



Les Lauinger

20100-1000

REPORT
OF THE PUBLIC HEALTH TEAM
ASSESSING THE EXXON VALDEZ OIL SPILL CLEANUP

24 April 1989

LABORERS' NATIONAL HEALTH AND SAFETY FUND
905 16th Street, N.W. • Washington, D.C. 20006-1765 • 202-737-8320



This report was compiled from a visit to Valdez by a public health team consisting of:

- o Eula Bingham, Ph.D., Vice President and University Dean of Graduate Studies and Research, University of Cincinnati, and an internationally known expert on chemical carcinogenesis, especially involving petroleum products and coal tar. From 1977 to 1981, she was Assistant Secretary for Occupational Safety and Health, U.S. Department of Labor;
- o Scott Barnhart, M.D., M.P.H., Director of the Occupational Health Clinic, University of Washington, Seattle, and an expert on toxic medical effects in workers;
- o Matt Gillen, M.S., C.I.H., industrial hygienist, Occupational Health Legal Rights Foundation, Washington, D.C., an expert on worker training;
- o Mark Catlin, industrial hygienist, Alaska Health Project, Anchorage, who has developed training programs for hazardous waste workers.

Assistance on regulatory and legal issues was provided by:

- o Donald Elisburg, Esq., Legal Counsel, Laborers' National Health and Safety Fund. Elisburg is an expert on labor law, who served as Assistant Secretary for Employment Standards Administration, U.S. Department of Labor, 1977-81, and General Counsel and Staff Director, Committee on Labor and Human Resources, U.S. Senate, 1972-77.

The report was prepared by:

- o Jane Seegal, Laborers' National Health and Safety Fund.

Introduction

Since March 24, when the Exxon Valdez tanker struck Bligh Reef off the coast of Valdez, Alaska, and began spilling 10.1 million gallons of crude oil, hundreds of members of the Laborers' International Union of North America have worked on efforts to restore the beaches, waters and wildlife of Prince William Sound. The cleanup is expected to include up to 4,000 workers this summer and could extend for months.

At the invitation of Alaska Commissioner of Labor Jim Sampson, the Laborers' National Health and Safety Fund dispatched a team of four occupational health experts to observe the cleanup April 12-14. The Health and Safety Fund, a joint union-management program, had expressed concerns to Sampson about whether the cleanup workers' health and safety have been adequately protected. Among other things, workers have been observed with oil-soaked clothing and with oil on their faces and hands.

The concern is that the environmental disaster could turn into a pattern of serious human health and safety problems. Skin contact and inhalation of crude oil or its vapors can cause dizziness, nausea and skin rashes in the short term. Long-term risks include kidney and nervous system damage, and some cancers.

The cleanup has had to move forward under emergency conditions, which do not facilitate easily the need for extensive worker training. One month has now elapsed since the spill, and the need to include worker protection requirements as part of the cleanup procedures must be addressed.

In consultation with the U.S. Occupational Safety and Health Administration and the Alaska State Department of Labor, we have established that the OSHA Hazardous Waste Standard (29 CFR 1910.120; 54 FR 9294, March 6, 1989) applies to oil spills and petroleum products. The standard requires at least 40 hours of training, special procedures and equipment to protect the cleanup workers, medical surveillance and long-term record-keeping. Applicable pages from the Standard are in Attachment 1.

There are caveats to this report. We still are missing important pieces of information--such as a detailed description of the toxicology of North Slope Crude oil, and air sampling results to date. It is hoped that Exxon, which is overseeing the cleanup, soon will provide such information.

Although the team did visit an oil-soaked beach, the members were unable to visit contaminated sites while cleanup was under way. The public health team was hampered by a boat's breakdown, the inability of a helicopter pilot to land near a cleanup crew, and the inability of two other experienced pilots to locate a working cleanup crew on a second day, despite more than three hours'

search. Information about cleanup practices, instead, is based on newspaper accounts and photographs, and interviews with three cleanup workers, two representatives of Exxon (Ray Botto and Wren Nealy, M.D.) and an Exxon contractor (Richard Wade of Med Tox). Two team members also attended a worker training session, and the team reviewed the Exxon Valdez Incident Health & Safety Program Manual.

Recommendations are described in detail below. At this point, we summarize by stressing the need to promptly implement an effective, thorough training program for all workers who might have been or may be exposed to the spilled oil or its vapors.

Second, a medical system must be in place--first to provide quick, effective first aid for any injured or ill worker, and second to monitor possible long-term ill effects. Medical surveillance now should document which personnel have worked at each site and for how long, and any reports of injury or illness that might be work-related.

Third, a broad-based local commission of union, management and community representatives should operate throughout the cleanup to assure that the workers' health and safety are protected.

The Laborers' International Union of North America (LIUNA) has extensive experience in hazardous waste operations. It conducts training programs of 80 hours duration at 10 training sites throughout the U.S. (including one in Alaska). Approximately 2,500 union members are trained annually. This training is funded in part under a major grant from the National Institute of Environmental Health Sciences under the Superfund Reauthorization Act, and is recognized nationally for its excellence. We propose to bring this experience and resources to bear on the problem at hand.

Findings in Brief

Workers were seen cleaning shoreline at two sites on Naked Island April 12, but not April 13. Based on observations limited to areas around Naked Island, the eastern shore of Knight Island north of Snug Harbor, and the western shore of Knight Island north of and including Herring Bay, less than 5% of the oil in the water was being cleaned up using booms and skimming boats.

Some workers were observed wearing protective clothing that was contaminated with oil over 25-75% of the surface.

Shoreline work sites are hazardous due to:

- o Physical factors such as cold. The risk of hypothermia is increased by the likelihood of workers becoming soaked (from cleaning hoses, dispersants or rain) and fatigued;
- o The long work hours, remote sites, and cold climate, which combined increase the risk of accidents;
- o Uneven surfaces made slippery by oil and water;
- o Animal hazards, including bears;
- o Salt water, which causes serious skin irritation, especially in combination with petroleum products.
- o Chemical toxins in crude oil and in dispersing agents, which include butoxy ethanol, isopropyl alcohol and paraffinic solvents. None of the toxins in dispersing agents has been linked to cancers, but the toxins have been linked to chronic effects such as central nervous system, liver, kidney and blood disorders.

