SUPREME COURT OF THE STATE OF NEW YORK COUNTY OF ALBANY

xIn the Matter of the Application of

RESILIENT FLOOR COVERING INSTITUTE,and TARKETT, INC., Petitioners, AFFIDAVIT

-against-

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, and Index Number 6721-02ERN M. CROTTY, as Commissioner of the New York State Department of Environmental Conservation,Respondents. ---x

STATE OF NEW YORK)) ss.:COUNTY OF ALBANY)

JUDITH SCHREIBER, Ph.D., being duly sworn, deposes and says:

1. I am Senior Public Health Scientist with the New York State Department of Law, New York State Office of the Attorney General ("OAG"), a position I have held since October, 2000.

2. In my current capacity as Senior Public Health Scientist with OAG, I am responsible for assessing public health risks related to chemicals used in industry, the environment, in schools, homes and office buildings, and other applications.

3. I submit this affidavit in response to a petition by the Resilient Floor Covering Institute (RFCI) and in support of the State's finding that polyvinylchloride or ("PVC") flooring does not qualify as a listed "green building" material and therefore does not qualify for the green building tax credit under New York State Tax and Finance law.

4. This affidavit summarizes some of the public health risks associated with the production, use, waste disposal, and incineration of PVC, as well as accidental fires involving PVC.

Education and Experience

5. Prior to joining OAG, I was Chief of the Special Investigations Section of the Bureau of Toxic Substance Assessment ("Bureau") in the New York State Department of Health ("NYSDOH") from 1998 to October 2000. I was appointed as Chief of the Special Investigations Section in May 1998. Prior to this appointment, I was employed for approximately eight years as a Research Scientist in the Special Investigations Section and ten years in the Bureau's Toxicological Assessment Section. In my capacity as Research Scientist, I was responsible for the design and conduct of studies evaluating the public's exposure to chemicals and the evaluation of scientific literature on human exposure to, and toxicity of, chemicals in air, soil, food, materials, wastes, and water.

In my past capacity as Chief of the NYSDOH Special Investigations Section, I was responsible for supervising twelve staff members with various scientific backgrounds. My duties included design and oversight of scientific studies evaluating the public's potential exposure to chemicals; providing assistance to, and coordinating with, local health departments responding to chemical contamination; developing scientific data for policy decisions regarding human exposure to chemicals and ways to reduce them; and coordinating responses to inquiries from the public regarding exposure to and toxicity of chemicals. These responsibilities entailed detailed evaluation of exposure pathways on chemicals found in the environment (indoor and outdoor air, food and water, offices and workplaces, homes, schools, day care centers, etc.) and assessment of the human health risks associated with exposure to such chemicals.

In addition, I served as a research scientist in the Bureau of Public Water Supply from 1978 to 1982 where I became familiar with sound public health practices related to protecting drinking water supplies from chemical and biological contamination.6. I earned a Bachelor of Science degree in chemistry from the State University of New York at Albany (1972), a Master of Science degree in chemistry from the State Universityof New York at Albany (1978) and a Doctoral degree in environmental health and toxicology from the School of Public Health of the State University of New York at Albany (1992). A copy of my curriculum vitae is annexed hereto as Exhibit A.

7. I make this affidavit based upon personal knowledge, review of government reports and publications, and/or peer-reviewed publications, and other published information. A reference list and the references cited in the affidavit are annexed hereto as Exhibit B.

Risks associated with Polyvinylchloride (PVC) production:

8. Reviews of the health effects related to vinyl chloride and polyvinyl chloride find clear evidence of adverse health effects (ATSDR, 1997; Lewis, 1999; NTP, 2002; MMWR, 1997, USEPA, 2002, WHO, 1999a,b; and others).

9. Vinyl chloride monomer is the basic building block of the polymer polyvinylchloride. Vinyl chloride is produced industrially by either of two processes: the hydrochlorination of acetylene, or the thermal cracking of 1,2-dichloroethane produced by direct chlorination or oxychlorination of ethylene (WHO, 1999a, page 8). Ninety eight percent of vinyl chloride monomer is used to produce PVC and various PVC copolymers; the other two percent is for miscellaneous uses (ATSDR, 1997, page 150). PVC resins are rarely used alone but are mixed with heat stabilizers such as lead, zinc and tin compounds; lubricants; plasticizers, such as diethylhexyl phthalate; fillers and other additives that influence its physical and mechanical properties (WHO, 1999b, page 34).

10. Since vinyl chloride is a volatile gas, most vinyl chloride released to the environment is eventually transported to the atmosphere; lesser amounts are transported to groundwater. Vinyl chloride has been detected in the ambient air in the vicinity of vinyl chlorideand PVC manufacturing plants and hazardous waste sites (ATSDR, 1997, page 153). Effluents and emissions from vinyl chloride and PVC manufacturers are responsible for most of the vinyl chloride released to the environment. (ATSDR, 1997, page 153).

11. Vinyl chloride is classified as a human carcinogen by the United States Environmental Protection Agency (USEPA, 2002), by the International Agency for Research on Cancer (IARC, 1979;1987), by the National Institutes of Occupational Safety and Health (NIOSH, 1997), by the American Conference of Governmental Industrial Hygienists (ACGIH, 2000), as well as other scientific and regulatory bodies. Vinyl chloride is one of only 52 chemicals or substances designated as a confirmed human carcinogen in the Tenth Report on Carcinogens by the National Toxicology Program (NTP, 2002). The NTP criterion for listing an agent substance, mixture, or exposure circumstance as “Known to be Human Carcinogen” is that there is sufficient evidence of

carcinogenicity from studies in humans, which indicates a causal relationship between exposure to the agent, substance, or mixture, and human cancer (NTP, 2000, introduction page 4).

