CCASE:

SOL (MSHA) V. FREEMAN UNITED COAL MINING

DDATE: 19790531 TTEXT: Federal Mine Safety and Health Review Commission (F.M.S.H.R.C.)

Office of Administrative Law Judges

SECRETARY OF LABOR,
MINE SAFETY AND HEALTH
ADMINISTRATION (MSHA),
PETITIONER

Civil Penalty Proceeding

Docket No. VINC 78-394-P A/O No. 11-00599-02009V

v.

Orient Mine No. 6

FREEMAN UNITED COAL MINING COMPANY,

RESPONDENT

DECISION

Appearances: Leo J. McGinn, Esq., and Sidney Salkin, Esq., Office

of the Solicitor, Department of Labor, for

Petitioner

Harry M. Coven, Esq., Gould & Ratner, Chicago, Illinois,

for Respondent

Before: Judge Cook

I. Procedural Background

On June 7, 1978, a petition was filed by the Mine Safety and Health Administration (MSHA) for the assessment of civil penalties against Freeman United Coal Mining Company for alleged violations of 30 CFR 75.601 and 30 CFR 75.604. This petition was filed pursuant to section 110(a) of the Federal Mine Safety and Health Act of 1977, 30 U.S.C. 820(a) (1977 Act). An answer to the petition was filed on June 19, 1978.

On June 26, 1978, MSHA filed a motion for production of documents, and the motion was granted by an order dated July 7, 1978.

Notice of hearing was given on July 14, 1978. The hearing was held on September 26, and September 27, 1978, in Chicago, Illinois. Representatives of both parties were present and participated.

At the hearing on September 26, 1978, the parties submitted a proposed settlement agreement as to the alleged violation of 30 CFR 75.601. Stipulations were entered into as to both the history of violations and the annual tonnage produced at the Orient No. 6 Mine and the annual tonnage produced by the Freeman United Coal Mining Company. An order approving the proposed settlement is included in this decision.

When the hearing opened on September 26, 1978, settlement proposals were submitted in the following additional cases involving the same parties: Docket Nos. VINC 78-392-P, 78-393-P, 78-396-P, 78-397-P. Settlement proposals were not submitted in the following companion cases: VINC 78-49-P and 78-395-P. It was proposed that the record be consolidated as to all cases, but the Respondent preferred to maintain separate transcripts of the proceedings in Docket Nos. VINC 78-49-P, 78-395-P, and the remaining contested withdrawal order in the present case, VINC 78-394-P. The record of the September 26, 1978, settlement negotiations was consolidated with the separate records of the remaining companion cases.

The hearing on the alleged violation of 30 CFR 75.604 was held on September 27, 1978. A schedule for the submission of post-hearing briefs was agreed upon at the conclusion of the hearing, but a delay in the receipt of transcripts and other problems experienced by counsel forced a revision of the briefing schedules. Under the revised schedule, briefs were due on or before February 22, 1979, and reply briefs were due on or before March 3, 1979. Freeman filed its post-hearing brief on February 22, 1979. MSHA filed no post hearing brief. No reply briefs were filed.

II. Violations Charged

Order No. 6-0172 (1 LDC), October 29, 1976, 30 CFR 75.604 Order No. 6-7016, December 29, 1976, 30 CFR 75.601

III: Evidence Contained in the Record

A. Stipulations

Stipulations were entered into by the parties on September 26, 1978, and are set forth in the findings of fact, infra.

B. Witnesses

 $\ensuremath{\mathsf{MSHA}}$ called as its witness Lonnie C. Connor, an $\ensuremath{\mathsf{MSHA}}$ inspector.

Freeman called as its witnesses Thomas Steven Bubanovich, a staff industrial engineer employed by Freeman; and Francis E. Harmon, Freeman's chief electrical engineer.

C. Exhibits

- 1. MSHA introduced the following exhibits into evidence:
 - (a) M-1 is a copy of Order No. 6-0172 (1 LDC), October 29, 1976, 30 CFR 75.604.
 - (b) M-2 is a termination of M-1.

