

The Secretary issued a citation to CH2M following an explosion on November 10, 1988, in an underground tunnel project in Milwaukee, Wisconsin, in which three workers were killed. The Secretary charged CH2M with 47 willful violations of the Act. The Secretary withdrew item 1 prior to the hearing (Tr. 6-7). The Secretary later withdrew item 18 as duplicative of item 17. Items 2 through 17 and 19 through 46 allege willful violations of § 1926.407(b), as adopted by § 1926.800(l)(1), which appears in Subpart K and provides in pertinent part:

Electrical installations. Equipment, wiring methods, and installations of equipment in hazardous (classified) locations shall be approved as intrinsically safe or approved for the hazardous (classified) location or safe for the hazardous (classified location).

Section 1926.800(l)(1) requires that “[e]lectrical equipment shall conform to the requirements of Subpart K of this part.” The Secretary contends that the tunnel in which the explosion occurred was a Class I, Division 2, hazardous location in which approved equipment was required to be installed. Each of the 44 items (items 2-17 and 19-46) cites a specific piece of unapproved equipment that was present in the tunnel.

Item 47 alleges a willful violation of § 1926.800(c)(2)(i), which provides:

Tunnels shall be provided with mechanically induced primary ventilation in all work areas. The direction of the air flow shall be reversible.

Background³

The Milwaukee Metropolitan Sewage District (MMSD) is a quasi-public regional agency responsible for sewage treatment and solid waste disposal for a 400-square-mile area consisting of Milwaukee and 26 adjacent communities. The MMSD initiated the Water Pollution Abatement Project (Project) because it was required by the Clean Water Act and court orders to eliminate discharges of untreated waste into the watershed, particularly Lake Michigan, during wet weather.

The Project consisted of numerous tunnels, shafts, sewers, and other systems that collect and convey both storm drainage and sewerage to two wastewater treatment plants. The MMSD

³ The background information in this case is almost a decade old and has been thoroughly documented. The following section is taken from the background sections in the decisions of Judge Brady and the Review Commission.

contracted with S. A. Healey, a tunneling contractor, to construct a two-mile long tunnel identified as crosstown tunnel number seven (CT-7). The MMSD contracted with hundreds of other contractors for the construction of the Project.

Because of the complexity of overseeing the Project, the MMSD changed the management approach it had used previously in other projects. The MMSD selected CH2M, an environmental engineering firm, to provide services for the program. In order to oversee the Project, CH2M established the Program Management Office (PMO). CH2M retained other engineering firms to help with the administration of the Project.

The MMSD had contracted with tunnel contractor Jay-Dee Contractors, Inc. (Jay-Dee), to complete the tunnel designated CT-8, which was located approximately one mile east of CT-7. On April 30, 1987, Jay-Dee encountered methane while drilling pre-construction soil borings. Jay-Dee filed a claim for a Differing Site Condition (DSC) with the MMSD to cover the costs of additional safety measures (Exh. C-23; Tr, 513-514, 663, 1583, 1597-1599). Jay-Dee hired Testing Service Corporation to investigate the methane problem (Tr. 663-665). CH2M hired Engineering Science, a Pasadena, California, engineering consulting firm, to investigate the methane problem at the CT-8 site (Tr. 525). The MMSD granted Jay-Dee's request for a DSC and executed a contract modification for Jay-Dee's contract (Exh. C-33; Tr. 675-676).

After Jay-Dee's contract was modified, the MMSD asked the PMO to modify the bidding contracts for the other contractors on the Project. This was in accordance with Task Order 189 which specified that the MMSD could "[a]uthorize preparation of Contract Modifications and provide administrative approval of Contract Modifications upon completion by the ENGINEER" (Exh. C-54).

The contract modification included the following section (Exh. C-107):

M. Tunnel Equipment

All electrical motors, accessories and installations and electrical equipment in the shafts and tunnels shall conform with Class I, Division 2, requirements of Subpart K, OSHA Standards 29 C.F.R. § 1926, published 1987.

The MMSD reviewed the contract modification and authorized its issuance. CH2M forwarded the contract modification to Healy on April 5, 1988 (Exh. C-33).

On May 2, 1988, Healy sent a letter to the CT-7 resident engineer Chuck Kennedy requesting a clarification of section “M. TUNNEL EQUIPMENT” of the contract modification regarding certain equipment it planned to use in CT-7 (Exh. C-35; Tr. 2161). On May 5, 1988, John Ramage, the head of CH2M’s geotechnical group, responded with a handwritten clarification which stated (Exh. C-37):

Only electrical gear associated with the mining machine is required to meet Class I, Division 2, requirements. Healy’s existing locomotives meet the intent of the specs. He should be reminded that the locomotive must be equipped with portable methane monitors.

Healy should also furnish information from Lovat concerning the mining equipment. Assuming the confirmation is positive, nothing else is required for this contract.

On June 6, 1988, Healy reported to CH2M that it had “largely complied with [CH2M’s] requirements, with the exception of the main ventilation fan.” Healy also provided an evacuation plan “to be followed in the Event of Methane Being Encountered in the Tunnel” (Exh. R-48).

On Monday, November 7, 1988, Healy’s tunnel boring machine (TBM) experienced a shutdown in the CT-7 tunnel due to methane. Healy’s employees were evacuated. Fifteen to thirty minutes later, they were told that the methane had dissipated and to return to work (Tr. 212-215). On November 10, 1988, Healy’s TBM experienced a second shutdown in the CT-7 tunnel. Healy’s employees were again evacuated. The evacuation plan called for the supervisor to “order the shutdown of all non-essential equipment in the tunnel” (Exh. C-48). This was not done. Healy’s evacuation plan provided that (Exh. R-48):

At the end of one hour, or one hour after the last positive reading for methane, the supervisor, in the company of two other individuals, should re-enter the tunnel, checking for methane as he advances. If the indications are that the level of methane has fallen to a safe level, he may order the work to re-start.

