APPENDIX J

ADDITIONAL PERFORMANCE CHARACTERISTICS ANALYSES, WHERE CANDIDATE STANDARDS FOR LEAD IN PLAY-AREA SOILS ARE CONSIDERED

Additional Performance Characteristics Analyses, Where Candidate Standards for Lead in Play-Area Soils Are Considered

Note: This appendix was not included in the version of this report that EPA distributed for external peer review.

This appendix is an extension to the performance characteristics analyses presented in Section 6.1. As discussed in Section 6.1, EPA employed performance characteristics analysis as a non-modeling approach to evaluating candidate §403 standards relative to their ability to detect lead hazards in homes containing children with elevated blood-lead concentrations.

The performance characteristics analyses in Section 6.1 evaluated candidate standards for dust-lead loadings on uncarpeted floors and window sills, yard-wide average soil-lead concentration, and the extent of deteriorated lead-based paint. After these analyses were completed and documented in this report, EPA wished to evaluate candidate soil-lead concentration standards that distinguished between areas of the yard where children played and other areas of the yard. Therefore, the performance analysis approach in Section 6.1 was repeated on data from the Rochester Lead-in-Dust study, where separate standards were considered for soil in play areas and soil in other areas of the yard. The results of these analyses are presented in this appendix.

According to the soil sampling protocol developed for the Rochester Lead-in-Dust study, a composite soil sample was to be collected within at least two feet of the foundation at each housing unit participating in the study. Then, a second composite soil sample was to be collected from bare areas of the yard where it could be determined that a resident child frequently played. Therefore, the Rochester study database distinguished between soil-lead concentrations collected from play areas and along the foundation.

As seen in Table 3-36 of the §403 risk analysis report, play area soil-lead concentration was specified for only 77 of the 205 housing units in the Rochester study. However, the soil sampling protocol for this study implied that play area soil samples were collected only when such areas contained bare soil. Therefore, the performance characteristics analyses presented in this appendix assumed that homes containing no data for play area soil-lead concentration had no bare soil in play areas, and therefore, the play area soil-lead concentration for these homes was assumed to be 0 ppm.

In this analysis, for a given housing unit in the Rochester study, the soil-lead concentration in areas of the yard other than play areas was equivalent to the yard-wide average soil-lead concentration calculated for the analyses presented within Section 6.1. For a given housing unit, this value was equal to the following:

- the average of play area and foundation soil-lead concentrations, if both were reported
- the play area soil-lead concentration, if it was reported but the foundation soil-lead concentration was not (assumes that no bare soil existed along the foundation)

- the foundation soil-lead concentration, if it was reported but the play area soil-lead concentration was not (assumes that no bare soil existed in play areas)

- 0 ppm, if neither the play area nor the foundation soil-lead concentrations were reported (assumes that no bare soil was available anywhere in the yard).

The performance characteristics analyses presented in this appendix consist of calculating estimates of sensitivity, specificity, positive predictive value, and negative predictive value, as they were defined within Section 6.1. In particular, sensitivity represents the number of homes with children having elevated blood-lead concentrations (i.e., blood-lead concentrations at or above 10 µg/dL) that exceed at least one candidate standard. Also, 100% minus the negative predictive value represents the percentage of homes at or above at least one standard that contain children with elevated blood-lead concentrations.

Table J-1 contains results of performance characteristics analyses performed under the following candidate standards:

- Uncarpeted floor dust-lead loading: 10, 20, 25, 40, 50, 100 µg/ft^2
- Window sill dust-lead loading: 250 µg/ft^2
- Play area soil-lead concentration: 250, 400, 1200, 2000 ppm
- Soil-lead concentration in non-play areas (see above): 400, 1200, 2000, 3000, 4000, 5000 ppm.

In addition, Table J-1 considers candidate play area soil-lead concentration standards of 100, 250, 400, 800, 1000, 1200, 2000, and 5000 ppm in situations where a play area soil-lead standard is the only standard being considered (i.e., no other dust or soil standards are considered). Note that the analyses within Table J-1 do not consider whether deteriorated lead-based paint is present in the housing units.

Results in Table J-1 show that when the only standard being considered is for play area soil-lead, the likelihood of having homes with elevated blood-lead levels that are at or above the candidate standard is quite low, even when the candidate standard is low. In turn, the likelihood of having elevated blood-lead children in homes that do not exceed the candidate standard is quite high. This is evidence that the other dust-lead and/or soil-lead standards should be considered simultaneously with the play area soil-lead standard in order to achieve desired goals for detecting homes with children having elevated blood-lead concentration.

Table J-1. Results of Performance Characteristics Analysis Performed on Data for Housing Units in the Rochester Lead-in-Dust Study, for Specified Sets of Candidate Standards for Lead in Floor Dust, Window Sill Dust, Soil in Play Areas, and Soil in Non-Play Areas

Note: Houses in the Rochester study with no play area soil-lead concentration specified were assumed to have no bare soil present in play areas, and therefore, their play area soil-lead concentration values were set to 0 ppm in this analysis. Non-play area soil-lead is specified if either dripline or play area soil-lead is nonzero or if no visible soil is present (when it is set to 0 ppm).