- (c) M-3 is a drawing produced at the hearing by Lonnie C. Connor.
- 2. Freeman introduced the following exhibit into evidence:
 - (a) 0-1 is a drawing produced by Thomas Steven Bubanovich.
- 3. The following exhibits were received into evidence during the September 26, 1978, settlement proceedings:
 - (a) Exhibit 3 is a computer printout listing the history of violations at the Orient No. 6 Mine. (This exhibit is filed in Docket No. VINC 78-49-P).
 - (b) Exhibit 8 is a letter from MESA to the Respondent concerning the order issued on December 29, 1976.
 - (c) Exhibit 9 is a copy of an inspector's statement pertaining to the order issued on December 29, 1976.

IV. Issues

Two basic issues are involved in the assessment of a civil penalty: (1) did a violation of the Act occur, and (2) what amount should be assessed as a penalty if a violation is found to have occurred? In determining the amount of civil penalty that should be assessed for a violation, the law requires that six factors be considered: (1) history of previous violations; (2) appropriateness of the penalty to the size of the operator's business; (3) whether the operator was negligent; (4) effect of the penalty on the operator's ability to continue in business; (5) gravity of the violation; and (6) the operator's good faith in attempting rapid abatement of the violation.

V. Opinion and Findings of Fact

A. Stipulations

During the settlement proceedings on September 26, 1978, the parties entered into the following stipulations:

- (1) The Orient No. 6 Mine produces approximately 1,159,797 tons of coal per year (Tr. 5, 11-September 26, 1978).
- (2) The Freeman United Coal Mining Company produces approximately 6,221,752 tons of coal per year (Tr. 5, 11-September 26,1978).

B. Occurrence of violation: Order No. 6-0172 (1 LDC), October 29, 1976, 30 CFR 75.604.

MSHA inspector Lonnie C. Connor1 conducted a regular health and safety inspection at Respondent's Orient No. 6 Mine on October 29, 1976 (Tr. 5-6). He issued the subject withdrawal order at 9:20 a.m. (Exh. M-1, Tr. 5), citing the Respondent for a violation of 30 CFR 75.604.2 The inspector observed a defective permanent splice in the trailing cable of the continuous mining machine located in the Second Main, East section (Exh. M-1, Tr. 6). According to the inspector, the manufacturer's instructions were not followed during the installation of a cable splice kit, causing the splice to split open and expose bare electrical conductors (Exh. M-1, Tr. 6, 8, 11). The inspector described the opening as "quite large," approximately 5 or 6 inches (Tr. 11). The conductors were described as bare for approximately 2 or 3 inches (Tr. 11). cable normally carries approximately 440 volts AC (Tr. 7, 83). The cable contained three phase conductors, or electrical conductors, three ground conductors and a ground check conductor (Tr. 52, 55, Exh. 0-1). The phase conductors were four aught in size, while the ground conductors were considerably smaller (Tr. 52).

Many splice kits are available on the market (Tr. 23, 32). The kit used in the present case required the installation of a "spider," or torpedo (Tr. 53-55), and an outer jacket. A spider is a holding device approximately 11 inches in length (Exh. 0-1), used to separate the conductors inside the cable, preventing them from making contact with each other (Tr. 8, 34). It is made of thin material (Tr. 45). It is similar in appearance to the revolving cylinder of a pistol (Tr. 29), with cylindrical openings to hold the conductors (Tr. 55, 56, Exh. 0-1). A slit running the entire length of the spider is located atop each cylindrical opening on the circumference for the insertion of the conductors (Tr. 65, 66). The heavy outer jacket is placed

around the insulated conductors (Tr. 10) for additional insulation (Tr. 9). It contains a sleeve which encircles the splice and bonds to the outer jacket of the trailing cable, producing a moisture proof barrier (Tr. 10, 14). The splice kit includes a plastic ribbing to hold the sleeve open to facilitate work on the mechanical part of the splice (Tr. 15). When the ribbing is removed, the sleeve shrinks forming a fused bond between the jacket and the splice (Tr. 15, 69). After it contracts, the edges are sealed with a type of rubber cement provided by the manufacturer (Tr. 15, 69).

The ground conductors did not have separate insulation (Tr. 52, 54). Each phase conductor is separately insulated by a rubber-type coating applied by the cable manufacturer (Tr. 52, 54).

Mr. Bubanovich, the Respondent's staff industrial engineer, was summoned to the mine shortly after the order was issued (Tr. 51). A two to three foot section of the cable had been brought to the surface by the time of his arrival. He dissected the splice and identified the exposed conductor as a ground conductor (Tr. 52, 53). He testified that approximately an inch-and-a-half of the conductor was exposed (Tr. 53). He was able to look through the fissure and see the phase conductors, although they were internally insulated by manufacturer applied insulation (Tr. 53).

