PUBLIC HEALTH AND THE Law

LEGAL ASPECTS OF PUBLIC HEALTH PRACTICE

Regulating Mercury in Miners' Eating Areas

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A Mine Safety and Health Administration (MSHA) regulation entitled "Prohibited Areas For Food And Beverages" reads, "No person shall be allowed to consume or store food or beverages in a toilet room or in any area exposed to a toxic material."[1] The meaning of the term "toxic material" became a hotly contested issue in a recent trial before a judge of the Federal Mine Safety and Health Review Commission. The Commission is an independent body that provides the first judicial review of citations issued by MSHA, the Labor Department agency charged with setting and enforcing rules to protect the nation's miners.

In March 1995, MSHA received a complaint that a Nevada mine operated by the Newmont Gold Company maintained two office and eating areas that were exposed to mercury on an ongoing basis. These break rooms were in two above-ground facilities that also housed a process in which carbon used to recover gold from a solution was recycled. Because the carbon is in contact with mercury in the gold recovery process, workers in the carbon recycling process are exposed to mercury vapors and liquid mercury.

Over a two-day period, an MSHA inspector took instantaneous readings for mercury vapor in the two small lunchrooms adjoining the carbon-handling areas. A company representative took his own measurements simultaneously. Both rooms showed mercury levels ranging between a low of 14 micrograms of mercury per cubic meter of air ($\mu g/m^3$) and a high of 58 $\mu g/m^3$. MSHA's eight-hour time-weighted threshold limit value (TLV) for mercury is 50$\mu g/m^3$ for shift-long exposure to airborne contaminants.[2,3] MSHA issued the citation on a day during which a series of instantaneous readings averaged 24 $\mu g/m^3$ in one room and 22 $\mu g/m^3$ in the other.

During the subsequent litigation, the discovery process uncovered hundreds of recorded readings taken by the company. These showed that the MSHA inspector's readings were within the usual range obtained in these office and eating areas. However, some company records demonstrated greater contamination. On a day just before the inspection, readings averaged more than 200 $\mu g/m^3$. Liquid mercury was also reported on or near the desktop where the miners ate. According to company records, the mercury readings in these break rooms actually exceeded, on some days, the levels found in the process areas.

MSHA found that Newmont made no consistent effort to prevent mercury from entering the lunchrooms. The rooms were immediately adjacent to the production areas, and air flowed into them from the production areas. Miners were not given a place to wash their hands or to change clothes and remove workboots before entering these areas. Miners brought mercury into the lunchrooms on their hands, feet, and work clothes, including respirators and gloves. These eating areas were also used as control rooms and foreman's offices, which meant that there was constant foot traffic from the plant. The inspector issued citations charging that Newmont had violated the toxic materials exposure prevention regulation for eating areas.

At trial, MSHA argued that 30 CFR, Section 56.20014, is a short and plainly worded regulation that is designed to be "performance oriented"—meaning that it mandates a goal of preventing toxic materials from entering and remaining in eating areas. The regulation does not, however, specify the exact steps to be taken to prevent the exposure, as the regulation is designed to apply to a variety of contaminants in a variety of mine settings. The mine operator may elect to control a contaminant at its source, to control exposure through industrial hygiene practices appropriate for the specific contaminant, or may physically separate the eating area from the production area.

Newmont's defense was that MSHA had to prove that a hazardous level of mercury was present in the rooms in question in order for there

to be an exposure to a "toxic material." The mine operator appropriated the teaching of the 16th century Swiss physician Paracelsus that "the dose makes the poison" to claim that mercury is not a "toxic" material at levels below the mercury TLV. Because mercury levels below the TLV are supposedly deemed "safe," Newmont asserted that mercury below that level is not "toxic." Carrying this logic still further, the operator noted that water, salt, medications, and oxygen are "toxic" at some levels and that, absent a uniform hazardous dose requirement, MSHA would also have to ban them from eating areas. The company also relied heavily on an Occupational Safety and Health Administration (OSHA) sanitation regulation that defines the term "toxic materials" with regard to the OSHA Permissible Exposure Level.[4] The operator argued that one part of the Department of Labor could not define the term "toxic material" by dose level while another defined it by the nature of the material itself.

MSHA countered by noting that it would be an impossible task and unnecessary burden to come up with a single definition of toxic materials that could be used in the performance-oriented standard governing "Prohibited Areas For Food And Beverages." Rather, MSHA asserted, each substance should be evaluated in light of the preventive goals of the regulation. And for any substance, MSHA should use a case-by-case analysis of factors: health effects and routes of absorption; feasibility of detection and control; recognized levels and types of control adopted as prudent industrial hygiene and occupational health practice; and the environment in which the substance is present.

MSHA further contended that wherever the bounds of the universe of "toxic materials" lay, mercury clearly fell within them. Mercury is a universally recognized toxic material. Not only do ordinary dictionaries describe mercury as poisonous but so do specialized industrial hygiene references.[5,6] Unlike water, salt, and medications, there is no safe or beneficial level of mercury in the range of detection using standard industrial hygiene instruments. In addition, control of mercury in eating areas had been long advised by the National Institute for Occupational Safety and Health (NIOSH)[7] and by OSHA (through "Material Safety Data Sheets"). Ironically, Newmont had instituted clean lunchroom procedures such as changing and washing areas in another eating area in an adjacent building.