EBL = elevated blood-lead ($ 10 μg/dL). LBP = Lead-based paint.

Set of Candidate Standards for Lead in ...				# Units At or Above At Least One Standard /Total # Units[1]	Performance Characteristics			
Play Area Soil (ppm)	Non-Play Area Soil (ppm)	Win-dow Sill Dust (μg/ft²)	Uncar-peted Floor Dust (μg/ft²)		Sensitivity # (%) of Units with EBL Children That Are At or Above At Least One Standard[2]	Specificity # (%) of Units with No EBL Children That Are At or Above No Standard[3]	PPV # (%) of Units At or Above At Least One Standard That Have EBL Children[4]	NPV # (%) of Units At or Above No Standard That Do Not Have EBL Children[5]
5000				1/205	0/48 (0.0%)	156/157 (99.4%)	0/1 (0.0%)	156/204 (76.5%)
2000				2/205	1/48 (2.1%)	156/157 (99.4%)	1/2 (50.0%)	156/203 (76.8%)
1200				6/205	4/48 (8.3%)	155/157 (98.7%)	4/6 (66.7%)	155/199 (77.9%)
1000				7/205	4/48 (8.3%)	154/157 (98.1%)	4/7 (57.1%)	154/198 (77.8%)
800				12/205	5/48 (10.4%)	150/157 (95.5%)	5/12 (41.7%)	150/193 (77.7%)
400				31/205	7/48 (14.6%)	133/157 (84.7%)	7/31 (22.6%)	133/174 (76.4%)
250				48/205	11/48 (22.9%)	120/157 (76.4%)	11/48 (22.9%)	120/157 (76.4%)
100				72/205	15/48 (31.3%)	100/157 (63.7%)	15/72 (20.8%)	100/133 (75.2%)
2000	5000	250	100	72/185	26/44 (59.1%)	95/141 (67.4%)	26/72 (36.1%)	95/113 (84.1%)
2000	5000	250	50	76/185	28/44 (63.6%)	93/141 (66.0%)	28/76 (36.8%)	93/109 (85.3%)
2000	5000	250	40	81/185	31/44 (70.5%)	91/141 (64.5%)	31/81 (38.3%)	91/104 (87.5%)
2000	5000	250	25	93/185	34/44 (77.3%)	82/141 (58.2%)	34/93 (36.6%)	82/92 (89.1%)
2000	5000	250	20	106/185	36/44 (81.8%)	71/141 (50.4%)	36/106 (34.0%)	71/79 (89.9%)
2000	5000	250	10	148/185	43/44 (97.7%)	36/141 (25.5%)	43/148 (29.1%)	36/37 (97.3%)
1200	5000	250	100	74/185	28/44 (63.6%)	95/141 (67.4%)	28/74 (37.8%)	95/111 (85.6%)
1200	5000	250	50	78/185	30/44 (68.2%)	93/141 (66.0%)	30/78 (38.5%)	93/107 (86.9%)
1200	5000	250	40	83/185	33/44 (75.0%)	91/141 (64.5%)	33/83 (39.8%)	91/102 (89.2%)
1200	5000	250	25	94/185	35/44 (79.5%)	82/141 (58.2%)	35/94 (37.2%)	82/91 (90.1%)
1200	5000	250	20	107/185	37/44 (84.1%)	71/141 (50.4%)	37/107 (34.6%)	71/78 (91.0%)
1200	5000	250	10	148/185	43/44 (97.7%)	36/141 (25.5%)	43/148 (29.1%)	36/37 (97.3%)

Table J-1. (cont.)

