ABSTRACT OF TOXICOLOGICAL ASSESSMENT OF FIBERLOCK LBC LEAD BARRIER COMPOUND TYPE III PERFORMED AND SIGNED BY TOXICOLOGIST MICHAEL J. NORVELL, PHD, DABT DATED 7/20/99

Dr. Norvell states in the Summary of Evaluation that it is his opinion "that liquid LBC Lead Barrier Compound, Type III will not produce any significant adverse health effects in people who come in contact with it. Such people include employees of lead abatement firms or homeowners who may be either exposed during application of the liquid product and other individuals, including pregnant women and children of less than six years of age who may be exposed to any volatile components arising from it during the drying phases when the product is used as intended. However, for some people, a single exposure of this product to the eyes or abrasions/cuts in the skin and/or prolonged or repeated exposures to intact skin may cause irritation."

Dr. Norvell goes on to detail his recommendations for protective wear for remediation workers and homeowners using the product, refraining from drinking eating or smoking when using the product and washing hands with soap and water before engaging in these activities.

He suggests that persons not re-enter buildings having product-treated surfaces until those surfaces are considered dry (as defined on the product label).

He states that "The cured product-treated surfaces will not produce any adverse health effects that could reasonably be attributed to this product in people who may be exposed to those surfaces, either from direct contact or breathing the air in the vicinity of them."

The following is a copy of the (Section 4.2) Toxicity Evaluations performed by Dr. Norvell for this product:

4.2 TOXICITY EVALUATIONS - The potential carcinogenic and non-carcinogenic toxic effects of each ingredient in this product were evaluated. Information from the toxicological literature was obtained for each ingredient by searching the National Library of Medicine's TOXNET databases (3) and/or other selected sources, as deemed appropriate.

4.2a CARCINOGENIC EFFECTS - Initially, each ingredient was assessed for its carcinogenic potential as defined by OSHA (2) by comparing it to the most recently published lists of known, probable or possible human carcinogens prepared by the International Agency for Research on Cancer (IARC) (4), the National Toxicology Program's Annual Lists of Carcinogens (5) or the OSHA (2). All identified known, probable and possible human carcinogens were compared to the calculated exposure values obtained from the exposure scenarios for each type of worker. Results of these comparisons were related to OSHA (2) TWA-PEL and ACGIH (6) TWA TLV/STEL levels.

4.2b NONCARCINOGENIC TOXIC EFFECTS - All non-carcinogenic adverse health effects identified for each ingredient were quantified and compared to calculated exposure values obtained from the exposure scenarios for each type of worker. Results of these comparisons were related to OSHA TWA-PEL and ACGIH TWA TLV/STEL levels.

DL LABORATORIES

116 East 16th Street
New York, New York 10003-2112

Phone (212) 777-4445
Fax (212) 505-8419
E-mail: dllabs@aol.com

Accredited by National Voluntary Laboratory Accreditation Program - Lab Code 100252
Accepted by Canadian General Standards Board - No. 76005 - ISO/IEC 25 Approved

December 10, 1999

Mr. Cole Stanton
Fiberlock Technologies, Inc.
P. O. Box 432
Cambridge, MA 01239

Re: DL-12560

Dear Cole:

Enclosed is the toxicological assessment of LBC Type III formatted to meet the requirements of Connecticut. There was a lot of work involved in this process, much more than either Mike or we anticipated.

Our invoice is enclosed.

Sincerely,

Saul Spindel
President

cw

cc: T. Sliva
P. Fairley

116 East 16th Street
New York, New York 10003-2112

Phone (212) 777-4445
Fax (212) 505-8419
E-mail: dllabs@aol.com

Accredited by National Voluntary Laboratory Accreditation Program - Lab Code 100252
Accepted by Canadian General Standards Board - No. 76005 - ISO/IEC 25 Approved

Toxicological Assessment of LBC Lead Barrier Compound, Type III, an encapsulant for the abatement of lead paint. This assessment was conducted in accordance with the Toxicology Assessment Protocol for Encapsulants (TAP) required by the State of Connecticut's Department of Public Health (DPH).

Summary

Based on the results of this TAP, it is the opinion of the undersigned board-certified toxicologist (certified by the American Board of Toxicology, Inc.), that liquid LBC Lead Barrier Compound, Type III will not pose any significant health risks to people who come into contact with it when that product is used as intended. Such people include employees of lead abatement firms or homeowners who may either be exposed to LBC Lead Barrier Compound, Type III during the application processes and others such as adults, pregnant women, infants, children and elderly persons who may be exposed to any volatile components arising from it during the drying/curing phases. However, for some people, a single direct exposure to LBC Lead Barrier Compound, Type III to the eyes or to abrasions/cuts in the skin and/or prolonged or repeated exposures to intact skin may cause irritation. For these reasons, it is recommended that remediation workers and homeowners using LBC Lead Barrier Compound, Type III wear protective eyewear (goggles) and clothing (full-body overalls, headgear, waterproof boots or shoes with covers and gloves) and take necessary precautions to minimize exposure of LBC Lead Barrier Compound, Type III to the skin (e.g. precautions such as changing clothing or gloves if they become saturated with the product; refraining from drinking, eating or smoking when using this product and washing hands with soap and water after applying the product before engaging in any of these activities). Cured treated surfaces are not expected to pose any health risks that could be reasonably attributed to LBC Lead Barrier Compound, Type III in people who may be exposed to those surfaces, either from direct contact or breathing the air in the vicinity of them.

Background - For an encapsulant product to be used as a lead abatement material in the State of Connecticut, that product must be assessed for potential risks according to the requirements in the November, 1997 DPH's TAP (1). As required by the TAP, this assessment qualitatively addresses the health risks to humans who may be exposed to LBC Lead Barrier Compound, Type III while using

this product for lead abatement operations and/or while inhabiting dwellings that have been treated with LBC Lead Barrier Compound, Type III. Both single and repeated dermal and oral exposures to all the constituent ingredients in LBC Lead Barrier Compound, Type III, except water, were considered. Exposures to adult workers who may be involved with the preparation, application, curing and post-application activities associated with using LBC Lead Barrier Compound, Type III as well as other persons who may come into contact with any residues resulting from these activities (e.g. infants, children, pregnant women, adults and elderly inhabitants of dwellings where abatement procedures are performed) were also considered.

Documentation Provided - A Material Safety Data Sheet (MSDS) dated August 4, 1999 for the LBC Lead Barrier Compound, Type III product was submitted to the toxicologist for review. In addition, except for water, an MSDS was submitted for each constituent ingredient in this product. Each hazardous ingredient in each of these constituents was identified with an appropriate Chemical Abstract Service Registration Number (CASRN).

The 1999 MSDS for this product contains information on product identity, identity of hazardous ingredients, physical/chemical characteristics, fire/explosion hazard data, reactivity data, health hazard/toxicity data, safe handling and use information, precautionary statements, recommendations for protective clothing/safety equipment and disposal recommendations.

In addition to a current MSDS, a current label for this product was submitted and reviewed for this assessment. This label contains information on product specification, handling and use information, warnings, precautionary statements and recommendations for safety equipment. Information in a technical bulletin (#13280 Hazardous Material Remediation by Fiberlock Technologies, Inc.), which also contains information on product specification, handling and use information and precautionary statements, was also reviewed for this assessment.

