

**FEDERAL MINE SAFETY AND HEALTH REVIEW COMMISSION**

1730 K STREET N.W., 6TH FLOOR  
WASHINGTON, D.C. 20006

November 29, 1995

IN RE: CONTESTS OF RESPIRABLE : Master Docket No. 91-1  
DUST SAMPLE ALTERATION :  
CITATIONS :  
: :  
KEYSTONE COAL MINING CORPORATION : Docket Nos. PENN 91-451-R through  
: PENN 91-503-R  
v. :  
: Docket Nos. PENN 91-1176-R through  
SECRETARY OF LABOR, : PENN 91-1197-R  
MINE SAFETY AND HEALTH :  
ADMINISTRATION (MSHA) :  
: :  
SECRETARY OF LABOR, : Docket Nos. PENN 91-1264 through  
MINE SAFETY AND HEALTH : PENN 91-1266  
ADMINISTRATION (MSHA) :  
: and  
v. :  
: Docket No. PENN 92-182  
KEYSTONE COAL MINING CORPORATION : Docket No. PENN 92-183  
: :  
JIM WALTER RESOURCES, :  
INC., et al., :  
Intervenors :  
: :  
UNITED MINE WORKERS :  
OF AMERICA (UMWA), :  
Representative of Miners :

BEFORE: Doyle, Holen and Marks, Commissioners<sup>1</sup>

DECISION

BY: Doyle and Holen, Commissioners

This proceeding arises under the Federal Mine Safety and Health Act of 1977, 30 U.S.C.

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<sup>1</sup> Chairman Jordan has recused herself in this matter. Pursuant to section 113(c) of the Federal Mine Safety and Health Act of 1977, 30 U.S.C. ' 823(c), we have designated ourselves a panel of three Commissioners to exercise the powers of the Commission in this matter.

' 801 et seq. (1988) (Mine Act or Act). Section 202(a) of the Mine Act requires coal mine operators to take accurate samples of the respirable dust in the mine atmosphere to which each miner is exposed.<sup>2</sup> 30 U.S.C. ' 842(a). This proceeding involves 3,460 citations<sup>3</sup> issued by the Department of Labor's Mine Safety and Health Administration (MSHA) to coal mine operators across the country, each of which alleges a violation of 30 C.F.R. ' 70.209(b), 71.209(b), or 90.209(b) (collectively, section 209(b)), for tampering with and altering the weight of respirable dust samples (Dust Cases).<sup>4</sup>

The Dust Cases were assigned to Administrative Law Judge James A. Broderick, who consolidated them for a trial of the issue common to all citations, i.e., whether the appearance of an abnormal white center (AWC) on a respirable dust sample filter establishes that the mine

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<sup>2</sup> The Mine Act and mandatory standards require each operator to maintain an average concentration of respirable dust in the mine atmosphere at or below 2.0 milligrams of respirable dust per cubic meter of air. 30 U.S.C. ' 842(b); 30 C.F.R. ' 70.100, 71.100. Under certain circumstances, it must be maintained at or below 1.0 milligrams. *See, e.g.*, 30 C.F.R. ' 90.100.

<sup>3</sup> An additional 110 contested citations are on stay pending resolution of the Common Issues case. Approximately 5,000 citations were issued in total. Not all, however, were contested and some were settled.

<sup>4</sup> Section 209(b) of 30 C.F.R. Parts 70, 71, and 90 provides:

The operator shall not open or tamper with the seal of any filter cassette or alter the weight of any filter cassette before or after it is used to fulfill the requirements of this part.

operator had intentionally altered it. The judge found that the Secretary had failed to prove by a preponderance of the evidence that an AWC on a filter establishes that the operator had altered the weight or that deliberate conduct was the only reasonable cause of an AWC. *In re: Contests of Respirable Dust Sample Alteration Citations*, 15 FMSHRC 1456, 1521-22 (July 1993) (ALJ) (ACommon Issues Decision@). The judge then ordered a trial on the citations issued to a single mine, the Urling No. 1 Mine (AUrling@), operated by Keystone Coal Mining Corporation (AKeystone@). In that case, the judge held that the Secretary of Labor had failed to carry his burden of proving by a preponderance of the evidence that the weight of the 75 cited filters had been intentionally altered by the operator. *Keystone Coal Mining Corp.*, 16 FMSHRC 857, 903 (April 1994) (ALJ) (AKeystone Decision@).<sup>5</sup>

The Secretary filed with the Commission a petition for discretionary review (APDR@) seeking review of the decisions and asserting 14 points of error by the judge. Among the Secretary's assignments of error was his challenge to the judge's articulation and application of the standard of proof in both the Common Issues Decision and in the *Keystone* Decision and his claim that, if the proper standard had been used, the Secretary would have prevailed in both cases.

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<sup>5</sup> The United Mine Workers of America (AUMWA@) participated in both proceedings as representative of miners but did not submit briefs to the judge.

The Commission granted the Secretary's PDR and granted intervenor status to a number of mine operators (the Intervenor<sup>6</sup>). The parties and Intervenor<sup>6</sup> submitted briefs and the Commission heard oral argument.<sup>6</sup> After careful review of the record, and for the reasons that follow, we affirm the judge's decisions.

## I.

### Background and Judge's Decisions

#### A. Factual and Procedural History in Common Issues

Coal mine operators are required to submit accurate dust samples on filter cassettes to MSHA for measurement of the quantity of respirable coal dust in the mine atmosphere. 15 FMSHRC at 1457; 30 C.F.R. §§ 70.201-220, 71.201-220, and 90.201-220. These samples are taken in a sampling unit, consisting of a pump, hose, cyclone assembly, and plastic cassette, manufactured by the Mine Safety Appliance Corporation (MSA<sup>®</sup>). 15 FMSHRC at 1457. The pump draws air into the cyclone assembly, which separates out larger dust particles. Air containing respirable dust particles is directed into the plastic cassette, which contains a capsule consisting of an aluminum foil cone, a filter, and a backing pad. *Id.* Airborne particles are deposited on the filter face. *Id.* The cassette is removed from the sampling unit and sent to MSHA's weighing laboratory along with a card providing information on the sample (a dust data card<sup>®</sup>). *Id.* At the weighing laboratory, MSHA technicians open the sealed cassette, remove and desiccate the capsule, and then weigh it to determine whether the respirable dust concentration is in compliance with the levels required by 30 C.F.R. §§ 70.100, 71.100, and 90.100. *See id.*

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<sup>6</sup> The UMWA filed an appearance but did not submit briefs to the Commission or participate in oral argument.

In 1983, Mr. Robert Thaxton, then an industrial hygienist at MSHA's District Office in Mt. Hope, West Virginia, subjected 25 to 50 dust filter cassettes to reverse air flow tests by blowing or otherwise directing air into the outlet of the cassette to determine the potential for removal of dust by tampering. *Id.* at 1457-58; Tr. 108-10. The resulting filters exhibited white circular areas in the center. 15 FMSHRC at 1458. In February 1989, a laboratory technician at Mt. Hope noticed a protruding filter on a cassette submitted by Peabody Coal Company (Peabody). *Id.*; Tr. 327-28.<sup>7</sup> When the foil was removed, a sharply defined circular white center that was aligned with the aluminum foil inlet opening of the filter capsule was visible on the filter. Tr. 329, 336-37. Mr. Thaxton, the supervisory industrial hygienist at Mt. Hope, regarded this filter appearance as abnormal and believed that the Peabody filter resembled some of his 1983 experimental filters. 15 FMSHRC at 1457-58; Tr. 108-10, 330-31. Filters with this abnormal white center appearance were termed AWCs. 15 FMSHRC at 1458.

The Pittsburgh Health Technology Center (PHTC), MSHA's main laboratory, began to examine all filters from that same Peabody mine and, later, from all Peabody mines. *Id.*; Tr. 337-38. In August 1989, MSHA's investigation expanded to include all filters submitted by coal mine operators nationwide. 15 FMSHRC at 1458; Tr. 342. Filters were examined for abnormalities and those with suspected AWCs were forwarded to Thaxton at the Mt. Hope facility. 15 FMSHRC at 1458; Tr. 128-29, 339.

On March 19, 1990, MSHA initiated an AWC Avoid code<sup>8</sup> and began rejecting respirable dust samples that exhibited AWCs. 15 FMSHRC at 1460; R. Ex. 1400, at 12. On April 4 and June 7, 1991, MSHA issued approximately 4,700 citations to approximately 847 mines and proposed civil penalty assessments totaling about \$6.5 million.<sup>9</sup> *See* 15 FMSHRC at 1460; Tr. 3 (Prehring Conf. June 19, 1991). The citations were issued by MSHA inspectors, but Thaxton alone determined whether a particular filter was to be cited. 15 FMSHRC at 1460. Each citation charged the mine operator with violating the provisions of section 209(b) and alleged that the weight of the respirable dust cassette . . . has been altered while the cassette was being submitted to fulfill the sampling requirements . . . .*Id.* Each citation characterized the level of the operator's negligence as Reckless disregard,<sup>10</sup> and the Narrative Findings for a Special

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<sup>7</sup> ATr. refers to transcript of the Common Issues trial. AK. Tr. refers to the transcript of the trial in *Keystone*. AR. Ex. refers to Respondent Exhibits and AGov't Ex. to Government Exhibits introduced at the Common Issues trial. AK. Ex. refers to *Keystone* Exhibits and AK. Gov't Ex. to Government Exhibits introduced at the *Keystone* trial. AOral Arg. Tr. refers to the transcript of oral argument held before the Commission on March 29, 1995.

<sup>8</sup> A void code is a three-letter code indicating that MSHA will not accept the respirable dust sample for use in determining compliance with the respirable dust standards. Tr. 848.

<sup>9</sup> MSHA continued to cite operators for AWCs. By the time of the Common Issues trial, approximately 370 additional citations had been issued. The last contested citation, now on stay, was issued on April 6, 1993.

Assessment (ASpecial Assessment Findings@) attached to the citation stated that A[t]he violations resulted from an intentional act of altering the dust samples.@ See, e.g., Citation dated April 4, 1991, and Special Assessment Findings dated June 12, 1991, issued to Keystone; see also 14 FMSHRC at 1512.

The cases in this proceeding arose from citations contested by operators and petitions for assessment of penalty filed by MSHA. Extensive discovery was conducted and the parties twice sought interlocutory Commission review of pretrial matters. In a pretrial order issued on August 13, 1992 (AAugust 1992 Order@), Judge Broderick, citing the time and expense of trying each case separately and relying on the Manual for Complex Litigation,<sup>10</sup> consolidated the cases for trial of the issue common to all cases and appointed a Lead Defense Counsel Committee to participate in the trial on behalf of all operators. 14 FMSHRC 1510, 1511, 1516 (August 1992) (ALJ). In the same order, the judge rejected the Secretary's argument that, if he proved that the weight of a dust sample had been altered, he need not prove that the alteration was deliberate. *Id.* at 1515. The judge concluded that the plain words of section 209(b) do not give rise to a violation based on accidental or unintentional altering of the cassette's weight. *Id.* at 1515-16. Rather, the judge found that a violation necessarily included an intentional action on the part of the mine operator. *Id.* at 1515. The judge set forth the issue to be determined as: A[w]hether an abnormal white center (AWC) on a cited filter cassette establishes that the operator intentionally altered the weight of the filter?@ *Id.* at 1517. The judge stated, Athe Secretary has the burden of establishing [his] case by the preponderance of the evidence.@ *Id.*

#### B. Common Issues Trial

The Common Issues trial commenced on December 1, 1992, and concluded on

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<sup>10</sup> AActions pending in the same court involving common questions of law or fact may be consolidated under Fed. R. Civ. P. 42(a) for trial or pretrial if it will avoid unnecessary cost or delay.@ Manual for Complex Litigation ' 21.631 (1995) (supplement to James W. Moore et al.; Moore's Federal Practice (2d ed.)).

February 22, 1993. Mr. Thaxton testified for eight days on his AWC classification and the potential causes of AWC formation. Thaxton had developed ten tamper codes to describe the various AWC appearances. 15 FMSHRC at 1460-62; Tr. 168-71; R. Ex. 1064. Approximately 97% of the cited filters were originally classified under tamper codes 1, 2 or 3.<sup>11</sup> 15 FMSHRC at 1462. Filters originally suspected of having AWCs, but which Thaxton decided should not be cited, were termed "no-calls." *Id.* at 1460; Tr. 129-31. In March 1992, Thaxton reexamined the cited filters and reclassified 464 filters; 95% of the cited filters remained as tamper code 1, 2 or 3. 15 FMSHRC at 1462. In his opinion, AWCs resulted from acts of intentional alteration by mine operators, primarily by the application of reverse air through the filters. Tr. 183, 191, 209, 598-99. Lewis Raymond, Chief of the Weighing Branch, Dust Division of the PHTC, testified on the handling and screening practices of filters exhibiting AWCs. The Secretary offered the scientific testimony of Dr. Virgil Marple and his colleague, Dr. Kenneth Rubow, who had conducted experiments involving AWCs, including application of reverse air flow to filter cassettes and dropping cassettes and pumps. 15 FMSHRC at 1474-83. Dr. Marple concluded that the most probable cause of AWC dust dislodgment was the deliberate application of reverse air flow. *Id.* at 1469-70, 1481; Gov't Ex. 280, at 4-7, 57, 103-05; Gov't Ex. 282, at App. A; Tr. 2590, 2597-98. The Secretary's statistical expert, Dr. John J. Miller, testified that AWCs were not random across all coal mines. 15 FMSHRC at 1485, 1488; Tr. 3721-23. According to Dr. Miller, there was a marked decline in AWCs after MSHA's initiation of the AWC void code on or about March 19, 1990. 15 FMSHRC at 1486, 1488; Tr. 3723-24. Miller also testified that the decrease in the rate of cited AWCs was not explained by the dates on which filters were manufactured. 15 FMSHRC at 1486-88.

The operators offered the scientific testimony of Dr. Richard J. Lee, who also classified the cited filters into groups based on appearance. *Id.* at 1470-71. Dr. Lee performed a series of dust dislodgment tests and concluded that AWCs can result from accidental and incidental events. *Id.* at 1488-96; Tr. 6531-34. He testified that manufacturing variations in the sampling units, such as a shorter filter-to-foil distance<sup>12</sup> in the cassette and the pliability of the hose, increase

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<sup>11</sup> Filters classified under tamper code 1, termed by Thaxton as "light cleaned," were described as containing a white ring in the center of the filter, approximately 6 millimeters (6mm) in diameter, directly aligned with the cassette inlet. The appearance of the center portion of the ring was not markedly lighter. In Thaxton's opinion, tamper code 1 AWCs resulted from reverse air flow. 15 FMSHRC at 1461; Tr. 179-181, 183; R. Ex. 1064. Filters classified under tamper code 2, "cleaned," were described as exhibiting a markedly lighter dust deposit within the circular area. Thaxton believed that tamper code 2 AWCs also resulted from reverse air flow. 15 FMSHRC at 1461; Tr. 184-85, 191, 193-98, 767-68, 776; R. Ex. 1064. Filters classified under tamper code 3, "cleaned and coned," were described as similar to those classified under tamper code 2, but exhibiting a slight rise or cone in the center. Thaxton believed that tamper code 3 AWCs resulted from "forceful" reverse air flow. 15 FMSHRC at 1461; Tr. 198-201, 208-09, 1258; R. Ex. 1064.

<sup>12</sup> Filter-to-foil distance is the distance in the cassette between the filter surface and the opening of the aluminum foil cone. Tr. 2279; R. Ex. 1001, at ii, B-8.7.

susceptibility to AWC formation. 15 FMSHRC at 1494-95; Tr. 6534-35. The operators= other scientific experts, Dr. R. Larry Grayson, Dr. Andrew R. McFarland, and Dr. Morton Corn, similarly testified that AWCs can result from accidental and incidental events, such as dropping or other impacts to sampling units and impacts to hoses of sampling units. 15 FMSHRC at 1497-99, 1505-06. Dr. McFarland conducted a courtroom demonstration in which he twice dropped a 31-pound tool box on the hose of a sampling assembly, each time producing an AWC. *Id.* at 1503. The operators= statistical expert, Dr. H. Daniel Roth, testified that the AWC citation rate declined continuously after September 1989 and that the void code date of March 19, 1990, was not statistically significant. Tr. 3983, 3987-88, 3994, 4001; R. Ex. 1041, at 4. Roth criticized Miller=s analysis of filter manufacturing dates. 15 FMSHRC at 1508.

The judge observed the filters presented at the hearing. *Id.* at 1467. The cited and experimental filters are not in the record but, during discovery, the operators= expert witnesses were permitted to inspect the cited filters and each expert had the opportunity to review the others= experimental filters. *E.g.*, Tr. 5949, 7521; Gov=t Ex. 267, at 4-6. Photographs of the cited filters and of many of the experimental filters are in the record. *See, e.g.*, Gov=t Exs. photograph albums entitled *Cited Filters*, vols. 1-7, set 2. Evidence concerning the practices or circumstances of any particular mine was excluded from the Common Issues trial. 15 FMSHRC at 1464; *see also id.* at 1522; 16 FMSHRC at 896.

### C. Common Issues Decision

The parties filed post-trial and reply briefs in April and May 1993, and the judge issued his decision on July 20, 1993. 15 FMSHRC 1456. His findings and conclusions are as follows:

#### 1. Burden of Proof

The judge held that the Secretary bore the burden of proving A by a preponderance of evidence that (1) the term AWC= has a coherent meaning and was consistently applied; (2) the cited AWCs can only have resulted from intentional acts; and (3) the AWCs resulted in weight losses in the cited filters.@ 15 FMSHRC at 1463-64.

#### 2. Mr. Thaxton=s AWC Classifications

The judge found that the term AAWC@ has a coherent meaning and refers to an Aabnormal filter appearance in a dust sample consisting of dust dislodgment from the central portion of the filter.@ 15 FMSHRC at 1513. He found that the classification of AWCs by Thaxton under his tamper codes, although not perfectly consistent, was sufficiently consistent to require a determination of whether the existence of an AWC establishes a violation. *Id.* at 1469, 1513.

#### 3. Possible Causes of AWCs



The judge determined that A[t]he dust dislodgment patterns on the cited filters classified under tamper codes 1, 2, 3, and 7<sup>13</sup> *can have resulted* from intentional acts: blowing by mouth through the cassette outlet, otherwise directing a jet or pulse of air into the cassette outlet, or introducing a vacuum source into the cassette inlet.@ 15 FMSHRC at 1513 (emphasis added). He also found that the dust dislodgment patterns on filters classified under these tamper codes *Ac*an *have resulted* from:

1. impacts to the cassette from dropping or striking it;
2. impacts to the hose from stepping on it, dropping an object on it, striking it against a wall while the hose was wrapped around the sampling assembly, closing a door or drawer on it, or sitting on it;
3. snapping together the two halves of the filter cassette.@

*Id.* (emphasis added).

The judge explained that, although the experts differed as to the likelihood that AWC dislodgment patterns would result from incidental events or accidents, Athe experiments all show that at least sometimes they do occur.@ *Id.* at 1513-14. He observed that dust dislodgment patterns on many of the filters subjected to impact or snapping tests were indistinguishable from cited AWCs. *Id.* at 1514. The judge concluded that the AWCs did not result from handling by the United States Postal Service or from the PHTC's handling or desiccation processes. *Id.*

The judge determined that the manufacturing characteristics of filter-to-foil distance and filter floppiness varied from filter to filter and mine to mine. *Id.* at 1515, 1521. The judge found that a filter cassette with a smaller filter-to-foil distance was more susceptible to an AWC dislodgment pattern than one with a larger distance; that a floppy filter was more susceptible than a taut one; and that AWC susceptibility also depended on the pliability of the sampling hose. *Id.* at 1515-17. He determined that the cited filters came from a population of cassettes with shorter filter-to-foil distances than those manufactured subsequently. *Id.* at 1515-16. The judge also identified mine and dust variables that would affect dislodgment, such as type of coal, humidity in the mine environment, weight of dust on the filter, size and shape of dust particles, and quantity of rock dust or diesel dust on the filter. *Id.* at 1516-17, 1521.

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<sup>13</sup> The judge noted that Thaxton came to believe that filters classified under tamper code 7, known as *Ac*lean tool@ and which he originally believed were created by a tool, were created by reverse air flow. 15 FMSHRC at 1461-62, 1513; Tr. 259.

#### 4. Statistical Evidence

The judge found Miller's conclusion that the AWC rate was not random across the mining industry was not persuasive evidence of intentional tampering because of the existence of many other potential causes. 15 FMSHRC at 1519, 1522. The judge also rejected the Secretary's claim that the sharp decline in cited AWCs beginning about March 19, 1990, can only be construed as showing intentional misconduct that ceased when the operators became aware of the void code. *Id.* at 1519. He reasoned that AWC citations continued, at a reduced rate, long after the void code was instituted and after significant publicity about the criminal investigation. *Id.* at 1519-20.<sup>14</sup> The judge stated that the statistical evidence showed cassettes manufactured before January 1, 1990, had a much higher citation rate than those manufactured later, suggesting manufacturing variables as a cause of AWC formation. *Id.* at 1520. The judge discounted Miller's opinion that there were no statistically significant relationships between dust dislodgment and filter-to-foil distance or floppiness of filters, concluding that the weight of the scientific evidence showed that such factors did, in fact, affect susceptibility to AWC formation. *Id.*

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<sup>14</sup> At the time of MSHA's investigation of operator samples, a large number of respirable dust samples taken by MSHA inspectors were also found to exhibit AWCs. 15 FMSHRC at 1462. Thaxton classified these samples under his tamper codes and most, but not all, were classified under one of the reverse air flow tamper codes. *Id.* The judge noted evidence indicating that the number of inspector samples exhibiting AWCs declined at about the same rate during the relevant periods as operator samples. *Id.* at 1519. The Office of Inspector General of the Labor Department investigated whether the inspectors who submitted these samples were guilty of misconduct. The investigation was closed with no finding of misconduct, apparently based on the finding that AWCs can result from the two parts of a cassette being snapped together. *Id.* at 1462

## 5. Judge's Conclusions

Based on these findings, the judge concluded that (1) the Secretary failed to carry his burden of proving by a preponderance of the evidence that an AWC on a cited filter establishes that the mine operator intentionally altered the weight of the filter, and (2) the Secretary failed to carry his burden of proving by a preponderance of the evidence that deliberate conduct on the part of the cited mine operators is the only reasonable explanation for the cited AWCs. 15 FMSHRC at 1521. The judge emphasized that filter variables (filter-to-foil distance and floppiness), pliability of the hose, and dust variables (type of coal, humidity, weight of dust on the filter, size and shape of dust particles, and quantity of rock or diesel dust) affect susceptibility to AWC formation and that Miller's statistical analysis failed to adequately account for these variables. *Id.* at 1521-22. The judge concluded that Miller's analysis also failed to establish that the cited AWCs were not the result of accidental occurrences or manufacturing variables. *Id.* Noting that the expert testimony as to causes of AWCs was conflicting, the judge, in summary, concluded that the record showed too many other potential causes to accept the Secretary's circumstantial evidence as sufficient to carry his burden of proof that the mine operators intentionally altered the weight [of] the cited filters. *Id.*

The judge ordered a mine specific hearing to address the 75 AWC citations issued to Keystone's Urling mine. *Id.* at 1522. He set forth the main issue as whether the weight of the filters cited as AWCs from . . . Urling . . . was intentionally altered by the mine operator and stated that the burden of proof remained with the Secretary. *Id.* The judge stayed all other Dust Cases. *Id.* at 1523.