Set of Candidate Standards for Lead in ...				# Units At or Above At Least One Standard /Total # Units[1]	Performance Characteristics			
Play Area Soil (ppm)	Non-Play Area Soil (ppm)	Win-dow Sill Dust ($\mu g/ft^2$)	Uncar-peted Floor Dust ($\mu g/ft^2$)		Sensitivity # (%) of Units with EBL Children That Are At or Above At Least One Standard[2]	Specificity # (%) of Units with No EBL Children That Are At or Above No Standard[3]	PPV # (%) of Units At or Above At Least One Standard That Have EBL Children[4]	NPV # (%) of Units At or Above No Standard That Do Not Have EBL Children[5]
400	5000	250	100	88/185	28/44 (63.6%)	81/141 (57.4%)	28/88 (31.8%)	81/97 (83.5%)
400	5000	250	50	92/185	30/44 (68.2%)	79/141 (56.0%)	30/92 (32.6%)	79/93 (84.9%)
400	5000	250	40	97/185	33/44 (75.0%)	77/141 (54.6%)	33/97 (34.0%)	77/88 (87.5%)
400	5000	250	25	106/185	35/44 (79.5%)	70/141 (49.6%)	35/106 (33.0%)	70/79 (88.6%)
400	5000	250	20	119/185	37/44 (84.1%)	59/141 (41.8%)	37/119 (31.1%)	59/66 (89.4%)
400	5000	250	10	155/185	43/44 (97.7%)	29/141 (20.6%)	43/155 (27.7%)	29/30 (96.7%)
250	5000	250	100	94/185	28/44 (63.6%)	75/141 (53.2%)	28/94 (29.8%)	75/91 (82.4%)
250	5000	250	50	98/185	30/44 (68.2%)	73/141 (51.8%)	30/98 (30.6%)	73/87 (83.9%)
250	5000	250	40	103/185	33/44 (75.0%)	71/141 (50.4%)	33/103 (32.0%)	71/82 (86.6%)
250	5000	250	25	110/185	35/44 (79.5%)	66/141 (46.8%)	35/110 (31.8%)	66/75 (88.0%)
250	5000	250	20	123/185	37/44 (84.1%)	55/141 (39.0%)	37/123 (30.1%)	55/62 (88.7%)
250	5000	250	10	156/185	43/44 (97.7%)	28/141 (19.9%)	43/156 (27.6%)	28/29 (96.6%)
2000	4000	250	100	72/185	26/44 (59.1%)	95/141 (67.4%)	26/72 (36.1%)	95/113 (84.1%)
2000	4000	250	50	76/185	28/44 (63.6%)	93/141 (66.0%)	28/76 (36.8%)	93/109 (85.3%)
2000	4000	250	40	81/185	31/44 (70.5%)	91/141 (64.5%)	31/81 (38.3%)	91/104 (87.5%)
2000	4000	250	25	93/185	34/44 (77.3%)	82/141 (58.2%)	34/93 (36.6%)	82/92 (89.1%)
2000	4000	250	20	106/185	36/44 (81.8%)	71/141 (50.4%)	36/106 (34.0%)	71/79 (89.9%)
2000	4000	250	10	148/185	43/44 (97.7%)	36/141 (25.5%)	43/148 (29.1%)	36/37 (97.3%)
1200	4000	250	100	74/185	28/44 (63.6%)	95/141 (67.4%)	28/74 (37.8%)	95/111 (85.6%)
1200	4000	250	50	78/185	30/44 (68.2%)	93/141 (66.0%)	30/78 (38.5%)	93/107 (86.9%)
1200	4000	250	40	83/185	33/44 (75.0%)	91/141 (64.5%)	33/83 (39.8%)	91/102 (89.2%)
1200	4000	250	25	94/185	35/44 (79.5%)	82/141 (58.2%)	35/94 (37.2%)	82/91 (90.1%)
1200	4000	250	20	107/185	37/44 (84.1%)	71/141 (50.4%)	37/107 (34.6%)	71/78 (91.0%)
1200	4000	250	10	148/185	43/44 (97.7%)	36/141 (25.5%)	43/148 (29.1%)	36/37 (97.3%)
400	4000	250	100	88/185	28/44 (63.6%)	81/141 (57.4%)	28/88 (31.8%)	81/97 (83.5%)
400	4000	250	50	92/185	30/44 (68.2%)	79/141 (56.0%)	30/92 (32.6%)	79/93 (84.9%)
400	4000	250	40	97/185	33/44 (75.0%)	77/141 (54.6%)	33/97 (34.0%)	77/88 (87.5%)
400	4000	250	25	106/185	35/44 (79.5%)	70/141 (49.6%)	35/106 (33.0%)	70/79 (88.6%)
400	4000	250	20	119/185	37/44 (84.1%)	59/141 (41.8%)	37/119 (31.1%)	59/66 (89.4%)

Table J-1. (cont.)