MSHA also distinguished the OSHA definition of "toxic materials," which incorporates a hazardous dose level, from MSHA's interpretation of the term by pointing out that the original framers of the mine lunchroom regulation chose not to adopt OSHA's definition. The preamble to the mine regulation called for a performance-oriented regulatory philosophy different from that of OSHA.[8] MSHA argued that it would be wrong for the judge to reinsert a definition of the term "toxic materials" that had been deliberately excluded by the authors of the mine rule.

The operator also argued that the mine lunchroom regulation exists

Mercury Toxicity

Mercury, a heavy metal, comes in several forms. "Elemental mercury"—not combined with other elements or chemicals—is commonly found in thermometers and medical instruments. Although no longer actively mined in the United States, elemental mercury is still produced as a by-product of the gold refining process. Due to its chemical affinity to gold, mercury is one of the last substances to be separated from gold in the refining process.

Because mercury can change at room temperature from liquid to vapor and back again, it is difficult to control. Small droplets will quickly vaporize to dangerous airborne levels in warm, enclosed spaces. When temperatures cool, mercury vapor condenses onto surfaces, from which it can be transferred to hands and clothes. Mercury borne on skin and in clothing can then be spread to miners' cars and homes.

Mercury vapor enters the body via the lungs. From there it is moved in the blood to central nervous system tissue and kidneys. Mercury remains in these tissues for long periods of time after exposure. Elemental mercury can also cross the skin barrier, although the rate of absorption is much lower than through inhalation. Elemental mercury can also be absorbed via the gastrointestinal tract but at very low rates of absorption.

Acute exposure to mercury can cause mercury intoxication. According to the U.S. Agency for Toxic Substances and Disease Registry, the symptoms include lung damage, nausea, vomiting, diarrhea, increased blood pressure and heart rate, and skin rashes.[11] Very high levels of exposure can cause death by respiratory failure.[11]

Chronic exposure to elemental mercury can lead to mercury poisoning. Symptoms include hand tremor and subtle behavioral changes such as forgetfulness, inability to concentrate, and paranoia. Severe chronic mercury toxicity can lead to sloughing of hair, loss of teeth, and severe tremors as well as permanent kidney impairment, memory deficits, and other neurological impairments.[11]

only to protect against hazards from ingestion of toxic materials via contaminated food and beverages. Thus, mercury would not fall under the regulation for eating areas because, compared to the serious inhalation risk, the ingestion risk is generally accepted to be minor.

MSHA answered that the terms of the regulation do not specify that the absorption of the toxic material must be through ingestion. The regulation requires a safe and healthful place to eat or drink; it should make no difference whether the hazard stems from an inhaled substance or an ingested one. In addition, MSHA provided evidence that eating in the vicinity of mercury enhanced the inhalation risk by creating microclimates of mercury concentration in the mouth and nose area as well as the opportunity to absorb mercury through unprotected skin.

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The Judge's Decision

On October 28, 1997, Judge Richard Manning ruled that Newmont had violated the lunchroom regulation.[9] He found that the meaning of the standard was somewhat unclear, but then applied a rule that when a regulation is unclear, an adjudicatory body must defer to an agency's interpretation of its own regulations unless the interpretation is "plainly wrong." He agreed with MSHA's assertion that mercury was a "toxic material" as a matter of law, and agreed that MSHA's insistence on recognized industrial hygiene measures to control mercury exposure in eating areas was consistent with the text of the regulation. He also agreed with the agency that it did not have to regulate all substances in the same way as mercury was regulated. He noted that feasibility of control may be an issue for some substances in some environments but not for mercury exposures in above-ground facilities, where evidence indicated that significant reductions in mercury levels to very low levels could be achieved in eating areas by following standard industrial hygiene practices.

Aftermath

While the Newmont case is now on appeal before the Commission and is then likely to go to the Court of Appeals, the agency will continue to treat the regulation as a performance-oriented standard that mandates reasonable steps to prevent mercury and other toxic materials from entering eating areas. Unless and until the judge's decision is reversed, mine operators are required to prevent mercury exposure well below the TLV by separating lunchrooms from plant areas, controlling mercury release in plants, and providing changing and washing facilities.

Already, MSHA's enforcement has resulted in the adoption of a proactive agreement with another mine operator, the Getchell Gold Company. That operator opted to institute stringent mercury control methods, monitoring for the presence of mercury in the lunchroom and plant and undertaking biological monitoring of its miners. Other operators have instituted protocols that have kept them in compliance with the goal of the regulation that no miners be unnecessarily exposed to mercury that could have been reasonable prevented. MSHA has also published a draft document addressing these issues, entitled *Controlling Mercury Hazards in Gold Mining: A Best Practices Toolbox*.[10]

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