CAI-2006-35

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

COAL MINE SAFETY AND HEALTH

REPORT OF INVESTIGATION

Surface Coal Mine

Fatal Fall of Highwall
July 18, 2006

Smith Branch No. 1
Hendrickson Equipment, Inc.
Mallie, Knott County, Kentucky
ID No. 15-18917

Accident Investigators

Robert J. Newberry
Mining Engineer

Lee Ann Shinavski
Civil Engineer

Donald T. Kirkwood
Supervisory Civil Engineer

Originating Office
Mine Safety and Health Administration
District 6
100 Fae Ramsey Lane
Pikeville, KY 41501
Kenneth A. Murray, District Manager

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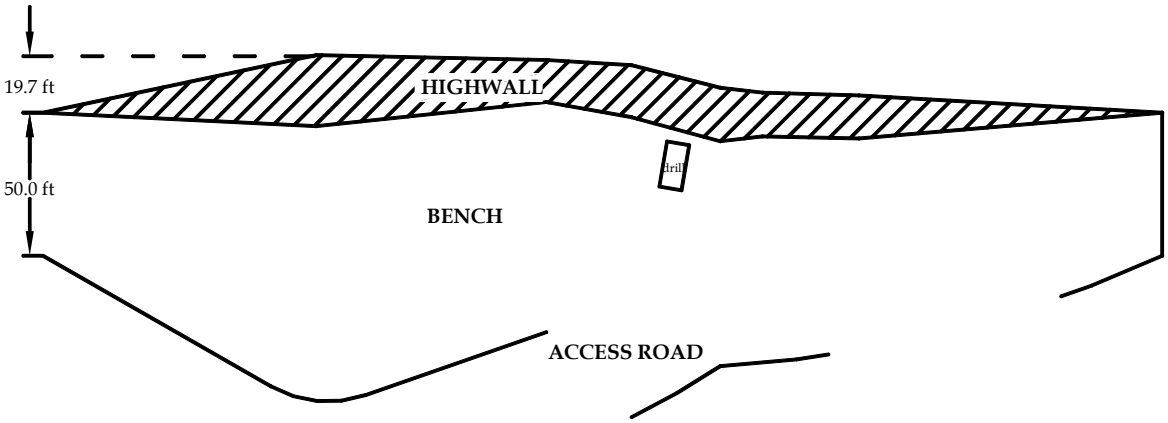
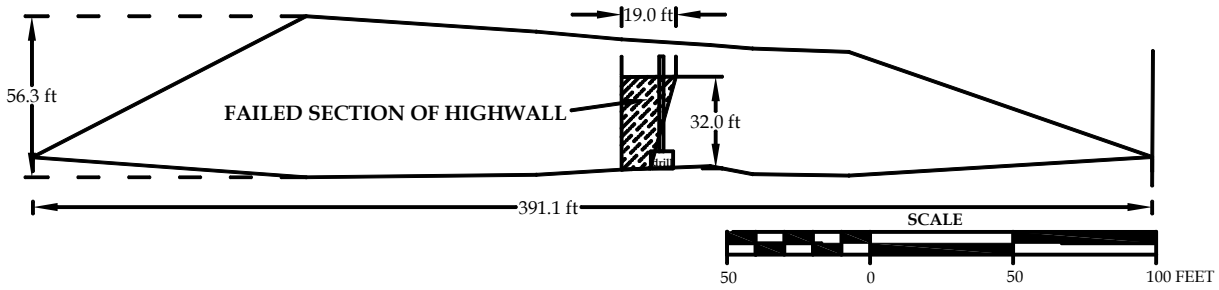


PLAN VIEW OF HIGHWALL



FRONT VIEW OF HIGHWALL

Fatal Fall of Highwall
Hendrickson Equipment, Inc.
MSHA ID No. 15-18917
July 18, 2006

Photograph of Accident Scene

OVERVIEW

At approximately 9:45 a.m. on Tuesday, July 18, 2006, Jason Mosley, a 28-year-old highwall drill operator, was fatally injured in a fall of highwall accident at the Hendrickson Equipment, Inc., Smith Branch No. 1 mine. Mosley had 6 years of total mining experience and had worked 36 weeks at this mine.

The accident occurred as Mosley was operating a highwall drill adjacent to a 43-foot highwall. As he was drilling the eighth hole of the day, rock fell onto the cab of the drill, resulting in fatal injuries to Mosley. The rock fall measured 32 feet high by 19 feet wide by 7 feet thick.