The Exxon Valdez Incident Health & Safety Program Manual, produced by an Exxon contractor, provides a preliminary framework for a health and safety plan. However it omitted some key details, and was inconsistent on other points.

The 90-minute training program provided the cleanup workers is inadequate and does not meet OSHA's requirement of 40 hours.

Remote work sites will make first aid difficult. A preliminary plan for providing prompt care has been developed.

**Report on Health Protection
of Cleanup Workers**

4

No ongoing medical surveillance was evident. A medical surveillance program is required by OSHA. Baseline physical examinations to assess the ability to use personal protective equipment, such as respirators, is required by OSHA but was not reported by workers.

Potential Hazards

Crude Oil

Crude oil is toxic and hazardous. It comprises more than 200 compounds. The compounds include paraffins (alkanes such as pentane and octane), cycloparaffins (naphthenes) and aromatics (such as benzene, toluene and xylene). One category of the aromatics, polynuclear aromatic hydrocarbons, includes benzo(a)pyrene, a well-known carcinogen. The fourth category, nonhydrocarbons, includes sulfur-containing compounds such as arsenic and vanadium. (A detailed explanation of the compounds is beyond the scope of this report.)

Many individual components in crude oil are known to cause health problems, including cancers. For example, several of the alkanes are known solvents, which means they can dissolve body fat in skin or other tissues. Benzene is linked with leukemia. However, less is generally known about the health effects when these compounds are mixed. What is known is that various crude oils have been tested and found to cause skin cancer; those risks vary from one crude oil to another.

Alaska crude is believed to be especially heavy in sulphur content. This raises special concerns, particularly with regard to the risk of developing skin diseases.

Other Hazards

Although cleanup crews until now have been at work in boats on the Sound, most of the remaining cleanup is expected to occur on more than 300 miles of coastline. Some of the beaches are covered with kelp and/or large rocks, both of which can be slippery.

The hazards, which range from extreme cold to bear attack to fatigue, as well as exposure to the oil, may interact synergistically. For example, many of the workers have been putting in seven-day weeks; traveling several hours by boat to a work site can extend a work day to as much as 12 to 14 hours. Fatigue surely increases the chance of a worker slipping on an oil-soaked rock and suffering an injury.

As for exposure to the crude, workers face three risks: inhalation, skin contact or ingestion.

Inhalation. Crude oil vapors, which give off a noticeable smell, comprise a variety of compounds. In general, lighter fractions

(which include alkanes, benzene, toluene, and xylene) are given off to a greater degree, with heavier fractions (which include a variety of polynuclear aromatic hydrocarbons, PAHs) given off to a lesser degree. Although a component may be present in only a small amount, that amount still could cause exposure problems. For example, a study performed on tank cleaning workers by NIOSH at the Valdez Marine Terminal found overexposures of benzene, a trace component of crude and a carcinogen.

While exposures to lighter fractions might be expected to decrease with time, great care must be taken in generalizing about inhalation exposures from "weathered" crude. The training provided to the cleanup workers states that the oil no longer poses an inhalation hazard. Such claims are problematic, and must be based on careful and comprehensive sampling. The oil this team observed was wet-looking and gave off a noticeable odor 20 days after the spill. The tides continually move and redistribute the oil, so that formation of a tar-like skin is less likely. Even if a skin is formed, vapors can be released when the skin is disturbed during cleanup work. Furthermore, the planned use of hot water sprays may serve to create oil-water aerosols which could be breathed by workers.

Skin Exposure. Skin contact may be the single biggest exposure risk for oil spill cleanup workers. The work involves many opportunities for skin exposure. Avoidance of skin exposure requires a program that adequately addresses a variety of issues from correct selection of protective gear, to detailed procedures on the decontamination and timely discarding of gloves and protective gear. Also, workers must fully understand the nature and consequences of regular skin contamination. Based on the worker training this team observed, workers are not given such an explanation.

A review of the Exxon Valdez Incident Health & Safety Program Manual points to several factors that appear to increase the risk of skin exposure.

- o Glove selection and replacement criteria. Gloves are available in about 10 different plastics and rubbers, because studies have shown that some types of materials can be easily permeated and even destroyed by given chemicals. When this "breakthrough" occurs, the glove is no longer providing protection. Thus, chemical permeation data must be considered in selecting gloves. Furthermore, even the most resistant glove is sooner or later permeated by a given chemical. Because of this, it is good industrial hygiene practice to provide glove-changing rules (e.g. change after 4 hours) for a

specific job or job site. A review of the most commonly used reference on glove permeation data revealed no entries for crude petroleum (Schwope 1983). A reference to crude petroleum was found for Trelchem protective suits, which are used by the Laborers-AGC hazardous waste training program, run by the Laborers' International Union of North America and the Associated General Contractors. The Trelchem reference revealed the following guidelines for crude petroleum.

<u>Type of Material</u>	<u>Time Factor</u>
Viton-butyl	can be used for up to 8 hours
Butyl	can be used for up to 1 hour (may be destroyed by the crude)
Polyvinyl chloride	can be used for up to 2 hours (may be destroyed by the crude)

The selection and changing of protective gear is critical. Actual changing times should be far less than those given above because:

- o Protective suits are generally thicker than gloves, and thickness affects breakthrough time.
- o The above scores are based on resistance and degradation of the materials. Permeation is much more relevant to skin absorption, and typically occurs well before the suit appears damaged.

The Exxon manual does not specify the type of glove to be used, nor any change guidelines. It does state in section VI (B)(F) that gloves "will be recycled if possible." Available research to date indicates that complete decontamination of protective equipment is difficult to achieve. Although the outside may be completely cleaned, inner materials (the matrix) may remain contaminated. A field validation test to evaluate the degree of decontamination would be needed to assure safe re-use, and no such test has been developed.

