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Workplace Pollution: Nuclear Safety, Ethics, and the Exploitation-Avoidance Argument

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Introduction

Annually in the United States, 7,000 to 11,000 people die prematurely from injuries sustained in the workplace and another 62,000 to 86,000 people die prematurely from occupationally induced diseases.[1] This means that a total of nearly 100,000 workers die needlessly each year in the United States from unsafe work environments, even though their deaths could have been prevented. These victims represent a largely silent minority, not only because their number represents less than 1/1000 of the United States work force, but also because their deaths frequently have undetected causes for which it is difficult to hold employers responsible. Also, there are only 2,700 practicing occupational-medicine physicians in the United States and only a handful of Occupational Safety and Health Administration (OSHA) inspectors. This is only enough to check a worksite for safety once every 75 years. OSHA had referred thirty cases of job-related criminal homicide to the United States Justice Department from 1980 to 1988 and only four had been prosecuted or were being prosecuted by 1989. This was due, in part, to the Bush Administration cutting the funding of the Justice Department section responsible for prosecuting companies for workplace deaths.[2]

If the preceding figures are correct, how can society ignore victims of the workplace environment when annual occupation-related deaths in the United States are approximately five times greater than those

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1 J. Paul Leigh, *Causes of Death in the Workplace* 3-7, 215 (Quorum Books 1995).

2 *Id.* at 3-7.

caused by the illegal drug trade and approximately four times greater than those caused by AIDS? One reason may be that few people are aware of the alarming occupational-fatality data, and few epidemiological studies (apart from several at the United States Bureau of Labor Statistics) track worker deaths over the long term. Also, many casualties of the workplace environment are poor African-Americans or Hispanics, all of which have few advocates.[3] Even in developed nations, employers often have so much power, privilege, and status that they can avoid responsibility for what happens to employees. In developing countries, apparent injustice in the workplace environment is even more evident. Worldwide workplace risks may be increasing, in part, because of the World Trade Organization (WTO), established in 1995 as part of the Uruguay Round Agreements of the General Agreement on Tariffs and Trade (GATT). The WTO typically treats all worker protections, including prohibitions against child labor, as "barriers to trade" that violate the WTO international regulations by which all member nations must abide. Because of the WTO and GATT, workers throughout the world are facing environmental injustices which include the inability to control the health risks that employers impose on them.[4]

Still another reason society minimizes the massive number of occupation-related fatalities is that economists tend to justify risky workplaces on the grounds of the compensating wage differential (CWD).[5] The CWD, or hazard-pay premium, is the alleged increment in wages that workers in risky jobs receive. According to this theory, employees trade safety for money on the job market, and they know some of the workers will bear the health consequences of their employment in a risky occupational environment.

To determine whether the CWD succeeds in justifying alleged environmental injustices in the workplace, this essay addresses three main issues. These issues include: (1) the theory behind the CWD used to justify the double standard for threats in the occupational

3 *See id.* at 3-7, 215.

4 *See* Lori Wallach & Michelle Sforza, *Whose Trade Organization*? Chapters 6-7 (Public Citizen 1999); David Newton, *Environmental Justice* (ABC-CLIO 1996); Kristin Shrader-Frechette, *Environmnetal Justice: Creating Equality, Reclaiming Democracy* (2002).

5 *See generally infra* nn. 19-22.

environment; (2) the doubtful success of the exploitation-avoidance argument for the CWD; and (3) several prominent reasons for rejecting the CWD as a proposed rationale for allowing apparent environmental injustice in the workplace. After analyzing these three issues, the essay uses the exploitation-avoidance argument to assess an empirical case: whether the CWD provides a justification for the apparent environmental injustice faced by the 600,000 United States workers who have labored in government nuclear weapons plants and laboratories.

Workplace Versus Public Standards

As a consequence of workplace risks, some policy experts argue that there should be no double standard (occupational and public) for exposure to various gases, chemicals, particulates, radiation, noise, and other forms of environmental pollution. They believe that unless industrial employees are protected by health and safety standards that are equal to those protecting the public, workers will face environmental injustice. According to critics of this double standard, employees ought not to trade their health and well-being for higher wages. Moreover, critics of the CWD note that paying people to put themselves at risk at work is not significantly different from murder for hire.[6]

Those who agree with the double standard for worker and public exposure to environmental risk usually maintain that the CWD compensates them for their increased risks. They also claim that workplace risk is overemphasized and sensationalized by "the danger establishment."[7] They say most countries, notably the United States, have unacceptably "rigid standards" for workplace risks. For example, for those who believe that occupational safety requirements are too strict, a recurrent target of ridicule is the portable toilet standard for cowboys that OSHA employs.[8]

Controversy over workplace risks originated at least as early as the emergence of a division of labor between manual and nonmanual work. Ancient Greek and Roman writings are filled with references to the

6 *See e.g.* Nicholas Ashford, *A Crisis in the Workplace: Occupational Disease and Injury* (MIT Press 1976); Nicholas Ashford & Claudia Miller, *Chemical Exposures* 156-158 (1991); Nicholas Ashford et al., *Human Monitoring*, 8(2) Harv. Envtl. L. Rev. 263-264 (1984).

7 *See* M. Douglas & A. Wildavsky, *Risk and Culture* 9 (Univ. of Cal. Press 1982).

