04.11 - 9/12/94 - 00402

OHM Corporation

FIELD SCREENING SUMMARY REPORT
FOR
ON-SITE DELINEATION OF
PESTICIDES-CONTAMINATED SOIL
MCB CAMP LEJEUNE
OPERABLE UNIT 5, SITE 2
CAMP LEJEUNE, NORTH CAROLINA

Prepared for:

DEPARTMENT OF THE NAVY
Contract No. N62470-93-D-3032
Delivery Order 0023

Prepared by:

OHM Remediation Services Corp.
Norcross, Georgia

D. Kent Geis
Delivery Order Manager

Katherine M. Lista, P.E.
Project Manager

George E. Krauter, P.E.
Program Manager

September 12, 1994
OHM Project 16207

TABLE OF CONTENTS

1.0 INTRODUCTION

OHM Remediation Services Corp. (OHM), under LANTDIV RAC Contract No. N62470-93-D-3032, Delivery Order No. 23, completed the excavation of 728 tons (501 cubic yards) of pesticides-contaminated soil from Marine Corps Base (MCB) Camp Lejeune, Operable Unit No. 5, Site 2 during the month of July 1994. Subsequent collection and analysis of post-excavation soil samples from both the excavation base and sidewalls indicated that excessive action level concentrations of the pesticides DDT, DDD and DDE established in the delivery order plans and specifications still existed.

In order to delineate the extent of remaining contamination and accurately predict the additional soil removal requirements, a field screening program was implemented. The objectives of this program were to:

- Delineate the extent of remaining pesticide-contaminated soil
- Quantitate the additional excavation, transportation and disposal requirements

OHM mobilized personnel and analytical equipment to the site. Two-hundred seven soil samples were collected and analyzed by the on-site laboratory to delineate the vertical and horizontal extent of remaining contamination.

This report has been prepared to summarize the results of the field screening process and review the additional soil removal requirements to achieve the objectives under the original delivery order.

2.0 FIELD WORK COMPLETED

Excavation base and sidewall samples were collected at discrete depths using hand augers and split spoon samplers. Sample locations were selected using the approach described in the Sampling and Analysis Plan Addendum, Sections 4.0 through 6.0 (reference OHM letter to LANTDIV dated August 8, 1994, Attachment 2). Each borehole was hand-augered to 6 inches above the desired sample location depth. Then a split spoon sampler with a 1 foot long barrel was driven through the target depth to collect a core sample of soil 6 inches above to 6 inches below the target depth. The soil sample core was removed from the barrel and placed in a glass jar for transportation to the on-site laboratory. All sampling equipment was then decontaminated as per the Sampling and Analysis Plan Addendum prior to proceeding to the next boring location. Sample locations were determined as per the Sampling and Analysis Plan Addendum, and later surveyed by a registered land surveyor. Locations and depths of the samples are indicated on the enclosed drawings.

Samples were prepared for analysis using a simplified sample extraction and cleanup procedure. They were subsequently analyzed for the target analytes using a Hewlett-Packard 5890 GC equipped with an Electron Capture Detector (ECD) per SW-846 Method 8080. The analytical activities on-site were provided as a screening process. Three sample results (CLJ-DSS57-1, CLJ-DSS76-2, and CLJ-DSS79-1) were estimated as over the action levels. Actual values for these three samples could not be calculated due to retention time shifts.

The sample preparation method consisted of a two stage liquid/liquid extraction from hydrated methanol to hexane followed by a mini-column liquid chromatographic cleanup step. This method is cited from Volume II of the "Fifth Annual Waste Testing and Quality Assurance Symposium Proceedings", July 24-28, 1989 publication.

In order to check the performance of this method, a standard reference material (Organics in Soil, Lot No. 325) from Environmental Resource Associates was extracted on 8/15/94, put through the cleanup process, and analyzed on the GC-

ECD system. The recovery results are shown in Table 2.1. All analytes of concern were found to be within the acceptable ranges.

Table 2.1
Standard Reference Material Recovery Results

Pesticide	Concentration Found (ug/kg)	True Concentration (ug/kg)	Acceptable Range (ug/kg)	% Recovery
Heptachlor	261.56	226	(76.8-251)	116 %
4,4'-DDE	332.25	289	(86.7-419)	115 %
Dieldrin	442.37	481	(173-702)	92 %
4,4'-DDD	376.72	362	(112-510)	104 %
4,4'-DDT	45.11	100	(25-160)	45 %

Note: ug/kg = microgram per kilogram; equivalent to parts per billion (ppb)

Initial calibration curves were run on August 15 and 24, 1994 . The second "initial" calibration curve was required following power loss in the area. Initial calibration results are summarized in Table 2.2. Continuing calibration checks (CCC) were analyzed daily prior to analyzing samples. The CCC consist of analyzing the midpoint standard (250 ng/ml in this case). Results from the CCC's are shown on Table 2.3. The acceptable range of deviation from the true value was set at 80-150 percent. This range was set on the conservatively high side in order to ensure that no results would be deceptively below the action levels on this project.

