

R E P O R T S

AMERICAN INDUSTRIAL HYGIENE CONFERENCE and EXPOSITION Washington, USA, 18–24 May 1996

The annual American Industrial Hygiene Conference (AIHCE) took place in Washington on 18–24 May 1996. It was co-sponsored by American Industrial Hygiene Association (AIHA) and American Conference of Governmental Industrial Hygienists (ACGIH). For over 50 years AIHCE has been the leading world-wide convention of professionals in health, work hygiene and environment. The Conference theme: "Recognition, Influence, Opportunity" reflects its major objectives. Through creating a favourable ground for becoming familiar with new challenges, problems and trends in industrial hygiene this event profoundly enriched the theoretical and practical knowledge of its participants. This knowledge will serve them in taking current and future decisions in occupational and environmental health and safety — an area of vital importance.

During the Opening Session, the participants were addressed by *Marion Barry, Jr.*, Mayor, District of Columbia, who stressed the significance of the industrial hygiene profession in protecting the health and safety of workers, their families and nations. On behalf of the residents of the District of Columbia, he sent his best wishes for successful conference.

Then *Linda Wertheimer*, National Public Radio's journalist, presented an excellent insider's view of Washington, the political process, and significant national issues. For more than 20 years, Linda Wertheimer has been a well known political correspondent reporting and commenting major events in the national politics.

A. Tripler, AIHA, Fairfax, VA, chaired a roundtable on the role of occupational health and safety in the legislative process. Hygienists, parliamentarians and businessmen discussed about the impact of hygienists' statements and recommendations on the issues being debated on Capitol Hill and in the regulatory agencies. The discussion focused on current and future issues.

Each day the Conference topics were presented and discussed during general, technical and poster sessions, roundtables, and case study meetings. Case study, a 12-minute presentation of practical information 'at first hand', was a novelty of this year Conference. Roundtables were of special importance, their topics were laid down individually by invited speakers and they resembled panel sessions. In total 100 sessions devoted to a broad range of topics and 50 roundtables were held during the Conference. At technical and poster sessions 457 presentations and posters were introduced. In addition, three case study meetings were organised.

The following topic categories were included in the Conference programme: aerosoles — metal working fluid aerosoles and risks involved, agricultural safety and health, air sampling instrument performance, air sampling and laboratory analysis, bioaerosoles — their evaluation in the environment, biological monitoring

— its application in dermal exposure, ethics of biomonitoring and modern analytical chemistry in biomonitoring, biotechnology and especially biomarkers of exposure to microbial contaminants, communication and training mainly linked with the training programme developed by the Occupational Safety and Health Administration (OSHA), confined spaces, construction health and safety, development of industrial hygiene during twenty five years to come, ergonomics and ergonomic risk factors, ethics in industrial hygiene, exposure assessment strategies, gas and vapour detection — air sampling and analysis methods, hazardous waste — treatment, storage and disposal of radiological and mixed waste, nonindustrial indoor air quality, industrial hygiene general practice, exposure to lead — management systems, noise — sound exposure monitoring, nonionizing radiation, occupational epidemiology — methodological issues, biological markers and molecular epidemiology, personal protective clothing and equipment, the role and tasks of industrial hygiene, legislation in industrial hygiene, respiratory protection, risk assessment and management, social concerns — teens at work, preventing violence in the workplace, ventilation and miscellaneous.

Case study meetings focused on three topics: toxic exposure in the chemical industry, ergonomics and indoor air quality, industrial hygiene general practice.

I would like to present several most important topic categories selected from a very broad range of subjects discussed during the Conference.

HEALTH CARE INDUSTRIES

N. Moss, Environmental Health and Engineering Inc. Newton, MA, presented paper devoted to latex management: identification, assessment and control in the health care environment.

