

Oral Testimony by
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Before the
U.S. House of Representatives
Committee on Education and Labor
July 13, 2010

Good afternoon Mr. Chairman and distinguished members of the Committee. As a former UMWA coal miner, mine superintendent and manager of mine safety and health research at NIOSH, I thank you for the opportunity to discuss provisions in H.R. 5663.

It is agonizing that we are again at a point where a major underground coal mine disaster has shattered the lives of so many people, and that industry and MSHA seem powerless from stopping these disasters. We had only one such event during the period 1991-2000, thus it appears that it can be done.

The tripartite Mine Safety Technology & Training Commission, which I chaired in 2006, indicated the key to achieving this goal includes processes that:

1. Require major hazard-related risk management, which now *must* involve the screening of mines with high risk for disasters and serious injuries; and

2. Facilitate the creation of a safety culture of prevention of hazardous conditions that can lead to major-hazard events and serious injuries.

It is imperative that these processes must drive adoption of best practices in building a culture of prevention. The objective is to ensure that everyone in the organization involved with the mine, top to bottom, performs the critical tasks of their jobs, aimed at removing threatening conditions, with painstaking thoroughness. The same approach must be used in MSHA.

The commission noted that industry has to “*fundamentally change the management approaches and work practices* taken to fulfill basic safety requirements.” We recognized that “simple regulatory compliance alone is not sufficient to mitigate significant risks.”

Since 2007 my graduate student and I worked on developing an effective and straight-forward tool to analyze the risk of underground coal mines. The Safe Performance Index (SPI) model contains essentially the same elements discussed in the new Pattern of Recurring Non Compliance or Accidents provisions (Section 202, paragraph (e)(8)) of H.R. 5663 for screening mines for high risk. The accident-related elements we used included:

- The no days-lost incidence rate,
- The non-fatal days lost incidence rate, and
- The severity measure¹.

¹ Some injuries or illnesses are of such a degree of severity that a standard time charge of lost workdays has been adopted by MSHA, called statutory days charged. For a single incident, the charge can range from 6000 for a fatality or full disability to a lower amount for a partial disability or loss of a body part.

The citation-related elements we used included:

- The number of citations per 100 inspection hours,
- The number of S&S citations per 100 inspection hours, and
- The number of unwarrantable failure and imminent danger withdrawal orders per 1000 inspection hours.

I give detailed results on SPI modeling of an 82-mine sample in my written comments. The most salient points related to H.R. 5663 are summarized as follows:

- Our sample represents about 18% of producing mines, and I am convinced that the SPI works very well in objectively determining high-risk mines. Similar discriminatory power could be achieved with an appropriate application of the new Pattern of Recurring Non Compliance or Accidents provisions (Section 202 paragraph (e)(8)) of H.R. 5663. I believe the key for success depends on a judicious weighting of the components delineated in the subsection on rulemaking, as specified in paragraph (8)(B), to determine the threshold criteria.
- The worst-performing 10% of mines were characterized by different measures. Some had a high injury rate and a high elevated citation rate, while others had either a very high injury rate or a very high elevated citation rate. Four MSHA potential pattern of violation mines were on the list, one being a longwall mine.

- Three of the worst-performing eight mines got there because of a terrible Severity Measure. Two of them had good S&S and order rates. Thus, I re-emphasize that the injury experience must be integrated with the citation experience in considering mines for pattern status.
- Regarding benchmark criteria for 90-day evaluations, I suggest that major hazard-related S&S citations and orders should immediately have a higher benchmark of the 25th percentile of top-performing mines. A pattern mine should alternatively be permitted to ‘pass’ the benchmark for citations if the S&S rate is reduced by 70 percent, provided the 70-percent reduction takes the mine’s S&S rate to one that is below the mean for grouped mines. The target of having mines in the top 35th percentile set forth in the bill for reducing the injury rate is appropriate.
- Regarding termination of pattern status, both the S&S rate and the order rate need to be considered, and the 80% reduction of the rates needs to be coupled with the caveat that the improved S&S and order rates should both be less than the mean for grouped mines. For injuries, the performance benchmark of the 25th percentile of top-performing mines is a reasonable challenge.