### D. Factual and Procedural History in Keystone

The Urling mine, in Indiana County, Pennsylvania, is operated by Keystone, a wholly owned subsidiary of Rochester and Pittsburgh Coal Company (R&P). The dust sampling program for all 13 R&P mines, including Urling, was conducted by R&P's Environmental Safety Department (ESD), also in Indiana, Pennsylvania. 16 FMSHRC at 858-59; Stipulations by Secretary and Keystone, No. 14, filed November 30, 1993 (Stip.). From 1970 until his retirement in 1991, Donald Eget, who was trained as an engineer, was the supervisor of ESD. 16 FMSHRC at 861; K. Tr. 2231-33. During 1989 and 1990, Shawn Houck worked with Eget in the ESD laboratory as a maintenance and calibration technician. 16 FMSHRC at 861-62. Douglas Snyder was the dust technician responsible for Urling sampling; three other dust technicians handled sampling for R&P's other mines. *Id.* at 862.

Pursuant to normal operating procedures at ESD during 1989 to 1991, the dust technicians picked up pumps and sampling assemblies in the morning and delivered them to R&P's mines for use on that day's three shifts. *Id.* Each morning, Eget drove to all 13 R&P mines to retrieve pumps and samples from the previous afternoon and midnight shifts. *Id.* The dust technicians returned to the ESD after 4:00 p.m., delivering pumps used during the day shift. *Id.* at 863.

While Eget collected pumps, Houck processed those from the previous day shift. *Id.* at 862. Houck removed the sampling head<sup>15</sup> and the hose from each pump, filled out the dust data cards, cleaned the sampling units, calibrated the pumps, reassembled the units, and inserted a new filter cassette in each one for use the next day. *Id.* at 862-63; K. Tr. 2103-04. When Eget returned to the laboratory, Houck took the cassettes into Eget's office. 16 FMSHRC at 862. Eget inspected the used cassettes, recorded their identification numbers, checked the dust data cards against the cassette numbers, and looked into the cassette inlets and recorded the filter appearances in a logbook he kept for each mine. *Id.* at 862-63, 889. The cassettes were then packaged for mailing to MSHA and taken to the R&P mailroom. *Id.* at 863; K. Tr. 2102-03, 2174.

Dust technician Snyder delivered pumps to Urling and distributed them to the miners or section foremen on the day and afternoon shifts. 16 FMSHRC at 864. He left pumps for the midnight shift. *Id.*

On April 4, 1991, the Secretary issued 53 citations to Urling, and on June 7, 1991, issued 22 additional citations, alleging violations of section 70.209(b). *Id.* at 858. Three filters forwarded to Thaxton were determined to be no-calls. *Id.* at 868, 870.

#### E. Keystone Trial

The trial in *Keystone* commenced on November 30, 1993, and concluded on January 6, 1994. 16 FMSHRC at 859. Robert Thaxton testified with respect to the appearance of the 75 cited and three no-call filters. Mr. Thaxton was of the opinion that the dust dislodgment patterns of the cited filters resulted from deliberate acts, in most cases from air blown through the filter cassette in a reverse direction. *Id.* at 868-72; K. Tr. 864-66, 911-15; *see* K. Gov't Ex. 505. Dr. Marple, the Secretary's scientific witness, also examined and classified the 78 filters. 16 FMSHRC at 872-74. Marple concluded that 71 or 72 resulted from reverse air flow, two or three resulted from a vacuum source introduced into the cassette inlet, and one resulted from water introduced into the filter (Marple was originally unable to ascribe a cause to that filter's appearance). *Id.* at 873, 898-99. Marple further concluded that none of the dislodgment patterns on the Urling filters resulted from impacts to the cassettes. *Id.* at 873-74, 899.

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<sup>15</sup> The sampling head includes the cyclone unit and filter cassette. Tr. 91-94.

Dr. Miller, the Secretary's statistical expert, testified that, before March 26, 1990, the date that MSHA alleges Urling learned of the void code, Urling had a much higher citation rate than other mines.<sup>16</sup> *Id.* at 878-79. He testified that Urling had a citation rate of 42.77% (74 cited samples out of 173) in the period August 1989 through March 26, 1990. After March 26, the rate fell to 0.18% (one cited out of 552). In contrast, other mines had an average citation rate of 5.96% for the earlier period. *Id.* at 878. Miller also testified that the date of cassette manufacture failed to explain the differences in citation rates between Urling and other mines because Urling's citation rate was eight times higher than that of other mines using cassettes manufactured on the same dates. *Id.* at 879.

Dr. Lee, Keystone's scientific expert, concluded that most of the cited filters showed comparatively slight dust dislodgments from the central area, slightly larger diameters, no cones, and only a slight indication of dimpling, all of which indicated lesser forces than would have occurred with deliberate reverse air flow. *Id.* at 876, 899. Lee testified that the appearance and dimensions of the dislodgment patterns on the Urling filters were consistent with a mixed mechanical pulse/reverse air pulse mode of occurrence (Mixed-mode theory). *Id.* at 876-77.<sup>17</sup> He also testified that humidity in the mine atmosphere reduced the susceptibility to dislodgment of dust on filters and that the introduction of water sprays and scrubbers at Urling beginning in 1989 and 1990 contributed to the decline in AWCs. K. Tr. 3891-97, 4042-44, 4087-89; *see also* 16 FMSHRC at 877; K. Ex. 2001, at 14.

Dr. Roth, the operators' statistical expert, testified that he examined the citation rates of Urling and all R&P mines on a bimonthly basis and that the data showed a strong trend of declining rates over the entire period from August 1989 to March 1992. 16 FMSHRC at 880. Roth also testified that manufacturing variables may have been a factor in AWC formation because the rate of cited AWCs was greater for cassettes manufactured on earlier dates compared to later dates. *Id.* He concluded that R&P's high incidence rates may be attributable to cassettes manufactured on four consecutive dates, May 26, May 31, June 1, and June 2, 1989. *Id.* The AWC citation rate of R&P mines, including Urling, for cassettes manufactured on those dates was 49.6% compared to 5.8% for other dates. *Id.*

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<sup>16</sup> Data from other mines consisted of data for all dust samples processed by MSHA from August 8, 1989, through March 31, 1992, except data from R&P mines, mines whose operators pled guilty to tampering, and mines whose cassettes may not have been examined for AWCs. 16 FMSHRC at 878.

<sup>17</sup> Under Lee's mixed-mode theory, two impacts may occur almost simultaneously: an impact to the cyclone that results in a mechanical pulse to the cassette and an impact to the hose that results in a reverse air pulse to the cassette. According to this theory, the mechanical pulse tends to dislodge dust on the filter outside of the 6 mm ring, while the reverse air pulse tends to dislodge dust inside the ring. *See* 16 FMSHRC at 876-77.

ESD personnel testified as to their involvement in the respirable dust sampling program at Urling. *Id.* at 888-93.<sup>18</sup> Eget, Houck, and Snyder denied tampering with the dust cassettes or observing anyone else tamper with the cassettes. *Id.* at 890-91.

#### F. Keystone Decision

The parties filed post-hearing briefs in March 1994 and the judge issued his decision on April 20, 1994. His findings and conclusions are as follows:

##### 1. Burden of Proof

The judge held that the Secretary bore the burden of proving **A** by a preponderance of the evidence that the 75 cited Urling filters resulted from intentional tampering. @ 16 FMSHRC at 895. The judge noted that Keystone **A** did not have the burden of establishing that the appearances on the samples resulted from some other cause. @ *Id.* at 896. The judge reasoned that the Secretary, as the party bearing the burden, must convince the trier of fact **A** that the existence of a fact is more probable than its nonexistence . . . @ *Id.* at 895, quoting *Concrete Pipe and Products of Cal., Inc. v. Construction Laborers Pension Trust for S. Cal.*, 508 U.S. \_\_\_\_, 113 S. Ct. \_\_\_\_, 124 L. Ed. 2d 539, 563 (1993). He explained that **A** [t]o preponderate, the evidence must be sufficient to convince the trier of fact that the proposition asserted is more likely true than not true. @ 16 FMSHRC at 895-96 (citations omitted). The judge also noted that **A** [a]ll of the evidence must be given appropriate weight, whether it be direct or circumstantial @ and that **A** [c]ircumstantial evidence may prove an ultimate fact. @ *Id.* at 896.

##### 2. Possible Causes of Urling AWCs

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<sup>18</sup> Thirty-three current and former Keystone and R&P employees, including miners, section foremen, technicians, managers, and safety department personnel, testified at the trial. All employees who worked at the ESD laboratory during 1989 and 1990 testified. 16 FMSHRC at 888.

Preliminarily, the judge reviewed the evidence pertaining to the handling of dust pumps and cassettes at the Urling mine and ESD laboratory. He found that dust dislodgment patterns on the cited filters could have resulted in whole or in part from the handling of the sampling equipment by Urling miners or ESD personnel. 16 FMSHRC at 864, 868. The judge found that AWCs could have resulted wholly or partly from incidental and accidental events occurring in the mine, such as pumps falling to the mine floor and hoses being pinched by mantrips, snagged on other objects, or wrapped around pumps, and from other contacts to hoses.<sup>19</sup> *Id.* at 868. The judge also found that AWCs could have resulted wholly or partly from incidental and accidental events occurring in the ESD laboratory or during transportation of the pumps, including multiple pumps being carried by their hoses and boxes containing pumps being dropped to the floor of a vehicle or onto a table. *Id.* at 861-64.

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<sup>19</sup> Some miners attached the pumps to their clothing during sampling, while others attached them to the continuous miners. 16 FMSHRC at 866. Urling used two types of continuous miners, Lee-Norse and Joy. *Id.* The judge found that the dust dislodgment patterns could have been caused or contributed to by attachment of the sampling head to the Lee-Norse miners, which vibrated while cutting coal. *Id.* at 882. However, he concluded that changes in the dust deposition patterns on Urling filters after the void code date were not due to changes in handling by section foremen or miner operators or helpers, although he noted that some Urling foremen kept a closer eye on dust pumps after learning of the MSHA investigation. *Id.* at 882, 898.

The judge made findings regarding factors that could have contributed to the decline of AWCs at Urling. *Id.* at 882-87. He found that changes in handling practices of ESD personnel during the spring of 1990 could have been a factor in the reduced incidence of AWCs. *Id.* at 884. He found that Eget, whose handling of the sampling equipment was rougher than that of the others, did not handle samples from April 9 to May 10, 1990, and that Snyder and the other technicians exercised more care in their handling of the equipment, avoiding impacts to the hoses because of MSHA's investigation. *Id.* The judge concluded that, because dust deposits were damper and less susceptible to dislodgment when scrubbers were in use, the installation of scrubber systems on the continuous miners at Urling beginning in 1989 could have been a factor in the decline of AWCs. *Id.* at 882-83. With respect to sampling equipment, the judge found that the Urling cassettes more probably than not had shorter filter-to-foil distances and this could have been a factor in the decline of AWCs. *Id.* at 885-86.<sup>20</sup>

On the basis of his Common Issues Decision, the judge determined that the dislodgment patterns on the Urling filters could also have resulted from intentional tampering. *Id.* at 898. The judge concluded that, if tampering occurred, it must have occurred at the ESD laboratory. *Id.* In resolving whether the AWCs resulted from intentional acts at ESD, the judge analyzed the scientific and statistical evidence and evaluated the testimony and credibility of ESD employees. *Id.*

### 3. Scientific Evidence

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<sup>20</sup> The judge determined that a number of other factors, such as changes in MSHA's AWC selection criteria and other mine conditions at Urling, including height of the coal seam, roof stability, presence of a layer of rock in the coal seam, and changes in mantrips did not explain the decline in Urling's AWC rate. 16 FMSHRC at 882-87. The judge was unable to determine whether the section in the mine from which dust samples were taken affected the decline of AWCs. *Id.* at 883. Although he found in the Common Issues Decision that pliability of dust pump hoses may be related to AWC formation, the judge was unable to conclude whether this was a factor in the decline in AWCs at Urling. *Id.* at 886. He also noted that equipment changes at ESD were of questionable significance. *Id.* at 884.



Based on Mr. Thaxton's testimony, the judge concluded that the appearances of the cited filters did not result from *normal* sampling. 16 FMSHRC at 897 (emphasis added). The judge was not persuaded, however, by Thaxton's reports and testimony asserting that the Urling AWCs had been caused by intentional tampering. *Id.* The judge discounted Thaxton's analysis as to causation because Thaxton's conclusions were to a considerable extent subjective. *Id.* His tests were not conducted according to a written protocol based on systematic testing that related specific dislodgment patterns to types of tampering. *Id.* Additionally, the judge found that the distinction Thaxton made between cited and no-call filters was difficult to discern and tenuous at best. *Id.* at 870-71, 897.

The judge concluded, on the basis of the testimony of Dr. Marple and Dr. Lee, that 73 of the cited Urling filters resulted in whole or in part from reverse air flow through the filter. *Id.* at 898-900. The judge credited Lee's testimony that those filters showed comparatively slight dislodgments from the central area, had no cones at the time the citations were issued, and had slightly larger areas of dust dislodgment. *Id.* at 899. On that basis, he reasoned that the forces responsible for the Urling AWCs were relatively slight and concluded that the reverse air forces involved in the creation of those filters were generally less than the force associated with deliberate blowing through the filter cassette. *Id.* at 899-900. The judge also concluded that the dust dislodgment patterns of the Urling filters may have been influenced by accidental and incidental events involving impacts to the cassette and sampling assembly, as set forth in Dr. Lee's mixed-mode theory. *Id.* at 900; *see id.* at 876-77.

As to the other two cited filters, the water stain filter No. 324842 and filter No. 325300, the judge held that the Secretary's evidence was inconsistent and unconvincing and failed to establish deliberate tampering. *Id.* at 900.

#### 4. Statistical Evidence

The judge noted that the statistical experts, Dr. Miller and Dr. Roth, reached different conclusions using the same data. 16 FMSHRC at 900. The judge agreed with Miller that there was a sharp decline in Urling's citation rate on or about March 26, 1990, the date used by Miller in his analysis. *Id.* He concluded, however, that March 26, 1990, was not a logical cutoff date for examining changes in behavior at Urling because the evidence showed that ESD personnel and Keystone management had become aware much earlier, in February 1990, of MSHA's investigation of AWCs. *Id.* He also found that there was an overall decline in Urling's citation rate from September 1989 to April 1990. *Id.* The judge agreed with Miller that dates of manufacture of the cassettes do not seem overall to explain all the differences in the AWC rate. *Id.* at 900. On the other hand, he agreed with Roth that manufacturing anomalies may have affected AWC formation because, as Roth showed, 60% of the cited Urling cassettes were manufactured on four consecutive work days in May and June 1989. *Id.* at 900-01.

The judge was unable to conclude on the basis of the statistical evidence that the reduction in the rate of cited filters at Urling was related to MSHA's investigation. *Id.* at 901.

## 5. Testimony of ESD Personnel

Preliminarily, the judge recognized that a large number of mine operators and their agents had pled guilty to criminal charges of tampering. 16 FMSHRC at 901. The judge summarized the testimony of employees of the ESD laboratory during 1989 and 1990, all of whom were witnesses. *Id.* at 888-893. He determined that only Eget and Houck had any substantial opportunity to tamper with the samples. *Id.* at 901. The judge was impressed by the backgrounds of Eget and Houck and by their forthrightness on the witness stand. *Id.* at 902. He credited their statements that they had not tampered with the dust samples submitted to MSHA. *Id.* at 902-03. The judge found the Secretary's proffered motives for tampering by Eget and Houck (to avoid penalties and resampling and the enormous cost of non-compliance) to be very weak. Neither employee paid the R&P penalties, resampling would not have been a substantial burden on ESD, and neither was involved in coal production or reported to a production supervisor. *Id.* at 902. He noted that they knew that tampering was illegal and that Eget, at least, was aware that criminal sanctions could result from tampering. *Id.* For the same reasons, he also accepted as true the statements of the other dust technicians that they did not tamper with the dust cassettes and further noted that they had little opportunity to tamper. *Id.* at 901, 903.

Overall, the judge credited the testimony of ESD personnel, expressly taking into consideration the evidence concerning handling of dust samples at the mine and the testimony of Thaxton, the scientists, and the statisticians. *Id.* at 903. He considered credibility determinations with respect to ESD personnel to be of primary importance in his decision. *Id.*

## 6. Judge's Conclusions

Based on the records in the Common Issues and *Keystone* trials, the judge concluded that the Secretary failed to carry his burden of proving by a preponderance of the evidence that the weight of the 75 cited Urling filters was intentionally altered by Keystone. @ 16 FMSHRC at 903. Accordingly, he vacated the Urling citations, denied the Secretary's petitions for civil penalties, and dismissed the proceedings. *Id.* The judge stayed all other Dust Cases until further order of the Commission. *Id.*

### II.

#### Disposition

##### A. Introduction

In his PDR, the Secretary sets forth 14 points of error. He asserts that, in the Common Issues trial, the judge imposed an improper burden of proof, which he also applied in *Keystone*. In addition, he contends that the judge made incorrect scientific, statistical, and credibility

determinations as well as erroneous procedural rulings. The Secretary places the following issues in contention and numbers them in the PDR as follows:

1. The judge misstated and misapplied the burden of proof in both proceedings. His use of the wrong burden in the Common Issues Decision fatally tainted his analysis in *Keystone*. PDR at 10-12 (addressed in section B., slip op. at 17).
2. The judge erred in failing to credit the opinions of Mr. Thaxton and Dr. Marple that AWCs were more consistent with deliberate application of reverse air flow through filters than with accidental events. PDR at 12 (addressed in section C. 2., slip op. at 26).
3. The judge erred in crediting Dr. Lee's opinion that AWCs were more consistent with accidental impact forces than with tampering. PDR at 12-14 (addressed in section C. 3., slip op. at 29).
4. The judge erred in admitting the testimony of Dr. Corn because his testimony was improperly withheld from the Secretary during discovery. PDR at 14 (addressed in section C. 4., slip op. at 34).
5. The judge erred in relying upon the conclusions of Dr. Corn as to accidental causation of AWCs because they lacked scientific foundation. PDR at 14 (addressed in section C. 4., slip op. at 34).
6. The judge erred in *Keystone* in failing to give weight to evidence regarding the optional quartz sampling program. PDR at 14 (addressed in section F. 2., slip op. at 59).
7. The judge erred in failing to appreciate that the statistical evidence supported intentional tampering as the likely cause of AWC formation. PDR at 15-16 (addressed in section D., slip op. at 47).
8. The judge erred in his analysis of the statistical evidence in *Keystone* in focusing on bimonthly sampling periods instead of on March 26, 1990, as the pertinent date for evaluating the rates of AWCs. PDR at 16 (addressed in section D. 2. b., slip op. at 55).
9. The judge erred in finding that Afilter-to-foil@distance and other manufacturing variables affected the likelihood of AWC formation. PDR at 16 (addressed in section C. 5., slip op. at 37).
10. The judge erred in *Keystone* in admitting the testimony of Dr. Lee regarding water sprays and scrubber systems because it was improperly withheld from the Secretary during discovery. PDR at 17 (addressed in section C. 6., slip op. at 44).

11. The judge erred in *Keystone* in crediting the opinion of Dr. Lee over that of Dr. Marple concerning the effects of water sprays and scrubber systems. PDR at 17 (addressed in section C. 6., slip op. at 44).

12. The judge erred in concluding in *Keystone* that handling changes by the ESD personnel explained a decline in AWCs on or about March 26, 1990. PDR at 18 (addressed in section F. 1., slip op. at 58).

13. The judge erred in *Keystone* in his analysis of the credibility of the ESD witnesses. PDR at 18-20 (addressed in section F. 3., slip op. at 60).

14. The judge erred in excluding evidence of criminal tampering with dust samples by other individuals and entities. PDR at 20-21 (addressed in section E., slip op. at 55).

## B. Burden of Proof<sup>21</sup>

### 1. Judge's Conclusions

The judge, in the Common Issues Decision, set forth his conclusion that the Secretary had failed to carry his burden of proving, by a preponderance of the evidence, that an AWC established that the operator had intentionally altered the weight of the filter or that deliberate conduct on the part of the cited mine operators is the only reasonable explanation for the cited AWCs. 15 FMSHRC at 1521.

In the *Keystone* Decision, the judge, noting that the burden of proof was the same as in the Common Issues Decision, set forth his conclusion that the Secretary had the burden of proving, by a preponderance of the evidence, that the Urling filters resulted from intentional tampering. 16 FMSHRC at 895.

### 2. Parties' Contentions

The Secretary contends that the judge imposed an improper burden of proof in both proceedings. PDR at 10-12. He argues that the judge erred in the Common Issues Decision in requiring him to prove that deliberate conduct on the part of the cited mine operators is the *only* reasonable explanation for the cited AWCs. 15 FMSHRC at 1521 (emphasis added); PDR at 7. The Secretary asserts that this is a burden of proof greater than the preponderance of evidence standard and that the judge required the Secretary to prove that there was no contradictory evidence or explanation regarding the basic propositions the Secretary sought to establish. S. Br. at 30-35.<sup>22</sup> The Secretary asserts that, by using the *only* reasonable cause formulation, the judge

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<sup>21</sup> This section addresses Issue No. 1 in the PDR.

<sup>22</sup> AS. Br. refers to the Secretary's Brief, filed September 26, 1994. AS. Reply Br. refers to the Secretary's Reply Brief, filed December 23, 1994. AK. Br. refers to *Keystone's* Brief, filed

imposed a burden of proof that was greater than the burden in criminal cases. *Id.* at 31-32; Oral Arg. Tr. 208-09. The Secretary argues that, under the preponderance standard, he should have been required to show only that the propositions sought to be established were more likely true than not. S. Br. at 32; S. Reply Br. at 2-3.