Contrary to Healy's evacuation plan, Healy foreman Tony Bell and Healy employees Ronald Coyne and Richard Sahacke re-entered the CT-7 tunnel after only 17 minutes (Tr. 13). The methane in CT-7 ignited, causing an explosion that killed the three Healy employees.⁴

CH2M's Defenses

CH2M raised a number of defenses at the hearing, in addition to the defense rejected by the Review Commission which has occasioned this remand. CH2M contends that it did not violate the terms of the cited standards, but it also raises three preliminary defenses:

1. Approved electrical equipment would not have been required by OSHA's new tunneling standard. Any violation was, therefore, de minimis;
2. Section 1926.407 does not apply to naturally-occurring concentrations of flammable gases; and
3. Section 1926.407 does not afford fair notice of its obligations, especially in the tunneling context. It is, therefore, so vague as to violate the due process clause of the fifth amendment.

These defenses will be addressed in turn:

(1) Approved Electrical Equipment Would Not Have Been Required By OSHA's New Tunneling Standard

CH2M argues that OSHA's revised § 1926.800 underground construction standard, which became effective on August 1, 1989 (nine months after the CT-7 explosion), would not have required approved equipment. CH2M contends that if the revised standard had been operative at the time of the explosion, the equipment in CT-7 would have been in compliance with the standard. CH2M claims that it would be unfair to find a violation of a standard when the equipment was in compliance with a later revised standard. CH2M contends that OSHA's current tunneling standard is proof that CH2M exercised sound engineering judgment at the time of the explosion.

⁴ The Secretary issued a citation containing 68 items to Healy for willful violations of the Act. In addition, both Healy and its project manager were indicted for criminal violations under section 17(e) of the Act. Healy was convicted in a jury trial. *United States v. S. A. Healy*, Case No. 90-Cr-123 (E. D., Wisc. 1991). Charges against the project manager were dismissed on the ground that liability under the Act extends only to employers. *United States v. Doig*, 950 F. 2d 411 (7th Cir. 1991). The Commission rejected Healy's contention that the imposition of civil penalties would violate its constitutional right not to be held in double jeopardy, but that decision was reversed on appeal. *S. A. Healy Co.* 17 BNA OSHC 1145 (No. 89-1508, 1995), *rev'd*, 96 F. 3d 906 (7th Cir. 1996), *cert. granted*, 1997 WL 71439 (U. S. Dec. 15, 1997) (No. 96-1299).

The issue of whether the portions of the revised underground construction standard, § 1926.800, that deal with electrical hazards preempt the general electrical standard for construction, § 1926.407(b), has been settled by the Review Commission. In *McNally Construction & Tunneling Co.*, 16 BNA OSHC 1879 (No. 90-2337, 1994), *aff'd* 71 F.3d 208 (6th Cir. 1995), the Commission affirmed Judge Brady's decision vacating a citation alleging a violation of § 1926.407(b). The Commission stated:

Having examined the text and structure of the two standards, we hold that the provisions of sections 1926.407 and 1926.449 are preempted by the provisions of section 1926.800. We reach this conclusion not only because section 1926.800 addresses the same hazards as section 1926.407 but also because these two standards set forth conflicting requirements, rather than complementary ones, as the Secretary contends. . . . If an employer simultaneously complied with the two standards at issue here, it would not only be taking different steps to abate the same hazard, but section 1926.407 would effectively preempt section 1926.800.

Id. at 1882. The Commission's holding was reiterated in *McNally's* companion case, *KM & M, A Joint Venture*, 16 BNA OSHC 1886 (No. 89-3403, 1994).

Had the revised version of § 1926.800 been in effect at the time of the CT-7 explosion, it would have preempted § 1926.407(b), which CH2M was charged with violating.⁵ CH2M argues that it would be unfair to find it in violation of § 1926.407(b) when, if the explosion had occurred nine months later, § 1926.800 would have preempted § 1926.407(b), and CH2M would have been in compliance with the operative standard. In support of its contention, CH2M cites *Clifford B. Hannay & Son, Inc.*, 6 BNA OSHC 1335 (No. 15983, 1978).

In *Hannay*, the Review Commission affirmed as de minimis a violation of § 1910.107(c)(6), which had been cited by the Secretary as serious. Section 1910.107(c)(6) required electrical wiring and equipment located in a spraying area to be approved for Class I, Division 2, hazardous locations. The standard defined hazardous locations as being within 20 feet of the spraying area. While *Hannay* conceded that it had violated the terms of § 1910.107(c)(6), it argued that it was in compliance with the applicable requirements of the National Electric Code, NFPA, 70-1975 (1975 NEC), which defined hazardous locations as being within 5 feet of the

⁵ "Section 1926.407 describes spark-proof equipment as 'approved.' Section 1926.800 refers to such equipment as 'accepted.'" *McNally*, 16 BNA at 1882, footnote 10.

spraying area. Hannay presented the testimony of an inspector for the New York Board of Fire Underwriters, who stated that no hazard was posed by the location of the spraying booths in relation to the unapproved electrical equipment. The Commission held:

Although the Commission cannot elect to enforce the 1975 NEC provision because it has not been promulgated by the Secretary as an OSHA standard, that provision constitutes an expert opinion that no hazard exists requiring that electrical equipment more than 5 feet from a spray booth equipped with an interlocking system be approved for Class I, Division 2, hazardous locations.

Id. at 1337.

Hannay can be distinguished from the present case. In *Hannay*, the 1975 NEC provisions were presumably operative at the time *Hannay* was cited for violating § 1910.107(c)(6). The timing of the citation with respect to the enactment of the 1975 NEC provisions was not at issue, whereas the timing of the citation in relation to the enactment of the revised § 1926.800 standard is crucial in the present case. At the time of the investigation of the CT-7 explosion, from which the citation resulted, § 1926.407(b) was the only OSHA standard that mandated the requirements for electrical equipment in the CT-7 tunnel. This is not a case where an employer was confronted with two conflicting standards.

The revised § 1926.800 did not become law and did not preempt § 1926.407(b) until after CH2M was cited for violating § 1926.407(b). This tribunal's concern is with the standards that were in effect at the time of the alleged violation. The fact that a subsequently enacted standard may have altered the requirements for the electrical equipment used in underground construction does not relieve an employer of its obligation to comply with the currently operative standard. Sound engineering judgment at the time of the explosion would have taken into account the OSHA standards then in effect.