The goal in this legislation should be to ensure that a low-performing mine that deserves to be placed on pattern status should be compelled to build a new safety culture that focuses day-to-day on preventing major hazard-related conditions and lost-time injuries.

I commend the Committee for inclusion of several important provisions. First is the independent investigation of mining disasters. Second is ensuring that MSHA inspects mines during normal operations on all shifts; I recommend that MSHA inspectors also perform a major-hazard ‘sweep’ of a mine at the beginning of a quarterly inspection. Third is allowing MSHA to invoke justifiable mitigating circumstances for an identified pattern mine.

In closing, I do believe that the new Pattern of Recurring Non Compliance or Accidents provisions will be a much needed improvement over the current Pattern of Violations process. The one-year remediation process coupled with quarterly monitoring of performance should inculcate in pattern mines adoption of practices and processes aimed at building a safety culture of prevention, which is necessary to eliminate mine disasters and ultimately all fatalities and serious injuries. This concludes my oral comments.

Written Comments by

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Good afternoon Mr. Chairman and other distinguished members of the Committee. As a former UMWA coal miner, mine superintendent and manager of mine safety and health research at NIOSH, I very much thank you for the opportunity to discuss certain provisions in Miner Safety and Health Act 2010, H.R. 5663.

It is agonizing that we are again at a point where a major underground coal mine disaster has shattered the lives of so many people, and that industry and MSHA seem powerless from stopping these disasters. In pursuing this legislation, our first priority must be to try to effectively prevent underground coal mine disasters from ever occurring again. We had only one such event during the period 1991-2000, thus it appears that it can be done. At the same time, we need to focus on the goal of preventing all fatalities and all serious injuries, especially those giving full and partial disabilities. Eventually we want to reduce lost-time accidents at the vast majority of mines to zero as well.

In my opinion, and the opinion of the tripartite Mine Safety Technology & Training Commission, which I chaired in 2006, the key to achieving these goals are setting up processes that will:

3. Require major hazard-related risk management as the first priority, which now must involve the screening of mines with high risk for disasters and serious injuries; and
4. Facilitate the creation of a safety culture founded on prevention of hazardous conditions that can lead to major-hazard events, fatalities or serious injuries.

In my opinion, it is imperative that any initiative that focuses on these processes must also focus on driving adoption of best practices in building and maintaining a culture of prevention. The objective is to ensure that everyone in the organization involved with the mine, top to bottom, performs the critical tasks of their jobs, aimed at removing threatening conditions, with painstaking thoroughness. The same approach must be used in MSHA regarding its supervisors and inspectors, who are the last line of defense in preventing disasters.

In its report, the Mine Safety Technology & Training Commission stated that “The commission *strongly believes* that companies which do not pursue the outlined approaches aimed at fulfilling fundamental safety requirements *should not be permitted to operate underground coal mines.*” In our collective minds, and in complete tri-partite consensus, we urged the

underground coal industry to ***adopt*** the approaches we outlined. Our most succinct, relevant closing paragraph noted the following:

In particular in order to move forward safely and productively, the commission believes that a number of broad issues framed by our recommendations deserve serious attention, and should be used to ***fundamentally change the management approaches and work practices*** taken to fulfill basic safety requirements. First and foremost, ***risk-based decision-making*** must be emphasized, employed, and improved in all aspects of design, assessment, and management. It is imperative that a risk-assessment-based approach be used, founded on the establishment of a ***value-based culture of prevention*** that focuses all employees on the prevention of all accidents and injuries. Importantly, every mine should employ a sound risk-analysis process, should conduct a risk analysis, and should ***develop a management plan*** to address the hazards and related contingencies identified by the analysis; simple regulatory compliance alone is not sufficient to mitigate significant risks.