All witnesses agreed as to the cause of the defective splice and as to the extent of the defect. The splice was mechanically strong (Tr. 29, 54) and correct except for the misapplication of the outer jacket (Tr. 15, 53, 54). The repairman had attempted to remove the plastic ribbing, or shrinking material, in an improper fashion. When he attempted to pull the ribbing out the wrong way, the sleeve started to contract on one end rendering impossible the removal of the plastic ribbing (Tr. 15, 53). Instead of removing the outer jacket or sleeve and reapplying it correctly, the repairman left the plastic ribbing on the sleeve and attempted to use plastic tape to hold the sleeve together (Tr. 15, 51-52). According to Inspector Connor, only a small amount of tape had been used. The tape had worn through and the ribbing was protruding from the worn and damaged places in the splice (Tr. 16).

The floor was damp and, in fact, the operator was required to sprinkle working section roads to keep them damp (Tr. 16).

I find the evidence sufficient to establish a violation of 30 CFR 75.604. 30 CFR 75.604(b) requires permanent splices in trailing cables to be effectively insulated and sealed so as to exclude moisture. The outer jacket was split due to improper splicing, and the defective splice would have permitted the entry of moisture into the cable (Tr. 14, 15, 16). The cylindrical spider contained in the splice kit contained slits around its circumference for the insertion of the ground and phase conductors (Tr. 65, 66). The slits often

remain partially open after insertion of the conductors (Tr. 43-45, 66). The split in the outer jacket could have enabled moisture not only to penetrate below the outer jacket, but also to reach the portion of the bare ground conductors protruding above the slit. The fissure in the defectively applied outer jacket thus prevented the trailing cable splice from being effectively sealed and insulated so as to exclude moisture.

30 CFR 75.605(c) requires permanent splices in trailing cables to be vulcanized or otherwise treated with suitable materials to provide flame-resistant qualities and good bonding to the outer jacket. The splice was not vulcanized (Tr. 14). Vulcanizing is the physical, hand-chemical process of bonding two objects together (Tr. 58). Both Inspector Connor and Mr. Bubanovich testified that the splice did not have good bonding to the outer jacket (Tr. 14, 61). Good bonding exists where the outer jacket of the splice and the outer jacket of the trailing cable are fused together by a glue-type substance (Tr. 14-15). In the presence case there was no fusion between the cable jacket and the splice jacket (Tr. 15). The lack of good bonding was attributable to the improper application of the outer jacket and the subsequent attempt to remedy the defect with plastic electrical-type tape (Tr. 15, 16).

I therefore conclude that MSHA has established a violation of 30 CFR 75.605 by a preponderance of the evidence.

C. Gravity of the Violation

The split in the cable splice exposed 1-1/2 to 3 inches of bare ground conductor (Tr. 11, 52, 74). The cable was attached to a 440 volt AC transformer (Tr. 7, 83). The cable was lying on the mine floor, with the defective splice approximately 100 to 150 feet from the mining machine (Tr. 8). The machine was not energized when the order was issued, (Tr. 16), and equipment was not running over the cable (Tr. 17). No methane was present, and the ventilation was adequate (Tr. 31).

The inspector considered the violation serious because the splice would not exclude moisture. The floor was damp, and, in fact, the operator was required to periodically sprinkle the roads on the working section to keep them damp. Moisture in the splice, coupled with the possibility of contact with bare wires, could have caused a person to receive an electrical shock when picking up or stepping on the splice (Tr. 16). Although the inspector admitted a lack of electrical expertise (Tr. 24, 26), he testified that a short circuit, caused by water touching the defective splice, would have kicked out a circuit breaker at the transformer, stopping the flow of electric current (Tr. 46). A short circuit would not have caused injury to any person if the breaker had kicked out (Tr. 46-47).

The Respondent's witnesses possessed expert training in electrical engineering. Mr. Thomas Steven Bubanovich, the Respondent's staff industrial engineer, had taken some electrical engineering courses in obtaining a degree in industrial technology (Tr. 58-59). Mr. Francis E. Harmon, the Respondent's chief electrical engineer, had an electrical engineering background (Tr. 73). Both witnesses testified that only a minimal hazard was associated with the defective splice (Tr. 56, 57, 77, 79, 84, 88, 89, 90-91).

