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RESPONSES TO COMMENTS ON OU 5 FEASIBILITY STUDY REPORT AND PROPOSED PLAN OF NOVEMBER 1994 - MARCH 1995

03/22/95

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RESPONSES

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RESPONSES TO COMMENTS ON THE OPERABLE UNIT 5 FEASIBILITY STUDY REPORT AND PROPOSED PLAN OF NOVEMBER 1994

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

MARCH 1995

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

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INTRODUCTION

The U.S. Department of Energy's (DOE) draft responses to U.S. Environmental Protection Agency (EPA) and Ohio EPA (OEPA) comments on the November 1994 draft Feasibility Study Report and Proposed Plan are provided herein. A total of 547 comments were submitted; 192 (Nos. 1 to 192) from EPA and 355 (Nos. 193 to 547) from OEPA. DOE's responses are provided in the usual template format.

EPA's comments were not coded as to major (M), clarification (C), or editorial (E) status so they are all included and answered. OEPA did provide coding and all the M and C comments are answered here; the editorial comments are addressed as appropriate in the revised report.

The sequential number DOE has assigned to each comment appears in the left margin. The original comment number assigned by each agency remains within the template, on the third line. A comment number cross reference list for each agency's comments is included.

The cross-reference list repeats the information from the comment template and adds, in the first and last columns, the sequential DOE-assigned comment number and the page number in the revised document where the resultant action appears, respectively. The DOE-assigned number appears in the left margin of the text at the beginning of the paragraph containing the redlined revision. In the New Page No. column, NA means a no-action response, G means a general comment affecting several different sections/appendices, and PP# means the Proposed Plan page where comment caused change.

For comments on the Proposed Plan, the cross-reference list provides the page number in that document where the revision can be found; neither redlining nor comment numbers are used in the Proposed Plan.

The Foreword to the FS Report explains how the text reflects the placement and nature of the comment responses.

U.S. EPA

COMMENT CROSS REFERENCE LIST
NOVEMBER 1994 FEMP OU5 FS REPORT

DOE No.	Commenting Organization	Commentor	Original Comment Number	Section	Original Page Number	Line Number	New Page No.
1	U.S. EPA	P. Van Leeuwen	1	ES	ES-15/ES-16 Tables		ES-14 ES-15
2	U.S. EPA	P. Van Leeuwen	2	1	1-38	27-28	1-37
3	U.S. EPA	P. Van Leeuwen	3	1	1-38	32	1-38
4	U.S. EPA	P. Van Leeuwen	4	1	1-39	3rd para	1-39
5	U.S. EPA	P. Van Leeuwen	5	1	1-43	29/30	1-43
6	U.S. EPA	Saric	General 1	2.0 & 4.0	NA	NA	4-72, 4-82, 4-93
7	U.S. EPA	Saric	Specific 1	2.3	2-23	NA	2-20
8	U.S. EPA	Saric	Specific 2	2.6	2-30	NA	NA
9	U.S. EPA	Saric	Specific 3	2.7.3	2-37	21-24	2-37
10	U.S. EPA	P. Van Leeuwen	6	2	2-47	Fig 2-3	Fig 2-3
11	U.S. EPA	Saric	Specific 4	2.9	2-49	NA	2-46
12	U.S. EPA	Saric	Specific 5	2.12	2-71	NA	2-69
13	U.S. EPA	Saric	General 2	3.0	NA	NA	G
14	U.S. EPA	Saric	General 3	4.0	NA	NA	4-9
15	U.S. EPA	Saric	General 4	4.0	NA	NA	G
16	U.S. EPA	Saric	General 5	4.0	NA	NA	G
17	U.S. EPA	Saric	General 6	4.1.3	4-8 to 4-9	NA	4-9
18	U.S. EPA	Saric	Specific 6	4.1.3	4-10	NA	4-10
19	U.S. EPA	Saric	Specific 7	4.1.5.2	4-18	NA	4-18
20	U.S. EPA	Saric	Specific 8	4.1.5.2	4-21	NA	4-20
21	U.S. EPA	Saric	Specific 9	4.1.5.3	4-23 to 4-24	1 & 2	4-23
22	U.S. EPA	Saric	General 8	4.3	NA	NA	4-64, 4-73, 4-84
23	U.S. EPA	Saric	General 7	4.3	NA	NA	4-91
24	U.S. EPA	Saric	Specific 10	4.4.6	4-110	14 to 23	4-110
25	U.S. EPA	Saric	General 10	5.0 & 6.0	NA	NA	NA
26	U.S. EPA	Saric	General 9	5.0	NA	NA	4-110
27	U.S. EPA	Saric	Specific 11	5.3	5-9	16	5-10
28	U.S. EPA	Saric	Specific 12	5.4.2.1	5-22	15 to 17	G
29	U.S. EPA	Saric	Specific 13	5.4.2.2.4	5-37	19	NA
30	U.S. EPA	Saric	Specific 14	5.4.2.2.6	5-47	20	5-47
31	U.S. EPA	Saric	Specific 15	5.4.4.1.3	5-88	25 to 26	5-88
32	U.S. EPA	Saric	Specific 16	5.6.2.3	5-161 to 5-162	7 to 15	5-160
33	U.S. EPA	P. Van Leeuwen	7	6	6-6	1st bullet	NA
34	U.S. EPA	Saric	Specific 17	6.4	6-11	NA	6-10

DOE No.	Commenting Organization	Commentor	Original Comment Number	Section	Original Page Number	Line Number	New Page No.
35	U.S. EPA	Saric	Specific 18	6.4.2.2	6-22	38	6-21
36	U.S. EPA	Saric	General 11	7.0	NA	NA	G
37	U.S. EPA	Saric	Specific 19	7.1.5	7-10 to 33	25 to 33	G
38	U.S. EPA	Saric	Specific 20	7.1.5	7-10	32 to 33	7-11
39	U.S. EPA	Saric	Specific 21	B	B.1-20 & B.3-25	NA	B.1-20
40	U.S. EPA	Saric	Specific 22	B.4.1	B-4-4	31	Fig. B.1
41	U.S. EPA	Saric	Specific 23	C.2.1	C-2-1	14 & 15	C-2-1
42	U.S. EPA	Saric	Specific 24	C.2.2	C-2-5	32	C-2-5
43	U.S. EPA	Saric	Specific 25	C.2.2	C-2-6	18	C-2-6
44	U.S. EPA	Saric	Specific 26	C.2.4	C-2-9	1 to 3	C-2-9
45	U.S. EPA	Saric	Specific 27	C.2.4	C-2-9	NA	C-2-9
46	U.S. EPA	Saric	Specific 28	C.2.6	C-2-10	NA	C-2-9
47	U.S. EPA	Saric	General 12	C.3.0	NA	NA	G
48	U.S. EPA	Sarci	General 13	C.3.0	NA	NA	C-3-5 G
49	U.S. EPA	Saric	Specific 29	C.3.1	C-3-1	9 to 11	C-3-1
50	U.S. EPA	Saric	Specific 30	C.3.1	C-3-1	16	C-3-1
51	U.S. EPA	Saric	Specific 31	C.3.1.1	C-3-2	3	C-3-2
52	U.S. EPA	Saric	Specific 32	C.3.1.2	C-3-3	21	NA
53	U.S. EPA	Saric	Specific 33	C.3.1.2	C-3-5	10 & 1	NA
54	U.S. EPA	Saric	Specific 34	C.3.1.2	C-3-5	4, 25 & 33	C-3-5
55	U.S. EPA	Saric	Specific 35	C.3.1.2	C-3-5	34 & 39	C-3-5
56	U.S. EPA	Saric	Specific 36	C.3.1.2	C-3-6	16	C-3-5
57	U.S. EPA	Saric	Specific 37	C.3.2	C-3-11	NA	C-3-12
58	U.S. EPA	Saric	Specific 38	C.3.2.1	C-3-12	9 & 11	C-3-12
59	U.S. EPA	Saric	Specific 39	C.3.2.3	C-3-15	37	C-3-16
60	U.S. EPA	Saric	Specific 40	C.3.2.3	C-3-16	NA	NA
61	U.S. EPA	Saric	Specific 41	C.3.2.3	C-3-17	5	C-3-17
62	U.S. EPA	Saric	Specific 42	C.3.3.3	C-3-25	6	C-3-25
63	U.S. EPA	Saric	Specific 43	C.3.5.2	C-3-32	14	C-3-32
64	U.S. EPA	P. Van Leeuwen	8	C.4	C-4-7	1-2	C-4-7
65	U.S. EPA	P. Van Leeuwen	9	C.4	C-4-8	2nd para	C-4-9
66	U.S. EPA	P. Van Leeuwen	10	C.4	C-4-10	last para	C-4-10
67	U.S. EPA	P. Van Leeuwen	11	C.4	C-4-11/12		G
68	U.S. EPA	Saric	14	D	NA	NA	NA
69	U.S. EPA	Saric	Specific 44	E.5.0	E-5-1	19 to 22	E-5-1

DOE No.	Commenting Organization	Commentor	Original Comment Number	Section	Original Page Number	Line Number	New Page No.
70	U.S. EPA	Saric	General 15	E.6.0	E-6-2 & E-6-3	NA	E-6-2
71	U.S. EPA	Saric	General 19	F.1	NA	NA	F-1-20
72	U.S. EPA	Saric	General 18	F.1	NA	NA	F-3-9
73	U.S. EPA	Saric	General 17	F.1	NA	NA	NA
74	U.S. EPA	Saric	General 16	F.1	NA	NA	NA
75	U.S. EPA	Saric	Specific 45	F.1.4	F-1-5	14 to 23	F-4-7
76	U.S. EPA	Saric	Specific 47	F.1.5.3.2	F-1-12	4 to 6	F-1-12
77	U.S. EPA	Saric	Specific 46	F.1.5.3.2	F-1-12	3 to 4	F-1-12
78	U.S. EPA	Saric	Specific 48	F.1.5.3.2	F-1-12	15 to 24	F-1-12
79	U.S. EPA	Saric	Specific 49	F.1.5.4	F-1-17	39	F-1-18 F-2-6
80	U.S. EPA	Saric	Specific 50	F.1.5.4	F-1-18	32 to 36	F-1-19
81	U.S. EPA	Saric	Specific 51	F.1.5.4	F-1-19	10	F-1-20
82	U.S. EPA	Saric	Specific 52	F.1.5.4	F-1-19	13 to 22	F-1-20
83	U.S. EPA	Saric	Specific 53	F.1.5.4	F-1-19	25 to 30	NA
84	U.S. EPA	Saric	Specific 54	F.2.2.2	F-2-5	1 to 30	F-2-5
85	U.S. EPA	Saric	Specific 55	F.2.2.3	F-2-6	22 to 23	F-2-7
86	U.S. EPA	Saric	Specific 56	F.2.2.5	F-2-7	24 to 30	F-2-7
87	U.S. EPA	Saric	Specific 57	F.3.2.5	F-3-7 to F-3-8	NA	F-3-7
88	U.S. EPA	Saric	Specific 58	F.3.2.5	F-3-8	15 to 20	NA
89	U.S. EPA	Saric	Specific 59	F.3.2.6	F-3-9	29	F-3-10
90	U.S. EPA	Saric	Specific 60	F.4.2.1.1	F-4-2	8	F-4-12 Tables F.4-9 thru F.4-14
91	U.S. EPA	Saric	Specific 61	F.4.3	F-4-9 & F-4-4 Tables	10 to 18	Tables F.4-4 F.4-9
92	U.S. EPA	Saric	Specific 63	F.4.4.1	F-4-12	27	F-4-12
93	U.S. EPA	Saric	Specific 66	F.5.2.2	F-5-4	29 to 33	F-5-4
94	U.S. EPA	Saric	General 20	F.6	NA	NA	F-6-8, 23, 26, 39
95	U.S. EPA	Saric	Specific 67	F.6.2.1.1	F-6-6	24 to 27	F-6-6
96	U.S. EPA	Saric	Specific 68	F.6.2.1.3	F-6-7	16 & 17	F-6-8
97	U.S. EPA	Saric	Specific 69	F.6.2.1.3	F-6-9	11	Tables F.6-5 and F.6-2
98	U.S. EPA	Saric	General 21	F.6.2.1.3	NA	NA	NA
99	U.S. EPA	Saric	Specific 70	F.6.3.1.2	F-6-14	16 to 20	F-6-15
100	U.S. EPA	Saric	Specific 71	F.6.3.1.2	F-6-15	1 & 2	F-6-16
101	U.S. EPA	Saric	Specific 72	F.6.3.1.2	F-6-15	24	F-6-16
102	U.S. EPA	Saric	Specific 73	F.6.3.1.3	F-6-17	23 to 25	NA
103	U.S. EPA	Saric	Specific 74	F.6.5.2	F-6-31	8 & 9	F-6-32

DOE No.	Commenting Organization	Commentor	Original Comment Number	Section	Original Page Number	Line Number	New Page No.
104	U.S. EPA	Saric	General 22	F.7.2	NA	NA	F-7-3
105	U.S. EPA	Saric	Specific 75	F.7.2.1	F-7-5	13 & 14	F-7-4
106	U.S. EPA	Saric	Specific 77	F.7.2.4	F-7-8	20 & 21	F-7-7
107	U.S. EPA	Saric	Specific 76	F.7.2.4	F-7-8	11	NA
108	U.S. EPA	Saric	Specific 78	F.7.2.7	F-7-9	20 & 21	F-7-8
109	U.S. EPA	Saric	Specific 79	F.7.2.8	F-7-10	22 to 25	F-7-9
110	U.S. EPA	Saric	General 23	F.7.3 to 7.6	NA	NA	G
111	U.S. EPA	Saric	Specific 80	F.7.3.2	F-7-11	39 to 43	F-7-11
112	U.S. EPA	Saric	Specific 81	F.7.3.2	F-7-11	NA	F-7-12
113	U.S. EPA	Saric	Specific 82	F.7.4.3	F-7-15	25 & 26	G
114	U.S. EPA	Saric	Specific 83	F.7.4.4	F-7-16	31 to 35	NA
115	U.S. EPA	Saric	Specific 84	F.7.4.6	F-7-18	34 & 35	F-7-18
116	U.S. EPA	Saric	Specific 85	F.7.4.6	F-7-19	36 to 38	F-7-19 Table F.8-9
117	U.S. EPA	Saric	Specific 86	F.7.4.6	F-7-19	45 & 46	F-7-20
118	U.S. EPA	Saric	Specific 87	F.7.5	F-7-21	12 to 14	F-7-21
119	U.S. EPA	Saric	Specific 88	F.7.7.2	F-7-26	35 to 39	F-7-27
120	U.S. EPA	Saric	Specific 89	F.7.7.3	F-7-27	20 to 25	G
121	U.S. EPA	Saric	Specific 90	F.7.7.4	F-7-29	3 & 4	NA
122	U.S. EPA	Saric	Specific 91	F.7.7.6	F-7-31	6 to 18	G
123	U.S. EPA	Saric	Specific 92	F.7.7.7	F-7-31	25 to 31	F-7-32
124	U.S. EPA	Saric	Specific 93	F.7.8.1	F-7-32	26 to 31	F-7-33
125	U.S. EPA	Saric	Specific 94	F.7.8.2	F-7-34	37 to 39	F-7-36
126	U.S. EPA	Saric	Specific 62	F-4-6 Table	NA	NA	Table F.4-6
127	U.S. EPA	Saric	Specific 64	F-4-9 to F-4-13, F-4-15, H-3-3, H-3-6, H-3-9 Tables	NA	NA	Tables F.4-9 thru F.4-15 H-3-23, -24, -25, -29
128	U.S. EPA	Saric	Specific 65	F-4-14 Table	NA	NA	Table F.4-14
129	U.S. EPA	Saric	General 24	G	NA	NA	G-2-13
130	U.S. EPA	Saric	Specific 95	G.1.0	G-1-1	26	G-1-1
131	U.S. EPA	Saric	Specific 96	G.2.2.2.2	G-2-16	NA	Table G-2-2
132	U.S. EPA	Saric	Specific 97	G.2.2.2.5	G-2-13	22 to 24	NA
133	U.S. EPA	Saric	Specific 99	G.3.2.1	G-3-9	NA	Table G.3-1, G-3-11 thru G-3-18
134	U.S. EPA	Saric	Specific 98	G.3.2.2	G-3-3	1 to 8	G-3-2, Tables G.3-2 and G.3-3
135	U.S. EPA	Saric	Specific 100	G.3.4.2	G-3-25	NA	Table G.3-6
136	U.S. EPA	Saric	Specific 101	G.4.1.3	G-4-11	NA	Table G.4-3

DOE No.	Commenting Organization	Commentor	Original Comment Number	Section	Original Page Number	Line Number	New Page No.
137	U.S. EPA	Saric	Specific 102	G.I.1.3	G-I-18 to -26	NA	Tables G.I-2, G.I-3, and G.I-4
138	U.S. EPA	P. Van Leeuwen	12	H			G
139	U.S. EPA	Saric	General 26	H	NA	NA	H-6-6, H-7-2, 3, H-II-15
140	U.S. EPA	Saric	General 25	H	NA	NA	G
141	U.S. EPA	Saric	Specific 103	H.2.3	H-2-8	31	G
142	U.S. EPA	Saric	Specific 110	H.3.4.2	H-3-19	30 & 31	H-3-20
143	U.S. EPA	Saric	Specific 104	H.4.1	H-4-1	23 & 24	H-4-1
144	U.S. EPA	Saric	Specific 105	H.4.1	H-4-2	NA	H-4-3
145	U.S. EPA	Saric	Specific 106	H.4.5.2	H-4-26	NA	H-4-26
146	U.S. EPA	Saric	Specific 108	H.5.7.5	H-5-9	17 to 19	H-5-9
147	U.S. EPA	Saric	Specific 107	H.5.7.5	H-5-9	15 & 16	H-5-9 H-7-6
148	U.S. EPA	Saric	Specific 109	H.IV & H.V	NA	NA	H-IV-5
149	U.S. EPA	P. Van Leeuwen	13	H-VI	NA	NA	G
150	U.S. EPA	Saric	General 27	J	NA	NA	J-4-2
151	U.S. EPA	Saric	General 29	K	NA	NA	NA
152	U.S. EPA	Saric	General 28	K	NA	NA	K-1-3
153	U.S. EPA	Saric	General 30	K	NA	NA	K-2-9
154	U.S. EPA	Saric	General 31	L.1	NA	NA	NA
155	U.S. EPA	Saric	Specific 111	L.1	L-1-2	NA	L-1-2
156	U.S. EPA	Saric	Specific 112	L.1	L-1-3	9 & 10	L-1-3
157	U.S. EPA	Saric	Specific 113	L.1	L-1-7	13 & 14	NA
158	U.S. EPA	Saric	Specific 114	L.1	L-1-10	22 to 25	L-1-10
159	U.S. EPA	Saric	Specific 115	L.1	L-1-11	10 to 12	L-1-11
160	U.S. EPA	Saric	General 32	L.10	NA	NA	G
161	U.S. EPA	Saric	Specific 116	L.1	L-1-11	24 to 26	L-1-11
162	U.S. EPA	Saric	Specific 117	L.1	L-1-18	17	L-1-18
163	U.S. EPA	Saric	Specific 118	L.1	L-1-20	3 to 6	L-1-20
164	U.S. EPA	Saric	General 33	L.2	NA	NA	G
165	U.S. EPA	Saric	Specific 119	L.2	L-2-2	10 to 13	L-2-2
166	U.S. EPA	Saric	Specific 120	L.2	L-2-3	NA	L-2-3 L-2-9
167	U.S. EPA	Saric	Specific 121	L.2	L-2-4	23 to 26	L-2-4
168	U.S. EPA	Saric	Specific 122	L.2	L-2-5	NA	L-2-5
169	U.S. EPA	Saric	Specific 123	L.2	L-2-7	25 & 26	L-2-7
170	U.S. EPA	Saric	Specific 124	L.2	L-27	NA	L-2-9
171	U.S. EPA	Saric	Specific 125	L.2	L-2-9	20	L-2-11

DOE No.	Commenting Organization	Commentor	Original Comment Number	Section	Original Page Number	Line Number	New Page No.
172	U.S. EPA	Saric	Specific 127	L.2	L-2-9	24 & 25	L-2-11
173	U.S. EPA	Saric	Specific 126	L.2	L-2-9	21 & 22	L-2-11
174	U.S. EPA	Saric	Specific 128	L.2	L-2-16	12 to 23	L-2-19
175	U.S. EPA	Saric	Specific 129	L.2	L-2-17	NA	L-2-17
176	U.S. EPA	Saric	Specific 130	L.2	L-2-18	NA	L-2-18
177	U.S. EPA	Saric	Specific 131	L.2	L-2-19	15	K-1-4
178	U.S. EPA	Saric	Specific 132	L.5	L-5-1	29 & 30	L-5-1
179	U.S. EPA	Saric	Specific 133	L.5	L-5-2	23	L-5-8
180	U.S. EPA	Saric	Specific 134	L.5	L-5-6	19	F-5-10
181	U.S. EPA	Saric	Specific 135	L.6	L-6-5	NA	L-6-5
182	U.S. EPA	Saric	Specific 136	L.6	L-6-7	4, 11 & 12	L-6-7
183	U.S. EPA	Saric	Specific 137	L.6	L-6-11	28 & 29	L-6-7
184	U.S. EPA	Saric	General 34	M.5.5.1	M-5-20 to M-5-21	NA	M-5-21
185	U.S. EPA	Saric	General 35	PP	NA	NA	PP-G
186	U.S. EPA	B. Barwick	1	PP	17		PP-17
187	U.S. EPA	B. Barwick	2	PP	19		PP-19
188	U.S. EPA	B. Barwick	3	PP	29		PP-29
189	U.S. EPA	B. Barwick	4	PP	30		PP-31
190	U.S. EPA	B. Barwick	5	PP	31		PP-31; ES-18
191	U.S. EPA	B. Barwick	6	PP	32		PP-32; ES-20
192	U.S. EPA	B. Barwick	7	PP	36 & 43		PP-36

U.S. EPA COMMENTS ON THE DRAFT OPERABLE UNIT 5 FEASIBILITY STUDY

1. Commenting Organization: U.S. EPA Commentor: P. VanLeeuwen
   Section #: ES Pg.#: ES-15/ES-16 Tables Line#: Code:
   Original Comment #: 1
   Comment: Why is the cost given in different units in the different alternatives?
   Response: The costs presented in the tables on pages ES-15 and ES-16 use the "M" designation (for millions of dollars) because there is not enough room in the tables to present the cost in the same format as is done for the other alternatives (e.g., Alternative 2C on page ES-14).
   Action: A footnote will be inserted in the tables for Alternatives 3A and 3C explaining that the "M" designation is for millions of dollars. This will also be provided on the duplicate tables that appear in the Proposed Plan.

2. Commenting Organization: U.S. EPA Commentor: P. VanLeeuwen
   Section #: 1 Pg.#: 1-38 Line#: 27-28 Code:
   Original Comment #: 2
   Comment: What is meant by "significant" contamination? What are the concentrations in these areas? Check this entire section for consistency of reporting.
   Response: Agree; "significant" is a relative term.
   Action: Sentence rewritten to read, "Total uranium contamination in soil identified by RI sampling (see Tables 4-17 and 4-18 of the Operable Unit 5 RI Report, DOE 1995d) was detected off property along the outfall line and at the eastern FEMP boundary adjacent to the sewage treatment plant. Concentrations of total U at the outfall line ranged from 3.0 mg/kg (1.0-1.5 foot depth) to 54.0 mg/kg (0.5-1.0 foot depth); total U concentrations at the sewage treatment plant near the eastern FEMP boundary ranged from 2.7 mg/kg (1.5-3.0 foot depth) to 7572.0 mg/kg (0.0-0.5 foot depth).

3. Commenting Organization: U.S. EPA Commentor: P. VanLeeuwen
   Section #: 1 Pg.#: 3) 1-38 Line#: 32 Code:
   Original Comment #: 3
   Comment: What is meant by "significant" contamination? What are the concentrations in these areas? Check this entire section for consistency of reporting.
   Response: Agree
   Action: Sentence rewritten to read, "Radium-226 contamination in the subsurface soil identified by RI sampling (see Tables 4-19 and 4-20 of the Operable Unit 5 RI Report, DOE 1995d) was located west of the K-65 silos; concentrations ranged from nondetectable (10.0-15.0 foot depth) to 137.0 pCi/g (3.0-5.0 foot depth)."

4. Commenting Organization: U.S. EPA Commentor: P. VanLeeuwen
   Section #: 1 Pg.#: 1-39 Line#: 3rd para. Code:
   Original Comment #: 4
   Comment: What happened to the lead detections? The RI identified areas with lead levels greater than 400 ppm lead in soil.
   Response: Agree. Discussion on lead will be added.
   Action: The following sentence will be inserted after the sentence describing selenium in the 3rd paragraph. Lead concentrations above 200 mg/kg are present in the Plant 2/3 area (440.0 mg/kg at 0.5-1.0 foot depth), the Plant 6 area (226.0 mg/kg at 0.0-0.5 foot depth), the sewage treatment plant (570.0 mg/kg at 0.0-0.5 foot depth), the electrical substation area (543.0 mg/kg at 0.0-0.5 foot depth), the maintenance building area (334.0 mg/kg at the 0.0-0.5 foot depth), the scrap metal pile, the KC-2 warehouse

(569.0 mg/kg at 0.0-0.5 foot depth), the trap range (2180.0 mg/kg at 0.0-0.5 foot depth), and the K-65/Clearwell line west (240.0 mg/kg at 0.0-0.5 foot depth) (see Tables 4-29 and 4-30 in the Operable Unit 5 RI)."

5. Commenting Organization: U.S. EPA Commentor: P. VanLeeuwen
   Section #: 1 Pg.#: 1-43 Line#: 29/30 Code:
   Original Comment #: 5
   Comment: Explain why detections of radionuclides and inorganics outside the maximum extent of uranium contamination are more likely to be due to errors or other activities? If analytical errors or cross-contamination are suspected, samples should be reanalyzed. Detections of radionuclides at concentrations above background are most likely due to the site, unless a better source can be shown. The text should be purged of unsubstantiated comments of this sort.
   Response: Agree
   Action: Sentence deleted.

6. Commenting Organization: U.S. EPA Commentor: Saric
   Section #: 2.0 and 4.0 Page #: NA Line #: NA
   Original General Comment #: 1
   Comment: Section 2.6 presents a discussion of cross-media preliminary remediation goals (CPRG) for Operable Unit (OU) 5. Table 2-5 presents CPRGs for radionuclides and chemicals. Specific contaminant levels are presented for the protection of human health and the Great Miami Aquifer (GMA). Two different levels are presented for total uranium, one for uranium associated with a soil leaching coefficient of 15 liters per kilogram (L/kg) and one for uranium associated with a soil leaching coefficient of 325 L/kg. The CPRG for total uranium for soil with a leaching coefficient of 325 L/kg is 98 parts per million (ppm). In Section 4.0, alternatives are developed for nine risk cases. Alternatives 4A, 4B, 4C (all risk cases) propose preliminary remediation levels (PRL) of greater than 98 ppm uranium. It is unclear how Alternatives 4A, 4B, and 4C are protective of the GMA because the proposed PRL of 125 ppm uranium exceeds the CPRG of 98 ppm uranium. Either this discrepancy should be explained, or Alternatives 4A, 4B, and 4C should be eliminated because they are not effective in meeting the remedial action objectives (RAO).
   Response: Tables 4-13, 4-16 and 4-19 incorrectly state the uranium PRL for on-property areas for the "C" alternatives as 125 ppm. The correct PRL value of 98 ppm is shown in Table 2-12 for the 10^{-6} ILCR level for the Government Reserve (Expanded Trespasser) scenario. An on-property PRL of 100 ppm was used as the basis for volume estimation for the "C" alternatives.
   Action: Revise Tables 4-13, 4-16 and 4-19 to properly reflect the uranium PRL for on-property soil.

7. Commenting Organization: U.S. EPA Commentor: Saric
   Section #: 2.3 Page #: 2-23 Line #: NA
   Original Specific Comment #: 1
   Comment: Table 2-3 summarizes COC by medium for each OU. Footnote "b" to this table indicates that the COCs for OU 5 were taken from the FS for OU 5. Section 2.3 is part of the OU 5 FS. Footnote "b" should be revised to indicate that the COCs for OU 5 were taken from the OU 5 RI.
   Response: Agree.
   Action: Revise footnote "b" in Table 2-3 to say the source of COCs was the Operable Unit 5 RI Report.

8. Commenting Organization: U.S. EPA Commentor: Saric
Section #: 2.6 Page #: 2-30 Line #: NA
Original Specific Comment #: 2
Comment: Table 2-5 on Page 2-30 presents CPRGs for soil. The CPRG for total uranium with a leaching coefficient (K_1) of 15 is listed as 20 ppm. Later, in Section 2.8, Page 2-46, Lines 28 and 29, the CPRG for uranium with a K_1 of 15 is listed as 5 ppm. This discrepancy should be resolved.
Response: Table 2-5 properly reflects the CPRGs for both the 10^{-6} ILCR and the MCL (20 ppb) case for groundwater. The example developed on page 2-46 employs the CPRG for the 10^{-6} ILCR in groundwater. The CPRG of 2.5 ppm total uranium used on page 2-46 is consistent with Table 2-5.
Action: No text revisions required.

9. Commenting Organization: U.S. EPA Commentor: Saric
Section #: 2.7.3 Page #: 2-37 Line #: 21-24
Original Specific Comment #: 3
Comment: Section 2.7.3 identifies applicable or relevant and appropriate requirements (ARAR) and other criteria or guidance to be considered (TBC) for soil. The polychlorinated biphenyl (PCB) spill cleanup policy is identified as an applicable requirement. The PCB spill policy is also considered a criteria TBC and not an applicable requirement because the spill policy is not promulgated. In addition, Appendix B refers to the PCB spill policy as both an ARAR and a TBC. The text in Section 2.7.3 and Appendix B should be revised to correctly identify the PCB spill policy as a TBC.
Response: Agree. The text on lines 21-24 inaccurately cites the PCB spill cleanup policy as an applicable requirement when in fact it is a TBC for soil. Appendix B will also be corrected as described in the comment response to comment 39.
Action: The text for this bullet item will be revised to say, "The PCB spill cleanup policy is not a binding regulation for the cleanup of PCBs. It is, therefore, not an ARAR but a TBC, as described in Appendix B. The final determination of the PCBs cleanup levels within Operable Unit 5 will be determined through the development of PRLs for each proposed alternative in each land-use scenario considered in this document (Section 4). The final selection of the appropriate cleanup level will be established in the ROD, as NCP guidance suggests for the CERCLA program ("A Guide of Remedial Actions at Superfund Sites with PCB Contamination," OSWER Directive No. 9355.4-01 FS (August 1990)."

10. Commenting Organization: U.S. EPA Commentor: P. VanLeeuwen
Section #: 2 Pg.#: 2-47 Line#: Figure 2-3 Code:
Original Comment #: 6
Comment: What happened to the gamma radiation exposure in this example? Should it be included in the "consideration" box for the Risk-based PRG?
Response: Direct radiation exposure is included in the derivation of risk-based PRGs. It was not included in Figure 2-3 along with several other pathways of exposure due to lack of space in the Figure.
Action: Modify Figure 2-3 to reflect the following revised definition of the "considerations" for risk-based PRGs. "10^{-6} risk from soil exposure pathways"

11. Commenting Organization: U.S. EPA Commentor: Saric
Section #: 2.9 Page #: 2-49 Line #: NA
Original Specific Comment #: 4
Comment: Table 2-10 presents detection limits (DL) for contaminants by medium and moisture content. The source of the DLs presented is not specified. Because the detection

limits are used to develop PRLs and may in fact be proposed as PRLs, the source of the DLs is very important so that the DLs presented can be verified. Table 2-10 should either be modified to present the source of the DLs or to refer to documents, such as OU-specific quality assurance project plans (QAPP) that document the DLs presented.

Response: Agree.

Action: Table 2-10 will be modified to reflect the source of the DLs.

12. Commenting Organization: U.S. EPA Commentor: Saric
Section #: 2.12 Page #: 2-71 Line #: NA
Original Specific Comment #: 5
Comment: Section 2.12 lists the RAOs for OU 5. In Table 2-17, RAOs are listed for all media, including groundwater. A groundwater RAO addressing the restoration of aquifer quality to its highest beneficial use (drinking water) should be added to Table 2-17.
Response: Agree.
Action: Add following RAO: "Restore the Great Miami Aquifer to the highest beneficial use (drinking water) in a reasonable time frame."

13. Commenting Organization: U.S. EPA Commentor: Saric
Section #: 3.0 Page #: NA Line #: NA
Original General Comment #: 2
Comment: Section 3.0 identifies and screens technology types and process options that may be applicable to OU 5. Table 3-9 summarizes the technologies and process options retained for soil and sediment remediation. Primary, support, and representative process options are listed for each technology type. Representative process options for the physical/chemical and solidification/stabilization technology types are not identified, and an explanation for not considering them is not provided. Because a treatability study was conducted for soil washing, more detail should be provided to explain why soil washing is not evaluated further in this feasibility study (FS). In addition, an explanation for why cementation is not considered should be provided. The reason for not considering cementation is particularly confusing because thermal desorption is retained. Both cementation and thermal desorption are proposed for the treatment of Resource Conservation and Recovery Act (RCRA) inorganic and organic wastes, respectively.
Response: The comment has been broken into the following sections to facilitate responding:

(a) **Representative Process Options for Physical/Chemical and Solidification/Stabilization Are Not Identified.**
The screening evaluation of the soil washing process option is presented in Appendix M (Section M.5.5.2). Soil washing is not retained for incorporation into the remedial alternatives as a primary representative process option (page M-5-22), but is retained as a support technology within a treatment-train process or as a single process targeting soil contaminant anomalies. Soil washing should be identified as a representative process option because of the potential of the phosphate amendment for stabilizing uranium mobility in the FEMP soils. Because of concerns involving long-term stability, high reagent consumption, and significant volume increases, solidification/stabilization techniques are not retained as primary representative process options for incorporation into the remedial alternatives (Section M.5.5.3). Cement/pozzolan-based solidification (cementation) and vitrification should be retained as representative support options because of limited potential applications under very specific conditions.

(b) **Provide More Detail to Explain Why Soil Washing Is Not Evaluated Further in the FS Report.**
The purpose of Section 3.0 is to provide an overview of identification and screening procedures and summarize the results of the technology screening process. Detailed explanations for promoting or eliminating various process options are presented in Appendix M; Section M.5.5.2 deals specifically with soil washing.
Soil washing was evaluated versus the screening criteria in Appendix M, and was not retained as a primary remedial alternative for detailed comparative analysis. Agree that additional narrative should be provided to clearly state the reasons for its elimination as a primary remedial alternative.

(c) **Explain Why Cementation is Not Considered in the FS Report.**
As stated above, cementation was evaluated versus the screening criteria in Appendix M and was not retained as a primary remedial alternative for detailed comparative analysis. Reasons for its elimination include concerns over long-term stability, high reagent consumption and significant volume increases leading to higher disposal costs. While cementation cannot be retained for large-scale soil remediation, it can be applied on a smaller scale to treat inorganic RCRA wastes. This application is referenced in Section 5.0, page 5-37.
It is recognized (page M-5-24) that solidification technologies have been most successful when applied to inorganic waste streams, sludge, contaminated soil containing nonvolatile organic materials (such as PCBs and creosote), and incinerator ash containing heavy metals. Cementation should be retained as a representative support option (page M-5-26) because there may be applications to waste treatment residuals or smaller areas of soil containing very high inorganic and radionuclide concentrations where it could have practical application.

Action: (a) **Representative Process Options for Physical/Chemical and Solidification/Stabilization Are Not Identified.**
In Section 3.0, Table 3-9 on Page 3-39 will be revised to show that soil washing (with the phosphate amendment) and solidification/stabilization process options will be characterized as representative support process options. The identical revisions will be made in Appendix M, Table M.5-2, page M-5-9. See Comments 13(b) and 13(c) for further discussions.

(b) **Provide More Detail to Explain Why Soil Washing Is Not Evaluated Further in the FS Report.**
The following abstract from the Appendix M narrative concerning elimination of soil washing as a preliminary process option has been inserted at the end of Section 3.3.3, page 3-31. "Although considerable time and effort were spent in treatability studies to evaluate soil washing processes using various chemical extraction techniques (Appendix D), this technology was not retained as a primary process option to be incorporated into a remedial alternative. The hybrid soil washing, which currently appears to be the most promising of the chemical extraction process options, was evaluated versus the screening criteria (Appendix M) and was not retained as a primary remedial alternative for detailed analysis in Section 5.0. Overall, the hybrid sulfuric acid/sodium carbonate physicochemical treatment process is an unattractive option from every aspect of the screening criteria. Component operating costs are extremely high at $592 per cubic yard; uranium removal is only marginally acceptable at the 1×10^{-5} risk assessment level and mobility remains an issue of concern; and implementation requires the construction and operation of a large chemical treatment plant around the clock for 22 years. Soil washing was retained as a representative support option because of the potential of the phosphate

amendment for stabilizing uranium mobility in FEMP soils. As a support option, it also allows a means for introducing innovative waste minimization technologies that are likely to emerge during the 22-year period of soil remediation. Several of these technologies are identified and briefly discussed in Appendix M."

Appendix M text and various tables in Section 3.0 and Appendix M have been expanded as follows to incorporate more detail with respect to soil washing and the initial screening and evaluation of this process.

In Table 3-3 on page 3-14 of Section 3.0 and Table M.3-1 on page M-3-3 of Appendix M, the following words have been added to the end of the description of the soil washing process option: "...possibly incorporating the use of phosphates for stabilizing uranium mobility." The same words have been added into the text in Appendix M, Section M.3.5.3, at the end of the first sentence in the soil washing process option description on page M-3-15.

A complete re-evaluation of the hybrid sodium carbonate/sulfuric acid sequential physicochemical treatment process, considering the potential application of the phosphate amendment has replaced the original evaluation of the soil washing process. The following text will be added into Appendix M, Section M.5.5.2, page M-5-22, line 3 and will replace the text on lines 5 to 34 of page M-5-22.

"A hybrid sodium carbonate/sulfuric acid sequential physicochemical treatment process has evolved, which can consistently reduce uranium concentrations in FEMP soil to the range of 30 to 130 mg/kg.

The primary focus of the screening evaluation of technologies and process options is effectiveness in handling the estimated volume of soil; meeting remediation goals; potential impacts to human health and the environment during construction and implementation; and how proven the process is with respect to contaminants and conditions at the site. The following is an evaluation of the hybrid sodium carbonate/sulfuric acid physicochemical treatment process option:

- Effectiveness: On the basis of bench- and pilot-scale testing, the hybrid chemical process option is capable of achieving mass-based residual total uranium concentrations in the range of 30 to 130 ppm. This performance is unacceptable for the 1×10^{-6} risk assessment level and only marginally acceptable for the 1×10^{-5} level. The only acceptable scenario for continuing the consideration of chemical treatment would be the least restrictive risk assessment level of 1×10^{-4}, whose adoption seemed improbable. Further, uranium mobility remained as an issue of concern in treated soil, based upon K_1 tests. The use of phosphate as a process amendment was subsequently proposed and is currently being tested. The effect of the hybrid physicochemical process would have on other radionuclide, organic, and inorganic COCs in the site soil is inconclusive.
- Implementability: Implementing the hybrid physicochemical treatability soil washing process would require the construction of a large chemical treatment plant that would occupy about 11 acres. The process is commodity-intensive, requiring a combined usage of about 5 tons per hour of direct materials of all types around the clock for 22 years. Logistical support of operations will require a daily average of 10 trucks per hour in and out of the site for 22 years. A relatively large complement of trained operators would be required, and large volumes of reagent chemicals would have to be shipped to the site on a daily or weekly basis. From the standpoint of process operability, the conceptual flowsheet identifies large-scale equipment having high retention times for processing soil. High tonnages could be produced without knowing its acceptability for on-site release. Real-time

monitoring technology must be developed and successfully applied for assuring process quality control of operations.

- Cost: Capital and O&M costs include treatment equipment, large volumes of reagent chemicals, a large complement of trained operators, and electrical power, and are extremely high relative to other process options, but are small in comparison with the O&M costs for hybrid chemical treatment. Operating and construction costs were estimated to be $592 per cubic yard for the hybrid chemical treatability soil washing process (see Appendix K). When combined with costs for excavation and process residuals disposal, the total cost of this process option amounts to $944 per cubic yard. This includes importing sand for regenerating the soil fertility following chemical treatment in order to support plant life and other agronomic practices.

Overall, the hybrid sodium carbonate/sulfuric acid physicochemical treatment process is an unattractive option from every aspect of the screening criteria. Operating costs are extremely high, uranium mobility remains an issue of concern, and implementation requires the construction of a large chemical treatment plant that would operate around the clock for 22 years at the FEMP site. Further discussion of the screening evaluation is presented in the following text.

Based on the current level of technological development, and the inability to satisfy any of the basic screening criteria, chemical treatability is eliminated as a primary remedial alternative, but retained as a support technology within a treatment-train process. This provides a means for incorporating physical separation techniques for achieving volume reduction by targeting soil contaminant anomalies, e.g., soil with excessively high concentration or mobility levels of uranium or other contaminants of concern. As a support option, it also allows a means for introducing innovative technologies that are likely to emerge during the 22-year period for soil remediation.

Soil washing is identified as a representative process option because of the potential of the phosphate amendment to the soil washing process option for stabilizing uranium mobility in FEMP soils. The basis for this interest is that a projected 1.2 million cubic yards of soil contains less than 80 mg/kg U, but the species are likely to have sufficient mobility for potentially contaminating the groundwater. Treatment would be either by an in-situ treatment application or a modified ex-situ soil washing treatability process. The latter would integrate mechanical separation techniques with treatment by an acid phosphate compound."

(c) **Explain Why Cementation is Not Considered in the FS Report.**
See also Comment 542 (regarding FEMP applications for solidification) The following sentence has been added beginning on line 10, page M-5-26 of Section M.5.5.3, "It is retained as a representative support option because of limited potential applications under very specific conditions."

14. Commenting Organization: U.S. EPA Commentor: Saric
Section #: 4.0 Page #: NA Line #: NA
Original General Comment #: 3
Comment: Section 4.0 presents waste acceptance criteria (WAC) for on-site disposal. The WAC for OU 5 should be compared to the WAC established for OU 2. Any differences in the OU 2 and OU 5 WACs should be explained.
Response: In accordance with the comment resolution meeting held with US and Ohio EPA on February 22, 1995, the 1030 ppm total uranium WAC developed through Operable Unit 5 will be adopted as the site-wide WAC for the disposal cell. This will resolve

the slight difference in the total uranium WAC developed by OU2 (1080 ppm) and OU 5 (1030 ppm). Total uranium was the only WAC previously developed by OU 2. All other COCs requiring the development of WACs are addressed through Operable Unit 5.

Action: All citations to the numerical WAC value for total uranium in the FS and Proposed Plan will use 1030 ppm as the adopted value.
The following paragraph will be added on page 4-9, at line 23: "Operable Unit 2's feasibility study and remedy selection process precedes Operable Unit 5 by approximately 6 months. A comparison was made between the total uranium WAC developed for Operable Unit 2's preferred remedy (on-site disposal in an engineered disposal facility) and the total uranium WAC for this same category of alternative developed through Operable Unit 5. The total uranium WAC of 1080 ppm for Operable Unit 2's preferred remedy is slightly greater than the 1030 ppm WAC developed for the more leachable (Kl15) soils found within Operable Unit 5 (shown in Table 4-1 and Appendix F). For consistency, the U.S. and Ohio EPA require adoption of the 1030 ppm WAC developed through Operable Unit 5 as the maximum WAC to be carried forward for detailed site-wide evaluations of the onsite engineered disposal facility alternative.

15. Commenting Organization: U.S. EPA Commentor: Saric
Section #: 4.0 Page #: NA Line #: NA
Original General Comment #: 4
Comment: Section 4.0 discusses the development and screening of remedial alternatives. Usually, alternatives are assembled from combinations of technologies and associated process options previously evaluated; however in the Operable Unit 5 FS, none of the eight soil process options identified as potentially applicable and summarized in Table 3-9 are considered for incorporation into the remedial alternatives. Use of these treatment technologies to reduce the toxicity, mobility, or volume of contaminated soil before disposal is viable as discussed in Appendix L. The technologies therefore need to be evaluated and considered for incorporation into remedial alternatives unless additional support for their elimination is provided. The discussion in Section 4.1.1, Page 4-5, Lines 1-9, should be expanded, especially Item 1, which discusses very briefly the treatment of soil. In addition, conclusions about why each of the soil treatment technologies is or is not included in possible remedial alternatives as a support technology should be presented.

Response: The reason that none of the eight soil treatment process options are incorporated into remedial alternatives is that each is generally not applicable to the wide range and large volumes of soil at the site. While these processes may be able to individually reduce toxicity, mobility, or volume, they typically can only effectively do so on either a smaller scale or under certain types of conditions. Therefore, the eight were designated as support rather than primary process options.
It should be noted that Section 4.6 allows for the incorporation of several options, depending upon the circumstances, which might support the selected remedial alternatives. In addition, the conclusions concerning why each of the soil treatment process options is or is not included in possible remedial alternatives as a support technology are presented at the end of each individual process evaluation in Section M.5.0 of Appendix M. Consistent with the February 8, 1995 conference call between DOE, EPA and OEPA, the discussions in Appendix M will be expanded to more fully discuss the basis for screening soil washing and cementation as lead process options.

Action: See Comment 13(b) and 13(c).

16. Commenting Organization: U.S. EPA Commentor: Saric
Section #: 4.0 Page #: NA Line #: NA
Original General Comment #: 5

Comment: Section 4.0 discusses the screening of alternatives. The C alternatives (2C, 3C, and 4C) each propose on-site disposal in a centralized consolidation area with an earthen cover. The text in Section 4.4.6, Page 4-110, Lines 8 - 11, states that the consolidation area with an earthen cover is only appropriate for risk cases that propose PRLs of less than 45 ppm of uranium; however, as indicated in Tables 4-18 and 4-19, Alternative 3C for Cases 5, 6, and 7 and Alternative 4C for Cases 8 and 9 propose PRLs of greater than 45 ppm of uranium. Despite this discrepancy, these alternatives are carried forward to the detailed analysis of alternatives presented in Section 5. Alternatives 3C (Cases 5, 6, and 7) and 4C (all risk cases) should be eliminated in Section 4.0 of the FS because they are not effective in achieving RAOs.

Response: Agree the text on Page 4-110, Lines 8-12 is confusing and should be removed. To address the issue raised by the commentor, it should be clarified that the excavated soils that can attain the WACs for the "C" alternatives are not restricted solely to the risk cases that have a uranium PRL of less than 45 ppm (as the text on page 4-110 incorrectly indicated), because there will be excavation of some additional soil quantities to address COCs other than uranium, extending deeper or beyond the uranium footprint. This is shown on the color overlays in Section 2, and is reflected in the onsite soil volume estimates contained in Tables 4-18 and 4-19. The key is for the excavated soils to be able to attain the WAC, rather than having a "limiting factor" soil PRL set at less than 45 ppm. This is why the two tables cited by the commentor contain soil volumes that, following excavation, can remain onsite in the consolidation area under the "C" alternatives.

It should also be noted that one of the tables referenced by the commentor and several others (Tables 4-13, 4-16, and 4-19) contain incorrect on-property uranium cleanup levels (shown as 125 ppm in the tables) for Land Use Objective 4. The correct value is 100 ppm, which represents the cross-media based PRL for soils outside the production area where less leachable (kl 325) category soils are present. The 100 ppm value is more restrictive than the 125 ppm risk-based PRL for the expanded trespasser, and should therefore appear in the tables, along with the footnote indicating that in the production area, 20 ppm is required to address the more leachable (kl = 15) category soils. The remaining information in the tables, including the on-property and off-property volume estimates for the "C" alternatives, is correct.

The reason the C alternatives are carried forward to the detailed analysis in Section 5 is that the C alternatives are basically "offsite shipment" alternatives which, for a given Land Use Objective, can be compared to the "onsite disposal" option represented by the A alternatives. The consolidation area with earthen cover concept only comes into play for the C alternatives where the WAC and PRL relationship allows the material to remain onsite on its own merit. Even if proportionately little material can remain onsite under a C alternative because of the low WAC, this still meets the intended purpose of the alternative and they should be retained for the next step of comparison and analysis. Additional information regarding the C alternatives and their compliance with ARARs can be found in the response to Comment No. 26.

Action: Strike text on Page 4-110, lines 8 through 12, which is not necessary. Correct soil PRL value shown on Tables 4-13, 4-16, and 4-19 from 125 ppm to 100 ppm.

17. Commenting Organization: U.S. EPA Commentor: Saric
Section #: 4.1.3 Page #: 4-8 to 4-9 Line #: NA
Original General Comment #: 6
Comment: Section 4.1.3 is titled "Waste Acceptance Criteria." The section describes the WAC for on-site disposal but does not refer to the WAC for off-site disposal detailed in Appendix E. The text should be revised to clearly define and differentiate between the on-site and off-site WACs.
Response: Information from Appendix E will be added to the text to illustrate that the on-site and off-site WAC are different.
Action: The following paragraph will be added at the end of Section 4.1.3, page 4-9, line 24: "Waste acceptance criteria for off-site disposal is discussed in Appendix E. Most of the contaminated soil excavated during remediation activities will be well below the WAC for off-site disposal with the exception of soil containing hazardous wastes such as oil, grease and PCBs; such soil would require treatment before shipment. Generally the off-site disposal WAC for specific metals (e.g., uranium) are several times higher than the WAC for on-property disposal."

18. Commenting Organization: U.S. EPA Commentor: Saric
Section #: 4.1.3 Page #: 4-10 Line #: NA
Original Specific Comment #: 6
Comment: Section 4.1.3 presents the WAC for Operable Unit 5. Table 4-1 presents the WAC levels for COCs and for each remediation scenario. Table 4-1 lists values for total soluble and insoluble uranium. Because the uranium PRLs are associated with K_1 values of 15 and 325, the WAC should also be linked to these differing K_1 values. If other factors besides soil leachability affect uranium leaching such as differences in the solubility of the uranium, these factors should be explained and accounted for. In addition, it is not clear why the WAC for soluble uranium is greater than the WAC for insoluble uranium. Finally, it is not clear why WACs have been established for insoluble uranium because the table indicates that it has either not been analyzed for or has not been detected. The text should be revised to address these issues.
Response: Some errors were found in Table 4-1. These have been corrected, including the defect pointed out by the comment that the WAC for soluble uranium is greater than the WAC for insoluble uranium. A WAC was developed for insoluble uranium because it was known that some insoluble uranium had been detected in samples obtained. These values were not available at the time of publication and have now been inserted.
Table 4-1 was presented to make it easy for a reader of Section 4.0 to refer to the various WAC. Appendix F, "Fate and Transport Modeling" presents the development of WAC including the importance of factors such as leachability and solubility of uranium. Page 4-9, lines 1-5 make it clear that the impact of factors such as these on WAC can be found in Appendix F.
Action: Table 4-1 has been corrected. No changes have been made in the text.

19. Commenting Organization: U.S. EPA Commentor: Saric
Section #: 4.1.5.2 Page #: 4-18 Line #: NA
Original Specific Comment #: 7
Comment: Section 4.1.5.2 identifies the remedial action area footprints associated with two groundwater treatment levels. The text in this section should clarify that the "remedial action area footprint" is synonymous with the "area of attainment" for groundwater cleanup levels. The area of attainment identifies the portions of the aquifer that will be restored to meet groundwater cleanup levels.

Response: The term "area of attainment" will be used parenthetically after "remedial action area footprint" to indicate that these are synonymous.

Action: Section 4.1.5.2, page 4-18, lines 39-42 will be changed to:

- The need to meet corresponding risk levels for other COCs in addition to uranium. Because uranium is the principal site contaminant present in groundwater, total uranium distributions are used for FS purposes to initially identify remedial action footprints (i.e. "areas of attainment") for the Great Miami Aquifer.

20. Commenting Organization: U.S. EPA Commentor: Saric
Section #: 4.1.5.2 Page #: 4-21 Line #: NA
Original Specific Comment #: 8
Comment: Figure 4-3 shows target remedial action areas for restoration of the GMA and the locations of existing and proposed extraction wells. Indication of the direction of groundwater flow would be helpful in understanding the placement of extraction wells. Arrows indicating groundwater flow direction should be included in the figure.
Response: Agree.
Action: Arrows to indicate the general direction of groundwater flow will be added to Figure 4-3.

21. Commenting Organization: U.S. EPA Commentor: Saric
Section #: 4.1.5.3 Page #: 4-23 and 4-24 Line #: 1 and 2;
Original Specific Comment #: 9
Comment: Section 4.1.5.3 discusses remedy performance. The technical limitations to achieving groundwater cleanup levels and the possibility of DOE seeking a technical impracticability (TI) waiver if asymptotic conditions develop. U.S. EPA's recent guidance on applying the TI waiver to groundwater cleanup states that although the FS and record of decision (ROD) should discuss the technical limitations to achieving cleanup standards, only in very limited circumstances (such as at sites where dense, nonaqueous phase liquids exist) should the FS or ROD discuss future applicability of the TI waiver. The discussion regarding the TI waiver should therefore be removed from the FS.
Response: The discussion is intended merely to indicate a possible approach if asymptotic conditions develop in the future. DOE is committed to implementing the active restoration remedy and is not in any way inferring that a TI waiver should be sought before implementation. To address the commentor's concern, the paragraph discussing the TI waiver (between lines 21 and 31) will be deleted. The remaining generic language regarding technical limitations will be retained, as the commentor suggests. See also the response to Comments 249 and 250 regarding language changes offered by OEPA on the same topic.
Action: Delete discussion between lines 21 and 31 (page 4-23) and incorporate language changes discussed under Comments 249 and 250.

22. Commenting Organization: U.S. EPA Commentor: Saric
Section #: 4.3 Page #: NA Line #: NA
Original General Comment #: 8
Comment: Section 4.3 describes the alternatives that will undergo initial screening. Sections 4.3.3, 4.3.4, and 4.3.5 describe the A, B, and C alternatives, respectively. For each of these alternatives, the soil remediation summary states that soil contaminated with hazardous waste will be treated to meet the federal Land Disposal Restriction (LDR) levels for off-site disposal; however, for most of the A, B, and C

alternatives, contaminated soil will not be treated to meet LDR levels. In most cases, soil containing hazardous waste will be treated to meet the on-site WAC and then be disposed of in the on-site disposal cell or consolidation area. This inconsistency in the text of Section 4.3 should be resolved.

Response: Agree. Identical concern was raised by Ohio EPA in Comment 266. Please see response and action for that comment.

Action: The fourth bullets on page 4-61, line 41; page 4-72, line 27; and page 4-84, line 12 were replaced with "Pretreating soil with concentrations of RCRA-regulated constituents above the WAC established for these constituents."

23. Commenting Organization: U.S. EPA Commentor: Saric
Section #: 4.3 Page #: NA Line #: NA
Original General Comment #: 7

Comment: The following discrepancies were found between the Operable Unit 5 FS and the Draft Proposed Plan: (1) in Table 4-10, the number of rail cars necessary for off-site disposal of soil under Cases 1 and 2 is not the same as the number presented in the Draft Proposed Plan; (2) in Table 4-13, the total project cost of Case 9 is not the same as the cost presented in the Draft Proposed Plan; and (3) in Table 4-18, the number of rail cars necessary for off-site disposal under Case 7 is not the same as the number presented in the Draft Proposed Plan. These discrepancies should be resolved and the text revised as necessary.

Response: Item 1: At the design parameters of 1.76 tons per cubic yard of in situ soil, and 100 tons capacity per rail car (see Section 5.4.2.1, page 5-22), 165,000 rail cars would be required to dispose of 9.35 million cubic yards of soil. Therefore, Tables 4-10, 4-17, and the Proposed Plan table for Alternative 2C are correct, while Tables 5-6, 5-13, and the Proposed Plan table for Alternative 1 are each incorrect with respect to rail car requirements.

Item 2: All costs have been updated and the appropriate modifications made in the tables in Section 4, Section 5, and the Proposed Plan.

Item 3: For the same design parameters referenced in Item 1, the number of rail cars required to dispose of 1.120 million cubic yards of soil is 19,700 rather than 19,800 as indicated in Case 7 of Table 4-18 (Alternative 3C); Case 7 of Table 5-21 is also incorrect.

Action: The number of rail cars was changed to 19,700 in Table 4-18, page 4-90, Case 7 column. The same change was made in Table 5-21.

24. Commenting Organization: U.S. EPA Commentor: Saric
Section #: 4.4.6 Page #: 4-110 Line #: 14 to 23
Original Specific Comment #: 10

Comment: Section 4.4.6 presents the initial screening evaluation of the C alternatives. The text states that the on-site consolidation area for materials containing uranium below the uranium WAC of 45 ppm would not meet the State of Ohio definition of solid waste. This reasoning is based on State of Ohio guidance that states that contaminated soil shall be managed as a solid waste unless it can be shown to be clean through a risk assessment. The text contends that the 45 ppm WAC was derived using a risk assessment and is protective of the intended receptor. It is doubtful that the State of Ohio considers the 45 ppm WAC for uranium as "clean." If the State of Ohio applies solid waste regulations to the C alternatives, then the C alternatives should be eliminated from further evaluation on the same basis that the B alternatives are eliminated.

Response: See response to Comment 26 (Section 5), which covers this same topic, and reflects resolutions discussed during February 8, 1995 conference.

Action: Added: "except for certain State of Ohio solid waste disposal facility siting requirements (e.g., location above a sole source aquifer)" on page 4-109, line 38. Deleted text from page 4-109, line 39 through page 4-110, line 23 and replaced with "An ARAR waiver (granted by U.S. EPA) to the State of Ohio's solid waste disposal siting prohibitions would be required. The State of Ohio has expressed an opinion that the basis for the waiver cannot be met without the incorporation of an engineered disposal facility for excavated soil that remains on site."

25. Commenting Organization: U.S. EPA Commentor: Saric
Sections #: 5.0 and 6.0 Page #: NA Line #: NA
Original General Comment #: 10
Comment: Generally, the detailed analysis of seven remedial alternatives presented in Section 5.0 and comparative analysis of these alternatives in Section 6.0 appear to be prepared in accordance with the U.S. EPA remedial investigation/feasibility study (RI/FS) guidance document; however, the assumptions used to estimate the risk budget and contingency percentages for each alternative are not explained. In addition, the rationale for applying the same risk budget and contingency percentages to both the construction cost and the operation and maintenance (O&M) cost is not clear because construction and O&M involve different risks. The text should be revised to provide the assumptions used to develop risk budgets and contingency percentages and the justification for applying the same percentages to both construction and O&M.
Response: Risk budget and contingency were determined for each remedial component by the method described in Appendix K. Remedial component costs were originally calculated based on assumed volumes or flow rates of contaminated media. Interpolation was used to calculate the remedial component cost for the estimated volumes or flow rates associated with the individual remedial alternatives. Risk budget and contingency costs are included in the remedial component costs which make up the remedial alternative costs. Risk budget and contingency cannot be calculated at the alternative level because remedial components often have different planning (operations) periods.
See response to Comment 32 for a full explanation of how risk budget and contingency is calculated. Considering the duration of some remedial activities and their magnitude of cost, certain elements of operations and maintenance (e.g., availability of chemical supplies, treatment media, and replacement parts) do have significant impact on overall costs, and require probabilistic analysis to address the uncertainties and risk associated with cost overruns.
Action: None required.

26. Commenting Organization: U.S. EPA Commentor: Saric
Section #: 5.0 Page #: NA Line #: NA
Original General Comment #: 9
Comment: Section 5.0 presents the detailed analysis of alternatives. The evaluation of the C alternatives may need to be eliminated if the State of Ohio applies its solid waste regulations to the contaminated soil to be disposed of in the consolidation area. The text should be changed to reflect the applicable State of Ohio regulations for solid waste.
Response: It is important to note that the C alternatives are basically "off-site shipment" alternatives, intended for comparison to the "on-site disposal" (A) alternatives, for a given land use objective. The soil left on site under the C alternatives consist only of what can be safely gathered and placed in a designated area without the need for any engineered barriers to protect either the aquifer or the representative receptor

(the trespasser) for the designated area. Any soil that does not meet these criteria require off-site shipment under the C alternatives. It should be noted that the maximum uranium WAC for the C alternatives (to allow placement without further engineered barriers) is 45 ppm, which is generally below the PRL for most of the representative receptors other than the residential farmer.

For the FS, the FEMP adopted a position for the development of the C alternatives that concluded: if the soil can be simply collected and placed in a designated area without the need for further engineered barriers to protect either the aquifer or the representative receptor, then they should not be construed as a solid waste. Under this position, placement of these materials in the designated area would not trigger the sole source aquifer solid waste disposal siting prohibitions or other solid waste management restrictions. If the State of Ohio does not concur with these interpretations, then to meet the intentions of the C alternatives, the soil slated for the designated area would also need to be shipped off site to maintain ARAR compliance. By virtue of this action, the C alternatives would generally transform into alternative 1 (i.e., their intentions would default to those of Land Use Objective 1, which requires off site shipment of all materials).

We agree that if the State of Ohio requires that all of the excavated soil be considered a solid waste, then the C alternatives cannot be construed as ARAR compliant. As discussed in the February 8, 1995 conference call, the two options for addressing the State's interpretation of the solid waste designation for the soil are:

1. Elimination of the C alternatives from further consideration on the basis that they are not ARAR compliant.
2. Stating that the C alternatives would also require an ARAR waiver (granted by U.S. EPA) to the State of Ohio's solid waste disposal siting prohibitions, and concluding through the analysis that the basis for the waiver is not justified unless an engineered facility is constructed.