Set of Candidate Standards for Lead in ...				# Units At or Above At Least One Standard /Total # Units[1]	Performance Characteristics			
Play Area Soil (ppm)	Non-Play Area Soil (ppm)	Win-dow Sill Dust ($\mu g/ft^2$)	Uncar-peted Floor Dust ($\mu g/ft^2$)		Sensitivity # (%) of Units with EBL Children That Are At or Above At Least One Standard[2]	Specificity # (%) of Units with No EBL Children That Are At or Above No Standard[3]	PPV # (%) of Units At or Above At Least One Standard That Have EBL Children[4]	NPV # (%) of Units At or Above No Standard That Do Not Have EBL Children[5]
400	4000	250	10	155/185	43/44 (97.7%)	29/141 (20.6%)	43/155 (27.7%)	29/30 (96.7%)
250	4000	250	100	94/185	28/44 (63.6%)	75/141 (53.2%)	28/94 (29.8%)	75/91 (82.4%)
250	4000	250	50	98/185	30/44 (68.2%)	73/141 (51.8%)	30/98 (30.6%)	73/87 (83.9%)
250	4000	250	40	103/185	33/44 (75.0%)	71/141 (50.4%)	33/103 (32.0%)	71/82 (86.6%)
250	4000	250	25	110/185	35/44 (79.5%)	66/141 (46.8%)	35/110 (31.8%)	66/75 (88.0%)
250	4000	250	20	123/185	37/44 (84.1%)	55/141 (39.0%)	37/123 (30.1%)	55/62 (88.7%)
250	4000	250	10	156/185	43/44 (97.7%)	28/141 (19.9%)	43/156 (27.6%)	28/29 (96.6%)
2000	3000	250	100	75/185	26/44 (59.1%)	92/141 (65.2%)	26/75 (34.7%)	92/110 (83.6%)
2000	3000	250	50	79/185	28/44 (63.6%)	90/141 (63.8%)	28/79 (35.4%)	90/106 (84.9%)
2000	3000	250	40	84/185	31/44 (70.5%)	88/141 (62.4%)	31/84 (36.9%)	88/101 (87.1%)
2000	3000	250	25	95/185	34/44 (77.3%)	80/141 (56.7%)	34/95 (35.8%)	80/90 (88.9%)
2000	3000	250	20	108/185	36/44 (81.8%)	69/141 (48.9%)	36/108 (33.3%)	69/77 (89.6%)
2000	3000	250	10	149/185	43/44 (97.7%)	35/141 (24.8%)	43/149 (28.9%)	35/36 (97.2%)
1200	3000	250	100	77/185	28/44 (63.6%)	92/141 (65.2%)	28/77 (36.4%)	92/108 (85.2%)
1200	3000	250	50	81/185	30/44 (68.2%)	90/141 (63.8%)	30/81 (37.0%)	90/104 (86.5%)
1200	3000	250	40	86/185	33/44 (75.0%)	88/141 (62.4%)	33/86 (38.4%)	88/99 (88.9%)
1200	3000	250	25	96/185	35/44 (79.5%)	80/141 (56.7%)	35/96 (36.5%)	80/89 (89.9%)
1200	3000	250	20	109/185	37/44 (84.1%)	69/141 (48.9%)	37/109 (33.9%)	69/76 (90.8%)
1200	3000	250	10	149/185	43/44 (97.7%)	35/141 (24.8%)	43/149 (28.9%)	35/36 (97.2%)
400	3000	250	100	90/185	28/44 (63.6%)	79/141 (56.0%)	28/90 (31.1%)	79/95 (83.2%)
400	3000	250	50	94/185	30/44 (68.2%)	77/141 (54.6%)	30/94 (31.9%)	77/91 (84.6%)
400	3000	250	40	99/185	33/44 (75.0%)	75/141 (53.2%)	33/99 (33.3%)	75/86 (87.2%)
400	3000	250	25	108/185	35/44 (79.5%)	68/141 (48.2%)	35/108 (32.4%)	68/77 (88.3%)
400	3000	250	20	121/185	37/44 (84.1%)	57/141 (40.4%)	37/121 (30.6%)	57/64 (89.1%)
400	3000	250	10	156/185	43/44 (97.7%)	28/141 (19.9%)	43/156 (27.6%)	28/29 (96.6%)
250	3000	250	100	96/185	28/44 (63.6%)	73/141 (51.8%)	28/96 (29.2%)	73/89 (82.0%)
250	3000	250	50	100/185	30/44 (68.2%)	71/141 (50.4%)	30/100 (30.0%)	71/85 (83.5%)
250	3000	250	40	105/185	33/44 (75.0%)	69/141 (48.9%)	33/105 (31.4%)	69/80 (86.3%)
250	3000	250	25	112/185	35/44 (79.5%)	64/141 (45.4%)	35/112 (31.3%)	64/73 (87.7%)

Table J-1. (cont.)