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November 14, 1994. AI. Br. refers to Respondent Intervenors' Brief, filed November 23, 1994. AS. P.H. Br. (C.I.) refers to the Secretary's Posthearing Brief, filed April 30, 1993, after the Common Issues trial.

Keystone and the Intervenor respond that the judge explicitly adopted the preponderance standard in his decisions and properly applied that standard. They argue that the Secretary has confused the burden of proof with the *issue* to be decided in the Common Issues trial, i.e., whether AWCs could only have resulted from deliberate acts. They assert that the judge properly found that the evidence did not support a finding that intentional tampering was the only reasonable explanation. K. Br. at 12-19; I. Br. at 20-25.

### 3. Development of the Common Issue

On July 1, 1992, a group of operators moved for consolidation of all Dust Cases for purposes of a separate trial on the issue of causation of AWCs. They asserted that the basic issue common to all the citations was whether the existence of an AWC dispositively prove[d] that an operator intentionally altered the weight of a respirable dust sample. Contestants' Mot. for Cons. and Separate Trial at 2. The Secretary opposed the consolidation as well as the operators' statement of the issue. S. Statement in Opposition to Contestants' Mot. for Cons. filed July 15, 1992 (AS. Opposition), at 1-2.

At a pretrial conference on July 17, 1992, the Secretary's counsel requested a bellwether trial involving a large company with a number of citations. Tr. 6, 11-12 (Pretrial Conf. July 17, 1992). The Secretary contended that it was imperative to resolve the standard of proof and how the issue is to be framed within that standard of proof. *Id.* at 33. The Secretary argued that the major issue in the proceedings was whether the weight of a cited filter had been altered while in the custody or control of the operator and maintained that the issue of whether a deliberate or accidental act caused the alteration was relevant only to the penalty. *Id.* at 27-28. The operators responded that, in order to establish a violation under the cited regulatory provisions, the Secretary had to establish a deliberate act by the operator. *Id.* at 40.

The Secretary subsequently withdrew his opposition to a common issues trial. S. Statement of the Issues and Trial Proposal filed Aug. 7, 1992 (AS. Statement) at 1. The Secretary urged that, in order to be useful, the common issues trial must include all operators and be binding on all parties. *Id.* at 13. As before, the Secretary argued that, to prove a violation, he was not required to prove that intentional tampering occurred but only that a weight alteration occurred while the filter was within the operator's control.<sup>23</sup> *Id.* at 3-10. The operators again

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<sup>23</sup> The Secretary asserted that three issues should be determined: (1) whether it was established, by a preponderance of the evidence, that the weight of the cited filters was altered; (2) whether it was established, by a preponderance of the evidence, that the weight alteration occurred while the samples were in the control of the operator; and (3) whether the proposed

asserted that the issue to be determined was whether an AWC proved that an operator intentionally altered the weight of a respirable dust filter. Contestants' Br. in Resp. to Judge's Prehearing Conf. filed Aug. 7, 1992, at 28.

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penalty was appropriate in light of the level of negligence exhibited. S. Statement at 2.

In the August 1992 Order, the judge noted the sharp disagreement that had emerged recently between the parties as to the basic issue presented for resolution. 14 FMSHRC at 1511. He also stated that "whatever [the Secretary's] position on what is necessary to prove a violation of the standard in the abstract, [he] has clearly taken the position . . . that the violations resulted from deliberate acts."<sup>24</sup> *Id.* at 1513. Rejecting the Secretary's assertion that he should not be

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<sup>24</sup> As support for this statement, the judge referenced the citations, in which the Secretary uniformly alleged the operators' negligence level as "reckless disregard," and his proposed penalties, which ranged from \$1,000 to \$1,800 for violations of sections 70.209(b) and 71.209(b) and \$10,000 for each violation of section 90.209(b). 14 FMSHRC at 1512. (In his closing arguments in *Keystone*, the Secretary argued for a fine of \$5,000 for each violation of section 70.209 (b). K. Tr. 4321.) The judge also noted that, in his Response to the First Set of Interrogatories, dated January 10, 1992, propounded by Utah Power and Light Co. ("Resp. to Interrog."), the Secretary responded affirmatively to the question: "State whether it is the Secretary's contention that the alleged AWC on the cited sample could not occur in any manner other than by the intentional act of an individual." 14 FMSHRC at 1513, *citing* Resp. to Interrog. No. 17(h) at 12. In addition, the judge relied on Thaxton's deposition testimony:

- Q. Okay. So that you believe that the phenomenon described in those citations resulted from deliberate dust removal; correct?
- A. It resulted from a deliberate act, yes.



required to prove intentional conduct, the judge found that, by the plain meaning of section 209(b), a violation was established by proving that an operator *intentionally* altered the dust on a filter. *Id.* at 1513-16. He held that, As a matter of law the accidental, unintentional altering (changing, reducing) the weight of a filter cassette while the cassette is in the custody of the mine operator is not a violation . . . @ *Id.* at 1515-16. Citing the burden of trying each case separately, the judge consolidated the Dust Cases for the purpose of trying the issue common to all. *Id.* at 1511. The judge delineated the issue to be determined as A[w]hether an abnormal white center (AWC) on a cited filter cassette establishes that the operator intentionally altered the weight of the filter,@and further specified that Athe Secretary has the burden of establishing [his] case by the preponderance of the evidence.@ *Id.* at 1517.

On August 24, 1992, the Secretary filed a Motion for Reconsideration and Clarification of the August 1992 Order (AS. Mot. for Recons.®), in which he challenged the judge=s interpretation of the Secretary=s regulations to require proof of intentional conduct. S. Mot. for Recons. at 2-3, 6.

In a September 8, 1992, order (ASeptember 1992 Order®), the judge denied the motion for reconsideration and repeated his conclusion that Athe accidental, unintentional altering (changing, reducing) the weight of a filter cassette while the cassette is in the custody of the mine operator is not a violation . . . .@ 14 FMSHRC 1675, 1676 (September 1992) (ALJ). The judge stated:

The purpose of the common issues trial is to receive evidence concerning this allegation [so] that I may determine whether or not the AWCs on the cited filters *can only have resulted* from such deliberate acts. (emphasis added).

*Id.* at 1677. At the outset of the Common Issues trial, the judge again stated that, to prevail, the Secretary must prove, by a preponderance of the evidence, that an AWC establishes that the mine operator intentionally altered the weight of the filter. Tr. 7.

The Secretary did not appeal, either in a petition for interlocutory review (29 C.F.R. ' 2700.76) or in his PDR giving rise to this proceeding, the judge=s ruling that, in order to prove a violation, the Secretary was required to prove deliberate acts. Section 113(d)(2)(A)(iii) provides: AIf [petitions for review are] granted, review shall be limited to the questions raised by the petition.@ 30 U.S.C. ' 823(d)(2)(A)(iii). Consequently, that determination is not in issue in this proceeding.

#### 4. Judge=s Formulation and Application of the Burden of Proof

##### a. Applicable Legal Principles

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14 FMSHRC at 1513-14, *quoting* Thaxton Deposition (July 25, 1991) at 310-12.

The Mine Act imposes on the Secretary the burden of proving each alleged violation by a preponderance of the credible evidence. *Garden Creek Pocahontas Co.*, 11 FMSHRC 2148, 2152 (November 1989). The preponderance standard, in general, means proof that something is more likely so than not so. See 3 Edward J. Devitt et al., *Federal Jury Practice and Instructions* ' 72.01 (1987); 2 Kenneth S. Brown et al., *McCormick On Evidence* ' 339, at 439 (4th ed. 1992); *Hopkins v. Price Waterhouse*, 737 F. Supp. 1202, 1206 (D.D.C. 1990). The Supreme Court, in *Concrete Pipe*, 124 L. Ed. 2d at 563, relied on by the judge, 16 FMSHRC at 895, explained that A[t]he burden of showing something by a preponderance of the evidence,= the most common standard in the civil law, simply requires the trier of fact to believe that the existence of a fact is more probable than its nonexistence before [he] may find in favor of the party who has the burden to persuade the [judge] of the fact's existence. See also 2 *McCormick* ' 339, at 439 n.12, citing Model Code of Evidence, Rules 1(3) & (5).

b. Burden of Proof in Common Issues Decision

The Common Issues Decision fully supports the judge's application of the proper burden of proof. We find that, in his rulings prior to and during the trial as well as in his decision, the judge appropriately articulated the appropriate burden. Based on our review of the record, we

conclude that the judge also properly applied the burden. Further, the judge's use of the phrase "only reasonable explanation" addressed the Secretary's argument, not the burden of proof.

In the September 1992 Order, the judge ordered the Common Issues trial to receive evidence on which to base a determination of whether AWCs can only have resulted from deliberate conduct. 14 FMSHRC at 1677. At the commencement of the trial, the judge stated that, in order to prevail, the Secretary must prove by a preponderance of the evidence that dust cassettes with AWCs were caused by mine operators intentionally altering their weight. Tr. 7. The Secretary, in his Posthearing Brief and Proposed Findings of Fact, argued that he had established that the "only reasonable explanation" for the AWCs was intentional tampering. S.P.H. Br. (C.I.) at 1-2, 224.

In his decision, the judge reiterated that the "Secretary has the burden of proof" and that this burden requires that the Secretary prove by a preponderance of the evidence that (1) the term "AWC" has a coherent meaning and was consistently applied; (2) the cited AWCs can only have resulted from intentional acts; and (3) the AWCs resulted in weight losses in the cited filters. 15 FMSHRC at 1463-64. The judge addressed both the issue and the Secretary's "only reasonable explanation" language in his decision:

1. The Secretary . . . failed to carry his burden of proving by a preponderance of the evidence that an AWC on a cited filter establish[ed] that the mine operator intentionally altered the weight of the filter.
2. The Secretary . . . failed to carry his burden of proving by a preponderance of the evidence that deliberate conduct on the part of the cited mine operators [was] the only reasonable explanation for the cited AWCs.

*Id.* at 1521. The two-part holding reveals that, first, the judge addressed the issue being tried in the Common Issues trial, i.e., whether the existence of an AWC established deliberate conduct, and generally concluded that the Secretary had not shown that it was more likely than not that an AWC established that a mine operator intentionally tampered with the filter. Second, the judge addressed the Secretary's argument that he had proven deliberate conduct was the only reasonable explanation for AWCs and found that the Secretary had failed to prove such assertion by a preponderance of the evidence. The Secretary now argues that we should reverse the judge for addressing the issue being tried and for responding to the Secretary's argument as set forth in his posthearing brief.

In arguing that the judge's reference to the "only reasonable explanation" for AWCs was reversible error, the Secretary has confused the burden of proof articulated by the judge with his statement of the central issue to be determined in the Common Issues trial. The issue, as set forth in the September 1992 Order, was whether the presence of an AWC, by itself, indicated that tampering had occurred. 14 FMSHRC at 1677. As the judge explained: "[t]he basic issue to be determined in the common issues trial is whether an AWC on a cited filter establishes *per se* that

the mine operator intentionally altered the weight of the filter.@ 15 FMSHRC at 1464 (emphasis added). We believe the judge appropriately exercised his discretion in setting forth that issue for determination in the Common Issues trial. Had *per se* violations been established, mine specific trials could have been avoided, except as to issues other than the violation, e.g., negligence and penalty. The determination sought by the Secretary in this review proceeding (that he had shown by a preponderance of the evidence that it was more likely than not AWCs were the result of deliberate conduct) would not have obviated the need for mine specific trials on the issue of whether each particular operator had intentionally altered the weight of a filter and, thus, violated section 209(b).<sup>25</sup> When he determined the issue to be decided in the Common Issues trial, in the August 1992 Order, the judge was endeavoring to avoid such protracted litigation. *See* 14 FMSHRC at 1511.

Contrary to the Secretary's assertion, S. Br. at 31-33, the judge did not require that the Secretary eliminate all other causes of AWCs. Application of the preponderance standard necessarily required an examination of the evidence as to other possible causes of AWCs. The judge weighed the evidence and concluded that the Secretary simply had not shown that it was more likely than not that an AWC established that a mine operator had engaged in tampering. He stated: "Weighing the conflicting opinions and considering all the evidence of record, especially the systematic studies of the experts, I conclude that the evidence does not establish that the AWCs resulted from deliberate mishandling.@ 15 FMSHRC at 1521."<sup>26</sup> The judge found that the

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<sup>25</sup> In his Motion for Reconsideration of the August 1992 Order, the Secretary acknowledged as much. He noted that a decision in the Common Issues trial establishing only a presumption that AWCs are more likely than not the result of deliberate conduct would do little to advance the litigation. S. Mot. for Recons. at 12.

<sup>26</sup> The Secretary complains that the judge erred by failing to assign probability factors to the possible causes of AWCs. *See* Oral Arg. Tr. 43-44, 48-49. It was not necessary for the judge to determine the level of probability for each possible cause. Rather, the Secretary had responsibility for proving that AWCs resulted from intentional tampering; the judge had only to decide whether the Secretary succeeded in proving that by a preponderance of the evidence. The judge determined the Secretary had not.

Secretary failed to carry his burden of proof, which he correctly characterized as the preponderance of the evidence standard, because too many other potential causes for the dust dislodgment patterns on the cited AWCs existed. *Id.* at 1521-22. The judge thus determined that the Secretary's evidence did not have such convincing force that what he was required to prove (that AWCs were the result of deliberate tampering) was more likely true than not true. See, e.g., *Merzon v. County of Suffolk*, 767 F. Supp. 432, 444-45 (E.D.N.Y. 1991); *St. Paul Fire & Marine Ins. Co. v. United States*, 6 F.3d 763,769 (Fed. Cir. 1993); 16 FMSHRC at 896.

The Secretary also argues that, contrary to the judge's statement, his position early in the case was that intentional tampering was the most likely, but not necessarily the only, cause of AWCs. S. Reply Br. at 3 n.3; S. Letter to Comm'n dated April 4, 1995, at 2. Although the judge referenced the Secretary's earlier allegations of deliberate conduct as evidenced by the allegations set forth in the citations, the size of his penalty proposals, his responses to interrogatories, and Mr. Thaxton's deposition testimony,<sup>27</sup> the judge did not rely on those allegations in determining that deliberate conduct must be shown in order to prove a violation. Rather, he relied on the plain language of the regulation. 14 FMSHRC at 1513-16. Thus, irrespective of the Secretary's position on whether deliberate conduct need be proven, the judge concluded, based on the plain language of the regulation, that deliberate conduct was a necessary element in proving a violation of section 209(b). In view of that determination, the judge appropriately exercised his discretion in seeking to determine, by way of the Common Issues trial, whether the existence of an AWC, in itself, established deliberate conduct.

The Secretary did not appeal the judge's determination that deliberate conduct must be proven to establish a violation of section 209(b) and, consequently, that determination is not in issue in this proceeding. 30 U.S.C. ' 823(d)(2)(A)(iii). As noted, he did not seek interlocutory review, pursuant to the Commission's Procedural Rules (29 C.F.R. ' 2700.76), of the August 1992 Order or the September 1992 Order, which set forth the central issue and the burden of proof for the Common Issues trial.

c. Burden of Proof in *Keystone* Decision

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<sup>27</sup> We also note the Secretary's allegation of deliberate tampering set forth in the Special Assessment Findings issued to all respondents when the penalties were proposed for the contested violations. See 14 FMSHRC at 1512.

We disagree with the Secretary's assertion that the judge erred as to the burden of proof in the Common Issues trial and that this error fatally tainted his entire evaluation of the evidence in *Keystone*. S. Br. at 34. The judge used the phrase, "only reasonable explanation," in the *Keystone* Decision solely in recounting his holdings in the Common Issues Decision. 16 FMSHRC at 861.<sup>28</sup> The judge did not require the Secretary to prove that the cited AWCs could only have resulted from deliberate tampering. Rather, he expressly recognized that the Secretary bore the burden of proving by a preponderance of the evidence that *Keystone* tampered with the cited samples. *Id.* at 896. Relying on *Concrete Pipe*, the judge specifically discussed the meaning of that term:

The burden of proving by a preponderance of the evidence requires the party bearing the burden to convince the trier of fact that the existence of a fact is more probable than its nonexistence . . . .

*Id.* at 895, quoting 124 L. Ed. 2d at 563. As noted, he also correctly explained that, in order to preponderate, the evidence must be sufficient to convince a trier of fact that the proposition asserted is more likely true than not true and that, where the evidence is equally balanced, the plaintiff has failed to meet his burden. 16 FMSHRC at 895-96, citing *Hopkins*, 737 F. Supp. 1202; *Merzon*, 767 F. Supp. 432; *Smith v. United States*, 557 F. Supp. 42 (W.D. Ark. 1982), *aff'd*, 726 F. 2d 428 (8th Cir. 1984). Thus, in *Keystone*, the judge clearly indicated that he understood the preponderance standard and correctly construed that standard to mean nothing more than proof that a proposition is more probable than not. See 16 FMSHRC at 895-96.<sup>29</sup>

According to the Secretary, the judge's statement that the "same evidentiary burden" applied in both the *Keystone* and Common Issues trial implies that a standard of proof higher than preponderance was applied in *Keystone*. S. Br. at 34-35. In our opinion, the judge's language merely indicates that in both cases he applied the preponderance of the evidence standard in determining whether the Secretary had proven that the AWCs resulted from intentional

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<sup>28</sup> In *Keystone*, the judge stated:

On the basis of all the evidence introduced in the common issues trial, I concluded that the Secretary failed to carry his burden of proving by a preponderance of the evidence . . . that deliberate conduct on the part of the cited mine operators is the only reasonable explanation for the cited AWCs.

16 FMSHRC at 861.

<sup>29</sup> We note that the Secretary was in the same position at the commencement of the *Keystone* trial as he would have been had the judge not consolidated the Dust Cases and held the Common Issues trial. He was required to prove, by a preponderance of the evidence, that *Keystone*'s AWCs were caused by deliberate tampering.

tampering. Except where he repeated his conclusions from the Common Issues Decision, the judge did not incorporate into *Keystone* the language articulating the issue disposed of in the Common Issues Decision, i.e., whether an AWC establishes that an operator intentionally altered the weight of the filter. See 16 FMSHRC at 861; 15 FMSHRC at 1464, 1521. References by the judge in the Common Issues Decision to “only reasonable explanation” addressed the issue before him and the Secretary’s argument, and were not a departure from the preponderance of evidence standard. We conclude that the judge correctly applied the preponderance standard in *Keystone*.

In sum, we conclude that the judge correctly applied the preponderance of the evidence standard in both the Common Issues and *Keystone* Decisions.

### C. Scientific Issues

#### 1. Introduction

The judge considered the entire record before him in making factual findings and in reaching conclusions in his Common Issues Decision and in his *Keystone* Decision. 15 FMSHRC at 1456, 1521; 16 FMSHRC at 903. Many of his findings were drawn from the reports and testimony of credited experts. On review the Secretary raises a number of issues concerning the judge’s admission and crediting of the scientific evidence presented by the expert witnesses to explain the causes of AWCs. Specifically, the Secretary contends that the judge erred in failing to credit Mr. Thaxton’s and Dr. Marple’s opinions that the appearances of AWCs were consistent with blowing air into the filters; in crediting Dr. Lee’s opinion that AWCs were consistent with accidental impacts; in admitting and relying on Dr. Corn’s opinion that accidental events were the likely cause of AWCs; in analyzing evidence of filter manufacturing variables; and in admitting and crediting Dr. Lee’s testimony on the effect of water sprays and scrubber systems on the susceptibility of AWC formation. PDR Issues 2, 3, 4, 5, 9, 10, and 11.

In considering the issues raised by the Secretary’s petition, we are guided by principles established under Rule 702 of the Federal Rules of Evidence: “If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise.” Fed. R. Evid. ‘ 702. “Expert witnesses testify to offer their scientific opinions on technical matters to the trier of fact.” *Cyprus Tonopah Mining Corp.*, 15 FMSHRC 367, 372 (March 1993), quoting *Asarco, Inc.*, 14 FMSHRC 941, 949 (June 1992). “Unlike an ordinary witness, . . . an expert is permitted wide latitude to offer opinions, including those that are not based on first-hand knowledge or observation.” *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. \_\_\_, 113 S. Ct. 2786, 125 L. Ed. 2d 469, 482 (1993).

All the witnesses who testified in technical or scientific areas were accepted by the judge as experts in their respective fields. The qualification of experts and the admission of their testimony are matters within the discretion of the trial judge. *Coleman v. Parkline Corp.*, 844

F.2d 863, 866 (D.C. Cir. 1988); *Polk v. Ford Motor Co.*, 529 F.2d 259, 271 (8th Cir. 1976), *cert. denied*, 426 U.S. 907 (1976). In the absence of clear error, as a matter of law, the trial judge's decision [as to a witness's qualification to express an opinion] will not be reversed. *Payton v. Abbott Labs*, 780 F.2d 147, 155 (1st Cir. 1985), *quoting A. Belanger & Sons, Inc. v. United States*, 275 F.2d 372, 376 (1st Cir. 1960). Under an abuse of discretion standard, a trial court's decision [to admit expert witness testimony] will not be disturbed unless the appellate court has a definite and firm conviction that the lower court made a clear error of judgment or exceeded the bounds of permissible choice in the circumstances. *Post Office v. Portec, Inc.*, 913 F.2d 802, 807 (10th Cir. 1990), *quoting United States v. Ortiz*, 804 F.2d 1161, 1164 n.2 (10th Cir. 1986).

[T]he resolution of conflicting testimony, including that of expert witnesses, is for the trier of fact. *Jackson v. Hartford Accident and Indemnity Co.*, 422 F.2d 1272, 1275 (8th Cir. 1970) (citation omitted). If the opinions of expert witnesses in a proceeding conflict, the judge must determine which opinion to credit, based on such factors as the credentials of the expert and the scientific bases for the expert's opinion. *Cyprus Tonopah*, 15 FMSHRC at 372 (citation omitted). [A] trial judge must ensure that . . . scientific testimony or evidence admitted is not only relevant, but reliable. *Daubert*, 125 L. Ed. 2d at 480. Further, the bias of an expert witness is a proper matter for the judge to consider in determining the weight to be given the expert's opinion. *See United States v. Cutler*, 58 F.3d 825, 836 (2d Cir. 1995). [A]n ALJ has substantial latitude in choosing between conflicting expert testimony. *L & J Energy Co. v. Secretary of Labor*, 57 F.3d 1086, 1088 (D.C. Cir. 1995); *accord Cyprus Tonopah*, 15 FMSHRC at 373. The judge's decision to credit the opinion of one expert over the opinion of another expert is reviewable under an abuse of discretion standard. *Chapman v. United States*, 169 F.2d 641, 645 (9th Cir. 1948), *cert. denied*, 335 U.S. 860 (1948) (citations omitted); *see also Autoskill, Inc. v. National Educ. Support Sys.*, 994 F.2d 1476, 1493 (10th Cir. 1993); *An-Son Corp. v. Holland-America Ins. Co.*, 767 F.2d 700, 702-03 (10th Cir. 1985) (when evidence consisted primarily of a battle of experts, resolution was the appropriate province of the trial court and appellate court was loath to disturb a finding based on such a resolution). *Accord Cyprus Tonopah*, 15 FMSHRC at 373.