Rather than continue the debate about whether the solid waste designation applies to the excavated soil that would remain on-site under the C alternatives, the FEMP agrees to incorporate the State of Ohio's interpretations into the FS and adopt the 2nd option indicated above. This option reflects the conclusions reached during the February 8, 1995 conference call. Preserving the C alternatives for evaluation affords reviewers an opportunity to evaluate the cost considerations associated with a full spectrum of options ranging from shipping everything (Alternative 1), keeping on-site those materials that can be safely managed without engineered barriers (the C alternatives) and the need to place all materials in an onsite engineered facility (the A Alternatives).

Action: Adopt Option 2 as discussed in the conference call. Revise ARAR compliance language in the Executive Summary, Sections 4, 5, 6, and the Proposed Plan to conclude that the C alternatives also require an ARAR waiver and that the State of Ohio has expressed an opinion that the basis for the waiver cannot be met without the incorporation of an engineered disposal facility for excavated soil that remains on site.

27. Commenting Organization: U.S. EPA Commentor: Saric
Section #: 5.3 Page #: 5-9 Line #: 16
Original Specific Comment #: 11
Comment: The text states that the five criteria are known as "primary balancing factors;" however, Figure 5-2 shows only four evaluation criteria as primary balancing factors. The figure should be revised to include the cost of alternatives as a primary balancing factor.

Response: Agree. The figure is in error.
Action: The figure will be revised to include the cost of alternatives as a primary balancing factor.

28. Commenting Organization: U.S. EPA Commentor: Saric
Section #: 5.4.2.1 Page #: 5-22 Line #: 15 to 17
Original Specific Comment #: 12
Comment: The text states that Table 5-6 shows the number of rail cars that would be required to support off-site disposal assuming a bulk density of 1.76 tons per cubic yard of excavated material. The calculations also assume 100 tons of excavated soil per rail car and 50 rail cars per train. The bulk density of 1.76 tons per cubic yard seems high for the excavated bulk soil. In addition, Appendix K, Page K-3-11, indicates that the number of shipments (rail cars) per scenario is based on an assumed density of 100 pounds per cubic feet (or 1.35 tons per cubic yard). This discrepancy should be corrected.
The text states that the calculations for the number of rail cars assume 100 tons of excavated soil per rail car; however, Appendix K, Page K-3-11, indicates that the net payload per rail car is 80 tons. This discrepancy should be clarified.
Finally, the number of rail cars (161,000) shown in Table 5-6 is incorrect based on 1.76 tons per cubic yard of excavated material and 100 tons of excavated soil per rail car. The correct number of rail cars should be 164,560 or about 165,000. The correct number of rail cars should be provided in all tables in Section 5.0 that present soil volumes for off-site disposal by rail transportation.
Response: An imprecise application of densities for in-situ (1.76 tons/cubic yard) and excavated (1.35 tons/cubic yard) soil has a source of confusion regarding the calculation of the quantity of rail cars needed to ship soil off site. The correct method for calculating the number of rail cars required is as follows:
1. Volume of contaminated soil (yd^3) x Density of in-situ soil (1.76 tons/yd^3) = Mass of contaminated soil (tons)
2. Mass of contaminated soil (tons) / 100 tons per rail car = Number of rail cars
3. 1.76 tons/yd^3 is the assumed density for in-situ soil.

Both Section 5.0 and Appendix K contain errors which will be corrected.
Action: For Tables 5-6, 5-9, 5-13, 5-17, 5-21, 5-25 and 5-29, corrected numbers have been inserted. Additionally, Table references to "Excavated Soil Volume" have been changed to read "Soil Volume Requiring Excavation" and references to "Remedial Action (soil volume in yd^3) have been changed to read "Remedial Action soil volume in yd^3)".
For the sake of clarity, text changes have been made as follows:
Page 5-22, line 10: "...estimated soil volume..." was changed to read "...estimated in situ soil volume...".
Page 5-22, line 16: "...cubic yard of excavated material." was changed to read "...cubic yard of in situ material." Also, "...100 tons of excavated soil..." was changed to read "...100 tons of soil...".
Page 5-82, line 13: "...estimated soil volume..." was changed to read "...estimated in situ soil volume...".
Page 5-82, line 15: "...quantity of this excavated soil..." was changed to read "...quantity of this soil..."
Page 5-84, line 20: "...per cubic yard of excavated material,..." was changed to read "...per cubic yard for in situ soil,..."
Page 5-114, line 30: "...provides the estimated soil..." was changed to read "...estimated in situ soil volumes..."
Page 5-116, line 1: "...quantity of this excavated soil..." was changed to read

"...estimated soil volumes..."
Page 5-143, line 7: "...estimated soil volumes..." was changed to read "...estimated in situ soil volumes..."
Page 5-143, line 9: "...quantity of this excavated soil..." was changed to read "...quantity of this soil..."

29. Commenting Organization: U.S. EPA Commentor: Saric
Section #: 5.4.2.2.4 Page #: 5-37 Line #: 19
Original Specific Comment #: 13
Comment: The text states that the quantity of soil containing RCRA hazardous PCB and petroleum wastes is estimated at 28,000 cubic yards. It is unclear whether Table 5-6 indicates this estimated quantity as excavated soil volume for off-site disposal. Table 5-6 should be revised to clarify this issue.
Response: It is intended that soil containing RCRA hazardous, PCB and petroleum wastes would be treated at the excavation site by a mobile treatment unit and then dispositioned according to its radiological content. Therefore, the portion of the estimated 28,000 yd^3 with contaminant concentrations exceeding the PRLs is included in the volume estimates in Table 5-6.
Action: None required.

30. Commenting Organization: U.S. EPA Commentor: Saric
Section #: 5.4.2.2.6 Page #: 5-47 Line #: 20
Original Specific Comment #: 14
Comment: The text states that between 3,300 and 844 trains per year would leave the FEMP site for the 1,900-mile trip to the commercial disposal facility under Cases 1 and 2, respectively. Table 5-6 presents 12 and 3 trains per month or 144 and 36 trains per year, respectively. This discrepancy in the number of trains leaving the FEMP site per year should be resolved.
Response: Agree; based on the method presented in response to Comment 28, the correct average number of trains leaving the site annually will range from 115 to 30 for Cases 1 and 2, respectively.
Action: Line 20 will be revised as follows, "period, an average of between 115 and 30 trains per year (consisting of a maximum of 50 cars each) would leave the FEMP."

31. Commenting Organization: U.S. EPA Commentor: Saric
Section #: 5.4.4.1.3 Page #: 5-88 Line #: 25 to 26
Original Specific Comment #: 15
Comment: Section 5.4.4.1.3 states that the consolidation area associated with Alternative 2C would cover a portion of the production area. Figure 5-9 indicates that the consolidation area for Alternative 2C barely impacts the production area. This inconsistency should be resolved.
Response: The Alternative 2C consolidation area would cover only a small portion of the northeast portion of the production area.
Action: Line 26 will be revised as follows, "consolidation area would extend to the southwest, covering only a small portion of the northeast corner of the production area."

32. Commenting Organization: U.S. EPA Commentor: Saric
Section #: 5.6.2.3 Pages #: 5-161 and 5-162 Line #: 7 to 15
Original Specific Comment #: 16
Comment: The text indicates that the design life of the disposal cell is 1,000 years, and under the hypothetical failure models evaluated through the Monte Carlo simulation, the cell should be reliable over the full 200- to 1,000-year performance period described in 40 CFR 192. The text also states that the performance assessment provides a reasonable level of assurance that the on-property disposal cell will cause negligible impact to the GMA within the first 200 years. The text should provide more information on the Monte Carlo simulation, including the procedures used and assumptions made to run the simulation. In addition, the text should be revised to provide a quantitative confidence level, if possible, rather than the phrase "a reasonable level of assurance."
Response: The discussion contained in Section 5.6.2.3 was intended solely to highlight the findings of the performance assessment, not provide the quantitative details. The details of the assessment are contained in Appendix F.
Action: The sentence beginning on line 21 of page 5-161 will be rewritten as follows: The quantitative details of the performance assessment including procedures, assumptions, and results are presented in Appendix F.

33. Commenting Organization: U.S. EPA Commentor: P. VanLeeuwen
Section #: 6 Pg.#: 6-6 Line#: 1st bullet Code:
Original Comment #: 7
Comment: What does this mean - if a lower residual risk is selected, there is no need to cleanup off-property land? I thought that some of this land included property that was used as cropland. If so, the opportunity for exposure is great. What restrictions can be placed on off-property areas, to restrict residential or farmland as uses? Can we/should we leave off-property areas with this level of contamination? This bullet opens the door for lots of discussion.
Response: Actually, the *higher* the permissible residual risk level selected, the less there is a need to clean up off-property land, since the remedial action area footprints become smaller with higher cleanup levels. Recognizing that regulatory decisionmakers face a choice in selecting appropriate residual risk levels for the site that must consider a number of site-specific factors, the bulleted discussions provided on this page were simply pointing out some of the considerations that decisionmakers need to factor into their deliberations, if they are contemplating selection of a cleanup level at the lower end of the risk range (i.e., selecting 10^{-6} risk values) as the desired goal. The FS recognizes that land use restrictions generally cannot be placed on off-property areas; for these areas, EPA decisionmakers and other stakeholders participating in the decision will thus need to select a risk level that reflects current land use (represented by the residential farmer receptor). The risk level for this receptor will need to be selected from among the NCP's choices available, considering other restrictions (10^{-4} to 10^{-6} risk range for carcinogenic risk; HI=1 threshold for noncarcinogenic risk; and ARAR compliance). Similar risk-based information has been provided to the Citizens Task Force who is also contemplating the setting of appropriate residual risk levels for the site.
Action: No action necessary.

34. Commenting Organization: U.S. EPA Commentor: Saric
Section #: 6.4 Page #: 6-11 Line #: NA
Original Specific Comment #: 17
Comment: Table 6-2 presents a comparative analysis of remedial alternatives and evaluation criteria. Under the evaluation criteria of "Overall Protection of Human Health and Environment" for Alternative 3A, the table indicates that the alternative is protective of the hypothetical on-property farmer for portions of FEMP and of the trespasser for the disposal area. According to Section 5.0, however, target receptors for Alterative 3A include an expanded trespasser in the disposal area and an industrial or recreational user for on-property areas outside the disposal area. This discrepancy should be resolved and also applies to Alternative 3C in Table 6-2.
Response: We agree; there was an error in the table. The Land Use Objective 3 family of alternatives referenced in the table (3A and 3C) should have referenced the industrial and recreational receptors in Column 2, rather than the on-property farmer. The industrial and recreational receptors are the correct receptors for Land Use Objective 3, and the on-property farmer applies to Land Use Objectives 1 and 2.
Action: Correct the discrepancies in Table 6-2.

35. Commenting Organization: U.S. EPA Commentor: Saric
Section #: 6.4.2.2 Page #: 6-22 Line #: 38
Original Specific Comment #: 18
Comment: The text states that soil washing is a promising technology for addressing contaminated soil; however, the technology is limited in its application at FEMP because of site-related constraints such as the presence of the sole-source aquifer beneath all potential treated soil backfill areas. It is not clear why this technology has limited application at the FEMP site or what the site-related constraints are. The text should explain in more detail why soil washing has been screened out as a primary remediation technology.
Response: Agree. See Comment 13 for a full explanation.
Action: The text will be revised beginning with, "Soil washing is a promising technology . . . waste technology . . . waste acceptance criteria for the engineered disposal cells."; line 36, page 6-22 through line 3, page 6-23.
The text identified above will be replaced with the following: The soil washing process evaluated in the FS is a hybrid system which uses both sodium carbonate and dilute sulfuric acid extractants coupled with physical separation operations at the front end of the system (refer to Appendix L for details). Treatability data, from bench- and pilot-scale results, indicated that the process was unsuccessful in consistently meeting the proposed mass-based cleanup levels required (2 to 45 ppm total uranium, depending on the leachability coefficient). More importantly, the results indicated a lack of effectiveness in reducing uranium mobility in treated soil and providing the required level of protectiveness to the Great Miami Aquifer. As a result, the physical/chemical hybrid soil washing process was eliminated from consideration as the leading remedial alternative for soil remediation.
Physical separation technology, coupling innovative physical separation techniques with conventional size fractionation operations and chemical amendments for reducing uranium mobility, is currently being evaluated for potential applications at the FEMP.

36. Commenting Organization: U.S. EPA Commentor: Saric
Section #: 7.0 Page #: NA Line #: NA
Original General Comment #: 11
Comment: This section should be revised to address all relevant comments provided by U.S. EPA for the Comprehensive Response Action Risk Evaluation (CRARE).
Response: Agree; revisions pending to Appendix H.
Action: Section 7.0 will be revised to match the new Appendix H text.

37. Commenting Organization: U.S. EPA Commentor: Saric
Section #: 7.1.5 Page #: 7-10 Line #: 25 to 33
Original Specific Comment #: 19
Comment: The text discusses deterioration of the caps over the on-site cell and the associated exposure pathways and states that these impacts would likely be insignificant based on the results of the CRARE. The CRARE states that the on-site cell caps are designed and assumed to last up to 1,000 years, the end of the CRARE time frame. The text should be revised to include this assumption and state that the CRARE does not consider scenarios associated with cap deterioration.
Response: Revision pending
Action: See response to Comment #36 above.

38. Commenting Organization: U.S. EPA Commentor: Saric
Section #: 7.1.5 Page #: 7-10 Line #: 32 and 33
Original Specific Comment #: 20
Comment: The text states that the CRARE is summarized in Section 7.4; however, the text does not include a Section 7.4. The CRARE is summarized in Section 7.2. The text should be revised accordingly.
Response: Agree
Action: Text will be revised to reference the appropriate subsection of Section 7.0.

39. Commenting Organization: U.S. EPA Commentor: Saric
Section #: B Page #: B.1-20 and B.3-25 Line #: NA
Original Specific Comment #: 21
Comment: Appendix B presents ARARS and TBCs for Operable Unit 5. On Page B.1-20, the PCB spill policy is identified as a TBC. On Page B.3-25, the PCB spill policy is identified as a relevant and appropriate ARAR. The PCB spill policy is not promulgated and therefore is not an ARAR. This discrepancy should be resolved.
Response: Agree, there is a contradiction between the two references to PCBs in the Appendix B tables regarding the status of this policy as a TBC or as an ARAR. The first reference to PCBs on page B.1-20 in the Chemical-Specific Table is generally correct. The second reference to PCBs on page B.3-25 in the Action-Specific Table as a relevant and appropriate requirement is incorrect.
Action: The second reference in the Action-Specific Table, page B.3-25, for PCBs will be deleted because this policy should not be duplicated in the ARAR/TBC Tables of Appendix B. This policy is preferentially included in Table B.1, "Operable Unit 5 Potential Chemical-Specific Requirements.
An additional phrase will be added to the end of the Remarks column of the PCB Spill Cleanup Policy on page B.1-20 to include, "...and will be considered relative to Operable Unit 5 PRLs for soil containing PCBs as CERCLA wastes, per the NCP."

40. Commenting Organization: U.S. EPA Commentor: Saric
Section #: B.4.1 Page #: B-4-4 Line #: 31
Original Specific Comment #: 22
Comment: Section B.4.1 discusses corrective action management unit (CAMU) rule requirements. Figure B.4-1 is referenced in the text but is not provided. Figure B.4-1 should be added to Section B.4.1.
Response: Agree, due to an oversight during compilation of the document, this figure was not included.
Action: This figure will be incorporated into the next submittal of the Operable Unit 5 Feasibility Study.

41. Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.2.1 Page #: C-2-1 Line #: 14 and 15
Original Specific Comment #: 23
Comment: These lines attempt to define a hazard quotient (HQ); however, the denominator of the ratio, specifically the reference dose (RfD), is not included in the definition. The lines should be changed to the following or a similar phrasing: "The HQs are ratios of a single COC exposure level developed over a specified time period to a RfD developed over a similar exposure period."
Response: Agree, the definition of a hazard quotient is not clearly stated.
Action: Lines 14 and 15 will be changed to read "The HQs are ratios of a single COC exposure level developed over a specified time period to a RfD developed over a similar time period."

42. Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.2.2 Page #: C-2-5 Line #: 32
Original Specific Comment #: 24
Comment: This line presents Equation C.2-2, which is used to calculate air concentrations. The units of the term "air concentration" are presented as picoCurie/gram (Pci/g). These units are incorrect. The line should be revised to present the units of the term "air concentration" as Pci per cubic meter (Pci/m^3).
Response: Agree.
Action: The units for air concentration will be changed to Pci/m^3.

43. Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.2.2 Page #: C-2-6 Line #: 18
Original Specific Comment #: 25
Comment: This line presents the unit risk for ingestion of meat as 6.8×10^{-8} $(Pci/g)^{-1}$. This value is incorrect. Section C.3.3.3, Equation C.3-72, Page C-3-26, Line 19, shows the correct value of 6.8×10^{-9} $(Pci/g)^{-1}$. Line 18 on page C-2-6 should be revised to present the correct unit risk.
Response: Agree, a typographical error was made on the exponent.
Action: The value on line 18 will be changed from 6.8×10^{-8} to 6.8×10^{-9}.

44. Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.2.4 Page #: C-2-9 Line #: 1 to 3
Original Specific Comment #: 26
Comment: These lines state that the risk-based PRG for surface water exposure was calculated based on exposure to the expanded trespasser through incidental ingestion of surface water. This statement does not support why potential exposure to surface water through dermal contact is not also considered. Lines 1 to 3 should be revised to

either justify the exclusion of potential exposure to surface water through dermal contact or the PRG for surface water should be recalculated.

Response: Disagree. The example PRG being calculated in the text is U-238. Because radionuclides are not readily absorbed dermally, dermal contact is not evaluated as a potential exposure pathway. However, this pathway is included in the calculation of surface water PRGs for chemicals and text will be added to clarify why this pathway was not considered for U-238.

Action: The following sentence will be added after the UR value on line 5: "For most metals and hence, most radionuclides in Operable Unit 5, dermal absorption is not a significant pathway because penetration through the skin is minimal. Therefore, the dermal contact pathway is not included in the calculation of the PRG for U-238."

45. Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.2.4 Page #: C-2-9 Line #: NA
Original Specific Comment #: 27

Comment: Equation C.2-6 presents the surface water PRG for uranium 238 (U238) based on an incidental ingestion value of 2.3×10^{-3} pCi per liter (pCi/L); however, performing the calculation presented gives a result of $2.3 \times 10^{+3}$ pCi/L, which is the PRG presented in Table C.2-9. Equation C.2-6 should be revised to present the correct value.

Response: Agree, the exponent has a typographical error.

Action: The PRG value calculated in equation C.2-6 will be changed to 2.3×10^{3}. This will have no impact on the PRGs presented in Table C.2-9.

46. Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.2.6 Page #: C-2-10 Line #: NA
Original Specific Comment #: 28

Comment: Equation C.2-7 presents the surface water PRG for U238 based on ingestion of meat and milk products as 1.8×10^{-2} pCi/L; however, performing the calculation presented gives a result of $1.8 \times 10^{+2}$ pCi/L, which is the PRG presented in Table C.2-10. Equation C.2-7 should be revised to present the correct value. Equation C.2-9 presents the calculation of the sediment PRG for U238 based on incidental ingestion and external exposure. This equation contains several errors. The unit risk (UR) for sediment pathways for U238 as shown in Line 29 on Page C-2-10 is 1.3×10^{-9} pCi/L. If equation C.2-9 is performed using this UR value, the calculated PRG should be $7.7 \times 10^{+2}$ pCi/L. This value differs from the value of 2.7 x 10+2 pCi/L presented in Table C.2-12. The other PRGs presented in Table C.2-12 are suspect. Equation C.2-9 should be revised to correctly present the calculation of the sediment PRG for U238. Also, the PRGs in Table C.2-12 should be reviewed and corrected as necessary.

Response: Agree, the exponent in equation C.2-7 has a typographical error.
The Unit Risk values presented in lines 26 to 29 are incorrect. Therefore, equation C.2-9 has the wrong value in its denominator.

Action: The value calculated in equation C.2-7 will be changed from 1.8×10^{-2} to 1.8×10^{2}. The unit risks presented in lines 26 and 27 will be changed to 8.0×10^{-11} and 3.6×10^{-9}, respectively, yielding a sum of 3.6×10^{-9} in line 29. The denominator in equation C.2-9 will be replaced with 3.6×10^{-9} to yield a result of 2.7×10^{2}. This value is consistent with the PRG reported in Table C.2-12.

47. Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.0 Pg. #: NA Line #: NA
Original General Comment #: 12
Comment: Section C.3.0 presents numerous equations for which terms are defined. As part of the definitions, the units for each of the terms are presented. Some of the terms have different units, depending on whether radionuclides or chemicals are being considered. In order to present the information clearly, Section C.3.0 should be revised to specify which units are associated with radionuclides and which are associated with chemicals. For example, the units for intake are routinely presented as "picoCuries (pCi) milligram per kilogram per day (mg/kg-d)." This presentation could be clarified as "(pCi, radionuclides) (mg/kg-d, chemicals)."
Response: Agree.
Action: Section C.3.0 will be closely reviewed and units will be clarified as radionuclides or chemicals where appropriate.

48. Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.0 Page #: NA Line #: NA
Original General Comment #: 13
Comment: Section C.3.0 includes many example calculations. Frequently, the exponents of unit risks (UR) and intakes are incorrectly presented as negative rather than positive values. For example, the intake of uranium 238 through ingestion of contaminated fruits and vegetables is incorrectly presented as 7.31×10^{-5} pCi rather than as 7.31×10^{5} pCi. Section C.3.0 should be closely reviewed and calculations checked and corrected as necessary.
Response: Agree, typographical errors were found in the exponents of several values.
Action: The intake calculated in equation C.3-13 will be changed to 7.31×10^{5}. Also Section C.3.0 will be reviewed for mistakes and corrections will be made if errors are discovered.

49. Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.1 Page #: C-3-1 Line #: 9 to 11
Original Specific Comment #: 29
Comment: These lines describe the location of the exposure parameters used to calculate unit risks and states that "...with the exception of those for the expanded trespasser, are listed in Tables A.3-21 to A.3-22 of the FEMP Operable Unit 5 Remedial Investigation." Several points regarding this statement need clarification. First, no Table A.3-21 is presented in the Operable Unit 5 RI. Lines 9 to 11 should therefore be revised to refer to Tables A.3-21a and A.3-21b. Second, Table A.3-22 is repeated in Appendix C as Table C.3-2. Also, Lines 9 to 11 should be revised to refer to Table C.3-2. Finally, Lines 9 to 11 do not explain where the exposure parameters for the expanded trespasser are located. The lines should be revised to provide this information.
Response: Agree, the correct parameter tables should be referenced. In addition, the exposure parameters are found in Appendix H.III of the Operable Unit 5 FS and therefore the RI need not be referenced.
Action: Lines 9 to 11 will be changed to read: "All exposure parameters are listed in Tables H.III-8A and H.III-8B.

50. Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.1 Page #: C-3-1 Line #: 16
Original Specific Comment #: 30
Comment: This line refers to "PRG calculations for the expanded trespasser." Line 16 should be revised to instead refer to "PRG calculations for multiple age group receptors."
Response: Agree.
Action: Line 16 will be revised to read: "PRG calculations for multiple age group receptors."

51. Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.1.1 Page #: C-3-2 Line #: 3
Original Specific Comment #: 31
Comment: This line presents the units for the concentration of chemicals in air as cubic meters (m^3)/hour. These units are incorrect; Line 3 should be revised to present the correct units as milligrams per cubic meter (mg/m^3).
Response: Agree.
Action: The units for the concentration of air on line 3 will be changed to (mg/m^3).

52. Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.1.2 Page #: C-3-3 Line #: 21
Original Specific Comment #: 32
Comment: Equation C.3-6 presents the calculation for determining the concentration of a contaminant in or on vegetables and fruits. As presented (including parameter definitions), the equation is incomplete because it does not include a term for the concentration in air of the contaminant. Section C.3.1.2 should be revised to modify Equation C.3-6 to include a term for the concentration of the contaminant in air.
Response: Disagree. The "d_d" represents the equation term where the concentration of the contaminant in air comes into the equation. The derivation of this term is presented in equation C.3-9 as the multiplication of the air concentration and the deposition rate.
Action: None.

53. Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.1.2 Page #: C-3-5 Line #: 10 and 11
Original Specific Comment #: 33
Comment: These lines present Equations C.3-11 and C.3-12 for calculating the intake of radionuclides and chemicals from the ingestion of vegetables and fruits. These equations should be revised to include the term "FT," which is defined as the fraction of a year homegrown produce is consumed (see Equations 7-15 and 7-16 of the FEMP Risk Assessment Work Plan Addendum).
Response: Comment noted. Equations 7-15 and 7-16 of the FEMP Risk Assessment Work Plan Addendum present an "FI" term defined as "the fraction ingested from contaminated source." In equations C.3-11 and C.3-12, the "FT" term or "fraction of a year homegrown produce is consumed" is already included in the "FI" term presented in the text.
Action: None.

54. Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.1.2 Page #: C-3-5 Line #: 4, 25, and 33
Original Specific Comment #: 34
Comment: These three lines present the concentration of U238 in vegetables as 0.497, 0.492, and 0.489 pCi/g, respectively. These lines should be revised to consistently present the concentration of U238 in vegetables.
Response: Agree; the correct value is 0.490.
Action: The values presented in lines 4, 25, and 33 will be changed to 0.490 pCi/g.

55. Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.1.2 Page #: C-3-5 Line #: 34 and 39
Original Specific Comment #: 35
Comment: These lines present the intake of U238 from vegetation as 7.31×10^{5} and 7.43×10^{-5} pCi, respectively. The correct value calculated using Equation C.3-13 is $7.31 \times 10^{+5}$ pCi. These lines should be revised to consistently and correctly present the intake of U238 from vegetation.
Response: Agree.
Action: The correct value 7.31×10^{5} will replace the values in lines 34 and 39.

56. Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.1.2 Page #: C-3-6 Line #: 16
Original Specific Comment #: 36
Comment: Equation C.3-15 presents the intake of U238 from vegetation as 7.308×10^{-5} pCi. As described in the previous comment, the correct intake value is $7.31 \times 10^{+5}$ pCi. Line 16 should be revised to correctly present the value for intake of U238 from vegetation.
Response: Agree.
Action: The intake value presented in line 16 will be changed from 7.308×10^{-5} to 7.31×10^{5}.

57. Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.2 Page #: C-3-11 Line #: NA
Original Specific Comment #: 37
Comment: This section discusses the calculation of PRGs for groundwater exposures. Possibly because the section uses U238 as the example contaminant, the exposure pathways discussed in the section do not include dermal contact and inhalation; however, as stated in Section C.2.3, the PRGs for chemicals are calculated to include these additional exposure pathways. Section C.3.2 should be revised to clarify that PRGs for chemicals in groundwater are calculated based on exposure pathways, including the full range of residential exposure pathways as discussed in Section C.2.3.
Response: Disagree, the text states "pathways of concern for U-238" and dermal contact is consider an insignificant exposure pathway for radionuclides because penetration of U-238 through the skin is minimal. However, to clarify the approach for the reader, text will be added explaining that dermal contact would be included in the calculation of chemicals.
Action: The following sentences will be added on line 37 after "ingestion of meat and milk products.": "In addition to these exposure pathways, intake from dermal contact while bathing would be included in the calculation of PRGs for chemicals. However, for most metals and hence, most radionuclides in Operable Unit 5, dermal absorption is not a significant pathway because penetration through the skin is minimal. Therefore, the dermal contact pathway is not included in the calculation of the PRG for U-238."

58. Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.2.1 Page #: C-3-12 Line #: 9 and 11
Original Specific Comment #: 38
Comment: These lines present Equations C.3-32 and C.3-33, which are used to calculate intakes through ingestion of drinking water. As presented, these equations include the term "FI," which is defined as the fraction ingested from the source. The term "FI" is not included in Equations 7-3 and 7-4 of the FEMP Risk Assessment Work Plan Addendum, which are the basis of Equations C.3-32 and C.3-33. Furthermore, Tables A.3-21a and A.3-21b, which are the source of the exposure parameter values used in Appendix C, do not include values for the term "FI." Equations C.3-32 and C.3-33 should therefore be revised to eliminate the term "FI."
Response: Agree.
Action: The "FI" term will be removed from equations C.3-32 and C.3-33 and from the list of equation terms.

59. Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.2.3 Page #: C-3-15 Line #: 37
Original Specific Comment #: 39
Comment: This line presents the units for the concentration of radionuclides in milk as pCi per milliliter (pCi/mL); however, an analysis of the units reported for the remaining parameters in Equation C.3-42 indicates that the units of the concentration of a radionuclide in milk should be pCi/L. Line 37 should be revised to correctly present the units for this parameter.
Response: Agree.
Action: The units for radionuclides in milk on line 37 will be changed to pCi/L.

60. Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.2.3 Page #: C-3-16 Line #: NA
Original Specific Comment #: 40
Comment: Equation C.3-43 is used to calculate the concentration of contaminants in plants as the result of irrigation with contaminated water. The equation as written is incomplete because it does not include a term for the concentration of the contaminant in water. Equation C.3-43 should be revised to incorporate a term for the concentration of the contaminant in water.
Response: Disagree. The concentration of the contaminant in water is contained in the d_w term, which is defined in line 1 on page C-3-17.
Action: None.

61. Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.2.3 Page #: C-3-17 Line #: 5
Original Specific Comment #: 41
Comment: Line 5 refers to the "reproductive" portions of feed plants; however, the value presented in this line for the parameter $B_{iv(1)}$, defined as the dry soil to wet plant partitioning coefficient, corresponds to the "vegetative" portions of plants. Line 5 should be revised to refer to the "vegetative" portion of plants.
Response: Agree this terminology is misleading.
Action: "The reproductive portion of" was deleted from the text.

62. Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.3.3 Page #: C-3-25 Line #: 6
Original Specific Comment #: 42
Comment: Line 6 presents the concentration of U238 in meat as 0.85 x 10^{-4} pCi/g. This value is incorrect. The correct value calculated using Equation C.3-67 and as reported in Line 28 on this page is 1.85 x 10^{-4} pCi/g. Line 6 should be revised to present the correct value.
Response: Agree, a typographical error was made in the result.
Action: The correct value, 1.85 x 10^{-4}, will be entered into equation C.3-67. This will not effect the PRGs.

63. Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.5.2 Page #: C-3-32 Line #: 14
Original Specific Comment #: 43
Comment: Line 14 states that each additional pCi/g of U238 in sediment increases the source strength by 41.5 picocurie-year per gram-life (pCi-y/g-life). Equation C.3-90 (using a slope factor for U238; see Table C.4-3) indicates that the increase in source strength for each additional pCi/g is 7.1 x 10^{-2} pCi-y/g-life. Line 14 should be revised to present the correct source strength value.
Response: Agree.
Action: The value presented in line 14 will be replaced with the correct value, 7.12 x 10^{-2}.

64. Commenting Organization: U.S. EPA Commentor: P. VanLeeuwen
Section #: C.4 Pg.#: C-4-7 Line#: 1-2 Code:
Original Comment #: 8
Comment: Actually, EPA (1989a) indicates that 0.05 is a reasonable default <u>in the absence of appropriate information</u>. For many metals, GI absorption values can be derived from the literature.
Response: Comment note. The text may be misleading. It was not intended that a GI absorption factor of 0.05 be used for all metals. Chemical specific absorption factors were used in the calculations when available in the literature. For example a GI absorption factor of 0.001 is used for arsenic.
Action: The following text will be added at the end of line 2. ".... when an appropriate value is not available in the literature."

65. Commenting Organization: U.S. EPA Commentor: P. VanLeeuwen
Section #: C.4 Pg.#: C-4-8 Line#: 2nd para. Code:
Original Comment #: 9
Comment: The approach for PAHs is the Relative Potency Factor (RPF) approach, not the TEF approach. An earlier approach used for PAHs was termed the TEF approach, but I do not believe that is what is referred to here.
Response: Agree. The RPF approach was used for quantifying carcinogenicity of PAHs.
Action: Line 4 on page C-4-9 will be changed to read "The Relative Potency Factor (RPF) approach was used.... Operable Unit 5." The remaining TEF's in the same paragraph will be changed to RPF's.

66. Commenting Organization: U.S. EPA Commentor: P. VanLeeuwen
Section #: C.4 Pg.#: C-4-10 Line#: last para. Code:
Original Comment #: 10
Comment: It is interesting that FERMCO believes that the arsenic oral risk value is less uncertain than for most carcinogens. Most contractors believe that the value is very uncertain. ECAO presently stands behind using the values stated, without modification.
Response: Comment Acknowledged.
Action: The sentence beginning on line 31, "EPA has noted...order of magnitude (EPA 1994b)" will be deleted.

67. Commenting Organization: U.S. EPA Commentor: P. VanLeeuwen
Section #: C.4 Pg.#: C-4-11/12 Line#: Code:
Original Comment #: 11
Comment: I'm not certain that I follow the magnesium discussion regarding Phillips Milk of Magnesia. The therapeutic treatment is limited, as described in the dosing, to 2 weeks. The RfD is calculated as a chronic exposure - more than 7 years by EPA definition. The 2 week exposure mat not result in any adverse exposure, while the 7 year exposure may have significant impact. The discussion should be revised to address the issue of a chronic exposure versus a very short term exposure.
Response: As per discussions between Operable Unit 5 Management and EPA Region V on February 22 and 23, 1995, magnesium is no longer a Constituent of Concern (COC).
Action: All references to magnesium have been eliminated from the text and risk calculations in the Operable Unit 5 FS and appendices.

68. Commenting Organization: U.S. EPA Commentor: Saric
Section #: D Page #: NA Line #: NA
Original General Comment #: 14
Comment: The soil washing treatability studies conducted by IT Corporation and the Fernald Environmental Restoration Management Corporation (FERMCO) show that minimum contaminant removal of 90 percent can be achieved using a physical and chemical separation process. The chemical separation process uses a carbonate-based reagent as a primary extractant followed by a sulfuric acid-based reagent. No discussion of cost and the sensitivity of the cost to the volume of soil treated is presented. This discussion should be provided to determine the economic viability of soil washing in the mix of alternatives discussed in the Operable Unit 5 FS.
Response: The design of the treatability study as outlined in the Treatability Study Work Plan for Operable Unit 5: Soil Washing (DOE 1992) did not propose the "discussion of cost and the sensitivity of the cost to the volume of the soil treated." Discussions of the costs of applying the soil washing process are more appropriately contained in Appendix M, which is "Screening and Evaluation of Technologies and Process Options." The sensitivity of costs to soil volumes is addressed in Appendix K.
Action: No discussion of cost sensitivity will be included in Appendix D. Supplement Appendix M text to discuss the costs associated with implementing soil washing. See Comment 13.

69. Commenting Organization: U.S. EPA Commentor: Saric
Section #: E.5.0 Page #: E-5-1 Line #: 19 to 22
Original Specific Comment #: 44
Comment: The text states that the commercial disposal facility's radioactive material license, granted by the Utah Department of Environmental Quality, establishes maximum

average concentrations of individual isotopes permissible in the waste disposed. The maximum concentrations permissible should be included in the document, and the impact these may have on the disposal of Operable Unit 5 soil, sediment, and treatment residuals at the facility should be evaluated.

Response: Agree

Action: A table (E.5-1) will be added to Appendix E listing the radionuclide constituents of concern, their maximum detected levels and the maximum average concentrations permissible in waste disposed at the permitted commercial facility.

The following text will be added to evaluate the impact of the maximum average permissible concentrations:

Table E.5-1 lists the radionuclide constituents of concern at the FEMP, their maximum detected levels and the maximum average concentrations permissible in waste disposed of at the permitted commercial facility. Of all the listed radionuclide constituents of concern in Table E.5.1, only three would not meet the WAC for the permitted commercial facility. Protactinium-231 is not a listed permissible waste and both radium-236's and uranium-235's maximum detected levels are above the maximum average concentrations allowable for the permitted commercial facility.

70. Commenting Organization: U.S. EPA Commentor: Saric
Section #: E.6.0 Page #: E-6-2 and E-6-3 Line #: NA
Original General Comment #: 15

Comment: Table E.6-1 provides specific waste acceptance requirements for the Nevada Test Site and the representative permitted commercial facility. For bulk requirements, the table states that mixed waste must be packaged to be accepted at the Nevada Test Site. For marking requirements, the table states that mixed waste packages of 110 gallons or less shall be marked in accordance with 49 Code of Federal Regulations (CFR) 262.32(b); however, Table 3-8 and Section M.5.7.2 state that the Nevada Test Site will not accept mixed waste. This discrepancy should be resolved and the text revised accordingly.

Response: Agree. Although the published NTS procedures for waste acceptance reflects the anticipation of approval of their pending permit for acceptance of mixed waste, the NTS is not (at present) approved to accept mixed waste.

Action: References to mixed waste acceptance will be deleted from Table E.6-1.

71. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.1 Page #: NA Line #: NA
Original General Comment #: 19

Comment: It is not clear how the concept of source depletion through remediation or natural processes affects the retardation factor. The Operable Unit 5 RI Report states that once the contaminant concentration of the passing plume begins to decrease, adsorption stops and desorption becomes dominant. This statement implies that in most cases, contaminated subsurface soils are desorbing contaminants to the water percolating through the vadose zone. This conclusion in turn implies that at any point in time, contaminant concentrations at the bottom of Layer 2 should be higher than concentrations at the bottom of Layer 1. It is not clear, however, whether the ODAST/SWIFTLOAD model output will reflect this situation. The effects of contaminant desorption during vertical transport modeling should be further discussed.

Response: After source remediation, contaminated subsurface soil will desorb contaminants to the water percolating through the vadose zone at a relatively slower rate (i.e., with higher K_d values). However, this does not imply that contaminant concentrations at the bottom of model Layer 2 (i.e., unsaturated sand and gravel) should always be

higher than concentrations at the bottom of model Layer 1 (i.e., gray clay). Before most of the leachable contaminants in Layer 1 are desorbed, Layer 1 will still have higher concentrations than Layer 2.

Theoretically, higher K_d values can be used to simulate the contaminant desorption process in the subsurface soil after the source remediation. The higher K_d values mean that more contaminant mass will remain adsorbed to soil and not dissolve into the liquid phase and impact the groundwater. However, in order to be conservative for CPRG development and determination of residual impacts, the same low K_d value was used throughout the modeling for both adsorption and desorption processes. In general, the contaminant retardation factor in soil remains the same when the same K_d value is used before or after the source remediation.

Action: The following sentences will be added in Section F.1.5.4, page F-1-19, line 11:

"Theoretically, higher K_d values can be used to simulate the contaminant desorption process in the subsurface soil after the source remediation. The higher K_d values mean that more contaminant mass will remain adsorbed to soil and not dissolve into the liquid phase and impact the groundwater. However, in order to be conservative for CPRG development and determination of residual impacts, the same low K_d value was used throughout the modeling for both adsorption and desorption processes. In general, the contaminant retardation factor in soil remains the same when the same K_d value is used before or after the source remediation."

72. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.1 Page #: NA Line #: NA
Original General Comment #: 18

Comment: The FS uses a source area size of 125 by 125 feet for CPRG development. A source area this large may not be adequate in areas where very high levels of contamination occur (such as production area soil). Justification for using this source area size for CPRG development in the production area should be provided.

Response: Impacts to the groundwater from a larger area are more significant than from a smaller area given the same soil contaminant concentration. Therefore, for CPRG development purposes, a smaller source area size will result in a higher CPRG (i.e., less conservative). It is conservative to use a 125 by 125 foot areal size as the basis for CPRG development. As stated in the comment, most of the hot spots in the former production area are expected to be in smaller areal sizes.

Action: The following sentences will be added in Section F.3, page F-3-9, line 21:

"Impacts to groundwater from a larger area are more significant than from a smaller area, given the same soil contaminant concentration. Therefore, for CPRG development purposes, a smaller source area size will result in a higher (i.e., less conservative) CPRG. It is conservative to use a 125 by 125 foot areal size as the basis for CPRG development. Most of the hot spots in the former production area are expected to be of similar or smaller areal size."

73. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.1 Page #: NA Line #: NA
Original General Comment #: 17

Comment: The development of remedial actions for surface water is based on the assumption that all perched groundwater will be remediated and will not act as a source of surface water contamination. Unless the entire site is covered with an impermeable cap, the post-remediation development of contaminated perched water units having a lateral flow component cannot be ruled out as a source of surface water contamination. It is also likely that some contaminated perched water units have not

been identified and therefore will not be remediated. These scenarios regarding future surface water contamination through the perched groundwater pathway should either be evaluated or their exclusion should be more fully justified.

Response: Contaminated perched groundwater was considered as one of two sources of contamination in the surface water exposure pathway; the other was contaminated surface soil, as shown in Figure F.1-5. Potential impacts from residual soil contamination through lateral perched groundwater migration to the surface water was considered during the soil CPRG development process described in Section F.3 (page F-3-3, line 11 to 29). Remediation of existing perched groundwater contamination was described in Section F.6. Section F.4 considered the impacts from contaminated surface soil to surface water bodies. Therefore, both sources of future surface water contamination were considered in the Operable Unit 5 FS Report.

Soil and perched groundwater remediation will reduce future impacts to surface water through migration of perched groundwater. Preliminary soil remediation goals and the extent of perched groundwater zone excavation (Sections F.3 and F.6) were also developed to ensure that future perched groundwater impacts to surface water will be at acceptable levels. As a result, the soil and perched groundwater zone remediation summarized in Section 2.0 of the FS Report will also protect the surface water.

Given the proposed extent of excavation in the perched groundwater zone described in Section F.6, it is unlikely that any significant contaminated perched groundwater unit will remain unidentified and unremediated. It is also important to point out that as long as the sources of perched groundwater contamination are remediated, it is not necessary to stop all the future lateral perched groundwater flow.

Action: None required.

74. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.1 Page #: NA Line #: NA
Original General Comment #: 16

Comment: The text in Section F.1.3 indicates that current and future residual contamination to be evaluated in the Operable Unit 5 FS Report does not include Operable Unit 3 soil or perched groundwater. It is not clear how and when these media will be addressed because the Operable Unit 3 RI Report only deals with contamination associated with production area structures and not with environmental media. The introductory sections of Appendix F should be revised to clearly indicate how and when contaminated Operable Unit 3 subsurface environmental media will be addressed.

Response: Section F.1.3 states that the Operable Unit 5 FS Report will address the surface and subsurface soil in the former production area (page F-1-3, line 22) and all perched groundwater, including Operable Units 1, 2, and 4 areas (page F-1-3, line 27). Operable Unit 3 does not address any soil or perched groundwater. The entire subsurface environment below the former production area is addressed in the Operable Unit 5 RI and FS Reports.

Action: None required.

75. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.1.4 Page #: F-1-5 Line #: 14 to 23
Original Specific Comment #: 45

Comment: The text in this passage states that protective requirements in air and surface water pathways are not used to develop CPRGs because the contaminant sources in these pathways consist of contaminated residual surface soil; however, radon emanation

from contaminated soil and other areas can be a significant source of air contamination, and sediments exposed in the SSOD and Paddys Run during the dry seasons may also significantly contribute to air emissions. Also, the sources of surface water contamination consist of other surface water bodies draining into local streams, contaminated perched groundwater discharging to Paddys Run, and contaminated Great Miami Aquifer groundwater discharging to the Great Miami River. The text should clearly indicate whether these sources have been considered in the development of CPRGs. If they have not been considered, their omission should be justified.

Response: In general, only soil-protective requirements in the groundwater pathway (including the perched groundwater pathway) were considered to develop the initial CPRGs as describe in Section F.3. All the protective requirements in air and surface water pathways were then developed (Section F.4) and applied in the refinement process of each remedial alternative, as shown in Figure F.1-4. This approach is explained in lines 15 to 23 on page F-1-5.

Radon emissions from soil contaminated with radium are identified and discussed on pages F-4-4, F-4-6, and F-4-13. The radon-222 off-property limit in air is presented in Table F.4-1 and the results of radon emission and dispersion modeling is presented in Table F.4-14. The results indicate that the off-property exposure limit is not exceeded, as stated on page F-4-13. No additional discussion is necessary regarding radon.

Virtually the entire site, including Paddys Run and the SSOD, was modeled for air emissions and dispersion. The modeled source areas are shown in Figure F.4-6. Because the surface area of Paddys Run and the SSOD are insignificant (i.e., < 1 percent) portions of the total surface area modeled, the soil PRGs were used for all modeled sources. In addition, Paddys Run and the SSOD are a significant distance from the northeast corner of the site. Because the prevailing wind direction is toward the northeast, the impact of contaminated airborne sediments from Paddys Run and the SSOD at the northeast fence lines are insignificant compared to impacts from source areas located closer to the northeast corner. The text will be revised to clarify this matter.

Action: The following assumption will be added to the bottom of Page F-4-7 (Section F.4.2.4.1):

"• The impact of contaminated sediment from Paddys Run and the SSOD is assumed to be negligible to off-property receptors through the air pathway. Virtually the entire site, including Paddys Run and the SSOD, are modeled using on-property receptor soil PRGs. The surface area of Paddys Run and the SSOD is insignificant compared to the total modeled surface area. In addition, because the prevailing wind direction is toward the northeast, the maximum off-property impact will be along the north or east fence line. The distances from Paddys Run and the SSOD to these fence lines are such that contaminated airborne sediment impacts will be negligible to off-property receptors."

76. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.1.5.3.2 Page #: F-1-12 Line #: 4 to 6
Original Specific Comment #: 47

Comment: The text states that infiltration information is used to calculate contaminant concentrations and loadings. Presumably, the text refers to loading to the Great Miami Aquifer; however, additional detail regarding the calculations of concentrations and loadings to the Great Miami Aquifer should be provided.

Response: The procedure for surface water contaminant mass loading rate calculations is described in the Operable Unit 5 RI Report, Appendix F.2 and is summarized in

Section F.4 of the FS Report. Section F.1.5.3.2 provides an overview for the components of modeling conducted in the surface water pathway. Detailed information is not suitable in this section.

Action: The following sentence will be added in Section F.1.5.3.2, page F-1-12, line 6:
"Detailed discussions of the calculation procedures used to determine the surface water contaminant mass loading rate into the aquifer are presented in Section F.4 and in the Operable Unit 5 RI Report, Appendix F.2."

77. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.1.5.3.2 Page #: F-1-12 Line #: 3 to 4
Original Specific Comment #: 46

Comment: The text discusses the computer code VS2DT and states that the output provides information about infiltration volumes and patterns in the Great Miami Aquifer. It is not clear what the term "infiltration patterns" refers to. More explanation regarding the infiltration patterns should be provided.

Response: Infiltration pattern refers to the predicted distributions of surface water infiltration rates along various reaches of the SSOD and Paddys Run. These infiltration rates, together with simulated contaminant concentrations in the surface runoff, were used to determine the contaminant mass loading rate into the Great Miami Aquifer through the streambed. Reference to the Operable Unit 5 RI Report where this infiltration pattern was developed will be provided.

Action: The following sentence will be added in Section F.1.5.3.2, page F-1-12, line 6:
"Detailed discussions of the calculation procedures used to determine the surface water contaminant mass loading rate into the aquifer are presented in Section F.4 and in the Operable Unit 5 RI Report, Appendix F.2."

78. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.1.5.3.2 Page #: F-1-12 Line #: 15 to 24
Original Specific Comment #: 48

Comment: The text discusses the calculations of future sediment loadings and their impacts. It is not clear if increased sediment loadings associated with the remedial action construction activities have been considered. The text should either indicate that this loading has been accounted for or provide justification for its omission.

Response: Short-term impacts to air, surface water, and sediment during the remediation process were not specifically considered in the cleanup goal development process. It is very difficult to accurately quantify these impacts in the FS. However, engineering controls will be applied to reduce the short-term impacts during remediation. During the certification process of site remediation, any residual sediment concentration found to be higher than the remediation goal will also be remediated.

Action: The following sentences will be added in Section F.1.5.3.2, page F-1-12, line 16:
"Short-term impacts to sediment loading during the remediation process will not be quantified in the cleanup goal development process. However, engineering controls will be applied to reduce impacts to minimum levels during remediation."

79. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.1.5.4 Page #: F-1-17 Line #: 39
Original Specific Comment #: 49

Comment: The text states that new infiltration rates and infiltration rate zones were calculated based on updated geological information. The text should indicate whether this new information is presented in the Operable Unit 5 RI Report or has just become available. The text should also indicate the source for which this information is presented.

Response: The infiltration rate and rate zones used in the FS were refined in accordance with the Operable Unit 5 RI. The same database of boring log information used in the RI was re-analyzed in more detail to update the geological cross-sections. 3-D solid block modeling was utilized in this analysis. Based on this analysis, refinements were made to the original cross-sections which were manually developed and used in the RI.

Action: The following sentences will be inserted in Section F.1.5.4, page F-1-17, line 37:

"The same database used in the RI was re-analyzed in more detail to update the geological cross-sections. Based on this analysis which also utilized 3-D solid block modeling, refinements were made in the original cross-sections presented in the Operable Unit 5 RI.

Geological interpretations of the thickness of the gray clay, presented and used for infiltration estimations in the OU5 RI Report, were refined for fate and transport modeling in the FS. Large infiltration areas, presented in the RI Report were sub-divided into smaller areas and area boundaries were more closely correlated with depositional and surface erosional features (i.e., the SSOD and Paddys Run).

The thickness of the gray clay was divided into four large zones in the RI Report for the purpose of calculating better estimates of infiltration rates (Figure 3-44; DOE 1995). These four large zones roughly correlate to depositional and erosional features. The level of detail pertaining to gray clay thickness is adequate for making gross estimations of infiltration. Many small areas exist within each of these large areas where the gray clay is thinner. These smaller areas needed to be assessed in the FS.

For the FS the four large RI infiltration zones (Figure 3-45; DOE 1995) were further subdivided into six zones (Figure F.2-11). The isopach map used to guide the zonation is shown in Figure F.2-10. The new zonation using six zones provides for the small areas where the gray clay is thinner. Figure F.2-12 shows the generalized cross sections for the FS zonation. Zone 1 of the RI Report became Zone V of the FS. The intent of this zone is to provide for a hypothetical continuous sand pathway from the perched water area beneath Plants 2/3, 8, and 1 to Paddy's Run, a pathway was not detected in the field. For the FS the southern boundary of this zone was modified to correspond to the pilot plant drainage ditch. The eastern boundary was modified to correspond to the perched groundwater area capable of sustaining a groundwater yield of 1 gpm. Zone II of the RI Report was subdivided into Zones III and IV and Zones III and IV of RI were subdivided into Zones I,II,III, and IV in the FS. Zone VI in the FS is used to represent areas where no gray clay is present. The boundaries of these new six zones more closely matches depositional and surface erosional and drainage features (i.e., Paddy's Run and the SSOD).

80. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.1.5.4 Page #: F-1-18 Line #: 32 to 36
Original Specific Comment #: 50

Comment: The text states that the long breakthrough times calculated in the RI Report do not change the conclusions regarding the maximum levels and sources of Great Miami Aquifer contamination and that uranium contamination in the Great Miami Aquifer will reach 9 milligrams per liter (mg/L) in 200 years. Although this statement may be true, risk-based thresholds such as maximum contaminant levels (MCL) will be exceeded much sooner. More tangible examples of breakthrough times using MCL exceedances should be provided.

Response: The updated discussion in the RI Report regarding the contaminant breakthrough times based on groundwater criteria will be referenced in the FS Report.

Action: The following sentence will be inserted in Section F.1.5.4, page F-1-18, line 36:
"Uranium breakthrough times through the glacial overburden in various areas of the site were calculated and discussed in Section F.5.4.3.5 of the Operable Unit 5 RI Report. Modeling results indicated that impacts to the Great Miami Aquifer exceeding the MCL (i.e., 20 μg/L) may occur within 60 years in certain areas."

81. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.1.5.4 Page #: F-1-19 Line #: 10
Original Specific Comment #: 51

Comment: The text states that breakthrough times associated with the lower K_d value are 50 times shorter than the baseline cases presented in the draft RI Report. The text should be revised to indicate that the breakthrough time is 5 times shorter.

Response: Agree.

Action: The text will be revised to state that the breakthrough time is 5 times shorter.

82. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.1.5.4 Page #: F-1-19 Line #: 13 to 22
Original Specific Comment #: 52

Comment: The text presents various justifications for using a K_d value of 24 liters per kilogram (L/kg) for the engineered clay liner. Unless the engineered clay liner is constructed of materials other than FEMP grey clay, the use of a K_d value nearly one order of magnitude higher than the K_d values used for the grey clay is not justified. The text further states that the use of high-quality clay material with high carbonate content justifies the use of the higher K_d value. This statement is confusing because high-quality clay implies high phyllosilicate and low carbonate content. The selection of K_d values for the engineered clay liner should be based on a statistically valid set of analytical results from the materials ultimately chosen for the liner. The issue of K_d values for the clay liner should be clarified.

Response: As described in the text, all currently available laboratory information supports the 24 L/kg K_d value for an engineered clay liner using homogeneous native clay material. A report titled "Adsorption of Select Metals and Radionuclides on Glacial Overburden Present at the Fernald Environmental Management Project Site" which was completed in 1993 will be provided to EPA for information. The text was intended to state that the K_d value of 24 L/kg is still reasonable for homogenuous native gray clay material even under high carbonate geochemical conditions. The lower K_d value of 3.1 L/kg used in the modeling for glacial overburden was determined through calibration against the observed uranium mobility in the glacial overburden due to both the geochemical and hydrogeologically heterogeneous conditions. This lower K_d value therefore includes the effects of hydrogeological conditions (such as preferential flow path due to the existence of coarser grained materials) that will not be encountered in the engineered clay liner.

However, it is agreed that the selection of K_d values for the engineered clay liner should be based on a statistically valid set of analytical results from the materials ultimately chosen for the liner. Chemical retardants which can slow down contaminant migration through the liner are also being considered as additives in the disposal facility design. Therefore, the 24 L/kg K_d value was selected as an achievable value through construction and engineering controls. It was used in the modeling to develop the preliminary waste acceptance criteria for FS purposes.

Action: To avoid confusions as described in the comment, ", high quality" will be deleted from line 17 of the text.
The following paragraph will be added in Section F.1.5.4, page F-1-19, line 23: "All the currently available laboratory information supports the 24 L/kg K_d value for an engineered clay liner using homogeneous native clay material. The lower K_d value of 3.1 L/kg used in the modeling for the glacial overburden was determined through calibration against the natural conditions and included the effects of hydrogeological conditions that will not be encountered in the engineered clay liner. The addition of chemical retardants which can further slow down contaminant migration through the liner are also being considered in the disposal facility design. The actual K_d values for the engineered clay liner will be based on a statistically valid set of analytical results from the materials ultimately chosen for the liner. Therefore, the value of 24 L/kg K_d is selected as being achievable through construction and engineering controls and is used in the modeling to develop the preliminary waste acceptance criteria for FS purposes."

83. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.1.5.4 Page #: F-1-19 Line #: 25 to 30
Original Specific Comment #: 53
Comment: The text in this paragraph discusses adjusting model layer thicknesses to simulate the effect of dispersion under low infiltration rates and large layer thicknesses. The rationale for performing these layer thickness adjustments is not clear because contaminant concentration changes due to vertical dispersion in unsaturated flow regimes. Further justification for adjusting model layer thicknesses should be provided.
Response: As stated in the comment, contaminant concentrations also change due to vertical dispersion in the unsaturated flow regimes. Modification of the ECTran model sublayer structure described in the text was not to eliminate the effects of vertical dispersion. It was designed to control the dispersion effects so a more reasonable contaminant migration rate can be simulated in the low infiltration rate and larger overall clay layer thickness conditions. This modification was deemed necessary after conducting cross-verification simulations between the ODAST/SWIFTLOAD and the ECTran models.
Action: None required.

84. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.2.2.2 Page #: F-2-5 Line #: 1 to 30
Original Specific Comment #: 54
Comment: This section discusses the delineation of areas capable of sustaining a yield of 1 gallon per minute (gpm) from perched groundwater zones. The areas delineated are apparently controlled by the location of pumping tests; however, these tests were only performed near the production area. The importance of accurately determining the areas of 1 gpm yields should be presented to assess whether additional data needs exist. It seems likely that areas in the western portions of the FEMP site, where deltaic sands are present, will also produce yields of greater than 1 gpm.

This issue should be addressed.

Response: One objective of a study conducted in the summer and fall of 1993 (Glacial Till/Vadose Zone Hydraulic Study) was to make a determination on the yield of groundwater that could be obtained from wells pumping in the glacial overburden. Over 200 drilling logs and dozens of detailed cross sections were reviewed to identify areas within the glacial overburden that seem most promising for delivering a sustainable yield of groundwater. The study concentrated on areas where a larger percentage of sand and gravel was present because several years of drilling and monitoring (for both water level and water quality) indicated that wells completed in clay and silt were slow to recharge, and wells completed in sand and gravel were quicker to recharge.

Hydraulic testing confirmed that the yield from sand and gravel sediment is controlled by the permeability of the silt and clay surrounding the sand and gravel. Slug test and pumping test results indicate that a hydraulic conductivity greater than 1×10^{-4} cm/s is needed to obtain a sustainable yield. Only one large contiguous area was located that meets this condition, and it is located in the western portion of the production area (Figure F.2-6 of the FS Report). Therefore, the pumping test locations were selected in this area.

One small channel feature was discovered in the Waste Pit Area which could also sustain a yield of about 1 gpm. The sand and gravel in the channel have hydraulic conductivities greater than 1×10^{-4} cm/s. As reported on page F-2-5, other undiscovered small channel features (as small as 20 feet across and capable of sustaining a 1 gpm yield) are probably present. The issue of their existence will be addressed during excavation. If encountered they will be evaluated and excavated or disrupted if deemed necessary.

Action: The following sentences will be added in Section F.2.2.2, page F-2-5, line 12: "One objective of the Glacial Till/Vadose Zone Hydraulic Study which was conducted in the summer and fall of 1993 was to determine the groundwater yield that could be obtained from wells pumping in the glacial overburden. Over 200 drilling logs and dozens of detailed cross sections were reviewed to identify areas within the glacial overburden that seemed most promising for delivering a sustainable yield of groundwater. The study concentrated on areas where a larger percentage of sand and gravel was present because several years of drilling and monitoring (for both water level and water quality) indicated that wells completed in clay and silt were slow to recharge, and wells completed in sand and gravel were quicker to recharge."

85. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.2.2.3 Page #: F-2-6 Line #: 22 to 23
Original Specific Comment #: 55

Comment: The text states that vertical seepage velocities through the glacial overburden are controlled by the thickness of the grey clay. It is not clear how a layer thickness can control the seepage velocity through it. The text should be revised to clarify this issue.

Response: The seepage velocity is controlled by the overall equivalent vertical hydraulic conductivity of the overburden. Sublayer-specific thicknesses and hydraulic conductivities are used to determine this equivalent vertical hydraulic conductivity by calculating the harmonic mean.

Action: The following sentences will replace the first sentence in Section F.2.2.3, page F-2-6, line 22:
"The seepage velocity is controlled by the overall equivalent vertical hydraulic conductivity of the overburden. Sublayer-specific thicknesses and hydraulic

conductivities are used to determine this equivalent vertical hydraulic conductivity by calculating the harmonic mean. The harmonic mean is controlled by the thickness of gray clay which has the lowest conductivity in the overburden. Calculated vertical seepage velocities through the glacial overburden range from 0.846 ft/yr (30 feet of gray clay) to 2.15 ft/yr (10 feet of gray clay)."

86. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.2.2.5 Page #: F-2-7 Line #: 24 to 30
Original Specific Comment #: 56
Comment: The text provides estimates of infiltration rates for areas where glacial overburden is present; however, when these estimates are compared to the vertical advective travel times presented in Section F.2.2.3, major volume problems appear. For instance, when the vertical advective travel time is 41.4 years in a 30-foot thick grey clay layer, 20.7 feet of water will have infiltrated into the grey clay before the water that infiltrated at the beginning of the 41.4-year period moves out of the grey clay. This scenario would require a porosity of 69 percent. This issue and its implications on assumed infiltration rates and vertical advective travel times should be addressed.
Response: The calculations presented in this section were based on field data with an assumed K_v equal to K_h divided by 10 for the purpose of preliminary description of the hydrogeological conditions. This preliminary assumption is typical before model calibration. The actual modeling of contaminant migration through overburden in both the RI and FS used a K_v equal to K_h divided by 2.586 (i.e., K_v is about 40 percent of K_h as shown in Figure F.2-12). This ratio was determined through model calibration to match the reported infiltration rate (i.e., 6 in./yr) in the area.
The preliminary vertical seepage velocities and times of travel presented here pertain to calculations also presented in the RI Report (Section 3, Table 3-21). These calculations further assume that the glacial overburden sediment is fully saturated and has an effective porosity of 26 percent. The value given for K_h is the geometric mean of slug test calculations (1.87×10^{-6} cm/s). K_v is assumed to be K_h divided by 10 (i.e., 1.87×10^{-7} cm/s) as is usually done before any specific calibration can be conducted. The seepage velocity and time of travel referred to in the comment above pertains to Zone II (as defined in the RI Report). Zone II contains 5 feet of brown clay and 30 feet of gray clay (total thickness of 35 feet). With a calculated seepage velocity of .85 ft/yr the time of travel through a 35-foot section is calculated to be 41.4 years. The seepage velocity of .85 ft/yr translates into an infiltration rate of 2.65 in./yr [(.85 ft/yr) * (12 in./ft) * (.26)]. This annual infiltration rate represents the maximum amount of water that could pass through the effective porosity of a fully saturated clay given this K_v value and porosity. This lower infiltration rate does not create the condition described in the comment (i.e., 69 percent porosity).
However, water budget information indicates that an average infiltration rate of 2.65 inches per year is too low. The FEMP area receives an average of 41 inches of rainfall a year. On average 28 inches is lost to evapotranspiration, leaving an average of only 13 inches available for infiltration into the glacial till. Modeling indicates that an average of 6 inches of recharge is needed to maintain the Great Miami Aquifer water table at its measured elevation; therefore, an average of 7 inches of precipitation is runoff and does not travel through the clay to recharge the aquifer (see Figure 3-5 of the RI Report).
In order to provide for this 6 inches of infiltration, the HELP and GO/UGMAS models were calibrated using a slightly higher vertical hydraulic conductivity than what was bracketed from the field studies presented in the preliminary seepage velocity calculation. Instead of using a K_v equal to K_h divided by 10, the model uses

a K_v equal to K_h divided by 2.586 or 7.23 x 10^{-7} cm/s. Given what is known about the water budget for the area and the nature of the glacial overburden sediment, this K_v value seems more reasonable. Use of this higher K_v in the model results in a faster seepage velocity and a higher infiltration rate than what was calculated using the assumed K_h to K_v ratio of 10 and the slug test data (Table F.2-1).