The accident occurred because mine management failed to ensure that the ground control plan was being followed, that persons did not work under or near dangerous highwalls, and that adequate examinations were being conducted to identify and correct hazardous conditions.

GENERAL INFORMATION

Hendrickson Equipment, Inc., Smith Branch No. 1 mine, is located one mile southwest of the intersection of Route 1393 and Smith Branch Road near Mallie, Knott County, Kentucky. The Smith Branch No. 1 mine operates in the Hazard No. 4 and the Hazard No. 4 Rider seams which average 28 inches and 36 inches respectively.

The principal officials for Hendrickson Equipment, Inc., at the time of the accident were:

Leonard Hendrickson	Owner/Superintendent
James Hylton	Foreman

Hendrickson Equipment Inc., Smith Branch No. 1 mine, was placed in active status on October 24, 2005. Coal is produced from one active pit using a highwall drill , front end loaders, bulldozers, and rock trucks. The company uses contour mining methods with a cross valley fill. The mine produces an average of 150 tons of raw coal per day and employs seven (7) persons. Coal is produced during one 8-hour shift, five days per week. The last regular safety and health inspection by the Mine Safety and Health Administration (MSHA) was completed on March 30, 2006.

DESCRIPTION OF ACCIDENT

On Tuesday, July 18, 2006, at approximately 6:30 a.m., James Hylton, foreman, arrived at the mine and conducted a mine examination and found no hazardous conditions. Hylton proceeded to the area of the mine where a pond was under construction. Daniel Gibson, dozer operator, and Jason Mosley arrived at approximately 7:00 a.m. and proceeded to the mine bench above the Hazard No. 4 Rider seam. Gibson had cleaned the bench for drilling on the previous day and moved the bulldozer to the end of the bench to continue pushing some material that remained.

Mosley continued drilling the line of pre-split holes that he had begun on Monday, July 17, 2006. At approximately 9:45 am, after he had drilled the eighth hole of the day, a section of highwall measuring 32 feet high by 19 feet wide by 7 feet thick fell onto the drill and the operator's compartment as he was removing the drill steel from the hole. The rock pinned Mosley inside the compartment and caused fatal injuries.

INVESTIGATION OF ACCIDENT

Tammy Hendrickson, secretary for Hendrickson Equipment, Inc., Smith Branch No. 1 mine, notified MSHA of the accident at 10:05 a.m. on July 18, 2006. A 103(k) order was issued to secure the accident scene while the investigation was conducted and to ensure the safety of any persons at the mine. An investigation was conducted in cooperation with State officials. Interviews were conducted with six miners and management officials deemed to have knowledge of the facts regarding the accident. The interviews were conducted at the MSHA Hindman Field Office on July 19, 2006, in Hindman, Kentucky.

DISCUSSION

The ground control plan indicates that the depth to the Hazard 4 Rider seam is a maximum of 80 feet (elevation 1,320 feet), and the depth to the Hazard 4 seam is an additional 40 feet (elevation 1,280 feet). No benches were constructed in the highwall since the ground control plan does not require benches for a highwall less than 80 feet high. At the time of the accident the wall had an average height of 47 feet.

Reportedly, the first lift on the highwall in the area of the accident was completed in January 2006. Pre-split drilling for the second lift was underway when the accident occurred. The base of the second lift was to be at the Hazard 4 Rider seam elevation.

The victim was operating a highwall drill when the failure occurred. The highwall drill was a Gardner Denver RDC 16B rotary blasthole drill, serial number 996, manufactured around 1978. The victim was drilling a line of pre-split holes, having drilled 20 holes the previous day and was on the 8th hole of the day. The pre-split layout consisted of a row of 36 vertical holes, 5 1/8 inch diameter, 30 feet deep, 8 feet apart, and reportedly 4 feet away from the toe of the highwall. Instructions were to complete the line of pre-split holes that day in preparation for blasting operations.

Scaling of the highwall was performed by Ronnie Adams, an excavator operator with 23 years mining experience. The area where the failure occurred had been scaled 6 days prior to the accident. Scaling was performed by ripping off the loose rock with an excavator bucket, advancing from the top down to the toe, and allowing the scaled material to fall to the working bench level. The loose material was assessed by sight and "feel" from the excavator machine. The machine used was a Kobelco SK400LC tracked excavator. This machine has a ground level reach of about 37 feet, and was operated from the working bench level as the blasted material was excavated.