Set of Candidate Standards for Lead in ...				# Units At or Above At Least One Standard /Total # Units[1]	Performance Characteristics			
Play Area Soil (ppm)	Non-Play Area Soil (ppm)	Win-dow Sill Dust ($\mu g/ft^2$)	Uncar-peted Floor Dust ($\mu g/ft^2$)		Sensitivity # (%) of Units with EBL Children That Are At or Above At Least One Standard[2]	Specificity # (%) of Units with No EBL Children That Are At or Above No Standard[3]	PPV # (%) of Units At or Above At Least One Standard That Have EBL Children[4]	NPV # (%) of Units At or Above No Standard That Do Not Have EBL Children[5]
250	3000	250	20	125/185	37/44 (84.1%)	53/141 (37.6%)	37/125 (29.6%)	53/60 (88.3%)
250	3000	250	10	157/185	43/44 (97.7%)	27/141 (19.1%)	43/157 (27.4%)	27/28 (96.4%)
2000	2000	250	100	79/185	27/44 (61.4%)	89/141 (63.1%)	27/79 (34.2%)	89/106 (84.0%)
2000	2000	250	50	83/185	29/44 (65.9%)	87/141 (61.7%)	29/83 (34.9%)	87/102 (85.3%)
2000	2000	250	40	88/185	32/44 (72.7%)	85/141 (60.3%)	32/88 (36.4%)	85/97 (87.6%)
2000	2000	250	25	99/185	35/44 (79.5%)	77/141 (54.6%)	35/99 (35.4%)	77/86 (89.5%)
2000	2000	250	20	112/185	37/44 (84.1%)	66/141 (46.8%)	37/112 (33.0%)	66/73 (90.4%)
2000	2000	250	10	152/185	43/44 (97.7%)	32/141 (22.7%)	43/152 (28.3%)	32/33 (97.0%)
1200	2000	250	100	81/185	29/44 (65.9%)	89/141 (63.1%)	29/81 (35.8%)	89/104 (85.6%)
1200	2000	250	50	85/185	31/44 (70.5%)	87/141 (61.7%)	31/85 (36.5%)	87/100 (87.0%)
1200	2000	250	40	90/185	34/44 (77.3%)	85/141 (60.3%)	34/90 (37.8%)	85/95 (89.5%)
1200	2000	250	25	100/185	36/44 (81.8%)	77/141 (54.6%)	36/100 (36.0%)	77/85 (90.6%)
1200	2000	250	20	113/185	38/44 (86.4%)	66/141 (46.8%)	38/113 (33.6%)	66/72 (91.7%)
1200	2000	250	10	152/185	43/44 (97.7%)	32/141 (22.7%)	43/152 (28.3%)	32/33 (97.0%)
400	2000	250	100	92/185	29/44 (65.9%)	78/141 (55.3%)	29/92 (31.5%)	78/93 (83.9%)
400	2000	250	50	96/185	31/44 (70.5%)	76/141 (53.9%)	31/96 (32.3%)	76/89 (85.4%)
400	2000	250	40	101/185	34/44 (77.3%)	74/141 (52.5%)	34/101 (33.7%)	74/84 (88.1%)
400	2000	250	25	110/185	36/44 (81.8%)	67/141 (47.5%)	36/110 (32.7%)	67/75 (89.3%)
400	2000	250	20	123/185	38/44 (86.4%)	56/141 (39.7%)	38/123 (30.9%)	56/62 (90.3%)
400	2000	250	10	157/185	43/44 (97.7%)	27/141 (19.1%)	43/157 (27.4%)	27/28 (96.4%)
250	2000	250	100	98/185	29/44 (65.9%)	72/141 (51.1%)	29/98 (29.6%)	72/87 (82.8%)
250	2000	250	50	102/185	31/44 (70.5%)	70/141 (49.6%)	31/102 (30.4%)	70/83 (84.3%)
250	2000	250	40	107/185	34/44 (77.3%)	68/141 (48.2%)	34/107 (31.8%)	68/78 (87.2%)
250	2000	250	25	114/185	36/44 (81.8%)	63/141 (44.7%)	36/114 (31.6%)	63/71 (88.7%)
250	2000	250	20	127/185	38/44 (86.4%)	52/141 (36.9%)	38/127 (29.9%)	52/58 (89.7%)
250	2000	250	10	158/185	43/44 (97.7%)	26/141 (18.4%)	43/158 (27.2%)	26/27 (96.3%)
2000	1200	250	100	91/185	33/44 (75.0%)	83/141 (58.9%)	33/91 (36.3%)	83/94 (88.3%)
2000	1200	250	50	95/185	35/44 (79.5%)	81/141 (57.4%)	35/95 (36.8%)	81/90 (90.0%)
2000	1200	250	40	100/185	38/44 (86.4%)	79/141 (56.0%)	38/100 (38.0%)	79/85 (92.9%)

Table J-1. (cont.)

