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**Environmental Protection Technology Series**

**DIRECT FILTRATION OF  
LAKE SUPERIOR WATER FOR  
ASBESTIFORM FIBER REMOVAL  
Appendix A**



**National Environmental Research Center  
Office of Research and Development  
U.S. Environmental Protection Agency  
Cincinnati, Ohio 45268**

DIRECT FILTRATION OF LAKE SUPERIOR  
WATER FOR ASBESTIFORM FIBER REMOVAL

Appendix A

Weather and Lake Level Data, Water Quality Data,  
and Raw Water Pumping Schedule

By

Black & Veatch, Consulting Engineers  
Kansas City, Missouri 64114

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USEPA, Region V and Corps of Engineers, St. Paul

Project Officer

Gary S. Logsdon  
Water Supply Research Laboratory  
National Environmental Research Center  
Cincinnati, Ohio 45268

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CINCINNATI, OHIO 45268

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## FOREWORD

Man and his environment must be protected from the adverse effects of pesticides, radiation, noise and other forms of pollution, and the unwise management of solid waste. Efforts to protect the environment require a focus that recognizes the interplay between the components of our physical environment -- air, water, and land. The National Environmental Research Centers provide this multidisciplinary focus through programs engaged in

- studies on the effects of environmental contaminants on man and the biosphere, and
- a search for ways to prevent contamination and to recycle valuable resources.

This report and its appendices present the results of pilot plant filtration research for the removal of asbestiform fibers from drinking water. The several appendices present detailed information on water quality, pilot plant equipment and operation, individual filter run data, asbestiform fiber and amphibole mass concentrations in raw and filtered water, and diatomite filter optimization. Appendix A contains water quality data.

A. W. Breidenbach, Ph.D.  
Director  
National Environmental  
Research Center, Cincinnati

## ABSTRACT

Pilot plant research conducted in 1974 at Duluth, Minnesota, demonstrated that asbestiform fiber counts in Lake Superior water could be effectively reduced by municipal filtration plants. During the study, engineering data were also obtained for making cost estimates for construction and operation of both granular and diatomaceous earth (DE) filtration plants ranging in size from 0.03 to 30 mgd.

This appendix contains a portion of the data collected in the study. The following categories of information are presented in Appendix A:

Weather and lake level data

Operating schedule for pumps at the pumping station

Chemical and physical quality parameters of raw and filtered water

Dissolved oxygen content of raw and finished water

Bacteriological data for raw and finished water.

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APPENDIX A-1 WEATHER AND LAKE LEVEL DATA, DULUTH LAKEWOOD PUMPING STATION  
MONTH OF APRIL, 1974.

| Date | High<br>temp.,<br>°F | Wind<br>veloc.,<br>mph <sup>a</sup> | Precip.<br>in. <sup>b</sup> | Wind<br>dir. <sup>a</sup> | Lake<br>level<br>ft <sup>c</sup> | Notes                    |
|------|----------------------|-------------------------------------|-----------------------------|---------------------------|----------------------------------|--------------------------|
| 1    |                      |                                     |                             |                           |                                  |                          |
| 2    |                      |                                     |                             |                           |                                  |                          |
| 3    |                      |                                     |                             |                           |                                  |                          |
| 4    |                      |                                     |                             |                           |                                  |                          |
| 5    |                      |                                     |                             |                           |                                  |                          |
| 6    |                      |                                     |                             |                           |                                  |                          |
| 7    |                      |                                     |                             |                           |                                  |                          |
| 8    |                      |                                     |                             |                           |                                  |                          |
| 9    |                      |                                     |                             |                           |                                  |                          |
| 10   |                      |                                     |                             |                           |                                  |                          |
| 11   |                      |                                     |                             |                           |                                  |                          |
| 12   |                      |                                     |                             |                           |                                  |                          |
| 13   |                      |                                     |                             |                           |                                  |                          |
| 14   |                      |                                     |                             |                           |                                  |                          |
| 15   |                      |                                     |                             |                           |                                  |                          |
| 16   |                      |                                     |                             |                           |                                  |                          |
| 17   |                      |                                     |                             |                           |                                  |                          |
| 18   |                      |                                     |                             |                           |                                  |                          |
| 19   | 36                   | 7                                   | 0                           | NE                        | 600.77                           | Ice on lake.             |
| 20   |                      |                                     |                             |                           |                                  |                          |
| 21   |                      |                                     |                             |                           |                                  |                          |
| 22   | 39                   | 3                                   | 0.40                        | NE                        | 600.7                            | Ice starting to breakup. |
| 23   | 41                   | 3                                   | 0                           | N                         | 600.72                           | Small patches of ice.    |
| 24   | 38                   | 6                                   | T                           | NE                        | 600.85                           | Very little ice.         |
| 25   | 47                   | 8                                   | 0                           | NE                        | 600.83                           | Ice along north shore.   |
| 26   | 52                   | 12                                  | 0                           | SE                        | 600.91                           | Ice along north shore.   |
| 27   |                      |                                     |                             |                           |                                  |                          |
| 28   |                      |                                     |                             |                           |                                  |                          |
| 29   | 57                   | 5                                   | 0.02                        | SW                        | 600.85                           | Ice on lake.             |
| 30   | 60                   | 8                                   | 0                           | NW                        | 600.80                           | Ice on lake.             |
| 31   |                      |                                     |                             |                           |                                  |                          |

a Wind velocities and direction are from Lakewood pumping station records and are not official. The values are based on observations by the plant operators.

b Precipitation values are from U.S. Weather Bureau at Duluth International Airport.

c International Great Lakes Datum.

APPENDIX A-1 (CONTINUED) MONTH OF MAY, 1974.

| Date | High<br>temp.,<br>°F | Wind<br>veloc.,<br>mph <sup>a</sup> | Precip.,<br>in. <sup>b</sup> | Wind<br>dir. <sup>a</sup> | Lake<br>level<br>ft. <sup>c</sup> | Notes                  |
|------|----------------------|-------------------------------------|------------------------------|---------------------------|-----------------------------------|------------------------|
| 1    | 36                   | 15                                  | T                            | NE                        | 601.11                            | Ice piled near shore.  |
| 2    | 61                   | 10                                  | 0.42                         | SW                        | 600.95                            | Ice on lake.           |
| 3    | 51                   | 8                                   | T                            | NW                        | 600.80                            | Ice on lake.           |
| 4    |                      |                                     |                              |                           |                                   |                        |
| 5    |                      |                                     |                              |                           |                                   |                        |
| 6    | 40                   | 12                                  | 0                            | NE                        | 600.97                            |                        |
| 7    | 35                   | 20                                  | 0                            | E                         | 601.10                            | White caps @ 1400 hrs. |
| 8    | 40                   | 15                                  | 0                            | E                         | 601.03                            |                        |
| 9    | 43                   | 4                                   | T                            | E                         | 600.98                            |                        |
| 10   | 39                   | 8                                   | 0.35                         | E                         | 601.12                            |                        |
| 11   | 50                   | 15                                  | 0.55                         | SW                        | 601.28                            |                        |
| 12   | 50                   | 20                                  | 0.03                         | NW                        | 600.88                            |                        |
| 13   | 43                   | 8                                   | 0.28                         | NE                        | 601.13                            |                        |
| 14   | 37                   | 8                                   | 0.32                         | NE                        | 601.15                            |                        |
| 15   | 52                   | 5                                   | 0                            | SE                        | 601.06                            |                        |
| 16   | 44                   | 7                                   | 0                            | NE                        | 601.18                            |                        |
| 17   | 60                   | 6                                   | 0                            | N                         | 601.08                            |                        |
| 18   | 54                   | 18                                  | 0                            | E                         | 601.22                            |                        |
| 19   | 52                   | 20                                  | 0                            | E                         | 601.32                            |                        |
| 20   | 49                   | 8                                   | T                            | NE                        | 601.30                            |                        |
| 21   | 60                   | 3                                   | 0.36                         | E                         | 601.17                            |                        |
| 22   | 68                   | 7                                   | 0                            | SW                        | 601.06                            |                        |
| 23   | 58                   | 18                                  | T                            | SW                        | 601.00                            |                        |
| 24   | 60                   | 8                                   | 0.02                         | NW                        | 601.01                            |                        |
| 25   | 64                   | 10                                  | 0                            | NW                        | 601.10                            |                        |
| 26   | 52                   | 5                                   | 0                            | SE                        | 601.17                            |                        |
| 27   | 45                   | 10                                  | 0.02                         | NE                        | 601.23                            |                        |
| 28   | 50                   | 5                                   | T                            | NE                        | 601.23                            |                        |
| 29   | 50                   | 7                                   | 0.01                         | E                         | 601.18                            |                        |
| 30   | 50                   | 7                                   | 0.62                         | E                         | 601.24                            |                        |
| 31   | 65                   | 10                                  | T                            | SW                        | 601.07                            |                        |

a Wind velocities and direction are from Lakewood pumping station records and are not official. The values are based on observations by the plant operators.

b Precipitation values are from U.S. Weather Bureau at Duluth International Airport.

c International Great Lakes Datum.

APPENDIX A-1 (CONTINUED) MONTH OF JUNE, 1974.

| Date | High<br>temp.,<br>°F | Wind<br>veloc.,<br>mph <sup>a</sup> | Precip.,<br>in. <sup>b</sup> | Wind<br>dir. <sup>a</sup> | Lake<br>level<br>ft <sup>c</sup> | Notes |
|------|----------------------|-------------------------------------|------------------------------|---------------------------|----------------------------------|-------|
| 1    | 60                   | 3                                   | T                            | SE                        | 601.19                           |       |
| 2    | 62                   | 8                                   | 0.05                         | SW                        | 601.22                           |       |
| 3    | 59                   | 3                                   | 0.12                         | W                         | 601.31                           |       |
| 4    | 68                   | 3                                   | 0.37                         | SE                        | 601.26                           |       |
| 5    | 55                   | 10                                  | 0                            | E                         | 601.39                           |       |
| 6    | 56                   | 10                                  | 1.26                         | E                         | 601.44                           |       |
| 7    | 53                   | 3                                   | T                            | NE                        | 601.28                           |       |
| 8    | 68                   | 5                                   | 0                            | S                         | 601.32                           |       |
| 9    | 54                   | 15                                  | 1.22                         | NE                        | 601.52                           |       |
| 10   | 68                   | 8                                   | 0.33                         | NW                        | 601.30                           |       |
| 11   | 65                   | 15                                  | 0.02                         | NW                        | 601.33                           |       |
| 12   | 67                   | 12                                  | T                            | NW                        | 601.36                           |       |
| 13   | 58                   | 5                                   | 0                            | E                         | 601.46                           |       |
| 14   | 74                   | 10                                  | 0.23                         | NW                        | 601.48                           |       |
| 15   | 52                   | 18                                  | 0.04                         | NW                        | 601.32                           |       |
| 16   | 56                   | 18                                  | T                            | NW                        | 601.31                           |       |
| 17   | 54                   | 5                                   | T                            | NW                        | 601.44                           |       |
| 18   | 68                   | 10                                  | T                            | SW                        | 601.54                           |       |
| 19   | 68                   | 7                                   | 0                            | SW                        | 601.49                           |       |
| 20   | 58                   | 8                                   | T                            | NE                        | 601.52                           |       |
| 21   | 60                   | 8                                   | 0                            | NE                        | 601.51                           |       |
| 22   | 54                   | 12                                  | 0                            | NE                        | 601.50                           |       |
| 23   | 52                   | 10                                  | 0                            | E                         | 601.50                           |       |
| 24   | 64                   | 8                                   | 0                            | E                         | 601.52                           |       |
| 25   | 56                   | 5                                   | 0                            | NE                        | 601.52                           |       |
| 26   | 67                   | 3                                   | 0                            | E                         | 601.53                           |       |
| 27   | 65                   | 8                                   | 0                            | E                         | 601.57                           |       |
| 28   | 64                   | 8                                   | 0                            | NE                        | 601.58                           |       |
| 29   | 73                   | 12                                  | 0.43                         | SW                        | 601.52                           |       |
| 30   | 76                   | 20                                  | 0                            | SW                        | 601.40                           |       |
| 31   |                      |                                     |                              |                           |                                  |       |

a Wind velocities and direction are from Lakewood pumping station records and are not official. The values are based on observations by the plant operators.

b Precipitation values are from U.S. Weather Bureau at Duluth International Airport.

c International Great Lakes Datum.

APPENDIX A-1 (CONTINUED) MONTH OF JULY, 1974.

| Date | High<br>temp.,<br>°F | Wind<br>veloc.,<br>mph <sup>a</sup> | Precip.,<br>in. <sup>b</sup> | Wind<br>dir. <sup>a</sup> | Lake<br>level<br>ft <sup>c</sup> | Notes |
|------|----------------------|-------------------------------------|------------------------------|---------------------------|----------------------------------|-------|
| 1    | 65                   | 8                                   | 0.03                         | E                         | 601.56                           |       |
| 2    | 60                   | 8                                   | 0                            | NE                        | 601.61                           |       |
| 3    | 66                   | 15                                  | 0.14                         | W                         | 601.63                           |       |
| 4    | 70                   | 8                                   | 0                            | NW                        | 601.50                           |       |
| 5    | 79                   | 12                                  | T                            | SW                        | 601.66                           |       |
| 6    | 64                   | 10                                  | T                            | SW                        | 601.69                           |       |
| 7    | 72                   | 10                                  | 0                            | SW                        | 601.71                           |       |
| 8    | 68                   | 8                                   | 0.04                         | SW                        | 601.71                           |       |
| 9    | 72                   | 18                                  | T                            | E                         | 601.76                           |       |
| 10   | 57                   | 18                                  | 0                            | E                         | 601.85                           |       |
| 11   | 55                   | 12                                  | 0                            | E                         | 601.82                           |       |
| 12   | 59                   | 4                                   | 0.12                         | E                         | 601.75                           |       |
| 13   | 62                   | 15                                  | 0.40                         | NW                        | 601.67                           |       |
| 14   | 79                   | 15                                  | 0                            | W                         | 601.58                           |       |
| 15   | 60                   | 10                                  | 0                            | NE                        | 601.68                           |       |
| 16   | 63                   | 8                                   | 0.02                         | SE                        | 601.73                           |       |
| 17   | 79                   | 12                                  | 0.15                         | SW                        | 601.79                           |       |
| 18   |                      | 10                                  | T                            | NW                        | 601.65                           |       |
| 19   | 65                   | 15                                  | 0.25                         | NE                        | 601.75                           |       |
| 20   | 62                   | 12                                  | 0                            | E                         | 601.80                           |       |
| 21   | 54                   | 7                                   | 3.40                         | E                         | 601.79                           |       |
| 22   | 79                   | 8                                   | 0                            | SW                        | 601.71                           |       |
| 23   | 62                   | 8                                   | 0                            | E                         | 601.75                           |       |
| 24   | 60                   | 8                                   | 0.29                         | NE                        | 601.84                           |       |
| 25   | 82                   | 8                                   | 0                            | SW                        | 601.76                           |       |
| 26   | 72                   | 10                                  | T                            | W                         | 601.64                           |       |
| 27   | 78                   | 15                                  | T                            | W                         | 601.53                           |       |
| 28   | 72                   | 15                                  | T                            | W                         | 601.51                           |       |
| 29   | 62                   | 10                                  | 0.01                         | NW                        | 601.54                           |       |
| 30   | 63                   | 8                                   | T                            | NW                        | 601.54                           |       |
| 31   |                      |                                     | 0                            |                           | 601.62                           |       |

a Wind velocities and direction are from Lakewood pumping station records and are not official. The values are based on observations by the plant operators.

b Precipitation values are from U.S. Weather Bureau at Duluth International Airport.

c International Great Lakes Datum.

APPENDIX A-1 (CONTINUED) MONTH OF AUGUST, 1974.

| Date | High<br>temp.,<br>°F | Wind<br>veloc.,<br>mph <sup>a</sup> | Precip.,<br>in. <sup>b</sup> | Wind<br>dir. <sup>a</sup> | Lake<br>level<br>ft <sup>c</sup> | Notes |
|------|----------------------|-------------------------------------|------------------------------|---------------------------|----------------------------------|-------|
| 1    | 67                   | 3                                   | 0.40                         | W                         | 601.72                           |       |
| 2    | 58                   | 8                                   | 1.23                         | NE                        | 601.84                           |       |
| 3    | 56                   | 5                                   | 0.25                         | NE                        | 601.76                           |       |
| 4    | 74                   | 5                                   | T                            | NW                        | 601.72                           |       |
| 5    | 74                   | 5                                   | T                            | W                         | 601.78                           |       |
| 6    | 75                   | 5                                   | 0                            | SW                        | 601.80                           |       |
| 7    | 72                   | 3                                   | 0.02                         | SE                        | 601.82                           |       |
| 8    | 66                   | 8                                   | 0                            | E                         | 601.85                           |       |
| 9    | 66                   | 15                                  | 0                            | E                         | 601.93                           |       |
| 10   | 63                   | 12                                  | 0.45                         | NE                        | 602.08                           |       |
| 11   | 63                   | 5                                   | 0.07                         | SW                        | 601.93                           |       |
| 12   | 75                   | 10                                  | 0.07                         | NW                        | 601.81                           |       |
| 13   | 64                   | 8                                   | 0.04                         | NE                        | 601.86                           |       |
| 14   | 64                   | 15                                  | T                            | NE                        | 602.04                           |       |
| 15   | 68                   | 5                                   | T                            | E                         | 601.99                           |       |
| 16   | 73                   | 7                                   | 0                            | SW                        | 601.84                           |       |
| 17   | 74                   | 8                                   | 0.01                         | W                         | 601.85                           |       |
| 18   | 68                   | 5                                   | T                            | S                         | 601.87                           |       |
| 19   | 68                   | Calm                                | 0                            |                           | 601.94                           |       |
| 20   | 76                   | 12                                  | 0.01                         | SE                        | 602.03                           |       |
| 21   | 72                   | 5                                   | 0.05                         | SW                        | 601.96                           |       |
| 22   | 64                   | 7                                   | T                            | W                         | 601.82                           |       |
| 23   | 62                   | 5                                   | T                            | NE                        | 601.88                           |       |
| 24   | 62                   | 15                                  | T                            | NE                        | 601.99                           |       |
| 25   | 75                   | 10                                  | 0.95                         | S                         | 602.02                           |       |
| 26   | 68                   | 15                                  | T                            | W                         | 601.78                           |       |
| 27   | 67                   | 10                                  | 0                            | W                         | 601.79                           |       |
| 28   | 62                   | 0                                   | 0.09                         | -                         | 601.92                           |       |
| 29   | 61                   | 15                                  | 0                            | W                         | 601.75                           |       |
| 30   | 64                   | 12                                  | 0.13                         | W                         | 601.82                           |       |
| 31   | 58                   | 10                                  | 0.02                         | W                         | 601.68                           |       |

a Wind velocities and direction are from Lakewood pumping station records and are not official. The values are based on observations by the plant operators.

b Precipitation values are from U.S. Weather Bureau at Duluth International Airport.

c International Great Lakes Datum.

APPENDIX A-1 (CONTINUED) MONTH OF SEPTEMBER, 1974.

| Date | High<br>temp.,<br>°F | Wind<br>veloc.,<br>mph <sup>a</sup> | Precip.,<br>in. <sup>b</sup> | Wind<br>dir. <sup>a</sup> | Lake<br>level<br>ft. <sup>c</sup> | Notes |
|------|----------------------|-------------------------------------|------------------------------|---------------------------|-----------------------------------|-------|
| 1    | 58                   | 5                                   | T                            | W                         | 601.82                            |       |
| 2    | 55                   | 8                                   | T                            | NW                        | 601.79                            |       |
| 3    | 62                   | 7                                   | 0                            | SW                        | 601.74                            |       |
| 4    | 60                   | 0                                   | 0                            | --                        | 601.82                            |       |
| 5    | 59                   | 7                                   | 0                            | E                         | 601.88                            |       |
| 6    | 55                   | 10                                  | 0.02                         | E                         | 601.93                            |       |
| 7    | 56                   | 5                                   | 0.13                         | SE                        | 601.89                            |       |
| 8    | 62                   | 7                                   | 0.02                         | NW                        | 601.76                            |       |
| 9    | 53                   | 10                                  | 0.01                         | E                         | 601.89                            |       |
| 10   | 52                   | 10                                  | 0.01                         | E                         | 602.03                            |       |
| 11   | 66                   | 10                                  | 0.17                         | SW                        | 601.84                            |       |
| 12   | 49                   | 10                                  | 0.18                         | E                         | 601.85                            |       |
| 13   | 52                   | 15                                  | T                            | W                         | 601.73                            |       |
| 14   | 64                   | 12                                  | 0                            | SW                        | 601.83                            |       |
| 15   | 60                   | 10                                  | 0                            | NW                        | 601.75                            |       |
| 16   | 66                   | 10                                  | 0.02                         | SW                        | 601.79                            |       |
| 17   | 56                   | 7                                   | 0                            | NE                        | 601.88                            |       |
| 18   | 71                   | 10                                  | 0                            | SW                        | 601.89                            |       |
| 19   | 62                   | 8                                   | 0.03                         | SW                        | 601.80                            |       |
| 20   | 57                   | 10                                  | 0.01                         | SW                        | 601.84                            |       |
| 21   |                      |                                     |                              |                           |                                   |       |
| 22   |                      |                                     |                              |                           |                                   |       |
| 23   |                      |                                     |                              |                           |                                   |       |
| 24   |                      |                                     |                              |                           |                                   |       |
| 25   |                      |                                     |                              |                           |                                   |       |
| 26   |                      |                                     |                              |                           |                                   |       |
| 27   |                      |                                     |                              |                           |                                   |       |
| 28   |                      |                                     |                              |                           |                                   |       |
| 29   |                      |                                     |                              |                           |                                   |       |
| 30   |                      |                                     |                              |                           |                                   |       |
| 31   |                      |                                     |                              |                           |                                   |       |

a Wind velocities and direction are from Lakewood pumping station records and are not official. The values are based on observations by the plant operators.

b Precipitation values are from U.S. Weather Bureau at Duluth International Airport.

c International Great Lakes Datum.