8 *See* W. K. Viscusi, *Risk by Choice* 114-115, 136 (Harv. Univ. Press 1983).

diseases peculiar to various professions. Later, during the Renaissance, miners and metal workers became the first subjects of medical research into diseases of the workplace. Perhaps the first publication to address occupational hazards and their prevention was a booklet written in Germany in 1472. The booklett told goldsmiths how to avoid poisoning by mercury and lead. In 1556, in his treatise on the mining industry, the German mineralogist, Agricola, wrote the first known review of miners' health problems. He noted that some women who lived near the mines of the Carpathian Mountains in Eastern Europe had lost seven successive husbands to mine-related accidents and diseases. Besieging his medical colleagues and statesmen to make workplaces safer, the Italian physician, Ramazzini, wrote *Diseases of Workers in 1700.*[9]

Despite the historical knowledge that various diseases are associated with particular jobs, governments have done surprisingly little to avoid or to reduce many known occupational risks. As J. K. Wagoner of the United States National Institute for Occupational Safety and Health (NIOSH) has observed, two centuries have passed since Percival Pott linked coal tars to scrotum cancer that killed young chimney sweeps in England. Yet "thousands of coke-oven workers in steel mills around the world continue to inhale the same deadly substances, and are dying of lung cancer at ten times the rate of other steel workers."[10]

One reason for the continuing controversy over workplace hazards and over whether to employ a double standard for public and occupational risk exposures is that some nations do not appear to protect public health and safety more rigorously than worker health and safety. Either they have the same standards for occupational and public environmental exposures, or they treat workers the same as other citizens when they compensate them for accidents or injuries. For example, in 1972 New Zealand passed a universal, state-run scheme to compensate all victims of accidents, workers and nonworkers, alike. In

9 *See* E. Eckholm, *Unhealthy Jobs*, **Environment** 31-32 (Aug. /Sept. 1977).

10 *Id.* at 32. For an excellent treatment of the history of occupational risk and disease, *see* D.M. Berman, *Death on the Job* (Monthly Review Press 1978); *see also Quantitative Risk Assessment in Regulation* Chapters 3-8 (L.B. Lave ed., Brookings Institute 1992)(case studies). Finally, *see* John Broome, *Ethics out of Economics* (Cambridge Univ. Press 1999); *Human Well-being and Economic Goals* (Frank Ackerman et al. eds., Island Press 1997); Frank Ackerman, *The Political Economy of Inequality* (Islamnd Press 2000).

this sense, New Zealand has no double standard for protection as the United States does. Another reason for controversy over the safety of the occupational environment is that United States standards for health in the workplace appear to permit greater risks than do those of many other nations. In terms of wage differentials for fatal-injury risk, for example, Australian workers appear to enjoy a wage increment that is nearly triple the United States increment for risky work.[11] And in terms of permissible levels of chemicals in the work environment, United States regulations are less strict than such as Germany, Sweden, and Czechoslovakia. Standards in Argentina, Great Britain, Norway, and Peru are approximately the same as those in the United States. In Sweden and Germany, for example, unlike the United States, workers have more extensive rights to be informed about hazards and to take steps to reduce exposures. Strikes there are rare, and labor productivity rates are among the highest in the world, while maximum-allowable-concentration values (MACs) are among the lowest in the world. The United States, however, has not adopted the approach of Sweden and Germany.[12]

In some respects, the former Soviet Union had a tradition of providing for occupational justice. In 1923, the Soviet Union founded the first hospital devoted entirely to the study and treatment of occupational diseases. No such hospital exists in the United States. Of course, Soviet enforcement patterns are not known, and although MAC values may have been lower in the Soviet Union and in the new Soviet republics, such as Belarus and Ukraine, enforcement there likely is far less stringent than in western countries, and if so, then despite safer environmental standards in these nations, workplace risks could be higher.

Regardless of whose enforcement patterns are better, comparisons between countries (such as the United States and Germany) raise a number of interesting philosophical questions. Among these are: When a workplace environment is so dangerous that it is unjust, do the Germans have a more or less desirable risk philosophy than their

11 *See* Thomas Kneisner & John Leeth, *Compensating Wage Differentials for Fatal Injury Risk*, **J. of Risk and Uncertainty** 75-90 (Jan. 1991).

12 *See* R. W. Kates, *Risk Assessment of Environmental Hazards* 46-47 (1978); James Robinson, *Toil and Toxics* 74 (Univ. of Cal. Press 1991). For the New Zealand example, *see* Tom Dwyer, *Life and Death at Work* 250 (Plenum Press 1991).

American counterparts? and; Why do German MAC values tend to be lower, often by a factor of 10 or more, than corresponding United States standards even though Germany must confront many of the same problems that the United States faces?[13] Yet another question is whether one can ethically justify workplace MAC values, which are sometimes higher than corresponding values for public exposure, on the grounds that workplace exposure time is shorter than that for the public. Also, apart from whether risky workplace environments ought to be improved, are lower MAC values even technically possible? If they are possible, would they be so costly as to jeopardize the economic well-being and the technological progress which has resulted in enormous improvements in human welfare? If they are possible, would they be so costly that most workers and citizens would not be willing to pay for them by raising the price of goods and services produced in risky ways?

Many factors are likely responsible for the more lenient occupational safety standards in the United States as compared to those in other countries. At least one of the reasons for the disparity is a surprisingly lower emphasis on equity in the United States. United States standards typically allow much higher pollution-exposure levels for workers than for the public. In large part, this is because United States policymakers do not believe that equity requires occupational and public exposure levels to be the same, given that workers allegedly receive higher pay because of their higher exposures. For example, the United States maximum permissible dose of whole-body ionizing radiation which can be received annually by the public is 100 millirems (mrems). The maximum permissible dose for the same time period for industrial workers is 2,000 mrems per year, averaged over five years, with a maximum of 5,000 mrems for any given year. Thus, a nuclear worker could legally receive fifty times as much radiation as a member of the public in a given year.[14] This double standard is even more troubling when one realizes that, before 1990, the public standard was ten times stricter than the worker standard for ionizing radiation. After

13 Berman, *supra* n. 10, at 192-193; *see also* Kates, *supra* n. 12, at 168-174.

14 The United States, like most nations, follows the recommendations given in International Commission on Radiological Protection (ICRP), 1990 *Recommendations of the ICRP*, ICRP Publication 60 (1991).