Clean up of scaled material was performed by Daniel Gibson, a bulldozer operator with 25 to 30 years experience. The clean up process involved pushing the fallen rock away from the wall and off of the working bench using a Caterpillar D9L bulldozer. This

work was done simultaneous with the wall scaling work.

The highwall pre-shift examinations were performed by James Hylton, a certified foreman with 30 years mining experience. He was responsible for supervising the work at the mine and performing daily examinations, in accordance with 30 CFR 77.1713. He indicated that the examinations were performed from the working bench level, and that he occasionally examined the wall from the top. On the morning of the accident, around 6:30 a.m., he recorded that the wall was in fair to good condition. The top of the highwall, above the fall area, had not been inspected on the day of the accident.

Leonard Hendrickson, the mine owner and superintendent, was briefly on site before the 7:00 a.m. shift began that morning. He stated that while counting the number of drilled holes, he walked along the toe of the highwall, and did not notice any fallen rock on the ground, his usual warning sign. Other miners stated that the wall seemed stable and had no indications of failure.

HIGHWALL DESCRIPTION

The highwall in the fall area was measured approximately 43 feet high. The slope angle was about 80 degrees, near vertical. Variations in slope roughness ranged from smooth to rough with broken rock.

Strata within the highwall consisted of soil material, 2 seams of sandstone, and 3 seams of shale. The bedding planes appeared to be nearly horizontal. The top and bottom layers were shale. At the failure area, the upper most 10 feet of overburden and shale remained in place. The highwall had been pre-split. Pre-split drill holes could be observed over most of the highwall.

FAILURE DESCRIPTION

The highwall failure occurred mid-way along the working face, 220 feet from the left end and 170 feet from the right end of the wall. The failure area extended from the toe to approximately 32 feet in height, was 19 feet wide at the top, 10 feet wide at the bottom, and 7 feet thick.

The fallen rock debris created a pile approximately 20 feet wide by 20 feet long by 6 feet high on the left side and front end of the highwall drill.

The rock fall severely damaged the highwall drill on the left side and on the front end. It also struck the mast and crushed the operator's cab, fatally injuring the victim inside. The rock debris covered approximately 4 feet of the front half of the drill.

DISCONTINUITIES

Several discontinuities were present in the strata. The failed mass appears to have been bounded by a combination of discontinuities which resulted in a wedge failure. The wedge failure was the result of 2 intersecting joint sets. The left side joint strike was near perpendicular to the wall and dipped vertical. The intersecting joint was parallel to the face of the wall, and dipped slightly towards the toe. Clay infill material was observed on the face of this joint. There was no water evident on the face of the highwall on the day of the investigation. The highwall had several joint sets existing on both sides of the failure area.

The excavator operator who scaled the wall indicated that he was aware of the joint infilled with clay. He reported that he had removed the rock from in front of the joint until the rock became too thick to extract with the excavator machine. These conditions were present when the highwall was exposed during the previous week. He reportedly dressed the remaining face of the highwall and stated that the highwall seemed stable.

Observations by investigators from the top of the highwall revealed cracks in the overburden directly above where the failure occurred. The cracks were located approximately 20 feet back from the crest of the highwall, orientated parallel to the face, varied in length from a few feet to 20 feet, varied in width from hairline to 4 inches, and had vertical displacement up to 2 inches. The soil and unconsolidated rock in this area was approximately 5 feet thick, was void of vegetation for about 30 feet from the edge to the tree line, and graded approximately 3 horizontal to 1 vertical.

DRILL POSITION AND ORIENTATION

When the accident occurred, the highwall drill was located less than 5 feet away from the toe of the highwall. The orientation of the drill was almost perpendicular to the wall, and it was situated on the right end of the failed highwall section. The operator's cab was located in front and to the right of the drill mast.

It was reported that the highwall drill was positioned perpendicular to the wall most of the time during operations. The purpose of this orientation was to get closer to the wall. According to Jamie Prater, mechanic, when the orientation is parallel to the wall, a side piece gets in the way and also pushes material back into previously drilled holes. The ground control plan required that drill operators not drill from positions that exposed them to hazardous highwall conditions. The ground control plan, therefore, was not being followed.