Furthermore, it would be inappropriate to reclassify the violations as de minimis. "A de minimis violation is one having no direct or immediate relationship to employee safety; normally, that classification is limited to situations in which the hazard is so trifling that an abatement order would not significantly promote the objectives of the Act." *Dover Electric Co.*, 15 BNA OSHC 1378, 1382 (No. 88-2642, 1991). In the present case, three employees were killed when the unapproved equipment in the CT-7 tunnel ignited the methane. This is not a "trifling" hazard. CH2M's defense is rejected.

(2) Section 1926.407 Does Not Apply to Naturally-Occurring
Concentrations of Flammable Gases

CH2M contends that § 1926.407 applies in tunnels only to the storage, use, and handling of man-made concentrations of flammable gases, such as those in gas cylinders. Section 1926.407(a) defines the scope of § 1926.407:

This section sets forth requirements for electric equipment and wiring in locations which are classified depending on the properties of the flammable vapors, liquids or gases, or combustible dusts or fibers which may be present therein and the likelihood that a flammable or combustible concentration or quantity is present.

Section 1926.407 is “part of Subpart K, which sets general electrical standards for employees involved in construction work. It is not specifically directed at tunnels. There are six hazardous (classified) locations, comprised of Classes I through III, each with Divisions 1 and 2.” *McNally*, 16 BNA at 1881. The definitions of these locations are found in §1926.449. Section 1926.449(b)(2) defines a Class I, Division 2, location as a location:

In which ignitable concentrations of gases or vapors are normally prevented by positive mechanical ventilation, and which might become hazardous through failure or abnormal operations of the ventilating equipment[.]

At the time of the explosion, Subpart O of the Construction Standards governed underground construction operations. Section 1926.800(l)(1) provides:

Electrical equipment shall conform to the requirements of Subpart K of this part.

Section 1926.407 is found in Subpart K. Thus, while § 1926.407 is not specifically directed at tunnels, the tunneling standards expressly incorporate the electrical requirements of Subpart K and apply them to electrical equipment used in underground construction. The incorporation of Subpart K by § 1926.800(l)(1) anticipates the possibility of naturally-occurring concentrations of flammable gases. Section 1926.407 applies to naturally-occurring concentrations of flammable gases, as well as to man-made concentrations of flammable gases.

(3) Section 1926.407 Does Not Afford Fair Notice Of Its Obligations, And
Is So Vague As To Violate Due Process

CH2M argues that the definitions in § 1926.449 of “Class I, Division 1” and “Class I, Division 2” do not give employers sufficient information to classify locations. The Review Commission has twice upheld the language at issue in this case, in *Continental Oil Co.*, 11 BNA OSHC 2114 (No. 79-570-E, 1984) and *Asamera Oil (U.S.), Inc.*, 11 BNA OSHC 2118 (No. 79-949, 1984). Those cases dealt with the definitions of Class I, Divisions 1 and 2, at § 1910.399, which are almost identical to the definitions of Class I, Divisions 1 and 2, at § 1926.449. In *Continental*, the Commission stated that it “will not declare a standard unenforceably vague merely because the wording is not exact or because it requires the employer to exercise some judgment” and concluded that the cited standard was not unenforceably vague. 11 BNA at 2117. Section 1926.449 is not unenforceably vague.

CH2M raises an additional defense in its Supplemental Post-Hearing Brief filed after the remand of this case. CH2M argues that § 1926.407 is an invalid standard, based on *Andrew Catapano Enterprises*, 17 BNA OSHC 1776 (No. 90-50, 1996). In *Catapano*, the Review Commission held that, when interpreting a broad regulation, “[t]he Secretary must show more than the mere possibility of or a potential for injury, but a ‘significant risk of harm.’” *Id.* at 1783. The Commission noted that “significant risk may be shown by evidence of injury rates, expert and lay opinion testimony, evidence of industry custom and practice.” *Id.*

In the present case, the Secretary has established that the methane in CT-7 presented a significant risk of harm. CH2M recognized the risk and took steps to abate it. Section 1926.407 is a valid standard.

The Citation

Items 2 through 17 and 19 through 46: Alleged Willful Violations of § 1926.407(b) as Adopted by § 1926.800(l)(1)

The Secretary charges CH2M with 44 instances of willfully violating § 1926.407(b), as adopted by § 1926.800(l)(1). As noted previously in this decision, § 1926.800(l)(1) requires that electrical equipment used in the tunnel shall conform to the requirements of Subpart K of the

standards. Subpart K (in §1926.407(b) and § 1926.449) requires that only approved electrical equipment be used in areas determined to be hazardous locations within the meaning of the standard.

The Secretary has the burden of proving his case by a preponderance of the evidence.

In order to establish a violation of an occupational safety or health standard, the Secretary has the burden of proving: (a) the applicability of the cited standard, (b) the employer's noncompliance with the standard's terms, (c) employee access to the violative conditions, and (d) the employer's actual or constructive knowledge of the violation (*i.e.*, the employer either knew or, with the exercise of reasonable diligence could have known, of the violative conditions).

Atlantic Battery Co., 16 BNA OSHC 2131, 2138 (No. 90-1747, 1994). The elements of proof will be analyzed in turn.

(a) Applicability of the Cited Standard

CH2M argues that § 1926.407(b) does not apply to the CT-7 tunnel because the tunnel was not a Class I, Division 2, location.⁶ Section 1926.449(b)(2) defines such a location as one “in which ignitable concentrations of gases or vapors are normally prevented by positive mechanical ventilation, and which might become hazardous through failure or abnormal operations of the ventilating equipment.” Ignitable concentrations of methane had been detected in the CT-7 tunnel prior to the explosion (Exhs. C-14, C-16, C-17, C-24, C-28, C-33, C-38, C-43, C-46; Tr. 1153-1161)⁷. Section 1926.407(b) applies to the CT-7 tunnel.

(b) Employer's Noncompliance with the Standard's Terms

Clete Stephan, principal mining engineer for the Department of Labor, Mining Safety and Health Administration (MSHA), testified that the pieces of electrical equipment cited in items 2 through 17 and 19 through 46 of the citation were not explosion-proof and were not permissible within the meaning of the MSHA standard (Tr. 377-422, 426-427, 490-491). Compliance officer

⁶ It is noted, but not relied on in this decision, that the classification of the CT-7 tunnel was also an issue in the criminal trial of S. A. Healy Co. The jury in the criminal trial determined that the CT-7 tunnel was a Class I, Division 2, hazardous location, and that Healy violated § 1926.407(b). *United States v. S. A. Healy*, Case No. 90-Cr-123 (E. D., Wisc. 1991).

