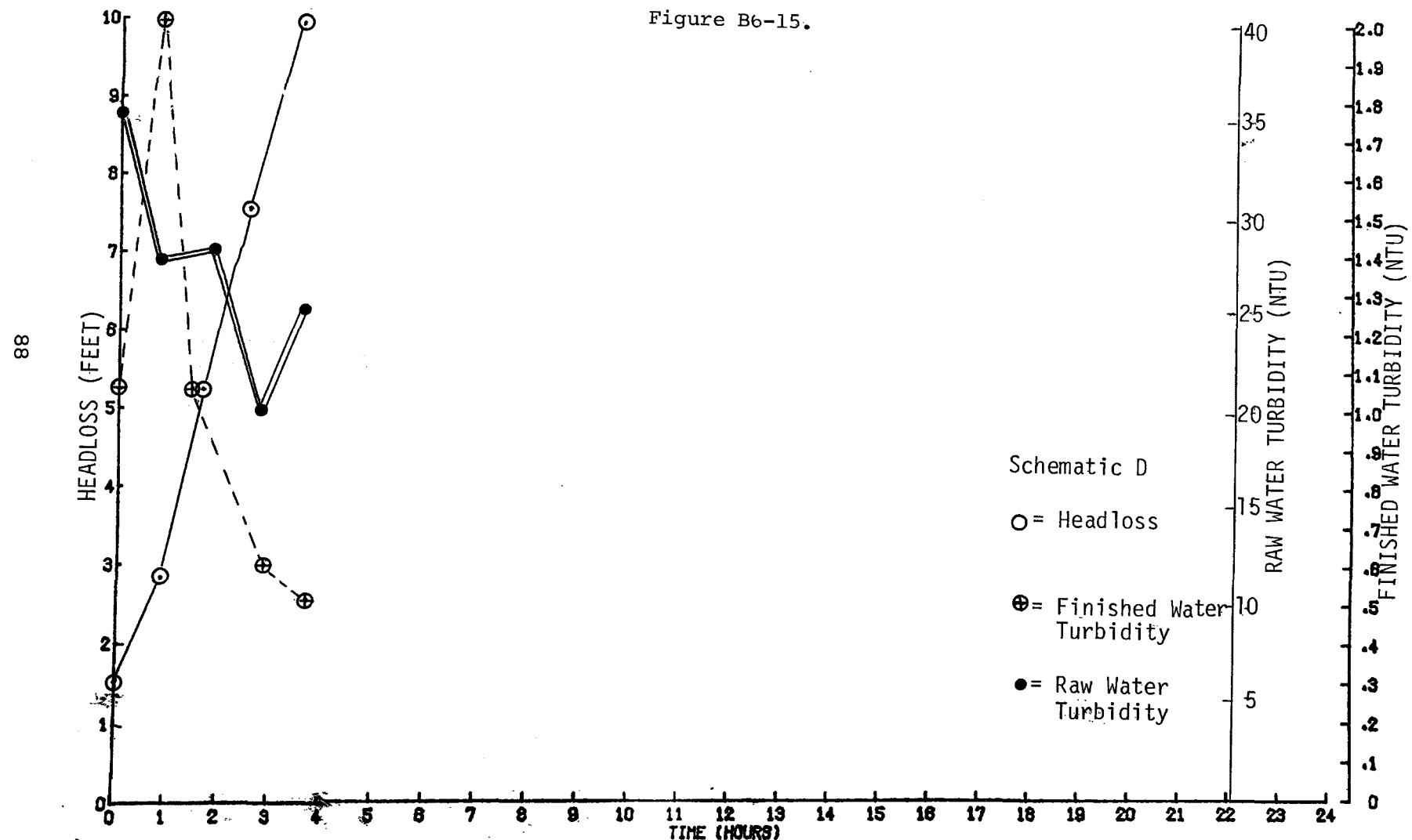
Figure B6-14.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 162MM

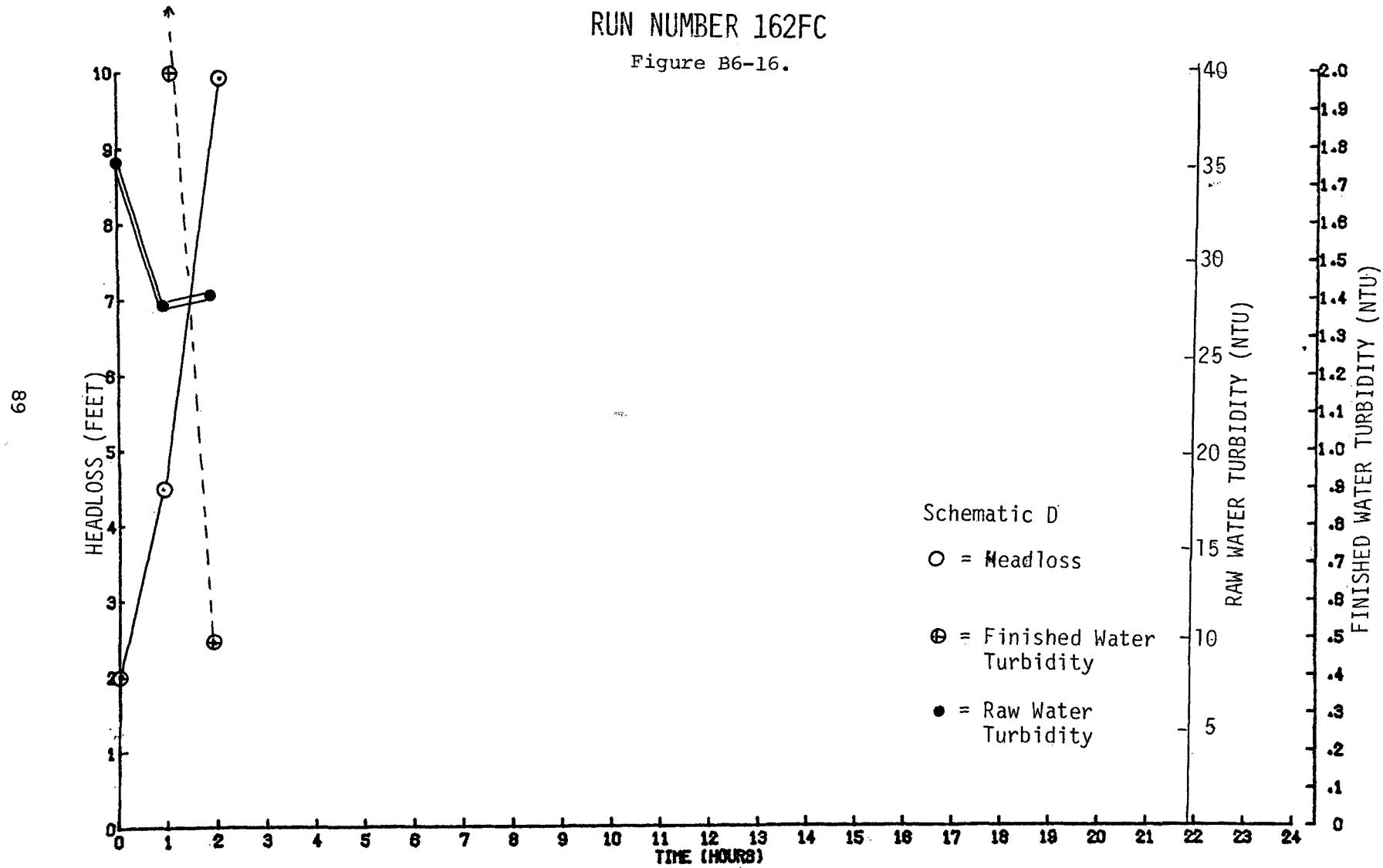
Figure B6-15.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 162FC

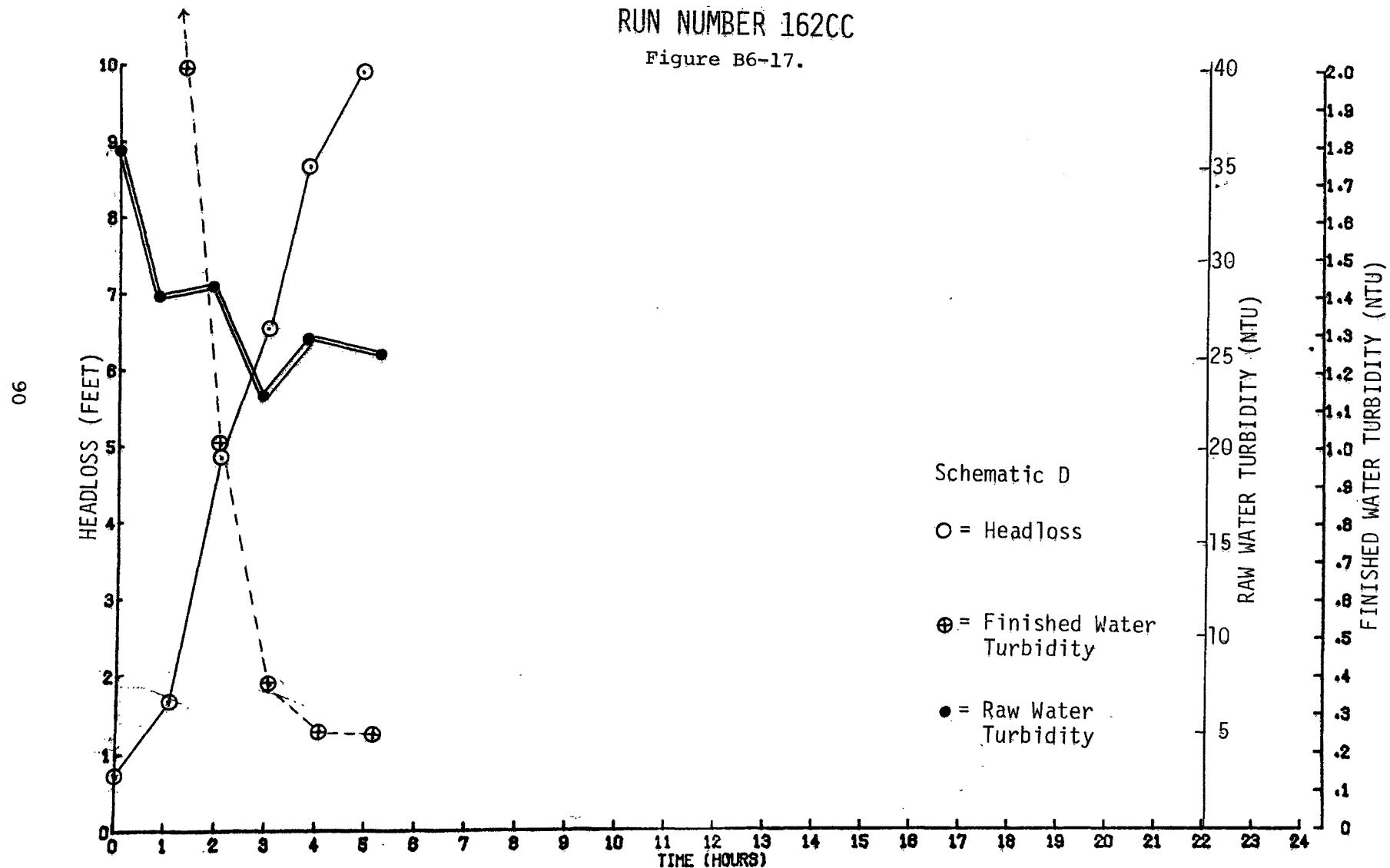
Figure B6-16.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 162CC

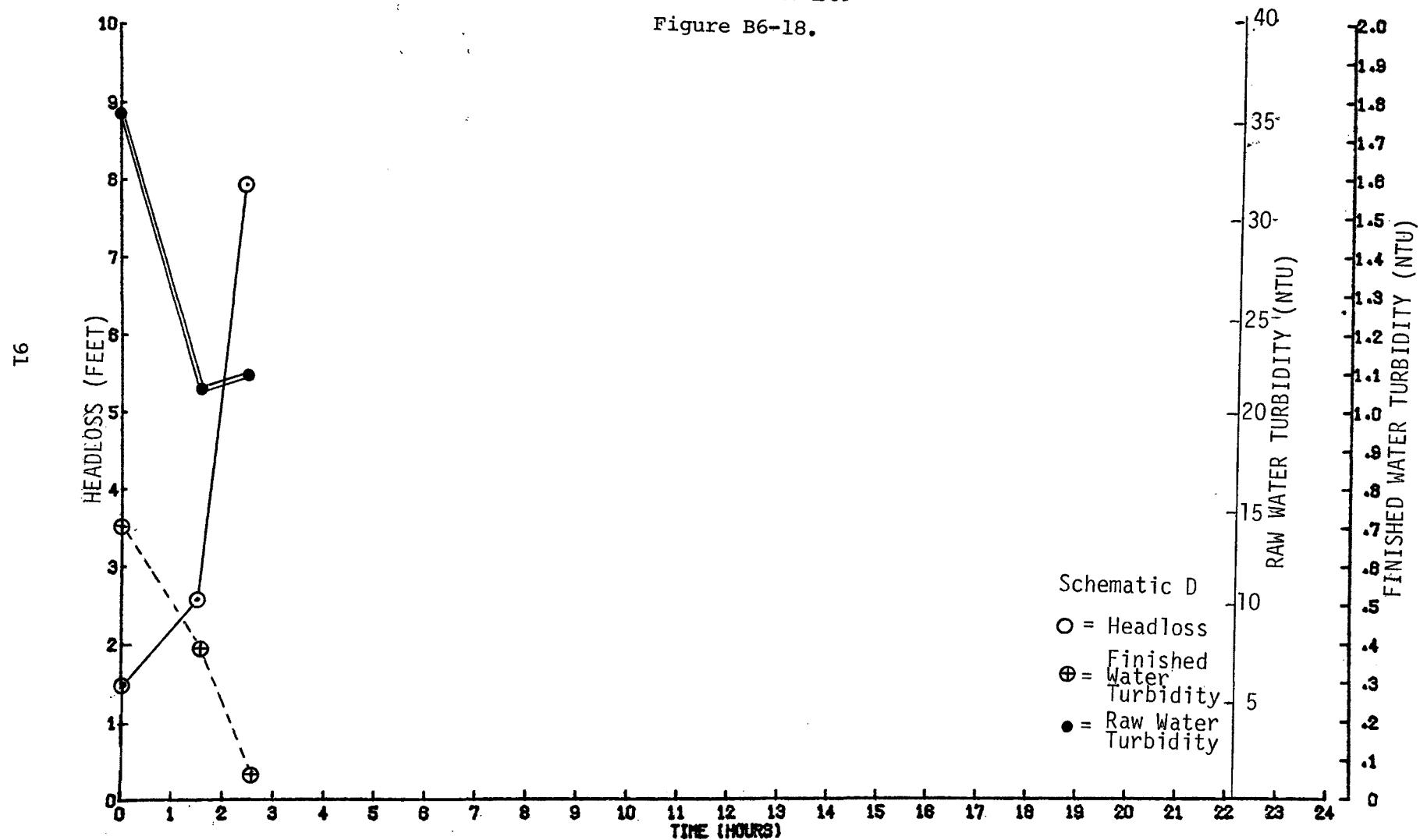
Figure B6-17.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 163

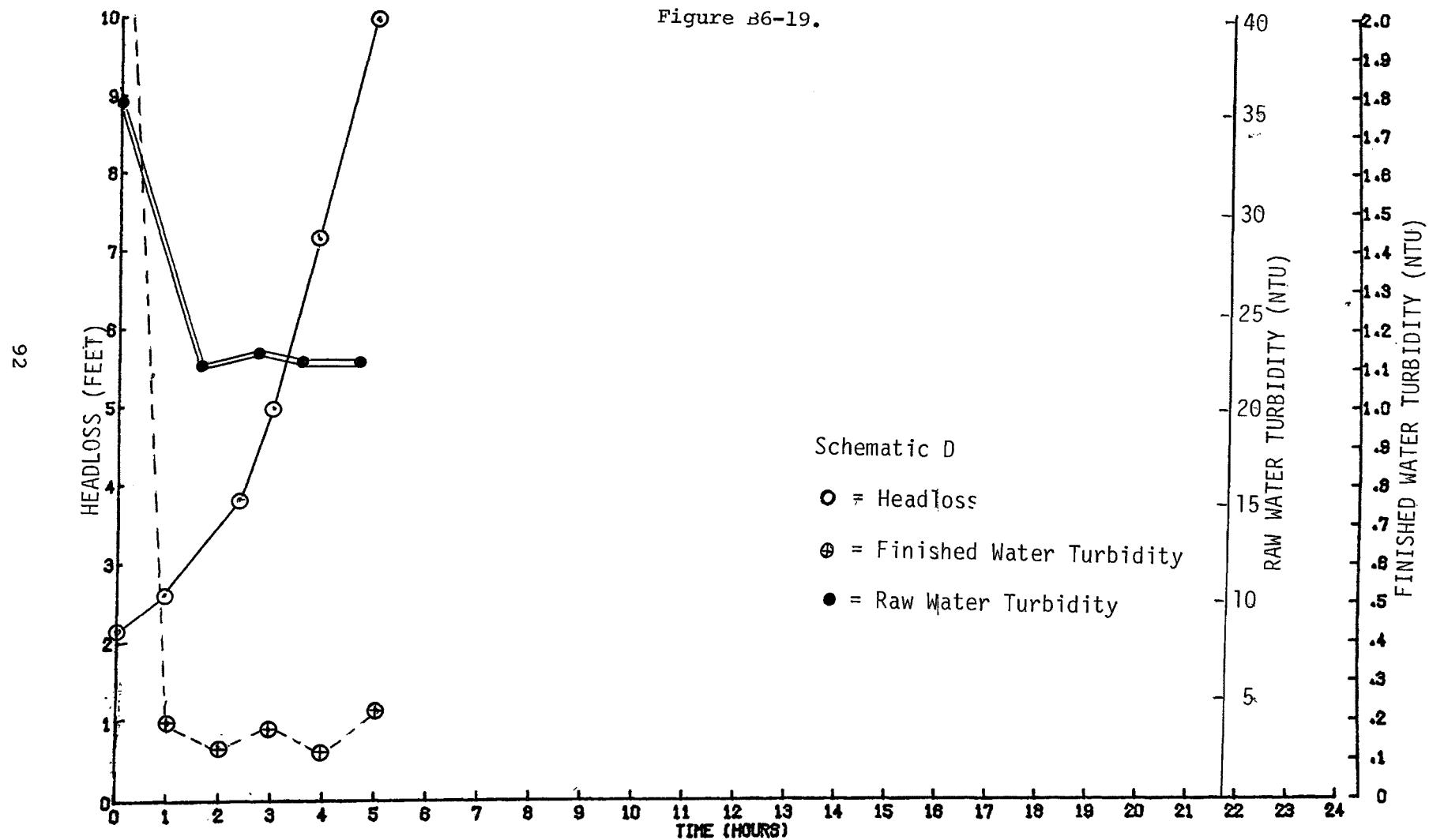
Figure B6-18.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 163CC

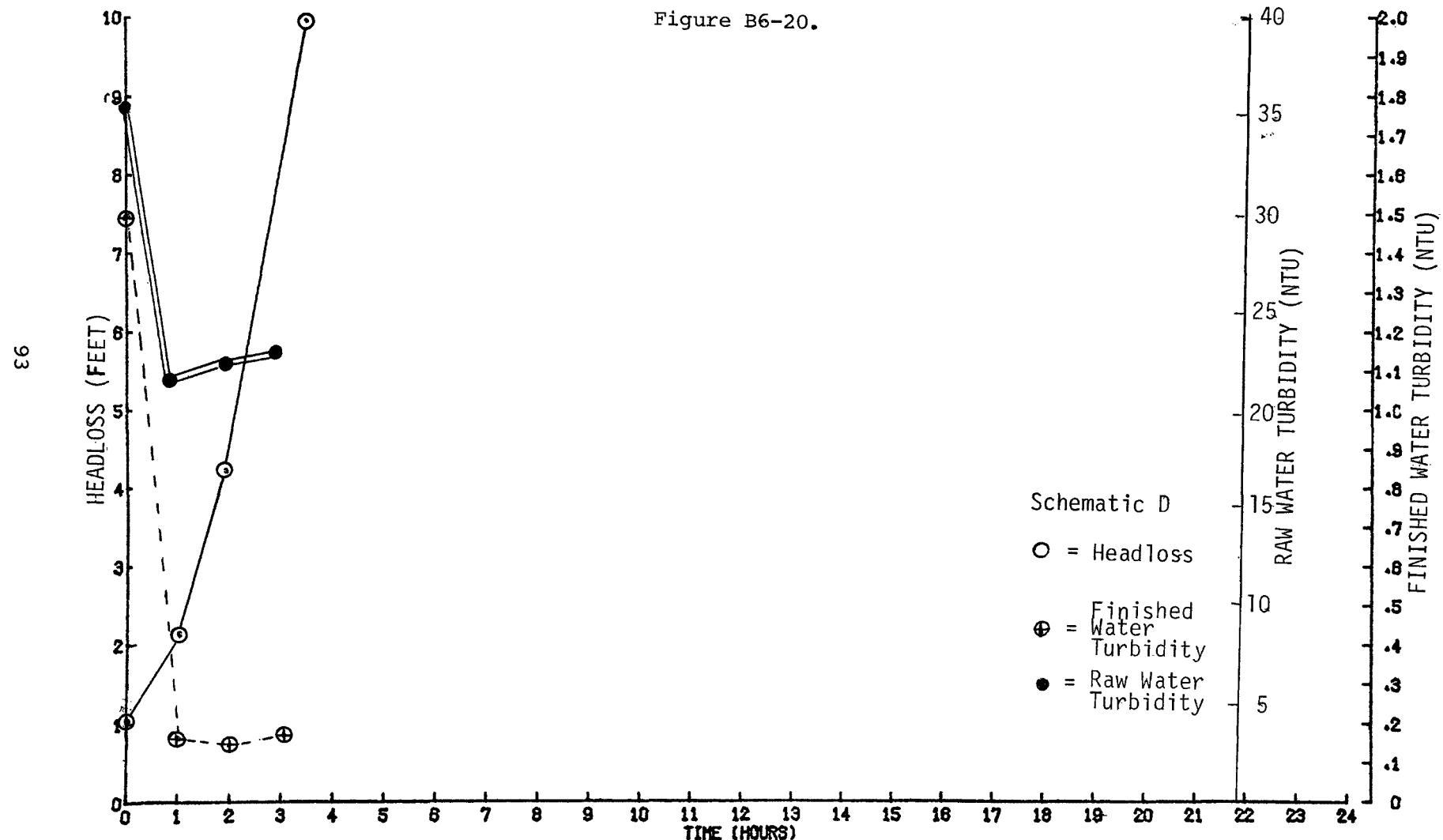
Figure B6-19.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 163FC

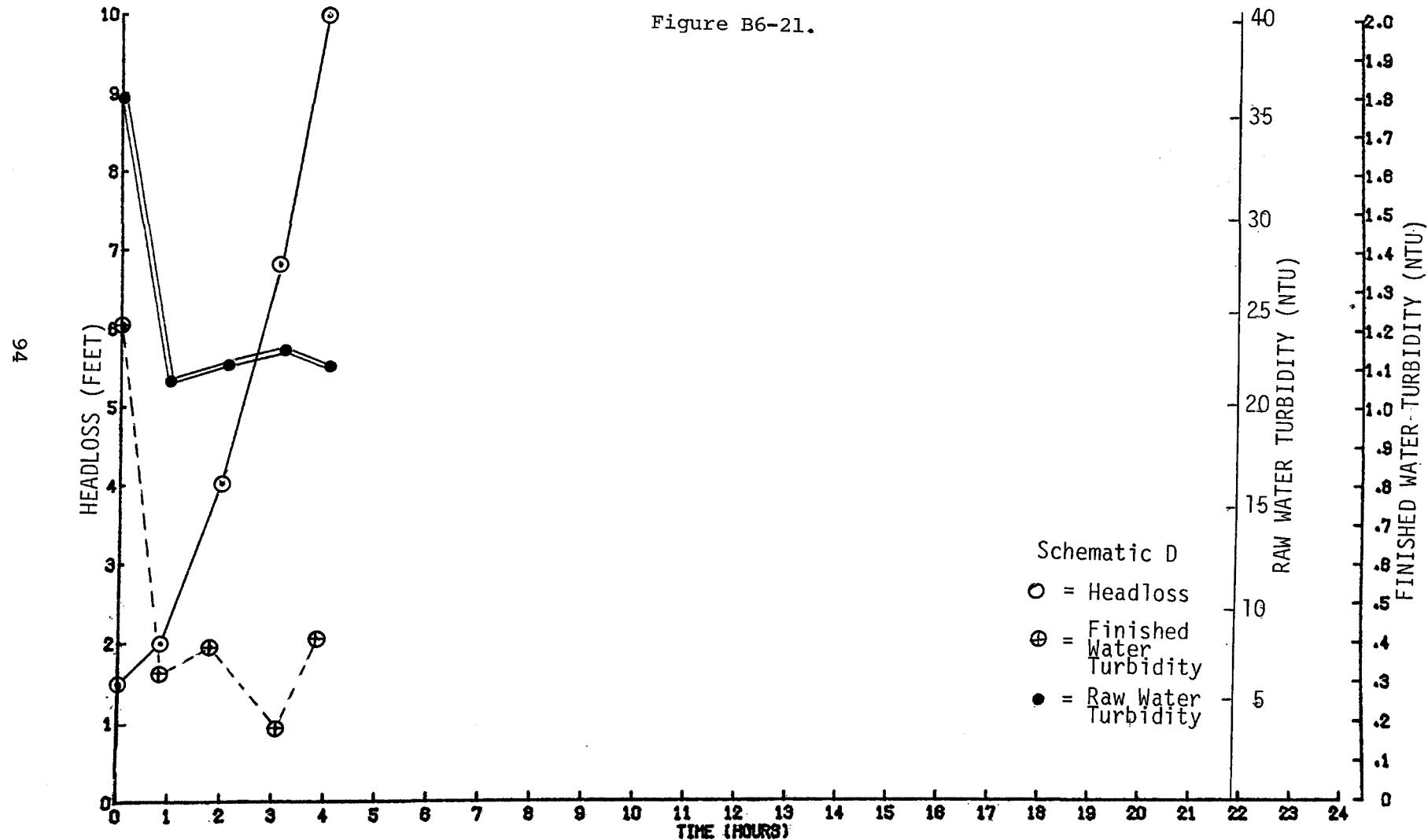
Figure B6-20.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 163MM

Figure B6-21.



