

APPENDIX 12

**OFFICE OF SURFACE MINING
REPORT ON
SEISMIC ACTIVITY**

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**OFFICE OF SURFACE MINING (OSM)
REPORT ON
SEISMIC ACTIVITY**

**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 seismic activity at the time of the 2000 breakthrough. This report also addresses the seismic activity on October 8, 2000. A large roof fall occurred on that date at an underground mine located about four miles from the MCCC impoundment. The review of the seismic activity at the time of the roof fall was conducted to determine if there was could be relationship between the roof fall and the MCCC breakthrough.

The review included the examination of 29 seismograms for the period September 25, 2000, to October 27, 2000. Figures 1, 2, and 3 are copies of the relevant seismograms. OSM obtained the seismograms from the Mine Safety and Health Administration (MSHA). MSHA obtained the seismograms from the Kentucky Geological Survey (KGS).

The seismograms are from the KGS ROKY seismic station located near Clay City, Kentucky. This is located about 78 miles west of MCCC. The seismograph is a Mark L4-c Seismometer with a single, vertical component channel buried to the top of bedrock. The seismograms are time histories. Each "tick" mark represents one minute. Each line has 15 ticks and represents 15 minutes. Consequently, every four lines is one hour and are shown with an elongated tick. Each seismogram represents a 24-hour period. The extra elongated ticks are 12 a.m. Universal Time and correlate to 8 p.m. Eastern Daylight Time. Unfortunately, the seismograms are not precisely printed to scale so that amplitudes cannot be measured.

For the review period, the seismic energy arriving at ROKY was generally light. The review could not estimate either velocity or acceleration amplitudes at the MCCC site. To do this would require triangulation of each seismic event and a special seismic study to establish the site response characteristics of the MCCC site. KGS was asked to quantify a few of the amplitudes; however, to date, OSM has not received a response to this request. While the velocity and acceleration amplitudes cannot be estimated, this review was able to evaluate the vibrations in terms of relative amplitudes between earthquakes and blasting events.

The seismograph is sensitive enough to record any seismic events in the region, including blasting and roof falls in underground mines. The review assumed that any significant event in the vicinity of MCCC would generate enough energy to be recorded at ROKY.

Noteworthy on the seismograms is the amount of activity that occurs between 3 and 6 p.m. each day, Monday through Saturday and is absent each Sunday. These times correlate to the time most mines are blasting in eastern Kentucky. It is commonly known that blasting results in regional seismic activity. By virtue of the amplitudes in this time period, OSM was able to establish the background vibrations being experienced on a daily basis in the area.

An earthquake occurred on October 25, 2000, at about 6 a.m. (Figure 1). The duration is over four minutes, and the amplitude crosses four “time lines.” Earthquakes have distinct “fingerprints” just like blasts do. The blast events by comparison are small in amplitude and duration (Figure 2). Thus, the region is subjected to numerous low amplitude blast vibrations on a daily basis. Earthquakes happen only occasionally but cause much larger amplitudes.

The breakthrough was first noticed about 12:10 a.m. on October 11, 2000. There was not any seismic activity for the four-hour period before and after the breakthrough (Figure 2). In the absence of any regional seismic activity, a seismic event did not cause an immediate collapse of the mine roof adjacent to the MCCC impoundment. During the review period, up to the time of the collapse, there was not any seismic activity other than the daily, low-amplitude seismic activity due to blasting.

Another concern was the potential impact of a roof fall at the adjacent Excel Mining LLC, Mine No. 2 on Sunday, October 8, 2000, at about 2:30 p.m. The seismogram shows one minor event within an hour of this time (Figure 3). This vibration was much less than the earthquake and blast vibrations received during the review period. As discussed earlier, there is an absence of vibrations from 3 to 6 p.m. on Sunday due to the absence of blasting.

In conclusion, no seismic events occurred around the time of the MCCC impoundment breakthrough. Based on the records, it is not apparent that any seismic activity in the area facilitated or caused the breakthrough. All vibrations before the failure time were within background levels of regional seismic activity.