Evaluation Procedures - The TAP requires that each ingredient of each constituent in the product formulation be reviewed for toxicology information, volatility, odor and other consumer uses. However, the TAP also provides for consideration of trade secrets/proprietary formulation information. Consequently, only quantitative information pertaining to the hazardous ingredients (as defined by OSHA [2] and listed on the MSDSs) in each constituent used in LBC Lead Barrier Compound, Type III was addressed in this assessment. Items addressed in these ingredient-by-ingredient reviews for each constituent MSDS in the formulation included the CASRN and summaries of available data on acute toxicity, irritation, sensitization potential, chronic toxicity, carcinogenicity, mutagenicity, reproductive and developmental toxicity, clinical toxicity, and, where available, quantitative indicators of toxicity. Ingredients were also researched through the use of designated USEPA databases,

searches of the toxicology/biomedical literature, checks against US EPA, IARC, OSHA and NTP lists of carcinogens and the use of on-line databases such as RTECS, CHEMLINE, HSDB and TOXLINE/MEDLINE (3-7). In addition, the potential for applicator or residential exposure, including descriptions of the likely dose routes, the potential health implications and the potential for other hazardous materials to be formed or released of each ingredient were also addressed in these ingredient-by-ingredient reviews.

Characteristics of LBC Lead Barrier Compound, Type III

Technical information on the physical, chemical and toxicological characteristics of LBC Lead Barrier Compound, Type III indicate that it is a proprietary ready mixed, water-based (35.1% water, w/w), acrylic copolymer, lead encapsulant coating which is comprised of 15 constituents plus municipal water. The MSDS for LBC Lead Barrier Compound, Type III indicates that it contains one hazardous ingredient (titanium dioxide at a level of less than 15%) as defined by OSHA (29 CFR 1910) or the EPA (SARA Section 313). The MSDS also states that titanium dioxide is present in this product as a wet encapsulated material and, as such, will not pose an inhalation hazard. The OSHA classification of titanium dioxide as a hazardous material is based on the potential of particles of this material to be inhaled.

LBC Lead Barrier Compound, Type III has a mild latex paint odor and contains an undisclosed amount of Bitrex (CASRN 3734-33-6) to discourage ingestion of the liquid. This product is a non-flammable mixture of several cleaning/binding agents, is to be applied by spray or with a roller or a brush, is available in a maximum container volume of 55 gallons and, when used as intended, forms a dry coat approximately 7 millimeters thick. At this rate of application, one gallon of LBC Lead Barrier Compound, Type III will cover up to 121 square feet of surface area.

LBC Lead Barrier Compound, Type III is not intended to be subjected to heating, grinding or polishing operations during application or immediate post-application. Any residual solvent mixture remaining on surfaces will evaporate as the encapsulant is air dried after application.

Evaluations of Individual Constituents in LBC Lead Barrier Compound, Type III

For each of the 15 constituent ingredients listed for LBC Lead Barrier Compound, Type III, all the pertinent information from the MSDSs and information on all the listed hazardous ingredients identified in these constituent ingredients from literature searches and other sources are summarized in Tables 1-8 of this assessment. Summaries for those constituent ingredients found at a level of less than 1% were combined because of their low levels in LBC Lead Barrier Compound, Type III and the absence of

chemical substances in them that would pose any significant health risks at the levels they are found in the product.

For all constituents in LBC Lead Barrier Compound, Type III, information provided on the MSDSs pertaining to the identities and levels of hazardous ingredients in those constituents was sufficiently complete to conduct a complete toxicological assessment as required by the TAP.

Data on all 15 constituents of LBC Lead Barrier Compound, Type III indicated that none of them contain hazardous ingredients at levels that would be expected to pose any significant health risks to persons using this product in lead abatement activities, being present in the vicinity of ongoing lead abatement operations or occupying buildings that have been treated with LBC Lead Barrier Compound, Type III, when that product is used as intended.

The MSDS for limestone indicates that it contains residues of less than 0.0002% arsenic and cadmium, less than 0.00001% chromium (iv), less than 0.000% lead. The MSDS for zinc oxide indicates that it contains residues of less than 0.0025% lead and 0.005% cadmium. While these substances have been reported to cause cancer at high dose levels, neither of them is considered to be carcinogenic at the trace levels they are found in LBC Lead Barrier Compound, Type III (Although the formula for this product is proprietary, it does contain approximately 35% water. Thus, if the amount of limestone or zinc oxide in the mixture were as much as 65%, the levels of arsenic, cadmium, chromium and lead in LBC Lead Barrier Compound, Type III would not exceed approximately 0.00026%, 0.0033%, 0.0000065% and 0.0016%). The EPA considers that concentrations of up to and including 18 micrograms of cadmium, 15 micrograms of lead and 11 micrograms of chromium (iv)/liter acceptable levels for drinking water (7). Several silica compounds found in a few ingredients in this mixture have been reported to be carcinogenic by the inhalation route. However, silicates dissolved in an aqueous medium are not capable of being inhaled in amounts that would be considered likely to contribute to tumor development. The primary potential route of exposure to people who may use LBC Lead Barrier Compound, Type III for lead abatement operations or non-workers who may contact surfaces treated with the product before it dries is the dermal route. Very small amounts (assumed to be less than a milliliter/day) of LBC Lead Barrier Compound, Type III may be inadvertently ingested by workers who may touch their mouths or foods before washing their hands, and that workers and non-workers who may be in the vicinity of LBC Lead Barrier Compound, Type III as it is being used may inhale trace amounts of one or more of the volatile compounds which may evaporate from it. However, these exposures are so small that they are not expected to produce any adverse health consequences and do not necessitate the use of special respiratory protection. In addition, the MSDSs for all the ingredients in LBC Lead Barrier Compound, Type III all indicate that none of the components in

these ingredients is considered carcinogenic by the IARC, the NTP or the OSHA.

None of the primary ingredients in this encapsulant product are found in sufficient concentrations to produce significant non-carcinogenic adverse health effects in workers or non-workers who may be exposed to it under normal conditions or circumstances associated with its use.

Based on all the available information, it is my opinion that, LBC Lead Barrier Compound, Type III will not pose any significant health risks in workers who apply the product according to directions for and under the conditions of use or in non-workers who may be present during the application of this product or who may come into contact with dried post-application treated surfaces. However, for some workers, a single exposure of LBC Lead Barrier Compound, Type III to the eyes or to abrasions/cuts in the skin and/or prolonged or repeated exposures to intact skin may cause irritation. For these reasons, it is recommended that workers using this encapsulant product wear protective eyewear and take precautions to minimize exposure of it to the skin. In addition, strict personal hygiene practices should be followed by people using this product and no eating, drinking, smoking or application of cosmetics should be permitted on the worksite or before thoroughly washing the face and hands. For safety reasons (not related to toxicological concerns about this product), it is also recommended that persons not re-enter buildings having LBC Lead Barrier Compound, Type III-treated surfaces until those surfaces are dry. The dried product-treated surfaces are not expected to produce any adverse health effects that could be attributed to this product in people who may be exposed to those surfaces, either from direct contact or breathing the air in the vicinity of them.

Homeowner Application

LBC Lead Barrier Compound, Type III may be used by a homeowner provided that all precautionary statements, recommendations and directions for use are strictly followed.