APPENDIX B-7
SLUDGE SETTLEABILITY TESTING

I. INTRODUCTION

To assess the settling characteristics of the solids present in the backwash wastewater, sludge settling tests were conducted. Backwash wastewater was discharged into a settling basin where the solids would settle and accumulate. The clear supernatent was periodically drawn off and discharged to the North Fork Tolt River. Near the end of the pilot testing phase; the solids, which had been accumulating for about one year, were collected in a 55-gallon drum and transported to the Water Quality Laboratory. Settling tests were initially performed using a small, 2-liter, graduated cylinder and subsequently using a larger 6-inch diameter settling column. The column was equipped with a stirring mechanism that rotated at 1 RPM to facilitate movement of the water up through the solids. Various concentrations of sludge were prepared and added to the graduated cylinder or column. The downward velocity of the liquid-solids interface was measured at various time intervals. From this data, batch settling curves were prepared and were used to estimate the minimum surface area of the clarifier-thickener.

II. RESULTS

The results of the settling tests are listed in the tables below and are illustrated in Figures B7-1 through B7-4. Review of this information indicates that the solids generated during the filter backwashing process can be thickened to a concentration of 2-3% by gravity thickening methods.

TABLE B7-1. SETTLING INFORMATION USING THE GRADUATED CYLINDER

| Sample | Sludge Concentration (mg/l) | Interface Settling Velocity | | Solids Flux (lb/Ft ² -day) |
|--------|-----------------------------------|--------------------------------|---------|---|
| | | In./Min. | Ft./Day | |
| 1 | 175 | 16-7/8"/5 | 408 | 4.5 |
| 2 | 245 | 16-7/8"/5 | 504 | 7.7 |
| 3 | 825 | 16"/4 | 480 | 24.7 |
| 4 | 2970 | 12.5"/7 | 216 | 40.0 |
| 5 | 3760 | 9"/6 | 180 | 42.2 |
| 6 | 6500 | 3"/7 | 51.6 | 20.9 |
| 7 | 11,000 | 2"/19 | 12 | 8.2 |
| 8 | 31,000 | 1/4"/20 | 1.2 | 2.3 |

TABLE B7-2. SETTLING INFORMATION USING THE 6-INCH DIAMETER COLUMN

| Sample | Sludge Concentration (mg/l) | Interface Settling Velocity | | Solids Flux (lb/Ft ² -day) |
|--------|-----------------------------------|--------------------------------|---------|---|
| | | In. or Ft./Min. | Ft./Day | |
| 1 | 450 | 5'9.5"/16 | 520 | 15 |
| 2 | 650 | 5'/15 | 480 | 19 |
| 3 | 740 | 4'8.5"/18 | 380 | 18 |
| 4 | 1,000 | 3'4"/15 | 320 | 20 |
| 5 | 2,000 | 3'7.5"/16 | 330 | 41 |
| 6 | 2,400 | 4'3"/11 | 560* | 84 |
| 7 | 7,600 | 6"/10 | 72 | 34 |
| 8 | 8,600 | 7.5"/27 | 33 | 17.7 |
| 9 | 11,000 | 8.5"/40 | 26 | 17.8 |
| 10 | 13,000 | 4.5"/30 | 18 | 15 |
| 11 | 20,000 | 2"/30 | 8 | 9.9 |
| 12 | 29,000 | 1"/80 | 1.5 | 2.7 |

*Does not seem to fit the rest of the data.

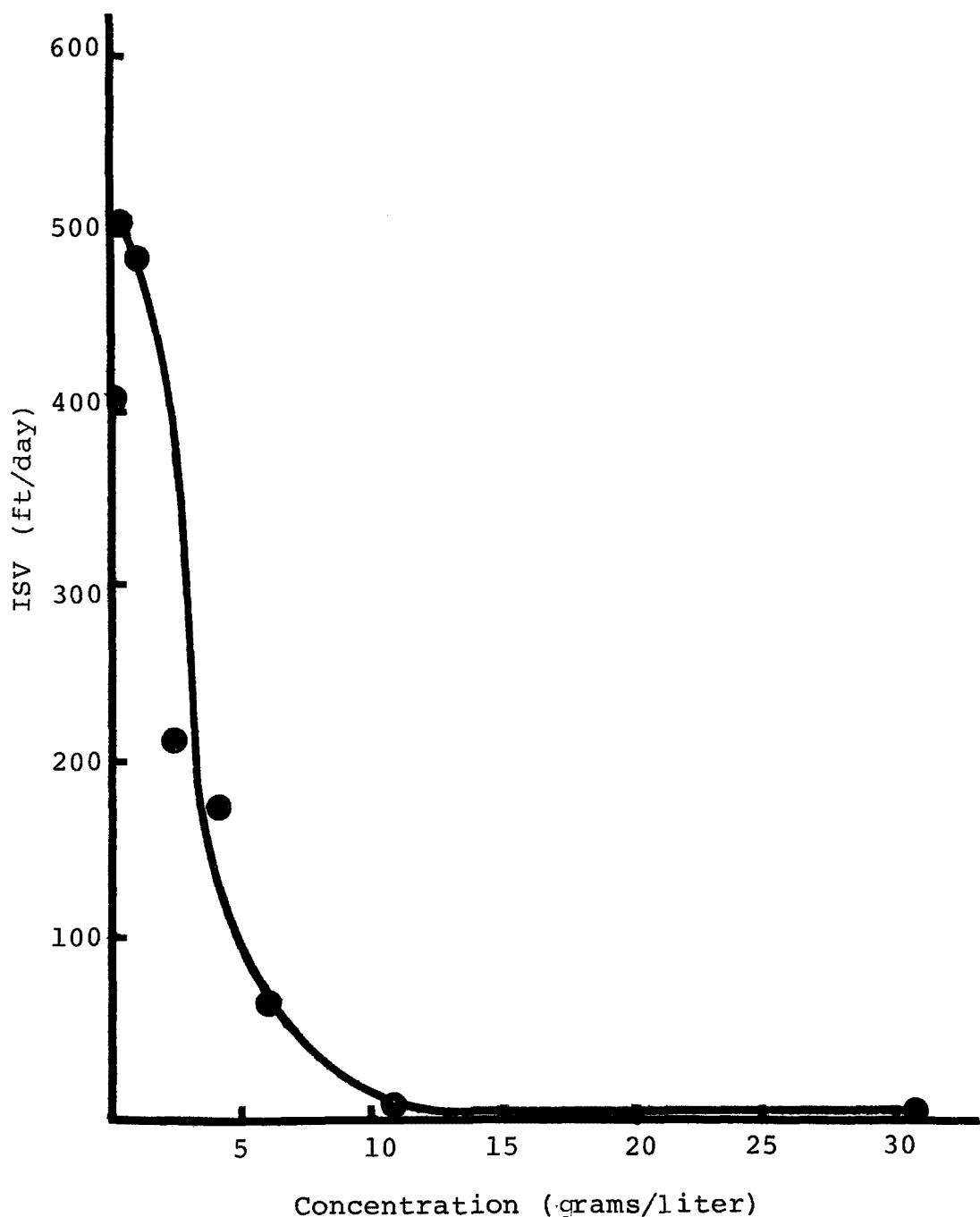


Figure B7-1. Cylinder interface settling velocity vs. concentration.

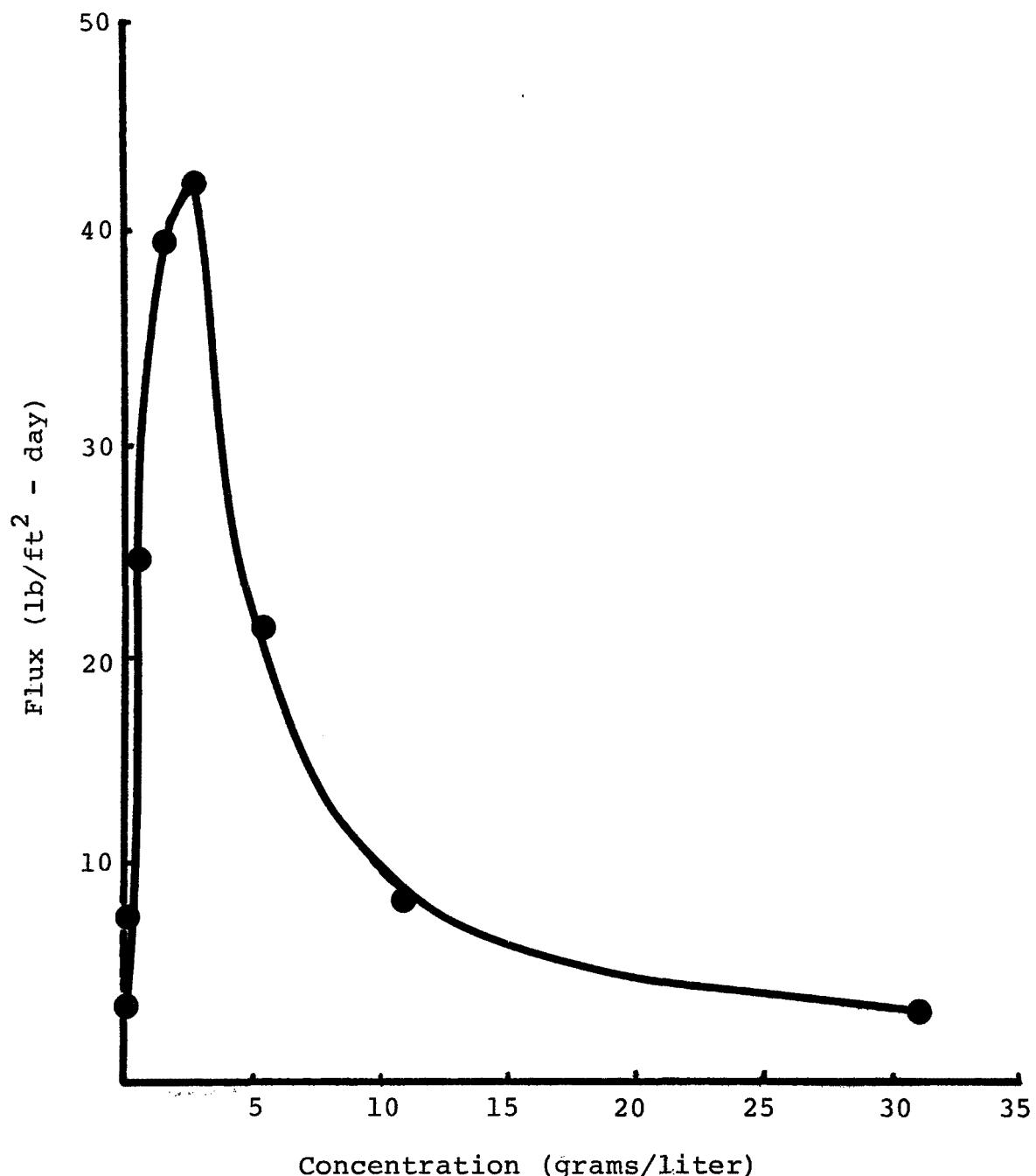


Figure B7-2. Cylinder flux curve for waste solids.

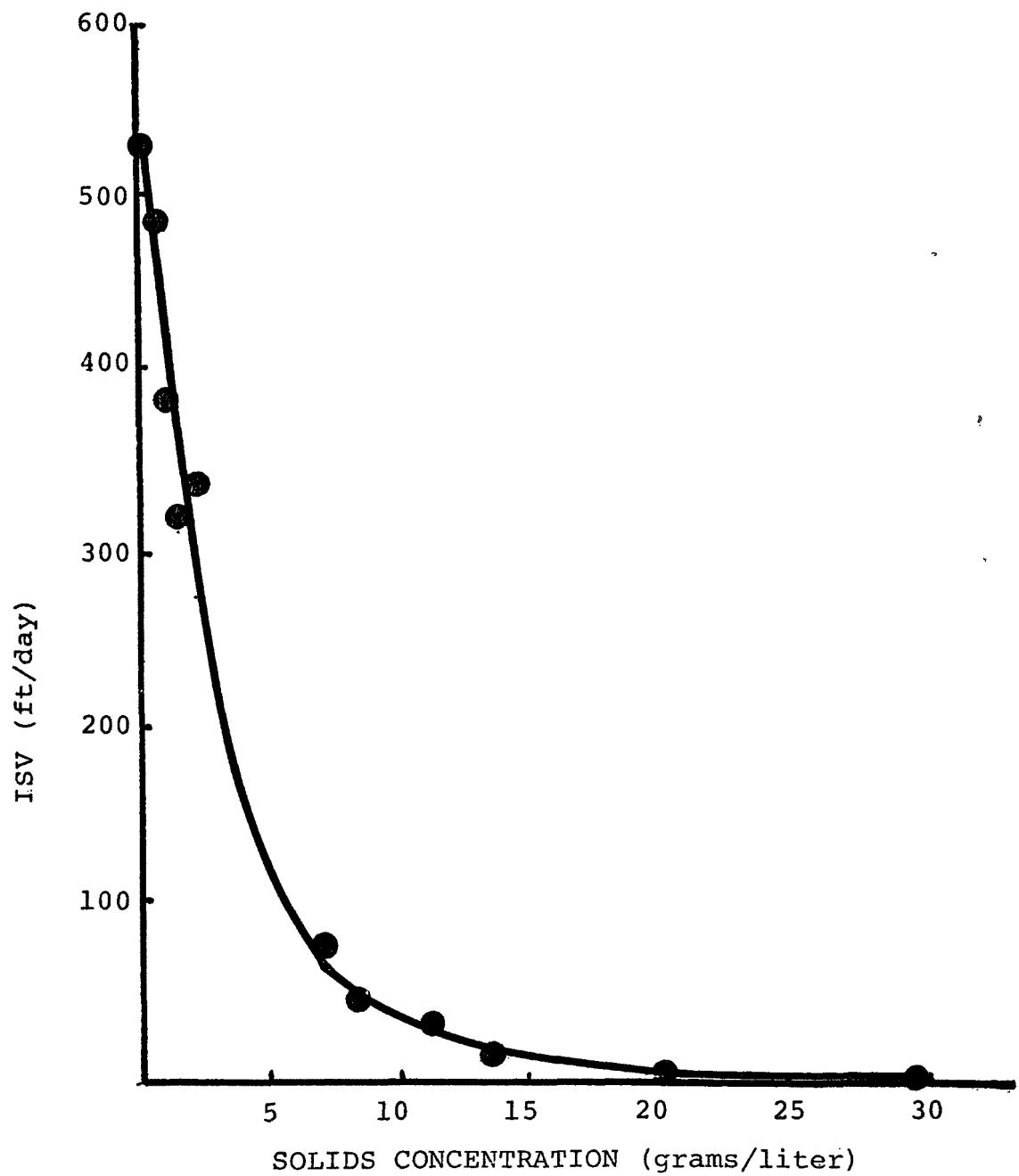


Figure B7-3. Column interface settling velocity vs. solids concentration.

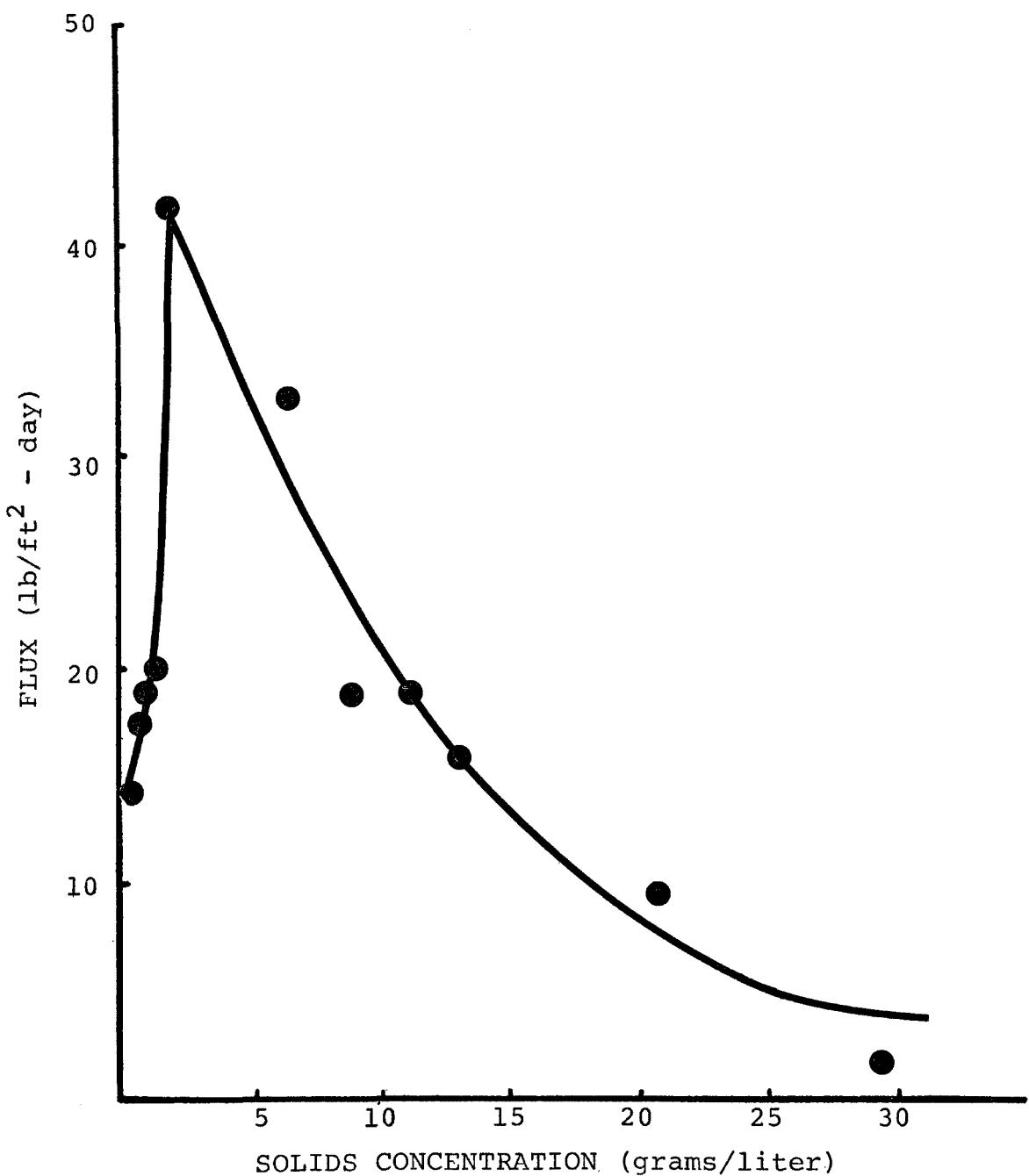


Figure B7-4. Column batch settling curve for waste solids.

APPENDIX B-8

DETAILED DOCUMENTATION OF COST INFORMATION

TABLE B8-1. OPERATIONAL COSTS

A. LABOR

1. Operators.

3 shifts/day - 1095 shifts/yr

Assume 1.33 men/shift x 1095 = 1456 shifts/yr

Assume 5 x 52 = 260 shifts/yr/man

$$\frac{1456}{260} = 5.6 \text{ men assume 6 men}$$

| | |
|-------------------------|-----------|
| 6 @ (18,000 + 50% O.H.) | \$162,000 |
|-------------------------|-----------|

2. Chief Operator/Chemist.

| | |
|-----------------------------|--------|
| 2 men @ (22,000 + 50% O.H.) | 66,000 |
|-----------------------------|--------|

3. Maintenance and Sludge.

| | |
|-----------------------------|----------------|
| 4 men @ (18,000 + 50% O.H.) | <u>108,000</u> |
|-----------------------------|----------------|

\$336,000

B. CHEMICAL USAGE (-ANNUAL) AND COST

| | <u>\$/Weight</u> | <u>Cost/Yr</u> |
|---|------------------|----------------|
| 1. Alum, 5000 ppd = 926 gpd | | |
| $\frac{365 \times 5000}{2000} = 912 \text{ T/yr}$ | @ \$100/T | 91,200 |
| 365 x 926 = 338,000 gal/yr | | |
| 2. Lime, 5150 ppd | | |
| $\frac{365 \times 5150}{2000} = 940 \text{ T/yr}$ | @ \$57/T | 53,600 |
| 3. Polymer - Cationic, 1000 ppd | | |
| 365 x 1000 = 365,000 lbs/yr | @ \$.70/lb | 255,500 |
| Polymer - Anionic, 50 ppd | | |
| 365 x 50 = 18,250 lbs/yr | @ \$.70/lb | 12,800 |

(continued)

TABLE B8-1 (CONTINUED) OPERATIONAL COSTS

| | | <u>\$/Weight</u> | <u>Cost/Yr</u> |
|----|---|------------------------|----------------|
| 4. | Sodium Silicate, 2000 ppd | | |
| | $\frac{365 \times 2000}{2000} = 365 \text{ T/yr}$ | @ \$330/T | 120,400 |
| 5. | Sodium Bicarbonate, 3760 ppd | | |
| | $\frac{365 \times 3760}{2000} = 686 \text{ T/yr}$ | @ \$230/T | 157,800 |
| 6. | Chlorine, 750 ppd | | |
| | $\frac{365 \times 750}{2000} = 137 \text{ T/yr}$ | @ \$270/T | 37,000 |
| 7. | Fluoride, 1 ppm | 500 lbs/day 91 T/yr | @ \$84/T |
| | | | <u>38,700</u> |
| | | | \$767,000 |

C. POWER

| | HP | KW | Use | KWH/Yr |
|---------------------|-----|------------|------------|---------------------------------|
| Motors Flocculators | 90 | 67 | 10% | 58,700 |
| Blowers | 30 | 22 | .4 hr/day | 150 |
| Backwash | 250 | 136 | 1.3 hr/day | 490 |
| Service water | 15 | 11 | 50% | 48,200 |
| Washwater recovery | 30 | 22 | 100% | 192,700 |
| Sludge pumps | 20 | 7 | 25% | 30,600 |
| Chemical feeders | 25 | 19 | 50% | 83,200 |
| | | 334 | | 414,000 |
| Misc. & Lighting | | <u>104</u> | 50% | <u>455,000</u> |
| Total | | 438 | = | 869,000 KWH/Yr 72,400 KWH/Mo |

Monthly Charge

| | |
|-------------------------|---------|
| Demand | \$ 6.00 |
| KW @ 1.00/KW over 10 KW | 428.00 |
| (438 - 10) x 1 | |

| | |
|------------------------|----------------|
| Energy | |
| 4000 KWH @ \$.026/KWH | 104.00 |
| (72,500 - 4000) @ 0.02 | <u>1370.00</u> |

| | | | |
|-------|--------------|---|-------------|
| Total | \$1908.00/Mo | = | \$22,900/Yr |
|-------|--------------|---|-------------|