Latex allergy has become a major occupational health problem. Reports in the international literature indicate that between 8% and 17% of health care workers are at risk for latex reactions. Traditional exposure reduction programmes have focused on replacing high allergen, powdered gloves with low allergen, powderless gloves. A study conducted in a large teaching hospital (> 700 beds) revealed that levels of latex allergens in the dust ranged from 1,000 ng/g to 1,000,000 ng/g. During renovation activities airborne levels of latex allergens accounted for 50 ng/m³. These levels have been associated with reactions in sensitive individuals. Appropriate identification, assessment and these allergen reservoirs, proposed by the authors, is required to fully control environmental latex exposures to health care personnel.

C. Warholic, Duke University Medical Centre, Durham, NC, discussed nitrous oxide exposure controls for cervix cryo therapy.

Given increasing concern about a growing hazard of exposure to nitrous oxide used not only as an anaesthetic but also utilised as a cryogenic agent in cervix cryo therapy found among health care workers, a study was initiated to investigate employee exposure levels in hospitals applying this method. In health care workers chronically exposed to nitrous oxide spontaneous abortion, congenital abnormalities and liver, kidney and nervous system disorders have been observed. Hospital employees participating in the procedure were interviewed and exposure monitoring was conducted. Initial results revealed that exposures were higher than 8-hr TLV — TWA of 50 ppm (according to ACGIH). During a 11-min freezing procedure

levels as high as 10,431 were noted. After introducing engineering control methods aimed at completely isolating the gas from the breathable environment and through subsequent exposure monitoring effective reducing in exposure levels to below ACGIH TLV and in some instances to below detection limits has been reached. To sum up, the authors have concluded that nitrous oxide must be scavenged during the procedure to prevent exposure among health care workers. Several types of engineering controls can be utilised to bring exposure levels to below detectable limits.

E. Stewart, Kaiser Permanente, Oakland CA, presented studies of nitrous oxide exposure to operating room personnel using different mask induction techniques during pediatric ear surgery.

Experimental, clinical and/or experimental evidence over the past 25 years indicated that nitrous oxide can injure the hematopoietic system, fetus, brain, lung, liver and kidneys of occupationally exposed persons. Perceptual, cognitive, and eye-hand coordination effects have been seen in volunteers exposed to levels as low as 50 ppm. Little published data exists that correlates anaesthesia providers' work practices with occupational exposure to operating room personnel. This study looks at those anaesthesia induction techniques most likely to produce fugitive emissions from anaesthesia machine equipped with waste gas scavenging hazardous to health care workers. Changes in work practices can have significant effects on the exposure in operating rooms. The work practices and resulting exposures of 27 anaesthesiologists and 11 nurse anaesthetics were examined over the course of 145 pediatric ear surgeries in 18 hospitals and ambulatory surgery centres. The study showed that careful work practices during mask induction can reduce occupational exposure to all operating room personnel to below recommended short-term exposure limits.

R. Korczynski, Manitoba Labour, Winnipeg, Manitoba, Canada, focused on occupational health concerns in the denture industry.

Concerns were raised by several denturists regarding potential exposure to methyl methacrylate, dust and noise in the processing of dentures. As a result studies have been carried out. They yielded the following results: respirable dust exposure was below the lower detection limit of 0.3 mg/filter ($N = 5$) and inhalable dust exposures ranged from 0.91 to 1.29 mg/m³ ($N = 5$, $SD \pm 14$); ACGIH TLV-TWA for respirable fraction dust was 3 mg/m³ and for total dust – 10 mg/m³. Noise concentration ranged from 71 to 79 dBA (AM = 75) (MAC = 80 dBA). Personal exposures to methyl methacrylate ranged from 7.14 to 7.35 mg/m³ ($N = 5$, $SD \pm 0.7$) and ambient concentrations ranged from 12.18 to 20.51 mg/m³ ($N = 10$, $SD \pm 2.17$); ACGIH TLV-TWA = 410 mg/m³. Based on this study, personal exposures were found to be acceptable. Nevertheless, a local exhaust ventilation system was installed in order to protect the hearing organ.