⁷ This evidence will be elaborated on in section (d), “Employer Knew of the Violative Condition,” *supra*.

Patrick Ostrenga testified that, with the exception of the telephone system, none of the electrical equipment in the CT-7 tunnel was approved for Class I, Division 2, locations (Tr. 1138). Ostrenga's broad testimony that all the electrical equipment was unapproved, taken with Stephan's specific testimony that the individual pieces of equipment were not explosion proof establishes that the electrical equipment was not in compliance with § 1926.407(b). The Secretary has established that the electrical equipment in the CT-7 tunnel was not approved for that location, in violation of § 1926.407(b)'s terms.⁸

(c) Employee Exposure and Employee Access to the Violative Condition

Employees of CH2M entered the CT-7 tunnel on a routine basis (Tr. 519, 792-794, 818-820). CH2M employees Phio Santacroce and John Ramage had actual and access exposure to CT-7 (Tr. 794).

PMO employees Chuck Kennedy and Barry Doyle entered CT-7 on a regular basis. Doyle was in CT-7 the week before the explosion, taking pictures. CH2M created and controlled PMO to manage the project. PMO's supervisors were CH2M employees. Employees of PMO were employees of CH2M. CH2M's employees had access to CT-7 and were exposed to its unsafe conditions. Healy's crew of 8 to 10 employees worked daily in the CT-7 tunnel (Tr. 199-201). These employees had access to the violative condition of the tunnel.

(d) Employer Knew of the Violative Condition

Jay-Dee began construction on the project at the CT-8 tunnel, located approximately one mile east of the CT-7 tunnel. In April 1987, Jay-Dee encountered methane while drilling a test boring. Jay-Dee informed CH2M of this encounter (Tr. 51-515). As a result of this information, CH2M investigated "the other collector system jobs that were within the Memomonee River Valley," including the CT-7 tunnel (Tr. 1608-1609).

CH2M hired Engineering Science, an engineering consulting group, to research the methane at the CT-8 tunnel. Barry Doyle, a geotechnical engineer for the PMO (the office created by CH2M), wrote to Engineering Services on September 24, 1987, on the PMO's letterhead, in which CH2M's name is prominently featured. Doyle stated in the letter that the

⁸ Four of the cited items of electrical equipment were not proved to be explosion proof, and are vacated. The specific factual findings with regard to each item are given in the "Penalty Determination" section of this decision.

Project “is looking for assistance in evaluating the possible effect of methane gas on soft ground tunnel construction in the Milwaukee area . . . [Jay-Dee] has expressed concern that methane gas may be present in greater concentrations than originally anticipated” (Exh. C-10; Tr. 524-526). Doyle testified that the PMO hired Engineering Science because the PMO “was not skilled in performing underground investigations towards methane gas” (Tr. 531).

Engineering Science began its study of the methane situation in the fall of 1987 and issued a report in December 1987 entitled “CT-8 Collector Methane Gas Subsurface Investigation.” The report concluded that methane was present in the groundwater along the CT-8 collector route (Exh. C-14). In its cover letter accompanying the report (addressed to Barry Doyle), Engineering Science stated (Exh. C-14):

The heterogenous configuration of the subsurface along the CT-8 collector alignment allows for gas transport along seams and thin strats which may not be detected by borings at spacings of several hundred feet. Consequently, there is a risk of methane gas at explosive concentrations throughout the area.

The PMO contacted Dr. James Monsees, a geotechnical engineer, and requested that he use Engineering Service’s findings to provide a “constructibility evaluation” for the Project (Exh. C-12). The PMO outlined the scope of the proposed constructibility evaluation (Exh. C-12, Attachment No. 1):

The constructibility evaluation should interpret the results of the ES [Engineering Science] study as they relate to tunnel construction. The interpretation should be presented in a manner to allow the construction contractor to develop for himself safe and efficient means of dealing with the amounts and concentrations of gas that may be present.

Provide for the following items in performing the evaluation:

- . . . Develop, in a general manner, reasonable and alternative means of reducing gas concentrations in the tunnel to acceptable levels.
- . . . Provide information and recommendations relative to mining equipment compliance with industry standards for potentially gassey tunnels.
- Provide for CH2M Hill review and comment on a draft copy of the constructibility evaluation.

- Evaluate, in conjunction with ES, the need for additional field investigation of gas concentrations at four other CSO tunnel sites.

The CT-7 tunnel is one of the “four other CSO tunnel sites” (Tr. 531).

On January 12, 1988, Dr. Monsees sent a letter to Doyle that was “an early evaluation and preliminary summary of our findings and recommendations relating to the methane gas found along the CT-8 tunnel” (Exh.. C-17).

Based on his investigation, Dr. Monsees stated that his premises were (Exh. C-17, p. 2):

- Gas concentrations of 100% must be assumed.
- Locations of gas concentrations cannot be predicted.
- Where uncertainties exist, we must select the conservative alternative.
- All involved must remain alert and be prepared to adjust to conditions as they are encountered in the field.

Dr. Monsees’s recommendations included the following (Exh. C-17, p. 4):

- Main exhaust fan lines, operating on pull, to be located as near the machine as possible. Auxiliary fans on the machine to move forward with the machine and to be overlapped by the main exhaust fan lines.
...
- Transformers to be located on the surface whenever possible.
Transformers in tunnel to be permissible -- preferably Class I, Division 1, per National Electric Code, Chapter 5, Article 500 -- Hazardous locations.
Minimum of Class I, Division II.
- Existing lighting in tunnel is not permissible -- to be replaced.

CH2M had previously discovered methane along the CT-7 tunnel alignment in the early 1980s when researching the construction site (Exh. C-46, p. 9; Tr. 509-512). Doyle acknowledged at the hearing that “the ground and the geologic conditions within that ground [are] substantially similar between CT-8 and CT-7” (Tr. 649). On February 16, 1988, the MMSD sent a memo to “All Commissioners” regarding the methane found in the CT-8 tunnel. The memo states “the PMO has been requested to identify other collector system projects which have the geology conducive to forming methane. Once identified, changes will be made to contract specifications directing minimum requirements for ventilation, electrical equipment, and monitoring procedures for potentially gasy tunnels” (Exh. C-23).