According to Mr. Bubanovich, the exposed ground lead presented no hazard (Tr. 56). He testified that touching an exposed ground lead would not result in injury (Tr. 57). However, he admitted under cross-examination that a likelihood of electrocution existed under the proper circumstances. Water seeping through the broken outer jacket could have made contact with the phase conductors (Tr. 63). If the cable had been lying in water or if it had become wet, and a person touched it, then the likelihood of electrocution was present (Tr. 63).

Mr. Harmon testified that, based on his knowledge and experience in working with electricity and working with electrical matters in mines, an individual standing in water would not have been injured by coming into contact with a bare ground conductor (Tr. 77). He testified as to the probable effect of a short circuit, stating that a worker could have suffered hand burns (Tr. 80). Mr. Harmon would not classify the resulting injury as fatal (Tr. 79-80). According to Mr. Harmon, if water had penetrated the split, and a man picked up the cable while standing in water, he would experience "some shock to a degree" (Tr. 83). The likelihood of a serious accident or a fatality would be very remote (Tr. 83). In order for an individual to suffer injury in connection with the handling of the splice, further deterioration of the jacket would have been required. A person would have had to penetrate below the plastic spirals and actually achieve contact with a phase conductor (Tr. In addition, damp or wet shoes and the possibility of good conductivity through the body would have been required to suffer anything more severe than a slight shock (Tr. 84).

The foregoing testimony of Messrs. Bubanovich and Harmon reveals the possibility of injuries ranging from a slight shock or burned hands to electrocution, depending upon the circumstances under which physical contact with the defective splice occurred. Therefore, I find the violation one of considerable gravity.

D. Operator Negligence

The inspector characterized the operator as negligent (Tr. 17). His estimation of operator negligence was based on the way the splice was made, the length of time the splice was in service, the foreman's failure to detect and correct the splice during his on-shift report, and the failure to correct the splice during any weekly examination of electrical equipment (Tr. 48).

It has been determined already that the defective splice was caused by the section repairman's failure to properly install the splice kit.

The inspector's estimate as to the period of time the splice had been in service was based on experience (Tr. 30). He believed the condition had existed for several shifts (Tr. 18). He also concluded, from past experience, that the outer jacket on the defective splice had split open as a result of being dragged on the mine floor and around the mine rib (Tr. 30). However, there is no indication in the record that he conducted an investigation to determine how long the defective splice had been on the cable.

According to the inspector, the splice should have been detected by the section foreman during his preshift or onshift examination (Tr. 20). He is required to inspect the section and everything on it at least once during each working shift and to record and correct any hazardous conditions observed during the working shift (Tr. 20). In addition, the operator is required to make weekly electrical checks on all face equipment (Tr. 18).

In this instance the splice at the outset was improperly installed by the repairman and immediately constituted a violation. At the time it was observed by the inspector it had been subjected to a certain amount of rough treatment in order for it to have reached the condition it was in. However, the inspector's order was issued at 9:20 a.m., which was relatively early in the shift. Therefore, it is logical that either a preshift examination or onshift examination should have revealed the improper splice. It is therefore considered that enough time had elapsed within which the preshift examiner or section foreman should have observed the violation and taken action to correct it. Knowledge, actual or constructive, by such personnel will be imputed to the operator. Pocahontas Fuel Company, 8 IBMA 136, 84 I.D. 488, 1977-1978 OSHD par. 22,218 (1977) aff'd sub nom. Pocahontas Fuel Company v. Andrus, No. 77-2239 (4th Cir., filed January 8, 1979). It is therefore found that the operator demonstrated ordinary negligence.

E. History of Previous Violations

The history of previous violations at the Respondents Orient No. 6 Mine during the 24 months prior the issuance of the order is embodied in the following chart:

Violations of	Year 1	Year 2	
30 CFR	10/30/74-10/29/75	10/30/75-10/28/76	Total
All Sections	190	169	359
Section 75.604	11	1	12

(Note: All figures are approximations).

The operator had paid assessments for approximately 359 violations of all regulations falling under 30 CFR within the 24 months preceding the violation of October 29, 1976. Approximately 190 of those violations occurred between October 30, 1974 and October 29, 1975, while 169 occurred between October 30, 1975 and October 28, 1976.