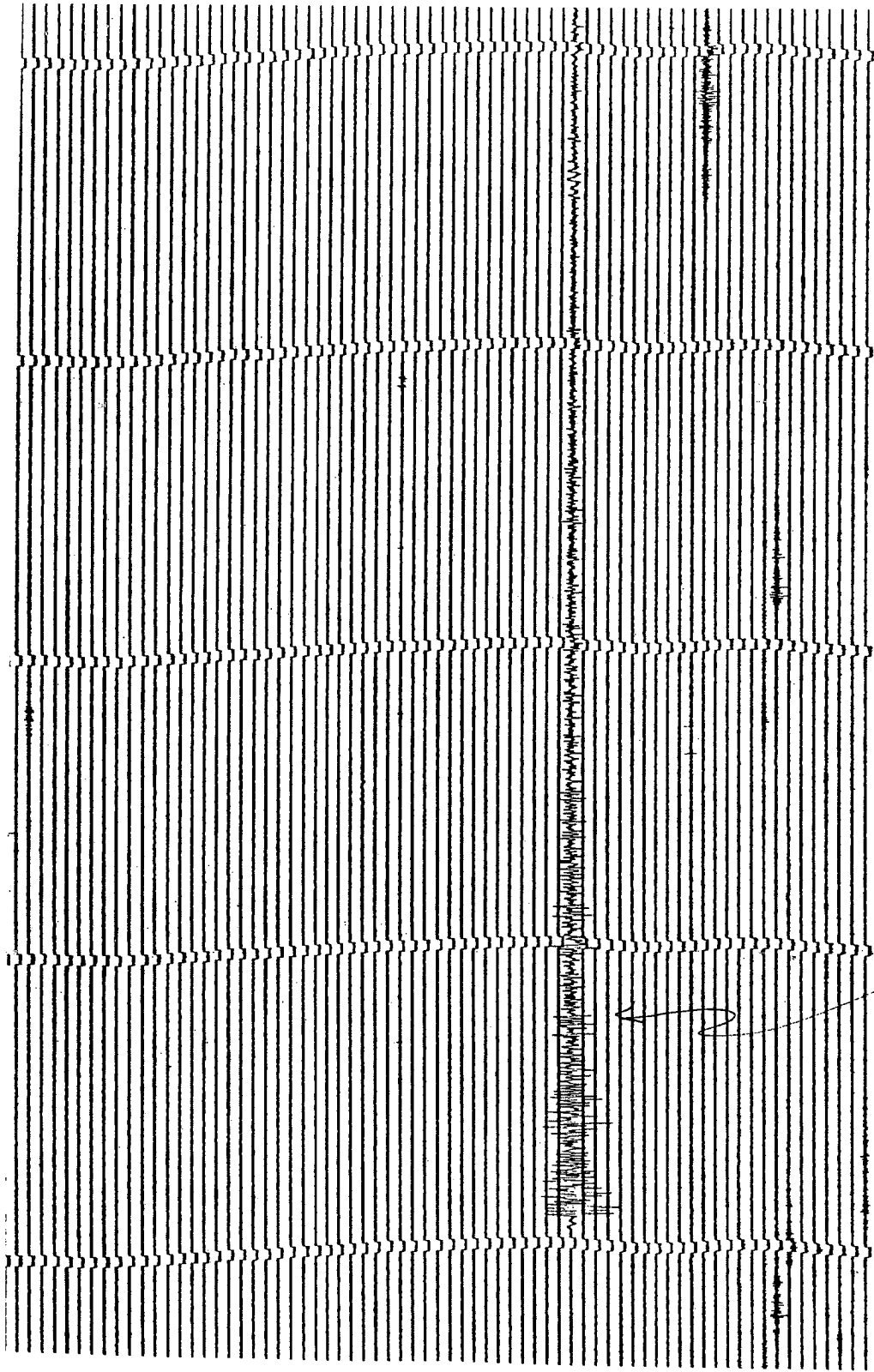


Figure 1
ROKY Seismogram
10/25/00 Earthquake

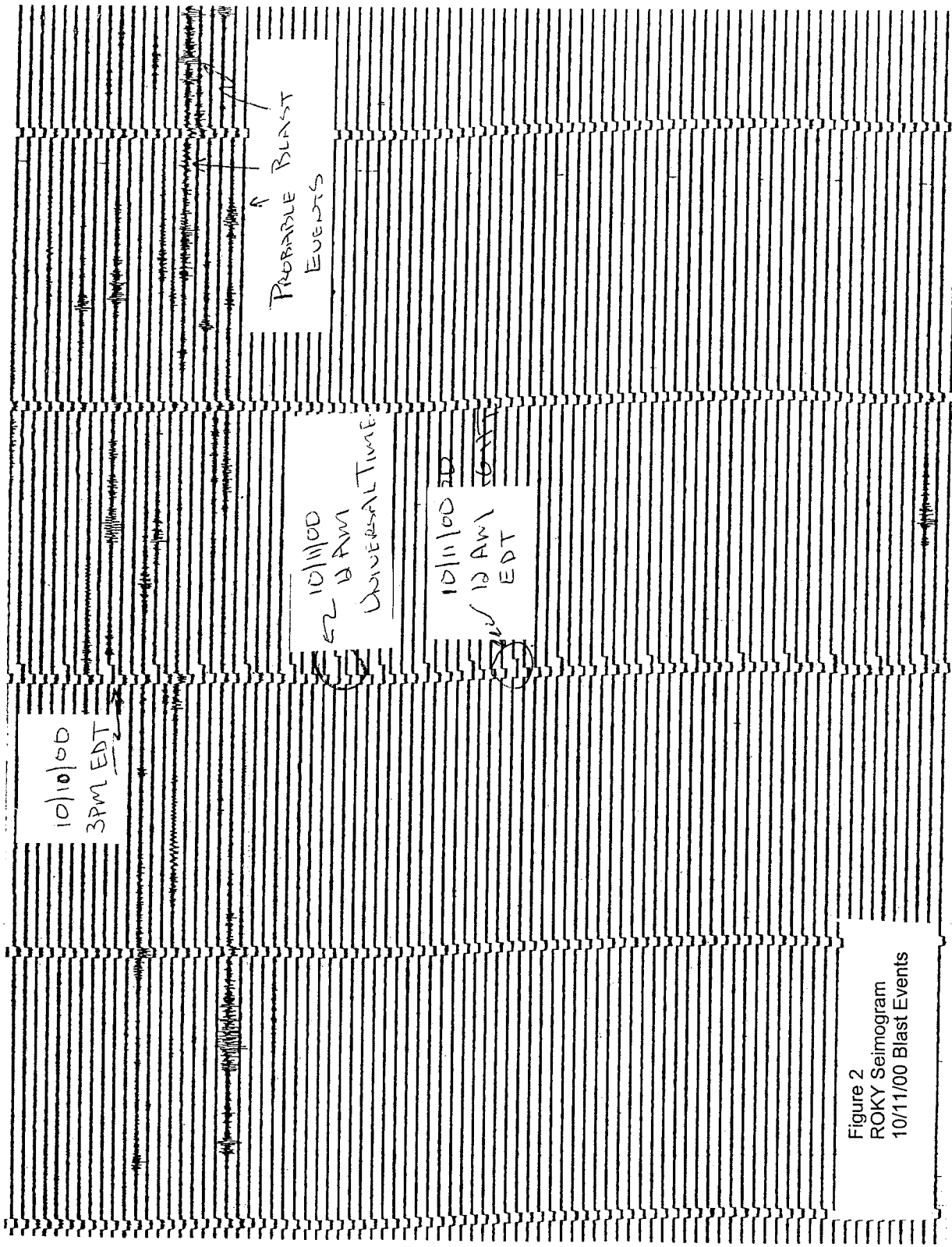