(continued)

TABLE B8-1 (CONTINUED) OPERATIONAL COSTS

D. MAINTENANCE AND REPAIRS

3%/Yr x initial cost of major equipment

$$\underbrace{.03 \times (1.87 + .58 + \frac{1.68}{4}) 10^6}_{2.87} = \$86,100$$

equip. + I & C + EICC

| | |
|----------------------------------|--------------------|
| TOTAL OPERATIONAL COST/YR | \$1,212,000 |
|----------------------------------|--------------------|

TABLE B8-2. BACKGROUND INFORMATION FOR CONSTRUCTION COSTS.

| Division Facility | Division 2 Sitework | Division 3 Concrete | Division 4 Not Used | Division 5 Metals | Division 6 Wood & Plastics | Division 7 & Therm. Moist Prot | Division 8 Doors & Windows | Division 9 Finishes | Division 10 Special ties | Division 11 Equip- ment | Division 12 Furnish- ings | Division 13 Special Constr. | Division 14 Conveying Syst. | Division 15 Mechan- ical | Division 16 Electri- cal | All Divisions Total |
|--------------------------------|---------------------------|---------------------------|------------------------------|-------------------------|-------------------------------------|---|-------------------------------------|---------------------------|-----------------------------------|----------------------------------|------------------------------------|--------------------------------------|--------------------------------------|-----------------------------------|-----------------------------------|---------------------------|
| | | | | | | | | | | | | | | | | |
| General | 1,828,500 | 190,700 | | 19,100 | | | | | | 10,700 | | 18,100 | | 4,084,700 | | 6,151,800 |
| Landscaping | 145,200 | | | | | | | | | | | | | | | 145,200 |
| Control Building | | 28,500 | | 63,600 | 2,100 | 2,600 | 9,200 | 13,300 | 1,200 | | 5,000 | 75,000 | 700 | 104,200 | | 305,400 |
| Filter Complex | | 1,516,300 | | 188,400 | 16,700 | 54,000 | 24,200 | 86,000 | | 499,500 | | | 27,000 | 679,100 | | 3,091,200 |
| Chemical Complex | | 503,700 | | 145,600 | 6,500 | 21,400 | 19,500 | 62,800 | 300 | 323,700 | | | 6,000 | 200,900 | | 1,290,400 |
| Flocculation Basins | | 266,800 | | 41,700 | 8,000 | 21,600 | 1,400 | 5,300 | | 165,000 | | 11,500 | 1,200 | 115,000 | | 637,700 |
| Headworks & Energy Dissipation | | 29,600 | | 13,600 | 700 | 1,800 | 1,400 | 3,900 | 100 | 64,500 | 100 | | 7,700 | 235,100 | | 358,500 |
| Dewatering Facility | | 137,300 | | 24,700 | 1,300 | 3,300 | 2,600 | 7,200 | | 300,000 | | | 5,000 | 80,600 | | 562,000 |
| Sludge Thickeners | | 30,000 | | 4,400 | 200 | 500 | 400 | 1,300 | | 45,400 | | | 200 | 14,400 | | 96,800 |
| Sludge Thickener Pump Station | | 20,300 | | 4,700 | 300 | 600 | 500 | 1,400 | | 24,800 | | | 200 | 15,300 | | 68,100 |
| Clarifiers & Flow Distribution | | 308,400 | | 28,900 | 1,600 | | | 8,400 | 300 | 330,500 | | | | 52,400 | | 730,500 |
| Reservoir | | 775,000 | | 16,800 | | | | | | 2,700 | | | | 20,900 | | 815,400 |
| Backwash Pump Station | | 41,900 | | 8,400 | 400 | 1,000 | 800 | 2,400 | 100 | 101,500 | | | 400 | 27,300 | | 184,200 |
| Electrical | | | | | | | | | | | | | | | | 1,678,900 |
| I & C | | | | | | | | | | | | 581,800 | | | | 581,800 |
| Total | 1,973,700 | 3,848,500 | Not Used | 560,100 | 37,800 | 106,800 | 60,000 | 192,000 | 2,000 | 1,793,300 | 5,100 | 686,400 | 48,400 | 5,629,900 | 1,678,900 | 16,697,900 |

APPENDIX C-1
TABULATED CONDITIONS SURROUNDING EACH FILTER RUN

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ⁻² | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | |
|-----|------|--------------|----------------|-------------------------|----------------|-------------------------------------|---------------------|-------|----------|---------------------|----------------|----------|----------------|-----------------------------|------------------------------|--|-----|-----|---------|--------|----------|---------------|
| | | | | | | | G sec ⁻¹ | GT | Time min | G sec ⁻¹ | GT | Time min | Hours <0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | |
| 1 | 1-15 | 1.3 | A | Alum = 10 | 24.0 | 6.0 | 229 | 46800 | 3.4 | 103 | 40170 | 6.5 | 2 | 8 | 720 | 5160 | 6.1 | 5.9 | 5.8 | 5.7 | 72.2 | |
| 2A | 1-19 | 1.4 | A | Alum = 10 | 12.0 | 3.0 | 160 | 66000 | 6.9 | 103 | 80300 | 13.0 | 10 | 15 | 1800 | 3732 | 6.6 | 6.0 | 5.5 | 5.3 | 88.9 | |
| 2B | 1-22 | 1.4 | A | Alum = 10 | 12.0 | 3.0 | 160 | 66000 | 6.9 | 103 | 80300 | 13.0 | 17 | 20 | 3060 | 3974 | 6.6 | 6.0 | 5.5 | 5.3 | 93.5 | |
| 2C | 1-20 | 1.4 | A | Alum = 10 | 12.0 | 3.0 | 160 | 66000 | 6.9 | 103 | 80300 | 13.0 | 11 | 18 | 1980 | 3785 | 6.6 | 6.0 | 5.5 | 5.3 | 89.9 | |
| 3 | 1-24 | 1.4 | A | Alum = 10 | 12.0 | 3.0 | 160 | 66000 | 6.9 | 103 | 80300 | 13.0 | 8 | 16 | 1440 | 3585 | 6.6 | 6.0 | 5.5 | 5.3 | 86.1 | Asbestos run. |
| 4A | 1-31 | 1.4 | A | Alum = 10 | 11.0 | 2.8 | 160 | 65300 | 6.8 | 79 | 67200 | 14.2 | 14 | 22 | 2268 | 3476 | 6.7 | 6.5 | 6.2 | 6.3 | 91.2 | |
| 4B | 2-2 | 1.4 | A | Alum = 10 | 12.0 | 3.0 | 168 | 62400 | 6.2 | 79 | 61600 | 13.0 | 13 | 19 | 2340 | 3868 | 6.8 | 6.4 | 6.2 | 6.4 | 91.5 | |

105

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ² | RAPID MIX | | | FLOC | | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS |
|-----|------|--------------|----------------|-------------------------|----------------|------------------------------------|---------------------|-------|------------|---------------------|-------|----------|-----------------|-----------------------------|------------------------------|--|------------|------------|------------|------------|---------|--------|---------------|
| | | | | | | | G sec ⁻¹ | GT | Time min | G sec ⁻¹ | GT | Time min | Hours ≤ 0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | | |
| 4C | 2-2 | 1.4 | A | Alum = 10 | 12.2 | 3.0 | 168 | 62400 | 6.2 | 79 | 61600 | 13 | 10 | 15 | 1800 | 3732 | 6.8 | 6.1 | 5.8 | 6.1 | | 88.9 | Asbestos run. |
| 5A | 2-6 | 1.4 | A | Alum = 10 | 12.3 | 3.1 | 168 | 62400 | 6.2 | 28.6 | 22300 | 13 | 9 | 16 | 1620 | 3667 | 6.9 6.2 | 5.2 6.2 | 5.2 6.5 | 5.3 6.9 | | 87.7 | |
| 5B | 2-8 | 1.4 | A | Alum = 10 | 12.0 | 3.0 | 168 | 62400 | 6.2 | 28.6 | 22300 | 13 | 11 | 18.5 | 1980 | 3785 | 6.6 6.8 | 6.4 6.2 | 6.3 6.5 | 6.3 6.3 | | 89.9 | |
| 5C | 2-10 | 1.4 | A | Alum = 10 | 12.0 | 3.0 | 168 | 62400 | 6.2 | 28.6 | 22300 | 13 | 9 | 17 | 1620 | 3667 | 6.3 6.9 | 6.2 6.2 | 6.1 6.4 | 6.3 6.6 | | 87.7 | Asbestos run. |
| 6A | 2-11 | 1.4 | B | Alum = 10 | 12.0 | 3.0 | 888 | 1087 | sec 1.2 | --- | ----- | --- | 11 | 14 | 1980 | 3785 | 6.5 6.8 | 6.3 6.3 | --- | 6.4 6.4 | | 89.9 | |
| 6B | 2-15 | 1.3 | B | Alum = 10 | 12.0 | 3.0 | 888 | 1087 | sec 1.2 | --- | ----- | -- | 12 | 12 | 2160 | 3830 | 6.3 6.2 | 5.9 5.8 | --- | 5.7 5.6 | | 90.7 | |
| 6C | 2-16 | 1.3 | C | Alum = 10 | 12.0 | 3.0 | 888 | 1087 | 1.2 sec | --- | ----- | -- | 13 | 14 | 2340 | 3868 | 6.2 6.2 | 6.0 5.7 | --- | 6.5 5.9 | | 91.5 | |

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ⁻² | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | TEMP °C | EFF. % | COMMENTS | | | |
|-----|------|--------------|----------------|-------------------------|----------------|-------------------------------------|---------------------|------|----------|---------------------|----------------|----------|----------------|-----------------------------|-------------------------------|---|-------------------|-------------------|--------|-------------------|------|---------------|---------------|
| | | | | | | | G sec ⁻¹ | GT | Time sec | G sec ⁻¹ | GT | Time min | Hours <0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ⁻² run | Net Water Produced gal/ft ⁻² 24 hr | Raw | RM | Floc | | | | |
| 6D | 2-17 | 1.25 | C | Alum = 10 | 11.6 | 2.9 | 888 | 1087 | 1.2 | --- | --- | --- | 13.5 | 13.5 | 2430 | 3884 | 6.3 6.6 | 5.7 6.3 | --- | 5.5 6.0 | 91.8 | Asbestos run. | |
| 7 | 2-19 | 1.25 | C | Alum = 15 | 12.2 | 3.0 | 888 | 1087 | 1.2 | --- | --- | --- | 11 | 12 | 1980 | 3785 | 6.3 | 5.4 | --- | 5.5 | 89.9 | | |
| 8 | 2-20 | 1.1 | C | Alum = 20 | 11.6 | 2.9 | 888 | 1987 | 1.2 | --- | --- | --- | 12 | 12 | 2160 | 3830 | 6.9 6.9 6.9 | 5.2 5.4 5.6 | --- | 5.2 5.3 5.5 | 90.7 | | |
| 9 | 2-20 | 1.1 | C | Alum = 5 | 11.6 | 2.9 | 888 | 1087 | 1.2 | --- | --- | --- | 7 | 19 | 1260 | 3480 | 6.4 6.6 6.8 | 6.2 6.3 6.3 | --- | 6.1 6.1 6.4 | 5.5° | 84.1 | |
| 10 | 2-21 | 1.15 | C | Alum = 3 | 11.7 | 2.9 | 888 | 1087 | 1.2 | --- | --- | --- | 0 | 0 | 0 | 0 | 6.4 | 6.4 | --- | 6.3 | 5.5° | 0 | |
| 11 | 2-23 | 1.12 | C | Alum = 5.9 | 11.0 | 2.8 | 761 | 1016 | 1.3 | --- | --- | --- | 0 | 24 | 0 | 0 | 6.5 6.4 6.8 | 7.1 6.3 6.3 | --- | 6.3 6.3 6.2 | 5.5° | 0 | Asbestos run. |
| 12A | 2-25 | 1.2 | C | Alum = 12.6 Lime | 11.2 | 2.8 | 761 | 1016 | 1.3 | --- | --- | --- | 17 | 18 | 2856 | 3690 | 6.6 6.7 6.5 | 6.8 6.8 6.8 | --- | 6.4 6.4 6.4 | 5.0° | 93.0 | |

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ² | RAPID MIX | | | FLOC | | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS |
|-----|------|--------------|----------------|--------------------------------------|----------------|------------------------------------|---------------------|-------|----------|---------------------|--------|----------|----------------|-----------------------------|------------------------------|--|--------------------------|--------------------------|--------------------------|--------------------------|---------|--------|---------------|
| | | | | | | | G sec ⁻¹ | GT | Time sec | G sec ⁻¹ | GT | Time min | Hours <0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | | |
| 12B | 2-26 | 1.2 | C | Alum = 11.5 Lime | 11.1 | 2.8 | 761 | 1016 | 1.3 | --- | ----- | --- | 13 | 20 | 2184 | 3585 | 6.6 6.6 | 6.5 6.5 | --- | 6.4 6.4 | 5° | 90.8 | |
| 12C | 2-28 | 1.15 | C | Alum = 11.5 Lime | 11.2 | 2.8 | 761 | 1016 | 1.3 | --- | ----- | --- | 15.5 | 17 | 2604 | 3657 | 6.8 6.5 6.6 6.5 | 6.7 6.4 6.4 6.3 | --- | 6.6 6.5 6.6 6.7 | 6° | 92.3 | |
| 12D | 3-3 | 1.0 | C | Alum = 10 Lime = 3.4 | 13.2 | 3.3 | 940 | 1034 | 1.1 | + | + | + | 19 | 20 | 3762 | 4437 | 7.3 6.8 6.7 6.8 | 7.3 6.4 6.5 6.4 | --- | 7.5 6.8 6.7 6.7 | 6° | 94.7 | Asbestos run. |
| 14 | 3-6 | 1.1 | C | Alum = 17 Lime = 6.2 | 12.5 | 3.1 | SAME AS RUN 12D | | | | | | 0 | 12 | 0 | 0 | 6.4 6.6 6.7 6.5 | 6.1 6.0 6.0 6.1 | --- | 6.0 5.9 5.9 6.1 | 6° | 0 | |
| 15 | 3-8 | 0.99 | I | Alum = 9.8 | 12.2 | 3.0 | 175 | 66468 | 6.3 min | + | + | + | 17 | 20 | 3060 | 3974 | 7.2 6.8 6.7 | 6.7 6.5 6.5 | 6.7 6.5 6.5 | 6.8 6.5 6.4 | 5.5° | 93.5 | |
| 16 | 3-9 | 0.95 | A | Alum = 10 Alum = 10 Lime = 3.7 | 12.1 | 3.0 | 175 | 66468 | 6.3 min | 73 | 56940 | 13.0 | 14 | 35 | 2520 | 3900 | 6.4 6.6 6.7 6.5 | 6.7 6.4 6.7 6.5 | 6.4 6.4 6.7 6.2 | 6.3 6.5 6.6 6.2 | 5.5° | 92.1 | |
| 17 | 3-12 | 1.15 | A | Alum = 10 Lime = 3.7 | 11.2 | 2.8 | 175 | 66468 | 6.3 min | 193 | 150540 | 13.0 | 17 | 35 | 2856 | 3690 | 6.7 6.5 6.5 | 6.3 6.3 6.3 | 6.2 6.4 6.4 | 6.4 6.3 6.0 | 6° | 93.0 | |

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ⁻² | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | | |
|-----|------|--------------|----------------|---|----------------|-------------------------------------|---------------------|-------|----------|---------------------|----------------|----------|----------------|-----------------------------|-------------------------------|---|-------------------|-------------------|-------------------|-------------------|----------|------|---------------|
| | | | | | | | G sec ⁻¹ | GT | Time sec | G sec ⁻¹ | GT | Time min | Hours <0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ⁻² run | Net Water Produced gal/ft ⁻² 24 hr | Raw | RM | Floc | Fin | | | |
| 18 | 3-14 | 0.89 | A | Alum = 10 Lime | 24.0 | 6.0 | 247 | 45900 | 3.1 min | 193 | 75270 | 6.5 | 0 | 11 | 0 | 0 | 6.7 6.7 6.7 | 6.3 6.3 6.4 | 6.3 6.3 6.3 | 6.1 6.1 6.1 | 6° | 0 | |
| 19 | 3-16 | 1.0 | A | Alum = 11.8 Lime = 3.9 | 17.1 | 4.3 | 203 | 57246 | 4.7 min | 193 | 113484 | 9.8 | 3 | 15 | 774 | 4076 | 6.4 6.4 | 6.3 6.2 | 6.3 6.2 | 6.2 6.1 | 6° | 74.2 | |
| 20 | 3-22 | 0.77 | C | Alum = 9.2 Lime = 3.2 1986N = 0.03 | 11.8 | 3.0 | 996 | 1124 | 1.1 | --- | ---- | --- | 17 | 18 | 3060 | 3974 | | | | 6.1 | 6° | 93.5 | |
| 21 | 3-24 | 0.70 | C | Alum = 9.2 Lime = 4.3 1986N = 65 ppb | 13.0 | 3.25 | 996 | 1124 | 1.1 | --- | ---- | --- | 16 | 17 | 3120 | 4307 | 6.6 6.6 | 6.4 6.4 | --- | 6.1 | 6° | 93.6 | Asbestos run. |
| 22 | 4-6 | 0.62 | C | Alum = 5.6 Lime = 3.2 1986N = 100 ppb | 12.0 | 3.0 | 880 | 1076 | 1.1 | --- | ---- | --- | 11 | 15 to 7 | 1980 | 3785 | 6.6 6.6 | 6.7 6.5 | --- | 6.3 6.4 | 9° | 89.9 | |
| 23 | 4-8 | 0.63 | C | Alum = 6.0 Lime = 3.2 1986N = 40 ppb | 12.0 | 3.0 | 880 | 1076 | 1.1 | --- | ---- | --- | 10 | 17 | 1800 | 3732 | 6.7 6.7 5.8 | 7.0 7.1 6.9 | --- | 6.9 6.9 6.9 | 8° | 88.9 | |
| 24 | 4-11 | 0.60 | C | Alum = 7.0 Lime = 4.1 1986N = 20 ppb | 12.7 | 3.2 | 970 | 1105 | 1.1 | --- | ---- | --- | 17 | 21 to 7 | 3264 | 4258 | 6.5 6.9 6.8 | 7.6 7.6 7.5 | --- | 7.4 7.4 7.3 | 8° | 93.5 | Asbestos run. |

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING $\frac{\text{gpm}}{\text{ft}^2}$ | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | | |
|-----|------|--------------|----------------|--|----------------|---|---------------------|------|----------|---------------------|----------------|----------|-----------------|-----------------------------|------------------------------|--|-------------------|-------------------|---------|-------------------|----------|------|--------------|
| | | | | | | | G sec ⁻¹ | GT | Time sec | G sec ⁻¹ | GT | Time min | Hours ≤ 0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr ⁻¹ | Raw | RM | Floc | Fin | | | |
| 25 | 4-13 | 0.65 | C | Alum = 7.5 Lime = 4.7 1986N = 20 ppb | 15.0 | 3.7 | 1210 | 1184 | .98 | --- | ---- | --- | 13 | 14 | 2925 | 4927 | 6.6 | --- | 6.7 | 6.6 | 8° | 93.2 | |
| 26 | 4-16 | 0.60 | C | Alum = 7.0 Lime = 4.4 1849A = 20 ppb | 16.0 | 4.0 | 1452 | 1316 | .91 | --- | ---- | --- | 13.5 | 13.5 | 3240 | 5298 | --- | --- | --- | --- | 8.5° | 93.8 | |
| 27 | 4-17 | 0.62 | C | Alum = 7.0 Lime = 4.4 | 16.2 | 4.0 | 1443 | 1324 | .92 | --- | ---- | --- | 12 | 13.5 | 2880 | 5240 | 6.8 6.9 | 6.7 6.7 | --- | 6.3 6.5 | 8.5° | 93.1 | |
| 28 | 4-19 | 0.63 | C | Alum = 7.0 Lime = 4.4 1849A = 20 ppb | 15.9 | 4.0 | 1402 | 1294 | .92 | --- | ---- | --- | 10 | 13.5 | 2400 | 4816 | 6.4 6.4 | 6.5 6.5 | --- | 6.6 6.6 | 8° | 91.7 | |
| 29 | 4-20 | 0.69 | C | Alum = 7.0 Lime = 4.1 1849A = 20 ppb | 12.7 | 3.2 | 970 | 1105 | 1.1 | --- | ---- | --- | 15 | 18 | 2880 | 4211 | 6.7 6.7 | 6.6 6.7 | --- | 6.4 6.7 | 8.5° | 93.1 | Asbestos run |
| 30 | 4-21 | 0.58 | C | Alum = 10 Lime = 6.2 1986N = 20 ppb | 15.9 | 4.0 | 1402 | 1294 | .92 | --- | ---- | --- | 9 | 10 | 2160 | 5067 | 6.5 6.5 6.5 | 6.3 6.4 6.4 | --- | 6.2 6.0 6.1 | 9° | 90.7 | |
| 31 | 4-28 | 0.64 | C | Alum = 10 Lime = 6.2 1986N = 70 ppb | 16.5 | 4.1 | 1503 | 1336 | .89 | --- | ---- | --- | 9 | 9.5 | 2214 | 5207 | 6.6 6.5 6.5 | 6.5 6.4 6.5 | --- | 6.5 6.5 6.5 | 9° | 91.0 | |

III

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ² | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | | |
|------------|----------------|--------------|----------------|--|----------------|------------------------------------|----------------------|--------|----------|---------------------|----------------|----------|----------------|-----------------------------|------------------------------|--|-------------------|-------------------|-------------------|-------------------|----------|------|--|
| | | | | | | | G' sec ⁻¹ | GT | Time sec | G sec ⁻¹ | GT | Time min | Hours <0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | | |
| 32 | 5-3 | 0.64 | C | Alum = 10 Lime 1986N = 70 ppb | 12.7 | 3.2 | 970 | 1105 | 1.1 | --- | --- | --- | 14 | 14 | 2683 | 4183 | 6.6 6.6 6.6 | 6.5 6.6 6.6 | --- | 6.6 6.7 6.6 | 10° | 92.5 | |
| 33 | 5-5 | 0.65 | C | Alum = 10 Lime 1986N = 70 ppb | 12.2 | 3.0 | 880 | 1076 | 1.2 | --- | --- | --- | 12 | 12 | 2160 | 4630 | 6.6 6.6 6.6 | 6.5 6.6 6.6 | --- | 6.6 6.7 6.6 | 9 | 90.7 | Asbestos run. |
| 34 | 5-7 | 0.62 | C | Alum = 10 Lime N-17 = 70 ppb | 12.7 | 3.2 | 970 | 1105 | 1.1 | --- | --- | --- | 15 | 19 | 2880 | 4211 | 6.5 6.4 6.4 | 6.4 6.4 6.4 | --- | 6.6 6.5 6.7 | 10° | 93.1 | No turb removal during 1st 3 hrs of run. Maybe due to feeding of lime slurry instead of saturated sol. |
| 35 | 5-8 | 0.62 | C | Alum = 10 Lime = 7.7 N-17 = 20 ppb | 11.9 | 3.0 | 880 | 1076 | 1.2 | --- | --- | --- | 14 | 14 | 2520 | 3900 | 6.6 6.6 6.5 | 6.7 6.7 6.6 | --- | 6.8 6.7 6.6 | 10° | 92.1 | |
| 36 thru 38 | 5-10 thru 5-12 | ----- | C | see comments | | | | | | | | | | | | | | | | | | | Run data gathered under varying conditions to determine upper & lower pH values for coagulation with alum. |
| 39 | 5-12 | 0.58 | C | Alum = 10 Lime N-17 = 20 ppb | 11.2 | 2.8 | 761 | 1016 | 1.3 | --- | --- | --- | 5 | 17 | 840 | 2870 | 6.7 6.5 6.5 | 6.8 6.7 6.9 | --- | 6.7 6.3 6.4 | 10° | 76.2 | |
| 40 | 5-13 | 0.62 | E | Alum = 10 Lime N-17 = 65 ppb | 16.5 | 4.1 | 1333 | 248000 | 3.1 | 70 min | 39400 | 9.4 | 11 | 11 | 2706 | 5333 | 6.4 6.4 6.3 | 6.9 6.9 6.8 | 6.0 6.1 6.1 | 6.8 6.8 6.7 | 9° | 92.6 | |