In reviewing a judge's factual determinations drawn from credited testimony, including expert testimony, the Commission is bound by the terms of the Mine Act to apply the substantial evidence test. *See* 30 U.S.C. ' 823(d)(2)(A)(ii)(I). The term substantial evidence means such relevant evidence as a reasonable mind might accept as adequate to support [the judge's] conclusion. *Rochester & Pittsburgh Coal Co.*, 11 FMSHRC 2159, 2163 (November 1989), *quoting Consolidated Edison Co. v. NLRB*, 305 U.S. 197, 229 (1938). [If an] ALJ provide[s] an explanation . . . for disregarding [other evidence], the expert testimony alone could have constituted substantial evidence in support of the conclusion. *L & J Energy*, 57 F.3d at 1088.

## 2. Judge's Rejection of Mr. Thaxton's Opinion on AWC Causation<sup>30</sup>

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<sup>30</sup> This section addresses Issue No. 2 in the PDR.



The judge concluded that Urling's AWCs did not result from normal sampling; something happened in the mine or thereafter to cause the abnormal appearances. 16 FMSHRC at 897. He found Thaxton's conclusions that the cause was intentional tampering to a considerable extent subjective. He noted that Thaxton's testing was unscientific and that his distinction between cited and no-call filters was tenuous at best. The judge was not able to conclude on the basis of Thaxton's reports and testimony that the abnormal appearances on the Urling filters were caused by intentional tampering. *Id.*

In his PDR, the Secretary asserts that the judge erred in failing to credit the findings of Mr. Thaxton and Dr. Marple<sup>31</sup> that the appearances of cited AWC filters at Urling were more consistent with appearances generated . . . by deliberately blowing reverse air . . . than by appearances generated by simulated accidental events. PDR at 12. In support, the Secretary argues that the judge's rejection of Thaxton's opinion as to the cause of AWCs was based, in critical part, on his no-call findings. *Id.*; S. Br. at 55. He takes issue with the judge's determination that Thaxton's reasons for citing no-call filters were tenuous at best and not an appropriate exercise of agency discretion. S. Br. at 55-56. The Secretary contends that the no-call designation was a reasonable way of handling a few questionable filters and that a decision not to cite those filters was a reasonable exercise of MSHA's discretion. *Id.* at 59. Keystone counters that the judge rejected Thaxton's testimony in large part because of his failure to provide a scientific basis for his conclusions and because of his bias. K. Br. at 64-69. According to Keystone, the judge's rejection of Thaxton's opinion was justified by the record. *Id.* at 64, 69, 112-18.

The judge did not err in declining to conclude, based on Thaxton's opinion, that intentional tampering caused AWCs. He found Thaxton's testing to be subjective and non-systematic, and not conducted with any scientific rigor. 16 FMSHRC at 897; 15 FMSHRC at 1473. The judge noted, in comparing Thaxton's background to the impressive credentials of Lee and Marple, that Thaxton is not a scientist . . . . 16 FMSHRC at 898. Thaxton did not use written criteria to distinguish normal filters from those he considered abnormal, Tr. 133, nor did he prepare a comprehensive written protocol based on scientific testing relating specific appearances to different kinds of tampering. 16 FMSHRC at 897. None of his tests were based on a written protocol. Tr. 123. No written report of his 1983 or 1989 tests was introduced into evidence.<sup>32</sup> He did not recall the number of filter cassettes he had tested in 1983, but estimated

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<sup>31</sup> The Secretary has offered no support in his briefs for his assertion that the judge erred in failing to credit Dr. Marple's opinion. Consequently, we do not address it. *ASARCO Mining Co.*, 15 FMSHRC 1303, 1304 n.3 (July 1993).

<sup>32</sup> Thaxton kept inadequate records of his tests. He maintained no data on the 1983 testing other than one page containing eight to ten of the actual filters with the weight recorded before and after application of reverse air flow. Tr. 110, 118-19. At trial, Thaxton was questioned regarding photographs of some test filters he created in 1991, but he was unable to identify the specific mechanism that caused the filter appearances in the photographs because he kept no records of that testing. Tr. 109-10, 120-22.

that between 25 to 50 filters . . . were played with to see how they would behave.@ Tr. 110. Nor did Thaxton subject the 1983 test filters to impact forces in an attempt to determine the potential for dust dislodgment patterns as a result of accidental events. Tr. 119, 123. Thaxton kept no records as to the particulars of his examinations, such as whether he reviewed the filters from the reverse side or with a magnifying glass. Tr. 619-21. He failed to note the characteristics that initially caused him to cite a particular filter. Tr. 611, 628; *see also* Tr. 619-21. We conclude that the judge did not abuse his discretion in determining, on the basis of this evidence, that Thaxton's opinion on the causes of AWCs was not sufficiently grounded in reliable scientific evidence to support a conclusion of deliberate tampering. A[A] trial judge must ensure that . . . scientific testimony or evidence admitted is not only relevant, but reliable.@ *Daubert*, 125 L. Ed. 2d at 480; *Cyprus Tonopah*, 15 FMSHRC at 372 (in evaluating an expert's opinion, a judge may properly focus on the scientific basis for that opinion).

The Secretary asserts that the judge erred in discounting Thaxton's testimony based on a lack of distinction between cited and no-call filters.<sup>33</sup> Denying that the similarity between cited and no-call filters was the result of inconsistency on MSHA's part, the Secretary claims prosecutorial discretion and points to evidence of other factors that sometimes determined Thaxton's decision on whether filters should be cited. S. Br. at 56-60. The Secretary states that Thaxton considered whether the same operator had submitted other filters with AWCs and whether those filters were submitted at or near the time of other AWC submissions. K. Tr. 1174-76. Thus, if a questionable filter was the only unusual filter submitted by an operator, Thaxton was not likely to cite it. K. Tr. 1172-73. On the other hand, a questionable filter was cited if similar filters had been submitted by that operator within a short time period. K. Tr. 1174-76. If a questionable filter was submitted by an operator who had submitted a number of filters with AWCs, Thaxton considered that filter to demonstrate tampering. K. Tr. 917-18. Thus, it appears that, in evaluating marginal patterns of dust dislodgment, Thaxton's reliance on an operator's other filters exaggerated differences in citation rates between operators and differences in citation rates over time. Thaxton's procedure provides further evidence that the judge was well within his discretion in finding Thaxton's determinations to be non-systematic and lacking in scientific rigor and in discounting Thaxton's opinion as to the causes of AWCs.

The judge, in determining that Thaxton's testimony was not sufficiently objective to support a determination to cite an operator with deliberate conduct, also referenced Thaxton's own testimony that: A[t]he no-call filters do not exhibit th[e] degree of dust removal that I would feel comfortable . . . saying that there is a citation to be issued.@ Tr. 139; 15 FMSHRC at 1466; 16 FMSHRC at 897. This testimony reveals both the imprecision and subjectivity in Thaxton's determinations and provides support for the judge's decision to give diminished weight to his opinion testimony as to the causes of AWCs. As noted by the judge,

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<sup>33</sup> Dr. Lee testified that many of the Urling filters were indistinguishable from no-calls. 16 FMSHRC at 876; K. Ex. 2001, at 3. The judge himself observed filters at issue in both the Common Issues and *Keystone* trials. 15 FMSHRC at 1468; 16 FMSHRC at 869.

decisions to charge operators with deliberate tampering must be based on more objective standards.@ 16 FMSHRC at 897.

The judge also gave diminished weight to Thaxton's determination as to causation of AWCs because he was not a disinterested witness.@ *Id.* at 872; 15 FMSHRC at 1473. He had been employed by MSHA for 16 years as an industrial hygienist. 15 FMSHRC at 1473; Gov't Ex. 344. Thaxton determined the issuance of each citation. 16 FMSHRC at 859. We conclude that, in evaluating Thaxton's testimony, the judge properly considered the fact that Thaxton was not disinterested. The bias of an expert witness is a proper matter for a court to consider in weighing the expert's opinion. *See Cutler*, 58 F.3d at 836.

We conclude that the judge did not abuse his discretion in determining that Thaxton's opinion was not sufficiently grounded in reliable scientific evidence nor sufficiently objective and disinterested to support a determination of deliberate tampering.

### 3. Judge's Crediting of Dr. Lee's Opinion on AWC Causation<sup>34</sup>

In his Common Issues Decision, the judge found that AWCs could have resulted from intentional acts. 15 FMSHRC at 1513. Crediting the opinion testimony of Dr. Lee and other operator experts, he also found that AWCs could have resulted from accidental and incidental impacts to the cassette and hose. *Id.* at 1513-14. He found that many of the filters subjected to impact tests exhibited dust dislodgment patterns indistinguishable from cited filters. *Id.* at 1514.

In his *Keystone* Decision, the judge concluded that 73 of the 75 cited filters resulted in whole or in part from reverse air flow, but that the forces involved were generally less than those created by deliberate blowing through the filter cassette. 16 FMSHRC at 900. He found that none of the Urling filters exhibited cones and that this indicated only slight impact forces had created the dislodgments. *Id.* at 899-900. The judge further concluded that the dust dislodgment patterns may have been influenced by impacts to the cassettes or sampling assemblies as well as reverse air through the cassettes, as described in Dr. Lee's mixed-mode theory. *Id.* at 900.

In his PDR, the Secretary contends that the judge erred in crediting and relying on Lee's opinion that AWCs were consistent with accidental impacts rather than intentional blowing through filter cassettes. PDR at 12-13. In support, he argues that the relative degrees of force involved in intentional blowing and accidental impacts had not been measured, that Lee's opinion on his coning theory in the *Keystone* trial was inconsistent with his opinion in the Common Issues trial, that his classification system was unreliable, and that the judge erred in crediting Lee's opinion on causation of AWCs while rejecting his opinion on MSHA handling. *Id.* at 13-14. The Secretary further argues that Lee's mixed-mode theory, advanced in *Keystone*, was unreliable and that the judge erred in failing to provide adequate reason for crediting Lee's opinions. S. Br. at 64-75.

In support of his position that the judge erred in crediting Lee's opinion that AWCs were consistent with accidentally caused impacts, the Secretary argues that Dr. Marple's testimony provided clear evidence that the cited AWCs were consistent with intentional tampering and inconsistent with accidental forces. S. Br. at 60. He points to Dr. Marple's testimony that his experiments simulating accidental events produced few AWCs. *Id.* at 60 n.22.

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<sup>34</sup> This section addresses Issue No. 3 in the PDR.

Keystone counters that the record fully supports the judge's conclusions that the dislodgment patterns on Urling filters may have been caused by impacts to the hoses, causing reverse air pulses, as well as impacts to the cyclones, causing mechanical pulses, as set forth in Lee's mixed-mode theory, and that these forces, which were weaker than those caused by deliberate blowing, resulted in the absence of cones on Urling filters and in dislodgment patterns that were often larger and more diffuse than those caused by deliberate blowing. K. Br. at 74-79, 82-86.

Dr. Lee has a doctorate in solid state physics and is president and chief scientist of the R. J. Lee Group, which had performed testing and research studies for numerous government agencies and for private industry. 15 FMSHRC at 1470; Tr. 5923-48, 5935; R. Ex. 1001A. He was accepted as an expert witness in physics, materials characterization and analysis, and environmental monitoring. 15 FMSHRC at 1488. His opinion that AWCs could be caused by accidental means was based on his Common Issues experiments, in which he generated more than 3,100 dust samples in the R. J. Lee Group dust tunnel, using coal from various seams and particles of similar size, shape, and aerodynamic diameter as found in coal mines. *Id.* at 1489. His samples were collected under controlled temperature and humidity. *Id.* He also obtained more than 650 samples from mines across the country. *Id.* He then conducted a series of tests involving impacts to the cyclones and hoses of dust sampling units, which produced filters with AWCs. *Id.*; R. Ex. 1001, at 11-13, R. Ex. 1002; *see* Tr. 6315-51. In addition to his reports and testimony, Lee showed a videotape recording of three incidents of a pump being dropped on a hose, two of which resulted in AWCs on the cassette filter. R. Ex. 1006. In the *Keystone* proceeding, Lee refined his experiments and performed 55 tests in which carrying boxes were dropped on sampling unit hoses; 40 AWC appearances, similar to those of the Urling filters, resulted. K. Ex. 2002.

Lee's opinion as to accidental causation of AWCs was also corroborated by other experts, Dr. McFarland and Dr. Grayson, who testified that they had produced AWCs through impacts. (McFarland) Tr. 4759-60, 4915, 5199-5200; (Grayson) R. Ex. 1014, at 16; Tr. 5551. McFarland conducted a courtroom demonstration in which a 31-pound tool box was twice dropped on the hose of a sampling assembly and twice resulted in AWCs. 15 FMSHRC at 1503; Tr. 4877-80, 4887-88, 4891, 5187-90.

Moreover, the record shows that Dr. Marple, the Secretary's expert, came to realize that impacts to hoses could result in AWCs. His first report, Gov't Ex. 280, failed to address the effects of hose impacts or the effect of filter-to-foil distance on susceptibility to AWCs and he performed further studies only after he learned of these phenomena from the operators' experts. Tr. 2277, 2282. After performing hose impact tests, Marple retracted the conclusion set forth in his first report that AWCs could only occur by an intentional act. Gov't Ex. 280, at 7. In his supplemental report, Marple concluded that "extreme mishandling" could cause AWCs.<sup>35</sup> Gov't

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<sup>35</sup> The changing nature of Marple's opinions diminishes their weight. *See, e.g., Kenbrooke Fabrics, Inc. v. Holland Fabrics, Inc.*, 602 F. Supp. 151, 154 (S.D. N.Y. 1984).

Ex. 282, at 14. Compare Gov't Ex. 280 with Gov't Ex. 282. Marple was able to replicate AWCs by forcefully stepping on hoses. Tr. 2354-56; Gov't Ex. 282, at 6-7; see also Gov't Ex. 311. The Secretary, in his Reply Brief to the Commission, concedes: "[A]s evidence was developed during the course of discovery, the Secretary's understanding of AWC formation also developed." S. Reply Br. at 3 n.3.

Similarly, Mr. Thaxton reviewed Lee's experimental filters and determined that 105 had AWCs.<sup>36</sup> Tr. 439, 445. Of those 105 filters, 40 had been formed by cassette drop, cyclone drop, hose impact, hose tread, or hose wrap -- each a type of forceful contact. See Gov't Ex. 267, Attach. 2; Tr. 7062-63. See also Tr. 577-78. Thaxton's testimony that 40 impact-caused AWCs were citable also corroborates the evidence that accidental events could have caused the AWCs.

Thus, we conclude that the judge did not err in choosing to credit Lee's opinion over Marple's to the contrary.

The Secretary also contends that Lee's testimony on coning in *Keystone* was inconsistent with his testimony in the Common Issues trial. S. Br. at 61.<sup>37</sup> In the Common Issues proceeding, Lee stated that coning is not necessarily associated with AWCs, R. Ex. 1003, at 2; Tr. 6418-37, and that deliberate reverse air flow is not necessary for the creation of cones. R. Ex. 1003, at 5. Lee noted that cones were present on the MSHA inspectors' sample filters. *Id.* In *Keystone*, he stated that "air blowing through filters using reverse air has a tendency to generate cones," K. Tr. 3879; K. Ex. 2001, at 7, and that, as a general proposition, deliberate reverse air flow involves more force than accidental events. K. Tr. 3988. Lee concluded that the slight dust dislodgment on many of the Urling filters indicated causation by a much smaller force than that generated by deliberate reverse air. K. Ex. 2001, at 5; see also 16 FMSHRC at 899. We find no discrepancy between Lee's testimony in the Common Issues trial and his testimony in *Keystone*. In fact, Lee's report in *Keystone* expressly harmonizes his conclusions with respect to the Urling filters with his general observations in the Common Issues trial: "Results by all experts indicate that physically blowing through the outlet creates a high percentage of cones although some dimples and cones are observed under other conditions." K. Ex. 2001, at 7. Moreover, Thaxton corroborated Lee's view by acknowledging in both trials that cones indicated *very forceful* application of reverse air to the filters. Tr. 209, 1258; K. Tr. 908, 1072. Thaxton testified that R&P filters had only slight cones or dimples as compared to those of some other mines, in which 50 to 60% of the cited filters had cones.<sup>38</sup> K. Tr. 1072-73.

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<sup>36</sup> Thaxton did not review Lee's 3,877 filters under scientific, double-blind conditions and, therefore, knew that he was reviewing filters of the operators' expert. Gov't Ex. 267, at 4-6; Oral Arg. Tr. 46.

<sup>37</sup> The Secretary's Brief refers to Lee's Coning Report as R. Ex. A1002"; that report was admitted as R. Ex. A1003. Tr. 5996.

<sup>38</sup> Although, in 1992, Thaxton had classified seven Urling filters as having cones, a year later he determined that none of the filters had cones and only one or two had dimples. K. Gov't

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Ex. 505. Thaxton believed that cones relaxed with time. His belief was based not on systematic experimentation but on his knowledge that filters are composed of a plastic material and plastics flatten out with time, as well as on his observation of one coned filter. K. Tr. 888-891. Lee, in his observations of numerous experimental filters, found no evidence that cones relaxed or flattened over time. K. Tr. 3883.

Consequently, we reject the Secretary's contention that Lee's testimony on coning was inconsistent.

The Secretary further contends that the judge erred in accepting Lee's opinion as to accidental AWC causation while rejecting his opinion that MSHA's handling of sample filters was one cause of AWCs. PDR at 13-14; S. Br. at 74, *citing Ona Corp. v. NLRB*, 729 F.2d 713, 719 (11th Cir. 1984) (AALJ's credibility finding will be disregarded if . . . inherently unreasonable or self-contradictory). We conclude that it was not unreasonable or contradictory for the judge to accept Lee's opinion as to AWC formation in general, which was based on scientific experiments, while rejecting other, less compelling, aspects of his opinion. *See DeSarno v. Department of Commerce*, 761 F.2d 657, 661 (Fed. Cir. 1985); *Hathaway v. Merit Systems Protection Bd.*, 981 F.2d 1237, 1241 (Fed. Cir. 1992). In our view, the judge closely examined Lee's opinion, including its underlying basis, and properly chose to credit those aspects that he found persuasive. The judge similarly credited certain aspects of Thaxton's opinion, concerning the classification of filters, 15 FMSHRC at 1469, while rejecting other aspects, concerning causation. *Id.* at 1473-74, 1513, 1518, 1521.

The Secretary also asserts that the judge erred in accepting Lee's opinion as to causation because his AWC classification system was unreliable. PDR at 13; S. Br. at 61-64. The judge recognized that Lee's classification system was not applied without error. 15 FMSHRC at 1489. Lee's inconsistency, however, in categorizing filter appearances does not substantially detract from his conclusion, drawn from his experiments, that accidental impacts to sampling equipment can cause AWCs.

The Secretary also challenges, on the basis that the theory lacks scientific support, S. Br. at 69, the judge's crediting of Lee's mixed-mode theory, in which he attributed the appearance of the Urling filters, which differed from those blown through deliberately, to a combination of events involving both impacts to the hose (causing reverse air pulses) and impacts to the cyclone (causing mechanical pulses). K. Ex. 2001, at 18; K. Tr. 3849-50, 3864-65, 3867-68.<sup>39</sup> That theory is supported by Lee's experiments, involving mixed-mode events, by Marple's testimony and videotape, Gov't Ex. 286, and by Marple and Rubow's dust dislodgment studies. As noted, Lee performed 55 tests of box drops that resulted in 40 filters with AWCs similar to those on the Urling filters. K. Tr. 3846; K. Ex. 2002, at 3. (Of the remaining 15 filters, Lee opined that eleven had no dust dislodgment pattern and four had dislodgment patterns that were dissimilar to the Urling filters. K. Ex. 2002, at 3.) For his tests, Lee employed the actual carrying boxes used by R&P and dropped them or firmly placed them down on hoses. K. Tr. 3833-36, 3843; K. Ex.

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<sup>39</sup> We note that Marple testified to the contrary, that mixed-mode events failed to cause filter appearances similar to those on the cited filters. K. Tr. 1472-81. Although Marple's tests of 40 mixed-mode events, performed by subjecting dust sampling units to rough transportation in trucks and tractors, resulted in only one AWC, K. Gov't Ex. 509; K. Tr. 1509, Marple's tests were criticized by Lee because he failed to adequately compress the hoses under the carrying box. K. Tr. 3848-49; K. Gov't Ex. 509, at 3-4.



2002. Lee's theory was also based in part on his Common Issues experimental filters and on Marple's videotape of AWC formation, Gov't Ex. 286, shown at the Common Issues trial. K. Tr. 3817, 3871, 3915-16.

Dr. Lee concluded that most of the cited filters showed comparatively little dust dislodgment and had slightly larger dislodgment areas than AWCs created by deliberate blowing. 16 FMSHRC at 899. The Secretary criticizes Lee's mixed-mode theory in part by arguing that the Urling filters do not have large and diffuse patterns of dislodgment. S. Br. at 71. The Secretary recognizes, however, that the diameters of the dislodgment area of the Urling filters were somewhat larger than those of experimental filters subjected to deliberate blowing. S. Br. at 68. Marple acknowledged that the dislodgment areas of the Urling filters were, in fact, larger than those of his experimental filters created by deliberate blowing. K. Tr. 1468; K. Gov't Ex. 508, at 13, 16. Marple as well as Lee found that the Urling filters had dislodgments with diameters larger than 6 mm. K. Tr. 1468, 3849; K. Ex. 2002A; K. Gov't Ex. 508. Marple stated his belief that the larger diameters resulted from deterioration as the filters aged, but he presented no scientific research to support that view. K. Tr. 1468-69. Lee concluded that the larger diameters showed that the filters were subjected to mechanical pulses due to impacts because, in his experiments, such impacts caused larger dislodgment areas. K. Tr. 3849-50, 3856-58, 3863-65, 3911-18; K. Ex. 2002A. Marple acknowledged and his videotape showed that impacts to cassettes result in dislodgments with a "wider, more diffuse ring," whereas reverse air flow caused sharply defined 6 mm circular dislodgments. Tr. 2111-16, *referencing* Gov't Ex. 280, at 35; *see also* Gov't Ex. 280, at 36. Lee relied on this videotape to explain his theory that the Urling filters, which had dislodgment both inside and outside the 6 mm central area, exhibited characteristics of both reverse air and mechanical pulses. K. Tr. 3817, 3870-71. Lee's theory is further supported by Marple and Rubow's systematic dust dislodgment studies, in which 210 filter cassettes subjected to three to six-foot drops resulted in a dislodgment pattern different from that resulting from reverse air, "it was larger in diameter and less sharply defined." 15 FMSHRC at 1476-77.