Next I will focus on a methodology to screen for high-risk mines that my graduate student and I worked on beginning in 2007, and which contains essentially the same elements discussed in the new Pattern of Recurring Non Compliance or Accidents provisions (Section 202, paragraph (e)(8)) of H.R. 5663. The accident-related elements we used included:

- The no days-lost incidence rate,
- The non-fatal days lost incidence rate, and
- The severity measure, calculated as the total statutory² days charged plus restricted work days plus lost work days multiplied by 200,000 and the result divided by the employee hours worked.

The citation-related elements we used included:

- The number of citations per 100 inspection hours,
- The number of S&S citations per 100 inspection hours, and
- The number of withdrawal orders per 1000 inspection hours.

One of three methods we pursued for safety risk analysis, which was follow-up work on the risk assessment recommendation made by the Mine Safety Technology & Training Commission, was to develop an effective and straight-forward tool that any company could use to analyze the risk levels of its underground coal mines.

As does paragraph (e)(8) of Section 202 relating to the new Pattern of Recurring Non Compliance or Accidents provisions, the Safe Performance Index (SPI) embraces all of the significant inputs for screening mines for high risk, from both the citation and injury perspectives. It similarly uses normalized measures. Fatalities and disabilities were brought into the risk calculation through use of the Severity Measure, because their serious nature is highlighted better and has more influence in determining the total risk

² Some injuries or illnesses are of such a degree of severity that a standard time charge of lost workdays has been adopted by MSHA, called statutory days charged. For a single incident, the charge can range from 6000 for a fatality or full disability to a lower amount for a partial disability or loss of a body part.

level of a mine. In my opinion, we used the SPI methodology to analyze several groups of mines with robust results in targeting high-risk mines.

In a recent analysis of a sample of 82 underground coal mines, the top-performing 10% of mines with the highest SPIs were characterized by low injury rates and low elevated citation rates (see Table 1). The following points characterize these best or safest-performing mines:

- All of them had an non-fatal days lost incidence rate (NFDL IR) and severity measure (SM/100) much less than the averages for all mines.
- All of them had a significant and substantial citation rate per 100 inspection hours (SS/100 IH) and withdrawal orders rate per 1,000 inspection hours (O/1000 IH) much less than the averages for all mines.
- Seven of the eight mines had no orders, including three longwall mines.
- Four pilot mines and four longwall mines were in the list.
- Significantly, no mines on the MSHA list of potential pattern of violations made the list.

Table 1. Top 10% SPI Best-Performing Mines.

<u>Mine ID</u>	<u>SPI</u>	<u>NDL IR</u>	<u>NFDL IR</u>	<u>SM/100</u>	<u>C/100 IH</u>	<u>SS/100 IH</u>	<u>O/1000 IH</u>
Pilot Mine 3	99.8	0.00	0.00	0.00	0.57	0.00	0.00
Pilot Mine 4	98.0	0.00	0.00	0.00	1.04	1.66	0.00
LW-19	97.5	5.74	0.00	0.00	0.45	0.49	0.00
LW-25	96.4	0.32	0.30	0.12	2.09	1.44	0.43
Pilot Mine 12	96.3	3.19	0.00	0.00	2.29	1.87	0.00
LW-26	96.1	0.26	0.47	1.02	1.60	0.77	0.00
Pilot Mine 14	96.0	9.39	0.00	0.00	0.60	0.72	0.00
LW-14	95.4	2.10	1.02	0.22	2.23	1.66	0.00
Scaled Averages		3.67	3.67	3.67	3.67	3.67	3.67

On the other hand, the worst-performing 10% of mines with the lowest SPIs were characterized by variable and different measures (see Table 2). The following points characterize these worst-performing or high-risk mines:

- For three of the mines, a very high rate for withdrawal orders per 1,000 inspection hours (O/1000 IH) got them on the list.
- For three of the mines, a very high rate for severity measure (SM/100) got them on the list
- The remaining two mines had four or five metrics that significantly exceeded the means for the metrics.
- Importantly, four MSHA potential pattern of violation mines were on the list, one being a longwall mine.

Table 2. Bottom 10% SPI Poorest-Performing Mines.

