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**Testimony of James Repace, MSc.
On HB 5608:
"An Act Concerning The Issuance of
Liquor Permits to Casinos that
Permit Smoking in the Casino".**

February Session, 2009

February 27, 2009

Senator Harris, Representative Ritter, and
Members of the Public Health Committee:

1. My name is James Repace. I am an international secondhand smoke (SHS) consultant. I have published 84 scientific papers, of which 76 concern research on the exposure, dose, risk, and control of secondhand smoke (SHS), over a period of 38 years. I have been asked to testify on this bill by the United Auto Workers, Region 9A.

I have performed scientific research on the levels of SHS respirable particulates and carcinogens in 4 casinos, 3 in Pennsylvania and one in Delaware, and have studied the levels of cotinine, a nicotine metabolite, in the urine of 7 patrons before and after casino visits, and in 6 casino workers injured by SHS. I have served as an expert witness on SHS exposure and health effects in several casino worker lawsuits in which workers suffered grave injuries, including respiratory disease, heart disease, cancer, and death as a result of workplace exposure to SHS. In two of these cases, Mullen et al. v. Treasure Chest, in New Orleans, and Januszewski et al. v. Horseshoe Hammond, in Indiana, large multi-million dollar settlements were awarded to the injured plaintiffs in out-of-court settlements.

My primary concern is the health and safety of casino workers and patrons. All U.S. Occupational Health, Environmental Health and Public Health authorities in the U.S. have concluded that exposure to secondhand smoke (SHS) causes fatal disease (CalEPA, 2006; USSG, 2006; NTOX, , and ASHRAE, the Society of Ventilation Engineers, has declared that ventilation or air cleaning cannot control SHS, and "should not be relied upon to control health risks from SHS exposure" (ASHRAE, 2005). SHS is a known human carcinogen (NTox, 2007) for which there is no safe level of exposure (SG, 2006). Recent studies show that rates of acute risk of heart attack decline after the passage of smoke-free workplace laws (Juster et al., 2007; Barnoya et al. 2005, Pehacek et al., 2004)

Although these advisories have been public for several years, the Mohegan Sun has proposed to use dilution, nonsmoking sections, and ventilation and air cleaning on its casino floors in lieu of establishing a smoke-free environment for its workers and patrons.

I am here to tell you this would be a grave mistake. It would take tornado-like levels of ventilation or air cleaning to control SHS to de minimis levels (Repace, 2006).

2. In appearing here today, my purpose is to comment on the Letter of Understanding (LOU) about smoking in the Mohegan Sun Casino in Connecticut by Chairman Bruce "Two Dogs" Bozsum to Governor Rell. In his letter, Chairman Bozsum proposes "Standards for Secondhand Smoke Reduction, Removal, and Monitoring at Mohegan Sun," which he asserts "are designed to promote the health and safety of our patrons and employees" (Bozsum, 2009). Ch. Bozsum's Standards establish (1) smoking areas (2) non-smoking areas, (3) state-of-the-art ventilation, (4) air quality monitoring, and (5) worker accommodations. The LOU has three components:

Smoking: According to this LOU, SHS will be permitted in "80% of the gaming areas, in all bars and nightclubs, and in a designated employee smoking room."

Ventilation: The LOU proposes "15 air changes per hour (ACH)" general ventilation, air filtration, and directed flow ventilation at some table games. System maintenance by filter replacement every 60 days and regular re-balancing by on-site contactors.

Air Quality Monitoring: Twice per year monitoring for unspecified pollutants to unspecified standards.

3. In a section entitled "Smoke Removal and Indoor Air Quality at Mohegan Sun," Executive Summary, Nov. 2008, the casino states that it has 10,000 round-the-clock employees potentially exposed to SHS, which the casino attempts to control using ventilation and filtration to limits which it claims to satisfy "threshold limits prescribed by the U.S. Occupational Health and Safety Act (OSHA) and ASHRAE (the American Society of Heating Refrigerating and Air Conditioning Engineers), "as documented in the November 2008 report on Indoor Air Quality in the Mohegan Sun, which includes copies of [multi-year] air quality sampling. Mohegan Sun claims that the large volume, "aggressive" air change rate, and air handling units "trap and remove" secondhand smoke particles using "Cosatron" electrostatic precipitator air cleaners. In addition, a "Summary of Smoke Removal and Indoor Air Quality on the Gaming Floor" is enclosed in the LOU. The following "standards" are cited in this Summary of Smoke Removal: OSHA PEL for nicotine vapor of 0.5 mg/m^3 {500 micrograms per cubic meter - ($\mu\text{g/m}^3$)}, and the level of detection used by the monitoring equipment is 0.017 mg/m^3 { $17 \mu\text{g/m}^3$ }.