On February 16, 1988, CH2M met with Healy regarding methane at the CT-7 tunnel (Tr. 847-850). Representatives of CH2M at the meeting included John Ramage, head of the geotechnical group, Phil Santacroce, the project construction manager, and Chuck Kennedy, the resident engineer. Pat Doig, Healy's project manager for the CT-7 tunnel, represented Healy (Exh. C-24, C-66). Kennedy's notes from the meeting state (Exh-24): "Changes are anticipated to consist primarily of increased tunnel ventilation, additional monitoring points for air, and emergency plan for evacuation of personnel. The need for explosion-proof electrical components will be researched by [CH2M]." Healy wrote to Kennedy on March 30, 1988, stating (Exh. C-31):

We refer to recent meetings in which the possibility of methane being encountered in the tunnel was raised by yourselves. Our understanding of your position was that you expected to issue a modification to the contract that would require certain items of tunnel equipment, specifically the TBM and ventilation fans, to have motors constructed to standards more stringent than currently required

As tunnel construction is now underway, we are in the process of installing equipment that may fall within the revised specifications. In order that no delays should result from the need to obtain equipment different from or additional to that currently in hand, we urge you to issue direction, if it is still your intention to do so, at the earliest possible opportunity.

On April 5, 1988, CH2M issued contract modifications to Healy addressing numerous safety issues, including conversion of all electrical equipment to meet Class I, Division 1 and/or 2 specifications (Exhs. C-33, C-66). The contract modification, drafted by CH2M's Ramage, included the following section (Exh. C-107):

M. Tunnel Equipment

All electrical motors, accessories and installations and electrical equipment in the shafts and tunnels shall conform with Class I, Division 2, requirements of Subpart K, OSHA Standards 29 C.F.R. § 1926, published 1987.

Kennedy of CH2M and Doig of Healy met regarding the requirements for the electrical equipment. On May 2, Doig wrote to Kennedy asking for clarification regarding the electrical equipment (Exh. C-35):

We refer to your transmittal dated 4-5-88 concerning modifications to tunnel equipment that will be required . . .

We are currently assessing which pieces of equipment need to be replaced and what additional equipment is required . . .

In order that we may fully comply with your directions we require clarification of paragraph M - Tunnel Equipment

We have other equipment in the tunnel that may not meet the requirements of paragraph M, notably a Haney grout pump, welders, lasers, a portable compressor and the communications system.

Our understanding of the meetings held to discuss these changes was that certain pieces of equipment would be exempt from this requirement. If the equipment mentioned above is intended to comply, we shall need your confirmation thereof as soon as possible

CH2M responded with a clarification on May 9, 1988. Ramage stated in the memo that (Exh. C-37):

The clarification of ¶ M -- Tunnel Equipment is that only electrical gear associated with the mining machine is required to meet Class I, Division 2 requirements. Healy's existing locomotives met the intent of the specs . . . Healy should also furnish confirmation from Lovat concerning the mining equipment. Assuming the confirmation is positive, nothing else is required for this contract.

CH2M continued to investigate the presence of methane in CT-8. Testing consistently revealed that ignitable dangerous concentrations of methane existed in the area (Exhs. C-28, C-38, C-84, C-94). A reasonable person familiar with the history of CT-7 and CT-8 would have required the use of approved equipment in CT-7.

On November 7, 1988, Healy's employees were working in the CT-7 tunnel (Tr. 211, 888). At some point, the alarm on the TBM sounded and the TBM shut down. The TBM was designed to shut down when it encountered 10% lower explosive limit (LEL) of explosive gas in the atmosphere. A hand held meter displayed a reading of 20% LEL methane (Tr. 213). Healy's employees walked to the shaft area of the tunnel, but did not evacuate to the surface (Tr. 215).

Doig called Kennedy of CH2M and told him that "the mining machine had automatically shut down because they had encountered levels of methane at least 20% LEL" (Tr. 888). Kennedy informed Phil Santacroce of this incident (Tr. 888). Kennedy also noted the incident in his daily log report (Exh. C-43).

On November 10, 1988, Healy's employees were using the TBM in the CT-7 tunnel when it shut down again. The hand-held meter read 13% LEL methane (Tr. 236). The percentage of the reading increased as Healy's employees watched it (Tr. 236-237). Healy's employees evacuated the tunnel but re-entered it a short time later (Tr. 13). The methane ignited, causing an explosion that killed three of Healy's employees.

Clete Stephan of MSHA investigated the explosion. He estimated that 350 cubic feet of methane accumulated in the CT-7 tunnel on November 10 (Tr. 343). Stephan concluded that the cause of the explosion was the attempted operation of the Haney grout machine by one of the employees who re-entered the CT-7 tunnel (Tr. 367-368). As previously noted, Healy had informed CH2M in its May 2, 1988, letter that the grout machine was not Class I, Division 2, approved.

The evidence is overwhelming that CH2M knew that the CT-7 tunnel was a Class I, Division 2, hazardous location and that the electrical equipment used by Healy in the tunnel was not approved. Indeed, it was CH2M who inexplicably instructed Healy that only the mining equipment needed to meet the § 1926.407(b) requirements.

The Secretary has established that CH2M violated § 1926.407(b) as adopted by § 1926.800(l)(1).

Willfulness

The Secretary charges that the 45 (items 2-17 and 19-46) violations of § 1926.407(b) are willful.

A willful violation of the Occupational Safety and Health Act of 1970, 29 U.S.C. §§ 651-678 ("the Act"), is one committed with an "intentional, knowing or voluntary disregard for the requirements of the Act or with plain indifference to employee safety." *L. E. Myers*, 16 BNA OSHC 1037, 1046, 1993-95 CCH OSHD ¶ 30,016, p. 41,132 (No. 90-945, 1993) (*quoting Williams Enterp.*, 13 BNA OSHC 1249, 1256, 1986-87 CCH OSHD ¶ 27,893, p. 36,589 (No. 85-355, 1987). "It is differentiated from other types of violations by a "heightened awareness -- of the illegality of the conduct or conditions -- and by a state of mind -- conscious disregard or plain indifference." *General Motors Corp., Electro-Motive Div.*, 14 BNA OSHC 2064, 2068, 1991-93 CCH OSHD ¶ 29,240, p. 39,168 (No. 82-630, 1991) (consolidated). A violation is not willful if an employer had a good faith belief that the violative condition conformed to the requirements of the Act. The test of

good faith is an objective one, that is, “whether the employer’s belief concerning the factual matters in question was reasonable under all the circumstances.” *Morrison-Knudsen Co./Yonkers Contracting Co.*, 16 BNA OSHC 1105, 1124, 1993-95 CCH OSHD ¶ 30,048, p. 41,281 (No. 88-572, 1993).