1990, the public standard became fifty times stricter for a given year. These numbers reveal that, while the government is doing a better job of protecting the majority (members of the public), it may not be doing the same for workers. This is especially true since there is no safe level of ionizing radiation. Indeed, since 1990 worker protection from ionizing radiation has been getting worse, not better.

The main reason United States policymakers do not believe that equity or environmental justice demands the same standard for occupational and public exposure to various pollutants is that they do not believe the two types of exposures are analogous. Proponents of the method of revealed preferences (for evaluating risks),[15] for example, define occupational risks as *voluntary* risks, but public risks as *involuntary* because people give no explicit consent to them. The proponents of the CWD claim correctly that involuntarily imposed risks ought to meet more stringent safety requirements. The proponents, however, believe the double standard for occupational and public risks is reasonable.[16] They also claim that risks accepted "voluntarily," through one's occupation, can be regulated by means of standards less strict than those applied to public risks. The proponents' reasoning is that workers are compensated (through their wages) for the higher workplace risks. Chauncey Starr and Kip Viscusi, two of the pre-eminent proponents of the CWD and the method of revealed preferences, claim that empirical data show that the risk entailed by a particular occupation is directly proportional to the cube of the wages for that occupation. They argue that as the risk increases, so do wages.[17]

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15 *See* Kristin Shrader-Frechette, *Risk Analysis and Scientific Method* Chapter 2 (D. Reidel Pub. Co. 1985). The method of revealed preferences consists of examining actual risk levels faced in society, levels to which society allegedly gives implicit consent. The method of expressed preferences consists of using survey data to determine people's risk preferences.

16 *See* Viscusi, *supra* n. 8; C. Starr, *Social Benefit Versus Technological Risk*, 165 Science 1232-1233 (Sept. 1969); *see also* Nicholas Rescher, *Risk: A Philosophical Introduction* 172 (1983)(argues that involuntary risks are less acceptable and hence ought to be subject to more stringent standards).

17 *See* W. K Viscusi et al., *Economics of Regulation and Antitrust* 765-769 (MIT Press 2000); W.K. Viscusi, *Fatal Tradeoffs* 6-8, 66-69 (Oxford Univ. Press 1992) (hereinafter "Viscusi (1992)"); Starr, *General Philosophy of Risk-Benefit Analysis, in Energy and the Environment, a Risk Benefit Approach* (Holt Ashley et al. eds., Pergamon 1976); Shrader-Frechette, *supra* n. 15; W. S. Siebert & Xiangdong Wei, *Wage Compensation for Job Risks*, Asian Econ. J. 171-181 (June 1998).

Opponents of the CWD say the wage-risk relationship is not so simple, especially in western countries. They claim many factors, in addition to risk, determine the wages people accept for given work. Some of these factors include the degree of education or training necessary for the job, the extent to which people are available to perform the work, the physical strength required to do the task, or the lack of other employment opportunities. Hence, although there is some sort of wage-risk relationship, such that wages often rise as job risks increase, they say this relationship may not be nearly as simple as Starr supposes. In fact, they note that different economists actually calculate different CWDs, different increments of pay per risk increment.[18]

Starr's view, widely accepted among risk assessors, is part of the classic theory of the CWD. Adam Smith formulated the fundamental economic principles of this theory long ago. As Smith expressed it, "the whole of the advantages and disadvantages of the different employments of labor" continually tend toward equality because the wages vary according to the hardship of occupation. Under Smith's theory, people exposed to a risky workplace had advantages and disadvantages, whose sum was equal to that for people not exposed to such risks, because those in the high-risk occupations were provided with higher rates of pay than those in low-risk jobs. According to proponents of the CWD, a double standard for worker and public risk is acceptable because those in high-risk jobs voluntarily agree to "trade" some degree of workplace safety for higher wages. In other words, the classic market solution to the problem of how to control occupational risks, and how to decide which worker risks are acceptable, is to use an "economic fix" for setting standards.[19] According to Smith, employers using dangerous technologies will lack employees unless they raise wages or offer some other inducement to attract workers. These CWDs partially compensate workers for the expected economic costs

18 *See e.g.* Lee A. Craig, *The Political Economy of Public Private Compensation Differentials*, **J. of Econ. History** 304-320 (June 1995); H. Frederick Gale, *Labor Productivity and Wages*, **Rev. of Regional Studies** 13-26 (Summer 1998).

19 Viscusi, *supra* n. 8, at 156-168; Viscusi, *supra* n. 17; *see also* Ian M. Dobbs, *Compensating Wage Differentials*, **Economics Letters** 103-109 (April 1999); Douglas Maclean, *Risk and Consent: A Survey of Issues for Centralized Decision Making* 6-9 (Center for Philosophy and Public Policy, 1981) (working paper, on file with the author) (Maclean refers to the theory of compensating wage differentials as part of what he calls the "model of implied consent."); Peter Dorman & Paul Hagstrom, *Wage Compensation for Dangerous Work*, 52 **Industrial and Labor Relations Rev.** 1116-1135 (1998).

of their later work-related injury or illness. Smith's theory also suggests that the necessity for firms with risky jobs to pay higher wages also gives them incentives to invest in safety and health precautions. According to the theory, they can recover these investments in the form of lower CWDs. Thus, Smith's theory predicts that workers will be aware of many of the hazards to which they are exposed, that quit rates will be higher in hazardous jobs, and that risky occupations will pay higher wages than safe occupations.