**APPENDIX A-2 RAW WATER PUMPING SCHEDULE, DULUTH LAKEWOOD PUMPING STATION,  
1974.**

| Date | Time  |      | Total hours<br>of pumping | Total Volume<br>pumped, 1,000 gal. |
|------|-------|------|---------------------------|------------------------------------|
|      | Start | Stop |                           |                                    |
| 4-19 | 0830  | 2000 | 11.5                      | 13280                              |
|      | 2130  | 2400 | 2.5                       |                                    |
| 4-22 | 0830  | 0500 | 20.5                      | 19530                              |
| 4-23 | 1200  | 2100 | 9.0                       | 16580                              |
|      | 2400  | 0830 | 8.5                       |                                    |
| 4-24 | 0830  | 1530 | 7.0                       | 16480                              |
|      | 2200  | 0830 | 10.5                      |                                    |
| 4-25 | 0830  | 2400 | 15.5                      | 15180                              |
|      | 0800  | 0830 | 0.5                       |                                    |
| 4-26 | 0740  | 0830 | 0.5                       | 15300                              |
| 4-29 | 0830  | 1540 | 7.16                      | 11950                              |
|      | 1500  | 2400 | 5.00                      |                                    |
|      | 0800  | 0830 | 0.5                       |                                    |
| 4-30 | 0830  | 2000 | 11.5                      | 18850                              |
|      | 2400  | 0830 | 8.5                       |                                    |
| 5-1  | 0830  | 1900 | 10.5                      | 18080                              |
|      | 2400  | 0830 | 8.5                       |                                    |
| 5-2  | 0830  | 2400 | 15.5                      | 16860                              |
|      | 0615  | 0830 | 2.25                      |                                    |
|      | 0830  | 2345 | 15.25                     |                                    |
| 5-3  | 0800  | 0830 | 0.5                       | 14870                              |
| 5-6  | 0830  | 0900 | 0.5                       | 14070                              |
|      | 1000  | 1700 | 7.0                       |                                    |
|      | 0100  | 0830 | 7.5                       |                                    |
| 5-7  | 0830  | 1700 | 8.5                       | 16080                              |
|      | 2400  | 0830 | 8.5                       |                                    |
| 5-8  | 0830  | 1200 | 15.5                      | 15290                              |
|      | 0800  | 0830 | 0.5                       |                                    |
| 5-9  | 0830  | 2345 | 15.25                     | 15200                              |
|      | 0745  | 0830 | 0.75                      |                                    |
| 5-10 | 0830  | 2345 | 15.25                     | 15170                              |
|      | 0750  | 0830 | 0.67                      |                                    |

APPENDIX A-2 (CONTINUED)

| Date | Time  |      | Total hours<br>of pumping | Total Volume<br>pumped, 1,000 gal. |
|------|-------|------|---------------------------|------------------------------------|
|      | Start | Stop |                           |                                    |
| 5-11 | 0830  | 2345 | 15.25                     | 15380                              |
|      | 0730  | 0830 | 1.00                      |                                    |
| 5-12 | 0830  | 0830 | 24.0                      | 22900                              |
| 5-13 | 0830  | 1800 | 9.5                       | 16580                              |
|      | 0025  | 0830 | 8.083                     |                                    |
| 5-14 | 0830  | 2300 | 14.5                      | 16680                              |
|      | 0530  | 0830 | 3.0                       |                                    |
| 5-15 | 0830  | 2345 | 15.25                     | 15070                              |
|      | 0745  | 0830 | 0.75                      |                                    |
| 5-16 | 0830  | 2345 | 15.25                     | 14480                              |
| 5-17 | 1345  | 0830 | 18.75                     | 18090                              |
| 5-18 | 0830  | 2345 | 15.25                     | 14400                              |
| 5-19 | 0830  | 0700 | 22.5                      | 21550                              |
| 5-20 | 0830  | 1530 | 7.0                       | 14380                              |
|      | 0000  | 0830 | 8.5                       |                                    |
| 5-21 | 0830  | 1230 | 4.0                       | 17200                              |
|      | 1420  | 2000 | 5.66                      |                                    |
|      | 0000  | 0830 | 8.5                       |                                    |
| 5-22 | 0830  | 2400 | 15.5                      | 15600                              |
|      | 0740  | 0830 | 0.33                      |                                    |
| 5-23 | 0830  | 2345 | 15.25                     | 15430                              |
|      | 0730  | 0830 | 1.00                      |                                    |
| 5-24 | 0830  | 2345 | 15.25                     | 14440                              |
| 5-25 | 0830  | 2345 | 15.25                     | 14880                              |
|      | 0800  | 0830 | 0.5                       |                                    |
| 5-26 | 0830  | 0810 | 23.66                     | 22660                              |
| 5-27 | 1200  | 1900 | 7.0                       | 14520                              |
|      | 0000  | 0830 | 8.5                       |                                    |

APPENDIX A-2 (CONTINUED)

| Date | Time  |      | Total hours<br>of pumping | Total Volume<br>pumped, 1,000 gal. |
|------|-------|------|---------------------------|------------------------------------|
|      | Start | Stop |                           |                                    |
| 5-28 | 0830  | 1800 | 9.5                       | 17150                              |
|      | 0000  | 0830 | 8.5                       |                                    |
| 5-29 | 0830  | 1520 | 6.83                      | 12890                              |
|      | 1800  | 2400 | 6.0                       |                                    |
| 5-30 | 0830  | 2345 | 15.25                     | 15140                              |
|      | 0745  | 0830 | 0.75                      |                                    |
| 5-31 | 0830  | 2345 | 15.25                     | 14910                              |
|      | 0800  | 0830 | 0.5                       |                                    |
| 6-1  | 0830  | 2345 | 15.25                     | 14990                              |
|      | 0800  | 0830 | 0.5                       |                                    |
| 6-2  | 0830  | 1330 | 5.0                       | 22140                              |
|      | 1430  | 0830 | 18.0                      |                                    |
| 6-3  | 0830  | 1900 | 10.5                      | 17120                              |
|      | 0000  | 0330 | 3.5                       |                                    |
|      | 0415  | 0830 | 4.25                      |                                    |
| 6-4  | 0830  | 2030 | 12.0                      | 19490                              |
|      | 0000  | 0830 | 8.5                       |                                    |
| 6-5  | 0830  | 2400 | 15.5                      | 15340                              |
|      | 0800  | 0830 | 0.5                       |                                    |
| 6-6  | 0830  | 2345 | 15.25                     | 15310                              |
|      | 0745  | 0830 | 0.75                      |                                    |
| 6-7  | 0830  | 2345 | 15.25                     | 16620                              |
|      | 0620  | 0830 | 2.14                      |                                    |
| 6-8  | 0830  | 2345 | 15.25                     | 15750                              |
|      | 0720  | 0830 | 1.14                      |                                    |
| 6-9  | 0830  | 0830 | 24.0                      | 23090                              |
| 6-10 | 0830  | 1800 | 9.5                       | 16980                              |
|      | 2400  | 0830 | 8.5                       |                                    |
| 6-11 | 0830  | 2400 | 15.5                      | 17000                              |
|      | 0620  | 0830 | 2.14                      |                                    |

APPENDIX A-2 (CONTINUED)

| Date | Time  |      | Total hours<br>of pumping | Total Volume<br>pumped, 1,000 gal. |
|------|-------|------|---------------------------|------------------------------------|
|      | Start | Stop |                           |                                    |
| 6-12 | 0830  | 2400 | 15.5                      | 16540                              |
|      | 0630  | 0830 | 2.0                       |                                    |
| 6-13 | 0830  | 2345 | 15.25                     | 15230                              |
|      | 0745  | 0830 | 0.75                      |                                    |
| 6-14 | 0830  | 2145 | 13.25                     | 20900                              |
|      | 2350  | 0830 | 8.67                      |                                    |
| 6-15 | 0830  | 2345 | 15.25                     | 14990                              |
|      | 0800  | 0830 | 0.5                       |                                    |
| 6-16 | 0830  | 0830 | 24.0                      | 22920                              |
| 6-17 | 0830  | 1700 | 8.5                       | 16050                              |
|      | 2400  | 0830 | 8.5                       |                                    |
| 6-18 | 0830  | 1900 | 10.5                      | 18080                              |
|      | 2400  | 0830 | 8.5                       |                                    |
| 6-19 | 0830  | 2400 | 15.5                      | 17040                              |
|      | 0610  | 0830 | 2.33                      |                                    |
| 6-20 | 0830  | 0830 | 24.0                      | 22970                              |
| 6-21 | 0830  | 2345 | 15.25                     | 14920                              |
|      | 0800  | 0830 | 0.5                       |                                    |
| 6-22 | 0830  | 2345 | 15.25                     | 14720                              |
| 6-23 | 0830  | 0830 | 24.0                      | 23010                              |
| 6-24 | 0830  | 2100 | 12.5                      | 20050                              |
|      | 2400  | 0830 | 8.5                       |                                    |
| 6-25 | 0830  | 0830 | 24.0                      | 22980                              |
| 6-26 | 0830  | 0830 | 24.0                      | 22850                              |
| 6-27 | 0830  | 1515 | 6.75                      | 22320                              |
|      | 1545  | 0830 | 16.75                     |                                    |
| 6-28 | 0830  | 0715 | 22.75                     | 21700                              |
| 6-29 | 0830  | 0510 | 20.67                     | 20050                              |
|      | 0800  | 0830 | 0.5                       |                                    |

APPENDIX A-2 (CONTINUED)

| Date | Time  |      | Total hours<br>of pumping | Total Volume<br>pumped, 1,000 gal. |
|------|-------|------|---------------------------|------------------------------------|
|      | Start | Stop |                           |                                    |
| 6-30 | 0830  | 0500 | 20.5                      | 21280                              |
|      | 0625  | 0830 | 2.09                      |                                    |
| 6-31 | 0830  | 1745 | 9.67                      | 18730                              |
|      | 2045  | 0715 | 10.5                      |                                    |
| 7-1  | 0830  | 1745 | 9.67                      | 18730                              |
|      | 2045  | 0715 | 10.5                      |                                    |
| 7-2  | 0830  | 0630 | 22.0                      | 20910                              |
| 7-3  | 0830  | 0230 | 18.0                      | 19090                              |
|      | 0630  | 0830 | 2.0                       |                                    |
| 7-4  | 0830  | 1430 | 6.0                       | 16410                              |
|      | 2100  | 0830 | 11.5                      |                                    |
| 7-5  | 0830  | 2200 | 13.5                      | 20160                              |
|      | 0045  | 0830 | 7.75                      |                                    |
| 7-6  | 0830  | 2345 | 15.25                     | 14800                              |
|      | 0800  | 0830 | 0.5                       |                                    |
| 7-7  | 0830  | 0830 | 24.0                      | 22910                              |
| 7-8  | 0830  | 0830 | 24.0                      | 23120                              |
| 7-9  | 0830  | 0830 | 24.0                      | 23120                              |
| 7-10 | 0830  | 0830 | 24.0                      | 22920                              |
| 7-11 | 0830  | 0830 | 24.0                      | 22850                              |
| 7-12 | 0830  | 2030 | 12.0                      | 22850                              |
|      | 2230  | 0830 | 10.0                      | 20830                              |
| 7-13 | 0830  | 1910 | 10.67                     | 21140                              |
|      | 2100  | 0830 | 11.5                      |                                    |
| 7-14 | 0830  | 1015 | 1.75                      | 19110                              |
|      | 1410  | 0830 | 18.33                     |                                    |
| 7-15 | 0830  | 1730 | 9.0                       | 20570                              |
|      | 1945  | 0830 | 12.75                     |                                    |

APPENDIX A-2 (CONTINUED)

| Date | Time  |      | Total hours<br>of pumping | Total Volume<br>pumped, 1,000 gal. |
|------|-------|------|---------------------------|------------------------------------|
|      | Start | Stop |                           |                                    |
| 8-2  | 0830  | 2400 | 15.5                      | 15630                              |
|      | 0730  | 0830 | 1.0                       |                                    |
| 8-3  | 0830  | 2345 | 15.25                     | 15630                              |
|      | 0715  | 0830 | 1.25                      |                                    |
| 8-4  | 0830  | 0830 | 24.0                      | 23080                              |
| 8-5  | 0830  | 2000 | 11.5                      | 19090                              |
|      | 2400  | 0830 | 8.5                       |                                    |
| 8-6  | 0830  | 0700 | 22.5                      | 21470                              |
|      | 0820  | 0830 | 0.166...                  |                                    |
| 8-7  | 0830  | 0330 | 19.0                      | 19180                              |
|      | 0715  | 0830 | 1.25                      |                                    |
| 8-8  | 0830  | 0830 | 24.0                      | 22730                              |
| 8-9  | 0830  | 1900 | 10.5                      | 15630                              |
|      | 1945  | 0115 | 5.5                       |                                    |
|      | 0800  | 0830 | 0.5                       |                                    |
| 8-10 | 0830  | 2345 | 15.25                     | 14920                              |
|      | 0800  | 0830 | 0.5                       |                                    |
| 8-11 | 0830  | 0700 | 22.5                      | 21570                              |
| 8-12 | 0830  | 0300 | 18.5                      | 18940                              |
|      | 0700  | 0830 | 1.5                       |                                    |
| 8-13 | 0830  | 0500 | 20.5                      | 19560                              |
| 8-14 | 0925  | 0830 | 23.083...                 | 21980                              |
| 8-15 | 0830  | 1700 | 8.25                      | 19080                              |
|      | 2100  | 0830 | 11.5                      |                                    |
| 8-16 | 0830  | 1730 | 9.0                       | 17620                              |
|      | 1830  | 0400 | 9.5                       |                                    |
| 8-17 | 0830  | 2345 | 15.25                     | 14920                              |
|      | 0800  | 0830 | 0.5                       |                                    |
| 8-18 | 0830  | 0830 | 24.0                      | 22850                              |

APPENDIX A-2 (CONTINUED)

| Date | Time  |      | Total hours<br>of pumping | Total Volume<br>pumped, 1,000 gal. |
|------|-------|------|---------------------------|------------------------------------|
|      | Start | Stop |                           |                                    |
| 7-16 | 0830  | 1830 | 10.0                      | 20800                              |
|      | 2030  | 0830 | 12.0                      |                                    |
| 7-17 | 0830  | 2400 | 15.5                      | 21740                              |
|      | 0100  | 0830 | 7.5                       |                                    |
| 7-18 | 0830  | 0830 | 24.0                      | 22930                              |
| 7-19 | 0830  | 0830 | 24.0                      | 22850                              |
| 7-20 | 0830  | 1600 | 7.5                       | 21970                              |
|      | 1700  | 0830 | 15.5                      |                                    |
| 7-21 | 0830  | 0900 | 0.5                       | 17950                              |
|      | 1400  | 0830 | 18.5                      |                                    |
| 7-22 | 0830  | 1715 | 8.75                      | 17850                              |
|      | 2000  | 0600 | 10.0                      |                                    |
| 7-23 | 0830  | 1215 | 3.75                      | 20820                              |
|      | 1400  | 0830 | 18.5                      |                                    |
| 7-24 | 0830  | 0100 | 16.5                      | 17600                              |
|      | 0600  | 0830 | 2.5                       |                                    |
| 7-25 | 0830  | 0830 | 24.0                      | 22290                              |
| 7-26 | 0830  | 0830 | 24.0                      | 22560                              |
| 7-27 | 0830  | 2345 | 15.25                     | 15210                              |
|      | 0730  | 0830 | 1.0                       |                                    |
| 7-28 | 0830  | 0830 | 24.0                      | 22950                              |
| 7-29 | 0830  | 2155 | 13.41                     | 20730                              |
|      | 2400  | 0830 | 8.5                       |                                    |
| 7-30 | 0830  | 1930 | 11.0                      | 20790                              |
|      | 2130  | 0830 | 11.0                      |                                    |
| 7-31 | 0830  | 0500 | 20.5                      | 21260                              |
|      | 0630  | 0830 | 2.5                       |                                    |
| 8-1  | 0830  | 0400 | 19.5                      | 19000                              |
|      | 0745  | 0830 | 0.75                      |                                    |

**APPENDIX A-2 (CONTINUED)**

| <b>Date</b> | <b>Time</b>  |             | <b>Total hours<br/>of pumping</b> | <b>Total Volume<br/>pumped, 1,000 gal.</b> |
|-------------|--------------|-------------|-----------------------------------|--------------------------------------------|
|             | <b>Start</b> | <b>Stop</b> |                                   |                                            |
| 8-19        | 0830         | 2100        | 12.5                              |                                            |
|             | 0100         | 0830        | 7.5                               | 18940                                      |
| 8-20        | 0830         | 0730        | 23.0                              | 21780                                      |
| 8-21        | 1015         | 0830        | 22.25                             | 21400                                      |
| 8-22        | 0830         | 2100        | 12.5                              |                                            |
|             | 2400         | 0500        | 5.0                               |                                            |
|             | 0800         | 0830        | 0.5                               | 17050                                      |
| 8-23        | 0830         | 2400        | 15.5                              |                                            |
|             | 0630         | 0830        | 2.0                               | 16500                                      |
| 8-24        | 0830         | 2400        | 15.5                              |                                            |
|             | 0815         | 0830        | 0.25                              | 14920                                      |
| 8-25        | 0830         | 2225        | 13.91                             |                                            |
|             | 0040         | 0830        | 7.83                              | 20700                                      |
| 8-26        | 0830         | 0300        | 18.5                              | 17540                                      |
| 8-27        | 0830         | 0830        | 24.0                              | 22750                                      |
| 8-28        | 0830         | 0900        | 0.5                               |                                            |
|             | 1300         | 0615        | 17.25                             | 16830                                      |
| 8-29        | 1200         | 0815        | 20.25                             | 19200                                      |
| 8-30        | 1030         | 2400        | 13.5                              | 12790                                      |
| 8-31        | 0830         | 2345        | 15.25                             |                                            |
|             | 0800         | 0830        | 0.5                               | 14920                                      |
| 9-1         | 0830         | 0400        | 19.5                              | 18480                                      |
| 9-2         | 1130         | 0130        | 14.0                              | 13270                                      |
| 9-3         | 1030         | 0830        | 22.0                              | 20850                                      |
| 9-4         | 0830         | 1200        | 3.5                               |                                            |
|             | 1700         | 0400        | 11.0                              | 13740                                      |
| 9-5         | 1100         | 0830        | 21.5                              | 20380                                      |

**APPENDIX A-2 (CONTINUED)**

| <u>Date</u> | <u>Time</u>  |             | <u>Total hours<br/>of pumping</u> | <u>Total Volume<br/>pumped, 1,000 gal.</u> |
|-------------|--------------|-------------|-----------------------------------|--------------------------------------------|
|             | <u>Start</u> | <u>Stop</u> |                                   |                                            |
| 9-6         | 0830         | 1630        | 8.0                               |                                            |
|             | 1830         | 2400        | 5.5                               |                                            |
|             | 0800         | 0830        | 0.5                               | 13260                                      |
| 9-7         | 0830         | 2345        | 15.25                             | 14450                                      |
| 9-8         | 0830         | 0830        | 24.0                              | 22790                                      |
| 9-9         | 0830         | 1130        | 3.0                               |                                            |
|             | 1830         | 0630        | 12.0                              | 14210                                      |
| 9-10        | 1200         | 0600        | 18.0                              | 17060                                      |
| 9-11        | 1200         | 0830        | 20.5                              | 19420                                      |
| 9-12        | 1200         | 0215        | 14.25                             | 13500                                      |
| 9-13        | 0900         | 2400        | 15.0                              | 13700                                      |
| 9-14        | 0830         | 2345        | 15.25                             |                                            |
|             | 0800         | 0830        | 0.5                               | 14920                                      |
| 9-15        | 0830         | 0800        | 23.5                              | 22280                                      |
| 9-16        | 2115         | 0830        | 11.25                             | 10480                                      |
| 9-17        | 0830         | 0830        | 24.0                              | 22730                                      |
| 9-18        | 0830         | 1530        | 7.0                               | 15660                                      |
|             |              |             |                                   |                                            |
| 9-19        | 0830         | 0900        | 0.5                               |                                            |
|             | 0745         | 0830        | 0.75                              | 990                                        |
| 9-20        | 0830         | 0830        | 24.0                              | 22730                                      |

APPENDIX A-3 RAW AND EFFLUENT WATER SAMPLE PARAMETERS, DULUTH LAKEWOOD  
PUMPING STATION, 1974

| Date | Unit  | Run | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|--------------|------|-------------|--------------|------------------|------------------------|---------------|
| 5-14 | Raw   |     | 1.20         | 7.80 | 33          | 42           |                  |                        |               |
|      | MM-1  | 6   | 0.27         | 7.40 |             | 32           |                  |                        |               |
|      | MM-2  | 36  | 0.19         | 7.05 |             | 33           |                  |                        |               |
|      | BIF   | 7   | 0.29         | 7.80 |             | 42           |                  |                        |               |
|      | ERD-2 | 10  | 0.40         | 7.70 | 37          | 42           |                  |                        |               |
| 5-16 | MM-1  | 6   | 0.23         | 7.00 |             | 32           |                  |                        |               |
|      | MM-2  | 36  | 0.21         | 7.00 |             | 33           |                  |                        |               |
|      | BIF   | 7   | 0.30         | 7.80 |             | 41           |                  |                        |               |
|      | ERD-2 | 10  | 0.30         | 7.65 | 37          | 41           |                  |                        |               |
|      | MM-1  | 6   | 0.17         | 7.10 |             | 31           |                  |                        |               |
|      | MM-2  | 37  | 0.14         | 7.15 |             | 33           |                  |                        |               |
|      | MM-1  | 7   | 0.15         | 7.00 |             | 33           |                  |                        |               |
|      | MM-2  | 37  | 0.10         | 7.00 |             | 32           |                  |                        |               |
|      | BIF   | 8   | 0.16         | 7.80 | 37          | 41           |                  |                        |               |
|      | ERD-2 | 10  | 0.14         | 7.80 | 37          | 40           |                  |                        |               |
|      | Raw   |     | 0.93         | 7.10 | 33          | 38           |                  |                        |               |
|      | MM-1  | 8   | 0.17         | 7.00 | 34          | 32           |                  |                        |               |
|      | MM-2  | 38  | 0.24         | 7.20 | 37          | 33           |                  |                        |               |
|      | BIF   | 8   | 0.28         | 7.90 | 37          | 39           |                  |                        |               |
|      | ERD-2 | 10  | 0.43         | 7.80 | 37          | 39           |                  |                        |               |
|      | ERD-2 | 11  | 0.35         | 7.20 |             | 38           |                  |                        |               |
|      | Raw   |     | 1.4          | 7.70 | 34          | 40           |                  |                        |               |
|      | MM-1  | 8   | 0.16         | 7.20 | 34          | 31           |                  |                        |               |
|      | MM-2  | 38  | 0.11         | 7.20 | 38          | 32           |                  |                        |               |
|      | BIF   | 9   | 0.54         | 7.60 | 38          | 40           |                  |                        |               |
|      | ERD-2 | 11  | 0.38         | 7.60 | 38          | 40           |                  |                        |               |
| 5-17 | MM-1  | 9   | 0.11         | 7.25 | 38          | 34           |                  |                        |               |
|      | MM-1  | 10  | 0.18         | 7.20 | 37          | 35           |                  |                        |               |
|      | MM-2  | 39  | 0.12         | 7.25 | 37          | 34           |                  |                        |               |
|      | BIF   | 9   | 0.55         | 7.85 | 36          | 42           |                  |                        |               |
|      | ERD-2 | 11  | 0.25         | 7.75 | 37          | 42           |                  |                        |               |
|      | Raw   |     | 0.79         | 7.90 | 33          | 43           |                  |                        |               |
|      | MM-1  | 10  | 0.25         | 7.30 | 37          | 35           |                  |                        |               |
|      | MM-2  | 39  | 0.11         | 7.20 | 39          | 34           |                  |                        |               |
|      | MM-2  | 40  | 0.20         | 7.25 | 35          | 35           |                  |                        |               |
|      | BIF   | 9   | 0.22         | 7.80 | 37          | 42           |                  |                        |               |
|      | ERD-2 | 12  | 0.34         | 7.8+ | 38          | 42           |                  |                        |               |

## APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb,<br>FTU | pH    | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|--------------|-------|-------------|--------------|------------------|------------------------|---------------|
| 5-18 | Raw   |     | 1.3          | 7.85  | 33          | 43           |                  |                        |               |
|      | MM-1  | 10  | 0.14         | 7.2   | 38          | 33           |                  |                        |               |
|      | MM-1  | 11  | 0.43         | 7.25  | 34          | 34           |                  |                        |               |
|      | MM-2  | 40  | 0.24         | 7.2+  | 35          | 34           |                  |                        |               |
|      | BIF   | 9   | 0.35         | 7.85  | 37          | 42+          |                  |                        |               |
|      | ERD-2 | 12  | 0.25         | 7.8+  | 38          | 41+          |                  |                        |               |
| 5-20 | Raw   |     | 0.74         | 7.9   | 34          | 42           |                  |                        |               |
|      | MM-1  | 12  | 0.28         | 7.8   | 35          | 36           |                  |                        |               |
|      | MM-2  | 41  | 0.53         | 7.5   | 38          | 38           |                  |                        |               |
|      | BIF   | 10  | 0.26         | 7.85  | 35          | 42           |                  |                        |               |
|      | ERD-2 | 13  | 0.34         | 7.9+  | 36          | 42           |                  |                        |               |
|      | MM-1  | 12  | 0.15         | 7.35  | 36          | 35           |                  |                        |               |
|      | MM-2  | 41  | 0.11         | 7.25  | 35          | 34           |                  |                        |               |
|      | BIF   | 10  | 0.40         | 7.9+  | 35          | 42           |                  |                        |               |
|      | ERD-2 | 13  | 0.15         | 7.9   | 35          | 42           |                  |                        |               |
|      | MM-1  | 13  | 0.19         | 7.25  | 37.5        | 35           |                  |                        |               |
|      | MM-2  | 41  | 0.08         | 7.2+  | 38          | 34           |                  |                        |               |
|      | BIF   | 10  | 0.34         | 7.85+ | 32          | 42           |                  |                        |               |
| 5-21 | ERD-2 | 13  | 0.17         | 7.85  | 35          | 42           |                  |                        |               |
|      | MM-1  | 14  | 0.20         | 7.3   |             | 35           |                  |                        |               |
|      | Raw   |     | 0.84         | 7.8+  | 34          | 42           |                  |                        |               |
|      | MM-1  | 14  | 0.27         | 7.3   | 35          | 36           |                  |                        |               |
|      | MM-2  | 42  | 0.35         | 7.2+  | 36          | 34           |                  |                        |               |
|      | BIF   | 10  | 0.32         | 7.85+ | 34          | 42           |                  |                        |               |
|      | ERD-2 | 13  | 0.19         | 7.8   | 35          | 43           |                  |                        |               |
|      | MM-1  | 15  | 0.22         | 7.3   | 35          | 38           |                  |                        |               |
|      | MM-2  | 42  | 0.08         | 7.2   | 35          | 36           |                  |                        |               |
|      | BIF   | 11  | 0.18         | 7.85  | 36          | 42           |                  |                        |               |
|      | ERD-2 | 13  | 0.17         | 7.75  | 35          | 40           |                  |                        |               |
|      | MM-1  | 15  | 0.25         | 7.50  |             | 33           |                  |                        |               |
|      | MM-2  | 43  | 0.20         | 7.28  | 34.5        | 32           |                  |                        |               |
|      | BIF   | 11  | 0.20         | 7.95  | 34          | 39           |                  |                        |               |
|      | ERD-2 | 13  | 0.09         | 7.90  | 34.5        | 39           |                  |                        |               |
|      | MM-1  | 16  | 0.30         | 7.39  | 34.5        | 33           |                  |                        |               |
|      |       |     |              |       |             |              |                  |                        |               |
|      |       |     |              |       |             |              |                  |                        |               |
| 5-22 | MM-1  | 15  | 0.25         | 7.50  |             | 33           |                  |                        |               |
|      | MM-2  | 43  | 0.20         | 7.28  | 34.5        | 32           |                  |                        |               |
|      | BIF   | 11  | 0.20         | 7.95  | 34          | 39           |                  |                        |               |
|      | ERD-2 | 13  | 0.09         | 7.90  | 34.5        | 39           |                  |                        |               |
|      | MM-1  | 16  | 0.30         | 7.39  | 34.5        | 33           |                  |                        |               |

## APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|--------------|------|-------------|--------------|------------------|------------------------|---------------|
| 5-23 | MM-1  | 16  | 0.42         | 7.38 | 36          | 33           |                  |                        |               |
|      | BIF   | 11  | 0.46         | 7.90 | 34.5        | 39           |                  |                        |               |
|      | ERD-2 | 13  | 0.18         | 7.88 | 35          | 39           |                  |                        |               |
|      | MM-1  | 17  | 0.50         | 7.40 | 34.5        | 33           |                  |                        |               |
|      | MM-2  | 43  | 0.13         | 7.20 | 36          | 32           |                  |                        |               |
|      | Raw   |     | 0.90         | 7.90 | 34          | 40           |                  |                        |               |
|      | MM-1  | 17  | 0.45         | 7.35 | 36          | 33           |                  |                        |               |
|      | Raw   |     | 0.82         | 7.80 |             | 39           |                  |                        |               |
|      | MM-1  | 17  | 0.25         | 7.38 | 36          | 33           |                  |                        |               |
|      | BIF   | 11  | 0.20         | 7.90 | 35          | 39           |                  |                        |               |
|      | Raw   |     | 1.5          | 7.80 | 34.5        | 40           |                  |                        |               |
|      | MM-1  | 18  | 0.30         | 7.39 | 35          | 34           |                  |                        |               |
|      | MM-2  | 44  | 0.10         | 7.35 | 36          | 34           |                  |                        |               |
|      | BIF   | 12  | 0.09         | 7.85 | 35          | 39           |                  |                        |               |
|      | ERD-2 | 13  | 0.11         | 7.90 | 35          | 38           |                  |                        |               |
|      | MM-1  | 18  | 0.25         | 7.55 |             | 35           |                  |                        |               |
|      | MM-2  | 44  | 0.15         | 7.20 |             | 32           |                  |                        |               |
|      | BIF   | 12  | 0.29         | 7.85 | 34.5        | 38           |                  |                        |               |
|      | ERD-2 | 13  | 0.20         | 7.85 |             | 39           |                  |                        |               |
|      | MM-1  | 19  | 0.35         | 7.40 | 34.5        | 33           |                  |                        |               |
|      | MM-2  | 45  | 0.15         | 7.25 | 34.5        | 33           |                  |                        |               |
|      | ERD-2 | 13  | 0.16         | 7.80 | 34.5        | 38           |                  |                        |               |
|      | MM-1  | 19  | 0.47         | 7.35 | 32          | 32           |                  |                        |               |
|      | Raw   |     | 1.0          | 8.00 | 35          | 42           |                  |                        |               |
|      | MM-1  | 20  | 0.20         | 7.30 | 35.5        | 33           |                  |                        |               |
|      | MM-2  | 45  | 0.15         | 7.40 | 37.5        | 34           |                  |                        |               |
|      | BIF   | 12  | 0.40         | 8.05 | 35          | 40           |                  |                        |               |
|      | ERD-2 | 13  | 0.16         | 8.00 | 35.5        | 40           |                  |                        |               |
|      | BIF   | 12  | 1.6          | 7.99 |             | 39           |                  |                        |               |
|      | MM-1  | 20  | 0.16         | 7.39 | 35          | 32           |                  |                        |               |
|      | MM-1  | 21  | 0.18         | 7.38 | 35          | 32           |                  |                        |               |
|      | MM-2  | 46  | 0.14         | 7.30 | 35          | 31           |                  |                        |               |
|      | BIF   | 13  | 0.40         | 7.90 |             | 40           |                  |                        |               |
|      | ERD-2 | 13  | 0.18         | 7.95 | 35          | 40           |                  |                        |               |
| 5-24 | MM-1  | 21  | 0.15         | 7.30 | 35          | 32           |                  |                        |               |
|      | MM-2  | 46  | 0.10         | 7.22 | 35          | 30           |                  |                        |               |
|      | BIF   | 13  | 0.30         | 7.63 | 35          | 38           |                  |                        |               |
|      | ERD-2 | 13  | 0.19         | 7.71 | 35          | 38           |                  |                        |               |

APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|--------------|------|-------------|--------------|------------------|------------------------|---------------|
|      | MM-1  | 22  | 0.13         | 7.38 | 34.5        | 31           |                  |                        |               |
|      | MM-2  | 47  | 0.21         | 7.30 | 35          | 32           |                  |                        |               |
|      | BIF   | 13  | 0.31         | 7.98 | 35          | 40           |                  |                        |               |
|      | ERD-2 | 13  | 0.24         | 7.98 | 35.5        | 39           |                  |                        |               |
|      | Raw   |     | 0.87         | 7.99 | 35          | 40           |                  |                        |               |
|      | MM-1  | 22  | 0.13         | 7.35 |             | 31           |                  |                        |               |
|      | MM-2  | 47  | 0.11         | 7.34 |             | 32           |                  |                        |               |
|      | BIF   | 14  | 0.45         | 7.97 |             | 40           |                  |                        |               |
|      | ERD-2 | 13  | 0.20         | 7.99 |             | 39           |                  |                        |               |
|      |       |     |              |      |             |              |                  |                        |               |
| 5-25 | MM-1  | 22  | 0.75         | 7.30 | 35          | 32           |                  |                        |               |
|      | MM-2  | 47  | 0.08         | 7.25 | 35          | 31           |                  |                        |               |
|      | Raw   |     | 0.90         | 7.50 | 35          | 37           |                  |                        |               |
|      | BIF   | 14  | 0.35         | 7.99 | 35          | 40           |                  |                        |               |
|      | ERD-2 | 13  | 0.27         | 7.50 | 35          | 37           |                  |                        |               |
|      |       |     |              |      |             |              |                  |                        |               |
| 5-28 | MM-1  | 23  | 0.13         | 7.45 | 35          | 35           |                  |                        |               |
|      | MM-2  | 48  | 0.10         | 7.40 | 35          | 31           |                  |                        |               |
|      | BIF   | 15  | 0.95         | 7.80 | 35          | 39           |                  |                        |               |
|      | ERD-2 | 14  | 0.28         | 7.95 | 36          | 40           |                  |                        |               |
|      | Raw   |     | 0.84         | 7.55 | 35          | 42           |                  |                        |               |
|      |       |     |              |      |             |              |                  |                        |               |
|      | BIF   | 15  | 0.56         | 7.98 |             | 38           |                  |                        |               |
|      | MM-1  | 23  | 0.34         | 7.45 | 35          | 33           |                  |                        |               |
|      | MM-2  | 45  | 0.23         | 7.40 | 35          | 34           |                  |                        |               |
|      | BIF   | 16  | 0.22         | 7.91 | 35          | 40           |                  |                        |               |
| 5-29 | ERD-2 | 14  | 0.18         | 7.90 | 36          | 38           |                  |                        |               |
|      |       |     |              |      |             |              |                  |                        |               |
|      | MM-1  | 24  | 0.20         | 7.51 | 35.5        | 34           |                  |                        |               |
|      | MM-2  | 48  | 0.90         | 7.40 | 36          | 33           |                  |                        |               |
|      | BIF   | 16  | 0.45         | 8.00 | 36          | 43           |                  |                        |               |
|      | ERD-2 | 14  | 0.27         | 7.99 | 36          | 42           |                  |                        |               |
|      | Raw   |     | 0.95         | 8.10 | 35.5        | 40           |                  |                        |               |
|      | MM-2  | 49  | 0.26         | 7.45 |             | 34           |                  |                        |               |
|      |       |     |              |      |             |              |                  |                        |               |
|      | MM-1  | 24  | 0.57         | 7.35 | 35          | 36           |                  |                        |               |
|      | MM-2  | 49  | 0.11         | 7.21 | 35          | 35           |                  |                        |               |
|      | BIF   | 16  | 0.30         | 7.65 | 36.5        | 43           |                  |                        |               |
|      | ERD-2 | 14  | 0.16         | 7.87 | 36.5        | 43           |                  |                        |               |
|      | Raw   |     | 0.93         | 7.81 | 35          | 44           |                  |                        |               |
|      |       |     |              |      |             |              |                  |                        |               |

## APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|--------------|------|-------------|--------------|------------------|------------------------|---------------|
| 5-30 | MM-1  | 24  | 1.50         | 7.20 |             | 36           |                  |                        |               |
|      | MM-2  | 49  | 0.09         | 7.09 | 35          | 35           |                  |                        |               |
|      | BIF   | 17  | 0.13         | 7.72 | 36          | 42           |                  |                        |               |
|      | ERD-2 | 14  | 0.15         | 7.62 | 36          | 42           |                  |                        |               |
|      | MM-1  | 25  | 0.10         | 7.21 | 35          | 37           |                  |                        |               |
|      | MM-2  | 49  | 0.83         | 7.42 | 35          | 33           |                  |                        |               |
|      | MM-1  | 25  | 0.10         | 7.47 | 35.5        | 37           |                  |                        |               |
|      | MM-2  | 50  | 0.09         | 7.35 | 37          | 34           |                  |                        |               |
|      | BIF   | 17  | 0.21         | 7.85 | 37          | 40           |                  |                        |               |
|      | ERD-2 | 14  | 0.17         | 7.90 | 36.5        | 43           |                  |                        |               |
|      | Raw   |     | 0.76         | 7.71 | 35          | 42           |                  |                        |               |
|      | MM-1  | 25  | 0.08         | 7.49 | 36.5        | 35           |                  |                        |               |
|      | MM-2  | 50  | 0.08         | 7.39 | 37          | 37           |                  |                        |               |
|      | MM-1  | 26  | 0.15         | 7.48 | 35          | 37           |                  |                        |               |
|      | BIF   | 17  | 0.34         | 7.93 | 35.5        | 43           |                  |                        |               |
|      | ERD-2 | 14  | 0.15         | 7.90 | 36.5        | 43           |                  |                        |               |
|      | BIF   | 17  | 0.33         | 7.72 |             | 43           |                  |                        |               |
|      | MM-1  | 26  | 0.13         | 7.16 |             | 37           |                  |                        |               |
|      | MM-2  | 50  | 0.06         | 7.08 |             | 36           |                  |                        |               |
| 5-31 | BIF   | 18  | 0.18         | 7.70 |             | 43           |                  |                        |               |
|      | ERD-2 | 14  | 0.15         | 7.60 |             | 43           |                  |                        |               |
|      | MM-2  | 50  | 0.50         | 7.15 |             | 36           |                  |                        |               |
|      | MM-1  | 26  | 0.16         | 7.09 |             | 33           |                  |                        |               |
|      | MM-2  | 51  | 0.36         | 7.18 |             | 36           |                  |                        |               |
|      | BIF   | 18  | 0.24         | 7.34 |             | 40           |                  |                        |               |
|      | ERD-2 | 14  | 0.18         | 7.42 |             | 40           |                  |                        |               |
|      | Raw   |     | 0.80         | 7.39 | 35          | 40           |                  |                        |               |
|      | MM-1  | 27  | 0.28         | 7.20 |             | 36           |                  |                        |               |
|      | MM-1  | 27  | 0.16         | 7.45 |             | 39           |                  |                        |               |
|      | MM-2  | 51  | 0.32         | 7.40 |             | 39           |                  |                        |               |
|      | BIF   | 18  | 0.24         | 7.80 |             | 43           |                  |                        |               |
|      | Raw   |     | 0.89         | 7.90 | 35          | 43           |                  |                        |               |
|      | MM-1  | 27  | 0.11         | 7.45 |             | 39           |                  |                        |               |
|      | MM-2  | 51  | 0.36         | 7.41 |             | 39           |                  |                        |               |
|      | BIF   | 18  | 0.19         | 7.91 |             | 43           |                  |                        |               |
|      | Raw   |     | 0.75         | 7.90 | 35          | 43           |                  |                        |               |

## APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|--------------|------|-------------|--------------|------------------|------------------------|---------------|
| 6-1  | Raw   |     | 0.84         | 7.75 | 36          | 43           |                  |                        |               |
|      | MM-1  | 27  | 0.10         | 7.30 |             | 39           |                  |                        |               |
|      | MM-2  | 51  | 0.50         | 7.45 |             | 39           |                  |                        |               |
|      | BIF   | 18  | 0.26         | 7.85 |             | 43           |                  |                        |               |
| 6-3  | MM-1  | 28  | 0.15         | 7.45 |             | 39           |                  |                        |               |
|      | MM-2  | 52  | 0.10         | 7.35 |             | 38           |                  |                        |               |
|      | BIF   | 19  | 0.20         | 7.80 |             | 42           |                  |                        |               |
|      | ERD-2 | 15  | 0.55         | 7.43 |             | 40           |                  |                        |               |
|      | Raw   |     | 0.77         | 7.91 | 36.5        | 43           |                  |                        |               |
|      | Raw   |     | 0.80         | 7.88 | 36.5        | 40           |                  |                        |               |
|      | MM-1  | 28  | 0.09         | 7.48 |             | 35           |                  |                        |               |
|      | MM-2  | 52  | 0.15         | 7.42 |             | 37           |                  |                        |               |
|      | BIF   | 19  | 0.19         | 7.70 |             | 41           |                  |                        |               |
|      | ERD-2 | 15  | 0.18         | 7.60 |             | 41           |                  |                        |               |
|      | MM-2  | 52  | 0.08         | 7.44 |             | 38           |                  |                        |               |
|      | MM-1  | 28  | 0.10         | 7.40 |             | 35           |                  |                        |               |
| 6-4  | BIF   | 19  | 0.15         | 7.70 |             | 41           |                  |                        |               |
|      | ERD-2 | 15  | 0.15         | 7.65 |             | 41           |                  |                        |               |
|      | Raw   |     | 0.80         | 8.00 | 36.5        | 42           |                  |                        |               |
|      | MM-1  | 29  | 0.14         | 7.40 |             | 35           |                  |                        |               |
|      | MM-2  | 53  | 0.12         | 7.50 |             | 36           |                  |                        |               |
|      | BIF   | 19  | 0.15         | 8.05 |             | 41           |                  |                        |               |
|      | ERD-2 | 15  | 0.13         | 7.90 |             | 38           |                  |                        |               |
|      | Raw   |     | 0.77         | 8.00 |             | 42           |                  |                        |               |
|      | MM-1  | 29  | 0.10         | 7.55 |             | 34           |                  |                        |               |
|      | MM-2  | 53  | 0.07         | 7.50 |             | 35           |                  |                        |               |
|      | BIF   | 19  | 0.18         | 8.00 |             | 40           |                  |                        |               |
|      | ERD-2 | 15  | 0.16         | 7.95 |             | 38           |                  |                        |               |
|      | BIF   | 19  | 0.15         | 7.99 | 36.5        | 41           |                  |                        |               |
|      | MM-1  | 29  | 0.07         | 7.40 |             | 35           |                  |                        |               |
|      | Raw   |     | 0.85         | 8.00 |             | 41           |                  |                        |               |
|      | MM-2  | 53  | 0.08         | 7.45 |             | 35           |                  |                        |               |
|      | BIF   | 20  | 0.33         | 8.00 |             | 37           |                  |                        |               |
|      | ERD-2 | 15  | 0.14         | 7.95 |             | 39           |                  |                        |               |

APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|--------------|------|-------------|--------------|------------------|------------------------|---------------|
| 6-6  | BIF   | 20  | 0.28         | 7.99 | 37          | 42           |                  |                        |               |
|      | Raw   |     | 0.75         | 8.00 |             | 42           |                  |                        |               |
|      | MM-1  | 30  | 0.08         | 7.45 |             | 36           |                  |                        |               |
|      | MM-2  | 54  | 0.15         | 7.55 |             | 38           |                  |                        |               |
|      | ERD-2 | 15  | 0.14         | 7.60 |             | 41           |                  |                        |               |
|      | MM-1  | 30  | 0.10         | 7.40 | 37          | 34           |                  |                        |               |
|      | MM-2  | 54  | 0.09         | 7.60 |             | 37           |                  |                        |               |
|      | BIF   | 20  | 0.19         | 8.00 |             | 42           |                  |                        |               |
|      | ERD-2 | 15  | 0.14         | 7.85 |             | 38           |                  |                        |               |
|      | Raw   |     | 0.69         | 8.05 |             | 43           |                  |                        |               |
|      | MM-1  | 30  | 0.05         | 7.55 | 37          | 34           |                  |                        |               |
|      | MM-1  | 31  | 0.12         | 7.60 |             | 35           |                  |                        |               |
|      | MM-2  | 54  | 0.06         | 7.50 |             | 34           |                  |                        |               |
|      | BIF   | 20  | 0.18         | 7.90 |             | 40           |                  |                        |               |
|      | ERD-2 | 15  | 0.15         | 7.95 |             | 39           |                  |                        |               |
|      | Raw   |     | 0.75         | 8.00 |             | 42           |                  |                        |               |
|      | ERD-2 | 15  | 0.24         | 7.90 | 36.5        | 39           |                  |                        |               |
|      | Raw   |     | 0.74         | 8.05 |             | 42           |                  |                        |               |
|      | MM-1  | 31  | 0.09         | 7.55 |             | 35           |                  |                        |               |
|      | MM-2  | 54  | 0.05         | 7.50 |             | 34           |                  |                        |               |
|      | BIF   | 20  | 0.20         | 8.00 |             | 40           |                  |                        |               |
|      | ERD-2 | 15  | 0.12         | 7.90 | 40          | 39           |                  |                        |               |
|      | MM-1  | 31  | 0.11         | 7.45 | 37.5        | 33           |                  |                        |               |
|      | MM-2  | 54  | 0.09         | 7.50 | 39          | 35           |                  |                        |               |
|      | BIF   | 20  | 0.15         | 7.99 | 38          | 39           |                  |                        |               |
|      | Raw   |     | 0.68         | 8.00 | 37          | 40           |                  |                        |               |
|      | Raw   |     | 2.2          | 8.40 | 37          | 42           |                  |                        |               |
| 6-7  | Raw   |     | 4.6          | 8.00 | 37          | 43           |                  |                        |               |
|      | BIF   | 20  | 0.50         | 7.95 | 34          | 39           |                  |                        |               |
|      | MM-1  | 31  | 0.13         | 7.49 |             | 34           |                  |                        |               |
|      | MM-1  | 32  | 0.15         | 7.45 | 37          | 34           |                  |                        |               |
|      | MM-2  | 54  | 0.07         | 7.50 | 38          | 34           |                  |                        |               |
|      | BIF   | 21  | 0.63         | 7.90 | 35          | 38           |                  |                        |               |
|      | Raw   |     | 2.8          | 8.00 | 33          | 42           |                  |                        |               |
|      | MM-1  | 32  | 0.15         | 7.55 | 33          | 35           |                  |                        |               |
|      | MM-2  | 54  | 0.07         | 7.50 | 35          | 34           |                  |                        |               |
|      | BIF   | 21  | 0.52         | 7.95 | 34          | 40           |                  |                        |               |
|      |       |     |              |      |             |              |                  |                        |               |
|      |       |     |              |      |             |              |                  |                        |               |

## APPENDIX A-3 (CONTINUED)

| Date              | Unit  | Run | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|-------------------|-------|-----|--------------|------|-------------|--------------|------------------|------------------------|---------------|
|                   | MM-1  | 32  | 0.09         | 7.60 | 37.5        | 37           |                  |                        |               |
|                   | MM-2  | 54  | 0.045        | 7.45 | 39.5        | 33           |                  |                        |               |
|                   | BIF   | 21  | 0.31         | 7.95 | 38          | 39           |                  |                        |               |
|                   | Raw   |     | 2.0          | 7.99 | 37          | 42           |                  |                        |               |
| 6-8               | MM-1  | 32  | 0.23         | 7.55 | 37.5        | 36           |                  |                        |               |
|                   | MM-2  | 54  | 0.08         | 7.50 | 39          | 33           |                  |                        |               |
|                   | BIF   | 21  | 0.31         | 7.95 | 38          | 39           |                  |                        |               |
|                   | Raw   |     | 1.6          | 8.00 |             | 42           |                  |                        |               |
| 6-10 <sup>a</sup> | MM-1  | 33  | 0.43         | 6.30 | 38          | 36           |                  |                        |               |
|                   | MM-2  | 55  | 0.42         | 6.50 | 39.5        | 37           |                  |                        |               |
|                   | BIF   | 22  | 0.88         | 7.20 | 38.5        | 39           |                  |                        |               |
|                   | Raw   |     | 5.6          | 7.35 | 37.5        | 42           |                  |                        |               |
|                   | ERD-2 | 17  | 4.9          | 7.35 | 39          | 40           |                  |                        |               |
|                   | ERD-2 | 17  | 6.1          | 7.30 | 37          | 41           |                  |                        |               |
| 6-11              | MM-1  | 34  | 0.13         | 7.42 | 37.5        | 36           |                  |                        |               |
|                   | MM-2  | 55  | 0.12         | 7.38 | 37.5        | 37           |                  |                        |               |
|                   | BIF   | 22  | 0.70         | 7.60 | 38          | 39           |                  |                        |               |
|                   | Raw   |     | 3.5          | 7.55 | 37.5        | 41           |                  |                        |               |
|                   | MM-1  | 33  | 0.14         | 6.60 | 34          | 37           |                  |                        |               |
|                   | MM-2  | 55  | 0.10         | 6.60 | 36          | 36           |                  |                        |               |
|                   | BIF   | 23  | 0.60         | 7.00 | 34          | 42           |                  |                        |               |
|                   | ERD-2 | 18  | 6.3          | 6.90 | 35          | 42           |                  |                        |               |
|                   | MM-1  | 33  | 0.96         | 6.52 | 38          | 37           |                  |                        |               |
|                   | BIF   | 23  | 0.56         | 7.00 | 38          | 42           |                  |                        |               |
|                   | ERD-2 | 18  | 6.30         | 7.00 | 38          | 42           |                  |                        |               |
|                   | Raw   |     | 1.90         | 7.00 | 37.5        | 42           |                  |                        |               |
|                   | MM-1  | 34  | 0.25         | 6.50 | 38          | 36           |                  |                        |               |
|                   | MM-2  | 55  | 0.06         | 6.49 | 39          | 37           |                  |                        |               |
|                   | BIF   | 24  | 0.50         | 7.00 | 37.5        | 42           |                  |                        |               |
|                   | ERD-1 | 1   | 0.56         | 7.00 | 38.5        | 42           |                  |                        |               |
|                   | MM-1  | 34  | 0.12         | 6.50 | 37.5        | 37           |                  |                        |               |
|                   | MM-2  | 55  | 0.11         | 6.50 |             | 37           |                  |                        |               |
|                   | BIF   | 25  | 0.49         | 7.06 | 37          | 43           |                  |                        |               |
|                   | ERD-1 | 1   | 0.19         | 6.90 | 37.5        | 42           |                  |                        |               |
|                   | MM-2  | 56  | 0.23         | 6.60 | 39.5        | 37           |                  |                        |               |
|                   |       |     |              |      |             |              |                  |                        |               |
|                   |       |     |              |      |             |              |                  |                        |               |
|                   |       |     |              |      |             |              |                  |                        |               |

## APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|--------------|------|-------------|--------------|------------------|------------------------|---------------|
| 6-12 | MM-1  | 34  | 0.16         | 6.60 | 37.5        | 37           |                  |                        |               |
|      | MM-2  | 56  | 0.17         | 6.50 | 39          | 35           |                  |                        |               |
|      | BIF   | 25  | 2.2          | 7.10 | 38          | 42           |                  |                        |               |
|      | ERD-1 | 1   | 0.35         | 6.95 | 37.5        | 41           |                  |                        |               |
|      | Raw   |     | 4.3          | 7.20 | 38          | 43           |                  |                        |               |
|      | MM-1  | 35  | 0.13         | 6.80 | 38.5        | 37           |                  |                        |               |
|      | MM-2  | 56  | 0.08         | 6.90 | 41          | 35           |                  |                        |               |
|      | BIF   | 25  | 0.74         | 7.35 | 38.5        | 38           |                  |                        |               |
|      | ERD-1 | 1   | 0.19         | 7.10 | 39          | 40           |                  |                        |               |
|      | Raw   |     | 2.6          | 7.35 | 37.5        | 40           |                  |                        |               |
|      | BIF   | 25  | 0.60         | 7.55 | 42.5        | 41           |                  |                        |               |
|      | MM-2  | 56  | 0.11         | 7.15 | 42.5        | 35           |                  |                        |               |
|      | Raw   |     | 2.3          | 7.45 | 38          | 42           |                  |                        |               |
|      | MM-2  | 57  | 0.90         | 7.40 | 41          | 38           |                  |                        |               |
|      | BIF   | 26  | 0.70         | 7.30 | 41          | 37           |                  |                        |               |
|      | ERD-1 | 1   | 0.09         | 7.10 | 42          | 39           |                  |                        |               |
| 6-13 | MM-1  | 35  | 0.09         | 6.90 |             | 36           |                  |                        |               |
|      | MM-2  | 57  | 0.15         | 6.66 | 39.5        | 36           |                  |                        |               |
|      | BIF   | 26  | 0.55         | 6.89 | 38          | 41           |                  |                        |               |
|      | ERD-1 | 1   | 0.32         | 6.98 | 39.5        | 41           |                  |                        |               |
|      | MM-1  | 36  | 0.20         | 6.59 | 39          | 35           |                  |                        |               |
|      | MM-1  | 36  | 0.08         | 6.90 | 39          | 35           |                  |                        |               |
|      | MM-2  | 57  | 0.39         | 6.99 | 40          | 36           |                  |                        |               |
|      | BIF   | 28  | 0.66         | 7.35 |             | 40           |                  |                        |               |
|      | ERD-1 | 1   | 0.14         | 7.35 | 40          | 42           |                  |                        |               |
|      | Raw   |     | 2.1          | 7.35 | 37.5        | 41           |                  |                        |               |
|      | MM-1  | 36  | 0.06         | 6.78 | 42          | 34           |                  |                        |               |
|      | Raw   |     | 2.0          | 7.50 | 38          | 42           |                  |                        |               |
|      | MM-1  | 37  | 0.40         | 6.95 | 42          | 37           |                  |                        |               |
|      | MM-2  | 58  | 0.10         | 6.99 | 41          | 36           |                  |                        |               |
|      | BIF   | 28  | 0.55         | 7.40 | 41          | 40           |                  |                        |               |
|      | ERD-1 | 2   | 0.50         | 7.05 | 41          | 41           |                  |                        |               |
| 6-14 | MM-1  | 37  | 0.35         | 6.84 |             | 40           |                  |                        |               |
|      | MM-2  | 58  | 0.10         | 6.30 |             | 36           |                  |                        |               |
|      | BIF   | 28  | 0.55         | 6.82 | 40          | 41           |                  |                        |               |
|      | MM-2  | 59  | 0.15         | 6.73 |             | 36           |                  |                        |               |

## APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|--------------|------|-------------|--------------|------------------|------------------------|---------------|
| 6-15 | MM-1  | 37  | 0.38         | 7.00 | 40          | 41           |                  |                        |               |
|      | MM-2  | 59  | 0.12         | 6.60 | 41          | 35           |                  |                        |               |
|      | BIF   | 29  | 0.34         | 6.92 | 39.5        | 39           |                  |                        |               |
|      | ERD-1 | 3   | 0.28         | 6.80 | 40.5        | 40           |                  |                        |               |
|      | Raw   |     | 1.9          | 7.19 | 38          | 41           |                  |                        |               |
|      | MM-1  | 38  | 0.16         | 6.60 | 40          | 36           |                  |                        |               |
|      | MM-2  | 59  | 0.13         | 6.75 | 39          | 36           |                  |                        |               |
|      | BIF   | 29  | 0.37         | 7.05 | 39          | 41           |                  |                        |               |
|      | MM-1  | 38  | 0.10         | 6.51 | 36          | 36           |                  |                        |               |
|      | MM-2  | 60  | 0.15         | 6.63 | 38          | 38           |                  |                        |               |
|      | BIF   | 30  | 0.40         | 6.59 | 36          | 43           |                  |                        |               |
|      | ERD-1 | 3   | 0.11         | 6.90 | 36          | 43           |                  |                        |               |
|      | Raw   |     | 1.6          | 7.05 | 36          | 42           |                  |                        |               |
|      | Raw   |     | 0.95         | 7.92 | 38          | 44           |                  |                        |               |
| 6-17 | MM-1  | 39  | 0.08         | 7.35 | 38.5        | 35           |                  |                        |               |
|      | MM-2  | 61  | 0.11         | 7.49 | 38.5        | 39           |                  |                        |               |
|      | BIF   | 31  | 0.61         | 7.80 | 38.5        | 42           |                  |                        |               |
|      | ERD-1 | 4   | 0.13         | 7.70 | 39          | 41           |                  |                        |               |
|      | MM-1  | 39  | 0.11         | 7.23 | 38.5        | 33           |                  |                        |               |
|      | MM-2  | 61  | 0.21         | 7.32 | 38.5        | 34           |                  |                        |               |
|      | BIF   | 31  | 0.26         | 7.60 | 38.75       | 38           |                  |                        |               |
|      | ERD-1 | 4   | 0.15         | 7.62 | 39          | 40           |                  |                        |               |
|      | Raw   |     | 0.90         | 7.90 | 38          | 43           |                  |                        |               |
|      | MM-1  | 39  | 0.16         | 7.30 | 37.5        | 34           |                  |                        |               |
|      | MM-1  | 40  | 0.14         | 7.49 | 39.5        | 37           |                  |                        |               |
|      | MM-2  | 62  | 0.21         | 7.79 | 39          | 39           |                  |                        |               |
|      | BIF   | 32  | 0.22         | 8.00 | 38.5        | 45           |                  |                        |               |
|      | ERD-1 | 4   | 0.14         | 7.90 | 40          | 42           |                  |                        |               |
| 6-18 | Raw   |     | 0.93         | 8.26 | 38          | 42           |                  |                        |               |
|      | ERD-1 | 4   | 0.11         | 8.39 | 39.5        | 42           |                  |                        |               |
|      | Raw   |     | 1.10         | 7.85 | 38          | 43           |                  |                        |               |
|      | MM-1  | 40  | 0.08         | 7.40 | 39          | 35           |                  |                        |               |
|      | MM-2  | 62  | 0.45         | 7.55 | 39          | 39           |                  |                        |               |
|      | BIF   | 32  | 0.19         | 8.00 | 39          | 43           |                  |                        |               |
|      | ERD-1 | 5   | 0.45         | 7.92 | 39          | 42           |                  |                        |               |
|      | MM-1  | 40  | 0.85         | 7.40 |             | 35           |                  |                        |               |
|      | MM-2  | 63  | 0.16         | 7.62 | 38.5        | 39           |                  |                        |               |
|      | BIF   | 32  | 0.12         | 7.91 | 38.5        | 43           |                  |                        |               |
|      | ERD-1 | 5   | 0.10         | 7.90 | 39          | 43           |                  |                        |               |

APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|--------------|------|-------------|--------------|------------------|------------------------|---------------|
| 6-19 | MM-2  | 63  | 0.14         | 7.55 | 39          | 39           |                  |                        |               |
|      | BIF   | 33  | 0.25         | 8.05 | 38.5        | 42           |                  |                        |               |
|      | ERD-1 | 5   | 0.10         | 8.05 | 39          | 42           |                  |                        |               |
|      | Raw   |     | 0.89         | 8.00 | 38          | 42           |                  |                        |               |
|      | MM-2  | 64  | 0.20         | 7.58 | 39          | 38           |                  |                        |               |
|      | MM-1  | 41  | 0.09         | 7.40 | 39          | 35           |                  |                        |               |
|      | MM-2  | 64  | 0.22         | 7.56 | 39          | 39           |                  |                        |               |
|      | BIF   | 33  | 0.18         | 7.88 | 39          | 43           |                  |                        |               |
|      | ERD-1 | 6   | 0.13         | 7.92 | 39          | 42           |                  |                        |               |
|      | Raw   |     | 0.93         | 7.98 | 38          | 42           |                  |                        |               |
|      | MM-2  | 64  | 0.11         | 7.10 |             | 43           |                  |                        |               |
|      | BIF   | 33  | 0.15         | 7.92 |             | 43           |                  |                        |               |
|      | MM-1  | 41  | 0.08         | 7.25 | 39          | 36           |                  |                        |               |
|      | MM-2  | 65  | 0.07         | 7.20 | 39          | 36           |                  |                        |               |
|      | BIF   | 34  | 0.30         | 8.00 | 38.5        | 43           |                  |                        |               |
|      | ERD-1 | 6   | 0.08         | 7.80 | 38.5        | 43           |                  |                        |               |
| 6-20 | MM-2  | 65  | 0.11         | 7.33 | 39          | 34           |                  |                        |               |
|      | MM-1  | 41  | 0.09         | 7.20 | 38          | 37           |                  |                        |               |
|      | MM-2  | 66  | 0.13         | 7.20 | 40          | 36           |                  |                        |               |
|      | BIF   | 34  | 0.22         | 8.00 | 38          | 45           |                  |                        |               |
|      | Raw   |     | 0.83         | 8.10 | 38          | 43           |                  |                        |               |
|      | MM-2  | 66  | 0.14         | 7.15 | 39          | 36           |                  |                        |               |
|      | MM-1  | 42  | 0.16         | 7.25 | 39          | 38           |                  |                        |               |
|      | MM-2  | 67  | 0.12         | 7.15 | 39          | 36           |                  |                        |               |
|      | BIF   | 34  | 0.25         | 8.00 | 38          | 43           |                  |                        |               |
|      | ERD-2 | 19  | 0.30         | 7.85 | 39          | 41           |                  |                        |               |
|      | BIF   | 34  | 0.15         | 8.00 | 38          | 43           |                  |                        |               |
|      | MM-2  | 67  | 0.12         | 7.21 | 39          | 36           |                  |                        |               |
|      | BIF   | 35  | 0.15         | 7.60 | 38          | 43           |                  |                        |               |
|      | ERD-2 | 20  | 0.09         | 8.05 | 38.5        | 43           |                  |                        |               |
|      | MM-1  | 42  | 0.10         | 7.67 | 38          | 36           |                  |                        |               |
|      | MM-2  | 68  | 0.08         | 7.80 | 39          | 39           |                  |                        |               |
| 6-21 | MM-1  | 42  | 0.08         | 7.40 | 39          | 35           |                  |                        |               |
|      | MM-2  | 68  | 0.10         | 7.45 | 39          | 37           |                  |                        |               |
|      | BIF   | 35  | 0.22         | 7.99 | 38.5        | 43           |                  |                        |               |
|      | ERD-2 | 20  | 0.16         | 7.41 | 39.5        | 43           |                  |                        |               |
|      | Raw   |     | 1.30         | 8.00 | 38          | 43           |                  |                        |               |

## APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|--------------|------|-------------|--------------|------------------|------------------------|---------------|
|      | ERD-2 | 20  | 0.22         | 8.05 | 39.5        | 43           |                  |                        |               |
|      | BIF   | 35  | 0.21         | 7.48 | 39.5        | 43           |                  |                        |               |
|      | Raw   |     | 1.30         | 7.95 | 38.5        | 43           |                  |                        |               |
|      | MM-1  | 42  | 0.06         | 7.35 |             | 35           |                  |                        |               |
|      | MM-2  | 69  | 0.16         | 7.60 |             | 40           |                  |                        |               |
|      | BIF   | 36  | 0.20         | 7.80 |             | 43           |                  |                        |               |
|      | ERD-2 | 21  | 0.09         | 7.95 |             | 43           |                  |                        |               |
|      | MM-1  | 42  | 0.10         | 7.40 | 38          | 35           |                  |                        |               |
|      | MM-2  | 69  | 0.15         | 7.55 |             | 40           |                  |                        |               |
|      | BIF   | 36  | 0.15         | 8.15 | 38.5        | 43           |                  |                        |               |
|      | ERD-2 | 21  | 0.10         | 8.11 | 38.5        | 43           |                  |                        |               |
|      | MM-1  | 43  | 0.12         | 7.65 | 39          | 37           |                  |                        |               |
|      | MM-2  | 70  | 0.18         | 7.50 | 39          | 40           |                  |                        |               |
|      |       |     |              |      |             |              |                  |                        |               |
|      |       |     |              |      |             |              |                  |                        |               |
| 6-22 | MM-1  | 43  | 0.07         | 7.40 | 40          | 35           |                  |                        |               |
|      | MM-2  | 70  | 0.20         | 7.50 | 40          | 34           |                  |                        |               |
|      | BIF   | 36  | 0.25         | 7.85 | 39          | 41           |                  |                        |               |
|      | ERD-2 | 21  | 0.11         | 7.15 | 40          | 37           |                  |                        |               |
|      | Raw   |     | 0.98         | 7.75 | 38.5        | 40           |                  |                        |               |
| 6-24 | Raw   |     | 0.70         | 7.90 | 37          | 41           |                  |                        |               |
|      | MM-1  | 44  | 0.09         | 7.35 | 39          | 38           |                  |                        |               |
|      | MM-2  | 71  | 0.12         | 7.50 | 41          | 39           |                  |                        |               |
|      | BIF   | 37  | 0.16         | 7.90 | 38.5        | 41           |                  |                        |               |
|      | ERD-2 | 22  | 0.06         | 7.85 | 38.5        | 41           |                  |                        |               |
|      | MM-1  | 44  | 0.08         | 7.48 | 38.5        | 36           |                  |                        |               |
|      | MM-2  | 71  | 0.11         | 7.60 | 38.5        | 37           |                  |                        |               |
|      | BIF   | 37  | 0.14         | 8.00 | 38.5        | 39           |                  |                        |               |
|      | ERD-2 | 22  | 0.07         | 7.95 | 39          | 42           |                  |                        |               |
|      | Raw   |     | 0.67         | 8.05 | 38          | 42           |                  |                        |               |
|      | BIF   | 38  | 0.16         | 7.95 | 38.5        | 41           |                  |                        |               |
|      | MM-2  | 71  | 0.11         | 6.85 | 39          | 38           |                  |                        |               |
| 6-25 | MM-1  | 44  | 0.10         | 7.50 | 39.5        | 37           |                  |                        |               |
|      | MM-2  | 7   | 0.11         | 7.65 | 39.5        | 38           |                  |                        |               |
|      | BIF   | 38  | 0.21         | 7.95 | 39.5        | 40           |                  |                        |               |
|      | ERD-2 | 23  | 0.11         | 7.70 | 39.5        | 39           |                  |                        |               |
|      | Raw   |     | 0.62         | 8.00 | 39          | 41           |                  |                        |               |

APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run           | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|-------|---------------|--------------|------|-------------|--------------|------------------|------------------------|---------------|
| 6-26 | MM-1  | 44            | 0.20         | 7.52 |             | 35           |                  |                        |               |
|      | MM-2  | 73            | 0.26         | 7.52 | 38.5        | 34           |                  |                        |               |
|      | BIF   | 38            | 0.14         | 8.01 |             | 41           |                  |                        |               |
|      | Raw   |               | 0.66         | 8.02 | 38          | 41           |                  |                        |               |
|      | MM-1  | 45            | 0.28         | 7.50 | 38.5        | 36           |                  |                        |               |
|      | MM-2  | 73            | 0.16         | 7.60 | 38.5        | 35           |                  |                        |               |
|      | BIF   | 39            | 0.16         | 8.02 | 38.5        | 40           |                  |                        |               |
|      | ERD-2 | 20            | 0.07         | 8.00 | 38.5        | 40           |                  |                        |               |
|      | MM-1  | 45            | 0.11         | 7.55 | 39          | 34           |                  |                        |               |
|      | MM-2  | 73            | 0.32         | 7.60 | 39          | 35           |                  |                        |               |
|      | BIF   | 39            | 0.09         | 8.00 | 39          | 41           |                  |                        |               |
|      | ERD-2 | 24            | 0.10         | 8.01 | 40          | 40           |                  |                        |               |
|      | Raw   |               | 0.67         | 7.99 | 38.5        | 40           |                  |                        |               |
|      | MM-2  | 74            | 1.5          | 7.60 | 39          | 36           |                  |                        |               |
|      | BIF   | 40            | 0.18         | 8.00 | 39          | 41           |                  |                        |               |
|      | MM-1  | 45            | 0.35         | 7.52 | 39          | 35           |                  |                        |               |
|      | BIF   | 41            | 0.14         | 8.00 | 39          | 40           |                  |                        |               |
|      | ERD-2 | 25            | 0.08         | 8.02 | 39          | 39           |                  |                        |               |
|      | Raw   |               | 0.67         | 8.02 | 38          | 41           |                  |                        |               |
|      | BIF   | 41            | 0.10         | 8.10 |             | 43           |                  |                        |               |
|      | ERD-2 | 25            | 0.05         | 8.05 |             | 43           |                  |                        |               |
|      | MM-1  | 45            | 0.70         | 7.90 |             | 35           |                  |                        |               |
|      | MM-2  | 75            | 0.08         | 7.60 | 41          | 37           |                  |                        |               |
|      | Raw   |               | 3.00         | 7.99 | 41          | 43           |                  |                        |               |
|      | MM-1  | 46            | 0.07         | 7.40 | 40          | 34           |                  |                        |               |
|      | BIF   | 42            | 0.30         | 8.02 | 40          | 41           |                  |                        |               |
|      | ERD-2 | 26            | 0.07         | 8.02 | 40          | 41           |                  |                        |               |
|      | MM-2  | Clear<br>Well | 0.25         | 7.55 |             | 37           |                  |                        |               |
|      | MM-1  | 46            | 0.10         | 7.50 | 39          | 34           |                  |                        |               |
|      | BIF   | 42            | 0.13         | 8.05 | 39          | 42           |                  |                        |               |
|      | ERD-2 | 26            | 0.10         | 8.00 | 39.5        | 40           |                  |                        |               |
|      | Raw   |               | 0.67         | 8.10 | 38.5        | 43           |                  |                        |               |
| 6-27 | BIF   | 41            | 0.11         | 8.00 | 39          | 41           |                  |                        |               |
|      | ERD-2 | 26            | 0.09         | 7.99 | 39.5        | 40           |                  |                        |               |
|      | MM-1  | 46            | 0.33         | 7.45 | 39          | 35           |                  |                        |               |
|      | MM-1  | 47            | 0.14         | 7.50 | 39          | 37           |                  |                        |               |
|      | ERD-2 | 27            | 0.12         | 8.01 | 39.5        | 40           |                  |                        |               |

## APPENDIX A-3 (CONTINUED)

| Date | Unit    | Run | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|---------|-----|--------------|------|-------------|--------------|------------------|------------------------|---------------|
| 6-28 | MM-1    | 47  | 0.14         | 7.40 | 39          | 36           |                  |                        |               |
|      | ERD-2   | 27  | 0.11         | 8.00 |             | 40           |                  |                        |               |
|      | Raw     |     | 0.62         | 8.01 | 40          | 42           |                  |                        |               |
|      | MM-1    | 47  | 0.33         | 7.45 | 39.5        | 35           |                  |                        |               |
|      | ERD-2   | 28  | 0.16         | 8.02 | 40          | 41           |                  |                        |               |
|      | Raw     |     | 0.66         | 8.05 | 39.5        | 42           |                  |                        |               |
|      | MM-1    | 47  | 0.65         | 7.47 |             | 34           |                  |                        |               |
|      | Raw     |     | 0.64         | 8.00 | 38.5        | 42           |                  |                        |               |
|      | MM-1    | 48  | 0.06         | 7.38 | 39.5        | 34           |                  |                        |               |
|      | BIF     | 46  | 0.33         | 7.97 | 39.5        | 39           |                  |                        |               |
|      | ERD-2   | 28  | 0.08         | 7.99 | 40          | 40           |                  |                        |               |
|      | Raw     |     |              |      |             |              |                  |                        |               |
|      | Cloquet |     | 2.80         | 7.93 | 42.5        | 40           |                  |                        |               |
|      | MM-2    |     |              |      |             |              |                  |                        |               |
|      | Cloquet | 76  | 0.10         | 7.40 | 43.5        | 35           |                  |                        |               |
|      | BIF     | 46  | 0.50         | 8.09 |             | 41           |                  |                        |               |
|      | Raw     |     | 0.66         | 8.11 | 40          | 41           |                  |                        |               |
|      | Raw     |     |              |      |             |              |                  |                        |               |
|      | Cloquet |     | 3.00         | 7.95 | 40          | 40           |                  |                        |               |
|      | MM-1    | 48  | 0.12         | 7.35 | 41.5        | 32           |                  |                        |               |
|      | MM-2    |     |              |      |             |              |                  |                        |               |
|      | Cloquet | 76  | 0.07         | 7.42 | 43.5        | 34           |                  |                        |               |
|      | BIF     | 47  | 0.20         | 8.05 | 40.5        | 40           |                  |                        |               |
|      | ERD-2   | 28  | 0.07         | 8.02 | 41          | 42           |                  |                        |               |
| 6-29 | MM-1    | 48  | 0.38         | 7.36 | 41.5        | 34           |                  |                        |               |
|      | MM-2    |     |              |      |             |              |                  |                        |               |
|      | Cloquet | 76  | 0.13         | 7.45 | 43.5        | 36           |                  |                        |               |
|      | BIF     | 47  | 0.34         | 8.05 | 41          | 41           |                  |                        |               |
|      | MM-1    | 49  | 0.11         | 7.40 | 41          | 35           |                  |                        |               |
|      | ERD-2   | 29  | 0.11         | 8.00 | 40.5        | 42           |                  |                        |               |
|      | MM-1    | 49  | 0.06         | 7.48 | 40.5        | 35           |                  |                        |               |
|      | BIF     | 48  | 0.26         | 8.00 | 40.5        | 41           |                  |                        |               |
|      | ERD-2   | 29  | 0.13         | 8.10 | 41.5        | 40           |                  |                        |               |
|      | Raw     |     | 0.65         | 8.05 | 40.5        | 42           |                  |                        |               |
| 7-1  | MM-1    | 50  | 0.07         | 7.55 | 39.5        | 36           |                  |                        |               |
|      | BIF     | 49  | 0.21         | 8.07 | 39.5        | 42           |                  |                        |               |
|      | ERD-2   | 30  | 0.15         | 8.02 | 39.5        | 41           |                  |                        |               |
|      | Raw     |     | 0.77         | 8.01 | 39.5        | 42           |                  |                        |               |

APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|--------------|------|-------------|--------------|------------------|------------------------|---------------|
| 7-2  | MM-1  | 50  | 0.14         | 7.60 | 40          | 35           |                  |                        |               |
|      | BIF   | 49  | 0.33         | 8.00 | 40          | 41           |                  |                        |               |
|      | ERD-2 | 30  | 0.22         | 8.04 | 39.5        | 41           |                  |                        |               |
|      | Raw   |     | 0.75         | 7.99 | 38.5        | 42           |                  |                        |               |
|      | MM-1  | 50  | 0.30         | 7.23 | 40          | 32           |                  |                        |               |
|      | BIF   | 49  | 0.40         | 7.60 | 40          | 43           |                  |                        |               |
|      | ERD-2 | 30  | 0.10         | 7.90 | 39.5        | 43           |                  |                        |               |
|      | MM-1  | 51  | 0.15         | 7.29 | 43          | 30           |                  |                        |               |
|      | BIF   | 49  | 0.28         | 8.02 | 42.5        | 43           |                  |                        |               |
|      | ERD-2 | 30  | 0.13         | 7.94 | 43.5        | 44           |                  |                        |               |
|      | Raw   |     | 0.61         | 8.01 | 42          | 43           |                  |                        |               |
|      | BIF   | 49  | 0.35         | 7.85 | 39.5        | 43           |                  |                        |               |
| 7-3  | MM-1  | 51  | 0.10         | 7.50 | 40          | 32           |                  |                        |               |
|      | MM-2  | 77  | 2.5          | 7.45 | 40          | 34           |                  |                        |               |
|      | BIF   | 50  | 0.35         | 7.90 | 40          | 42           |                  |                        |               |
|      | ERD-2 | 30  | 0.13         | 7.90 | 39.5        | 42           |                  |                        |               |
|      | Raw   |     | 0.85         | 7.99 | 39.5        | 43           |                  |                        |               |
|      | MM-1  | 51  | 0.10         | 7.48 |             | 32           |                  |                        |               |
|      | MM-1  | 52  | 0.05         | 7.50 | 40          | 32           |                  |                        |               |
|      | MM-2  | 77  | 0.10         | 7.47 | 40          | 34           |                  |                        |               |
|      | BIF   | 50  | 0.55         | 7.91 | 40          | 42           |                  |                        |               |
|      | ERD-2 | 31  | 0.15         | 7.90 | 40          | 42           |                  |                        |               |
|      | MM-1  | 52  | 0.08         | 7.35 | 40.5        | 31           |                  |                        |               |
|      | MM-2  | 78  | 0.08         | 7.50 | 41.5        | 34           |                  |                        |               |
| 7-4  | BIF   | 51  | 0.27         | 8.15 | 41          | 42           |                  |                        |               |
|      | ERD-2 | 32  | 0.17         | 7.80 | 41          | 42           |                  |                        |               |
|      | Raw   |     | 0.77         | 8.00 | 40          | 41           |                  |                        |               |
|      | BIF   | 51  | 0.24         | 8.12 | 44.5        | 41           |                  |                        |               |
|      | Raw   |     | 0.85         | 8.01 | 41          | 41           |                  |                        |               |
|      | MM-1  | 53  | 0.09         | 7.40 | 43.5        | 32           |                  |                        |               |
|      | MM-2  | 78  | 0.12         | 7.48 | 43.5        | 34           |                  |                        |               |
|      | BIF   | 52  | 0.32         | 8.05 | 41.5        | 41           |                  |                        |               |
|      | ERD-2 | 32  | 0.17         | 7.85 | 44          | 40           |                  |                        |               |
|      | MM-1  | 53  | 0.05         | 7.20 |             | 32           |                  |                        |               |
|      | MM-1  | 54  | 0.09         | 6.90 | 40          | 29           |                  |                        |               |
|      | MM-2  | 78  | 0.06         | 7.33 | 41          | 35           |                  |                        |               |
|      | BIF   | 52  | 0.28         | 7.52 | 40          | 41           |                  |                        |               |
|      | ERD-2 | 32  | 0.14         | 7.62 | 41          | 41           |                  |                        |               |