12. Vinyl chloride was first listed as a carcinogen in the First Report on Carcinogens by NTP in 1992. This classification was based on the strength of epidemiologic studies demonstrating a relationship between exposure to vinyl chloride and angiosarcoma of the liver, a rare form of liver cancer. Many published studies have demonstrated the relationship between working in vinyl chloride production facilities (high level occupational exposure to vinyl chloride) and angiosarcoma of the liver as well as other liver cancers and diseases (See e.g., ATSDR, 1997, pages 54 to 60; Lewis, 1999; and MMWR,1997 for reviews; and, Maltoni et al., 1981; Maltoni and Lodi, 1981; Maltoni, 1974; Pirastu et al., 1990; Wagoner, 1983; and Wu et al.,1989). Recent follow-up of the mortality and cancer incidence among European and Taiwanese workers employed in the vinyl chloride industry have confirmed these findings (Ward et al., 2001; Wong et al., 2002). 13. Further evidence of the carcinogenicity of vinyl chloride arises from animal studies. For example, rats administered vinyl chloride by inhalation had exceptionally high incidence of brain neuroblastomas, liver angiosarcomas, and heptatocarcinomas (Maltoni and Cotti, 1988). See also ATSDR, 1997, pages 54 to 60; IARC, 1979; and Lewis, 1999.

14. As a result of health concerns that were published in 1970, on October 4, 1974, the Occupational Safety and Health Administration ("OSHA") promulgated regulations limiting occupational exposure to vinyl chloride monomer. See 29 C.F.R. § 1910.93q (1974); 39 Federal Register 35890-98. Various manufacturers of vinyl chloride and vinyl chloride products then challenged the OSHA regulation. In an important 1975 federal court of appeals decision, the court denied the petition of the manufacturers of vinyl chloride and vinyl chloride products, to invalidate the safety regulations and ruled that the Secretary of Labor's regulation prohibiting exposure to concentrations of vinyl chloride in excess of one part per million (ppm) was warranted by the available scientific medical evidence where 13 workers had died from exposure and animal studies identified fatal liver angiosarcoma as an effect of the chemical. See Society of the Plastics Industry, Inc. v.OSHA, 509 F.2d 1301 (2nd Cir.1975). The court found that available scientific medical evidence was sufficient to warrant OSHA's regulation; as such, the court denied the petitions for review.

15. The current OSHA regulation can be found at 29 C.F.R. § 1910.1017. Among other things, the OSHA regulations impose various warning requirements. See 29 C.F.R. § 1910.1017(l). Under the federal regulations, "Containers of polyvinyl chloride shall be legibly labeled: POLYVINYL CHLORIDE (OR TRADE NAME) Contains VINYL CHLORIDE VINYL CHLORIDE IS A CANCER SUSPECT AGENT" See 29 C.F.R. § 1910.1017(l)(4). 16. Studies have shown that working in PVC manufacturing facilities (these facilities generally have a lower level occupational exposure to vinyl chloride than facilities for polymerization and vinyl chloride production) also increases the risk of angiosarcoma of the liver (Maltoni, et al., 1984; Kielhorn et al., 2000; Wong et al., 2002). The risk of liver angiosarcomaamong PVC extruders working in PVC manufacturing facilities is important because of the very large number of people working with extruding, manufacturing and handling PVC, as compared with the number of people working in PVC polymerization and/or vinyl chloride production.

17. Vinyl chloride exposure is also associated with non-cancer adverse effects on a wide variety of target organs including the nervous system,

liver, lungs, blood, immune system, cardiovascular system, skin, bones, and the reproductive organs (ATSDR, 1997, page 131; Wagoner, 1983). Acute exposure to high levels of vinyl chloride via inhalation in humans has resulted in effects on the central nervous system, such as dizziness, drowsiness, headaches, and giddiness (USEPA, 2002). Other acute effects after high level exposure include irritation of the eyes and respiratory tract, loss of consciousness, lung and kidney irritation, and inhibition of blood clotting in humans (USEPA, 2002). Chronic non-cancer health effects include liver damage, and "vinyl chloride disease" which is characterized by Raynaud's phenomenon (fingers blanch, numbness and discomfort upon exposure to the cold) and changes in the bones at the end of the fingers, joint and muscle pain, and scleroderma-like skin changes (thickening of the skin, decreased elasticity, and slight edema)(USEPA, 2002). Reproductive and developmental effects include case reports of male sexual dysfunction, increased incidence of birth defects in children of exposed women, increased incidence of miscarriages in wives of occupationally exposed men, as well as testicular damage and decreased male fertility in exposed rats (USEPA, 2002).

18. Polyvinyl chloride occupational exposure is a risk factor for systemic sclerosis (scleroderma), a diffuse connective tissue disease characterized by changes in the skin, blood vessels, skeletal muscles, and internal organs. There is no known prevention other than to minimize exposure to polyvinyl chloride and silica dust (another risk factor for this disease) (National Library of Medicine, 2002).

19. In a number of case-control studies on testicular cancer and various occupational exposures, an increase in the risk for seminoma (one type of testicular cancer) was found among men exposed to polyvinyl chloride (Hardell et al., 1997, 1998, and Ohlson and Hardell, 2000). Significantly increased risk was found for exposure to PVC. The induction latency period varied between 11 and 35 years with a median time of 22 years. The authors suggest that the additives to PVC such as phthalate, bisphenol A and nonylphenol may contribute to the risks of PVC exposure because of their endocrine disrupting effects.