Smith's theory of the CWD falls short on several counts. Dangerous jobs typically are not filled by rational agents who are well informed of the risks. Workers who have little formal education and who have difficulty recognizing subtle hazards often have risky jobs. This fact makes it important to note that at least two assumptions underlie Adam Smith's theory of compensating differentials. First, workers must be aware of the hazards they face. Second, they must have a number of meaningful job possibilities. Both of these assumptions often conflict with the real world. The number of realistic job options enjoyed by different workers varies widely depending on their skills and social status. To the extent that hazardous occupations are filled with less skilled and socially disadvantaged workers, Smith's theory requires that such jobs will offer meager CWDs.[20]

The Exploitation-Avoidance Argument

In arguing for a market mechanism, such as the CWD, to compensate for the problems of alleged environmental injustice raised by the double standard for occupational and public risk, economists, risk assessors, and public policymakers often employ what I call "the exploitation-avoidance argument." This essay will examine and evaluate this argument in order to determine whether it succeeds in justifying apparent environmental injustice.

The exploitation-avoidance argument begins with the recognition that occupational safety and worker welfare are not always guaranteed simply by letting market forces operate. Many economists realize that employees can often be exploited by employers if the managers are not forced to provide a safe working environment. To counteract this

20 Robinson, *supra* n. 12, at 5, 77; *see* Ashford, *supra* n. 6.

tendency to exploit, economists maintain that workers have adequate information about the risks they incur as a necessary condition for ethical implementation of the CWD. These economists admit that "the most salient" form of market failure is inadequate worker information. They recognize that "if workers and firms are not fully cognizant of the job risks resulting from their decisions, the desirable properties usually imputed to market outcomes may not prevail."[21] To avoid worker exploitation and market failure of the CWD, its proponents often advocate employee education. Their view is that once worker education is adequate, the CWD becomes defensible because market forces will create optimal matchups between employees and occupations.[22]

Obviously, the exploitation-avoidance argument is on sound ground when it emphasizes the role of occupational-risk education. Its flaw, however, is its major presupposition that education and compensation alone provide sufficient grounds for worker consent and autonomy. The argument takes too simplistic a stance as to the requirements for legitimate consent and free choice. Other factors besides workers' knowledge of a situation and their being compensated for losses determine the moral quality of choices about that situation. Even perfectly informed workers, who have consented to the level of compensation for their high-risk jobs, nonetheless might have been forced to take the work. This is especially true if alternative employment opportunities were not available or if they needed the money. If so, then in addition to workers having full knowledge of their risk situation and being compensated for it, genuine market efficiency and environmental justice also require that occupational choices be made in a context of ethically desirable background conditions. Such background conditions might include the operation of a free market and the existence of alternative employment opportunities. Without these background conditions, it is not clear that ethically desirable employee-employment matchups will occur.[23]

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21 Viscusi, *supra* n. 8, at 76, 77-87; *see also* Peter Dorman, *Markets and Morality: Economics, Dangerous Work & the Value of Human Life* 42 (Cambridge Univ. Press 1996).

22 Viscusi (1992), *supra* n. 17, at 150; Viscusi et al., *supra* n. 17, at 770-771.

23 For further discussion of these background conditions, *see* John Rawls, *A Theory of Justice* (Harv. Univ. Press 1971).

Consider, for example, the situation of Appalachian (Appalachia includes much of the states of Kentucky, West Virginia, Virginia, Tennessee, North Carolina, and South Carolina.) coal miners. How desirable are their wages and job conditions? It is well known that mining is one of the highest-risk occupations and poorer workers are typically employed in the most risky jobs.[24] Moreover, residents of Appalachia generally have no alternative to working in the mines unless they want to move out of the region. There are few employment alternatives because the Appalachian economy is not diversified, there is no job training for a variety of occupations, and absentee corporations (controlling 80% of all Appalachian land and mineral rights) also control the only jobs. The Appalachian situation is often one of monopsony, where owners of most of the land also control most of the employment force.[25]

Even if Appalachian coal miners were compensated generously, and they all had perfect information as to the dangers of their jobs, background conditions in the Appalachian economy likely would prevent their making minimally-voluntary choices to work in the mines. If they were not able to make minimally-voluntary choices as to the form of their employment, then it is not clear that proponents of the CWD will succeed in arguing that the CWD justifies a riskier workplace environment. Those who want to defend such an environment face at least two obstacles. They seem unable to argue that workers freely choose the risks if they are aware that their jobs are extremely risky. They also are unable to argue convincingly that the prevailing double standard (with respect to occupational and public risks) is actually acceptable to workers. In fact, if background conditions necessary for procedurally just choices (about forms of employment) are not met, it is not clear that alleged acceptance of the CWD is just. As John Rawls put it, "only against the background of a

24 *See* Leigh, *supra* n. 1 (to confirm the mining claim); *see e.g.* M. W. Jones-Lee, *The Value of Life: An Economic Analysis* 39 (Univ. of Chicago Press 1976); *see also* Starr, *supra* n. 17, at 15; Dorman & Hagstrom, *supra* n. 19.

25 *See* John Egerton, *Appalachia's Absentee Landlords,* The Progressive 43-45 (June 1981); J. Gaventa & W. Horton, *Land and Ownership Patterns and their Impacts on Appalchian Communities* 25-59, 210-211 (Appalchian Land and Ownership Task Force, 1981); *see also* D.E. Albrecht & S.H. Murdoc, *The Sociology of U.S.Agriculture* (Iowa State Univ. Press 1990) (see also Chapter 3 of this volume for discussion of Appalachian problems); Samantha Friedman & Daniel Richter, *Spatial Inequality and Poverty Among American Children*, Population Research and Policy Rev. 91-109 (Apr. 1998).

just basic structure and a just arrangement of economic and social institutions, can one say that the requisite just procedure [for occupational and other choices] exists."[26]

