APPENDIX 10

OFFICE OF SURFACE MINING
REPORT ON
SOUTH MAINS POND PORTAL DISCHARGE

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OFFICE OF SURFACE MINING (OSM)
REPORT ON
SOUTH MAINS PORTAL POND DISCHARGE

PREPARED IN RESPONSE TO THE OCTOBER 11, 2000,
IMPOUNDMENT BREAKTHROUGH
AT
MARTIN COUNTY COAL CORPORATION (MCCC)
BIG BRANCH SLURRY IMPOUNDMENT

This report was prepared by OSM as a part of its review of the MCCC 2000 breakthrough. This report addresses the drainage from the pond near the South Mains Portal. This review was conducted to determine whether the drainage from the pond provided a forewarning of the breakthrough. This review includes an evaluation of (1) information provided by MCCC, and (2) discharge and precipitation trends.

The pond was located on a contour bench near the South Mains Portal and discharged through an 18-inch pipe. The pond received drainage from the 1-C underground mine and precipitation runoff from the adjoining 10.8 acres of surface land. Generally, small bench ponds such as this one would only discharge in direct response to precipitation except where the pond is near and receives water from an underground mine.

1. Monitoring Requirements and Reporting

Long-term, weekly monitoring plans for the South Mains Portal pond were contained in the August 8, 1994, sealing plan. The plan provided for the weekly inspector to immediately report to the Mine Safety and Health Administration (MSHA) and MCCC any unusual change in flow that would indicate possible impoundment leakage. The sealing plan was attached to the August 18, 1994, permit revision. The permit revision's surface and groundwater monitoring plan did not address the monitoring at the pond or its importance with regard to impoundment leakage. The annual certifications, as addressed in Section 3.3.2.10, do not contain indications that MCCC or Geo/Environmental Associates, Inc. (GAI) analyzed the increased flow rates from the South Mains Portal pond.

In addition, MCCC monitored the pond discharges for compliance with the Kentucky Pollutant Discharge Elimination System (KPDES) permit issued by the Kentucky Division of Water (DOW). The Department for Surface Mining Reclamation and Enforcement (DSMRE) incorporated the KPDES requirements into permit number 880-7000. The KPDES reports were submitted to DSMRE and DOW.

2. Information Provided by MCCC

Wyatt, Tarrant and Combs, LLP, attorneys at law, representing MCCC, submitted pond discharge data and precipitation information to OSM, DSMRE, and MSHA on August 10, 2001, and September 13, 2001. This information covered the period from January 12, 1999, through

October 23, 2000. The pond discharge data contains the KPDES information on flow rates (gallons per minute) and total suspended solids (TSS). The KPDES information includes the South Mains Portal pond, two other ponds that MCCC states are within the influence area of the impoundment, and three ponds that MCCC states are located outside the impoundment influence area. The submittal also contains precipitation information from the National Weather Service (NWS) Integrated Flood Observing and Warning System (IFLOWS) station number 3193, at Inez, Kentucky, and station number 3194, along Wolf Creek. Station number 3193 is about eight miles from the impoundment. Station number 3194 is about three miles from the impoundment and was the primary source of information for the OSM analysis. Finally, the submittal contains the flow depth from the weekly inspections for the South Mains Portal pond.

The KPDES monitoring was conducted by Blackburn Contracting, Inc. (Blackburn). Blackburn measured the flow rates with a flow meter to determine velocity, and they calculated the flow area using a chart (velocity times area equals quantity). The chart converts flow depth to area. MCCC's attorney submitted Blackburn's explanations of its measurement procedures to OSM, DSMRE, and MSHA on September 21, October 3, and October 11, 2001. For the South Mains Portal pond, Blackburn noted that it was difficult to obtain velocity "due to the discharge pipe being surrounded by rock. Therefore flow rates had to be estimated."

In its submittals, MCCC contends that the information does not indicate any "problem with the impoundment prior to the October 11, 2000 breakthrough." MCCC based these conclusions on three findings: (1) the precipitation amounts increased during 2000 when compared to 1999 and resulted in higher pond discharges, (2) all six ponds showed similar trends for both 1999 and 2000, and (3) there was a steady increase in the impoundment pool elevation. In addition, MCCC reported a decrease of TSS in the South Mains Portal pond and stated that this contrasted with an increase of TSS for the other five ponds during 2000.