J. Kesavanathan, John Hopkins University, Baltimore, MD, presented results of investigations of human nasal passage deposition: the effect of particle size, flowrate and anatomical factors. The study was performed on 10 healthy nonsmokers. The nasal deposition efficiency of 1–10 μm diameter particles at 15, 25 and 35 l/min⁻¹ constant flow rates was measured. The nasal passage cross-sectional areas and the nostril dimensions (nostril length and width) were also measured. Statistical analysis yielded the following efficiency equation:

$$DE_n = 1 - \exp(-0.1 \times d_p^{1.78} \times Q^{1.12} \times A_m^{-1.33} \times E^{1.26})$$

where:

- DE_n — particle deposition efficiency
- d_p — particle size
- Q — airflow
- A_m — nasal passage cross-sectional area
- E — nostril length and width.

BIOLOGICAL MONITORING AND DERMAL EXPOSURE ASSESSMENT

D. Trout, NIOSH, Cincinnati, OH, turned attention to health effect of exposure to sodium azide in production plants.

Sodium azide is the principal gas generating agent used to inflate automobile airbags, which are being increasingly used worldwide. Sodium azide and a reactant product hydrazoic acid effect the cardiovascular system by causing peripheral vasodilation, potentially leading to hypotension and headaches.

In 1994, the National Institute for Occupational Safety and Health (NIOSH) evaluated occupational exposure to sodium azide and hydrazoic acid among employees of the only continuous sodium azide production plant in the U.S. The tests applied found exposures above the NIOSH recommended exposure limits (REL). The evaluation included a symptoms questionnaire, blood pressure monitoring and blood analysis for azide. Headache were reported by 10 of 11 (91%) persons and episodes of 'low' blood pressure by 9 of 11 (82%) subjects as occurring in the production areas within six months prior to the NIOSH evaluation. During the NIOSH survey 4 of 11 (36%) employees reported mild headache and in 1 of 10 employees hypotension was observed. This worker was exposed to sodium azide in the concentration five times the NIOSH REL. None of the blood samples had detectable azide. As a result of this evaluation recommendations were made to identify areas of exposure and to prevent potential health effects.

D. Kang, NIOSH, Cincinnati, OH, highlighted potential mercury toxicity among workers in a battery recycling plant.

A cross-sectional survey was conducted to determine potential mercury toxicity among 58 workers employed in a plant where a variety of batteries, e.g. alkaline, household battery, railroad battery, containing a small amount of mercury, were recycled. The investigations consisted of environmental monitoring, measurements of urinary mercury levels and administration of symptom questionnaires on CNS, respiratory, gum and teeth and GI symptoms.

The mean urinary mercury level of all 58 employees evaluated was 39 (± 5.4) $\mu\text{g/g}$ creatinine. Forty percent (23/58) of individual values were above the biological exposure indices (BEI) recommended by ACGIH (35 $\mu\text{g/g}$ creatinine). The mean urinary mercury level of 10 employees who worked in an area where alkaline household batteries were recycled was 49 $\mu\text{g/g}$ creatinine; 50% (5/10) of individual values of these workers were above the BEI of ACGIH. There was a statistically significant correlation between ambient mercury levels and urinary mercury levels. There were also statistically significant relationships between urinary mercury levels and CNS and respiratory symptoms, feeling tired, weak and depressed. These results are consistent with the presence of mercury toxicity among workers in a battery recycling plant.

C. Cambell, University of British Columbia, Vancouver, Canada, discussed health effects induced by dioxins and furans in sawmill workers exposed to chlorophenol fungicides.

Chlorophenols are used in many countries to prevent sapstain fungal growth on lumber in sawmills. Elevated levels of chlorophenols were found in urine of sawmill workers, particularly those with dermal exposure. Polychlorinated dibenzodioxins (PCDDs) and furans polychlorinated dibenzodioxins (PCDDFs) are contaminants created in the manufacture of chlorophenols so it is expected that sawmill workers were exposed. PCDD/Fs have half-lives on the order of years and accumulate in adipose tissue. Biological monitoring is not easily carried out due to its invasive nature and cost, consequently little information exists on PCDD/F levels in sawmill workers.