Pentecost Contracting Corp., 17 BNA OSHC 1953, 1955 (No. 92-3788, 1997).

CH2M knew that the OSHA standards required approved equipment in the CT-7 tunnel. Kennedy’s notes from the February 16, 1988, meeting between Healy and CH2M state “the need for explosion-proof electrical components will be researched by [CH2M]” (Exh. C-24). The contract modification issued by CH2M on April 5 required the electrical equipment to “conform with Class I, Division 2, requirements of Subpart K, OSHA Standards 29 C.F.R. § 1926, published 1987.”

The fact that CH2M researched the issue and initially required approved electrical equipment in the CT-7 tunnels demonstrates CH2M’s heightened awareness of the illegality of its later “clarification.” CH2M inexplicably withdrew its requirement of approved electrical equipment. John Ramage, who drafted the contract modification and its subsequent “clarification,” was in a supervisory position with CH2M.

In establishing that an employer knew of the Act’s requirements and knowingly disregarded them, the knowledge and conduct of a supervisory employee may be imputed to the employer for purposes of finding that the violation was willful Thus, willful conduct by an employee in a supervisory capacity constitutes a *prima facie* case of willfulness against his or her employer.

L. R. Willson and Sons, Inc., 17 BNA OSHC 2059, 2063 (No. 94-1546, 1997).

CH2M’s inaction constitutes an intentional, knowing, and voluntarily disregard for the requirements of the Act. The violations are properly classified as willful.

Penalty Determination

Instance-by-Instance Penalties

CH2M argues that it is “unlawful and inappropriate” for the Secretary to seek to impose separate penalties for each piece of unapproved electrical equipment that was in the CT-7 tunnel. The Commission has held that separate penalties may be proposed and assessed for separate violations of a single standard. *See Caterpillar, Inc.*, 15 BNA OSHC 2155 (No. 87-922, 1993) and *J. A. Jones Construction Co.*, 15 BNA OSHC 2201 (No. 87-2059, 1993). “The test of

whether the Act and the cited regulation permits multiple or single units of prosecution is whether they prohibit individual acts, [or whether they prohibit] a single course of action.” *Caterpillar*, 15 BNA at 2172. Section 1926.407(b) refers to “[e]quipment, wiring methods, and installations of equipment.”

The Commission has held in *S. A. Healy*, 17 BNA OSHC 1145 (No. 89-1508, 1995), *aff’d on other grounds*, U.S. Sup.Ct., No. 96-1299, December 15, 1997, that instance-by-instance penalties are appropriate in circumstances such as the present one.

Penalty Assessment in Accordance with *J. A. Jones*

In *J. A. Jones*, the Commission held that where, as here, the Secretary proposes penalties on an instance-by-instance basis, the penalty assessment must be based on specific factual findings relating to the penalty assessment criteria for each individual assessment. 15 BNA at 2213-2214.

Section 17(j) of the Act . . . requires that in assessing penalties, the Commission must give “due consideration” to four criteria: the size of the employer’s business, gravity of the violation, good faith, and prior history of the violations These factors are not necessarily accorded equal weight, generally speaking, the gravity of the violation is the primary element in the penalty assessment The gravity of a particular violation, moreover, depends upon such matters as the number of employees exposed, the duration of the exposure, the precautions taken against injury, and the likelihood that any injury would result.

15 BNA at 2214 (citations omitted).

The record does not disclose the exact size of CH2M, but it establishes that CH2M is “the largest firm of its kind in the country” and “employs thousands of individuals” (Exh. C-50(c)(2), pp. 6-7). CH2M has no history of prior violations of the Act. No evidence of bad faith on the part of CH2M was presented.

The gravity of each of the 44 items is high. The hazard created by the use of unapproved electrical equipment was the ignition of methane and the explosion in the tunnel. The relevant factors are identical for each item. In addition to the CH2M employees who periodically entered the CT-7 tunnel, between 8 and 10 Healy employees worked in the CT-7 tunnel on a daily basis (Tr. 199-201). The duration of the exposure was from September 1988, when Healy began work on the north tunnel, to November 10, 1988, when the explosion occurred (Tr. 199). Precautions were not taken with regard to the unapproved equipment. The likelihood that any injury would

result was great, given that repeated testing had revealed that methane was present. Each of the pieces of the unapproved equipment was capable of igniting the methane in the CT-7 tunnel. The gravity of the violation is exacerbated by CH2M's knowledge of the two shutdowns of the TBM on November 7 and 10, which CH2M ignored. CH2M's culpability is mitigated somewhat in that it shared responsibility for employee safety with Healy. Healy was the contractor on the project who had actual hands-on experience with tunnel construction. It is determined that a penalty of \$5,000.00 per item is appropriate. Following are the specific factual findings regarding each item of equipment in relation to the penalty assessment. The descriptions of the pieces of equipment are quoted from the citation:

Item 2

Piece of equipment: "motor controller panel which was located at the upper left front of the mole and was missing four bolts."

Evidence relied upon: Stephan observed the motor controller panel and determined that it was not explosion proof (Exh. C-127; Tr. 374, 377-378).

Penalty: \$5,000.00

Item 3

Piece of equipment: "standard male and female connectors in the mole at segment 489+."

Evidence relied upon: Stephan observed the standard male and female connectors in the mole and determined that they were not explosion proof (Exh. C-128; Tr. 379-380).

Penalty: \$5,00.00

Item 4

Piece of equipment: "lighting device located at segment 489+."

Evidence relied upon: Stephan observed the lighting device and determined that it was not explosion proof (Tr. 380-381).