WEATHER

The National Weather Service in Jackson, Kentucky (20 miles north of Hindman) reported the high temperature at 92 degrees F, the low temperature at 73 degrees F, and no precipitation for July 18, 2006. The average temperature for the whole month of July was 2.2 degrees higher than normal. The total precipitation was 0.7 inches less than normal.

One of the miners suggested that the highwall failure may be related to the recent hot and dry weather by drying up of the clay infill, losing surface contact, and triggering failure. However, the clay infill in either context, wet or dry, has low shear strength, and will not resist sliding. In addition, the absence of water in the joint would reduce the hydrostatic force on the outby rock mass, lessening the potential for failure. Therefore, the dried aspect of the clay infill is not related to the failure.

ROOT CAUSE ANALYSIS

An analysis was conducted to identify the most basic causes of the accident. Root causes were identified that, if eliminated, would have either prevented the accident or mitigated its consequences.

Listed below are root causes identified during the analysis and their corresponding corrective actions implemented to prevent a recurrence of the accident:

Root Cause: Mine management did not ensure that the ground control plan was being followed. The highwall drill was positioned perpendicular to the highwall with the operator's compartment immediately adjacent to the highwall. The operator's ground control plan established for this mine states that drill operators shall not drill from positions that expose them to hazardous highwall conditions. The plan further states that the drill will be positioned with the operator's compartment on the side opposite the highwall.

Corrective Actions: All persons working at this mine received additional training in all aspects of the ground control plan including the positioning of the highwall drill with the operator's compartment on the side opposite the highwall. Mine management should also institute a procedure or program to ensure that their plan is being followed during the course of the work day.

Root Cause: Mine management performed inadequate on-shift examinations of the drill bench working area and thereby failed to identify hazardous conditions and to implement corrective measures. The on-shift examination conducted on each working

July 17, 2006, and July 18, 2006, at the first bench above the Hazard No. 4 Rider seam failed to detect and subsequently correct the hazardous condition created by the positioning the highwall drill without the operator's compartment on the side opposite the highwall.
Corrective Actions: The operator had all work areas examined and hazardous conditions were recorded. All persons at this mine received additional training relative to identifying hazards associated with the positioning of the highwall drill.

Root Cause: Mine management failed to ensure that persons did not work near or under dangerous highwalls. Obvious discontinuities evidenced by a hill seam intersected by vertical jointing were present in the highwall where the accident occurred and should have been seen by examiners and management. These conditions were present when the highwall was exposed during the previous week.

Corrective Action: All persons working at this mine, including the mine examiner, were given additional training covering the identification and correction of ground control hazards. Additionally the ground control plan was revised to include a safety bench to increase the distance between the highwall drill and the exposed highwall.

CONCLUSION

The accident occurred because mine management failed to assure that the positioning of the highwall drill was in accordance with the ground control plan established for this mine. At the time of the accident the operator's cab was positioned immediately adjacent to the highwall while the blast holes were being drilled. This positioning was not in accordance with the ground control plan established for this mine. The operator failed to detect this dangerous condition created by the positioning of the highwall drill because inadequate onshift examinations were performed. The presence of a hill seam running nearly parallel to the highwall face and perpendicular jointing caused a hazardous highwall condition. The unstable highwall collapsed crushing the highwall drill operator's cab and resulted in the death of the machine operator.

APPROVED BY:

_____ _____

Kenneth A. Murray Date
District Manager

ENFORCEMENT ACTIONS

1. A 103(k) Order, No. 7443786, was issued on July 18, 2006.

   Condition or Practice: "A fatal accident occurred at this operation on July 18, 2006, when a highwall collapsed on the operator's compartment of a Gardner-Denver RDC16B highwall drill. This order is issued to assure the safety of all persons at this operation. It prohibits all activity at this operation until MSHA has determined that it is safe to resume normal mining operations at this mine. The mine operator shall obtain prior approval from an authorized representative for all actions to recover and or restore operation to the affected area."

2. A 104(d)(1) Citation No. 7428781, was issued to Hendrickson Equipment, Inc. for a violation of 30 CFR 77.1000

   Condition or Practice: On July 18, 2006, a highwall drill operator was fatally injured when the highwall collapsed crushing the operator's cab of the machine as he was removing the drill steel from a blast hole.