20. The ACGIH threshold limit value of one part per million for occupational exposure to vinyl chloride is based on vinyl chloride critical effects on the central nervous system, liver, cardiovascular system, and Raynaud's syndrome (ACGIH, 2000).

Risks associated with PVC additives:

21. To soften and make PVC more pliable, various chemicals are added to PVC. These chemicals include phthalates and adipates (di-n-butyl-phthalate, di-(2-ethylhexyl)phthalate, and di-isononylphthalate among others).

22. Phthalates may become an airborne source of exposure when they volatilize from PVC-containing products. Measurable levels of a variety of phthalates were found in test chamber studies evaluating off-gassing from PVC-coated wall coverings (Uhde et al., 2001).

23. Phthalates are of concern because exposure to them may affect development and reproduction, and increase the risk of infertility, testicular damage, reduced sperm count and suppressed ovulation (NTP, 2000; Health Care Without Harm, 2002, pages 1-3). Phthalates have also been implicated in the pathogenesis of asthma and respiratory disease (Oie et al., 1997; Jaakkola et al., 2000).

Risks associated with PVC use:

24. Volatile organic chemicals (VOCs) which off-gas from PVC can become airborne contaminants to interior spaces in occupied buildings, exposing occupants to the resulting emissions. Some of these VOCs are toxic air contaminants and pose risks to people exposed to them. In a report by the California Air Resources Board ("CARB"), forty target compounds, including 10 toxic air contaminants, were evaluated in a study examining off-gassing from PVC vinyl flooring. All of the vinyl sheets evaluated were a source of phenol, a toxic air contaminant. The residential sheet vinyls with a clear "no-wax" top coat emitted more compounds and had higher emission rates of individual VOCs and total VOC than the single commercial sheet vinyl. The new generation "solvent-free" or "low VOC content" adhesive products were the source of a number of VOCs (CARB, 1999, Executive Summary page, xx, and pages 35-41).

25. CARB's study of vinyl flooring revealed that vinyl flooring emitted a large number of other compounds. The compounds with the highest concentrations were tetrahydrofuran and cyclohexanone emitted by the seam sealer, toluene emitted by the sheet flooring adhesive, and n-tridecane and phenol emitted by the sheet vinyl flooring (CARB, 1999, Executive Summary, page xxi). Additional ventilation had relatively small effects on the concentrations of the less volatile VOCs emitted, such as phenol, vinyl plasticizer, and benzothiazole (CARB, 1999, Executive summary, page xxi).

Risks associated with PVC waste disposal:

26. Vinyl chloride released from the plastics industry in waste water is expected to volatilize into the atmosphere. Vinyl chloride leaches into groundwater from spills, landfills, and industrial sources (e.g., the plastics industry). According to data collected from the analysis of leachates and monitoring wells at sites where groundwater was contaminated by municipal solid waste landfill leachate, vinyl chloride was present in both the leachates and the groundwater samples (ATSDR, 1997, pages 155-159).

27. Buried PVC in landfills release phthalates into landfill leachate (Health Care, 2002 page 12). In the United States, di-(2-ethyl hexyl) phthalate, diethyl phthalate, and di-n-butyl phthalate have been found in 18%, 44%, and 30%, respectively, of the Superfund hazardous waste sites designated as national priorities for clean-up. In Sweden, Italy, Germany and the United Kingdom, various phthalates have been detected in landfill leachates (Health Care Without Harm, 2002, page 12).

28. A minor percentage of PVC is recycled, and the potential for substantial re-use of PVC is limited. The sorting of PVC waste plastic for recycling is complicated and expensive, and in reality, only a small portion of PVC is recycled (Kielhorn et al., 2000). According to an American Plastics Council post-consumer recycling rates study ("Post-industrial and Post-consumer Vinyl Reclaim; Material Flow and Uses in North America"), approximately 18 million pounds of post-consumer vinyl were recycled in 1997. Although this may sound like an impressive recycling effort, it represents only 0.1% of the17.4 billion pounds of worldwide PVC production. The report notes that "collection and separation are the two greatest obstacles limiting the opportunity due to contamination and high recovery costs/logistics issues". (Principia Partners, on behalf of the American Plastics Council, July 1999, pages 1, 4 and 5 of executive summary).

29. A review of environmental aspects of PVC was completed by the Ministry of the Environment in Denmark (Denmark Ministry, 1995, Environmental Project No. 313). The report noted that although PVC is a reusable and recyclable material, the collection and sorting that is required gives rise to organizational and economic problems which have slowed down the development of recycling (Denmark Ministry, 1995, page 12). The lack of efficient recycling of PVC has also been noted in the United States. According to the Environmental Protection Agency, only 0.5% of total post-consumer PVC is recovered for processing. Since PVC is "rarely recycled, it either ends up in a landfill or is burned (leading to more heavy metal and dioxin emissions)"(Healthy Buildings, 2000).

Risks associated with PVC incineration:

30. PVC combustion is well recognized to generate polychlorinated dibenzodioxins ("PCDDs") and polychlorinated dibenzofurans ("PCDFs")(Carroll, 2001; Carroll et al., 2001). Like other chlorine-containing materials, PVC will generate PCDDs and PCDFs upon combustion. Combustion conditions, such as time/temperature, mixing patterns, oxygen availability, as well as carbon and chlorine availability are all important factors in the formation of PCDDs and PCDFs (Lemieux et al., 2000, page 380) .