APPENDIX A-3 (CONTINUED)

| Date | Unit    | Run | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|---------|-----|--------------|------|-------------|--------------|------------------|------------------------|---------------|
| 7-4  | b MM-1  | 54  | 0.07         | 6.49 | 41.5        | 31           |                  |                        |               |
|      | b MM-2  | 79  | 0.09         | 6.70 | 41.5        | 35           |                  |                        |               |
|      | b BIF   | 52  | 0.18         | 7.15 | 41.5        | 41           |                  |                        |               |
|      | ERD-2   | 33  | 0.12         | 7.72 | 41.5        | 40           |                  |                        |               |
|      | b Raw   |     | 0.59         | 7.05 | 41          | 40           |                  |                        |               |
|      | b MM-1  | 55  | 0.28         | 6.51 | 40.5        | 32           |                  |                        |               |
|      | b MM-2  | 79  | 0.18         | 6.65 | 41          | 35           |                  |                        |               |
|      | b BIF   | 52  | 0.44         | 7.13 | 40.5        | 40           |                  |                        |               |
|      | b ERD-2 | 33  | 0.11         | 7.00 | 41          | 38           |                  |                        |               |
|      | b Raw   |     | 0.61         | 7.10 | 41          | 40           |                  |                        |               |
| 7-5  | b MM-1  | 55  | 0.12         | 6.50 | 41          | 32           |                  |                        |               |
|      | b MM-2  | 79  | 0.06         | 6.67 | 41          | 34           |                  |                        |               |
|      | b BIF   | 52  | 0.20         | 7.20 | 40.5        | 40           |                  |                        |               |
|      | b ERD-2 | 33  | 0.09         | 7.10 | 40.5        | 40           |                  |                        |               |
| 7-8  | MM-1    | 56  | 0.14         | 7.30 | 40          | 32           |                  |                        |               |
|      | MM-2    | 80  | 0.35         | 7.55 | 40          | 37           |                  |                        |               |
|      | BIF     | 53  | 0.05         | 7.60 | 40          | 43           |                  |                        |               |
|      | ERD-2   | 34  | 0.14         | 7.93 | 40          | 43           |                  |                        |               |
|      | Raw     |     | 0.68         | 7.98 |             | 43           |                  |                        |               |
|      | BIF     | 53  | 0.30         | 7.65 |             | 43           |                  |                        |               |
|      | MM-1    | 56  | 0.05         | 7.15 | 39          | 32           |                  |                        |               |
|      | MM-2    | 80  | 0.08         | 7.33 | 39          | 39           |                  |                        |               |
|      | BIF     | 54  | 0.25         | 7.85 | 39          | 43           |                  |                        |               |
|      | ERD-2   | 34  | 0.05         | 7.86 | 39          | 43           |                  |                        |               |
|      | MM-1    | 56  | 0.19         | 7.12 | 40          | 31           |                  |                        |               |
|      | MM-2    | 80  | 0.09         | 7.55 | 40          | 37           |                  |                        |               |
| 7-9  | MM-1    | 57  | 0.08         | 7.15 | 40          | 30           |                  |                        |               |
|      | MM-2    | 81  | 0.09         | 7.53 | 40.5        | 38           |                  |                        |               |
|      | BIF     | 54  | 0.20         | 8.01 | 40.5        | 41           |                  |                        |               |
|      | ERD-2   | 34  | 0.10         | 8.08 | 40.5        | 44           |                  |                        |               |
|      | Raw     |     | 0.68         | 7.98 | 39.5        | 43           |                  |                        |               |
|      | MM-1    | 57  | 0.07         | 6.92 | 39.5        | 37           |                  |                        |               |
|      | BIF     | 54  | 0.20         | 7.30 | 40          | 44           |                  |                        |               |
|      | ERD-2   | 34  | 0.07         | 7.43 | 40          | 44           |                  |                        |               |
|      | Raw     |     | 0.67         | 7.55 | 39.5        | 44           |                  |                        |               |
|      | MM-1    | 56  | 0.19         | 7.12 | 40          | 31           |                  |                        |               |
|      | MM-2    | 80  | 0.09         | 7.55 | 40          | 37           |                  |                        |               |
|      | MM-1    | 57  | 0.08         | 7.15 | 40          | 30           |                  |                        |               |
|      | MM-2    | 81  | 0.09         | 7.53 | 40.5        | 38           |                  |                        |               |
|      | BIF     | 54  | 0.20         | 8.01 | 40.5        | 41           |                  |                        |               |
|      | ERD-2   | 34  | 0.10         | 8.08 | 40.5        | 44           |                  |                        |               |
|      | Raw     |     | 0.68         | 7.98 | 39.5        | 43           |                  |                        |               |

## APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|--------------|------|-------------|--------------|------------------|------------------------|---------------|
| 7-10 | ERD-2 | 34  | 0.08         | 7.48 |             | 44           |                  |                        |               |
|      | MM-1  | 57  | 0.14         | 6.75 |             | 30           |                  |                        |               |
|      | MM-1  | 58  | 0.60         | 7.23 | 55          | 30           |                  |                        |               |
|      | MM-2  | 82  | 1.80         | 7.67 | 55          | 40           |                  |                        |               |
|      | BIF   | 54  | 0.25         | 8.10 | 55          | 44           |                  |                        |               |
|      | ERD-2 | 35  | 0.19         | 8.13 | 55          | 44           |                  |                        |               |
|      | Raw   |     | 0.99         | 8.11 | 55          | 44           |                  |                        |               |
|      | MM-2  | 82  | 2.1          | 7.10 | 50          | 38           | 41               |                        |               |
|      | MM-1  | 58  | 0.43         | 7.05 | 49          | 29           | 46               |                        |               |
|      | MM-2  | 83  | 2.1          | 7.50 | 48          | 38           | 44               |                        |               |
|      | BIF   | 55  | 0.32         | 8.00 | 48          | 42           | 47               |                        |               |
|      | ERD-2 | 35  | 0.15         | 7.90 | 50          | 43           | 45               |                        |               |
|      | Raw   |     | 0.90         | 7.99 | 47          | 43           | 44               |                        |               |
|      | BIF   | 55  | 0.41         | 7.99 | 51.5        | 42           | 45               |                        |               |
|      | MM-2  | 84  | 1.60         | 7.43 | 48.5        | 37           | 47               |                        |               |
|      | MM-1  | 59  | 0.40         | 7.99 | 48.5        | 41           | 42               |                        |               |
|      | MM-2  | 84  | 0.11         | 7.50 | 48.5        | 34           | 42               |                        |               |
|      | BIF   | 56  | 0.38         | 7.95 | 48          | 44           | 42               |                        |               |
|      | MM-1  | 59  | 0.06         | 7.15 |             | 29           | 47               |                        |               |
|      | BIF   | 56  | 0.30         | 8.05 | 47          | 44           | 43               |                        |               |
| 7-11 | MM-2  | 84  | 0.05         | 7.50 |             | 37           | 45               |                        |               |
|      | ERD-2 | 35  | 0.08         | 8.12 | 46          | 44           | 45               |                        |               |
|      | MM-2  | 85  | 0.30         | 7.70 | 46.5        | 43           |                  |                        |               |
|      | MM-1  | 60  | 0.11         | 7.50 | 44          | 32           | 44               |                        | 0             |
|      | MM-2  | 85  | 0.07         | 7.53 | 45          | 39           | 44               |                        |               |
|      | BIF   | 57  | 0.17         | 7.95 | 44          | 45           | 44               |                        |               |
|      | ERD-2 | 35  | 0.12         | 7.86 | 46          | 45           | 44               |                        |               |
|      | Raw   |     | 0.71         | 7.90 | 43          | 45           | 44               |                        | 0.02          |
|      | MM-2  | 85  | 0.12         | 7.53 | 44          | 39           | 44               |                        |               |
|      | MM-1  | 60  | 0.17         | 7.31 | 44          | 31           | 44               |                        | 0             |
|      | MM-1  | 61  | 0.20         | 7.38 | 44          | 34           | 44               |                        | 0.02          |
|      | MM-2  | 86  | 0.09         | 7.52 | 44          | 39           | 44               |                        |               |
|      | BIF   | 57  | 0.27         | 7.90 | 44          | 45           | 44               |                        |               |
|      | BIF   | 57  | 0.31         | 7.95 |             | 45           | 45               |                        |               |
|      | MM-2  | 87  | 0.09         | 7.62 | 46          | 39           | 44               |                        |               |
|      | Raw   |     | 2.10         | 8.12 | 47          | 45           | 44               |                        | 0.03          |
|      | MM-1  | 61  | 0.10         | 7.40 | 45          | 34           | 44               |                        | 0             |
|      | MM-2  | 87  | 0.15         | 7.70 | 46          | 39           | 44               |                        |               |
|      | BIF   | 58  | 0.40         | 7.92 | 46.5        | 45           | 44               |                        |               |
|      | ERD-2 | 36  | 0.10         | 7.91 | 46          | 45           | 44               |                        |               |

APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|--------------|------|-------------|--------------|------------------|------------------------|---------------|
| 7-12 | MM-1  | 61  | 0.09         | 7.38 | 45          | 33           | 44               |                        | 0.03          |
|      | MM-2  | 87  | 0.10         | 7.58 | 45          | 40           | 44               |                        |               |
|      | BIF   | 58  | 0.26         | 7.82 | 44.5        | 45           | 44               |                        |               |
|      | ERD-2 | 36  | 0.12         | 7.80 | 46          | 45           | 44               |                        |               |
|      | Raw   |     | 1.0          | 7.92 | 44          | 44           | 44               |                        | 0.02          |
|      | MM-2  | 87  | 0.14         | 7.60 | 44          | 39           | 44               |                        |               |
|      |       |     |              |      |             |              |                  |                        |               |
|      | BIF   | 58  | 0.33         | 7.81 | 43.5        | 44           | 44               |                        |               |
|      | MM-1  | 62  | 0.09         | 7.39 | 45          | 32           | 44               |                        | 0.02          |
|      | MM-2  | 88  | 0.12         | 7.72 | 44          | 39           | 44               |                        |               |
|      | BIF   | 59  | 0.36         | 7.80 | 44          | 44           | 44               |                        |               |
|      | ERD-2 | 36  | 0.15         | 7.80 | 44.5        | 44           | 44               |                        |               |
|      |       |     |              |      |             |              |                  |                        |               |
|      | MM-2  | 88  | 0.08         | 7.61 |             | 40           | 44               |                        |               |
|      | MM-1  | 62  | 0.07         | 7.40 |             | 34           | 44               |                        | 0.03          |
|      | MM-2  | 89  | 0.08         | 7.62 | 47          | 39           | 44               |                        |               |
|      | BIF   | 59  | 0.25         | 7.85 | 45          | 44           | 44               |                        |               |
|      | ERD-2 | 36  | 0.10         | 7.91 | 46          | 44           | 44               |                        |               |
|      | MM-1  | 63  | 0.12         | 7.39 | 47          | 33           | 44               |                        | 0.03          |
| 7-13 | MM-2  | 89  | 0.10         | 7.65 | 45          | 38           | 44               |                        |               |
|      | MM-1  | 63  | 0.12         | 7.55 | 44          | 32           | 44               |                        | 0.03          |
|      | BIF   | 60  | 0.36         | 7.94 | 43.5        | 43           | 44               |                        |               |
|      | ERD-2 | 36  | 0.12         | 7.90 | 45          | 42           | 44               |                        |               |
|      | Raw   |     | 0.73         | 7.80 | 43          | 43           | 43               |                        | 0.02          |
| 7-15 | Raw   |     | 0.80         | 7.95 | 41          | 42           | 44               |                        | 0.03          |
|      | MM-1  | 64  | 0.27         | 7.63 | 42          | 38           | 45               |                        | 0.04          |
|      | MM-2  | 90  | 0.20         | 7.70 | 42          | 37           | 44               |                        |               |
|      | BIF   | 61  | 0.62         | 8.00 | 42          | 43           | 44               |                        |               |
|      | ERD-2 | 37  | 0.20         | 7.90 | 42          | 42           | 44               |                        |               |
|      |       |     |              |      |             |              |                  |                        |               |
|      | MM-1  | 64  | 0.07         | 7.48 | 43.5        | 36           | 44               |                        | 0.04          |
|      | MM-2  | 90  | 0.07         | 7.80 | 43          | 38           | 45               |                        |               |
|      | BIF   | 61  | 0.35         | 8.02 | 42.5        | 42           | 44               |                        |               |
|      | ERD-2 | 37  | 0.08         | 7.90 | 44          | 41           | 44               |                        |               |
|      | Raw   |     | 0.63         | 8.00 | 42          | 43           | 43               |                        | 0.03          |
|      |       |     |              |      |             |              |                  |                        |               |
|      |       |     |              |      |             |              |                  |                        |               |
| 7-16 | Raw   |     | 0.70         | 7.95 | 42          | 42           | 43               |                        | 0.03          |
|      | MM-1  | 64  | 0.07         | 7.65 | 43.5        | 38           | 44               |                        | 0.04          |
|      | MM-2  | 91  | 0.06         | 7.70 | 43          | 38           | 44               |                        |               |
|      | BIF   | 61  | 0.28         | 7.85 | 43          | 41           | 44               |                        |               |
|      | ERD-2 | 37  | 0.09         | 7.90 | 43.5        | 42           | 44               |                        |               |

## APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|--------------|------|-------------|--------------|------------------|------------------------|---------------|
| 7-16 | MM-1  | 65  | 0.25         | 7.45 | 41          | 35           | 44               |                        | 0.06          |
|      | MM-2  | 92  | 0.15         | 7.67 | 41          | 38           | 44               |                        |               |
|      | BIF   | 62  | 0.72         | 7.95 | 41          | 43           | 44               |                        |               |
|      | ERD-2 | 38  | 0.13         | 7.90 | 41          | 42           | 44               |                        |               |
|      | Raw   |     | 0.70         | 8.00 | 41          | 43           | 43               |                        |               |
|      | MM-1  | 65  | 0.10         | 7.50 | 43          | 34           | 44               |                        | 0.02          |
|      | MM-2  | 92  | 0.06         | 7.60 | 43          | 35           | 45               |                        |               |
|      | BIF   | 63  | 0.12         | 7.99 | 43          | 43           | 44               |                        |               |
|      | ERD-2 | 38  | 0.06         | 7.89 | 43          | 42           | 44               |                        |               |
|      | Raw   |     | 0.81         | 8.00 | 42          | 44           | 43               |                        |               |
| 7-17 | MM-1  | 65  | 0.08         | 7.60 | 43          | 35           | 44               |                        | 0.02          |
|      | ERD-2 | 38  | 0.09         | 7.90 | 43          | 42           | 44               |                        | 0.02          |
|      | Raw   |     | 0.65         | 7.70 | 43          | 43           | 44               |                        | 0.20          |
|      | MM-1  | 65  | 0.20         | 7.60 | 43          | 38           | 44               |                        | 0.05          |
|      | BIF   | 64  | 0.16         | 8.00 | 43          | 45           | 44               |                        |               |
|      | ERD-2 | 38  | 0.11         | 7.82 | 43          | 43           | 44               |                        |               |
|      | MM-1  | 66  | 0.05         | 7.70 | 43.5        | 39           | 44               |                        | 0.06          |
|      | MM-2  | 93  | 0.06         | 7.82 | 44          | 38           | 44               |                        |               |
|      | BIF   | 64  | 0.12         | 8.15 | 44          | 43           | 44               |                        |               |
|      | ERD-2 | 38  | 0.10         | 7.98 | 44          | 44           | 44               |                        |               |
|      | Raw   |     | 0.67         | 7.95 | 42          | 43           | 44               |                        |               |
| 7-18 | MM-2  | 93  | 0.07         | 7.80 | 44          | 38           | 44               |                        | 0.05          |
|      | MM-1  | 66  | 0.09         | 7.74 | 43.5        | 39           | 44               |                        |               |
|      | MM-2  | 94  | 0.10         | 7.85 | 43.5        | 39           | 44               |                        |               |
|      | BIF   | 65  | 0.09         | 7.99 | 44          | 42           | 44               |                        |               |
|      | ERD-2 | 39  | 0.10         | 7.95 | 43.5        | 43           | 44               |                        |               |
|      | Raw   |     | 0.70         | 8.00 | 42          | 42           | 44               |                        |               |
|      | Raw   |     | 0.73         | 8.00 | 42          | 43           | 44               |                        | 0.02          |
|      | MM-1  | 66  | 0.12         | 7.75 | 44          | 39           | 44               |                        | 0.04          |
|      | MM-2  | 94  | 0.09         | 7.80 | 44          | 39           | 44               |                        |               |
|      | BIF   | 66  | 0.14         | 8.10 | 44          | 42           | 44               |                        |               |
|      | ERD-2 | 39  | 0.11         | 7.91 | 44          | 39           | 44               |                        |               |
|      | MM-2  | 94  | 0.10         | 7.85 | 43          | 39           | 44               |                        |               |
|      | BIF   | 66  | 0.30         | 8.02 | 43          | 41           | 44               |                        |               |
|      | MM-1  | 67  | 0.08         | 7.75 | 42          | 38           | 44               |                        | 0.03          |
|      | MM-2  | 95  | 0.56         | 7.90 | 42          | 39           | 44               |                        |               |
|      | ERD-2 | 39  | 0.12         | 7.98 | 42          | 43           | 44               |                        |               |
|      | Raw   |     | 0.79         | 8.00 | 41          | 42           | 44               |                        |               |

## APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|--------------|------|-------------|--------------|------------------|------------------------|---------------|
| 7-19 | ERD-2 | 39  | 0.11         | 8.00 | 42          | 41           | 44               |                        |               |
|      | Raw   |     | 0.86         | 7.99 | 41          | 42           | 44               |                        | 0.02          |
|      | MM-1  | 67  | 0.09         | 7.70 | 42          | 38           | 44               |                        | 0.03          |
|      | MM-2  | 95  | 0.70         | 7.85 | 42          | 39           | 45               |                        |               |
|      | BIF   | 69  | 0.34         | 8.10 | 42          | 42           | 44               |                        |               |
|      | ERD-2 | 40  | 0.08         | 7.95 | 42          | 41           | 44               |                        |               |
|      | MM-1  | 67  | 0.11         | 7.65 | 42          | 39           | 44               |                        | 0.02          |
|      | MM-2  | 96  | 0.16         | 7.62 | 42          | 41           | 44               |                        |               |
|      | BIF   | 70  | 0.25         | 7.90 | 42          | 44           | 44               |                        |               |
|      | ERD-2 | 40  | 0.08         | 7.92 | 42          | 44           | 44               |                        |               |
|      | Raw   |     | 0.88         | 7.92 | 41          | 44           | 43               |                        | 0.06          |
|      | MM-1  | 68  | 0.10         | 7.7  | 50          | 39           | 44               |                        | 0.08          |
|      | MM-2  | 97  | 0.30         | 7.8  | 50          | 41           | 44               |                        |               |
|      | BIF   | 70  | 0.26         | 8.05 | 50          | 45           | 45               |                        |               |
|      | ERD-2 | 40  | 0.10         | 8.0  | 50          | 44           | 44               |                        |               |
|      | Raw   |     | 0.64         | 7.92 | 49          | 45           | 43               |                        | 0.08          |
| 7-20 | BIF   | 70  | 0.32         | 8.01 | 48          | 45           | 45               |                        |               |
|      | MM-1  | 68  | 0.12         | 7.8  | 47          | 39           | 44               |                        | 0.02          |
|      | MM-2  | 97  | 0.22         | 7.75 | 48          | 42           | 44               |                        |               |
|      | ERD-2 | 40  | 0.16         | 7.82 | 47.5        | 43           | 44               |                        |               |
|      | Raw   |     | 0.73         | 8.00 | 47          | 42           | 43               |                        | 0.03          |
| 7-22 | MM-1  | 69  | 0.06         | 7.75 | 51.5        | 39           | 44               |                        | 0.02          |
|      | MM-2  | 98  | 0.07         | 7.80 | 52          | 39           | 44               |                        |               |
|      | BIF   | 71  | 0.14         | 8.00 | 51.5        | 44           | 44               |                        |               |
|      | ERD-2 | 41  | 0.06         | 7.90 | 52          | 43           | 44               |                        |               |
|      | Raw   |     | 0.53         | 8.01 | 50.5        | 43           | 43               |                        | 0.02          |
|      | MM-1  | 69  | 0.08         | 7.80 | 50          | 38           | 44               |                        | 0.02          |
|      | MM-2  | 98  | 0.08         | 7.85 | 51          | 39           | 44               |                        |               |
|      | BIF   | 71  | 0.15         | 8.02 | 50          | 44           | 44               |                        |               |
|      | ERD-2 | 41  | 0.11         | 7.95 | 50.5        | 41           | 44               |                        |               |
|      | Raw   |     | 0.63         | 8.05 | 49          |              | 44               |                        | 0.02          |
| 7-23 | Raw   |     | 0.60         | 8.00 | 49          | 43           | 44               |                        | 0.03          |
|      | MM-1  | 69  | 0.13         | 7.80 | 51          | 39           | 44               |                        | 0.06          |
|      | BIF   | 71  | 0.17         | 8.02 | 51          | 43           | 44               |                        |               |
|      | ERD-2 | 41  | 0.21         | 7.95 | 51          | 41           | 44               |                        |               |
|      | MM-2  | 98  | 0.22         | 7.80 | 51          | 38           | 44               |                        | 0.03          |

## APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|--------------|------|-------------|--------------|------------------|------------------------|---------------|
| 7-23 | MM-1  | 70  | 0.07         | 7.65 | 46          | 38           | 44               |                        | 0.03          |
|      | MM-2  | 99  | 0.11         | 7.70 | 46          | 39           | 44               |                        | 0.03          |
|      | BIF   | 72  | 0.18         | 7.95 | 46          | 42           | 44               |                        |               |
|      | ERD-2 | 41  | 0.11         | 7.99 | 46          | 42           | 44               |                        |               |
|      | Raw   |     | 0.58         | 8.00 | 45          | 43           | 44               |                        | 0.02          |
|      | Raw   |     | 0.60         | 8.01 | 47.5        | 44           | 44               |                        | 0.02          |
|      | MM-1  | 70  | 0.06         | 7.70 | 48.5        | 39           | 44               |                        | 0.03          |
|      | MM-2  | 99  | 0.10         | 7.73 | 48.5        | 38           | 44               |                        | 0.03          |
|      | BIF   | 72  | 0.21         | 8.00 | 49          | 44           | 44               |                        |               |
|      | ERD-2 | 42  | 0.06         | 7.95 | 48.5        | 42           | 44               |                        |               |
| 7-24 | MM-2  | 100 | 0.11         | 7.65 | 49.5        | 38           | 44               | 0.017                  |               |
|      | BIF   | 72  | 0.13         | 7.98 | 50          | 44           | 44               |                        |               |
|      | ERD-2 | 42  | 0.09         | 7.98 | 50          | 43           | 44               |                        |               |
|      | Raw   |     | 0.68         | 7.96 | 49          | 43           | 44               | 0.033                  |               |
|      | MM-1  | 71  | 0.23         | 7.58 | 50          | 38           | 44               | 0.025                  |               |
|      | Raw   |     | 0.78         | 8.00 | 53          | 44           | 44               |                        |               |
|      | MM-1  | 71  | 0.07         | 7.53 | 53          | 38           | 44               |                        |               |
|      | MM-2  | 100 | 0.09         | 7.52 | 53          | 39           | 44               |                        |               |
|      | BIF   | 73  | 0.18         | 7.90 | 53          | 44           | 45               |                        |               |
|      | ERD-2 | 42  | 0.11         | 7.90 | 52.5        | 44           | 44               |                        |               |
|      | BIF   | 72  | 0.14         | 7.92 | 54          | 44           | 44               |                        |               |
|      | ERD-2 | 42  | 0.18         | 7.95 | 54          | 44           | 44               |                        |               |
|      | MM-2  | 100 | 0.08         | 7.65 | 54          | 38           | 44               |                        |               |
|      | MM-1  | 71  | 0.08         | 7.58 | 54          | 38           | 44               |                        |               |
|      | MM-2  | 101 | 0.13         | 7.60 | 54          | 38           | 44               |                        |               |
|      | BIF   | 73  | 0.17         | 7.89 | 54          | 43           | 43               |                        |               |
|      | ERD-2 | 43  | 0.12         | 7.90 | 54          | 43           | 44               |                        |               |
|      | Raw   |     | 0.89         | 7.99 |             | 43           | 43               |                        |               |
| 7-25 | Raw   |     | 0.84         | 7.70 | 52.5        | 44.0         | 44               |                        | 0.06          |
|      | MM-1  | 72  | 0.15         | 7.40 | 53          | 47.0         | 47               |                        | 0.03          |
|      | MM-2  | 101 | 0.20         | 7.32 | 53.5        | 46.0         | 46               |                        | 0.02          |
|      | BIF   | 73  | 0.21         | 7.72 | 53.5        | 46.0         | 46               |                        |               |
|      | ERD-2 | 43  | 0.15         | 7.70 | 54          | 47.0         | 47               |                        |               |
|      | MM-1  | 72  | 0.07         | 7.60 | 53          | 48.0         | 48               |                        |               |
|      | MM-2  | 101 | 0.09         | 7.70 | 54          | 48.0         | 48               |                        | 0.02          |
|      | BIF   | 73  | 0.23         | 8.00 | 54          | 48.0         | 48               |                        |               |
|      | ERD-2 | 43  | 0.09         | 8.00 | 54          | 45.0         | 45               |                        |               |
|      | Raw   |     | 0.66         | 8.00 | 53          | 46.0         | 46               |                        |               |

APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|--------------|------|-------------|--------------|------------------|------------------------|---------------|
| 7-25 | BIF   | 73  | 0.19         | 8.10 | 51          | 46.0         | 46               |                        |               |
|      | ERD-2 | 43  | 0.14         | 8.10 | 54          | 48.0         | 48               |                        |               |
| 7-26 | Raw   |     | 0.66         | 8.10 | 52          | 45.0         | 45               |                        |               |
|      | MM-1  | 73  | 0.12         | 7.50 |             | 49.0         | 47               |                        |               |
|      | MM-2  | 103 | 0.17         | 7.70 | 53          | 46.0         | 46               |                        |               |
|      | BIF   | 74  | 0.19         | 8.00 | 53          | 47.0         | 47               |                        |               |
|      | ERD-2 | 44  | 0.12         | 7.90 | 53          | 44.0         | 48               |                        |               |
|      | MM-2  | 102 | 0.36         | 7.32 | 51          | 43           | 45               | 0.035                  |               |
|      | BIF   | 74  | 0.21         | 7.75 | 50          | 45           | 44               | 0.079                  |               |
|      | MM-1  | 73  | 0.08         | 7.28 | 45          | 41           | 44               | 0.026                  |               |
|      | MM-2  | 103 | 0.06         | 7.32 | 44          | 42           | 45               | 0.036                  |               |
|      | BIF   | 75  | 0.11         | 7.78 | 44          | 45           | 45               | 0.030                  |               |
|      | ERD-2 | 44  | 0.16         | 7.60 | 45          | 45           | 46               | 0.054                  |               |
|      | Raw   |     | 0.58         | 7.75 | 43          | 42           | 45               | 0.007                  |               |
|      | MM-1  | 73  | 0.05         | 7.42 | 43          | 39           | 45               | 0.013                  |               |
|      | MM-2  | 103 | 0.09         | 7.46 | 43          | 38           | 45               | 0.028                  |               |
|      | BIF   | 75  | 0.11         | 7.90 | 43          | 42           | 45               | 0.045                  |               |
|      | ERD-2 | 44  | 0.13         | 7.85 | 43.5        | 43           | 45               | 0.039                  |               |
|      | Raw   |     | 0.54         | 7.95 | 42          | 43           | 46               | 0.005                  |               |
| 7-27 | MM-1  | 73  | 0.13         | 7.40 | 44          | 38           | 47               | 0.019                  |               |
|      | MM-2  | 103 | 0.44         | 7.30 | 44          | 40           | 46               | 0.047                  |               |
|      | BIF   | 75  | 0.15         | 7.75 | 44          | 44           | 47               | 0.065                  |               |
|      | Raw   |     | 0.55         | 7.70 | 40          | 43           | 47               | 0.031                  |               |
| 7-29 | Raw   |     | 0.64         | 7.80 | 39.5        | 41           | 48               |                        |               |
|      | MM-1  | 74  | 0.09         | 7.25 |             | 42           | 46               |                        |               |
|      | MM-2  | 104 | 0.08         | 7.40 | 40          | 42           | 49               |                        |               |
|      | BIF   | 76  | 0.10         | 7.80 | 40.5        | 38           | 46               |                        |               |
|      | ERD-2 | 45  | 0.09         | 8.00 | 41          | 42           | 47               | 0.005                  |               |
|      | MM-1  | 74  | 0.13         | 7.10 | 41          | 46           | 63               | 0.007                  |               |
|      | MM-2  | 104 | 0.24         | 7.20 | 42          | 43           | 64               | 0.007                  |               |
|      | BIF   | 76  | 0.11         | 7.40 | 42          | 42           | 47               | 0.007                  |               |
|      | ERD-2 | 45  | 0.11         | 7.60 | 42          | 40           | 59               |                        |               |
|      | Raw   |     | 0.75         | 7.30 | 40.5        | 39           | 54               | 0.011                  |               |
|      | BIF   | 77  | 0.14         | 7.60 |             | 43           | 65               | 0.017                  |               |
|      |       |     |              |      |             |              |                  |                        |               |
|      |       |     |              |      |             |              |                  |                        |               |
|      |       |     |              |      |             |              |                  |                        |               |
|      |       |     |              |      |             |              |                  |                        |               |

## APPENDIX A-3 (CONTINUED)

| Date | Unit    | Run | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|---------|-----|--------------|------|-------------|--------------|------------------|------------------------|---------------|
| 7-30 | MM-1    | 74  | 0.12         | 7.20 | 41          | 39           | 53               |                        |               |
|      | MM-2    | 104 | 0.40         | 7.20 | 41          | 37           | 49               |                        |               |
|      | BIF     | 77  | 0.13         | 7.80 | 40          | 37           | 53               |                        |               |
|      | ERD-2   | 45  | 0.10         | 7.60 | 41          | 43           | 65               |                        |               |
|      | Raw     |     | 0.76         | 8.00 | 39.5        | 44           | 50               | 0.005                  |               |
|      | Raw     |     | 0.72         | 7.90 | 41.5        | 40           | 65               |                        |               |
|      | MM-1    | 74  |              | 7.40 | 40.5        | 40           | 42               | 0.019                  |               |
|      | MM-2    | 105 | 0.09         | 7.52 | 40          | 39           | 42               | 0.019                  |               |
|      | BIF     | 77  | 0.11         | 8.02 | 40          | 46           | 43               | 0.025                  |               |
|      | ERD-2   | 45  | 0.14         | 8.05 | 40          | 43           | 43               | 0.017                  |               |
|      | Raw     |     | 0.76         | 7.79 | 40.5        | 43           | 40               | 0.015                  |               |
|      | MM-1    | 74  | 0.11         | 7.07 | 40.5        | 38           | 42               | 0.013                  |               |
|      | MM-2    | 105 | 0.06         | 7.18 | 41          | 39           | 43               | 0.019                  |               |
|      | BIF     | 77  | 0.09         | 7.60 | 40          | 44           | 42               | 0.026                  |               |
|      | ERD-2   | 45  | 0.17         | 7.60 | 40.5        | 42           | 44               | 0.014                  |               |
|      | Raw     |     | 0.79         | 7.59 | 40          | 43           | 44               | 0.017                  |               |
| 7-31 | MM-1    | 75  | 0.07         | 7.30 | 45          | 35           | 52               | 0.013                  |               |
|      | MM-2    | 105 | 0.16         | 7.50 | 42          | 38           | 84               | 0.031                  |               |
|      | BIF     | 77  | 0.08         | 7.75 | 41          | 42           | 69               |                        |               |
|      | ERD-2   | 45  | 0.09         | 7.80 | 44          | 35           | 76               | 0.011                  |               |
|      | Raw     |     | 0.83         | 7.80 | 40          | 44           | 59               |                        |               |
|      | Raw     |     |              |      |             |              |                  |                        |               |
|      | Cloquet |     | 3.6          | 7.70 | 45          | 46           | 63               |                        |               |
|      | MM-1    | 75  | 0.08         | 7.35 |             | 35           | 63               | 0.021                  |               |
|      | MM-2    |     |              |      |             |              |                  |                        |               |
|      | Cloquet | 106 | 0.05         | 7.30 | 45          | 43           | 75               | 0.013                  |               |
|      | BIF     | 75  | 0.10         | 7.70 | 39.5        | 42           | 70               |                        |               |
|      | ERD-2   | 46  | 0.10         | 7.80 | 40          | 45           | 68               |                        |               |
|      | Raw     |     | 0.78         | 7.70 | 40          | 44           | 75               | 0.011                  |               |
|      | Raw     |     | 0.82         | 7.80 | 41          | 39           | 55               | 0.001                  |               |
|      | MM-1    | 75  | 0.12         | 7.40 | 41.5        | 44           | 79               | 0.011                  |               |
|      | MM-2    | 107 | 0.12         | 7.40 | 42          | 41           | 69               | 0.021                  |               |
|      | BIF     | 78  | 0.10         | 7.50 | 41.5        | 35           | 51               | 0.038                  |               |
|      | ERD-2   | 46  | 0.11         | 7.60 | 41.5        | 36           | 53               | 0.021                  |               |
| 8-1  | MM-1    | 75  | 0.35         | 7.30 | 42.5        | 42           | 38               | 0.021                  |               |
|      | MM-2    | 107 | 0.06         | 7.20 | 42          | 36           | 42               | 0.021                  |               |
|      | BIF     | 78  | 0.08         | 7.85 | 41.5        | 38           | 45               | 0.009                  |               |
|      | ERD-2   | 46  | 0.12         | 7.90 | 42          | 54           | 35               | 0.026                  |               |

## APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|--------------|------|-------------|--------------|------------------|------------------------|---------------|
| 8-1  | Raw   |     | 0.88         | 7.80 | 40.5        | 45           | 44               | 0.011                  |               |
|      | MM-1  | 76  | 0.08         | 7.60 | 41.5        | 36           | 44               | 0.011                  |               |
|      | MM-2  | 107 | 0.07         | 7.45 | 42          | 36           | 45               | 0.025                  |               |
|      | BIF   | 79  | 0.19         | 7.95 | 41          | 43           | 44               |                        |               |
|      | ERD-2 | 46  | 0.13         | 7.80 | 42          | 44           | 45               |                        |               |
|      | Raw   |     | 0.94         | 7.80 | 42          | 46           | 46               |                        |               |
|      | Raw   |     | 1.04         | 7.80 | 42          | 44           | 48               |                        |               |
|      | MM-1  | 76  | 0.14         | 7.50 |             | 35           | 44               | 0.026                  |               |
|      | MM-2  | 107 | 0.14         | 7.50 | 42          | 36           | 45               | 0.038                  |               |
|      | BIF   | 79  | 0.17         | 7.90 | 42          | 43           | 45               |                        |               |
|      | ERD-2 | 47  | 0.16         | 7.80 | 42          | 43           | 45               |                        |               |
| 8-2  | MM-1  | 76  | 0.07         | 7.35 | 42.5        | 36           | 44               | 0.021                  |               |
|      | MM-2  | 108 | 0.08         | 7.50 | 42.5        | 40           | 45               | 0.045                  |               |
|      | BIF   | 79  | 0.16         | 7.80 | 42.5        | 44           | 42               |                        |               |
|      | ERD-2 | 47  | 0.11         | 7.80 | 42.5        | 42           | 46               |                        |               |
|      | Raw   |     | 1.1          |      | 41.5        |              |                  |                        |               |
|      | MM-1  | 76  | 0.12         | 7.50 | 40          | 38           | 44               | 0.073                  |               |
|      | BIF   | 79  | 0.12         | 7.90 | 48          | 42           | 45               |                        |               |
|      | Raw   |     | 0.90         | 8.00 | 49          | 45           | 43               | 0.015                  |               |
|      | MM-1  | 77  | 0.13         | 7.50 | 48          | 39           | 44               | 0.023                  |               |
|      | MM-2  | 108 | 0.07         | 7.65 | 48          | 37           | 46               | 0.023                  |               |
|      | ERD-2 | 47  | 0.16         | 7.90 | 48.5        | 42           | 44               |                        |               |
|      | MM-1  | 77  | 0.06         | 7.50 | 48.5        | 35           | 46               | 0.019                  |               |
|      | MM-2  | 108 | 0.09         | 7.50 | 49          | 37           | 45               | 0.019                  |               |
|      | BIF   | 80  | 0.37         | 7.90 |             | 42           | 44               |                        |               |
|      | ERD-2 | 47  | 0.13         | 7.80 | 50          | 44           | 44               |                        |               |
|      | Raw   |     | 1.12         | 7.99 | 48          | 45           | 45               | 0.021                  |               |
| 8-3  | MM-1  | 77  | 0.06         | 7.55 |             | 38           | 46               | 0.006                  |               |
|      | MM-2  | 108 | 0.12         | 7.39 | 49          | 36           | 44               | 0.017                  |               |
|      | Raw   |     | 0.87         | 8.00 | 48          | 45           | 44               | 0.017                  |               |
| 8-5  | MM-1  | 78  | 0.09         | 7.60 | 45          | 39           | 45               | 0.011                  |               |
|      | MM-2  | 109 | 0.08         | 7.55 | 45.5        | 37           | 47               | 0.015                  |               |
|      | BIF   | 81  | 0.25         | 7.80 | 45.5        | 43           | 45               |                        |               |
|      | ERD-2 | 48  | 0.12         | 7.84 | 45          | 44           | 45               |                        |               |
|      | Raw   |     | 0.81         | 8.03 | 44          | 45           | 46               | 0.030                  |               |

## APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|--------------|------|-------------|--------------|------------------|------------------------|---------------|
| 8-5  | MM-1  | 78  | 0.12         | 7.40 | 44.5        | 34           | 45               | 0.033                  |               |
|      | MM-2  | 109 | 0.07         | 7.50 | 44.5        | 35           | 39               | 0.009                  |               |
|      | BIF   | 82  | 0.15         | 7.80 | 44.5        | 48           | 43               |                        |               |
|      | ERD-2 | 48  | 0.36         | 8.10 | 44.5        | 42           | 44               |                        |               |
|      | Raw   |     | 0.56         | 7.50 | 43          | 46           | 46               | 0.013                  |               |
| 8-6  | MM-1  | 78  | 0.08         | 7.4  | 43          | 38           | 47               | 0.017                  |               |
|      | MM-2  | 109 | 0.06         | 7.4  | 43.5        | 4]           | 42               | 0.017                  |               |
|      | BIF   | 82  | 0.19         | 8.0  | 42.5        | 44           | 47               | 0.021                  |               |
|      | ERD-2 | 48  | 0.09         | 8.0  | 43          | 44           | 46               | 0.40                   |               |
|      | Raw   |     | 0.58         | 8.0  | 41.5        | 44           | 42               | 0.025                  |               |
|      | ERD-2 | 48  | 0.08         | 7.95 |             | 44           | 46               |                        |               |
|      | MM-1  | 78  | 0.11         | 7.40 | 42          | 37           | 42               |                        |               |
|      | MM-2  | 109 | 0.11         | 7.50 | 42.5        | 38           | 45               |                        |               |
|      | BIF   | 82  | 0.20         | 7.90 | 42          | 44           | 44               |                        |               |
|      | ERD-2 | 49  | 0.11         | 8.00 | 42          | 43           | 44               |                        |               |
|      | Raw   |     | 0.65         | 8.03 | 42          | 45           | 44               |                        |               |
|      | MM-1  | 78  | 0.16         | 7.40 | 44          | 37           | 45               | 0.011                  |               |
|      | MM-2  | 109 | 0.34         | 7.50 | 42.5        | 37           | 44               | 0.013                  |               |
|      | Raw   |     | 0.55         | 8.00 | 42          | 42           | 46               | 0.011                  |               |
|      | MM-1  | 79  | 0.08         | 7.55 | 42          | 35           | 43               | 0.023                  |               |
| 8-7  | MM-2  | 110 | 0.10         | 7.70 | 42          | 37           | 44               | 0.013                  |               |
|      | BIF   | 82  | 0.18         | 8.00 | 42.5        | 43           | 40               |                        |               |
|      | ERD-2 | 49  | 0.20         | 8.00 | 42.5        | 44           | 44               |                        |               |
|      | MM-1  | 79  | 0.07         | 7.48 | 43.5        | 33           | 45               | 0.021                  |               |
|      | MM-2  | 110 | 0.06         | 7.40 | 44.5        | 36           | 44               | 0.030                  |               |
|      | BIF   | 82  | 0.15         | 7.85 | 44          | 42           | 41               |                        |               |
|      | ERD-2 | 49  | 0.10         | 7.61 | 43.5        | 40           | 45               |                        |               |
|      | Raw   |     | 0.55         | 8.00 | 43          | 42           | 41               | 0.023                  |               |
|      | Raw   |     | 0.58         | 7.85 | 44          | 44           | 44               |                        |               |
|      | MM-1  | 79  | 0.09         | 7.45 | 45          | 37           | 45               | 0.028                  |               |
|      | MM-2  | 110 | 0.12         | 7.50 | 45          | 37           | 46               | 0.019                  |               |
|      | BIF   | 83  | 0.21         | 7.98 | 45.5        | 44           | 44               |                        |               |
|      | ERD-2 | 49  | 0.09         | 7.90 | 45          | 43           | 45               |                        |               |
|      | Raw   |     | 0.93         | 7.65 | 42          | 43           | 43               |                        |               |
|      | MM-1  | 79  | 0.09         | 7.25 | 41.5        | 37           | 46               |                        |               |
|      | MM-2  | 110 | 0.35         | 7.30 | 41          | 38           | 47               |                        |               |
|      | BIF   | 83  | 0.28         | 7.70 | 40.5        | 42           | 44               |                        |               |

APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|--------------|------|-------------|--------------|------------------|------------------------|---------------|
| 8-7  | ERD-2 | 49  | 0.07         | 7.70 | 42          | 43           | 44               |                        |               |
| 8-8  | MM-1  | 79  | 0.30         | 7.53 | 42.5        | 37           | 45               | 0.021                  |               |
|      | MM-2  | 111 | 0.08         | 7.95 | 43          | 37           | 45               | 0.011                  |               |
|      | BIF   | 84  | 0.15         | 8.00 | 43          | 41           | 44               |                        |               |
|      | ERD-2 | 49  | 0.12         | 8.05 | 43.5        | 42           | 44               |                        |               |
|      | Raw   |     | 0.53         | 7.82 | 42          | 41           | 43               | 0.023                  |               |
|      | ERD-2 | 49  | 0.10         | 7.70 | 43          | 42           | 44               |                        |               |
|      | MM-1  | 80  | 0.08         | 7.45 | 42          | 37           | 43               | 0.038                  |               |
|      | MM-2  | 111 | 0.08         | 7.50 | 41.5        | 34           | 41               | 0.026                  |               |
|      | BIF   | 84  | 0.18         | 7.85 | 41          | 40           | 39               |                        |               |
|      | ERD-2 | 50  | 0.16         | 7.90 | 41.5        | 42           | 43               |                        |               |
|      | Raw   |     | 0.59         | 7.85 | 41          | 41           | 44               |                        |               |
|      | MM-1  | 80  | 0.17         | 7.40 | 54          | 38           | 44               |                        |               |
|      | MM-2  | 111 | 0.12         | 7.42 | 54          | 34           | 45               |                        |               |
|      | BIF   | 86  | 0.38         | 7.65 | 54          | 42           | 44               |                        |               |
|      | ERD-2 | 50  | 0.26         | 7.92 | 55          | 42           | 42               |                        |               |
|      | Raw   |     | 1.40         | 7.80 | 53          | 41           | 42               |                        |               |
| 8-9  | MM-1  | 80  | 0.27         | 7.45 | 57          | 37           | 45               | 0.001                  |               |
|      | MM-2  | 112 | 0.35         | 7.60 | 57          | 38           | 45               | 0.013                  |               |
|      | BIF   | 86  | 0.32         | 7.95 | 57          | 42           | 43               |                        |               |
|      | ERD-2 | 50  | 0.25         | 8.00 | 57          | 43           | 45               |                        |               |
|      | Raw   |     | 1.50         | 8.00 | 55          | 41           | 45               | 0.011                  |               |
|      | MM-1  | 81  | 0.16         | 7.60 | 58          | 38           | 43               | 0.009                  |               |
|      | MM-2  | 112 | 0.19         | 7.65 | 58          | 41           | 43               | 0.007                  |               |
|      | BIF   | 86  | 0.29         | 7.86 | 58          | 41           | 45               |                        |               |
|      | ERD-2 | 50  | 0.19         | 7.90 | 58          | 42           | 44               |                        |               |
|      | Raw   |     | 1.15         | 7.95 | 57.5        | 37           | 41               | 0.005                  |               |
|      | Raw   |     | 1.3          | 8.10 | 57          | 42           | 46               | 0.015                  |               |
|      | BIF   | 86  | 0.35         | 8.05 | 57          | 43           | 46               |                        |               |
|      | MM-1  | 81  | 0.10         | 7.55 | 57          | 36           | 43               | 0.017                  |               |
|      | MM-2  | 112 | 0.14         | 7.60 | 58          | 39           | 44               | 0.015                  |               |
|      | BIF   | 87  | 0.20         | 8.00 | 57.5        | 42           | 49               |                        |               |
|      | ERD-2 | 50  | 0.21         | 7.80 | 57.5        | 43           | 50               |                        |               |
| 8-10 | MM-1  | 81  | 0.12         | 7.38 | 58          | 37           | 44               | 0.162                  |               |
|      | BIF   | 87  | 0.23         | 7.90 | 58          | 43           | 45               |                        |               |
|      | Raw   |     | 1.00         |      | 57          |              | 45               |                        |               |

APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|--------------|------|-------------|--------------|------------------|------------------------|---------------|
| 8-12 | MM-1  | 82  | 0.09         | 7.40 | 52          | 36           | 45               | 0.061                  |               |
|      | MM-2  | 113 | 0.08         | 7.5  | 52          | 37           | 45               | 0.112                  |               |
|      | BIF   | 88  | 0.16         | 8.00 | 52          | 44           | 45               |                        |               |
|      | ERD-2 | 51  | 0.11         | 8.08 |             | 44           | 45               |                        |               |
|      | Raw   |     | 0.62         | 8.02 | 51          | 44           | 45               | 0.420                  |               |
|      | MM-1  | 82  | 0.05         | 7.42 | 51          | 35           | 45               | 0.050                  |               |
|      | MM-2  | 113 | 0.05         | 7.50 | 51.5        | 36           | 43               | 0.012                  |               |
|      | BIF   | 88  | 0.21         | 8.02 | 50          | 44           | 45               |                        |               |
|      | ERD-2 | 51  | 0.08         | 8.10 | 51.5        | 41           | 43               |                        |               |
|      | Raw   |     | 0.58         | 8.05 | 52          | 39           | 43               | 0.421                  |               |
|      | Raw   |     | 0.66         | 7.50 | 50          | 45           | 46               | 0.026                  |               |
|      | MM-1  | 82  | 0.07         | 7.40 | 51          | 34           | 46               | 0.017                  |               |
|      | MM-2  | 113 | 0.09         | 7.30 | 51          | 40           | 47               | 0.017                  |               |
|      | BIF   | 88  | 0.21         | 7.60 | 51.5        | 40           | 47               |                        |               |
|      | ERD-2 | 51  | 0.09         | 7.60 | 51          | 43           | 47               |                        |               |
|      | Raw   |     | 0.59         | 7.99 | 49          | 43           | 46               | 0.022                  |               |
|      | MM-1  | 82  | 0.16         | 7.31 | 50          | 37           | 43               | 0.045                  |               |
|      | MM-2  | 114 | 0.11         | 7.42 | 50          | 38           | 46               | 0.022                  |               |
| 8-13 | BIF   | 88  | 0.15         | 7.98 | 50          | 43           | 44               |                        |               |
|      | ERD-2 | 54  | 0.16         | 7.99 |             | 44           | 45               |                        |               |
|      | Raw   |     | 0.68         | 8.00 | 53          | 43           | 47               | 0.053                  |               |
|      | MM-1  | 83  | 0.06         | 7.60 | 51          | 36           | 45               | 0.045                  |               |
|      | MM-2  | 114 | 0.06         | 7.65 | 52.5        | 35           | 44               | 0.095                  |               |
|      | BIF   | 88  | 0.14         | 7.95 | 51.5        | 42           | 44               |                        |               |
|      | ERD-2 | 54  | 0.15         | 8.05 | 52          | 43           | 45               |                        |               |
|      | Raw   |     | 0.59         | 7.90 | 54          | 41           | 44               | 0.011                  |               |
|      | MM-1  | 83  | 0.07         | 7.45 |             | 38           | 45               | 0.021                  |               |
|      | MM-2  | 114 | 0.05         | 7.40 | 55          | 36           | 45               | 0.025                  |               |
|      | BIF   | 88  | 0.15         | 7.80 | 55.5        | 43           | 53               |                        |               |
|      | ERD-2 | 54  | 0.16         | 7.90 | 55          | 40           | 48               |                        |               |
|      | Raw   |     | 0.76         | 8.10 | 56          | 43           | 46               | 0.023                  |               |
|      | MM-1  | 83  | 0.06         | 7.45 | 56          | 33           | 47               | 0.021                  |               |
|      | MM-2  | 114 | 0.04         | 7.40 | 58          | 30           | 43               | 0.017                  |               |
|      | BIF   | 88  | 0.10         | 7.80 | 57          | 42           | 40               |                        |               |
|      | ERD-2 | 55  | 0.09         | 8.00 | 58          | 41           | 50               |                        |               |
|      | MM-1  | 83  | 0.32         | 7.40 | 56          | 35           | 50               | 0.031                  |               |
|      | MM-2  | 115 | 0.05         | 7.35 | 58          | 35           | 47               | 0.017                  |               |

## APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|--------------|------|-------------|--------------|------------------|------------------------|---------------|
| 8-14 | BIF   | 89  | 0.08         | 7.90 | 56          | 41           | 43               |                        |               |
|      | ERD-2 | 55  | 0.08         | 7.70 | 56.5        | 42           | 48               |                        |               |
|      | Raw   |     | 0.62         | 7.90 | 57          | 38           | 47               | 0.015                  |               |
| 8-15 | Raw   |     | 0.74         | 7.75 | 56          | 35           | 50               | 0.042                  |               |
|      | MM-1  | 84  | 0.06         | 7.50 | 57          | 35           | 52               | 0.023                  |               |
|      | MM-2  | 114 | 0.06         | 7.50 | 57.5        | 34           | 50               | 0.013                  |               |
|      | BIF   | 89  | 0.17         | 8.00 | 57.5        | 42           | 49               |                        |               |
|      | ERD-2 | 55  | 0.13         | 7.90 | 58          | 45           | 52               |                        |               |
|      | Raw   |     | 0.54         | 8.00 | 57          | 43           | 45               | 0.030                  |               |
|      | MM-1  | 84  | 0.06         | 7.40 | 58          | 34           | 46               | 0.039                  |               |
|      | MM-2  | 114 | 0.04         | 7.40 | 58          | 35           | 48               | 0.013                  |               |
|      | BIF   | 89  | 0.13         | 8.00 | 58          | 44           | 38               |                        |               |
|      | ERD-2 | 56  | 0.04         | 8.00 | 58          | 47           | 46               |                        |               |
|      | MM-1  | 84  | 0.05         | 7.10 | 55          | 32\$         | 46               | 0.015                  |               |
|      | MM-2  | 114 | 0.04         | 7.30 | 57          | 32           | 51               | 0.011                  |               |
|      | BIF   | 89  | 0.19         | 7.90 | 56          | 40           | 50               |                        |               |
|      | ERD-2 | 56  | 0.12         | 7.50 | 56          | 37           | 47               |                        |               |
|      | Raw   |     | 0.51         | 7.40 | 56.5        | 38           | 57               | 0.007                  |               |
| 8-16 | Raw   |     | 0.66         | 7.95 | 56          | 37           | 48               | 0.013                  |               |
|      | MM-1  | 84  | 0.16         | 7.40 | 57.5        | 36           | 53               | 0.017                  |               |
|      | MM-2  | 115 | 0.09         | 7.40 | 58          | 36           | 48               | 0.021                  |               |
|      | BIF   | 89  | 0.20         | 7.80 | 58          | 41           | 52               |                        |               |
|      | ERD-2 | 56  | 0.15         | 8.00 | 56.5        | 36           | 50               |                        |               |
|      | Raw   |     | 0.62         | 8.00 | 56.5        | 43           | 48               | 0.015                  |               |
|      | MM-1  | 85  | 0.06         | 7.60 | 56          | 46           | 36               | 0.017                  |               |
|      | MM-2  | 115 | 0.07         | 7.40 | 56          | 38           | 47               | 0.11                   |               |
|      | BIF   | 90  | 0.17         | 7.70 | 55.5        | 41           | 40               |                        |               |
|      | ERD-2 | 57  | 0.07         | 7.80 | 56          | 36           | 47               |                        |               |
|      | Raw   |     | 0.66         | 8.00 | 56.5        | 38           | 43               | 0.11                   |               |
|      | MM-1  | 85  | 0.06         | 7.35 |             | 40           | 52               | 0.028                  |               |
|      | MM-2  | 115 | 0.05         | 7.30 |             | 36           | 48               | 0.035                  |               |
|      | BIF   | 91  | 0.10         | 7.80 |             | 50           | 51               |                        |               |
|      | ERD-2 | 57  | 0.14         | 7.70 |             | 43           | 51               |                        |               |
|      | Raw   |     | 1.10         | 7.90 |             | 44           | 45               | 0.032                  |               |
| 8-17 | Raw   |     | 0.60         | 7.60 | 54.5        | 42           | 46               | 0.017                  |               |
|      | MM-1  | 80  | 0.08         | 7.20 | 56          | 35           | 48               | 0.030                  |               |
|      | MM-2  | 115 | 0.67         | 7.20 | 56          | 38           | 48               | 0.007                  |               |

APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|--------------|------|-------------|--------------|------------------|------------------------|---------------|
| 8-17 | BIF   | 91  | 0.23         | 7.50 | 56.5        | 45           | 47               |                        |               |
|      | ERD-2 | 57  | 0.13         | 7.40 | 56          | 43           | 50               |                        |               |
| 8-19 | Raw   |     | 0.51         | 7.90 | 50          | 42           | 49               | 0.009                  |               |
|      | MM-2  | 116 | 0.05         | 7.45 | 51.5        | 39           | 45               | 0.011                  |               |
|      | BIF   | 92  | 0.19         | 7.90 | 51          | 41           | 44               |                        |               |
|      | ERD-2 | 58  | 0.08         | 7.90 | 51          | 41           | 50               |                        |               |
|      | Raw   |     | 0.52         | 8.00 | 51          | 43           | 45               | 0.021                  |               |
|      | MM-2  | 116 | 0.06         | 7.40 | 50.5        | 35           | 48               | 0.021                  |               |
|      | BIF   | 92  | 0.06         | 7.90 | 49.5        | 48           | 50               |                        |               |
|      | ERD-2 | 58  | 0.12         | 7.90 | 50.5        | 46           | 48               |                        |               |
|      | Raw   |     | 0.69         | 7.90 | 52          | 42           | 43               | 0.021                  |               |
|      | MM-2  | 117 | 0.29         | 7.60 | 53          | 39           | 50               | 0.023                  |               |
|      | BIF   | 92  | 0.15         | 7.90 | 53          | 45           | 53               |                        |               |
|      | ERD-2 | 58  | 0.12         | 8.00 | 52.5        | 42           | 47               |                        |               |
|      | Raw   |     | 0.74         | 8.00 | 55.5        | 42           | 46               | 0.015                  |               |
|      | MM-2  | 117 | 0.05         | 7.50 | 57.5        | 35           | 45               | 0.021                  |               |
|      | BIF   | 93  | 0.26         | 8.00 | 58          | 42           | 49               |                        |               |
|      | ERD-2 | 59  | 0.06         | 8.00 | 57.5        | 39           | 49               |                        |               |
| 8-20 | Raw   |     | 0.65         | 8.00 | 55.5        | 37           | 45               | 0.021                  |               |
|      | MM-2  | 117 | 0.23         | 7.45 | 55          | 35           | 48               | 0.017                  |               |
|      | BIF   | 93  | 0.16         | 7.90 | 54.5        | 47           | 46               |                        |               |
|      | ERD-2 | 59  | 0.10         | 7.90 | 55          | 45           | 46               |                        |               |
|      | MM-2  | 118 | 0.07         | 7.30 | 54          | 40           | 48               | 0.011                  |               |
|      | Raw   |     | 0.83         | 7.95 | 56          | 48           | 48               | 0.051                  |               |
|      | MM-2  | 118 | 0.15         | 7.90 | 58          | 42           | 48               | 0.021                  |               |
|      | BIF   | 93  | 0.23         | 7.30 | 58.5        | 35           | 45               |                        |               |
|      | ERD-2 | 59  | 0.14         | 7.80 | 58          | 43           | 49               |                        |               |
|      | Raw   |     | 0.83         | 7.90 | 54          | 35]          | 44               | 0.035                  |               |
|      | MM-2  | 118 | 0.11         | 7.35 | 55          | 38           | 42               | 0.019                  |               |
|      | BIF   | 94  | 0.16         | 7.85 | 55          | 41           | 45               |                        |               |
|      | ERD-2 | 60  | 0.12         | 7.90 | 55          | 40           | 40               |                        |               |
|      | MM-2  | 118 | 0.20         | 7.20 | 53.5        | 31           | 42               | 0.013                  |               |
|      | Raw   |     | 0.55         | 7.90 | 57.5        | 40           | 44               | 0.011                  |               |
|      | MM-1  | 86  | 0.08         | 7.40 | 57.5        | 34           | 48               | 0.043                  |               |
|      | BIF   | 94  | 0.16         | 7.80 | 56.5        | 41           | 45               |                        |               |
|      | ERD-2 | 60  | 0.10         | 7.90 | 57.5        | 45           | 45               |                        |               |
| 8-21 | Raw   |     | 0.83         | 7.90 | 54          | 35]          | 44               | 0.035                  |               |
|      | MM-2  | 118 | 0.11         | 7.35 | 55          | 38           | 42               | 0.019                  |               |
|      | BIF   | 94  | 0.16         | 7.85 | 55          | 41           | 45               |                        |               |
|      | ERD-2 | 60  | 0.12         | 7.90 | 55          | 40           | 40               |                        |               |
|      | MM-2  | 118 | 0.20         | 7.20 | 53.5        | 31           | 42               | 0.013                  |               |
|      | Raw   |     | 0.55         | 7.90 | 57.5        | 40           | 44               | 0.011                  |               |
| 8-21 | MM-1  | 86  | 0.08         | 7.40 | 57.5        | 34           | 48               | 0.043                  |               |
|      | BIF   | 94  | 0.16         | 7.80 | 56.5        | 41           | 45               |                        |               |
|      | ERD-2 | 60  | 0.10         | 7.90 | 57.5        | 45           | 45               |                        |               |
|      | ERD-2 | 60  | 0.10         | 7.90 | 57.5        | 45           | 45               |                        |               |

APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb,<br>FTU | pH   | Temp,<br>°F | Alk,<br>mg/l | Hardness<br>mg/l | Alumi-<br>num,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|--------------|------|-------------|--------------|------------------|------------------------|---------------|
| 8-21 | Raw   |     | 0.68         | 7.90 | 56.5        | 43           | 48               | 0.011                  |               |
|      | MM-1  | 86  | 0.09         | 7.35 | 58          | 35           | 41               | 0.007                  |               |
|      | BIF   | 94  | 0.15         | 7.85 | 58          | 45           | 46               |                        |               |
|      | ERD-2 | 60  | 0.14         | 7.90 | 58          | 48           | 44               |                        |               |
| 8-22 | MM-1  | 86  | 0.05         | 7.30 | 55          | 35           | 50               | 0.013                  |               |
|      | BIF   | 95  | 0.35         | 7.60 | 55          | 35           | 51               |                        |               |
|      | ERD-2 | 62  | 0.08         | 7.70 | 55          | 43           | 50               |                        |               |
|      | Raw   |     | 0.65         | 7.70 | 54          | 45           | 45               | 0.003                  |               |
|      | BIF   | 95  | 0.53         | 7.80 | 52          | 39           | 45               |                        |               |
|      | MM-1  | 86  | 0.06         | 7.10 |             | 34           | 47               | 0.049                  |               |
|      | MM-2  | 119 | 0.08         | 7.10 | 52          | 35           | 45               | 0.047                  |               |
|      | BIF   | 96  | 0.37         | 7.30 | 52          | 45           | 43               |                        |               |
|      | ERD-2 | 62  | 0.09         | 7.30 | 54          | 50           | 46               |                        |               |
|      | Raw   |     | 0.60         | 7.70 | 53          | 47           | 44               | 0.055                  |               |
|      | Raw   |     | 0.71         | 7.70 | 48.5        | 42           | 46               | 0.038                  |               |
|      | MM-2  | 119 | 0.09         | 7.10 | 49          | 40           | 48               | 0.033                  |               |
|      | BIF   | 97  | 0.24         | 7.50 | 49          | 46           | 48               |                        |               |
|      | ERD-2 | 62  | 0.10         | 7.40 | 50          | 43           | 47               |                        |               |
|      | Raw   |     | 0.49         | 7.40 | 49          | 40           | 47               | 0.57                   |               |
|      | MM-2  | 119 | 0.07         | 7.40 | 49.5        | 34           | 48               | 0.023                  |               |
| 8-23 | BIF   | 97  | 0.24         | 6.90 | 49.5        | 43           | 47               |                        |               |
|      | ERD-2 | 63  | 0.13         | 7.40 | 49.5        | 43           | 40               |                        |               |
|      | BIF   | 97  | 0.25         | 7.60 | 52          | 42           | 48               |                        |               |
|      | MM-2  | 119 | 0.06         | 7.10 | 50.5        | 37           | 48               | 0.025                  |               |
|      | ERD-2 | 63  | 0.06         | 7.40 | 52          | 46           | 45               |                        |               |
|      | Raw   |     | 0.55         | 7.50 | 51.5        | 49           | 49               | 0.039                  |               |
|      | BIF   | 99  | 0.25         | 7.60 |             | 45           | 51               |                        |               |
|      | Raw   |     | 0.51         | 7.40 | 52          | 48           | 46               | 0.017                  |               |
|      | MM-2  | 120 | 0.11         | 7.20 | 52.5        | 49           | 50               | 0.019                  |               |
|      | BIF   | 100 | 0.67         | 7.30 | 53          | 49           | 47               |                        |               |
|      | ERD-2 | 63  | 0.15         | 7.50 | 52          | 43           | 48               |                        |               |
|      | Raw   |     | 0.46         | 7.90 | 51          | 42           | 48               | 0.009                  |               |
| 8-26 | ERD-2 | 64  | 0.06         | 7.80 | 52          | 42           | 50               |                        |               |
|      | Raw   |     | 0.43         | 7.70 | 50          | 47           | 47               | 0.011                  |               |
|      | BIF   | 101 | 0.09         | 7.70 | 52          | 42           | 53               | 0.035                  |               |
|      | ERD-2 | 64  | 0.07         | 7.80 | 51          | 42           | 35               |                        |               |
|      |       |     |              |      |             |              |                  |                        |               |

APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb.,<br>FTU | pH   | Temp.,<br>°F | Alk.,<br>mg/l | Hardness,<br>mg/l | Aluminum,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|---------------|------|--------------|---------------|-------------------|-------------------|---------------|
| 8-27 | Raw   |     | 0.46          | 7.40 | 46.5         | 40            | 46                | 0.042             |               |
|      | BIF   | 101 | 0.13          | 7.50 | 45           | 45            | 49                |                   |               |
|      | ERD-2 | 64  | 0.10          | 7.50 | 46           | 40            | 53                |                   |               |
|      | ERD-2 | 65  | 0.06          | 7.50 | 46           | 41            | 57                |                   |               |
|      | Raw   |     | 0.49          | 7.80 | 41           | 43            | 45                | 0.057             |               |
|      | MM-2  | 121 | 0.07          | 7.40 | 42           | 42            | 47                | 0.019             |               |
|      | BIF   | 102 | 0.09          | 7.70 | 41           | 47            | 53                |                   |               |
|      | Raw   |     | 0.48          | 7.90 | 42           | 43            | 44                | 0.007             |               |
|      | MM-2  | 121 | 0.06          | 7.50 | 43           | 37            | 45                | 0.015             |               |
|      | BIF   | 102 | 0.10          | 7.85 | 43           | 46            | 52                |                   |               |
|      | ERD-2 | 66  | 0.08          | 7.70 | 43           | 41            | 49                |                   |               |
|      | Raw   |     | 0.48          | 7.80 | 42.5         | 50            | 45                | 0.011             |               |
|      | MM-2  | 121 | 0.10          | 7.40 | 42           | 42            | 50                | 0.023             |               |
|      | BIF   | 102 | 0.09          | 7.75 | 42           | 47            | 52                |                   |               |
|      | ERD-2 | 66  | 0.07          | 7.70 | 42           | 43            | 50                |                   |               |
| 8-28 | Raw   |     | 0.42          | 7.80 | 43           | 45            | 46                | 0.062             |               |
|      | MM-2  | 122 | 0.07          | 7.20 | 43           | 41            | 53                | 0.047             |               |
|      | BIF   | 103 | 0.18          | 7.70 | 43           | 44            | 46                |                   |               |
|      | ERD-2 | 66  | 0.06          | 7.60 | 43           | 50            | 57                |                   |               |
|      | Raw   |     | 0.43          | 7.70 | 42           | 46            | 50                | 0.039             |               |
|      | MM-2  | 122 | 0.05          | 7.40 | 42           | 43            | 50                | 0.015             |               |
|      | BIF   | 103 | 0.11          | 7.70 | 41           | 45            | 50                |                   |               |
|      | ERD-2 | 67  | 0.06          | 7.80 | 42           | 45            | 53                |                   |               |
|      | Raw   |     | 0.47          | 7.80 | 43           | 45            | 45                | 0.038             |               |
|      | MM-2  | 122 | 0.07          | 7.50 | 42           | 42            | 53                | 0.038             |               |
|      | BIF   | 103 | 0.11          | 7.80 | 41           | 42            | 49                |                   |               |
|      | ERD-2 | 67  | 0.04          | 7.80 | 42.5         | 44            | 50                |                   |               |
|      | Raw   |     | 0.40          | 7.70 | 40           | 45            | 54                | 0.021             |               |
|      | MM-2  | 123 | 0.04          | 7.30 | 40           | 38            | 58                | 0.011             |               |
|      | BIF   | 104 | 0.11          | 7.50 | 40           | 45            | 46                |                   |               |
|      | ERD-2 | 67  | 0.05          | 7.40 | 42           | 46            | 57                |                   |               |
| 8-29 | Raw   |     | 0.55          | 7.70 | 40           | 42            | 51                | 0.011             |               |
|      | MM-2  | 123 | 0.06          | 7.20 | 41           | 40            | 50                | 0.013             |               |
|      | BIF   | 104 | 0.10          | 7.60 | 41           | 40            | 52                |                   |               |
|      | ERD-2 | 68  | 0.07          | 7.50 | 41           | 42            | 51                |                   |               |
|      |       |     |               |      |              |               |                   |                   |               |

APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb.,<br>FTU | pH   | Temp.,<br>°F | Alk.,<br>mg/l | Hardness,<br>mg/l | Aluminum,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|---------------|------|--------------|---------------|-------------------|-------------------|---------------|
| 8-30 | BIF   | 104 | 0.06          | 7.50 | 41.5         | 46            | 52                |                   |               |
|      | Raw   |     | 0.41          | 7.50 | 41.5         | 41            | 58                |                   |               |
|      | MM-2  | 123 | 0.06          | 7.20 | 41           | 40            | 52                | 0.011             |               |
|      | BIF   | 104 | 0.06          | 7.50 | 40.5         | 46            | 52                |                   |               |
|      | ERD-2 | 68  | 0.04          | 7.50 | 42           | 45            | 55                | 0.013             |               |
|      | Raw   |     | 0.41          | 7.80 | 40           | 40            | 46                | 0.015             |               |
|      | MM-2  | 124 | 0.04          | 7.30 | 40           | 35            | 53                | 0.021             |               |
|      | BIF   | 105 | 0.21          | 7.80 | 40           | 43            | 55                |                   |               |
|      | ERD-2 | 68  | 0.05          | 7.75 | 41           | 47            | 55                |                   |               |
|      | MM-2  | 124 | 0.05          | 7.30 | 40           | 39            | 55                | 0.026             |               |
|      | BIF   | 106 | 0.16          | 7.60 | 40           | 42            | 50                |                   |               |
|      | ERD-2 | 68  | 0.05          | 7.70 | 40           | 44            | 52                |                   |               |
|      | Raw   |     | 0.54          | 7.70 | 39           | 45            | 50                | 0.039             |               |
|      | Raw   |     | 0.93          | 7.70 | 40           | 39            | 50                | 0.023             |               |
|      | MM-2  | 124 | 0.28          | 7.20 | 39           | 37            | 60                | 0.026             |               |
|      | BIF   | 106 | 0.23          | 7.50 | 39           | 38            | 53                |                   |               |
|      | ERD-2 | 68  | 0.06          | 7.50 | 40           | 36            | 52                |                   |               |
| 9-3  | Raw   |     | 0.71          | 7.75 | 39           | 44            | 46                | 0.025             |               |
|      | MM-2  | 125 | 0.06          | 7.40 | 40           | 40            | 58                | 0.013             |               |
|      | BIF   | 107 | 0.17          | 7.70 | 40           | 41            | 50                |                   |               |
|      | ERD-2 | 69  | 0.07          | 7.75 | 40           | 40            | 50                |                   |               |
|      | Raw   |     | 0.59          | 7.80 | 41           | 44            | 46                | 0.011             |               |
|      | MM-2  | 125 | 0.07          | 7.50 | 40           | 38            | 50                | 0.011             |               |
|      | BIF   | 107 | 0.15          | 7.90 | 41           | 38            | 55                |                   |               |
|      | ERD-2 | 69  | 0.06          | 7.80 | 41.5         | 41            | 48                |                   |               |
| 9-4  | Raw   |     | 0.63          | 7.90 | 40           | 44            | 51                | 0.011             |               |
|      | MM-2  | 126 | 0.04          | 7.30 | 40           | 38            | 53                | 0.011             |               |
|      | BIF   | 108 | 0.16          | 7.80 | 40           | 42            | 51                |                   |               |
|      | ERD-2 | 69  | 0.04          | 7.70 | 41           | 44            | 50                |                   |               |
|      | Raw   |     | 0.66          | 7.80 | 40           | 43            | 46                | 0.028             |               |
|      | MM-2  | 126 | 0.05          | 7.40 | 41           | 39            | 48                | 0.015             |               |
|      | BIF   | 108 | 0.18          | 7.80 | 41           | 42            | 47                |                   |               |
|      | ERD-2 | 70  | 0.05          | 7.70 | 41           | 41            | 47                |                   |               |
|      | BIF   | 108 | 0.27          | 7.80 | 40           | 39            | 52                |                   |               |
|      | Raw   |     | 0.68          | 7.80 | 41.5         | 40            | 46                | 0.011             |               |
|      | MM-2  | 126 | 0.65          | 7.40 | 41           | 35            | 50                | 0.025             |               |
|      | MM-2  | 126 | 0.65          | 7.40 | 41           | 35            | 50                | 0.025             |               |

## APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb.,<br>FTU | pH   | Temp.,<br>°F | Alk.,<br>mg/l | Hardness,<br>mg/l | Aluminum,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|---------------|------|--------------|---------------|-------------------|-------------------|---------------|
| 9-4  | BIF   | 109 | 0.25          | 7.80 | 40           | 45            | 51                |                   |               |
|      | ERD-2 | 70  | 0.05          | 7.80 | 41.5         | 42            | 56                |                   |               |
| 9-5  | Raw   |     | 0.64          | 7.90 | 40           | 43            | 45                | 0.026             |               |
|      | BIF   | 109 | 0.45          | 7.85 | 40           | 39            | 52                |                   |               |
|      | ERD-2 | 70  | 0.05          | 7.80 | 41           | 40            | 53                |                   |               |
|      | Raw   |     | 0.69          | 7.85 | 41           | 43            | 44                | 0.025             |               |
|      | MM-2  | 127 | 0.06          | 7.40 | 42           | 35            | 45                |                   |               |
|      | BIF   | 110 | 0.16          | 7.80 | 42           | 41            | 46                |                   |               |
|      | ERD-2 | 71  | 0.05          | 7.75 | 42           | 42            | 52                | 0.007             |               |
|      | Raw   |     | 0.65          | 7.80 | 42.5         | 41            | 45                |                   |               |
|      | MM-2  | 127 | 0.07          | 7.40 | 41           | 38            | 58                |                   |               |
|      | BIF   | 110 | 0.17          | 7.80 | 41           | 40            | 48                |                   |               |
|      | ERD-2 | 71  | 0.05          | 7.80 | 42           | 43            | 49                |                   |               |
| 9-6  | Raw   |     | 0.62          | 7.75 | 40           | 44            | 46                | 0.009             |               |
|      | MM-2  | 128 | 0.06          | 7.40 | 40.5         | 40            | 55                |                   |               |
|      | BIF   | 110 | 0.11          | 7.20 | 40           | 43            | 52                |                   |               |
|      | ERD-2 | 71  | 0.05          | 7.80 | 42           | 40            | 55                | 0.015             |               |
|      | Raw   |     | 0.53          | 7.75 | 42           | 43            | 46                |                   |               |
|      | MM-2  | 128 | 0.04          | 7.70 | 43           | 38            | 56                |                   |               |
|      | BIF   | 111 | 0.11          | 7.60 | 43           | 42            | 55                | 0.009             |               |
|      | ERD-2 | 72  | 0.06          | 7.70 | 43           | 40            | 55                |                   |               |
|      | Raw   |     | 0.44          | 7.90 | 48           | 43            | 44                |                   |               |
|      | MM-2  | 128 | 0.10          | 7.40 | 46           | 33            | 46                | 0.007             |               |
|      | BIF   | 111 | 0.06          | 7.60 | 46           | 44            | 41                |                   |               |
|      | ERD-2 | 72  | 0.05          | 7.60 | 46           | 44            | 50                |                   |               |
| 9-7  | Raw   |     | 0.39          | 7.70 | 46           | 35            | 44                | 0.007             |               |
|      | BIF   | 112 | 0.05          | 7.40 | 46           | 35            | 50                |                   |               |
|      | ERD-2 | 72  | 0.04          | 7.50 | 47           | 40            | 54                |                   |               |
| 9-9  | Raw   |     | 0.46          | 7.40 | 49           | 38            | 44                | 0.011             |               |
|      | MM-2  | 129 | 0.10          | 7.20 | 46.5         | 35            | 51                |                   |               |
|      | BIF   | 113 | 0.07          | 7.40 | 46.5         | 35            | 49                |                   |               |
|      | ERD-2 | 73  | 0.06          | 7.40 | 47.5         | 40            | 49                |                   |               |
|      | Raw   |     | 0.50          | 7.70 | 48           | 43            | 45                | 0.011             |               |
|      | MM-2  | 129 | 0.06          | 7.10 | 48           | 36            | 46                |                   |               |
|      | BIF   | 113 | 0.07          | 7.40 | 48           | 45            | 45                | 0.028             |               |

APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb.,<br>FTU | pH   | Temp.,<br>°F | Alk.,<br>mg/l | Hardness,<br>mg/l | Aluminum,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|---------------|------|--------------|---------------|-------------------|-------------------|---------------|
| 9-9  | ERD-2 | 73  | 0.50          | 7.40 | 49           | 43            | 44                |                   |               |
| 9-10 | Raw   |     | 0.50          | 7.70 | 48           | 45            | 45                | 0.015             |               |
|      | MM-2  | 130 | 0.06          | 7.30 |              | 38            | 50                | 0.011             |               |
|      | BIF   | 113 | 0.08          | 7.60 | 48.5         | 40            | 42                |                   |               |
|      | ERD-2 | 73  | 0.07          | 7.50 | 49           | 46            | 48                |                   |               |
|      | BIF   | 113 | 0.10          | 7.30 | 48           | 40            | 48                |                   |               |
|      | MM-2  | 130 | 0.08          | 7.00 | 48           | 35            | 43                | 0.023             |               |
|      | BIF   | 114 | 0.07          | 7.80 | 47           | 42            | 45                |                   |               |
|      | ERD-2 | 74  | 0.05          | 7.90 | 48           | 43            | 47                |                   |               |
|      | Raw   |     | 0.50          | 7.90 | 49           | 43            | 44                | 0.011             |               |
|      | MM-2  | 131 | 0.06          | 7.40 | 47           | 36            | 45                | 0.011             |               |
|      | Raw   |     | 0.76          | 7.80 | 47           | 43            | 45                | 0.011             |               |
|      | MM-2  | 131 | 0.07          | 7.40 | 47           | 35            | 48                | 0.017             |               |
|      | BIF   | 114 | 0.07          | 7.70 | 47           | 40            | 52                |                   |               |
|      | ERD-2 | 74  | 0.06          | 7.80 | 47.5         | 43            | 45                |                   |               |
| 9-11 | Raw   |     | 0.74          | 7.70 | 48           | 43            | 44                | 0.015             |               |
|      | MM-2  | 132 | 0.06          | 7.80 | 49           | 35            | 46                | 0.011             |               |
|      | BIF   | 114 | 0.07          | 7.80 | 49           | 40            | 44                |                   |               |
|      | ERD-2 | 75  | 0.07          | 6.90 | 49           | 41            | 45                |                   |               |
|      | BIF   | 114 | 0.10          | 6.70 | 47           | 30            | 46                |                   |               |
|      | MM-2  | 132 | 0.20          | 7.00 | 47           | 25            | 43                |                   |               |
|      | BIF   | 115 | 0.15          | 7.60 | 45           | 40            | 45                |                   |               |
|      | ERD-2 | 75  | 0.05          | 7.60 | 46           | 37            | 42                | 0.015             |               |
|      | Raw   |     | 0.45          | 7.80 | 47           | 43            | 44                | 0.013             |               |
|      | MM-2  | 133 | 0.07          | 7.10 | 45           | 32            | 41                |                   |               |
|      | Raw   |     | 0.55          | 7.80 | 44           | 43            | 44                | 0.011             |               |
|      | MM-2  | 134 | 0.04          | 7.20 | 44           | 33            | 47                | 0.011             |               |
|      | BIF   | 115 | 0.07          | 7.40 | 44           | 43            | 41                |                   |               |
|      | ERD-2 | 75  | 0.05          | 7.60 | 45           | 40            | 50                |                   |               |
| 9-12 | Raw   |     | 0.40          | 7.70 | 45           | 42            | 46                | 0.007             |               |
|      | MM-2  | 134 | 0.04          | 7.20 | 46           | 39            | 55                | 0.015             |               |
|      | BIF   | 115 | 0.06          | 7.60 | 46           | 40            | 48                |                   |               |
|      | ERD-2 | 76  | 0.05          | 7.60 | 46           | 45            | 55                |                   |               |

## APPENDIX A-3 (CONTINUED)

| Date  | Unit  | Run | Turb.,<br>FTU | pH   | Temp.,<br>°F | Alk.,<br>mg/l | Hardness,<br>mg/l | Aluminum,<br>mg/l | Iron,<br>mg/l |       |  |
|-------|-------|-----|---------------|------|--------------|---------------|-------------------|-------------------|---------------|-------|--|
| 9-12  | MM-2  | 134 | 9.0           | 7.30 | 44           | 35            | 46                | 0.075             |               |       |  |
|       | BIF   | 116 | 0.07          | 7.90 | 44           | 45            | 48                |                   |               |       |  |
|       | ERD-2 | 76  | 0.06          | 7.80 | 44           | 40            | 48                |                   |               |       |  |
|       | Raw   |     | 0.35          | 7.90 | 45           | 44            | 44                | 0.013             |               |       |  |
|       | Raw   |     | 0.41          | 8.00 | 44           | 43            | 49                | 0.011             |               |       |  |
|       | MM-2  | 135 | 0.04          | 7.50 | 44           | 35            | 52                | 0.005             |               |       |  |
|       | BIF   | 116 | 0.05          | 7.90 | 44           | 40            | 56                |                   |               |       |  |
|       | ERD-2 | 76  | 0.04          | 7.90 | 44.5         | 42            | 45                |                   |               |       |  |
| 9-13  | MM-2  | 136 | 0.04          | 6.90 | 46           | 35            | 45                | 0.067             |               |       |  |
|       | BIF   | 116 | 0.05          | 7.30 | 46           | 40            | 56                |                   |               |       |  |
|       | Raw   |     | 0.47          | 7.30 | 45           | 38            | 44                | 0.011             |               |       |  |
|       | MM-2  | 136 | 0.55          | 7.20 | 46           | 27            | 55                | 0.049             |               |       |  |
|       | BIF   | 116 | 0.05          | 7.40 | 44           | 45            | 56                |                   |               |       |  |
|       | Raw   |     | 0.40          | 7.90 | 45           | 38            | 44                | 0.011             |               |       |  |
|       | MM-2  | 130 | 0.05          | 7.50 | 44           | 34            | 45                | 0.011             |               |       |  |
|       | BIF   | 117 | 0.08          | 7.90 | 44           | 40            | 50                |                   |               |       |  |
|       | ERD-2 | 78  | 0.08          | 8.00 | 44           | 45            | 45                |                   |               |       |  |
|       | Raw   |     | 0.49          | 8.00 | 42           | 43            | 44                | 0.005             |               |       |  |
|       | BIF   | 117 | 0.05          | 7.40 | 42           | 42            | 41                |                   |               |       |  |
|       | ERD-2 | 78  | 0.03          | 8.00 | 43           | 43            | 50                |                   |               |       |  |
|       | 9-14  | Raw |               | 0.45 | 7.90         | 45            | 45                | 44                |               | 0.012 |  |
|       |       | BIF | 117           | 0.04 | 7.40         | 46            | 40                | 45                |               |       |  |
| 9-16  | Raw   |     | 0.37          | 7.70 | 40           | 43            | 45                | 0.009             |               |       |  |
|       | MM-2  | 138 | 0.04          | 7.40 | 40           | 37            | 43                | 0.028             |               |       |  |
|       | BIF   | 118 | 0.08          | 7.20 | 40           | 38            | 46                |                   |               |       |  |
|       | ERD-2 | 79  | 0.04          | 7.50 | 40           | 37            | 45                |                   |               |       |  |
|       | MM-2  | 138 | 0.04          | 7.30 | 43           | 38            | 47                | 0.015             |               |       |  |
|       | BIF   | 118 | 0.08          | 7.10 | 43           | 33            | 50                |                   |               |       |  |
|       | ERD-2 | 79  | 0.05          | 7.40 | 43           | 35            | 43                |                   |               |       |  |
|       | Raw   |     | 0.38          | 7.70 | 42           | 43            | 44                | 0.011             |               |       |  |
|       | 9-17  | Raw |               | 0.46 | 7.70         | 41            | 44                | 45                |               | 0.011 |  |
| MM-2  |       | 138 | 0.05          | 7.30 | 40           | 32            | 48                | 0.021             |               |       |  |
| BIF   |       | 118 | 0.07          | 7.70 | 39.5         | 42            | 50                |                   |               |       |  |
| ERD-2 |       | 79  | 0.06          | 7.70 | 40           | 55            | 50                |                   |               |       |  |

APPENDIX A-3 (CONTINUED)

| Date | Unit  | Run | Turb.,<br>FTU | pH   | Temp.,<br>°F | Alk.,<br>mg/l | Hardness,<br>mg/l | Aluminum,<br>mg/l | Iron,<br>mg/l |
|------|-------|-----|---------------|------|--------------|---------------|-------------------|-------------------|---------------|
| 9-17 | Raw   |     | 0.42          | 8.00 | 42           | 45            | 45                | 0.011             |               |
|      | MM-2  | 139 | 0.06          | 7.50 | 42           | 37            | 44                | 0.013             |               |
|      | BIF   | 119 | 0.06          | 8.00 | 42           | 42            | 47                |                   |               |
|      | ERD-2 | 80  | 0.05          | 7.90 | 43           | 40            | 46                |                   |               |
|      | MM-2  | 139 | 0.08          | 7.50 | 42           | 42            | 50                | 0.011             |               |
|      | BIF   | 119 | 0.10          | 7.90 | 42           | 50            | 47                |                   |               |
|      | ERD-2 | 80  | 0.08          | 7.90 | 42           | 40            | 53                |                   |               |
|      | Raw   |     | 0.53          | 7.90 | 41           | 43            | 46                | 0.021             |               |
|      | MM-2  | 139 | 0.06          | 7.50 | 43           | 38            | 51                | 0.011             |               |
|      | BIF   | 119 | 0.07          | 8.00 | 42           | 40            | 52                |                   |               |
|      | ERD-2 | 80  | 0.05          | 7.90 | 44           | 40            | 55                |                   |               |
|      | Raw   |     | 0.48          | 7.90 | 44           | 43            | 44                | 0.021             |               |
|      | ERD-2 | 81  | 0.06          | 7.75 | 40           | 46            | 43                |                   |               |
|      | Raw   |     | 0.57          | 7.90 | 39           | 43            | 44                | 0.011             |               |
| 9-18 | MM-1  | 87  | 0.26          | 7.80 | 40           | 42            | 48                | 0.015             |               |
|      | MM-1  | 87  | 0.14          | 7.60 | 41           | 42            | 47                | 0.011             |               |
|      | ERD-2 | 81  | 0.06          | 7.70 | 41           | 38            | 50                |                   |               |
|      | Raw   |     | 0.51          | 7.90 | 40           | 43            | 44                | 0.007             |               |
|      | MM-1  | 87  | 0.10          | 7.70 | 41           | 42            | 51                | 0.021             |               |
|      | ERD-2 | 81  | 0.05          | 7.70 | 41.5         | 45            | 52                |                   |               |
|      | Raw   |     | 0.51          | 7.90 | 41           | 43            | 45                | 0.005             |               |
|      | MM-2  | 140 | 0.06          | 7.40 | 42           | 38            | 50                | 0.019             |               |
|      | BIF   | 120 | 0.11          | 7.60 | 42           | 39            | 48                |                   |               |
|      | ERD-2 | 82  | 0.06          | 7.60 | 42           | 38            | 43                |                   |               |
| 9-19 | Raw   |     | 0.52          | 7.70 | 41           | 43            | 44                | 0.021             |               |
|      | Raw   |     | 0.49          | 7.70 | 39           | 43            | 44                | 0.021             |               |
|      | MM-2  | 140 | 0.05          | 7.20 | 40           | 37            | 45                | 0.038             |               |
|      | BIF   | 120 | 0.58          | 7.40 | 39           | 42            | 43                |                   |               |
|      | ERD-2 | 83  | 0.05          | 7.40 | 40           | 45            | 50                |                   |               |
|      | Raw   |     | 0.45          | 7.31 | 40           | 43            | 45                | 0.054             |               |
|      | MM-2  | 140 | 0.05          | 7.20 | 41           | 40            | 44                | 0.049             |               |
|      | BIF   | 120 | 0.07          | 7.51 | 48           | 48            |                   |                   |               |
|      | Raw   |     | 0.45          | 7.31 | 40           | 43            | 45                | 0.054             |               |
|      | MM-2  | 140 | 0.05          | 7.20 | 41           | 40            | 44                | 0.049             |               |
| 9-20 | BIF   | 120 | 0.07          | 7.51 | 48           | 48            |                   |                   |               |

APPENDIX A-3 (CONTINUED)

| Date | Unit                                                                                                       | Run | Turb.,<br>FTU | pH   | Temp.,<br>°F | Alk.,<br>mg/l | Hardness,<br>mg/l | Aluminum,<br>mg/l | Iron,<br>mg/l |
|------|------------------------------------------------------------------------------------------------------------|-----|---------------|------|--------------|---------------|-------------------|-------------------|---------------|
| 9-20 | Raw                                                                                                        |     | 0.42          | 7.70 | 40           | 43            | 44                | 0.017             |               |
|      | MM-2                                                                                                       | 140 | 0.05          | 7.30 | 41           | 36            | 48                | 0.011             |               |
|      | BIF                                                                                                        | 121 | 0.05          | 7.70 | 40           | 40            | 48                |                   |               |
|      | ERD-2                                                                                                      | 85  | 0.05          | 7.70 | 41           | 42            | 49                |                   |               |
|      | MM-2                                                                                                       | 140 | 0.06          | 7.40 | 40.5         | 36            | 48                | 0.011             |               |
|      | ERD-2                                                                                                      | 85  | 0.05          | 7.80 | 41.5         | 42            | 48                |                   |               |
|      | Raw                                                                                                        |     | 0.43          | 7.75 | 40           | 43            | 45                | 0.021             |               |
|      | BIF                                                                                                        | 122 | 0.09          | 7.60 | 40           | 43            | 55                |                   |               |
| 9-21 | Raw                                                                                                        |     | 0.48          | 7.80 | 41           | 44            | 44                | 0.011             |               |
|      | BIF                                                                                                        | 122 | 0.07          | 7.60 | 42           | 46            | 48                |                   |               |
|      | ERD-2                                                                                                      | 86  | 0.06          | 7.60 | 42           | 40            | 55                |                   |               |
| a    | From 6-10 to 6-15, pH was run on Corning pH meter. Apparently this unit reads lower than Beckman pH meter. |     |               |      |              |               |                   |                   |               |
| b    | Beckman pH meter would not come to rest at any value, would not standardize. Corning pH meter was used.    |     |               |      |              |               |                   |                   |               |
| c    | Raw sample bottle contaminated.                                                                            |     |               |      |              |               |                   |                   |               |

APPENDIX A-4 DISSOLVED OXYGEN DATA, RAW AND FILTERED WATER, DULUTH LAKEWOOD  
PUMPING STATION - 1974.

| Date | Unit  | Time | Run | DO,<br>mg/l | Water<br>temperature,<br>°F | DO saturation<br>value,<br>mg/l |
|------|-------|------|-----|-------------|-----------------------------|---------------------------------|
| 2-25 | Raw   | 0815 | -   | 14.2        | 33                          | 14.4                            |
| 3-4  | Raw   | 0900 | -   | 14.2        | 33                          | 14.4                            |
| 3-11 | Raw   | 0830 | -   | 14.2        | 33                          | 14.4                            |
| 3-26 | Raw   | 0900 | -   | 14.4        | 33                          | 14.4                            |
| 4-2  | Raw   | 0830 | -   | 14.6        | 33                          | 14.4                            |
| 4-8  | Raw   | 0830 | -   | 14.5        | 33                          | 14.4                            |
| 4-15 | Raw   | 0830 | -   | 14.2        | 33                          | 14.4                            |
| 4-18 | Raw   | 0820 | -   | 14.1        | 33                          | 14.4                            |
| 4-22 | Raw   | 0815 | -   | 14.5        | 33                          | 14.4                            |
| 4-29 | Raw   | 0840 | -   | 14.4        | 33                          | 14.4                            |
| 5-6  | Raw   | 0820 | -   | 14.5        | 33.5                        | 14.3                            |
| 5-13 | Raw   | 0810 | -   | 14.5        | 34                          | 14.2                            |
| 5-20 | Raw   | 0900 | -   | 13.9        | 35                          | 14.0                            |
| 5-28 | Raw   | 0830 | -   | 13.8        | 35                          | 14.0                            |
| 6-3  | Raw   | 0815 | -   | 14.0        | 37                          | 13.6                            |
| 6-16 | Raw   | 0815 | -   | 12.0        | 37                          | 13.6                            |
| 6-17 | Raw   | 0845 | -   | 14.8        | 37                          | 13.6                            |
| 6-24 | Raw   | 0815 | -   | 13.6        | 38                          | 13.4                            |
| 7-1  | Raw   | 0830 | -   | 13.6        | 39                          | 13.2                            |
| 7-8  | Raw   | 0900 | -   | 13.6        | 39.5                        | 13.1                            |
| 7-12 | Raw   | 1130 | -   | 13.6        | 43.5                        | 12.3                            |
| 7-12 | BIF   | 1240 | 58  | 11.3        | 43.5                        | 12.3                            |
| 7-12 | ERD-2 | 1242 | 36  | 12.3        | 45.0                        | 12.1                            |
| 7-12 | MM-1  | 1245 | 62  | 12.6        | 45.0                        | 12.1                            |
| 7-12 | MM-2  | 1247 | 88  | 12.6        | 45.0                        | 12.1                            |
| 7-20 | BIF   | 0020 | 70  | 11.8        | 48.0                        | 11.6                            |
| 7-20 | MM-2  | 0024 | 97  | 12.0        | 48.0                        | 11.6                            |
| 7-20 | MM-1  | 0028 | 68  | 12.2        | 48.0                        | 11.6                            |
| 7-20 | ERD-2 | 0032 | 40  | 11.9        | 48.0                        | 11.6                            |
| 7-20 | RAW   | 0036 | -   | 14.4        | 47.0                        | 11.8                            |
| 7-23 | ERD-2 | 2235 | 42  | 12.3        | 48.5                        | 11.6                            |
| 7-23 | BIF   | 2239 | 72  | 12.5        | 49.0                        | 11.5                            |
| 7-23 | MM-1  | 2243 | 70  | 12.2        | 48.5                        | 11.6                            |
| 7-23 | MM-2  | 2247 | 99  | 12.6        | 48.5                        | 11.5                            |
| 7-23 | RAW   | 2253 | -   | 13.1        | 47.5                        | 11.7                            |
| 7-26 | ERD-2 | 1245 | 44  | 12.2        | 47.0                        | 11.8                            |
| 7-26 | BIF   | 1248 | 75  | 11.4        | 50.0                        | 11.3                            |
| 7-26 | MM-2  | 1251 | 103 | 13.3        | 51.0                        | 11.2                            |
| 7-26 | MM-1  | 1318 | 73  | 12.4        | 51.0                        | 11.2                            |
| 8-2  | BIF   | 1505 | 79  | 10.6        | 48.0                        | 11.6                            |
| 8-2  | MM-1  | 1507 | 77  | 15.3        | 48.0                        | 11.6                            |
| 8-2  | MM-2  | 1507 | 108 | 11.7        | 48.0                        | 11.6                            |
| 8-2  | ERD-2 | 1511 | 47  | 8.9         | 48.5                        | 11.5                            |

APPENDIX A-4 (CONTINUED).

| Date | Unit  | Time | Run | DO,<br>mg/l | Water<br>temperature,<br>°F | DO saturation<br>value,<br>mg/l |
|------|-------|------|-----|-------------|-----------------------------|---------------------------------|
| 8-9  | Raw   | 2335 | -   | 11.1        | 58.0                        | 10.3                            |
| 8-9  | MM-1  | 2320 | 81  | 10.9        | 57.0                        | 10.4                            |
| 8-9  | MM-2  | 2323 | 112 | 10.0        | 58.0                        | 10.3                            |
| 8-9  | BIF   | 2326 | 87  | 10.9        | 57.5                        | 10.4                            |
| 8-9  | ERD-2 | 2330 | 50  | 10.5        | 57.5                        | 10.4                            |
| 8-14 | MM-1  | 2022 | 84  | 10.5        | 57                          | 10.4                            |
| 8-14 | MM-2  | 2000 | 115 | 10.2        | 58                          | 10.3                            |
| 8-14 | BIF   | 2005 | 90  | 10.4        | 56                          | 10.5                            |
| 8-14 | ERD-2 | 2016 | 55  | 10.5        | 56.5                        | 10.5                            |
| 8-14 | Raw   | 2007 | -   | 10.6        | 57.0                        | 10.4                            |
| 9-4  | MM-2  | 2115 | 126 | 12.8        | 40                          | 13.0                            |
| 9-4  | Raw   | 2120 | -   | 13.2        | 41                          | 12.8                            |
| 9-4  | ERD-2 | 2123 | 70  | 13.0        | 41                          | 12.8                            |
| 9-4  | BIF   | 2127 | 109 | 12.9        | 41                          | 12.8                            |

APPENDIX A-5 BACTERIOLOGICAL DATA, RAW AND FILTERED WATER, DULUTH LAKEWOOD PUMPING STATION -  
1974.

| Date | Time | Unit  | Run | Raw Water                    |                              |                            | Finished Water               |                              |                            |
|------|------|-------|-----|------------------------------|------------------------------|----------------------------|------------------------------|------------------------------|----------------------------|
|      |      |       |     | Total<br>Coliform<br>/100 ml | Fecal<br>Coliform<br>/100 ml | Fecal<br>Strep.<br>/100 ml | Total<br>Coliform<br>/100 ml | Fecal<br>Coliform<br>/100 ml | Fecal<br>Strep.<br>/100 ml |
| 6/10 | 1245 | MM-2  | 55  | 132                          | 55                           | 110                        | 3                            | 0                            | 2                          |
| 6/11 | 1330 | MM-2  | 55  | 50                           | 16                           | 55                         | 0                            | 0                            | 0                          |
| 6/12 | 1232 | MM-1  | 35  | 38                           | 9                            | 16                         | 0                            | 0                            | 0                          |
| 6/12 | 1223 | MM-2  | 56  | 38                           | 9                            | 16                         | 2                            | 1                            | 0                          |
| 6/12 | 1228 | ERD-2 | 1   | 38                           | 9                            | 16                         | 0                            | 0                            | 0                          |
| 6/12 | 1225 | BIF   | 25  | 38                           | 9                            | 16                         | 0                            | 0                            | 0                          |
| 6/13 | 1225 | MM-1  | 36  | 20                           | 7                            | 6                          | 0                            | 0                            | 0                          |
| 6/13 | 1232 | MM-2  | 57  | 20                           | 7                            | 6                          | 0                            | 0                            | 0                          |
| 6/13 | 1238 | ERD-2 | 1   | 20                           | 7                            | 6                          | 0                            | 0                            | 0                          |
| 6/13 | 1401 | BIF   | 28  | 20                           | 7                            | 6                          | 0                            | 0                            | 0                          |
| 6/14 | 1234 | MM-1  | 37  | 4                            | 7                            | 1                          | 2                            | 1                            | 2                          |
| 6/14 | 1238 | MM-2  | 59  | 4                            | 7                            | 1                          | 0                            | 0                            | 0                          |
| 6/14 | 1340 | ERD-2 | 3   | 4                            | 7                            | 1                          | 0                            | 0                            | 0                          |
| 6/14 | 1231 | BIF   | 29  | 4                            | 7                            | 1                          | 0                            | 0                            | 0                          |
| 7/10 | 1238 | MM-1  | 59  | 8                            | 1                            | 1                          | 5                            | 0                            | 1                          |
| 7/10 | 1241 | MM-2  | 84  | 8                            | 1                            | 1                          | 0                            | 0                            | 0                          |
| 7/10 | 1243 | ERD-2 | 35  | 8                            | 1                            | 1                          | 0                            | 0                            | 0                          |
| 7/10 | 1235 | BIF   | 56  | 8                            | 1                            | 1                          | 0                            | 0                            | 0                          |

| <b>TECHNICAL REPORT DATA</b><br><i>(Please read instructions on the reverse before completing)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                              |                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| 1. REPORT NO.<br>EPA-670/2-75-050b                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2.                                                                                                                                           | 3. RECIPIENT'S ACCESSION NO. |
| 4. TITLE AND SUBTITLE<br>DIRECT FILTRATION OF LAKE SUPERIOR<br>WATER FOR ASBESTIFORM FIBER REMOVAL<br>Appendix A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 5. REPORT DATE<br>June 1975; Issuing Date                                                                                                    |                              |
| 7. AUTHOR(S)<br>Black & Veatch, Consulting Engineers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 6. PERFORMING ORGANIZATION CODE                                                                                                              |                              |
| 9. PERFORMING ORGANIZATION NAME AND ADDRESS<br>Black & Veatch, Consulting Engineers<br>1500 Meadow Lake Parkway<br>Kansas City, Missouri 64114                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 8. PERFORMING ORGANIZATION REPORT NO.                                                                                                        |                              |
| 12. SPONSORING AGENCY NAME AND ADDRESS<br>National Environmental Research Center<br>Office of Research and Development<br>U.S. Environmental Protection Agency<br>Cincinnati, Ohio 45268                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 10. PROGRAM ELEMENT NO.<br>1CB047; ROAP 21AQB; Task 024                                                                                      |                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 11. CONTRACT/GRANT NO.<br>DACW 37-74-C-0079<br>IAG #EPA-IAG-D4-0388                                                                          |                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 13. TYPE OF REPORT AND PERIOD COVERED<br>Final                                                                                               |                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 14. SPONSORING AGENCY CODE                                                                                                                   |                              |
| 15. SUPPLEMENTARY NOTES<br>This work conducted through interagency agreement between EPA Region V and the Corps of Engineers, St. Paul District. See also EPA-670/2-75-050a, c, d, e, f, and g.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                              |                              |
| 16. ABSTRACT<br><br>Pilot plant research conducted in 1974 at Duluth, Minnesota, demonstrated that asbestiform fiber counts in Lake Superior water would be effectively reduced by municipal filtration plants. During the study, engineering data were also obtained for making cost estimates for construction and operation of both granular and diatomaceous earth (DE) filtration plants ranging in size from 0.03 to 30 mgd. This appendix contains a portion of the data collected in the study. The following categories of information are presented in Appendix A: (1) Weather and lake level data; (2) Operating schedule for pumps at the pumping station; (3) Chemical and physical quality parameters of raw and filtered water; (4) Dissolved oxygen content of raw and finished water; and (4) Bacteriological data for raw and finished water. |                                                                                                                                              |                              |
| 17. KEY WORDS AND DOCUMENT ANALYSIS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                              |                              |
| a. DESCRIPTORS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | b. IDENTIFIERS/OPEN ENDED TERMS                                                                                                              | c. COSATI Field/Group        |
| Asbestos<br>Amphiboles<br>Serpentine<br>Water supply<br>Filtration<br>Water treatment<br>Pilot plants                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Mixed media filtration<br>Diatomaceous earth filtration<br>Asbestiform<br>Chrysotile<br>Fiber removal<br>Duluth (Minnesota)<br>Lake Superior | 13B                          |
| 18. DISTRIBUTION STATEMENT<br><br>RELEASE TO PUBLIC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 19. SECURITY CLASS (This Report)<br>UNCLASSIFIED                                                                                             | 21. NO. OF PAGES<br>62       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 20. SECURITY CLASS (This page)<br>UNCLASSIFIED                                                                                               | 22. PRICE                    |