Consequently, we reject the Secretary's assertion that the mixed-mode theory lacks scientific support.

The Secretary also complains that Lee's mixed-mode theory was not developed until after the Common Issues trial. S. Br. at 71-72. We do not find it inappropriate that Lee conducted further research and produced a second report to address more specifically the particular characteristics of the filters cited in the *Keystone* case.

We also reject the Secretary's assertion that the judge failed to discuss the comparable strengths and weaknesses of the opinions of Lee, Marple, and Thaxton or explain his reasons for crediting Lee. In the Common Issues Decision, as well as in the *Keystone* Decision, the judge described the scientific testimony in detail and carefully explained the basis for crediting Lee's testimony. *See* 15 FMSHRC at 1473-84, 1488-96, 1513-18, 1521-22; 16 FMSHRC at 872-878, 898-900.

A[A]n [administrative law judge] has substantial latitude in choosing between conflicting expert testimony.@ *L&J Energy*, 57 F.3d at 1088. Lee's opinions had a scientific basis and the judge was within his discretion in crediting it. We emphasize that, in evaluating Lee's testimony, the judge himself observed Urling filters. 16 FMSHRC at 869. We conclude that the judge did not abuse his discretion in crediting Lee's testimony that AWCs were consistent with accidental impacts over Marple's testimony that they were not.

#### 4. Judge's Admission of and Reliance on Dr. Corn's Opinions<sup>40</sup>

The judge credited the opinion of Dr. Corn, along with that of Dr. Lee, Dr. Grayson, and Dr. McFarland, in determining that a filter cassette with a shorter filter-to-foil distance is more prone to dust dislodgment than one with a greater distance. 15 FMSHRC at 1515. The judge also credited Dr. Corn's opinion that size and shape of the dust particles could be a factor in dust dislodgment patterns. *Id.* at 1517.

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<sup>40</sup> This section addresses Issues No. 4 and 5 in the PDR.

In his PDR, the Secretary asserts that the judge erred in admitting and relying on Corn's testimony to corroborate Lee's opinion that accidental impacts cause AWCs.<sup>41</sup> PDR at 14. The Secretary argues that the judge erred in admitting portions of Corn's opinion at trial<sup>42</sup> and that the testimony lacked a scientific foundation. S. Br. at 75-78. The Secretary relies on Rule 26(b)(4)(A), (e)(1), & (e)(2) of the Federal Rules of Civil Procedure, which provides that discovery may be obtained of facts known and opinions held by experts and that a party has a duty to supplement its disclosure of information provided by experts.<sup>43</sup> Intervenors counter that the judge's admission of and reliance on Corn's testimony was within his discretion, was reasonable given Corn's background and credentials, and was justified because Corn's opinions were supported by the evidence. I. Br. at 72-77.

Corn's report, disclosed during discovery, states: A[W]e reviewed data generated by the R.J. Lee Group as a result of their experiments. We agree with their conclusions regarding filter cassette susceptibility to [AWC] formation . . . (e.g., "filters-to-foil= distance) . . . @ R. Ex. 1037, at 7. At the Common Issues trial, the Secretary objected to the questioning of Corn about Lee's work, on the grounds that portions of his opinion had not been disclosed during discovery. Tr. 7551-52. The judge overruled the objection because, at the pretrial conference, he had ruled that, at trial, Aexpert witnesses . . . should be able to respond to criticism by other experts@and he considered Corn's testimony to be a response to Dr. Marple's criticism of Dr. Lee. Tr. 7573; Tr. 23-24 (Prehr-g Conf. Nov. 17, 1992). We conclude that, under Rule 26(a)(2)(B),<sup>44</sup> the judge

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<sup>41</sup> The Secretary, in his brief, asserts generally that A[t]he judge used Dr. Corn's testimony to corroborate Dr. Lee's opinion that accidental causes account for AWC patterns,@but he provides no supporting citation. S. Br. at 75. In our opinion, the judge did not credit Corn in areas other than the effect of filter-to-foil distance and dust particle size and shape. See 15 FMSHRC at 1512-13, 1515, 1517.

<sup>42</sup> Apparently, the Secretary's objection to the admission of Corn's testimony does not extend to his testimony on filter-to-foil distances. At trial, in support of his objection, the Secretary acknowledged that Corn's report, disclosed during discovery, contained the statement that Ahe agreed with Dr. Lee on filter-to-foil distance . . . @ Tr. 7551-52.

<sup>43</sup> Commission Procedural Rule 1(b), 29 C.F.R. ' 2700.1(b), incorporates the Federal Rules of Civil Procedure, so far as practicable, on any procedural question not regulated by the Mine Act, the Commission's Procedural Rules, or the Administrative Procedure Act, 5 U.S.C. ' 500 et seq.

<sup>44</sup> Rule 26(a)(2)(B) provides:

*Except as otherwise stipulated or directed by the court, . . . [t]he [expert] report shall contain a complete statement of all opinions to be expressed and the basis and reasons therefor; the data or other information considered by the witness in forming the opinions . . . .*

properly admitted Corns' expert report because he had ~~not~~ otherwise . . . directed in a pretrial ruling that experts would be allowed at trial to respond to other experts' opinions.

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Fed. R. Civ. P. 26(a)(2)(B) (emphasis added).

Further, a judge's determination of a duty to supplement discovery under Rule 26(e) and the exclusion of trial testimony are committed to his sound discretion. *Phil Crowley Steel Corp. v. Macomber, Inc.*, 601 F.2d 342, 344 (8th Cir. 1979).<sup>45</sup> A judge's decision to allow such evidence will usually not be disturbed unless it results in undue prejudice or fundamental unfairness. *Id.* The Secretary was not prejudiced by Corn's testimony. Corn had been deposed by the Secretary concerning his work with Lee. Tr. 7552. Further, Corn's report, disclosed during discovery, stated that he had reviewed the experimental data of the R. J. Lee Group and that he agreed with their conclusions regarding filter susceptibility to AWC formation. We find no abuse of the judge's discretion in his admission of Corn's testimony.

The Secretary specifically disputes the scientific foundation for Corn's opinions that: (1) a filter cassette with a smaller filter-to-foil distance was more prone to dust dislodgment than a filter with a larger filter-to-foil distance; and (2) the size and shape of dust particles could be a factor in dislodgment patterns. S. Br. at 75. We conclude that these two opinions were within Corn's area of expertise.<sup>46</sup> Corn has a doctorate in industrial hygiene and sanitary engineering and is professor in, and division director of, the Department of Environmental Health Services, School of Hygiene and Public Health at Johns Hopkins University. 15 FMSHRC at 1496. He was accepted as an expert witness in the fields of aerosol and particle physics, including the adhesion and dislodgment of particles, coal mine dust sampling technology, and federal occupational safety and health regulation and enforcement systems. Tr. 7490; *see also* 15 FMSHRC at 1496-97. Corn studied the adhesion forces of particles and concluded, based on his review of the scientific literature and information received from Lee, that Lee's dust particles were representative of dust in mines. Tr. 7553-55, 7570-71, 8025-26. Thus, Corn's testimony had a proper scientific foundation. In addition, Corn was directly involved with the measurements and tests on which he based his opinion. Corn visited Lee's research facility on a number of occasions and reviewed Lee's equipment, protocols, and procedures. Tr. 7560, 7581-83, 7585, 8009, 8085-86. Corn himself

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<sup>45</sup> In support of the proposition that Corn's testimony should have been excluded, the Secretary relies on *Freund v. Fleetwood Enterprises, Inc.*, 956 F.2d 354, 356-59 (1st Cir. 1992); *Jenkins v. Whittaker Corp.*, 785 F.2d 720, 728 (9th Cir. 1986), *cert. denied*, 479 U.S. 918 (1986); and *Jefferson v. Davis*, 131 F.R.D. 522, 528 (N.D. Ill. 1990). S. Br. at 77. These cases emphasize the trial judge's discretion in discovery-related matters. For example, *Freund*, which involved the exclusion of expert testimony at trial, states that the judge's discretion is not to be disturbed absent manifest error. 956 F.2d at 356-59.

<sup>46</sup> The judge did not accept Corn as an expert in, nor rely on his conclusions as to, image analysis. 15 FMSHRC at 1509-13. There is no inherent contradiction in a judge's accepting an expert's testimony in areas in which he is well qualified and rejecting his testimony in areas in which he is less qualified. *Cf. Wilkinson v. Rosenthal & Co.*, 712 F. Supp. 474, 478 (E.D. Pa. 1989) (expert qualified to testify in areas in which he had appropriate education and experience but was not qualified to testify in areas in which he lacked education or experience); *Bass v. Spitz*, 522 F. Supp. 1343, 1352-53 (E.D. Mich. 1981) (economist could not testify in areas beyond his knowledge and expertise).

measured filter-to-foil distances of cassettes and also examined 1,248 of the cited filters.<sup>47</sup> Tr. 7562, 7591; R. Ex. 1037, at 2. Corn requested that Lee examine the size of the airborne dust particles used in his dust tunnel experiments. Tr. 7570-71. We conclude that the Secretary has not demonstrated that the judge abused his discretion in crediting Dr. Corn's testimony.

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<sup>47</sup> Corn's opinion that a shorter filter-to-foil distance makes a filter more prone to dust dislodgment was one of several expert opinions to that effect. *See* 15 FMSHRC at 1515. Thus, even if Corn's opinion had not been properly credited by the judge, other record evidence supports the judge's findings on filter-to-foil distance.

## 5. Filter-to-foil Distance and Other Manufacturing Variables<sup>48</sup>

The judge determined that the distance between the filter and the aluminum foil cone of dust sampling cassettes was variable and that cassettes with shorter filter-to-foil distances were more susceptible to AWC dust dislodgment patterns than those with greater distances. 15 FMSHRC at 1515, 1521. In the Common Issues Decision, the judge concluded that the cited filters had shorter filter-to-foil distances than those manufactured subsequently.<sup>48</sup> *Id.* at 1515-16. In the *Keystone* Decision, he concluded that the cited filters *more probably than not* had shorter filter-to-foil distances than those manufactured subsequently<sup>49</sup> and that this could have been a factor in the decline of cited AWCs [at Urling] in the Spring of 1990.<sup>50</sup> 16 FMSHRC at 885-86 (emphasis added).

The Secretary asserts that the judge erred in several respects in his analysis of filter-to-foil distances and other manufacturing variables of dust sampling cassettes in reaching his conclusion that accidental and incidental impacts could have caused Urling's AWCs. PDR at 16-17; S. Br. at 78-88. First, the Secretary argues that the judge's findings that filter-to-foil distance affects the likelihood of AWCs and that the cited filters had shorter filter-to-foil distances are not supported by substantial evidence. PDR at 16; S. Br. at 78-81. Second, he argues that, in *Keystone*, the evidence does not show that filter-to-foil distances or other variables associated with the manufacturing process changed over time. PDR at 16-17; S. Br. at 82-83. He also contends that the statistical evidence in *Keystone* does not support a finding that manufacturing variables caused Urling's AWCs or a sudden decline in their rate of occurrence. PDR at 17; S. Br. at 87. In response, *Keystone* and Intervenors contend that there was ample evidence that manufacturing variables influenced the frequency of AWCs. I. Br. at 26; K. Br. at 80-81. *Keystone* further

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<sup>48</sup> This section addresses Issue No. 9 in the PDR. The Secretary's briefs fail to provide support for the argument set forth in section (c) of that issue, dealing with changes in floppiness of filters over time, and we do not address it. The judge found in his Common Issues Decision that floppiness or tautness of the filters varied and that a floppy filter was more prone to AWC formation than a taut one. 15 FMSHRC at 1515. In his *Keystone* Decision, the judge, referencing Dr. Marple's testimony that floppiness was associated with *smaller* filter to foil distances,<sup>49</sup> stated that the evidence related to the question whether the more recently manufactured filters were floppier than the older ones is not sufficiently clear,<sup>50</sup> thus precluding his making a finding on this issue. 16 FMSHRC at 885 n.3.

asserts that there is record support for the judge's crediting of Lee's testimony that its cited filters had shorter filter-to-foil distances and were more susceptible to accidental or incidental AWC formation than filters manufactured later. K. Br. at 79. After reviewing these contentions and the record evidence, we affirm the judge.

a. Filter-to-foil Distance and Susceptibility to AWCs

In the Common Issues Decision, the judge found that shorter filter-to-foil distance makes a filter more prone to AWC formation. 15 FMSHRC at 1515. He credited the testimony of the operators' experts, Drs. Lee, Grayson, McFarland and Corn, that filter-to-foil distance was an important characteristic of filter cassettes that varied with date of manufacture and that a shorter filter-to-foil distance made a filter more susceptible to AWC formation. (Lee) R. Ex. 1001, at ii; Tr. 6225, 6238-41; (Grayson) Tr. 5551, 5648; (McFarland) Tr. 5183-85, 5196, 5321; (Corn) Tr. 7567, 7697-98.

As noted, Dr. Lee was accepted as an expert witness in physics, materials characterization and analysis, and environmental monitoring. 15 FMSHRC at 1488. Using a stereo optical microscope, Dr. Lee measured the filter-to-foil distance of the 3,100 samples generated in his dust tunnel as well as 650 samples taken from coal mines across the country. *Id.* at 1489; R. Ex. 1001, at 1, 11. Based on his tests of subjecting cassettes to drops and hoses to impacts, Dr. Lee concluded that filter-to-foil distance was the strongest factor influencing susceptibility to AWC formation. 15 FMSHRC at 1491; Tr. 6238-39; R. Ex. 1001, at 11, 15. In tests of dropping cassettes a distance of 4 feet, 33% of 30 filters with filter-to-foil distance of 1 mm or less had potentially citable AWCs; 27% of 129 filters with a distance of 1 to 2 mm had potentially citable AWCs; none of 43 filters with a distance of 2 to 3 mm had potentially citable AWCs; 4% of 52 filters with a distance of 3 to 4 mm and none of 5 filters with a distance of 4 to 5 mm had potentially citable AWCs. 15 FMSHRC at 1491; R. Ex. 1001, at 11; App. B-4.3, B-4.7, B-8. In tests of hose impacts using a one pound weight, 66% of 30 filters with a distance of 0 to 1 mm, 12% of 8 filters with a distance of 1 to 2 mm, none of 3 filters with a distance of 2 to 3 mm, 12% of 30 filters with a distance of 3 to 4 mm, and none of 9 filters with a distance of 4 to 5 mm had potentially citable AWCs. 15 FMSHRC at 1491; R. Ex. 1001, at B-5.2-5.3, B-5.6. Dr. Lee also produced a video, R. Ex. 1006, which illustrated that, under the same conditions, it is easier to produce an AWC with a short filter-to-foil distance than with a larger distance. Tr. 6241-53. Dr. Lee explained that, as a matter of basic physics, it is easier to dislodge dust on a filter that is closer to the foil. Tr. 6241; *See* 15 FMSHRC at 1515.

Dr. Grayson is dean of the College of Mineral and Energy Resources at West Virginia University and has a doctorate in mining engineering. 15 FMSHRC at 1497; Tr. 5518-20; R. Ex. 1014C. He was accepted as an expert witness in aerosol mechanics, fluid mechanics, thermodynamics, aerosol filtration, and engineering statistics. 15 FMSHRC at 1499. In his research on filter-to-foil distance, Dr. Grayson measured the distances of 178 samples from various mines by inserting a millimeter scale into the cassette inlet. *Id.* at 1498. Of those filters, 94 were drop tested and the remaining filters were examined for existing AWCs. *Id.*; Tr. 5644-



45; R. Ex. 1014, at 14-16. Dr. Grayson concluded that there was a strong relationship between filter-to-foil distance and creation of AWCs. 15 FMSHRC at 1499; R. Ex. 1014, at 18.

Dr. McFarland is a professor of mechanical engineering and was accepted as an expert in the fields of aerosol mechanics, fluid mechanics, thermodynamics, aerosol filtration, and engineering statistics. 15 FMSHRC at 1499; Tr. 4480, 4548. Dr. McFarland measured the filter-

to-foil distances of several hundred cassettes. 15 FMSHRC at 1502; Tr. 4730-38, 4752. Based on his tests of applying varying degrees of pressure to cassettes with varying distances between the filter and the foil, Dr. McFarland concluded that it was more difficult to form AWCs on filters with larger filter-to-foil distances. 15 FMSHRC at 1502, 1505, 1515-16; Tr. 5004-05 ; R. Ex. 1018, at 37.

As noted, Dr. Corn was qualified as an expert in aerosol and particle physics, including the adhesion and dislodgment of particles and coal mine dust sampling technology. Tr. 7490; *See also* 15 FMSHRC at 1496-97. Corn measured filter-to-foil distances and examined 1,248 of the cited filters in reaching his opinion that a cassette with a shorter filter-to-foil distance is more prone to dust dislodgment than one with a greater distance. Tr. 7562, 7591; R. Ex. 1037, at 2.

Thus, the operators' experts presented a scientific basis, not merely a common sense view as alleged by the Secretary, S. Br. at 82, to support the effect of filter-to-foil distance on susceptibility to dust dislodgment.

The testimony of the Secretary's experts, Drs. Marple and Rubow, was inconsistent on the influence of filter-to-foil distance and filter floppiness. The judge recognized that, although Marple and Rubow concluded that manufacturing variables such as filter-to-foil distance and floppiness were not probably contributing factors to dust dislodgment, Marple had also testified that filter floppiness and the distance between the filter and foil influenced dust dislodgment patterns. 15 FMSHRC at 1482-83; *compare* Tr. 2826, 9347-48; Gov't Ex. 282, at 13 *and* Tr. 2692-93, 2803-04, 2820-21, 2841-42. The judge reasonably discounted the inconsistent testimony of the Secretary's experts on the effect of filter-to-foil distance and credited the scientifically supported, consistent, and corroborated testimony of the operators' experts. Thus, his finding that filter-to-foil distance affects the likelihood of AWCs is supported by substantial evidence and we affirm it. In *Keystone*, the judge reiterated his holding in the Common Issues Decision, that shorter filter-to-foil distance increases susceptibility to AWC formation.<sup>49</sup> 16 FMSHRC at 885.

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<sup>49</sup> The Secretary also requests the Commission to accept Marple's uncontradicted testimony identifying threshold velocity of dust particles, i.e., the air velocity that is required to dislodge dust particles from the surface of filters, as the single most important factor in dust dislodgment. S. Br. at 82. The judge found that both filter-to-foil distance *and* threshold velocity were important factors in dislodgment. *See* 16 FMSHRC at 885, 899. There is no inconsistency

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in the judge's determination that both factors, one having to do with the physical characteristics of dust and the other with the physical characteristics of the filter cassette (filter-to-foil distance), were causative.

The Secretary also takes issue with the judge's finding that the cited filters were from a population of filters having short filter-to-foil distances. 15 FMSHRC at 1516; S. Br. at 78-79. Lee testified, without contradiction, that 80% of the cited filters were from the series with numbers 200,000 and 300,000.<sup>50</sup> See Tr. 6271. See also 15 FMSHRC at 1515-16. Based on certain graphs, the judge also found that, after the filters were loaded with dust, the filter-to-foil distance for 80% of the series 200,000 and 95% of the series 300,000 filters was 2 mm or less. 15 FMSHRC at 1516; R. Exs. 1068-69.<sup>51</sup>

The Secretary asserts that the judge erred in relying on graphs that plotted filter-to-foil distances for experimental filters in each series because the graphs were based on a small number of filters with widely varying measurements. R. Exs. 1068-69; S. Br. at 79-81. He argues that the judge made an inherently weak assumption that the very few experimental filters manufactured before February 1990 were representative of all such filters. S. Br. at 80. The Secretary also contends that the graphs at best showed only a slight tendency over time toward an increase in the relative percentages of filters with filter-to-foil distances of more than

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<sup>50</sup> The series 200,000 filters were manufactured between April 20, 1988, and April 3, 1989, R. Ex. 1069; series 300,000 between April 3, 1989, and February 13, 1990, R. Ex. 1068; series 400,000 between February 13, 1990, and October 25, 1990, R. Ex. 1070; series 500,000 between October 25, 1990, and August 5, 1991, Gov't Ex. 259A; series 600,000 between August 5, 1991, and February 15, 1992, Gov't Ex. 261A; series 700,000 between February 15, 1992, and May 28, 1992, R. Ex. 1071; and series 800,000 from May 28, 1992, through the date of the Common Issues trial, Gov't Ex. 265A.

<sup>51</sup> The graphs provide filter-to-foil distance measurements under two conditions, before dust was loaded onto the filter, and after dust had been loaded. See Tr. 2880-81. The judge analyzed both types of measurements and noted that the pre-loading values show a slight tendency of filter-to-foil distance to increase in the later manufactured series. 15 FMSHRC at 1516. See Gov't Exs. 253A, 255A, 257A, 259A, 261A, 263A.

2 mm . . . @ *Id.* He further argues that 50% of the filters manufactured between October 25, 1990, and February 15, 1992, seven months to almost two years after institution of the void code, had short filter-to-foil distances, and that the rarity of AWCs in that filter group refutes an association between filter-to-foil distance and AWCs. *Id.* at 80-81.

The graphs in question were prepared by the Secretary and set forth the filter-to-foil distances after dust loading for experimental filters manufactured between April 20, 1988, through the time of the Common Issues trial; they were based on measurements by both the Secretary's and the operators' experts. 15 FMSHRC at 1516. In addition to showing that 80% of the series 200,000 and 95% of the series 300,000 filters had short filter-to-foil distances (2 mm or less) the graphs showed that a lower percentage of filters in the later manufactured series had short filter-to-foil distances: 45% in the 400,000 series; 50% in the 500,000 series; approximately 50% in the 600,000 series; and a little more than 40% in the 700,000 series. Gov't Exs. 260A, 262A; R. Exs. 1070, 1071. Thus, the graphs support the judge's finding that the cited filters, more than 80% of which were from the 200,000 and 300,000 series, came from a population of filters with comparatively shorter filter-to-foil distances. 15 FMSHRC at 1515-16. Dr. Rubow, Marple's colleague, acknowledged that the graphs showed a marked increase in the percentage of filters with filter-to-foil distances greater than 2 mm in filters manufactured after February 1990. Tr. 9244-47.