Action: The following sentences will added in Section F.2.2.3, page F-2-6, line 26: "The calculations presented in this section relate to field data with an assumed K_h/K_v ratio of 10 for the purpose of preliminary description of the hydrogeological conditions. After water budget analysis and model calibration were conducted, the actual modeling of contaminant migration through overburden used a higher K_v value. The site-specific K_h/K_v ratio of 2.59 was determined through model calibration to match the reported groundwater recharge rate (i.e., 6 in./yr) in the area. Therefore, the seepage velocity through the overburden is about 4 times higher than the preliminary values presented."

87. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.3.2.5 Page #: F-3-7 to F-3-8 Line #: NA
Original Specific Comment #: 57
Comment: The text states that surface water dilution factors were developed using estimated perched groundwater discharge rates into Paddys Run and the Pilot Plant Drainage Ditch. The text should indicate how the perched water discharge rates were established.
Response: Agree.
Action: The following sentences will be added to Section F.3.2.5 following line 1 on page F.3-8:
"The total flow of perched water is calculated based on the gradient of the average groundwater elevation contours of the Type 1 monitoring wells, lengths of seepage faces along the pilot plant drainage ditch and Paddys Run, and the estimated average perched groundwater zone thickness (15 feet). The perched groundwater zone gradients were based on the steeper contours within 400 feet of the seepage face. Basing the gradient on the steeper portion of the contours rather than the overall gradient of the perched water zone yielded a higher (more conservative) discharge rate from the perched groundwater zone. The seepage face lengths were taken as the distances along Paddys Run and the pilot plant drainage ditch where the perched groundwater zone sand and gravel is exposed on the streambanks."

88. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.3.2.5 Page #: F-3-8 Line #: 15 to 20
Original Specific Comment #: 58
Comment: Equation 7 gives an estimated surface water infiltration rate to the Great Miami Aquifer of 0.099 cubic feet per second (cfs) and an estimated flow rate for the Great Miami River of 0.067 cfs. These figures should be checked for accuracy because the estimated surface water infiltration rate to the Great Miami Aquifer (0.099 cfs) coincidentally corresponds with the estimated total seepage rate of perched groundwater to surface water bodies. The estimated flow of the Great Miami River corresponds to a flow rate of approximately 0.5 gallons per second. This figure seems extremely low for a stream the size of the Great Miami River. Also, if these estimates are erroneous, the calculations that use them should be corrected and the effect of these errors should be identified.
Response: The surface water infiltration rate to the Great Miami Aquifer does match the perched groundwater to surface water flow rate since it was conservatively assumed that all of the flow from the perched groundwater zone infiltrates into the Great

Miami Aquifer. The flow rate reported as 0.067 cfs is the estimated flow rate in the Great Miami Aquifer under Paddys Run, not for the Great Miami River as stated in the comment. This value was correctly described in the report. This estimated flow rate is reasonable for an aquifer and the calculation has been checked.

Action: No action.

89. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.3.2.6 Page #: F-3-9 Line #: 29
Original Specific Comment #: 59

Comment: The text states that a minimum mixing depth of 10 feet below ground surface was used in the Great Miami Aquifer. The text should provide the maximum mixing depth used in Great Miami Aquifer modeling and provide justification for this value.

Response: Ten feet is a reasonable assumption of well-screen length of typical groundwater production wells. Therefore, the minimum mixing thickness of 10 feet below groundwater table was set in modeling for determining the potential future impacts to Great Miami Aquifer groundwater users. This assumption was made to avoid the use of any unrealistically small mixing depth directly calculated by the mixing equation in the ECTran model which only considers the vertical infiltration rate, lateral travel time, and vertical dispersion. For the CPRG development purposes, 10 feet was also the maximum mixing depth used, because the calculated mixing depths were slightly smaller than 10 feet.

Action: The following sentences will be added in to Section F.3.2.6, page F-3-9, line 29: "Ten feet is a reasonable assumption of well-screen length of typical groundwater production wells. Therefore, the minimum mixing thickness of 10 feet was set in modeling for determining the potential future impacts to Great Miami Aquifer groundwater users. This assumption was made to avoid the use of any unrealistically small mixing depth directly calculated by the mixing equation in the ECTran model which only considers the vertical infiltration rate, lateral travel time, and vertical dispersion. For the CPRG development purposes, 10 feet was also the maximum mixing depth used, because the calculated mixing depths were slightly smaller than 10 feet."

90. Commenting Organization: U.S. EPA Commentor: Saric
Sections #: F.4.2.1.1 Page #: F-4-2 Line #: 8
Original Specific Comment #: 60

Comment: The first set of protective requirements for the air pathway were developed based on an ILCR of 10^{-5}, but those for the surface water pathway were developed using an ILCR of 10^{-6}. The rationale for selecting an ILCR of 10^{-5} for the air pathway should be presented.

Response: An off-property target receptor risk criteria of 10^{-5} ILCR is used for both air and surface water pathways. However, the on-property soil concentrations are based on a 10^{-6} ILCR PRG for each on-property receptor analyzed. A typographical error has been found in the column heading of Tables F.4-9 through F.4-12. The second column heading in each table should read "On-Property Receptor Soil PRG, 0.2 HQ or 10^{-6} ILCR," not 10^{-5} ILCR. Also, the on-property soil PRGs in Table F-4-12 are incorrect. These values will be corrected and Table F.4-12 revised. Tables F.4-13 and F.4-14 as well as text on pages F-4-12 and F-4-13 will be revised to be consistent with the corrections made to Table F.4-12.

Action: The second column heading in Tables F.4-9 through F.4-12 will be revised to read:
On-Property Receptor Soil PRG, 0.2 HQ or 10^{-6} ILCR
Table F.4-12 will be revised to include the appropriate soil PRGs for the Expanded

Trespasser in the second column. This correction will require revisions to text on Pages F-4-12 and F-4-13 as well as to Tables F.4-13 and F.4-14. The text starting at line 26 on page F-4-12 and ending on line 13 on page F-4-13 will be revised as follows:

"Results of the first two screening steps are presented in Tables F.4-9 through F.4-12 for each of the on-property receptors considered. These results indicate that only one contaminant does not pass these screening steps. For a recreational user on an undeveloped park and for an expanded trespasser, the thorium-230 PRG and maximum baseline surface soil concentration exceed the air pathway protective requirement.

Air dispersion modeling was conducted to complete the third step in the screening process for thorium-230. The analysis was conducted by assuming that the entire site emitted PM_{10} and the maximum PM_{10} concentration in air was 20 x 10^{-6} g/m^3 at the FEMP fence line. The ISCLT2 model was run with a unit emission rate (1 g/s/m^2) for all sources. The modeled fence line air concentration was corrected to 20 x 10^{-6} g/m^3 and the correction factor was multiplied by the modeled emission rate to determine the site-wide PM_{10} emission rate. The modeled maximum fence line concentration was 27.2 g/m^3 for a unit emission rate. Therefore, the site-wide PM_{10} emission rate was calculated to be 7.34 x 10^{-7} g/s/m^2. This emission rate was multiplied by the baseline soil concentrations of thorium-230 in each area of the FEMP to determine the contaminant emission rate from each area. The modeled areas are shown in Figure F.4-6 and the area-specific baseline soil concentrations are presented in Table F.4-13. The area-specific emission rates were then modeled with ISCLT2 to determine the maximum airborne fence line concentrations of thorium-230. Thirty-six fence line receptors were included in the analysis to identify the point of maximum impact.

The maximum modeled fence line concentration was 2.84 x 10^{-3} pCi/m^3 for thorium-230. This value is below the airborne PRG value presented in Table F.4-1. Therefore no additional analysis or remedial action is required for this compound."

91. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.4.3 Page #: F-4-9 and F-4-4 (Tables) Line #: 10 to 18
Original Specific Comment #: 61
Comment: The estimated airborne gram per cubic meter (PM_{10}) concentration for Station AMS 7 presented in Table F-4-4 appears erroneous. Based on particulate concentrations in air and soil, the PM_{10} concentration value should be 2.4 x 10^{-4} g/m^3 instead of "2.4 x 10^{-6} g/m^2" as presented in the table. The 2.4 x 10^{-4} g/m^3 value is also the highest PM_{10} concentration. Table F-4-4 and the text should therefore be revised to consistently list the correct value. The air pathway protective requirement values should also be recalculated using a PM_{10} concentration of 2.4 x 10^{-4} g/m^3.
Response: A review of the source document indicates that the value of the measured uranium concentration in soil at AMS 7 should be 1.3 x 10^{+1} pCi/g, not 1.3 x 10^{-1} pCi/g as presented in Table F.4-4. This value will be corrected in the third column of the table. The PM_{10} concentration of 2.4 x 10^{-6} in the fourth column of the table is correct; therefore, additional corrections of text, tables and calculations are not necessary.
Action: The value of the uranium soil concentration measured at AMS 7 (Table F.4-4, third column, last row) will be revised to read: 1.3 x 10^{1}.

92. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.4.4.1 Page #: F-4-12 Line #: 27
Original Specific Comment #: 63

Comment: This line states that only two contaminants do not pass the screening steps; however, text in subsequent lines indicate that four contaminants consistently fail the screening steps. The text should be revised to list the number of contaminants that do not pass the screening steps.

Response: Agree. The text will be revised appropriately. Also, see response to Comment 90.

Action: See Action for Comment 90.

93. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.5.2.2 Page #: F-5-4 Line #: 29 to 33
Original Specific Comment #: 66

Comment: This section presents general considerations and characteristics of WAC development. The text states that high-yield areas of perched water and lateral migration in the perched water zone underlying the potential on-property disposal areas will be minimized by engineering controls or removed by excavation. Because few production or waste management activities were conducted in the proposed consolidation/disposal facility area, the hydrogeology of the area is not well characterized. Also, Figure F.2-6 indicates that an area of coarse-grained sediment is present below the proposed disposal facility area; however, its lateral extent is not well defined. It is not clear how or when the hydrogeological data gaps associated with the design and construction of the consolidation/disposal facility area will be addressed. Finally, the excavation of perched water zones may not ensure that other perched water zones will not redevelop because some of these areas are formed by underlying aquitards impeding vertical flow. The text should be revised to discuss these issues.

Response: Perched groundwater will always be present in the glacial overburden, unless there is no gray clay layer to impede vertical flow, but perched groundwater yield can be greatly reduced by removing the larger deposits of croser grained sediments in the glacial overburden or by reducing the surface recharge. As stated in the text, high-yield areas of perched groundwater and lateral migration in the perched groundwater zone underlying the potential on-property disposal areas will be minimized by engineering controls or removed by excavation. FEMP (Operable Unit 2) is conducting hydrogeological investigation in the proposed disposal cell location. Any significant data gap that is important for the design purposes will be filled by this investigation. The multilayer cap of the disposal cell will reduce future infiltration rate directly through the disposal area. Also as part of the disposal cell design, a channel around the facility will diverge surface runoff from up-gradient area to reduce impact of surface runoff and local recharge rate. Therefore, chance of future existence of a high-yield perched groundwater zone directly under the disposal cell will be very small.

Action: The following sentences will be inserted in Section F.5.2.2, page F-5-4, line 31 of the text:
"Perched groundwater will always be present in the glacial overburden, unless there is no gray clay layer to impede vertical flow, but perched groundwater yield can be greatly reduced by removing the larger deposits of sand and gravel in the glacial overburden or by reducing the surface recharge. Additional hydrogeological investigations in the potential disposal facility location are currently being conducted to provide additional hydrogeological characterization of the area. The multilayer cap of the disposal cell will reduce future infiltration rate directly through the disposal area. Also as part of the disposal cell design, a channel around the facility will diverge surface runoff from up-gradient area to reduce impact of surface runoff and local recharge rate. Therefore, chance of future existence of a high-yield perched groundwater zone directly under the disposal cell will be very small."

94. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.6 Page #: NA Line #: NA
Original General Comment #: 20
Comment: The text cites equations in this section to perform calculations such as a water budget analysis for perched groundwater (see Section F.6.2.1.3). The text should either include references or describe the derivation of the equations used.
Response: The derivation of equations has already been presented in Section F.6.2.1.3 and Attachments F.6.I.1, F.6.I.2, F.6.I.3, and F.6.I.4. All of the equations in the above-mentioned section and attachments are in their most basic forms and are self-explanatory.
Action: Add the following to line 21, page F-6-7:
"....the principle of mass conservation (Ponce 1989), Q_1^M....."
Add the following to line 32, page F-6-7:
"In order to dewater the perched zone completely within a given time period, the average extraction rate must be at least equal to the sum of the net influx due to lateral recharge and infiltration and the rate necessary to remove the groundwater stored in the perched zone. The first term on the right hand side of Equation (F6-1) represents the net influx, while the second term represents the average extraction rate required for the removal of groundwater stored in the perched zone within a time period of Δt. Additional details are presented in Section 1 of Attachment F.6.I."
Change the 1st sentence in line 1, page F-6-22 to read:
"Details of the derivation of Equation (F6-6) and of the calculation....."
Change the 1st sentence in line 31, page F-6-24 to read:
"Details of the derivation of Equations (F6-7) and (F6-8) and of the calculation....."
The following reference will be added:
Ponce, V.M., 1989, Engineering Hydrology: Principles and Practices, Prentice-Hall, New Jersey.

95. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.6.2.1.1 Page #: F-6-6 Line #: 24 to 27
Original Specific Comment #: 67
Comment: The text states that "source concentrations within perched groundwater outside of Infiltration Zone V do not function as sources of contamination in the perched groundwater analysis" and that "these areas will be remediated concurrently with the overlying soil." According to Figure F-6-2, areas outside of Zone V have significant uranium concentrations. The text should specifically state why these areas are not considered in the perched groundwater analysis. Also, the text should state how these areas will be remediated "concurrently with overlying soil."
Response: The following discussion will be added in Section F.6.2.1.1, page F-6-6, line 34:
Action: Infiltration Zone V has been found to contain larger areas of coarse grained sediments. Some of these areas have relatively higher yields. Zone V was conservatively assumed to be a zone of continuous croser grained materials for the modeling purposes. On the other hand, the glacial overburden contains isolated smaller areas of coarser grained sediments and low yields outside Infiltration Zone V. Therefore, perched groundwater has limited lateral migration potential and low yields. Outside of Infiltration Zone V only vertical migration is assumed to occur. Hydraulic extraction techniques such as wells and trenches would be an infeasible remedial alternative for such discontinuous, low-yield materials, and the only feasible alternative for remediation would be excavation. Because perched groundwater contamination outside of Infiltration Zone V most likely

occurred through the vertical migration pathway from overlying soil, remediation of contaminated perched groundwater would occur as part of the soil remediation by excavation as summarized in Section 2 of the FS. To simplify the transport modeling processes within and in the vicinity of Infiltration Zone V for the analysis, it was assumed that only Infiltration Zone V has both lateral and vertical perched groundwater migration. Therefore, the detailed perched groundwater modeling analysis was limited to Infiltration Zone V to test the feasibility of both hydraulic extraction and excavation remedial methods.

96. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.6.2.1.3 Page #: F-6-7 Line #: 16 and 17
Original Specific Comment #: 68
Comment: The text states that in the perched groundwater system, "the vertical discharge rate is relatively constant even with pumping." The text should further explain this statement because pumping would decrease the head in the perched groundwater zone and therefore would decrease the vertical gradient, discharge rate, and movement of contaminants from the perched groundwater to the Great Miami Aquifer. This explanation will also clarify why vertical recharge is not included in net influx of groundwater (Q_I) to perched groundwater.
Response: This text is intended for conditions associated with remediation scenarios with pumping and reinjection wherein drawdown is relatively small. Furthermore, because the total pumping rate is always prescribed to be identical to the total injection rate, the net drawdown is essentially zero.
Action: Add the following in front of the subject sentence:
"In the ensuing subsections, remediation scenarios with identical pumping and injection rates are analyzed. With the zero net extraction rate, the net drawdown of the groundwater is also approximately zero. Therefore, the regionally averaged vertical discharge is likely to remain relatively constant."

97. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.6.2.1.3 Page #: F-6-9 Line #: 11
Original Specific Comment #: 69
Comment: The text refers to Table F-6-5 for parameters used to calculate perched groundwater discharge rates to ditches. The text or table should provide a reference for the 3.55 feet per day rate for discharge of perched groundwater to the ditches.
Response: Agree.
Action: Table F.6-5 will be modified to include an additional footnote relating to the hydraulic conductivity value of 3.55 ft/d. The following will be added to the footnote:
"Geometric mean of hydraulic conductivity values from 8 locations along the discharge boundary (see also Table F.6-2)."

98. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.6.2.1.3 Page #: NA Line #: NA
Original General Comment #: 21
Comment: The text refers to an incremental lifetime cancer risk (ILCR) of 10^{-6} and Hazard Quotient (HQ) protective level of 0.2 for land use scenarios. For the Operable Unit 5 RI Report, a HQ of 0.1 was used for land use scenarios. The text should state why a HQ of 0.2 was used in the FS Report.
Response: The Operable Unit 5 RI Report used a HQ of 0.1 for the purposes of identifying constituents of concern and determining baseline risk. Because a HQ of 0.2 has been selected as the preliminary groundwater cleanup criteria in the FS Report, this

criteria was used to determine the zone of required perched groundwater remediation.

Action: No action.

99. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.6.3.1.2 Page #: F-6-14 Line #: 16 to 20
Original Specific Comment #: 70
Comment: The text states that Excavation Footprint 1 includes groundwater zone areas outside of Infiltration Zone V and that these areas will be excavated regardless of the remedial option selected for Infiltration Zone V. According to Figure F-6-2, perched groundwater uranium contamination also exists by the Operable Unit 1 waste pits north of Infiltration Zone V. It is not apparent if this contaminated perched groundwater will also be excavated. The text should discuss how this area outside of Infiltration Zone V will be remediated.
Response: Because the subject area of perched groundwater contamination is in such close proximity to the Operable Unit 1 waste lagoons, it is anticipated that it will be remediated as part of the Operable Unit 1 clean up. Operable Unit 5 will excavate about 81000 cubic yards of additional soil under and around the waste lagoons after Operable Unit 1 remediation.
Action: The text will be expanded on page F-6-14 to provide further explanation of the intended Operable Unit 1 remediation as follows:
"Contaminated perched groundwater outside of Infiltration Zone V which is in close proximity to Operable Unit 1 waste lagoons will be remediated concurrently with that operable unit."

100. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.6.3.1.2 Page #: F-6-15 Line #: 1 and 2
Original Specific Comment #: 71
Comment: The text states that the effects of constituent-specific distribution coefficients (K_d) and layer thickness were taken into account to estimate excavation footprints. The text should be revised to specify how these parameters were taken into account to estimate the excavation footprints.
Response: The use of K_ds and layer thicknesses was as a preliminary tool to estimate the excavation footprint. This technique was abandoned for a more straightforward modeling approach. ODAST/SWIFTLOAD simulations as described on page F-6-15 were directly used to define excavation footprints. Therefore, the subject sentence was a remnant of an early screening tool that will be deleted from the text.
Action: Lines 1 and 2 on page F-6-15 will be deleted from the text.

101. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.6.3.1.2 Page #: F-6-15 Line #: 24
Original Specific Comment #: 72
Comment: The text states that technetium-99 concentrations of greater than 35 pCi/L were included in the initial Excavation Footprint 1. The text should state why technetium-99 concentrations of greater than 35 pCi/L were included in Excavation Footprint 1.
Response: The statement that technetium-99 concentrations greater than 35 pCi/L were included in the initial excavation footprint 1 is incorrect.
Action: Lines 23 and 24 of page F-6-15 will be corrected and expanded as follows:
"In addition, one additional grid block containing technetium-99 concentrations greater than 100 pCi/L was conservatively included in the initial excavation footprint. Grid block 48,74 was included based on its interior proximity to surrounding grid blocks already included in the excavation footprint due to uranium-

238 concentrations."

102. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.6.3.1.3 Page #: F-6-17 Line #: 23 to 25
Original Specific Comment #: 73
Comment: The text states that uranium K_d values of 3.1 and 15 L/kg were used in the model. According to Table F-6-2, uranium K_d values of 1.78 and 15 L/kg were used for modeling. This inconsistency should be corrected.
Response: K_ds presented in Table F.6-2 were used in the trench and well scenario modeling. Section F.6.3.1.2, page F-6-17, lines 23 to 25 references sensitivity simulations performed for excavation modeling. The K_d values of 3.1 and 15 L/kg presented in the text in this subsection are consistent with those presented in Table F.6-3 for excavation modeling, which is referenced on page F-6-15, line 4.
Action: No action.

103. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.6.5.2 Page #: F-6-31 Line #: 8 and 9
Original Specific Comment #: 74
Comment: The text refers to Tables F-6-21 and F-6-22 for the uncertainty analysis of K values in the remediation scenarios. Tables F-6-21 and F-6-22 present K_d values and not K values. The text should include and correctly refer to tables showing the uncertainty analysis for K values.
Response: The sensitivity analysis of K value was conducted for two K_d conditions as shown in the first column of both tables. Calculation of the mean K values used in the analysis are shown in the footnotes of the subject tables.
Action: The following sentences will be inserted in line 8 on page F-6-31:
"Range of the mean value of hydraulic conductivity was evaluated by using a weighing factor and two bounding hydraulic conductivity values as shown in the footnotes of Table F-6-21 and F-6-22. The sensitivity analysis of hydraulic conductivity was conducted under two K_d conditions as shown in the first column of the tables."

104. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.2 Page #: NA Line #: NA
Original General Comment #: 22
Comment: Section F.7.2 provides the modeling background. Information concerning contaminant loadings to the Great Miami Aquifer is not provided for the various remediation scenarios. Information such as the rate and amount of contaminants moving from the glacial overburden to the Great Miami Aquifer should be provided. This information should also be provided because remediation of sources such as the glacial overburden will not occur in a short period of time and will continue to load contaminants to the Great Miami Aquifer.
Response: According to the vadose zone and surface water modeling, the only areas in which breakthrough of contaminants occurred over the period of interest (i.e., 20 years before all the required soil remediation is completed) was Paddys Run, SSOD, and certain facilities in Operable Unit 1 and Operable Unit 2 areas.
Action: A table will be added summarizing the rate of contaminant loading through these areas.

105. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.2.1 Page #: F-7-5 Line #: 13 and 14
Original Specific Comment #: 75

Comment: The text states that the FEMP production well is turned off for the groundwater modeling simulations. The text should state if the production well will be in operation when the groundwater remediation of the Great Miami Aquifer occurs.

Response: The FEMP is being connected to the public water supply being installed in the area by the Hamilton County Department of Public Works; DOE is providing some technical and financial support to this effort. When this system becomes operable, by the end of 1995, all water for FEMP operations will come from this source. Only one of the three production wells will remain operable for emergency hookup to the fire protection system. Therefore, the FEMP production well(s) will not be operational during the period of groundwater remediation.

Action: The last sentence (line 13) of the third bullet on page F-7-5 will be replaced with:
"The FEMP production wells will essentially be out of service by the time groundwater remediation begins because the site is expected to receive all of its water from the Cincinnati Water Works' new public water supply system by the end of 1995."

106. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.2.4 Page #: F-7-8 Line #: 20 and 21
Original Specific Comment #: 77

Comment: The text states that "most of the contamination found in Type 4 monitoring wells is from suspected leaking wells and is relatively localized." The text should provide additional evidence supporting the statement that the contamination is from leaking monitoring wells and not from vertical migration of contamination.

Response: Agree.

Action: The sentence in question will be deleted and replaced by the following:
"Most of the contamination found in Type 4 wells (at the bottom of the aquifer) is relatively localized. Section 4.8.3 of the Operable Unit 5 RI Report presents a summary of the nature and extent of contamination in the Great Miami Aquifer and Figure 4-97 illustrates where total uranium contamination in Type 4 wells has been recorded. The reported concentration of 103 ppb is an error. This contamination is present at shallower levels and is not from the base of the aquifer. The 1.5 ppb value noted in the northeast corner of the production area comes from an area where several wells were plugged and abandoned due to leaking joints (DOE 1995)."

107. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.2.4 Page #: F-7-8 Line #: 11
Original Specific Comment #: 76

Comment: The text refers to Figure F-7-7 for initial concentrations in model layers 4, 5, and 6. These model layers represent the confining clay unit in the Great Miami Aquifer and the lower Great Miami Aquifer. According to the figure, limited amounts of contamination are present in these layers; however, additional uranium contamination in these model layers of the Great Miami Aquifer seems to be missing. Plate E-82 from the Operable Unit 5 RI Report depicts total unfiltered uranium concentrations in Types 3 and 4 (lower Great Miami Aquifer) monitoring wells. Plate E-82 shows uranium contamination in the lower Great Miami Aquifer beneath Operable Unit 1, Operable Unit 2, Paddys Run, the South Plume area, and other areas beneath FEMP. The data for all lower Great Miami Aquifer monitoring wells should be reviewed for uranium detections in groundwater, and the figure and initial source concentrations should be revised accordingly, if necessary.

Response: Available data was reviewed to develop initial conditions. In fact, an attempt was made to define initial conditions as a conservative representation of the existing

plume. Type 3 wells (formerly 3000-series wells) are screened above the blue clay (or, if the clay is absent, at a vertical location representing the approximate elevation of the blue clay). Therefore, the Type 3 wells are actually in the bottom of the upper Great Miami Aquifer. The Type 3 well-screens are approximated by model layer 3. Most of the concentrations that you describe are in Type 3 wells, not in Type 4 wells, and have been represented as initial conditions in model layer 3. Concentrations above background in Type 4 wells were represented as initial conditions in a single model block in which the well was located.

Action: No text changes are necessary.

108. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.2.7 Page #: F-7-9 Line #: 20 and 21
Original Specific Comment #: 78

Comment: The text refers to Table F-7-5 as presenting modeling parameters for other COCs in the Great Miami Aquifer that have concentrations greater than screening levels. The K_d values shown in Table F-7-5 appear to be the upper limit of K_d values reported for contaminants in Table F-2-5 of Section F.2.4. The text should state why the upper limit of K_d values were used for the contaminants.

In addition, according to Table F-7-5, there is no loading of volatile organic compounds (VOC) from Paddys Run to the Great Miami Aquifer. Plates E-132 and E-133 show VOC contamination in Type 2 (upper Great Miami Aquifer) and Types 3 and 4 (lower Great Miami Aquifer) monitoring wells, respectively. These plates show groundwater plumes near Paddys Run and the SSOD, apparently indicating that contaminated surface water is contaminating the underlying Great Miami Aquifer. The text should either explain why there is no loading of VOCs from Paddys Run to the Great Miami Aquifer in Table F-7-5 or be revised to show the VOC loading rates from the surface water bodies.

Response: From a groundwater extraction perspective and given complete hydraulic capture, the upper limit K_d represents a more difficult situation for extraction than a lower K_d. Therefore the upper limit K_d was used to add conservatism in the cleanup time estimation.

Based on Plates E-132 and E-133 in the RI Report, three localized VOC plumes close to Paddys Run can be seen. These plumes are also adjacent to contaminant sources such as the Clearwell (Operable Unit 1 waste pit area), inactive flyash pile (Operable Unit 2 South Field area), and the pilot plant drainage ditch. Because of the volatile characteristics of VOCs, significant concentrations are not expected in the surface water runoff. Results of surface water modeling conducted in the Operable Unit 5 RI Report showed that only benzene has notable mass loading into the aquifer through the Paddys Run streambed (RI Report, Table F.2.4-4). Results also indicated that groundwater concentrations due to this mass loading are insignificant (RI Report, Table F.2.4-3). Therefore, the source of these VOC plumes is likely the vertical loading through overburden from the above-mentioned source areas and not the surface water runoff. Because impacts of the surface water loading are insignificant, the model simulations of groundwater pumping only focus on the effectiveness of the pumping operation on existing VOC plumes in the aquifer without including surface water loading of VOCs.

Action: The following text will be inserted on line 24 on page F-7-9:

From a groundwater extraction perspective and given complete hydraulic capture, the upper limit K_d represents a more difficult situation for extraction than a lower K_d. Therefore the upper limit K_d was used to add conservatism in the cleanup time estimation.

Based on Plates E-132 and E-133 in the RI Report, three localized VOC plumes

exist close to Paddys Run. These plumes are also adjacent to contaminant sources such as the Clearwell (Operable Unit 1's waste pit area), inactive flyash pile (Operable Unit 2's South Field area), and the pilot plant drainage ditch. Because of the volatile characteristics of VOCs, significant concentrations are not expected in the surface water runoff. Results of surface water modeling conducted in the Operable Unit 5 RI Report (Table F.2.4-4) showed that only benzene has notable mass loading into the aquifer through the Paddys Run streambed; results also indicated that groundwater concentrations due to this mass loading are insignificant (Table F.2.4-3). Therefore, the source of these VOC plumes is probably the vertical loading through overburden from the above-mentioned source areas and not the surface water runoff. Because the impacts of surface water loading are insignificant, the model simulations of groundwater pumping focus only on the effectiveness of the pumping operation on existing VOC plumes in the aquifer without including surface water loading of VOCs.

109. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.2.8 Page #: F-7-10 Line #: 22 to 25
Original Specific Comment #: 79

Comment: The text discusses sensitivity analysis of K_d values by changing the K_d value to 12 to model the effect of higher K_d values on concentrations of uranium in the Great Miami Aquifer. The text should state why a K_d value of 12 was chosen to model this effect.

Also, the text states that after increasing K_d, the dissolved concentrations of uranium in the Great Miami Aquifer were adjusted to reset the total sorbed mass approximately back to the original value that occurred at time equal to zero (t=0) or 1995 conditions. Adjusting the dissolved concentrations in the Great Miami Aquifer to retain the total sorbed mass seems to present dissolved uranium concentrations in the Great Miami Aquifer at t=0 that are not realistic or similar to presently detected concentrations in the Great Miami Aquifer. Modeling based on these methods, therefore, would yield future remedial scenarios that are also not realistic. The text should state how adjusting the total dissolved concentrations applies to places the future remedial scenarios modeled. This comment also applies to places in text that discuss the performance of sensitivity analyses of K_d values and should be addressed in these areas as well.

Response: Sensitivity simulations with a K_d value of 12 L/kg were used because it was felt that this value represented an average upper limit aquifer K_d value. This was based on data presented in the Geochemical Program Issues 3 and 5 Report which was included in the Groundwater Modeling Report - Summary of Model Development (DOE 1993b). In addition, sensitivity analysis of even higher K_d values was conducted (see Section F.7.7.4).

In the sensitivity analysis, uranium concentrations in groundwater and K_d value were adjusted after the initial dissolved phase uranium was extracted by pumping as described in the text from line 13 to 20 on page F-7-10. This process will take about 7 to 10 years. The groundwater concentrations were not adjusted at time 0 as stated in the comment. The model then simulated the adsorption and transport processes of the remaining adsorbed mass, which is conservatively assumed to be equal to the initial adsorbed mass at time 0, with a higher desorption K_d value. There was no inconsistent or unrealistic groundwater concentrations used in the sensitivity analysis.

Action: The following sentence will be added to the end of line 25:
"Based on data presented in the Geochemical Program Issues 3 and 5 Report, which was included in the Groundwater Modeling Report - Summary of Model

Development (DOE 1993a), 12 L/kg was selected to represent an average upper limit aquifer K_d value."

110. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.3 to 7.6 Page #: NA Line #: NA
Original General Comment #: 23
Comment: The text should provide information such as well depths, screened intervals, and radii of influence for extraction wells used in the different remedial scenarios. This information will aid in the analysis of the different remediation scenarios presented.
Response: Because a 3-dimensional finite difference model was used and multiple wells were pumped, drawdown at every model block is obtained for the different pumping scenarios and the radius of influence for any particular well is not a viable concept. Head contours and drawdown contours are provided for the preferred design (see Figures F.7-106 and F.7-107). Hydraulic capture zone maps were used in the process of selecting well locations, but were not included in the report.
Action: Tables F.7-6, F.7-8, F.7-9, F.7-10, and F.7-13 have been modified to include information on well depths and screened intervals for the modeled scenarios. Capture zone maps for the three extraction scenarios are provided in Appendix F.8.

111. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.3.2 Page #: F-7-11 Line #: 39 to 43
Original Specific Comment #: 80
Comment: The text refers to Figure F-7-20 for uranium concentration contour plots in layer 1 of the Great Miami Aquifer at 345 years, respectively, from t=0 and states that the plume has shifted east. The text should explain why the plume has shifted east and away from the FEMP site at 345 years after t=0.
Also, under the no-additional-action scenario, groundwater in the Great Miami Aquifer beneath the FEMP site flows south and east (see Figure F-7-105). The text should provide information supporting the claim that the South Plume recovery wells pumping under the no-additional-action scenario can remediate contaminated groundwater flow beneath the FEMP site to the east.
Response: As the comment suggests, there is clearly an eastward component of flow and the capture zone from the existing South Plume Recovery Wells misses a portion of the plume. However, there is no claim in the FS that the South Plume Recovery Wells can remediate eastward flowing contamination. What we have shown with the model is the time distribution of the maximum concentration in the five defined zones in Figure F.7-17. This figure shows that the maximum Zone 5 concentration does stay below 20 ppb over the entire time frame. The maximum Zone 5 concentration is shown as approximately 15 ppb. Apparently, the South Plume Recovery Wells capture zone is effective at recovering the most concentrated portions of the plume (e.g., the South Field) but misses the less concentrated areas to the north. According to the model, natural attenuation and dilution processes reduce contaminant levels for the eastward migrating plume at the eastern fence line to below 20 ppb.
Action: The following text will be added on Page F-7-11, line 39 after "...are located.": "This figure shows that the maximum Zone 5 concentration does stay below 20 ppb over the entire time frame although it remains above 10 ppb for approximately 50 years."
The following text will be added on Page F-7-11, line 43 after "...the east.": "This remnant plume to the east is the result of an area of uranium concentration, not originally within the South Plume Recovery Well capture zone, that has migrated

to the southeast."

112. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.3.2 Page #: F-7-11 Line #: NA
Original Specific Comment #: 81
Comment: The text discusses the modeling results of the no-additional-action remediation scenario for uranium concentrations in the Great Miami Aquifer. The text should state how this remediation scenario affects other COCs in the Great Miami Aquifer.
Response: No simulations were performed for the other COCs for the no additional action scenario because useful information would not be obtained from them. Although conditions were slightly different, it is expected that results of such simulations would be similar to the simulations for the other COCs in the RI Report. Other COC results would be bounded by the RI Report simulations and the "Restore to 20 ppb Design" results.
Action: A table (Table F.7-7) will be added to the text defining the results of the other COC simulations as determined in the RI Report. A new section, F.7.3.4, will be added to the end of the no-additional-action discussion.

113. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.4.3 Page #: F-7-15 Line #: 25 and 26
Original Specific Comment #: 82
Comment: The text states that model layer 2 will take the longest time to remediate; however, curves representing the remediation time for model layer 2 are not provided for review. Remediation curves for this model layer and a discussion of how the remediation time for model layer 2 was determined should be provided because concentrations in model layer 2 are actually an approximation based on concentrations in model layers 1 and 3 (see Section F.7.2.4, Page F-7-8). Layer 2 is usually the layer that requires the longest time to remediate in other remediation scenarios also; therefore, this comment also applies to these other remediation scenarios and should be addressed.
Response: In an effort to keep the number of figures down in this very data-intensive exercise, only model layers 1, 3 and 6 (corresponding to Types 2, 3, and 4 wells, respectively) were presented, although results from all layers were reviewed. Typically, model layer 2 results mirrored layer 1 results and took similar times to reduce the maximum below the performance standard.
Action: Figures will be added showing the results from Model Layers 2, 4 and 5, and will be appropriately referenced in the text.

114. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.4.4 Page #: F-7-16 Line #: 31 to 35
Original Specific Comment #: 83
Comment: The text states that the lower model layers will require a longer remediation time because the extraction pumps are placed in the shallow aquifer. The text should explain how groundwater in the lower layers of the Great Miami Aquifer will be remediated by extraction pumps in the shallow aquifer or upper model layers of the Great Miami Aquifer.
Response: The referenced text states "Lower model layers **clean up in a shorter time**, although the solute is extracted at a slower rate and thus the curves are flatter. This is not only due to the pumps being placed in the shallow aquifer and preferentially extraction shallow groundwater, but also artificial vertical dispersion in the model (see Section F.7.7 for further discussion)" (emphasis added). The commentor has apparently misinterpreted the text.

However, the question regarding the effectiveness of upper Great Miami Aquifer wells extracting contamination at lower aquifer levels remains. First of all, most of the contamination is in the upper Great Miami Aquifer so, for efficiency reasons, extraction is from upper layers. Secondly, extraction wells operate in a 3-dimensional field, lowering pressure at the well-screen and extracting groundwater from all directions. Lower vertical hydraulic conductivities relative to horizontal conductivity (by factors from 5 to 20) encourage horizontal flow. However, model simulations including particle tracking have shown significant vertical flow and contaminant transport when pumping the shallow aquifer even with the lower vertical conductivities. Therefore, modeling has shown that shallow extraction wells can effectively remove contamination from the lower aquifer.

Action: No changes to the text will be made.

115. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.4.6 Page #: F-7-18 Line #: 34 and 35
Original Specific Comment #: 84
Comment: The text states that based on modeling, technetium-99 has been identified in plumes originating at the Waste Pit Area and South Field. The text should explain if any groundwater samples confirm the technetium-99 contamination of groundwater.
Response: Groundwater monitoring results of technetium-99 were shown in Plate E-101 of the Operable Unit 5 RI Report. The plumes originated from the waste pit area (Pit 4) and South Field were clearly marked. In general, modeling results for technetium-99 match the monitoring data patterns with larger simulated plumes with concentrations below the detection limit.
Action: The following text will be inserted in line 35:
"Groundwater monitoring results of technetium-99 were shown in Plate E-101 of the Operable Unit 5 RI Report (DOE 1995). The plumes originating from the waste pit area (Pit 4) and South Field were clearly marked. In general, modeling results for technetium-99 match the measured concentration patterns with larger simulated plumes of concentrations below the detection limit."

116. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.4.6 Page #: F-7-19 Line #: 36 to 38
Original Specific Comment #: 85
Comment: The text states that trichloroethene (TCE) concentrations are relatively quickly reduced from over 1,000 micrograms per liter (μg/L) to below the MCL of 5 μg/L. The text should also present the time required to reduce the TCE concentration to 5 μg/L.
Response: Table F.7-11 shows that the maximum total VOC concentration at 30 years for the Restore to 20 ppb Design is 0.26 ppb.
Action: Text and a figure will be added showing the time that it takes to reduce TCE below 5 ppb. See Table F.8-9.

117. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.4.6 Page #: F-7-19 Line #: 45 and 46
Original Specific Comment #: 86
Comment: The text states that "apparent elevated concentrations or plumes of other constituents at certain areas may not be due to FEMP releases" or that they may be naturally occurring. The text should either provide background concentrations or further evidence supporting the statement that some of the contaminant plumes detected may not be from FEMP releases.
Response: The text was intended to state that certain relatively less mobile contaminants also

have large initial groundwater plumes which were conservatively assigned using the maximum detected concentration in each monitoring well for groundwater modeling purposes. Some portions of these plumes are located far away or upgradient from known contaminant source areas such as the former production area, waste management areas, Paddys Run, and the SSOD and may not be due to FEMP releases. This conclusion was based on the reasonable transport speeds of these contaminants in the aquifer.

Action: The following text will be added:
"Certain relatively less mobile contaminants also have large initial groundwater plumes which were conservatively assigned using the maximum detected value in each monitoring well for groundwater modeling purposes. Some portions of these plumes are located far away or up-gradient from known contaminant source areas such as the former production area, waste management areas, Paddys Run, and the SSOD and may not be due to FEMP releases considering the reasonable transport speeds of these contaminants in the aquifer. Examples of such situations include portions of the arsenic, manganese, and radium-226 plumes used in the modeling. Measured 1993 groundwater data presented in the plates in the Operable Unit 5 RI Report (DOE 1995_) show much smaller groundwater plumes of these contaminants."

118. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.5 Page #: F-7-21 Line #: 12 to 14
Original Specific Comment #: 87
Comment: The text states that "contour output from year 25 from the restoration to 20 μg/L design, with the more aggressive 7,500 gallon per minute (gpm) rate, was inspected to determine the locations of remaining plumes." The text should state why data from year 25 was chosen for this analysis.
Response: The year 25 was chosen based on results of other similar model simulations. Five years after source loading from surface water and other operable units is terminated at year 20 was considered a reasonable time frame to change the pumping. At this stage of the analysis, it was desired to keep the pumping sequence simple, yet changing the pumping scheme at year 25 allowed extraction efficiency to be increased.
Action: The following text will be inserted in line 14 on page F-7-21: "Year 25 is five years after source loading from surface water and other operable units is terminated at year 20. It was considered a reasonable time frame to change the pumping. At this stage of the analysis, it was desired to keep the pumping sequence simple, yet changing the pumping scheme at year 25 allowed extraction efficiency to be increased in certain areas for achieving the lower cleanup goal."

119. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.7.2 Page #: F-7-26 Line #: 35 to 39
Original Specific Comment #: 88
Comment: The text states that an analysis was performed to determine the impact of lost uranium mass in the model from facility dewatering. The text provides the results of the analysis but not information detailing how the analysis was performed. The text should provide information concerning the analysis of the lost uranium mass in the model because it affects the estimated mass of uranium that must be removed and the time required for groundwater cleanup.
Response: As stated in the text, the impact of lost mass was evaluated in a sample case by continuously loading facilities that have a dewatered zone above (based on natural

infiltration rate and estimated leachate concentrations) until the adsorbed contaminant mass was depleted. The adsorbed mass, mass loading rate with infiltration, and time of loading were estimated during the analysis. This analysis showed little impact to aquifer remediation so the model was used in its present state for the analysis. The text further states that a more detailed evaluation will be performed during design and this phenomenon will be corrected if necessary.

Action: The following text will be added to describe the analysis in more detail: "The impact of lost mass was evaluated in a sample case by continuously loading facilities that have a dewatered zone above (based on natural infiltration rate and estimated leachate concentrations) until the adsorbed contaminant mass was depleted. The adsorbed mass, mass loading rate with infiltration, and time of loading were estimated during the analysis." More quantitative information regarding the analysis of lost mass above the reduced water table will also be provided in the text.

120. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.7.3 Page #: F-7-27 Line #: 20 to 25
Original Specific Comment #: 89

Comment: The text states that "with the strong vertical gradients produced by the shallow extraction pumping, longitudinal dispersivity would operate in the vertical direction and this relatively high dispersivity would cause excessive dispersion vertically, resulting in vertical downward migration of solute." The text also states that vertical dispersion results in a significant mass of uranium in the lower model layers (lower Great Miami Aquifer) are not consistent with conceptual models of contaminant transport. The extraction pumps would cause water levels in the shallow aquifer to decrease, thereby decreasing the vertical gradient; consequently, contaminants will migrate from the shallow Great Miami Aquifer to the lower Great Miami Aquifer. Also, vertical migration of contaminants should be retarded by the clay layer (model layer 4) in the Great Miami Aquifer. The fate and transport model should be reviewed and revised as necessary because the vertical migration of contaminants should decrease with pumping of the shallow extraction pumps.

Response: The conclusion reached in the text (pg. F-7-27, lines 27 - 35) was that for comparative analysis, the model was acceptable in its present state, but needed to be corrected for more detailed optimization. In most areas the artificial vertical dispersion issue made aquifer cleanup more difficult by spreading contamination to the lower layers. Therefore, the size and extraction period using artificial dispersion would be larger and longer. Because correcting the code is a significant undertaking and involves certain quality assurance requirements, it was determined that the best course of action was to use the code in its present state for the FS, but to correct it for preliminary design.

Action: Simulations will be run with the old code and the corrected code to compare results on the latest optimized extraction system design. The results of these simulations will be included in Appendix F as a sensitivity analysis.

121. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.7.4 Page #: F-7-29 Line #: 3 and 4
Original Specific Comment #: 90

Comment: The text states that continued surface water loading becomes a major factor controlling cleanup time; however, uranium concentration contours in the Great Miami Aquifer do not seem to be influenced by surface water loading (see Figures F.7-18 to F.7-20). The text should explain why surface water loading does not

seem to control the concentration contours in the figures.

Response: Surface water loading only occurs until year 20 while Figures F.7-18 to F.7-20 show plumes at years 45, 85, and 345 respectively. By these times, the effect of surface loading has been dispersed, although Figure F.7-18 shows a 50 ppb plume apparently caused by earlier surface water loading from the SSOD.

Action: No action necessary.

122. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.7.6 Page #: F-7-31 Line #: 6 to 18
Original Specific Comment #: 91

Comment: The text states that model constant head boundaries would be affected by pumping from the remediation scenarios; however, because they are constant head boundaries, the water levels at these boundaries should not change, thereby causing artificially high groundwater gradients. The text also states that this effect is acceptable to select a preliminary remediation scenario; however, the artificially high groundwater gradients increase the rate of groundwater flow and contaminant movement, which in turn decreases the estimated time for contaminant cleanup. The text should explain in more detail why this effect on boundary conditions is acceptable during the FS.

Response: While the fixed higher boundaries do have the effect of increasing gradients, nevertheless it is our experience that the effect on extraction times caused by an increase in hydraulic gradient is much less than those caused by geochemical effects (represented by K_d). Similar to the dispersivity issue, it was always the intent to correct this issue before preliminary design. However, since preparation of the draft FS Report additional, optimization simulations have been performed using an approach that corrects the boundary based on the extraction well locations and pumping rates.

Action: Results of optimization simulations using an approach that corrects the boundary based on the extraction well locations and pumping rates will be incorporated into the FS Report as Appendix Section F.8.

123. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.7.7 Page #: F-7-31 Line #: 25 to 31
Original Specific Comment #: 92

Comment: The text discusses the removal of suspended solids from the Great Miami Aquifer by the extraction pumps. The text should discuss if the removal of suspended solids affects the concentration of adsorbed contaminant concentrations or the degree of retardation.

Response: Because of the small relative (to the total aquifer) volume of solids removed, it is estimated that there will be insignificant effects on adsorbed concentrations of contaminants in the aquifer.

Action: The following sentence will be added in line 30 on page F-7-31: "Because of the small volume of solids removed by pumping, there will be insignificant effects on adsorbed concentrations or degree of retardation of contaminants in the aquifer."

124. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.8.1 Page #: F-7-32 Line #: 26 to 31
Original Specific Comment #: 93

Comment: The text states that a pumping test will be conducted in the South Field area to better define aquifer properties in the area. These aquifer properties will then be used to determine the location of extraction wells in the area. According to the

preliminarily chosen remediation scenario, extraction wells will also be located by the Operable Unit 1 waste pits. The text should state if a pump test will be performed or has been performed in the Operable Unit 1 area to better define aquifer properties, and if not, why.

Response: Agree. The text will be modified to explain that a pumping test has been performed near the waste pit area.

Action: The following sentence will be added following the first sentence of the paragraph: "This is the one main area of the proposed extraction system where a pumping test has not been performed."
The following sentence will be added to the end of the paragraph:
"A pumping test was performed in the area of the waste pits (another main area of the extraction system) in 1962 by the U.S. Geological Survey (Spieker and Norris 1962; DOE 1995)."

125. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.8.2 Page #: F-7-34 Line #: 37 to 39
Original Specific Comment #: 94

Comment: The text states that reinjection wells could induce flow reversals and other hydraulic gradient changes to increase extraction rates. The reinjection wells could also produce groundwater mounds and assist in the lateral spreading of contaminants. This scenario is evaluated in the perched groundwater remediation scenario (see Section F.6.3.3.2, Page F-6-24). Groundwater mounding and lateral spreading of contaminants could cause larger than anticipated contaminant plumes, decreased extraction well efficiency rates, and increased time for remediation. The text should address these issues concerning the reinjection wells.

Response: If not properly designed and operated, groundwater reinjection could have undesirable effects that will reduce contaminant recovery efficiency. However, a properly designed groundwater recovery/reinjection well system can increase groundwater flushing rates through the contaminated zone and still maintain hydraulic capture of all the contaminated groundwater. By the higher flushing rate, aquifer restoration can be achieved in a shorter time frame. The use of groundwater reinjection wells will be further evaluated as a supporting technology during the engineering design stage of aquifer restoration and carefully designed and operated if implemented.

Action: The following sentences will be added in Section F.7.8.2, page F-7-24, line 46:
"If not properly designed and operated, groundwater reinjection could have undesirable effects that will reduce contaminant recovery efficiency. However, a properly designed groundwater recovery/reinjection well system can increase groundwater flushing rates through contaminated zones and still maintain hydraulic capture of all the contaminated groundwater. The higher flushing rate can achieve aquifer restoration in a shorter time frame. The use of groundwater reinjection wells will be further evaluated as a supporting technology during the engineering design stage of aquifer restoration and carefully designed and operated if implemented."

126. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F-4-6 Table Page #: NA Line #: NA
Original Specific Comment #: 62

Comment: The partition coefficient values presented in this table are not referenced. The source of these values should be presented.

Response: Sources of the values presented will be referenced as footnotes in the table.

Action: The following footnotes will be added to Table F.4-6:
"Values presented in Operable Unit 5 RI Report, Table F.2.3-5."

127. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F-4-9 through F-4-13, F-4-15, and H-3-3, H-3-6, H-3-9 (Tables) Page #: NA
Line #: NA
Original Specific Comment #: 64
Comment: These tables list soil concentrations of several contaminants. Some of the values are presented as "0.00." This presentation is misleading. Results of chemical analyses should be presented either as a detected value or as a value less than the detection limit. These tables should therefore be revised to eliminate the presentation "0.00" and replace it with appropriate numbers. The detection limits should be specified to allow comparison with other values presented in the tables.
Response: Agree, for Tables F.4-9 through F.4-13 and F.4-15. Disagree for Tables H.3-3, H.3-6, and H.3-9.
Action: In tables F.4-9 through F.4-13 and F.4-15, values presented as "0.00" will be replaced with the detection limit value.
For Tables H.3-3, H.3-4, H.3-6, and H.3-9, the values given are modeled air concentrations derived from background source terms in soil. Therefore, when no source term exists for a COC, not "NA" (not applicable) will be presented in the tables.

128. Commenting Organization: U.S. EPA Commentor: Saric
Section #: F-4-14 (Table) Page #: NA Line #: NA
Original Specific Comment #: 65
Comment: Values for soil bulk density, layer thickness, soil porosity, and soil moisture content presented in this table are not referenced. The source of these values should be provided.
Response: The values for soil bulk density, layer thickness, soil porosity, and soil moisture content were selected to be consistent with values used in the HELP model runs conducted for groundwater analysis. The bulk density falls within the range of surface soil bulk densities reported in soil surveys of Hamilton (USDA 1982) and Butler (USDA 1980) counties. The thickness of the surface soil was assumed to be 18 instead of 6 inches. The surface soil typically has the highest radium-226 concentration (compared to subsurface soil) and the emission model uses the layer thickness in calculating radon-222 flux. Using the larger layer thickness provides a more conservative (higher) estimate of radon-222 emissions. The remaining parameters were taken from HELP model input files used in the Operable Unit 5 FS.
Action: Footnotes and references have been added to Table F-4-14

129. Commenting Organization: U.S. EPA Commentor: Saric
Section #: G Page #: NA Line #: NA
Original General Comment #: 24
Comment: Section G.2.2.2.5 states that personal protective equipment (PPE) will be worn by workers (presumably on-site remediation workers) to reduce the potential for exposure through inhalation, dermal contact, and ingestion. Figure G.2-1 indicates that the inhalation exposure pathway (except for inhalation exposures associated with volatiles from groundwater treatment) is considered a complete exposure pathway and will be quantitatively evaluated. The ingestion and dermal exposure pathways are not evaluated because the use of PPE mitigates exposure from these pathways. Similarly, Table G.3-2 indicates that inhalation exposures will be quantitatively

evaluated, but ingestion and dermal pathways are not evaluated because exposure from these pathways will be mitigated by administrative controls and the use of PPE, respectively.
Appendix G should be revised to clearly and consistently state whether and for what reasons potential exposure of on-site remediation workers through inhalation is or is not evaluated quantitatively and why the ingestion and dermal pathways are not evaluated.

Response: Page G-2-13, line 23 incorrectly lists inhalation in the exposures mitigated by protective clothing.

Action: Change the phrase "reduce the potential for inhalation, dermal, and ingestion exposures." located on line 23, page G-2-13, to "reduce the potential for dermal and ingestion exposures. Because these controls are assumed to effectively minimize dermal contact and ingestion, exposures from those pathways are not quantified in this assessment."

130. Commenting Organization: U.S. EPA Commentor: Saric
Section #: G.1.0 Page #: G-1-1 Line #: 26
Original Specific Comment #: 95
Comment: This comment references U.S. EPA's RAGS, Part A, as "(EPA 1991a)." RAGS, Part A, was published in 1989. Line 26 and the corresponding reference section should be revised to correctly reference RAGS, Part A.
Response: The error in the citation is noted.
Action: Change the citation on line 26 of pg G-1-1 from "(EPA 1991 a,b)" to "(EPA 1989; EPA 1991)"

131. Commenting Organization: U.S. EPA Commentor: Saric
Section #: G.2.2.2.2 Page #: G-2-16 Line #: NA
Original Specific Comment #: 96
Comment: Table G.2-2 presents component-level release mechanisms. The potential exposure pathways under Component 1 do not include the inhalation pathway for the on-site remediation worker; however, Figure 6.2-1 includes this pathway, and potential exposures to on-site remediation workers through inhalation are discussed throughout the appendix. Table G.2-2 should therefore be revised to include inhalation by on-site remediation workers as a potential exposure pathway under Component 1.
Response: Inhalation was mistakenly left out of this table entry.
Action: Change the table entry for the site remediation worker performing excavation from:

"•SRW	to:	"•SRW
-DR		-INH
-MH-C"		-DR
		-MH-C"

132. Commenting Organization: U.S. EPA Commentor: Saric
Section #: G.2.2.2.5 Page #: G-2-13 Line #: 22 to 24
Original Specific Comment #: 97
Comment: These lines state that "This study also assumes protective clothing will be worn by the workers to reduce the potential for inhalation, dermal, and ingestion exposures." Figure G.2-1 shows that potential exposures to on-property remediation workers through inhalation will be evaluated, but potential exposures through dermal contact and incidental ingestion will not be evaluated because the use of PPE mitigates these pathways. Similarly, Table G.3-2 indicates that potential exposures for the on-property remediation worker through inhalation are quantified, but potential exposures through incidental ingestion and dermal contact are mitigated through administrative controls and the use of PPE, respectively. Appendix G should be

revised to clearly and consistently discuss whether potential exposures through inhalation are evaluated as part of the short-term risk assessment. Appendix G should also be revised to provide the rationale for any decision to quantify potential exposures for on-property remediation workers in light of the statement made in Lines 22 to 24 on Page G-2-13.

Response: See response to Comment 129.

Action: See proposed action for Comment 129.

133. Commenting Organization: U.S. EPA Commentor: Saric
Section #: G.3.2.1 Page #: G-3-9 Line #: NA
Original Specific Comment #: 99

Comment: Table G.3-1 presents exposure point concentrations in soil. Some of the values are presented as "0.00." This presentation is misleading. Insufficient data was collected to definitively determine that any of the contaminants is not present at FEMP; therefore, Table G.3-1 should be revised to eliminate all use of the presentation "0.00" and replace it with appropriate terms indicating whether the contaminant was not analyzed for in a particular area or the concentration was less than detection limits.

Response: Agree.

Action: All "0.00" entries in Table G.3-1 will be removed. Where no data is available, the entry "n.d." will be substituted. Where all results were below the detection limit, the entry "<d.l." will be inserted.

134. Commenting Organization: U.S. EPA Commentor: Saric
Section #: G.3.2.2 Page #: G-3-3 Line #: 1 to 8
Original Specific Comment #: 98

Comment: These lines define the parameters used in the calculation of intakes through the inhalation pathway; however, the text does not indicate where the values used for these parameters are located. Section G.3.2.2 should be revised to specify where the parameter values are located.

Response: Agree. These values are currently distributed throughout the document. This is confusing and interferes with the flow of information. A central reference point for all exposure factors will be created.

Action: A new table will be included which lists the exposure factors used in the short-term risk assessment. This table will follow the exposure pathway table and will be numbered as Table G.3-3. The numbers of all subsequent tables and table references in this section will be incremented by one (1). The following sentence will be inserted after line 19 on page G.3-2: " Table G.3-3 presents the parameters used to quantify these exposure pathways."

135. Commenting Organization: U.S. EPA Commentor: Saric
Section #: G.3.4.2 Page #: G-3-25 Line #: NA
Original Specific Comment #: 100

Comment: Table G.3-5 presents injury and fatality hazard coefficients. The table does not specify which coefficients are used to represent each process or component. For example, Tables G.3-4 and G.4-6 indicate that injuries during excavation and off-site disposal were calculated using the injury coefficient for general building contractors, but injuries associated with groundwater treatment were calculated using the injury coefficient for electric, gas, and sanitary services. Table G.3-5 should be revised to specify which coefficients were used to calculate fatalities and injuries associated with each process or component.

Response: Agree. This information will be provided by a new column in the table currently

identified as Table G.3-5.

Action: Replace the current version of Table G.3-5 with the new version of the table, now renumbered as Table G.3-6, which incorporates injury and fatality coefficients.

136. Commenting Organization: U.S. EPA Commentor: Saric
Section #: G.4.1.3 Page #: G-4-11 Line #: NA
Original Specific Comment #: 101

Comment: Table G.4-3 presents selected human health risks for on-site remediation workers. The carcinogenic sum for excavation under Alternative 3a, Case 7, is presented as 9.4×10^{-4}; however, a check of this sum reveals that it is incorrect. Table G.4-3 should be revised to present this carcinogenic sum as 1.5×10^{-3}.

Response: Agree. Both the external radiocarcinogenic risk values and carcinogenic sums are incorrect. The incorrect values are from a previous version of the table. This version was mistakenly printed out and included in the current version.

Action: Replace the current version of Table G.4-3 with the revised version of Table G.4-3 which incorporates corrections to the external radiocarcinogenic risk values and carcinogenic sums.

137. Commenting Organization: U.S. EPA Commentor: Saric
Section #: G.I.1.3 Page #: G-I-18 to -26 Line #: NA
Original Specific Comment #: 102

Comment: A check of a sample of the results indicates that Tables G.I-2 through G.I-4 may contain errors in the risks presented. For all three tables, the ILCR calculated as shown in each table's footnotes appear to be two orders of magnitude too high. For example, in Table G.I-2, the ILCR presented for U238 + d under Case 1 is 1.1×10^{-5}. The calculated value is 1.1×10^{-7}. Also, in Tables G.I-2 and G.I-3, the chronic exposure dose equivalents (CEDE) presented for Radium 226 + d, U235 + d, and Thorium 232 + d are all incorrect. The incorrectness of these values can easily be verified by noting that the CEDE values for Thorium 232 + d under Cases 1 and 2 are both presented as 19.0 even though the number of workers under the two cases is different. Tables G.I-2 through G.I-4 should be closely reviewed and all calculations verified and corrected as necessary. The text should be revised as necessary to reflect any corrected values.

Response: Agree. There are two problems with these tables.

1) The tables footnotes are in error and will be corrected.
2) The CEDE results are incorrectly reported and will be corrected. The impact of these changes is minimal because the CEDE results are only presented here and were not used elsewhere in the November document.

The tables correctly report the ICLR results.

Action: Replace the current versions of Tables G.I-2 through G.I-4 with the revised versions of Tables G.I-2 through G.I-4 following this comment response/action.

138. Commenting Organization: U.S. EPA Commentor: P. VanLeeuwen
Section #: H Pg.#: Line#: Code:
Original Comment #: 12

Comment: As we have discussed numerous times, the source terms used to calculate CRARE residual risks <u>MUST</u> include background levels of both inorganic and organic COCs; ONLY radionuclide COC are exempt from this direction. All calculation and discussions of inorganic risks in this section are bogus and should be revised. We have already advised FERMCO that Figures H.6-1 and 2 should be revised. Background levels may be shown in the figures for comparison, but any presentation of risks to the public must include background risks unless FERMCO knows of

some way to selectively eliminate the background portion of the exposure.

Response: Comment acknowledged.