Despite the soundness of this insight about background conditions, many economists and risk assessors often neglect it in their considerations. For example, even the philosopher Nicholas Rescher appears to neglect the role of background conditions in determining ethically acceptable risk choices. He speaks, for example, of suicide as being a "wholly voluntary" mode of death and of incurable disease as being a "wholly involuntary" mode of death.[27] Such language ignores the importance of background conditions in determining what is more or less voluntary. Death by suicide might not be "wholly voluntary," as he says, if it is a consequence of medication-induced depression, especially if the medication's side effects were unknown by the patient and the doctor prescribing it. Likewise, death by incurable disease might not be "wholly involuntary," as he says, if it is brought on more quickly by a person's unwillingness to take proper medical treatments, follow prescribed diets, and so on. In other words, the line between what is voluntary and involuntary is quite uncertain in numerous cases. To the degree that philosophers, economists, and risk assessors ignore the numerous ways in which background conditions can affect the voluntariness of an action — and therefore its environmental justice — to that same extent they are also likely to misjudge the voluntariness with which persons genuinely accept a particular level of risk in a specific job. To the degree that they misjudge voluntariness, they also are likely to propose inadequate theories about the ethics of risk acceptability and environmental justice.

In addition to the Appalachian example, there is further evidence for the thesis that, even with full information about risk, workers often are unlikely to make minimally voluntary decisions to accept high-risk employment. This evidence indicates that people who can afford to avoid working in hazardous occupations usually do so. It is well known that, apart from adventure recreation, as people's income increases, their general willingness to accept extremely risky situations decreases.[28] If

26 *See* Rawls, *supra* n. 23, at 87.
27 Rescher, *supra* n. 16, at 173.

this wealth-risk relationship holds, workers' alleged acceptance of high occupational risks may be explicable more by the constraints imposed by their low income and limited job skills than by their understanding the dangers to which they are exposed.

Even if proponents of the exploitation-avoidance argument are correct in believing that proper education of workers theoretically can block exploitation of employees in high-risk occupations, it is still not clear, practically speaking, that such education typically can be accomplished. Even if education were a sufficient condition for insuring that high-risk workers voluntarily accept the terms of their employment, it is not clear that this condition could be met in most situations. Two reasons for doubt exist. One reason is that if employers provide full information, this would likely cut their workforce.[29] In addition, those who accept high-risk jobs tend to be less educated and thus less able to understand the risks they face. If full education is not possible, it is not clear that one would be justified in implementing a system of compensating wage differentials as a way to offset apparent environmental injustice in the risky workplace.

What does empirical data reveal about employee risk education, deliberately or out of negligence? Companies and regulators often have kept their research findings about hazards secret from employees exposed to them. In the case of vinyl chloride, for example, long before anyone knew that workers at risk from liver cancer, there was strong evidence to support a presumption of a serious occupational hazard. Similarly, decades after countries such as Japan banned carcinogenic dye ingredients from the workplace, American workers "are still literally sloshing in them."[30] When company doctors have been aware of employment-induced illness (e.g., from asbestos in the Johns-Manville factory in Pittsburg), they have often covered up this fact for decades.[31]

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28 *See e.g.* B.A. Emmett et al., *The Distribution of Environmental Quality*, in Environmental Assessment 367-371, 374 (D. Burkhardt & W. Ittelson eds., 1978); P.S. Albin, *Economic Values and the Value of Human Life*, in Human Values and Economic Policy 97 (S. Hook ed., 1967); *see also* Jones-Lee, *supra* n. 24, at 20-55.

29 *See e.g.* Elaine Draper, *Risky Business* (1991)(documents that such risk information typically is withheld by employers).

30 Eckholm, *supra* n. 9, at 33.

31 Berman, *supra* n. 10, at 1-4.

Even some proponents of the CWD admit that:

> available evidence suggests that few firms make a comprehensive effort to inform workers of the risks they face. For example, no firms tell their employees the average annual death risk they face. Much information that corporations do provide is not intended to enable workers to assess the risk more accurately. Rather, it is directed at lowering employees' assessments of the risk. For example, the most widespread claim by firms is that National Safety Council statistics indicate that the worker is safer on the job than at home.[32]

This statement is intentionally misleading because although the average job is safer than living in the average home, clearly, risky jobs, like mining, are not safer than living in the average home. If not, then this frequent claim of employers is true only because it uses aggregate and average data and not data about the riskiest jobs. The claim also misleads because other factors account for homes, on average, being riskier. Homes include old people and very young people, both more prone to die than workers. According to this "healthy-worker" effect, job-age people are less likely to die than average members of the population. If so, then this healthy-worker effect is not a result of especially safe workplaces. Moreover, many companies hire only the healthiest workers after performing genetic tests on them. As a result, such workers are likely to remain healthy, even in somewhat unsafe work environments.[33]

In situations where there is no deceit on the part of employers regarding the relevant risks faced by their employees and workers receive full information, this is not enough to ensure that the practical conditions necessary for wholly rational occupational choices have been met. Even in the presence of complete company disclosure of threats, employees exposed to high-risk situations typically take on the "it

32 Viscusi, *supra* n. 8, at 71.

33 Draper, *supra* n. 29, at 25.

won't happen to me syndrome."[34] The pervasiveness of this syndrome indicates that even when the theoretical conditions for full employee education are met, they might not be satisfied in particular concrete cases, owing to misperception on the part of the workers. This in turn means that because their knowledge is not operative, many employees likely are not making wholly voluntary decisions to work in high-risk situations.[35] If not, then their decisions fail to justify the apparent environmental injustices in risky workplaces.