Contrary to the thrust of the Secretary's argument, the judge was mindful of the limitations of the graphs. 15 FMSHRC at 1516. He recognized that the number of filters measured from each series varied considerably and that the measurements in each series were made by different experts who used different methods. *Id.* The judge noted, however, that, because the cited cassettes had been disassembled without being measured, the graphs provided the best available evidence of the filter-to-foil distance. *Id.*

Based on the evidence of record, we conclude that the judge's finding in the Common Issues Decision, that the cited filters came from a population of cassettes with shorter filter-to-foil distance, more susceptible to AWC formation than those manufactured subsequently, is supported by substantial evidence. *Id.* at 1515-16.

b. Filter-to-foil Distance and Decline of AWCs at Urling

In *Keystone*, the judge found that the cited filters probably had shorter filter-to-foil distances than those manufactured subsequently. 16 FMSHRC at 886. He also found that the decline in the number of cited AWCs in the spring of 1990 could be explained, in part, by this manufacturing variable. *Id.*

The Secretary asserts that there was no evidence that filter-to-foil distance or other filter characteristics, varying with date of manufacture, changed after March 26, 1990, or provide an explanation for the decline in AWC rates after that date. S. Br. at 83; S. Reply Br. at 23.

All the cited Urling filters were series 200,000 and 300,000 filters. 16 FMSHRC at 885; *see* K. Ex. 2133, R. Exs. 1068-69. As discussed *supra*, the judge, in the Common Issues Decision, found that filters from these two series tended to have shorter filter-to-foil distances. 15 FMSHRC at 1515-16. The judge noted that, according to Dr. Lee, the Urling filters exhibited physical characteristics indicative of shorter filter-to-foil distances. 16 FMSHRC at 885. Lee testified that the absence of 9 mm segmented ring standoff patterns on the Urling filters correlated with shorter filter-to-foil distance.<sup>52</sup> K. Tr. 3874-79; R. Ex. 1001, at 15; K. Ex. 2001, at 5-6. Dr. Marple concluded that the absence of standoff patterns did not indicate shorter filter-to-foil distance because his experiments for the Common Issues trial indicated that, even when filters were resting on the standoff, only 50% had standoff patterns. 16 FMSHRC at 885; Tr. 2528-29. Nonetheless, Marple agreed that the presence of the standoff pattern was associated with greater filter-to-foil distance; he found that standoff ring patterns appeared only on filters with filter-to-foil distances greater than 3.7 mm. Tr. 2527-29, 9335-38, 9619-23; Gov't Ex. 327. Lee also testified, without contradiction, that the presence of crimping or pinching on 20% of the Urling filters indicated shorter filter-to-foil distance. K. Tr. 3877-78; K. Ex. 2001, at 6. Lee noted that the incidence of crimping on recently purchased filters was much lower, about 6%. *Id.*; 16 FMSHRC at 885.

We conclude that substantial evidence, including the testimony of Dr. Lee, which was properly credited, as well as the testimony of Dr. Marple, supports the judge's conclusion in *Keystone*, 16 FMSHRC at 885-86, that the cited filters more probably than not had shorter filter-to-foil distances than filters manufactured subsequently.

In arguing that the judge erred in finding that manufacturing variables provided an explanation for a decline in AWC rates after March 26, 1990, S. Br. at 79, the Secretary mischaracterizes the *Keystone* Decision. The judge merely considered filter-to-foil distance as one of several factors that could account for a decline in AWCs at Urling in the spring of 1990. 16 FMSHRC at 882-86. The failure of manufacturing variables to explain completely a decline in AWCs in the spring of 1990 does not substantiate the Secretary's argument that the judge erred in finding that such variables ~~could have been a factor~~ contributing to the decline. At oral argument, the Secretary asserted that ~~the judge owed it to us to analyze those data and tell us what he thought was the most likely cause of these appearances.~~ Oral Arg. Tr. 48. The judge was not required to find a complete explanation for the downward trend in AWCs. The Secretary, to preponderate, was required to show that the trend was the result of deliberate tampering.

### c. Statistical Analysis of Manufacturing Variables

In the Common Issues Decision, the judge, relying on Dr. Roth's statistical analysis, concluded that the evidence ~~does not establish . . . but may point to~~ manufacturing variables as

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<sup>52</sup> The 9 mm ring standoff pattern is caused by the filter backing pad coming in contact with the 9 mm plastic (standoff) supports on the cassette. Tr. 2526-27; Gov't Ex. 328.

affecting the decline in AWC formation. 15 FMSHRC at 1520.<sup>53</sup> In his *Keystone* Decision, the judge noted that the statistical experts arrived at different conclusions on the effect of cassette manufacturing date on AWC rate. 16 FMSHRC at 900. He found that manufacturing variability may have played some role in AWC formation. *Id.* at 886, 900-01.

The Secretary challenges the judge's analysis of manufacturing variables in *Keystone*, asserting that the statistical evidence does not support a finding that manufacturing variables caused AWCs or the sudden . . . change in AWC occurrences. PDR at 17. The Secretary argues, based on Miller's analysis, that, rather than the cassette manufacturing date, the most significant date affecting the occurrence of AWCs was the sampling date and whether it was before or after March 26, 1990, the date he alleges Keystone learned of the void code. S. Br. at 84-87. The Secretary further states that the judge failed to resolve conflicting testimony of Miller and Roth on the relationship between manufacturing dates and AWC formation. *Id.* at 87-88. In response, Keystone argues that Miller's comparison of cassettes manufactured on certain dates and used by R&P mines before and after March 26, 1990, was faulty because he failed to use data for the same mines in the two periods. K. Br. at 109-10. Keystone further asserts that a valid comparison, based on cassette manufacturing date, between R&P mines including Urling and mines of other operators could not be made because of handling and sampling differences. *Id.* at 109.

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<sup>53</sup> The judge referred to Roth's testimony and report, which showed that cassettes manufactured before 1990 had an AWC rate that was 10 times higher than cassettes manufactured after 1990. *See* Tr. 4128-30; R. Ex. 1041, at 3. *See also* Oral Arg. Tr. 168.

Dr. Roth's analysis showed that the rate of AWCs at Urling was more than nine times higher for cassettes manufactured on four consecutive key dates than on other manufacturing dates, 46.9% as compared to 4.8%.<sup>54</sup> K. Ex. 2004, at 6; 16 FMSHRC at 881, 900-01. Dr. Miller's analysis showed that, for non-R&P mines sampled before March 26, 1990, the citation rate for cassettes manufactured on the key dates was 2.5%, lower than that for cassettes manufactured on other dates, 6.2%. K. Gov't Ex. 527, at 2-3, Table 1b; S. Br. at 85; 16 FMSHRC at 879. Miller also found, however, that, for all samples from R&P mines including Urling that were taken before March 26, 1990, the citation rate for cassettes manufactured on the key dates was 49.9%, higher than that for cassettes manufactured on other dates, 38.2%. 16 FMSHRC at 879; K. Tr. 760-61; K. Gov't Ex. 527, at Table 1a.

Miller's analysis that manufacturing date does not account for changes in AWC rates was countered by Roth's analysis that the rate of AWCs tended to be higher for cassettes manufactured earlier. K. Ex. 2004, at 5-6; K. Tr. 3563, 3565. The judge explained that he saw merit in both Miller's and Roth's analyses, i.e., that manufacturing *in general* did not explain citation rates, but that cassettes manufactured on four key dates accounted for 60% of the AWCs at Urling, suggesting manufacturing anomalies. 16 FMSHRC at 900-01. There is record evidence that the dust cassettes were plagued by manufacturing problems. In July 1990, MSA, the manufacturer of the dust cassette assemblies, recognized that filter airflow resistance exceeding the allowed level and incompatibility of the filter and backing pad had to be corrected. R. Ex. 1124, at 2-4; Tr. 9211-13. On August 23, 1990, MSA recalled from its district offices and destroyed all cassettes manufactured before August 1, 1990. R. Exs. 1134, 1144; Tr. 9221-22. This recall included all filters in the 200,000 and 300,000 series and part of the 400,000 series. *See* note 50, *supra*. Shortly thereafter, MSA began screening all cassettes to ensure proper airflow resistance. Tr. 9207-08, 9221-22; R. Ex. 1180. As the judge noted, 15 FMSHRC at 1481, Dr. Rubow, the Secretary's expert, conceded that a filter with a higher airflow resistance would be more likely to flex (and thereby be more susceptible to AWC formation) when exposed to a constant reverse airflow. Tr. 9147-48. Dr. Lee similarly testified that reverse air pulses of low magnitude would be more likely to form AWCs on filters with higher airflow resistance. Tr. 6214-16. Dr. Corn also testified as to his concern that changes associated with achieving proper airflow resistance influenced the formation of AWCs. Tr. 8050-51.

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<sup>54</sup> The four key dates were: May 26, May 31, June 1, and June 2, 1989. Roth found that, for all R&P mines including Urling, the rate of AWCs for cassettes manufactured on these dates was 49.6% as compared to 5.8% for other dates of manufacture. K. Ex. 2004, at 6; 16 FMSHRC at 880.



We affirm the judge's refusal to infer tampering from Miller's statistical analysis. Miller used March 26, 1990, as the critical date in analyzing data on AWCs submitted by Keystone. The judge determined that March 26, 1990, is not materially significant at Urling because R&P personnel knew of the AWC investigation some six weeks prior to that date and Urling's AWC citation data show a significant overall decline beginning in September of 1989.<sup>55</sup> 16 FMSHRC at 900. Accordingly, the judge could reasonably diminish the weight accorded to Miller's statistical analysis. Conversely, Roth's analysis of the four key dates of cassette manufacture was not tied to March 26, 1990, was supported by record evidence of cassette manufacturing problems, and could reasonably be considered more probative by the judge. *See Id.* at 900-01.

Given the conflicting analyses of the experts, the judge was within his discretion in refusing to draw an inference of tampering from these statistics. We emphasize that the judge did not hold that manufacturing variables, in themselves, explained the decline in AWCs; rather, he considered them as a factor, among others, that could account for the decline in AWC rates at Urling. *Id.* at 885-86.

#### 6. Judge's Admission and Crediting of Dr. Lee's Opinion on Scrubbers<sup>56</sup>

In *Keystone*, the judge found that, when the air was sampled in the vicinity of a continuous miner with a scrubber, the dust deposits on filters were damper, had a higher threshold velocity, and were more difficult to dislodge. 16 FMSHRC at 883. He noted that the experts expressed conflicting opinions on the effect of scrubbers and their accompanying water sprays on dust deposits.<sup>57</sup> The judge concluded that the introduction of scrubber systems on the continuous miners at Urling in 1989 and 1990 could have been a factor in the decline of AWCs during that period. *Id.* at 882-83.

The Secretary raises two issues related to the judge's findings and conclusion. First, citing Rule 26 of the Federal Rules of Civil Procedure, the Secretary contends that the judge erred in admitting Dr. Lee's testimony on the effect of water sprays and scrubber systems because that opinion had not been disclosed during discovery. PDR at 17; S. Br. at 89-90. Further, the

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<sup>55</sup> We have affirmed that determination as discussed *infra* in section D. 2. a.

<sup>56</sup> This section addresses Issues No. 10 and 11 in the PDR.

<sup>57</sup> The record shows that scrubbers were gradually introduced beginning in 1989 and early 1990. *See K. Tr.* 85-86, 2594, 2796-98.

Secretary asserts that Lee lacked the scientific background to offer such an opinion. PDR at 17; S. Br. at 90-96. Keystone responds that the judge properly admitted Lee's opinion because the Secretary had notice of, and opportunity to rebut, the testimony. K. Br. at 87-88. Additionally, Keystone argues that Lee was qualified to give an opinion on the effects of environmental conditions and mining equipment. *Id.* at 86-87. After review of the record, we find neither of the Secretary's contentions well taken.

a. Admission of Dr. Lee's Opinion

Under Rule 46 of the Federal Rules of Civil Procedure, a party must make known to the court the action that he seeks and the grounds therefor. Fed. R. Civ. P. 46; *In Re Bildisco*, 682 F.2d 72, 82 (3d Cir. 1982), *aff'd on other grounds*, 465 U.S. 513 (1984); *accord Browzin v. Catholic Univ. of Am.*, 527 F.2d 843, 850 & n.15 (D.C. Cir. 1975). See also section 113(d)(2)(A)(iii) of the Mine Act, 30 U.S.C. § 823(d)(2)(A)(iii). Here, the Secretary failed to do that. Several times during the *Keystone* trial, the Secretary objected specifically to Lee's opinions on other issues on the grounds that they had not been disclosed during discovery. K. Tr. 3781-83, 3865-66, 3883. When Keystone questioned Lee as to whether an increase in the water pressure of scrubbers, with an accompanying greater water spray, would affect the susceptibility to dislodgment of dust samples, however, the Secretary raised no objection. K. Tr. 3891. The judge then asked whether the increase in water pressure would increase or decrease the susceptibility, and Lee answered that the pressure increase would decrease the susceptibility to dislodgment. K. Tr. 3892. The Secretary again failed to object to Dr. Lee's testimony on the effect of scrubbers on susceptibility of filters to dust dislodgment. Indeed, the Secretary subsequently questioned Dr. Lee as to how he arrived at his opinion on the effect of scrubbers. K. Tr. 4043-45.

The portion of the transcript that the Secretary cites in support of his contention, K. Tr. 3894, pertains to another matter. He has apparently confused questions to Dr. Lee related to whether "overall water levels and moisture levels in the Urling One Mine [that] increased between 1990 and 1993" affected the susceptibility of filters to dust dislodgment, to which he raised objections, with earlier questions regarding the use of scrubbers between 1989 and 1990 (*see* Stips. 85, 93, and 94),<sup>58</sup> which coincided with the general decline in AWCs, to which he raised no objection.<sup>59</sup>

In any event, even if the Secretary had timely objected to questions regarding the effect of scrubbers, the testimony would have been properly admitted. As noted with respect to the Secretary's Rule 26 objection to the testimony of Dr. Corn, the judge stated at the Common

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<sup>58</sup> In their stipulations, the parties included facts relating to the use of scrubbers on continuous miners at Urling and specifically identified those miners that had scrubbers. Stip. 94.

<sup>59</sup> The judge was unable to draw conclusions from the evidence before him concerning the increased moisture levels in the mine in 1993 as compared to 1989 and 1990 and the decline in AWCs in late 1989 and 1990. 16 FMSHRC at 883.

Issues pretrial conference that, at trial, the expert witnesses should be able to testify in support of their own conclusions, their own opinions and should be able to respond to criticism by other experts and should be able to criticize and attack the reports of experts on the other side. Tr. 23-24 (Pretrial Conf. Nov. 17, 1992). Dr. Lee's testimony falls squarely within the parameters of the judge's ruling.

Further, the primary report submitted by Dr. Lee in the *Keystone* proceeding set forth his opinion that lower relative humidity, in existence in the winter months, increases the susceptibility of filters to dust dislodgment. K. Ex. 2001, at 14. In response to Dr. Lee's report, the Secretary's expert, Dr. Marple, stated:

[T]he important parameter to consider is the moisture content of the particles and not the relative humidity of the air outside of the mine or even in the mining environment. When the coal is mined, there are water sprays from the mining machine on the coal face providing a very wet local atmosphere in the generated dust, independent of the months identified in Dr. Lee's report.

K. Gov't Ex. 509, at 10. At the *Keystone* trial, Dr. Marple testified further on the effect of scrubbers: "I think the wetness of the particles would have a major effect which would be related back to water sprays." K. Tr. 1551. Dr. Lee's subsequent testimony regarding scrubbers was made in response to Marple's report and testimony. See also K. Tr. 4042-44. Thus, under the judge's pretrial ruling, which was within his discretion, Lee's testimony was admissible, even if not disclosed during discovery.<sup>60</sup> See Fed. R. Civ. P. 26(a)(2)(B); *Phil Crowley*, 601 F.2d at 344.

#### b. Crediting of Dr. Lee's Opinion

The Secretary challenges the expertise of Dr. Lee to give an opinion on the effect of scrubber systems on dust deposits, arguing that the issue was outside the area in which he was qualified, and that Dr. Marple's credentials were more directly related to this issue. S. Br. at 90-91. In response, *Keystone* notes that Dr. Lee was the only expert to research systematically the effect of humidity and water on AWC formation and that his testimony on the effect of scrubbers was consistent with his basic opinion that moisture content of coal was a factor that affected susceptibility to AWCs. K. Br. at 86-87. Intervenors argue that Dr. Lee's opinion was consistent with testimony of all experts at the Common Issues trial and that Dr. Marple's testimony also indicated that a variety of factors, including humidity, could affect the threshold velocity needed to dislodge dust particles from filters. I. Br. at 50-52.

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<sup>60</sup> The cases on which the Secretary relies, S. Br. at 90, to support the proposition that his testimony should have been excluded are inapposite. See *Weiss v. Chrysler Motors Corp.*, 515 F.2d 449, 457-58 (2d Cir. 1975); *Freund*, 956 F.2d at 356-59.

The Secretary failed to lodge an objection to Lee's testimony on this subject during the trial. As with the Secretary's contention that the judge erred in admitting Lee's testimony because it was not disclosed during discovery, the Secretary was obliged to lodge a timely objection to the testimony in order that the judge could consider the issue of Lee's qualifications to give an opinion on this issue. *See* Fed. R. Civ. P. 46; *Browzin*, 527 F.2d at 850 & n.15; 30 U.S.C. ' 823(d)(2)(A)(iii).

In any event, Lee was fully qualified to offer an opinion on this subject. As noted, he has a doctorate in solid state physics and was accepted as an expert witness in physics, materials characterization and analysis, and environmental monitoring. 15 FMSHRC at 1488; *see* R. Ex. 1001A. The R. J. Lee Group, which Dr. Lee headed, was experienced in analyzing air samples and particulate matter and had worked for numerous government agencies, as well as for private industry. *See* Tr. 5923-48. A portion of his expert report dealt with the impact of humidity on the susceptibility of filters to dislodgment. *See* K. Ex. 2001, at 14. Lee's opinions were based on his water spray experiments performed for the Common Issues trial. K. Tr. 3893. The Secretary offers no persuasive argument to support his contention that Dr. Lee's testimony was outside his area of expertise. *See* S. Br. at 90-91. Rather, he argues that Dr. Marple, who testified that water sprays do not reduce the susceptibility of dust deposits to dislodgment, K. Tr. 4145-49, was *more* qualified to testify in this area. S. Br. at 90-91. However, the resolution of conflicting testimony, including that of expert witnesses, is for the trier of fact. *Jackson*, 422 F.2d at 1275 (citations omitted); *see also L & J Energy*, 57 F.3d at 1088.

Here, the judge weighed partially conflicting testimony and determined that the use of scrubbers and water sprays would reduce the susceptibility of filters to dust dislodgment. 16 FMSHRC at 883. He noted inconsistencies in Marple's testimony regarding the effect of water sprays. *Id.* at 875. Marple testified that water sprays do *not* reduce the susceptibility of dust deposits to dislodgment, K. Tr. 4145-50, but he also testified that wetness of coal dust caused by scrubbers *affects* susceptibility to dust dislodgment, K. Tr. at 1551-52. We further note that Marple testified in the Common Issues trial, in response to a question from the judge, that wet particles would be more resistant to dislodgment. Tr. 3103-05; *see also* Tr. 9498-9500. The judge was well within his discretion in crediting Dr. Lee's opinion over Dr. Marple's.

Finally, the Secretary argues that the installation of scrubbers systems does not explain a decline in AWCs after March 26, 1990. S. Br. at 93. As noted in section C. 5. b., *supra*, the Secretary mischaracterizes the *Keystone* Decision. The judge merely considered the installation of scrubbers as one of several factors that could account for the decline in AWCs at Urling in late 1989 and early 1990. 16 FMSHRC at 883.

D. Statistical Issues<sup>61</sup>

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<sup>61</sup> This section addresses Issues No. 7 and 8 in the PDR, which are set forth in terms of the *Keystone* Decision. The Secretary concurrently objected to related findings and conclusions in the Common Issues Decision. PDR at 10 n.1; S. Br. at 40 n.15.

In the Common Issues trial, the Secretary attempted to establish, through the use of statistics, that AWCs were not randomly distributed across the industry, that a sharp drop in the rate of AWC citations across the industry occurred after institution of an AWC void code on March 19, 1990, and that these factors, along with other evidence, established intentional tampering by the cited operators.<sup>62</sup> In support of his proposition that statistics can be used to prove a causal relationship, the Secretary cited cases in which statistics were used to prove discrimination in employment. The judge found that the susceptibility of filters to dust dislodgment depended on a number of manufacturing and other variables and that the statistical analysis of the Secretary's expert failed to take those variables into account. 15 FMSHRC at 1521. He noted that the operators's statistical evidence showed that AWCs were non-random after the void code was instituted as well as before and that the decline in AWC citation rate commenced in September 1989. *Id.* at 1507-08; *see also id.* at 1485-86. The judge concluded that, because of the existence of many other potential causes, the statistical evidence did not establish that AWCs resulted from intentional tampering. *Id.* at 1519-22.

In *Keystone*, the Secretary attempted to establish, through the use of statistics, that a sharp drop in Urling's AWC citation rate occurred after March 26, 1990, the date the Secretary alleges ESD personnel became aware of the void code,<sup>63</sup> and that this drop established that Urling had intentionally tampered. As noted in section C.5.c., *supra*, the judge refused to infer tampering from the statistical evidence. He held that March 26, 1990, was not materially significant at Urling and that the statistical evidence did not establish that a reduction in the mine's citation rate resulted from MSHA's investigation of its dust sampling program. 16 FMSHRC at 900-01.

#### 1. Common Issues Decision

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<sup>62</sup> The Secretary states: "The institution of the AWC void code was the first official notification to the mining industry that samples with AWC characteristics were considered by MSHA to be abnormal and that some kind of government investigation into the AWC matter was under way." S. Br. at 8-9.

<sup>63</sup> In the Common Issues case, the Secretary used March 19, 1990, the date on which the void code notices were issued by MSHA, asserting that this was the date on which operators were advised of the voiding of filters with AWCs. 15 FMSHRC at 1460, 1486; S. Br. at 8-9. In *Keystone*, he used March 26, 1990. 16 FMSHRC at 878.

In his PDR, the Secretary argues that the judge erred in failing to understand the significance of the statistical evidence in supporting the conclusion that intentional tampering was the likely cause of AWCs because such conduct was highly consistent with a dramatic decline in AWCs in the spring of 1990 and other explanations are inconsistent with that decline. PDR at 15-16.

