

## *Synopsis*

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### **September-October 2003 Main Chamber Maintenance Closure Greenup Lock and Dam**

Closure Began	1744 8 September 2003
Closure Ended	0140 31 October 2003
Delay Returned to Zero	0707 1 November 2003
Closure Duration	52 days, 7.9 hrs
Time Required for Queue to Return to Zero	29.5 hours
Closure Induced Delay	26957 Hours
Closure Induced Processing Time	508 Hours
Total Closure Induced Extra Time	27465 Hours
Maximum Delay	92.8 Hours
Tow Cost @ Greenup	\$481 per Hour <sup>1</sup>
Total Closure Induced Cost	\$13.2 Million

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<sup>1</sup> FY03 price level, 0.05875 discount rate

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## **September-October 2003 Main Chamber Maintenance Closure Greenup Lock and Dam**

### **Chronology**

The 1200' x 110' main chamber at Greenup Lock and Dam, Ohio River Mile 341.0, was closed for maintenance on 8 September 2003 at 1744 hours. It was reopened on 31 October 2003 at 0140 hours. Therefore, the main chamber was closed for 1255.9 hours, or approximately 52 days and 7.9 hours.

### **Tow Arrivals**

Figure 1 shows the arrivals per day at Greenup L&D for the months of August through September. Average tow arrivals per day for the period of 1 August – 7 September was 16 tows per day. Average arrivals per day for the closure period 8 September – 31 October was 13 tows per day.

### **Tow Processing Time**

During the closure of the 1200' chamber, 87.3% of the tows through Greenup had to double lock. This increased the average processing time from 52.5 minutes, for all tows outside the 2003 closure, to 97.1 minutes during the closure. During the closure, 684 tows transited Greenup. Given an increase in time of 44.6 minutes per tow and 684 tows, an additional 508 hours of tow transit time was experienced during the closure.

### **Tow Delays**

Figure 1 shows delays at Greenup L&D for September-October 2003. Delays started building soon after the 1200' chamber closed and continued until 1 November 2003 at 0707 hours. This means that the 1255.9 hour closure impacted traffic for 1285.4 hours. The 29.5 hour difference represents the time required for the reopened 1200' chamber to serve the tows in queue and bring the delay back to zero. During the impact period, 27,590 hours of tow delay were experienced by 718 tows. This works out to an average delay of 38.4 hours/tow. By comparison, 3,963 tows were served at Greenup outside the September – October closure. The average delay per tow was 52.9 minutes or 0.9 hours. Therefore, on average, each tow experienced 37.5 hours more delay during the closure than normal. Given that the average additional delay per tow was 37.5 hours, and

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<sup>2</sup> discrepancies due to rounding

that 718 tows were impacted, the closure caused 26,957 hours of additional delay. The maximum delay was 92.8 hours.

## **Cost Impact**

Time is money to the towing industry. The most recent information available indicates that the average tow transit costs at Greenup are about \$481 per hour. Given the analysis above which shows that the closure caused an additional 508 hours of processing time and 26957 hours of additional delay, and that transit costs at Greenup are about \$481 per hour, the September-October 2003 closure cost approximately \$13.2 million.

For purposes of comparison, lets compare the delay caused by this closure with the delay experienced for all of 2002. The total delay experienced at Greenup in 2002 was 4,844 hours. The total delay caused by this 52+ day closure was 27,465 hours. This means that the delay caused by the closure was 5.7 times as much as what was experienced for all of 2002.