The information as presented in the CRARE attachment of the Operable Unit 5 FS was not intended to pre-select or justify a residual risk level. The purpose of presenting three columns of risk values (i.e., Option A, Option B, Option CRARE) was to provide information for the regulators and other decision makers about the residual risk levels and their components that impact key and reference receptors. Labeling of these risk levels may have been misleading to the reader. Option A represented the residual or total risk experienced by the receptor including radiological and inorganic background risk. Option B was the residual risk minus the risk presented by naturally occurring radionuclide background. Option CRARE as presented in the report was the residual minus both radiological and chemical background and can also be referred to as the incremental risk above background.

DOE/FERMCO is in agreement with Region 5 that naturally occurring background contributions must be considered as an integral component of the residual risk values. On the other hand it is valuable to know what magnitude of contribution that naturally occurring background of both radiological and inorganic constituents contribute to the overall risk picture. Failure to examine this information may impede informed and sound decision making.

Action: This "tiering" of the risk levels was intended to present decision makers with as much information as possible on the composition of the risk experienced by the entire suite of receptors. To stress this point, tables (including H.6-1 and H.6-2) will be altered to reflect this unbiased presentation of risk information. We believe there is general agreement that the residual risk values presented are accurate but the presentation format needs to be improved for clarity.

139. Commenting Organization: U.S. EPA Commentor: Saric
Section #: H Page #: NA Line #: NA
Original General Comment #: 26
Comment: The text should provide a reference for the source of the background levels of COCs.
Response: Agree; references will be provided.
Action: Text and tables presenting background levels will be noted with the following references: U.S. Dept. of Energy, 1994a, "Characterization of Background Water Quality for Streams and Groundwater," Fernald Environmental Management Project, DOE, Fernald Field Office, Cincinnati, OH.
U.S. Dept. of Energy, 1993a, "CERCLA/RCRA Background Soil Study," Fernald Environmental Management Project, DOE, Fernald Field Office, Cincinnati, OH.

140. Commenting Organization: U.S. EPA Commentor: Saric
Section #: H Page #: NA Line #: NA
Original General Comment #: 25
Comment: The CRARE approach does not consider risks posed by background concentrations of inorganic or radionuclide contaminants of concern (COC). Although the Risk Assessment Guidance for Superfund (RAGS) states that in some cases, naturally occurring levels of inorganics may be eliminated from the quantitative risk assessment, RAGS also states that if background concentrations present a significant risk, as at the FEMP site, then the background risk is an important site characteristic to those exposed. Background concentrations of inorganic COCs should be included in the CRARE approach. It should be noted that non-naturally occurring radionuclide sources can be more readily identified than sources of chemical

contaminants. It is appropriate to eliminate naturally occurring levels of radionuclides from residual COC concentrations.
Also, option B of the CRARE includes inorganic and organic background concentrations but does not consider naturally occurring radionuclide levels. The text should be revised to replace the current CRARE approach with option B.

Response: Agree. Three options were presented to provide a way to differentiate between risks associated with total residual concentrations and the component due to background of radionuclides and inorganics. The CRARE option or approach was not intended to endorse the selection of values eliminating background.

Action: The CRARE text and tables will be revised to clarify the presentation of risk values as they relate to the residual contaminant post-remedial concentrations.

141. Commenting Organization: U.S. EPA Commentor: Saric
Section #: H.2.3 Page #: H-2-8 Line #: 31
Original Specific Comment #: 103

Comment: The text states that all chemicals of potential concern (CPC) collectively posing 95 percent or greater of the total risk are identified as COCs. The remaining CPCs are not evaluated in the CRARE for OU 5. RAGS, Section 5.9, suggests that COCs posing 99 percent of total cancer risk or hazard be presented in the main text of the report and that the remaining chemicals be presented in the appendixes. The document should be revised to include the rationale for including only CPCs posing 95 percent or greater of the total risk or hazard and not including the remaining chemicals in the appendixes.

Response: Comment acknowledged. The CRARE COC's list will be revised to include those CPCs posing 99 percent of the total preremedial cancer risk and hazard. The purpose of the CRARE is to identify potential health risks resulting from multiple pathway exposures under the projected postremedial site conditions. Due to the uncertainties involved in remediation, risk drivers representing 99 percent of the total target receptor risks were used to simplify and focus this evaluation effort.

Action: The rationale and approach for CRARE COC selection will be included in Section H.2.3. These changes will ensure that the CPCs posing no less than 99 percent of the total risk or hazard have been accounted for in the CRARE.

142. Commenting Organization: U.S. EPA Commentor: Saric
Section #: H.3.4.2 Page #: H-3-19 Line #: 30 and 31
Original Specific Comment #: 110

Comment: The partition coefficient values presented in these lines are not referenced. The source of these values should be provided.

Response: Agree. References will be provided.

Action: The following text will be added at the end of line 32: "(see Section F.1)."

143. Commenting Organization: U.S. EPA Commentor: Saric
Section #: H.4.1 Page #: H-4-1 Line #: 23 and 24
Original Specific Comment #: 104

Comment: The text does not consider workers that will maintain the on-site disposal cells or trespassers that may be exposed to the disposal cell as target receptors in the undeveloped park scenario. The text should be revised to either include these receptors as target receptors or include an acceptable rationale for their exclusion.

Response: The combination of target and reference receptors provided in the CRARE covers the range of possible risk levels associated with remediated site conditions. Since the disposal facility includes a thick protective cover, the risks to the groundskeeper and trespasser will be less than the risk to the undeveloped-park user.

Action: The text will be revised to clarify this point.

144. Commenting Organization: U.S. EPA Commentor: Saric
Section #: H.4.1 Page #: H-4-2 Line #: NA
Original Specific Comment #: 105
Comment: Figure H.4-1 states that the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) risk assessment methods for radionuclides do not address external radiation exposure in air. Section 10.5.5 of RAGS presents a method to calculate external exposure to radionuclides in air. The baseline risk assessment from the RI for OU 5 states that the contribution to exposure from this pathway is negligible. The text should be revised to include a rationale for exclusion of airborne radionuclides similar to that presented in the OU 5 RI baseline risk assessment.
Response: Agree.
Action: The "3" (denoting that the CERCLA risk assessment method does not address this exposure route) in Figure H.4-1 will be changed to "2" for this pathway.

145. Commenting Organization: U.S. EPA Commentor: Saric
Section #: H.4.5.2 Page #: H-4-26 Line #: NA
Original Specific Comment #: 106
Comment: The reasonable maximum exposure risk value for direct radiation is not provided in Table H.4-8. The missing value is mistakenly shown as the risk value for ingestion of vegetables and fruits contaminated with radionuclides. The table should be revised to include the correct risk values.
Response: Agree.
Action: The table will be reviewed and appropriate corrections made.

146. Commenting Organization: U.S. EPA Commentor: Saric
Section #: H.5.7.5 Page #: H-5-9 Line #: 17 to 19
Original Specific Comment #: 108
Comment: The text states the contaminant levels in consumed drinking water will most likely be less than the default values. The default values mentioned should be defined and referenced in the text.
Response: Agree.
Action: The text will be revised to refer to "consumption rates" rather than "contaminant levels."

147. Commenting Organization: U.S. EPA Commentor: Saric
Section #: H.5.7.5 Page #: H-5-9 Line #: 15 and 16
Original Specific Comment #: 107
Comment: The text states that an adult is more likely to consume 1.4 liters per day (L/day) of drinking water than the 2 L/day default value provided by U.S. EPA. A reference for this statement should be provided.
Response: Agree. References will be provided.
Action: The references "EPA 1989g," the Risk Assessment Guidance for Superfund Part A, and "EPA 1993g," the Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposure, Preliminary Draft, May 5, will be added at the end of the indicated sentence on line 16.

148. Commenting Organization: U.S. EPA Commentor: Saric
Section #: H.IV and H.V Page #: NA Line #: NA
Original Specific Comment #: 109
Comment: An attempt was made to reproduce the chronic daily intake (CDI) values presented in Tables H.IV-5 and H.V.1-5; however, the values differ by a factor of 1×10^{-6} from CDI values listed in the tables. A unit analysis was performed and all units canceled accurately; therefore, it appears that the radionuclide concentrations presented in pCi per milligram (pCi/mg) are actually in pCi per kilogram (pCi/kg) concentrations. The radionuclide concentrations in these and all similar tables should be reviewed and revised as appropriate.
Tables H.IV-10 and H.V.1-10 also present CDI values; however, the CDI values presented could not be duplicated when checked. The outdoor shield factor is apparently missing from the tables and it is unclear why an indoor shield factor is presented when the receptor indoor exposure time is not applicable. These and similar tables should be reviewed and calculations should be corrected as necessary.
Response: Agree.
Action: All tables presenting CDI values will be reviewed, calculations checked, and corrections made where appropriate.

149. Commenting Organization: U.S. EPA Commentor: P. VanLeeuwen
Section #: H-VI Pg.#: Line#: Code:
Original Comment #: 13
Comment: a) The reference for the Exposure Factors Handbook (AIHC 1994) is missing. Explain why this document was chosen as the source of parameter distribution data for this analysis.
b) Exposure Duration: The analysis does not indicate that the values used in the risk assessment were based on the practice in the area surrounding Fernald (70 years), not the national average (30 years). More specific data, especially distribution data to use in Monte Carlo (MC) analysis, is seldom available for local areas. The discussion does not explain that the MC analysis done here substitutes the Israeli and Nelson (1992) data for more site-specific considerations. Please explain in the text why these data are more appropriate than local realty industry data and what is to be gained by applying this data to the Fernald area.
c) Body Weight: If body weight is a sensitive parameter, shouldn't male and female exposure be examined separately in an uncertainty analysis? The average female probably weighs much less than adult 72 kg mean. Women do farm. The uncertainty in the risk analysis is not addressed by doing a combined adult calculation. It is obvious from the sensitivity analysis that the risk calculation, as performed in the RI, is not conservative for women.
d) Ingestion Rate: The text states that the zirconium data was used to prepare the simulated distribution because this is the "most reliable tracer." That is a hotly debated issue that does not lend itself to such a statement of fact. All that is universally agreed upon is that the zirconium data gives the lowest of several estimates of ingestion rate; this is not explained in the text. A more appropriate uncertainty analysis would look at the risk using the distribution about the data used in the RI assessment.
e) Section H.VI.5.1 Impact: The discussion does not indicate that rather than examine the distribution (and uncertainty) about the data used in the RI to make the point estimates, this uncertainty analysis used DIFFERENT DATA BASES to select different means and ranges of values for a MC analysis. The analysis is really an analysis of outcome using alternate sources of parameter values. A

more meaningful MC analysis would have examined the risk range using the SAME DATA BASES as used in the RI risk calculations, not different ones. Overall, the uncertainty section purports to be a more indepth analysis of the point estimates, but it is really more an evaluation of alternate data inputs. This should be thoroughly explained in this section.

Response: Per discussions with U.S. EPA Region V on 22-23 February, Attachment H.VI, "Quantitative Uncertainty Analysis of Exposure Parameters and the Impact on Preliminary Remediation Goals,"will be deleted from this document.

Action: Attachment H.VI will be deleted.

150. Commenting Organization: U.S. EPA Commentor: Saric
Section #: J Page #: NA Line #: NA
Original General Comment #: 27
Comment: The text should discuss the potential presence of endangered, threatened, or special status species in an on-site wetland. These species should be considered before determining which wetlands will be lost as a result of cleanup activities. Also, the text should include a map delineating which wetlands will be lost.
Response: Agreed.
Action: The following text will be added: "Consultation with the Ohio Department of Natural Resources and the U.S. Fish and Wildlife Service took place to determine which areas contained potential for the presence of threatened and endangered (T&E) species before initiation of T&E species surveys. Based on this agency consultation, only wetlands located along the riparian area and in the north woodland contained the potential for T&E species. Surveys were performed in those wetland areas and indicated no presence of endangered, threatened, or special status species. To avoid the confusion with having multiple versions of Wetland maps, the existing Wetland map will be revised in the future to reflect Wetland losses and will accompany the FEMP Wetland Mitigation Plan if appropriate."

151. Commenting Organization: U.S. EPA Commentor: Saric
Section #: K Page #: NA Line #: NA
Original General Comment #: 29
Comment: The cost estimate for soil washing at the rate of 20 tons per hour does not reflect the cost savings that can be achieved using higher soil washing rates. Considering the large volumes of soil assumed for the soil washing component, a higher production rate should be used for cost estimating. Also, the contingency factor of 57 percent is not justified. The estimate should be revised to consider higher soil washing rates and lower contingency factors. A lower cost estimate for soil washing may allow soil washing on site and reduce the off-site soil disposal volume.
Response: It is not reasonable to assume that sufficient volumes of contaminated soil would be available for excavation to sustain a higher treatment capacity, given the assumed 7 days per week, three 8-hour shifts per day operating schedule. A 20-ton per hour soil washing capacity was selected based on current remediation schedules of all FEMP operable units, and the projected availability of contaminated soil for excavation within each operable unit. A 20-ton per hour treatment capacity with an 85 percent availability rate and a 75 percent processing efficiency rate (to account for reworking some soil) equates to a nominal processing capacity of 12.5 tons per hour. For the assumed operating schedule, this plant would process 2.4 million tons of contaminated soil. Assuming a soil density of 1.35 tons per cubic yards for excavated soil, this would equate to almost 1.8 million cubic yards of contaminated soil.

Extensive soil washing treatability studies of FEMP soil (see Appendix D) have shown that soil washing is successful in reducing uranium concentrations in sample soil to between 50 and 100 ppm. From Tables 2-18 and 2-21, less than 1,797,000 yd^3 of contaminated soil exceeding a PRL of 50 ppm is estimated on- and off-property. This volume is approximately equivalent to the total capacity of the assumed soil washing system.

The contingency factor ranged from 57 percent for processing 1.5 million yd^3 to 50 percent for processing 2 million yd^3. The contingency factor was determined using a Monte Carlo simulation. Risk and contingency input parameters were determined by applying percentages to the major cost impact elements based on the engineers' and cost estimators' experience, and the availability of other technical and cost information as reflected by the Cost Impact Matrixes. These percentages were reviewed and refined to reflect as realistic values as possible. Given that soil washing is still an unproven technology at the FEMP site, a contingency factor of from 50 to 57 percent is not considered overly conservative.

Action: None required.

152. Commenting Organization: U.S. EPA Commentor: Saric
Section #: K Page #: NA Line #: NA
Original General Comment #: 28
Comment: The overall basis for estimating the costs of the remedial components seems reasonable; however, the use of the risk and contingency factors for the O&M cost estimates seems inappropriate and overly conservative. The rationale for using a contractor turnover rate of 2 years is not explained and should be.
Response: Disagree with the commentor's statement that "risk and contingency factors for the O&M cost estimates seems inappropriate and overly conservative." Considering the duration of some remedial activities and their magnitude of cost, certain elements of operations and maintenance (e.g., availability of chemical supplies, treatment media, and replacement parts) do have significant impact on overall costs, and require probabilistic analysis to address the uncertainties and risk associated with cost overruns.

It is not realistic to assume that a single contract would be awarded for the full 22 years of operations. A 2-year contractor turnover was chosen based partly on current DOE contracting preferences. The contractor turnover rate could just as easily have been 4 years. However, the cost difference is relatively insignificant when considering alternative costs measured in the hundreds of millions.

Action: On Page K-1-3, Section K.1.1.3, first bullet, will replace the first, fourth and fifth sub-bullets with the following sub-bullet:

"- Soil/sediment excavation and backfill, and construction of the consolidation area and on-property disposal cell will occur for 22 years via eleven 2-year contracts. A 2-year contract period was chosen based on DOE preference for shorter contract periods. Each contract will include full mobilization and demobilization costs."

153. Commenting Organization: U.S. EPA Commentor: Saric
Section #: K Page #: NA Line #: NA
Original General Comment #: 30
Comment: The rationale for the assumptions used to develop the risk and contingency factors is not explained. The use of the Monte Carlo technique in deriving the risk and contingency factors, especially for the soil washing and groundwater and wastewater treatment, should be explained. Also, the impact of the risk and contingency factors on the comparison of the alternatives should be discussed in Appendix K.

Response: Additional explanation of Risk and Contingency is needed to clarify how the two costs are derived.

Action: Sections K.2.1.9 and K.2.1.10 will be replaced by the following:

"K.2.1.9 Risk Budget and Contingency

Risk budget is a specific provision as a separate line item in the estimate to cover cost overruns that may result from incomplete design, unforeseen and unpredictable site conditions, or uncertainties. Contingency is a specific provision as a separate line item in the estimate to ensure a balanced cost risk. It is the amount to be added to the base estimate to achieve a 50 percent chance of overrun or underrun. The following method was used to determine the risk budget and contingency factors for each remedial component.

Each remedial component estimate was broken down into various cost elements (major cost drivers) as presented by each Cost Impact Matrix. Percentages were then developed to measure the level of confidence of all the available information used to generate costs (e.g., design information, available unit costs, etc.). The percentages were also tempered by the engineers' and cost estimators' experience. The resulting low and high percentages of a cost element defined the lower and upper limit of the range for the cost element. The risk profile selected for this analysis was a uniform probability distribution. The risk profile defines how a sample will be drawn by the specified range of a cost element during computer simulation. It is the range of values generated from the Cost Impact Matrix in combination with the risk profile for each cost element that forms the basis for the simulation analysis.

Data is entered from the matrices onto the 'Range Estimate' spreadsheet within the Monte Carlo program. The program generates 2000 samples within each of the confirmed ranges of the estimated cost elements and produces a frequency plot from which a curve is then drawn showing the probability of estimated overrun or underrun at any given total cost level.

The analysis report was reviewed to attain the risk budget and contingency amounts based on the overrun probability level. The risk budget percentage is the portion of the overprobability that can be applied to the base estimate to achieve the target estimate. This amount is obtained from the line that identifies the '50 percent chance of overrun.' The amount applied for contingency is the difference between the 5 percent chance of overrun and 50 percent chance of overrun."

154. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.1 Page #: NA Line #: NA
Original General Comment #: 31

Comment: The text assumes that the soil from contaminated areas less than 5 acres in size will not be removed; however, because of the lack of justification for this assumption, it is not clear why the contaminated soil from areas less than 5 acres in size will not be removed. The text should be revised to clarify this issue.

Response: For purposes of presenting the verification sampling logic, it was assumed that an off-property farm, as defined in the Baseline Risk Assessment, that supports a resident farm family and produces 40 percent of their total daily vegetables, 30 percent of daily fruits, and 75 percent of the meat and dairy products eaten in a year would have to be 5 to 20 acres in size. An area smaller than this would not be large enough to support the farmer and thus would not constitute a sufficient risk to warrant cleanup. The purpose of this section was to present the logic for verification sampling. The issue of the minimum allowable hot spot after cleanup will have to be resolved in the development of the RD/RA.

Action: None required.

155. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.1 Page #: L-1-2 Line #: NA
Original Specific Comment #: 111
Comment: Figure L.1-1 shows that segregated and pretreated soil with contaminant levels below PRLs will be loaded, transported, and stockpiled for backfilling. The rationale behind loading and transporting soil with contaminant concentrations below PRLs is not clear. Perhaps the symbol "< PRL" is mistakenly used in place of "> PRL." The figure should be checked and corrected if necessary.
Response: The symbol "<PRL" is mistakenly used in place of ">PRL" in the figure.
Action: The figure will be revised to show that soil with contaminant concentrations greater than the PRL will go to Loading.

156. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.1 Page #: L-1-3 Line #: 9 and 10
Original Specific Comment #: 112
Comment: The text states that analytical detection levels and procedures may range from the hand-held field instruments to laboratory procedures. Analytical detection levels are chemical concentrations and not instruments or procedures. The text should be revised to clearly state the analytical detection levels.
Response: The text incorrectly refers to hand-held field instruments as analytical detection levels and procedures.
Action: Lines 9 and 10 will be revised as follows, "Verification survey procedures may entail the use of hand-held field instruments or sampling and laboratory analysis to detect contaminant concentrations in suspect areas."

157. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.1 Page #: L-1-7 Line #: 13 and 14
Original Specific Comment #: 113
Comment: The text states that some suspect areas may be reduced in size to below the 5-acre limit and therefore will not require remediation. As discussed in General Comment 29, the rationale for not remediating areas less than 5 acres in size is not clear and should be explained.
Response: See response to comment 154.
Action: None required.

158. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.1 Page #: L-1-10 Line #: 22 to 25
Original Specific Comment #: 114
Comment: The text in Lines 22 and 23 states that sampling will extend to the water table or to a depth of 5 feet below the depth of the RI sample that indicated contaminant presence; however, the text in Lines 24 and 25 states that samples will be collected until the bottom of the boring is reached. The text should be revised to resolve this inconsistency.
Response: Agree. The text as written is confusing and will be clarified.
Action: Line 25 will be revised as follows, "every other 6 inches until the water table is reached or no contaminant concentrations exceeding the PRLs are detected."

159. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.1 Page #: L-1-11 Line #: 10 to 12
Original Specific Comment #: 115
Comment: The text states that the coarse-grained material will be removed if it can sustain a yield of 1 gpm for at least 2 days. The text should be revised to clarify what will

happen to the coarse-grained material that does not have a sustained yield of 1 gpm for 2 days, but that contains contaminant concentrations above the PRL.

Response: The paragraph does not clearly state what will happen to coarse-grained material that doesn't have a sustainable yield but does contain contaminant concentrations above the PRLs.

Action: The following sentence will be added after the sentence in question, "Coarse-grained material which does not sustain a yield of 1 gpm for at least 2 days, but contains contaminant concentrations above the PRLs, would also be excavated for subsequent treatment, storage or disposal, depending upon the remedial alternative."

160. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.10 Page #: NA Line #: NA
Original General Comment #: 32

Comment: Anticipated wastewater characteristics and flow rates are presented in several tables in Section L.10; however, the data and calculations used to estimate these characteristics and flow rates are not presented. Section L.10 should either be revised to present the missing information or provide a correct and complete reference to a document containing the missing information. The availability of data and calculations used to estimate the wastewater characteristics and flow rates is important for independent verification of the anticipated wastewater characteristics and flow rates presented in Section L.10.

Response: Agree. The source of information for the Tables L.10-1 through L.10-6 are listed below. Some of the anticipated flows are estimated based on site programs that may change due to uncertain site budgets and evolving plans. Some information is not available in a published format but exists in plant data logbooks.

1. Information in Tables L.10-1 & 2 was taken from recent groundwater modeling reports which are presented in Appendix F.7.
2. Information in Tables L.10-3 was taken from the Plant 6, Plant 2/3, and Plant 9 Contaminated Perched Water Modified Removal Action Work Plans, August-September, 1990 and from Plant 8 VOC Treatment System process data (1991 - 1994).
3. Information in Table L.10-4 was based on the latest information from the various FEMP operable unit organizations and is documented in the FEMP Strategic Plan for Remedial Waste Treatment, Storage and Disposal, September, 1994.
4. Information in Tables L.10-5 & 6 was taken from existing plant data logbooks, engineering assessments, etc., which have been partially compiled onto site drawing 20X-5500-F-00377.

Action: The following changes will be made to the text to clarify the sources of the information presented in Tables L.10-1 through L.10-4.

Page L-10-2 line 22 will be modified to read "...are shown in Table L.10-1 and discussed in Appendix F.7."

Page L-10-2 line 28 will be modified to read "...treatment facility are summarized from Appendix F.7 and presented in Table L.10-2."

The following footnote will be added to Table L.10-3, "Taken from the Plant 6, Plant 2/3, and Plant 9 Contaminated Perched Water Modified Removal Action Work Plans, August-September, 1990 and from Plant 8 VOC Treatment System process data (1991 - 1994)."

The following footnote will be added to Table L.10-4, "Based on the FEMP Strategic Plan for Remedial Waste Treatment, Storage and Disposal, September, 1994."

161. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.1 Page #: L-1-11 Line #: 24 to 26
Original Specific Comment #: 116
Comment: The text states that the boring will advance until at least 3 feet of till has been penetrated below the water-bearing unit or until the boring is within 5 feet of the base of the glacial overburden, whichever comes first. Because the elevation of the base of glacial overburden varies with location and may not be known at the locations of some boreholes, the text should clarify how it will be determined that the boring is within 5 feet of the base of the glacial overburden.
Response: The text as written is confusing and will be clarified.
Action: The following text will be added, "The top of the glacial overburden will be estimated by a senior geologist during the planning phase of the investigation using the database of existing FEMP borings and wells. An additional buffer of 3 feet will be added to the 5 foot buffer by the Geologist if nearby existing borings or wells are not adequate for the estimation."

162. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.1 Page #: L-1-18 Line #: 17
Original Specific Comment #: 117
Comment: The phrase "below a containing HWMU" is unclear and appears to be missing words. The text should be reviewed and corrected as necessary.
Response: The text as written is confusing and will be clarified.
Action: Line 17 will be revised as follows, "originating beneath a HWMU that managed listed waste (for off-site alternatives) would be..."

163. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.1 Page #: L-1-20 Line #: 3 to 6
Original Specific Comment #: 118
Comment: The text states that final certification sampling will be conducted to indicate with reasonable confidence that the area's average contaminant concentrations are statistically above the cleanup standards established in the ROD. Average contaminant concentrations above ROD-established cleanup standards implies that the area still needs remediation; therefore, the objective of the final certification sampling should be revised to demonstrate that the contaminant concentrations are below ROD-established cleanup standards. Also, the phrase "reasonable confidence" in the referred text should be replaced with a quantitative confidence level such as 95 percent upper confidence level.
Response: Certification sampling should show that remediated areas are statistically below the cleanup standards established in the ROD.
Action: Lines 3 to 5 will be revised as follows, " Final certification sampling would be conducted to indicate that the excavated areas' average contaminant concentrations are statistically below the cleanup standards established in the ROD."

164. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.2 Page #: NA Line #: NA
Original General Comment #: 33
Comment: Section L.2 presents several process flow diagrams (PFD). Each PFD is accompanied by a table that presents information on various streams in the PFD. These tables are presented in small font size and are poorly reproduced, which makes the tables difficult to read. The tables in PFDs should be revised to improve their readability.
Response: The tables presented in the PFDs are of standard size and format and cannot be

changed. The PFDs presented in the FS were copies of copies. Readability will be improved by using original PFDs for reproduction.

Action: Ensure clearly legible originals are used for reproduction purposes.

165. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.2 Page #: L-2-2 Line #: 10 to 13
Original Specific Comment #: 119

Comment: The text presents the rates of carbonate and sulfuric leach processes as 20 and 1.7 tons per hour, respectively. The text should also provide the basis for selecting these rates.

Response: The soil washing system capacity, including the carbonate leaching process, was selected based on the projected availability of contaminated soil for excavation. This capacity was assumed to be 20 tons per hour based on current remediation schedules for all operable units (see response to Comment 31 for additional information).
A sulfuric acid leaching process rate of 1.7 tons per hour was selected based on process knowledge and engineering judgment that the process would treat 10 percent of the feed (dry solids basis) to the carbonate leach process.

Action: The following text will be added to line 11: "A 20-ton per hour soil washing capacity was selected based on current remediation schedules of all FEMP operable units, and the projected availability of contaminated soil for excavation within each operable unit."
The following text will be added to line 13, "A 1.7-ton per hour processing rate was selected based on process knowledge and engineering judgment that the process would treat 10 percent of the feed (dry solids basis) to the carbonate leach process."

166. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.2 Page #: L-2-3 Line #: NA
Original Specific Comment #: 120

Comment: Figure L.2-1 shows that a portion of the filtrate from multimedia filtration of liquid from the dewatering operation is recycled to the carbonate leach process. The remaining filtrate goes to the advanced wastewater treatment (AWWT) plant. Because the role of recycled water in the carbonate leach process is not explained in the text and because the figure does not show that any solids are removed in the filtration process, it seems the arrows showing recycling of filtrate are probably erroneous. These arrows should show that solids removed during filtration are sent to the carbonate leach process for treatment. The figure should be reviewed and corrected if necessary.
The figure also shows that a portion of the liquid from precipitation/dewatering/recarbonation process is sent to the carbonate leach process. The rest of the liquid is filtrated. The arrows showing recycling of liquid to the carbonate leach process are probably erroneous. These arrows should indicate that solids removed by filtration are sent to the carbonate leach process. The figure should be reviewed and corrected if necessary.

Response: Figure L.2-1 gives an overall view of the soil washing system. Details for the filtration and recycle of the carbonate leach solution are shown in Figure L.2-5. Discussing the disposition of the solids collected during filtration, Note 3 on Figure L.2-5 states that the filters will be backwashed, and the solids along with the backwash water will be sent to the AWWT slurry dewatering system.
The portion of liquid that leaves "Dewatering" and is sent to "Multimedia Filtration" should be recycled back to "Washing/Screening" (as depicted in Figure L.2-5), not to the carbonate leach system.
A portion of the liquid leaving the precipitate belt filter is sent to a recarbonation

tank, where the excess sodium hydroxide remaining from the precipitation process is converted to sodium carbonate by the addition of carbon dioxide. This converted sodium carbonate is recycled back to the carbonate leaching process as reagent supply for leaching. The portion of water liquid leaving the precipitate belt filter that is not recarbonated is filtered, then sent to AWWT for treatment. As before, this filter will be backwashed, and the solids along with the backwash water will be sent to the AWWT slurry dewatering system.

Action: Figure L.2-1 will be revised to show a second line leaving filtration going to AWWT's Slurry Dewatering System, and the text will be modified accordingly. Figure L.2-1 will also show that the portion of liquid that leaves "Dewatering" and is sent to "Multimedia Filtration" should be recycled back to "Washing/Screening," not to the carbonate leach system. New text on page L-2-9 is "a portion of the liquid leaving the precipitate belt filter is sent to a recarbonation tank, where the excess sodium hydroxide remaining from the precipitation process is converted to sodium carbonate by the addition of carbon dioxide. This converted sodium carbonate is recycled back to the carbonate leaching process as reagent supply for leaching. The portion of water liquid leaving the precipitate belt filter that is not recarbonated is filtered, then sent to the AWWT for treatment. This filter will be backwashed, and the solids along with the backwash water will be sent to the AWWT slurry dewatering system".

167. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.2 Page #: L-2-4 Line #: 23 to 26
Original Specific Comment #: 121
Comment: The text states that washing and screening is adequate for decontaminating soil particles greater than 0.157 inch in diameter. The text does not support this statement with a test result or with a reference to a study that can support the statement. The text should provide information to support the statement.
Response: Agree.
Action: New text on page L-2-4 is "High-pressure water used during this process operation is assumed to be adequate for removing loosely bound contaminants from gravel greater than 4 mesh (0.187 inch). The gravel and soil particles less than 0.187 inch are considered to have contaminants more tightly bound to them, requiring more aggressive soil conditions".

168. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.2 Page #: L-2-5 Line #: NA
Original Specific Comment #: 122
Comment: Figure L.2-2 shows a table that presents data on the various streams shown in the figure. This table does not present any information about the mass flow rate for Stream No. 3 or where oversized solids will go. In addition, the figure does not indicate any impact of Stream No. 3 on Streams No. 4 and No. 5. Mass flow rates for Stream No. 3 will probably vary with time, resulting in variable mass flow rates for Streams No. 4 and No. 5. The information in the referred table should be corrected to address these issues.
Response: Oversize material (Stream 6) is sent to monitoring and disposal or clean soil storage as shown in Figure L.2-9.
The mass flow rates of Streams 3 and 4 will vary depending upon the size distribution of the stockpiled soil. However, the mass flow rate of Stream 5 will be maintained at 20 tons per hour (40,000 lbs/hour)

Action: Figure L.2-2 will be revised as follows:
- Stream 3 mass flow rate will be shown as "VARIES"
- All figure titles will include PFD numbers.
- Stream 4 mass flow rates will be shown as "VARIES"

169. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.2 Page #: L-2-7 Line #: 25 and 26
Original Specific Comment #: 123
Comment: The text states that the residence time of 1.25 hours in the reactor scrubber is sufficient for all reactions to occur. The text should provide or refer to information such as a treatability study to support this statement.
Response: The 1.25 hour residence time is based on scrubbing test work at Oak Ridge National Laboratory as reported in the document "Selective Leaching of Uranium from Uranium-Contaminated Soil: Progress Report; ORNL/TM-12177."
Action: The following text will be added to Line 26, " The residence time was selected based on the results of scrubbing test work conducted at Oak Ridge National Laboratory as reported in the document Selective Leaching of Uranium from Uranium-Contaminated Soil: Progress Report; ORNL/TM-12177."

170. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.2 Page #: L-2-8 Line #: NA
Original Specific Comment #: 124
Comment: Figure L.2-4 shows that filtrate from the second zone of the belt filter press (Stream 46) is recycled to aid in washing the filter cake. The figure and the associated text on Page 9 of Section L.2 do not clarify how the filter cake will be washed in the beginning of the process when no filtrate will be present in Filtrate Tank 2. Also, it is not clear what will happen to the filtrate after it becomes saturated with contaminants and may not aid in washing the filter cake. The text should be revised to clarify these issues.
Response: Process water (Stream 43) will be used to wash the filter cake at the beginning and throughout the process. Filtrate Tank 2 is not a stagnant tank and contaminants do not concentrate there. However, it is recognized that the concentration profile would change with recycle. Actual usage would be determined by operational experience.
Action: The following text will replace Line 31, "Process water will be used to wash the filter cake at the beginning and throughout the process. Filtrate from Filtrate Tank 2 is recycled to the front of the belt filter press, thereby sending the contaminated filtrate to Filtrate Tank 3, where the filtrate is sent to precipitation. Filter cake is discharged at approximately 75 percent solids and conveyed to a loading hopper."

171. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.2 Page #: L-2-9 Line #: 20
Original Specific Comment #: 125
Comment: The text indicates that the precipitation process uses a series of two precipitation tanks. Figure L.2-5 shows a series of three precipitation tanks. The text and the figure should be reviewed and corrected to present the actual number of precipitation tanks used.
Response: The text incorrectly states "two tanks" instead of "three tanks."
Action: The number of tanks as stated in the text will be changed to "three."

172. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.2 Page #: L-2-9 Line #: 24 and 25
Original Specific Comment #: 127
Comment: The text states that the overflow from the precipitate thickener is sent to a sump and then pumped to the second wastewater holding tank. Figure L.2-5 does not show the sump referred to in the text. The figure and the text should be reviewed and revised consistently to describe the actual process and equipment.
Response: The text incorrectly states the thickener overflow is sent to a sump.
Action: Lines 24 and 25 will be revised as follows, "The overflow from the precipitate thickener is sent to a wastewater holding tank."

173. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.2 Page #: L-2-9 Line #: 21 and 22
Original Specific Comment #: 126
Comment: The text states that the residence time of 4.5 hours in precipitation tanks allows sufficient time for all reactions to occur. The text should provide or refer to information such as a treatability study to support this statement.
Response: The residence time was a design assumption based on industrial experience of uranium alkaline leach circuits. This assumption is subject to further testing before beginning detailed design.
Action: The following text will be added to Line 22, "The residence time will be verified by future testing and revised as necessary before the start of detailed design."

174. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.2 Page #: L-2-16 Line #: 12 to 23
Original Specific Comment #: 128
Comment: The text states that the contents of about 1 in 10 containers will be randomly sampled and analyzed. Containers whose contents meet the WAC will be sent to the clean container storage area, and their contents will ultimately be backfilled on site. Because WACs and PRLs are different and because only soil meeting PRLs can be backfilled on site, the text seems to confuse PRLs with WAC. The text should be corrected to clarify this issue.
The text also states that containers whose contents do not meet PRLs will be sent to the contaminated soil storage pad. The text, however, does not indicate what will happen to containers whose contents are not sampled. The text should be revised to clearly indicate the fate of unsampled containers.
Response: Contaminated soil is excavated based on PRLs. Once excavated, contaminated soil would be treated to attain the WAC for its final disposition: off-site disposal, on-property disposal facility, consolidation, or return as backfill. The text incorrectly states "PRLs" instead of "WAC."
Filled containers would be segregated into lots based on anticipated turn-around times for analytical sampling results. For example, if it takes 8 hours to get the analytical results of a sample, all containers filled during an 8-hour period would be segregated as a lot. The number of containers sampled would be determined by statistical methods. The frequency of sampling would be high until a performance database is established that would justify decreasing the frequency of sampling. Based on laboratory analysis results, the entire lot would be dispositioned to clean storage or further processing.
Action: "PRLs" will be replaced with "WAC" on lines 21 and 29.
Lines 12 to 16 will be replaced with the following text, "Filled containers would be segregated as lots based on anticipated turn-around times for analytical sampling results and stored on a concrete pad adjacent to the treatment facility. For example,

if it takes 8 hours to get the analytical results of a sample, all containers filled during an 8-hour period would be segregated as a lot. The number of containers sampled would be determined by statistical methods. The frequency of sampling would be high until a performance database is established that would justify decreasing the frequency of sampling. Based on laboratory analysis results, the entire lot would be dispositioned to clean storage or further processing. Containers whose contents meet the WAC for on-property backfill will be moved by forklifts to the 'clean ' storage area."

175. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.2 Page #: L-2-17 Line #: NA
Original Specific Comment #: 129
Comment: Figure L.2-9 contains many discrepancies that should be resolved. Figure L.2-9 refers to Note 3 which is not provided. The PFD presented in the figure shows Streams No. 6 and 8, but information for only one of these streams is presented in the table accompanying the PFD. Also, because of poor readability of the table, it is not clear if the information in the table refers to Stream 6 or 8. The figure shows dashed lines surrounding some processes, but the significance of these lines is not explained. The legend also shows that the same line type is used to represent main and secondary process lines, making it impossible to distinguish them. Figure L.2-9 should be revised to correct these problems.
Response: Agree the PFD is not clearly legible and contains discrepancies.
Action: The PFD will be revised to correct the problems listed by the commentor and improve the legibility. Stream 6 will be added to the mass balance table. Reference to Note 3 will be deleted. Dashed lines will be deleted. Main and secondary lines will be clearly distinguished.

176. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.2 Page #: L-2-18 Line #: NA
Original Specific Comment #: 130
Comment: Figure L.2-10 shows dashed lines surrounding some processes, but the significance of these lines is not explained. The legend also uses the same line type to represent main and secondary process lines, making it impossible to distinguish them. Figure L.2-10 should be revised to correct these problems.
Response: Agree the PFD is not clearly legible and contains discrepancies.
Action: The PFD will be revised to correct the problems listed by the commentor and improve the legibility. Dashed lines will be deleted. Main and secondary lines will be clearly distinguished.

177. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.2 Page #: L-2-19 Line #: 15
Original Specific Comment #: 131
Comment: The text discusses the decontamination and demolition of soil washing facilities but does not discuss their disposal. The text should be revised to specify the options for disposing of demolished soil washing facilities.
Response: A discussion of the disposition of soil washing facility demolition rubble and equipment is not germane to the intent of this section - a description of a reference soil washing process.
Action: The following text will be added to Section K.1.3;
"• All remedial facilities are assumed to be decontaminated and demolished at the end of their useful life. Structures, utility systems, vehicles, and process equipment would be decontaminated. Decontaminated vehicles and equipment

would be released for reuse or salvage. Radiologically clean demolition rubble would be disposed of at an off-property landfill. Contaminated demolition material would be packaged and shipped off site for disposal."

178. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.5 Page #: L-5-1 Line #: 29 and 30
Original Specific Comment #: 132
Comment: The phrase "excess soil for consolidation with an earthen cover would be constructed" is unclear. The text should be revised to clarify its meaning.
Response: The text as written is confusing and will be clarified.
Action: Lines 29 and 30 will be revised as follows, "Excess soil which meets the WAC for consolidation with an earthen cover would be used to construct a buffer zone of less contaminated material around the disposal facility".

179. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.5 Page #: L-5-2 Line #: 23
Original Specific Comment #: 133
Comment: The text refers to a performance review for the consolidation area but does not present the criteria that will be used to review its performance. The text should present the performance review criteria for the consolidation area.
Response: As required by 40 CFR 300.430(f)(4)(ii), remedies that involve leaving waste on site above levels that allow for unlimited use and unrestricted exposure must be reviewed by the lead agency no less often than every five years after initiation of the selected remedy. The consolidation area falls into this category. We are unable to find any EPA guidance regarding this assessment other than that the assessment will ensure the remedy is still "protective of human health and the environment."
It is possible that DOE criteria for low-level rad facility performance assessments may be followed. Criteria found in DOE's *Recommended Format and Content for DOE Low-Level Waste Disposal Facility Radiological Performance Assessment Reports (April 1989)* may be used in an assessment. The DOE assessment typically looks at site and waste characteristics and discusses the disposal unit, source terms, pathways and scenarios, assumptions, and performance analysis methods. The assessment presents the analysis results, sensitivity and uncertainty analyses, and any design changes required to meet the performance objectives. The assessment also discusses ongoing or proposed work to improve the performance assessment.
A detailed list of the performance requirements is not necessary at this time. As a minimum, the above-listed performance requirements will be included.
Action: The following paragraph will be added at the end of Section L.5.5:
"As required by 40 CFR 300.430(f)(4)(ii), remedies that involve leaving waste onsite above levels that allow for unlimited use and unrestricted exposure must be reviewed by the lead agency no less often than every five years after initiation of the selected remedy.
Criteria found in DOE's *Recommended Format and Content for DOE Low-Level Waste Disposal Facility Radiological Performance Assessment Reports (April 1989)* may be used in an assessment. The DOE assessment typically looks at site and waste characteristics and discusses the disposal unit, source terms, pathways and scenarios, assumptions, and performance analysis methods. The assessment presents the analysis results, sensitivity and uncertainty analyses, and any design changes required to meet the performance objectives. The assessment also discusses ongoing or proposed work to improve the performance assessment."

180. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.5 Page #: L-5-6 Line #: 19
Original Specific Comment #: 134
Comment: The text states that the earthen cover will consist of a minimum of 1 foot of compacted clean soil. The text should present the criteria used to determine that the 1-foot thickness will provide adequate protection. Generally, leakage estimated using the U.S. EPA's Hydrologic Evaluation of Landfill Performance (HELP) model is used to evaluate the adequacy of soil thickness. A HELP model simulation result for the 1-foot thick compacted soil layer should therefore be presented.
Response: Agree. A HELP model simulation was performed to verify the adequacy of the earthen cover thickness.
Action: The HELP model simulation results will be presented in the draft final Operable Unit 5 FS Report, Section F.5.5 page F-5-10.

181. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.6 Page #: L-6-5 Line #: NA
Original Specific Comment #: 135
Comment: Figure L.6-2 shows details of the composite cap and liner. In the section showing the cap, the 12-inch-thick pea gravel layer and the geotextile separating it from the cobble layer can be removed because the drainage provided by the pea gravel layer can also be provided by the cobble layer without affecting the cobble layer's function as a biotic barrier. Also, DOE should consider providing a geocomposite layer consisting of a geotextile fabric, a geonet, and a geomembrane under the compacted clay layer to reduce infiltration of any leakage through the clay layer to waste in the cell. Reduced infiltration will reduce the probability of groundwater contamination from cell leakage. In addition, the title of the section showing the cap should be corrected to read "composite cap" instead of "composite gap."
Finally, the size of perforated pipes in the leachate collection and leak detection layers should be increased to facilitate inspection using a video camera and cleaning of these pipes in the future. Increased pipe size will also require greater thickness of the gravel layers containing these pipes.
Response: The figure showing the details of the composite cap and liner are intended to demonstrate the feasibility of the representative design and for use in cost estimating purposes. DOE intends to design only one on-site disposal facility. The specific design details and considerations for the cap and liner system will be addressed during the detailed engineering design of the facility during the remedial design process. During the engineering effort, DOE will consider and evaluate refinements to the representative cap and liner systems to minimize the potential for "groundwater contamination from cell leakage." Section L.6.1 states that future designs could include additional considerations to "Minimize the potential for a 'bathtub effect' by incorporating a design such that the hydraulic conductivity of the liner is slightly greater than that of the cap."
As noted by the commentor, the biotic barrier would provide drainage. However, the pea gravel layer is included in the conceptual cap to provide both drainage and protection to the underlying layers from the cobbles in the biotic barrier. The geotextile layer functions primarily as a separator during construction.
The piping shown in the leak detection and leachate collection systems are 6 inches in diameter; this is adequate for currently available video inspection and cleaning equipment. Specific designs for these systems will be addressed during the detailed engineering of the disposal facility.
The section is correctly titled "COMPOSITE CAP." Confusion may have been caused by the figure legibility.

Action: Ensure Figure L.6-2 is clearly legible.

182. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.6 Page #: L-6-7 Line #: 4, 11, and 12
Original Specific Comment #: 136
Comment: The text states that the pipes in the leachate collection and leak detection layers will be plugged and removed from service when the AWWT is removed from service. Leachate may keep building up within the cell and may leak from the bottom and sides of the cell if these pipes are not available for removal of leachate from the cell. The text should be revised to address this issue.
Response: Agree. Clarification is required regarding operation of the leachate collection and detection systems for the representative disposal facility design and infiltration rates upon removing the systems from service.
The leachate collection system would be kept in operation for as long as wastewater treatment is available onsite. For the purposes of the FS, the disposal facility was assumed to be completed (final cap) in about 22 years. Leachate collected during construction of the cell would be collected and transported to the AWWT for treatment as long as the AWWT is operational. The AWWT is expected to remain in operation for about 30 years in support of groundwater treatment. After the AWWT ceases operations, the collected leachate would be treated by a number of alternative methods that will be addressed by Operable Unit 2 during the detailed design of the disposal facility.
Action: The text on page L-6-7 will be revised as follows:
- Delete from "Collected ..." on line 2 through "... from service" on line 4.
- Delete lines 11 and 12
- Add the following text after line 16:
"• Collected leachate will be transported to the AWWT for treatment. After the AWWT ceases operations, leachate flow rates are expected to be small enough to allow treatment by alternative methods such as mobile treatment units or vendor operated systems. These alternative treatment methods will be fully evaluated during the detailed design of the on-property disposal facility."

183. Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.6 Page #: L-6-11 Line #: 28 and 29
Original Specific Comment #: 137
Comment: The text states that leachate collected from the cell will be removed by pipes to the AWWT for treatment until the AWWT is removed from service. The text does not clarify the fate of leachate after removal of the AWWT from service. Because leachate generation in the cell will not cease after removal of the AWWT, the text should specify what will happen to the leachate after the removal of the AWWT from service.
Response: See response to Comment 182.
Action: See action for Comment 182.

184. Commenting Organization: U.S. EPA Commentor: Saric
Section #: M.5.5.1 Page #: M-5-20 to M-5-21 Line #: NA
Original General Comment #: 34
Comment: This section states that dewatering/drying is effective in reducing the amount of material handled as a solid, is readily implementable, and is moderate in cost with negligible O&M cost. The cost of dewatering/drying could potentially be offset by reduced disposal costs due to less soil volume. The use of soil dewatering/drying as a support process option before disposal of the contaminated soil should be fully

evaluated and considered for incorporation into the remedial alternatives in Section 4.0. Cost estimates for dewatering/drying and then disposal should be included in Appendix K.

Response: In terms of its application to soil as opposed to treatment sludge or residue, dewatering/drying does not appreciably reduce the volume of the soil as much as it reduces the weight. While weight reduction would be beneficial in reducing transportation costs for off-site disposal, the bulk of the soil requiring off-site disposal will originate at depths well above the water table and are expected to have nominal water content. In addition, to a limited degree, a form of drying is used in the alternatives where thermal treatment is provided to deal with soil contaminated with organics. Dewatering/drying should therefore be considered as a support process option suitable only to smaller quantities of wet soil (such as from excavated perched water zones) and to various treatment residuals rather than to the bulk of site soil requiring disposal.

Action: To clarify the applicability of dewatering/drying, the text on page M-5-21, line 1, should be revised to read as follows: "Dewatering/drying is applicable to saturated soil, sediment and treatment process residue, and will be.."

185. Commenting Organization: U.S. EPA Commentor: Saric
Section #: Proposed Plan Page #: NA Line #: NA
Original General Comment #: 35

Comment: Aside from current inconsistencies between the Operable Unit 5 FS and the Proposed Plan (see General Comment 7), the Proposed Plan will need to be revised in accordance with any changes made to the Operable Unit 5 FS based on technical comments received by the U.S. Department of Energy (DOE).

Response: Agree.

Action: The Proposed Plan will certainly be revised to accurately reflect the draft final Operable Unit 5 FS Report.

186. Commenting Organization: U.S. EPA Commentor: B. Barwick
Section #: Proposed Plan Pg.#: 17 Line#: Code:
Original Comment #: 1

Comment: The discussion of ARARs needs to be modified to clarify that: a) ARARs are relevant only to on-site remedial activities. All off-site activities must comply with all applicable laws; and b) Section 121 (d) (1) of CERCLA requires that remedial actions attain the level of protection required by an ARAR but not compliance with all aspects of an ARAR (e.g., procedural requirements).

Response: Agree, the text will be modified as follows.

Action: CERCLA does not provide for one set of cleanup criteria for universal application to waste sites, but requires that sites attain, or seek a waiver to, federal and state environmental laws and regulations (i.e., applicable relevant and appropriate requirements [ARARS]), which are location-, chemical-, and action-specific to the individual remediation site. Section 121 (d) (1) of CERCLA requires that on-site remedial actions attain the level of protectiveness required by an ARAR, but not compliance with procedural or administrative requirements. Off-site remedial actions must comply with the administrative as well as substantive requirements of laws and regulations. Therefore, in addition to meeting the risk-based remediation levels established for each land use objective, all the viable alternatives must satisfy ARARs specified in federal and state environmental laws and regulations....

187. Commenting Organization: U.S. EPA Commentor: B. Barwick
Section #: Proposed Plan Pg.#: 19 Line#: Code:

Original Comment #: 2
Comment: DOE should further describe the Paddys Road Run Site investigation, including reference to the applicable Federal and State authorities, the status of the investigation, and DOE's role, if any, in that investigation.
Response: Most of the information requested in this comment is already present in the text. Additional text regarding the status of their investigation will be added, however.
Action: Modify existing text to say, "- a State of Ohio-led RI/FS cleanup site located south of the FEMP along Paddys Run Road. The site, which is currently finalizing their remedial investigation findings, involves volatile and semivolatile compounds as well as inorganics (including arsenic) in the Great Miami Aquifer."

188. Commenting Organization: U.S. EPA Commentor: B. Barwick
Section #: Proposed Plan Pg.#: 29 Line#: Code:
Original Comment #: 3
Comment: The side bar definition of ARAR should be modified to include reference to the ARAR waivers.
Response: Agree, the following language will be added to the bullet:
Action: Compliance with an ARAR during a remedial action may be waived if compliance with the requirement will result in greater risk to human health and the environment than other alternatives; compliance with the ARAR is technically impractical from an engineering perspective; or the alternative will attain an equivalent level of protection to that required under the otherwise applicable requirement.

189. Commenting Organization: U.S. EPA Commentor: B. Barwick
Section #: Proposed Plan Pg.#: 30 Line#: Code:
Original Comment #: 4
Comment: Figure 10 shows that alternative one, which does not include on-site disposal, would attain ARARs only with stipulations. Is this correct?
Response: The table is correct. The maximum contaminant levels (MCLs) for arsenic and radium cannot be achieved in the Great Miami Aquifer within a reasonable time frame due to technical constraints. The slow rate of desorption of arsenic and radium from the aquifer materials results in an anticipated remediation time greater than three times that required to achieve the proposed MCL for uranium. Additionally, background concentrations of these constituents exceed the MCL. However, as discussed in Appendix H, the rate of migration of these constituents results in minimal movement of radium and arsenic over the 1000-year compliance period. Because the remedial strategy for addressing groundwater contamination is the same for all alternatives, this stipulation applies to all alternatives.
Action: Page 31 paragraph 5 of the text will be modified as follows:
... Each of the alternatives are designed to maintain concentrations in the aquifer below existing and proposed drinking water standards through engineering measures. However, the maximum contaminant level (MCL) for arsenic and proposed MCL for radium are not anticipated to be achieved in the Great Miami Aquifer due to the slow rate of desorption of these constituents from the aquifer materials. Additionally, background concentrations of these constituents exceed the MCL.

190. Commenting Organization: U.S. EPA Commentor: B. Barwick
Section #: Proposed Plan Pg.#: 31 Line#: Code:
Original Comment #: 5
Comment: The last sentence of the fourth paragraph must be revised to read: "In general, to be granted the waivers, the FEMP would be required to adopt an engineering design for the cell which would, when coupled with existing site geologic conditions, attain

a standard of performance that is equivalent to that required under the State of Ohio solid waste disposal facility siting requirements."

Response: Agree

Action: The sentence will be modified as requested.

191. Commenting Organization: U.S. EPA Commentor: B. Barwick
Section #: Proposed Plan Pg.#: 32 Line#: Code:
Original Comment #: 6
Comment: DOE should explain that it plans to replace or restore any wetlands which are destroyed as a part of this remedy.
Response: Agree with commentor.
Action: Add the following text to the end of the referenced paragraph: "Mitigation for wetland impacts will be determined using the 404 (b) (1) guidelines of the Clean Water Act, in consultation with the Corps of Engineers, EPA, and OEPA."

192. Commenting Organization: U.S. EPA Commentor: B. Barwick
Section #: Proposed Plan Pg.#: 36 and 43 Line#: Code:
Original Comment #: 7
Comment: DOE should further elaborate and specify that other land uses could occur depending on the level of risk one is willing to accept (i.e., 10^{-4} vs. 10^{-6}).
Response: Agree.
Action: A note will be added following the bullets on page 36 which indicates that the Proposed Plan is not intended to select future land use for the site. The off-property farmer, on-property recreational user, and hypothetical trespasser were selected as example receptors to facilitate explanation of the alternatives and residual risk. Other land uses could occur depending on the level of risk deemed acceptable.