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING $\frac{gpm}{ft^2}$ | RAPID MIX | | | FLOC | | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS |
|-----|------|--------------|----------------|---|----------------|-----------------------------------|---------------------|--------|----------|---------------------|--------|----------|----------------|-----------------------------|------------------------------|--|--------------------------|--------------------------|--------------------------|--------------------------|---------|--------|---------------|
| | | | | | | | G sec ⁻¹ | GT | Time min | G sec ⁻¹ | GT | Time min | Hours <0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | | |
| 41 | 5-14 | 0.59 | E | Alum = 10 Lime = 4.9 N-17 = 20 ppb | 16.1 | 4.0 | 1333 | 248000 | 3.1 | 70 | 40400 | 9.7 | 6 | 16 | 1440 | 4720 | 6.4 6.4 6.3 | 6.0 6.0 6.0 | 6.0 6.1 6.1 | 6.1 6.2 6.1 | 10° | 86.1 | |
| 42 | 5-15 | 0.60 | J | Alum = 10 Lime = 4.9 N-17 = 65 ppb | 16.0 | 4.0 | 1333 | 248000 | 3.1 | 70 | 40400 | 9.7 | 9 | 14 | 2160 | 5067 | 6.4 6.4 6.5 6.5 | 6.1 6.1 6.2 6.1 | 6.2 6.2 6.2 6.2 | 6.2 6.2 6.3 6.3 | 10° | 90.7 | |
| 43 | 5-16 | 0.60 | J | Alum = 10 Lime = 4.9 N-17 = 35 ppb | 16.0 | 4.0 | 1333 | 248000 | 3.1 | 70 | 40400 | 9.7 | 5 | 9 | 1230 | 4649 | 6.4 6.3 | 6.0 6.1 | 5.9 6.1 | 6.1 6.2 | 10° | 83.7 | |
| 44 | 5-17 | 0.60 | E | Alum = 10 Lime = 4.9 N-17 = 50 ppb | 11.8 | 2.9 | 1333 | 336000 | 4.2 | 167 | 132000 | 13.2 | 13 | 23 | 2262 | 3727 | 6.4 5.4 6.3 6.4 | 5.8 5.8 6.0 5.9 | 5.8 5.8 5.9 5.8 | 5.9 6.1 6.0 6.2 | 10° | 91.2 | Asbestos run. |
| 45 | 5-21 | 0.60 | E | Alum = 10 Lime = 4.9 N-17 = 140 ppb | 12.2 | 3.0 | 1333 | 328000 | 4.1 | 167 | 128000 | 12.8 | 14 | 17 to 5.5' headloss | 2520 | 3900 | 6.4 6.4 6.3 6.4 | 5.9 5.7 5.8 5.6 | 6.0 5.8 5.8 5.7 | 6.0 5.8 5.8 5.9 | 10° | 92.1 | |
| 46 | 5-22 | 0.55 | F | Alum = 10 Lime = 4.9 1986N = 20 ppb | 16.5 | 4.1 | 1333 | 248000 | 3.1 | ----- | ----- | ----- | 5 | 17 | 1230 | 4649 | 6.3 6.3 6.3 6.3 | 5.8 5.8 5.8 5.8 | 5.7 5.8 5.8 5.8 | 6.1 6.1 6.1 6.0 | 10° | 83.7 | |
| 47 | 5-23 | 0.58 | F | Alum = 10 Lime = 4.9 1986N = 50 ppb | 16.5 | 4.1 | SAME AS RUN #46 | ----- | ----- | ----- | ----- | ----- | 9 | 17 | 2214 | 5207 | 6.3 6.3 6.3 6.3 | 6.1 6.0 6.0 6.0 | 6.2 6.1 6.0 6.0 | 6.3 6.2 6.2 6.1 | 9.5° | 91.0 | |

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ² | RAPID MIX | | | FLOC | | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | |
|------------|----------------|--------------|----------------|--|----------------|------------------------------------|---------------------|--------|----------|---------------------|-----|----------|----------------|-----------------------------|------------------------------|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--|----------|---------------|
| | | | | | | | G sec ⁻¹ | GT | Time sec | G sec ⁻¹ | GT | Time min | Hours <0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | | | |
| 48 | 5-24 | 0.58 | F | Alum = 10 Lime = 4.9 1986N = 100 ppb | 16.5 | 4.1 | 1333 | 248000 | 3.1 min | --- | --- | --- | 11.5 | 12 | 2829 | 5358 | 6.3 6.3 6.3 | 6.1 6.1 6.1 | 6.0 6.0 6.0 | 6.1 6.0 6.0 | 10° | 92.9 | | |
| 49 | 5-25 | 0.60 | F | Alum = 10 Lime = 4.9 N-17 = 20 ppb | 16.4 | 4.1 | SAME AS RUN #48 | 1452 | 1316 | sec 0.91 | --- | --- | --- | 5.5 | 19 | 1353 | 4763 | 6.3 6.3 6.3 6.3 | 6.1 6.1 6.1 6.1 | 6.1 6.2 6.2 6.2 | 6.2 6.2 6.2 6.0 | 10° | 85.2 | |
| 50 | 5-31 | 0.56 | K | Alum = 8 Lime = 4.9 N-17 = 100 ppb | 16.3 | 4.1 | 1452 | 1316 | 0.91 | --- | --- | --- | 12 | 13 | 2952 | 5381 | 6.3 6.3 6.3 6.3 | 6.2 6.2 6.2 6.2 | --- | 6.3 6.3 6.2 6.3 | 11° | 93.2 | | |
| 51 | 6-1 | 0.56 | L | Alum = 10 Lime = 4.9 N-17 = 100 ppb | 16.0 | 4.0 | SAME AS RUN #48 | 1452 | 1316 | 0.91 | --- | --- | --- | 7 | 14 | 1680 | 4869 | 6.3 6.3 6.3 6.3 | 6.1 6.1 5.8 5.8 | --- | 6.1 6.0 5.9 5.9 | 11° | 88.1 | Asbestos run. |
| 52 | 6-7 | | G | | | | | | | | | | | | | | | | | | | Conducted under varying conditions to determine effectiveness of CATFLOC T-1 as primary coagulant. | | |
| 53 | 6-8 | 0.48 | G | CATFLOC T-1 = 3 mg/l | 16.4 | 4.1 | SAME AS RUN #48 | 1452 | 1316 | 0.91 | --- | --- | --- | 7 | 25 | 1722 | 5007 | 6.3 6.3 6.3 6.3 | --- | --- | 6.2 6.3 6.3 6.3 | 12° | 88.4 | Asbestos run. |
| 54 thru 59 | 6-11 thru 6-21 | | G | | | | | | | | | | | | | | | | | | | Conducted under varying conditions to optimize CATFLOC T-1 and alum. | | |

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| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ² | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | | |
|-----|------|--------------|----------------|---|----------------|------------------------------------|---------------------|--------|----------|---------------------|----------------|----------|-------------------------|-----------------------------|------------------------------|--|--------------------------|--------------------------|--------------------------|--------------------------|----------|---------------|--|
| | | | | | | | G sec ⁻¹ | GT | Time min | G sec ⁻¹ | GT | Time min | Hours ≤ 0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | | |
| 60 | 6-26 | 0.4 | G | Alum = 4 CATFLOC T-1 = 0.8 mg/l | 16.3 | 4.1 | 1333 | 248000 | 3.1 | --- | --- | --- | 0 | 25 | 0 | 0 | 6.4 6.4 6.3 6.3 | 6.3 6.3 5.9 6.0 | --- | 6.3 6.3 5.9 6.0 | 12° | 0 | |
| 61 | 6-26 | 0.40 | G | Alum = 2 CATFLOC T-1 = 1.6 mg/l | 16.4 | 4.1 | SAME AS RUN | #60 | --- | --- | --- | 7 | 24 to 6.25' headloss | 1722 | 5007 | 6.3 6.9 6.3 6.3 | 6.0 6.1 6.1 6.2 | --- | 6.0 6.1 6.2 6.2 | 12° | 88.4 | | |
| 62 | 6-28 | 0.40 | G | Alum = 3 CATFLOC T-1 = 2 mg/l 1986N = 100 ppb | 16.4 | 4.1 | SAME AS RUN | #60 | --- | --- | --- | 13 | 20 | 3198 | 5421 | 6.8 6.7 6.8 6.8 | 6.5 6.5 6.4 6.6 | --- | 6.5 6.5 6.5 6.5 | 12° | 93.8 | Asbestos run. | |
| 63 | 6-29 | 0.39 | G | Alum = 3 CATFLOC T-1 = 2 mg/l 1986N = 150 ppb | 16.8 | 4.2 | SAME AS RUN | #60 | --- | --- | --- | 13.5 | 21 | 3402 | 5580 | 6.4 6.4 6.4 | 6.5 6.5 6.6 | --- | 6.5 6.5 6.5 | 12° | 94.1 | | |
| 64 | 7-2 | 0.40 | G | Alum = 3 CATFLOC T-1 = 2 mg/l CA233 = 100 ppb | 17.3 | 4.3 | SAME AS RUN | #60 | --- | --- | --- | 8.5 | 22 | 2193 | 5445 | 6.4 6.4 6.6 6.5 | 6.5 6.4 6.6 6.5 | --- | 6.5 6.4 6.6 6.5 | 12° | 90.9 | | |
| 65 | 7-4 | 0.40 | G | Alum = 3 CATFLOC T-1 = 2 mg/l CA233 = 300 ppb | 16.6 | 4.1 | SAME AS RUN | #60 | --- | --- | --- | 17 | 17 | 4182 | 5534 | 6.4 6.4 6.6 | 6.5 6.5 6.4 | --- | 6.5 6.5 6.4 | 12° | 95.2 | | |
| 66 | 7-5 | 0.38 | G | Alum = 3 CATFLOC T-1 = 2 mg/l CA253 = 0.1 | 16.0 | 4.0 | SAME AS RUN | #60 | --- | --- | --- | 8 | 25 | 1920 | 4980 | 6.5 6.4 6.4 | 6.5 6.5 6.5 | --- | 6.5 6.5 6.5 | 12° | 89.6 | | |

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| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft^2 | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | | |
|-----------|--------------|--------------|----------------|---|----------------|----------------------------------|---------------------|--------|----------|---------------------|----------------|----------|-----------------|-----------------------------|-------------------------------------|---|--------------------------|--------------------------|------------|--------------------------|--|--|---------------|
| | | | | | | | G sec ⁻¹ | GT | Time min | G sec ⁻¹ | GT | Time min | Hours ≤ 0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ $\text{ft}^2 \text{ run}$ | Net Water Produced gal/ $\text{ft}^2 24 \text{ hr}$ | Raw | RM | Floc | Fin | | | |
| 67 | 7-8 | | G | | | | | | | | | | | | | | | | | | Conducted at varying polymer dosages. | | |
| 68 | 7-9 | 0.36 | G | Alum = 3 CATFLOC T-1 = 2 mg/l A23 = 100 ppb | 16.7 | 4.2 | 1333 | 248000 | 3.1 | --- | --- | --- | 17 | 22 | 4284 | 5677 | 6.7 6.5 6.6 6.6 | 6.5 6.6 6.6 6.5 | --- | 6.6 6.5 6.5 6.5 | 12.5° | 95.3 | |
| 69 | 7-10 | 0.36 | G | Alum = 3 CATFLOC T-1 = 2 mg/l A23 = 300 ppb | 16.4 | 4.1 | SAME AS RUN #68 | --- | --- | --- | --- | --- | 18 | 21 | 4428 | 5555 | 6.6 6.5 6.6 6.6 | 6.5 6.5 6.5 6.5 | --- | 6.5 6.5 6.4 6.5 | 12.5° | 95.5 | |
| 70 | 7-12 | 0.33 | G | Alum = 3 CATFLOC T-1 = 2 mg/l A23 = 300 ppb | 16.4 | 4.1 | SAME AS RUN #68 | --- | --- | --- | --- | --- | 17 | 21 | 4182 | 5534 | 6.7 6.3 6.7 | 6.7 6.4 6.4 | --- | 6.7 6.4 6.6 | 12° | 95.2 | Asbestos run. |
| 71 | 7-17 | 0.35 | G | Alum = 3 573C = 2 | 16.3 | 4.1 | SAME AS RUN #68 | --- | --- | --- | --- | --- | 19 | 22 | 4674 | 5574 | 6.6 6.5 6.6 6.6 | 6.5 6.5 6.5 6.5 | --- | 6.5 6.5 6.5 6.5 | 12° | 95.7 | |
| 72 and 73 | 7-18 to 7-19 | | G | | | | SAME AS RUN #68 | | | | | | | | | | | | | | Conducted under varying conditions to determine 573C dosage. | | |
| 74 | 7-23 | 0.30 | G | Alum = 3 573C = 2 | 16.2 | 4.0 | SAME AS RUN #68 | --- | --- | --- | --- | 0 | 15 | 0 | 0 | 6.6 6.6 | 6.5 6.5 | --- | 6.5 6.4 | 12° | 0 | High turbidity probably due to malfunction in cationic polymer pump. | |

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| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING $\frac{gpm}{ft^2}$ | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | | |
|-------|------|--------------|----------------|---|----------------|-----------------------------------|----------------------|--------|----------|----------------------|----------------|----------|------------------|-----------------------------|-----------------------------|---|-------------------|-------------------|-------------------|-------------------|----------|------|--|
| | | | | | | | G' sec ⁻¹ | GT sec | Time sec | G' sec ⁻¹ | GT | Time min | Hours ≤ 0.1 NTU | Hours to 8' or 10' Headloss | UFRV $\frac{gal/ft^2}{run}$ | Net Water Produced $\frac{gal/ft^2}{24 hr}$ | Raw | RM | Floc | Fin | | | |
| 75 | 7-30 | 0.35 | G | Alum = 3 573C = 2 CA233 = 100 ppb | 16.3 | 4.1 | 1333 | 247938 | 3.1 min | ----- | ----- | ----- | 0 | 15.5 | 0 | 0 | 6.7 6.5 6.6 | 6.6 6.5 6.6 | --- --- --- | 6.6 6.5 6.5 | 13° | 0 | |
| 76 | 7-31 | 0.34 | G | Alum = 3 573C = 2 CA233 = 200 ppb | 16.4 | 4.1 | SAME AS RUN #75 | ----- | ----- | ----- | ----- | ----- | 17 | 17 | 4182 | 5534 | 6.6 6.5 6.4 | 6.6 6.6 6.5 | --- --- --- | 6.6 6.6 6.5 | 13° | 95.2 | |
| 77 | 8-1 | 0.34 | G | Alum = 3 573C = 2 CA233 = 300 ppb | 16.5 | 4.1 | SAME AS RUN #75 | ----- | ----- | ----- | ----- | ----- | 0 | 14 | 0 | 0 | 6.7 6.6 6.6 | 6.6 6.6 6.6 | --- --- --- | 6.6 6.6 6.6 | 13° | 0 | |
| 78 | 8-2 | 0.33 | G | Alum = 3 573C = 2 1986N = 100 ppb | 15.8 | 4.0 | SAME AS RUN #75 | ----- | ----- | ----- | ----- | ----- | 0 see comment | 15 | 0 | 0 | 6.7 6.7 6.7 | 6.7 6.7 6.7 | --- --- --- | 6.7 6.7 6.6 | 13° | 0 | Turbidity remained at 0.11 NTU for entire run. |
| 79 | 8-3 | 0.35 | G | Alum = 3 573C = 2 1986N = 200 ppb | 16.5 | 4.1 | SAME AS RUN #75 | ----- | ----- | ----- | ----- | ----- | 0 see comment | 14 | 0 | 0 | 6.6 6.5 6.5 | 6.6 6.4 6.4 | --- --- --- | 6.6 6.4 6.4 | 13° | 0 | Turbidity remained at 0.11 NTU for entire run. |
| 80 | 8-14 | 0.31 | B | Alum = 3 CATFLOC T-1 = 2 mg/l CA253 = 0.1 | 16.6 | 4.0 | 1443 | 1324 | 0.92 | ----- | ----- | ----- | 0 | 17 | 0 | 0 | 6.5 6.5 6.6 | 6.5 6.5 6.6 | --- --- --- | 6.4 6.4 6.6 | 14° | 0 | |
| 80 MM | 8-14 | 0.31 | B | Alum = 3 CATFLOC T-1 = 2 mg/l CA253 = 0.1 | 0.44 | 4.0 | SAME AS RUN #80 | ----- | ----- | ----- | ----- | ----- | 0 | 20 | 0 | 0 | SAME AS RUN #80 | ----- | ----- | 14° | 0 | | |

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ⁻² | RAPID MIX | | | FLOC | | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF % | COMMENTS | |
|-----|------|--------------|----------------|--|-----------------|-------------------------------------|---------------------|-----------------|----------|---------------------|-------|-----------|----------------|-----------------------------|------------------------------|--|-----------------|------------|------------|------------|---------|-------|----------|--|
| | | | | | | | G sec ⁻¹ | GT | Time sec | G sec ⁻¹ | GT | Time min. | Hours <0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | | | |
| 81 | 8-16 | 0.31 | M | Alum = 3 CATFLOC T-1 = 2 mg/l CA 233 = 0.1 | 16.0 | 4.0 | 1443 | 1324 | 0.92 | --- | ----- | --- | 11 | 11 | 2640 | 5193 | 6.7 6.6 | 6.6 6.5 | --- | 6.6 6.5 | 14° | 92.4 | | |
| | | | | | | | 1443 | 1324 | 0.92 | --- | ----- | --- | | | | | | | | | | | | |
| 81 | M | 8-16 | 0.31 | M | SAME AS RUN #81 | 0.44 | 4.0 | SAME AS RUN #81 | #81 | --- | ----- | --- | 18 | 22 | 4320 | 5413 | SAME AS RUN #81 | | | | | 14° | 95.4 | |
| 82 | 8-18 | 0.31 | M | Alum - 3 CATFLOC T-1 = 2 mg/l CA233 = 0.3 | 15.8 | 4.0 | SAME AS RUN #81 | | | | | | 12 | 12 | 2880 | 5240 | 6.4 | 6.2 | --- | 6.2 | 14° | 93.0 | | |
| 82 | M | 8-18 | 0.31 | M | SAME AS RUN #82 | 0.44 | 4.0 | SAME AS RUN #81 | | | | | 26 | 26 | 6240 | 5520 | SAME AS RUN #82 | | | | | 14° | 96.8 | |
| 83 | 8-20 | 0.32 | C | Alum = 10 Lime = 4.0 1986N = 0.07 | 15.0 | 3.8 | 1443 | 1324 | 0.92 | --- | ----- | --- | 9 | 9 | 2052 | 5067 | 6.7 6.7 | 6.4 6.4 | --- | 6.4 6.4 | 14° | 90.2 | | |
| 83 | M | 8-20 | 0.32 | C | SAME AS RUN #83 | 0.44 | 4.0 | SAME AS RUN #83 | #83 | --- | ----- | --- | 21 | 23 | 5040 | 5463 | SAME AS RUN #83 | | | | | 14° | 96.0 | |
| 84 | 8-22 | 0.32 | C | SAME AS RUN #83 | 16.0 | 4.0 | SAME AS RUN #83 | #83 | --- | ----- | --- | 10 | 23 | 2400 | 5336 | 6.5 6.6 | 6.4 6.3 | --- | 6.4 6.4 | 13.5 | 91.7 | | | |

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ² | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | | |
|------|------|--------------|----------------|---|----------------|------------------------------------|---------------------|--------|----------|---------------------|----------------|----------|----------------|-----------------------------|------------------------------|--|-------------------|-------------------|-------------------|-------------------|----------|------|--|
| | | | | | | | G sec ⁻¹ | GT sec | Time sec | G sec ⁻¹ | GT | Time min | Hours <0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | | |
| 84 M | 8-22 | 0.32 | C | Alum = 10 Lime = 4.1 1986N = 0.07 | 0.66 | 6.0 | 1443 | 1324 | .92 | | | | 10 | 10 | 3600 | 7944 | 6.5 6.6 6.3 | 6.4 6.6 --- | 6.4 6.4 --- | 6.4 6.4 --- | 13.5° | 94.4 | |
| 85 | 8-23 | 0.33 | C | SAME AS RUN #84M | 16.3 | 4.1 | SAME AS RUN #84M | | | | | | 6 | 1440 | 5136 | 6.7 6.7 6.4 | 6.4 6.7 --- | 6.4 6.4 --- | 6.4 6.4 --- | 13.5° | 86.1 | | |
| 85 M | 8-23 | 0.33 | C | SAME AS RUN #84M | 0.88 | 8.0 | SAME AS RUN #85 | | | | | | 6 | 6 | 2880 | 10240 | SAME AS RUN #85 | | | | 13.5° | 93.1 | |
| 86 | 8-29 | 0.35 | C | SAME AS RUN #84M | 15.9 | 4.0 | SAME AS RUN #84M | | | | | | 11 | 11 | 2640 | 5193 | 6.6 6.6 6.5 | 6.4 6.3 6.3 | 6.4 6.4 --- | 6.4 6.4 6.4 | 13° | 92.4 | |
| 86 M | 8-29 | 0.35 | C | SAME AS RUN #84M | 0.67 | 6.1 | SAME AS RUN #86 | | | | | | 11 | 11 | 4026 | 8143 | SAME AS RUN #86 | | | | 13° | 95.0 | |
| 87 | 8-30 | 0.35 | C | SAME AS RUN #84M | 15.7 | 3.9 | SAME AS RUN #84M | | | | | | 12 | 12 | 2808 | 5099 | 6.7 6.6 6.4 | 6.4 6.4 --- | 6.4 6.4 --- | 6.4 6.4 --- | 13° | 92.9 | |
| 87 M | 8-30 | 0.35 | C | SAME AS RUN #84M | 0.68 | 6.2 | SAME AS RUN #87 | | | | | | 11 | 12 | 4092 | 8342 | SAME AS RUN #87 | | | | 13° | 95.1 | |

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| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ⁻² | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | | |
|--------|------|--------------|----------------|---|----------------|-------------------------------------|---------------------|--------|----------|---------------------|----------------|----------|-----------------|-----------------------------|------------------------------|--|-------------------|-------------------|---------|-------------------|----------|------|---------------|
| | | | | | | | G sec ⁻¹ | GT sec | Time sec | G sec ⁻¹ | GT | Time min | Hours ≤ 0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | | |
| 88 | 8-31 | 0.35 | C | Alum = 10 Lime | 16.1 | 4.0 | 1443 | 1324 | 0.92 | | | | 12 | 12 | 2800 | 5240 | 6.7 6.6 6.6 | 6.4 6.4 6.4 | --- | 6.4 6.4 6.4 | 13° | 93.1 | |
| 88 M | 8-31 | 0.35 | C | SAME AS RUN #88 | 0.68 | 6.2 | | | | | | | 13 | 14 | 4836 | 8387 | SAME AS RUN #88 | | | | 13° | 95.9 | |
| 89 | 9-2 | 0.32 | C | Alum = 10 Lime 196N = 0.07 | 16.0 | 4.0 | 1440 | 1370 | 0.9 | | | | 11 | 11 | 2160 | 5067 | 6.5 6.6 | 6.4 6.4 | --- | 6.4 6.4 | 13° | 90.7 | Asbestos run. |
| 89 MM | 9-2 | 0.32 | C | SAME AS RUN #89 | 0.44 | 4.0 | SAME AS RUN #89 | | | | | | 20 | 20 | 4800 | 5448 | SAME AS RUN #89 | | | | 13° | 95.8 | Asbestos run. |
| 89B | 9-3 | 0.32 | M | Alum = 3 CATFLOC T-1 = 2 mg/l A23 = 0.1 | 16.0 | 4.0 | 1440 | 1370 | 0.9 | | | | 11 | 16 | 2160 | 5067 | 6.7 | 6.7 | --- | 6.6 | 13° | 90.7 | |
| 89B MM | 9-3 | 0.32 | M | SAME AS RUN #89B | 0.44 | 4.0 | SAME AS RUN #89B | | | | | | 24 | 34 to 7.5' headloss | 5760 | 5900 | SAME AS RUN #89 | | | | 13° | 96.5 | |
| 90 | 9-5 | 0.35 | M | SAME AS RUN #89B | 16.0 | 4.0 | 1443 | 1324 | 0.92 | | | | 16 | 16 | 3840 | 5370 | 6.7 6.7 6.6 | 6.6 6.5 6.5 | --- | 6.6 6.6 6.5 | 14° | 94.8 | |