31. In a study evaluating PCDDs and PCDFs from open burning of household wastein barrels, the emissions of PCDDs and PCDFs were higher in waste samples containing 4.5% PVC compared to waste samples containing 0.2% PVC (Lemieux et al, 2000, page 380).

32. The source of chloride is a major concern regarding dioxin formation in incinerators. A recent study (Yasuhara et al., 2001) compared emissions from six typical mixtures (heavy oil, newspaper, wood, sodium chloride (salt) treated newspaper, salt treated newspaper plus polyethylene, and plus newspaper PVC . PVC combined with newspaper produced dioxins in higher amounts via combustion compared with combustion of the other materials studied (Yasuhara et al., 2001). Analysis of incinerator emissions in this study found that newspapers with PVC generated greater amounts of dioxins than the other materials, as well as higher levels of dioxins when expressed as toxic equivalency quotients ("TEQs"), a scientific expression of the total toxicity of the specific dioxin isomers identified (Yasuhara et al., 2001, Table 2). When expressed as total TEQs, the PVC-newspaper dioxin emissions were several hundreds of times greater than the dioxin emissions from the heavy oil, newspaper alone, and wood. The PVC-newspaper dioxin emissions expressed as TEQs were about 60 percent higher than the TEQ dioxin emissions from salt treated newspaper and from salt treated newspaper plus polyethylene (see Yasuhara et al., 2001, Table 2).

33. Exhaust gases from the combustion of PVC, polyethylene, polystyrene, poly(ethylene terephthalate) and their various mixtures were analyzed for PCDDs, PCDFs, and polychlorinated biphenyls (PCBs). The combustion of PVC under both high and low carbon monoxide level conditions resulted in the highest levels of PCDDs and PCDFs compared to the other materials evaluated. The results indicate that PVC contributes significantly to the formation of PCDDs, PCDFs, and coplanar PCBs from mixtures of plastics upon combustion (Katami, et al, 2002).

34. The emission of chlorinated polycyclic aromatic hydrocarbons ("PAHs") from the combustion of PVC was investigated by Wang et al., 2001. They found

that chlorinated PAHs are formed during the combustion process, and are easily formed at higher incineration temperatures, for example, 800 to 900 degrees Celsius.

Risks associated with accidental fires:

35. Before flames are present, heated PVC can generate toxic and deadly fumes. In the early stages of a fire, heat causes the PVC molecules to begin to come apart generating hydrochloric acid (HCl), carbon monoxide, phosgene gas, benzene, toluene, xylenes, chlorinated biphenyls, PCDDs and PCDFs (IAFF, 1995). The release of HCl on thermal degradation of PVC has been well documented in the scientific and medical literature. PVC, of all the synthetic plastic polymers, has been implicated as causing one of the most insidious, serious problems in fire fighting due to its release of HCl while burning (Dyer and Esch, 1976, page 394). Once the decomposition temperature has been reached (above 225 degrees Celsius), hydrogen chloride is generated from the thermal decomposition of PVC. By the time actual combustion begins (around 475 degrees Celsius), PVC has lost over 60% of its weight in the generation of HCl and other chemicals (Dyer and Esch, 1976, page 395). The toxic gases generated during this pre-combustion period are particularly dangerous as there is no flame to warn fire fighters and occupants (IAFF, 1995).

36. The National Fire Protection Association's Fire Protection Handbook (NFPA, 1997), notes that "unplasticized PVC softens as it burns, producing white smoke and acrid fumes which can be corrosive. Most of the chlorine content of PVC is released as hydrogen chloride [hydrochloric acid]" (see NFPA, page 4-123).

37. Accidental fires involving PVC have resulted in deaths and injuries due to exposure to toxic gases generated by PVC. The episodes involved, for example, workers exposed to toxic gases generated from combustion of PVC used on electrical wiring (Colardyn et al. 1978), residents exposed to airborne by-products of PVC waste from a plastics recycling plant in Hamilton, Ontario, Canada (Upshur et al., 2001), the 1977 Beverly Hills Supper Club fire where 164 people died (Donovan, 1978, page 59), and, the MGM Grand Hotel fire where 85 people died (Buerk et al., 1982; Birky et al., 1983). In the MGM Grand Hotel tragedy, 79 people died of smoke inhalation far from the actual fire location (most died on the top few floors near the elevator lobbies), and over 1,500 people were injured (Buerk et al., page 641-642). The largest number of MGM fire victims had a blood carboxyhemoglobin level range of 30 to 39%, which is considered 'sub-lethal', indicating that victims were killed by some other toxic products

in the smoke in addition to carbon monoxide (Birky et al., 1983, page 270). Some of the injuries included respiratory problems, sleep difficulties, skin sensitivity and dryness, and problems with microcirculation in the extremities.

38. Further evidence of the risk posed by PVC fumes is based on injuries suffered by Washington D. C. firefighters in 1970 who were exposed to smoke in a Navy yard building containing PVC were studied by Dyer and Esch, 1976. A 33-year-old fire fighter died approximately 24-hours after the fire. Postmortem examination by the medical examiner found severe pulmonary hemorrhage and edema due to chemical pneumonitis secondary to exposure to chemical smoke and fire (Dyer and Esch, 1976, page 393). The main danger to exposed fire fighting personnel at the fireground resulted from the massive

formation of HCl gas, and in many cases, its adsorption on spherical soot particles that are carried into the victims' respiratory tracts. The authors report that although smoke levels were relatively low, the 1970 fire produced high concentrations of toxic fumes including HCl Firefighters experienced unusual and unexplainable symptoms, including a constriction of the chest and burning sensation in the throat, in addition to the usual symptoms of headache, dizziness and vertigo which are commonly seen in cases of nonchemical smoke inhalation. (Dyer and Esch, 1976).