Penalty: \$5,000.00

Item 5

Piece of equipment: “job built connector that was intended to allow a non-permissible plug to get power on a Class 1 rated outlet at segment 489+ in the mole electrical equipment.”

Evidence relied upon: Stephan observed the job built connector and determined that it was not explosion proof (Tr. 381-382).

Penalty: \$5,000.00

Item 6

Piece of equipment: “control transformer for the forward sump pump at segment 489+.”

Evidence relied upon: Stephan observed the control transformer and determined that it was not explosion proof (Tr. 382).

Penalty: \$5,000.00

Item 7 - (Vacated)

Piece of equipment: “small sump pump at the face.”

Evidence relied upon: Stephan observed the sump pump but could not “recall the specifics” in order to determine whether it was explosion proof (Tr. 382-383). Thus, no determination can be made that it was unapproved.

Vacated with no penalty assessed.

Item 8

Piece of equipment: “lighting device located at segment 487.”

Evidence relied upon: Stephan observed the lighting device and determined that it was not explosion proof (Tr. 384).

Penalty: \$5,000.00

Item 9

Piece of equipment: “lighting device located at segment 486.”

Evidence relied upon: Stephan observed the lighting device and determined that it was not explosion proof (Tr. 384-385).

Penalty: \$5,000.00

Item 10

Piece of equipment: “standard 120 volt male electrical plug located at segment 483.”

Evidence relied upon: Stephan observed the standard 120 volt male electrical plug and determined that it was not explosion proof (Tr. 385).

Penalty: \$5,000.00

Item 11

Piece of equipment: “lighting device socket located at segment 483.”

Evidence relied upon: Stephan observed the lighting device and determined that it was not explosion proof (Exh. C-129; Tr. 385-387).

Penalty: \$5,000.00

Item 12

Piece of equipment: “300 watt lighting device, which has an attached outdoor outlet with a broken cover, located at segment 482.”

Evidence relied upon: Stephan observed the 300 watt lighting device and determined that it was not explosion proof (Tr. 387-388).

Penalty: \$5,000.00

Item 13

Piece of equipment: “lighting device located at segment 482.”

Evidence relied upon: Stephan observed the lighting device and determined that it was not explosion proof (Tr. 388).

Penalty: \$5,000.00

Item 14

Piece of equipment: “laser located at segment 481.”

Evidence relied upon: Stephan observed the laser and determined that it was not explosion proof (Exhs. C-130, C-132; Tr. 388-390).

Penalty: \$5,000.00

Item 15

Piece of equipment: “grease pump control cable (16 \ 4 SO) with exposed copper conductors which was located at segment 481.”

Evidence relied upon: Stephan observed the grease pump control cable and determined that it was not explosion proof (Tr. 391-392).

Penalty: \$5,000.00

Item 16

Piece of equipment: “Haney grout pump remote switch located at segment 480.”

Evidence relied upon: Stephan observed the Haney grout pump remote switch and determined that it was not explosion proof (Tr. 393-394).

Penalty: \$5,000.00

Item 17

Piece of equipment: “lighting device located at segment 479.”

Evidence relied upon: Stephan observed the lighting device and determined that it was not explosion proof (Tr. 394).

Penalty: \$5,000.00

Item 19

Piece of equipment: “lighting device located at segment 478.”

Evidence relied upon: Stephan observed the lighting device and determined that it was not explosion proof (Tr. 395).

Penalty: \$5,000.00

Item 20

Piece of equipment: “power supply for the laser located at segment 478.”

Evidence relied upon: Stephen observed the power supply for the laser and determined that it was not explosion proof (Tr. 395-396).

Penalty: \$5,000.00

Item 21

Piece of equipment: “Haney grout pump (with meter and control box) located at segment 477.”

Evidence relied upon: “Stephan observed the Haney grout pump and determined that it was not explosion proof (Exh. C-134; Tr. 396-397).

Penalty: \$5,000.00

Item 22

Piece of equipment: “sump pump, which pumped into the ‘mop’ line, located at segment 476.”

Evidence relied upon: Stephan observed the sump pump and determined that it was not explosion proof (Tr. 398).

Penalty: \$5,000.00

Item 23

Piece of equipment: “lighting device located at segment 475.”

Evidence relied upon: Stephan observed the lighting device and determined that it was not explosion proof (Tr. 398-399).

Penalty: \$5,000.00

Item 24

Piece of equipment: “lighting device located at segment 474.”

Evidence relied upon: Stephan observed the lighting device and determined that it was not explosion proof (Tr. 399).

Penalty: \$5,000.00

Item 25

Piece of equipment: “flasher light on the Goodman electric locomotive located at segment 472.”

Evidence relied upon: Stephan observed the flasher light and determined that it was not explosion proof (Tr. 399-400).

Penalty: \$5,000.00

Item 26

Piece of equipment: “goodman electric locomotive located at segment 472.”

Evidence relied upon: Stephan observed the Goodman electric locomotive and determined that it was not explosion proof (Exh. C-135; Tr. 400-401).

Penalty: \$5,000.00

Item 27

Piece of equipment: “lighting device located at segment 471.”

Evidence relied upon: “Stephan observed the lighting device and determined that it was not explosion proof (Exh. C-136; Tr. 401-403).

Penalty: \$5,000.00

Item 28

Piece of equipment: “electrode drying oven located at segment 470.”

Evidence relied upon: Stephan observed the electrode drying oven and determined that it was not explosion proof (Tr. 403).

Penalty: \$5,000.00

Item 29

Piece of equipment: “Lighting device located at segment 469.”

Evidence relied upon: Stephan observed the lighting device and determined that it was not explosion proof (Tr. 404).

Penalty: \$5,000.00

Item 30

Piece of equipment: "lighting device located at segment 464."

Evidence relied upon: Stephan observed the lighting device and determined that it was not explosion proof (Tr. 404-405).

Penalty: \$5,000.00

Item 31

Piece of equipment: "conveyor light and control panel (located on the conveyor structure at segment 461) which was not sealed from the tunnel atmosphere."

Evidence relied upon: Stephan observed the conveyor light and control panel and determined that it was not explosion proof (Tr. 405).

Penalty: \$5,000.00

Item 32

Piece of equipment: "440 breaker panel located at segment 459."