<u>Mine ID</u>	<u>SPI</u>	<u>NDL IR</u>	<u>NFDL IR</u>	<u>SM/100</u>	<u>C/100 IH</u>	<u>SS/100 IH</u>	<u>O/1000 IH</u>
MSHA List-20	59.3	3.70	6.77	0.20	8.69	10.00	9.77
MSHA List-6	52.1	14.65	7.06	2.28	6.61	10.42	9.46
MSHA List-18	42.7	1.53	1.40	0.45	5.96	5.42	23.60
LW-22	41.2	3.74	6.84	5.15	5.42	3.35	17.71
Pilot Mine 29 also							
LW-3	40.1	2.93	2.54	27.14	1.27	1.03	0.40
MSHA List-11 also LW-31	33.9	3.89	4.27	1.98	5.92	7.46	23.67
LW-2	32.3	2.92	4.23	29.20	2.14	1.97	0.79
MSHA List-3	0.0	3.46	4.65	37.29	6.57	6.75	5.46
Scaled Averages		3.67	3.67	3.67	3.67	3.67	3.67

The sample of 82 underground coal mines represents approximately 18% of such active producing mines. In our SPI calculations we used all citation and injury data extracted from the MSHA Data Retrieval System, not just final orders. The rationale was to look at a one-year snapshot of the risk

variations in underground coal mines, and to identify those with excess risk. I am convinced that the SPI works very well in objectively determining low-risk mines from high-risk mines. I believe ultimately that similar discriminatory power could be achieved with an appropriate application of the provisions of the new Pattern of Recurring Non Compliance or Accidents provisions (Section 202 paragraph (e)(8)) of H.R. 5663. In my opinion, the key for success depends on a judicious weighting of the components delineated in paragraph (8)(B) to determine the threshold criteria, which will lead to an appropriate screening of high-risk mines that are dangerous because of a very high level of serious injuries or a very high level of elevated citations, or high levels of both. Realizing that weighting factors will likely be determined through rulemaking, I emphasize, however, that the weighting factor applied to the Severity Measure, including statutory days charged for fatalities and disabilities should not be downplayed. Disabilities and serious injuries to miners have an overwhelming and inestimable impact on them and their families.

Other very important features of H.R. 5663 concern the remediation of conditions and/or the injury experience of a mine placed on pattern status, the benchmark criteria for continuation of the remediation effort, and the one-year benchmark criteria for termination of pattern status. Related to these aspects, the Mine Safety Technology & Training Commission stressed the need for all underground coal mines to build a culture of prevention that involves all mine personnel from top to bottom. Our goal in this legislation is to ensure that a mine that deserves to be placed on pattern status should truly be involved in building a new safety culture that focuses day-to-day on preventing major hazard-related conditions and lost-time injuries. It is

difficult to say how long this process could take for a specific mine, but most excellent-performing mining companies who have built such a culture will tell you that it is more than a year. However, these companies generally were not pressed as severely as they would be in pattern status, and were very deliberative in selecting the tools and practices they thought would be most effective. A one-year period in pattern status, in my opinion, would enhance the probability that any mine in such status would systematically focus its remedial efforts to ensure that the 90-day benchmarks would be achieved, and another withdrawal order would not be issued. The cumulative effect of the successive 90-day evaluations would likely be to inculcate the processes and practices employed into daily work routines.

Regarding the benchmark criteria for the 90-day evaluations, a pattern mine should be challenged to have high goals, but I believe that the first-quarter evaluation is somewhat steep for a mine that has a ‘bad’ S&S citation record and which was likely chaotic in its approach to safety. I suggest that the challenge for the initial 90-day period would be to move the pattern mine to the top-performing 50th percentile of rates for all S&S citations but to the top-performing 25th percentile of rates for all major hazard-related S&S citations. I believe that the target for reducing the injury rate is appropriate, primarily to significantly reduce a high Severity Measure, which would include statutory charges. Based on the historical evidence of the potential pattern of violations process, I agree that the pattern mine should alternatively be permitted to ‘pass’ the benchmark for citations if the S&S rate is reduced by 70 percent with the caveat that the 70-percent reduction takes the mine’s S&S rate to one that is below the mean for mines of similar size and type. The following 90-day evaluations could then seek the 35th

percentile for the S&S citation rate and injury rate, and a 70-percent reduction for the S&S citation rate, provided the rate is below the mean value for mines of similar size and type. I again suggest that major hazard-related S&S citations should have the higher benchmark of the 25th percentile. In the end, application of these benchmark criteria would logically reflect the intent that a culture of prevention is being built and that a pattern mine pursues the types of safety performances achieved by the low-risk mines.