3. OSM's Evaluation of Information Provided by MCCC

A. Pond Discharge and Precipitation Trends

In Figures 1 and 2, OSM graphed the KPDES pond discharges from all six ponds and the precipitation from IFLOWS station number 3194. The graphs show the precipitation and pond discharge rates for January 12, 1999, to October 23, 2000, and information collected by OSM for January 2001 through June 2001. The precipitation plotted in these graphs is cumulative for the seven-day period preceding the discharge measurements. OSM examined these graphs and determined that there was no clear, consistent trend between discharge rates and precipitation as contended by MCCC.

B. Precipitation Runoff and South Mains Portal Pond Discharge

To further assess the relationship between discharge rates and precipitation, OSM compared the South Mains Portal pond discharge to the daily precipitation. Figure 3 shows this comparison for the period January 1999 to the 2000 breakthrough. This figure covers the period for which precipitation data was available from IFLOWS station 3194 and includes the KPDES and weekly

inspection data. OSM calculated the discharge rates for the South Mains Portal pond using the Chezy - Manning Formula as discussed later in this report.

From May 25, 1999, through September 30, 1999, precipitation was recorded for 30 days. No precipitation was recorded for the remaining 99 days. During September 1999, there was a significant increase in the discharge rate from the South Mains Portal pond. Figure 3 shows that there was only minimal precipitation preceding the September 1999 increase; and consequently, the amount of runoff would have been minimal. Therefore, OSM has concluded that the increased pond discharge, starting in September 1999, was not related to surface runoff from precipitation. OSM concluded that the increased discharge from the South Mains Portal pond, in fact, was caused by increased drainage from the underground mine.

C. Pool Elevation, Precipitation, and South Mains Portal Pond Discharge

In Figure 4, OSM reviewed the relationship between the pool elevation, precipitation, and discharge from the South Mains Portal pond. OSM's review did not identify a consistent relationship between the discharge from the South Mains Portal pond and the impoundment pool elevation. Further, OSM's review did not identify a relationship between the precipitation and pool elevation.

D. Total Suspended Solids

OSM reviewed the information concerning the TSS contained in the pond discharges and MCCC's contention that the low TSS levels indicate that there was not a forewarning of pond problems. Prior to the 2000 breakthrough, water and slurry entering the underground mine at the 2000 breakthrough location would have traveled over 4,000 feet within the mine before entering the South Mains Portal pond. Some of the travel within the mine may have been through minor depressions and mine pools. Sediment would have had time to settle out during this travel. Additional settling of suspended solids would also have occurred within the South Mains Portal pond. Therefore, OSM concludes that the TSS levels in the South Mains Portal pond discharge are not an indication of impoundment leakage.

E. Comparison of Discharge Rates Reported by Blackburn and Calculated by OSM

As is apparent by reviewing Figures 1, 3, and 4, there is a considerable difference between the discharge rates at the South Mains Portal pond as reported by Blackburn and as calculated by OSM. As addressed above, Blackburn measured flow depth and velocity to determine the discharge rate. As addressed below, OSM used the flow depth reported by the weekly inspector and the Chezy - Manning Formula to determine the discharge rate. Because the pond was destroyed by the 2000 breakthrough, OSM has not been able to verify its calculated discharge rates and those reported by Blackburn. Consequently, the disparity between the calculated and reported rates cannot be totally resolved. However, because OSM's discharge calculations use the flow depths reported by the weekly inspector, the flow depth and calculated discharge rates both have the same trend. The KPDES discharge rates reported by Blackburn and the flow depth reported by the weekly inspector do not exhibit similar trends.