A Case Study: 600,000 Department of Energy Workers

What happens to the CWD rationale for apparent environmental injustice if one examines an empirical case pertaining to nuclear workers exposed to high levels of ionizing radiation as a result of employment in United States Department of Energy (DOE) nuclear facilities? For several reasons, the 600,000 current and former workers represent an ideal case study for applying the exploitation-avoidance argument given earlier. One would expect these nuclear workers to be treated better than most labor groups throughout the world because they are, or have been, employees of the United States government, or its contractors and subcontractors. As employees of one of the richest governments in the world, these workers, in theory, ought to receive excellent treatment, in part because the DOE runs a multi-billion dollar operation in the United States. Another reason DOE workers represent an excellent case study is that they are such a large group. As a result, in theory it should be possible to get statistically robust conclusions about the wages and the risks to which the 600,000 employees are, and have been exposed. Still another reason the group is an excellent one to study is that roughly 1/6th of it is unionized members belongs to the Paper, Allied-Industrial, Chemical, and Energy Workers' Union.[36] This percentage of DOE union members is roughly the same as the percentage of all United States workers who are unionized, so they may constitute a fairly representative group at least relative to unionization.

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34 Starr, *supra* n. 17, at 5.

35 Viscusi, *supra* n. 8, at 60-75.

36 H.R. Commerce Comm., *Worker Safety at DOE Nuclear Facilities,* 106th Cong. 57, 59 (1999) (testimony of Richard Miller) (hereinafter "1999 DOE House Hearing").

The DOE has 3,500 nuclear facilities at thirty-four sites in thirteen states of the United States. Eighty percent of these facilities are defense-related and the remainder do commercial or laboratory work. Twenty-three of the United States DOE facilities are national laboratories, such as Los Alamos National Laboratory (LANL), Lawrence Livermore National Laboratory (LLNL), Idaho National Engineering and Environmental Laboratory (INEEL), and Sandia National Laboratory (SNL).[37]

For the exploitation-avoidance argument to succeed in using the CWD to justify the riskier workplace environment, there must be empirical evidence, in the nuclear case that employers adequately educated their workforce about risks and thereby promoted their free and efficient market choices. Has this worker education been adequate in the DOE nuclear case? One reason that DOE workers do not have full information and education is that careless DOE contractors often keep it from them. For example, at the Mound facility in Miamisburg, Ohio, from 1991 through 1994, Congressional testimony revealed that the DOE contractor allowed bioassay samples from the workers to sit on the shelf unanalyzed even though the workers were doing decontamination activity involving dangerous materials, including actinium-227. These employees were ordered to work, however, "without knowing what isotopes they were likely to encounter."[38] By 1994, when the contractor finally analyzed the bioassay samples, the results showed that fifteen of the thirty-one workers tested positive for actinium-227 contamination. Even worse, the contractor withheld this information from the DOE for another nine months. Finally, a government assessment team came to the Mound facility and concluded that there was no adequate dosimetry program, no accredited lab doing the dosimetry and contamination work, no radiation-worker safety program that complied with the laws and regulations, no radiation-control technician, and no presentation of exposure reports to the workers for three years. To correct these problems, in 1996 the contractor filed a recovery plan. Yet by May of

37 United States General Accounting Office (GAO), *DOE: Clear Strategy on External Regulation Needed for Worker and Nuclear Facility Safety* 4 (1998) (hereinafter "GAO DOE Document").

38 1999 DOE House Hearing, *supra* n. 36, at 57-61.

1997, the DOE discovered that most of the serious problems remained. The contractor still was undercounting radiation exposures, was improperly calculating worker uptakes of radionuclides, was not testing all workers in the bioassay program, and was not requiring all workers to have and wear respiratory protection to prevent ingestion of high fired oxides of plutonium. In response to all this mismanagement, coverup, delay, and illegal action over the five year period (1992 through 1997), the DOE assessed a penalty of only $112,000 less than what OSHA could have assessed for only two days of such problems. Such a trivial fine would not even cover the cancer care for one of the exposed workers. Despite all the preceding problems, when the new contractor took over the Mound facility in 1997, the DOE later discovered that this company was deducting some radiation exposures from its reports, was leaving worker bioassay samples unanalyzed for as long as two years, and had not implemented a worker bioassay program for metallic forms of tritium.[39]

When Congress and the GAO show that radiation workers often do not even have the results of their bioassays, during years when their exposures exceed the allowable limits, it is difficult to argue that DOE employees are informed about their occupational risks. If they are not informed, then they hardly can make informed choices that avoid their exploitation. Moreover, the Mound facility example does not appear to be atypical. Congressional hearings revealed that at virtually all DOE facilities, there were "significant and potentially widespread problems with workers not adhering to nuclear safety procedures."[40] This included "multiple and recurring failure to follow critical safety procedures."[41] As a result, LLNL workers, for example, were contaminated and LANL workers were subjected to fires and explosions involving radioactive materials.[42]

If DOE nuclear workers were aware of such problems, then it is possible that they were able to make informed occupational choices to

39 *Id.*

40 H.R. Commerce Comm., *Worker Safety at DOE Nuclear Facilities*, 106th Cong. 98-99 (1999) (testimony of Upton).

41 *Id.*

42 *Id.*

accept both the risk and the CWD. However, they may not have been aware of the risks, largely because at least three different governmental oversight parties, Congress, the GAO, and the United States Office of Technology Assessment (OTA) confirmed that the DOE had engaged in the widespread and repeated coverup of nuclear-safety problems. The GAO concluded that the DOE has used secrecy as "a shield to deflect public scrutiny" of its poor worker-safety and environmental practices.[43] For 40 years, the DOE and its predecessor agencies have said that "no releases" at its facilities posed a health threat. Yet, in August of 1990, Congress noted that the Secretary of Energy, James D. Watkins was forced to admit, in the face of overwhelming evidence that thousands of children and members of the public had suffered significant radiation doses because of the Hanford facility. The United States OTA showed that as many as 13,000 United States children received up to 70 rads of radiation because of the milk that they drank was contaminated by releases from the Hanford facility. As a result, the OTA warned that offsite health impacts from the DOE facilities were likely. In addition, the OTA documented excess cancer deaths near the Rocky Flats plant and an increase in leukemia among workers at the Savannah River facility. The OTA noted that these findings were consistent with an increase in childhood cancer among those whose fathers worked at the Sellafield nuclear reprocessing plant in Britain, as documented in the British Medical Journal.[44]