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ⁻² | RAPID MIX | | | FLOC | | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | |
|---------|-------|--------------|----------------|---|----------------|-------------------------------------|----------------------|--------|----------|----------------------|-------|----------|----------------|-----------------------------|------------------------------|--|--------------------------|--------------------------|--------------------------|--------------------------|---------|--------|---------------|--|
| | | | | | | | G' sec ⁻¹ | GT sec | Time sec | G' sec ⁻¹ | GT | Time min | Hours <0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | | | |
| 90 M | 9-5 | 0.35 | M | Alum = 3 CATFLOC T-1 = 2 mg/l A23 = 0.1 | 0.66 | 6.0 | 1443 | 1324 | 0.92 | | | | 18 | 18 | 6480 | 8253 | 6.7 6.7 6.6 | 6.6 6.5 6.5 | --- --- --- | 6.6 6.6 6.5 | 14° | 96.9 | | |
| | | | | | | | 1443 | 1324 | 0.92 | | | | | | | | | | | | | | | |
| 91 | 9-7 | 0.35 | M | SAME AS RUN #90M | 16.0 | 4.0 | SAME AS RUN #90M | | | | | | 16 | 17 | 3840 | 5370 | 6.7 6.6 6.5 | 6.7 6.7 6.5 | --- --- --- | 6.7 6.7 6.5 | 14° | 94.8 | | |
| 91 M | 9-7 | 0.35 | M | SAME AS RUN #90M | 0.88 | 8.0 | SAME AS RUN #90M | | | | | | 5 | 11 | 2400 | 9984 | SAME AS RUN #91 | | | | | 14° | 91.7 | |
| 92 | 10-3 | 0.38 | D | Alum = 10 Lime = 4.1 A23 = 0.1 | 16.0 | 4.0 | 1443 | 1324 | 0.92 | 69.7 | 40400 | 9.6 | 17 | 17 | 4080 | 5393 | 6.5 6.7 6.8 6.7 | 6.6 6.5 6.7 6.6 | 6.7 6.5 6.7 6.6 | 6.6 6.5 6.5 6.6 | 14° | 95.1 | | |
| 92 M | 10-3 | 0.38 | D | SAME AS RUN #92 | 0.44 | 4.0 | SAME AS RUN #92 | | | | | | 21 | 21 | 5040 | 5463 | SAME AS RUN #92 | | | | | 14° | 96.0 | |
| 93 | 10-5 | 0.38 | D | Alum = 10 Lime = 3.3 A23 = 0.07 | 16.0 | 4.0 | SAME AS RUN #92 | | | | | | 9 | 12 | 2160 | 5067 | 7.0 6.9 6.9 | 6.7 6.7 6.7 | 6.7 6.7 6.7 | 6.8 6.7 6.7 | 14° | 90.7 | Asbestos run. | |
| 93 M | 10-16 | 0.39 | D | SAME AS RUN #93 | 0.44 | 4.0 | SAME AS RUN #92 | | | | | | 16 | 19 | 3840 | 5370 | SAME AS RUN #93 | | | | | 14° | 94.8 | |

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| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ⁻² | RAPID MIX | | | FLOC | | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | |
|------|-------|--------------|----------------|--------------------------------------|----------------|-------------------------------------|---------------------|------|----------|---------------------|-------|----------|----------------|-----------------------------|------------------------------|--|-------------------|-------------------|-------------------|-------------------|---------|--------|----------|--|
| | | | | | | | G sec ⁻¹ | GT | Time sec | G sec ⁻¹ | GT | Time min | Hours <0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | | | |
| 94 | 10-11 | 0.39 | D | Alum = 10 Lime = 3.3 A23 = 0.1 | 16.0 | 4.0 | 1443 | 1324 | 0.92 | 69.7 | 40400 | 9.6 | 9 | 11 | 2160 | 5067 | 6.7 6.7 | 6.4 6.5 | 6.4 6.4 | 6.5 6.5 | 13° | 90.7 | | |
| 94 M | 10-11 | 0.39 | D | SAME AS RUN #94 | 0.44 | 4.0 | SAME AS RUN #94 | | | | | | 18 | 18 | 4320 | 5413 | SAME AS RUN #94 | | | | | 13° | 95.4 | |
| 95 | 10-12 | 0.39 | D | SAME AS RUN #94 | 16.0 | 4.0 | SAME AS RUN #94 | | | | | | 12 | 12 | 2880 | 5240 | 6.6 6.7 6.6 | 6.4 6.4 6.4 | 6.4 6.4 6.3 | 6.4 6.5 6.5 | 13° | 93.1 | | |
| 95 M | 10-12 | 0.39 | D | SAME AS RUN #94 | 0.66 | 6.0 | SAME AS RUN #94 | | | | | | 11 | 11 | 3960 | 8007 | SAME AS RUN #95 | | | | | 13° | 95.0 | |
| 96 | 10-16 | 0.39 | D | SAME AS RUN #94 | 16.0 | 4.0 | SAME AS RUN #94 | | | | | | 11 | 11 | 2640 | 5193 | 6.7 6.7 | 6.5 6.5 | 6.5 6.5 | 6.7 6.6 | 13° | 92.4 | | |
| 96 M | 10-16 | 0.39 | D | SAME AS RUN #94 | 0.88 | 8.0 | SAME AS RUN #94 | | | | | | 6 | 6 | 2880 | 10240 | SAME AS RUN #96 | | | | | 13° | 93.1 | |
| 97 | 10-17 | .40 | D | SAME AS RUN #94 | 16.0 | 4.0 | 1443 | 1324 | 0.92 | 28.6 | 16600 | 9.6 | 11 | 11 | 2160 | 5067 | 6.6 6.6 | 6.5 6.5 | 6.6 6.5 | 6.6 6.6 | 13° | 90.7 | | |

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ² | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | | |
|-------|-------|--------------|----------------|--------------------------------------|----------------|------------------------------------|---------------------|--------|---------------------|-----|----------------|----------------|-----------------------------|------------------------------|--|-------|------------------|------------|------------|------------|----------|------|--|
| | | | | | | | G sec ⁻¹ | GT sec | G sec ⁻¹ | GT | Time min | Hours <0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | R.M. | Floc | Fin | | | | |
| 97 M | 10-17 | 0.40 | D | Alum = 10 Lime = 3.3 A23 = 0.1 | 0.44 | 4.0 | 1443 | 1324 | 0.92 | 29 | 16600 | 9.6 | 18 | 18 | 4320 | 5413 | 6.6 6.6 | 6.5 6.5 | 6.6 6.5 | 6.6 6.6 | 13° | 95.4 | |
| 98 | 10-18 | 0.40 | D | SAME AS RUN #97M | 16.0 | 4.0 | SAME AS RUN #97M | | | | | | 11 | 11 | 2160 | 5067 | 6.4 | 6.5 | 6.5 | 6.4 | 13° | 90.7 | |
| 98 M | 10-18 | 0.40 | D | SAME AS RUN #97M | 0.66 | 6.0 | SAME AS RUN #97M | | | | | | 10 | 10 | 3600 | 7944 | SAME AS RUN #98 | | | | 13° | 94.4 | |
| 99 | 10-19 | 0.40 | D | SAME AS RUN #97M | 16.0 | 4.0 | SAME AS RUN #97M | | | | | | 12 | 12 | 2880 | 5240 | 6.7 6.7 | 6.7 6.7 | 6.8 6.7 | 6.8 6.8 | 13° | 93.1 | |
| 99 M | 10-19 | 0.40 | D | SAME AS RUN #97M | 0.88 | 8.0 | SAME AS RUN #97M | | | | | | 6 | 7 | 2880 | 10240 | SAME AS RUN #99 | | | | 13° | 93.1 | |
| 100 | 10-22 | 0.39 | D | SAME AS RUN #97M | 16.0 | 4.0 | 1443 | 1324 | 0.92 | 193 | 111000 | 9.6 | 12 | 12 | 2880 | 5240 | 6.9 6.7 | 6.7 6.5 | 6.7 6.5 | 6.7 6.6 | 12° | 93.1 | |
| 100 M | 10-22 | 0.39 | D | SAME AS RUN #97M | 0.44 | 4.0 | SAME AS RUN #100 | | | | | | 18 | 19 | 4320 | 5413 | SAME AS RUN #100 | | | | 12° | 95.4 | |

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| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ² | RAPID MIX | | | FLOC | | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS |
|-------|-------|--------------|----------------|--------------------------------------|----------------|------------------------------------|---------------------|------|----------|---------------------|--------|----------|----------------|-----------------------------|------------------------------|--|-------------------|-------------------|-------------------|-------------------|---------|--------|----------|
| | | | | | | | G sec ⁻¹ | GT | Time sec | G sec ⁻¹ | GT | Time min | Hours <0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | | |
| 101 | 10-23 | 0.39 | D | Alum = 10 Lime = 3.3 A23 = 0.1 | 16.0 | 4.0 | 1443 | 1324 | 0.92 | 193 | 111000 | 9.6 | 12 | 12 | 2880 | 5240 | 6.9 6.7 | 6.7 6.6 | 6.7 6.7 | 6.7 6.7 | 12.5° | 93.1 | |
| 101 M | 10-23 | 0.39 | D | SAME AS RUN #101 | 0.66 | 6.0 | SAME AS RUN #101 | | | | | | 11 | 11 | 3960 | 8007 | SAME AS RUN #101 | | | | 12.5° | 95.0 | |
| 102 | 10-24 | 0.40 | D | SAME AS RUN #101 | 16.0 | 4.0 | SAME AS RUN #101 | | | | | | 13 | 13 | 4200 | 5280 | 6.9 6.8 6.8 | 6.7 6.7 6.5 | 6.7 6.7 6.5 | 6.7 6.7 6.5 | 13° | 95.2 | |
| 102 M | 10-24 | 0.40 | D | SAME AS RUN #101 | 0.88 | 8.0 | SAME AS RUN #101 | | | | | | 6 | 6 | 2880 | 10240 | SAME AS RUN #102 | | | | 13° | 93.1 | |
| 103 | 10-30 | 0.45 | D | Alum = 8.5 Lime 1986N = 0.07 | 16.0 | 4.0 | 1443 | 1324 | 0.92 | 70 | 40400 | 9.6 | 13 | 13 | 4200 | 5280 | 6.8 6.8 | 6.7 6.7 | 6.6 6.6 | 6.7 6.6 | 12° | 95.2 | |
| 103 M | 10-30 | 0.45 | D | SAME AS RUN #103 | 0.44 | 4.0 | SAME AS RUN #103 | | | | | | 17 | 21 | 4080 | 5314 | SAME AS RUN #103 | | | | 12° | 95.1 | |
| 104 | 10-30 | 0.46 | D | SAME AS RUN #103 | 16.0 | 4.0 | SAME AS RUN #103 | | | | | | 15 | 15 | 3600 | 5344 | 6.8 6.7 6.7 | 6.7 6.7 6.5 | 6.6 6.6 6.5 | 6.7 6.7 6.5 | 12° | 94.4 | |

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| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ⁻² | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | | | |
|-------|-------|--------------|----------------|--|----------------|-------------------------------------|---------------------|------|----------|---------------------|----------------|----------|----------------|-----------------------------|------------------------------|--|-------------------|-------------------|-------------------|-------------------|----------|------|------|--|
| | | | | | | | G sec ⁻¹ | GT | Time sec | G sec ⁻¹ | GT | Time min | Hours <0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | | | |
| 104 M | 10-30 | 0.46 | D | Alum = 8.5 Lime = 3.3 1986N = 0.07 | 0.66 | 6.0 | 1443 | 1324 | 0.92 | 70 | 40400 | 9.6 | 12 | 1.2 | 4320 | 8060 | 6.8 6.7 6.7 | 6.7 6.7 6.5 | 6.6 6.6 6.5 | 6.7 6.7 6.5 | 12° | 95.4 | | |
| 105 | 11-1 | 0.48 | D | SAME AS RUN #104M | 16.0 | 4.0 | SAME AS RUN #104M | | | | | | 13 | 13 | 4200 | 5280 | 6.8 6.7 6.8 | 6.7 6.5 6.7 | 6.7 6.5 6.7 | 6.7 6.5 6.7 | 11° | 95.2 | | |
| 105 M | 11-1 | 0.48 | D | SAME AS RUN #104M | 0.88 | 8.0 | SAME AS RUN #104M | | | | | | 8 | 8 | 3840 | 10560 | SAME AS RUN #105 | | | | | 11° | 94.8 | |
| 106 | 11-5 | 0.60 | D | SAME AS RUN #104M | 16.0 | 4.0 | 1443 | 1324 | 0.92 | 28 | 16600 | 9.6 | 0 | 11 | 0 | 0 | 6.8 6.8 6.8 | 6.7 6.7 6.7 | 6.7 6.7 6.7 | 6.7 6.7 6.7 | 10° | 0 | | |
| 106 M | 11-5 | 0.60 | D | SAME AS RUN #104M | 0.44 | 4.0 | SAME AS RUN #106 | | | | | | 5 | 20 | 1200 | 4512 | SAME AS RUN #106 | | | | | 10° | 83.3 | |
| 107 | 11-6 | 0.61 | D | SAME AS RUN #104M | 16.0 | 4.0 | SAME AS RUN #106 | | | | | | 7 | 19 | 1680 | 4869 | 6.8 6.7 6.7 | 6.7 6.7 6.6 | 6.7 6.7 6.5 | 6.6 6.6 6.5 | 10° | 88.1 | | |
| 107 M | 11-6 | 0.61 | D | SAME AS RUN #104M | .66 | 6.0 | SAME AS RUN #106 | | | | | | 3 | 14 | 1080 | 6320 | SAME AS RUN #107 | | | | | 10° | 81.5 | |

125

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING $\frac{\text{gpm}}{\text{ft}^2}$ | RAPID MIX | | | FLOC | | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | |
|-------|-------|--------------|----------------|---|----------------|---|----------------------|------|----------|---------------------|-------|----------|-----------------|-----------------------------|---|---|--------------------------|--------------------------|--------------------------|--------------------------|---------|--------|---------------|---------------|
| | | | | | | | G' sec ⁻¹ | GT | Time sec | G sec ⁻¹ | GT | Time min | Hours ≤ 0.1 NTU | Hours to 8' or 10' Headloss | UFRV $\frac{\text{gal}}{\text{ft}^2 \text{ run}}$ | Net Water Produced $\frac{\text{gal}}{\text{ft}^2 24 \text{ hr}}$ | Raw | RM | Floc | Fin | | | | |
| -108 | 11-7 | 0.70 | D | Alum = 8.5 Lime = 2.9 1986N = 0.07 | 16.0 | 4.0 | 1443 | 1324 | 0.92 | 70 | 40400 | 9.6 | 18 | 18 | 4320 | 5413 | 6.9 6.8 6.8 | 6.9 6.8 6.7 | 6.8 6.7 6.7 | 6.8 6.7 6.7 | 10° | 95.4 | Asbestos run. | |
| 108 M | 11-7 | 0.70 | D | SAME AS RUN #108 | 0.55 | 5.0 | SAME AS RUN #108 | | | | | | 14 | 18 | 4200 | 6729 | SAME AS RUN #108 | | | | | 10° | 95.2 | Asbestos run. |
| 109 | 11-12 | 0.75 | D | Alum = 3 CATFLOC T-1 = 2 mg/l 1986N = 0.1 | 16.0 | 4.0 | SAME AS RUN #108 | | | | | | 17 | 26 | 4080 | 5314 | 6.9 6.8 6.9 6.8 | 6.7 6.7 6.7 6.7 | 6.7 6.7 6.7 6.7 | 6.7 6.7 6.7 6.7 | 10° | 95.1 | | |
| 109 M | 11-12 | 0.75 | D | SAME AS RUN #109 | 0.66 | 6.0 | SAME AS RUN #108 | | | | | | 8 | 17 | 2880 | 7770 | SAME AS RUN #109 | | | | | 10° | 93.1 | |
| 110 | 11-13 | 0.80 | D | Alum = 5 CATFLOC T-1 = 2 mg/l 1986N = 0.1 | 16.0 | 4.0 | 1440 | 1320 | .92 | 70 | 40740 | 9.7 | 19 | 19 to 4' headloss | 4560 | 5500 | 6.9 6.8 6.8 | 6.7 6.7 6.7 | 6.7 6.7 6.7 | 6.7 6.7 6.7 | 10° | 95.6 | | |
| 110 M | 11-13 | 0.80 | D | SAME AS RUN #110 | 0.66 | 6.0 | SAME AS RUN #110 | | | | | | 12 | 16 | 4298 | 8018 | SAME AS RUN #110 | | | | | 10° | 95.3 | |
| 111 | 11-16 | 0.80 | D | SAME AS RUN #110 | 16.0 | 4.0 | 1440 | 1320 | .92 | 70 | 40740 | 9.7 | 22 | 22 | 5280 | 5476 | 6.8 6.9 6.9 | 6.7 6.7 6.8 | 6.7 6.7 6.7 | 6.7 6.7 6.7 | 10° | 96.2 | Asbestos run. | |

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ⁻² | RAPID MIX | | | FLOC | | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | |
|-------|-------|--------------|----------------|--|----------------|-------------------------------------|----------------------|--------|----------|----------------------|-------|----------|----------------|-----------------------------|------------------------------|--|--------------------------|--------------------------|--------------------------|--------------------------|---------|---|---------------|--|
| | | | | | | | G' sec ⁻¹ | GT sec | Time sec | G' sec ⁻¹ | GT | Time min | Hours <0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | | | |
| 111 M | 11-16 | 0.80 | D | Alum = 5 CATFLOC T-1 = 2 mg/l 1986N = 0.1 | 0.55 | 5.0 | 1440 | 1320 | .92 | 70 | 40740 | 9.7 | 17 | 19 | 5080 | 6783 | 6.8 6.9 6.9 | 6.7 6.7 6.8 | 6.7 6.7 6.7 | 6.7 6.7 6.7 | 10° | 96.1 | Asbestos run. | |
| 112 | 11-20 | 0.81 | D | SAME AS RUN #111M | 16.0 | 4.0 | SAME AS RUN #111M | | | | | | 21 | 22 | 5040 | 5476 | 7.0 6.9 6.8 6.8 | 6.9 6.8 6.6 6.5 | 6.8 6.8 6.6 6.6 | 6.9 6.7 6.6 6.5 | 7.5° | 96.0 | | |
| 112 M | 11-20 | 0.81 | D | SAME AS RUN #111M | 0.66 | 6.0 | SAME AS RUN #111M | | | | | | 14 | 15 | 5040 | 8143 | SAME AS RUN #112 | | | | | 7.5° | 96.0 | |
| 113 | 12-21 | 4.8 | D | | | | | | | | | | | | | | | | | | | Varying conditions to determine ferric chloride dosage. | | |
| 114 | 12-22 | 3.8 | D | | | | | | | | | | | | | | | | | | | SAME AS RUN #113 | | |
| 115 | 12-25 | 3.6 | D | FeCl ₃ = 15 | 16.0 | 4.0 | SAME AS RUN #111M | | | | | | 0 | 19 | 0 | 0 | | | | | | 0 | | |
| 116 | 12-28 | 3.6 | D | FeCl ₃ = 6 | 16.0 | 4.0 | SAME AS RUN #111M | | | | | | 0 | 15 | 0 | 0 | | | | | | 4.5° | 0 | |

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING $\frac{\text{gpm}}{\text{ft}^2}$ | RAPID MIX | | | FLOC | | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS |
|-------|------|--------------|----------------|---|----------------|---|---------------------|------|----------|---------------------|-------|----------|----------------|-----------------------------|--|---|--------------------------|--------------------------|--------------------------|--------------------------|---------|--------|---------------|
| | | | | | | | G sec ⁻¹ | GT | Time sec | G sec ⁻¹ | GT | Time min | Hours <0.1 NTU | Hours to 8' or 10' Headloss | UFRV $\frac{\text{gal}/\text{ft}^2}{\text{run}}$ | Net Water Produced $\frac{\text{gal}/\text{ft}^2}{24 \text{ hr}}$ | Raw | RM | Floc | Fin | | | |
| 117 | 1-2 | 3.2 | D | FeCl ₃ = 6 | 16.0 | 4.0 | 1440 | 1320 | .92 | 70 | 40740 | 9.7 | 0 | 15 | 0 | 0 | | | | | 4.5° | 0 | |
| 118 | 1-9 | 3.2 | D | Alum = 10 Lime = 3.1 1986N = 0.07 | 16.0 | 4.0 | SAME AS RUN #117 | | | | | | 7 | 18 | 1680 | 4869 | 5.6 6.6 6.7 | 5.4 6.2 6.2 | 5.4 6.2 6.3 | 5.7 6.3 6.3 | 3° | 88.1 | |
| 118 M | 1-9 | 3.2 | D | SAME AS RUN #118 | 0.55 | 5.0 | SAME AS RUN #117 | | | | | | 7 | 24 | 2092 | 6230 | SAME AS RUN #118 | | | | 3° | 90.4 | |
| 119 | 1-10 | 3.1 | D | Alum = 7 Lime = 2.5 1986N = 0.07 | 16.0 | 4.0 | SAME AS RUN #117 | | | | | | 0 | 22 | 0 | 0 | 6.6 6.6 6.5 6.5 | 6.4 6.4 6.4 6.4 | 6.7 6.4 6.4 6.4 | 6.5 6.4 6.4 6.4 | 4° | 0 | |
| 119 M | 1-10 | 3.1 | D | SAME AS RUN #119 | 0.55 | 5.0 | SAME AS RUN #117 | | | | | | 0 | 37 | 0 | 0 | SAME AS RUN #119 | | | | 4° | 0 | |
| 120 | 1-11 | 3.3 | D | Alum = 10 Lime 1986N = 0.15 | 16.0 | 4.0 | 1440 | 1320 | 0.92 | 70 | 40740 | 9.7 | 13 | 13 | 3120 | 5240 | 6.7 6.7 | 6.5 6.5 | 6.5 6.5 | 6.6 6.6 | 4° | 93.6 | Asbestos run. |
| 120 M | 1-11 | 3.3 | D | SAME AS RUN #120 | 0.44 | 4.0 | SAME AS RUN #120 | | | | | | 17 | 27 | 4070 | 5379 | SAME AS RUN #120 | | | | 4° | 95.1 | Asbestos run. |

128

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ² | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | | |
|-------|------|--------------|----------------|--|--------------------------|------------------------------------|----------------------|--------|----------|---------------------|----------------|----------|-----------------|-----------------------------|------------------------------|--|--------------------------|--------------------------|--------------------------|--------------------------|----------|------|-----------------------------|
| | | | | | | | G' sec ⁻¹ | GT sec | Time sec | G sec ⁻¹ | GT min | Time min | Hours ≤ 0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | | |
| 121 | 1-15 | 2.6 | D | Alum = 10 Lime = 3.3 1986N = 0.15 | 16.0 | 4.0 | 1440 | 1320 | 0.92 | 70 | 40740 | 9.7 | 9 | 10 | 2160 | 5067 | 6.7 6.7 6.5 6.7 | 6.5 6.5 6.2 6.6 | 6.4 6.4 6.3 6.4 | 6.4 6.4 6.4 6.5 | 5° | 90.7 | |
| 121 M | 1-15 | 2.6 | D | SAME AS RUN #121 | 0.55 | 5.0 | SAME AS RUN #121 | | | | | | 15 | 24 | 4482 | 6732 | SAME AS RUN #121 | | | | 5° | 95.5 | |
| 122 | 1-16 | 2.5 | D | SAME AS RUN #121 | 16.0 | 4.0 | SAME AS RUN #121 | | | | | | 9 | 14 | 2160 | 5067 | 6.8 6.7 6.4 | 6.6 6.6 6.3 | 6.5 6.6 6.4 | 6.5 6.5 6.3 | 5° | 90.7 | Shut down at 6' headloss. |
| 122 M | 1-16 | 2.5 | D | SAME AS RUN #121 | 0.66 | 6.0 | SAME AS RUN #121 | | | | | | 10 | 15 | 3582 | 7944 | SAME AS RUN #122 | | | | 5° | 94.4 | Shut down at 7.75' headloss |
| 123 | 1-17 | 2.5 | D | Alum = 10 Lime = 3.3 1986N = 0.25 | 16.0 | 4.0 | SAME AS RUN #121 | | | | | | 14 | 14 | 3360 | 5314 | 6.7 6.7 | 6.3 6.3 | 6.3 6.3 | 6.5 6.4 | 4° | 94.1 | |
| 123 M | 1-17 | 2.5 | D | Ave. = 0.64 Max. = 0.66 SAME AS RUN #123 | Ave. = 5.8 Max. = 6.0 | SAME AS RUN #121 | | | | | | | 17 | 18 | 5905 | 7930 | SAME AS RUN #123 | | | | 4° | 96.6 | |
| 124 | 1-22 | 2.3 | D | SAME AS RUN #123 | 16.0 | 4.0 | SAME AS RUN #121 | | | | | | 14 | 14 | 3360 | 5314 | 6.6 6.6 6.3 6.7 | 6.3 6.2 6.1 6.3 | 6.3 6.3 6.1 6.3 | 6.6 6.6 6.0 6.3 | 5° | 94.1 | |