In a cohort of Canadian sawmill workers assembled for a cancer incidence and mortality study, the adipose tissue concentration of PCDD/F compounds was estimated, using a single-compartment pharmacokinetic model. Estimates of dermal and inhalation exposure to chlorophenols were combined with PCDD/F contamination levels, half-lives and absorption efficiencies. Predicted median adipose tissue concentration of all dioxine and tetra- and penta-chlorinated furans among the sawmill workers were similar to background levels in unexposed residents of the same region, however, about 10 to 30% of sawmill workers were estimated to have elevated levels of these congeners. Median levels of hexa-, hepta- and octa-chlorinated furans were predicted to be 2 to 15 times background levels.

D. Kang, NIOSH, Cincinnati, OH, spoke about the use of 1-hydroxypyrene glucuronide in human urine as a biomarker of exposure to polycyclic aromatic hydrocarbons.

Humans are exposed to polycyclic aromatic hydrocarbons (PAHs) from various occupational, environmental, medicinal and dietary sources. The measurement of specific PAH metabolites in human urine can be used to assess recent exposure to PAHs. The authors have measured a major pyrene metabolite, 1-hydroxypyrene glucuronide (1-OHP -gluc), in human urine in three groups of subjects with exposure to PAHs from occupation, diet or smoking. 1-OHP-gluc concentration was measured: 1) in a controlled feeding study of 10 subjects; 2) before, during and after ingestion of charbroiled beef; 2) in a group of 44 steel plant workers and 40 on-site controls stratified by job category and smoking status; and 3) in 47 cigarette smokers stratified by type of tobacco smoked (black or blond) and 50 controls.

In all three studies, urinary 1-OHP-gluc was strongly associated with PAH exposure. The feeding study indicated that elevated urinary 1-OHP-gluc reflected recent (within 48–72 hours) exposure to PAH. The steel plant study indicated that workers in the high PAH exposure job categories (blast furnace or coke oven) had a mean urinary 1-OHP-gluc level of 10-fold higher than office workers. The smoking study showed significant differences in mean urinary 1-OHP-gluc concentration between smokers and nonsmokers, and a dose-response relationship between number of cigarettes smoked and urinary 1-OHP-gluc. These validation study support the use of urinary 1-OHP-gluc as a biomarker of recent exposure to PAHs.

R. Nordlinder, Institute of Internal Medicine, Göteborg, Sweden, presented investigations of dermal uptake of polycyclic aromatic hydrocarbons in engine room personnel on ships.

Engine room personnel are at increased risk of lung and bladder cancer. Smoking is one explanation but occupational factors have also been suggested as etiological agents. Asbestos and polycyclic aromatic hydrocarbons (PAHs) are possible factors in the engine room environment. Asbestos has been banned since the 1970s in Sweden. PAHs are still a component of heavy marine diesel oils and in lubricant oils and the mechanists could be exposed to PAH by inhalation or dermal uptake during work in engine rooms. The PAHs are metabolised to different metabolites and 1-hydroxypyrene is a metabolite to the common PAH pyrene. The authors have analysed the urinary 1-hydroxypyrene excretion in engine room personnel in different types of ships and compared the results with unexposed personnel on the same ships. The study covered 20 machinists and 14 unexposed men on five ships. Exposure to oil and oil products and smoking was registered using a questionnaire 24 hours before sampling. The 1-hydroxypyrene levels in urine were measured with the HPLC method. There were no differences in excretion of 1-hydroxypyrene between unexposed ($0.12 \mu\text{mol/mol creatinine}$; 95% CI $0.06-0.18$; $N = 14$) and exposed with no dermal contact with oil ($0.13 \mu\text{mol/mol creatinine}$; 95% CI $0.01-0.16$; $N = 4$). Machinists who had dermal contact with oil and oil products showed significantly higher excretion ($0.25 \mu\text{mol/mol creatinine}$; 95% CI $0.15-0.35$; $N = 16$, $p = 0.03$). A higher excretion of 1-hydroxypyrene was also seen in smokers but the effect was smaller than that of the oil exposure.

The investigations revealed that polycyclic aromatic hydrocarbons can be absorbed through unprotected skin. Dermal uptake seems to dominate compared to uptake through the respiratory system. The use of protection gloves and overalls during work in the engine room should reduce dermal uptake of PAHs.