Set of Candidate Standards for Lead in ...				# Units At or Above At Least One Standard /Total # Units[1]	Performance Characteristics			
Play Area Soil (ppm)	Non-Play Area Soil (ppm)	Win-dow Sill Dust ($\mu g/ft^2$)	Uncar-peted Floor Dust ($\mu g/ft^2$)		Sensitivity # (%) of Units with EBL Children That Are At or Above At Least One Standard[2]	Specificity # (%) of Units with No EBL Children That Are At or Above No Standard[3]	PPV # (%) of Units At or Above At Least One Standard That Have EBL Children[4]	NPV # (%) of Units At or Above No Standard That Do Not Have EBL Children[5]
2000	1200	250	25	107/185	38/44 (86.4%)	72/141 (51.1%)	38/107 (35.5%)	72/78 (92.3%)
2000	1200	250	20	118/185	39/44 (88.6%)	62/141 (44.0%)	39/118 (33.1%)	62/67 (92.5%)
2000	1200	250	10	155/185	43/44 (97.7%)	29/141 (20.6%)	43/155 (27.7%)	29/30 (96.7%)
1200	1200	250	100	91/185	33/44 (75.0%)	83/141 (58.9%)	33/91 (36.3%)	83/94 (88.3%)
1200	1200	250	50	95/185	35/44 (79.5%)	81/141 (57.4%)	35/95 (36.8%)	81/90 (90.0%)
1200	1200	250	40	100/185	38/44 (86.4%)	79/141 (56.0%)	38/100 (38.0%)	79/85 (92.9%)
1200	1200	250	25	107/185	38/44 (86.4%)	72/141 (51.1%)	38/107 (35.5%)	72/78 (92.3%)
1200	1200	250	20	118/185	39/44 (88.6%)	62/141 (44.0%)	39/118 (33.1%)	62/67 (92.5%)
1200	1200	250	10	155/185	43/44 (97.7%)	29/141 (20.6%)	43/155 (27.7%)	29/30 (96.7%)
400	1200	250	100	102/185	33/44 (75.0%)	72/141 (51.1%)	33/102 (32.4%)	72/83 (86.7%)
400	1200	250	50	106/185	35/44 (79.5%)	70/141 (49.6%)	35/106 (33.0%)	70/79 (88.6%)
400	1200	250	40	111/185	38/44 (86.4%)	68/141 (48.2%)	38/111 (34.2%)	68/74 (91.9%)
400	1200	250	25	117/185	38/44 (86.4%)	62/141 (44.0%)	38/117 (32.5%)	62/68 (91.2%)
400	1200	250	20	128/185	39/44 (88.6%)	52/141 (36.9%)	39/128 (30.5%)	52/57 (91.2%)
400	1200	250	10	160/185	43/44 (97.7%)	24/141 (17.0%)	43/160 (26.9%)	24/25 (96.0%)
250	1200	250	100	108/185	33/44 (75.0%)	66/141 (46.8%)	33/108 (30.6%)	66/77 (85.7%)
250	1200	250	50	112/185	35/44 (79.5%)	64/141 (45.4%)	35/112 (31.3%)	64/73 (87.7%)
250	1200	250	40	117/185	38/44 (86.4%)	62/141 (44.0%)	38/117 (32.5%)	62/68 (91.2%)
250	1200	250	25	121/185	38/44 (86.4%)	58/141 (41.1%)	38/121 (31.4%)	58/64 (90.6%)
250	1200	250	20	132/185	39/44 (88.6%)	48/141 (34.0%)	39/132 (29.5%)	48/53 (90.6%)
250	1200	250	10	161/185	43/44 (97.7%)	23/141 (16.3%)	43/161 (26.7%)	23/24 (95.8%)
2000	400	250	100	145/185	41/44 (93.2%)	37/141 (26.2%)	41/145 (28.3%)	37/40 (92.5%)
2000	400	250	50	145/185	41/44 (93.2%)	37/141 (26.2%)	41/145 (28.3%)	37/40 (92.5%)
2000	400	250	40	146/185	42/44 (95.5%)	37/141 (26.2%)	42/146 (28.8%)	37/39 (94.9%)
2000	400	250	25	147/185	42/44 (95.5%)	36/141 (25.5%)	42/147 (28.6%)	36/38 (94.7%)
2000	400	250	20	154/185	42/44 (95.5%)	29/141 (20.6%)	42/154 (27.3%)	29/31 (93.5%)
2000	400	250	10	170/185	43/44 (97.7%)	14/141 (9.9%)	43/170 (25.3%)	14/15 (93.3%)
1200	400	250	100	145/185	41/44 (93.2%)	37/141 (26.2%)	41/145 (28.3%)	37/40 (92.5%)
1200	400	250	50	145/185	41/44 (93.2%)	37/141 (26.2%)	41/145 (28.3%)	37/40 (92.5%)

Table J-1. (cont.)

Set of Candidate Standards for Lead in ...				# Units At or Above At Least One Standard /Total # Units[1]	Performance Characteristics			
Play Area Soil (ppm)	Non-Play Area Soil (ppm)	Window Sill Dust ($\mu g/ft^2$)	Uncarpeted Floor Dust ($\mu g/ft^2$)		Sensitivity # (%) of Units with EBL Children That Are At or Above At Least One Standard[2]	Specificity # (%) of Units with No EBL Children That Are At or Above No Standard[3]	PPV # (%) of Units At or Above At Least One Standard That Have EBL Children[4]	NPV # (%) of Units At or Above No Standard That Do Not Have EBL Children[5]
1200	400	250	40	146/185	42/44 (95.5%)	37/141 (26.2%)	42/146 (28.8%)	37/39 (94.9%)
1200	400	250	25	147/185	42/44 (95.5%)	36/141 (25.5%)	42/147 (28.6%)	36/38 (94.7%)
1200	400	250	20	154/185	42/44 (95.5%)	29/141 (20.6%)	42/154 (27.3%)	29/31 (93.5%)
1200	400	250	10	170/185	43/44 (97.7%)	14/141 (9.9%)	43/170 (25.3%)	14/15 (93.3%)
400	400	250	100	147/185	41/44 (93.2%)	35/141 (24.8%)	41/147 (27.9%)	35/38 (92.1%)
400	400	250	50	147/185	41/44 (93.2%)	35/141 (24.8%)	41/147 (27.9%)	35/38 (92.1%)
400	400	250	40	148/185	42/44 (95.5%)	35/141 (24.8%)	42/148 (28.4%)	35/37 (94.6%)
400	400	250	25	149/185	42/44 (95.5%)	34/141 (24.1%)	42/149 (28.2%)	34/36 (94.4%)
400	400	250	20	156/185	42/44 (95.5%)	27/141 (19.1%)	42/156 (26.9%)	27/29 (93.1%)
400	400	250	10	171/185	43/44 (97.7%)	13/141 (9.2%)	43/171 (25.1%)	13/14 (92.9%)
250	400	250	100	147/185	41/44 (93.2%)	35/141 (24.8%)	41/147 (27.9%)	35/38 (92.1%)
250	400	250	50	147/185	41/44 (93.2%)	35/141 (24.8%)	41/147 (27.9%)	35/38 (92.1%)
250	400	250	40	148/185	42/44 (95.5%)	35/141 (24.8%)	42/148 (28.4%)	35/37 (94.6%)
250	400	250	25	149/185	42/44 (95.5%)	34/141 (24.1%)	42/149 (28.2%)	34/36 (94.4%)
250	400	250	20	156/185	42/44 (95.5%)	27/141 (19.1%)	42/156 (26.9%)	27/29 (93.1%)
250	400	250	10	171/185	43/44 (97.7%)	13/141 (9.2%)	43/171 (25.1%)	13/14 (92.9%)