The Secretary states that his use of statistics in the Common Issues trial was designed to enable the judge to draw inferences regarding the conduct of the cited operators and to corroborate the Secretary's other evidence of intentional tampering. S. Br. at 36-37 n.12; S. Reply Br. at 15. He asserts that the judge erred when he stated that "[s]tatistical evidence alone . . . cannot prove causal relationships."<sup>64</sup> S. Br. at 36-37 n.12, quoting 15 FMSHRC at 1484 n.4. He contends that the judge had "a legally erroneous understanding of what statistical evidence can prove." S. Br. at 37 n.12. He submits that very significant weight should have been given to the statistical evidence and cites discrimination cases, in which courts have determined that statistics alone can constitute *prima facie* proof of employment or other discrimination.<sup>65</sup> *Id.* at 36-37 n.12. He also argues that Intervenor's attempts to explain AWCs do not comport with the Secretary's evidence that AWCs did not occur randomly over time and across the industry. S. Reply Br. at 15-16.

Intervenors respond that the inference, if any, to be drawn from, and the weight to be given to, the statistical evidence was within the judge's sound discretion. I. Br. at 56. Intervenor and Keystone argue that the statistical evidence deserved little weight because the underlying data were merely allegations of tampering, not objective evidence of such conduct. *Id.* at 61-62, referencing 15 FMSHRC at 1465-66; K. Br. at 94. They distinguish the discrimination cases as analyzing fundamentally different data, i.e., objective facts, and as providing evidence of probable relationships between variables, not proof of causal relationships. I. Br. at 57 & n.49. They note that MSHA first developed written protocols for AWC identification in the spring of 1990 and that the criteria for identifying AWCs also became more stringent then. *Id.* at 63. Intervenor argues that the continuing non-random distribution of AWCs across mines after the void code undermines the Secretary's position. *Id.* at 69. Intervenor further argue that AWC rates had

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<sup>64</sup> Dr. Miller conceded at the Common Issues trial, however, that none of his studies allowed him to conclude that the presence of an AWC on a filter "establishes that the weight of the coal dust on that filter was intentionally altered . . ." Tr. 3740; *see also* Tr. 3806-07.

<sup>65</sup> The Secretary relies on such discrimination cases as *Hazelwood School District v. United States*, 433 U.S. 299, 307-08 (1977); *International Brotherhood of Teamsters v. United States*, 431 U.S. 324, 339-40 (1977); *Barnett v. W.T. Grant Co.*, 518 F.2d 543, 549 (4th Cir. 1975); *Wetzel v. Liberty Mutual Ins. Co.*, 508 F.2d 239, 259 (3d Cir. 1975), *cert. denied*, 421 U.S. 1011 (1975); *United States v. Jacksonville Terminal Co.*, 451 F.2d 418, 442 (5th Cir. 1971), *cert. denied*, 406 U.S. 906 (1972); *Alabama v. United States*, 304 F.2d 583, 586 (5th Cir. 1962), *aff'd per curiam*, 371 U.S. 37 (1962). S. Br. at 35-36.

dramatically declined for five months before institution of the void code and that the data reveal a continuous decline throughout the period in question. *Id.* at 66. They point out that *any* date selected during the period will result in a rate that is statistically significantly higher before that date than after, and that the rate of decline was steeper before the void code date than after. *Id.* at 67-68. Intervenors further note the Secretary's failure to explain the comparable rate of decline in AWCs in the samples taken by MSHA inspectors before and after institution of the void code. *Id.* at 68.

The statistical evidence on which the Secretary relies was based on cited filters submitted to MSHA between August 8, 1989, and March 31, 1992. 15 FMSHRC at 1484. The data base



(the Analysis Data Set) analyzed by Dr. Miller, the Secretary's statistical expert, contains a record of all respirable dust compliance filters submitted to MSHA during that period except those from operators who pled guilty to charges related to submitting fraudulent samples. Tr. 3201-07; Gov't Ex. 227, at 4-6. Miller concluded, on the basis of a chi-square analysis, that the data were inconsistent with the hypotheses that the phenomenon leading to cited cassettes is random and that the likelihood of cited cassette generation is the same at each mine. Gov't Ex. 227, at 18. He also found a trend to decreasing cited rate over time and a marked decrease in the cited rate on or about 3/19/90. *Id.* at 21.

Preliminarily, we agree that the data here are not objective. The Secretary asserts that the AWC citations constitute objective data because the judge found Thaxton's AWC determinations to be consistent for purposes of the Common Issues case. The judge found in his Common Issues Decision that Thaxton's *classifications* were consistent and that his determinations as to whether filters should be cited under his tamper codes were sufficiently consistent so that I must consider whether an AWC establishes a violation. 15 FMSHRC at 1466-67, 1469. The judge declined, however, to credit Thaxton's opinion on AWC *causation*, finding that his opinion was not supported by systematic scientific experiments. 16 FMSHRC at 897; *see* 15 FMSHRC at 1513, 1521. We have affirmed that conclusion. Thus, the data analyzed by Dr. Miller were merely *allegations* of tampering.<sup>66</sup>

We find no error in the judge's determination that the statistical evidence on non-randomness was not persuasive of intentional tampering. Differences in AWC rates across mines do not necessarily prove tampering.

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<sup>66</sup> The judge was correct in determining that this case is not analogous to a discrimination case. 15 FMSHRC at 1464. Use of data derived from Thaxton's decisions, even if consistent as to which filters to cite, stands in marked contrast to the use of statistical data in employment discrimination cases, where statistics are generally used to compare objective data as to two groups. *See, e.g., Teamsters*, 431 U.S. at 336-42. For example, the racial makeup of a particular category of a company's workers is compared to the racial makeup of the qualified and available labor pool. Absent discrimination, the percentages should be similar. The data used by the Secretary in this case are not objective and, moreover, they are not compared to a second, control group.

Further, the drop in citation rate for the industry as a whole on March 19, 1990, derives from data as to two different groups of mines. The data were analyzed based on certain *Abefore* and *Aafter* periods. The *Abefore* period included mines that submitted filters with AWCs before March 20, 1990, and the *Aafter* period included mines that submitted filters with AWCs after March 19, 1990. *See* Govt Ex. 241, at 1. The *Abefore* data included filters from 300 mines that did not submit filters during the *Aafter* period. 15 FMSHRC at 1507; Tr. 4036-38. The *Aafter* period contained data on 762 mines that were not considered in the *Abefore* period. *Id.* Of the

2,677 mines in the Secretary's analysis, more than 1,000 were included in only one period, not both. 15 FMSHRC at 1507-08; Tr. 4036-38. Thus, the data can prove nothing as to a change over time for one group of mines or the other.

Moreover, the drop in the citation rate for the coal mining industry does not prove a drop in the citation rate for all operators in the Common Issues proceeding. Some operators had submitted their only cited sample some months before the void code date.<sup>67</sup> Others received their only citation for a sample taken many months after that date.<sup>68</sup> In fact, many operators who received multiple citations had not yet taken their first cited sample as of that date.<sup>69</sup> The statistical evidence presented by the Secretary in the Common Issues trial did not even prove that many cited operators experienced a drop in citation rates at or near the void code date.

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<sup>67</sup> For example, Big Fork Coal Co., Mine ID # 4401969, received its only citation for a sample taken on September 22, 1989; C&N Coal Co., Mine ID # 1516336, received its only citation for a sample taken on November 17, 1989; and Big Hill Coal Co., Mine ID # 1513300, received its only citation for a sample taken on October 4, 1989. *See Gov't Ex. 272.*

<sup>68</sup> For example, Bullion Hollow Enterprise, Inc., Mine ID # 4404871, received its only citation for a sample taken on April 2, 1991; LJ's Coal Corp., Mine ID # 1516637, received its only citation for a sample taken on October 25, 1990; and Wampler Brothers Coal, Inc., Mine ID # 1516722, received its only citation for a sample taken on September 25, 1990. *See Gov't Ex. 272.*

<sup>69</sup> For example, Trojan Mining, Mine ID # 1502091, received its first of 12 citations for a sample taken on July 11, 1990; Double M. Coal Co., Mine ID # 4405661, received its first of five citations for a sample taken on October 22, 1991; and Soldier Creek Coal Co., Mine ID # 4200077, received its first of three citations for a sample taken on June 11, 1990. *See Gov't Ex. 272.*

The Secretary has not alleged that the operators in this consolidated case were engaged in a conspiracy or were in any way acting in concert to violate the Mine Act. Yet he has attempted to use statistics on the citation rate for the coal mining industry as a whole not only to prove a drop in the citation rate for all operators but to prove that the drop occurred because operators learned of the AWC void code and, as a result, ceased deliberate tampering. The Secretary is essentially asserting that a drop in the rate of allegations against coal mine operators as a group provides legal support for the underlying allegations against particular operators. We conclude that, absent a conspiracy charge, a drop in the citation rate for the industry as a whole cannot, as a matter of law, be used to draw inferences regarding the conduct of all operators or to support a finding of deliberate misconduct on the part of any. Based on that determination, we conclude that the judge did not err in finding that the statistical evidence did not establish that AWCs resulted from intentional tampering. *See* 15 FMSHRC at 1520.

## 2. Keystone Decision

The judge, refusing to infer tampering from the statistical evidence, held that March 26, 1990, was not materially significant at Urling. He was unable to conclude on the basis of the statistical evidence that the reduction in the citation rate at Urling was related to MSHA's investigation of the dust sampling program at the mine. 16 FMSHRC at 901.

In his PDR, the Secretary argues that the judge erred in failing to understand the significance of the statistical evidence in supporting the conclusion that intentional tampering was the likely cause of AWC formation because such conduct was highly consistent with a sharp decline in AWCs on March 26, 1990, and other explanations are inconsistent with that decline. PDR at 15-16. Further, the Secretary asserts that the judge erred in his analysis of the statistical evidence by focusing, *inter alia*, on the bimonthly sampling period rather than recognizing the self-evident and paramount importance of March 26, 1990, as a discrete and most logical date for evaluating rates of AWCs. *Id.* at 16.

In support of the petition, the Secretary argues that the record establishes that Urling submitted 74 filters with AWCs during the seven months preceding March 26, 1990, but only one AWC after that date, and that AWC rates for other R&P mines were similar. S. Br. at 37-38. The Secretary asserts that whatever was causing the AWCs effectively ceased on March 26, 1990, and the most likely explanation was the response of R&P employees to the AWC void code. *Id.* at 37-40. The Secretary further argues that, even assuming R&P employees had sufficient knowledge of the MSHA investigation to consider altering their conduct prior to March 26, 1990, that date is of critical importance because it is when they learned that tampering would no longer yield positive results for R&P. *Id.* at 45-46. He also argues that the analysis of AWCs on a bimonthly basis masks a dramatic decline after March 26, 1990. *Id.* at 46-48. Finally, the Secretary asserts that Keystone's attempts to explain the occurrences of AWCs are unsatisfactory. S. Reply Br. at 15-16; *see also id.* at 20, 26, 27.

Keystone responds that substantial evidence supports the judge's decision. It asserts that the Secretary's analysis is flawed. It states that the date on which Keystone was alleged to have gained knowledge of the void code, March 26, 1990, is irrelevant because their personnel were aware almost two months prior to that date of a criminal investigation into dust sampling conducted by MSHA. K. Br. at 94-99. Keystone also argues that, even if these flaws in the Secretary's analysis are ignored, the statistical evidence does not establish that AWCs resulted from tampering. *Id.* at 94.

### a. Significance of March 26, 1990

The judge concluded that March 26, 1990, was not the most logical cutoff point for comparing AWC rates. 16 FMSHRC at 900. He found that the evidence shows that the ESD personnel and Keystone management were aware of the investigation . . . 6 weeks or more before the notification of the void code . . . . *Id.*

In early February 1990, Dennis Hellgren, the Director of Safety for R&P mines, learned that MSHA was investigating R&P's dust sampling program. 16 FMSHRC at 888. He had received a telephone call from the superintendent of the Florence No. 2 mine, who related that two foremen, Charlie McGinnis and Norm Thompson, had been contacted by MSHA special investigators, who were looking into R&P's dust sampling program. Both foremen had taken notes of their interviews with the MSHA investigators, and those notes were sent to Hellgren.<sup>70</sup> Hellgren knew that special investigators normally handled criminal investigations. K. Tr. 2490-91. From his review of the notes, Hellgren knew that the investigators were asking questions concerning cassettes with white centers and tampering. K. Tr. 2476-78, 2492-97; *see* 16 FMSHRC at 888. He called the superintendents of other R&P mines to find out whether MSHA investigators had contacted their foremen about the dust sampling program and asked them to report back to him. K. Tr. 2477-78, 2486-88; K. Ex. 2073; *see* 16 FMSHRC at 888.

Hellgren called but was unable to reach the MSHA agent in charge of special investigations at the local district office; instead, he spoke to an investigator, who confirmed that MSHA was collecting information but who refused to explain the reason. K. Tr. 2478-79. On February 2, while Hellgren was present, Edward Onuscheck, a former vice-president of safety and a consultant to R&P, had a telephone conversation with Jerry Spicer, an MSHA supervisor. Spicer said that a preliminary inquiry, on a nationwide basis, was being made into respirable dust sampling. K. Tr. 2479-84; K. Ex. 2073; *see* 16 FMSHRC at 888.

On or about February 3, after reviewing Thompson's and McGinnis's notes, Hellgren showed them to Donald Eget, supervisor of R&P's ESD laboratory, and asked Eget what he thought the investigators were seeking. K. Tr. 2299-2300, 2497-98; *see* 16 FMSHRC at 888. Other employees of the ESD laboratory also learned of the MSHA investigation. Dust technician, Robert Bollinger, Sr., knew about the investigation because MSHA investigators came to his home looking for his son, who was a foreman at an R&P mine. K. Tr. 3016-19. Shawn Houck, who worked under Eget's supervision, learned of an MSHA investigation from Bollinger. K. Tr. 2120-21. Foreman McGinnis told Thomas Hollern, a dust technician in the R&P laboratory, about the MSHA investigation in early February. K. Tr. 3256-58, 3294. Douglas Snyder and Herbert Gleditsch, other dust technicians, also learned of the MSHA investigation and knew that investigators were talking to foremen. K. Tr. 1908-11, 2677-78, 2728.

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<sup>70</sup> Thompson's notes are dated January 25, 1990, K. Ex. 2075, while McGinnis's are dated February 1, 1990, K. Ex. 2076. McGinnis's notes indicate that he was interviewed at his home and shown dust filters with AWCs. *Id.*; *see* K. Tr. 2496-97. Neither Thompson nor McGinnis testified at trial.

On February 20, 1990, an MSHA investigator, Joe Totorio, telephoned Hellgren to set up a meeting with R&P officials. Totorio indicated to Hellgren that MSHA was working with the U.S. Attorney's office in investigating dust cassettes with white spots in the centers. Hellgren asked Totorio which of the R&P mines were being investigated and was told that Urling was one. In a second telephone conversation that day, Totorio identified the lawyer from the U.S. Attorney's office with whom he was working. K. Tr. 2499-2507; K. Ex. 2074; *see* 16 FMSHRC at 888. Following these conversations, Hellgren told R&P's legal department that the company was under investigation by the U.S. Attorney. K. Tr. 2507-08. Hellgren also told Eget about the conversation with Totorio. K. Tr. 2300-01, 2508-09; *see* 16 FMSHRC at 888.

To summarize, beginning in early February 1990, officials at R&P, from its top management to its first-line supervisors, had knowledge of MSHA's investigation into dust cassette tampering. A mine superintendent first telephoned R&P's safety director to report MSHA's efforts to interview foremen, and he in turn put every R&P mine superintendent on notice to report any MSHA contacts with foremen. The safety director's February 20 telephone conversation with an MSHA investigator confirmed that the investigation involved allegations of criminal misconduct. In early February and again on the 20th, details of the investigation were passed along to Donald Eget, whom the judge found had an opportunity to tamper with dust cassettes. 16 FMSHRC at 888-89, 901; K. Tr. 2495-98, 2508-09. These communications diffused knowledge of the investigation among R&P managers. ESD laboratory employees, including dust technicians, also became aware of the investigation. 16 FMSHRC at 890-92; K. Tr. 1908-11, 3016-19, 3355-59.

Substantial evidence in the record supports the judge's finding that R&P employees were aware of MSHA's criminal investigation some six to seven weeks prior to MSHA's notification that dust sample filters with AWCs would be voided. 16 FMSHRC at 900. Further, we reject the Secretary's argument that, even if R&P employees knew of the investigation earlier, March 26, 1990, is critical because they learned on that date that tampering would no longer be beneficial. The Secretary has presented us with no evidence of why, if R&P personnel had been tampering with dust cassettes, they would have been more likely discouraged by the institution of the void code than by the special investigation and the prospect of criminal prosecution. We also note that, from early February 1990, the time the judge found R&P's employees had knowledge of the investigation, until March 26, 1990, Urling's citation rate actually rose sharply, from zero in the sampling weeks of February 5, 12 and 26, to 50% in the week of March 19, 1990. K. Gov't Ex. 501.

Significant to the judge's rejection of Miller's analysis of the rate of AWCs at Urling before and after March 26, 1990, was the unexplained *overall* decline in the rate of AWCs from September of 1989 through April of 1990. 16 FMSHRC at 900. Indeed, in other periods prior to March 1990, the rate of AWCs also decreased, sometimes more sharply than it did after March 26. *See* 16 FMSHRC at 905 (App. A); K. Ex. 2129B; K. Gov't Ex. 500, at Attach. A1. Although the Secretary states in his brief that the data picked the date, S. Reply Br. at 21, Dr. Miller testified that the date March 26, 1990, was given to him by the Secretary's trial counsel for

use in his analysis. K. Tr. 788-789. The Secretary offered no explanation, *see* Oral Arg. Tr. 116-17, to distinguish earlier declines in the rate of AWCs from the decline that occurred after March 26, 1990, which he asserts is indicative of the cessation of intentional tampering.

We affirm the judge's conclusion that the date March 26, 1990, is not materially significant in the *Keystone* proceeding and that the drop after that date in Urling's citation rate does not establish intentional tampering.

b. Use of Bimonthly Data<sup>71</sup>

The Secretary challenges the statistical analysis of the rate of AWCs by Keystone's expert, Dr. Roth, because it was based on bimonthly data, which the Secretary alleges masks the decline after March 26, 1990.<sup>72</sup> S. Br. at 46-48. The judge accepted Roth's approach in using bimonthly data because operators carry out dust sampling on a bimonthly basis. 16 FMSHRC at 900; *see* 30 C.F.R. ' ' 70.207(a) & 70.208(a) (1994).

Miller conceded that, once March 26, 1990, loses its significance as the date on which R&P employees became aware of the MSHA investigation, as the judge held and we have affirmed, there was nothing *unnecessarily wrong* with using a two-month period to analyze the rate of AWCs. K. Tr. 845-47. It is also apparent, from the judge's consideration of Urling's AWC rate before and after March 26, 1990, that he also examined weekly data and did not rely exclusively on Roth's bimonthly analysis. 16 FMSHRC at 900, 905 (App. A). Thus, we conclude that the judge did not err in relying in part on Dr. Roth's analysis based on bimonthly data.

E. Exclusion of Third-Party Criminal Evidence<sup>73</sup>

Prior to the Common Issues trial, the operators sought to exclude the testimony of five individuals on the Secretary's witness list who were expected to testify about methods by which dust could be deliberately dislodged from filters or fraudulent samples created. Mot. to Exclude S. Case-Specific Witnesses from the Common Issues Trial, filed Nov. 12, 1992; Tr. 79-80, 85-88 (Prehr's Conf. Nov. 17, 1992). Those individuals included Randy Thomas, a former R&P employee, and a principal and an employee of Triangle Research Corporation (*Triangle*).

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<sup>71</sup> Bimonthly analysis has the effect of smoothing the data over time. 16 FMSHRC at 880. *Compare* 16 FMSHRC at 905 (App. A) *with Id.* at 906 (App. B).

<sup>72</sup> In the Common Issues proceeding, Dr. Roth analyzed weekly data. *See* R. Ex. 1041, Attachs. B & C. In that case, Dr. Miller used March 19, 1990, rather than March 26, 1990, as the pivotal time in his analysis. 15 FMSHRC at 1485. We note that both experts tailored their analyses to the issues before the judge in the respective cases.

<sup>73</sup> This section addresses Issue No. 14 of the PDR.



S. Witness List filed Oct. 30, 1992. At the pretrial hearing, the judge granted the operators' motion, excluding the testimony because it was not relevant to the issue to be determined in the Common Issues trial, i.e., whether an AWC on a cited filter cassette . . . establishes that the operator intentionally altered the weight. Tr. 82-83, 89 (Prehearing Conf. Nov. 17, 1992).

At the Common Issues trial, the Secretary, in examining Mr. Thaxton on filters classified as tamper code 10, sought to question him regarding Triangle and offered exhibits involving guilty pleas of individuals and entities in criminal cases involving Triangle and its employees and other operators.<sup>74</sup> Tr. 294-96. He offered the evidence to show the accuracy of Mr. Thaxton being able to discern which cassettes [had] been deliberately altered, and also discern the method by which they were altered. Tr. 296-97. The Secretary asserted that evidence of those guilty pleas would show that, at least as to tamper code 10, Mr. Thaxton was very accurate. Tr. 296-97. The judge sustained the operators' objection and excluded the evidence. Tr. 307. He let stand Thaxton's testimony that tamper code 10 filters came from a particular geographical area (Kentucky, Virginia, and West Virginia) and were largely submitted by Triangle. Tr. 305. During redirect examination of Thaxton, the Secretary renewed his request that the evidence be admitted, again urging that it would show Thaxton's ability to identify filters that had been deliberately altered. Tr. 1115-20. Again, the judge sustained the operators' objection, finding the evidence irrelevant and not necessary to rehabilitate Thaxton as a witness. Tr. 1119-20. The Secretary made offers of proof regarding the five individuals whose testimony was excluded at the pretrial hearing as well as several other documents involving criminal pleas. Excluded Exs. 330-34; Tr. 307-11, 1120; S. Statement and Intro. to Offers of Proof Reg. Potential Testimony of Pysher, Murray, Thomas, Ellis, and White, filed Jan. 7, 1993.

In the PDR, the Secretary asserts that the judge erred in the Common Issues trial in excluding evidence of criminal tampering and evidence from those who had witnessed or participated in tampering because it would have played a substantial role, when weighed with other evidence, in establishing that intentional tampering was the most likely cause of AWCs and was clearly relevant to the general question of motive in tampering . . . . PDR at 20-21. He further contends that the evidence of criminal conduct was relevant to showing the opportunity and the incentive to tamper by R&P personnel, S. Br. at 101, S. Reply Br. at 49-50, and that the judge's ruling precluded the possibility of consideration of most of this evidence at the [Keystone] hearing. S. Br. at 100.