4. OSM's Evaluation of Discharge and Precipitation for the South Mains Portal Pond

A. Discharge and Precipitation Trend from 1994 to the 2000 Breakthrough

To determine if a trend existed with regard to the South Mains Portal pond discharge and precipitation, OSM plotted this information on Figure 4. The figure shows the relationship of the precipitation, South Mains Portal pond discharge based on the weekly inspection data, and the impoundment pool elevation. The chart shows precipitation from two gauging stations (1) NWS station at Paintsville, Kentucky, about 15 miles west of the impoundment, and (2) IFLOWS station number 3194, about 3 miles southeast of the impoundment. Because the IFLOWS data was not available for precipitation prior to 1999, OSM used the Paintsville data to obtain a long-term trend. Figure 4 shows that while the Paintsville and IFLOWS precipitation rates differ, they both have similar trends.

OSM used the Chezy - Manning Formula to determine the flow rates:

$Q = (1.49 \div n) \cdot A \cdot R^{2/3} \cdot S^{1/2}$

Where Q = discharge in cubic feet per second
n = Manning number (OSM used 0.024 for corrugated metal pipe)
A = area of the water flowing in the pipe
R = hydraulic radius
S = slope of the pipe
Q is multiplied by 448.8 to convert the quantity from cubic feet per second to gallons per minute, and the product is then multiplied by an exit loss coefficient of 0.9 to reflect flow restriction due to rip-rap at the pipe outlet

Note: A and R use the flow depth reported by the weekly inspector.

Figure 4 shows a valley and peak trend for both the precipitation and pond discharge while the impoundment pool elevation generally continues to steadily rise. The pond discharge trendline peaks a few months after the precipitation trendline peaks. This indicates that the pond discharge is, in part, related to the infiltration of precipitation into the underground mine. This trend continues until early- to mid-1998 at which time the pond discharge trendline continues to remain elevated. A valley occurs during mid-1999; however, it is not as low as the previous valleys. The pond discharge trendline then becomes further elevated in September 1999 and remains elevated until the 2000 breakthrough. As addressed in Section 3.B, OSM concluded that the elevated discharge that started in September 1999 was not related to surface runoff from precipitation. OSM concluded that the increased discharge from the South Mains Portal pond, in fact, was caused by increased drainage from the underground mine and that this increased drainage was the result of leakage from the impoundment into the underground mine. OSM believes that this was an indicator of the impending breakthrough.

B. Possible Impoundment Leakage During 1998

During February 1998, bubbling was identified west of the embankment, indicating possible leakage into the underground mine. During the MSHA interviews, MCCC and GAI stated (1) that the bubbling zone was sealed shortly after being noticed, (2) that the leakage was not related

to the underground mine, and (3) that there were no changes observed in the flow rate from the South Mains Portal. The bubbling occurred about the time that the discharge trendline, as shown on Figure 4, would be expected to start trending downward. However, following the bubbling, the discharge trendline increased and did not reach the level of the previously charted trendline valleys. OSM believes that the elevated discharges in 1998 indicate an increase in the impoundment leakage into the underground mine. OSM could not, however, determine if the leakage was related to the February 1998 bubbling or to leakage at some other location within the impoundment.

5. Precipitation Prior to the 2000 Breakthrough

OSM's review of the precipitation from station number 3194 identified eight events with measurable rainfall in the 30 days prior to the 2000 breakthrough. The dates and amounts for these precipitation events are as follows: September 12, 0.04 inches; September 21, 0.02 inches; September 24, 0.16 inches; September 25, 1.83 inches; September 26, 0.04 inches, September 28, 0.04 inches; October 6, 0.04 inches, and October 8, 0.04 inches.

6. Summary

- The drainage from the South Mains Portal pond significantly increased during September 1999. OSM found that the increased discharge was due to drainage from the underground mine. Further, OSM's review found that the increase was likely due to leakage from the impoundment into the underground mine.