The problems described above likely would lead to a situation where workers receive skin exposures even while wearing gloves. Studies show that this can be a

serious problem, as gloves can create conditions which then make skin absorption more likely. Exxon will most likely need to conduct breakthrough studies to develop meaningful glove selection and changing guidelines.

o Decontamination sequence. Contaminated clothing must be removed carefully to avoid skin exposure. For example, hands will become exposed from handling boots and other gear if gloves are taken off first. For both asbestos abatement and hazardous waste jobs, protective gear is taken off in a very specific sequence, and workers are given hands-on drills in this sequence prior to going on the job.

A review of the program manual and worker training finds that decontamination is discussed only briefly. The manual does not require a shower as part of decontamination. Furthermore, decontamination is not described as a section to be added to the next version of the manual. This is a serious oversight. While a full 19-step decontamination sequence such as that used for level-A protective gear on a hazardous waste job is not needed, a standard operating procedure unique to the hazards and logistics of this cleanup must be developed as soon as possible. This operating procedure needs to also address the laundering of contaminated street clothes.

In sum, skin exposures are difficult to prevent. There are no meaningful regulations for skin exposure. Wipe-sampling to obtain contamination estimates is not routinely done for most jobs. (Wipe-sampling involves wiping a small area with treated filter paper, then analyzing the paper for contaminants.) The oily, nonvolatile nature of the weathered crude means that it will stay in one place for a long time. While this is obvious when considering areas such as the shoreline, it is also true for less obvious areas should they become contaminated, such as sleeping quarters and occupied areas of the support ships, and for tools and equipment. Although not as obvious as the gross contamination on the shore, this secondary contamination can significantly affect skin exposures, because those surfaces will be touched often with bare skin. Research on surface contamination involving polychlorinated biphenyls (PCBs) points up this risk for the oil. PCBs should not be confused with crude oil in regard to toxic effects, but the oily persistent nature of PCBs is similar in regard to surface contamination. Consider these studies:

o In one striking finding, Christiani et al. (1986) found that workers in a gear shop had elevated PCB levels. The operation did not use any PCBs. The exposure occurred because the company had taken over a building which had been used by another firm three years before to make PCB-filled transformers. The workers received daily skin exposures from surfaces which had stayed contaminated for a long period of time.

o Lees et al. (1987) studied transformer shops and found contamination on 90% of the surfaces tested. These ranged from the work area to tools, vehicles (such as on steering wheels), the insides of respirators and gloves, cigarette butts, and worker skin.

A National Institute of Occupational Safety and Health (NIOSH) study of leaky transformers in the Smithsonian Institution museums in Washington, D.C., found PCB surface contamination in and around transformer vaults. Wipe tests showed contamination on floors, door handles, nearby telephones, table surfaces used for lunch, and even floors 100 feet from the vaults (NIOSH 1986).

These studies provide a valuable warning about how extensive secondary contamination can become. It is clear that a responsive decontamination procedure must be developed for this job. There must be clear demarcation between "dirty" and "clean" zones. Decontamination must be thorough, and workers must shower before entering clean areas. A system for tools and gear is also needed, so that contaminated tools are not handled by workers without gloves.

Ingestion. Inadvertent swallowing of chemicals can occur when food or cigarettes are handled with contaminated hands. When this happens regularly, the overall exposure can be significant. The Exxon manual and the worker training session do not address this issue. In fact, the Sanitation and Hygiene section of the manual only discusses washing of hands at the end of the shift. Anecdotal reports have claimed that workers eat lunches on the beach, and that washup is not performed beforehand. Changes in procedures and worker training will be needed to correct this problem.

Dispersing Agents

In response to an inquiry as to what other chemicals may be used in cleanup operations, Exxon listed the following.

Butoxy ethanol (butyl cellosolve) is a colorless liquid with solvent properties. The permissible exposure limit is 25 parts per million (ppm). It can harm the liver, kidneys, lymphoid system, skin, blood, eyes, and respiratory system. "Substantially exposed workers" should be provided impervious gloves and protective clothing, goggles and respirators.

Butoxy ethanol can be absorbed through the skin. Studies on human volunteers show that immersing four fingers of one hand into butoxy ethanol corresponds to being exposed to vapors at a 20-ppm level (Johanson et al. 1988). Animal studies indicate that the presence of water enhances the skin absorption of butoxy ethanol (Johanson and Fernstrom 1988).

Permeation test results for butoxy ethanol show how critical glove selection can be. Union Carbide reported the following breakthrough times (1984).

<u>Type of Glove</u>	<u>Breakthrough time</u>
Polyvinyl	0.05 hours (3 min.)
Neoprene	0.75 hours (45 min.)
Nitrile	6.93 hours
Butyl rubber	at least 26.8 hours

While the above results suggest that Butyl gloves provide the best protection, specific tests must be conducted--with a mixture of crude oil, seawater and dispersing agents--to verify that they would be the best choice for the crude oil cleanup.

Isopropyl alcohol is a colorless liquid with solvent properties and a permissible exposure level of 400 parts per million. At risk for toxicity are eyes, skin and the respiratory system. The magnitude of toxicity is less than that for butoxy ethanol. Substantially exposed workers should be provided with impervious gloves and protective clothing, goggles and respirators.

Paraffinic solvents are subcomponents of crude oil. The permissible exposure limit listed in the Material Safety Data Sheet is 300 ppm total hydrocarbon. These solvents cause irritation to the mucous membranes and skin. These solvents also may affect liver and kidney functions, and they pose a serious

anesthetic risk at high levels which may lead to prolonged central nervous system disorders. Exposed workers should be provided with impervious gloves and protective clothing, goggles and respirators.

Recommendations

Organization of Health Program

We recommend that a Commission for the Health Protection of Oil-spill Cleanup Workers be established by the Governor of the State of Alaska, to be administered by the Alaska Department of ~~Health~~^{Labor}. The Commission would direct the public health program. Specifics on the recommended composition and functions are in attachment 2.

We also recommend that the training program for all workers be organized by the Laborers-AGC Training and Education Fund and the Alaska Laborers' Training and Education Fund in cooperation with the Alaska Health Project.

We recommend that the Alaska Department of Labor assume responsibility for workplace enforcement monitoring, and that it seek assistance from the National Institute for Occupational Safety and Health and the Occupational Safety and Health Administration to conduct necessary environmental and toxicologic monitoring.

