# APPENDIX G

# PERFORMANCE CHARACTERISTICS ANALYSIS CITED IN THE §403 PROPOSED RULE

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Date September 3, 1997

To Todd Holderman

From Ronald Menton and Warren Strauss

Subject Requested Analyses for WA 3-28 EPA Contract No. 68-D5-0008

Attached are two tables describing the results of analyses performed to identify example options for combined multi-media standards which achieve negative predictive values of 99, 95 and 90 percent for detecting a childhood blood-lead concentration of 10 µg/dL. The negative predictive value is defined in this analysis as the probability of a resident child in the Rochester Lead-in-Dust study having a blood-lead concentration below 10 µg/dL, given that lead-levels in residential environmental media are below the combined standard. The example standards provided in this memorandum are based on an empirical sensitivity/specificity analysis performed on a subset of 77 homes/children from the Rochester Lead-in-Dust Study. These 77 homes included measurements of children's blood-lead concentration, soil-lead concentration, uncarpeted floor and window sill dust-lead loading and the percentage of interior and exterior painted surfaces with deteriorated lead-based paint. For each home, soil-lead concentrations measured for the drip-line and play-area sampling locations were averaged to produce a yard-wide average soil-lead concentration. The sensitivity/specificity analyses focussed on all possible combinations of the following potential standards for environmental lead:

| Environmental Media | Potential Standards Considered in Analysis |
|---|---|
| Uncarpeted Floor Dust-Lead Loading | 50, 75, 100, 125, 150, 175, 200 and 400 µg/ft$^2$ |
| Window Sill Dust-Lead Loading | 800, 500, 300 and 100 µg/ft$^2$ |
| Average Soil-Lead Concentration | 200, 300, 400, 500, 600, 700, 900, 1000, 1500 µg/g |
| Maximum of Percent of Interior/Exterior Painted Surfaces with Deteriorated LBP | 5, 10, 20 % |

Table 1 provides the maximum lead-levels identified in each of the above four environmental media, which when combined, achieve a negative predictive value (NPV) of 99, 95 and 90 percent or above. Note that combined standards that achieve a NPV of 99% also achieve NPV's of 95% and 90%, and that combined standards that achieve a NPV of 95% also achieve a NPV of 90%.

Table 2 provides a summary of all the potential combinations of standards in the above four environmental media that achieved negative predictive values of 99, 95 and 90 percent or above. In Table 2, the negative predictive value achieved corresponds to any combination of potential standards in a row. For example, all combinations of standards of 50 - 400 µg/ft$^2$ for dust on uncarpeted floors, 100 - 800 µg/ft$^2$ for dust on window sills, 200 - 900 µg/g for average soil and 5 - 20 percent of painted surfaces having deteriorated lead-based paint resulted in negative predictive values of 99 percent or above.

Please note that the results provided in Tables 1 and 2 are based on an analysis of data from 77 homes, and that since there were relatively few homes that had environmental lead-levels below the combination of standards under consideration, the denominator for the negative predictive value estimates are small in most cases (i.e. less than 25).

**Table 1. Example Options For the Maximum Combined Multi-Media Standard which Achieves a NPV of 99, 95 and 90% for Detecting a Blood-Lead Concentration of 10 µg/dL, Based on Data from the Rochester Lead-in-Dust Study.**

| NPV Achieved | Uncarpeted Floor Dust-Lead Standard ($\mu g/ft^2$) | Average Soil-Lead Concentration ($\mu g/g$) | Window Sill Dust-Lead Standard ($\mu g/ft^2$) | Maximum of Percent of Interior/Exterior Components with Deteriorated LBP |
|---|---|---|---|---|
| 99% | 400 | 900 | 800 | 20 |
| | 50 | 1500 | 500 | 20 |
| 95% | 400 | 1500 | 500 | 20 |
| 90% | 400 | 1500 | 800 | 20 |

**Table 2. Example Options For All Combinations of Multi-Media Standards which Achieve a NPV of 99, 95 and 90% for Detecting a Blood-Lead Concentration of 10 µg/dL, Based on Data from the Rochester Lead-in-Dust Study.**

| NPV Achieved | Uncarpeted Floor Dust-Lead Standard ($\mu g/ft^2$) | Average Soil-Lead Concentration ($\mu g/g$) | Window Sill Dust-Lead Standard ($\mu g/ft^2$) | Maximum of Percent of Interior/Exterior Components with Deteriorated LBP |
|---|---|---|---|---|
| 99% | 400, 200, 175, 150, 125, 100, 75, 50 | 900, 700, 600, 500, 400, 300, 200 | 800, 500, 300, 100 | 20, 10, 5 |
| | 50 | 1500, 1000 | 500, 300, 100 | 20, 10, 5 |
| 95% | 400, 200, 175, 150, 125, 100, 75 | 1500 | 500 | 20 |
| 90% | 400, 200, 175, 150, 125, 100, 75 | 1500 | 800, 300, 100 | 20 |
| | | | 500, 300 | 10, 5 |
| | | 1000 | 500, 300 | 20, 10, 5 |
| | | | 100 | 20 |
| | 50 | 1500, 1000 | 800 | 20, 10, 5 |

The options for combined multi-media standards in these tables are based on a sensitivity/specificity analysis of empirical data from 77 homes in the Rochester Lead-in-Dust Study which included measurements of children's blood-lead concentration, drip-line and play-area soil-lead concentration, uncarpeted floor and window sill dust-lead loading, and the percentage of interior and exterior painted surfaces with deteriorated lead-based paint.