Intervenors argue that the evidence was properly excluded under the terms of the September 1992 Order, which provided that evidence of intent by individual mine operators was not an issue in the Common Issues proceeding. I. Br. at 53-54. Keystone and Intervenors also argue that the evidence was properly excluded at the Common Issues trial because it was neither relevant nor probative and because evidence concerning operators who were criminally liable

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<sup>74</sup> Tamper code 10 was developed in the fall of 1990, after initiation of the void code. Filters classified under this code had a slightly darker center, less than 6mm in diameter, surrounded by a broad lighter ring. 15 FMSHRC at 1462; Tr. 292-93, 8264-65.

could not be used to establish that other operators acted in a similar manner. Oral Arg. Tr. 198-99; K. Br. at 52; I. Br. at 54.

We conclude that the judge did not err in excluding the evidence at the Common Issues trial. As noted in section B. 3., *supra*, the judge, in the September 1992 Order, set forth the

issue to be determined in the Common Issues trial as whether an AWC establishes that the operator intentionally altered the weight of the filter. 14 FMSHRC at 1677. The intent of a particular mine operator or group of operators [was] not an issue in the common issues trial . . . .  
*Id.* Moreover, evidence that some AWCs were caused by deliberate conduct would not have established that all or even most AWCs were caused by deliberate conduct. We conclude that the judge's evidentiary ruling is consistent with the September 1992 Order and was not an abuse of discretion.

We also agree with Keystone and Intervenors that the evidence concerning guilty pleas by several operators could not properly be used to establish motive, opportunity, incentive, or the likelihood of intentional tampering as to others because such evidence does not prove that operators, in general, had acted similarly.

Further, it is not apparent that, if the testimony regarding Triangle and the challenged exhibits had been admitted into evidence, the judge would have analyzed tamper code 10 filters differently. The evidence was proffered for the purpose of confirming Mr. Thaxton's ability to *identify and categorize* AWCs, particularly those in tamper code 10. The judge found the evidence neither relevant to the case nor necessary to rehabilitate Mr. Thaxton as a witness. Tr. 1119-20. In fact, the judge found that classification of AWCs by Thaxton under his tamper codes was consistently applied . . . . 15 FMSHRC at 1513. Moreover, the judge allowed testimony from Thaxton that the vast majority of tamper code 10 filters came from mines serviced by Triangle, whose principal and employee were parties to a criminal plea agreement. Tr. 295, 305. Thus, the judge had before him evidence of criminal activity with respect to tamper code 10 filters and referred to the criminal convictions in the Common Issues Decision. 15 FMSHRC at 1520.

Contrary to the Secretary's argument, S. Br. at 100-101, Oral Arg. Tr. 205, the judge's exclusion of the proffered evidence in the Common Issues trial *did not preclude* its consideration in *Keystone*. Randy Thomas, one of the individuals whose testimony was excluded from the Common Issues trial, testified as the Secretary's witness in *Keystone*. K. Tr. 1307; 16 FMSHRC at 892, 902. Further, at trial, after Keystone had cross-examined Thaxton using exhibits relating to the criminal pleas involving Rushton Mining Company and Peabody Coal Company, those exhibits were accepted into evidence on the Secretary's motion. K. Tr. 1212-16, 1295-97; K. Exs. 2117, 2118. Keystone Exhibit 2118 included criminal indictments and plea agreements relating to Peabody and made up a portion of the Secretary's Exhibit 334, which was offered and excluded at the Common Issues trial. The Secretary did not offer into evidence any other testimony or exhibits on this issue that were excluded from the Common Issues trial. Thus, the Secretary's argument on review, that the judge's exclusion of this evidence in the Common Issues proceeding precluded its consideration in *Keystone*, is without merit.

## F. Other Keystone Issues

### 1. Handling of Sampling Equipment at ESD<sup>75</sup>

The judge found that changes in the handling of sampling equipment at ESD could have been a factor in the decrease of AWCs at Urling in the spring of 1990. 16 FMSHRC at 884. He found that ESD supervisor Donald Eget, who handled the equipment more roughly than other ESD personnel, did not handle samples or sampling equipment from April 9 until May 10, 1990, and that dust technician Douglas Snyder and the other technicians were more careful in their handling of the equipment as a result of MSHA's investigation. *Id.*

The Secretary contends that substantial evidence does not support a finding by the judge that changes occurring on or about March 26, 1990, in handling of dust sampling equipment at ESD explained the decline in AWCs after that date. PDR at 18; S. Br. at 96-100. To support his argument, the Secretary states that both Eget and his laboratory assistant Shawn Houck admitted that they had not modified their handling practices after March 26, 1990. S. Br. at 97. He also argues that Snyder could not identify the time at which he made changes in his handling of the sampling units. *Id.* Keystone counters that the judge found handling changes in the spring of 1990 to be only one of many possible explanations for the decline. K. Br. at 103-07.

In asserting that the judge relied on changes in handling to explain the decline of AWCs after March 26, 1990, the Secretary mischaracterizes the *Keystone* Decision. The judge found that handling changes by ESD personnel, *in addition to* other phenomena at Urling, *could* have been factors in the decrease in the number of cited AWCs in the Spring of 1990.<sup>@</sup> 16 FMSHRC at 884; *see also id.* at 882-86. Substantial evidence supports that finding.

Eget, Houck, and Snyder testified that the sampling units had been subjected to rough handling by ESD personnel. For example, Snyder testified that, in transporting pumps, he dropped the pumps, caught protruding hoses on door latches, and slammed hoses in doors. K. Tr. 1838, 1849-51. Houck testified that the dust technicians often left the pumps in disarray at the ESD with pumps piled on top of each other and hoses tangled together. K. Tr. 2084-86, 2159-60. Eget was rough in his treatment of the pumps; for example, he carelessly threw pumps into his vehicle when transporting them and swung pumps onto the table at the ESD laboratory. K. Tr. 2178-80, 2244-48, 2250-52.

Houck testified that, although he did not know of any changes in the conduct of the respirable dust program and that it was hard to reduce the rate of accidentally dropped cassettes, he thought everyone, including the technicians, became *aa* little bit more careful of the handling of the pumps.<sup>@</sup> K. Tr. 2179, 2203, 2214-15. Although Eget did testify that he had not changed his behavior after March 26, 1990, he did not handle pumps from early April until May 10, 1990. K.

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<sup>75</sup> This section addresses Issue No. 12 in the PDR.

Tr. 2319-20, 2362, 2384. Snyder could not pinpoint exactly when his behavior changed, but he testified that he became more careful in his pump handling. See K. Tr. 1921. Other ESD dust technicians also testified to using greater care. Dust technician Herbert Gleditsch, who at times sampled at Urling, testified that he handled pumps more carefully. K. Tr. 2713-14, 2733-34. Dust technician Thomas Hollern, who sampled at R&P's Heshbon mine, testified that he became more careful after the AWC investigation. K. Tr. 3272-76, 3283-84.

We conclude that substantial evidence supports the judge's finding that changes in the handling practices of ESD personnel did occur and we affirm that finding. We also affirm the judge's conclusion that these changes could have been factors causing the decrease in cited AWCs in the spring of 1990.

## 2. Optional Quartz Samples<sup>76</sup>

The judge drew no conclusions with respect to the fact that no AWCs were noted or cited by MSHA on the optional quartz samples<sup>77</sup> concurrently submitted by Urling and other R&P mines. 16 FMSHRC at 887-88. The Secretary asserts that the judge erred in failing to accord weight to this evidence. PDR at 14-15; S. Br. at 48-55. He contends that the Urling and R&P quartz sample filters did not display AWCs even though they were taken in the same manner, under the same conditions, and at the same time as the respirable coal dust samples that exhibited AWCs. *Id.* The Secretary asserts that the absence of AWCs on the quartz samples indicates tampering because, for a quartz sample to be accepted as valid by MSHA, it must be sufficiently heavy and, thus, R&P would not have had the same incentive to remove dust from a quartz sample as from a compliance sample. S. Br. at 49-51; see K. Tr. 1109, 1122-24. Keystone

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<sup>76</sup> This section addresses Issue No. 6 in the PDR.

<sup>77</sup> If a mine's atmosphere contains more than 5% quartz, the maximum level of respirable dust permitted is reduced below 2.0 milligrams per cubic meter. K. Tr. 1104-05; 30 C.F.R. §§ 70.101, 71.101, 90.101 (below 1.0 milligrams per cubic meter where a Part 90 miner is exposed). If more than 5% of quartz is detected in a sample drawn by an inspector, an operator is given the option of submitting additional samples for evaluation. K. Tr. 1119. The results of the optional quartz samples drawn by the operator are then averaged with the results of the inspector samples to determine the mine's respirable dust standard. K. Tr. 1119.

responds that the judge properly rejected the Secretary's evidence on optional quartz samples because the appearances of those filters could not be evaluated. K. Br. at 90-92.

Paul Parobeck, chief of the instrumentation and analytical branch at the PHTC laboratory and overseer of quartz sampling and the Secretary's only witness on this issue, testified that none of the quartz sample filters submitted by Urling and other R&P mines from August 1989 through March 31, 1991, had AWCs. K. Tr. 1124-30. Parobeck's testimony was based on computer records, not on his personal examination of the filters. K. Tr. 1124-30, 1140; K. Gov't Ex. 506. The PHTC employees who had reviewed the filters were not called as witnesses. 16 FMSHRC at 887-88; *see* K. Tr. 1140-42. Moreover, the filters were no longer in existence<sup>78</sup> and no photographs of them were introduced at the trial or made available for examination prior to the trial. 16 FMSHRC at 887; *see* K. Tr. 1128-30, 1140-41; K. Gov't Ex. 506. Thus, the operators' experts did not have an opportunity to examine the filters and compare them with cited filters or form opinions about them. We conclude that the judge did not err in according no weight to the Secretary's evidence regarding Urling's quartz sample filters or in refusing to infer from such evidence that Keystone or R&P personnel had engaged in tampering.

### 3. Credibility of ESD Personnel<sup>79</sup>

*Keystone*, unlike the Common Issues case, involved allegations of tampering by the employees of a specific operator. The judge's evaluation of the credibility of employee witnesses was critical and properly assumed a significant role in his decision. *See* 16 FMSHRC at 903. The judge heard the testimony of 33 witnesses from Keystone and the ESD laboratory; all employees of ESD during 1989 and 1990 testified. 16 FMSHRC at 859, 888, 901; *see generally* K. Tr. The judge accepted as truthful the testimony of these employees that they did not tamper with dust samples. 16 FMSHRC at 903.

The Secretary argues that the judge erred in several respects in his credibility determinations as to ESD personnel. PDR at 18-19. He asserts that the judge gave undue weight to the testimony and credibility of ESD witnesses and contends that the judge's credibility determinations are undermined because that testimony conflicts. He objects to the judge's finding that ESD personnel lacked incentive to tamper and he objects to the judge's failure to credit the testimony of Randy Thomas and Jack Szentmiklosi. *Id.* at 19. He also asserts that the judge's credibility determinations conflict with the overwhelming weight of the other evidence. *Id.* at 19-20. Keystone responds that the judge's credibility determinations are fully substantiated by the record and, in accordance with longstanding precedent, are entitled to significant weight. *See* K. Br. at 36-45, 53-57.

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<sup>78</sup> The quartz evaluation process itself destroys the quartz sample filters. K. Tr. 1112-13.

<sup>79</sup> This section addresses Issue No. 13 in the PDR.

The Commission has long held that a judge's credibility determinations are not to be overturned lightly and are entitled to great weight. *Farmer v. Island Creek Coal Co.*, 14 FMSHRC 1537, 1541 (September 1992); *Quinland Coals, Inc.*, 9 FMSHRC 1614, 1618 (September 1987); *Penn Allegh Coal Co.*, 3 FMSHRC 2767, 2770 (December 1981); *Hollis v. Consolidation Coal Co.*, 6 FMSHRC 21, 25 (January 1984). "Since the ALJ has an opportunity to hear the testimony and view the witnesses he is ordinarily in the best position to make a credibility determination." *Ona*, 729 F.2d at 719. The *Ona* court observed that, "As a general rule courts are bound by the credibility choices of the ALJ, even if they might have made different findings had the matter been before [them] . . . de novo." *Id.* at 719, citing *Gulf States Mfrs., Inc. v. NLRB*, 579 F.2d 1298, 1329 (5th Cir. 1978).

The judge, noting several elements of demeanor that must be considered in determining credibility, also recognized that his credibility determinations must take into account the extensive factual, scientific, and statistical evidence and the witnesses' prior knowledge of sanctions for tampering. 16 FMSHRC at 901. His analysis focused on Eget and Houck because he determined that only they, among ESD personnel, had substantial opportunity to tamper. *Id.* In evaluating their testimony, the judge stated that he was "impressed [with] the backgrounds of Eget and Houck and their forthrightness on the witness stand" and that he "carefully considered their testimony." *Id.* at 902. We conclude from our review of this record that the judge did not make these credibility resolutions lightly. The judge found these individuals to be truthful witnesses and his acceptance of their denials of tampering is linked to his careful consideration of the other evidence. *See id.* at 903. Thus, the judge properly based his credibility determinations on his evaluation of the witnesses and their demeanor and did so in the context of the record before him.

The Secretary argues that, in crediting ESD personnel, the judge overlooked a number of inconsistencies in their testimony. S. Br. at 109-11 & n.38. The Secretary identifies two points on which Eget and Houck differed: Eget did not regard his handling as rough, whereas Houck did; Houck recalled performing a dust removal experiment that Eget did not remember. *See PDR* at 18, citing 16 FMSHRC at 862, 890; S. Br. at 109-10. Neither of these differences provide reason to discredit the witnesses or overturn the judge's determination. The perception of one's own behavior frequently differs from how it is perceived by others. Eget's failure to recall one experiment does not make his testimony that he had not tampered unworthy of belief by the judge, who had the opportunity to listen to his testimony and observe his demeanor. We conclude that such insignificant differences in testimony do not provide sufficient basis to overturn the judge's credibility determinations.

The Secretary also argues that the judge erred in basing his decision to credit ESD personnel on their lack of incentive to engage in tampering because they knew that tampering could subject them to punishment. S. Br. at 106-07. Specifically, the Secretary contends that the judge erred by: (1) failing to recognize that, on both "an economic plane" and "a psychological plane," employees have an incentive to help their employer; and (2) by stating that R&P's small number of respirable dust violations indicates a lack of incentive. *Id.* at 107-09. The judge

expressly recognized that mine operators and agents had pled guilty to criminal tampering. 16 FMSHRC at 901. The judge's statement as to lack of incentives responded to the Secretary's asserted motivation for ESD personnel to engage in tampering, i.e., to avoid penalties, to avoid resampling, and to avoid the enormous potential costs of non-compliance. *Id.* at 902. The judge rejected these asserted incentives as very weak and, when considered with R&P's relatively small history of dust violations, to be almost non-existent. *Id.* It was in this context that the judge referenced the employees' knowledge of criminal sanctions and found, on balance, that the evidence showed a lack of incentive rather than an incentive to tamper, as argued by the Secretary. *Id.*

In addition, the record reveals that ESD supervisor Eget had a strong concern relating to MSHA investigations into tampering and possible sanctions. *See* K. Tr. 2322-26. In 1982, Eget wrote a memo cautioning safety personnel of the possibility of criminal investigations and advising them to conduct themselves in a responsible manner and beyond reproach. K. Ex. 2036. Because of an earlier MSHA investigation, Eget kept a logbook to record the appearance of every sample sent to MSHA. K. Tr. 2260-61, 2377-80. Eget's logbook noted that two of the filters (369468 and 294719) submitted to MSHA and later cited would be voided for having been taken on a low production shift. K. Ex. 2006A; K. Tr. 2279-80. We find no apparent incentive for Eget to remove dust from filters that he knew were going to be routinely voided by MSHA. Thus, the judge's finding of lack of incentive is supported as to Eget.

As to other ESD personnel, dust technician Robert Bollinger, Sr. testified that he and others who worked under Eget's supervision had nothing to gain from tampering. K. Tr. 3035-36. Dennis Hellgren, R&P's Director of Safety, testified that he knew of no incentive for personnel to tamper. K. Tr. at 2540. Hellgren also stated that Eget would not have put up with tampering and that Hellgren would have fired Eget if he had tampered with filters. K. Tr. at 2541.

Further, a review of the record indicates that, before the judge, the Secretary neither offered evidence on, nor argued his theory regarding, employees' incentive to help their employers. We do not accept the Secretary's theory as true on its face because even if, in much of their behavior, employees have an incentive to help their employers, it is not evident that, in general, they would engage in tampering or other illegal behavior to help their employers. Consequently, we reject the Secretary's theory as a basis for reversing the judge.

The Secretary argues that the judge's reasoning with regard to the effect on incentives of R&P's small history of respirable dust violations is circular in nature, because the small history itself may have resulted from tampering. S. Br. at 107-08. In deciding to credit denials of tampering by ESD witnesses, the judge relied primarily on his evaluation of their truthfulness and their demeanor in the context of the other evidence. 16 FMSHRC at 901-03. Before taking into consideration R&P's small history of dust violations, he found the Secretary's asserted incentives to be minimal. *Id.* at 902. Moreover, his determination as to ESD employees' credibility was based only marginally on their lack of incentive. Thus, any error by the judge in relying on R&P's violation history is harmless.



We also reject the Secretary's assertion that the judge failed to give his reason for discounting the testimony of Jack Szentmiklosi, that he had heard a conversation between Bollinger and R&P's then Vice-President of Operations, Robert Anderson, on the subject of the tampering investigation. S. Br. at 110 n.39. As the judge explained, both Anderson and Bollinger testified that they did not recall such a conversation. 16 FMSHRC at 891, 893. In choosing to credit Bollinger and Anderson, the judge referenced the same reasons he had set forth earlier for crediting Eget and Houck. *Id.* at 903. The PDR further takes issue with the judge's discounting of the testimony of Randy Thomas, who testified to alleged tampering at ESD some 15 years earlier, PDR at 19; K. Tr. 1316-19, but the Secretary offers no support in his briefs for this objection. We conclude that the judge did not abuse his discretion in weighing Thomas's testimony against that of Gary Foehrenbach and in determining that Thomas misunderstood what he saw or that his recollection was dimmed by the passage of time. 16 FMSHRC at 902.

Finally, we reject the Secretary's assertion that the judge's credibility determinations are entitled to no deference because they are irreconcilable with the weight of the evidence. S. Br. at 103. The contrary evidence of tampering referenced by the Secretary, which he characterizes as *overwhelming*, i.e., that nothing explains the sudden and dramatic decline in AWCs except the fact that on March 26, 1990, R&P learned that MSHA believed that the existence of AWCs indicated tampering, *id.*, provides no basis on which to overturn the judge's credibility determinations. We have affirmed the judge's findings and conclusions as to the scientific and statistical evidence as well as the handling of sampling equipment at ESD. Thus, in our view, the judge's crediting of ESD employees' testimony that they did not engage in tampering is not irreconcilable with the record evidence but is in accord with it.

The Secretary's contentions do not compel the extraordinary step of overturning the judge's credibility determinations.<sup>80</sup> *See Hollis*, 6 FMSHRC at 25.

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<sup>80</sup> We have considered the cases on which the Secretary relies for extending diminished weight to the judge's credibility determinations. S. Br. at 28-30, 102-05, 110. Those cases offer no support for the Secretary's position; they recognize the general rule that, absent exceptional circumstances, appellate courts do not overturn findings based on credibility resolutions. *Medline Industries, Inc. v. NLRB.*, 593 F.2d 788, 795 (7th Cir. 1979); *Breeden v. Weinberger*, 493 F.2d 1002, 1010 (4th Cir. 1974) (administrative law judge has unique advantage in making credibility determinations); *NLRB v. Brooks Cameras, Inc.*, 691 F.2d 912, 915 (9th Cir. 1982) (weight is given to the administrative law judge's determinations of credibility for obvious reasons). None of the exceptions to the general rule on review of credibility resolutions presented in those cases apply here. The judge's determinations were not self-contradictory (*Ona Corp.*, 729 F.2d at 719), were not based on irrational criteria (*Breeden*, 493 F.2d at 1010), and did not contradict the evidence (*Medline*, 593 F.2d at 795; *NLRB v. Huntington Hospital, Inc.*, 550 F.2d 921, 924 (4th Cir. 1977)). Unlike many of the Secretary's proffered cases, *see, e.g., NLRB v. Interboro Contractors, Inc.*, 388 F.2d 495, 501 (2d Cir. 1967) (credibility determinations not supported by record); *Victor Products Corp. v. NLRB*, 208 F.2d 834, 839 (D.C. Cir. 1953) (sense of record did not support finding), the judge's credibility determinations are supported by the record.

### III.

#### Conclusion

We have concluded that the judge articulated and applied the appropriate burden of proof in both the Common Issues Decision and in the *Keystone* Decision. We have determined that the judge did not abuse his discretion in rejecting Mr. Thaxton's opinion on AWC causation, in crediting Dr. Lee's opinion on AWC causation, in admitting and crediting Dr. Corn's opinions on the effect of filter-to-foil distance and the size and shape of dust particles, and in admitting and crediting Dr. Lee's opinion on the effect of scrubbers. We have found that

substantial evidence supports the judge's findings that manufacturing variables affect the susceptibility of filters to AWC formation and could have been a factor, among others, in the decline of AWCs.

We have also affirmed the judge's conclusion that the statistical evidence did not establish that AWCs resulted from intentional tampering or that, in *Keystone*, a reduction in the mine's citation rate resulted from MSHA's investigation of its dust sampling program. We have concluded that the judge did not err in excluding evidence of criminal tampering from the Common Issues trial and that its exclusion did not preclude its consideration at the *Keystone* trial.

As to *Keystone*, we have found that substantial evidence supports the judge's finding that changes in the handling of sampling equipment occurred at Urling and that those changes could have been factors in the decrease in cited AWCs. We have also concluded that the judge did not err in according no weight to the Secretary's evidence as to quartz samples and have declined to overturn the judge's credibility determinations as to ESD personnel.

Accordingly, we affirm both the Common Issues Decision and the *Keystone* Decision. The 75 citations at issue in *Keystone* are vacated.

The judge's determination in the Common Issues Decision, i.e., that the presence of an AWC on a filter does not, in itself, prove deliberate conduct and a violation of section 209(b), applies to all citations in Master Docket 91-1. It serves as precedent on that issue in other dust cases, not on the Master Docket, that have been stayed pending the outcome of this case.

Within 45 days after issuance of this decision, the Chief Administrative Law Judge shall issue an order in the cases on stay, setting forth a schedule for submissions from the parties as to disposition of those cases.

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Joyce A. Doyle, Commissioner

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Arlene Holen, Commissioner

Commissioner Marks dissents and will file his opinion later.