OEPA

DOE No.	Commenting Organization	Commentor	Original Comment Number	Section	Original Page Number	Line Number	New Page No.
193	OEPA	GeoTrans	274				NA
194	OEPA	OFFO	2	General			7-15
195	OEPA	OFFO	3				H-I-1 H-I-8
196	OEPA	GeoTrans	4				NA
197	OEPA	GeoTrans	5				NA
198	OEPA	GeoTrans	6				G
199	OEPA	GeoTrans	10	Exec Summ	ES-9	10	ES-9
200	OEPA	OFFO	7	Exec Summ	ES-1	2	ES-1
201	OEPA	OFFO	11	Exec Summ	ES-14		ES-13
202	OEPA	OFFO	12	Exec Summ	ES-19	12	ES-18
203	OEPA	OFFO	8	Exec Summ	ES-6	3-6	ES-6
204	OEPA	OFFO	9	Exec Summ	ES-9	13 to 17	NA
205	OEPA	OFFO	1-G	Gen Comment			G
206	OEPA	OFFO	18	1	1-47	19 & 20	1-46
207	OEPA	OFFO	20	1	1-47	26 & 27	1-47
208	OEPA	OFFO	19	1	47	23	1-48
209	OEPA	OFFO	13	1.0	1-4	4 & 5	1-3
210	OEPA	GeoTrans	14	1.3.1	1-10	25	NA
211	OEPA	OFFO	15	1.3.3	1-14	21 & 22	1-14
212	OEPA	OFFO	16	1.4.2.1	1-22	12-14	1-22
213	OEPA	GeoTrans	21	1.5.3	1-50	35	1-50
214	OEPA	GeoTrans	22	1.5.4	1-53	19-21	1-52
215	OEPA	OFFO	17	1-1 Table	1-28 & 29		Table 1-1
216	OEPA	OFFO	23	2.1	2-3	29	2-3
217	OEPA	OFFO	24	2	2-5	31	2-5
218	OEPA	OFFO	26	2.2.1	2-12	8 to 10	2-12
219	OEPA	OFFO	27	2.2.2	2-16	32 to 33	2-16
220	OEPA	OFFO	28	2.6	2-29	25 to 36	NA
221	OEPA	OFFO	29	2.7.2	2-32		2-35
222	OEPA	OFFO	30	2	2-33	Table 2-6	2-32
223	OEPA	OFFO	32	2	2-36	Table 2-7	2-36
224	OEPA	OFFO	33	2.7.5	2-37		2-37
225	OEPA	OFFO	34	2.7.8	2-43	33 to 35	2-45
226	OEPA	GeoTrans	35	2.13	2-75		2-71
227	OEPA	OFFO	36	2.13	2-76	1 to 5	2-70
228	OEPA	OFFO	37	2	79	11	NA
229	OEPA	GeoTrans	38	2	2-81	15 to 16	NA

DOE No.	Commenting Organization	Commentor	Original Comment Number	Section	Original Page Number	Line Number	New Page No.
230	OEPA	DDAGW	39	2.13.1.1	2-81	25 to 30	NA
231	OEPA	GeoTrans	40	2	2-81	25 to 36	2-78
232	OEPA	GeoTrans	41	2.13.1.1	2-81	30	NA
233	OEPA	DDAGW	42	2.13.1.1	2-82	14 to 18	2-79
234	OEPA	OFFO	43	2	87	28	NA
235	OEPA	GeoTrans	44	2	2-91	Figure 2-8	NA
236	OEPA	GeoTrans	45	2	2-93	Table 2-21	NA
237	OEPA	OFFO	46	2	2-93	Table 2-21	NA
238	OEPA	OFFO	47	2	95	27 & 33	NA
239	OEPA	GeoTrans	49	2	2-107	19 to 21	2-103
240	OEPA	OFFO	31	2-6 Table	2-33		2-32
241	OEPA	GeoTrans	50	3.2.2	3-6		G
242	OEPA	GeoTrans	51	3.3.3	3-13		G
243	OEPA	DDAGW	52	3-7	3-30	Removal General Response Action	G
244	OEPA	GeoTrans	53	4.0	4-2	36	4-2
245	OEPA	OFFO	54	4	10	Table 4-1	4-10
246	OEPA	GeoTrans	55	4.1.4	4-13	4	4-12, 4-14
247	OEPA	DDAGW	56	4.1.5.2	4-20	21	4-21
248	OEPA	GeoTrans	57	4.1.5.2	4-20	28-31	4-21
249	OEPA	OFFO	58	4	4-23	14	4-23
250	OEPA	OFFO	59	4	4-23	36	4-23
251	OEPA	GeoTrans	60	4.1.5.3	4-24	1 & 2	NA
252	OEPA	GeoTrans	61	4.1.6	4-26	24	4-28
253	OEPA	OFFO	62	4	4-27	5 to 37	G
254	OEPA	OFFO	63	4	4-28	31 to 35	4-30
255	OEPA	GeoTrans	64	4.1.6	4-28	37	4-30
256	OEPA	OFFO	67	4.1.6.2.2	4-38	29 to 30	4-39
257	OEPA	GeoTrans	68	4.1.6	4-40		NA
258	OEPA	OFFO	69	4	41	33	4-42
259	OEPA	OFFO	70	4	42	28	NA
260	OEPA	OFFO	71	4	44	21	4-45
261	OEPA	OFFO	72	4.1.8	4-45	14 to 17 & 23 to 27	4-47
262	OEPA	OFFO	73	4	61	31	4-64
263	OEPA	OFFO	74	4	64	9 to 11, 28, 29, 42, 43	4-65 4-66
264	OEPA	OFFO	75	4	65	38	4-67

DOE No.	Commenting Organization	Commentor	Original Comment Number	Section	Original Page Number	Line Number	New Page No.
265	OEPA	GeoTrans	76	4.3.3	4-67		G
266	OEPA	GeoTrans	78	4.3.4	4-72	27	4-64 4-73 4-84
267	OEPA	OFFO	77	4	72	17	4-73
268	OEPA	OFFO	79	4	74 & 75	43, 16, 30	4-76
269	OEPA	OFFO	80	4	76	26	4-77
270	OEPA	GeoTrans	82	4.3.4	4-84	40	NA
271	OEPA	GeoTrans	81	4.3.5	4-81		4-82
272	OEPA	OFFO	83	4	85 & 86	25, 43, 8	4-86 4-87
273	OEPA	OFFO	84	4	87	1	4-88
274	OEPA	OFFO	85	4	87	5	NA
275	OEPA	OFFO	86	4	101	3	4-102
276	OEPA	OFFO	87	4.4.6	4-110	14 to 23	4-110 5-87
277	OEPA	OFFO	65	4-2 Table	4-29		4-31 4-34
278	OEPA	OFFO	66	4-5 Table	4-33		NA
279	OEPA	GeoTrans	89	5.4.2	5-20	28	NA
280	OEPA	GeoTrans	91	5.4.2	5-49		NA
281	OEPA	GeoTrans	90	5.4.2	5-42	19	5-42
282	OEPA	GeoTrans	92	5.4.5	5-100		NA
283	OEPA	OFFO	88	5-3 Table	5-7		5-7
284	OEPA	OFFO	96	6.4.1.1	6-20	17 to 19	6-19
285	OEPA	OFFO	97	6.4.1.2	6-20	36 & 37	6-20
286	OEPA	OFFO	98	6.4.2.2	6-22		6-22
287	OEPA	OFFO	93	6-1 Table	6-9		6-9
288	OEPA	OFFO	94	6-2 Table	6-11		6-10
289	OEPA	OFFO	95	6-3 Table	6-13		6-12
290	OEPA	GeoTrans	102	7	7-17	15 to 17	G
291	OEPA	GeoTrans	101	7	7-16	10 to 21	G
292	OEPA	GeoTrans	99	7	7-10	33	7-11
293	OEPA	GeoTrans	103	7	7-18	22 & 23	7-29
294	OEPA	GeoTrans	100	7	7-15	Table 7-6	G
295	OEPA	OFFO	107	A	Figure A-6		Fig. A-6
296	OEPA	OFFO	104	A	A-2-7	15	A-2-7
297	OEPA	OFFO	105	A	A-2-9	18	A-2-9
298	OEPA	OFFO	106	A	A-5-14	19	A-5-14
299	OEPA	OFFO	108	B.4.2	B-4-6 & B-4-7	29 to 38; 1 to 3	NA

DOE No.	Commenting Organization	Commentor	Original Comment Number	Section	Original Page Number	Line Number	New Page No.
300	OEPA	OFFO	111	B-1 to 3 Table	B1-1 to B.5.C-7		G
301	OEPA	OFFO	109	B-2 Table	B.2-9		B.2-8
302	OEPA	OFFO	110	B-3 Table	B.3-21	Surface Water Sec.	B.3-23
303	OEPA	GeoTrans	112	B.4 Table	B.4-5		B.5.A-1
304	OEPA	GeoTrans	207	C	C-4-23	Miller, Marken	C-4-21
305	OEPA	GeoTrans	218	C	C-3-5	Equation C.3-13	C-3-5
306	OEPA	GeoTrans	115	C, TOC	c-iii	C.2-1b	C-iii
307	OEPA	GeoTrans	213	C	C-2-6	21	C-2-6
308	OEPA	GeoTrans	221	C	C-3-10	Equation C.3-28	C-3-9 C-3-10
309	OEPA	GeoTrans	222	C	C-2-10	32	C-2-11
310	OEPA	GeoTrans	211	C	C-2-8	Equation C.2-5	C-2-8
311	OEPA	GeoTrans	212	C	C-2-8	14	NA
312	OEPA	GeoTrans	214	C	C-2-9	Equation C.2-6	C-2-9
313	OEPA	GeoTrans	215	C	C-2-9	Equation C.2-7	C-2-9
314	OEPA	GeoTrans	216	C	C-2-10	Equation C.2-8	C-2-10
315	OEPA	GeoTrans	217	C	C-2-10	Equation C.2-9	C-2-10 C-2-11
316	OEPA	OFFO	113	C			G
317	OEPA	GeoTrans	116	C, TOC	c-iii	C.2-9	C-iii
318	OEPA	GeoTrans	114	C, TOC	c-ii		C-ii
319	OEPA	GeoTrans	210	C.2	C-2-11	C.2-1a	C-2-12
320	OEPA	GeoTrans	209	C.2			G
321	OEPA	GeoTrans	118	C.2.1	C-2-2	28	C-2-2
322	OEPA	GeoTrans	117	C.2.1	C-2-2	25	C-2-2
323	OEPA	GeoTrans	208	C.2.1	C-2-1 to C-2-4		C-2-4
324	OEPA	GeoTrans	119	C.2.2	C-2-6	18	C-2-6
325	OEPA	GeoTrans	120	C.2.2	C-2-6	21	C-2-6
326	OEPA	GeoTrans	121	C.2.2	C-2-6	34	NA
327	OEPA	GeoTrans	25	2.2	2-8		NA
328	OEPA	GeoTrans	123	C.2.3	C-2-8	C.2-5	C-2-8
329	OEPA	GeoTrans	122	C.2.3	C.2.8	15	C-2-8
330	OEPA	GeoTrans	125	C.2.4	C-2-9	C.2-7	C-2-9
331	OEPA	GeoTrans	124	C.2.4	C-2-9	C.2-6	C-2-9

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332	OEPA	GeoTrans	126	C.2.5	C-2-10	C.2-8	C-2-10
333	OEPA	GeoTrans	127	C.2.6	C-2-10	C.2-9	C-2-11
334	OEPA	GeoTrans	130	C.3.1.1	C-3-2	3	C-3-2
335	OEPA	GeoTrans	133	C.3.1.2	C-3-5	38	C-3-5
336	OEPA	GeoTrans	131	C.3.1.2	C-3-5	16	C-3-5
337	OEPA	GeoTrans	132	C.3.1.2	C-3-5	34	C-3-5
338	OEPA	GeoTrans	219	C	C-3-6	C.3-15	C-3-6
339	OEPA	GeoTrans	134	C.3.1.2	C-3-6	15	C-3-6
340	OEPA	GeoTrans	135	C.3.1.3	C-3-9	5	C-3-9
341	OEPA	GeoTrans	136	C.3.1.3	C-3-9	35	C-3-9
342	OEPA	GeoTrans	137	C.3.1.3	C-3-9	41	C-3-10
343	OEPA	GeoTrans	220	C	C-3-9	C.3-25 & C.3-26	C-3-9 C-3-10
344	OEPA	GeoTrans	139	C.3.1.3	C-3-10	6	C-3-10
345	OEPA	GeoTrans	141	C.3.1.3	C-3-10	28	C-3-10
346	OEPA	GeoTrans	138	C.3.1.3	C-3-10	5	C-3-10
347	OEPA	GeoTrans	140	C.3.1.3	C-3-10	9	C-3-10
348	OEPA	GeoTrans	142	C.3.1.4	C-3-11	18	C-3-11
349	OEPA	GeoTrans	143	C.3.2.2	C-3-13	22	C-3-13
350	OEPA	GeoTrans	144	C.3.2.2	C-3-14	2	C-3-14
351	OEPA	GeoTrans	145	C.3.2.2	C-3-14	7	NA
352	OEPA	GeoTrans	146	C.3.2.2	C-3-14	8	C-3-14
353	OEPA	GeoTrans	148	C.3.2.2	C-3-14	17	C-3-14
354	OEPA	GeoTrans	147	C.3.2.2	C-3-14	C.3-38	C-3-14
355	OEPA	GeoTrans	149	C3.2.3	C-3-16	39	C-3-17
356	OEPA	GeoTrans	150	C.3.2.3	C-3-17	6	C-3-17
357	OEPA	GeoTrans	151	C.3.3.1	C-3-21	14	C-3-21
358	OEPA	GeoTrans	152	C.3.3.2	C-3-22	23	C-3-23
359	OEPA	GeoTrans	154	C.3.3.3	C-3-25	39	C-3-26
360	OEPA	GeoTrans	153	C.3.3.3	C-3-25	6	C-3-25
361	OEPA	GeoTrans	156	C.3.3.5	C-3-28	2	C-3-28
362	OEPA	GeoTrans	155	C.3.3.5	C-3-28	1	C-3-28
363	OEPA	GeoTrans	157	C.3.5.2	C-3-32	10	C-3-32
364	OEPA	GeoTrans	161	C.3.6	C-3-36	C.3-110	C-3-36 C-3-37
365	OEPA	GeoTrans	160	C.3.6	C-3-36	C.3-109	C-3-37
366	OEPA	GeoTrans	159	C.3.6	C-3-36	C.3-108	C-3-36
367	OEPA	GeoTrans	158	C.3.6	C-3-36	C.3-107	C-3-36
368	OEPA	GeoTrans	163	C.4.1	C-4-1	21	C-4-1

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369	OEPA	GeoTrans	164	C.4.4	C-4-7	13	C-4-7
370	OEPA	GeoTrans	165	C.4.4.	C-4-7	16	C-4-7
371	OEPA	GeoTrans	166	C.4.4	C-4-7	36	C-4-7
372	OEPA	GeoTrans	167	C.4.4	C-4-7	39	C-4-7
373	OEPA	GeoTrans	168	C.4.5.1	C-4-10	21,22	C-4-10 C-4-11
374	OEPA	GeoTrans	169	C.4.5.2	C-4-11	15	C-4-10
375	OEPA	GeoTrans	170	C.4.5.2	C-4-11	23	C-4-10
376	OEPA	OFFO	171	C.4.6	C-4-15	12	C-4-13
377	OEPA	GeoTrans	128	C.2-1a Table		13	C-2-13
378	OEPA	GeoTrans	129	C.2-6 Table			C-2-30
379	OEPA	GeoTrans		C.3-2 Table	C-3-45		C-4-22
380	OEPA	GeoTrans	192	C.4-2 Table	C-4-19		C-4-17
381	OEPA	GeoTrans	193	C.4-2 Table	C-4-19		NA
382	OEPA	GeoTrans	194	C.4-2 Table	C-4-20		NA
383	OEPA	GeoTrans	189	C.4-2 Table	C-4-18		C-4-16
384	OEPA	GeoTrans	190	C.4-2 Table	C-4-18		C-4-16
385	OEPA	GeoTrans	191	C.4-2 Table	C-4-18		C-4-16
386	OEPA	GeoTrans	201	C.4-2 Table	C-4-21		C-4-19
387	OEPA	GeoTrans	200	C.4-2 Table	C-4-21		NA
388	OEPA	GeoTrans	188	C.4-2 Table	C-4-18		C-4-16
389	OEPA	OFFO	199	C.4-2 Table	C-4-20		C-4-18
390	OEPA	GeoTrans	198	C.4-2 Table	C-4-20		C-4-18
391	OEPA	GeoTrans	196	C.4-2 Table	C-4-20		NA
392	OEPA	GeoTrans	197	C.4-2 Table	C-4-20		NA
393	OEPA	GeoTrans	195	C.4-2 Table	C-4-20		NA
394	OEPA	GeoTrans	182	C.4-2 Table	C-4-18		C-4-16
395	OEPA	GeoTrans	187	C.4-2 Table	C-4-18		C-4-16
396	OEPA	GeoTrans	177	C.4-2 Table	C-4-17		C-4-15
397	OEPA	GeoTrans	175	C.4-2 Table	C-4-17		C-4-15
398	OEPA	GeoTrans	174	C.4-2 Table	C-4-17		C-4-15
399	OEPA	GeoTrans	172	C.4-2 Table	C-4-17		C-4-15
400	OEPA	GeoTrans	173	C.4-2 Table	C-4-17		C-4-15
401	OEPA	OFFO	178	C.4-2 Table	C-4-17		C-4-15
402	OEPA	GeoTrans	176	C.4-2 Table	C-4-17		C-4-15
403	OEPA	GeoTrans	185	C.4-2 Table	C-4-18		C-4-16
404	OEPA	GeoTrans	179	C.4-2 Table	C-4-17		C-4-15
405	OEPA	GeoTrans	183	C.4-2 Table	C-4-18		C-4-16

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406	OEPA	GeoTrans	184	C.4-2 Table	C-4-18		C-4-16
407	OEPA	GeoTrans	186	C.4-2 Table	C-4-18		C-4-15
408	OEPA	GeoTrans	181	C.4-2 Table	C-4-17		C-4-15
409	OEPA	GeoTrans	180	C.4-2 Table	C-4-17		C-4-15
410	OEPA	GeoTrans	205	C.4-3 Table	C-4-22		C-4-20
411	OEPA	GeoTrans	206	C.4-3 Table	C-4-22		C-4-20
412	OEPA	GeoTrans	203	C.4-3 Table	C-4-22		NA
413	OEPA	GeoTrans	202	C.4-3 Table	C-4-22		C-4-20
414	OEPA	OFFO	204	C.4-3 Table	C-4-22		NA
415	OEPA	GeoTrans	223	F.1.5.1	F-1-8	22	F-1-8
416	OEPA	GeoTrans	229	F.1.5.3.3	F-1-16	9	F-1-16
417	OEPA	GeoTrans	247	F.1.5.3.3	F-1-15	40	NA
418	OEPA	GeoTrans	226	F.1.5.3.3	F-1-15	13-40	NA
419	OEPA	GeoTrans	231	F.1.5.3.3	F-1-16	19	G
420	OEPA	GeoTrans	232	F.1.5.3.3	F-1-16	22	F-1-16
421	OEPA	GeoTrans	227	F.1.5.3.3	F-1-15	24	F-1-15 F-1-23
422	OEPA	GeoTrans	234	F	F-1-16	41	F-1-17
423	OEPA	GeoTrans	235	F	F-1-20	35	F-1-22
424	OEPA	GeoTrans	233	F	F-1-16	38	NA
425	OEPA	GeoTrans	230	F	F-1-16	12	NA
426	OEPA	GeoTrans	225	F	F-1-15	3	Attch. F.1.II
427	OEPA	GeoTrans	224	F	F-1-12	38	F-1-13
428	OEPA	GeoTrans	228	F.1.5.3.3	F-1-15	37	F-1-15 F-1-23
429	OEPA	GeoTrans	236	F.1.6	F-1-22	6	F-1-23
430	OEPA	OFFO	238	F.2.2.1	F-2-4	35	F-2-4
431	OEPA	GeoTrans	248	F.2.2.1	F-2-3	27	F-2-3
432	OEPA	GeoTrans	237	F.2.2.1	F-2-4	15	Fig. F.2-4
433	OEPA	GeoTrans	239	F; Sec. 3.0	F-3-2	23	F-3-2
434	OEPA	GeoTrans	241	F.3.2.5	F-3-8	17-19	F-3-7
435	OEPA	GeoTrans	240	F.3.2.5	F-3-7	19	F-3-7
436	OEPA	GeoTrans	273	F.3.2.6	F-3-9	29-32	F-5-9
437	OEPA	GeoTrans	242	F.3	F		Tables F.3-6, 7, 8, 9
438	OEPA	GeoTrans	250	F.5.2.1	F-5-3	33	F-5-3
439	OEPA	GeoTrans	251	F.5.2.2	F-5-5	30	F-5-5
440	OEPA	GeoTrans	252	F.5.2.4	F-5-8	11-13	F-5-8
441	OEPA	GeoTrans	243	F.5.2.4	F-5-8	35-40	F-5-9

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442	OEPA	GeoTrans	253	F.6.1.2	F-6-3		NA
443	OEPA	GeoTrans	254	F.6.2.1	F-6-3	36	ES?
444	OEPA	GeoTrans	255	F.6.2.1.2	F.6-7	1-2	F-6-7 39.TaF.6-1
445	OEPA	GeoTrans	263	F.7	F		G
446	OEPA	GeoTrans	269	F.7			NA
447	OEPA	GeoTrans	257	F.7	F-7-2	12	F-7-26
448	OEPA	GeoTrans	258	F.7.2.1	F-7-5	24	F-7-39
449	OEPA	GeoTrans	244	F.7.2.4	F-7-8	9	NA
450	OEPA	GeoTrans	268	F.7.4			NA
451	OEPA	GeoTrans	267	F.7.4.1	F-7-14	16	F-7-14
452	OEPA	GeoTrans	259	F.7.4.4	F-7-16	2	F-7-17
453	OEPA	GeoTrans	261	F.7.4.7	F-7-20	9	F-7-20 F-7-21
454	OEPA	OFFO	260	F.7.5	F-7-17	9	F-7-17
455	OEPA	GeoTrans	264	F.7.5.1	F-7-21	8	NA
456	OEPA	GeoTrans	245	F.7			NA
457	OEPA	GeoTrans	265	F.7.5.1	F-7-21	27-28	F-7-32
458	OEPA	GeoTrans	266	F.7.7.2	F-7-26	35	G
459	OEPA	GeoTrans	272	F.7.7.3	F-7-27	18	NA
460	OEPA	GeoTrans	271	F.7.7.6	F-7-31	6-18	NA
461	OEPA	GeoTrans	262	F.7.9.2	F-7-38	1-5	F-7-39
462	OEPA	GeoTrans	249	F.2-2 Table			F-2-11
463	OEPA	GeoTrans	256	F.6-1 & F.6-2 Tables			Tables F.6-1 and -2
464	OEPA	GeoTrans	275	G.4.2	G-4-3		G-4-3
465	OEPA	GeoTrans	276	G.I-2 Table	G.I-20		Tables G.I-2, G.I-3, and G.I-4
466	OEPA	GeoTrans	277	G.I-2 Table	G.I-20		G-3-2, Tables G.3-2 and G.3-3
467	OEPA	GeoTrans	278	G.I-2 Table	G.I-20		Tables G.I-2, G.I-3, and G.I-4
468	OEPA	GeoTrans	279	G.I-2 Table			Tables G.I-2, G.I-3, and G.I-4
469	OEPA	OFFO	280	G.I-2 Table			Tables G.I-2, G.I-3, and G.I-4
470	OEPA	GeoTrans	281	G.I-2 Table			Tables G.I-2, G.I-3, and G.I-4

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471	OEPA	GeoTrans	282	G.I-4 Table			Tables G.I-2, G.I-3, and G.I-4
472	OEPA	GeoTrans	289	H	H-vi	TOC	H-v
473	OEPA	GeoTrans	288	H	H-vi	TOC	H-iv
474	OEPA	GeoTrans	284	H	H-i	TOC	TOC
475	OEPA	GeoTrans	285	H	H-iii	TOC	H.I title pg.
476	OEPA	GeoTrans	287	H	H-vi	TOC	H-v
477	OEPA	GeoTrans	286	H	H-iii	TOC	NA
478	OEPA	GeoTrans	292	H	H-vii	TOC	H-v
479	OEPA	GeoTrans	291	H	H-vi	TOC	H-v
480	OEPA	GeoTrans	290	H	H-vi	TOC	H-v
481	OEPA	OFFO	294	H.4.2	H-4-11	eq. H.4-2	H-4-12
482	OEPA	GeoTrans	293	H.4.2	H-4-10	eq. H.4-1	H-4-11
483	OEPA	GeoTrans	296	H.I	H.I-1	TOC	H.I TOC H-I-iii
484	OEPA	GeoTrans	297	H.III	H.III-i	TOC	H.III TOC
485	OEPA	GeoTrans	298	H.III	H.III-ii	LOT	H-III-ii
486	OEPA	GeoTrans	299	H.III	H.III-ii	LOT	H-III-ii
487	OEPA	GeoTrans	300	H.III	H.III-ii	LOT	H-II-ii
488	OEPA	GeoTrans	301	H.III	H.III-88	LOT	H-III-ii
489	OEPA	GeoTrans	302	H.III.1.2	H.III-3	35	H-III-3
490	OEPA	GeoTrans	303	H.III.1.4	H.III-5	25	H-III-5 H-III-12
491	OEPA	GeoTrans	305	H.IV	H.IV-ii	LOT	H-IV-ii thru H-IV-x
492	OEPA	GeoTrans	306	H.IV			H-IV-6
493	OEPA	GeoTrans	309	H.IV-118 Table			H-IV-6
494	OEPA	GeoTrans	308	H.IV-89 Table			H-IV-6
495	OEPA	GeoTrans	307	H.IV-10 Table			H-IV-6
496	OEPA	GeoTrans	311	H.V			G
497	OEPA	GeoTrans	310	H.V	H.V-1		H-V-1
498	OEPA	GeoTrans	312	H.V.1-1 Table			H-IV-5
499	OEPA	GeoTrans	317	H.V.1-118 Table			H-IV-5
500	OEPA	GeoTrans	318	H.V.2-1 Table			G in Attch IV
501	OEPA	GeoTrans	323	H.VI	H.VI-i		NA
502	OEPA	OFFO	324	H.VI.I	H-VI-2		NA

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503	OEPA	GeoTrans	314	H.V.1-25			H-IV-5 H-IV-6
504	OEPA	GeoTrans	325	H.VI.3	H-VI-8		NA
505	OEPA	GeoTrans	326	H.VI.3	H-VI-9		NA
506	OEPA	GeoTrans	328	H.VII	H.Vii-i		H-V-i
507	OEPA	GeoTrans	330	H.VIi	H.VII-5		H-V-5
508	OEPA	GeoTrans	329	H.VII	H.VII-i		H-V-ii
509	OEPA	GeoTrans	295	H	H.4-3		NA
510	OEPA	GeoTrans	304	H.III-6 Table	H.III-12		H-III-5 H-III-12
511	OEPA	GeoTrans	313	H.V.1-10 Table			H-IV-5
512	OEPA	GeoTrans	315	H.V.1-89 Table			H-IV-5
513	OEPA	GeoTrans	316	H.V.1-98 Table			G in Attch IV
514	OEPA	GeoTrans	320	H.V.1-89 Table			H-IV-6
515	OEPA	GeoTrans	321	H.V.2-98 Table			H-IV-6
516	OEPA	GeoTrans	319	H.V.2-10 Table			H-IV-6
517	OEPA	GeoTrans	320	H.V.2-89 Table			G in Attch IV
518	OEPA	GeoTrans	321	H.V.2-98 Table			G in Attch IV
519	OEPA	OFFO	319	H.V.2-10 Table			G in Attch IV
520	OEPA	GeoTrans	327	H.VI.3	H-VI-10	2	NA
521	OEPA	GeoTrans	327	H.VI.3	H-VI-10	2	NA
522	OEPA	GeoTrans	331	I.3.6.4			I-3-12
523	OEPA	GeoTrans	332	J.4.0	J-4-2	13-15	J-4-2
524	OEPA	GeoTrans	337	K 3-0	3-1		K-1-3
525	OEPA	GeoTrans	336	K 3-1	3-1		K-2-10
526	OEPA	GeoTrans	335	K 1.1	1.9		K-1-9
527	OEPA	GeoTrans	334	K 1.1	1-6		K-1-4
528	OEPA	GeoTrans	333	K.1.1	K-1-2		K-1-1
529	OEPA	GeoTrans	338	K.3.1	3-2		K-3-2
530	OEPA	GeoTrans	339	K 3-3	3-12		NA
531	OEPA	GeoTrans	340	L 1.1	L 1-8	19-20	NA
532	OEPA	GeoTrans	341	L 1.1	L-1-10	22-23	L-1-10
533	OEPA	GeoTrans	342	L 1.2	L 1-13	22-23	NA
534	OEPA	GeoTrans	343	L 1.2	L 1-18	17	L-1-18

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535	OEPA	GeoTrans	344	L	L-6-3	12	NA
536	OEPA	GeoTrans	345	L-6	6	23	L-6-6
537	OEPA	GeoTrans	346	L-6	7	15	NA
538	OEPA	GeoTrans	347	L	10-4	17	L-10-4
539	OEPA	GeoTrans	351	M 5-7	5-37	41-44	NA
540	OEPA	GeoTrans	349	M 5-5	5-22	30-32	M-5-23
541	OEPA	GeoTrans	348	M 5.5	5-22	9	M-5-22
542	OEPA	GeoTrans	350	M 5-5	5-26	8-13	M-5-25
543	OEPA	OFFO	1	PP	1	box	NA
544	OEPA	GeoTrans	2	PP	2	margin	PP-2
545	OEPA	GeoTrans	3	PP	5		PP-G
546	OEPA	GeoTrans	4	PP	7		PP-7
547	OEPA	GeoTrans	48	Case Figures	96?		NA

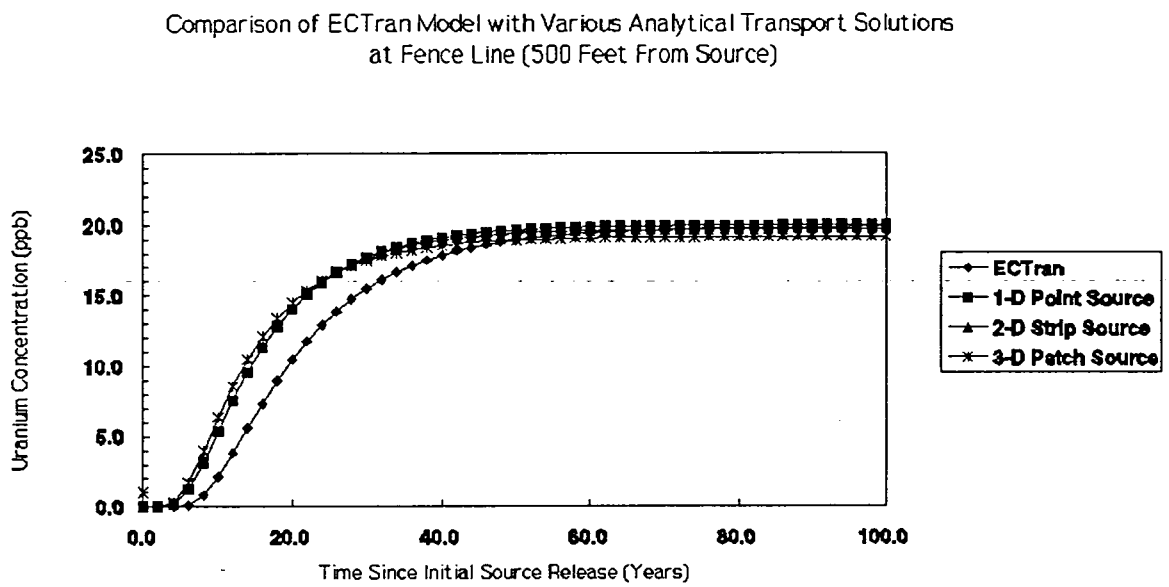
OEPA COMMENTS ON THE DRAFT OPERABLE UNIT 5 FEASIBILITY STUDY

193. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: Pg. #: Line #: Code: C
Original Comment #: 274
Comment: Information Comment: The results of ECTran were compared to coded analytical solutions (Wexler 1989) for solute transport in the Miami aquifer for a one-dimensional point source (SEMINF), a two-dimensional areal strip source (STRIPI), and a three-dimensional patch source (PATCHF). This comparison is very useful because it allows one to determine the level of conservativeness for any lateral aquifer transport application of the ECTran model. The model parameter values used in this comparison are provided below.
The plot shown on the following page shows that the ECTran model computes uranium concentrations that are similar to the more conservative one-dimensional point source along the centerline of the plume for any time greater than 50 years. For any time less than 50 years, concentration values calculated by ECTran are lower than the other solutions because the analytical solution (Domenico 1987) used by ECTran disregards the second term of the Ogata and Banks (1961) solution. The Ogata and Banks (1961) was used to develop the Domenico (1987) solution. The effects of transverse dispersion do not decrease concentrations along the centerline of the plume because of the large width of the source area (1000 ft). Given this source size, the uranium concentrations computed by ECTran model are therefore similar to the more conservative one-dimensional (disregards transverse dispersion) point source after 50 years.

Model Parameter	Value
Source Concentration	20 ppb
Aquifer Saturated Thickness	75 ft
Aquifer Mixing Depth	30.6 ft
Average Linear Groundwater Velocity	304 ft/yr
Retardation Factor	10.49
Longitudinal Dispersivity	100 ft
Horizontal Transverse Dispersivity	33 ft
Vertical Transverse Dispersivity	0.35 ft
Uranium Half Life	4.5×10^9 yr
2-D Strip Source Width	1000 ft
3-D Strip Source Width	1000 ft
3-D Strip Source Thickness	30.6 ft
Fence Line Distance From Source	500 ft

REFERENCES

Domenico, P. A. 1987. An Analytical Model for Multidimensional Transport of a Decaying Contaminant Species. J. Hydrol., Vol. 91, pp. 49-58.
Ogata, A. and R. B. Banks. 1961. A Solution of the Differential Equation of Longitudinal Dispersion in Porous Media. U. S. Geologic Survey , Prof. Paper no. 411-A.
Wexler, E. J. Analytical Solutions for One-, Two-, and Three-Dimensional Solute Transport in Ground-Water Systems With Uniform Flow. U. S. Geologic Survey, Open File Report 89-56.


Comparison of ECTran Model with Various Analytical Transport Solutions
at Fence Line (500 Feet From Source)
Uranium Concentration (ppb)
25.0
20.0
15.0
10.0
5.0
0.0
0.0
20.0
40.0
60.0
80.0
100.0
Time Since Initial Source Release (Years)
ECTran
1-D Point Source
2-D Strip Source
3-D Patch Source

194. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: General Comment Pg #: Line #: Code: C
Original Comment #: 2
Comment: The Feasibility Study and probably the Proposed Plan should include a table which provides the PRLs along with the PRLs from OU1 and OU2 as well as the levels within the final OU4 ROD. This will help reviewers see the progression of cleanup levels and answer questions with regard to lowering other OU's levels as described in their respective draft and final RODs.
Response: Agreed.
Action: Table to be included; accompanying text to read "Table 7-6 presents a summary comparison of Operable Unit 5 proposed cleanup levels with those of other operable units. Only constituents common to Operable Unit 5 are listed. The cleanup levels established in previous Records of Decision remain in effect without revision for areas within the boundaries of the respective operable unit. Where the final soil remediation level for a specific constituent established through the Operable Unit 5 remedy decision process is more restrictive (i.e., lower) than that defined in the individual RODs for Operable Unit 1, 2, or 4, the final Operable Unit 5 remediation level will serve as the soil cleanup criteria within the boundary of the source operable unit. This strategy allows consideration of operable unit-specific factors driving the cleanup levels (such as constituents of concern hydrogeology, etc.) while still providing a basis for application of a consistent site-wide future land use.

195. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Pg #: Line #: Code: M
Original Comment #: 3
Comment: Based upon this reviewers evaluation of the non-modelling portions of the document, it appears the groundwater remediation and soil remediation analyses were both evaluated to protect the GMA to the MCL. The question arises that if the GMA is remediated to 20 ppb and soils were remediated to protect the GMA to 20ppb is there an additive effect resulting in the GMA concentration being between 20 and 40ppb? DOE should revise the document and the Proposed Plan to explain this issue to the reviewer and the public.
Response: Although 20 ppb was also used as the groundwater criteria for soil CPRG development purposes, very conservative assumptions were used in the CPRG-development modeling and the subsequent estimation of required soil excavation volumes. As a result, residual impact simulations for the postremediation conditions presented in Appendix H indicate that future groundwater uranium concentrations will remain below 20 ppb (Figure H.I-11) even with additional loading from residual soil contamination.
It is important to point out that additional contaminant loading during and after soil remediation through runoff and infiltration into the aquifer were also considered to determine the required time frame for the aquifer remediation. With these continuous loadings, groundwater remediation will require 30 years to reach the cleanup goal. In general, after this time frame the groundwater concentrations are only affected by the residual loading.
Action: The following text will be added into Appendix H at the end of Section H.I.3, Modeling Results; however, this text is not appropriate and not necessary for the Proposed Plan: "Although groundwater PRLs were also used as the criteria for soil CPRG development purposes, very conservative assumptions were used in the CPRG-development modeling and the subsequent estimation of required soil excavation volumes. Groundwater remediation also considered these residual loadings. As a result, residual impact simulations for the postremediation conditions

presented in Appendix H indicate that future groundwater concentrations will remain below PRLs even with additional loading from residual soil contamination."

196. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: Pg. #: Line #: Code: M
Original Comment #: 4
Comment: Engineering geology literature is full of examples of failed geotechnical projects. A key to risk minimization is the ability to (1) monitor containment system performance and (2) remedy system failure. We believe that the disposal cell (and associated remedies) can be reasonably monitored (e.g., by leachate monitoring) and remedied (e.g., by pumping) if necessary.
Response: Agree, comment noted.
Action: None required.

197. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: Pg. #: Line #: Code: M
Original Comment #: 5
Comment: Why was a relatively low-cost hydraulic containment with limited excavation work (e.g., cover surface soils and excavate hot spots) not developed for the purpose of comparing alternatives? If aquifer restoration is not possible, the pump-and-treat remedy may revert to long-term hydraulic containment. Such long term pumping may require long-term treatment. If so, the major reason noted to not consider hydraulic containment (that extended treatment plant operation will be expensive) is invalid because such cost will be incurred anyway. Were the preliminary calculations set up to diminish savings that would result from long-term containment pumping with much less earth work? Are the long-term treatment costs for groundwater pumping necessarily so high?
Response: The FS did examine both a hydraulic containment option and a limited soil excavation alternative. The hydraulic containment option was screened early in the FS process, under technology screening in Section 3. The hydraulic containment option was first reviewed and eliminated during the Initial Screening of Alternatives Document (issued in 1993) in favor of active restoration. The FS revisited hydraulic containment (the details of which are presented in Appendix F), and the conclusion was reached that hydraulic containment could not attain PRLs in a reasonable time frame and therefore was not capable of achieving the RAOs established for the FS. Since DOE has concluded that active restoration is technically practicable and can reasonably be expected to achieve the RAOs, it was retained in favor of hydraulic containment. DOE is committing to the implementation of the active restoration alternative. It is recognized, however, that if active restoration does not achieve PRLs following implementation, other options may need to be considered such as hydraulic containment or, if suitable to the regulatory agencies, cessation of operations and employment of institutional controls. Such measures would be evaluated (and implemented as necessary) as part of the technical justifications accompanying a TI waiver petition -- if active restoration were found to be impracticable at a point in the future.
The alternatives formulated for Land Use Objective 4 specifically looked at the limited soil excavation option raised by the reviewer. The goal under Land Use Objective 4 is to excavate only those soils that cannot be left or capped in place. The alternatives developed under Land Use Objective 4 were carried forward for detailed analysis through Section 5. As discussed with Ohio EPA during the alternatives development meetings occurring during the Summer of 1995, because of the large spatial distributions of the uranium over fairly shallow depths, it was found

that the placement of 13 foot thick caps over soils with a few feet or less of contaminated thickness was not a practical or cost effective solution to controlling contaminant migration or physical contact with contaminated soils. Therefore, excavation and consolidation in a central area was found to be necessary, even under the intentions of Land Use Objective 4. Because of the amount of excavation necessary to protect the aquifer, the amount of excavation for Land Use Objective 4 and Land Use Objective 3 is practically identical, even though the representative receptor (trespasser vs. industrial or recreational user) is different. This is discussed in detail in Section 6.

Leaving the soils that will affect the aquifer over the long term in place, allowing them to leach to the aquifer, and then applying hydraulic containment as the control measure was examined as a special case for the Fernald Citizens Task Force. The net cost savings associated with less excavation were more that offset by the long term perpetual care and groundwater treatment costs accompanying the hydraulic containment requirements. It was agreed by the Task Force that this was not a workable solution, and it was not considered further. The Task Force subsequently adopted a resolution to protect and restore the GMA as part of their deliberations.

It should also be noted that Ohio EPA has expressed an opinion that the Cap in Place and Excavation and Cap options generally will not provide a suitable technical basis for demonstrating equivalency to the State's exemption criteria for siting a solid waste disposal facility over a sole source aquifer.

We agree that if the FS analyses had demonstrated that active restoration was not practicable, then long term hydraulic containment coupled with long term treatment would likely be the only other viable remediation approach. Under this condition, it would have made sense not to pursue excavation of all of the soils that can affect the aquifer over the long term, but rather let them leach, as suggested in the comment.

Action: No change necessary.

198. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: Pg. #: Line #: Code: C
Original Comment #: 6

Comment: The screening of certain treatment technologies for soils was performed without citing references and based upon a large volume of low level radioactive waste. Several technologies such as soil washing, solidification and vitrification, for example, were retained as support technologies without criteria for their use. These support technologies can become a viable treatment alternative in the reduction of mobility and volume of contaminants during hot spot remediation. Hot spot remediation and the associated treatment technologies should have been included as alternatives during the screening process.

Response: As agreed in the February 8, 1995 conference call between representatives of DOE, EPA and OEPA, Appendix M will be expanded to include more specific information as to why cementation and soil washing were screened as lead process options. An abstract of this information will also be included in Section 3.0. For alternatives considering on-property disposal in an engineered facility, a group of support technologies were identified in Appendix M and Section 3.0, which may be viable to reduce the quantity of material placed in the cell or to treat material exceeding WAC. To ensure a fair comparison of alternatives all materials exceeding the uranium WAC were assumed to be shipped to an off-site disposal facility without further treatment. As discussed in the conference call, language agreed upon with OEPA will be added to the text of the FS and Proposed Plan providing a stronger commitment on the part of the DOE to continue to investigate (and apply, if

appropriate) new and emerging technologies to reduce the quantity of material requiring on-property disposal.

Action: Expand discussions in Appendix M on soil washing and cementation. (See Comment 13).

Add an abstract of this information to Section 3.0. (See Comment 13).

Incorporate language into FS and PP on commitment to investigate new and emerging technologies. The following sentence has been added to the end of the first paragraph in Section 3.2.3, page 3-12. "Operable Unit 5 will continue to support the development of environmentally acceptable technologies that have cost-effective potential for achieving volume reduction through waste minimization."

The following four paragraphs were added to the end of Section M.3.0, page M-3-1. "Innovative technologies currently being studied and developed at several locations are not included in this initial screening for soils and sediments. These technologies are not ready for immediate application, but require further development and technology demonstration for assessing their potentials. Operable Unit 5 will continue to support the development of environmentally acceptable technologies that have cost-effective potential for achieving volume reduction through waste minimization. Such technologies include magnetic separation, tall-column flotation, and in-situ injection of geochemical technology barrier materials.

Magnetic methods were used for uranium ore beneficiation during the 1950s. Newer techniques and better high-gradient equipment have developed with increasing interest in this technology. This application is based upon either inducing transient magnetism or surface adsorption of ferromagnetic materials to uranium materials. The effectiveness of magnetic separation is partly dependent upon the form of uranium present. For example, UO_2 has considerably greater magnetic susceptibility than U_3O_8. By either mechanism, uranium removal through magnetic separation has high potential as a breakthrough technology. Recent lab tests show promise for decontaminating soils to very low levels of uranium.

Tall-Column Flotation is a countercurrent gravity flow separation technique that depends on surface chemistry which determines whether the species is either hydrophobic or hydrophilic. Emphasis should be placed on those techniques which do not modify the surface chemistry. Significant physical separation testing of FEMP soils by tall-column flotation is being sponsored by the DOE Office of Technology Development at the University of Nevada, Reno.

In-situ geochemical technology can be applied either through injection of materials such as amorphous ferric oxyhydride in the ground as a barrier to prevent the migration of radionuclides or by placing at the bottom of a landfill above a liner to immobilize radionuclides and prevent their migration. Oak Ridge National Laboratory is funding research on this technique."

199. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: Executive Summary Pg. #: ES-9 Line #: 10 Code: C
Original Comment #: 10

Comment: DOE's use of the term "Maximum Concentration Level (MCL)" conflicts with the use of an already well-established term "Maximum Contaminant Level (MCL)". Maximum Contaminant Levels are a specific set of water standards established by EPA. It is not clear whether DOE is simply mistaken when referring to the name given to the EPA standards or is referring to something altogether different.

Response: DOE is referring to the maximum contaminant level in this sentence.

Action: Change text to "maximum contaminant level (MCL)."

200. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Executive Summary Pg #: ES-1 Line #: 2 Code: C
Original Comment #: 7
Comment: Please modify this sentence to read " ...(FEMP)'s goal is a safe, least-cost..." or" FEMP has been assigned the task of..." . As written, this sentence appears to take credit for achieving results before the job is finished.
Response: Agree with comment.
Action: Text will be changed to "...(FEMP)'s goal is a safe, ...".

201. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Executive Summary Pg #: ES-14 Line #: Code: C
Original Comment #: 11
Comment: This paragraph makes no reference to a waste acceptance criteria being in place for contaminated media proposed for disposal in the on-site cell. Please make a reference to such in the revised text.
Response: Agree.
Action: The first sentence of the paragraph will be modified as follows. Under this alternative, contaminated soil exceeding remediation levels would be excavated, consolidated in one central location and placed into an engineered disposal facility, provided that soil concentrations do not exceed risk-based waste acceptance criteria (WAC) developed for the facility. Soil exceeding the WAC will be treated before placement in the facility or shipped off site for disposal.

202. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Executive Summary Pg #: ES-19 Line #: 12 Code: C
Original Comment #: 12
Comment: Please rephrase this sentence. As written it can be inferred that all proposed federal standards for the next 1000 years will be met.
Response: Agree.
Action: The sentence will be modified as follows: .... concentrations in the aquifer underlying the cell will not exceed concentrations specified as proposed or existing federal drinking water standards (at the time the Record of Decision is signed) for 1000 years.

203. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Executive Summary Pg #: ES-6 Line #: 3-6 Code: C
Original Comment #: 8
Comment: OEPA believes this sentence is too brief and that it oversimplifies the ILCR goals. Please insert language to the effect that the NCP(40CFR§300.430(e)(2)(i)(A)(2)) targets an ILCR of 10^{-6} as an initial point of departure.
Response: Comment noted, the text will be revised.
Action: The second sentence of the paragraph will be modified as follows: The NCP targets an ILCR of 10E-6 as a point of departure for developing PRLs; however, the total incremental risk should be in the range of or less than 10E-4 after remediation and have a total HI of less than 1.0 for the noncarcinogenic toxic effect.

204. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Executive Summary Pg #: ES-9 Line #: 13-17 Code: C
Original Comment #: 9
Comment: Please elaborate on the rather vague reference to the " such time as the need for future action" in regards to the mixed plume. OEPA believes that nothing substantial will be gained by delaying actions on serious negotiations with the PRRS.

Response: Remediation of PRRS plumes is the subject of a separate RI/FS action currently under development between the State of Ohio and the PRRS responsible parties. DOE's role and involvement in the cleanup of the PRRS plumes (if any) will be defined separately as part of the ongoing identification of PRRS response obligations and in accordance with the PRRS project schedule.

Action: None required.

205. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: General Comment Pg #: Line #: Code: M
Original Comment #: 1

Comment: Ohio EPA believes DOE has failed to consider a viable technology for addressing contaminated soils from Operable Unit 5 as well as other OUs. The technology referred to as the "Brickmaker" is currently being used at the DOE Mound site for radionuclide contaminated soils. The technology uses standard brick making industry equipment with modifications. Use of this technology results in a highly compacted soil brick. Test runs at Mound have shown a 20% volume reduction for soils being disposed of in metal boxes. Based upon conversations will Mound staff (Bill Johanan), it is believed a 40-45% reduction could be achieved for an application in an on-site disposal cell without containers. This is based upon test data showing a change in density from 80-95 lbs per cubic foot (post excavation) to 130lbs per cubic foot following treatment.

The use of this technology for on-site disposal of soils has a number of benefits. A few of these are: 1) less volume means a smaller disposal cell and thus more land for reuse; 2) a smaller active face to the cell since waste wouldn't be compacted by heavy machinery; 3) significant reduction in the potential for airborne emissions due to brick waste form rather than landfill style soil compaction; 4) treatment can be completed within an enclosed building eliminating fugitive emissions; 5) reduced potential for erosion of contaminated soil during placement in the cell; 6) waste form would be less permeable than standard landfill compaction; 7) costs of the disposal cell would decline as size declines.

Use of this technology would appear to be practical and not require a large additional expense. The technology will address citizen concerns with fugitive emissions from landfill style disposal. Employing this technology will show a commitment by DOE to implement treatment where feasible. This treatment would meet the NCP's statutory preference for treatment when practicable. In general, the preferred alternatives presented for the OUs to date only select treatment for waste being disposed of off-site. Incorporation of the "Brickmaker" technology into on-site disposal alternatives would address this imbalance in the use of treatment technologies. Ohio EPA believes DOE must consider implementation of this technology for the on-site disposal alternatives.

Response: The applicability of the soil compaction "brickmaker" technology to alternatives considering on-property disposal was a subject of discussion in the February 8, 1995 conference call. As agreed in the conference call, DOE will incorporate a discussion on the soil compaction technology in Appendix M and Section 3.0. As discussed in the conference call, the "brickmaker" technology will not be specifically incorporated into any remedial alternative. Language will be added to the FS and PP strengthening DOE's commitment to evaluate (and apply) new and emerging technologies, such as soil compaction.

Action: Add language to Section 3 and Appendix M on the brickmaker. The soil compaction or "brickmaker" technology has been added to this FS as a process option to be screened and evaluated. The following changes have been made to accommodate the consideration of soil compaction.

The soil compaction process option has been added to all initial screening and evaluation, and summary tables in Section 3 and Appendix M. These include: Table 3-3, page 3-15; Table 3-4, page 3-18; Table 3-8, page 3-35; Table 3-9, page 3-39; Table M.3-1, page M-3-4; Table M.3-2, page M-3-7; Table M.5-1, page M-5-5; and Table M.5-2, page M-5-9.

Soil compaction has also been added to the end of the bulletized solidification/stabilization process options listed in Appendix M, Section M.3.5.4, page M-3-16, and Section M.5.5.3, page M-5-24. In addition, the following process description has been added to the end of Section M.3.5.4 on page M-3-18.

Soil Compaction (Brickmaking)

This technique utilizes standard brickmaking equipment and practices to increase soil compaction from a standard density of approximately 85 pounds/cubic foot for soil under its own weight to an average of 140 pounds/cubic foot by mechanical compaction. The principal advantages of mechanical compaction of soil for emplacement in an on-property disposal facility are volume reduction, dust control, and improving the size and aesthetics of the facility. Preliminary estimates show that compaction could reduce the soil volume by as much as 50 percent. The impact of the disposal facility size reduction and potential cost benefits must be assessed through demonstration testing and analysis of all types of wastes that may be disposed to the facility."

Finally, the evaluation of soil compaction was added to the end of Section M.5.5.3 on page M-5-30.

Soil compaction is the process by which a reduction in the volume of contaminated soil for disposition to an on-property disposal facility or shipment off-property results from densification by conventional brickmaking techniques. Standard equipment and practices can be utilized to densify soil from a conventional 85 pounds/cubic foot to about 140 pounds/cubic foot, or a greater than 50 percent increase. Auxiliary equipment is used at the head-end for separating rocks that are greater than 4.5 inches and for crushing the soil matrix to less than 0.5 inch. A modest size soil compactor would cost about $1.5 million; operating and maintenance costs would be relatively low.

In this process, soil that has been sized and shaped is extruded into densified logs having approximate dimensions of 6 x 6 inches cross-section by 6 feet long. This step accomplishes a volume reduction of 30 to 50 percent. The densified logs can be lifted by a rotating overhead crane for emplacement into either the on-property disposal facility or a container for off-property shipment. A cost benefit exists for either disposal mode: reduced facility construction costs or lower operating costs for off-property disposal.

The evaluation of this process option is as follows:

- Effectiveness: The soil compaction process is capable of achieving a 30 to 50 percent volume reduction through densification by mechanical compaction. It would also be effective in reducing the mobility of inorganic and radionuclide COCs during emplacement by offering better dust control than is possible when moving loose contaminated soil. Placement of the "logs" in storage crates reduces the risks of dermal contact and eliminates direct exposures to environmental receptors. Long term stability is a potential concern since the contaminants are not destroyed, but remain within the compacted soils.

- Implementability: The equipment and practices required for this process are standard in the brickmaking industry. No specially trained operators would be required. No permits, except for construction permits, would be required for on-property treatment.
- Costs: Capital costs are relatively low at $1.5 million for a conventionally sized unit; uses standard low-cost auxiliaries; O&M costs are projected to be very low.

On the basis that this process option has potential benefit regardless of whether contaminated soil is disposed on-property or shipped off-property, it should be retained as a representative process support option. Aside from the environmental advantages of volume reduction, other benefits exist in the aesthetics of the cell construction and dust control during emplacement operations. Also, the facility is portable and can be targeted for use at selected hot spots."

Add text to the FS and PP to strengthen DOE's commitment to evaluate new and emerging technologies. (See Comment 198)

206. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 1 Pg #: 1-47 Line #: 19,20 Code: C
Original Comment #: 18
Comment: OEPA does not think it is appropriate to compare EPA indoor air standards with levels observed in the out-doors . It is more appropriate to cite 40 CFR part 192.02(b)2 which specifies that the average annual increase of radon-222 in air at or above any location outside the disposal site should not exceed 0.5 pCi/L. Please compare the observed levels to this standard.
Response: Agree except for the comment wording "... outside the disposal site...".
Action: Sentence revised to cite 40 CFR 192.

207. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 1 Pg #: 1-47 Line #: 26,27 Code: C
Original Comment #: 20
Comment: OEPA does not believe the reference here to background dose is an appropriate comparison. Please delete this sentence.
Response: Partially agree.
Action: Will delete first half of sentence but retain DOE limit comparison and add to end of previous paragraph.

208. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 1 Pg #: 47 Line #: 23 Code: E
Original Comment #: 19
Comment: Is the reference here to "milleram" a typo?
Response: Agree.
Action: Changed to "millirem."

209. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 1.0 Pg #: 1-4 Line #: 4-5 Code: C
Original Comment #: 13
Comment: The sentence should be revised to reflect the current status of the OU4 ROD (finalized and signed).
Response: Agree.
Action: Sentence revised to read, "The Operable Unit 4 FS-EIS has been finalized and the ROD has been signed."

210. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 1.3.1 Pg. #: 1-10 Line #:25 Code: C
Original Comment #: 14
Comment: The text should state what the Hazard Ranking Score for the Fernald site was.
Response: According to 40 CFR 300 Appendix B the FEMP score was between 47.80 and 48.41. The score, however, may not be the sole reason the site was put on the NPL. Criteria is varied, as explained in the text on pp. 1-10 and 1-11. A specific HRS for the FEMP must be requested from EPA.
Action: No action.

211. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 1.3.3 Pg #: 1-14 Line #: 21-22 Code: C
Original Comment #: 15
Comment: The portion of this sentence addressing the OU2 "engineering containment systems" should be revised to reflect the preferred alternative detailed in the OU2 Proposed Plan. The preferred alternative is use of an on-property disposal cell rather than "engineering containment systems" discussed here.
Response: Agree.
Action: Sentence revised to read, "... but outside the proposed on-property disposal facility;..."

212. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 1.4.2.1 Pg #: 1-22 Line #: 12-14 Code: C
Original Comment #: 16
Comment: The sentence should be revised to reflect the fact that listed hazardous wastes are expected to be encountered in addition to characteristic hazardous wastes.
Response: Agree.
Action: Sentence revised to read "... or treatment residuals exhibiting characteristics of hazardous waste or containing a listed hazardous waste or exceeding PRG...".

213. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 1.5.3 Pg.#: 1-50 Line #: 35 Code: C
Original Comment #: 21
Comment: Sum of 3.6×10^{-2} and 1.7×10^{-2} is $5.\underline{3} \times 10^{-2}$. Is this due to rounding?
Response: Agree.
Action: Value changed to 5.3×10^{-2}.

214. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 1.5.4 Pg.#: 1-53 Line #: 19-21 Code: C
Original Comment # 22
Comment: Some words seem to be missing in this sentence.
Response: Agree.
Action: Sentence rewritten to read, "Observed data limitations, as identified in the RI Report, and the approach adopted in the FS to address each of these limitations is discussed further in Section 2.0.".

215. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 1-1 Table Pg.#: 1-28&29 Line #: Code: C
Original Comment #: 17
Comment: DOE should review the basis for listing categories to ensure they are consistent with the current listing proposals (e.g., Pit 5 as listed waste, biosurge lagoon as unit, etc.).

Response: Agree.
Action: Table 1-1 will be revised to reflect latest status.

216. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 2.1 Pg.#: 2-3 Line #: 29 Code: C
Original Comment #: 23
Comment: The text should provide additional clarification as to the meaning of "proprietary institutional controls." A more appropriate statement might be "land use control through federal ownership."
Response: Agree. Consistent with the EPA Draft "Guidance On Use of Institutional Controls at Superfund Sites' dated Dec. 17, 1991, proprietary institutional controls include restrictions imposed on land use through rights-of-ownership and deed restrictions.
Action: Clarification will be added to the text on line 28 of page 2-3 to state: "proprietary institutional controls include restrictions placed on land use through rights-of-ownership and such measures as deed restrictions. For purposes of this FS, proprietary institutional controls would include controls placed on future land use through continued federal ownership."

217. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 2 Pg.#: 2-5 Line #: 31 Code: C
Original Comment #: 24
Comment: OEPA believes that this sentence is too brief and that it over simplifies the ILCR goals. Please insert language to the effect that the NCP (40CFR part 300.430(e)(2)(i)(A)(2)) targets an ILCR of 10^{-6} as a point of departure.
Response: Agree.
Action: Add following text to line 32: "the NCP targets the use of an ILCR of 10^{-6} as the point of departure for establishing whether response actions are warranted at a cleanup site."

218. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 2.2.1 Pg.#: 2-12 Line #: 8-10 Code: C
Original Comment #: 26
Comment: A long-term surveillance and monitoring program will be required not only for the disposal system but also for all other areas of the property where contaminated soils are left in place. This monitoring system is necessary to ensure that land use controls are being maintained and that contaminants left in place are not migrating such that they exceed the remedial action objectives.
Response: Agree.
Action: Add following text to line 10: "... continued performance of the disposal system, ensure institutional controls are maintained, and ensure remedial systems are maintained over the long term."

219. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 2.2.2 Pg.#: 2-16 Line #: 32-33 Code: C
Original Comment #: 27
Comment: Ohio EPA disagrees with DOE's assertion that hunting would not occur at the site,

due to the size of the property and the presence of signs. Ohio EPA's experience with warning signs at sites significantly smaller than FEMP suggests hunting will occur under the expanded trespasser scenario.

Response: Agree.

Action: Remove sentence on line 3d, "Due to ... likely activity.".

220. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 2.6 Pg.#: 2-29 Line #: 25-36 Code: C
Original Comment #: 28
Comment: DOE should have developed a CPRG for soils that would protect the GMA outside the FEMP property to a $1X10^{-6}$ ILCR for land use options 3 and 4.
Response: Disagree. The cleanup criteria for each of the alternatives were discussed with OEPA and EPA early during the development of the FS. DOE considers that the range of alternatives and cleanup levels within alternatives present a sufficient range to reach an informed decision for Operable Unit 5. The range of PRLs considered for Land Use Objectives 3 and 4 also fully accommodate the resolutions of the Fernald Citizens Task Force.
Action: No change to the text required.

221. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 2.7.2 Pg.#: 2-32 Line #: Code: C
Original Comment #: 29
Comment: This section should include a discussion of an additional TBC, Ohio EPA's VOC discharge policy. Policy #DSW-DERR 0100.027.
Response: Agree. This policy will be added as an item of discussion to Section 2.7.2., page 2-32.
Action: Include a discussion of the OEPA's VOC discharge policy as a TBC for Operable Unit 5.

222. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 2 Pg.#: 2-33 Line #: Table 2-6 Code: C
Original Comment #: 30
Comment: The State of Ohio has revised its drinking water standards since 1991. We have included a copy of the newest regulations for DOE's convenience.
Response: Attachment not included with package.
Action: Update drinking water ARARs to be consistent with newest state regulations.

223. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 2 Pg.#: 2-36 Line #: Table 2-7 Code: C
Original Comment #: 32
Comment: Two of the standards listed in this table have been incorrectly transcribed. Ohio has no maximum concentration limit for dieldrin. The listed concentration should appear in the "30-day maximum" column. The value for fluoride in the table is 2.0 not the 2000 listed.
Response: Agree.
Action: Correct Table 2-7 to properly reflect state standards for dieldrin. The fluoride concentration is presented in μg/L which is equivalent to 2.0 mg/L.

224. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 2.7.5 Pg.#: 2-37 Line #: Code: C
Original Comment #: 33
Comment: An additional ARAR which should be discussed is OAC 3745.31-05(A)(3) which

requires all new source employ Best Available Technology (BAT) for minimizing air emissions.

Response: Agree.

Action: Add following text to line 14 of page 2-38: "State of Ohio regulations (OAC 3145.31-05[A][3]) require that all new sources of air emissions employ best available technology (BAT) to minimize air emissions of regulated pollutants."

225. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 2.7.8 Pg.#: 2-43 Line #: 33-35 Code: E
Original Comment #: 34
Comment: The final sentence of this paragraph is somewhat confusing. "Ability" may need to be revised to state "inability" or the sentence could be rewritten.
Response: Agree.
Action: The sentence was rewritten to: "For alternatives examining soil cleanup levels in the range of 50 to 100 ppm total uranium, an examination was conducted as part of the FS to determine if a lower cleanup level could be economically attained by applying the use of hand-held radiological instrumentation to its lowest projected detection capability (i.e., approximately 50 ppm of uranium)."

226. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 2.13 Pg. #:2-75 Line #: Code: C
Original Comment #: 35
Comment: The groundwater PRLs should be ppb not ppm.
Response: Agree.
Action: Correct Table 2-18 to properly reflect that groundwater PRL units are ppb.

227. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 2.13 Pg.#: 2-76 Line #: 1-5 Code: M
Original Comment #: 36
Comment: Ohio EPA believes it is inappropriate for DOE to determine that rounding to the nearest 5ppm is appropriate. Since DOE believes rounding is more consistent with numbers "credibly achieved," Ohio EPA believes the numbers should be rounded down to the nearest 5ppm. In addition, DOE has failed to even implement its proposed rounding scheme appropriately (44ppm has been rounded to 50 ppm rather than 45ppm).
Response: Disagree. DOE has rounded the PRLs for uranium to simplify the presentation. DOE considers this an appropriate objective which has not in any way confused the technical evaluations contained in the FS. The 44 ppm value cited from page 2-76 is a PRG to which background of 3.7 ppm was added to arrive at the rounded value of 50 ppm as the PRL. As discussed with OEPA at the OU5 FS meeting in Chicago on February 22-23, DOE will add text identifying that the PRLs for uranium were rounded for purposes of volume estimations only.
Action: Remove sentence on page 2-76, line 2: "At the... field techniques." Add to the end of the previous sentence "... nearest 5 ppm for purposes of estimating volumes of affected media only."

228. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 2 Pg.#: 79 Line #: 11 Code: C
Original Comment #: 37
Comment: The OEPA has several questions about the details of the solid block model. Since the model is only 30.5 feet deep, is all data collected at depths greater than this ignored by the model? OEPA requests more detail on the vertical distribution of

uranium and how limits were placed on the vertical distribution of uranium in soil for areas both inside and outside the production area..

Response: The vertical and lateral extent of contamination was presented in the Operable Unit 5 RI Report. The block model used the RI data to estimate volumes of soil that would require removal. As indicated in the RI the vast majority of the uranium soil contamination is in the glacial overburden at depths of less than 20 feet. However, because the vertical extent of contamination is not necessarily fully delineated in all areas, the model was extended to a depth of 30.5 feet in order to include an estimation of the contamination that may be present below 20 feet. Where sample results exist in the interval from 20 to 30.5 feet they were included in the model. Although the block model was bounded at the 30.5 foot depth, that limit only applies to the extent of the kriged estimates and resulting volumes. Samples which lie below the 30.5 foot depth were used to produce kriged estimates at block locations above 30.5 feet if it was determined in the kriging process that the sample had an impact on the block being estimated.

The purpose of the model was to make reasonable estimates of soil volumes so the various remedial alternatives could be evaluated for implementability and cost. The model boundaries and volumes will not be the basis for actual excavation. As indicated in the RI comment responses regarding the uncertainty of the depth extent of some contaminants, the final excavation plans will be based on verification sampling in the RD/RA process that will augment the RI data to refine the vertical extent of contamination and provide the basis for the excavation program.

Action: None required.

229. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 2 Pg. #: 2-81 Line #: 15-16 Code: C
Original Comment #: 38

Comment: If no sampling points were found within the search ellipsoid, no estimate of concentration was made for the block. Does this ultimately imply that no uranium exists in the search area or that no samples were collected in the search area? The concern is that a lack of data is interpreted as a lack of contamination. Please clarify.

Response: The search radii were chosen to equal the range of the horizontal and vertical semi-variograms. The range of the semi-variogram represents the maximum distance at which two points still have some spatial correlation to each other. This criterion attempts to ensure that the kriging estimates are based upon samples that have some correlation to the block being estimated. A total of 70 subsurface blocks within the bounding volume had no samples close enough to derive an estimate and were assigned background. This represents a small fraction of the entire model (less than 26,000 cubic yards).

The need for samples was determined in the remedial investigation process and the location and density of samples was presented in the RI Report for Operable Unit 5. The kriging process was applied to the data that showed there is a limit to the extent of the contamination. In order to characterize the nature and extent of contamination in the remedial investigation, the density of sampling points was greatest in the areas where contamination exists and least in the areas where contamination was not present. Therefore, when the kriging process did not find samples in an area it is because the remedial investigation found little reason to collect samples in the area due to the lack of contamination in that or adjacent areas. Thus the lack of data is a reflection of the RI finding that there is little or no contamination in the area. The

RI Report shows that there should be little concern that the lack of data means that there are areas of contamination that were missed.

Action: None required.

230. Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: 2.13.1.1 Pg.#: 2-81 Line #: 25-30 Code:
Original Comment #: 39

Comment: The 16 foot vertical and 275 foot horizontal search seems large. Is it possible to reduce this in areas of the site which have large quantities of spatial data, such as is done through grid discritization for ground water modeling efforts?

Response: Kriging is essentially a method to calculate weighted averages from sample points near a particular location. The weights are dependent on several factors, but primarily upon the three-dimensional distance between the block being estimated and the surrounding samples. In areas where the density of samples is high, sampling points near to the block location are given far more weight than those farther away. In these areas, the radii of the search ellipsoid are essentially irrelevant, because the weights given to points near the perimeter of the search ellipsoid are several orders of magnitude less than those calculated for points near the center of the ellipsoid.

Action: None required.

231. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 2 Pg. #: 2-81 Line #: 25-36 Code: C
Original Comment #: 40

Comment: The text states that limits were placed upon the depth of contamination for all blocks within the FEMP. Why were limits placed on blocks which had sufficient points for Kriging over the 16 feet depth? Please clarify. If measured sampling results exist why does a manual limit need to be set? What difference results when the limit is set manually versus interpreted by the Kriging program?

Response: Agree the text needs clarification as to the method used to limit the kriged total uranium values with depth. The lower bounding surface was necessary to limit the exponential increase in the kriged concentration from the standard error term as the routine attempted to extrapolate from areas of high density input data to no data areas within the search volume. The kriging depth was not limited to 16 feet beneath the surface.

Action: The text will be revised to clarify the limiting process for the kriged total uranium concentration values. Lines 11-36 on page 2-81 and lines 1-2 on page 2-82 will be replaced with the following:

"The kriging program employed an ellipsoidal search, using a distance of 16 feet in the vertical direction and 275 feet in the horizontal direction. These limits were set after examining the semi-variogram constructed from the measured sample data. In other words, when estimating the concentration of uranium within a block, the kriging routine was allowed to search up to 16 feet vertically and up to 275 feet horizontally around each model cell for correlative samples with which to interpolate a concentration for the cell. If no measured sampling points were found within the search ellipsoid, no estimate of concentration was made for that block.