   The mine operator's established ground control plan was not being followed where a highwall drill was being used to drill blast holes. The highwall drill was positioned perpendicular to the highwall with the operator's compartment immediately adjacent to the highwall. The operator's ground control plan established for this mine states that drill operators shall not drill from positions that expose them to hazardous highwall conditions. The plan further states that the drill will be positioned with the operator's compartment on the side opposite the highwall. Evidence indicates that 23 holes were drilled on July 17, 2006, in the same manner with the drill positioned perpendicular to the highwall. These holes were observed by the superintendent on the evening of July 17, 2006.

3. A 104(d)(1) Order, No. 7428782, was issued to Hendrickson Equipment, Inc. for a violation of 30 CFR 77.1713

   Condition or Practice: On July 18, 2006, a highwall drill operator was fatally injured when the highwall collapsed crushing the operator's cab of the machine as he was removing the drill steel from a blast hole.

   An adequate mine examination was not conducted of the working area where pre-split blast holes were being drilled. The highwall drill was positioned perpendicular to the highwall with the operator's compartment immediately adjacent to the highwall. The operator's ground control plan established for this mine states that drill operators shall not drill from positions that expose them to hazardous highwall conditions. The plan further states that the drill will be

positioned with the operator's compartment on the side opposite the highwall.

This condition was not detected or recorded in the examination record and was not corrected prior to persons working in the area.

4. A 104(a) Citation, No. 7428783, was issued to Hendrickson Equipment, Inc. for a violation of 30 CFR 77.1006(a)

   Condition or Practice: On July 18, 2006, a highwall drill operator was fatally injured when the highwall collapsed crushing the operator's cab of the machine as he was removing the drill steel from a blast hole.

   The victim was assigned to work and was working while a dangerous highwall condition was present. The hazard was immediately adjacent to the highwall drill as evidenced by a hill seam that was parallel to the highwall face and was intersected by vertical jointing. This condition was present for several days after the highwall was exposed on or about July 13, 2006. The shift foreman failed to take corrective action for this obvious hazard.

APPENDIX A

List of Persons Participating in the Investigation

Hendrickson Equipment, Inc. Officials

Leonard Hendrickson	Owner/Superintendent
James Hylton	Foreman
Daniel Gibson	Bulldozer Operator
Ronnie Adams	Excavator Operator
Jamie Prater	Mechanic Contractor

Kentucky Office of Mine Safety and Licensing

Greg Goins	Accident Investigator
Neil Honeycutt	Surface Safety Analyst
Ron Hughes	Director of Investigations
Tracy Stumbo	Chief Accident Investigator

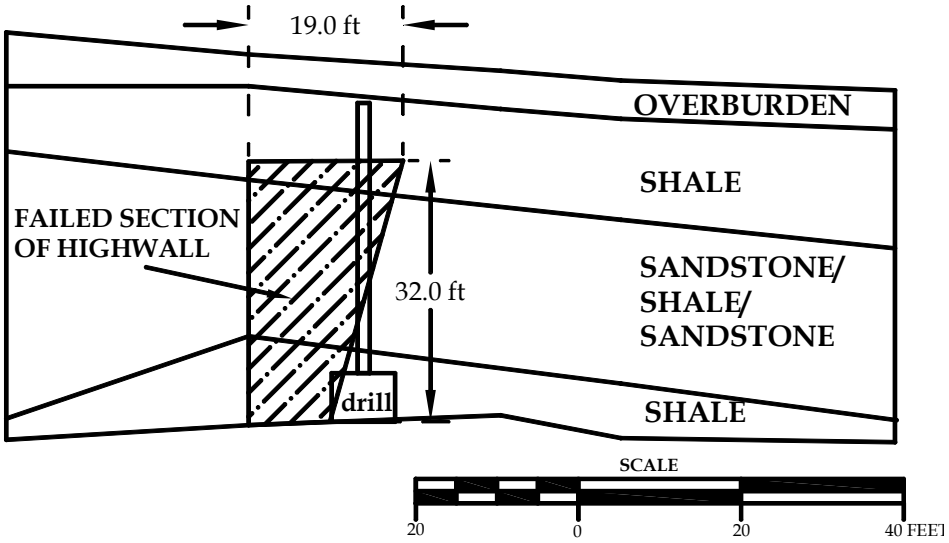
Mine Safety and Health Administration

Roy Parker	Mine Safety and Health Inspector
Timothy Watkins	Acting District Manager
Robert Newberry	Mining Engineer
Donald Kirkwood	Supervisory Civil Engineer
Lee Ann Shinavski	Civil Engineer
Garett Robinson	Acting Assistant District Manager - Technical