Figure 2
ROKY Seimogram
10/11/00 Blast Events

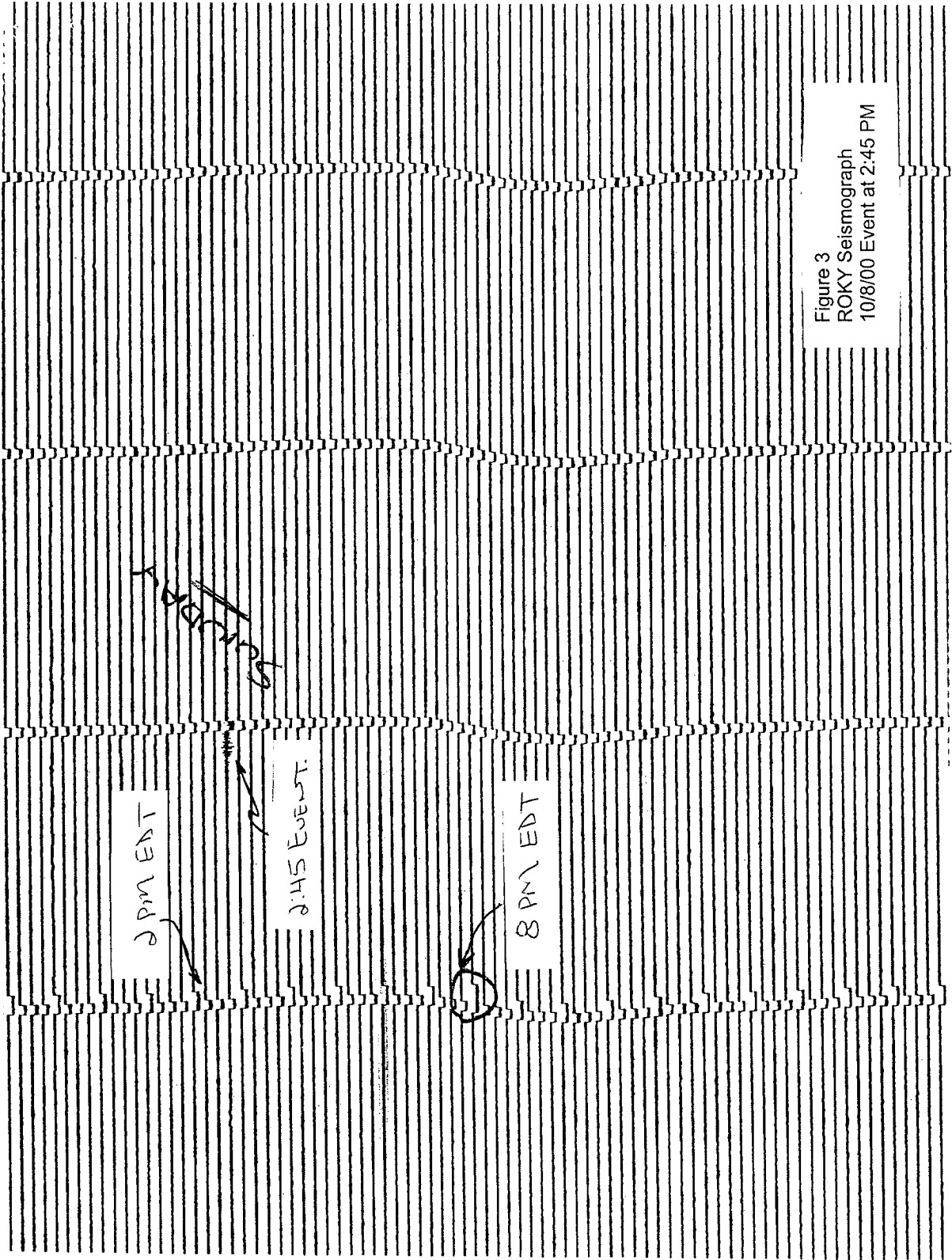


Figure 3
 ROKY Seismograph
 10/8/00 Event at 2:45 PM

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