We recommend that medical monitoring be organized by the office of the State Epidemiologist, and that the National Institutes for Occupational Safety and Health and the Agency for Toxic Substances and Disease Registry, Centers for Disease Control, be asked to participate in developing and administering the medical monitoring program.

We also recommend that the Alaska State epidemiologist organize the recordkeeping system as a long-term prospective register on the health of cleanup workers, and that the Agency for Toxic Substances and Disease Registry, CDC, be asked to assist.

Finally, we recommend that all efforts to protect health in accordance with this report be financed by Exxon under contract with the Alaska State Department of Labor.

Health and Safety Plan

The OSHA Hazardous Waste Operations and Emergency Response Standard (1910.120) requires a written safety and health program to identify, evaluate, and control safety and health hazards at these complex work sites. The team evaluated the Exxon Valdez Incident Health and Safety Program Manual. While the program provides a preliminary framework, it is inadequate in many respects. Below, the manual is compared with the required OSHA elements for such plans.

o Organizational structure. OSHA requires that the plan establish a clear chain of command to clearly identify lines of authority, responsibility, and communication. A "Site safety and health supervisor" must be named as well. The Exxon plan does not meet these requirements. This is a serious flaw, given the complexity, size and logistical challenges of the spill site. Several pages on communication methods alone are needed.

o Comprehensive workplan. OSHA requires that the program describe work tasks and objectives, and describe personnel requirements for implementing the plan. It must also provide details on implementing training and medical surveillance plans. The Exxon plan does provide job titles, but otherwise falls short of the mark.

o Site-specific safety and health plan. The OSHA standard acknowledges that every site is different, and requires that a comprehensive plan be tailored to the hazards posed by a given site. The plan must address the following elements:

o A safety and health hazard analysis for each task. The Exxon plan does provide a basic analysis of hazards for beach cleanup workers. It does address hypothermia, work exhaustion, boat and shoreline safety, animal safety, and other hazards. While it is a good start it needs to be expanded as soon as possible. For example, jobs involving confined spaces need to be identified, and jobs (such as dispersant applicator) with other hazards need to be evaluated further.

o Employee training assignments. The plan must insure that all employees are provided adequate training, and that this training covers the hazards that they will face. Such a plan is badly needed for this job, to detail how supplemental

training will be given to workers who have only received a 90-minute orientation. 1910.120 requires 40 hours of training.

o Personal Protective Equipment. Correct selection and proper use of protective gear is critical to the safe performance of hazardous waste work. The Exxon plan provides some details, but it also reports that the section on PPE is missing, and will be added to version 2 of the report.

o Air monitoring plan. OSHA requires a description of air sampling plans. Exxon does provide such a plan. However, the plan has several defects which are described later in this report.

o Site control measures. OSHA requires that the plan provide basic measures such as site maps, site work zones, the use of the buddy system, and a site communications system. The Exxon plan does incorporate the buddy system, but the other measures are not described in the plan. There is a special need for a check-in system to insure that no workers are missing at the end of a day.

o Decontamination procedures. The Exxon plan calls for setting up central decontamination points. However, the section is very sketchy, and this deficiency is one of the most important failings of the plan.

o An emergency response plan. The Exxon plan addresses emergency response, but it is likely that further detail will be required.

o A confined space plan. This is missing and needs to be added by Exxon.

o A spill containment program. Because so much of the work involves spill containment, this is not as relevant as on other hazardous waste sites.

In addition to requiring the comprehensive program, the OSHA standard also goes into further detail on certain important requirements. These are:

o Site characterization. OSHA requires that safety and

health hazards be assessed at the early stages of a waste cleanup. According to Med-Tox representatives, air sampling has been done. While team members have not yet been able to review any of these data, it will be important to do so. Air sampling must be done in a comprehensive and meaningful fashion.

o Because oil is a complex mixture, analysis for a full spectrum of components is needed. Benzene, toluene, and xylene are important components, and the sampling program described does account for them. However, additional sampling for such toxic substances as polynuclear aromatic hydrocarbon fractions should also be performed. The OSHA formula for mixtures should be used for data evaluation.

o Skin exposure evaluation. Wipe-sampling for surface and skin contamination is highly advisable. This is especially important as a quality control check for surfaces with the potential for "secondary contamination" (such as tools, equipment, protective gear). Also, luminescence monitors should be used to detect traces of oils on skin and surfaces. Such sampling would be extremely useful to let workers know immediately how successful the skin protection program is.

o Where work shifts are longer than 8 hours, OSHA formulas for extended work shifts must be used to adjust exposure limits.

o Sampling conditions must be carefully documented to assure that they accurately reflect working conditions. Efforts should be made to sample under worst-case conditions so as to better understand the potential for exposure.

o Short-term and ceiling samples should be taken to better understand the chief sources of exposure.

o Great care must be taken to insure that inhalation exposures for a wide variety of jobs are evaluated. Boom operations, pumping of waste oil into barges, and all confined space jobs must be checked.

o Special sampling techniques must be used to assess aerosol exposures from beach spraying operations. Sampling methods for vapors generally do not allow detection of aerosols.

o NIOSH-recommended exposure limits must be considered during data evaluation.

o Great care should be taken in generalizing from the results for some components to the whole mixture. Consideration should be given to the development of an uncertainty factor for evaluating data if sampling constraints do not allow the evaluation of all important crude oil components. If this is not done, data for a few components may provide a false sense of security.

o Protective equipment. The manual indicates that an additional section on personal protective equipment is being prepared. This section should fully discuss the many issues related to using personal protective equipment on this job.

o Glove and clothing selection must be based on laboratory testing. Gloves must be changed prior to the breakthrough point. Exxon should commission permeation tests to obtain reliable data. Data are needed on gloves and clothing.

o Decontamination. OSHA requires that a full standard operating procedure be developed. It should include a station for each step, and workers to help with decontamination. A shower must be provided. Workers must be drilled on the decontamination sequence during initial training.

Re-use of protective gear must be based on field tests showing that decontamination is totally effective. Such a finding would need to be backed up with a regular field validation program to insure quality control. If this is not done, then workers likely will receive significant skin exposures from partially contaminated gear.