39. The United Kingdom Thetford plastics fire of October 1991 consumed about 1,000 tons of plastic, mainly PVC. Baxter et al., 1995, evaluated the health impacts of this fire. The fire burned for over 72 hours and emitted a large smoke plume that threatened the health of local residents and emergency workers. Forty-six casualties were reported among the fire fighters who received exposure to the fire smoke. On the first two days of the fire, the local department of environmental health measured hydrochloric acid present in the fumes from the burning of PVC. HCl was identified at the edge of the smoke plume at levels of several parts per million in air, and, high unrecordable concentrations were found by firemen working close to the fire (Baxter et al., page 695). The casualties were almost entirely confined to fire fighters whose respiratory symptoms, if any, had arisen from only brief inhalation exposure to the smoke. Skin irritation was also reported (Baxter et al., pages 695-696). The report notes that large plastics fires are "notoriously difficult to extinguish because of the formation of a plastic skin that prevents water from getting to the heart of the fire. Hydrogen chloride was therefore likely to have been emitted for much of the time the fire continued"(Baxter et al., page 697).

40. The International Association of Fire Fighters (IAFF) produced a PVC summary for fire fighters alerting them to the dangers of PVC in building fires (IAFF, 1995). Among the dangers to fire fighters are the products of PVC combustion including hydrochloric acid, carbon monoxide, phosgene gas, cadmium, and benzene, as well as PCDDs and PCDFs. The most serious concern to fire fighters is their exposure to hydrochloric acid: "When hydrochloric acid is breathed into the lungs, the caustic action it produces in the lining of the lung, eating away at the cell walls, causes the lungs to produce copious amounts of fluid secretions in an attempt to flush out the hydrochloric acid. The hydrochloric acid eats itself into the lung linings, and is unable to be flushed out so the flushing process continues, and it is possible for the victim to literally drown in his/her own body fluids (IAFF, 1995). Fire fighters are advised to use Self Contained Breathing Apparatus ("SCBA") in all phases of fire fighting operations, including overhaul, where smoldering materials are common place. They note that "SCBA should be used in all fires, no matter how small and should be kept on, regardless of lack of visible flames. PVC has been known to cause death even after a small fire in a copying machine" (IAFF, 1995).

41. The generation of hydrochloric acid from PVC combustion is undisputed. The affidavit of William F. Carroll, Ph.D., (October 4, 2002) on behalf of the Resilient Floor Covering Institute claims that the calcium carbonate content of vinyl composition tile would "in principle, not only neutralize the tile's own hydrochloric acid (i.e. prevent dioxin formation from the PVC in the tile) but the excess would also theoretically act to reduce PCDD/F [dioxin and furan] formation from other materials being burned in the incinerator. Therefore, it is reasonable to predict that the addition of vinyl chloride tile to incinerator waste would, if anything, reduce PCDD/F generation due to the net excess of calcium carbonate present in the tile"

(Carroll affidavit paragraph 16). Dr. Carroll further states that, “the calcium carbonate content of sheet vinyl will essentially scavenge the hydrochloric acid formed by incineration of the sheet vinyl’s PVC content” (Carroll affidavit paragraph 17).

42. Dr. Carroll is free to assert that “in principle” the hydrochloric acid is scavenged; in reality, however, PVC combustion is known to generate hydrochloric acid with fatal consequences to firefighters and others who inhale it (see paragraphs 34 to 39 above).

43. In addition to the physical injuries associated with exposure to hydrogen chloride and other emissions from PVC smoke, long-term physiological stress has been noted among chemically exposed fire fighters (Markowitz et al., 1987; Markowitz, 1989; Markowitz et al., 1989). In the aftermath of a PVC fire in Plainfield, New York, firefighters were evaluated using a self-administered questionnaire to assess three measures of psychological distress. Comparison of a sample of firefighters involved in a PVC fire to a group of firefighters not involved in a chemical fire, found significant between-group differences for all three outcome measures (post-incident demoralization, specific emotional distress, and perceptions of threat to physical health)(Markowitz et al., 1987, page 89). Re-evaluation at 22 months after the fire revealed no reduction in symptoms over time. Some of the psychological symptoms documented in this study may be related to physiological changes associated with exposure to PVC (Markowitz, 1989, page 81).

44. PCDD contamination was reported following a fire in an unoccupied university building where PCBs (a potential precursor of PCDD formation) were not present. The fire consumed various building materials including PVC floor tiles. An extensive series of analyses were conducted after returning students complained of discomfort. The authors conclude that PCDDs were formed during the fire, and that any building fire involving synthetic materials such as PVC should be analyzed for PCDDs and PCDFs (Deutsche and Goldfarb, 1988).

45. Examining the relative toxicity of smoke, Caldwell and Alarie, 1991, found that smoke from PVC combustion was more toxic to mice than smoke from combustion of polycarbonate, Douglas fir (wood), and rigid polyurethane foam.

Advisories, Recommendations and Findings of regulatory bodies:

46. Vinyl chloride monomer was banned in the United States and other countries in 1974 for use as a refrigerant and as a propellant in aerosol sprays for cosmetics, drugs and pesticides (WHO, 1999b).