The United States OTA also confirmed that the DOE has made it almost impossible for non-DOE scientific researchers to have access to DOE worker-exposure and safety records. The OTA noted, in its report, that even states' Departments of Health have no access to the DOE exposure and radiological-release records that might reveal causes of illness and disease among their citizens. Confronted with all the DOE coverups and lies, the OTA recommended establishment of a new agency and the external regulation of DOE.[45] Such evidence and OTA recommendations argue against the claim that DOE workers have information that is essential to avoid worker exploitation in choosing the CWD and its attendant risks.

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43 GAO DOE Document, *supra* n. 37, at 3.

44 United States Office of Technology Assessment (OTA), CC, at 8, 77, 80, 84, 99-100.

45 *Id.* at 111, 138-143.

Of course, even though government oversight shows DOE has covered-up safety records, nevertheless, such records do not accurately reveal the threats DOE operations pose to nuclear workers and the public. Rather, United States Congressional hearings revealed that DOE dosimetry data is inaccurate and incomplete. Despite the fact that conditions at the DOE facilities have been "extremely hazardous," nevertheless, "monitoring programs ... were inaccurate, and in many cases, nonexistent."[46] After 40 years of United States DOE nuclear facilities, Congress discovered in the late 1980s that the "DOE health and safety program was solidly in shambles" and that levels of radioactivity "repeatedly" exceeded the maximum allowable levels at United States DOE installations.[47] A Congressional appraisal at Rocky Flats noted that it had "inadequate capabilities for monitoring and sampling air," that there was no instrument calibration program at the facility, and that its dosimetry data are inaccurate.[48] Fernald, one nuclear facility, claimed there was complete exposure data on only 150 of several thousand nuclear workers. Congressional investigations showed, for example, that Fernald nuclear workers were allowed to leave the site even though they were contaminated. Operators at Fernald said that the accuracy of its radiation-dose monitors was plus or minus 100%. To cover up these worker-safety problems, Congressional investigators discovered that DOE contractors repeatedly applied "correction factors" to worker dosimetry-badge data. This was done to reduce the apparent radiation doses to workers. In a number of cases, the "correction" was so extreme that some worker doses were listed as negative.[49] As a GAO official put it, "[P]roblems exist with monitoring workers' exposures and collecting exposure data at DOE sites."[50] Even according to the DOE, as late as 1989, air-sampling techniques were inadequate at 83% of its facilities.[51] An additional problem with the DOE worker-exposure data is that

46 H.R. GAO, 101st Cong. 1-2, 3-15, 70 (1994) (testimony of John Dingell, James Wells & O'Toole respectably) (hereinafter "1994 GAO House Hearing").

47 *Id.*

48 *Id.*

49 *Id.*

50 *Id.* (alteration in original).

51 *Id.*

employees often have not returned the dosimeters while measurements for many workers are missing. When occupational exposures are unknown, even the DOE admitted that it often recorded these missing doses as zero rather than as uncertain. Hence, a zero in the dosimetry data could mean a zero dose, an unknown dose, or an unmonitored dose.[52]

Given all of these dosimetry problems, it is not surprising that the United States GAO concluded that "for most DOE facilities, the methods used to calculate recorded radiological doses for workers varied considerably over the years documentation is fragmented."[53] A 1989 National Research Council/National Academy of Sciences review of worker health and safety at DOE facilities concluded that data was "inadequate" to determine worker safety. And DOEs own internal reviews in 1989 and 1999 "found thousands of problems with radioactive monitoring practices and the actual dosimetry information the individual dosimetry devices suffer from inadequate calibration, so even the data that they did have appears to be not very credible."[54] Given such findings, the GAO concluded: "DOEs credibility in this area [dosimetry to establish worker safety and health] has been almost zero."[55] Although DOE admitted that 2,000 employees had exceeded the five-rem annual exposure limit, even this claim is likely too low because of the "lack of workplace exposure data" that are reliable. As a result, the GAO said that it is impossible to tell what has caused the high rates of recurrent illnesses among DOE nuclear workers. DOE officials admitted in 1994 that worker-exposure data was unreliable because some exposures were not measured, some were measured with uncalibrated or incorrect instruments, some were reported incorrectly, and some were lost. As a result, the top DOE health official admitted that "the application of DOE exposure data in the field of epidemiological studies is unsatisfactory."[56] Using DOE

52 *Id.*

53 1994 GAO House Hearing, *supra* n. 46, at 15-22, 25 (testimony of James Wells); *id.* at 34, 40, 43 (testimony of O'Toole).

54 *Id.*

55 *Id.* (alteration in original).

56 *Id.*

exposure data in studies is unreliable in part because of the absence of reliable data on internal doses, because of limited data on chemical exposures, and because most data is not linkable to individuals.[57]

United States Congressional investigators concluded that it is impossible to fully reconstruct what has happened to workers at DOE nuclear facilities because only paper records of exposures have been available for the last 50 years. The investigators also noted that the radiation badges are gone and the paper data makes it difficult to aggregate worker-exposure levels across the nuclear industry. As late as 1994, Congress revealed that only seven of DOE's thirty-three types of facilities were covered under its medical monitoring program for workers. Congressional investigators noted that DOE health and safety data was unreliable because, for the most part, workers who contracted cancer or other diseases simply retired and did not remain part of any monitoring program. Because former DOE workers retired when they became ill, their only assistance was from state workers' compensation programs, and because the DOE did not take care of them, Congress affirmed that the DOE does not have accurate data on workplace-induced health problems. For all of these reasons, it is not surprising that DOE worker-exposure data, on the admission of DOE officials, has been contested in the courts.