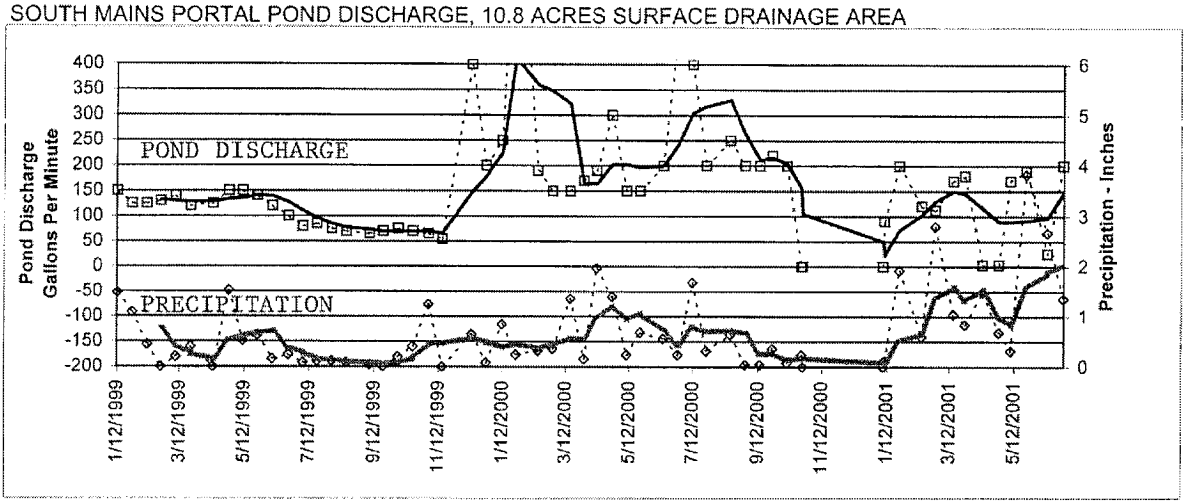
- The increased leakage from the impoundment into the underground mine may have started as early as 1998. This leakage may have been associated with bubbling, identified during February 1998, west of the embankment.

- The annual certifications do not contain indications that MCCC or GAI analyzed the increased flow rates from the South Mains Portal pond, which would have indicated leakage from the impoundment into the underground mine.

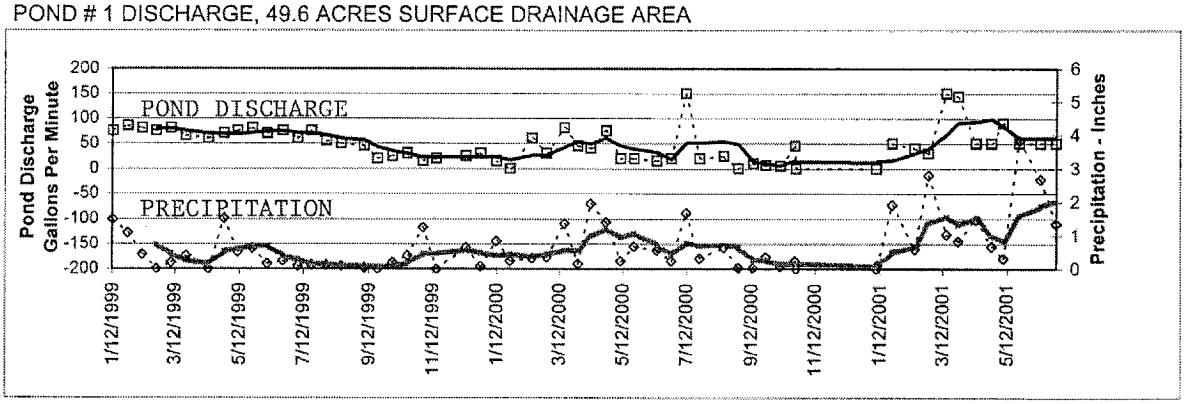
- The precipitation prior to the 2000 breakthrough was not significant.