47. Vinyl chloride was evaluated by the International Agency for Research on Cancer (IARC, 1979) and the evaluation was updated in Supplement 7 (IARC, 1987). There was sufficient evidence for carcinogenicity of vinyl chloride in humans and sufficient evidence for carcinogenicity in animals; the overall evaluation was that vinyl chloride is carcinogenic to humans (WHO, 1999b, page 251).

48 The Sustainable Hospital Project, based in Washington, D.C., limits the use of PVC in medical equipment and recommends that reduction priorities be based on the potential for patient exposure to phthalates. They recommend that a PVC reduction plan (1) phase out of PVC medical and health care

products, (2) phase out PVC office supplies, (3) purchase PVC-free furnishings, furniture, and construction products (Sustainable Hospitals, 1998, pages 1-4).

49 Other nursing organizations also advise reducing the reliance on vinyl products in hospital settings and recommend consideration of non-PVC products where possible (Shaner, 2002).

50 Some private companies have determined that PVC is inappropriate for their products. For example,·IKEA requires that packaging must be reusable or recyclable and contain as high a proportion of recycled material as possible. PVC is not an approved packaging material at IKEA (IKEA website, 2000). ·General Motors no longer applies PVC spray coating to the underbody or the wheel wells of the current S-series space frames. The result, according to GM, will be a reduction in air emission of approximately 25 tons per year (GM, 2001).·Honda is taking steps to eliminate PVC use from their car interiors (Automotive Engineering, 2001).·Nike determined in 1993 to phase out the use of PVC in all product lines, based on environmental criteria developed by their Nike Environmental Action Team. In reaching this decision, Nike considered a broad range of scientific information from its own consultants, industry sources, government agencies and independent monitoring groups. Many of these findings indicate that PVC may pose a risk of harm to living systems, particularly if it is manufactured or disposed of improperly (Nike, 2000).·Other companies have determined that PVC is inappropriate due to the presence of phthalate additives. Mattel, Inc., in 1998 announced its commitment to phase out phthalate in plastic teething toys for children under 36 months (Mattel, 1998).

Alternatives to PVC

51 There are available alternatives to PVC flooring that have less production and disposal risks, and are cost effective. For example, alternative materials include natural linoleum, bamboo, ceramic tile, carpeting with natural fiber backing, wood, cork, slab flooring and nonchlorinated plastics (Healthy Buildings, 2000). They note that “natural linoleum” provides the closest natural replacement for vinyl, sharing its water resistant properties while

being made of more environmentally sound materials than any of the plastic options. Natural linoleum is distributed by both Armstrong (DLW Linoleum) and Forbo (Healthy Buildings, 2000).

52 A new kind of “natural plastic” made from plants, such as corn or wheat instead of petroleum, is being produced by Cargill Dow Polymers, LLC (Cargill, 2000). The process utilizes carbon harvested by plants from the air and soil and stored in starchy sugars. The sugars are extracted and converted by microbes into lactic acid . The lactic acid is then chemically reacted with a catalyst to produce polylactide (Wall Street Journal, 2000).

Summary

53 PVC production, use, combustion and disposal result in potential exposure of production workers, residents living near production facilities, and the general public to chemicals from PVC that are associated with adverse effects on health. The production, combustion and disposal of PVC presents risks to

production workers and neighbors of such facilities that could be avoided by use of alternative materials. Therefore, PVC flooring does not qualify as a green building material and should not be afforded the Green Building tax credit although its use in buildings will not be prohibited.

_________________________________JUDITH SCHREIBER, Ph.D.

Sworn to before me thisday of

NOTARY PUBLICExhibits

Exhibit A CV of Dr. Judith Schreiber

Exhibit B References cited in Affidavit

Exhibit B

References cited in Dr. Judith Schreiber's affidavit:

1. ACGIH (2000). American Conference of Governmental Industrial Hygienists. 2000 Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. ACGIH Worldwide, Cincinnati, OH.

2. ATSDR (1997). Agency for Toxic Substances and Disease Registry. Toxicological Profile for Vinyl Chloride. U.S. Department of Health and Human Services, Public Health Service, September 1997.

3. Automotive Engineering (2001). Material Innovations. A PVC-reduced Honda Civic interior. In: http://www.sae.org/automag/material/07-2001/matinn2.htm

4. Baxter, P., Heap, B., Rowland, M, Murray, V. (1995). Thetford plastics fire, October 1991: the role of a preventive medical team in chemical incidents. Occupational and Environmental Medicine 52: 694-698.

5. Birky, M., Malek, D., Paabo, M. (1983). Study of Biological Samples Obtained from Victims of MGM Grand Hotel Fire. J. Analytical Toxicology. Volume 7, November/December 1983, pages 265-271.

6. Buerk, C., Batdorf, J., Carmack, K, Ravenholt, O. (1982). The MGM Grand Hotel Fire. Lessons Learned from a Major Disaster. Arch Surg, Volume 117, pages 641-644.

7. CARB (1999). California Air Resources Board. Common Indoor Sources of Volatile Organic Compounds: Emission Rates and Techniques for Reducing Consumer Exposures. Final Report. Contract No. 95-302. January 1999.

8. Cargill (2000). Press release of January 11, 2000. Archive copy from www.cargill.com. Cargill Dow Polymers to build plant in Nebraska to make corn-based plastics.

9. Carroll W., Jr. (2001) The relative contribution of wood and poly(vinyl chloride) to emissions of PCDD and PCDF from house fires. Chemosphere. 45: 1173-1180.