[1] Total number of units having available data that could be compared to all specified candidate standards.
[2] Cell entries are(number of homes at or above at least one standard that have EBL children)/ number of homes containing EBL children), followed by the corresponding percentage (in parentheses).
[3] Cell entries are (number of homes not at or above at least one standard that do not have EBL children)/(total number of homes not containing EBL children), followed by the corresponding percentage (in parentheses).
[4] Cell entries are (number of homes at or above at least one standard that have EBL children)/(total number of homes at or above at least one standard), followed by the corresponding percentage (in parentheses).
[5] Cell entries are (number of homes not at or above at least one standard that do not have EBL children)/(total number of homes not at or above any standard), followed by the corresponding percentage (in parentheses).

Table J-2 contains results of performance characteristics analyses performed under the following candidate standards:

- Uncarpeted floor dust-lead loading: 40, 50 $\mu g/ft^2$
- Window sill dust-lead loading: 250 $\mu g/ft^2$
- Play area soil-lead concentration: 400 ppm
- Soil-lead concentration in non-play areas: 400, 800, 1200, 1600, 2000, 3000 ppm.

Unlike Table J-1, Table J-2 (like Table 6-8 in Section 6.1 of the report) documents the extent of deteriorated lead-based paint that is present in housing units that contain an elevated blood-lead child but are not at or above at least one of the candidate dust or soil standards. This information suggests which of these housing units would possibly exceed a standard on the amount of deteriorated lead-based paint and which would not. (Recall that the information in the Rochester study database on amount of deteriorated lead-based paint was not in a format that allowed direct comparisons to candidate standards on deteriorated lead-based paint that were considered for the §403 rule, and as a result, deteriorated lead-based paint needed to be handled in this manner in the analysis.)

Note that Table J-2 differs from Table 6-8 of Section 6.1 in that candidate soil-lead standards exclusively for play areas has been added to the set of standards. For example, at a yardwide average soil-lead concentration standard of 1200 ppm, a window sill dust-lead standard of 250 $\mu g/ft^2$, and a floor dust-lead standard of 40 $\mu g/ft^2$, only 100 of 184 homes exceeded at least one of these standards (Table 6-8), compared to 111 homes when a play area soil standard of 400 ppm is added to these three standards (Table J-2; where the yardwide average soil-lead standard is interpreted as a non-play area soil-lead standard). However, among the 11 additional homes triggered when a play area soil standard of 400 ppm was added to these standards, none had elevated blood-lead children. That is, sensitivity was not affected in this instance when adding the play area standard, and negative predictive value decreased slightly (from 92.9% to 91.8%). If the yardwide average soil-lead standard is increased to 2000 ppm, an additional 13 homes are triggered when a play area soil-lead standard of 400 ppm is added (from 88 to 101 homes; Tables 6-8 and J-2). Of these 13 homes, 2 contain elevated blood-lead children.

Table J-2. Results of Performance Characteristics Analysis Performed on Data for Housing Units in the Rochester Lead-in-Dust Study, for Specified Sets of Candidate Standards for Lead in Dust and Soil

Note: Houses in the Rochester study with no play area soil-lead concentration specified were assumed to have no bare soil present in play areas, and therefore, their play area soil-lead concentration values were set to 0 ppm in this analysis. Non-play area soil-lead is specified if either dripline or play area soil-lead is nonzero or if no visible soil is present (when it is set to 0 ppm).

LBP = lead-based paint ($ 1.0 mg/cm^2); EBL = elevated blood-lead level ($ 10 μg/dL)

"Deteriorated lead-based paint" on a tested surface implies >5% of the lead-based paint is peeling, cracking, worn, chalking, flaking, blistering, or otherwise separating from the substrate.

Set of Candidate Standards for Lead in ...[1]				# Units At or Above At Least One Standard /Total # Units[2]	Performance Characteristics				Sum of the 4 Performance Characteristics (%)	# Units with EBL Children That Are At or Above No Standard and Have No Deteriorated LBP	# Units with EBL Children That Are At or Above No Standard, Where the % of Tested Interior Paint Surfaces Having Deteriorated LBP equals[7] ...				# Units with EBL Children That Are At or Above No Standard, Where the % of Tested Exterior Paint Surfaces Having Deteriorated LBP equals[7] ...			
Play Area Soil (ppm)	Non-Play Area Soil (ppm)	Window Sill Dust (μg/ft^2)	Floor Dust (μg/ft^2)		Sensitivity # (%) of Units with EBL Children That Are At or Above At Least One Standard[3]	Specificity # (%) of Units with No EBL Children That Are At or Above No Standard[4]	PPV # (%) of Units At or Above At Least One Standard That Have EBL Children[5]	NPV # (%) of Units At or Above No Standard That Do Not Have EBL Children[6]			0%	10-30%	31-50%	> 50%	0%	20-50%	51-75%	> 75%
400	400	250	40	147/184	42/44 (95.5%)	35/140 (25.0%)	42/147 (28.6%)	35/37 (94.6%)	243.6	0	0	1	0	1	1	0	0	1
400	800	250	40	121/184	39/44 (88.6%)	58/140 (41.4%)	39/121 (32.2%)	58/63 (92.1%)	254.4	2	3	1	0	1	3	0	1	1
400	1200	250	40	111/184	38/44 (86.4%)	67/140 (47.9%)	38/111 (34.2%)	67/73 (91.8%)	260.2	2	3	1	1	1	4	0	1	1
400	1600	250	40	105/184	37/44 (84.1%)	72/140 (51.4%)	37/105 (35.2%)	72/79 (91.1%)	261.9	3	4	1	1	1	5	0	1	1
400	2000	250	40	101/184	34/44 (77.3%)	73/140 (52.1%)	34/101 (33.7%)	73/83 (88.0%)	251.0	3	5	2	2	1	6	1	1	2
400	3000	250	40	99/184	33/44 (75.0%)	74/140 (52.9%)	33/99 (33.3%)	74/85 (87.1%)	248.2	3	5	2	3	1	6	2	1	2