Regarding termination of pattern status for a mine, as related to the mine's elevated-citation performance, I examined the eight mines of the 82 in my database which fell in the bottom 10% of the SPIs. The worst-performing S&S rate among the eight mines was 10.41 per 100 inspector hours, and an 80% reduction of that would yield a rate of 2.08, which is 57% of the mean rate for all 82 mines. On the other hand when looking at orders, the worst-performing order rate was 23.67, and an 80% reduction would yield a rate of 4.73, which would exceed the mean rate for all mines by 29%. Thus I suggest that both the S&S rate and the order rate needs to be considered in evaluating the citation performance, and that the 80% reduction in the S&S and order rates needs to be coupled with the caveat that the improved S&S rate and order rate should both be less than the mean of all mines in the mine size and type category.

One other important issue must be noted here, that three of eight mines in the bottom 10% of mines in my SPI ranking got there because of a terrible Severity Measure. Two of them had good S&S and order rates. In these three cases, the Severity Measure reflected one fatality and several full and

partial disabilities. One mine had a total of 16,098 total lost days, including statutory days plus restricted day and lost work days. In the other two mines, each of which had total lost days above 6,000, full disabilities were involved. Thus, I re-emphasize that the injury experience at mines must be integrated with the citation experience in considering mines for pattern status.

The 25th percentile mine's O/100 IH rate was 0.37; however, very significantly 20 of the 21 mines in the upper quartile had zero orders. In our database, 60 mines of the 82, or 71% of them, had a mean performance or better. Thus getting zero orders in our database mines was frequent, at nearly 25%; and doing better than the mean order rate was highly probable, at approximately 70%.

Switching to the accident experience, my comments will focus on both the number of lost-time accidents and the Severity Measure as the 25th percentile benchmark is examined. A total of 16 mines among 82, nearly 20% of them, had no lost-time accidents. Further 24 of 82, over 29%, had one or no lost-time accidents. Among them were 5 of 18 small mines, 1 of 6 medium-size mines, and 5 of 40 longwall (large) mines. Specific to the Severity Measure, 22 mines, or nearly 27%, had less than 10 lost work days, and similar performances were achieved for the Severity Measure. Thus it appears that the 25th percentile is a reasonable challenge, particularly since our goal is zero lost-time accidents as well as zero fatalities and serious injuries. This is a major point the Mine Safety Technology & Training Commission also emphasized in its report. Further, with progressive improvement occurring

responsive to the 90-day reviews, achieving the benchmark level apparently would be facilitated by the monitoring.

I would like to commend the Committee for its inclusion of several important provisions. First, the Mine Safety Technology & Training Commission also recommended that an independent investigation of mining disasters should be conducted. Second, it was important to ensure that MSHA inspects mines during normal operations on shifts other than day shift; I personally recommend that MSHA inspectors also perform a major-hazard ‘sweep’ of a mine at the beginning of a quarterly inspection. Third, the Committee was insightful about allowing MSHA to invoke justifiable mitigating circumstances for an identified pattern mine, because sometimes statistics may be deceptive and also because some accidents occur from fast-changing conditions.

In closing, I do believe that the new Pattern of Recurring Non Compliance or Accidents provisions will be a much needed improvement over the current Pattern of Violations process. The one-year remediation process coupled with quarterly monitoring of performance should inculcate in pattern mines adoption of practices and processes aimed at building a safety culture of prevention, which is necessary to eliminate mine disasters and ultimately all fatalities and serious injuries.

This concludes my written comments.