Comment 1: This discussion centers on dilution of smoke and removal by air cleaning and ventilation. However, it unaccountably ignores the generation of the smoke, which is dependent upon the number of smokers, the type of smoking materials, and the smoking rate. The level of smoke is determined by the ratio of smoke generation to smoke removal. Also, air cleaning or ventilation cannot intercept the smoke as it leaves the smoker and is inhaled by the nonsmoking workers and patrons on its way to the ventilation and air cleaning ducts. Moreover, ventilation systems recirculate smoke, and air cleaners are inefficient for smoke gases, which contain many tobacco smoke poisons and carcinogens.

Comment 2: The last ASHRAE Standard to specify ventilation for casinos was ASHRAE Standard 62-2001 which is obsolete. That standard specified a ventilation rate of 30 cubic feet per minute per occupant (cfm/occ) and is equivalent to an air exchange rate of 15 air changes per hour [Repace, JOEM 2004]. However, ASHRAE no longer recommends ventilation rates for casinos with smoking, and declared in 2005 that “no ...engineering approaches, including current and advanced dilution ventilation or air cleaning technologies, have been demonstrated or should be relied upon to control health risks from ETS exposure in spaces where smoking occurs,” and “ASHRAE ... encourages elimination of smoking in the indoor environment...”.

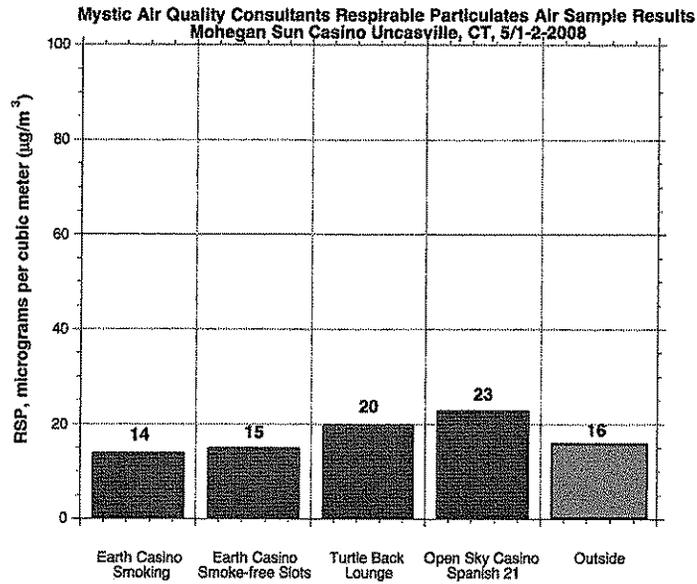
Comment 3: The cited OSHA PEL for nicotine applies only to pure nicotine vapor in the air of tobacco barns or tobacco plants. It does not apply to nicotine in secondhand smoke.

Comment 4: The minimum level of detection of the monitoring equipment used by Mystic Air Quality Consultants for Mohegan Sun ($17 \mu\text{g}/\text{m}^3$) is higher than the typical level expected ($10 \mu\text{g}/\text{m}^3$) for nicotine in a casino ventilated at 15 ACH [Repace JOEM, (2004); Repace and Lowrey (1993)], assuming a casino smoking prevalence of 23%. Connecticut smoking prevalence is lower (17%) < <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5638a2.htm>>.

4. **Figure 1** shows the Mohegan Sun’s Summary of Smoke Removal and Indoor Air Quality on the Gaming Floor (pages 7 and 8 of 8) presents measured data for 2008 from Mystic Air Quality Consultants reported Respirable particulates for Mohegan Sun at levels ranging from Outside: $0.016 \text{ mg}/\text{m}^3$ ($16 \mu\text{g}/\text{m}^3$) to Open Sky Casino: $0.023 \text{ mg}/\text{m}^3$ ($23 \mu\text{g}/\text{m}^3$) from May 1-2, 2008 LOU Enclosure (2) pages 7 of 8 and 8 of 8. However, in the same year, measurements by Roswell Park Cancer Institute researchers (**Figure 2**), showed much higher levels of RSP pollution in the Mohegan Sun, with $74 \mu\text{g}/\text{m}^3$ in Mohegan Sun smoking areas, and $58 \mu\text{g}/\text{m}^3$ in nonsmoking areas of Mohegan Sun, while the outdoor levels averaged $11 \mu\text{g}/\text{m}^3$, with the U.S. National Ambient Air Quality Standard for $\text{PM}_{2.5}$ (RSP) at $15 \mu\text{g}/\text{m}^3$, with comparable levels in Foxwoods (Skeps et al., 2008).