METHODOLOGICAL ISSUES IN EXPOSURES ASSESSMENT AND IMPLICATIONS FOR OCCUPATIONAL EPIDEMIOLOGY

W. Sanderson, NIOSH, Cincinnati, OH, presented paper: "Estimating Retrospective Exposures of Workers in a Beryllium Manufacturing Plant".

Beryllium is known to be toxic to the lungs, causing both acute chemical pneumonitis and chronic berylliosis and it has been also associated with increased lung cancer. For over 40 years airborne beryllium exposures have been monitored with the aim to reduce workers' risk for these diseases. The authors presented various methods used to measure airborne beryllium and how historical measurements had been used to create a matrix for categorising workers by potential exposure level in a long cancer control study. Over 7,000 historical measurements were available to estimate the beryllium exposures of workers. Average exposures between jobs varied considerably and exposures for all jobs decreased dramatically between the 1940s and 1970s due to major plant production changes and strict hygienic regime. For example, the average exposure of the furnace operators in the 1940s was estimated to be $131 \mu\text{g}/\text{m}^3$ but only $3.4 \mu\text{g}/\text{m}^3$ in the 1970s, and in the rolling mills $14.8 \mu\text{g}/\text{m}^3$ and $0.09 \mu\text{g}/\text{m}^3$, respectively.

Although some inaccuracy in the exposure estimates for the cases and controls is likely to occur due to the limitations of the exposure assessment data, the exposure matrix provides a reasonable, objective mechanism for categorizing workers by the relative exposure that they were likely to have encountered during their tenure.

S. Viet, Chew and Assoc. Inc., Golden, discussed chronic beryllium disease (CBD) and beryllium sensitisation (SENS) as well as a case-control study conducted to evaluate various levels of historical beryllium exposure at the Rocky Flats nuclear weapons facility.

The purpose of the study was to determine whether the current occupational beryllium standard of $2 \mu\text{g}/\text{m}^3$ provides adequate worker protection from its effect. As of October 1994, the Beryllium Health Surveillance Program at Rocky Flats had identified 50 CBD cases and 74 SENS cases by the blood lymphocyte proliferation test. Each of these cases was matched to a control of the same age group, race, gender and smoking status.

A job exposure matrix was developed from beryllium air sampling data available from 1960. Using the matrix, long-term average exposure and cumulative exposure were estimated for each subject. It was that both long-term average and cumulative exposures were significantly higher for CBD cases as compared to their controls. Also the odds ratio rose statistically above 1.0 with increasing exposure suggesting a dose-response relationship for CBD. These trends were not observed for SENS cases as compared to their controls.

H. Kim, Catholic University Medical College, Seoul, Korea and *G. Perrault*, Institute de Recherche en Sante at en Securite, Montral, Quebec, Canada, presented results of studies of the work environment in the furniture industry.

Total wood dust concentrations were measured by 37 mm closed face cassette and the inspirable particulate mass (IMP) sample. The results showed significant difference between median concentrations measured by these two methods. Depending on the measurement strategy (fixed sampling stations or in the personal breathing zone) and the workplace category (wood furniture manufacture, sawmills and paper mills), the differences were 1.20 to 3.70 times higher than the concentrations of total dust. These results are related to the sampling efficiency of both systems. Both groups of authors were in agreement that the utilisation of total dust measurements may lead to underevaluation of the furniture industry workers' exposure associated with the risk for adenocarcinoma of the nasal cavities and paranasal sinuses.

SOCIAL ISSUES

E. Morse, Massachusetts Department of Health, Boston MA, focused on issues of teens at work and child labour concerns for health and safety professionals.

Millions of adolescents in the United States work. Despite of federal and state laws that limit employment of hazardous occupation, teens are injured and killed on the jobs at a rate similar to that of adults. NIOSH estimates that nearly 200,000 adolescents suffer work-related injuries each year. Some of these injuries required hospitalisation, some caused permanent disabilities. In 1992-93 more than 65 work-related deaths among teenagers under the age of 18 years were reported. Information regarding health hazard exposures for working teens is scanty, but may be expected that thousands of teenagers may be exposed to chemical, biological and physical agents on their first job. These problems were discussed at roundtable 233 attended by experts in the field adolescents and work, and in the area of epidemiology, industrial hygiene, occupational health and prosecution for child labour and safety violations.