129

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ² | RAPID MIX | | | FLOC | | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS |
|-------|------|--------------|----------------|---|----------------------------|------------------------------------|---------------------|------|----------|---------------------|-------|----------|----------------|-----------------------------|------------------------------|--|--------------------------|--------------------------|--------------------------|--------------------------|---------|--------|----------|
| | | | | | | | G sec ⁻¹ | GT | Time sec | G sec ⁻¹ | GT | Time min | Hours ≤0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | | |
| 124 M | 1-22 | 2.3 | D | Alum = 10 Lime = 3.3 1986N = 0.25 | Ave. = 0.57 Max. = 0.66 | Ave. = 5.2 Max. = 6.0 | 1440 | 1320 | 0.92 | 70 | 40740 | 9.7 | 21 | 21 | 6500 | 7100 | 6.6 6.6 6.3 6.7 | 6.3 6.2 6.1 6.3 | 6.3 6.3 6.1 6.3 | 6.6 6.6 6.0 6.3 | 5° | 96.9 | |
| 125 | 1-23 | 2.3 | D | SAME AS RUN #124M | 16.0 | 4.0 | SAME AS RUN #124M | | | | | | 13 | 17 | 3120 | 5280 | 6.6 6.4 6.7 | 6.6 6.8 6.4 | 6.5 6.2 6.2 | 6.6 6.2 6.4 | 5° | 93.6 | |
| 125 M | 1-23 | 2.3 | D | SAME AS RUN #124M | Ave. = 0.49 Max. = 0.77 | Ave. = 4.5 Max. = 7.0 | SAME AS RUN #124M | | | | | | 19 | 24 | 5152 | 6171 | SAME AS RUN #125 | | | | 5° | 96.1 | |
| 126 | 1-24 | 2.2 | D | SAME AS RUN #124M | 16.0 | 4.0 | SAME AS RUN #124M | | | | | | 0 | 20 | 0 | 0 | 6.7 6.7 6.6 | 6.4 6.4 6.4 | 6.4 6.4 6.5 | 6.4 6.4 6.4 | 5° | 0 | |
| 126 M | 1-24 | 2.2 | D | SAME AS RUN #124M | Ave. = 0.65 Max. = 0.89 | Ave. = 5.9 Max. = 8.0 | SAME AS RUN #124M | | | | | | 0 | 23 | 0 | 0 | SAME AS RUN #126 | | | | 5° | 0 | |
| 127 | 1-29 | 2.1 | D | SAME AS RUN #124M | 16.0 | 4.0 | SAME AS RUN #124M | | | | | | 11 | 15 | 2640 | 5192 | 6.9 6.9 6.4 | 6.7 6.7 6.5 | 6.5 6.6 6.4 | 6.4 6.4 6.4 | 5° | 92.4 | |
| 127 M | 1-29 | 2.1 | D | SAME AS RUN #124M | Ave. = 0.74 Max. = 0.77 | Ave. = 6.8 Max. = 7.0 | SAME AS RUN #124M | | | | | | 10 | 14 | 4080 | 9072 | SAME AS RUN #127 | | | | 5° | 95.1 | |

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING Epm ft ⁻² | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | | |
|-------|------|--------------|----------------|---|----------------------------|-------------------------------------|----------------------|--------|----------|----------------------|----------------|----------|----------------|-----------------------------|------------------------------|--|--------------------------|--------------------------|-------------------|--------------------------|----------|------|---|
| | | | | | | | G' sec ⁻¹ | GT sec | Time sec | G' sec ⁻¹ | GT | Time min | Hours <0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | | |
| 128 | 1-29 | 2.0 | D | Alum = 10 Lime = 3.3 1986N = 0.25 | 16.0 | 4.0 | 1440 | 1320 | 0.92 | 70 | 40740 | 9.7 | 13 | 13 | 3120 | 5280 | 6.7 6.6 6.6 | 6.6 6.6 6.3 | 6.6 6.6 6.4 | 6.4 6.5 6.5 | 5° | 93.6 | |
| 128 M | 1-29 | 2.0 | D | SAME AS RUN #128 | Ave. = 0.71 Max. = 0.88 | Ave. = 6.5 Max. = 8.0 | SAME AS RUN #128 | | | | | | 16 | 16 | 6240 | 8914 | SAME AS RUN #128 | | | | 5° | 96.8 | Loading set at 6.5 gpm/ft ² and allowed to drop off as run progressed. |
| 129 | 1-30 | 1.9 | D | SAME AS RUN #128 | 16.0 | 4.0 | 1440 | 1320 | 0.92 | --- | ---- | --- | 0 | 14 to 4.0' headloss | 0 | 0 | 6.8 6.7 6.8 | 6.7 6.6 6.7 | --- | 6.7 6.6 6.6 | 4° | 0 | |
| 129 M | 1-30 | 1.9 | D | SAME AS RUN #128 | 0.67 | 6.1 | SAME AS RUN #129 | | | | | | 0 | 14 to 4.25' headloss | 0 | 0 | SAME AS RUN #129 | | | | 4° | 0 | |
| 130 | 1-31 | 1.8 | D | SAME AS RUN #128 | 16.0 | 4.0 | SAME AS RUN #129 | | | | | | 9 | 14 | 2160 | 5067 | 6.7 6.7 | 6.5 6.4 | --- | 6.4 6.4 | 4° | 90.7 | |
| 130 M | 1-31 | 1.8 | D | SAME AS RUN #128 | 0.66 | 6.0 | SAME AS RUN #129 | | | | | | 0 | 32 | 0 | 0 | SAME AS RUN #130 | | | | 4° | 0 | Turbidity >0.1 NTU throughout run. |
| 131 | 2-5 | 1.8 | D | SAME AS RUN #128 | 16.0 | 4.0 | SAME AS RUN #129 | | | | | | 9 | 15 | 2160 | 5067 | 6.8 6.8 6.6 6.6 | 6.6 6.6 6.5 6.5 | --- | 6.4 6.4 6.4 6.5 | 5° | 90.7 | |

131

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft^2 | RAPID MIX | | | FLOC | | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS |
|-------|------|--------------|----------------|---|----------------|----------------------------------|---------------------|------|----------|---------------------|-------|----------|-----------------|-----------------------------|------------------------------|--|--------------------------|--------------------------|--------------------------|--------------------------|---------|--------|----------|
| | | | | | | | G sec ⁻¹ | GT | Time sec | G sec ⁻¹ | GT | Time min | Hours ≤ 0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | | |
| 131 M | 2-5 | 1.8 | D | Alum = 10 Lime = 3.3 1986N = 0.25 | 0.44 | 4.0 | 1440 | 1320 | 0.92 | --- | ---- | --- | 8 | 19 | 1915 | 4966 | 6.8 6.8 6.6 6.6 | 6.6 6.6 6.5 6.5 | --- | 6.4 6.4 6.4 6.5 | 5° | 89.6 | |
| 132 | 2-6 | 1.7 | D | SAME AS RUN #131M | 16.0 | 4.0 | SAME AS RUN #131M | | | | | | 9 | 14 | 2160 | 5067 | 6.7 6.6 6.6 6.7 | 6.6 6.6 6.5 6.5 | --- | 6.6 6.6 6.5 6.4 | 5° | 90.7 | |
| 132 M | 2-7 | 1.7 | D | SAME AS RUN #131M | 0.55 | 5.0 | SAME AS RUN #131M | | | | | | 5 | 26 | 1500 | 5852 | SAME AS RUN #132 | | | | 5° | 86.7 | |
| 133 | 2-7 | 1.8 | D | SAME AS RUN #131M | 16.0 | 4.0 | SAME AS RUN #131M | | | | | | 10 | 18 | 2400 | 5136 | 6.7 6.7 6.8 6.8 | 6.6 6.6 6.7 6.7 | --- | 6.7 6.5 6.8 6.8 | 6° | 91.7 | |
| 133 M | 2-7 | 1.8 | D | SAME AS RUN #131M | 0.66 | 6.0 | SAME AS RUN #131M | | | | | | 0 | 27 | 0 | 0 | SAME AS RUN #133 | | | | 6° | 0 | |
| 134 | 2-12 | 1.7 | D | SAME AS RUN #131M | 16.0 | 4.0 | 1440 | 1320 | 0.92 | 70 | 40740 | 9.7 | 14 | 14 | 3360 | 5314 | 6.7 6.7 6.6 6.7 | 6.6 6.6 6.5 6.5 | 6.6 6.6 6.6 6.5 | 6.6 6.6 6.6 6.5 | 5° | 94.1 | |
| 134 M | 2-12 | 1.7 | D | SAME AS RUN #131M | 0.44 | 4.0 | SAME AS RUN #134 | | | | | | 25 | 26 | 5985 | 5496 | SAME AS RUN #134 | | | | 5° | 96.7 | |

132

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING $\frac{\text{gpm}}{\text{ft}^2}$ | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | | |
|--------|------|--------------|----------------|--|----------------------------|---|----------------------|--------|----------|----------------------|----------------|----------|----------------|-----------------------------|---|---|-------------------|-------------------|-------------------|-------------------|----------|------|---------------|
| | | | | | | | G' sec ⁻¹ | GT sec | Time sec | G' sec ⁻¹ | GT | Time min | Hours <0.1 NTU | Hours to 8' or 10' Headloss | UFRV $\frac{\text{gal}}{\text{ft}^2 \text{ run}}$ | Net Water Produced $\frac{\text{gal}}{\text{ft}^2 \text{ 24 hr}}$ | Raw | RM | Floc | Fin | | | |
| 135 | 2-14 | 1.6 | D. | Alum = 12 Lime = 3.3 1986N = 0.2 | 16.0 | 4.0 | 1440 | 1320 | 0.92 | 70 | 40740 | 9.7 | 14 | 15 | 3360 | 5314 | 6.7 6.6 6.7 | 6.6 6.6 6.2 | 6.6 6.6 6.2 | 6.5 6.5 6.2 | 5° | 94.1 | Asbestos run. |
| 135 M | 2-14 | 1.6 | D | SAME AS RUN #135 | 0.44 | 4.0 | SAME AS RUN #135 | | | | | | 23 | 24 | 5506 | 5474 | SAME AS RUN #135 | | | | 5° | 96.3 | Asbestos run. |
| 136 | 2-15 | 1.6 | D | Alum = 10 Lime = 3.3 1986N = 0.2 | 16.0 | 4.0 | SAME AS RUN #135 | | | | | | 16 | 16 | 3840 | 5370 | 6.8 6.8 6.7 | 6.7 6.7 6.7 | 6.6 6.6 6.6 | 6.6 6.6 6.6 | 5° | 94.8 | |
| 136 MM | 2-15 | 1.6 | D | SAME AS RUN #136 | 0.55 | 5.0 | SAME AS RUN #135 | | | | | | 16 | 16 | 4781 | 6759 | SAME AS RUN #136 | | | | 5° | 95.8 | |
| 137 | 2-16 | 1.6 | D | SAME AS RUN #136 | 16.0 | 4.0 | SAME AS RUN #135 | | | | | | 16 | 16 | 3840 | 5370 | 6.8 6.8 6.8 | 6.6 6.6 6.6 | 6.6 6.6 6.6 | 6.6 6.6 6.6 | 5° | 94.8 | |
| 137 MM | 2-16 | 1.6 | D | SAME AS RUN #136 | Ave. = 0.62 Max. = 0.66 | Ave. = 5.6 Max. = 6.0 | SAME AS RUN #135 | | | | | | 22 | 23 | 7405 | 7768 | SAME AS RUN #137 | | | | 5° | 97.3 | |
| 138 | 2-21 | 1.5 | D | SAME AS RUN #136 | 16.0 | 4.0 | SAME AS RUN #135 | | | | | | 13 | 13 | 3120 | 5280 | 6.7 6.6 | 6.4 6.4 | 6.4 6.4 | 6.4 6.5 | 5° | 93.6 | |

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ² | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | TEMP °C | EFF. % | COMMENTS | | | |
|--------|------|--------------|----------------|---|--------------------------------|------------------------------------|---------------------|------|----------|---------------------|----------------|----------|-----------------|-----------------------------|------------------------------|--|-------------------|-------------------|-------------------|-------------------|----|------|--|
| | | | | | | | G sec ⁻¹ | GT | Time sec | G sec ⁻¹ | GT | Time min | Hours ≤ 0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/fr ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | | |
| 138 MM | 2-21 | 1.5 | D | Alum = 10 Lime = 3.3 1986N = 0.2 | Ave. = 0.73 Max. = 0.77 | Ave. = 6.7 Max. = 7.0 | 1440 | 1320 | 0.92 | 70 | 40740 | 9.7 | 10 | 13 | 4020 | 8930 | 6.7 6.6 | 6.4 6.4 | 6.4 6.4 | 6.4 6.5 | 5° | 95.0 | |
| 138 FC | 2-21 | 1.5 | D | SAME AS RUN #138M | Ave. = 0.71 Max. = 0.77 | Ave. = 6.5 Max. = 7.0 | SAME AS RUN #138M | | | | | | 12 | 13 | 4680 | 8760 | SAME AS RUN #138M | | 5° | 95.7 | | | |
| 139 | 2-23 | 1.4 | D | Alum = 10 Lime = 3.3 1986N = 0.25 | 16.0 | 4.0 | SAME AS RUN #138M | | | | | | 12 | 12 | 2880 | 5240 | 6.6 6.6 | 6.5 6.5 | 6.5 6.5 | 6.5 6.5 | 6° | 93.1 | |
| 139 MM | 2-23 | 1.4 | D | SAME AS RUN #139 | Ave. = 0.71 Max. = 0.77 | Ave. = 6.5 Max. = 7.0 | SAME AS RUN #138M | | | | | | 11 | 13 | 4303 | 8739 | SAME AS RUN #139 | | 6° | 95.4 | | | |
| 139 FC | 2-23 | 1.4 | D | SAME AS RUN #139 | Ave. = 0.71 Max. = 0.77 | Ave. = 6.5 Max. = 7.0 | SAME AS RUN #138M | | | | | | 10 | 10 | 3900 | 8640 | SAME AS RUN #139 | | 6° | 94.9 | | | |
| 139 CC | 2-23 | 1.4 | D | SAME AS RUN #139 | Ave. = 0.68 Max. = 0.77 | Ave. = 6.2 Max. = 7.0 | SAME AS RUN #138M | | | | | | 13 | 13 | 4875 | 8400 | SAME AS RUN #139 | | 6° | 95.9 | | | |
| 140 | 2-25 | 1.4 | D | Alum = 10 Lime = 3.3 1986N = 0.25 | 16.0 | 4.0 | SAME AS RUN #138M | | | | | | 12 | 12 | 2880 | 5240 | 6.7 6.7 6.3 | 6.6 6.6 6.0 | 6.6 6.6 6.1 | 6.6 6.6 6.1 | 5° | 93.1 | |

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING $\frac{\text{gpm}}{\text{ft}^2}$ | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | TEMP OC | EFF. % | COMMENTS | | | |
|--------|------|--------------|----------------|--------------------------------|----------------------------|---|----------------------|------|----------|---------------------|----------------|----------|----------------|-----------------------------|------------------------------|--|--------------------|-------------------|-------------------|-------------------|----|------|--|
| | | | | | | | G' sec ⁻¹ | GT | Time sec | G sec ⁻¹ | GT | Time min | Hours <0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced $\frac{\text{gal}}{\text{ft}^2 \text{ hr}}$ | Raw | RM | Floc | Fin | | | |
| 140 MM | 2-25 | 1.4 | D | Alum = 10 Lime 1986N = 0.25 | Ave. = 0.79 Max. = 0.88 | Ave. = 7.2 Max. = 8.0 | 1440 | 1320 | 0.92 | 70 | 40740 | 9.7 | 12 | 12 | 5184 | 9440 | 6.7 6.7 6.3 | 6.6 6.6 6.0 | 6.6 6.6 6.1 | 6.6 6.6 6.1 | 5° | 96.1 | |
| 140 FC | 2-25 | 1.4 | D | SAME AS RUN #140MM | Ave. = 0.81 Max. = 0.88 | Ave. = 7.4 Max. = 8.0 | SAME AS RUN #140MM | | | | | | 10 | 10 | 4440 | 9888 | SAME AS RUN #140MM | | | | 5° | 95.5 | |
| 140 CC | 2-25 | 1.4 | D | SAME AS RUN #140MM | Ave. = 0.80 Max. = 0.88 | Ave. = 7.3 Max. = 8.0 | SAME AS RUN #140MM | | | | | | 13 | 13 | 5690 | 9872 | SAME AS RUN #140MM | | | | 5° | 96.5 | |
| 141 | 2-27 | 1.4 | D | SAME AS RUN #140MM | 16.0 | 4.0 | SAME AS RUN #140MM | | | | | | 12 | 12 | 2880 | 5240 | 6.7 6.7 6.4 | 6.6 6.5 6.3 | 6.6 6.4 6.3 | 6.6 6.4 6.3 | 5° | 93.1 | |
| 141 MM | 2-27 | 1.4 | D | SAME AS RUN #140MM | Ave. = 0.65 Max. = 0.66 | Ave. = 5.9 Max. = 6.0 | SAME AS RUN #140MM | | | | | | 16 | 16 | 5568 | 7902 | SAME AS RUN #141 | | | | 5° | 96.4 | |
| 141 FC | 2-27 | 1.4 | D | SAME AS RUN #140MM | Ave. = 0.62 Max. = 0.66 | Ave. = 5.7 Max. = 6.0 | SAME AS RUN #140MM | | | | | | 13 | 13 | 4446 | 7608 | SAME AS RUN #141 | | | | 5° | 95.5 | |
| 141 CC | 2-27 | 1.4 | D | SAME AS RUN #140MM | 0.66 | 6.0 | SAME AS RUN #140MM | | | | | | 16 | 16 | 5760 | 8190 | SAME AS RUN #141 | | | | 5° | 96.5 | |

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ² | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | | |
|--------|------|--------------|----------------|---|----------------------------|------------------------------------|----------------------|------|----------|---------------------|----------------|----------|-----------------|-----------------------------|------------------------------|--|--------------------------|--------------------------|--------------------------|--------------------------|----------|------|--|
| | | | | | | | G' sec ⁻¹ | GT | Time sec | G sec ⁻¹ | GT | Time min | Hours ≤ 0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | | |
| 142 | 3-8 | 1.3 | D | Alum = 10 Lime = 3.3 1986N = 0.25 | 16.0 | 4.0 | 1440 | 1320 | 0.92 | 70 | 40740 | 9.7 | 15 | 15 | 3600 | 5344 | 6.7 6.7 6.7 6.7 | 6.6 6.6 6.6 6.6 | 6.5 6.5 6.5 6.5 | 6.4 6.5 6.4 6.5 | 5° | 94.4 | |
| 142 MM | 3-8 | 1.3 | D | SAME AS RUN #142 | Ave. = 0.43 Max. = 0.44 | Ave. = 3.9 Max. = 4.0 | SAME AS RUN #142 | | | | | | 26 | 26 | 6084 | 5356 | SAME AS RUN #142 | | | | 5° | 96.7 | |
| 142 FC | 3-8 | 1.3 | D | SAME AS RUN #142 | Ave. = 0.39 Max. = 0.44 | Ave. = 3.6 Max. = 4.0 | SAME AS RUN #142 | | | | | | 26 | 26 | 5616 | 4928 | SAME AS RUN #142 | | | | 5° | 96.4 | |
| 142 CC | 3-8 | 1.3 | D | SAME AS RUN #142 | Ave. = 0.40 Max. = 0.44 | Ave. = 3.7 Max. = 4.0 | SAME AS RUN #142 | | | | | | 24 | 26 | 5328 | 5068 | SAME AS RUN #142 | | | | 5° | 96.2 | |
| 143 | 3-12 | 1.2 | D | SAME AS RUN #142 | 16.0 | 4.0 | SAME AS RUN #142 | | | | | | 14 | 14 | 3360 | 5214 | 6.7 6.3 6.7 | 6.6 6.3 6.5 | 6.6 6.4 6.4 | 6.5 6.4 6.4 | 6.5° | 94.1 | |
| 143 MM | 3-12 | 1.2 | D | SAME AS RUN #142 | Ave. = 0.54 Max. = 0.56 | Ave. = 4.9 Max. = 5.1 | SAME AS RUN #142 | | | | | | 8 | 22 | 2352 | 6236 | SAME AS RUN #143 | | | | 6.4° | 91.5 | |
| 143 FC | 2-27 | 1.4 | D | SAME AS RUN #142 | Ave. = 0.39 Max. = 0.56 | Ave. = 3.6 Max. = 5.1 | SAME AS RUN #142 | | | | | | 20 | 33 | 4320 | 4879 | 6.7 6.7 6.4 | 6.6 6.5 6.3 | 6.6 6.4 6.3 | 6.6 6.4 6.3 | 5° | 95.4 | |

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ⁻² | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | | |
|--------|------|--------------|----------------|---|----------------------------|-------------------------------------|---------------------|--------|----------|---------------------|----------------|----------|-----------------|-----------------------------|-------------------------------|---|-------------------|-------------------|-------------------|-------------------|----------|------|--|
| | | | | | | | G sec ⁻¹ | GT sec | Time sec | G sec ⁻¹ | GT | Time min | Hours ≤ 0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ⁻² run | Net Water Produced gal/ft ⁻² 24 hr | Raw | RM | Floc | Fin | | | |
| 143 CC | 2-27 | 1.4 | D | Alum = 10 Lime = 3.3 1986N = 0.25 | Ave. = 0.51 Max. = 0.56 | Ave. = 4.7 Max. = 5.1 | 1440 | 1320 | 0.92 | 70 | 40740 | 9.7 | 20 | 24 | 5640 | 6542 | 6.7 6.7 6.4 | 6.6 6.5 6.3 | 6.6 6.4 6.3 | 6.6 6.4 6.3 | 5° | 96.4 | |
| 144 | 3-13 | 1.2 | D | Alum = 3 CATFLOC T-1 = 2 mg/l CA233 = 0.2 | 16.0 | 4.0 | SAME AS RUN #143CC | | | | | | 19 | 20 | 4560 | 5432 | 6.6 6.5 6.7 | 6.2 6.1 6.4 | 6.2 6.1 6.4 | 6.4 6.1 6.4 | 5.5° | 95.6 | |
| 144 MM | 3-13 | 1.2 | D | SAME AS RUN #144 | Ave. = 0.42 Max. = 0.44 | Ave. = 3.8 Max. = 4.0 | SAME AS RUN #143CC | | | | | | 30 | 31 | 6840 | 5266 | SAME AS RUN #144 | | | | 5.5° | 97.1 | |
| 144 FC | 3-13 | 1.2 | D | SAME AS RUN #144 | Ave. = 0.37 Max. = 0.44 | Ave. = 3.4 Max. = 4.0 | SAME AS RUN #143CC | | | | | | 31 | 32 | 6324 | 4700 | SAME AS RUN #144 | | | | 5.5° | 96.8 | |
| 144 CC | 3-13 | 1.2 | D | SAME AS RUN #144 | Ave. = 0.37 Max. = 0.44 | Ave. = 3.5 Max. = 4.0 | SAME AS RUN #143CC | | | | | | 32 | 32 | 6720 | 4851 | SAME AS RUN #144 | | | | 5.5° | 97.0 | |
| 145 | 3-19 | 1.1 | D | SAME AS RUN #144 | 16.0 | 4.0 | SAME AS RUN #143CC | | | | | | 12 | 12 | 2880 | 5240 | 6.6 6.5 6.7 | 6.6 6.6 6.6 | 6.5 6.5 6.6 | 6.5 6.5 6.6 | 7° | 93.1 | |
| 145 MM | 3-19 | 1.1 | D | SAME AS RUN #144 | Ave. = 0.59 Max. = 0.66 | Ave. = 5.4 Max. = 6.0 | SAME AS RUN #143CC | | | | | | 16 | 28 | 5184 | 7355 | SAME AS RUN #145 | | | | 7° | 96.1 | |