Comment 5: These contradictory measurements suggest that contrary to implications by Mohegan Sun, SHS is not being controlled, and workers and patrons are being exposed at risk to their lives and health.

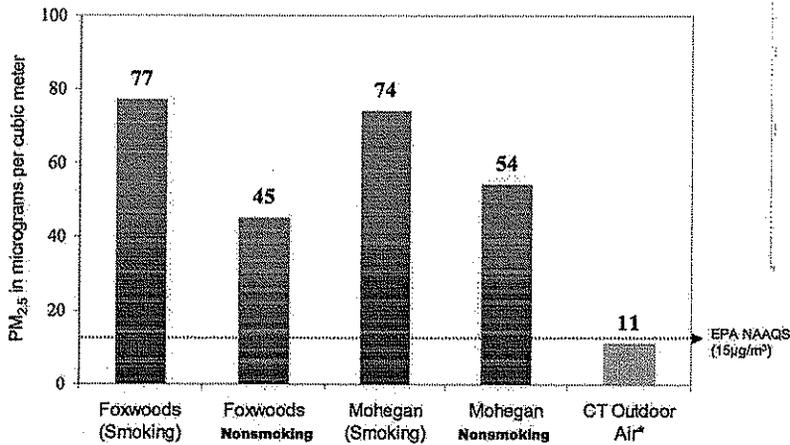
Figure 1.



Data Reported in Mohegan Sun Summary of Smoke Removal for 2008.

Figure 2.

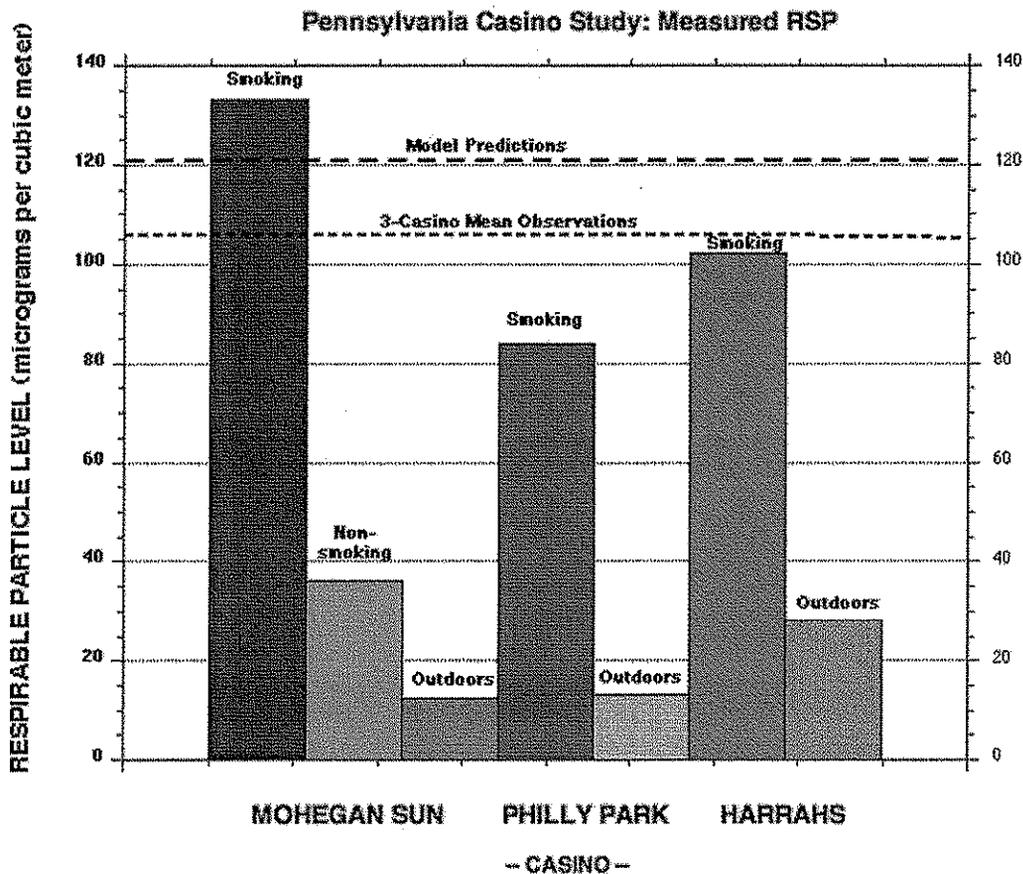
Average Fine Particle Air Pollution in Casinos in Connecticut



*Used for comparison purposes. Based on the 2007 average PM_{2.5} level as of 2/25/2007 of the 15 Connecticut EPA monitoring sites <www.epa.gov/air/data>. Data collected by Roswell Park Cancer Institute from 6:30pm to 9:30pm, Saturday February 23, 2008.