R. Barish, OSHA Consultation Service, San Francisco, CA, discussed the issues of preventing violence in the workplace: a new safety and health responsibility.

According to the US Bureau of Labor Statistics' census homicide is now the second leading cause of fatal traumatic workplace injuries in the United States, trailing only transportation accidents. About 75% of employee homicides occur during robberies and other crimes involving cash or valuables. Popular media reports of "workplace violence" focus on multiple fatality attacks by customers and service recipients, supervisors, co-workers and estranged spouses. These well-publicized events are only the most visible manifestations of incidents ranging from verbal threats to serious non-fatal assaults which can occur in any workplace. What is a role to be played by professionals in preventing and responding to assaults on employees. These issues and risk factors for workplace assault and effective preventive measures were discussed at the rountable. The roles of other professionals with responsibilities for protecting employees from the hazard and violence were also debated.

LEAD ISSUES

D. Jacobs, HUD Office of Lead Hazard Control, Washington, DC, analysed the problem of lead-contaminated house dust and blood lead levels in urban children.

The purpose of the study was to estimate the probability of a child having elevated blood lead level based on known amount of lead dust in the child's primary residence and how that lead dust should be quantified. In Rochester, NY, 205 children aged one and one-half years to two years were enrolled in a cross-sectional study. Three dust collection methods were used to obtain samples from up to 12 sampling locations in each home. Other sources of lead exposure were also quantified, including paint, soil, water and other sources. Blood level and iron status for each child were measured. Results show that dust lead loading ($\mu\text{g}/\text{m}^2$) is a significantly better predictor of children's blood lead level than dust lead concentration ($\mu\text{g}/\text{g}$) and that significant differences exist among dust sampling methods. Statistical analysis showed that the proportion of urban children having elevated blood lead levels increased at dust lead levels lower than EPA standards. The results of this study can be used to guide the development new hygiene standards for settled leaded dust in housing.

G. Piacitelli, NIOSH, Cincinnati, OH, raised the problem of lead exposures among construction workers' families.

Para-occupational or 'take home' exposures to lead have been reported for several industries, including battery plants, lead smelters and radiator shops. However, little information is known about take-home exposures in the construction industry, where extremely high exposures to lead may occur and where preventive measures such as personal hygiene programmes are often lacking. The authors presented results of the study designed to assess take-home exposures among 29 families of lead-exposed construction workers, and 18 neighborhood families with not known lead exposures were included for comparison. Environmental sampling was conducted to assess lead contamination on participants' hands and inside their cars and homes. Lead concentrations were generally higher in homes of exposed persons (120 ppm, $p = 0.04$) than in control homes. Mean hand lead

levels were similar for children in the exposed and control homes (35 and 43 $\mu\text{g}/\text{m}^2$; $p = 0.52$). A greater percent of exposed children than control children had blood lead level at or over 10 $\mu\text{g}/\text{dl}$ (OR = 6.1; CI 0.9–147.2). The study indicates that workers take lead from construction sites into their cars and homes, thereby potentially expose their families. Children whose parents work with lead had elevated blood lead levels. The study emphasises the need for proper hygiene programmes at construction sites, including the use of change and shower facilities before leaving work.

J. Yang, Industrial Health Research Institute, Inchon, Korea, presented data on blood lead concentrations in the general population and in occupationally exposed workers in Korea.