POND DISCHARGE AS REPORTED UNDER KPDES
PONDS LOCATED WITHIN INFLUENCE AREA OF MCCC IMPOUNDMENT
Covers discharges from 1/12/99 to 10/23/00 and 1/9/01 to 6/27/01

SOUTH MAINS PORTAL POND DISCHARGE, 10.8 ACRES SURFACE DRAINAGE AREA



POND # 1 DISCHARGE, 49.6 ACRES SURFACE DRAINAGE AREA



POND # 326 DISCHARGE, 523 ACRES SURFACE DRAINAGE AREA

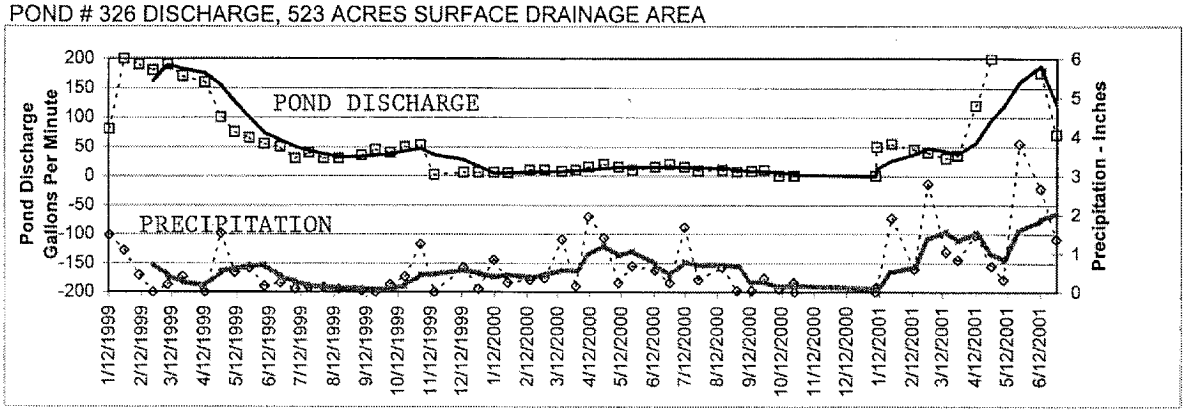
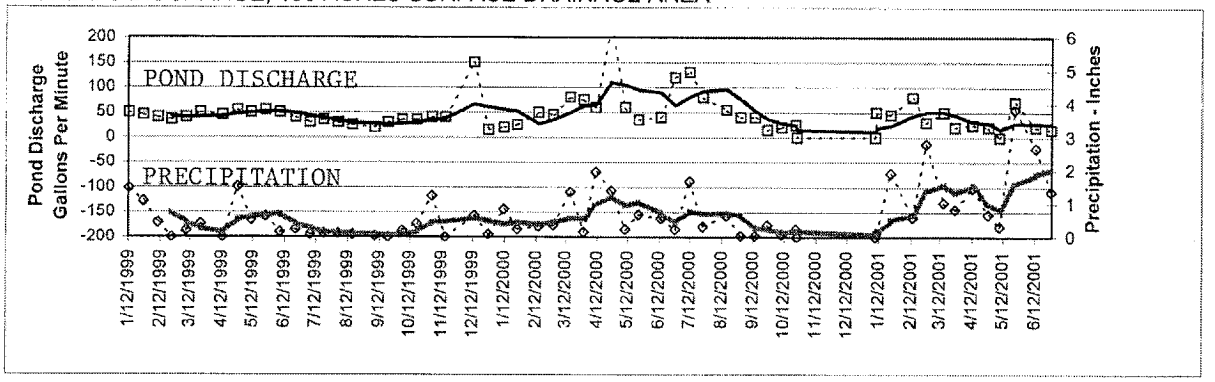