Occupancy During Application/Reoccupancy

While it is recommended that, for general safety reasons, children not be permitted in the immediate vicinity of the site during the application of LBC Lead Barrier Compound, Type III, there is no toxicological basis for such a recommendation. People who may have access to areas being treated with LBC Lead Barrier Compound, Type III (including adults, pregnant women, infants, young children and the elderly) are not expected to incur any toxicologically-related adverse health effects from it when the product has been used as intended. There is also no toxicological basis for limiting occupation of a dwelling unit or restricting entry of residents to common areas being treated or in the process of drying; regardless of whether or not those residents

live in dwellings that have not been treated with LBC Lead Barrier Compound, Type III. If multiple applications of this product are needed within a given residence, that residence could be occupied between applications without any concerns about the toxicity of the product. Occupants of a dwelling may remain in occupancy during the LBC Lead Barrier Compound, Type III application processes. However, occupants and children under six years of age in particular, should not be permitted in a room, hall or other interior area while the application of LBC Lead Barrier Compound, Type III in that particular area is in progress. Rooms, halls and other areas should be isolated while this encapsulant is being applied. These precautions are recommended for reasons of general safety and accident prevention for any home renovation project.

Michael J. Norvell Ph.D.,DABT*
Toxicologist

6 DEC 99
Date

** Diplomate, American Board of Toxicology, Inc.

Table 1

Toxicological Assessment for Propylene Glycol (CASRN 57-55-6) in LBC Lead Barrier Compound, Type III

1. A current and acceptable MSDS for this component ingredient of LBC Lead Barrier Compound, Type III was submitted. This MSDS provided adequate information to the reviewer on ingredient specification, handling and use information, warnings, precautionary statements, recommendations for protective clothing/safety equipment and disposal recommendations.

2. Maximum Concentration of this component ingredient in LBC Lead Barrier Compound, Type III: Proprietary Information

3. Information from the MSDS (ARCO Chemical Company, Newtown Square, PA 19073, dated November 3, 1993)

   A. Not a Hazardous Substance (as designated by OSHA 29 CFR Part 1910).

   B. Chemical Characteristics:
      Vapor Pressure: 0 mm Hg

   C. Odor Characteristics: none

   D. Toxicological Characteristics:

      May cause slight irritation to eyes. No adverse effects expected from ingestion or temporary contact with skin. Prolonged exposure to skin may cause irritation. No chronic health hazards are expected from exposures to this ingredient. Not carcinogenic according to NTP, IARC or OSHA.

4. Information on propylene glycol from sources other than ARCO's MSDS

   A. General: The Food and Drug Administration (FDA) considers propylene glycol to be Generally Recognized as Safe (GRAS).(21 CFR 184).

   B. Toxicological Characteristics

      1. Acute Toxicology - acute oral LD_{50} values 8,000-46,000 mg/kg (rats), 25,000-32,000 mg/kg (mice) and 18,000- 20,000 mg/kg (guinea pigs). (1999, ATSDR Toxicological Profile for Ethylene Glycol and Propylene Glycol, p. 44).

      2. Irritation Data - Propylene glycol was found to be a mild skin irritant in humans and a mild eye irritant in rabbits (1999, RTECS).

3. Sensitization Potential - No evidence was found to indicate that propylene glycol is a potential sensitizer (1999, RTECS).

4. Chronic Toxicity - Lowest published toxic dose: Cats orally administered 1,200 mg/kg/day propylene glycol for 17 weeks exhibited increased numbers of Heinz bodies (sign of RBC degeneration). (1999, ATSDR Toxicological Profile for Ethylene Glycol and Propylene Glycol, p. 69). In a study conducted in 1947, monkeys were continuously exposed by inhalation to 32-112 ppm propylene glycol for 13 months. During the course of the study, 13 of 29 animals died or were killed when ill (1999, ATSDR Toxicological Profile for Ethylene Glycol and Propylene Glycol, p.25). Rats exposed to propylene glycol at a concentration of 51 ppm 6 hours/day, 5 days/week for 90 days exhibited nasal hemorrhaging (1999, ATSDR Toxicological Profile for Ethylene Glycol and Propylene Glycol, p. 32).

5. Carcinogenicity - In a dietary study, rats exposed to 2,500 mg/kg/day propylene glycol for 2 years exhibited no evidence of carcinogenicity (1999, ATSDR Toxicological Profile for Ethylene Glycol and Propylene Glycol, p. 85).

6. Mutagenicity - Propylene glycol was not mutagenic in tests with Salmonella typhimurium or Chinese Hamster Ovaries (sister chromatid exchange) (1999, ATSDR Toxicological Profile for Ethylene Glycol and Propylene Glycol, p. 170).

7. Reproductive/Developmental Toxicity - Pregnant mice orally administered 10,000 mg/kg/day propylene glycol produced no effect on the production of live pups or pup survival. Propylene glycol administered in drinking water at doses of up to 10,118 mg/kg/day caused no adverse effects on any measure of reproduction, including numbers of litters, litter size, pup weight or sex ratio. There was also no effect on the reproductive capacity of the offspring from the high dose group (1999, ATSDR Toxicological Profile for Ethylene Glycol and Propylene Glycol, pp. 83-84).

8. Clinical Toxicity - see chronic toxicity (above)

9. Quantitative Indicators of Toxicity - none reported

5. Regulatory Thresholds:

None

6. Evaluation Procedure:

A. Qualitative Assessment of Exposure

The dermal route is considered to be the primary route of exposure to propylene glycol in LBC Lead Barrier Compound, Type III for workers. A secondary possible route of exposure to workers using LBC Lead Barrier Compound, Type III is ingestion, but only extremely small amounts of this mixture are expected to be occasionally ingested.

The potential exposure to propylene glycol by the inhalation route to workers applying this mixture is expected to be biologically insignificant for the following reasons:

1. When LBC Lead Barrier Compound, Type III is used as intended, no mists will be released into the air.

2. After surfaces treated with LBC Lead Barrier Compound, Type III have dried, amounts of propylene glycol residues assumed to remain on those surfaces are considered to be biologically insignificant.

It is assumed that inhabitants of dwellings treated with LBC Lead Barrier Compound, Type III will be exposed to 100-1000 times less amounts of this mixture than workers. Such exposure levels are not considered to be biologically significant.

B. Qualitative Assessment of Health Risks

Propylene glycol is not expected to pose any significant health risks to individuals who may be exposed to LBC Lead Barrier Compound, Type III during the application process or remaining residues from LBC Lead Barrier Compound, Type III-treated sites to residents living in or around those sites when that product is used as intended. All the available information indicates that propylene glycol is not toxic by the dermal route of exposure, the Bitrex added to LBC Lead Barrier Compound, Type III will discourage the small amounts of that product that may be ingested from being swallowed and the amount of propylene glycol in aqueous solutions likely to be inhaled is considered to be biologically insignificant.

Inhabitants of a treated dwelling and occasional visitors around sites being treated with LBC Lead Barrier Compound, Type III are assumed to be exposed to much lower levels of the product than the workers who used it while engaged in lead abatement activities. Therefore, the potential health risks to such individuals are also much lower than they would be for workers assumed to have insignificant health risks.

C. Potential for the Formation/Release of Other Hazardous Materials

No evidence has been found to suggest that propylene glycol will react with other components in the LBC Lead Barrier Compound, Type III mixture to produce or release any toxic substances.