Recognizing the problems with exposures to the 600,000 nuclear workers, President Clinton, in April of 2000, promised that all nuclear workers would have government financed compensation and health care for their ailments. Because of inadequate dose and exposure records, Clinton further guaranteed that all missing or unknown dose data would be assumed to be at the maximum level. In late 2000, Congress passed the Energy Employees Occupational Illness Compensation Program Act.[58] The act gave the DOE responsibilities to: (1) locate workers who are potential applicants for compensation for radiation-induced illness; (2) educate them about the compensation program; and (3) help workers and families file claims.[59] The Energy and

57 *Id.*

58 *Id.* at 7-14, 22 (testimony of James Wells); *id.* at 32-33 (testimony of O'Toole). For information on the DOE program mandated by the 2000 law, see information updated July 31, 2001 from http://tis.eh.doe.gov/advocacy/ factsheets/factsheet010622. pdf and for the current status of the program, *see* http://tis.eh.doe.gov/advocacy/status/ status.html (hereinafter "DOE Web Page").

Employees Occupational Illness Compensation Program officially began on July 31, 2001, and the Department of Labor is administering the program. The DOE, however, is providing the DOL with employment and medical records to support the claims' process.[60]

Because the site operators and the DOE control the DOE worker employment and medical data, it is questionable whether the compensation program will be effective. If, Congress and the United States Office of Technology's Assessment that an outside monitoring and oversight agency is needed to oversee DOE activities to ensure that DOE follows health and safety regulations, then there still are likely to be problems at the DOE, given that there is no external oversight agency. In any case, the DOE situation clearly shows that United States nuclear workers have not been informed fully of their occupational risks, in part because the record-keeping has been so poor.

A final reason for doubting that DOE nuclear workers are informed of occupational risks to the degree requisite to avoid their exploitation is that DOE is well known for retaliating against employees who reveal safety problems or try to have them corrected. Even DOE officials have admitted this and said that workers who noted safety problems were threatened with harassment, the loss of their jobs, and their security clearances. DOE also forced employee-whistleblowers to see psychiatrists. The GAO noted that when David Lappa of LLNL revealed critical safety problems and tried to have them fixed, problems for which LLNL was given "phantom fines," the DOE harassed and demoted him, even though the United States Department of Labor concluded that there was merit in his safety concerns.[61]

Because of all the lies, coverup, and information gaps regarding nuclear-worker safety, as documented by the United States Congress, GAO, and OTA, it is questionable whether the exploitation-avoidance argument can succeed in the DOEs case. And if so, then it may not be possible to use the CWD to justify the riskier nuclear-workplace environment of United States DOE facilities.[62]

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59 *Id.*

60 *Id.*

61 H.R. Commerce Comm., *Worker Safety at DOE Nuclear Facilities*, 106th Cong. 32 (1999) (testimony of Jones); *id.* at 32-33, 40, 43 (1999) (testimony of O'Toole).

62 *See* DOE Webpage, *supra* n. 58 (for current DOE activities).

Not only has the DOE lied and covered-up vital safety information, but it has retaliated against workers who were whistleblowers and has used taxpayer money to fight against employees who have raised safety concerns. In one three-year period, for example, Congressional testimony revealed that the DOE reimbursed attorneys for $50 million in legal expenses used to fight workers' safety charges.[63] Congressional testimony also revealed that the DOE and its contractors were able to stop press releases about safety and health violations at its facilities, so that newspapers never printed the information. Given such a coverup, it is questionable whether the DOE did an adequate job of educating either the public or its own workers about nuclear safety.[64] If the DOE did not fulfill the educational role necessary to the exploitation-avoidance argument, then this suggests yet another reason that CWD arguments probably do not succeed in justifying apparent environmental injustices at risky DOE workplaces.

Conclusions and Alternatives

This analysis of arguments about using the CWD to justify more dangerous workplace environments suggests that appeal to the CWD is not adequate grounds for defending a double standard with respect to occupational and public risks. Compensation and voluntary choice of occupation may not guarantee that a particular level of worker risk is ethically acceptable, any more than compensation and consent guarantee that other alleged environmental injustices are ethically acceptable. If particular actions are wrong, such as engaging in nontherapeutic experimentation on human beings, then the fact that people may have consented to the experimentation, or that they may have been compensated for it, does not change the ethical quality of the act of experimentation from "undesirable" to "desirable." Consent and compensation do render a questionable act less undesirable than it otherwise might have been. Nevertheless, consent and compensation alone do not appear to justify a double standard for occupational and public risk.

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63 *See* 1994 GAO House Hearing, *supra* n. 46, at 86 (testimony of John Dingell).

64 *See* H.R. Commerce Comm., *supra* n. 61, at 5, 43-49 (testimony of Jones).

Although there is an ethical and legal requirement for informed consent on the part of patients being treated by a medical doctor, one of the limitations of the current CWD policy is that there are no comparable legal requirements for guaranteeing background conditions for informed consent in the workplace. Applying the medical-ethics analogy, one might well argue, for example, that just as people now claim that a doctor's withholding information from a patient is a violation of the medical doctor's fiduciary role and a way of undermining the patient's autonomy, an analogous point holds in the workplace. That is, an employer's withholding risk information from an employee is a violation of the employer's fiduciary role and a way of undermining the employee's autonomy. If there were recognized ethical and legal requirements for attempting to guarantee background conditions necessary to informed consent in the workplace, then the case for the ethical acceptability of the CWD would be much stronger.