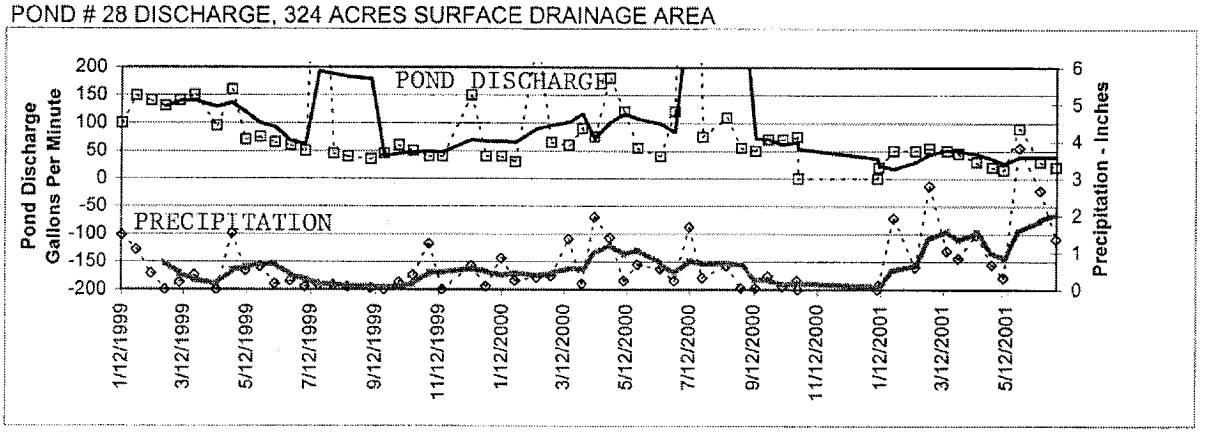
Figure 1. Pond Discharge and Precipitation. MCCC reported that these ponds are within the influence area of the impoundment. The KPDES pond discharges were reported by MCCC. The precipitation is from IFLOWS station number 3194. The solid lines are "trendlines" based on a four point moving average.

POND DISCHARGE AS REPORTED UNDER KPDES
PONDS *NOT* LOCATED WITHIN INFLUENCE AREA OF MCCC IMPOUNDMENT
Covers discharges from 1/12/99 to 10/23/00 and 1/9/01 to 6/27/01

POND # 3 DISCHARGE, 196 ACRES SURFACE DRAINAGE AREA



POND # 28 DISCHARGE, 324 ACRES SURFACE DRAINAGE AREA



POND # 108 DISCHARGE, 692 ACRES SURFACE DRAINAGE AREA

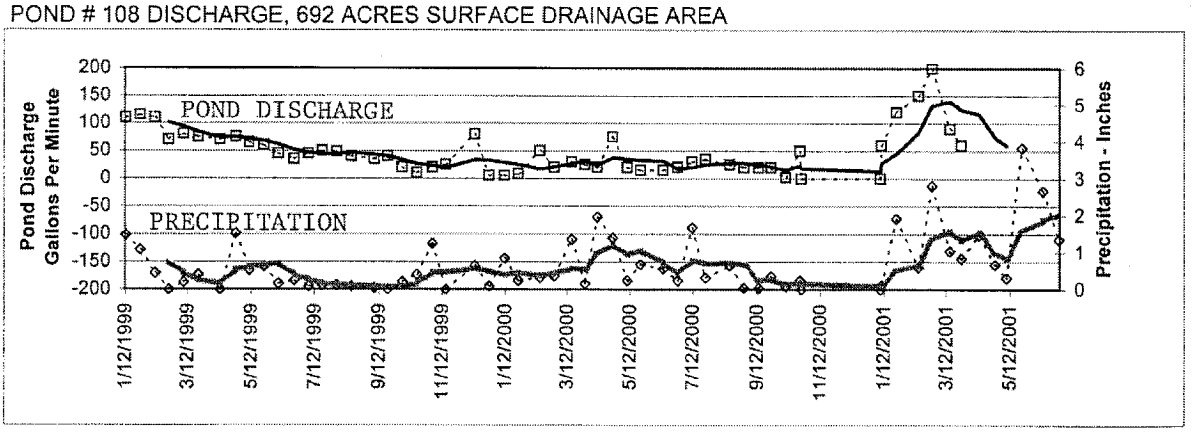


Figure 2. Pond Discharge and Precipitation. MCCC reported that these ponds are outside the influence area of the impoundment. The KPDES pond discharges were reported by MCCC. The precipitation is from IFLOWS station number 3194. The solid lines are "trendlines" based on a four point moving average.