Training

The existing training is severely inadequate in both quality and quantity. To their credit, those who are interested in doing this difficult and hard cleanup work are not afraid to get their hands dirty. It is not appropriate to convey the message that the oil is not really a toxic hazard. Unless the workers are given the full picture, including problems like secondary contamination, the precautions necessary to limit exposure will

only be partly effective. Spill workers need to respect the hazards of the oil, and understand the rationale for the detailed safety and health procedures.

The spill is appropriately covered by the OSHA Hazardous Waste and Emergency Response Standard 1910.120, which calls for 40 hours of training. Given the widening impact of the spill, and the time limitations provided by the approach of winter weather, the cleanup effort should not be stopped so as to certify all the workers. However, a meaningful plan to provide supplemental training needs to be put into place at once. Prioritization of items to be taught and job classifications to be trained first are needed. The development of a responsive, detailed, site safety plan must also be a high priority.

Regulatory Enforcement

Enforcement rests with the Alaska Department of Labor. (See letter from the Department in Attachment 3).

Medical Surveillance

Workers engaged in cleanup work should be provided with a medical surveillance program. The components of the program should be designed by an occupational physician in consultation with industrial hygienists familiar with the potential worksite exposures. An example of medical surveillance offered to hazardous waste workers includes a baseline occupational and health history, and regular documentation of exposures. In addition, a physical examination, spirometry and laboratory testing should be provided (CBC, BUN, Creatine, liver function tests, urine analysis). Audiometry or screening for heavy metals should be added as indicated.

The frequency of examination should be at baseline, at least annually, and prior to exit from the cleanup operation.

Administering 4,000 exams and occupational and health histories--and reviewing and storing those records--may present logistical problems, but no worse than recruiting and housing 4,000 workers. The system should be standardized so that the test results are comparable, one person reviews data and one facility is used to store records.

Each participant should receive a report of the results with any follow-up recommendations. Medical records are confidential, and any information to be released to the employer is for the benefit of health protection only, and even then, only with the employee's prior written informed consent. Information suitable

for the employer is limited to fitness for duty, including physical capacity to use protective equipment.

Following better characterization of work site exposures, appropriate biological monitoring for exposures such as benzene and heavy metals should be included in the surveillance program.

Recordkeeping

The requirements for recordkeeping are specified in the OSHA Hazardous Waste Standard. For each worker, the records shall include physician's written opinions, recommended limitations, results of medical examinations and tests, any worker medical complaints, any medical information provided by the employer to the physician.

The records are to be maintained in accordance with 29 CFR 1910.20 for at least **thirty (30) years** beyond the period of employment.

Research

The extent and expected length of cleanup activities provides an important opportunity to study the health risks associated with clean-up activities and possible exposures to petroleum products. Primary areas of concern include the continued toxicity of the crude oil in the environment, and the adequacy of personal protective equipment and measures. Studies which seek to characterize the validity of different ways to assess exposure, the extent of dermal exposure, absorption of crude oil products, effects on target organs, and validity of biological measures, are all needed.

The requirements for environmental monitoring, medical monitoring and record-keeping provides the opportunity to establish a long-term register on the population. The requirements for such a register would add minimal additional costs to the other regulatory requirements, and would, in addition to yielding research information of great potential importance, almost certainly enhance the rigor and quality of all other protective measures.

Works Cited

- Christiani, D.C. et al. 1986. Persistently Elevated Polychlorinated biphenyl Levels from Residual Contamination of Workplace Surfaces. American Journal of Industrial Medicine. 10:143-51.
- Johnson, G. et al. 1988. Percutaneous Absorption of 2-butoxyethanol. Scandinavian Journal of Work and Environmental Health, Vol. 14
- Johnson, G. et al. 1988. Influence of Water on the Percutaneous Absorption of 2-butoxyethanol in Guinea Pigs. Scandinavian Journal of Work and Environmental Health, Vol. 14.
- Lees, P.S. et al. 1987. Evidence for Dermal Absorption as the Major Route of Body Entry During Exposures of Transformer Maintenance and Repairmen to PCBs. American Industrial Hygiene Association Journal. 48(3) 257-64.
- National Institute of Occupational Safety and Health. HETA Report 85-516. Smithsonian Institution. 22 January 1986.
- Schwoppe, A.D. et al. 1983. Guidelines for the Selection of Chemical Protective Clothing. American Conference of Governmental Industrial Hygienists publication.
- Union Carbide. 1984. Protective Clothing (Gloves) for Glycol Ethers. Technical Bulletin.
- VECO Safety and Med Tox Associates. Exxon Valdez Incident Health & Safety Program Manual. 31 March 1989.

List of Attachments

1. Excerpts from OSHA Hazardous Waste Standard Rule concerning applicability to oil spills and petroleum products.
2. Health Assessment for Oil-spill Cleanup Workers.
3. Letter from Tom Stuart, Alaska State Department of Labor, dated April 21, 1989.

exposure limits suggested by NIOSH and ACGIH. After review of these and other comments, OSHA concludes that it is appropriate to go beyond the OSHA established PELs in triggering medical surveillance. First, medical surveillance is appropriate for workers exposed to toxic chemicals other than those covered by the PEL's. Second, because of the broadly-worded language in section 128(b)(3), which requires medical surveillance for workers engaged in hazardous waste operations "which would expose them to toxic substances." Some of these "toxic substances" are not included in the OSHA PELs. When OSHA completes its rulemaking on the air contamination proposal (PEL's project), there will be fewer toxic substances not covered by PEL's. But in light of Congressional language and the large number of hazardous chemicals present in an uncontrolled hazardous waste site, OSHA concludes that this definition is appropriate to protect employee safety and health.

The term "permissible exposure limits" was defined in the proposal as the inhalation or dermal permissible exposure limit specified in 29 CFR Part 1910, Subpart Z. As a result of the comments received in the record, OSHA has amended its definition that ignored the health limits specified in Subpart G, for "permissible exposure limits."

OSHA has amended the definition for "permissible exposure limits" to include a reference to Subpart G of Part 1910. It now includes both Subpart Z health hazards and those requirements in Subpart G of Part 1910.