Table J-2. (cont.)

Set of Candidate Standards for Lead in ...[1]				# Units At or Above At Least One Standard /Total # Units[2]	Performance Characteristics				Sum of the 4 Performance Characteristics (%)	# Units with EBL Children That Are At or Above No Standard and Have No Deteriorated LBP	# Units with EBL Children That Are At or Above No Standard, Where the % of Tested Interior Paint Surfaces Having Deteriorated LBP equals[7] ...				# Units with EBL Children That Are At or Above No Standard, Where the % of Tested Exterior Paint Surfaces Having Deteriorated LBP equals[7] ...			
Play Area Soil (ppm)	Non-Play Area Soil (ppm)	Window Sill Dust ($\mu g/ft^2$)	Floor Dust ($\mu g/ft^2$)		Sensitivity # (%) of Units with EBL Children That Are At or Above At Least One Standard[3]	Specificity # (%) of Units with No EBL Children That Are At or Above No Standard[4]	PPV # (%) of Units At or Above At Least One Standard That Have EBL Children[5]	NPV # (%) of Units At or Above No Standard That Do Not Have EBL Children[6]			0%	10-30%	31-50%	> 50%	0%	20-50%	51-75%	> 75%
400	400	250	50	146/184	41/44 (93.2%)	35/140 (25.0%)	41/146 (28.1%)	35/38 (92.1%)	238.4	1	1	1	0	1	2	0	0	1
400	800	250	50	119/184	38/44 (86.4%)	59/140 (42.1%)	38/119 (31.9%)	59/65 (90.8%)	251.2	3	4	1	0	1	4	0	1	1
400	1200	250	50	106/184	35/44 (79.5%)	69/140 (49.3%)	35/106 (33.0%)	69/78 (88.5%)	250.3	3	5	1	1	2	6	1	1	1
400	1600	250	50	100/184	34/44 (77.3%)	74/140 (52.9%)	34/100 (34.0%)	74/84 (88.1%)	252.2	4	6	1	1	2	7	1	1	1
400	2000	250	50	96/184	31/44 (70.5%)	75/140 (53.6%)	31/96 (32.3%)	75/88 (85.2%)	241.5	4	7	2	2	2	8	2	1	2
400	3000	250	50	94/184	30/44 (68.2%)	76/140 (54.3%)	30/94 (31.9%)	76/90 (84.4%)	238.8	4	7	2	3	2	8	3	1	2

[1] The data compared to these standards are average (wipe) floor dust-lead loading, average (wipe) window sill dust-lead loading, play area soil-lead concentration, and average soil-lead concentration (across dripline and play areas, with only one of the two areas represented if no data existed for the other area). Units having no reported soil-lead concentration but with no bare soil reported were assumed to have soil-lead concentrations of 0 ppm. For units having no play area soil results, it was assumed that the homes had no bare soil in play areas from which to collect soil samples, and therefore, the play area soil-lead concentration was assumed to be 0 ppm (after the average soil-lead concentration was calculated).

[2] Total number of units having available data that could be compared to all specified candidate standards, as well as data on the percentage of tested interior lead-based paint that is deteriorated and the percentage of tested exterior lead-based paint that is deteriorated.

[3] Cell entries are(number of homes at or above at least one standard that have EBL children)/ number of homes containing EBL children), followed by the corresponding percentage (in parentheses).

[4] Cell entries are (number of homes not at or above at least one standard that do not have EBL children)/(total number of homes not containing EBL children), followed by the corresponding percentage (in parentheses).

[5] Cell entries are (number of homes at or above at least one standard that have EBL children)/(total number of homes at or above at least one standard), followed by the corresponding percentage (in parentheses).

[6] Cell entries are (number of homes not at or above at least one standard that do not have EBL children)/(total number of homes not at or above any standard), followed by the corresponding percentage (in parentheses).

[7] No housing units had between 0 and 10% deteriorated lead-based paint on interior tested surfaces or between 0 and 20% deteriorated lead-based paint on exterior tested surfaces.