The distribution of sample data in the semi-variogram indicated that kriging would be best applied to the log-transform of the measured total uranium values. The expected value of total uranium for each model block was obtained by back-transforming the kriged logarithmic estimate and the kriged standard error:

Estimated Total U = exp(kriged estimate + std. error/2).

As the distance from model grid cell to measured sampling locations within the search ellipsoid increased, so too did the kriged error, which in turn exponentially

increased the expected value of total uranium for the model block. This resulted in areas with extrapolated values of uranium concentration caused solely by the exponential effect of the standard error increasing away from the measured sampling points.

To prevent this effect, a lower bounding surface was constructed from measured sampling results and from knowledge of site geology. Because much of the contamination present at the FEMP, particularly in regions outside the production area, is the result of air deposition and is present at elevated concentrations in only the upper 2 to 6 inches of soil, the bounding depth was set at 0.5 feet in these areas. This assumption is supported by the preliminary results of the K_l sampling program presented in Appendix F, Attachment F.2.I. In areas where deeper contamination was measured or where knowledge of site geology allowed the possibility of deeper contamination, the bounding depth was set 5 feet below the deepest known contamination and the kriged values down to that depth were used in soil volume estimates."

232. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 2.13.1.1 Pg. #:2-81 Line #: 30 Code: C
Original Comment #: 41
Comment: Please discuss the dimensionality of the kriging effort. Please describe more fully how the interpolation was bounded and provide simple examples to aid the explanation.
Response: The kriging process used is a fully three-dimensional one. The estimate derived at each block location is essentially dependent on two factors, in order of importance :
i) The distance between the block location and all samples lying within the search radius. In calculating distance, the vertical component is exaggerated by a factor of 17.2 (275 ÷ 16) to account for the lower correlation in the vertical direction.
ii) The spatial correlation between the samples being used to estimate a block. This factor incorporates the concept of "screening," whereby if a sampling point lies beyond another sampling point in roughly the same direction from the block location, the weight given to the farthest point is reduced dramatically. This mechanism also results in the declustering of the data, i.e., the total weight given to a group of points at one location is roughly similar to the weight that would be given to a single point at the same location.
Action: None required.

233. Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: 2.13.1.1 Pg.#: 2-82 Line #: 14-18 Code:
Original Comment #: 42
Comment: The document needs to have the reference to the report or study where DOE technically justifies these subdivided zones of leachability.
Response: Agree. The K_l study is discussed in Appendix F, Attachment F.2.I.
Action: Line 15 of text in page 2-82 will be modified to read. "...was subdivided based upon the leaching properties (K_l) of uranium in site soil (Appendix F, Attachment F.2.I).

234. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 2 Pg.#: 87 Line #: 28 Code: C
Original Comment #: 43
Comment: The plow depth for most crops in this part of the Ohio is typically 7 inches. The volume calculations for those off-property areas that have been farmed would be

more realistic if the assumed removal depth were revised from the assumed 6 inches.

Response: Disagree. This is an estimate. Even though plow depth may be 7 instead of 6 inches, it is also true that the entire area has not been plowed. In areas where residential yards or pastures exist the 7 inch depth would be an overestimate. Because the estimate does not take credit for unplowed land, pastures, residential areas, or areas covered by pavement or buildings the 6 inch depth is conservative.

Action: None required.

235. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 2Pg. #: 2-91 Line #: Figure 2-8 Code: C
Original Comment #: 44

Comment: The drainage in the north-east corner of the figure do not extend back to the source areas. Please clarify why the drainageways in the north-east corner of Figure 2-8 do not extend back towards the site.

Response: The extent of the drainage shown on Figure 2-8 is defined by contours on the USGS and site topographic maps. The area on the FEMP that drains into this stream is relatively flat pasture where water moves as sheet wash rather than in distinct stream channels. Approximately 25 acres of FEMP property are drained by the northeast drainage. Figure 3-9 in the Operable Unit 5 RI Report shows that the topographic divide defining the head of the northeast drainage is well over 1000 feet northeast of the northeast corner of the production area security fence.

Action: None required.

236. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 2Pg. #: 2-93 Line #: Table 2-21 Code: C
Original Comment #: 45

Comment: Table 2-21 lists an on-property soil disposal volume of 1,797,000 cu. yds. for OU-5, land use objective 3, case 7. Table 7-3 (pg. 7-7) lists 1,750,000 cu. yds. for OU-5, land use objective 3, case 7. Please clarify.

Response: Table 2-21 depicts the <u>total volume</u> of soil requiring action.
Table 7-3 depicts the volume of soil that was assumed to meet the waste acceptance criteria for on-property disposal in the CRARE analysis. The volume of soil to be disposed of on property is less than the total volume requiring action because the total volume requiring action includes both the volume to be disposed of on property and the volume to be disposed of off site.

Action: None required.

237. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 2 Pg.#: 2-93 Line #: Table 2-21 Code: C
Original Comment #: 46

Comment: Footnote "b" refers to an estimated 175,000 cubic yards of gravel from the former Production Area. It seems this gravel would be a very strong candidate for evaluation for soil washing. Has any such evaluation been performed?

Response: Treatability testing to evaluate the washability of former production area gravel has not been completed. The FEMP is currently evaluating possible options for treating this gravel.

Action: No change.

238. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 2 Pg.#: 95 Line #: 27,33 Code: C
Original Comment #: 47
Comment: Because the plow depth is typically 7 inches, these volume estimates should be revised upwards to incorporate the additional excavation depth that will need to be removed to account for this mixing
Response: Disagree. This is an estimate. Even though plow depth may be 7 instead of 6 inches, it is also true that the entire area has not been plowed. In areas where residential yards or pastures exist the 7 inch depth would be an overestimate. Since the estimate does not take credit for unplowed land, pastures, residential areas, or areas covered by pavement or buildings the 6 inch depth is conservative.
Action: None required.

239. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 2Pg. #: 2-107 Line #: 19-21 Code: C
Original Comment #: 49
Comment: The text implies that surface water contamination is a short-term problem which will diminish over time. Because the anticipated duration required to achieve the remedial objectives for soils is estimated at 22 years, surface water would likely remain a concern for some time. Based on the high concentrations of uranium currently detected in surface water (0.3 to 3.5 ppm, see Table 2-22) and the 22 year time frame, could surface water act as a receptor? At a minimum have these considerations been accounted for?
Response: Section 2.13.4 was intended to state that surface water contamination will diminish over time due to soil and production area remediations. During the remediation period, surface runoff will be collected and processed before reaching the uncontrolled surface water bodies such as Paddys Run and the SSOD, as described between lines 23 and 27. However, the explanation for considering surface water other than the Great Miami River as a pathway rather than receptor in lines 15 and 16 can be further expanded to avoid confusions.
The streambeds of the SSOD and Paddys Run south of the silo area are sitting directly on the Great Miami Aquifer sand and gravel sediment which has very high permeabilities. The majority of surface water contamination will quickly infiltrate through these streambeds into the Great Miami Aquifer. These two surface water bodies do not usually have standing or continuously flowing water. Therefore, no surface water in Paddys Run and the SSOD can be effectively collected for treatment. Although surface water criteria in these surface water bodies and other drainage ditches for the meat and milk consumer were also considered when developing the soil and perched groundwater CPRGs, these two surface water bodies were generally considered as the pathway between contaminated surface runoff and the Great Miami Aquifer. Protective requirements for residual surface soil due to this contaminant migration pathway were developed in Appendix F.4.
Action: The following text will be added to the end of line 21 on page 2-107: "The streambeds of the SSOD and Paddys Run south of the silo area are sitting directly on the Great Miami Aquifer sand and gravel sediment which have very high permeabilities. The majority of surface water contamination will quickly infiltrate through their streambeds into the Great Miami Aquifer. These two surface water bodies do not usually have standing or continuously flowing water. Therefore, no surface water in the Paddys Run and the SSOD can be effectively collected for treatment. Although surface water criteria in these surface water bodies and other drainage ditches for the meat and milk consumer were also considered when developing the soil and perched groundwater CPRGs, these two surface water bodies

were generally considered as the pathway between contaminated surface runoff and the Great Miami Aquifer. Protective requirements for residual surface soil due to this contaminant migration pathway were developed in Appendix F.4."

240. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 2-6 Table Pg.#: 2-33 Line #: Code: C
Original Comment #: 31
Comment: a) The table should be revised to show that the total concentration of all trihalomethanes may not exceed 80ug/l. This should be noted for bromodichloromethane and chloroform.
b) The lead MCL is not listed as "Tentative" as suggest by the footnotes in this table. The lead MCL is final (F) and is a treatment technique (TT) standard.
c) Copper has an action level, such as lead, for the MCL. The level is the same as the MCLG, 1.3mg/l.
Response: Disagree with a); 40 CFR 141.12 states that the MCL for trihalomethanes applies to water treatment systems employing chlorination for disinfection. Such an MCL is not pertinent to alternatives, location for contaminants being considered. Agree with b) and c).
Action: Make changes suggested in b) and c) in Table 2-6.

241. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 3.2.2 Pg. #: 3-6 Line #: Code: C
Original Comment #: 50
Comment: Table 3-1 screens out single-layer caps for containment. The same logic for screening out single-layer caps or covers should also be applied to consolidation. Why then were earthen covers developed as alternatives in Section 4? Please clarify. This same comment applies to Table 3-3.
Response: The term earthen cover should not be associated with capping technology. The purpose of a cap is to significantly reduce the infiltration rate over that of native soil. While both a cap and an earthen cover would reduce the migration of contaminants to air and surface water, a cap could protect the aquifer by reducing the migration of contaminants to groundwater. In comparison, an earthen cover would require WAC to protect the aquifer.
An earthen cover, as described in this FS, is basically a vegetative cover with a compact soil layer beneath the vegetated topsoil layer. Unlike a cap, it is not assumed to reduce infiltration rate over that of native soil. Tables 3-3, 3-8, and 3-9 indicate that revegetation (a vegetative cover to stabilize soil) passes all screening steps and is applicable for use in the development of alternatives.
Action: To clarify the intent to depict the synonymous nature of revegetation and earthen cover, key references to revegetation in Section 3 and Appendix M tables, and Appendix M text will be followed by the words "earthen cover" in parentheses. This was done at the following locations: Page M-3-10 line 35, page M-3-11 lines 13 and 15, page M-5-16 line 24, page M-5-17 lines 21, 22, 26, 35 and 42, Table 3-3 (page 3-13), Table 3-4 (page 3-18), Table 3-8 (page 3-33), Table 3-9 (page 3-39), Table M.3-1 (page M-3-2), Table M.3-2 (page M-3-7), Table M.5-1 (page M-5-3), and Table M.5-2 (page M-5-9). In each table the change occurs in the process option column after the word "revegetation."

242. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 3.3.3Pg. #: 3-13 Line #: Code: C
Original Comment #: 51
Comment: Channel relocation and modifications were screened out (See Table 3-3) because on-site streams are ephemeral. This is not adequate justification. Existing channels convey stormwater and should be incorporated into a site-wide drainage control plan using existing and improved channels for both short-term and long-term runoff control. Dikes and berms are short-term solutions to employ during remediation followed by a long-term drainage design incorporating natural features.
Response: As explained in Appendix M (Section M.3.3.2), channel relocation and modification for existing site streams would be used to control sediment deposition. The site-specific condition that on-site streams run dry for part of the year does not in itself screen out these technologies. However, there would be no need for stream deposition control since dry sediment could be easily excavated at certain times of the year. This would result in less disturbance to the surrounding environment and thus cause the channel relocation and modification process options to become unnecessary.
Many on-site streams can be currently classified as "existing and improved channels" resulting from removal actions related to surface water runoff at the site. Several of these actions are described in detail in Section 1.3.5 of this FS. Typically the surface water control technologies discussed in this section of the FS are required to support soil remediation actions on a temporary or permanent basis.
Action: Screening comments in Tables 3-3 on page 3-13 and M.3-1 on page M-3-2 for the process options of channel relocation and channel modification have been revised to read "Not applicable. Site conditions make stream deposition control unnecessary."

243. Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: 3-7 Table Pg #: 3-30 Line #: Removal General Response Action Code:
Original Comment #: 52
Comment: Why not consider horizontal extraction wells?
Response: In this FS, horizontal extraction wells are referred to as directional extraction wells. Directional extraction wells passed the initial screening procedure in Section M.2.4.1 of Appendix M, but did not pass the evaluation step in Section M.4.4.1. We agree that this process option should have passed the evaluation step, however, the extent of its application will depend upon specific hydrogeological conditions at key areas of the site where extraction of subsurface water is critical.
Action: Replace last sentence of Directional Extraction Wells evaluation in Appendix M (page M-4-26, lines 32-33) with the following sentences. "However, depending upon hydrogeological conditions in certain areas of the site where subsurface water extraction will be required, directional (horizontal) extraction wells could be used to supplement vertical extraction well technology. Therefore, directional extraction wells will be retained as a potential support option to vertical extraction wells."
In addition, the following modifications have been made to tables. Table 3-5 (page 3-23) and Table M.4-1 (page M-4-5) have had the shading removed from the directional extraction wells evaluations. Tables 3-6 (page 3-29), 3-7 (page 3-30), M.4-2 (page M-4-11) and M.4-3 (page M-4-12) have an additional process option "Directional extraction wells" added directly below vertical extraction wells. The new retained process option is categorized as support (x).

244. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 4.0 Pg. #: 4-2 Line #: 36 Code: C
Original Comment #: 53
Comment: "Principal threat" is discussed in Section 4.1.6.1, not in Section 4.1.7.1 as stated. Please correct.
Response: Agree.
Action: Replace "4.1.7.1" with "4.1.6.1" on line 36.

245. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4 Pg.#: 10 Line #: Table 4-1 Code: C
Original Comment #: 54
Comment: The terms "total uranium-soluble" and "total uranium-insoluble" are not defined in this table. It would be helpful if an explanatory note were inserted to distinguish between the two.
Response: Agree.
Action: Change "soluble" and "insoluble" to "more leachable (K_l=15)" and "less leachable (K_l=325)" in Table 4-1; and add footnote at the end of the table defining the leachability coefficient (K_l).

246. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 4.1.4Pg. #: 4-13 Line #: 4 Code: C
Original Comment #: 55
Comment: DOE states that the "incremental soil volume" consists of portions of the perched zones that are high yielding, do not exceed PRLs, and are <u>above drinking water standards.</u> In the discussion following, however, the same volume of soil is said to include "unaffected" areas. Please clarify. Also note whether the incremental soil volume is the same for all four land use scenarios.
Response: Agree with need for clarification.
Action: The first line on the page should have the following words added in parentheses: "....but are contaminated (or could become contaminated in the future) above established...." This will clarify that there is a need to remove areas that are currently unaffected, as the reviewer indicates. Also, the first bullet on Line 4 should have the words "Land Use Objectives 1 and 2:" added at the beginning of the sentence. The second bullet should have the words "Land Use Objectives 3 and 4:" added at the beginning of the sentence. These words were inadvertently edited from the final draft. These additions will clarify that the 411,000 cubic yards of incremental excavation (i.e., incremental beyond that necessary to satisfy cross-media-based PRLs) applies to Land Use Objectives 1 and 2, which both contemplate the hypothetical presence of an on-property domestic user of the perched groundwater system. Under Land Use Objectives 3 and 4, this hypothetical receptor is not considered. Also revise sentences on page 4-14, line 26 to read: "For risk cases 1 and 2, where the on-property resident farmer is considered, all 50 acres will be excavated during the soil remediation". Add sentence on line 28 to read: "For the remaining risk cases (3 through 8), approximately 60% of the higher yielding zones require excavation to satisfy cross-media-based PRLs."

247. Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: 4.1.5.2 Pg.#: 4-20 Line #: 21 Code:
Original Comment #: 56
Comment: Change "before to discharge" to "before discharge".
Response: Agree.
Action: Change "before to discharge" to "before discharge" on line 21.

248. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 4.1.5.2 Pg. #: 4-20 Line #: 28-31 Code: C
Original Comment #: 57
Comment: The TI waiver may result in the pump-and-treat objectives being switched to containment from restoration rather than allowing the cessation of pumping.
Response: Agree that TI waiver can also be used to modify the remedy, rather than result in cessation of further operations.
Action: Will add words....."or modify the remedial approach" after the phrase "discontinue further operations" on line 31.

249. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4 Pg.#: 4-23 Line #: 14 Code: C
Original Comment #: 58
Comment: Please add a commitment here that before DOE concludes that asymptotic pumping conditions have been reached, more aggressive recovery methods (such as surge pumping, reinjection, etc.) are implemented first.
Response: Agree with reviewer's intentions. As part of the process justifying a TI waiver, an evaluation of available aggressive recovery methods would be required (and implemented as necessary) following negotiations with EPA and Ohio EPA. This activity would be performed following issuance of the ROD, at the time actual conditions indicated that a TI waiver may be necessary (perhaps several decades into the future). On page 4-18, DOE recognizes its responsibility to continually evaluate enhancement technologies (including the methods mentioned by the reviewer) and that these responsibilities extend beyond the ROD. Similar language can be brought to the discussion on page 4-23 as the reviewer requests.
Action: Revised sentence on page 4-23, line 16 to incorporate words in parentheses: ....." use of asymptotic recovery limits (as determined through negotiations with EPA and the application of enhancement technologies as necessary)"....

250. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4 Pg.#: 4-23 Line #: 36 Code: C
Original Comment #: 59
Comment: Ohio EPA does not concur that seeking a TI waiver is justified because a COC can not be remediated to below its MCL within the uranium-based remediation time frame. It is Ohio EPA's position that DOE must remediate damage done to this valuable resource.
Response: Agree such conditions must be negotiated, and the uranium remediation time frame is just one factor to consider. Will revise sentence to indicate that other COCs (and the need to invoke the TI waiver process for them if necessary) will be handled on an independent basis not linked to the uranium remediation time frame.
Action: Revised sentence on line 36 to state: ....."or if other COCs cannot be reduced below their MCLs in a reasonable time frame (to be negotiated with EPA) before conditions become asymptotic for these contaminants."

251. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 4.1.5.3 Pg. #: 4-24 Line #: 1-2 Code: C
Original Comment #: 60
Comment: How do the simulations indicate that asymptotic behavior of contaminant concentrations may be realized?
Response: Under the hydrogeologic and geochemical conditions selected as representative for the "base case" simulations, the goal of 20 ppb uranium concentrations achieved throughout the aquifer could be met within the 30-year target restoration time frame.

When these representative conditions were varied in the sensitivity runs (i.e., looking at possible "worst case" scenarios suggested by the extensive range of field data available for evaluation) it was not always possible to achieve the 20 ppb goal before conditions became asymptotic.
Following the evaluations, it was DOE's conclusion that the next step towards gaining a better understanding of how the system will behave during pumping conditions (including whether or not actual conditions depart significantly from those selected as representative) generally requires actual implementation of the base case remedy; monitoring performance during implementation; and making necessary adjustments and refinements as a natural course of performance assessment and response. The discussion referred to by the reviewer (lines 1 and 2 page 4-24) was simply indicating that the degree to which conditions depart from representative will generally not be known until full-scale implementation is achieved (and the system is adjusted or refined as necessary, to the satisfaction of EPA). DOE felt it was important for other stakeholders to be aware of this situation, and that such recognition should be stated in the ROD as appropriate.

Action: Clarification comment; no revisions necessary.

252. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 4.1.6 Pg. #: 4-26 Line #: 24 Code: C
Original Comment #: 61

Comment: The question is posed whether an evaluation of isopleth maps for the various COCs will show that the risk footprints are contained within the uranium footprint (as is the case for the 10-6 residential farmer). The DOE goes on to state that volumes and footprints were adjusted, but does not answer the original question. Does the uranium footprint control for all of the risk cases? Please clarify the extent of the deviation.

Response: For the on-property excavation areas, uranium distributions are not always the controlling factor in detecting footprint size. On line 26, it is stated that the volumes and footprints of uranium excavation were adjusted as necessary to account for the other COCs, indicating that for some of the risk cases, the nonuranium COC footprint is larger than the uranium footprint. The color overlays provided in Section 2.0 (following page 2-95) were developed specifically to display the extent of deviation (i.e., footprint expansion) caused by the nonuranium COCs. The third color overlay of each set denotes the incremental level of excavation necessary to accommodate the other COCs. The color overlays are provided for each risk case. The actual increases in excavation volumes associated with the incremental level of excavation are tallied on page 2-93 in Table 2-21.

Action: A conclusion-type sentence will be added on line 25 to indicate that, for some of the risk cases, the uranium footprint had to be expanded to address the nonuranium COCs. A reference to the color overlays will also be provided here to direct the reader to the extent of expansion, and the general reference to Section 2.0 will be removed. Add following sentence on page 4-26, line 25: "For risk cases 2 through 8, the uranium footprints required expansion to address nonuranium COCs. This can be seen from the color overlays provided in Section 2.13."

253. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4 Pg.#: 4-27 Line #: 5 thru 37 Code: C
Original Comment #: 62

Comment: Ohio EPA agrees with DOEs contention that the wastes in OU1, OU4, and the inventoried process residuals collectively constitute the principal threat materials on site. Ohio EPA is not in agreement with the implication that the remaining materials

represent a secondary threat and that engineering and/or institutional controls are adequate to protect the environment. Ohio EPA believes that these high volume, low toxicity wastes do in fact represent a significant long-term threat to the Great Miami Aquifer. We further assert that treatment to reduce the mobility and volume of these wastes is in fact not impracticable. We also assert that regardless of the engineering controls implemented, the existence of a sole-source aquifer precludes the placement of even a solid waste landfill in this location. OEPA believes that the use of additives in either the construction of the liner or during the placement of wastes should be evaluated. Technology to reduce the soil volumes in excess of 30% also exists. The use of this "brickmaking" technology also would provide a way to incorporate such additives to the soil matrix.

Response: DOE contends that the text in Section 4.1.6.1 does properly reflect the intent of the NCP regarding the designation of principal threat and secondary threat materials. As agreed in the February 8, 1995 conference call, DOE will add descriptions of a number of emerging technologies, such as the brickmaker and the use of iron oxyhydroxides in geochemical barriers to Appendix M and Section 3. Further, DOE will add language strengthening the commitment to examine these and other emerging technologies to reduce the volume of material proposed for on-property disposal or to potentially improve the performance of the facility.

Action: Revise Section 3 and Appendix M as discussed by adding language to FS and PP strengthening the DOE's commitment to evaluate new and emerging technologies. (See Comment 198).

254. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4 Pg.#: 4-28 Line #: 31-35 Code: C
Original Comment #: 63
Comment: Please emphasize here that neglecting the environmental media associated with the other HWMUs is for volume estimating purposes only.
Response: Agree.
Action: Added, "This assumption is for volume estimating purposes only, and verification will be conducted following the decision logic displayed in Figures 4-4 and 4-5." to line 35.

255. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 4.1.6 Pg. #: 4-28 Line #: 37 Code: C
Original Comment #: 64
Comment: The assumption that 10 percent of the respective footprint beneath each of the 15 HWMUs has been affected by contamination seems arbitrary. The coincident depth for uranium excavation also seems unrelated. Please elaborate on these assumptions.
Response: These assumptions were for volume estimating purposes only, and will be field verified. Their main purpose was to identify representative costs for dealing with the materials. To accommodate the vertical extent of contamination, in the absence of contaminant-specific information, the depth of contamination of uranium was used as a surrogate to "bracket" as best as possible the potential depth to which RCRA constituents may have migrated. This information was felt to be sufficient to evaluate costs and examine the sensitivity of the RCRA-affected soil volumes on the overall remedy selection process.
Action: Additional text will be added to elaborate on the assumptions and their intended purpose. On line 39, Page 4-28 add the following text: "This assumption will be verified during the remedial action as part of the soil verification and certification process. The intended purpose of the assumption is for cost estimating purposes."

256. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4.1.6.2.2 Pg.#: 4-38 Line #: 29-30 Code: C
Original Comment #: 67
Comment: Since WACs are currently a concentration based limit, how will cement stabilization result in meeting the WAC? The total mass of contaminant will not change and the only change in concentration would be based upon dilution by cement additives.
Response: The solid phase WACs are derived as the "second step" of the WAC development process. They are calculated from the initial liquid phase concentrations (i.e. the acceptable leachate concentrations) that are determined from the application of the fate and transport model. While the leachate concentrations remain fixed at the values determined through the model, the solid phase WACs derived from them can change based upon the leachability potentials of the solid phase materials. Thus they are both concentration and leachability dependent limits, not a just concentration based alone, as indicated by the commentor. This is why the solid phase WAC for uranium changes for the two different (Kl=15 and Kl=325) leachable forms of uranium contaminated soils that have been represented in the FS. Similarly, if the soils are treated, such that the leachable potential is modified, the WAC is adjusted accordingly to represent the change in leachability potential that would be expected from the treated soil. Such is the effect that cement stabilization has on the WAC. The change is not the result of a "dilution effect" as the commentor concludes. Appendix F provides the details of how solid phase WACs are derived from the acceptable leachate concentrations determined through the fate and transport model.
Action: Revise sentence line 29, page 4-38 to read: "In the event that the treated soil does not attain the WAC, the soil would require off-site disposal."

257. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 4.1.6 Pg. #: 4-40 Line #: Code: C
Original Comment #: 68
Comment: Figure 4-5 indicates that waste which does not meet WAC for radiological constituents is sent off-site for treatment of RCRA wastes. Those RCRA wastes that are not listed are sent to a subtitle D facility. This final disposition following treatment does not address the fact that the materials contain radiological constituents that cannot be placed in a Subtitle D facility.
Response: What is meant by the Subtitle D facility denoted in the figure is a licensed facility that can accept radiological waste, but not mixed waste, such as the Nevada Test Site. Such facilities must still meet Subtitle D waste management requirements, but they cannot accept hazardous wastes. Disposal of radiological materials in this manner can avoid the surcharge associated with disposal of mixed waste, if hazardous constituent concentrations and/or designations allow for such disposal following treatment.
Action: None necessary.

258. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4 Pg.#: 41 Line #: 33 Code: C
Original Comment #: 69
Comment: It appears that all soils with organic vapors detectable with field screening instruments are destined for treatment or off-site disposal. There is expected to be a large middle ground between the field analytical detection limit and the concentration that is deleterious to the cell liner. Please clarify in the text the disposition of materials in this middle ground.
Response: It is recognized that the concentrations that may be deleterious to the liner are "full strength" concentrations of organic liquids, and that the field screening instruments

will be setting a surrogate threshold for these concentrations as low as the part per million level in soil. The materials that are contaminated between "full strength" and the part per million levels detectable by the field screening methods (i.e. the "middle ground" concentrations denoted by the reviewer) will be handled as if they were "full strength" materials, in the interest of conservatism. For the onsite alternative, these materials will be destined for treatment, even if the organic concentration levels meet the WAC. Provided the remaining concentration levels of other constituents (for example, uranium) are below their respective onsite WAC, the soils will be dispositioned onsite following treatment. If the onsite constituent concentrations pass the field screening threshold (and are also below their respective WAC along with the other constituents), they will be dispositioned onsite without further treatment.

For the offsite alternatives, the "middle ground" materials will also be treated (most likely onsite, as assumed for cost estimating purposes) to meet the respective LDR restrictions for disposal at the offsite facility.

In effect, the field screening threshold can also be viewed as an "operational WAC" separate and distinct from the concentration-based WAC for those organic constituents that can harm the liners if deposited in the cell as full strength solvents.

Action: On page 4-41, Line 37 add the following sentence: "In the interest of conservatism, this would include all soils conceivably contaminated at "full strength" concentrations (i.e. saturated with organic solvents) and those existing at the part per million concentrations detectable with the field screening equipment."

259. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4 Pg.#: 42 Line #: 28 Code: C
Original Comment #: 70
Comment: Please add clarifying language here to the effect that RCRA constituents detected under the "listed RCRA waste" units will be remediated to the analytical detection limits.
Response: Disagree. RCRA-listed waste constituents will be remediated to PRLs, identical to the process for the other non-RCRA COCs. In some cases, the analytical detection limit is the PRL, but not in all cases.
Action: No change necessary.

260. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4 Pg.#: 44 Line #: 21 Code: C
Original Comment #: 71
Comment: Please make an addition to this bullet which provides for the possible re-injection of treated ground water.
Response: Agree.
Action: Added following at end of sentence, line 22: ...."(or possible reinjection to the Great Miami Aquifer, if selected as an enhancement technology during remedy design or implementation)"....

261. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4.1.8 Pg.#: 4-45 Line #: 14-17 & 23-27 Code: C
Original Comment #: 72
Comment: Ohio EPA expects that any mitigative measures required for wetlands or threatened and endangered species will be clearly defined in the RD work plan and detailed within remedial design.
Response: Agree.
Action: Will add requested references to the RD work plan and remedial design. On line

37, page 4-45, add the following paragraph: "The plans for any mitigative measures required for wetlands or threatened or endangered species will be clearly defined in the RD work plan and detailed within the remedial design."

262. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4 Pg #: 61 Line #: 31 Code: C
Original Comment #: 73
Comment: Please elaborate on how the verification sampling will focus on the mobility of contaminants.
Response: It is anticipated that additional K_l determinations would be conducted as part of the verification effort, in addition to the contaminant concentration tracking. The details of the verification work effort, and the amount of supplementary investigations deemed necessary, would be produced as part of the RD work plan. At this time, for FS planning purposes, it is anticipated that the same method used during the RI investigations to determine K_l would be employed.
Action: The following was added to line 32: "by determining concentration levels and leachability coefficients (K_l) as appropriate."

263. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4 Pg #: 64 Line #: 9-11,28,29,42,43 Code: C
Original Comment #: 74
Comment: Treatment residuals from surface water, waste water, and the GMA all go off site but disposition of treatment residuals from perched ground water is dependent on meeting on-site WACs. Please justify/clarify these differences or alternatively revise this section to be more logically consistent.
Response: Logically the treatment residuals from each treatment would be likely to meet the WACs for on-site disposal. Therefore changes will be made in the text to indicate that if WACs are met, on-site disposal may be used.
Action: The following was added to line 29 and 43: "if WAC can be met, on-property disposal facilities may be used."

264. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4 Pg #: 65 Line #: 38 Code: C
Original Comment #: 75
Comment: Please delete this assumption and evaluate treatment options for these soils.
Response: The basic assumption that stabilization or other treatment would not be necessary was made as input to the modeling. The results of the modeling verify that this assumption was valid.
Action: The sentence on line 38, "Based on the physical and chemical characteristics of the contaminated soil and sediment, it is assumed that stabilization or other treatment would not be necessary." was replaced with: "Modeling results indicate that stabilization or other treatment of the soil and sediment will not be necessary to enhance the degree of protection provided by the onsite disposal facility. Treatability studies for brick making, phosphate amendment, and physical separation will be conducted to evaluate the enhancement of long-term effectiveness and for addressing the NCP preference for treatment to reduce toxicity, and mobility, or volume. Additional treatment technologies may be evaluated before implementation as new technologies evolve."

265. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 4.3.3 Pg. #: 4-67 Line #: Code: C
Original Comment #: 76
Comment: Does the excavated volume of soil shown in Table 4-11 define total contaminated soil in bank cubic yards (in-place cubic yards)? Does the volume include overburden to gain access to the contaminated soils?
Response: The volumes of soil presented in Table 4-11 (and comparable tables for other alternatives) represent in-place estimates. As indicated by a foot note on each table, the volumes do not include estimates of the clean soil that must be excavated to gain access to the contaminated soil.
Action: Added the footnote: "In-place volume estimate" for excavation volume to Tables 4-11 (page 4-67), 4-12 (page 4-69), 4-13 (page 4-70), 4-14 (page 4-78), 4-15 (page 4-79), 4-16 (page 4-81), 4-17 (page 4-88), 4-18 (page 4090), and 4-19 (page 4-91).

266. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 4.3.4 Pg. #: 4-72 Line #: 27 Code: C
Original Comment #: 78
Comment: Please explain why soils containing hazardous waste exceeding LDRs are treated and disposed off-site (rather than on-site). This is not consistent with Figure 4-5.
Response: Reviewer is correct. The inconsistency will be corrected. Soil that exceeds the respective WACs for the RCRA COCs will be treated and disposed of on site, for all of the on-site alternatives. This is what was assumed in the cost estimate, and matches the descriptions in Section 5. Only in the event that the treatment failed to meet the WAC would the soil be sent off site. This correction will be made for all of the alternatives contemplating on-site disposal.
Action: The fourth bullets on page 4-61, line 41; page 4-72, line 27; and page 4-84, line 12 were replaced with... "Pretreating soil with concentrations of RCRA-regulated constituents above the WAC established for these constituents."

267. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4 Pg #: 72 Line #: 17 Code: C
Original Comment #: 77
Comment: Please elaborate on how the soil verification sampling would focus on the mobility of contaminants.
Response: Mobility of contaminants will be assessed by conducting analyses not only for total metals but also for soluble metals.
Action: The following was added to line 18: "by determining concentration levels and leachability coefficients (K_l) as appropriate."

268. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4 Pg #: 74,75 Line #: 43,16,30 Code: C
Original Comment #: 79
Comment: As in a similar comment on the "A" alternatives, please clarify/justify the on- and off-site disposition of waste water treatment residuals.
Response: see # 263
Action: The following was added to pg. 4-75, lines 17 and 31: "If WAC can be met, on-property disposal facilities may be used."

269. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4 Pg #: 76 Line #: 26 Code: C
Original Comment #: 80
Comment: Please delete this assumption and evaluate these soils for treatment to reduce toxicity, mobility and volume as is preferred in the NCP.
Response: The basic assumption that stabilization or other treatment would not be necessary was made as input to the modeling. The results of the modeling verify that this assumption was valid.
Action: The sentence on line 26, "Based on the physical and chemical characteristics of the contaminated soil and sediment, it is assumed that stabilization or other treatment would not be necessary." was replaced with: "Modeling results indicate that stabilization or other treatment of the soil and sediment will not be necessary to enhance the degree of protection provided by the consolidation area with a multilayer cap. Treatability studies for brickmaking, phosphate amendment, and physical separation will be conducted to evaluate the enhancement of long-term effectiveness and for addressing the NCP preference for treatment to reduce toxicity, mobility, or volume. Additional treatment technologies may be evaluated before implementation as new technologies evolve."

270. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 4.3.4 Pg. #: 4-84 Line #: 40 Code: C
Original Comment #: 82
Comment: The use of single-layer caps (under containment) were screened out in Section 3.0, Table 3-1. Why then are the "C" alternatives, which provide earthen covers even more permeable than single-liner caps, being considered in Section 4?
Response: The single-layer cap was rejected because it could not meet ARARs or provide a suitable basis for an ARAR waiver to the Ohio solid waste disposal facility siting restrictions. The earthen cover is not intended to provide protection of groundwater but merely serves to allow reestablishment of vegetation. Groundwater protection in the "C" alternatives is provided by a WAC which considers only geologic protection without additional engineering control. Also, as indicated in the response to Comment 26, the C alternatives are basically off-site shipment alternatives; see response to Comment 26 for additional ARAR compliance information.
Action: No change.

271. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 4.3.5 Pg. #: 4-81 Line #: Code: C
Original Comment #: 81
Comment: The Total Project cost shown for Case 8 appears to be off by $10 Billion.
Response: Correct
Action: The cost was corrected when updated costs were inserted into Table 4-16 (page 4-81).

272. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4 Pg #: 85,86 Line #: 25,43,8 Code: C
Original Comment #: 83
Comment: As in a similar comment in the "A" and "B" alternatives, please clarify/justify the on-and-offsite disposition of waste water treatment residuals.
Response: see Comment 263.
Action: The following was added to page 4-85, line 44 and page 4-86, line 9. "If WAC can be met, on-property disposal facilities may be used."

273. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4 Pg #: 87 Line #: 1 Code: C
Original Comment #: 84
Comment: See previous comments. Please delete this sentence and evaluate these soils for treatment to reduce toxicity, mobility, and volume as preferred in the NCP.
Response: See Comment 264.
Action: The sentence in line 1, "Based on the physical and chemical characteristics of the contaminated soil and sediment, it is assumed that stabilization or other treatment would not be necessary." was replaced with: "Modeling results indicate that stabilization or other treatment of the soil and sediment will not be necessary to enhance the degree of protection provided by the consolidation area with an earthen cover. Treatability studies for brickmaking, phosphate amendment, and physical separation will be conducted to evaluate the enhancement of long-term effectiveness and for addressing the NCP preference for treatment to reduce toxicity, mobility, or volume. Additional treatment technologies may be evaluated before implementation as new technologies evolve."

274. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4 Pg #: 87 Line #: 5 Code: C
Original Comment #: 85
Comment: Does the use of the term "indigenous" refer to grasses before or after the introduction of agriculture? It is our understanding that native grasses have been almost completely replaced by exotic species.
Response: The term "indigenous" is meant to refer to grasses commonly found at the site at the present time. Appendix A, section A.2.4.3 titled "Ecological Communities on the FEMP Site" states that "Typical grasses found on the FEMP site are red fescue, Kentucky bluegrass, timothy and red top." These are the types of grasses that will be used. This section mentions no exotic species as being found at the FEMP site.
Action: No change.

275. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4 Pg #: 101 Line #: 3 Code: C
Original Comment #: 86
Comment: Please change this sentence to allow for investigating treatment options for all soil destined for the on-site disposal cell.
Response: A reference to the ongoing commitment by DOE to look at treatment options over the life of the remedial action (as discussed during the February 5, 1995 conference call) will be provided in this sentence.
Action: The following was added at line 5: "DOE, however, has made a commitment to investigate treatment options for all soil destined for the on-property disposal facility over the life of the remedial action."

276. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4.4.6 Pg #: 4-110 Line #: 14-23 Code: M
Original Comment #: 87
Comment: Ohio EPA does not concur with DOE conclusion that an ARAR waiver would not be required for the consolidated soil in the "C" alternative. These soils would constitute a solid waste and would require a waiver. Ohio EPA disagrees with DOE's interpretation of the Closure Plan Guidance concerning the implementation of risk assessment for use under this guidance.
Response: As noted in response to Comment 26, DOE will incorporate Ohio EPA's ARAR interpretation.

Action: The paragraph in question will be added: "except for certain State of Ohio solid waste disposal facility siting requirements (e.g., location above a sole-source aquifer)" on page 4-109, line 38. Deleted text from page 4-109, line 39 through page 4-110, line 23, and replaced with "An ARAR waiver (granted by U.S. EPA) to the State of Ohio's solid waste disposal siting prohibitions would be required. The State of Ohio has expressed an opinion that the basis for the waiver cannot be met without the incorporation of an engineered disposal facility for excavated soil that remains on site."

277. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4-2 Table Pg.#: 4-29 Line #: Code: C
Original Comment #: 65
Comment: A) Based upon activities associated with the Pilot Plant Sump Removal Act, the reviewer understood that all of the piping system under the Pilot Plant was now a part of this HWMU. This was based upon the fact that the sump was still connected to the existing piping system prior to the removal action.
B) Please add Unit Number 40 Biodenitrification Surge Lagoon and Unit Number 51 Experimental Treatment Facility to this list.
Response: A) The subsurface piping system is not ancillary equipment to the temporary pilot plant sump that was installed, and therefore is not part of this HWMU. This subsurface piping was strictly used as a drain system, which is now abandoned.
B) All HWMUs to be closed under CERCLA but also pending reclassification as SWMUs will be included in Table 4-2, except the biodenitrification surge lagoon which has been approved by your agency as a SWMU since the original comment response was prepared. The other HWMUs to be included on Table 4-2 include the experimental treatment facility, waste pit 5 and waste pit 4.
Action: A) No change.
B) All HWMUs to be closed under CERCLA but also pending reclassification as SWMUs will be included in Table 4-2. These units include the biodenitrification surge lagoon, the experimental treatment facility, Waste Pit 5 and Waste Pit 4.

278. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4-5 Table Pg.#: 4-33 Line #: Code: C
Original Comment #: 66
Comment: See previous comment on Table 4-2. Include whole Pilot Plant foundation into the volume calculations.
Response: The pilot plant is not a HWMU. Therefore, it is not considered as a unit to be closed under CERCLA.
Action: No change.

279. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 5.4.2 Pg. #: 5-20 Line #: 28 Code: M
Original Comment #: 89
Comment: The discussion on mixed waste is inconsistent with previous waste handling strategies (refer to Figure 4-5). The discussion indicates that waste with listed constituents will be treated to meet LDRs, and shipped off-site to a subtitle C mixed waste disposal site. Are radiological materials present at levels greater than on-site WACs? If so please state. Note that Figure 4-5 indicates that as long as WACs are met for radiological constituents, the material can be treated and disposed on-site. Please clarify.
Characteristic waste would be treated then disposed in an off-site Subtitle D disposal

facility. What if this waste contains radioactive material? Is this material to be shipped offsite because it failed on-site WACs for radiological constituents, and if so, how could a Subtitle D facility accept it.
The suggestion that treated waste with RCRA constituents would be sent off-site seems inconsistent with the LDR Compliance strategy developed earlier (Page 4-38, Line 14). In that discussion, wastes that do not meet WAC for RCRA constituents are treated before disposal on-site or disposal off-site. CAMU and AOC considerations allow disposal on-site without specifically meeting LDRs. Please elaborate on this apparent change in strategy.

Response: From the points raised in this comment, it appears that the confusion stems from the commentor possibly not being aware that the discussion on page 5-20 pertains to Alternative 1 -- Excavation and Off-site Shipment. The on-site WAC do not come into play for this alternative, because all soil affected above PRLs (and all wastes from other operable units) is designated for off-site shipment under this alternative. Therefore, the discussion provided on page 5-20 is correct. Because all media is being shipped off site, the LDR treatment requirements apply, and the CAMU and AOC provisions cannot be invoked. Listed wastes require disposal at a Subtitle C facility following LDR treatment (assuming the facility can also accept mixed waste if the materials are also radioactive) and characteristic wastes can be sent to a Subtitle C or D facility following treatment (again assuming the facility can also accept radioactive waste). This is consistent with the strategy portrayed in Figure 4-5, page 4-40, for the materials following the off-site pathway as shown on the top of the page.

Action: No revisions necessary.

280. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 5.4.2 Pg. #: 5-49 Line #: Code: C
Original Comment #: 91
Comment: Table 5-7 should also indicate the year associated with the present worth costs.
Response: By definition, the present worth costs apply to the current year, and assume that the funds are available immediately to begin the project. Because the present worth costs are derived from the total costs (1994 dollars) which are indicated in the table, it is evident that the present worth costs apply to the conditions current at the time of FS submittal.
Action: No revisions necessary.

281. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 5.4.2 Pg. #: 5-42 Line #: 19 Code: C
Original Comment #: 90
Comment: The effects of contaminated soil deposition in Paddys Run could be alleviated by erosion control measures. Sediment control structures, ponds, etc. could greatly reduce this short-term impact. Please discuss.
Response: We agree. Will add additional notation.
Action: Add sentence that mitigative measures are available to minimize short-term impacts during remediation. Carry discussion to other alternatives with similar concerns, as appropriate. On line 22, page 5-42 add the following sentence: "Mitigative measures such as sediment control structures are available to minimize short-term erosional impacts during remediation. Such measures would be developed and incorporated into the remedy as necessary during remedial design."

282. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 5.4.5 Pg. #: 5-100 Line #: Code: C
Original Comment #: 92
Comment: Please note that Table 5-17 does not include an estimate of the volumes of mixed waste that are to be managed and pretreated. Please revise.
Response: The volumes shown in the table are total volumes, of which the mixed waste volume is a subset, rather than an increment above the volumes shown. Therefore, they are included in the total estimates provided. For the A alternatives, it is assumed for costing purposes that the mixed waste volumes can be treated and disposed of on site.
Action: No revisions necessary.

283. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 5-3 Table Pg.#: 5-7 Line #: Code: C
Original Comment #: 88
Comment: Table 5-3 states that consolidation of soils will not occur for remedial alternatives 1,2A,3A, 4A. Yet, section 5.2.2.3, line #12 states that soils will be consolidated an placed within an on-site disposal cell. Please modify the text accordingly.
Response: Agree the term "consolidation" can be confusing. The term applies generically to the placement of affected soil in a smaller footprint area (regardless of the disposal option employed) as a means to free up portions of the on-property area for other use. In some meetings with EPA and the public, stakeholders have used the "consolidation" term to denote the on-property alternatives that do not use a disposal facility. To be consistent, the FS strives to use the term "consolidation and placement in an on-site disposal facility" or "consolidation and placement beneath an earthen cover" in discussing the alternatives.
Action: Table 5-3 will be revised to denote "consolidation beneath an earthen cover" for the C alternatives, and "consolidation in an on-site disposal cell" for the A alternatives.

284. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 6.4.1.1 Pg.#: 6-20 Line #: 17-19 Code: C
Original Comment #: 96
Comment: Considering that in most scientific analyses "high certainty" refers to a confidence level of 95-99%, the statement concerning "high certainty (>80%)" is certainly an overstatement.
Response: Agree with commentor that although this was intended to be a summary discussion, additional detail should be provided here. The 80 percent confidence factor was arrived at *considering hypothetical failure scenarios within the analysis*, rather than assessing performance of the cell in the absence of hypothetical failure. This needs to be indicated.
Action: Will add concept that even in the presence of hypothetical failure modes considered through Monte Carlo simulations, there is an 80 percent likelihood that the cell can protect the aquifer for a 1000-year performance period, as indicated by the performance assessment in Appendix F.

285. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 6.4.1.2 Pg.#: 6-20 Line #: 36-37 Code: C
Original Comment #: 97
Comment: These sentences should be revised to state "The only alternatives that comply with ARARs are the complete off-site disposal alternatives. All other alternatives would require...."

Response: Agree to editorial change, based on conclusions reached during February 8, 1995 conference call. See response to Comment 26.
Action: Will incorporate editorial change.

286. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 6.4.2.2. Pg.#: 6-22 Line #: Code: C
Original Comment #: 98
Comment: As stated in previous Ohio EPA comments, we believe DOE has failed to consider some very appropriate technologies which could achieve the statutory preference for treatment. DOE should consider such treatment technologies as the "brickmaker" and mobility reducing compound additions even for the waste being placed in the on-site disposal cell.
Response: Do not agree that these technologies are appropriate, other than as a support technology for materials that fail to meet the WAC for the on-site disposal facility. Will add clarification that other emerging technologies such as the "brickmaker" and mobility reductants will be considered throughout the RD/RA process, as additional support technologies. However, as discussed with EPA and OEPA, it is not intended that these technologies be specified as mandatory requirements for the preferred remedy. It is the FEMP's position that the engineered disposal facility alternative satisfies the remedial action objectives established for the FS, without the need for additional soil treatment.
Action: Will revise to include statement that the additional technologies referenced by OEPA in this comment will be considered as candidate support technologies during design and remedy implementation.

287. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 6-1 Table Pg.#: 6-9 Line #: Code: C
Original Comment #: 93
Comment: The table would be more useful to the reviewer if footnotes or an additional column briefly defined land use and PRL levels for total U.
Response: Agree in part. The land use objectives for each of the alternatives depicted in this table will be defined in a footnote. DOE believes it would be confusing to add the actual PRLs to this table due to the fact that there is more than one PRL for uranium in soil for some risk cases. (i.e. differing risk targets for on- vs. off-property target receptors within some risk cases.) A footnote referencing Table 2-18 "Target Risk Cases Evaluated in Feasibility Study" which depicts the requested PRLs will be added to Table 6-1.
Action: Revise Table 6-1 as follows: Change the heading of column 1 to read "Alternative/Land Use Objective." Add the Land Use Objectives to the alternatives in column 1. Add a footnote defining the Land Use Objectives. Add a footnote to "PRL" at the top of column 2. Footnote will read: See Table 2-18 "Target Risk Cases Evaluated in Feasibility Study" for uranium PRLs for soil for each risk case.

288. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 6-2 Table Pg.#: 6-11 Line #: Code: C
Original Comment #: 94
Comment: a) It is unclear what soil treatment is occurring in alternative 3A that is not occurring in any of the other alternatives. This column should be revised for clarity and consistency.
b) As stated in previous comments, it is Ohio EPA's position that an ARAR waiver would be necessary for Alternatives 2C and 3C as a solid waste is being disposed over a sole-source aquifer.

Response: Agree with commentor regarding error in 5th column of table. Phrase should read "no treatment of soil" for Alternative 3A. Regarding Alternatives 2C and 3C ARAR compliance, see response to Comment 26.
Action: Revise 5th column for Alternative 3A, and provide notation that all the C alternatives also require ARAR waiver.

289. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 6-3 Table Pg.#: 6-13 Line #: Code: C
Original Comment #: 95
Comment: a) No footnote is provided for the "*" in Socioeconomics and Land Use.
b) The table fails to discuss the socioeconomic and land use impacts associated with alternatives that include large scale off-property excavations. These include temporary land use impacts on farming and residential areas.
c) As suggested for a previous table brief footnotes describing the risk cases would be helpful to the reviewer.
Response: Agree with suggestions.
Action: Add suggestions to the table. For comment c), see response/action to comment 287.

290. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 7 Pg. #: 7-17 Line #: 15-17 Code: C
Original Comment #: 102
Comment: The sentence is incomplete. Presumably, the sentence notes that, if background radionuclide and inorganic concentrations are removed, the HI is within the NCP acceptable range. If this is the meaning, what would be the revised HI? Please clarify and specify the values.
Response: Agree.
Action: Section 7.0 is being rewritten to provide a summary of integration strategies/impacts and the CRARE (Appendix H). A revised HI will be provided as part of the revision.

291. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 7 Pg. #: 7-16 Line #: 10-21 Code: C
Original Comment #: 101
Comment: It is unclear whether the resident on-site child's HI level would be below 1.0 if background magnesium concentrations are not considered as a contributor. Please clarify and give the HI with magnesium not included.
Response: Agree.
Action: See response to Comment 290 above.

292. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 7 Pg. #: 7-10 Line #: 33 Code: C
Original Comment #: 99
Comment: There is no Section 7.4; the reference should identify Section 7.2.4.
Response: Agree.
Action: Changed to "... Section 7.2.4), ...".

293. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 7 Pg. #: 7-18 Line #: 22-23 Code: C
Original Comment #: 103
Comment: The off-site disposal volume is projected at 775,000 cubic yards. The value in Table 7-4 obtained on summing individual volumes for each operational unit is approximately 714,000 cubic yards. The values are inconsistent. Please clarify.

Response: Agree.
Action: Section is being rewritten; disposal volumes may go away and reader be referred to earlier discussion (Sections 2, 3, and/or 4).

294. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: 7 Pg. #: 7-15 Line #: Table 7-6 Code: C
Original Comment #: 100
Comment: An ILCR of a resident on-site farm adult which is greater than the on-site resident farm child seems inconsistent. Based on a smaller body weight of the child and the same exposure as the adult, why is the ILCR for the farm child lower? Please clarify.
Response: Agree.
Action: Table is being revised to be consistent with Appendix H (CRARE).

295. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: A Pg.#: Figure A-6 Line #: Code: E
Original Comment #: 107
Comment: Figure A-6 is impossible to read. It is too cluttered and the reader can't distinguish which wells yield greater than 1 gallon per minute.
Response: Agree.
Action: The intent was to provide the reader with the general area of yield greater than 1 gpm. It is not necessary to provide actual well numbers; this information is in the OU5 RI Report. Figure A-6 will be upgraded for readability.

296. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: A Pg.#: A-2-7 Line #: 15 Code: C
Original Comment #: 104
Comment: Please locate these large tributaries on a map.
Response: Agree.
Action: A figure noting these locations will be added.

297. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: A Pg.#: A-2-9 Line #: 18 Code: E
Original Comment #: 105
Comment: The Figure to is A-10 not A-8.
Response: Agree.
Action: Reference changed to Figure A-10.

298. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: A Pg.#: A-5-14 Line #: 19 Code: C
Original Comment #: 106
Comment: It is not OEPA's experience that tributyl phosphate is a common laboratory contaminant. Please justify this assertion.
Response: Agree.
Action: "Both common laboratory contaminants)" deleted.

299. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: B.4.2 Pg #: B-4-6; B-4-7 Line #: 29-38; 1-3 Code: C
Original Comment #: 108
Comment: Ohio EPA disagrees with DOE's position that removed soils that contain contaminants below PRLs are not a solid waste. These contaminated soils are considered wastes. The petroleum contaminated soils policy applies only to such

soils and may not be used to for making determinations with regard to other wastes.

Response: Disagree. If soil below PRLs were to be considered as a solid waste then the remediation process under CERCLA would not be relevant because the entire site would be considered a solid waste landfill after remediation. This includes using risk assessment results to determine an acceptable cleanup level that is protective of human health and the environment for a given land use scenario. Under the concept that soil containing detectable concentrations of hazardous constituents is a solid waste, even if they are below risk-based cleanup levels, would require replacing the application of risk assessment under CERCLA with laboratory method detection limits as the strategy to drive compliance for site remediation.

Action: No change.

300. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: B-1 to 3 Table Pg #: B1-1toB.5.C-7 Line #: Code: C
Original Comment #: 111

Comment: Listed below are additional ARARs and TBCs which should be considered.
Hazardous Waste ARARs which should be added:

a) OAC 3745-56-51, 54, and 58; Waste Piles - any storage piles of RCRA waste.
b) OAC 3745-57-40 thru 51; incinerator - thermal treatment for VOCs.
c) OAC 3745-57-91 to 93; miscellaneous methods of waste treatment - soil treatment.
d) 40 CFR 264 Subpart G (OAC 3745-55-11 to 16; HWMU closure requirements
Air Emission Standards
a) 40 CFR Part 61.90 thru 61.97; radionuclide emissions
b) 40 CFR 60.670 Subpart OOO; crusher standards if a proposed technology
c) OAC 3745.31-05(A)(3); air emission BAT requirements
d) OAC 3745-21-07(G)(2); organic material emissions
e) OAC 3745-21-02(C) & 3745-21-03(D); hydrocarbon emissions
f) OAC 3704.05(A-I); prohibits violation of air poll. control rules Surface Water Standards
a) 40CFR 122.26 (OAC 3745-38); stormwater discharge
b) Ohio EPA policy "NPDES Wastewater Discharges Resulting from Clean-Ups of Response Action Sites Contaminated with VOC's; Policy #DSW-DERR 0100.027 Wastewater Standards
a) OAC 3745-31; PTI

Response: In order to respond accurately to each of the regulations specified above, the responses are alphabetized in sequence below. The original alphabetical designations were struck out where the lettering was out of sequence. Each additional ARAR and TBC cited in the above comment was reevaluated for Operable Unit 5 and addressed with the corresponding action as follows:

a) OAC 3745-56-51, 54, and 58 for management of hazardous waste piles is appropriate for Operable Unit 5 if they are used for over 90 days.

Action: OAC 3745-56-51,54, and 58 will be incorporated into Appendix B, Table B.3 as relevant and appropriate, in accordance with the CAMU rule.

b) OAC 3745-57-40 through 51 for using incineration as a thermal treatment method for VOCs are not intended to be used as a treatment method for Operable Unit 5 soil. Treatment of some VOCs may be performed through the application of low-temperature thermal desorption.

Action: No change.

c) The use of miscellaneous units under OAC 3745-57-91 to 93 to store or treat soil, may be pertinent to Operable Unit 5 anticipated remediation activities.

Response: This regulation will be incorporated in Appendix B, Table B.3 as relevant and appropriate with respect to the CAMU rule.

d)~~a)~~ 40 CFR 61.92 and .93 on air emissions are already addressed in Appendix B on Table B.1, page B.1-15 and Table B.5.A, page B.5.A-1. Other portions of these regulations are addressed as follows:

40 CFR 61.90, designation of facilities, designates DOE facilities as being required to comply with Subpart H. It is agreed that this requirement is pertinent to Operable Unit 5 anticipated remediation activities.

40 CFR Part 61.90, .91, and .94, through .97 are considered for site-wide emissions and are pertinent to Operable Unit 5. Compliance with parts .94 and .95 are currently prepared in annual reports, which include air emissions that may be produced by Operable Unit 5.

Action: Operable Unit 5 will incorporate 40 CFR 61.90, .91, and .94 through .97 to Table B.1 as an additional ARAR.

e)~~b)~~ Currently, crushers are not planned for use during remediation. Therefore, 40 CFR 60.670, Subpart 000 was not included in Appendix B.

Action: No change.

f)~~a)~~ Agree that air emission BAT requirements (OAC 3745-31-05(3)) should be considered as applicable.

Action: OAC 3745-31-05(A)(3) will be included as an applicable requirement to Table B.3, Appendix B.

g)~~d)~~ Organic material emissions will be considered as applicable if a remediation technology is employed that produces organic material emissions.

Action: OAC 3745-21-07(G)(2) will be included in Table B.3 as an action-specific ARAR in case organic emissions are produced during remediation.

h)~~e)~~ Hydrocarbon emissions (OAC 3745-21-02(C) and -03(D)) will be pertinent to Operable Unit 5 if hydrocarbons are emitted during remediation.

Action: Hydrocarbon emissions regulations will be included in Table B.3 as an applicable action-specific ARAR for any activity that may cause these emissions.

i)~~f)~~ ORC 3704.05 (A-I) for prohibitions to violations of air pollution is already included in Appendix B, Table B.3, page B.3-17 of the action-specific table as an applicable requirement. It is assumed that the reference to "OAC," above, is actually "ORC." However, clarification is requested to the reference,"control rules Surface Water Standards." The regulation cited does not discuss surface water.

Action: No change.

j)~~a)~~ The NPDES permitting requirements specified in 40 CFR 122.26 (OAC 3745-38) is pertinent to future Operable Unit 5 remediation activities.

Action: The NPDES permitting requirements for storm water discharges (40 CFR 122.26 and OAC 3745-38) will be added as a separate line item to the citation quoted on page B.3-21, Table B-3 for general NPDES permit requirements (40 CFR 122.41, Subpart C and OAC 3745-33-05) as applicable.

k)~~b)~~ The Ohio EPA policy "NPDES Wastewater Discharges Resulting from Clean-Ups of Response Action Sites Contaminated with VOCs: Policy #DSW-DERR 0100.027 Wastewater Standards" is pertinent to Operable Unit 5 remedial actions.

Action: This OEPA proposed policy will be included in the action-specific table, B.3 as a TBC.

l)~~a)~~ A permanent exemption is provided in OAC 3745-31-03(nn) for PTIs at CERCLA sites, which states:

"Cleanup activities associated with the removal or remedial action conducted entirely on site, where such remedial action is selected and carried out in compliance with

the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) section 121(E) and where such action meets all applicable air pollution emission limits and policies."
Therefore this regulation is not considered as an ARAR or TBC for Operable Unit 5.
Action: No change.

301. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: B-2 Table Pg #: B.2-9 Line #: Code: C
Original Comment #: 109
Comment: The citation to OAC 3745-27-06(C)(10)(c) should be rewritten as OAC 3745-32.
Response: Agree. The citation to OAC 3745-27-06(C)(10)(c) is incorrectly labeled.
Action: The original citation on Table B-2, page B.2-9 will be changed to OAC 3745-32 for state water quality certifications.

302. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: B-3 Table Pg #: B.3-21 Line #: Surface Water Section Code: C
Original Comment #: 110
Comment: The citation of OAC 6111.042 should be rewritten as **ORC** 6111.042
Response: Agree.
Action: The citation of OAC 6111.042 will be rewritten as ORC 6111.042.

303. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: B.4 Table Pg.#: B.4-5 Line#: Code: C
Original Comment #: 112
Comment: Production error on photocopy.
Response: Agree.
Action: The production error on photocopy will be corrected.

304. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C Pg. #: C-4-23 Line #: Miller, Marken Code: C
Original Comment #: 207
Comment: Titles are missing from these references. Thomson et al.
Response: Agree.
Action: The title "Interrelation of intestinal transport system for manganese and iron," will be added to appropriate reference.

305. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C Pg. #: C-3-5 Line #: Equation C.3-13 Code: C
Original Comment #: 218
Comment: The calculation of the lifetime intake for U-238 appears to have the sign of the exponent recorded incorrectly. The value should be 7.31E+5 not 7.31E-5.
Response: Agree.
Action: The intake value noted will be changed from 7.31×10^{-5} to $7.3 \times 10^{+5}$.

306. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C, TOC Pg.#: c-iii Line#: C.2-1b Code: C
Original Comment #: 115
Comment: "...On-property RME Child" should be "...On-property Child"
Response: Agree.
Action: The noted change will be made.

307. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C Pg. #: C-2-6 Line #: 21 Code: C
Original Comment #: 213
Comment: The sum of soil exposure unit risks on line 21 does not add up to 2.35E-6 but rather 2.41E-6 or possibly 2.40E-6 (given the largest possible rounding error bias to the summed values).
Response: Comment noted. However, a typographical mistake was made in the value reported for unit risk for ingestion of meat on line 18. This unit risk value should be 6.8×10^{-9}, not 6.8×10^{-8}. With this corrected value inserted, the sum of unit risks results in 2.35×10^{-6}.
Action: See action to Comment 43.

308. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C Pg. #: C-3-10 Line #: Equation C.3-28 Code: C
Original Comment #: 221
Comment: The equation apparently takes the results of the incorrectly written results of equations C.3-25 and C.3-26 and gets the correct answer for all but the exponent (listed as negative but apparently should be positive) of Equation C.3-28.
Response: Agree. Transposition errors were made.
Action: The exponents in the resulting intakes from Equations C.3-25, C.3-26, and C.3-27 will be changed from negative to positive.

309. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C Pg. #: C-2-10 Line #: 32 Code: C
Original Comment #: 222
Comment: The value listed in equation C.2-9 as the sediment PRG for U-238 is 1.16×10^{-3} pCi/L. However Table C.2-12 on page C-2-47 lists the same value as $2.7 \times 10^{+2}$ pCi/g. Even allowing for the different units involved, the difference is not clear. Please explain.
Response: Agree. The unit risk values used in this equation are in error due to transposition errors. However, the correct values are listed in Table C.2-12.
Action: See response to Comment 46.

310. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C Pg. #: C-2-8 Line #: Equation C.2-5 Code: C
Original Comment #: 211
Comment: The equation lists the sum of the unit risks as being 1.7E-6. However, the sum is given as 1.16E-6 on line 15 of the same page.
Response: Agree, mistakes in the unit risk values shown were made. The incorrect unit risks for the vegetable and milk pathways were presented. These values should have been 1.46×10^{-7} and 2.2×10^{-9} respectfully. Using the correct unit risks the resulting sum is correct.
Action: The unit risk values for vegetables and milk will be replaced with 1.46×10^{-7} and 2.2×10^{-9} respectfully. The denominator in Equation C.2-5 will be replaced with 1.16×10^{-6}.

311. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C Pg. #: C-2-8 Line #: 14 Code: C
Original Comment #: 212
Comment: The sum of the unit risks on lines 10 through 13 is not 1.16E-6. Instead it is 1.25E-6.
Response: Comment noted. See response and action to Comment 310.
Action: None.

312. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C Pg. #: C-2-9 Line #: Equation C.2-6 Code: C
Original Comment #: 214
Comment: The value for the quotient should be 2.3E+3 not 2.3E-3.
Response: Agree, a typographical error was made in the exponent.
Action: The value will be changed as noted.

313. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C Pg. #: C-2-9 Line #: Equation C.2-7 Code: C
Original Comment #: 215
Comment: The value for the quotient should be 1.8E+2 not 1.8E-2.
Response: Agree. A typographical error was made in the exponent.
Action: The negative sign on the exponent of the result will be deleted.

314. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C Pg. #: C-2-10 Line #: Equation C.2-8 Code: C
Original Comment #: 216
Comment: The value for the quotient should be 1.1E+1 not 1.1E-1.
Response: Agree, a typographical error was made in the exponent.
Action: The value will be changed as noted.

315. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C Pg. #: C-2-10 Line #: Equation C.2-9Code: C
Original Comment #: 217
Comment: The value for sediment unit risk due to sediment pathways was incorrectly taken from the sum on line 29 of this page. The division of 2.7E-9 into 1.0E-6 also does not appear to have been performed correctly.
Response: Agree. The wrong unit risk values were transposed in lines 26 to 29. These values should read: 8.0×10^{-11}, 3.6×10^{-9}, and 3.6×10^{-9}, respectively. Therefore the result to Equation C.2-9 would be 2.7×10^{2}, the same value reported in Table C.2-12.
Action: The corrections noted above will be made.

316. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: C Pg.#: Line #: Code: C
Original Comment #: 113
Comment: It is unclear from review of the document wherein the determination with regard to the PRL being based upon background, detection limit, ARAR or risk is made. A table should be included that lists each of the criteria for each contaminant and shows which is selected.
Response: Comment noted. Appendix C presents only the calculation of scenario-specific PRGs. A detailed discussion of the process used to select PRLs will be presented in Section 2.0.

Action: The PRL tables in Section 2.0 will be revised to clearly document the derivation of the PRLs with footnotes designating either background, detection limits, ARARs or risk-based values.

317. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C, TOC Pg.#: c-iii Line#: C.2-9 Code: C
Original Comment #: 116
Comment: "...Expanded Trespasser" should be "...Trespasser/Recreational" as on table on page C-2-38.
Response: Agree.
Action: The change noted in the comment will be made in the table of contents.

318. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C, TOC Pg.#: C-ii Line#: last line Code: C
Original Comment #: 114
Comment: List of References is not included.
Response: Agree.
Action: The reference section will be identified in the table of contents.

319. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.2 Pg. #: C-2-11 Line #: Table C.2-1a Code: C
Original Comment #: 210
Comment: There should be a symbol indicating whether the PRG value is based on the cancer risk or the hazard quotient.
Response: Comment noted.
Action: PRGs based upon a hazard quotient will be identified and footnoted.

320. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.2 Pg. #: Line #: Code: M
Original Comment #: 209
Comment: The apparent arithmetic errors in the section describing the development of PRGs detracts from confidence that this section has received even rudimentary QA/QC.
Response: Comment noted. A great number of equations are repeated in this section. As a result several transpositional errors were made and overlooked. PRG tables were QA'ed before they were transposed into WordPerfect.
Action: Calculations in Appendix C will be reviewed for accuracy. Corrections will be made where appropriate.

321. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.2.1 Pg.#:C-2-2 Line #: 28 Code: C
Original Comment # 118
Comment: Add "a" after 4 in to "...(EPA, 1994..."
Response: Agree.
Action: The reference on line 28 will be changed to "(EPA 1994a)".

322. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.2.1 Pg.#: C-2-2 Line #: 25 Code: C
Original Comment # 117
Comment: Delete "...unit risk or..."
Response: Agree.
Action: In the text, "unit risk or" will be deleted from line 25.

323. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.2.1 Pg. #:C-2-1 to C-2-4 Line #: Code: C
Original Comment #: 208
Comment: The scenarios considered in the development of PRGs are not adequately described. Because development of PRGs is of critical importance to the Feasibility Study - the section describing PRG development should be written as a largely self- contained document. Conceptual models describing each exposure scenario should be presented. Media intake rates and exposure duration and frequency assumptions under each scenario should be presented in table format to facilitate comparison.
Response: Comment noted. The scenarios used to develop PRGs are based upon the identical scenarios evaluated in the Operable Unit 5 RI Report. A detailed description of the scenarios is provided in Appendix A of that Report and in Appendix H of the FS. In an effort to reduce to the size of these documents, this information was not repeated in Appendix C.
Action: A reference to Appendix H will be added to the reference to the Operable Unit 5 RI Report on pg. C-2-4, line 29.

324. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.2.2 Pg.#: C-2-6 Line #: 18 Code: M
Original Comment #: 119
Comment: The value "6.8×10^{-8}" should be "6.8×10^{-9}"
Response: Agree.
Action: The correction noted will be made. See response to Comment 43.

325. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.2.2 Pg.#: C-2-6 Line #: 21 Code: C
Original Comment #: 120
Comment: The sum of unit risk for soil from these values is 2.41E-06; but when the above value is changed the sum of unit risk is correct, as in equation C.3-77.
Response: Comment noted.
Action: The unit risk value mentioned in Comment 324 will be corrected.

326. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.2.2 Pg.#: C-2-6 Line #: 34 Code: C
Original Comment #: 121
Comment: Using the UR of 2.41E-6 yields a PRG of 0.41 pCi/g
Response: Comment acknowledged. The PRG derived in the text, 0.42, is the result of rounding that occurred in the spreadsheets. The difference noted here is insignificant.
Action: None.

327. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 2.2 Pg.#: 2-8 Line #: Code: C
Original Comment #: 25
Comment: The text within this section including the discussion of the four land use objectives suggests a predisposition to on-property disposal. The text only discusses on-property disposal and fails to consider off-property disposal of materials exceeding PRLs within any of the land use objectives. Three of the use objectives clearly incorporate the on-property disposal component.
Response: This comment was missorted and belongs with other comments on Section 2.0. Section 2.2 introduces the land use objectives and the associated receptor scenarios. There was no intent on the part of DOE to imply a predisposition to any remedial

approach. The intent of the land use objectives was to appropriately bound the viable land uses and disposition methods for the contaminated media of the site. Land use objective 1 was created explicitly to provide the decisionmaker with a perspective on the viability of disposing of all contaminated materials exceeding cleanup levels at an off-site disposal facility. Additionally, the "C" alternatives for Land Use Objectives 2, 3 and 4 rely on off-site disposal as the principal method of response, with on-property consolidation considered only for low concentration soil. DOE considers that Section 2.2, as presently drafted, presents a fair and unbiased description of the land use objectives considered in the FS.

Action: No change in the FS text.

328. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.2.3 Pg.#: C-2-8 Line #: (C.2-5) Code: C
Original Comment #: 123
Comment: "$1.7x10^{-6}$" in the equation should be "$1.16x10^{-6}$" to be consistent with the sum of unit risks given above and the PRG value of 0.86 pCi/L reported as the result. If 1.25E-06 is used in the equation, the PRG is 0.80 pCi/L
Response: Agree the wrong value is presented in the denominator. The PRG value reported is correct.
Action: The number in the denominator of Equation C.2-5 will be changed from 1.7×10^{-6} to 1.16×10^{-6}.

329. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.2.3 Pg.#: C.2.8 Line #: 15 Code: C
Original Comment #: 122
Comment: The sum of unit risks is actually 1.25E-06.
Response: Disagree. However, incorrect unit risks were presented in lines 11 and 13. These values should be 1.46×10^{-7} and 2.2×10^{-9}, respectively. With corrections made to these unit risk values, the sum on line 15 is correct.
Action: The unit risks presented in lines 11 and 13 will be changed to 1.46×10^{-7} and 2.2×10^{-9}, respectively.

330. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.2.4 Pg.#: C-2-9 Line #: (C.2-7) Code: M
Original Comment #: 125
Comment: The PRG value should be "$1.8x10^{+2}$ pCi/L" as in Table C.2-10 instead of "10^{-2}"
Response: Agree.
Action: The corrections noted above will be made in the text.

331. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.2.4 Pg.#: C-2-9 Line #: (C.2-6) Code: M
Original Comment #: 124
Comment: The PRG value should be "$2.3x10^{+3}$ pCi/L" as in Table C.2-9 instead of "10^{-3}"
Response: Agree, a typographical error was made in the exponent.
Action: The change noted above will be made in the text.

332. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.2.5 Pg.#: C-2-10 Line #: (C.2-8) Code: M
Original Comment #: 126
Comment: The PRG value should be "$1.13x10^{+1}$ pCi/L" as in Table C.2-11 instead of "10^{-1}"
Response: Agree, a typographical error was made in the exponent.
Action: The change noted above will be made in the text.

333. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.2.6 Pg.#: C-2-10 Line #: (C.2-9) Code: M
Original Comment #: 127
Comment: "2.7 x 10^{-9}" in the equation should be "1.3 x 10^{-9}" and the PRG value is also incorrect based on the values provided in the equation (3.7×10^{2}).
Response: Comment acknowledged; transposition errors were made with the values presented in this section.
Action: See action to Comment 315.

334. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.1.1 Pg. #: C-3-2 Line #: 3 Code: C
Original Comment #: 130
Comment: Units for nonradionuclide concentration in air should be "mg/m^3" instead of "m^3/hr"
Response: Agree.
Action: The units for chemical concentrations will be changed to "mg/m^3".

335. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.1.2 Pg. #: C-3-5 Line #: 38 Code: C
Original Comment #: 133
Comment: Why is this value different from that in line 34? And it should be 10^{+5} also.
Response: Agree, a typographical error was made.
Action: See response to Comment 55. The value presented in line 38 will be changed to 7.31 x 10^{+5}.

336. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.1.2 Pg. #: C-3-5 Line #: 16 Code: C
Original Comment #: 131
Comment: Units for nonradionuclide ingestion rate (IR) should be "kg/d" instead of "kg"
Response: Agree.
Action: The units for ingestion rate of chemicals will be changed to "kg/d".

337. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.1.2 Pg. #: C-3-5 Line #: 34 Code: C
Original Comment #: 132
Comment: The value for L_{avU238} should be 7.31 x 10^{+5} instead of 10^{-5}.
Response: Agree, a typographical error was made in the exponent.
Action: The change noted above will be made in the text.

338. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C Pg. #:C-3-6 Line #: Equation C.3-15Code: C
Original Comment #: 219
Comment: The equation appears to take the incorrect value for lifetime U-238 intake from Equation C.3-13 as 7.31E-5. However if the correct exponent of +5 is used the final answer still does not appear to be correct and should be 1.46 E-5 rather than 1.49E-5.
Response: Comment acknowledged. A typographical mistake (a 6 was entered rather than a 9) was made in the value reported and on the sign of the exponent.
Action: The ILCR in line 16 will be changed from 1.49 x 10^{-5} to 1.46 x 10^{-5}. The value in line 15 will be changed from 7.303 x 10^{-5} to 7.31 x 10^{+5}.

339. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.1.2 Pg.#: C-3-6 Line #: 15 Code: C
Original Comment #: 134
Comment: "7.308 x 10^{-5}" should be 7.31 x 10^{+5}.
Response: Agree, a typographical error was made in the exponent.
Action: The change noted above will be made in the text.

340. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.1.3 Pg. #: C-3-9 Line #: 5 Code: C
Original Comment #: 135
Comment: The value obtained by multiplying the number in equation C.3-22 is 2.67 x 10^{-2}
Response: Agree. However, the biouptake parameters associated with uptake of U-238 in beef were transposed into this equation. With the correct values inserted, the result is correct.
Action: Equation C.3-22 will be corrected as shown below:

$$C_{ad\ U238} = (6.0x10^{-4}\ d/mL)[(0.789\ pCi/g)(25000\ g/d) + (1.000\ pCi/g)(25000\ g/d) + (4.44\ pCi/g)(500\ g/d)]$$

341. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.1.3 Pg. #: C-3-9 Line #: 35 Code: M
Original Comment #: 136
Comment: The value obtained by multiplying the numbers in equation C.3-25 is 1.73 x 10^{+4} not "10^{-4}"
Response: Agree, at typographical error was made in the exponent.
Action: The exponent will be changed from 10^{-4} to 10^{+4}.

342. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.1.3 Pg. #: C-3-9 Line #: 41 Code: M
Original Comment #: 137
Comment: The value obtained by multiplying the numbers in equation C.3-26 is 2.07 x 10^{+5} not "10^{-5}"
Response: Agree.
Action: The resulting value in equation C.3-26 will be changed to 2.07 x 10^{+5}.

343. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C Pg. #: C-3-9 Line #: Eqs. C.3-25 & C.3-26Code: C
Original Comment #: 220
Comment: The exponents of the products should be positive rather than negative.
Response: Agree.
Action: The exponents noted will be changed from negative to positive.

344. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.1.3 Pg. #: C-3-10 Line #: 6 Code: M
Original Comment #: 139
Comment: The value should be 2.24 x 10^{5} not "10^{-5}"
Response: Agree, a typographical error was made in the exponent.
Action: The change noted above will be made in the text.

345. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.1.3 Pg. #: C-3-10 Line #: 28 Code: C
Original Comment #: 141
Comment: The value for L_{aAU238} is not the same as that reported from equation C.3-27, although the scientific notation is correct. The slope factor value in the equation should be

2.0 not 2.8. However, the answer in line 29 is correct when 2.0×10^{-11} and $2.24 \times 10^{+5}$ are used. "*r*" in the answer should be spelled out "*risk*"
Response: Agree, transposition errors were made in the text.
Action: The intake value in line 28 will be changed to $2.24 \times 10^{+5}$ and the slope factor will be changed from 2.8×10^{-11} to 2.0×10^{-11}. The "r" will be spelled out "risk".

346. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.1.3 Pg. #: C-3-10 Line #: 5 Code: M
Original Comment #: 138
Comment: The scientific notation for values should be "+" not "-".
Response: Agree.
Action: The negative sign in the exponents in lines 5 and 6 will be deleted.

347. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.1.3 Pg. #: C-3-10 Line #: 9 Code: M
Original Comment #: 140
Comment: The unit intake should be 2.24×10^{5} pCi.
Response: Agree.
Action: The sign of the exponent will be changed as noted.

348. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.1.4 Pg. #: C-3-11 Line #: 18 Code: M
Original Comment #: 142
Comment: The values for I_{ai} and I_{aAi} should be "x 10^{5}" not "x 10^{-5}." The answer reported on line 20 is correct for these corrected values, however.
Response: Agree.
Action: The changes noted will be made.

349. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.2.2 Pg. #: C-3-13 Line #: 22 Code: C
Original Comment #: 143
Comment: "C_{wvi}" should be "C_{vwi}" to be consistent with the parameter in equation C.3-37.
Response: Agree, this was a typographical error.
Action: The "C_{wvi}" in line 22 will be changed to "C_{vwi}."

350. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.2.2 Pg. #: C-3-14 Line #: 2 Code: C
Original Comment #: 144
Comment: Change "(d_w)" to "(IR)".
Response: Disagree. The list of equation terms on page C-3-14 shows d_w as the irrigation rate. It also indicates that in this equation the deposition by irrigation is $C_w \times d_w$, C_w being a unit concentration of 1.0.
Action: "C_w" will be inserted in line 3 to read: "...so the rate of constituent deposition by irrigation, (d_w) x (C_w) is (C_{wU238} pCi/L) x (0.081 L/m^2-h) or..."

351. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.2.2 Pg. #: C-3-14 Line #: 7 Code: C
Original Comment #: 145
Comment: Add "($B_{iv(2)}$)" after "coefficient"
Response: Disagree, "($B_{iv(2)}$)" is listed after the complete name of the equation term.
Action: None.

352. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.2.2 Pg. #: C-3-14 Line #: 8 Code: C
Original Comment #: 146
Comment: Add "(CF_p)" after "ratio"
Response: Agree.
Action: ,"(CF_p)," will be added after the word "ratio" in line 8.

353. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.2.2 Pg. #: C-3-14 Line #: 17 Code: C
Original Comment #: 148
Comment: The value obtained by multiplying the correct values for equation C.3-38 is "4.98 x 10^{-3}". "(C.3.38)" should be "(C.3-38)"
Response: Agree, a typographical error was made in the result.
Action: The result in line 17 will be changed from 4.89 x 10^{-3} to 4.98 x 10^{-3}. The equation number will be changed to "(C.3-38)."

354. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.2.2 Pg. #: C-3-14 Line #: C.3-38 Code: M
Original Comment # 147
Comment: The term "$lambda_{di}$" is reported in the text to equal 1.61 x 10^{-5} but the value for "$lambda_{Li}$" (6.49 x 10_{-6}) was used in this equation. The value "(0.483)" in this equation should be "(0.428)" based on values given in the text and on the previous page.
Response: Comment noted. The wrong value for $lambda_{di}$ was transposed into the text. This value should be the sum of $lambda_{Li}$, 6.49 x 10_{-6}, and $lambda_{ri}$, 1.77 x 10^{-14}, which results in a $lambda_{di}$ of 6.49 x 10_{-6}. Therefore the correct value for $lambda_{di}$ is in the equation and the wrong value is in the text. Using these corrected values, the concentration in vegetables, C_{vw}, is 4.99 x 10^{-3} pCi/g.
Action: The value 1.61 x 10^{-5} in line 14 will be replaced with 6.49 x 10^{-6}. The value "0.483" in equation C.3-38 will be replaced with "0.428." The result in line 17 will be changed from "4.89 x 10^{-3}" to "4.98 x 10^{-3}".

355. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.2.3 Pg. #: C-3-16 Line #: 39 Code: C
Original Comment #: 149
Comment: "(d_w)" should be "(IR)"
Response: Comment acknowledged. The total irrigation rate, not the chemical specific deposition irrigation rate, is referred to here. However, not to confuse irrigation rate with ingestion rate, this term will not be abbreviated.
Action: The "(d_w)" will be removed from line 39.

356. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.2.3 Pg. #: C-3-17 Line #: 6 Code: C
Original Comment #: 150
Comment: "(Greek letter lambda)" should be "(Greek letter rho)" for effective dry surface density of the soil.
Response: Agree, a typographical error was made.
Action: The change noted above will be made in the text.

357. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.3.1 Pg. #: C-3-21 Line #: 14 Code: C
Original Comment #: 151
Comment: Change "4.4" to "4.41" to be consistent with result on page C-3-20, line 37.
Response: Agree.
Action: The change noted will be made for consistency.

358. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.3.2 Pg. #: C-3-22 Line #: 23 Code: C
Original Comment #: 152
Comment: "10^{-3}" should be "10^{+3}"
Response: Agree.
Action: The change noted will be made.

359. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.3.3 Pg. #: C-3-25 Line #: 39 Code: C
Original Comment #: 154
Comment: The value "4079" should be "4080" to be consistent with the result reported in line 35.
Response: Agree, the rounded value was used to derive the result.
Action: The value "4079" will be changed to "4080."

360. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.3.3 Pg. #: C-3-25 Line #: 6 Code: M
Original Comment #: 153
Comment: The actual result should be "1.85 x 10^{-4} pCi/g" not "0.85..."
Response: Agree.
Action: The change noted will be made.

361. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.3.5 Pg. #: C-3-28 Line #: 2 Code: C
Original Comment #: 156
Comment: The slope factor should be "2.0 x 10^{-11}". The resulting value on line 4 is correct when this value is used in the equation.
Response: Agree.
Action: The slope factor used will be changed to 2.0 x 10^{-11}.

362. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.3.5 Pg. #: C-3-28 Line #: 1 Code: C
Original Comment #: 155
Comment: The value "2.559" should be "2.56" to be consistent with the result reported on page C-3-22, line 20.
Response: Comment noted. The result was rounded.
Action: For consistency the value "2.559" will be rounded to "2.56."

363. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.5.2 Pg. #: C-3-32 Line #: 10 Code: C
Original Comment #: 157
Comment: The SF_e is not inserted in the equation here.
Response: Comment noted. The SF_e is the first term in Equation C.3-90. However, the value of SF_e should be inserted.
Action: The value of SF_e, "5.1x10^{-8}," will replace the "SF_e" term in Equation C.3-90.

364. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.6 Pg. #: C-3-36 Line #: (C.3-110) Code: C
Original Comment #: 161
Comment: The answer obtained from these calculations is actually 829 mg/kg for the weighted PRG. The value that should be in Table C.2-6 is 1.65×10^{2} as the soil PRG for the expanded trespasser.
Response: Disagree, 991 mg/kg is the correct PRG; however, the wrong values are presented in the equation. The HI in Equation C.3-108 should be 6.07×10^{-4}. Therefore, in Equation C.3-110, the 2.8×10^{-3} should be replaced with 2.08×10^{-3}, and the 6.08×10^{-4} should be 6.07×10^{-4}, resulting in a PRG of 991 mg/kg.
Action: The HI in Equation C.3-108 will be corrected to 6.07×10^{-4}. In Equation C.3-110, the value 2.8×10^{-3} will be replaced with 2.08×10^{-3}, and 6.08×10^{-4} will be replaced with 6.07×10^{-4}.

365. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.6 Pg. #: C-3-36 Line #: (C.3-109) Code: C
Original Comment #: 160
Comment: If the above value is used instead, the answer would be 1645 mg/kg.
Response: Comment acknowledged. The result presented is wrong. Using the HI presented in the response above, the PRG will be 1649.
Action: The 6.09×10^{-4} will be changed to 6.07×10^{-4} and the result will be corrected to equal 1649.

366. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.6 Pg. #: C-3-36 Line #: (C.3-108) Code: C
Original Comment #: 159
Comment: The result of using 6.00 in the equation is 6.08×10^{-4}, which is used below in equation (C.3-110).
Response: Agree.
Action: 6.01×10^{-4} will be replaced with 6.00×10^{-4}.

367. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3.6 Pg. #: C-3-36 Line #: (C.3-107) Code: C
Original Comment #: 158
Comment: The result should be "6.00×10^{-4}"
Response: Agree.
Action: The result to Equation C.3-107 will be changed to "6.00 x 10-4"

368. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4.1 Pg. #: C-4-1 Line #: 21 Code: C
Original Comment #: 163
Comment: This should explain that toxicological profiles for some metals are in section C.4.5. The section on background concentrations is actually C.4.6.
Response: Agree.
Action: Line 21 will be changed to read "Finally, Section C.4.6 explains...."

369. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4.4 Pg. #: C-4-7 Line #: 13 Code: C
Original Comment #: 164
Comment: "ATSDR 1991" needs to be identified as to whether it refers to ATSDR 1991a or ATSDR 1991b in the References.

Response: Agree.
Action: The reference in line 13 will be changed to "ATSDR 1991a".

370. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4.4 Pg. #: C-4-7 Line #: 16 Code: C
Original Comment #: 165
Comment: EPA 1990d: Only one EPA 1990 is listed in the References.
Response: Agree.
Action: The appropriate reference will be added at the end of the text, and the reference in line 16 will be changed to "(EPA 1990b)".

371. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4.4 Pg. #: C-4-7 Line #: 36 Code: C
Original Comment #: 166
Comment: "ATSDR 1991" needs to be identified as to whether it refers to ATSDR 1991a or ATSDR 1991b in the References.
Response: Agree.
Action: The reference in line 36 will be changed to "ATSDR 1991a".

372. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4.4 Pg. #: C-4-7 Line #: 39 Code: C
Original Comment #: 167
Comment: "DOE 1994" needs to be identified as to whether it refers to DOE 1994a or DOE 1994b in the References.
Response: Agree.
Action: The reference will be corrected as "DOE 1994b".

373. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4.5.1 Pg. #: C-4-10 Line #: 21, 22 Code: C
Original Comment #: 168
Comment: The "*" in "kg*day" should be a "/"
Response: Agree.
Action: "mg/(kg*day)" will be changed to "mg/kg/day" on page C-4-10. This same change will be made on page C-4-11 in lines 28 and 36.

374. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4.5.2 Pg. #: C-4-11 Line #: 15 Code: C
Original Comment #: 169
Comment: "Casarette et al." should be "Casarett and Doull"
Response: Comment noted.
Action: As agreed upon with EPA Region VI, Magnesium will be removed as a COC and hence section C.4.5.2 will be removed from text.

375. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4.5.2 Pg. #: C-4-11 Line #: 23 Code: C
Original Comment #: 170
Comment: What does "(16 mg/L to 30 mg/L)" refer to?
Response: These values refer to the range of normal plasma magnesium concentrations.
Action: Please see response and action to comment 374.

376. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: C.4.6 Pg.#: C-4-15 Line #: 12 Code: C
Original Comment #: 171
Comment: Shouldn't this be an HI of .2? It was the reviewers understanding that only uranium used an HI of 1.0 for PRG calculations.
Response: Agree. An HI of 0.2 was used for the calculation of PRGs for all toxicants.
Action: The HI listed in line 12 will be changed to "0.2."

377. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.2-1a Table Pg.#: Line #: 13 Code: C
Original Comment # 128
Comment: Information on ethyl ether is provided in Table C.4-2, so is this a COC?
Response: Comment noted; this compound was inadvertently left out of Table C.4-2. Ethyl ether represents a COC.
Action: A PRG for ethyl ether will be added in Table C.2-1a.

378. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.2-6 Table Pg.#: Line #: Code: M
Original Comment #: 129
Comment: For U-238, the values in the column should increase by a factor of 10 from left to right (i.e., 4×10^1, 4×10^2, 4×10^3) because the PRGs are based on cancer slope factors, as in the text (C.3-101).
Response: Agree.
Action: In Table C.2-6. the PRGs for U-238 in the second and third columns will be "4×10^2" and "4×10^3," respectively.

379. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.3-2 Table Pg. #: C-3-45 Line #: Code: C
Original Comment #:
Comment: References listed in the table and footnote c are not cited in the References at the end of this section.
Response: Comment noted.
Action: References listed in Table C.3-2 will be added to the reference section.

380. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-19 Line #: Code: M
Original Comment #: 192
Comment: The most recent toxicity criteria for oral and inhalation slope factors for Indeno(1,2,3-cd)pyrene are 7.3E-01 and 6.1E-01, respectively (Source: EPA-ECAO 1994).
Response: Comment acknowledged. The toxicological database for this risk assessment was updated from IRIS and HEAST in September 1994. The slope factors noted were not available to us at that time. However, for purposes of this FS, the updated slope factors will be used to derive PRGs.
Action: The updated slope factors will replace the values listed in Table C.4-2 and will be used to derive PRGs for indeno (1,2,3rd) pyrene.

381. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-19 Line #: Code: C
Original Comment #: 193
Comment: The most recent toxicity criterion for inhalation slope factor for Chlordane is 1.29E+00 (Source: IRIS 1994).

Response: Comment acknowledged. The slope factor used in this report was 1.30. This difference does not appear to be significant.
Action: None. See response to Comment 380.

382. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-20 Line #: Code: C
Original Comment #: 194
Comment: "Antimony" should be "Antimony and compounds"
Response: Disagree. Analytically, we do not know which antimony compounds are present. The atomic absorption results from the lab only identify the concentration of the element, not compounds present. The toxicity data reported for this constituent was based on a search on antimony.
Action: None.

383. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-18 Line #: Code: C
Original Comment #: 189
Comment: The most recent toxicity criterion for an oral cancer slope factor for N-Nitroso-di-n-propylamine is 7.00E+00 (Source: IRIS 1994).
Response: Agree. The value used in this report was 7.00.
Action: The oral cancer slope factor for N-Nitroso-di-n-propylamine on page C-4-18 will be changed from 7.01E+00 to 7.0E+00.

384. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-18 Line #: Code: M
Original Comment #: 190
Comment: The toxicity criteria and other notes for N-Nitroso-di-phenylamine are missing from this table.
Response: Agree.
Action: "NA" will be entered under the two "reference doses" and "target organ" columns. An oral slope factor of 4.9E-03 and a "B2" classification for the weight of evidence will be entered for these constituents. A "NA" will be entered in the remaining columns.

385. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-18 Line #: Code: M
Original Comment #: 191
Comment: The most recent toxicity criterion for an oral slope factor for Benzo(a)anthracene is 7.3E-01 (Source: EPA-ECAO provisional 1994)
Response: Agree. A typographical error was made in the table.
Action: The oral slope for Benzo(a)anthracene on page C-4-18 will be changed from $7.3x10^{+1}$ to $7.3x10^{-1}$.

386. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-21 Line #: Code: C
Original Comment #: 201
Comment: "Thallium" could refer to a variety of thallium salts and the specificity of the oral RfD should be indicated here.
Response: Comment acknowledged. Analytically, we do not know which thallium compounds are present. Hence the search for toxicity data was done on elemental thallium, which was not found in IRIS or HEAST (1994). The value presented, 7.0E-05,

was from a former IRIS search and is more conservative than the values for thallium compounds listed in HEAST, which range from 8.0×10^{-4} to 9.0×10^{-4}.
Action: The oral RfD for thallium will be referenced as EPA IRIS, 1994.

387. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-21 Line #: Code: C
Original Comment #: 200
Comment: "Silver" should be "Silver and compounds"
Response: Disagree; see response to Comment 382.
Action: None.

388. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-18 Line #: Code: M
Original Comment #: 188
Comment: The most recent toxicity criterion for an oral RfD for 4-Methylphenol is 5.0E-03 (Source: HEAST 1994).
Response: Agree. A typographical error was made; however, 5.0×10^{-3} was used in the calculation of PRGs for this constituent.
Action: The oral slope factor will be changed from 5.0×10^{-2} to 5.0×10^{-3}.

389. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-20 Line #: Code: C
Original Comment #: 199
Comment: "Mercury" should be "Mercury, inorganic." The uncertainty factor of "[30]" should be under the inhalation RfD, not beside it.
Response: Agree. Mercury will be listed as "Mercury, inorganic." The uncertainty factor, "[30]" will be moved below the inhalation slope factor, 8.6×10^{-5}.
Action: The chemical will be listed as "Mercury, inorganic, and the value "[30]" will be placed below the inhalation slope factor.

390. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-20 Line #: Code: C
Original Comment #: 198
Comment: The uncertainty factor of "[10]," should be under the oral RfD value, not beside it.
Response: Agree.
Action: The uncertainty factor for fluoride, "[10]," will be placed under the oral slope factor, 6.0×10^{-2}.

391. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-20 Line #: Code: C
Original Comment #: 196
Comment: "Copper" should be "Copper and compounds"
Response: Disagree; see response to Comment 382.
Action: None.

392. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-20 Line #: Code: C
Original Comment #: 197
Comment: "Cyanide" should be "Cyanide, free"
Response: Disagree. See response to Comment 382.
Action: None.

393. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-20 Line #: Code: C
Original Comment #: 195
Comment: The inhalation RfD for trivalent chromium of 5.71E-07 has been withdrawn.
Response: Comment noted. However, no RfDs were listed for trivalent chromium in the table.
Action: None.

394. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-18 Line #: Code: C
Original Comment #: 182
Comment: The Cancer Slope Factor value for Tetrachloroethene should be written as "5.2E-02" for consistency. The most recent criteria for an inhalation slope factor is 2.03E-03 (Source: EPA-ECAO provisional 1994). U.S. EPA weight of evidence is missing.
Response: Agree, values should be written using a consistent style and the weight of evidence should be noted. 5.2E-02 is the valued use in the baseline risk assessment and in the calculation of the PRGs. This is the value that was available when the toxicity database was updated in September, 1994. See response to Comment 380.
Action: The style in which the oral cancer slope factor will be changed from $5.2x10^{-2}$ to 5.2E-02. The EPA classification "C-B2" will be listed as the weight of evidence for tetrachloroethene.

395. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-18 Line #: Code: C
Original Comment #: 187
Comment: The weight of evidence for 3.3'-Dichlorobenzidine is missing.
Response: Agree.
Action: The EPA classification "B2" will be listed as the weight of evidence for 3,3'-Dichlorobenzidine.

396. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-17 Line 3: Code: M
Original Comment #: 177
Comment: The oral RfD for Bromodichlorobenzene is 2.0E-2 (Source: IRIS 1994). Unsure where the inhalation Cancer Slope Factor for this compound came from, needs source citation. U.S. EPA weight of evidence is B2.
Response: Comment noted. Bromodichlorobenzene is not listed in the table; however, if the reviewer meant to say "bromodichloromethane," the oral slope factors were obtained from IRIS. We agree that the oral RfD is 2.0E-02. The oral RfD was used in the calculations of the PRGs but was inadvertently left out of this table.
Action: "B2" will be added as the "weight of evidence." "2.0E-02" will be listed as the oral RfD and "renal cytomegaly" will be listed under the "target organ..." heading.

397. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-17 Line 3: Code: C
Original Comment # 175
Comment: The U.S. EPA weight of evidence for Bromoform is missing.
Response: Agree
Action: The EPA classification "B2" will be listed as the weight of evidence for bromoform.

398. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-17Line 3: Code: M
Original Comment #: 174
Comment: The most recent criteria for inhalation RfD for Benzene is 1.71E-03 (Source: EPA-ECAO provisional 1994)
Response: Comment acknowledged. A typographical error was made in the table.
Action: The value for the inhalation RfD, 1.4E-04 will be replaced with 1.71E-03.

399. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-17 Line 3: Code: M
Original Comment #: 172
Comment: 1,1-Dichloroethane oral RfD is reported as "NA," should be 1.00E-01 (Source: HEAST 1994).
Response: Agree.
Action: The value "1.0E-01[f]" will be added.

400. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-17 Line 3: Code: C
Original Comment #: 173
Comment: The most recent criteria for inhalation RfD for 1,2-Dichloroethane is 2.86E-03 (Source: EPA-ECAO provisional 1994)
Response: Agree. The wrong RfD is presented. 2.86E-03 was used in the calculations of the PRGs.
Action: The inhalation RfD for 1,2-Dichloroethane will be changed to 2.86E-03 and ECAO 1994 will be referenced.

401. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-17 Line 3: Code: C
Original Comment #: 178
Comment: "Ethyl benzene" can be spelled as one word "ethylbenzene." Designation for U.S. EPA weight of evidence is missing (NA?)
Response: Agree.
Action: The spelling change will be made and "NA" will be entered under the heading "U.S. EPA Weight of Evidence." "Liver toxicity will be entered under "Target organ..."

402. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-17 Line 3: Code: M
Original Comment #: 176
Comment: The values listed under Cancer Slope Factors for Bromomethane belong under the oral and inhalation Reference Doses for this compound. Bromomethane is not a carcinogen, and this will affect the risk assessment. However, it appears that RfDs were properly used in the assessment.
Response: Agree.
Action: The bromomethane values listed as slope factors will be moved under the RfDs and deleted from the slope factor columns.

403. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-18 Line #: Code: C
Original Comment #: 185
Comment: The weight of evidence for Trichloroethene is missing.
Response: Agree.
Action: "C" will be entered under the weight of evidence.

404. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-17 Line 3: Code: C
Original Comment #: 179
Comment: The oral RfD for methylene chloride is 6.0E-02 (Source: IRIS 1994).
Response: Agree. A typographical error was made.
Action: The oral RfD for methylene chloride will be changed from 6.1E-02 to 6.0E-02.

405. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-18 Line #: Code: C
Original Comment #: 183
Comment: The RfD for 1,1,1-Trichloroethane of 9.0E-02 has been withdrawn.
Response: Comment acknowledged.
Action: The RfD will be deleted.

406. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-18 Line #: Code: C
Original Comment #: 184
Comment: The inhalation slope factor for 1,1,2-Trichloroethane should be "5.6E-02." The weight of evidence classification is missing.
Response: Agree.
Action: The inhalation slope factor for 1,1,2-Trichloroethane will be changed from "5.7E-02" to "5.6E-02." A "C" will be entered under the weight of evidence column.

407. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-18 Line #: Code: C
Original Comment #: 186
Comment: The weight of evidence for bis(2-Chloroisopropyl) ether is missing.
Response: Agree.
Action: A "C" will be added as the weight of evidence.

408. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-17 Line #: Code: M
Original Comment #: 181
Comment: The values listed under Cancer Slope Factors for 2-Butanone (methyl ethyl ketone) belong to the oral and inhalation Reference Doses for this compound. 2-Butanone is not a carcinogen. It appears that RfDs were properly used in the assessment.
Response: Agree.
Action: The above corrections will be made.

409. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-2 Table Pg. #: C-4-17 Line 3: Code: C
Original Comment #: 180
Comment: The most recent toxicity criteria for 4-Methyl-2-Pentanone (methyl isobutyl ketone) is 8.0E-02 (Source: HEAST 1994).
Response: Agree. The correct value was inadvertently used as a Rec to derive an RfD.
Action: 8.0E-02 will be entered as the inhalation RfD.

410. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-3 Table Pg. #: C-4-22 Line #: Code: M
Original Comment #: 205
Comment: No values were provided for any of the cancer slope factors and other information for Lead-210+2D, which are reported in HEAST (1994).

Response: Agree. The values were inadvertently left out.
Action: The values, 2.0E-01, for GI absorption; 6.6E-10 for the oral slope factor; 4.0E-09 for the inhalation slope factor; and 1.6E-10 for the external slope factor will be added.

411. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-3 Table Pg. #: C-4-22 Line #: Code: C
Original Comment #: 206
Comment: In the value for "GI Absorption Factor" for Radium-226+8D, the "3" in "2.03-01" should be an "E"
Response: Agree.
Action: The correction will be made.

412. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-3 Table Pg. #: C-4-22 Line #: Code: M
Original Comment #: 203
Comment: The values given for oral, inhalation, and external radiation slope factors for Cesium-137+1D do not match the values reported in HEAST (1994): 1.4E-13, 1.0E-13, 2.8E-09.
Response: Disagree. The values presented are those from HEAST, 1994.
Action: None.

413. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-3 Table Pg. #: C-4-22 Line #: Code: C
Original Comment #: 202
Comment: The value "(Risk-g/yr-pCi)" is presented in HEAST as "risk/yr per pCi/g soil"
Response: Agree.
Action: The change in units will be made in the column heading.

414. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: C.4-3 Table Pg. #: C-4-22 Line #: Code: M
Original Comment #: 204
Comment: The value given for external radiation cancer slope factor for Neptunium-237 does not agree with value reported in HEAST (1994): 7.8E-09.
Response: Disagree. The values listed in Table C.4-3 are for Np-237+D, from HEAST, March, 1994. The values suggested are for Np-237 (without daughters).
Action: None.

415. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.1.5.1 Pg.#: F-1-8 Line #: 22 Code: C
Original Comment #: 223
Comment: A suggested change for the term "driving gradient" is "hydraulic gradient," as this is more specific and technically correct. Further, there is no mention of effective porosity as a factor important to contaminant transport.
Response: Agree.
Action: The sentence in question will be revised to read: "Flow and contaminant transport in these materials is affected by the permeability and effective porosity of the media, the hydraulic gradient, and the degree of saturation."

416. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.1.5.3.3 Pg.#: F-1-16 Line #:9 Code: C
Original Comment #: 229
Comment: It is not justified to refer to the ECTran model as "robust" because this was intentionally developed and chosen to be less "robust" than the three-dimensional model SWIFT and more hence efficient.
Response: Agree.
Action: "and robust" will be deleted from the sentence.

417. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.1.5.3.3 Pg. #: F-1-15 Line #: 40 Code: C
Original Comment #: 247
Comment: Because they are undocumented, a reference should be made to the verification and the correct implementation of the mentioned data extraction and manipulation programs.
Response: The data extraction and manipulation programs are considered "simple codes" in our QA/QC procedures and therefore do not require intensive verification. However, these auxiliary codes are checked as part of the calculation procedure during application.
Action: No action necessary.

418. Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: F.1.5.3.3 Pg #: F-1-15 Line #: 13-40 Code:
Original Comment #: 226
Comment: What platform was the ground water modeling conducted on for both the RI Report and the FS? If it was performed using an Intel pentium processor, DOE needs to assess any impact that the flawed processor may have had on modeling efforts.
Response: 486 PCs and Silicon Graphic computers were used for RI/FS fate and transport modeling at the FEMP. No Intel Pentium processor-based computer has been used to date for RI/FS modeling purposes.
Action: No action.

419. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.1.5.3.3 Pg.#: F-1-16 Line #: 19 Code: C
Original Comment #: 231
Comment: The reference to "DOE 1993a" should be "DOE 1993b". The references should be resequenced.
Response: Agree.
Action: The references will be resequenced and corrected throughout Section F.1.0.

420. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.1.5.3.3 Pg.#: F-1-16 Line #: 22 Code: C
Original Comment #: 232
Comment: To describe ECTran as "without dispersion" is misleading because the ECTran model assumes instantaneous mixing in sublayers within the unsaturated zone. The number and thickness of these mixing sublayers in ECTran controls the increase in vertical concentration due to vertical spreading effects caused by the assumption of instantaneous, perfect mixing. In other words, the effect of instantaneous, perfect mixing is similar to hydrodynamic dispersion and, therefore, the effects of the perfect mixing assumption should be mentioned along with the statement on line 22. The stirred-cell reactor model does simulate vertical mixing, but not in the classical dispersion tensor formulation. There is mixing (i.e. dispersion), based on the

facility size and rate of fluid transfer. The model should be described more correctly as series of cascading stirred-cell reactors which result a distribution or spreading of the concentration profile. This technique approaches "no dispersion" theoretically as the number of reactors becomes infinite.

Response: Agree.

Action: "without dispersion" in the sentence will be replaced by "with vertical mixing process controlled by model sublayer thickness and rate of advective mass transfer instead of by classical dispersion tensor formulation."

421. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.1.5.3.3 Pg.#: F-1-15 Line #: 24 Code: C
Original Comment #: 227
Comment: The most recent version of SWIFT is version 2.54, not 2.52 as referenced on page F-7-39.
Response: Agree.
Action: The most recent version of SWIFT will be referenced.

422. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F Pg. #: F-1-16 Line #: 41 Code: C
Original Comment #: 234
Comment: This statement is incorrect. Replace "groundwater flow conditions" with "uniform groundwater flow velocity".
Response: Agree.
Action: Will replace "groundwater flow conditions" with "uniform groundwater flow velocity."

423. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F Pg. #:F-1-20 Line #:35 Code: C
Original Comment #: 235
Comment: Multilayer is misspelled.
Response: Agree.
Action: The spelling will be corrected.

424. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F Pg. #: F-1-16 Line #: 38 Code: C
Original Comment #: 233
Comment: Although ECTran represents the effects of pumping by assuming no source releases during the pumping period, the ECTran model does not simulate the changes in groundwater flow rates and directions which occur as a result of pumping. Instead, ECTran assumes that any contaminants released before pumping will migrate at unstressed groundwater flow rates directly toward the nearest receptor. The results from a more complex model such as SWIFT should be used for examining the effects of pumping on the transport of contaminants throughout the site. However, since ECTran is only being applied to calculate exposure point concentrations, its simplified representation of pumping, under the assumption of unstressed flow rates, provides conservative concentration values at the exposure point.
Response: Agree. However, the comment does not require any change to the text.
Action: No action required.

425. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F Pg. #: F-1-16 Line #: 12 Code: C
Original Comment #: 230
Comment: Monte Carlo simulations of the ECTran model were not apparently performed to develop CPRGs and WACs. The use of Monte Carlo methods would provide a better evaluation of the uncertainty of key model parameters. Why were Monte Carlo simulations not performed to help develop CPRGs and WACs.
Response: It was required to demonstrate that the disposal facility would be protective of the Great Miami Aquifer in a 1000-year time frame. Therefore, ECTran Monte Carlo simulations were performed to evaluate the long-term performance of the on-site disposal facility using uranium as the indicator chemical. This analysis was presented in Section F.5 of the FS Report following the WAC development. Because of the large number of COCs which require PRGs and WACs, Monte Carlo simulation was not performed during the CPRG and WAC development process. Instead very conservative assumptions regarding key hydrogeological and chemical conditions were directly incorporated in the development process. This approach ensures that CPRGs and WACs developed will be protective even when the actual conditions are uncertain. As a result of the conservative WAC, the long-term performance of the disposal facility was demonstrated to be acceptable through Monte Carlo simulations.
Action: No action.

426. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F Pg. #: F-1-15 Line #: 3 Code: C
Original Comment #: 225
Comment: Because the source depletion time and source depletion rate are key model parameters, a more detailed explanation of the calculations involved in their determination should be given to ensure a conservative mass loading rate into layer 1 for later model simulations. Several FEMP reports were examined, including reports for Operable Unit 2, but no detailed explanation was found. Therefore, a detailed discussion of this would be very useful in this section of the report.
Response: Agree. The source depletion time and rate calculations for the ODAST model have been documented in an unpublished report titled "Fate and Transport Model Transition Report."
Action: Relevant sections of this report will be incorporated into the FS Report Attachment F.1.II. A copy of the transition report will be provided to Ohio EPA for information.

427. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F Pg. #: F-1-12 Line #: 38 Code: C
Original Comment #: 224
Comment: Further explanation should be given to justify that each source area can be simulated by ECTran individually to develop CPRGs and WACs. The current approach does not examine the effects of multiple sources on a single receptor location.
Response: In order to keep the modeling process efficient when the extent of remediation was still unknown, individual source or disposal areas were simulated using the ECTran model during the CPRG and WAC developments. The cumulated impacts are then evaluated during the residual impact modeling for each remedial alternative (defined according to the CPRGs and WACs) using the primary models.
Action: The following sentence will be inserted in line 4 on page F-1-13:
"This modeling is conducted to determine the residual site-wide impacts and also to verify that the CPRGs and WACs developed by the screening model are protective."

428. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.1.5.3.3 Pg.#: F-1-15 Line #: 37 Code: C
Original Comment #: 228
Comment: Assuming that SWIFT version 2.54, not 2.52 was used, the correct reference is "SWIFT/486," not "SWIFT/386".
Response: Agree.
Action: SWIFT/486 will be referenced.

429. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.1.6 Pg.#: F-1-22 Line #: 6 Code: C
Original Comment #: 236
Comment: Should be "Release 2.32" not "2.5".
Response: Agree.
Action: "2.5" will be replaced by "2.32" in the reference.

430. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.2.2.1 Pg.#: F-2-4 Line #:35 Code: C
Original Comment #: 238
Comment: The term permeability "enhancers" is inappropriate and should be replaced with "variations". Further explanation or reference should be provided when discussing fractures (presumably those in the brown and to a lesser extent the gray till)as the cause of "dripping" variations. Variations in the till/Great Miami Aquifer contact is also very important to localized variations in seepage into the Great Miami Aquifer.
Response: Agree that use of this term is confusing.
Action: The following text changes will be made: The sentence "Permeability of the gray clay layer could be varied due to the presence of sand and gravel, or the existence of fractures" will be changed to "The low permeability of the gray clay could be increased by the presence of sand and gravel or the existence of fractures." The sentence "The dripping is probably not uniform across the FEMP but greater in some locations due to the presence of permeability enhancers (i.e., sand, gravel, and fractures)" will be changed to "The dripping is probably not uniform across the FEMP but greater in some locations due to the presence of sand, gravel, and fractures." The following text will be added to the end of the paragraph: "The hydrogeology of the glacial overburden is presented in more detail in Section 3.0 of the Operable Unit 5 RI Report (DOE 1995)."

431. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.2.2.1 Pg. #: F-2-3 Line #: 27 Code: C
Original Comment #: 248
Comment: The clarification indicating that highlighted areas do not necessarily represent continuous interconnected units should be included in the FS Report to avoid misinterpretation.
Response: Agree, clarification would improve the discussion.
Action: The following text will be added to the end of the paragraph:
"Figure F.2-2 illustrates where most of the coarser sand and gravel sediment within the glacial overburden is located and is useful for determining trends. Although interconnections may occur, the highlighted areas do not represent contiguous interconnected units of sediment but simply indicate where most of the coarser grained material is located."

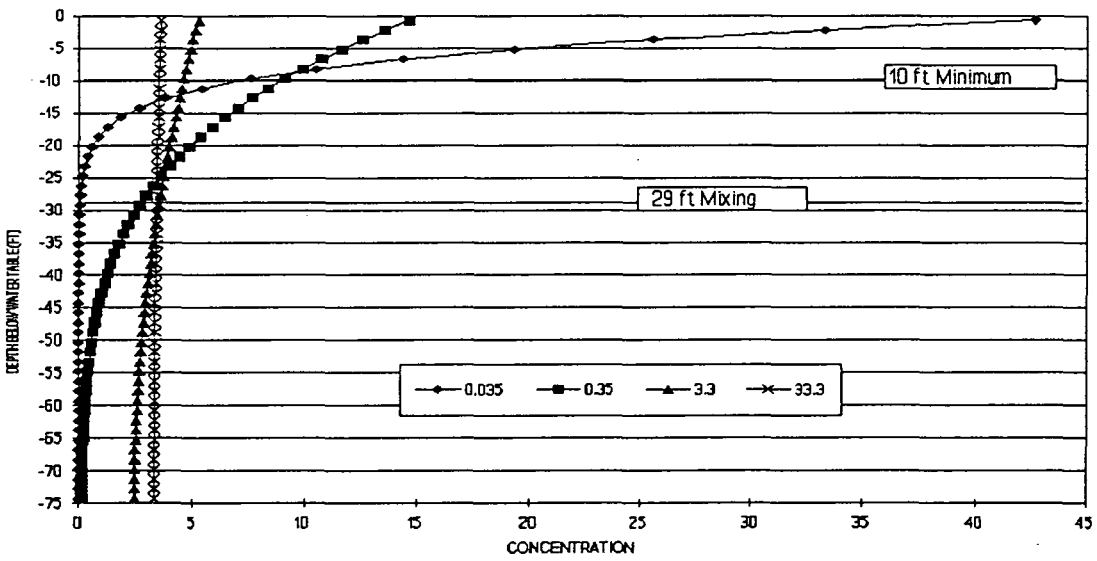
432. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.2.2.1 Pg.#: F-2-4 Line #: 15 Code: C
Original Comment #: 237
Comment: The vertical matrix potential profile in Figure F.2-4 shows a dramatic change in slope in the gray clay directly beneath sand. Assuming the grey clay to be homogeneous, the steady-state profile should not have a marked change. While the diagram is not to scale, the general shape of the pressure profile should be consistent with the conceptual model.
Response: Agree.
Action: The pressure head profile for the gray clay in Figure F.2-4 will be revised to show a smoother transition from the saturated condition under the saturated sand zone to the unsaturated condition in the Great Miami Aquifer sand and gravel.

433. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.3.2.1 Pg. #: F-3-2 Line #: 23 Code: C
Original Comment #: 239
Comment: The summary of COC screening is in Section F.2.3.
Response: Agree.
Action: The reference on line 23 will be changed to "Section F.2.3."

434. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.3.2.5 Pg.#: F-3-8 Line #:17-19 Code: C
Original Comment #: 241
Comment: Please provide a reference for estimated surface water infiltration and flow in Great Miami Aquifer.
Response: Agree.
Action: The following sentences will be added to the text in Section F.3.2.5 following line 1 on page F-3-8:
"The total flow of perched groundwater is calculated based on the gradient of the average groundwater elevation contours of the Type 1 monitoring wells, lengths of seepage faces along the pilot plant drainage ditch and Paddys Run, and the estimated average perched water zone thickness (15 feet). The perched groundwater zone gradients were based on the steeper contours within 400 feet of the seepage face, rather than the overall gradient, which yielded a higher (more conservative) discharge rate. The seepage face lengths were taken as the distances along Paddys Run and the pilot plant drainage ditch where the perched groundwater zone sand and gravel is exposed on the streambanks."
The following sentence, starting on line 10 on page F.3-8, will be revised to read:
"A representative Great Miami Aquifer flow rate is estimated using an average groundwater velocity of 306 ft/yr, a porosity of 0.3, a mixing depth of 10 feet, and an estimated width."

435. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.3.2.5 Pg.#: F-3-7 Line #: 19 Code: C
Original Comment #: 240
Comment: There is an extraneous "minus" sign between the *erfc* and *erf* terms in Equation 5. Also, it would be helpful to indicate that this is the centerline concentration for two-dimensional advective-dispersive transport.
Response: Agree.
Action: The "minus" sign will be removed from Equation 5.

436. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.3.2.6 Pg.#: F-3-9 Line #: 29-32 Code: C
Original Comment #: 273
Comment: Justification for selecting different mixing depths is needed. The ECTran model calculates the mixing depth as a function of the ratio of vertical and horizontal fluxes and the vertical dispersivity (Equation 8, p. 3-10 in ECTran Sept 1993 documentation). The mixing depth is dominated by the latter term in which a vertical dispersivity of 0.35 feet results in a calculated mixing depth of 26.45 feet. In order to better understand the importance of the magnitude of the vertical dispersivity and analyze the approximation of the mixing depth relation, we constructed a numerical model. A two-dimensional vertical section of the saturated Great Miami Aquifer, extending 1000 by 75 feet was simulated using SWIFT. Small grid blocks were assigned to represent the mixing directly beneath the disposal area. A grid 40 columns by 50 rows with a cell size of 25.0 by 1.5 feet was constructed. A horizontal flow rate of 304 ft/year was imposed using constant heads. The longitudinal dispersivity assigned was 100 feet and four values of transverse dispersivity were simulated. Contaminant transport was simulated to steady-state. Concentration profiles along the downgradient edge of the landfill were plotted as shown below:



These simulations show (for the system modeled using SWIFT) the relationship between transverse dispersivity and mixing depth. The higher dispersivity values produce unrealistically deep mixing depths. The dispersivities and calculated mixing depths used in the ECTran simulations are within the reasonable range of results simulated using SWIFT. Because the contaminants are generally limited to the 2000 and 3000 series wells, it is reasonable to assume that the vertical dispersivity is small and probably less than 1 foot.

Response: Agree with the general conclusion of the comment. Equation 8 was used to calculate the mixing depth; however, a 10-foot limit was also selected as the minimum value for the mixing depth considering the actual exposure scenario of a groundwater user. Ten feet is a reasonable assumption of well-screen length of typical groundwater production wells. Therefore, the minimum mixing thickness of 10 feet was set in modeling for determining the potential future impacts to Great Miami Aquifer groundwater users. This assumption was made to avoid the use of any unrealistically small mixing depth directly calculated by the mixing equation.

Action: The following sentences will be added to Section F.5.2.4, page F-5-8, line 41:
"As indicated in the last two assumptions, two approaches were used to determine the mixing depth of the Great Miami Aquifer considering the infiltration rate and actual exposure scenario of a groundwater user. Ten feet is a reasonable assumption of well-screen length of typical groundwater production wells. Therefore, the minimum mixing depth of 10 feet was set in modeling for determining the potential future impacts to Great Miami Aquifer groundwater users. This assumption was made to avoid the use of any unrealistically small mixing depth directly calculated by the mixing equation under low infiltration rate conditions such as under the two disposal facilities with cap. The mixing equation only considers the vertical infiltration rate, lateral travel time, and vertical dispersion. This equation is reasonable and was directly used for higher infiltration rate conditions such as under the consolidation area without a multilayer cap."

437. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.3 Pg.#: F Line #: Code: C
Original Comment #: 242
Comment: Units for Tables F.3-6 though 9 should be mg/kg.
Response: Agree.
Action: The unit in the titles of Tables F.3-6 through 9 will be revised to mg/kg.

438. Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: F.5.2.1 Pg #: F-5-3 Line #: 33 Code:
Original Comment #: 250
Comment: This description of the liner system is not consistent with the rest of the document. It does not include any geo-synthetic membranes or leachate collection systems.
Response: Agree. This description focused only on components that were considered in the WAC development process. The actual liner system also includes geosynthetic membranes and leachate collection layers as shown in Figure F.5-6.
Action: The following sentence will be inserted in line 34 on page F-5-3:
"The liner system also includes geosynthetic membranes and leachate collection layers as shown in Figure F.5-6."

439. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.5.2.2 Pg. #: F-5-5 Line #: 30 Code: C
Original Comment #: 251
Comment: The rationale for the selection of this time period as the default climatological data should be included.
Response: Agree.
Action: The following sentences will be inserted in line 31 on page F-5-5:
"Only climatological data between 1974 to 1978 is included in the HELP model database. Therefore, data for this five-year period was used repeatedly as consecutive five-year periods in the HELP model to emulate long-term conditions."

440. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.5.2.4 Pg. #: F-5-8 Line #: 11-13 Code: C
Original Comment #: 252
Comment: Suggest stating "By not considering this layer, conservatism is added by modeling higher concentrations reaching the Great Miami Aquifer faster". Otherwise, this sentence implies that this process is actually occurring.
Response: Agree.
Action: The sentence will be revised to say: "Not considering this layer adds conservatism by modeling higher concentrations reaching the Great Miami Aquifer faster."

441. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.5.2.4 Pg.#: F-5-8 Line #: 35-40 Code: C
Original Comment #: 243
Comment: Explain the rationale for using a minimum mixing depth of 10 feet for the disposal facility and consolidation with cap options as compared to using equatio1n 8 for the consolidation with earthen cover option. This does not seem to be consistent in comparing the alternatives. The equation predicts a mixing depth of 29 feet, thus a three-fold increase in dilution for the consolidation with earthen cover option.
Response: Ten feet is a reasonable assumption of well-screen length of typical groundwater production wells. Therefore, the minimum mixing thickness of 10 feet was set in modeling for determining the potential future impacts to Great Miami Aquifer groundwater users. This assumption was made to avoid the use of any unrealistically small mixing depth directly calculated by the mixing equation under low infiltration rate conditions.
Action: The following sentences will be added to Section F.5.2.4, page F-5-8, line 41:
"As indicated in the last two assumptions, two approaches were used to determined the mixing depth of the Great Miami Aquifer considering the infiltration rate and actual exposure scenario of a groundwater user. Ten feet is a reasonable assumption of well-screen length of typical groundwater production wells. Therefore, the minimum mixing depth of 10 feet was set in modeling for determining the potential future impacts to Great Miami Aquifer groundwater users. This assumption was made to avoid the use of any unrealistically small mixing depth directly calculated by the mixing equation under low infiltration rate conditions such as under the two disposal facilities with cap. The mixing equation only considers the vertical infiltration rate, lateral travel time, and vertical dispersion. This equation is reasonable and was directly used for higher infiltration rate conditions such as under the consolidation area without a multilayer cap."

442. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.6.1.2 Pg.#: F-6-3 Line #: Code: C
Original Comment #: 253
Comment: Why does the technical approach not include a comparison simulation of the remedial actions utilizing the GO/UGMAS model?
Response: Because the perched groundwater evaluation was for the purpose of testing the feasibility of different remedial alternatives, simple calculations such as those used for the trench/well alternatives were preferred over more complex models such as GO/UGMAS. As the excavation of perched groundwater zones turned out to be the preferred alternative, further complex modeling using GO/UGMAS is not necessary.
Action: No action is warranted.

443. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.6.2.1 Pg. #: F-6-3 Line #: 36 Code: C
Original Comment #: 254
Comment: Section 4.7.2 of the draft final Operable Unit 5 RI Report October 1994 states that there are seven geographically separate areas of perched groundwater contamination at the FEMP. The perched groundwater zone presented in Figure F.6-2 does not include all of these areas. Given that one of the three protection criteria presented in the Executive Summary section of Appendix F.6 is Perched Groundwater, Section F.6.2.1 should clearly state the rationale for the reduction of the perched groundwater zone from the seven areas presented in the RI Report to the zone presented in the draft FS Report. The reader may be able to ascertain from Sections F.2.2.2 and F.6 that the zone was determined based on areas of perched groundwater able to sustain pumping at 1 gpm and where lateral migration pathways may exist, however, it is not clearly presented. The FS Report should make it clear that there will be contaminated perched groundwater outside of the identified "zone" that will not be addressed. Therefore, the Perched Groundwater protection criterion should be modified to state that only perched groundwater within the identified "zone" will be protected.
Response: The three perched groundwater protection criteria are merely introduced in the executive summary of Appendix F.6. They are more fully described in Section F.6.2.2. As stated in that section, the protection of perched groundwater relates to perched groundwater in the 1 gallon per minute (gpm) zone which may be used as a drinking water source. The Executive Summary will be modified in order to clarify this point.
Action: Line 23 of the Executive Summary will be modified as follows:
"Perched groundwater in the 1 gallon per minute (gpm) zone as a drinking water source."

444. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.6.2.1.2 Pg. #: F.6-7 Line #: 1-2 Code: C
Original Comment #: 255
Comment: This section refers to Tables F.6-1 and F.6-2 where the values of hydraulic conductivity are identified based on slug test data. Why are data from the pump tests in the coarse grained sediment bodies or the calibration of the GO/UGMAS model not utilized? These sources of data could be considered more reliable and representative than isolated slug tests.
Response: The values of hydraulic conductivity in Table F.6-1 were used to analyze the excavation scenarios and were taken directly from the GO/UGMAS model. The values of hydraulic conductivity in Table F.6-2, however, were used to analyze the vertical pumping wells, collection trenches, and containment trenches. The above

scenarios are location-dependent as the densities of the remedial options were dictated by the distributions of chemical concentrations. Because of the location-dependency consideration, an average hydraulic conductivity value of the coarse-grained portion within each respective chemical-concentration zone was used (zones shown in Figures F.6-24 through F.6-26). In these zones, the geometric means of hydraulic conductivity values of the coarse-grained portion determined by slug tests (1.64 to 47.1 ft/day) are similar to those determined from pumping tests (4.3 to 24.2 ft/day). In addition, where appropriate to account for uncertainty at the site, both of the extreme geometric mean values of the range of slug-test values (1.64 and 47.1 ft/day) were used in the analyses.

Action: Table F.6-1 will be expanded to include a statement referencing the GO/UGMAS report for the hydraulic conductivity values. The text on page F.6-7 will be expanded as follows:
"The values of hydraulic conductivity in Tables F.6-1 and F.6-2 are consistent with results from previous model calibration and field tests. The values of hydraulic conductivity in Table F.6-1 were obtained from the calibration of the GO/UGMAS model (USDOE, 1994). These values were utilized in analyzing the regional scenarios (Section F.6.3.1) which are not location-dependent. The values of hydraulic conductivity in Table F.6-2, however, were used to analyze the pumping wells, collection trenches, and containment trenches (Sections F.6.3.2, F.6.3.3, and F.6.4.1) scenarios, which are location-dependent because the densities of the remedial options are dictated by the distributions of chemical concentrations. In Table F.6-2, the values of hydraulic conductivity within respective chemical-concentration zones (Section F.6.3.2.2) are based on geometric averages of hydraulic conductivity values of the coarse-grained portion determined by slug tests. In these zones, the geometric averages of hydraulic conductivity are similar to the values of hydraulic conductivity determined by pumping tests. Because of the relative abundance of the slug test results with respect to the chemical-concentration zones, the slug-test values were preferred to those of the pumping-test values."
The following reference will be added:
U.S. Department of Energy, 1994b, "Glacial Overburden/ Upper Great Miami Aquifer System Model Development Report," Fernald Environmental Management Project, DOE, Fernald Field Office, Cincinnati, OH.

445. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.7 Pg.#: F Line #: Code: C
Original Comment #: 263
Comment: With regard to Tables F.7-6, 7, 8, and 9, please indicate in which layers the extraction wells are completed as is done in Table F.7-12. If wells are completed in multiple layers, indicate the method used to allocate the pumping rates between layers under dewatered conditions.
Response: Agree.
Action: Tables F.7-6, -7, -8 and -9 will be corrected to include an additional field showing the model layers that each extraction well is screened in. A footnote to each table will discuss the method of layer allocation. See response to Comment 457 for a discussion of layer allocation.

446. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.7. Pg.#: Line #: Code: C
Original Comment #: 269
Comment: Please provide a representative input data file for the SWIFT simulation of the groundwater remediation in digital format. It is preferable that the restoration to 20

ppb scenario be used. The input file should also include the initial concentration distribution for all 6 layers. For reference, please provide a CAD drawing file in DXF export format of the site features (i.e., Figure F.7-4; PO113/SX03291.DGN). Please also provide the revised source code.

Response: Agree.

Action: The requested revised SWIFT source code, SWIFT input file for the Restore to 20 ppb Design, and a ".dxf" file of Figure F.7-4 will be provided.

447. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.7 Pg. #: F-7-2 Line #: 12 Code: C
Original Comment #: 257

Comment: The last bullet under the heading for Clean-up to 3 ug/l indicates that there was an evaluation for the containment to 20 ug/l and that predicted range of time required is 330 to 380 years. This is not discussed in the subsequent text of Section F.7. Given that it is highlighted in the Executive Summary, some discussion is warranted.

Response: The "Containment to 20 ppb Design" had an objective of not allowing concentrations greater than 20 ppb to migrate off site. This design was also assessed to determine the time it took for all aquifer concentrations under this pumping scheme to reduce below 3 ppb and it was found that 380 years were required (see page F-7-25, line 4). However, the time to reduce concentrations below 3 ppb for the high K_d case was not reported in the text.

Action: The following text will be added on page F-7-25, line 39 after "...120 years": "and below 3 ppb in approximately 380 years."

448. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.7.2.1 Pg. #: F-7-5 Line #: 24 Code: C
Original Comment #: 258

Comment: Does this section intend to state that only the selected design will be refined with optimization in the preliminary design effort? It is understood that the "simple direct extraction philosophy" facilitates evaluation of costs and that detailed enhancement systems (e.g., sparging) do not need to be evaluated at this stage. However, the comparison of effectiveness of different extraction scenarios will be better served by considering more extensive optimization (e.g., well numbers, location, depth, pumping rate). Given similarity of the results presented in Section F.7.4, it is possible that the designs not selected for the preliminary design effort would perform more efficiently and meet the remediation objectives earlier upon optimization.

Response: We agree with the observations in the comment. The objective of the FS analysis was to determine if a simple design could effectively meet performance standards even under conservative conditions. When we perform optimization of the "selected design" during preliminary design, we do not intend to restrict the optimization to fixed well locations, but rather to include adjustment of well numbers, locations, depth, pumping rate, etc.

An aquifer restoration optimization study was conducted to identify and support revised treatment strategies that could accomplish EPA's intended protectiveness goals and satisfy regulatory requirements at less cost. The optimization process was begun so that a more realistic projection of this groundwater extraction and treatment system could be incorporated into the draft Operable Unit 5 Record of Decision (ROD) and used as the basis for engineering design.

Before creating additional cases for evaluation, a revised baseline case was created with updated conditions. These changes to the FS baseline case included hydraulic boundary conditions, layer mobility fractions for modeled wells, soil remediation

schedule, and surface water loading rate. These changes are described below:

- The constant head model boundary conditions on the west and north grid boundary were adjusted to reflect the hydraulic effects of pumping. These boundaries were adjusted by simulating pumping at the desired rate for each case using the original regional grid (IT 1993) and adjusting the boundary at the revised smaller grid based on drawdown in the regional grid. At the maximum pumping rate of 6300 gpm, drawdown effects up to 7 feet were seen at the nearest (western) boundary with proportionally less effect at lower pumping rates and at boundaries that were farther away.
- Mobility fractions for wells simulated in particular layers were calculated to account for reduced cell transmissivity scaled by the final water elevation in the cell resulting from pumping. This was needed because of the dewatering of Layer 1 due to the high rate of pumping.
- Surface water loading rates of uranium during the remediation period were revised based on the latest operable unit remediation schedules. The Surface Water Flow and Infiltration Model (DOE 1993) was simulated with these latest data, and two loading rates (from years 0 to 10 and 10 to 20) were established based on these modeling results. Postremedial surface water loading of uranium after 20 years was also included in the loading terms. This loading continued until the completion of the simulation.
- Uranium loading rates from existing Operable Units 1 and 2 areas were loaded for only 10 years (instead of 20 years as in the draft Operable Unit 5 FS) based on the latest remediation schedule showing remediation of Operable Units 1, 2, and 4, and other areas outside of the production area, within 10 years. Uranium loading from Operable Unit 3 remained at 20 years because the production area will be remediated last.

In the optimized extraction strategy, the four recovery well systems defined in Appendix F.7 will be operated in sequence and therefore require a lower maximum pumping rate. Also the same groundwater cleanup goal specified in the FS can be achieved in a shorter time frame. With the lower pumping rate and modification of the boundary conditions and mobility fraction, the artificial dispersion in the vertical direction discussed in the FS seems to become much less significant.

Action: The following text will be added on page F-7-37, line 39 after "...preliminary design":
"This optimization process will include adjustment of well numbers, locations, depth, pumping rate, etc.."
Approaches and results of this optimization study will be incorporated into the FS as Appendix F, Section F.8.0.

449. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.7.2.4 Pg.#: F-7-8 Line #: 9 Code: C
Original Comment #: 244
Comment: What averaging procedure was used for model layer 2? While arithmetic is generally the most conservative, a logarithmic approach might be more realistic.
Response: An arithmetic average was used to define initial concentrations in Layer 2. An arithmetic average was used to be conservative.
Action: No action required.

450. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.7.4 Pg.#: Line #: Code: C
Original Comment #: 268
Comment: In comparing the maximum concentration curves simulated for the different layers, there appears to be a significant degree of vertical mixing after 40 years. Is this primarily the result of unwanted artificial vertical dispersion or the result of system hydrodynamics?
Response: Maximum concentration curves for the Restore to 20 ppb Design include Figures F.7-29 Scenario 1A, F.7-30 Scenario 1B, F.7-36 Scenario 2A, F.7-37 Scenario 2B, F.7-43 Scenario 3A, F.7-44 Scenario 3B. These graphs only run 40 years so it's difficult to understand what "after 40 years" refers to. It is important to note that scales are often different for the different model layers, so a simple eyeball inspection between the layers may be misleading because there is greater sensitivity to change on these graphs for the lower layers. In addition, the absolute numbers at 40 years are typically quite low. Also, these "maximum curves" can result from a single model block at a given concentration. Therefore, these relative concentrations may not represent distribution of mass between the layers since there could be a single block causing it in Layer 6 and 100 blocks in Layer 1.
As stated in the text, we believe that artificial vertical dispersion has caused greater than realistic concentrations in the lower layers.
Action: No action required.

451. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.7.4.1 Pg.#: F-7-14 Line #: 16 Code: C
Original Comment #: 267
Comment: It would be helpful to point out the reason for the drop in concentration in layer 1 after 20 years (i.e., the time at which the source loadings from Operable Unit 1, and Operable Unit 2 cease). This has the most dramatic effect on Zones 1, 2, and 3.
Response: Agree.
Action: The following text will be added on page F-7-14, line 19 after "...years, respectively.":
"The drop in maximum concentrations after year 20 in Zones 1, 2 and 3 is caused by the completion of Operable Unit 1 and Operable Unit 2 remedial activities and surface water loading at year 20."

452. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.7.4.4 Pg. #: F-7-16 Line #: 2 Code: C
Original Comment #: 259
Comment: This line states that it will be determined if additional off-site wells can significantly improve the overall system performance; however, Section F.7 does not report the results of this evaluation.
Response: Agree.
Action: The following text will be added on page F-7-17, line 7 after "...1 and 2 counterparts.":
"Based on a comparison of Scenarios 1, 2 and 3, additional off-property wells (No. 13 in Scenario 1 [see Figure F.7-26] and Nos. 24 and 25 in Scenario 2 [see Figure F.7-33]) did not significantly improve efficiency or remediation time."

453. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.7.4.7 Pg. #: F-7-20 Line #: 9 Code: C
Original Comment #: 261
Comment: Which pumping scenario was used in this analysis? Both Figures F.7-42 (Scenario 3B) and F.7-43 (Scenario 3A) are referred to and compared to F.7-63 and F.7-64 respectively.
Response: Agree.
Action: The following text will be added on page F-7-20, line 7 after "...was achieved.": "Scenario 3B was used in this analysis."
On page F-7-20, line 33, "Figure F.7-43" will be replaced with "Figure F.7-44."

454. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.7.5 Pg.#: F-7-17 Line #: 9 Code: C
Original Comment #: 260
Comment: The first two sentences of this paragraph could be made more clear.
Response: Agree.
Action: The following text will be added on page F-7-17, line 9 after "...a lower efficiency than their "B" counterparts."

455. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.7.5.1 Pg.#: F-7-21 Line #: 8 Code: C
Original Comment #: 264
Comment: The text claims that only one scenario was developed, but in Table F.7-12 there are two pumping schedules. Are these scenarios 4a and 4b? Which schedule is used the calculations?
Response: Table F.7-12 only shows a single pumping schedule, although three different pumping periods are shown.
Action: No action necessary.

456. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.7 Pg.#: F Line #: Code: C
Original Comment #: 245
Comment: Figures F.7-29, 30, 36, 37, 43, 44. Why does the Zone 2 concentration in Layer 6 increases dramatically between years 5 and 10? There is no extraction in model layers 5 and 6. Apparently this may result from artificial vertical dispersion as discussed in F.7.7.3.
Response: The increase in lower layer concentrations from 5 to 10 years is primarily caused by the artificial vertical dispersion discussed in F.7.7.3.
Action: No action required.

457. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.7.5.1 Pg.#: F-7-21 Line #: 27-28 Code: C
Original Comment #: 265
Comment: How is the extraction rate implemented with wells that are completed in several layers? Is the layer allocation based on the total block transmissivity or the reduced transmissivity resulting from dewatering? In addressing the partially dewatered blocks, was the average water elevation in the cell used to scale the layer allocation or was the head at the well (via well index and bottom hole pressure) used?
Response: Agree these questions need to be addressed.
Action: The following text will be added on page F-7-31, line 18 after "...design case.": "<u>Assignment of Mobility Fractions</u>
For this analysis, constant mobility fractions were assigned to each layer. Fractions

of 0.25, 0.50, and 0.25 were assigned to Layers 1, 2, and 3, respectively, for shallow wells completed in those layers. Fractions of 0.5 and 0.5 were assigned to Layers 5 and 6, respectively, for deep wells completed in those layers. These fractions correspond roughly to average saturated cell thicknesses before extraction pumping. This approach assumed that additional drawdown from extraction pumping was not significant, which was not the case in Layer 1 where significant additional dewatering occurred. However, this approach is considered adequate for the relative comparison of alternatives in the FS.

During optimization and design studies, an approach will be used which accounts for reduced cell transmissivity scaled by the final water elevation in the cell resulting from pumping. Cell transmissivity will vary from pumping sequence to pumping sequence depending on final water elevations for each sequence."

458. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.7.7.2 Pg.#: F-7-26 Line #:35 Code: C
Original Comment #: 266

Comment: What is the magnitude of the dewatering? Please provide a contour map of the drawdown for each of the pumping scenarios. It is difficult to appreciate the importance of the error in the simulations caused by dewatering. In Figure F.7-107, one of the possible 6 pumping schedules is presented with drawdown contours exceeding 8 feet, but the maximum reported is 7.266 feet.

Response: As stated in the text, the impact of lost mass was evaluated in a sample case by continuously loading cells that have a dewatered zone above. This analysis showed little impact to results; thus, the model was used in its present state for the analysis in the FS. The text further states that a more detailed evaluation will be included during design and this phenomenon will be corrected if necessary.

Action: New figures showing the drawdown contours will be included for the four designs. For the Restore to 20 ppb Design, only Scenario 3b will be presented since there is very little difference in the drawdown patterns with the relatively small differences in these scenarios. With these relatively minor differences, the drawdown patterns are primarily a function of total pumping rate. The error in the reported maximum drawdown reported in Figure F.7-107 will be corrected.

459. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.7.7.3 Pg.#: F-7-27 Line #: 18 Code: C
Original Comment #: 272

Comment: The finite difference grid increments, both areally and vertically, are much too coarse to accurately simulate a transverse dispersivity of 0.1 feet. While truncation analysis has only been developed for the longitudinal coefficient, it is reasonable to assume that transverse dispersion is affected by grid size. It is very likely that sensitivity analysis would show the model to be insensitive to transverse dispersivities less than a few feet. At these low values, the solution is likely to be overcome with numerical dispersion.

Response: The results of the revised calibration of the flow and solute transport model are described in the Summary of Improvements Report (DOE 1994a) and were used for modeling the Great Miami Aquifer for the FS. When the solute transport model was calibrated, we tried to consecutively lower values of transverse (vertical) dispersivity and found that mass distribution in the lower aquifer was sensitive to values to approximately 0.1 feet (see above-referenced report). When we stepped down lower than 0.1 feet, we saw little additional effect. We never saw any tendency for results to scatter or diverge. So while there will be some numerical dispersion for the

reasons the commentor stated, we never saw the solution "overcome" with numerical dispersion and feel that reasonably valid results have been obtained.

Action: No action required.

460. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.7.7.6 Pg.#: F-7-31 Line #: 6-18 Code: C
Original Comment #: 271

Comment: If the model is constrained by constant head boundaries and an area approximately 3 time the current model grid would be required, is such a model revision planned? Is it not possible to simulate the flow using a regional coarse grid and interpolate new boundaries for the current 120 x 112 grid?

Response: For optimization simulations conducted since the FS was issued in November, a regional flow grid was used to interpolate new boundaries. A model revision is presently ongoing to add flow blocks on the northern and western boundaries so that the tedious step of interpolating new boundaries is eliminated. With this revised model, it will be more efficient to perform optimization simulations.

Action: No action required.

461. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.7.9.2 Pg. #: F-7-38 Line #: 1-5 Code: C
Original Comment #: 262

Comment: The noted benefits of pulsed pumping can similarly be achieved by manipulating pumping schedules and locations (e.g., variations on the pulsed pumping concept), and by the use of reinjection.

Response: It is true that a pulsed pumping scheme basically has a lower effective pumping rate over time as wells are sequenced and will be able to remove mass from the pumping-induced unsaturated zone in the model. Counterbalancing these effects are some mitigation of stagnation zones and increases in efficiency.

It is our experience with these simulations that we are still pumping at a higher rate than is needed for effective remediation; consequently some reduction in pumping rate will be met with increases in efficiency and result in comparable remediation times. Because pumping occurs adjacent to areas with the highest vadose zone concentrations, this added mass from the vadose zone will primarily result in higher efficiencies. Therefore, it is estimated that there will not be a major effect on remediation times, at least compared to uncertainty in other variables in this preliminary analysis. However, we do recognize it as an issue for optimization. Because of the many variables in the selection of an extraction design, an overall approach has been adopted of starting with a simple analysis in the FS, selecting a preliminary approach, and gradually introducing more sophisticated schemes during actual design. While it would be ideal to include all factors in preliminary simulations, it is not practical. The simulating of pulsed pumping with the site model is a difficult undertaking and introduces new variables to a problem that already has many variables. Therefore, this analysis has been deferred to the optimization process during preliminary design.

Action: The following text will be added on page F-7-38, line 10 after "...and wells.": "Detailed analysis of pulsed pumping should be conducted during design."

462. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.2-2 Table Pg. #: Line #: Code: C
Original Comment #: 249
Comment: It is unclear from Table F.2-2, why the following COPCs require CPRG screening: 3,3'-dichlorobenzidine, 4-methylphenol, and dieldrin. Likewise, it is unclear from Table F.2-2 why the following COPCs do not require CPRG screening: tetrachloroethene, trichloroethene, bis(2-ethylhexyl)phthalate, barium, cadmium, copper, molybdenum, nickel, silver, thallium, vanadium, and zinc.
Response: Only chemicals that fail either groundwater or surface water cross-media model screening (i.e., have "F" in columns titled "Vertical Migration from Soil or PW to GW," "Surface Water," or "Sediment") may require CPRGs. The first group of chemicals listed in the comment pass the groundwater but fail the surface water pathway model screening; therefore CPRGs may be required for these chemicals. The second group of chemicals pass the model screening in both pathways, so no CPRGs are required.
In addition to model screening, screening results from direct contact exposure based on **both measured and model simulated** soil or surface water concentrations were also summarized in Table F.2-2 (i.e., columns titled "DC SS" and "DE SW"). The second group of chemicals mentioned in the comment failed the screening for direct contact due to measured high soil and/or surface water concentrations. The measured surface water concentrations include samples taken from the pilot plant drainage ditch where high concentrations of some chemicals have been detected due to past discharges from the plant. However, surface water modeling only considered impacts from contaminated surface runoff caused by contaminated surface soil. The measured soil concentrations were used as the source for model screening in both the groundwater and surface water pathways. These chemicals passed the cross-media model screening and do not require CPRGs. Other sources which were not simulated such as direct discharge from the plant will be eliminated during Operable Unit 3 remediation and, therefore, do not require CPRGs.
Action: The following sentence will be added at the end of line 36 on page F-2-9: "Only COPCs that fail either groundwater or surface water model screening (i.e., have "F" in Columns 4, 8, or 10) may require CPRGs."

463. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: F.6-1 & F.6-2 Tables Code: C
Original Comment #: 256
Comment: The porosity values listed in these tables contradict the values which were presented in the GO/UGMAS model.
Response: The value of porosity that appeared in the GO/UGMAS report was 0.39. This value was based on the range reported in the literature. The porosity value for the perched zone had not been determined at the time the GO/UGMAS report was prepared. The reported porosity value was not used in the analysis at that time because the flow simulation was steady state in nature and no transport analysis was carried out. The porosity value of 0.3 used in the FS Report was based on the model calibration results from the recent pumping tests in the South Plume area.
Action: An appropriate source will be cited in Tables F.6-1 and F.6-2.

464. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: G.4.2 Pg. #: G-4-3 Line #: 32-33 Code: C
Original Comment # 275
Comment: The sentence that states "These results represent the average number of injuries and fatalities that may be expected to occur." should be amended to include the period over which these events occur.
Response: Agree.
Action: Amend the sentence to read "These results represent the average number of injuries and fatalities that may be expected to occur over the 22-year period of remediation."

465. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: G.I-2 Table Pg. #: G.I-20 Line #: Code: C
Original Comment # 276
Comment: Missing legend for superscript "c" and "e" referred to in table header.
Response: Agree. The typos will be corrected.
Action: See proposed action for Comment 137.

466. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: G.I-2 Table Pg. #: G.I-20 Line #: Code: C
Original Comment # 277
Comment: Total Person Hours referred to in item "c" of legend is in Table G.3-4 rather than G.3-3.
Response: Agree.
Action: Change table reference from G.3-3 to G.3-5 in response to this comment and Comment 134.

467. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: G.I-2 Table Pg. #: G.I-20 Line #: Code: C
Original Comment # 278
Comment: Formula in item "e" of legend is incorrect. Should divide by 22 years not multiply.
Response: Agree. The typo will be corrected.
Action: Change footnote "e" at the bottom of Tables G.I-2 through G.I-4. to "# People = (Total Person Hours from Table G.3-5)/(22y)(250d/y)/8h/d)." See proposed response action for Comment 137.

468. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: G.I-2 Table Pg. #: Line #: Code: C
Original Comment # 279
Comment: Formula used for CEDE calls for exposure times in hr/day, however, numbers in table are in units of hr/life.
Response: Agree. This applies to Tables G.I-3 and 4 as well.
Action: Change the units in the heading of the columns in these three tables that pertain to exposure time from "(h/Life)" to "(h)." Change "h/d" units in footnote to "h." See proposed response action for Comment 137.

469. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: G.I-2 Table Pg. #: Line #: Code: M
Original Comment # 280
Comment: Formula for ILCR given as item "g" in legend does not produce numbers in table. Risks by formula are 2 orders of magnitude lower.
Response: Agree. Footnote is incorrect.
Action: See action for Comment 137.

470. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: G.I-2 Table Pg. #: Line #: Code: M
Original Comment # 281
Comment: Formula for ILCR given as item "g" in legend does not produce numbers in table. Risks by formula are 2 orders of magnitude lower.
Response: Agree. Footnote is incorrect.
Action: See action for Comment 137.

471. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: G.I-4 Table Pg. #: Line #: Code: M
Original Comment # 282
Comment: Risks by formula for ILCR in item "g" are 2 orders of magnitude lower than those indicated in the table.
Response: Agree. Footnote is incorrect.
Action: See action for Comment 137.

472. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H Pg. #: H-vi Line #: TOC Code: C
Original Comment # 289
Comment: Figure H.3-7 should be titled "Arsenic Concentration Contours, Movement over 1000 Years Following Remedial Actions"
Response: Agree.
Action: The list of figures will be revised to reflect the correct figure title.

473. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H Pg. #: H-vi Line #: TOC Code: C
Original Comment # 288
Comment: Figure H.3-6 should be titled "Categories of Residual Source Terms and Linkages to Fate and Transport Models"
Response: Agree.
Action: The title of Figure H.3-6 will be changed.

474. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H Pg. #: H-i Line #: TOC Code: C
Original Comment # 284
Comment: H.1.2 "Postremediation Site Conditions" should be changed to "Organization of the Operable Unit 5 CRARE"
Response: Agree.
Action: The table of contents will be altered to reflect the correct section title.

475. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H Pg. #: H-iii Line #: TOC Code: C
Original Comment # 285
Comment: Attachment H.I cover page reads "Computer Print Outs Mass Loading" but should be "Water Transport Modeling" to be consistent with the materials therein.
Response: Agree.
Action: The title page will be changed to read as noted.

476. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H Pg. #: H-vi Line #: TOC Code: C
Original Comment # 287
Comment: Figure H.3-4 should be titled "Initial Extent of Soil Excavation in the Adopted Site-Wide Remedy"
Response: Agree.
Action: The list of figures will be revised as stated.

477. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H Pg. #: H-iii Line #: TOC Code: C
Original Comment # 286
Comment: Attachment H.V should read "Background Contributions to Risk"
Response: This title no longer exists.
Action: No action.

478. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H Pg. #: H-vii Line #: TOC Code: C
Original Comment # 292
Comment: Figure H.4-1 should read "Conceptual Exposure Model, Adopted Site-Wide Remedy."
Response: Agree.
Action: The list of figures will be revised as stated.

479. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H Pg. #: H-vi Line #: TOC Code: C
Original Comment # 291
Comment: Figure H.3-9 should be titled "Ra-226 Concentration Contours, Movement Over 1000 Years Following Remedial Actions."
Response: Agree.
Action: The list of figures will be revised as stated.

480. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H Pg. #: H-vi Line #: TOC Code: C
Original Comment # 290
Comment: Figure H.3-8 should be titled "Manganese Concentration Contours, Movement Over 1000 Years Following Remedial Actions."
Response: Agree.
Action: The list of figures will be revised as stated.

481. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.4.2 Pg. #: H-4-11 Line #: eq.H.4-2 Code:C
Original Comment # 294
Comment: The units for ET, h/d, do not cancel out in the equation as written to provide a CDI in pCi.
Response: Agree.
Action: The units for the inhalation rate in line 17 will be changed from "m^3/d" to "m^3/h."

482. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.4.2 Pg. #: H-4-10 Line #: eq. H.4-1 Code: C
Original Comment # 293
Comment: Exposure frequency and exposure duration are usually two separate terms.
Response: Agree.
Action: The term "EFD" will be broken out into two terms, "EF = exposure frequency (d/y)" and "ED = exposure duration (y)." Equation H.4-1 will be changed to read:
CDI = (C x CR x EF x ED)/(BW x AT)

483. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.I Pg. #: H.I-1 Line #: TOC Code: C
Original Comment # 296
Comment: The section heading does not correspond to section heading on following page.
Response: Agree.
Action: The table of contents will be corrected to reflect current section headings.

484. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.III Pg. #: H.III-i Line #: TOC Code: C
Original Comment # 297
Comment: Section H.III.2 begins on page H.III-15 in text. The rest of headings for section (H.III.3 and following) are missing from the Table of Contents.
Response: Agree.
Action: The table of contents will be corrected to reflect current section headings.

485. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.III Pg. #: H.III-ii Line #: List of Tables Code:E
Original Comment # 298
Comment: Table number H.III-5 reads "Contaminant Concentrations...." here but table header is "COC Concentrations...." on page H.III-11.
Response: Agree.
Action: The word "contaminant" will be replaced with the term "COC" to reflect the wording on Table H.III-5.

486. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.III Pg. #: H.III-ii Line #: List of Tables Code: C
Original Comment # 299
Comment: Table number H.III-6 contains the phrase "..., Current Land Use" which is missing in table header on page H.III-12.
Response: Agree.
Action: In the list of tables, "Current Land Use" will be deleted from the title for Table H.III-6.

487. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.III Pg. #: H.III-ii Line #: List of Tables Code: C
Original Comment # 300
Comment: Table number H.III-7 contains the phrase "..., Future Land Use" which is missing in table header on page H.III-13.
Response: Agree.
Action: In the list of tables, "Future Land Use" will be deleted from the title for Table H.III-7.

488. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.III Pg. #: H.III-ii Line #: List of Tables Code: C
Original Comment # 301
Comment: Table number H.III-10 title is not the same as that on page H.III-27.
Response: Agree.
Action: The List of Tables will be revised to show the correct title of Table H.III-10.

489. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.III.1.2 Pg. #: H.III-3 Line #: 35 Code: C
Original Comment # 302
Comment: Concentrations of contaminants in livestock water do not appear to be given in any of the tables in this section (Great Miami River?).
Response: The concentrations are presented as C_{iw} in Table H.III-4.
Action: The parameter C_{iaw} in the livestock water ingestion equation will be changed to C_{iw} as presented in Table H.III-4.

490. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.III.1.4 Pg. #: H.III-5 Line #: 25 Code: C
Original Comment # 303
Comment: The text says that Table H.III-6 presents the summary of modeling results for contaminant concentrations in vegetables, meat, dairy, and <u>fish</u> products. However, there is no column for modeled concentrations in fish in the table on page H.III-12.
Response: Agree.
Action: The text will be revised to say "Tables H.III-5 through H.III-8 present..." In addition, a column will be added to Table H.III-8 for fish concentrations.

491. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.IV Pg. #: H.IV-ii Line #: List of Tables Code: C
Original Comment # 305
Comment: The rest of tables H.IV-2 through 120 are not listed here.
Response: Agree.
Action: Missing tables will be added to the list of tables.

492. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.IV Pg. #: Line #: Code: C
Original Comment # 306
Comment: In many of the tables, EF = fraction of year spent exposed not exposured.
Response: Agree.
Action: Tables will be reviewed for typographical errors and corrections made. The word "exposured" will be changed to "exposed."

493. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.IV-118 Table Pg. #: Line #: Code: M
Original Comment # 309
Comment: Use of this equation and values do not result in the CDIs given at the bottom of the page for fish ingestion. The ILCR is increased by a factor of 100.
Response: Agree.
Action: The CDI calculation under this pathway will be corrected.

494. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.IV-89 Table Pg. #: Line #: Code: C
Original Comment # 308
Comment: EF = fraction of year spent exposed not exposured. Calculations using this equation and values do not result in CDIs given, but the same CDI is obtained if only the first half of the equation (outdoor exposure) is used and the second half (indoor exposure) is disregarded, as would be correct for this receptor and exposure scenario. So, the term "+[CRxEFxEDxET$_i$x1-SH$_i$)] should be deleted from the exposure equation at the top of the page.
Response: A) Agree.
B) The method used for the calculation of external radiation exposures is applicable to both indoor and outdoor exposures. In this case the receptor does not spend any time indoors while on the facility. The value of the term "ET$_i$" was indicated as "NA" (Not Applicable) which is equivalent to zero (0) for this receptor. Plugging this value into the original equation produces the correct answer. The equation does not require modification.
Action: A) The word "exposured" will changed to "exposed."
B) The value for ET$_i$ will be changed from "NA" to "0."

495. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.IV-10 Table Pg. #: Line #: Code: C
Original Comment # 307
Comment: EF = fraction of year spent "exposed" not "exposured." Calculations using this equation and values do not result in CDIs given, but the same CDI is obtained if only the first half of the equation (outdoor exposure) is used and the second half (indoor exposure) is disregarded, as would be correct for this receptor and exposure scenario. So, the term "+[CRxEFxEDxET$_i$x1-SH$_i$)] should be deleted from the exposure equation at the top of the page.
Response: A) Agree.
B) The method used for the calculation of external radiation exposures is applicable to both indoor and outdoor exposures. In this case the receptor does not spend any time indoors while on the facility. The value of the term "ET$_i$" was indicated as "NA" (Not Applicable) which is equivalent to zero (0) for this receptor. Plugging this value into the original equation produces the correct answer. The equation does not require modification.
Action: A) The word "exposured" will be changed to "exposed."
B) The value for ET$_i$ will be changed from "NA" to "0."

496. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.V Pg. #: Line #: Code: C
Original Comment # 311
Comment: Tables H.V.1-1 through H.V.1-120 use the term "TLCR" everywhere instead of "ILCR" as used in the rest of the FS/CRARE. This should be changed to be consistent.
Response: Agree.
Action: Tables will be reviewed for typographical errors and corrections made.

497. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.V Pg. #: H.V-1 Line #: 24 Code: C
Original Comment # 310
Comment: The table referred to should be H.V-2 not H.V-1.
Response: Agree.
Action: The reference to the table will be corrected.

498. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.V.1-1 Table Pg. #: Line #: Code: C
Original Comment # 312
Comment: "Undeveloped" should be "Undeveloped Park User."
Response: Agree.
Action: Table H.V.1-1 will be changed to "Undeveloped-Park User." Other tables will also be reviewed and corrected if errors are found.

499. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.V.1-118 Table Pg.#: Line #: Code: M
Original Comment # 317
Comment: Use of this equation and values do not result in the CDIs given at the bottom of the page for fish ingestion. The ILCR is increased by a factor of 100.
Response: Agree.
Action: The CDI calculation under this pathway will be corrected.

500. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.V.2-1 Table Pg.#: Line #: Code: C
Original Comment # 318
Comment: Scientific notation used in this table ("E-01") is different from that used in all other tables ("x 10^{-1}"). "Undeveloped" should be "Undeveloped Park User"
Response: Agree.
Action: Tables will be reviewed for consistency and corrections made where applicable.

501. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.VI Pg. #: H.VI-i Line #: TOC Code: C
Original Comment # 323
Comment: Section H.VI.5.3, "Qualitative Discussion of Related Uncertainties in the Risk Assessment" is completely missing from the text.
Response: Per discussion with U.S. EPA Region V on 22-23 February, Attachment H.VI, "Quantitative Uncertainty Analysis of Exposure Parameters and the Impact on Preliminary Remediation Goals," will be deleted from this document.
Action: Attachment H.VI will be deleted.

502. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.VI.I Pg. #: H-VI-2 Line #: 14,15 Code: C
Original Comment # 324
Comment: Add "th" after 70, 90, 95.
Response: Per discussion with U.S. EPA Region V on 22-23 February, Attachment H.VI, "Quantitative Uncertainty Analysis of Exposure Parameters and the Impact on Preliminary Remediation Goals," will be deleted from this document.
Action: Attachment H.VI will be deleted.

503. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.V.1-25 and others Tables Page #: Line #: Code: C
Original Comment # 314
Comment: EF = fraction of year spent exposed not exposured.
Response: Per discussion with U.S. EPA Region V on 22-23 February, Attachment H.VI, "Quantitative Uncertainty Analysis of Exposure Parameters and the Impact on Preliminary Remediation Goals," will be deleted from this document.
Action: Attachment H.VI will be deleted.

504. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.VI.3 Pg. #: H-VI-8 Line #: 26, 35 Code: C
Original Comment # 325
Comment: AHIC 1994 is not given in references.
Response: Per discussion with U.S. EPA Region V on 22-23 February, Attachment H.VI, "Quantitative Uncertainty Analysis of Exposure Parameters and the Impact on Preliminary Remediation Goals," will be deleted from this document.
Action: Attachment H.VI will be deleted.

505. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.VI.3 Pg. #: H-VI-9 Line #: 26 Code: C
Original Comment # 326
Comment: Finley et al. 1994 is not given in references.
Response: Per discussion with U.S. EPA Region V on 22-23 February, Attachment H.VI, "Quantitative Uncertainty Analysis of Exposure Parameters and the Impact on Preliminary Remediation Goals," will be deleted from this document.
Action: Attachment H.VI will be deleted.

506. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.VII Pg. #: H.VII-i Line #: Code: C
Original Comment # 328
Comment: Table of Contents is missing. There are no references provided at the end of the section for the literature cited in the text.
Response: Agree. Note that this attachment has been renumbered; it is now H.V.
Action: The table of contents for this attachment will be added. References can be found in Section H.7.

507. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.VII Pg. #: H.VII-5 Line #: Table Code: C
Original Comment # 330
Comment: Exponents for values in last column are unclear in copy reviewed.
Response: Comment acknowledged. Note that this attachment has been renumbered; it is now H.V.
Action: Copy quality will be reviewed before distribution of the next draft.

508. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.VII Pg. #: H.VII-i Line #: List of Tables Code: C
Original Comment # 329
Comment: Table number H.VII-1 is actually on page H-VII-3, not H-VII-4. Rest of page numbers in list are also off by 1 compared with text.
Response: Agree. Note that this attachment has been renumbered; it is now H.V.
Action: The list of tables will be corrected.

509. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H Pg. #: Line #: H.4-3 - H.4-13 Tables Code: C
Original Comment # 295
Comment: Many of the RME totals have possible errors due to rounding, check to see if the original numbers produce the number listed as a total.
Response: Noted.
Action: No action.

510. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.III-6 Table Pg. #: H.III-12 Line #: Code: C
Original Comment # 304
Comment: Table is missing column for fish products.
Response: Agree.
Action: The text will be revised to say "Tables H.III-5 through H.III-8 present..." In addition, a column will be added to Table H.III-8 for fish concentrations.

511. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.V.1-10 Table Pg. #: Line #: Code: C
Original Comment # 313
Comment: EF = fraction of year spent exposed not exposured. Calculations using this equation and values do not result in CDIs given, but the same CDI is obtained if only the first half of the equation (outdoor exposure) is used and the second half (indoor exposure) is disregarded, as would be correct for this receptor and exposure scenario. So, the term "+[CRxEFxEDxET_ix1-SH_i)] should be deleted from the exposure equation at the top of the page.
Response: The method used for the calculation of external radiation exposures is applicable to both indoor and outdoor exposures. In this case, the receptor does not spend any time indoors while on the facility. The value for the term "ET_i" was indicated as "NA" (Not Applicable) which is equivalent to zero (0) for this receptor. Inserting this value into the original equation produces the correct answer. The equation does not require modification.
Action: The value for ET_i will be changed from "NA" to "0."

512. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.V.1-89 Table Pg. #: Line #: Table Code:C
Original Comment # 315
Comment: EF = fraction of year spent exposed not exposured. Calculations using this equation and values do not result in CDIs given, but the same CDI is obtained if only the first half of the equation (outdoor exposure) is used and the second half (indoor exposure) is disregarded, as would be correct for this receptor and exposure scenario. So, the term "+[CRxEFxEDxET_ix1-SH_i)] should be deleted from the exposure equation at the top of the page.
Response: The method used for the calculation of external radiation exposures is applicable to both indoor and outdoor exposures. In this case, the receptor does not spend any time indoors while on the facility. The value for the term "ET_i" was indicated as "NA" (Not Applicable) which is equivalent to zero (0) for this receptor. Inserting this value into the original equation produces the correct answer. The equation does not require modification.
Action: The value for ET_i will be changed from "NA" to "0."

513. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.V.1-98 Table Pg. #: Line #: Table Code: C
Original Comment # 316
Comment: EF = fraction of year spent exposed not exposured. Calculations using this equation and values do not result in CDIs given, but the same CDI is obtained if only the first half of the equation (outdoor exposure) is used and the second half (indoor exposure) is disregarded, as would be correct for this receptor and exposure scenario. So, the term "+[CRxEFxEDxET$_i$x1-SH$_i$)] should be deleted from the exposure equation at the top of the page.
Response: The method used for the calculation of external radiation exposures is applicable to both indoor and outdoor exposures. In this case, the receptor does not spend any time indoors while on the facility. The value for the term "ET$_i$" was indicated as "NA" (Not Applicable) which is equivalent to zero (0) for this receptor. Inserting this value into the original equation produces the correct answer. The equation does not require modification.
Action: The value for ET$_i$ will be changed from "NA" to "0."

514. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.V.2-89 Table Pg.#: Line #: Code: C
Original Comment # 320
Comment: EF = fraction of year spent exposed not exposured. Calculations using this equation and values do not result in CDIs given, but the same CDI is obtained if only the first half of the equation (outdoor exposure) is used and the second half (indoor exposure) is disregarded, as would be correct for this receptor and exposure scenario. So, the term "+[CRxEFxEDxET$_i$x1-SH$_i$)] should be deleted from the exposure equation at the top of the page.
Response: The method used for the calculation of external radiation exposures is applicable to both indoor and outdoor exposures. In this case, the receptor does not spend any time indoors while on the facility. The value for the term "ET$_i$" was indicated as "NA" (Not Applicable) which is equivalent to zero (0) for this receptor. Inserting this value into the original equation produces the correct answer. The equation does not require modification.
Action: The value for ET$_i$ will be changed from "NA" to "0."

515. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.V.2-98 Table Pg.#: Line #: Code: C
Original Comment # 321
Comment: EF = fraction of year spent exposed not exposured. Calculations using this equation and values do not result in CDIs given, but the same CDI is obtained if only the first half of the equation (outdoor exposure) is used and the second half (indoor exposure) is disregarded, as would be correct for this receptor and exposure scenario. So, the term "+[CRxEFxEDxET$_i$x1-SH$_i$)] should be deleted from the exposure equation at the top of the page.
Response: The method used for the calculation of external radiation exposures is applicable to both indoor and outdoor exposures. In this case, the receptor does not spend any time indoors while on the facility. The value for the term "ET$_i$" was indicated as "NA" (Not Applicable) which is equivalent to zero (0) for this receptor. Inserting this value into the original equation produces the correct answer. The equation does not require modification.
Action: The value for ET$_i$ will be changed from "NA" to "0."

516. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.V.2-10 Table Pg.#: Line #: Code: C
Original Comment # 319
Comment: EF = fraction of year spent exposed not exposured. Calculations using this equation and values do not result in CDIs given, but the same CDI is obtained if only the first half of the equation (outdoor exposure) is used and the second half (indoor exposure) is disregarded, as would be correct for this receptor and exposure scenario. So, the term "+[CRxEFxEDxET$_i$x1-SH$_i$)] should be deleted from the exposure equation at the top of the page.
Response: The method used for the calculation of external radiation exposures is applicable to both indoor and outdoor exposures. In this case, the receptor does not spend any time indoors while on the facility. The value for the term "ET$_i$" was indicated as "NA" (Not Applicable) which is equivalent to zero (0) for this receptor. Inserting this value into the original equation produces the correct answer. The equation does not require modification.
Action: The value for ET$_i$ will be changed from "NA" to "0."

517. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.V.2-89 Table Pg.#: Line #: Code: C
Original Comment # 320
Comment: EF = fraction of year spent exposed not exposured. Calculations using this equation and values do not result in CDIs given, but the same CDI is obtained if only the first half of the equation (outdoor exposure) is used and the second half (indoor exposure) is disregarded, as would be correct for this receptor and exposure scenario. So, the term "+[CRxEFxEDxET$_i$x1-SH$_i$)] should be deleted from the exposure equation at the top of the page.
Response: The method used for the calculation of external radiation exposures is applicable to both indoor and outdoor exposures. In this case, the receptor does not spend any time indoors while on the facility. The value for the term "ET$_i$" was indicated as "NA" (Not Applicable) which is equivalent to zero (0) for this receptor. Inserting this value into the original equation produces the correct answer. The equation does not require modification.
Action: The value for ET$_i$ will be changed from "NA" to "0."

518. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.V.2-98 Table Pg.#: Line #: Code: C
Original Comment # 321
Comment: EF = fraction of year spent exposed not exposured. Calculations using this equation and values do not result in CDIs given, but the same CDI is obtained if only the first half of the equation (outdoor exposure) is used and the second half (indoor exposure) is disregarded, as would be correct for this receptor and exposure scenario. So, the term "+[CRxEFxEDxET$_i$x1-SH$_i$)] should be deleted from the exposure equation at the top of the page.
Response: The method used for the calculation of external radiation exposures is applicable to both indoor and outdoor exposures. In this case, the receptor does not spend any time indoors while on the facility. The value for the term "ET$_i$" was indicated as "NA" (Not Applicable) which is equivalent to zero (0) for this receptor. Inserting this value into the original equation produces the correct answer. The equation does not require modification.
Action: The value for ET$_i$ will be changed from "NA" to "0."

519. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.V.2-10 Table Pg.#: Line #: Code: C
Original Comment # 319
Comment: EF = fraction of year spent exposed not exposured. Calculations using this equation and values do not result in CDIs given, but the same CDI is obtained if only the first half of the equation (outdoor exposure) is used and the second half (indoor exposure) is disregarded, as would be correct for this receptor and exposure scenario. So, the term "+[CRxEFxEDxET$_i$x1-SH$_i$)] should be deleted from the exposure equation at the top of the page.
Response: The method used for the calculation of external radiation exposures is applicable to both indoor and outdoor exposures. In this case, the receptor does not spend any time indoors while on the facility. The value for the term "ET$_i$" was indicated as "NA" (Not Applicable) which is equivalent to zero (0) for this receptor. Inserting this value into the original equation produces the correct answer. The equation does not require modification.
Action: The value for ET$_i$ will be changed from "NA" to "0."

520. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.VI.3 Pg.#: H-VI-10 Line #: 2 Code: C
Original Comment # 327
Comment: "The chemical uptake of **[word missing]** via dermal..."
Response: Per discussion with U.S. EPA Region V on 22-23 February, Attachment H.VI, "Quantitative Uncertainty Analysis of Exposure Parameters and the Impact on Preliminary Remediation Goals," will be deleted from this document.
Action: Attachment H.VI will be deleted.

521. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: H.VI.3 Pg.#: H-VI-10 Line #: 2 Code: C
Original Comment # 327
Comment: "The chemical uptake of **[word missing]** via dermal..."
Response: Per discussion with U.S. EPA Region V on 22-23 February, Attachment H.VI, "Quantitative Uncertainty Analysis of Exposure Parameters and the Impact on Preliminary Remediation Goals," will be deleted from this document.
Action: Attachment H.VI will be deleted.

522. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: I.3.6.4 Pg. #: Line #: Code: C
Original Comment #: 331
Comment: Estimation of the volumes of additional traffic through the local community appears unrealistically low. Details of the traffic estimation process are lacking and should be included to permit review. It is not clear whether a "truck trip" includes arrival or departure of the unloaded truck. There is also no mention of the traffic generated by the daily commuting practices of the remediation work crews, support personnel, supervisory personnel, and heavy equipment transportation to and from the site. Given that transportation is already cited as posing "possibly the greatest environmental impact" (page I-3-10 line 30) to the surrounding community, more detail regarding this evaluation should be included.
Response: The traffic volume for Operable Unit 5 waste shipment is stated as 833 truck trips over 22 years for off-site disposal. These truck trips were derived from the 25,000 yd^3 of waste expected for off-site transport by truck as indicated in Section 5.0 of the Operable Unit 5 FS assuming 30 yd^3 per truck. Therefore, the truck trip accuracy is in keeping with Operable Unit 5 waste material projected for off-site

disposal. However, the cumulative number of truck trips are expected to increase as a result of recent information becoming available from the Operable Unit 4 remedial design process and the Operable Unit 3 RI/FS process. The text will be revisited and revised to reflect the cumulative truck trip increase. The text will also be revised to clarify the term "truck trip" as being inclusive of a round trip to the disposal facility and return to the FEMP.

Traffic generated from work crews, support personnel, etc., has existed since the inception of FEMP operations and is considered a baseline condition. The purpose of the transportation evaluation is to assess changes in cumulative impacts resulting from remediation. Minor fluctuations in worker traffic to and from the site are expected.

Action: It is agreed that the discussion of transportation impacts should be further developed. Text will be revised as appropriate.

523. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: J.4.0 Pg. #: J-4-2 Line #: 13 - 15 Code: C
Original Comment #: 332

Comment: The text says:"Mitigation for wetland impacts will be determined using the 404 (b) (1) guidelines of the Clean water Act, in consultation with the COE, U.S. Environmental Protection Agency, and Ohio Environmental Protection Agency." The text should give some indication of the criteria for mitigation selection that would be required by these agencies. The text should also develop one or more reasonable mitigation scenarios and show how these requirements would be fulfilled.

Response: We agree with the first portion of the comment regarding mitigation sequencing. However, with regards to the second portion of the comment, DOE is considering the options of both on- and off-property mitigation to compensate for wetland losses. A Wetland Mitigation Approach has been drafted and will be submitted to appropriate regulatory agencies in the near future. Subsequent agency negotiation of this approach will identify optimal mitigation scenarios.

Action: The following text will be added at the end of the second paragraph,"The need for compensatory mitigation will be determined after all practicable steps to avoid and minimize adverse impacts to wetlands have been applied. Wetland mitigatory options for the FEMP are being formally documented for agency review and comment."

524. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: K 3-0 Pg. #: 3-1 Line #: Code: C
Original Comment #: 337

Comment: Contractor turnover every two years will result in over-estimates of costs. Even though the contract will be rebid every two years, the same contractor may successfully maintain the contract.

Response: Agree it is possible that the same contractor may successfully maintain the contract for successive 2-year periods. For the purpose of the FS, a 2-year contractor turnover rate was selected based partly on DOE contracting preferences for shorter contract periods. The contractor turnover rate could just as easily have been 4 years. However, the cost difference is relatively insignificant when considering alternative costs measured in the hundreds of millions.

Action: On Page K-1-3, Section K.1.1.3, first bullet, will replace the first, fourth and fifth sub-bullets with the following sub-bullet:

"- Soil/sediment excavation and backfill, and construction of the consolidation area and on-property disposal facility will occur for 22 years via eleven 2-year

contracts. A 2-year contract period was chosen based on DOE preference for shorter contract periods. Each contract will include full mobilization and demobilization costs."

525. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: K 3-1 Pg. #: 3-1 Line #: Code: C
Original Comment #: 336
Comment: Cost summaries were provided for 1.5 M CY to 2.0 M CY of excavated soil. These values are not in the range for most of the remedial alternatives. Were costs for other excavation values calculated or extrapolated?
Response: From Table 2-21, estimated soil volumes for three cases, 6, 7 and 9, were between 1.5 and 2 million yd^3. Estimated soil volumes for Cases 4, 5 and 8 are within +10 percent of 2 million yd^3. Estimates for two of the remaining cases, Cases 2 and 3, are within +37 and +19 percent of 2 million yd^3, respectively. Cost estimates for the FS were developed with an accuracy range of -30 to +50 percent as recommended in the EPA Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA. Since the estimated soil volumes in most cases were within this range, costs for volumes greater than 2 million yd^3 were estimated by multiplying the 2 million yd^3 costs by a proportional ratio.
Action: The following text will be added to Section K.2.2, "Where estimated soil volumes exceeded 2 million cubic yards, costs were derived by proportionally increasing the 2 million cubic yards cost data."

526. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: K 1.1 Pg. #: 1.9 Line #: Code: C
Original Comment #: 335
Comment: The off-site Disposal volume presented is different from the value presented in Table K1.1.
Response: Agree. The text is in error.
Action: The text will be corrected as follows, "Off-Site Disposal = 25,000 yd^3."

527. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: K 1.1 Pg. #: 1-6 Line #: Code: C
Original Comment #: 334
Comment: Were sunk-costs, DOE administration costs, and project costs to date included in the Total Project Costs? If they were included, into what section were they added?
Response: Any costs incurred before the start of remedial activity design are not included. DOE and operating contractor administrative costs are not included. Site landlord costs (e.g., labor, utilities, supplies) not directly associated with the remedial activities are not included.
Action: The following text will be added to Section K.1.1.3:
"• The following costs are not included in the remedial component or alternative cost estimates:
- Costs incurred prior to the start of remedial activity design
- DOE and Operating Contractor administrative costs
- Site landlord costs (e.g., labor, utilities, and supplies) for the daily operation of the FEMP site"

528. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: K.1.1 Pg. #: K-1-2 Line #: Code: M
Original Comment #: 333
Comment: Change "Estimatess" to "Estimates."
Response: Agree.
Action: Text will be changed to "Estimates."

529. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: K 3.1 Pg. #: 3-2 Line #: Code: C
Original Comment #: 338
Comment: If the all work is being performed by a subcontractor, and this subcontractor will demobilize his equipment after two years, why is heavy equipment being purchased and replaced every 22 years?
Response: The contractor will fully mobilize and demobilize his labor force very two years. Because earth moving equipment will be contaminated during use, it will be purchased by the operating contractor and provided for the contractor's use. This is more cost effective than paying the construction contractor to rent equipment and have to decontaminate it every two years.
Action: The text in Section K.3.1, Item 9, will be revised as follows, "construction contractor" will be replaced with "operating contractor."

530. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: K 3-3 Pg. #: 3-12 Line #: Code: C
Original Comment #: 339
Comment: Did the cost estimates include shipments by truck in containers larger than 2 CY?
Response: Two yd^3 containers are standard containers used for truck transport of contaminated media. Because the volume of contaminated soil which would be transported by truck did not exceed 50,000 yd^3 over a 22-year remediation period, 2 yd^3 containers were selected as representative containers to minimize the time that containers would be open and accumulating material. No other size containers were considered.
Action: None required.

531. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: L 1.1 Pg. #: L 1-8 Line #: 19-20 Code: C
Original Comment #: 340
Comment: Sediments should be sampled periodically during excavation, especially at the Site boundary. Mitigative procedures should be put in place if contaminated sediments are found to be migrating.
Response: Agree. Specific actions to manage the excavation and control runoff of surface water and sediment would be established in the RD/RA phase and would include release monitoring during excavation. However, the inclusion of such detail is not necessary in the FS.
Action: None required.

532. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: L 1.1 Pg. #: L 1-10 Line #: 22-23 Code: C
Original Comment #: 341
Comment: Soil sampling should continue to the water table or until no contamination is detected.
Response: Agree. However, it is not always possible to determine if you have found the water table due to the very low yield of the sediment in parts of the glacial overburden. Because the water table is generally within 5 feet or so of the surface, the 5-foot

limit is a reasonable alternative depth limit. In any sampling program, if contamination is found in the deepest sample, additional sampling may be required.

Action: The sentence will be clarified as follows. ".. sampling would extend to the water table or, where the water table is not easily identified, to a depth of five feet below the depth of the RI sample that indicated that contamination was present."

533. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: L 1.2 Pg. #: L 1-13 Line #: 22-23 Code: C
Original Comment #: 342
Comment: Have specific statistical techniques been proposed?
Response: No they have not. The statistical techniques will be developed in the RD/RA process and may vary from area to area depending on the nature of the contaminant being removed.
Action: None required

534. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: L 1.2 Pg. #: L 1-18 Line #: 17 Code: C
Original Comment #: 343
Comment: Rearrange words.
Response: Agree.
Action: The line will be rewritten to state: "Soil suspected of containing RCRA hazardous waste above the waste acceptance criteria for the RCRA COC's (for on-site alternatives), above TCLP limits (for off-site alternatives), or originating beneath a HWMU that managed listed waste (for off-site alternatives) would be segregated and containerized."

535. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: L Pg #: L-6-3 Line #: 12 Code: C
Original Comment #: 344
Comment: It is Ohio EPA's expectation that DOE will aggressively investigate the incorporation of the attenuating materials referred to here.
Response: Agree. The disposal facility presented in the FS is a representative design. Specific design details, including the use of attenuating materials, will be addressed by Operable Unit 2 during the detailed engineering of the disposal cell during the remedial design process.
Action: This comment will be communicated to Operable Unit 2 for consideration.

536. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: L-6 Pg #: 6 Line #: 23 Code: C
Original Comment #: 345
Comment: Please be more specific in defining the "probable maximum flood" referred to here. It is Ohio EPA's expectation that the channel be design to accommodate flows from a 500 year storm event.
Response: The channel was sized to accommodate a probable maximum precipitation storm event, which is more conservative than a 500-year storm event.
Action: The text will be revised to replace "flood" with "storm."

537. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: L-6 Pg #: 7 Line #: 15 Code: C
Original Comment #: 346
Comment: It is Ohio EPA's expectation that the use of attenuating materials such as those referred to on page L-6-3 be investigated for being incorporated into the construction of this secondary liner.
Response: Agree. See response to Comment 535.
Action: See action for Comment 535.

538. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: L Pg #: 10-4 Line #: 17 Code: C
Original Comment #: 347
Comment: This section does not mention that perched groundwater that is contaminated with listed RCRA constituents will be pre-treated before being transferred to the AWWT. See Section 4.1.4.1.
Response: Agree. The perched groundwater beneath two HWMUs, the fire training area and the sewage treatment plant would be treated for removal of RCRA-listed constituents before treatment at the AWWT. This action is necessary to prevent contaminating AWWT treatment residuals with RCRA-listed constituents.
Action: The following text will be added to line 19, "Perched groundwater zones below the fire training area and sewage treatment plant would be treated for removal of RCRA-listed constituents before being treated at the AWWT."

539. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: M 5-7 Pg. #: 5-37 Line #: 41-44 Code: C
Original Comment #: 351
Comment: Although RCRA land disposal permits may not be required for consolidation, the regulatory barriers should include the 1000 year criteria for the integrity of the consolidation cover as stated in Section M.3.3.1.
Response: See Comment 241.
The term earthen cover should not be associated with capping technology. The purpose of a cap is to significantly reduce the infiltration rate over that of native soil. While both a cap and an earthen cover would reduce the migration of contaminants to air and surface water, a cap could protect the aquifer by reducing the migration of contaminants to groundwater. In comparison, an earthen cover would require WAC to protect the aquifer.
An earthen cover, as described in this FS, is basically a vegetative cover with a compact soil layer beneath the vegetated topsoil layer. Unlike a cap, it is not assumed to reduce the infiltration rate over that of native soil. A properly vegetated earthen cover could perform its intended function, that is to prevent migration of contaminants to air or surface water, for a period of 1000 years.
Action: See Comment 241.

540. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: M 5-5 Pg. #: 5-22 Line #: 30-31 Code: C
Original Comment #: 349
Comment: Please provide the details of the situations where soil washing may be considered a viable option.
Response: We agree that it would be beneficial to add supporting text.
Action: This is addressed in the rewrite of the evaluation of the hybrid soil washing process in Section M.5.5.2. See Comment 13(b).

541. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: M 5.5 Pg. #: 5-22 Line #: 9 Code: C
Original Comment #: 348
Comment: Please clarify "the questions remaining about the mobility of uranium in the processed soils."
Response: Agree. This text needs to be clarified. This sentence was not meant to imply that the mobility of the uranium in the soil treated by this technology is not known or understood.
Action: This is addressed in the rewrite of the evaluation of the hybrid soil washing process in Section M.5.5.2. See Comment 13(b).

542. Commenting Organization: Ohio EPA Commentor: GeoTrans
Section #: M 5-5 Pg. #: 5-26 Line #: 8-13 Code: C
Original Comment #: 350
Comment: Please provide details of the potential applications for solidification at the site.
Response: Solidification techniques are typically most successful when applied to concentrated inorganic waste streams, treatment residuals and sludges, small volumes of soil which are highly contaminated with nonvolatile organics, radionuclides, or inorganics, and incinerator ash containing heavy metals.
Action: The following text will be added beginning on line 29, page M-5-24, of Section M.5.5.3. "Due to the high reagent consumption and significant volume increases associated with this process, the most likely applications at the site include small areas of soil containing high inorganic and radionuclide concentrations (hot spots) and treatment residuals or sludges containing the same."

543. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: PP Pg #: 1 Line #: box Code: C
Original Comment #: 1
Comment: The last three items in this box are not included as the table indicates them to be. Specifically, 1) there is no postage-paid comment form on the back page, 2) there is no section on "Workshops," as is listed in the table, and 3) there is no section on public meetings, as is listed in the table. Please adjust the text to correctly reflect the contents of the Proposed Plan.
Response: The commentor is correct in that these three items were omitted from the Proposed Plan. These items were left out because this is a draft document and no dates have been selected. The final version of the Proposed Plan (which will be submitted for public comment) will include these items.
Action: None required.

544. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: PP Pg #: 2 Line #: margin Code: C
Original Comment #: 2
Comment: In the definition for Records of Decision, add a sentence to indicate that the ROD is a legally binding document.
Response: Agree with the commentor.
Action: Text will be changed to "Records of Decision are legally binding documents and follow the consideration of public...."

545. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: PP Pg #: 5 Line #: Code: C
Original Comment #: 3
Comment: The layout and graphics on this and subsequent pages should be re-evaluated. First, do not allow only one or two lines of text to appear on a page that is mainly graphics. The text can often be overlooked in this situation. Keep pages or half-pages dedicated to graphics and consolidate areas of text for readability. Second, the graphics in Figure 2, and to a lesser extent in subsequent pages, is very difficult to read. The words are blurry, too small and didn't copy well.
Response: Points made about layout and graphics noted.
Action: As the Proposed Plan is being revised, close attention will be paid to placement and readability of graphics and to general layout.

546. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: PP Pg #: 7 Line #: Code: E
Original Comment #: 4
Comment: Remove the brackets around ***[parts per million]*** so that text reads, "(greater than 8000 ***parts per million [ppm]***).
In the margin definition, remove the "a" from waater so that text reads, "(usually soil or water)."
Response: Agree with commentor.
Action: The brackets around "parts per million" will be removed and the second "a" in water will be removed.

547. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Case Figures Pg.#: 96? Line #: Code: C
Original Comment #: 48
Comment: The blocked shading presents some difficulty in determining areas considered and not considered. Of particular interest to the reviewer is what the gray shaded block at coordinates 477500 X1382300 and what are the gray shaded blocks within the production area representing. Please provide some clarification.
Response: The grey shaded block at coordinate 477500 x 1382300 is incorrectly located and should be placed at 477500 x 1380200 within the footprint of the Operable Unit 2 area. The movement of the block to this location would have a negligible impact (< 1 percent) on the evaluations presented in the FS. Due to the cost of redoing the graphics in the FS, it is proposed that no change be made.
The gray shaded areas appearing in the production area are located in the rolling mill area of Plant 6. This area was purposely shaded as being from another operable unit so as not to falsely increase the volume estimate of affected soil attributable to cross-media impacts or uranium PRLs. This area of Plant 6 has a two-story basement. Unless the area was shaded, the solid block model would have falsely assumed the space was occupied by contaminated soil.
Action: No change required to text or case figures of FS.