Appendix B

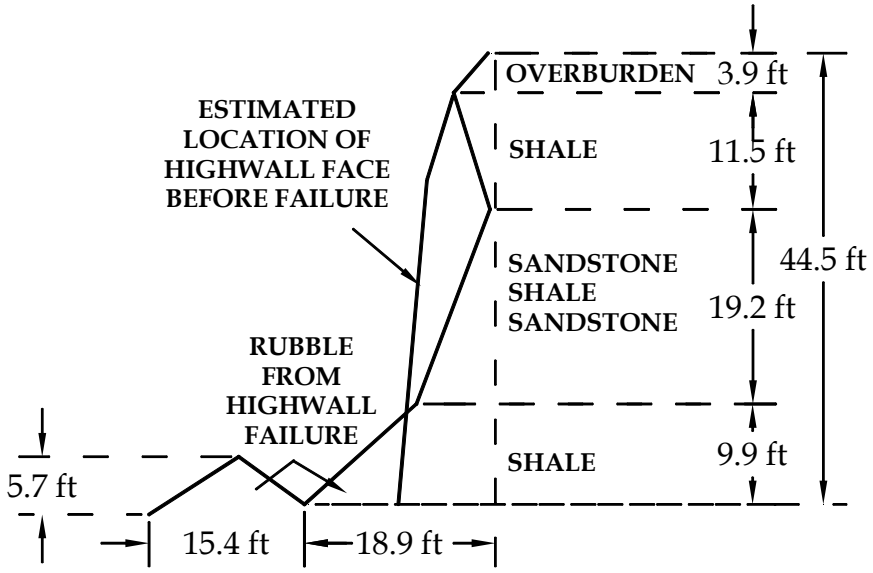
SUPPLEMENTAL INFORMATION

Drawings of the accident scene, including cross sections and profiles, were prepared based on field investigations the day following the accident, and supplemented with photographs. The drawings show the relative position of the highwall drill to the highwall. The drawings also show the strata of overburden, shale, and sandstone on the highwall face and the geometric details of the highwall failure area.



FRONT VIEW OF FAILURE AREA

SECTION D



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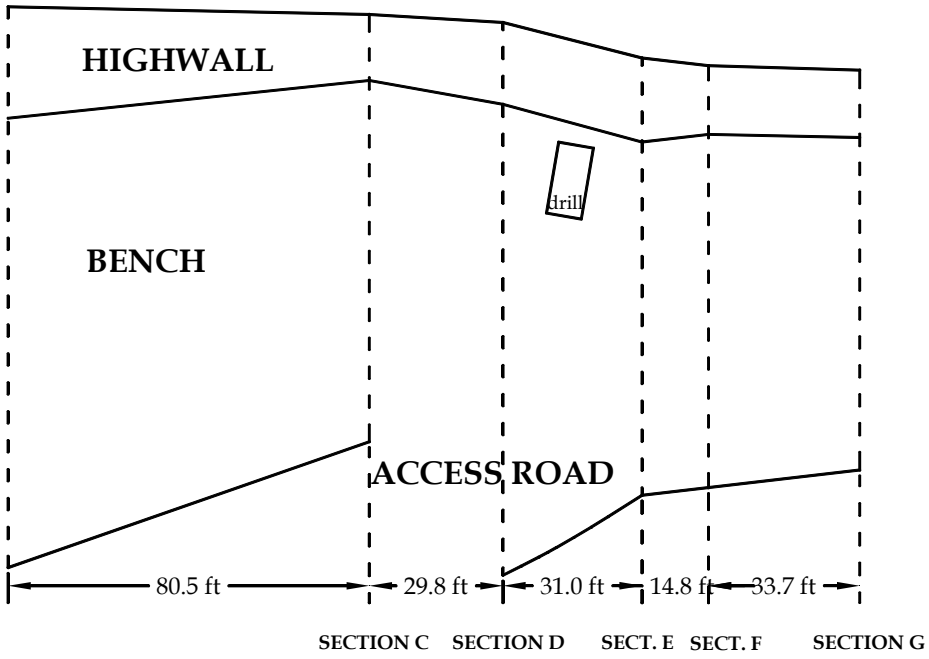

PLAN VIEW