Over 30 thousand people work in the lead industry in Korea. From the 1980s, about 50–70 workers with blood lead levels over 60 $\mu\text{g}/\text{dl}$ and symptoms of lead poisoning have been observed every year. The purpose of the survey was to collect the information about overall blood lead concentrations, including both environmental and occupational exposure. A group of non-exposed 525 Korean adults from 4 provinces and a high risk group of 245 workers, employed in the lead industry, were selected. Blood lead concentrations were measured by an atomic absorption spectrometer (with graphite furnace). In the control group the geometric mean were 6.36 $\mu\text{g}/\text{dl}$ in males and 5.09 $\mu\text{g}/\text{dl}$ in females. There was no correlation between blood lead concentration and age. The mean blood lead concentration in smokers was higher than that in nonsmokers ($p < 0.0005$). In the group of 245 lead-exposed workers mean blood lead concentration was 32.89 $\mu\text{g}/\text{dl}$. Significant differences were observed between individual branches of the industry, e.g. in refinery industry blood lead concentration accounted for 63.52 $\mu\text{g}/\text{dl}$, in battery plants – 32.16 $\mu\text{g}/\text{dl}$, in inorganic paint workers – 29.51 $\mu\text{g}/\text{dl}$, in workers employed in a factory manufacturing PVC stabilisers – 65.02 $\mu\text{g}/\text{dl}$ and in electronic factories (in welders) – 12.59 $\mu\text{g}/\text{dl}$.

INTERNATIONAL CO-OPERATION

A. Nowakowski, Windsor, discussed American initiatives regarding co-operation between American hygienists and their colleagues in Central and Eastern European countries. The American Industrial Hygiene Association (AIHA) is particularly active in these activities. The Association has already established a number of contacts in these countries through the institutes cooperating with the World Health Organization, including the Institute of Occupational Medicine and Environmental Health in Sosnowiec and the Nofer Institute of Occupational Medicine in Łódź, Poland. The author presented, *inter alia*, the contribution of American hygienists to the elaboration of a pilot training programme tailored for hygienists and the accreditation of labour hygiene laboratories. These actions are aimed at legal, global approval of industrial hygiene as a profession following the example of the United States where this profession has a long-standing tradition.

CASE STUDIES

I. Chemical exposures

M. Evans, Dade, Intl., Miami, FL, evaluated occupational exposure to low levels of sodium azide and hydrozoic acid.

Very low quantities of hydrozoic acid are able to contaminate general workroom air creating a 'red eye' syndrome in exposed workers. Monitoring for both sodium azide and hydrozoic acid revealed low levels of the acid. Sodium azide in presence of humid air creates hydrozoic acid. Levels of hydrozoic acid within the ACGIH TLV norms continued to cause red eyes in exposed workers. Proper design of local exhaust ventilation coupled with increased air make-up reduced airborne concentration to less than detectable, resolving red eye issue.

G. Gruenwald, Fireman's Fund Insurance, Tustin, CA, discussed problems regarding glutaraldehyde exposure at a fogging operation.

High concentrations of glutaraldehyde-based solutions are used to fog aseptic rooms in a pharmaceutical manufacturer. It appeared that workers employed in adjacent areas had complained of ill effects. Sampling indicated that initial levels of glutaraldehyde were very high (above 4 mg/m^3) while in adjacent areas the levels were comparable to $\text{TLV} = 0.82 \text{ mg/m}^3$. The situation may be improved through: 1) finding a suitable substitute for glutaraldehyde; 2) personal protection equipment; and 3) proper ventilation.

RISK ASSESSMENT

C. Freeman, USDOL-OSHA, Washington, DC, spoke about the new OSHA regulations for hexavalent chromium.

In July 1993, the Occupational Safety and Health Administration (OSHA) proposed a standard to reduce the permissible exposure limit for occupational exposures to hexavalent chromium. The major illnesses associated with occupational exposure to hexavalent chromium are lung cancer and dermatoses. OSHA estimates that between 200,000 and 750,000 workers are exposed to hexavalent chromium on regular basis in all American industries. It is mostly used as a structural and anti-corrosive element in the production of stainless steel, and in electroplating, and welding. OSHA has initiated the new regulations for all hexavalent chromium compounds in all branches of industry. In addition, a preliminary risk assessment and new air sampling methods have been developed. It is anticipated that the new rules will be published in 1996.