D. Overall Assessment

In summary, based on all the available information, it is my opinion that the propylene glycol in LBC Lead Barrier Compound, Type III will not pose any significant health risks to individuals who may be exposed to that mixture during the application process or remaining residues from LBC Lead Barrier Compound, Type III treated sites to residents living in or around those sites when that product is used as intended.

Table 2

Toxicological Assessment for 2,2,4-Trimethyl-1,3-Pentanediol (CASRN 25265-77-4) in LBC Lead Barrier Compound, Type III

1. A current and acceptable MSDS for this component ingredient of LBC Lead Barrier Compound, Type III was submitted. This MSDS provided adequate information to the reviewer on ingredient specification, handling and use information, warnings, precautionary statements, recommendations for protective clothing/safety equipment and disposal recommendations.

2. Maximum Concentration of this component ingredient in LBC Lead Barrier Compound, Type III: Proprietary Information

3. Information from the MSDS (Eastman Chemical Company, Kingsport, TN 37662, dated November 19, 1996)

   A. Not a Hazardous Substance (as designated by OSHA 29 CFR Part 1910).

   B. Chemical Characteristics:
      Vapor Pressure: <0.01 mm Hg

   C. Odor Characteristics: none

   D. Toxicological Characteristics:

      Acute oral LD_{50} 6.86 mL/kg (rat), 1.6-3.2 g/kg (male mouse); acute dermal LD_{50} >20 mL/kg (guinea pig), >16 mg/kg (rabbit); acute inhalation LC_{50} 3.55 mg/kg (rat), slight skin irritant (guinea pig), not a skin sensitizer (guinea pig), slight to moderate eye irritant (rabbit). NOEL value of 1,000 mg/kg in a 51 day oral toxicity study (rat), reproductive toxicity study (species not stated). Negative in Salmonella typhimurium and mouse micronucleus mutagenecity assays. Not carcinogenic according to NTP, IARC or OSHA.

4. Information on 2,2,4-Trimethyl-1,3-Pentanediol from sources other than Eastman's MSDS

   A. General: See evaluation procedure (below).

   B. Toxicological Characteristics

      1. Acute Toxicology - oral LD_{50} 3,200 mg/kg (rats and mice); dermal LD_{50} >20 mL/kg (rabbits); inhalation LC_{50} >3,500 mg/m^3/6 hours (rats) (1999, RTECS).

      2. Irritation Data - No information available (1999, RTECS).

3. Sensitization Potential - No information available (1999, RTECS).

4. Chronic Toxicity - Lowest published toxic dose: No information available (1999, RTECS).

5. Carcinogenicity - No information available (1999, RTECS)

6. Mutagenicity - No information available (1999, RTECS).

7. Reproductive/Developmental Toxicity - No information available (1999, RTECS).

8. Clinical Toxicity - No information available (1999, RTECS).

9. Quantitative Indicators of Toxicity - No information available (1999, RTECS).

5. Regulatory Thresholds:

None

6. Evaluation Procedure:

A. Qualitative Assessment of Exposure

The dermal route is considered to be the primary route of exposure to 2,2,4-trimethyl-1,3-pentanediol in LBC Lead Barrier Compound, Type III for workers. A secondary possible route of exposure to workers using LBC Lead Barrier Compound, Type III is ingestion, but only extremely small amounts of this liquid mixture are expected to be occasionally ingested.

The potential exposure to 2,2,4-trimethyl-1,3-pentanediol by the inhalation route to workers applying LBC Lead Barrier Compound, Type III is expected to be biologically insignificant for the following reasons:

1. When LBC Lead Barrier Compound, Type III is used as intended, no mists will be released into the air.

2. After surfaces treated with LBC Lead Barrier Compound, Type III have dried, amounts of 2,2,4-trimethyl-1,3-pentanediol residues assumed to remain on those surfaces are considered to be biologically insignificant.

It is assumed that inhabitants of dwellings treated with LBC Lead Barrier Compound, Type III will be exposed to 100-1000 times less amounts of this mixture than workers. Such

exposure levels are not considered to be biologically significant.

B. Qualitative Assessment of Health Risks

All the available information indicates that 2,2,4-trimethyl-1,3-pentanediol is not expected to pose any significant health risks to individuals who may be exposed to this material during the application process or remaining residues from LBC Lead Barrier Compound, Type III-treated sites to residents living in or around those sites when that product is used as intended. The 2,2,4-trimethyl-1,3-pentanediol in this mixture is not considered to be toxic by the dermal route of exposure, the Bitrex added to LBC Lead Barrier Compound, Type III will discourage the small amounts of that product that may be ingested from being swallowed and the amount of 2,2,4-trimethyl-1,3-pentanediol in aqueous solutions likely to be inhaled is considered to be biologically insignificant.

Inhabitants of a treated dwelling and occasional visitors around sites being treated with LBC Lead Barrier Compound, Type III are assumed to be exposed to much lower levels of the product than the workers who used it while engaged in lead abatement activities. Therefore, the potential health risks to such individuals are also much lower than they would be for workers assumed to have insignificant health risks.

C. Potential for the Formation/Release of Other Hazardous Materials

No evidence has been found to suggest that 2,2,4-trimethyl-1,3-pentanediol will react with other components in the LBC Lead Barrier Compound, Type III mixture to produce or release any toxic substances.

D. Overall Assessment

In summary, based on all the available information, it is my opinion that the 2,2,4-trimethyl-1,3-pentanediol in LBC Lead Barrier Compound, Type III will not pose any significant health risks to individuals who may be exposed to that mixture during the application process or remaining residues from LBC Lead Barrier Compound, Type III treated sites to residents living in or around those sites when that product is used as intended.

Table 3

Toxicological Assessment for Titanium Dioxide in LBC Lead Barrier Compound, Type III

1. A current and acceptable MSDS for this component ingredient of LBC Lead Barrier Compound, Type III was submitted. This MSDS provided adequate information to the reviewer on ingredient specification, handling and use information, warnings, precautionary statements, recommendations for protective clothing/safety equipment and disposal recommendations.

2. Maximum Concentration of this component ingredient in LBC Lead Barrier Compound, Type III: Proprietary Information

3. Information from the MSDS (DuPont Chemicals, Wilmington DE 19880, dated May 23, 1996)

   A. Hazardous Substance (as designated by OSHA 29 CFR Part 1910) in Ti-Pure:

Name	CASRN	Amount (%)
titanium dioxide	13463-67-7	80-98
amorphous silica	7631-86-9	0-10

   B. Chemical Characteristics:
      Vapor Pressure: not volatile

   C. Odor Characteristics: not applicable

   D. Toxicological Characteristics:

      Acute Toxicity
      Oral LD_{50} (rat) >24,000 mg/kg
      Dermal LD_{50} (rabbit) >10,000 mg/m^3
      Inhalation LC_{50} (rat) >6820 mg/m^3 (4 hrs)

      Irritation
      Eye - mild
      Skin - mild

      In short term inhalation studies of mixtures of titanium oxide similar to this product, a slight fibrogenic response occurred in animals exposed to 1,000 mg/m^3 respirable dust. A typical dust cell reaction but no fibrogenic response was noted in animals similarly exposed to titanium dioxide, or titanium dioxide mixtures containing 1-3% aluminum hydroxide and 2.7-3% silicon dioxide. tests in bacterial or mammalian cell cultures with aluminum hydroxide, titanium dioxide and amorphous silica demonstrate no mutagenic activity.