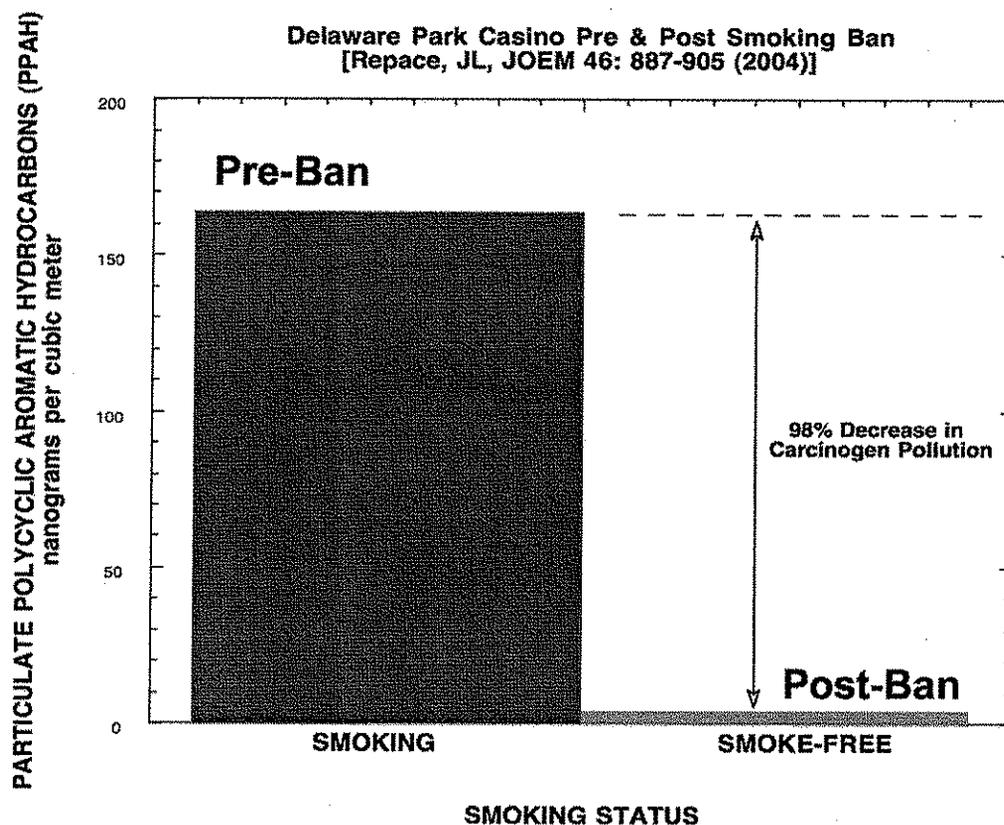
By comparison, Figure 3 shows unpublished data I measured in three modern casinos built since 2000: the Mohegan Sun, Philadelphia Park, and Harrah's Casinos in Pennsylvania in 2007. Note that the Nonsmoking Area in the Wilkes-Barre, PA Mohegan Sun is on a separate floor, and shows unmistakable infiltration of SHS. Figure 4 shows the measured levels of SHS particulate carcinogens that I made in the Delaware Park Casino in Wilmington, DE in 2002 and 2003 before and after a state-wide smoke-free workplace law (Repace, 2006). The particulate polycyclic aromatic carcinogen levels dropped by 98% after the law.

Figure 3.



Measurements of SHS respirable particulates in 3 Pennsylvania Casinos. (J.L. Repace, in press)

Figure 4.



Measurements of SHS carcinogens before and after a state-wide smoke-free workplace law in Delaware.

Appendix: Qualifications of James Repace as a Secondhand Smoke Expert:

I was a science policy analyst and staff scientist at the U.S. Environmental Protection Agency in Washington DC for 19 years, and a research physicist at the Naval Research Laboratory for 11 years. I was the principal spokesman on indoor air pollution at the EPA for 7 years. I assisted the U.S. Department of Labor in its proposed rule to regulate smoking in the workplace, and the U.S. Department of Transportation in its project to measure secondhand smoke on passenger aircraft. My CV is downloadable from my website.