The operator had paid assessments for approximately 12 violations of 30 CFR 75.604 during the 24 months preceding the violation of October 29, 1976. Approximately 11 of those occurred between October 30, 1974 and October 29, 1975, while approximately one occurred between October 30, 1975 and October 28, 1976.

F. Appropriateness of Penalty to Operator's Size

The Freeman United Coal Mining Company produces approximately 6,221,752 tons of coal per year. (Stipulations embodied in transcript of the September 26, 1978 proceedings, pp. 5, 11). The Orient No. 6 Mine produces approximately 1,159,797 tons of coal per year. (Stipulation embodied in transcript of the September 26, 1978 proceedings, pp. 5, 11).

G. Effect on Operator's Ability to Continue in Business

Counsel for the Respondent concedes in his post-hearing brief that assessment of the maximum penalty would have no effect on the Respondent's ability to continue in business (Respondent's Post-Hearing Brief, p. 14). Furthermore, the Interior Board of Mine Operations Appeals has held that evidence relating to whether a civil penalty will affect the operator's ability to remain in business is within the operator's control, resulting in a rebuttable presumption that the operator's ability to continue in business will not be affected by the assessment of a civil penalty. Hall Coal Company, 1 IBMA 175, 79 I.D. 668, 1971-1973 OSHD par. 15,380 (1972). Therefore, I find that penalties otherwise properly assessed in this proceeding will not impair the operator's ability to continue in business.

H. Operator's Good Faith in Securing Rapid Abatement

The withdrawal order was issued at 9:20 a.m. on October 29, 1976 (Exh. M-1). It was terminated three hours and ten minutes later (Exh. M-2).

Therefore, it is found that the Respondent demonstrated good faith in securing a rapid abatement of the violation.

VI. Conclusions of Law

- 1. Freeman United Coal Mining Company and its Orient No. 6 Mine have been subject to the provisions of the Federal Coal Mine Health and Safety Act of 1969 and the 1977 Mine Act during the respective periods involved in these proceedings.
- 2. Under the Acts, this Administrative Law Judge has jurisdiction over the subject matter of, and the parties to these proceedings.
- 3. The violation charged in Order No. 6-0172 (1 LDC), October 29, 1976, 30 CFR 75.604, is found to have occurred.
- 4. All of the conclusions of law set forth in Part V of this decision are reaffirmed and incorporated herein.
- VII. Proposed Findings of Fact and Conclusions of Law

Freeman United Coal Mining Company submitted a post-hearing brief. MSHA submitted no post-hearing brief. Such brief, insofar as it can be considered to have contained proposed findings and conclusions, has been considered fully, and except to the extent that such findings and conclusions have been expressly or impliedly affirmed in this decision, they are rejected on the ground that they are, in whole or in part, contrary to the facts and law or because they are immaterial to the decision in this case.

VIII. Penalty Assessed

Upon consideration of the entire record in this case and the foregoing findings of fact and conclusions of law, I find that the assessment of a penalty is warranted as follows:

Order No. Date 30 CFR Standard Penalty 6-0172 (1 LDC) 10/29/76 75.604 \$2,500

IX. Decision Approving Settlement: Order No. 6-7016, December

29, 1976, 30 CFR 75.601

As previously stated in Part I, supra, the Mine Safety and Health Administration (MSHA) filed a petition for assessment of civil penalties pursuant to section 110(a) of the Federal Mine Safety and Health Act of 1977 (Act) in June of 1978. Subsequent thereto, the proceedings were set for hearing. At the time of hearing, counsel for both parties proposed a settlement as to the penalty assessment to be paid by Respondent as to the alleged violation of 30 CFR 75.601.

During the hearing, stipulations were entered into as to the annual tonnage of the Respondent and the individual mine which is

contained in the transcript filed in each case file. Exhibit No. 3, which is filed in the case file for Docket No. VINC 78-49-P Õwhich is another case involving the same parties which was heard starting on the same day as the above-captioned casesÊ, contains a history of violations for which the Respondent had paid penalty assessments relating to the Orient No. 6 Mine.

Exhibits Nos. 8 and 9 were filed in the case file at the hearing. These documents are Office of Assessment's statements describing the alleged violation and the reasons given by that office for the special assessment recommended in this case. In addition, these exhibits contain statements by the inspector as to the negligence of the operator, the gravity of the alleged violation and the good faith of the Respondent relating to abatement of the alleged violation.