      In lifetime inhalation studies of respirable titanium

Table 3

Toxicological Assessment for Titanium Dioxide in LBC Lead Barrier Compound, Type III

1. A current and acceptable MSDS for this component ingredient of LBC Lead Barrier Compound, Type III was submitted. This MSDS provided adequate information to the reviewer on ingredient specification, handling and use information, warnings, precautionary statements, recommendations for protective clothing/safety equipment and disposal recommendations.

2. Maximum Concentration of this component ingredient in LBC Lead Barrier Compound, Type III: Proprietary Information

3. Information from the MSDS (DuPont Chemicals, Wilmington DE 19880, dated May 23, 1996)

   A. Hazardous Substance (as designated by OSHA 29 CFR Part 1910) in Ti-Pure:

Name	CASRN	Amount (%)
titanium dioxide	13463-67-7	80-98
amorphous silica	7631-86-9	0-10

   B. Chemical Characteristics:
      Vapor Pressure: not volatile

   C. Odor Characteristics: not applicable

   D. Toxicological Characteristics:

      Acute Toxicity
      Oral LD_{50} (rat) >24,000 mg/kg
      Dermal LD_{50} (rabbit) >10,000 mg/m^3
      Inhalation LC_{50} (rat) >6820 mg/m^3 (4 hrs)

      Irritation
      Eye - mild
      Skin - mild

      In short term inhalation studies of mixtures of titanium oxide similar to this product, a slight fibrogenic response occurred in animals exposed to 1,000 mg/m^3 respirable dust. A typical dust cell reaction but no fibrogenic response was noted in animals similarly exposed to titanium dioxide, or titanium dioxide mixtures containing 1-3% aluminum hydroxide and 2.7-3% silicon dioxide. tests in bacterial or mammalian cell cultures with aluminum hydroxide, titanium dioxide and amorphous silica demonstrate no mutagenic activity.

      In lifetime inhalation studies of respirable titanium

dioxide at levels up to 250 mg/m³, no compound related signs of toxicity were seen in the exposed animals. Slight pulmonary fibrosis was seen at 50-250 mg/m³ respirable titanium dioxide but not at 10 mg/m³. There was no evidence of cancer in animals exposed to 10 or 50 mg/m³ respirable titanium dioxide. Microscopic lung tumors were seen in 17% of the rats exposed to 250 mg/m³ respirable titanium dioxide. In lifetime feeding tests at levels of up to 50,000 ppm (5% of the diet), titanium dioxide showed no evidence of adverse effects in mice or rats.

4. Information on Ti-Pure from sources other than DuPont's MSDS:

In a MSDS for Ti-Pure R960, the following additional information was included:

> Prolonged or repeated skin contact with titanium dioxide powder may cause drying and cracking of the skin in sensitive individuals. Overexposure to titanium dioxide by inhalation may cause mild and temporary upper respiratory tract irritation with cough and shortness of breath. Results of an epidemiology study with employees who had been exposed to titanium dioxide pigments at concentrations in the workplace showed no evidence of increased lung cancer or chronic respiratory disease.
>
> Overexposure to amorphous silica by skin or eye contact may cause eye irritation with discomfort, tearing, or blurring of vision; or slight skin irritation with discomfort or rash. Overexposure by inhalation to amorphous silica may cause temporary lung irritation effects with cough, discomfort, difficulty in breathing, or shortness of breath. Individuals with preexisting conditions of the lungs may have increased susceptibility to the toxicity of excessive exposures to amorphous silica. Tests of amorphous silica in animals demonstrated no carcinogenic activity.

5. Pertinent toxicological information on the hazardous ingredient of Ti-Pure (titanium dioxide) from sources other than the MSDSs:

A. Effects in Humans - 300 micrograms/3 days, mild skin irritant (1999, RTECS)

B. Effects in Experimental Animals

1. Acute Toxicity - no reports in RTECS

2. Irritation - no reports in RTECS

3. Sensitization Potential (RTECS) - no evidence from available information that titanium dioxide is a sensitizer

4. Subchronic/Chronic Toxicity - rats inhaling 250 mg/m^3 titanium dioxide 6 hours/day for 4 weeks and 2 years exhibited chronic pulmonary edema and lung tumors, respectively. (1999, RTECS)

5. Carcinogenicity - see Subchronic/Chronic Toxicity

6. Mutagenicity (RTECS)

Titanium dioxide has been found to yield positive results at relatively high concentrations in a DNA inhibition assay with hamster lung.

7. Reproductive/Developmental Toxicity - no reports in RTECS

8. Clinical Toxicity - no reports in RTECS

9. Quantitative Indicators of Toxicity - none reported

5. Regulatory Thresholds

OSHA PEL: 15 mg/m^3 (total dust)

ACGIH TLV: 10 mg/m^3

IRIS, HEAST: not listed

IARC, NTP: not carcinogenic

6. Evaluation Procedure

A. Qualitative Assessment of Exposure

The dermal route is considered to be the primary route of exposure to the Ti-Pure in LBC Lead Barrier Compound, Type III for workers using it. Secondary route of exposure to workers using this product are ingestion and inhalation, but only extremely small amounts of LBC Lead Barrier Compound, Type III are expected to be occasionally ingested as a liquid or inhaled as a mist.

It is assumed that inhabitants of dwellings treated with LBC Lead Barrier Compound, Type III will be exposed to much smaller amounts of the product, including Ti-Pure, than workers using LBC Lead Barrier Compound, Type III. Such exposure levels are not considered to be biologically significant.

B. Qualitative Assessment of Health Risks

It is my opinion that Ti-Pure will not pose any significant health risks to individuals who may be exposed to LBC Lead Barrier Compound, Type III during the application process or remaining residues from LBC Lead Barrier Compound, Type III treated sites to residents living in or around those sites when that product is used as intended.

Ti-Pure is not toxic by the dermal route and the concentration of Ti-Pure in LBC Lead Barrier Compound, Type III is sufficiently low to provide a wide margin of safety for workers using it, assuming that less than milligram amounts of that product are expected to be inhaled or ingested per day when compared to the OSHA PEL or ACGIH TLV values (10-15 mg/m^3).

Inhabitants of a treated dwelling and occasional visitors around sites being treated with LBC Lead Barrier Compound, Type III are assumed to be exposed to much lower levels of the product, including Ti-Pure, than the workers who used it while engaged in lead abatement activities. Therefore, the potential health risks to such individuals are also much lower (100-1000 times lower) than they would be for workers assumed to have insignificant health risks for Ti-Pure in LBC Lead Barrier Compound, Type III.

C. Potential for the Formation/Release of Other Hazardous Materials

No evidence has been found to suggest that Ti-Pure will react with other components in the LBC Lead Barrier Compound, Type III mixture to produce or release any toxic substances.

D. Overall Assessment

In summary, based on all the available information, it is my opinion that the Ti-Pure in LBC Lead Barrier Compound, Type III will not pose any significant health risks to individuals who may be exposed to that product during the application process or remaining residues from LBC Lead Barrier Compound, Type III treated sites to residents living in or around those sites when that product is used as intended.

Table 4

Toxicological Assessment for Tetrapotassium Pyrophosphate (CASRN 7320-34-5) in LBC Lead Barrier Compound, Type III

1. A current and acceptable MSDS for this component ingredient of LBC Lead Barrier Compound, Type III was submitted. This MSDS provided adequate information to the reviewer on ingredient specification, handling and use information, warnings, precautionary statements, recommendations for protective clothing/safety equipment and disposal recommendations.