First, OSHA has changed the term "established exposure levels" to the term "published exposure level" to reduce confusion. Second, the term "published exposure level" is defined as the exposure limits published in "NIOSH Recommendations for Occupational Health Standards" dated 1986, incorporated by reference, or if none is specified, the exposure limits published in the standards specified by the American Conference of Governmental Industrial Hygienists in their publication "Threshold Limit Values and Biological Exposure Indices for 1987-88" dated 1987, incorporated by reference. Third, the provisions of (f)(2) on medical surveillance have been changed to cover overexposures to both PEL's and, if none, then over-exposure to published exposure limits. OSHA concludes that with these changes the definitions are clear, comprehensive and carry out both statutory directives and appropriate medical criteria in determining whether medical

surveillance is required. Some commenters stated a broader guide is necessary for respirator use and that is discussed under paragraph (g).

OSHA requested comment on the appropriateness of its definitions of hazardous waste, health hazard and hazardous substance and whether they were consistent with EPA and DOT practice. Several comments were received on these issues. One set of comments criticized OSHA's incorporation of petroleum and petroleum products in its definition of hazardous substances.

A typical comment was made by EXXON (10-33). In their comments EXXON presented the following discussion:

Perhaps the most fundamental misinterpretation contained in this rule is the inclusion of petroleum and petroleum products in the definition of hazardous substance. As discussed in Comment IIA.v, below at pages 11 to 14 [internal EXXON comment references], Congress, the Environmental Protection Agency (EPA), and the Department of Transportation (DOT) have uniformly recognized the inappropriateness of characterizing petroleum as a hazardous substance. There is no indication in SARA Section 126 that Congress intended to change the petroleum exclusion or to subject petroleum releases to emergency response regulation.

EXXON further stated:

It is EXXON's understanding that a situation is not an emergency response subject to the requirements of paragraph (1) unless there is a release of a "hazardous substance." Therefore it is essential that the definition of "hazardous substance" be accurate and correct.

The proposed definition of "hazardous substance" references the Department of Transportation's definition of "hazardous materials" under 49 CFR 171.8. By so doing, petroleum and petroleum products have been included as hazardous substances; and, related spills may be subject to the burdensome requirements for emergency response operations.

Congress, in the very CERCLA sections cited in the proposed definition of "hazardous substance," has recognized that petroleum and petroleum products are excluded from the federal definition of "hazardous substance." EPA regulations under CERCLA have incorporated this congressional directive. See 40 CFR Part 302 and discussion at 50 FR 13458, 13460 (April 4, 1985). DOT has specifically recognized this Federal petroleum exclusion and incorporated the exclusion in its definition of "hazardous substance." See 42 FR 34474 (July 1, 1987). As such, the proposed OSHA definition is inconsistent with the CERCLA, EPA and DOT definitions of "hazardous substance."

The proposed definition of "hazardous waste" includes the EPA RCRA definition of hazardous waste and the DOT definition at 49 CFR 171.8. The cited DOT regulation defines both hazardous substances and

hazardous wastes. As noted above, the DOT definition of hazardous substance at 49 CFR 171.8 should properly be incorporated in the proposed OSHA definition of hazardous substance. It is not a waste definition. Therefore, the proposed definition of hazardous waste should be limited to waste materials; and, the DOT definition of hazardous substance should be clearly excluded.

OSHA does not agree with these arguments. Section 126 of SARA is directed to protecting workers from the hazards of all hazardous waste spills. Petroleum products create significant health and safety hazards. Many comments supported OSHA's incorporation of petroleum and petroleum products.

During the questioning of Dr. Kenneth H. Chase, M.D., President of the Washington Occupational Health Associates, Inc., Mr. Chappell Pierce of the OSHA panel asked Dr. Chase the following question (Tr. pg. 531): "Do you feel that medical monitoring for these types of products [petroleum products] is appropriate?"

Dr. Chase responded, "Petroleum products is just too broad a term for me to answer that in a general way. Certain petroleum derivatives are more toxic than others. Some have acute toxicity; others substitute toxicity; and others, the concern is more about chronic toxicity that is most difficult to detect."

During the hearings, OSHA asked many of the individuals who testified if petroleum and petroleum products should be included in the definition of hazardous substances.

Representative of the responses made to this question was the testimony of the Prince Georges County Fire Department; the International Association of Fire Fighters, AFL-CIO; NIOSH; and the Seattle, Washington Fire Department.

Mr. Gregory Noll, the Hazardous Materials Coordinator for the Prince Georges County Maryland Fire Department, testified on the issue (Tr. pg. 445). Mr. Thomas Seymour of the OSHA panel addressed Mr. Noll by stating: "I notice in your testimony, on page 2, that you indicate that at least 50 percent of your responses are involved with flammable liquids or gas emergencies. The definition that OSHA is using in this rulemaking for hazardous substances dealing with and covering flammable liquids and gases you find, then, appropriate?"

Mr. Noll responded, "I think realistically, from the perspective of fire service, we've been successfully handling flammable liquid and gas emergencies for a number of years. Today, with HAZMATs being the buzz word, certainly those categories of

HEALTH ASSESSMENT FOR OIL SPILL CLEANUP WORKERS

Objectives

To establish a system to monitor possible hazardous exposures and medical effects among oil-spill clean-up workers. This work will be conducted under the supervision of a Commission on Health Protection of Oil-Spill Cleanup Workers, appointed by the Governor of the State of Alaska. The work of the Commission shall be administered by the Alaska State Department of Labor.

Charge

The Commission shall perform the following tasks.

A. Preparatory Tasks

The Commission shall define the scope and procedures required to monitor the cleanup work and workers.

- 1) Develop a protocol to assess:
 - a) Exposures to hazards at work.
 - b) Adequacy of training and protective measures at work.
 - c) Medical monitoring of workers.
- 2) Develop requirements for a delivery system for:
 - a) Training evaluation.
 - b) Worksite industrial hygiene and safety inspections.
 - c) Medical testing.
 - d) Laboratory testing for industrial hygiene and medical samples.
- 3) Develop a data analysis plan, including:
 - a) Forms to record observations and tests.
 - b) Data transmittal, storage and analysis.
 - c) Quality control procedures in testing, data recording and data processing.
- 4) Develop a data reporting system:
 - a) Define responsibility for data analysis and reporting.
 - b) Define mechanisms for pre-release review of findings and reports.
 - c) Define conditions under which reports will be released, including briefings, press conferences, and testimony.
- 5) Develop budget estimates by task for clean up period.

commodities have been thrown into the hazardous materials field.