10. Carroll W.F., Jr., Berger T.C., Borrelli F.E., Garrity P.J., Jacobs R.A., Ledvina J., Lewis J.W., McCreedy R.L., Smith T.P., Tuhovak D.R., Weston A.F., (2001). Characterization of emissions of dioxins and furans from ethylene dichloride, vinyl chloride monomer and polyvinyl chloride facilities in the United States. Consolidated Report. Chemosphere. 43: 689-700.

11. Colardyn, F., Van der Straiten, M.., Lamont, H., Van Peteghem, T. (1978). Acute Inhalation-Intoxication by Combustion of Polyvinylchloride. Int. Arch. Occup. Environ. Health. 38: 121-127.

12. Denmark Ministry of the Environment (1995). Environmental Aspects of PVC. Environmental Project No. 313. Danish Environmental Protection Agency.

13. Deutsche D., and Goldfarb T. (1988). PCDD/PCDF contamination following a plastics fire in a university lecture hall building. Chemosphere 12:2423-2431.

14. Donovan, L. (1978). Polyvinyl Chloride. Fighting the secret killer in fires. RN 41(2): 58-63.

15. Dyer R.F., Esch V.H. (1976). Polyvinyl Chloride Toxicity in Fires. JAMA, Vol. 235, No. 4, pp 393-397.

16. General Motors (2001). GM brand website, Environment: http://www.gm.com/company/gmability/environment/plants/plant_db/usa/springhill.html

17. Hardell L., Ohlson C., Fredrikson M. (1997). Occupational Exposure to Polyvinyl Chloride as a Risk Factor for Testicular Cancer Evaluated in a Case-Control Study. Int. J. Cancer. 73: 828-830.

18. Hardell, L., Nasman, A., Ohlson, C-G., Fredrickson, M. (1998). Case-control study on risk factors for testicular cancer. Int. J. Oncol. 13: 1299-1303.

19. Health Care Without Harm (2002). Aggregate Exposures to Phthalates in Humans. July 2002. Washington, D.C.

20. Healthy Buildings (2000). PVC: Overview of Hazards and Alternatives. January 2000. Oakland, CA.

21. IKEA (2000). Facts about materials. From: http://www.ikea-usa.com/content/about/environment/environment3.asp

22. IARC (1979). International Agency for Research on Cancer. Vinyl chloride, polyvinyl chloride and vinyl chloride-vinyl acetate copolymers. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Volume 19, pp 377-438. Lyon, France.

23. IARC (1987). International Agency for Research on Cancer. Overall evaluations of carcinogenicity: An updating of IARC monographs, Volumes 1 to 42. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Supplement 7, pp. 373-376. Lyon, France.

24. IAFF (1995). International Association of Fire Fighters. Hazardous Materials: Polyvinyl Chloride. Department of Occupational Health and Safety. Revised May 16, 1995.25. Jaakkola J.K., MD, Dsc, PhD, Verkasalo P.K., MD,

Dsc, Jaakkola N. Msc. (2000). Plastic Wall Materials in ht Home and Respiratory Health in Young Children. American Journal of Public Health Vol. 90, No. 5.

26. Katami T., Yasuhara A., Okuda T., Shibamoto T. (Mar. 2002). Formation of PCDDs, PCDFs, and coplanar PCBs from polyvinyl chloride during combustion in an incinerator. Environ. Sci. Technol. 36(6): 1320-1324.

27. Kielhorn J., Melber C., Wahnschaffe U., Aitio A., Mangelsdorf I. (2000). Vinyl Chloride: Still a Cause for Concern. Environmental Health Perspectives; Volume 108, Number 7.

28. Lemieux, P., Lutes, P., Abbott, J., Aldous, K. (2000). Emissions of polychlorinated dibenzo-p-dioxin and polychlorinated dibenzofurans from the open burning of household waste in barrels. Environ. Sci. Technol. 34: 377-384.

29. Lewis, R. (1999). Vinyl Chloride and Polyvinyl Chloride. Occupational Medicine: State of the Art Reviews. Volume 14, No. 4, October-December 1999, pages 719-741. Philadelphia, Hanley & Bellus, Inc.

30. Maltoni, C. (1974). Occupational carcinogenesis. Report to the Second International Symposium on Cancer Detection and Prevention, Bologna, April 9-12, 1973. Advances in Tumour Prevention, Detection and Characterization. 2: 19-26.

31. Maltoni, C., Lefemine, G., Ciliberti, A., et al. (1981). Carcinogenicity bioassays of vinyl chloride monomer: A model of risk assessment on experimental basis. Environ. Health Perspect 41:3-29.

32. Maltoni, C., Lodi, P. (1981). Results of sputum, cytology among workers exposed to vinyl chloride monomer and to poly(vinyl chloride). Environ Health Perspect 41: 85-88.

33. Maltoni, C., Clini, C., Vicini, F. and Marina, A. (1984). Two Cases of Liver Angiocarcoma among PVC Extrudes of an Italian Factory Producing PVC Bags and Other Containers. American J. Industrial Medicine, 5: 297-302.

34. Maltoni, C., Cotti, G. (1988). Carcinogenicity of Vinyl Chloride in Sprague-Dawley Rats after Prenatal and Postnatal Exposure. Annals of the New York Academy of Sciences. 534: 145-159.

35. Markowitz, J. (1989). Long-Term Psychological Distress Among Chemically Exposed Firefighters. Behavioral Medicine 15(2): 75-83.

36. Markowitz, J., Gutterman, E., Schwartz, S., Link, B., Gorman, S. (1989). Acute Health Effects Among Firefighters Exposed to a Polyvinyl Chloride (PVC) Fire. Am. J. Epidemiology 129(5): 1023-1031.