2. Maximum Concentration of this component ingredient in LBC Lead Barrier Compound, Type III: Proprietary Information

3. Information from the MSDS (Lidochem Inc., Hazlet, NJ 07730, dated February 1, 1987)

   A. Not a Hazardous Substance (as designated by OSHA 29 CFR Part 1910).

   B. Chemical Characteristics:
      Vapor Pressure: Not applicable (solid)

   C. Odor Characteristics: none

   D. Toxicological Characteristics:

      Dust is irritating to the eyes, nose and throat. Solid material is irritating to the eyes and skin. If swallowed, material will cause nausea, vomiting, cramps and diarrhea. Not carcinogenic according to NTP, IARC or OSHA

4. Information on tetrapotassium pyrophosphate from sources other than Lidochem's MSDS

   A. General: See evaluation procedure (below).

   B. Toxicological Characteristics

      1. Acute Toxicology - oral LD_{50} 4,640 mg/kg (rats); dermal LD_{50} >4,640 mg/kg (rabbits) (1999, RTECS).

      2. Irritation Data - No information available (1999, RTECS).

      3. Sensitization Potential - No information available (1999, RTECS).

      4. Subchronic Toxicity - Lowest published toxic dose: 273,000 mg/kg (rats), changes in structure and function of salivary glands, acute renal failure, decreased body

weight and weight gain (1999, RTECS).

5. Carcinogenicity - No information available (1999, RTECS)

6. Mutagenicity - No information available (1999, RTECS).

7. Reproductive/Developmental Toxicity - No information available (1999, RTECS).

8. Clinical Toxicity - No information available (1999, RTECS).

9. Quantitative Indicators of Toxicity - No information available (1999, RTECS).

5. Regulatory Thresholds:

None

6. Evaluation Procedure:

A. Qualitative Assessment of Exposure

The dermal route is considered to be the primary route of exposure to tetrapotassium pyrophosphate in LBC Lead Barrier Compound, Type III for workers. A secondary possible route of exposure to workers using LBC Lead Barrier Compound, Type III is ingestion, but only extremely small amounts of this liquid mixture are expected to be occasionally ingested.

The potential exposure to tetrapotassium pyrophosphate by the inhalation route to workers applying LBC Lead Barrier Compound, Type III is expected to be biologically insignificant for the following reasons:

1. When LBC Lead Barrier Compound, Type III is used as intended, no mists will be released into the air.

2. After surfaces treated with LBC Lead Barrier Compound, Type III have dried, amounts of tetrapotassium pyrophosphate residues assumed to remain on those surfaces are considered to be biologically insignificant.

It is assumed that inhabitants of dwellings treated with LBC Lead Barrier Compound, Type III will be exposed to 100-1000 times less amounts of this mixture than workers. Such exposure levels are not considered to be biologically significant.

B. Qualitative Assessment of Health Risks

All the available information indicates that tetrapotassium pyrophosphate is not expected to pose any significant health risks to individuals who may be exposed to this material during the application process or remaining residues from LBC Lead Barrier Compound, Type III-treated sites to residents living in or around those sites when that product is used as intended. The tetrapotassium pyrophosphate in this mixture is not considered to be toxic by the dermal route of exposure, the Bitrex added to LBC Lead Barrier Compound, Type III will discourage the small amounts of that product that may be ingested from being swallowed and the amount of tetrapotassium pyrophosphate in aqueous solutions likely to be inhaled is considered to be biologically insignificant.

Inhabitants of a treated dwelling and occasional visitors around sites being treated with LBC Lead Barrier Compound, Type III are assumed to be exposed to much lower levels of the product than the workers who used it while engaged in lead abatement activities. Therefore, the potential health risks to such individuals are also much lower than they would be for workers assumed to have insignificant health risks.

C. Potential for the Formation/Release of Other Hazardous Materials

No evidence has been found to suggest that tetrapotassium pyrophosphate will react with other components in the LBC Lead Barrier Compound, Type III mixture to produce or release any toxic substances.

D. Overall Assessment

In summary, based on all the available information, it is my opinion that the tetrapotassium pyrophosphate in LBC Lead Barrier Compound, Type III will not pose any significant health risks to individuals who may be exposed to that mixture during the application process or remaining residues from LBC Lead Barrier Compound, Type III treated sites to residents living in or around those sites when that product is used as intended.

Table 5

Toxicological Assessment for Calcium Carbonate (CASRN 1317-65-3) in LBC Lead Barrier Compound, Type III

1. A current and acceptable MSDS for this component ingredient of LBC Lead Barrier Compound, Type III was submitted. This MSDS provided adequate information to the reviewer on ingredient specification, handling and use information, warnings, precautionary statements, recommendations for protective clothing/safety equipment and disposal recommendations.

2. Maximum Concentration of this component ingredient in LBC Lead Barrier Compound, Type III: Proprietary Information

3. Information from the MSDS (Pfizer Inc., NY, NY 10017, dated June, 1988)

   A. Not a Hazardous Substance (as designated by OSHA 29 CFR Part 1910).

   B. Chemical Characteristics:
      Vapor Pressure: Not applicable (solid)

   C. Odor Characteristics: none

   D. Toxicological Characteristics:

      Calcium carbonate is a nuisance particulate and may cause irritation to the eyes and skin from abrasion. Not carcinogenic according to NTP, IARC or OSHA

4. Information on calcium carbonate from sources other than Pfizer's MSDS

   A. General: See evaluation procedure (below).

   B. Toxicological Characteristics

      1. Acute Toxicology - No information available (1999, RTECS).

      2. Irritation Data - No information available (1999, RTECS).

      3. Sensitization Potential - No information available (1999, RTECS).

      4. Subchronic Toxicity - No information available (1999, RTECS).

      5. Carcinogenicity - No information available (1999, RTECS)

6. Mutagenicity - No information available (1999, RTECS).

7. Reproductive/Developmental Toxicity - No information available (1999, RTECS).

8. Clinical Toxicity - No information available (1999, RTECS).

9. Quantitative Indicators of Toxicity - No information available (1999, RTECS).

5. Regulatory Thresholds:

ACGIH TLV: 10 $mg/^3$ inhalable dust

OSHA PEL: 15 $mg/^3$ total dust, 5 $mg/^3$ respirable fraction

6. Evaluation Procedure:

A. Qualitative Assessment of Exposure

The dermal route is considered to be the primary route of exposure to calcium carbonate in LBC Lead Barrier Compound, Type III for workers. A secondary possible route of exposure to workers using LBC Lead Barrier Compound, Type III is ingestion, but only extremely small amounts of this liquid mixture are expected to be occasionally ingested.

The potential exposure to calcium carbonate by the inhalation route to workers applying LBC Lead Barrier Compound, Type III is expected to be biologically insignificant for the following reasons:

1. When LBC Lead Barrier Compound, Type III is used as intended, no mists will be released into the air.

2. After surfaces treated with LBC Lead Barrier Compound, Type III have dried, amounts of calcium carbonate residues assumed to remain on those surfaces are considered to be biologically insignificant.

It is assumed that inhabitants of dwellings treated with LBC Lead Barrier Compound, Type III will be exposed to 100-1000 times less amounts of this mixture than workers. Such exposure levels are not considered to be biologically significant.