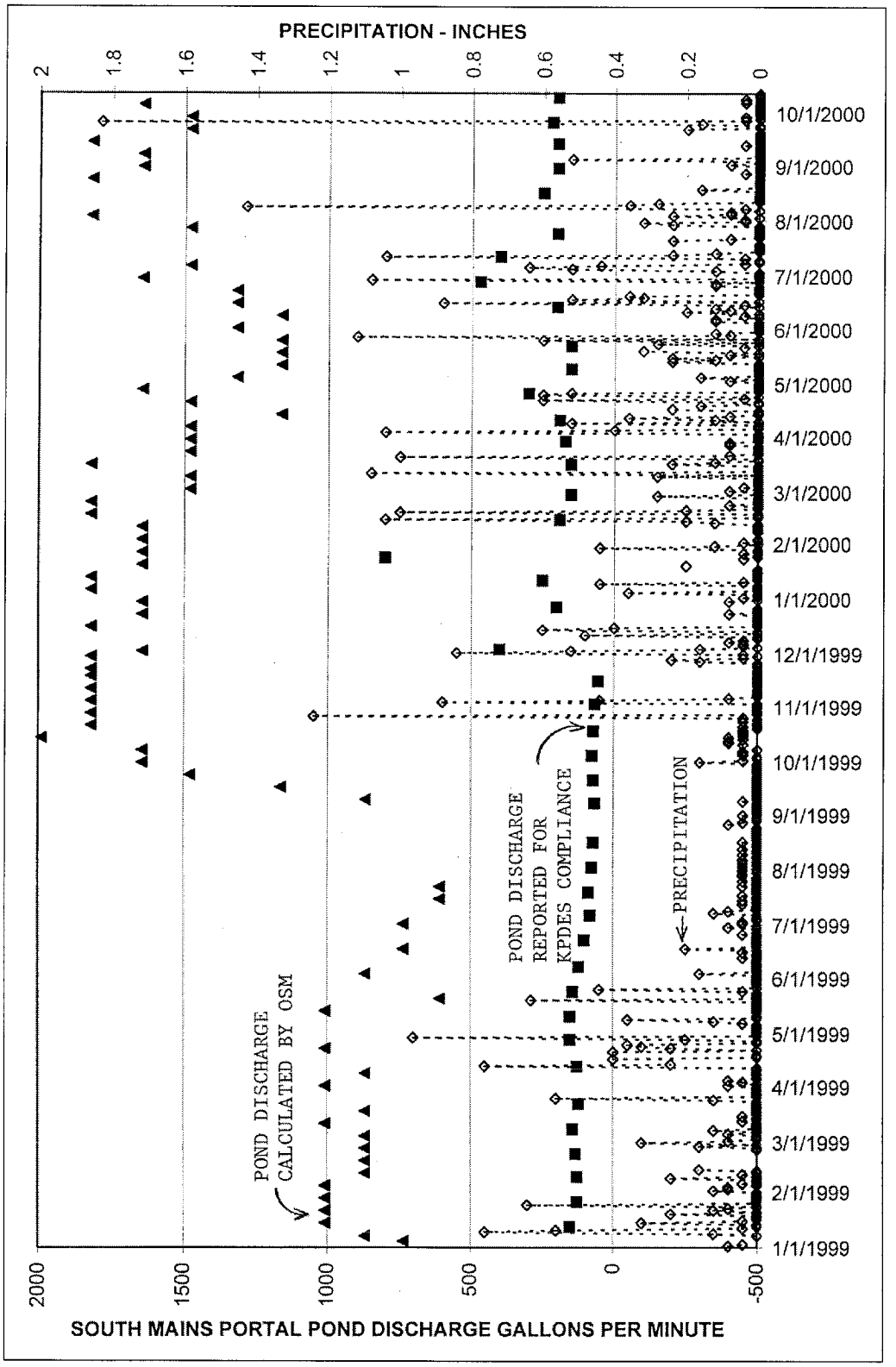


Figure 3. South Mains Portal Pond Discharge and Precipitation. See Section 4 for information related to OSM's calculation of the pond discharges. The KPDES pond discharges were reported by MCCC. The precipitation is from IFLOWS station number 3194.