Together with the importance of contributions presented during technical and poster sessions and during roundtable discussions, the significance of feature keynotes on health policy, social security, scientific policy and on a number of other topics should be stressed. Keynotes were produced by renowned representatives of American political life, economy and mass media, invited by the organisers of the AIHA Conference. In this group of contributors were Linda Wertheimer, a host of National Public Radio's "All Things Considered" already mentioned as a keynote speaker during the Opening Session, Robert Reich, Secretary of Labor, Dana Mead, Chairman of the Board and CEO of Tenneco and Chairman of Case Corporation, Lynn R. Goldman, Assistant Administrator for Prevention, Pesticides, and Toxic Substances for the Environmental Protection Agency, Joseph A. Dear, Assistant Secretary of Labor for the Occupational Safety and Health (OSHA), Linda Rosenstock, Director of the National Institute for Occupational Safety and Health (NIOSH) and Tara O'Toole, Assistant Secretary of Environment, Safety and Health for the Department of Energy.



AWARDS AND RECOGNITION

By tradition, during the Conference ten awards and recognitions were presented, among others, to *James Merchant* of the University of Iowa and Senator, *John Doull*, professor of pharmacology and toxicology at the University of Kansas Medical Center and the chair of the ACGIH TLV Chemical Substances Committee, *Elisabeth K. Weisburger* of the National Cancer Institute to recognise outstanding contributors to the fields of industrial hygiene and environmental and occupational health. Seven persons were honored by AIHA Honorary Membership.

Awards were also presented to recognise outstanding contributions to particular fields of industrial hygiene (aerosols, hazardous waste), and respiratory protection as well as the best 1996 poster and the best 1996 abstract.

Films devoted to health and environmental and occupational safety issues were presented on the final day of the Conference during a festival specially arranged on this occasion. For three days the participants could visit the exposition as one of the largest attractions at the Conference. The best-known companies were displaying the latest state-of-art products such as personal protection equipment, gas monitoring systems, individual dosimetry pumps or heat stress monitoring equipment. Computer companies, and producers of software and professional literature on occupational health and safety also displayed their products.

The Conference was attended by a group of Polish researchers: Professors *Janusz A. Indulski*, *Marek Jakubowski* and *Edward Wiecek* of the Nofer Institute of Occupational Medicine in Łódź and Professor *Jan Grzesik*, Dr *Krystyna Pawlas*, Dr *Józef Pastuszka* of the Institute of Occupational Medicine and Environmental Health in Sosnowiec. The Polish delegation introduced the ACGIH and AIHA to activities of institutions and organisations responsible for the implementation of the National Programme for Occupational and Environmental Hygiene. They also discussed the questions of an official recognition of industrial hygiene as a profession, education of hygienists as well as certification and accreditation of occupational hygiene laboratories.

At technical session Prof. *J. Grzesik* highlighted practical aspects of informing the affected people about the results of examinations aimed at estimating the impact of radio-frequency electromagnetic fields on their health, and Dr *J. Pastuszka* spoke about emission of bacterial aerosol from the fish aquarium and presented some deliberations on the question whether tobacco smoke particles can carry bacteria and fungi. At poster sessions two problems were presented: effects of exposure to impulse and permanent noise in industry and criteria for noise assessment — Dr *K. Pawlas*, and hearing protection of noise exposed workers in Poland — Prof. *J. Grzesik*.

A special bulletin containing the most important and interesting events was issued every day of the Conference. On 23 May the information on the activities of the Polish delegation was published in the bulletin.

The fifty-sixth annual American Industrial Hygiene Conference was a forum of professionals in the area of occupational hygiene at which the most up-to-date and best knowledge was presented. The Conference created an opportunity of getting familiar with the world trends in the development of occupational

hygiene and introducing the auditorium to unknown and extraordinary environmental and health investigations. Industrial hygiene services were challenged to new tasks.

I would like to underline an excellent organisation of the whole event and great hospitality and concern showed to all participants by the Conference organisers.

The next, 1997 American Industrial Hygiene Conference will be held on 17–23 May 1997, in Dallas, Texas, with the theme: “Taking Responsibility, Building Tomorrow’s Profession”.

Janusz A. Indulski

