lieu of establishing a lower PEL for asbestos. The epidemiological evidence presented in Section IV (Health Effects) of this preamble does indicate that the combined effect of asbestos exposure and smoking on lung cancer risks is greater than the sum of the individual lung cancer risks for these two hazards. The evidence for the effect of smoking and asbestos exposure on the incidence of asbestosis is equivocal, and there is no known relationship between smoking and mesothelioma risk. Based on this evidence, the AIA/NA argued that:

> By failing to take the smoking factor into account, the OSHA risk assessment attributes a substantial portion of the risk, which is solely a matter of personal habit, to workplace exposure . . . . Section 5(b) of the OSHA Act requires each worker to comply with standards that apply 'to his own actions,' indicating that Congress intended to regulate employee conduct at least where the employer cannot control it . . . . [B]y failing to separate out the substantial portion of the lung cancer risk due to smoking, OSHA has again overestimated the risks of exposure to asbestos. Given that smokers are easily identifiable and that successful programs can be instituted to eliminate or substantially reduce smoking among asbestos workers . . . the risk Assessment fails to provide the necessary scientific basis for assessing risk reduction measures through a revised standards. (Ex. 328, p. I-28)

OSHA believes that the AIA/NA's belief that the Agency's risk assessment does not account for the portion of lung cancer risk caused by smoking is not accurate. OSHA's risk assessment for lung cancer is based on studies that measured the *relative* risk of lung cancer among asbestos-exposed populations, and not the *absolute* risk. In other words, all of the studies on which the Agency's risk assessment is based measured the increase in risk among asbestos-exposed workers over and above that experienced by the general population, which includes smokers. In some of these studies, smoking was a confounding factor that was controlled for. It is unlikely that most of the excess lung cancer deaths found among asbestos-exposed cohorts are attributable solely to smoking, as evidenced by the failure of these studies to observe significant excesses of other smoking-related diseases, such as bladder cancer and heart disease. Therefore, OSHA finds that the lung cancer risk estimates predicted by the quantitative risk assessment cannot be principally attributed to smoking.

This view is also held by Dr. Weill, whose written testimony states that "while it is clear that the extent and prevalence of smoking in a study population, its various exposure groups, and the comparison or control group, can have an extremely important effect on lung cancer exposure-response curves, there is insufficient information available to allow smoking to be used in quantitative risk assessment for asbestos-related lung cancer" (Ex. 99, p. 28). Moreover, OSHA's estimate of the risk of mesothelioma mortality, which is not confounded by smoking, is significant in itself (1.64 deaths per 1,000 workers) for lifetime exposure at the new PEL of 0.2 f/cc.

Methodological considerations aside, OSHA find it inappropriate, from a public health viewpoint, to determine the significance of occupational risk for different populations of workers who may have different sensitivities and different lifestyles on the basis of forces that act outside of the workplace. Section 6(b)(5) of the Act makes it clear that OSHA is to promulgate standards that ensure that ". . . no employee will suffer material impairment of health or functional capacity . . ." as a result of exposure to occupational hazards. Although it is true that smoking is associated with a considerable risk of lung cancer mortality, exposure to asbestos substantially increases that risk among workers who smoke. OSHA has consistently maintained that reducing the permissible exposure limit is the approach that "most adequately assures" that employees will not suffer material impairment of health as a result of occupational exposure to toxic substances. OSHA is continuing this policy by choosing not to attempt to make a distinction among exposed worker populations who may have different lifestyles. OSHA's authority to regulate workplace hazards and to reduce their associated risks, even in cases where exposure to the hazard may also occur outside the workplace, was recently reaffirmed by the U.S. Court of Appeals for the Fourth Circuit in its decision upholding OSHA's Hearing Conservation Amendment (*Forging Industry Association* v. *Secretary of Labor*):

> [The Forging Industry Association] . . . constructs its first argument that because hearing loss may be sustained as a result of activities which take place outside the workplace . . . OSHA acted beyond its statutory authority by regulating non-occupational conditions or causes. . . . [T]he [Hearing Conservation] amendment does nothing more than ensure that a hearing-endangered worker is provided with protection *in the workplace* [emphasis in original] in order to decrease the risk of a hearing impairment. Having identified employee susceptibility to noise, '[t]he Act does not wait for an employee . . . [to] become injured, authorizes the promulgation of health and safety standards . . . in the hope that these will act to prevent . . . injuries from ever occurring.' *Whirlpool Corp.* v. *Marshall*, 445 U.S. 1, 12 (1980). . . .
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> [That hearing loss sustained outside the workplace may aggravate that sustained within the workplace] . . . is scant reason to characterize the primary risk factor as non-occupational. Breathing automobile exhaust and general air pollution, for example, is damaging to the lungs, whether [the lungs are] healthy or not. The presence of unhealthy lungs in the workplace, however, hardly justifies failure to regulate noxious workplace fumes. Nor would there be logic to characterizing regulation of the fumes as non-occupational because the condition inflicted is aggravated by outside irritants (*IFA* v. *Secretary*, p. 9, 13).

Therefore, OSHA is well within its statutory authority when it regulates asbestos as a workplace carcinogen and applies the revised asbestos standard to all exposed employees, despite the presence of non-occupational factors, such as smoking, that serve to compound the risk of some workers. OSHA believes that, by promulgating this revised standard, it is carrying out its Congressional mandate to reduce serious occupational risks, to the extent feasible, for all American workers exposed to asbestos.

VII. Final Economic Impact and Regulatory Flexibility Analysis

This analysis has been performed in accordance with the requirements of Executive Order 12291 and the Regulatory Flexibility Act of 1980 (5 U.S.C. 601 et seq.). The following paragraphs summarize the economic and other impacts of the final rule on those industries most likely to be affected.

Industries Affected

The industries affected by the final standard include primary manufacturing, secondary manufacturing, automotive brake and clutch repair, shipbuilding and ship repair, and construction.

Primary Manufacturing

Several industrial processes are used by primary manufacturers to create these diverse product lines, and many potential sources of airborne asbestos fibers can be identified throughout each process. Two particular operations that are common to all processes and that have a high potential for generating airborne asbestos fiber are fiber introduction and product finishing.

The fiber introduction stage includes operations that are necessary for preparing the asbestos fiber for subsequent mixing or blending. Broken bags and spills in the fiber receiving and storage areas account for the release of

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