Evidence relied upon: Stephan observed the 440 breaker panel and determined that it was not explosion proof (Tr. 406).

Penalty: \$5,000.00

Item 33

Piece of equipment: "110/208 breaker panel located at segment 459."

Evidence relied upon: Stephan observed the 110/208 breaker panel and determined that it was not explosion proof (Tr. 406-407).

Penalty: \$5,000.00

Item 34

Piece of equipment: "high voltage (7.2 ku) transformer located at segment 459."

Evidence relied upon: Stephan observed the high voltage transformer and determined that it was not explosion proof (Exh. C-137; Tr. 407-409).

Penalty: \$5,000.00

Item 35 (Vacated)

Piece of equipment: “high voltage (7.2 ku) connector located at segment 458.”

Evidence relied upon: Stephan observed the connector but could not make a determination that it was not explosion proof (Tr. 409).

Vacated with no penalty assessed.

Item 36

Piece of equipment: “lighting circuit connector located at segment 458.”

Evidence relied upon: Stephan observed the lighting circuit connector and determined that it was not explosion proof (Tr. 409-410).

Penalty: \$5,000.00

Item 37 (Vacated)

Piece of equipment: “Powcon welder located at segment 457.”

Evidence relied upon: Stephan could not recall observing this welder (Tr. 410).

Vacated with no penalty assessed.

Item 38

Piece of equipment: “standard male plug for the supplemental lighting circuit located at segment 457.”

Evidence relied upon: Stephan observed the plug and determined that it was not explosion proof (Exh. C-138; Tr. 410-411).

Penalty: \$5,000.00

Item 39

Piece of equipment: “SO cord with a bare end located at segment 456.”

Evidence relied upon: Stephan observed the SO cord and determined that it was not explosion proof (Exh. C-139; Tr. 413-414).

Penalty: \$5,000.00

Item 40

Piece of equipment: “standard lighting device located at segment 455.”

Evidence relied upon: Stephan observed the lighting device and determined that it was not explosion proof (Tr. 414-415).

Penalty: \$5,000.00

Item 41 (Vacated)

Piece of equipment: “supplemental vent fan located at segment 453, which was not energized with a standard locking plug.”

Evidence relied upon: Stephan could not recall what determination he made regarding whether this fan was explosion proof (Tr. 415-416).

Vacated with no penalty assessed.

Item 42

Piece of equipment: “standard locking plug located at segment 453.”

Evidence relied upon: Stephan observed the plug and determined that it was not explosion proof (Exh. C-141; Tr. 418-420).

Penalty: \$5,000.00

Item 43

Piece of equipment: “non-permissible battery operated lighting device located at segment 458.”

Evidence relied upon: Stephan observed the lighting device and determined that it was not explosion proof (Tr. 420-421).

Penalty: \$5,000.00

Item 44

Piece of equipment: “small power panel located at the end of the trailing gear.”

Evidence relied upon: Stephan observed the power panel and determined that it was not explosion proof (Tr. 421).

Penalty: \$5,000.00

Item 45

Piece of equipment: “Bosch hand drill (Model Number 0611 207 534 US, Serial Number 7510001) located at the end of the trailing gear.”

Evidence relied upon: Stephan observed the drill and determined that it was not explosion proof (Tr. 422).

Penalty: \$5,000.00

Item 46

Piece of equipment: “2 sets of 7.2 ku. male and female main power line connectors, the 16 sets of male and female lighting system power connectors, and the 138 lighting devices in the light stringer located from the end of the trailing geara to the shaft.”

Evidence relied upon: Stephan observed the power line connectors and determined that they were not explosion proof (Exh. C-142 and C-143; Tr. 422-425).

Penalty: \$5,000.00

Item 47: Alleged Willful Violation of § 1926.800(c)(2)(i)

Section 1926.800(c)(2)(i) provides:

Tunnels shall be provided with mechanically induced primary ventilation in all work areas. The direction of the air flow shall be reversible.

The citation alleges that “the supplemental fan at the face of the mouth tunnel was not capable of providing reversible airflow.” The evidence regarding this fan was vague and inconclusive (Tr. 922-924; 1535-1537). The Secretary has failed to prove that the air flow in the tunnel was not reversible. Item 47 is vacated.

FINDINGS OF FACT AND CONCLUSIONS OF LAW

The foregoing decision constitutes the findings of fact and conclusions of law in accordance with Federal Rule of Civil Procedure 52(a).

ORDER

Based upon the foregoing decision, it is hereby ORDERED that the 47 items of the citation be disposed of as follows:

Item	Disposition	Penalty
1	Withdrawn by Secretary	-0-
2	Affirmed	\$5,000
3	Affirmed	\$5,000
4	Affirmed	\$5,000
5	Affirmed	\$5,000
6	Affirmed	\$5,000
7	Vacated	-0-
8	Affirmed	\$5,000
9	Affirmed	\$5,000
10	Affirmed	\$5,000
11	Affirmed	\$5,000
12	Affirmed	\$5,000
13	Affirmed	\$5,000
14	Affirmed	\$5,000
15	Affirmed	\$5,000
16	Affirmed	\$5,000
17	Affirmed	\$5,000
18	Withdrawn by Secretary	-0-
19	Affirmed	\$5,000
20	Affirmed	\$5,000
21	Affirmed	\$5,000
22	Affirmed	\$5,000
23	Affirmed	\$5,000
24	Affirmed	\$5,000

Item	Disposition	Penalty
25	Affirmed	\$5,000
26	Affirmed	\$5,000
27	Affirmed	\$5,000
28	Affirmed	\$5,000
29	Affirmed	\$5,000
30	Affirmed	\$5,000
31	Affirmed	\$5,000
32	Affirmed	\$5,000
33	Affirmed	\$5,000
34	Affirmed	\$5,000
35	Vacated	-0-
36	Affirmed	\$5,000
37	Vacated	-0-
38	Affirmed	\$5,000
39	Affirmed	\$5,000
40	Affirmed	\$5,000
41	Vacated	-0-
42	Affirmed	\$5,000
43	Affirmed	\$5,000
44	Affirmed	\$5,000
45	Affirmed	\$5,000
46	Affirmed	\$5,000
47	Vacated	-0-
<u>TOTAL</u>		<u>\$200,000</u>

NANCY J. SPIES

Judge