"We now regard them in the hazardous materials field from a practical perspective."

Mr. Thomas Seymour of the OSHA panel asked Mr. Richard Duffy of the International Association of Fire Fighters (Tr. pg. 110). "Mr. Duffy, we have had some previous commenters who have advocated that petroleum and petroleum products be excluded from the scope of the standard.

The example that you just gave about the propane tank inside the building exploding and killing fire fighters, what is your opinion about whether we should exclude petroleum products from this standard?"

Mr. Duffy responded: "I don't know how we would classify them. I would object to that. I mean, I don't know how to better qualify—I could talk to you for days about incidents involving petroleum products. I don't see any reason to exclude them any more than excluding the oxidizers or any group. I mean, you could pick lots of products and ask to exclude them. And I'm sure a lot of the lobbying entities can establish reasons for it. But I can't see any in terms for fire fighters."

Mr. Charles Gordon of the Department of Labor's Office of the Solicitor and a member of the OSHA panel asked Captain Richard A. Lemen, Director of the Division of Standards Development and Technology Transfer of, NIOSH the following question (Tr. pg. 200-201): "In the case of spills of petroleum or petroleum products in either an emergency response situation or as a hazardous waste dump were there are petroleum products as one of the major contaminants, is it appropriate for all the provisions of the OSHA standard or the recommendations to apply in those circumstances?"

Captain Lemen responded, "We believe it is appropriate and they should apply in those circumstances, as well."

Mr. Seymour also asked Deputy Chief Roger Ramsey of the Seattle Fire Department (Tr. pg. 142): "I gather from what you have also said that the definition we have, including the DOT hazardous material definition for hazardous substance and materials is appropriate, and that we should not exclude petroleum products from the coverage of this standard?"

Deputy Chief Ramsey responded, "Absolutely not."

Many spills and emergency response to these spills involve petroleum products. These spills present both health and safety risks. Training is necessary to protect employees who respond to petroleum spills as with

other spills. In fact, these are usually the same employees.

OSHA concludes that it is crucial to cover responses to petroleum spills as well as all other spills because petroleum products constitute a substantial threat to employees responding to accidental releases of these substances. Many petroleum products present health hazards as well as fire and explosion hazards. In addition they often contain fractions which present high health hazards. For example, many contain benzene, a carcinogen to which employees may be exposed.

Therefore, OSHA is not amending its definition for "hazardous substance" to include the petroleum exclusion as referenced by some of the commenters.

The other definitions are discussed in the preamble to the proposal for this rulemaking. There were no major comments. OSHA concludes that those definitions are appropriate for the reasons stated in the proposal preamble.

Paragraph (b)—Safety and Health Program

Paragraph (b) of the proposal has been reorganized for clarity as a result of the public comment. Basic requirements remain the same. Specific changes are discussed below. This paragraph basically requires that a written safety and health program cover safety and health organization and specific work practices to assure employee safety and health. OSHA has concluded that it is crucial for employee safety and health to have a written safety and health program that would force the systematic identification of site hazards and identify employee response to those hazards. The written plan is necessary to communicate hazards to employees for their awareness and protection. (See preamble discussion at 52 FR 29824.)

OSHA received many comments supporting the requirement for a written safety and health program (i.e., State of Wyoming, 10-8; James T. DeLoe, 10-78; International Association of Fire Fighters Local 251, 10-12; other commenters have made suggestions for changes to the proposed language.

OSHA concludes that for the reasons stated a written program is necessary. The following discussion covers specific changes.

OSHA has included a non-mandatory note at the beginning of new paragraph (b) that explains the acceptability of safety and health programs developed and implemented to meet other Federal, state, or local regulations in meeting the requirements of this paragraph. Some commenters believed that OSHA's

requirements for a safety and health program were somewhat duplicative of the contingency plans and emergency response plans required by the E.P.A. for its permit requirements (i.e., Tennessee Valley Authority, 10-43; National Paint and Coating Association, 10-72; Johnson Wax, 10-80). OSHA will permit existing programs that have been designed to meet other government or corporate requirements. For example, contingency plans developed under 40 CFR 265.50 are acceptable in meeting this requirement if they are supplemented with the provisions established by the OSHA standard. OSHA does not intend to require the duplication of efforts made to meet other governmental regulations. Therefore, any plan containing all of the elements required for the OSHA plan will be acceptable in meeting this requirement without the need for developing a separate OSHA plan.

In paragraph (b)(1) of the final rule OSHA has taken the language proposed in paragraphs (b)(1)(i), (b)(2), and (b)(3) of the proposal and subdivided it into paragraphs (b)(1)(i), (b)(1)(ii), (b)(1)(iii), and (b)(1)(iv). Paragraph (b)(1)(i) contains the first two sentences of the proposal along with two new sentences that clarify what the safety and health program shall include. OSHA has included the new sentences and the new note to this paragraph to provide further guidance to employers who may need assistance in developing their safety and health program.

In paragraph (b)(1)(ii) of the final rule OSHA is using the last sentence and the list of chapters proposed in paragraph (b)(1)(i) and subparagraphs (A) through (C). There are no changes made to the language as proposed other than a recodification of the paragraphs.

In paragraph (b)(1)(iii) of the final rule OSHA is using the exact language proposed in paragraph (b)(2). The proposed language has been moved to this paragraph because it contains a requirement that is of a general nature.

In paragraph (b)(1)(iv) of the final rule OSHA is using the language proposed in paragraph (b)(3)(B) with one exception. A new phrase would require the employer to inform contractors and subcontractors of the site emergency response procedures in addition to the proposed information. One commenter, CDM Federal Programs Corporation (10-83), suggested revised language to the proposal that would assure that the contractor and subcontractors received the site specific safety and health plan as well as the safety and health programs. OSHA agrees with the suggestion of the commenter and that

B. Implementation of Monitoring

Monitoring shall be implemented by the Alaska Department of Labor. The Commission shall review the monitoring periodically in accordance with the tasks established above.