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ² | RAPID MIX | | | FLOC | | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS |
|--------|------|--------------|----------------|--|----------------------------|------------------------------------|---------------------|------|----------|---------------------|-------|----------|----------------|-----------------------------|------------------------------|--|--------------------|-------------------|-------------------|-------------------|---------|--------|--|
| | | | | | | | G sec ⁻¹ | GT | Time sec | G sec ⁻¹ | GT | Time min | Hours <0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | | |
| 145 FC | 3-19 | 1.1 | D | Alum = 3 CATFLOC T-1 = 2 mg/l CA233 = 0.2 | Ave. = 0.49 Max. = 0.66 | Ave. = 4.5 Max. = 6.0 | 1440 | 1320 | 0.92 | 70 | 40740 | 9.7 | 25 | 25 | 6750 | 6223 | 6.6 6.5 6.7 | 6.6 6.6 6.6 | 6.5 6.6 6.6 | 6.5 6.5 6.5 | 7° | 97.0 | |
| 145 CC | 3-19 | 1.1 | D | SAME AS RUN #145FC | | Ave. = 0.52 Max. = 0.66 | SAME AS RUN #145FC | | | | | | 25 | 26 | 7050 | 6508 | SAME AS RUN #145FC | | | | 7° | 97.2 | |
| 146 | 3-21 | 1.0 | D | SAME AS RUN #145FC | 16.0 | 4.0 | SAME AS RUN #145FC | | | | | | 8 | 13 | 1915 | 5966 | 6.7 6.7 | 6.6 6.5 | 6.6 6.5 | 6.5 6.5 | 7° | 89.6 | |
| 146 MM | 3-21 | 1.0 | D | SAME AS RUN #145FC | 0.89 | | SAME AS RUN #145FC | | | | | | see comments | | | | SAME AS RUN #146 | | | | 7° | | Insufficient data due to chemicals running out |
| 146 FC | 3-21 | 1.0 | D | SAME AS RUN #145FC | 0.89 | | SAME AS RUN #145FC | | | | | | see comments | | | | SAME AS RUN #146 | | | | 7° | | SAME AS RUN #146 MM. |
| 146 CC | 3-21 | 1.0 | D | SAME AS RUN #145FC | 0.89 | | SAME AS RUN #145FC | | | | | | see comments | | | | SAME AS RUN #146 | | | | 7° | | SAME AS RUN #146 MM. |
| 147 | 3-27 | 0.98 | D | SAME AS RUN #145FC | 16.0 | 4.0 | SAME AS RUN #145FC | | | | | | 11 | 12 | 2640 | 5192 | 6.9 6.8 | 6.5 6.4 | 6.5 6.4 | 6.5 6.5 | 7° | 92.4 | |

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING $\frac{\text{gpm}}{\text{ft}^2}$ | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | | |
|--------|------|--------------|----------------|---|----------------------------|---|----------------------|--------|----------------------|----|----------------|------------------|-----------------------------|------------------------------|--|-------|--------------------|-------------------|-------------------|-------------------|----------|------|--|
| | | | | | | | G' sec ⁻¹ | GT sec | G' sec ⁻¹ | GT | Time min | Hours to 0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | | | |
| 147 MM | 3-27 | 0.98 | D | Alum = 3 CATFLOC T-1 = 2 mg/l CA233 = 0.2 | Ave. = 0.85 Max. = 0.89 | Ave. = 7.7 Max. = 8.1 | 1440 | 1320 | 0.92 | 70 | 40740 | 9.7 | 13 | 22 | 6060 | 10520 | 6.9 6.8 | 6.5 6.4 | 6.5 6.4 | 6.5 6.5 | 7° | 96.7 | |
| 147 FC | 3-27 | 0.98 | D | SAME AS RUN #147MM | Ave. = 0.70 Max. = 0.89 | Ave. = 6.3 Max. = 8.1 | SAME AS RUN #147MM | | | | | | 16 | 18 | 6048 | 8630 | SAME AS RUN #147MM | | | | 7° | 96.7 | |
| 147 CC | 3-27 | 0.98 | D | SAME AS RUN #147MM | Ave. = 0.67 Max. = 0.89 | Ave. = 6.1 Max. = 8.1 | SAME AS RUN #147MM | | | | | | 21 | 22 | 7686 | 8451 | SAME AS RUN #147MM | | | | 7° | 97.4 | |
| 148 | 3-29 | 0.95 | D | SAME AS RUN #147MM | 16.0 | 4.0 | SAME AS RUN #147MM | | | | | | 14 | 14 | 3360 | 5314 | 6.7 6.7 6.7 | 6.6 6.6 6.6 | 6.5 6.5 6.5 | 6.5 6.5 6.5 | 6° | 94.1 | |
| 148 MM | 3-29 | 0.95 | D | SAME AS RUN #147MM | 0.79 | 7.2 | SAME AS RUN #147MM | | | | | | 0 | 20 | 0 | 0 | SAME AS RUN #148 | | | | 6° | 0 | |
| 148 FC | 3-29 | 0.95 | D | SAME AS RUN #147MM | 0.79 | 7.2 | SAME AS RUN #147MM | | | | | | 0 | 14 | 0 | 0 | SAME AS RUN #148 | | | | 6° | 0 | |
| 148 CC | 3-29 | 0.95 | D | SAME AS RUN #147MM | 0.79 | 7.2 | SAME AS RUN #147MM | | | | | | 0 | 18 | 0 | 0 | SAME AS RUN #148 | | | | 6° | 0 | |

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| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING $\frac{gpm}{ft^2}$ | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | | | |
|-----|------|--------------|----------------|--------------------------------|----------------|-----------------------------------|----------------------|------|----------|----------------------|----------------|----------|----------------|-----------------------------|------------------------------|--|------------------|-----|---------|--------|----------|------|----------------------|---------------------|
| | | | | | | | G' sec ⁻¹ | GT | Time sec | G' sec ⁻¹ | GT | Time min | Hours ≤0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 20 hr | Raw | RM | Floc | Fin | | | | |
| 149 | 4-7 | 0.8 to 15 | D | Alum = 10 Lime 1986N = 0.25 | 16.0 | 4.0 | 1440 | 1320 | 0.92 | 70 | 40740 | 9.7 | ≤0.5 | 5 | 1200 | 4512 | 6/6 | 6.7 | 6.7 | 6.6 | 6° | 83.3 | High turbidity runs | |
| 150 | 4-12 | 4.0 to 13 | D | SAME AS RUN #149 | 16.0 | 4.0 | SAME AS RUN #149 | | | | | | 7 hr | 7 | 1680 | 4869 | 7.2 | 7.0 | 7.0 | 7.0 | 8.5° | 88.1 | High turbidity runs. | |
| 151 | 4-14 | 5.0 | D | SAME AS RUN #149 | 8.8 | 2.2 | SAME AS RUN #149 | | | | | | 8 hr | 8 | 924 | 2469 | 6.5 | 6.6 | 6.4 | 6.5 | 8.5° | 78.4 | High turbidity run. | |
| 151 | 4-14 | 5.0 | D | SAME AS RUN #149 | 0.43 | 3.9 | SAME AS RUN #149 | | | | | | 7 hr | 12 | 1655 | 4785 | SAME AS RUN #151 | | | | | 8.5° | 87.9 | High turbidity run. |
| 151 | 4-14 | 5.0 | D | SAME AS RUN #149 | 0.46 | 4.2 | SAME AS RUN #149 | | | | | | 7 hr | 10 | 1743 | 5077 | SAME AS RUN #151 | | | | | 8.5° | 88.5 | High turbidity run. |
| 151 | 4-14 | 5.0 | D | SAME AS RUN #149 | 0.45 | 4.1 | SAME AS RUN #149 | | | | | | 10 hr | 10 | 2442 | 5234 | SAME AS RUN #151 | | | | | 8.5° | 91.8 | High turbidity run. |
| 152 | 4-21 | 5.7 | D | SAME AS RUN #149 | 16.0 | 4.0 | SAME AS RUN #149 | | | | | | 10 | 16 | 2400 | 5136 | 6.5 | 6.6 | 6.5 | 6.5 | 8.5° | 91.7 | | |

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ² | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | | |
|--------|------|--------------|----------------|--------------------------------|---------------------------|------------------------------------|---------------------|------|----------|---------------------|----------------|----------|----------------|-----------------------------|------------------------------|--|--------------------|-------------------|-------------------|-------------------|----------|------|--|
| | | | | | | | G sec ⁻¹ | GT | Time sec | G sec ⁻¹ | GT | Time min | Hours <0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 HR | Raw | RM | Floc | Fin | | | |
| 152 MM | 4-21 | 0.57 | D | Alum = 10 Lime 1986N = 0.25 | 0.44 | 4.0 | 1440 | 1320 | 0.92 | 70 | 40470 | 9.7 | 0 | 29 | 0 | 0 | 6.5 6.5 6.5 | 6.6 6.6 6.6 | 6.5 6.5 6.6 | 6.5 6.5 6.5 | 8.5° | 0 | |
| 152 FC | 4-21 | 0.57 | D | SAME AS RUN #152MM | 0.44 | 4.0 | SAME AS RUN #152MM | | | | | | 0 | 24 | 0 | 0 | SAME AS RUN #152MM | 8.5° | 0 | | | | |
| 152 CC | 4-21 | 0.57 | D | SAME AS RUN #152MM | 0.44 | 4.0 | SAME AS RUN #152MM | | | | | | 0 | 24 | 0 | 0 | SAME AS RUN #152MM | 8.5° | 0 | | | | |
| 153 | 4-24 | 0.55 | D | SAME AS RUN #152MM | 16.0 | 4.0 | SAME AS RUN #152MM | | | | | | 10 | 10 | 2400 | 5136 | 6.7 6.6 6.6 | 6.6 6.6 6.7 | 6.6 6.5 6.5 | 6.5 6.5 6.5 | 8.5° | 91.7 | |
| 153 MM | 4-24 | 0.55 | D | SAME AS RUN #152MM | Ave. = 0.80 Max. = 1.1 | Ave. = 7.3 Max. = 10.0 | SAME AS RUN #152MM | | | | | | 12 | 13 | 5256 | 9893 | SAME AS RUN #153 | 8.5° | 96.2 | | | | |
| 153 FC | 4-24 | 0.55 | D | SAME AS RUN #152MM | Ave. = C.74 Max. = 1.1 | Ave. = 6.8 Max. = 10.0 | SAME AS RUN #152MM | | | | | | 14 | 14 | 5712 | 9248 | SAME AS RUN #153 | 8.5° | 96.5 | | | | |
| 153 CC | 4-24 | 0.55 | D | SAME AS RUN #152MM | Ave. = 0.66 Max. = 1.1 | Ave. = 6.0 Max. = 10.0 | SAME AS RUN #152MM | | | | | | 14 | 14 | 5040 | 8143 | SAME AS RUN #153 | 8.5° | 96.0 | | | | |

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| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ⁻² | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | | | |
|--------|------|--------------|----------------|--------------------------------|---------------------------|-------------------------------------|---------------------|------|----------|---------------------|----------------|----------|-----------------|-----------------------------|-------------------------------|---|-------------------|-------------------|-------------------|-------------------|----------|------|---------------------|---------------------|
| | | | | | | | G sec ⁻¹ | GT | Time sec | G sec ⁻¹ | GT | Time min | Hours ≤ 0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ⁻² run | Net Water Produced gal/ft ⁻² 24 hr | Raw | RM | Floc | Fin | | | | |
| 154 | 4-28 | 6.0 | D | Alum = 10 Lime 1986N = 0.25 | 16.0 | 4.0 | 1440 | 1320 | 0.92 | 70 | 40470 | 9.7 | 10 ≤ 0.5 | 10 | 2400 | 5136 | 6.5 | 6.6 | 6.6 | 6.6 | 8.5° | 91.7 | High turbidity run. | |
| 154 MM | 4-28 | 6.0 | D | SAME AS RUN #154 | 0.44 | 4.0 | SAME AS RUN #154 | | | | | | 10 ≤ 0.5 | 15 | 2400 | 5136 | SAME AS RUN #154 | | | | | 8.5° | 91.7 | High turbidity run. |
| 154 FC | 4-28 | 6.0 | D | SAME AS RUN #154 | 0.43 | 3.9 | SAME AS RUN #154 | | | | | | 10 ≤ 0.5 | 12 | 2352 | 5024 | SAME AS RUN #154 | | | | | 8.5° | 91.5 | High turbidity run. |
| 154 CC | 4-28 | 6.0 | D | SAME AS RUN #154 | 0.44 | 4.0 | SAME AS RUN #154 | | | | | | 12 ≤ 0.5 | 13 | 2851 | 5184 | SAME AS RUN #154 | | | | | 8.5° | 93.0 | High turbidity run. |
| 155 | 5-1 | 0.5 | D | SAME AS RUN #154 | 16.0 | 4.0 | SAME AS RUN #154 | | | | | | 12 | 12 | 2880 | 5240 | 6.7 6.7 6.8 | 6.6 6.6 6.6 | 6.6 6.6 6.7 | 6.6 6.5 6.6 | 10° | 93.1 | | |
| 155 MM | 5-1 | 0.5 | D | SAME AS RUN #154 | Ave. = 6.9 Max. = 1.1 | Ave. = 6.3 Max. = 10.0 | SAME AS RUN #154 | | | | | | 0 | 22 | 0 | 0 | SAME AS RUN #155 | | | | | 10° | 0 | |
| 155 FC | 5-1 | 0.5 | D | SAME AS RUN #154 | Ave. = 0.68 Max. = 1.1 | Ave. = 6.2 Max. = 10.0 | SAME AS RUN #154 | | | | | | 3 | 24 | 1116 | 6584 | SAME AS RUN #155 | | | | | 10° | 82.1 | |

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ² | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | | |
|-----------|------|--------------|----------------|--------------------------------|---------------------------|------------------------------------|---------------------|--------|----------|---------------------|----------------|----------------|-----------------|-----------------------------|------------------------------|--|-------------------|-------------------|-------------------|-------------------|-------------------|------|---|
| | | | | | | | G sec ⁻¹ | GT sec | Time sec | G sec ⁻¹ | GT | Time min | Hours ≤ 0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | | |
| 155 CC | 5-1 | 0.5 | D | Alum = 10 Lime 1986N = 0.25 | Ave. = 0.71 Max. = 1.1 | Ave. = 6.5 Max. = 10.0 | 1440 | 1320 | 0.92 | 70 | 40470 | 9.7 | 0 | 22 | 0 | 0 | 6.7 6.7 6.8 | 6.6 6.6 6.6 | 6.6 6.6 6.7 | 6.6 6.6 6.6 | 6.5 6.5 6.6 | 10° | 0 |
| 156 | 5-3 | 0.45 | D | SAME AS RUN #155CC | 16 | 4.0 | SAME AS RUN #155CC | | | | | | 8 | 8 | 1915 | 4966 | 6.8 6.8 | 6.7 6.7 | 6.7 6.7 | 6.6 6.6 | 8.5° | 89.6 | |
| 156 MM | 5-3 | 0.45 | D | SAME AS RUN #155CC | Ave. = 0.76 Max. = 1.1 | Ave. = 6.9 Max. = 10.0 | SAME AS RUN #155CC | | | | | | 14 | 14 | 5796 | 9390 | SAME AS RUN #156 | | | | 8.5° | 96.5 | |
| 156 FC | 5-3 | 0.45 | D | SAME AS RUN #155CC | Ave. = 0.78 Max. = 1.1 | Ave. = 7.1 Max. = 10.0 | SAME AS RUN #155CC | | | | | | 14 | 14 | 5964 | 9672 | SAME AS RUN #156 | | | | 8.5° | 96.6 | |
| 156 CC | 5-3 | 0.45 | D | SAME AS RUN #155CC | Ave. = 0.72 Max. = 1.1 | Ave. = 6.6 Max. = 10.0 | SAME AS RUN #155CC | | | | | 14 to headloss | 14 | 5544 | 8966 | SAME AS RUN #156 | | | | 8.5° | 96.4 | | |
| 157 | 5-14 | 0.40 | D | SAME AS RUN #155CC | 16.0 | 4.0 | SAME AS RUN #155CC | | | | | | 11 | 11 | 2640 | 5192 | 6.5 6.7 | 6.3 6.5 | 6.3 6.4 | 6.3 6.4 | 11° | 92.4 | |
| 157 MM | 5-14 | 0.40 | D | SAME AS RUN #155CC | Ave. = 6.9 Max. = 1.1 | Ave. = 6.3 Max. = 10.0 | SAME AS RUN #155CC | | | | | | 16 | 16 | 6048 | 8630 | SAME AS RUN #156 | | | | 11° | 96.7 | |

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| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ⁻² | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | | |
|--------|------|--------------|----------------|--------------------------------|---------------------------|-------------------------------------|---------------------|------|----------|---------------------|----------------|----------|----------------|-----------------------------|------------------------------|--|--------------------|-------------------|-------------------|-------------------|---------------------|---------------------|---------------------|
| | | | | | | | G sec ⁻¹ | GT | Time sec | G sec ⁻¹ | GT | Time min | Hours <0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | | |
| 157 FC | 5-14 | 0.40 | D | Alum = 10 Lime 1986N = 0.25 | Ave. = 5.7 Max. = 1.1 | Ave. = 5.2 Max. = 10.0 | 1440 | 1320 | 0.92 | 70 | 40470 | 9.7 | 20 | 20 | 6240 | 6860 | 6.5 6.7 6.7 | 6.3 6.5 6.6 | 6.3 6.4 6.5 | 6.3 6.4 6.5 | 11° | 96.8 | |
| 157 CC | 5-14 | 0.40 | D | SAME AS RUN #157FC | Ave. = 0.44 Max. = 1.1 | Ave. = 4.0 Max. = 10.0 | SAME AS RUN #157FC | | | | | | 28 | 28 | 6720 | 5537 | SAME AS RUN #157FC | | | | 11° | 97.0 | |
| 158 | | | | | | | | | | | | | | | | | | | | | | No Run #158 | |
| 159 | 5-20 | 5.0 | D | SAME AS RUN #157FC | 16.0 | 4.0 | SAME AS RUN #157FC | | | | | | 8 ≤0.5 | 8 | 1920 | 4980 | 6.5 6.6 6.6 | 6.6 6.6 6.6 | 6.6 6.6 6.6 | 10.5° | 89.6 | High turbidity run. | |
| 160 | 5-24 | 14 to 34 | D | SAME AS RUN #157FC | 16.0 | 4.0 | SAME AS RUN #157FC | | | | | | 7 ≤0.5 | 7 | 1680 | 4869 | 6.6 6.6 6.6 | 6.6 6.6 6.8 | 6.8 6.6 13° | 88.1 | High turbidity run. | | |
| 160 MM | 5-24 | 14 to 34 | D | SAME AS RUN #157FC | 0.43 | 3.9 | SAME AS RUN #147FC | | | | | | 9 ≤0.5 | 10 | 2101 | 4913 | SAME AS RUN #160 | | | | 13° | 90.5 | High turbidity run |
| 160 FC | 5-24 | 14 to 34 | D | SAME AS RUN #157FC | 0.43 | 3.9 | SAME AS RUN #157FC | | | | | | 9 ≤0.5 | 10 | 2117 | 4955 | SAME AS RUN #160 | | | | 13° | 90.6 | High turbidity run. |

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ⁻² | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | | |
|--------|------|--------------|----------------|--------------------------------|----------------------------|-------------------------------------|---------------------|------|----------|---------------------|----------------|----------|-----------------|-----------------------------|------------------------------|--|------------------|------------|------------|------------|---------------------|------|---------------------|
| | | | | | | | G sec ⁻¹ | GT | Time sec | G sec ⁻¹ | GT | Time min | Hours ≤ 0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | | |
| 160 CC | 5-24 | 14 to 34 | D | Alum = 10 Lime 1986N = 0.25 | 0.43 | 3.9 | 1440 | 1320 | 0.92 | 70 | 40470 | 9.7 | 9 0.5 | 10 | 2095 | 4899 | 6.6 | 6.6 | 6.6 | 6.8 | 13° | 90.5 | High turbidity run. |
| 161 | 6-8 | 0.30 | D | SAME AS RUN #160CC | 16.0 | 4.0 | SAME AS RUN #160CC | | | | | | 11 | 11 | 2640 | 5192 | 6.5 6.5 | 6.4 6.3 | 6.4 6.4 | 6.5 6.5 | 12° | 92.4 | Asbestos run. |
| 161 MM | 6-8 | 0.30 | D | SAME AS RUN #160CC | Ave. = 0.73 Max. = 1.1 | Ave. = 6.7 Max. = 10.0 | SAME AS RUN #160CC | | | | | | 16 | 16 | 6432 | 9197 | SAME AS RUN #161 | | 12° | 96.9 | Asbestos run. | | |
| 161 FC | 6-8 | 0.30 | D | SAME AS RUN #160CC | Ave. = 0.71 Max. = 1.1 | Ave. = 6.5 Max. = 10.0 | SAME AS RUN #160CC | | | | | | 15 | 15 | 5850 | 8408 | SAME AS RUN #161 | | 12° | 96.6 | Asbestos run. | | |
| 161 CC | 6-8 | 0.30 | D | SAME AS RUN #160CC | Ave. = 6.7 Max. = 1.1 | Ave. = 6.1 Max. = 10.0 | SAME AS RUN #160CC | | | | | | 16 | 16 | 5856 | 7909 | SAME AS RUN #161 | | 12° | 96.6 | Asbestos run. | | |
| 162 | 6-10 | 5 to 34 | D | SAME AS RUN #160CC | 16.0 | 4.0 | SAME AS RUN #160CC | | | | | | 0 ≤ 0.5 | 2 | 0 | 0 | 6.6 | 6.6 | 6.8 | 6.6 | 13° | 0 | High turbidity run. |
| 162 MM | 6-10 | 18 to 34 | D | SAME AS RUN #160CC | Ave. = 0.53 Max. = 0.56 | Ave. = 4.8 Max. = 5.1 | SAME AS RUN #160CC | | | | | | 1 ≤ 0.5 | 4 | 290 | 416 | SAME AS RUN #162 | | 13° | 31.0 | High turbidity run. | | |

145

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING $\frac{\text{gpm}}{\text{ft}^2}$ | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | | |
|------------|------|--------------|----------------|---|----------------------------|---|---------------------|------|----------|---------------------|----------------|----------|-----------------|-----------------------------|------------------------------|--|--------------------|-----|---------|--------|----------|--------------------|---------------------|
| | | | | | | | G sec ⁻¹ | GT | Time sec | G sec ⁻¹ | GT | Time min | Hours ≤ 0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 28 hr | Raw | RM | Floc | Fin | | | |
| 162 FC | 6-10 | 18 to 34 | D | Alum = 10 Lime = 3.3 1986N = 0.25 | Ave. = 0.46 Max. = 0.56 | Ave. = 4.2 Max. = 5.1 | 1440 | 1320 | 0.92 | 70 | 40470 | 9.7 | 0 ≤ 0.5 | 2 | 0 | 0 | 6.6 | 6.6 | 6.8 | 6.6 | 13° | 0 | High turbidity run. |
| 162 CC | 6-10 | 18 to 34 | D | SAME AS RUN #162FC | Ave. = 0.44 Max. = 0.56 | Ave. = 4.0 Max. = 5.1 | SAME AS RUN #162FC | | | | | | 3 ≤ 0.5 | 5 | 718 | 3667 | SAME AS RUN #162FC | | | | 13° | 72.0 | High turbidity run. |
| 163 | 6-11 | 18 to 34 | D | SAME AS RUN #162FC | 16.0 | 4.0 | SAME AS RUN #162FC | | | | | | 1 ≤ 0.5 | 2 | 240 | 0 | 6.7 | 6.8 | 6.6 | 6.7 | 13.1° | 16.7 | High turbidity run. |
| 163 MM | 6-11 | 18 to 34 | D | SAME AS RUN #162FC | Ave. = 0.48 Max. = 0.56 | Ave. = 4.3 Max. = 5.1 | SAME AS RUN #162FC | | | | | | 4 ≤ 0.5 | 4 | 1039 | 4646 | SAME AS RUN #163 | | | | 13.1° | 80.8 | High turbidity run. |
| 163 FC | 6-11 | 18 to 34 | D | SAME AS RUN #162FC | Ave. = 0.38 Max. = 0.56 | Ave. = 3.4 Max. = 5.1 | SAME AS RUN #162FC | | | | | | 3 ≤ 0.5 | 3 | 617 | 2928 | SAME AS RUN #163 | | | | 13.1° | 67.6 | High turbidity run. |
| 163 CC | 6-11 | 18 to 34 | D | SAME AS RUN #162FC | Ave. = 0.45 Max. = 0.56 | Ave. = 4.1 Max. = 5.1 | SAME AS RUN #162FC | | | | | | 5 ≤ 0.5 | 5 | 1239 | 4690 | SAME AS RUN #163 | | | | 13.1° | 83.9 | High turbidity run. |
| 164 to 167 | | | | | | | | | | | | | | | | | | | | | | No runs conducted. | |