B. Qualitative Assessment of Health Risks

All the available information indicates that calcium carbonate is not expected to pose any significant health risks to individuals who may be exposed to this material during the application process or remaining residues from

LBC Lead Barrier Compound, Type III-treated sites to residents living in or around those sites when that product is used as intended. The calcium carbonate in this mixture is not considered to be toxic by the dermal route of exposure, the Bitrex added to LBC Lead Barrier Compound, Type III will discourage the small amounts of that product that may be ingested from being swallowed and the amount of calcium carbonate in aqueous solutions likely to be inhaled is considered to be biologically insignificant.

Inhabitants of a treated dwelling and occasional visitors around sites being treated with LBC Lead Barrier Compound, Type III are assumed to be exposed to much lower levels of the product than the workers who used it while engaged in lead abatement activities. Therefore, the potential health risks to such individuals are also much lower than they would be for workers assumed to have insignificant health risks.

C. Potential for the Formation/Release of Other Hazardous Materials

No evidence has been found to suggest that calcium carbonate will react with other components in the LBC Lead Barrier Compound, Type III mixture to produce or release any toxic substances.

D. Overall Assessment

In summary, based on all the available information, it is my opinion that the calcium carbonate in LBC Lead Barrier Compound, Type III will not pose any significant health risks to individuals who may be exposed to that mixture during the application process or remaining residues from LBC Lead Barrier Compound, Type III treated sites to residents living in or around those sites when that product is used as intended.

Table 6

Toxicological Assessment for Zinc Oxide (CASRN 1314-13-2) in LBC Lead Barrier Compound, Type III

1. A current and acceptable MSDS for this component ingredient of LBC Lead Barrier Compound, Type III was submitted. This MSDS provided adequate information to the reviewer on ingredient specification, handling and use information, warnings, precautionary statements, recommendations for protective clothing/safety equipment and disposal recommendations.

2. Maximum Concentration of this component ingredient in LBC Lead Barrier Compound, Type III: Proprietary Information

3. Information from the MSDS (Zinc Corporation of America, Monaca, PA 15061, dated July 17, 1997)

   A. Not a Hazardous Substance (as designated by OSHA 29 CFR Part 1910).

   B. Chemical Characteristics:
      Vapor Pressure: Not applicable (solid)

   C. Odor Characteristics: none

   D. Toxicological Characteristics:

      Inhalation of high levels of zinc oxide may result in tightness of chest, metallic taste, cough, dizziness, fever, chills, headache, nausea and dry throat. May cause irritation to the eyes and skin from abrasion. Not carcinogenic according to NTP, IARC or OSHA

4. Information on calcium carbonate from sources other than Zinc Corporation of America's MSDS

   A. General: See evaluation procedure (below).

   B. Toxicological Characteristics

      1. Acute Toxicology - oral LD_{50} >8,437 mg/kg (rats), 7,950 mg/kg (mice) (1999, RTECS).

      2. Irritation Data - Mild skin and eye irritant (1999, RTECS).

      3. Sensitization Potential - No information available (1999, RTECS).

      4. Subchronic Toxicity - Lowest published toxic dose: 500 mg/kg (oral, humans); 600 mg/m^3 (inhalation, humans); 17,431 mg/kg, oral, 1-22 days after conception

(rats); 4.6 mg/m^3, (inhalation, guinea pigs) (1999, RTECS).

5. Carcinogenicity - No information available (1999, RTECS)

6. Mutagenicity - Tested in DNA Adduct, Morphological Transformation, Unscheduled DNS Synthesis, Sister Chromatid Exchange tests and Cytogenetic Analyses. (1999, RTECS).

7. Reproductive/Developmental Toxicity - 6,846 mg/kg, oral, 1-22 days after conception (rats) (1999, RTECS).

8. Clinical Toxicity - No information available (1999, RTECS).

9. Quantitative Indicators of Toxicity - No information available (1999, RTECS).

5. Regulatory Thresholds:

ACGIH TLV: 10 mg/^{3} inhalable dust

OSHA PEL: 15 mg/^{3} total dust, 5 mg/^{3} fume and respirable fraction

6. Evaluation Procedure:

A. Qualitative Assessment of Exposure

The dermal route is considered to be the primary route of exposure to zinc oxide in LBC Lead Barrier Compound, Type III for workers. A secondary possible route of exposure to workers using LBC Lead Barrier Compound, Type III is ingestion, but only extremely small amounts of this liquid mixture are expected to be occasionally ingested.

The potential exposure to zinc oxide by the inhalation route to workers applying LBC Lead Barrier Compound, Type III is expected to be biologically insignificant for the following reasons:

1. When LBC Lead Barrier Compound, Type III is used as intended, no mists will be released into the air.

2. After surfaces treated with LBC Lead Barrier Compound, Type III have dried, amounts of zinc oxide residues assumed to remain on those surfaces are considered to be biologically insignificant.

It is assumed that inhabitants of dwellings treated with LBC Lead Barrier Compound, Type III will be exposed to 100-1000 times less amounts of this mixture than workers. Such

exposure levels are not considered to be biologically significant.

B. Qualitative Assessment of Health Risks

All the available information indicates that zinc oxide is not expected to pose any significant health risks to individuals who may be exposed to this material during the application process or remaining residues from LBC Lead Barrier Compound, Type III-treated sites to residents living in or around those sites when that product is used as intended. The zinc oxide in this mixture is not considered to be toxic by the dermal route of exposure, the Bitrex added to LBC Lead Barrier Compound, Type III will discourage the small amounts of that product that may be ingested from being swallowed and the amount of zinc oxide in aqueous solutions likely to be inhaled is considered to be biologically insignificant.

Inhabitants of a treated dwelling and occasional visitors around sites being treated with LBC Lead Barrier Compound, Type III are assumed to be exposed to much lower levels of the product than the workers who used it while engaged in lead abatement activities. Therefore, the potential health risks to such individuals are also much lower than they would be for workers assumed to have insignificant health risks.

C. Potential for the Formation/Release of Other Hazardous Materials

No evidence has been found to suggest that zinc oxide will react with other components in the LBC Lead Barrier Compound, Type III mixture to produce or release any toxic substances.

D. Overall Assessment

In summary, based on all the available information, it is my opinion that the zinc oxide in LBC Lead Barrier Compound, Type III will not pose any significant health risks to individuals who may be exposed to that mixture during the application process or remaining residues from LBC Lead Barrier Compound, Type III treated sites to residents living in or around those sites when that product is used as intended.

Table 7

Toxicological Assessment for Acrylic Latex Emulsion Solids in LBC Lead Barrier Compound, Type III

1. Two current and acceptable MSDSs for this component of LBC Lead Barrier Compound, Type III were submitted. These MSDSs provided adequate information to the reviewer on ingredient specification, handling and use information, warnings, precautionary statements, recommendations for protective clothing/safety equipment and disposal recommendations.