37. Markowitz, J., Gutterman, E., Link, B., Rivera, M. (1987). Psychological Response of Firefighters to a chemical fire. J. Human Stress 13(2): 84-93.

38. Mattel (1998). Mattel commits to the elimination of phthalates in teething toys for children under 36 months. Http://www.mattel.com/corporate/news_,edoa/press_releases.asp?chapter=572.

39. MMWR (1997). Mortality and Morbidity Weekly Review. Epidemiologic Notes and Reports. Angiosarcoma of the Liver Among Vinyl Chloride Workers. February 7, 1997

40. NFPA (1997). National Fire Protection Association. Fire Protection Handbook. 18th Edition. Quincy, Mass.

41. NIOSH (1997). National Institute of Occupational Safety and Health. Pocket Guide to Chemical Hazards. US Department of Health and Human Services. Public Health Service. Centers for Disease Control and Prevention.

42. National Library of Medicine (2002). Systemic sclerosis (scleroderma). www.nlm.nih.gov/medlineplus/ency/article/000429.htm

43. National Toxicology Program (2000). NTP-CERHR Expert Panel Report on Di(2-ethylhexyl)phthalate. NTP-CERHR-DEHP-00. October, 2000.

44. National Toxicology Program (2002). Report on Carcinogens, 10th Edition, U.S. Department of Health and Human Services, Public Health Service, National Toxicology Program, National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina.

45. Nike (2000). Nike's decision to phase out PVC. Http://www.nikebiz.com/environ/pvc.html.

46. Ohlson CG., Hardell L. (May-June 2000). Testicular cancer and occupational exposures with a focus on xenoestrogens in polyvinyl chloride plastics. Chemosphere. 40(9-11): 1277-1282.47. Oie L., Hersoug L.G., Madsen J.O. (1997). Residential Exposure to Plasticizers and Its Possible Role in the Pathogenesis of Asthma. Environmental Health Perspectives Volume 105, Number 9.

48. Pirastu R., Comba P., Reggiani A., Foa V., Masina A., Maltoni C. (1990). Mortality from liver disease among Italian vinyl chloride monomer/polyvinyl chloride manufacturers. Am J Ind Med.; 17(2): 155-161.

49. Principia Partners. (1999). Post-industrial and Post-consumer Vinyl Reclaim. Material Flow and Uses in North America. A Final Report to Chlor-Vinyl Steering Group, An Initiative of the Vinyl Institute and Chlorine Chemistry Council. July, 1999.

50. Shaner, H. (2002). Green Birthdays: Reducing harmful exposures. J Pediatric Nursing, Vol 17(3): 222-225

51. Society of Plastics v. OSHA, 509 F. 2nd 1301 (2nd Cir.1975).

52. Sustainable Hospitals (1998). Polyvinyl chloride. Http://sustainablehospitals.org/HTMLSrc/IP_PVC.html

53. Uhde E., Bednarek M., Fuhrmann F., Salthammer T. (Sept. 2001). Phtalic esters in the indoor environment--test chamber studies on PVC-coated wallcoverings. Indoor Air. 11(3): 150-155.

54. Upshur, R., James, M., Richardson, E., Brunton, G., Hunter, W., Chambers, L. (2001). Short-term Adverse Health Effects in a Community Exposed to a Large Polyvinyl Chloride Plastics Fire. Archives Environ. Health 56(3): 264-270.

55. USEPA (2002). United States Environmental Protection Agency. Vinyl Chloride Hazard Summary. In: http://www.epa.gov/ttn/atw/hlthef/vinylchl.html (July 30, 2002).

56. Wall Street Journal (2000). Cargill, Dow Chemical Join to Make "Natural Plastic". January 11, 2000.

57. Wagoner, J. (1983). Toxicity of Vinyl Chloride and Poly(vinyl Chloride): A Critical Review. Environmental Health Perspectives, 52: 61-66.

58. Wang D., Piao M., Chu S., Xu X. (2001). Chlorinated Polycyclic Aromatic Hydrocarbons from Polyvinylchloride Combustion. Environ. Contam. Toxicol. 66: 326-333.59. Ward E., Boffetta P., Andersen A., Colin D., Comba P., Deddens J.A., De Santis M., Engholm G., Hagmar L., Langard S., Lundberg I., McElvenny D., Pirastu R., Sali D., Simonato L. (2001). Update of the follow-up of mortality and cancer incidence among European workers employed in the vinyl chloride industry. Epidemiology; 12(6): 710-718.

60. Wong R.H., Chen P.C., Du C.L., Wang J.D., Cheng T.J. (2002). An increased standardized mortality ratio for liver cancer among polyvinyl chloride workers in Taiwan. Occup Environ Med. 59: 405-409.

61. WHO. World Health Organization (1999a). Vinyl Chloride: Health and Safety Guide. International Programme on Chemical Safety (IPCS), Health and Safety Guide No. 109, Geneva.

62. WHO. World Health Organization (1999b). Vinyl Chloride. International Programme on Chemical Safety (IPCS), Environmental Health Criteria 215, Geneva.

63. Wu W., Steenland K., Brown D., Wells V., Jones J., Schulte P., Halperin W. (1989). Cohort and case-control analyses of workers exposed to vinyl chloride: An update. J Occup Med.; 31(6): 518-523.

64. Yasuhara, A., Katami T., Okuda T., Ohno N., Shibamoto T. (Apr. 2001). Formation of Dioxins during the Combustion of Newspapers in the Presence of Sodium Chloride and Poly(vinyl chloride). Environ. Sci. Technol. 35(7):1373-1378.