C. Propose Long-Term Surveillance

The Commission shall specify a plan for long-term health monitoring of clean-up workers.

- 1) Establish a framework for long-term monitoring:
 - a) Define anticipated chronic effects.
 - b) Propose medical monitoring requirements anticipated, including periodicity.
 - c) Propose population-registry system.
 - d) Outline logistical options, and estimate budget requirements.
- 2) Propose terms and conditions under which long-term monitoring should be conducted.

Background

Oil-spill cleanup workers face serious health hazards that can result in short-term and long-term harm. Current efforts to protect workers have not been adequate. Clean-up of the oil falls under the OSHA hazardous waste standard (29 CFR 1910.120). It requires specific training, personal protection, medical monitoring and record-keeping.

The most recent estimates call for approximately 4,000 workers to be engaged in the clean-up effort. While response to the spill requires extraordinary measures, it is also essential to ensure that the workers involved are protected adequately and that work is done in accordance with established rules and regulations.

Hazards include falls and slips; possible animal (bear) attacks; freezing air and water; hot water and steam used in cleaning; chemical degreasing agents used in cleaning; and the crude oil.

Health effects include injuries; burns; hypothermia; dizziness and nausea; skin irritations and skin lesions; various lung diseases and many different types of cancers and nervous system diseases.

The clean-up is done in remote areas with limited facilities.

This makes health protection difficult, and increases the need for a careful first-aid and evacuation plan.

Health protection is mainly done by assuring that workers are properly trained and outfitted for the work. The requirements for this protection are set forth in the OSHA Hazardous Waste Standard (29 CFR 1910.120) Clothing that protects against penetration of petroleum products needs to be provided and changed often, and must be properly decontaminated. Workers require special respirators to protect against inhalation of toxic materials. Workers need to have clean eating areas to avoid ingesting contaminated food.

To protect the health of workers engaged in this effort, it is critical that a system to monitor possible exposures and health effects be established, so that any untoward medical effects can be minimized.

It is important to recognize that health effects may not become evident for years, and that future medical monitoring and record-keeping on the clean-up workers will be required.

Organization

The agreement which has been established between Exxon and the State of Alaska and three Federal departments (Interior, Agriculture, and Commerce) to assess environmental damages should be expanded to include this assessment of health hazards to clean-up workers.

The Commission shall be appointed by the Governor of the State of Alaska with representatives from the State of Alaska, the Federal government (including the National Institute for Occupational Safety and Health), academic experts, industry and union officials, and community representatives.

The Commission shall be administered by the State Department of Labor, which also shall be responsible for implementing actions to assure a prompt and effective monitoring program. Any contractual arrangements made to effectuate the monitoring program must be exempted from normal procurement requirements in order to expedite procedures.

Attachment 3
STATE OF ALASKA

DEPARTMENT OF LABOR

LABOR STANDARDS AND SAFETY DIVISION

STEVE COWPER, GOVERNOR

P.O. BOX 20630
JUNEAU, ALASKA 99802-0630
PHONE:

April 21, 1989

Dr. Knut Ringen
Director
Laborers' National Health and
Safety Fund
905 - 16th Street, N.W.
Washington, D.C. 20006-1765

Dear Dr. Ringen:

The Alaska Department of Labor has made the determination that the oil cleanup work being performed as a result of the oil spill of the Exxon Valdez is a hazardous waste operation and, therefore, the worker safety provision outlined in Subchapter 10, Hazardous Waste Operations and Emergency Response standard of the Alaska occupational safety and health law should be followed.

This standard has specific requirements for training of workers, medical surveillance, engineering controls to lower exposure levels, personal protective equipment, air sampling and monitoring, informational programs, sanitary facilities for workers, food handling and temporary sleeping quarters, and decontamination procedures.

The Department, however is aware that some of the provisions of this standard such as the requirement that workers receive 40 hours of training before being allowed to perform cleanup work, may not be possible because of the logistical problems and the magnitude of the spill. We, therefore, believe it would benefit all parties involved to hold a meeting to discuss what type of safety and health program is required to protect workers. We will have a draft outline of a program based on the Hazardous Waste Operations and Emergency Response Code for you to review at this meeting.

The meeting will be attended by representatives of the the Department of Environmental Conservation, the Department of Health and Social Services, the Federal Occupational Safety and Health Administration, the Alaska Health Project, the Laborers' National Health and Safety Fund, Veco Inc., Exxon Corp., and H.C. Price/AHTNA. I believe it is important that we have a meeting of all interested parties so that we can develop a workable program that will provide for the safety and health of the workers involved in the oil spill.

Dr. Knut Ringen

-2-

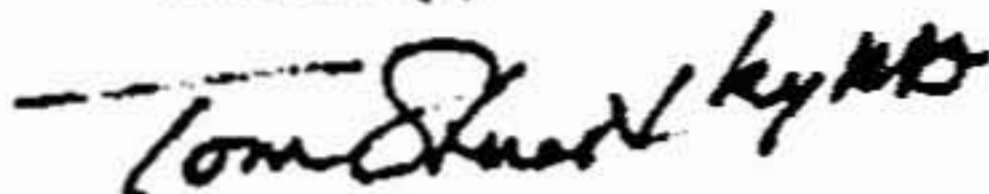
April 21, 1989

As this is a very important issue which needs immediate attention, I would like to hold this meeting on April 25, 1989 at 10:00 a.m. at

First Floor Conference Room
Alaska Housing Finance Corporation
520 East 34th Avenue
Anchorage

I would appreciate it very much if you will make sure that a representative from your organization attends this meeting.

Sincerely,



Tom Stuart
Director

cc: Mark Catlin, AK Health Project
Cal Hild, AK Health Project
Tom Stuart, Director, LS&S
Richard Arab, Deputy Director, LS&S
Eric Shortt, Assistant Chief, S.C.
Bill Kober, Compliance Officer, S.C.