I have testified before both the U.S. Senate and House of Representatives on SHS, and provided technical testimony on the risks to flight attendants from smoking on aircraft, aiding the Aviation Subcommittee in its decision to ban smoking on domestic flights. I published the first scientific paper showing that SHS was a major source of public exposure to air pollution, and the first risk assessment of passive smoking and lung

cancer, estimating that 5000 nonsmoking Americans died annually from SHS exposure at work and at home.

For my achievements on SHS, I was awarded the Surgeon General's Medallion from Dr. C. Everett Koop, the William Cahan Distinguished Professor Award from the Flight Attendant's Medical Research Institute, the Innovator Award from the Robert Wood Johnson Foundation, and a Lifetime Achievement Award from the American Public Health Association.

I am a visiting assistant clinical professor at the Tufts University School of Medicine, Department of Public Health and Family Medicine. I have been in private practice for 10 years and have consulted on SHS for many foreign governments, including Australia, Chile, Canada, England, Ireland, Hong Kong, Norway, The Netherlands, and New Zealand.

Summary: Secondhand Smoke (SHS) at the levels seen in the Mohegan Sun, is a significant threat to the health of casino workers and casino patrons. Although modern casinos may have large space volumes and state-of-the-art ventilation systems, these cannot eliminate SHS. Similarly although some casinos maintain nonsmoking areas, these areas are not smoke free. Ventilation and Air Cleaning, with dilution and spatial separation of smoking and nonsmoking cannot be made to control SHS to safe levels. Only smoke-free workplaces can protect workers from injury from SHS.

References

ASHRAE Position Document on Environmental Tobacco Smoke, Approved by ASHRAE Board of Directors, June 30, 2005. American Society of Heating, Refrigerating, and Air Conditioning Engineers) Atlanta, GA, 2005.

Barnoya J, Glantz SA. Cardiovascular Effects of Secondhand Smoke Nearly as Large as Smoking. *Circulation*, 111:2684-2698 (2005).

Bozsum BT. "Standards for Secondhand Smoke Reduction, Removal, and Monitoring at the Mohegan Sun." October 2008. Letter to Hon. M. J. Rell, Governor, State of Connecticut.

CalEPA, 2006. California Environmental Protection Agency, Air Resources Board Office of Environmental Health Hazard Assessment, State of California. **Proposed Identification of Environmental Tobacco Smoke as a Toxic Air Contaminant As Approved by the Scientific Review Panel**, June 24, 2005.

Juster HR, Loomis BR, Hinman TM, Farrelly MC, Hyland A, Bauer UE, Birkhead GS. **Declines in Hospital Admissions for Acute Myocardial Infarction in New York State After Implementation of a Comprehensive Smoking Ban**. *American Journal of Public Health*, 97: 2035-2039 (2007).

National Toxicology Program. Report on Carcinogens, Eleventh Edition; U.S. Department of Health and Human Services, Public Health Service, National Toxicology Program .

Pechacek TF, Babb S. **Commentary: How acute and reversible are the cardiovascular risks of secondhand smoke?** *BMJ VOLUME 328*: 980-983 (2004).

Repace JL. **Controlling Tobacco Smoke Pollution**. *Technical Feature*, ASHRAE IAQ Applications: 6, #3, 11-15 (2005).

Repace JL. **Controlling Tobacco Smoke Pollution**. *Technical Feature*, ASHRAE IAQ Applications: 6, #3, 11-15

(2005).

Repace JL. **Respirable Particles and Carcinogens in the Air of Delaware Hospitality Venues Before and After a Smoking Ban.** *Journal of Occupational and Environmental Medicine*, 46:887-905 (2004).

Repace JL. **SECONDHAND SMOKE IN PENNSYLVANIA CASINOS: A STUDY OF NONSMOKERS' EXPOSURE AND DOSE** (in preparation).

REPACE, JL. **EXPERT REPORT ON THE EMPRESS HORSESHOE CASINO.** *In The Matter of Januszewski et al., v. Horseshoe Hammond, USDC, NDIN, Hammond Div., 2:00CV352JM.* March 14, 2006.

Skeps R, Higbee C, Travers M, Hyland A. **Air Monitoring: Foxwoods and Mohegan Sun Casinos.** Roswell Park Cancer Institute, Department of Health Behaviors, February 26, 2008.

U.S. Surgeon General, *The health consequences of involuntary exposure to tobacco smoke : a report of the Surgeon General.* – [Atlanta, Ga.] : U.S. Dept. of Health and Human Services, Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, (2006).