The proposed assessment was \$5,000, and the proposed settlement is \$2,000.

During the course of the hearing, counsel for both parties set forth reasons on the record as to why the penalty assessments should be in the amounts agreed to rather than the amounts set forth originally by the Office of Assessments.

Of significant consideration to a settlement are the following statements by counsel for both parties:

JUDGE COOK: There has been some discussion off the record concerning a proposed settlement in Docket Number VINC 78-394-P, and this relates to Orient Number six mine, and the proposed settlement relates to a 104-C2 order which was issued on December 29th, 1976, which relates to an alleged violation of 30 CFR 75.601. There previously has been an agreement in the record concerning the annual tonnage of the Orient Number six mine, being 1,159,979 tons, and the annual tonnage of Freeman at 6,221,752 tons.

We have already produced a record concerning a history of violations of the Orient number six mine, which we have mentioned previously and we have produced here a copy of the Inspector's negligence, gravity, and good faith memoranda prepared for this particular violation, and also a copy of the special assessment letter which was prepared by the Office of Assessment and proposed a penalty of \$5,000 for this particular violation.

I wonder if you, Mr. McGinn, would like to describe what was alleged to be the violation and any reasons for a change in the amount of the fine that is proposed.

MR. MCGINN: Well, the violation alleged that a dual element fuse was not installed in the trailing cable for the shuttle car. Based on the fact that the testimony which would have been presented would have been to the effect that a single element fuse had been installed and should lend to reduce the proposed settlement and accept a settlement in the amount of \$2,000, because although the proper fuse was not installed, the system would be that the single element fuse would provide some degree of protection and significantly reduce the gravity of the condition. Additionally, we feel that the negligence of the operator would be significantly reduced because it was not a case of failing completely to observe a mandatory standard. It was using an incorrect fuse rather than the correct one. So from our standpoint, we would see where the negligence would be reduced in this case, and these are our basic reasons for proposing a settlement of \$2,000.

JUDGE COOK: Very well. Now, Mr. Covin [sic], do you have anything to add to that?

MR. COVEN: In addition to what Mr. McGinn has just stated, this cable was part of a system which involved a shuttle car to which it was connected, and a transformer too, which was its source of power. That transformer had a rectifier section to which this cable was connected, and that rectifier section had a circuity [sic] breaker which would have killed the power should there have been an overload.

The shuttle car itself had the silicone diodes which protects it from reverse polarity. It also had circuit breakers within it, which protects in the event of an overload or a short so that the shuttle car could not become alive. So there were multiple safety features involved in the system of which this case was a part of.

(Tr. 10-13).

This information set forth in the record of the hearing in this case, along with the information provided as to the statutory criteria contained in section 110 of the 1977 Act, has provided a full disclosure of the nature of the settlement and the basis for the original determination. Thus, the parties have complied with the intent of the law that settlements be a matter of public record.

In view of the reasons given above by counsel for MSHA for the proposed settlements, and in view of the disclosure as to the elements constituting the foundation for the statutory criteria, it appears that a disposition approving the settlement will adequately protect the public interest.

ORDER

Accordingly, IT IS ORDERED that the proposed settlement as outlined in Part IX, supra, be and hereby is, APPROVED.

IT IS FURTHER ORDERED that Respondent, within 30 days of the date of this decision, pay total penalties in the amount of \$4,500, which figure represents the sum of the agreed upon penalty of \$2,000 assessed pursuant to the settlement agreement, and the \$2,500 penalty assessed in the contested portion of this proceeding.

John F. Cook Administrative Law Judge

FOOTNOTES START HERE

~FOOTNOTE_ONE

1. It was stipulated that judicial notice would be taken of the transcript of hearing filed in the case of Secretary of Labor, Mine Safety and Health Administration v. Freeman United Coal Mining Company, Docket No. VINC 78-49-P, as relates to the background and duties of Mr. Connor (Tr. 4).

~FOOTNOTE_TWO

2. 30 CFR 75.604 states:

"When permanent splices in trailing cables are made, they shall be:

- (a) Mechanically strong with adequate electrical conductivity and flexibility;
- (b) Effectively insulated and sealed so as to exclude moisture; and
- (c) Vulcanized or otherwise treated with suitable materials to provide flame-resistant qualities and good bonding to the outer jacket."