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ² | RAPID MIX | | | FLOC | | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS |
|--------|------|--------------|----------------|---|----------------------------|------------------------------------|---------------------|------|----------|---------------------|-------|----------|----------------|-----------------------------|------------------------------|--|-----|----|------|-----|---------|--------|----------|
| | | | | | | | G sec ⁻¹ | GT | Time sec | G sec ⁻¹ | GT | Time min | Hours 50.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | | |
| 168 | 7-26 | 0.25 | H | Alum = 10 Lime = 3.3 1986N = 0.25 | Ave. = 0.42 Max. = 0.45 | Ave. = 3.8 Max. = 4.0 | 1440 | 1320 | 0.92 | 70 | 40470 | 9.7 | 7 | 26 | 1596 | 4591 | | | | | 13° | 87.5 | |
| 168 MM | 7-26 | 0.25 | H | SAME AS RUN #168 | Ave. = 0.36 Max. = 0.44 | Ave. = 3.3 Max. = 4.0 | SAME AS RUN #168 | | | | | | 10 | 26 | 1980 | 4153 | | | | | 13° | 89.9 | |
| 168 FC | 7-26 | 0.25 | H | SAME AS RUN #168 | Ave. = 0.40 Max. = 0.44 | Ave. = 3.6 Max. = 4.0 | SAME AS RUN #168 | | | | | | 6 | 26 | 1296 | 4444 | | | | | 13° | 84.6 | |
| 168 CC | 7-26 | 0.25 | H | SAME AS RUN #168 | Ave. = 0.40 Max. = 0.44 | Ave. = 3.6 Max. = 4.0 | SAME AS RUN #168 | | | | | | 6 | 26 | 1296 | 4444 | | | | | 13° | 84.6 | |
| 169 | 8-10 | 0.25 | H | SAME AS RUN #168 | 16.0 | 4.0 | SAME AS RUN #168 | | | | | | 8 | 8 | 1915 | 4966 | | | | | | 89.6 | |
| 169 MM | 8-10 | 0.25 | H | SAME AS RUN #168 | 0.55 | 5.0 | SAME AS RUN #168 | | | | | | 14 | 14 | 4200 | 6729 | | | | | | 95.2 | |
| 169 FC | 8-10 | 0.25 | H | SAME AS RUN #168 | Ave. = 0.50 Max. = 0.55 | Ave. = 4.6 Max. = 5.0 | SAME AS RUN #168 | | | | | | 14 | 14 | 3864 | 6163 | | | | | | 94.8 | |

147

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ² | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | |
|-----------|------|--------------|----------------|---|----------------------------|------------------------------------|----------------------|--------|----------------------|----|----------------|----------------|-----------------------------|------------------------------|--|------|----|------|---------|--------|----------|--|
| | | | | | | | G. sec ⁻¹ | GT sec | G. sec ⁻¹ | GT | Time min | Hours ≤0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | | |
| 169 CC | 8-10 | 0.25 | H | Alum = 10 Lime = 3.3 1986N = 0.25 | Ave. = 0.50 Max. = 0.55 | Ave. = 4.6 Max. = 5.0 | 1440 | 1320 | 0.92 | 70 | 40470 | 9.7 | 14 | 14 | 3864 | 6163 | | | | | 94.8 | |
| 170 | 8-14 | 0.28 | H | SAME AS RUN #169CC | 16.0 | 4.0 | SAME AS RUN #169CC | | | | | | 12 | 12 | 2880 | 5240 | | | | | 93.1 | |
| 170 MM | 8-14 | 0.28 | H | SAME AS RUN #169CC | 0.66 | 6.0 | SAME AS RUN #169CC | | | | | | 0 | 12 | 0 | 0 | | | | | 0 | |
| 170 FC | 8-14 | 0.28 | H | SAME AS RUN #169CC | Ave. = 0.61 Max. = 0.66 | Ave. = 5.5 Max. = 6.0 | SAME AS RUN #169CC | | | | | | 0 | 12 | 0 | 0 | | | | | 0 | |
| 170 CC | 8-14 | 0.28 | H | SAME AS RUN #169CC | Ave. = 0.61 Max. = 0.66 | Ave. = 5.5 Max. = 6.0 | SAME AS RUN #169CC | | | | | | 0 | 12 | 0 | 0 | | | | | 0 | |
| 171 | 8-16 | 0.30 | H | SAME AS RUN #169CC | 16.0 | 4.0 | SAME AS RUN #169CC | | | | | | 12 | 12 | 2880 | 5240 | | | | | 93.1 | |
| 171 MM | 8-16 | 0.30 | H | SAME AS RUN #169CC | 0.77 | 7.0 | SAME AS RUN #169CC | | | | | | 0 | 16 | 0 | 0 | | | | | 0 | |

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ⁻² | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENT: | |
|-----------|------|--------------|----------------|---|---|-------------------------------------|---------------------|------|----------|---------------------|----------------|----------|----------------|-----------------------------|------------------------------|--|------------|------------|------------|------------|----------|------|
| | | | | | | | G sec ⁻¹ | GT | Time sec | G sec ⁻¹ | GT | Time min | Hours <0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | |
| 171 FC | 8-16 | 0.30 | H | Alum = 10 Lime = 3.3 1986N = 0.25 | Ave. = 0.69 Max. = 0.78 | Ave. = 6.3 Max. = 7.0 | 1440 | 1320 | 0.9270 | 40470 | 9.7 | 0 | 12 | 0 | 0 | | | | | 0 | | |
| 171 CC | 8-16 | 0.30 | H | SAME AS RUN #171FC | Ave. = 0.69 Max. = 0.78 | Ave. = 6.3 Max. = 7.0 | SAME AS RUN #171FC | | | | | | 0 | 12 | 0 | 0 | | | | | 0 | |
| 172 MM | 8-21 | 0.28 | H | SAME AS RUN #171FC | 16.0 | 4.0 | SAME AS RUN #171FC | | | | | | 12 | 13 | 2880 | 5240 | | | | | 13° | 93.1 |
| 172 FC | 8-21 | 0.28 | H | SAME AS RUN #171FC | Ave. = 0.77 Max. = 0.89 | Ave. = 7.0 Max. = 8.0 | SAME AS RUN #171FC | | | | | | 0 | 18 | 0 | 0 | | | | | 13° | 0 |
| 172 CC | 8-21 | 0.28 | H | SAME AS RUN #171FC | Max. = 0.89 | Max. = 8.0 | SAME AS RUN #171FC | | | | | | 0 | 8 | 0 | 0 | | | | | 13° | 0 |
| 174 | 9-5 | 0.28 | II | SAME AS RUN #171FC | Alum = 10 Lime = 3.3 1986N = 0.20 | 15.4 | 3.8 | 1440 | 1320 | 0.9270 | 40470 | 9.7 | 11 | 11 | 2508 | 4911 | 6.4 6.4 | 6.2 6.0 | 6.2 6.2 | 6.2 6.1 | 15° | 92.0 |

149

| RUN | DATE | RAW TURB NTU | FLOW SCHEMATIC | CHEMICAL DOSAGES (mg/l) | PLANT FLOW gpm | FILTER LOADING gpm ft ⁻² | RAPID MIX | | FLOC | | FINISHED WATER | | | | pH | | | | TEMP °C | EFF. % | COMMENTS | | |
|------------|------|--------------|----------------|---|----------------------------|-------------------------------------|---------------------|--------|----------|---------------------|----------------|----------|----------------|-----------------------------|------------------------------|--|--------------------|--------------------|--------------------|--------------------|----------|------|---------------------|
| | | | | | | | G sec ⁻¹ | GT sec | Time sec | G sec ⁻¹ | GT | Time min | Hours <0.1 NTU | Hours to 8' or 10' Headloss | UFRV gal/ft ² run | Net Water Produced gal/ft ² 24 hr | Raw | RM | Floc | Fin | | | |
| 174 NM | 9-5 | 0.28 | D | Alum = 10 Lime = 3.3 1986N = 0.20 | Ave. = 0.72 Max. = 1.1 | Ave. = 6.6 Max. = 10.0 | 1440 | 1320 | 0.92 | 70 | 40470 | 9.7 | 18 | 18 | 7128 | 9105 | 6.4 6.4 | 6.2 6.0 | 6.2 6.2 | 6.2 6.1 | 15° | 97.2 | Declining rate run. |
| 174 CMM | 9-5 | 0.28 | D | SAME AS RUN #174MM | Ave. = 0.73 Max. = 1.1 | Ave. = 6.7 Max. = 10.0 | SAME AS RUN #174MM | | | | | | 18 | 18 | 7236 | 9247 | SAME AS RUN #174MM | 15° | 97.2 | Declining rate run. |
| 174 CC | 9-5 | 0.28 | D | SAME AS RUN #174MM | Ave. = 0.73 Max. = 1.1 | Ave. = 6.7 Max. = 10.0 | SAME AS RUN #174MM | | | | | | 19 | 19 | 7638 | 9268 | SAME AS RUN #174MM | 15° | 97.4 | Declining rate run. |
| 175 | 9-19 | 0.45 | D | SAME AS RUN #174MM | 16.7 | 4.2 | SAME AS RUN #174MM | | | | | | 11 | 11 | 2772 | 5193 | 6.7 6.7 | 6.2 6.2 | 6.2 6.2 | 6.4 6.3 | 15° | 92.3 | |
| 175 MM | 9-19 | 0.45 | D | SAME AS RUN #174MM | Ave. = 0.56 Max. = 0.66 | Ave. = 5.1 Max. = 6.0 | SAME AS RUN #174MM | | | | | | 18 | 18 | 5508 | 6975 | SAME AS RUN #175 | | 96.4 | |
| 175 CMM | 9-19 | 0.45 | D | SAME AS RUN #174MM | Ave. = 0.57 Max. = 0.66 | Ave. = 5.2 Max. = 6.0 | SAME AS RUN #174MM | | | | | | 18 | 18 | 5616 | 7117 | SAME AS RUN #175 | | 96.4 | |
| 175 CC | 9-19 | 0.45 | D | SAME AS RUN #174MM | Ave. = 0.59 Max. = 0.66 | Ave. = 5.4 Max. = 6.0 | SAME AS RUN #174MM | | | | | | 18 | 18 | 5832 | 7401 | SAME AS RUN #175 | | 96.6 | |

APPENDIX C-2

DIAGRAMS OF FLOW SCHEMATICS TESTED DURING THE PILOT STUDY

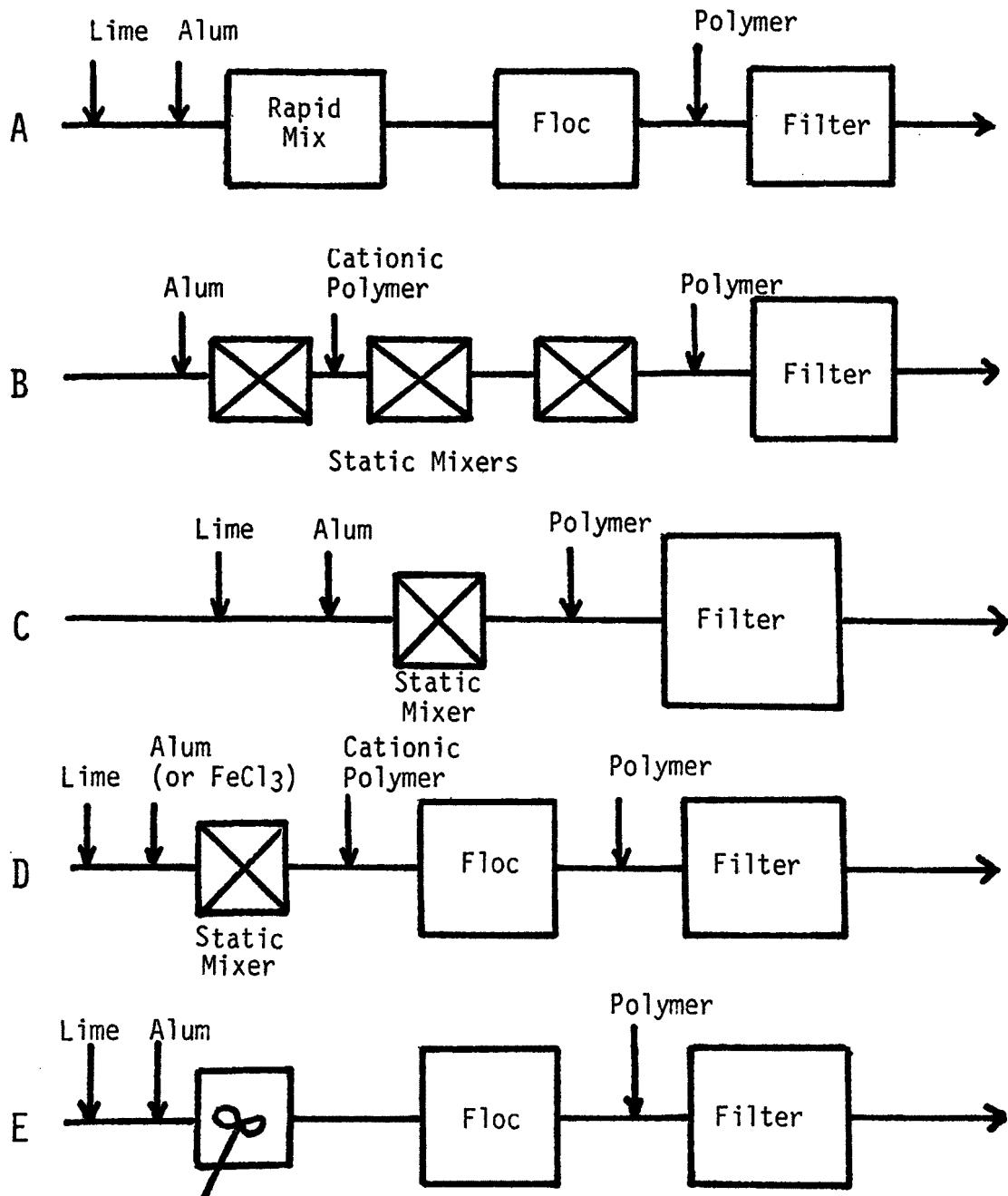


Figure C-1. Listing of flow schematics tested during pilot study.

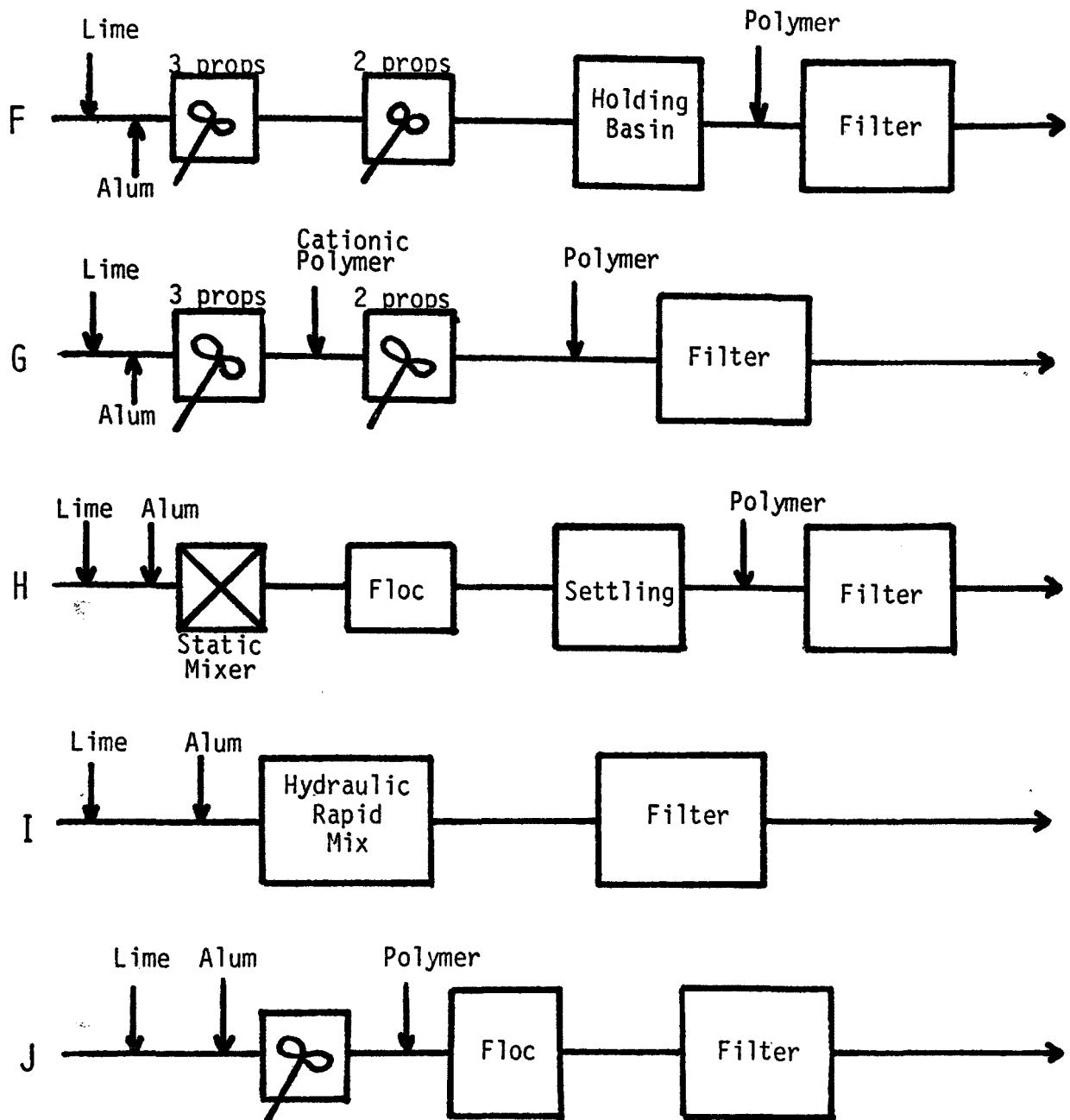


Figure C-1. Listing of flow schematics tested during pilot study.

(continued)

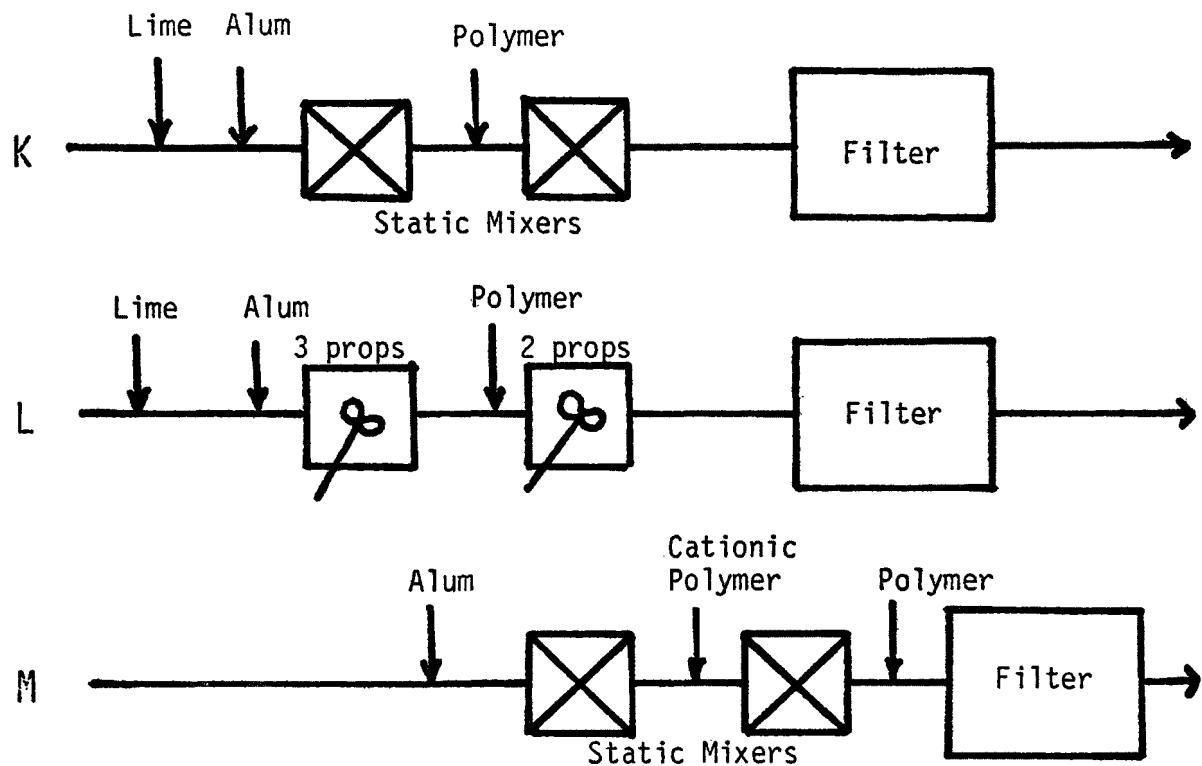


Figure C-1. Listing of flow schematics tested during pilot study.

(continued)

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

| | | |
|---|---|---|
| 1. REPORT NO. EPA-600/2-79-153 | 2. | 3. RECIPIENT'S ACCESSION NO. |
| 4. TITLE AND SUBTITLE SEATTLE TOLT WATER SUPPLY MIXED ASBESTIFORM REMOVAL STUDY Appendices B and C | | 5. REPORT DATE December 1979 (Issuing Date) |
| 7. AUTHOR(S) Gregory J. Kirmeyer | | 6. PERFORMING ORGANIZATION CODE |
| 9. PERFORMING ORGANIZATION NAME AND ADDRESS Water Quality Division Seattle Water Department 1509 South Spokane Street Seattle, Washington 98144 | | 8. PERFORMING ORGANIZATION REPORT NO. |
| | | 10. PROGRAM ELEMENT NO. 1CC614 SOS 1 Task 06 |
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| 12. SPONSORING AGENCY NAME AND ADDRESS Municipal Environmental Research Laboratory-Cin., OH Office of Research & Development U.S. Environmental Protection Agency Cincinnati, Ohio 45268 | | 13. TYPE OF REPORT AND PERIOD COVERED Final 5/76 - 11/78 |
| | | 14. SPONSORING AGENCY CODE EPA/600/14 |
| 15. SUPPLEMENTARY NOTES Appendices B and C are supplementary to main report, EPA-600/2-79-125. Additional supplementary material is in Appendix D, EPA-600/2-79-126. Project Officer: Gary Logsdon 513/684-7345. | | |
| 16. ABSTRACT For 1 1/2 years the Seattle Water Department conducted direct filtration pilot plant studies at the Tolt Reservoir, obtaining data on techniques to remove amphibole and chrysotile asbestos from drinking water. Research showed that filtered water turbidity should be 0.1 ntu or lower in order to effectively remove fibers. Flocculation was necessary but sedimentation was not. Amphibole fibers are more readily removed than chrysotile, but both types could be reduced to below detectable limits or to not statistically significant counts by treatment with alum, lime and a filter aid (nonionic or anionic polymer); or alum, cationic polymer and a filter aid; or cationic polymer and a filter aid. Asbestos fiber content of filtered water increased sharply when filtered water turbidity rose above 0.10 ntu. Asbestos fibers in the concentrations encountered in this study (raw up to 20×10^6 f/L, filtered down to 0.01×10^6 f/L) can not be detected by a turbidimeter; however, the association of rising fiber counts and turbidities in filtered water would enable a plant operator to estimate fiber removal by observing turbidity if the filter was operated in the manner done in this work. Appendix B contains equipment photographs; data on operating conditions, water quality, fiber counting, and filter media; turbid water test data; results of sludge studies; and documentation of cost estimation data. Appendix C has details on conditions for each filter run. | | |
| 17. KEY WORDS AND DOCUMENT ANALYSIS | | |
| a. DESCRIPTORS Asbestos, Coagulation, Electron microscopes, Filtration, Pilot plants, Potable water, Turbidity, Water treatment | b. IDENTIFIERS/OPEN ENDED TERMS Seattle, Washington Tolt Reservoir fiber removal, Chrysotile, Amphibole, Direct filtration, Flocculation | c. COSATI Field/Group 13 B |
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