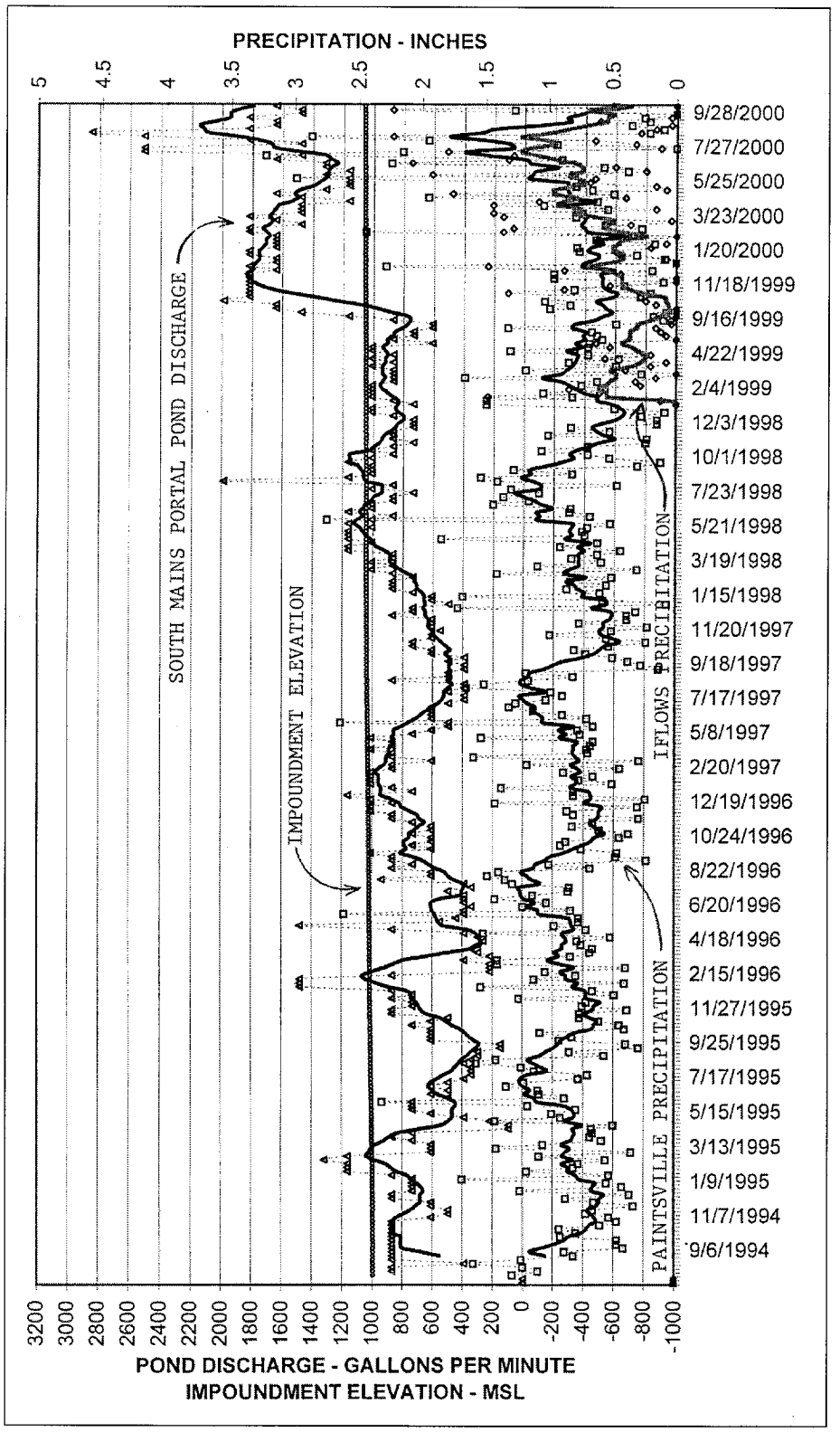


Figure 4. South Mains Portal Pond Discharge, Precipitation, and Impoundment Elevation. See Section 4 for information related to OSM's calculation of the pond discharges. The impoundment elevations and KPDES pond discharges were reported by MCCC. The precipitation is from the NWS Paintsville station and IFLOWS station number 3194. The solid lines are "trendlines" based on an eight point moving average. Note: the impoundment elevations are individual points and not a trendline.

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