2. Maximum Concentration of this component ingredient in LBC Lead Barrier Compound, Type III: Proprietary Information

3. Information from the MSDS (Rhom and Haas Company, Philadelphia, PA 19106, dated November 23, 1998 and January 1, 1999)

   A. Not a Hazardous Substance (as designated by OSHA 29 CFR Part 1910).

   B. Chemical Characteristics:
      Vapor Pressure: <1.0

   C. Odor Characteristics: ammonia

   D. Toxicological Characteristics: Acute oral LD_{50} >5,000 mg/kg (rat), Acute dermal LD_{50} >5,000 mg/kg (rabbits), skin irritation - practically nonirritating (rabbit), eye irritation - inconsequential nonirritation (rabbit)

4. Information on acrylic latex emulsion solids from sources other than Rhom & Haas's MSDSs

   A. General: See evaluation procedure (below).

   B. Toxicological Characteristics

      1. Acute Toxicology - No information available (1999, RTECS).

      2. Irritation Data - No information available (1999, RTECS).

      3. Sensitization Potential - No information available (1999, RTECS).

      4. Subchronic Toxicity - No information available (1999, RTECS).

      5. Carcinogenicity - No information available (1999, RTECS)

6. Mutagenicity - No information available (1999, RTECS).

7. Reproductive/Developmental Toxicity - No information available (1999, RTECS).

8. Clinical Toxicity - No information available (1999, RTECS).

9. Quantitative Indicators of Toxicity - No information available (1999, RTECS).

5. Regulatory Thresholds:

None

6. Evaluation Procedure:

A. Qualitative Assessment of Exposure

The dermal route is considered to be the primary route of exposure to acrylic latex emulsion solids in LBC Lead Barrier Compound, Type III for workers. A secondary possible route of exposure to workers using LBC Lead Barrier Compound, Type III is ingestion, but only extremely small amounts of this liquid mixture are expected to be occasionally ingested.

The potential exposure to acrylic latex emulsion solids by the inhalation route to workers applying LBC Lead Barrier Compound, Type III is expected to be biologically insignificant for the following reasons:

1. When LBC Lead Barrier Compound, Type III is used as intended, no mists will be released into the air.

2. After surfaces treated with LBC Lead Barrier Compound, Type III have dried, amounts of acrylic latex emulsion solids residues assumed to remain on those surfaces are considered to be biologically insignificant.

It is assumed that inhabitants of dwellings treated with LBC Lead Barrier Compound, Type III will be exposed to 100-1000 times less amounts of this mixture than workers. Such exposure levels are not considered to be biologically significant.

B. Qualitative Assessment of Health Risks

All the available information indicates that acrylic latex emulsion solids are not expected to pose any significant health risks to individuals who may be exposed to this material during the application process or remaining

residues from LBC Lead Barrier Compound, Type III-treated sites to residents living in or around those sites when that product is used as intended. The acrylic latex emulsion solids in this mixture are not considered to be toxic by the dermal route of exposure, the Bitrex added to LBC Lead Barrier Compound, Type III will discourage the small amounts of that product that may be ingested from being swallowed and the amounts of acrylic latex emulsion solids in aqueous solutions likely to be inhaled are considered to be biologically insignificant.

Inhabitants of a treated dwelling and occasional visitors around sites being treated with LBC Lead Barrier Compound, Type III are assumed to be exposed to much lower levels of the product than the workers who used it while engaged in lead abatement activities. Therefore, the potential health risks to such individuals are also much lower than they would be for workers assumed to have insignificant health risks.

C. Potential for the Formation/Release of Other Hazardous Materials

No evidence has been found to suggest that acrylic latex emulsion solids will react with other components in the LBC Lead Barrier Compound, Type III mixture to produce or release any toxic substances.

D. Overall Assessment

In summary, based on all the available information, it is my opinion that the acrylic latex emulsion solids in LBC Lead Barrier Compound, Type III will not pose any significant health risks to individuals who may be exposed to that mixture during the application process or remaining residues from LBC Lead Barrier Compound, Type III treated sites to residents living in or around those sites when that product is used as intended.

Table 8

Toxicological Assessment for those Constituent Ingredients in LBC Lead Barrier Compound, Type III at Concentrations of 0.56% or Less

1. Current and acceptable MSDSs for each of these component ingredients (chlorothalonil, denatonium benzoate, ammonium hydroxide, a biocide, defoamers and a dispersing agent) in LBC Lead Barrier Compound, Type III were submitted for review. Consequently, adequate information on product specification, handling and use information, all warnings, precautionary statements, recommendations for protective clothing/safety equipment, and disposal recommendations for each constituent ingredient was provided the reviewer.

2. Maximum Concentration of each of these component ingredients in Barrier Coat II: 0.56%

3. Evaluation Procedure

   A. Qualitative Assessment of Exposure

   The dermal route is considered to be the primary route of exposure to each of these constituent ingredients in LBC Lead Barrier Compound, Type III for workers using it. Secondary route of exposure to workers using this product are ingestion and inhalation, but only extremely small amounts of LBC Lead Barrier Compound, Type III are expected to be occasionally ingested as a liquid or inhaled as a mist.

   It is assumed that inhabitants of dwellings treated with LBC Lead Barrier Compound, Type III will be exposed to much smaller amounts of the product, including these constituent ingredients, than workers using LBC Lead Barrier Compound, Type III. Such exposure levels are not considered to be biologically significant.

   B. Qualitative Assessment of Health Risks

   It is my opinion that all these constituent ingredients will not pose any significant health risks to individuals who may be exposed to LBC Lead Barrier Compound, Type III during the application process or remaining residues from LBC Lead Barrier Compound, Type III treated sites to residents living in or around those sites when that product is used as intended.

   The concentration of each of these ingredients in LBC Lead Barrier Compound, Type III is sufficiently low (<0.56%) to provide a wide margin of safety for workers using it, assuming that less than milligram amounts of that product

are expected to be inhaled or ingested per day when compared to the established OSHA PEL or ACGIH TLV values for those components having such values.

Inhabitants of a treated dwelling and occasional visitors around sites being treated with LBC Lead Barrier Compound, Type III are assumed to be exposed to much lower levels of the product, including each of these constituent ingredients, than the workers who used it while engaged in lead abatement activities. Therefore, the potential health risks to such individuals are also much lower (100-1000 times lower) than they would be for workers assumed to have insignificant health risks for each of these constituent ingredients in LBC Lead Barrier Compound, Type III.

C. Potential for the Formation/Release of Other Hazardous Materials

No evidence has been found to suggest that any of these ingredients will react with other components in the LBC Lead Barrier Compound, Type III mixture to produce or release any toxic substances.

D. Overall Assessment

In summary, based on all the available information, it is my opinion that none of the constituent ingredients in LBC Lead Barrier Compound, Type III at less than 1% will pose any significant health risks to individuals who may be exposed to that product during the application process or remaining residues from LBC Lead Barrier Compound, Type III treated sites to residents living in or around those sites when that product is used as intended.

References

1. Toxicology Assessment Protocol for Encapsulants (Revised 11/97). State of Connecticut, Department of Public Health, Childhood Lead Poisoning Prevention Program.

2. Occupational Safety and Health Administration, United States Department of Labor. Occupational Safety and Health Standards for General Industry (29 CFR Part 1910.1200). Commerce Clearing House Inc., Chicago Illinois 60646. 1993

3. National Library of Medicine, Bethesda, MD 20894

4. International Agency for Research on Cancer. IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans. IARC. Lyon France.

5. U.S. Dept. of Health and Human Services, National Toxicology Program. Eighth Annual Report of Carcinogens., 1998

6. American Conference of Governmental Industrial Hygienists. Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. 1998-1999

7. USEPA Region III. Risk-Based Concentration Table. December 3, 1999