Method blanks were analyzed daily following the CCC and prior to analyzing samples. Analytes of interest were below detection limits in all the blanks analyzed. A calibration check standard was analyzed on 8/25/94. This standard was a Chlorinated Pesticides Mix from Supelco, Lot No. LA-42716. The mix was injected directly into the GC-ECD system. Results from this run are listed on Table 2.4.

Table 2.2
Initial Calibration Results

Initial Calibration	8/15/94				
Areas Found	1,000 ng/ml	500 ng/ml	250 ng/ml	50 ng/ml	20 ng/ml
Heptachlor	1715387	844732	421251	90981	38910
4,4'-DDE	2927410	1372077	649830	120065	46676
Dieldrin	3539666	1633788	753657	135376	55977
4,4'-DDD	1347576	666334	351646	76378	33633
4,4'-DDT	1282292	654270	349800	91225	45884
Correlation Coefficient	1.000	0.999	0.998	1.000	1.000
Initial Calibration	**8/24/94**				
Areas Found	100 ng/ml	500 ng/ml	250 ng/ml	50 ng/ml	20 ng/ml
Heptachlor	2522898	1193575	594918	114172	48192
4,4'-DDE	4072681	1907137	895466	136119	51767
Dieldrin	4563384	2087437	968009	152887	59846
4,4'-DDD	2012635	899048	432788	83429	33672
4,4'-DDT	1732447	816853	415826	80835	31158
Correlation Coefficient	0.999	0.999	0.998	0.997	0.999

Table 2.3
Continuing Calibration Check Results

Continuing Calibration Check Date	Heptachlor (% Rec)	4.4'-DDE (% Rec)	Dieldrin (% Rec)	4,4'-DDD (% Rec)	4,4' DDT (% Rec)
Initial Calibration	**8/15/94**				
8/15/94	103	104	100	111	110
8/16/94	114	116	108	129	124
8/17/94	114	116	109	127	127
8/18/94	118	123	114	131	130
8/19/94	116	118	110	124	127
8/20/94	121	124	114	128	136
8/22/94	129	126	116	123	115
8/23/94	136	129	119	135	118
8/24/94	135	128	118	134	117
Initial Calibration	**8/24/94**				
8/24/94	97	104	100	111	110
8/25/94	101	116	108	129	124
8/26/94	114	116	109	127	127
8/27/94	114	116	109	127	127
8/28/94	114	116	109	127	127

Table 2.4
Standard Reference Material Recovery Results

Pesticide	Concentration Found (ug/ml)	Certified Concentration (ug/ml)	% Recovery	Notes
Heptachlor	95.3	51.3	196%	Coelution with another chlorinated pesticide
4,4'-DDE	111.5	100.2	111%	
Dieldrin	127.1	120.1	106%	
4,4'-DDD	242.0	190.2	127%	
4,4'-DDT	289.7	260.0	111%	

3.0 ANALYTICAL RESULTS

Table 3.1 presents a summary of the analytical results of field screening activities. Bold-faced results indicate that the specific parameter concentration exceeded the action limit set for that parameter. Drawing number 16207-1 provides the location of each sample. Drawing numbers 16207-2 and 16207-3 summarize the field screening results and the revised limits of excavation based on these results.

Table 3.1

Camp Lejeune **Summary of Pesticide Results** *Project 16207*

Lab ID	Sample Number	Heptachlor (ug/kg)	4,4'-DDE (ug/kg)	Dieldrin (ug/kg)	4,4'-DDD (ug/kg)	4,4'-DDT (ug/kg)	Chlordane ((ug/kg)
	Action Limits	*179*	*3,000*	*50*	*4,000*	*3,000*	*621*
1	CLJ-DSS40-1	<50	250	<50	<200	1,080	<500
2	CLJ-DSS41-1	<50	620	<50	430	**3,700**	<500
18	CLJ-DSS41-2	<50	<200	<50	<200	<200	<500
3	CLJ-DSS42-1	<50	<200	<50	<200	<200	<500
4	CLJ-DSS43-1	<50	<200	<50	<200	<200	<500
5	CLJ-DSS44-1	<50	570	**300**	3,400	**108,000**	<500
19	CLJ-DSS44-2	<50	<200	<50	<200	**6,900**	<500
50	CLJ-DSS44-3	<50	<200	<50	<200	<200	<500
6	CLJ-DSS45-1	<50	<200	<50	<200	<200	<500
7	CLJ-DSS46-1	<50	450	**210**	1,800	**24,000**	<500
20	CLJ-DSS46-2	<50	<200	<50	<200	400	<500
8	CLJ-DSS47-1	<50	<200	<50	<200	<200	<500
9	CLJ-DSS48-1	<50	<200	<50	<200	<200	<500
10	CLJ-DSS49-1	<50	<200	<50	<200	<200	<500
11	CLJ-DSS50-1	<50	<200	<50	<200	<200	<500
12	CLJ-DSS51-1	<50	<200	<50	<200	<200	<500
13	CLJ-DSS52-1	<50	<200	<50	<200	**3,600**	<500
41	CLJ-DSS52-2	<50	<200	<50	<200	<200	<500
14	CLJ-DSS53-1	<50	770	<50	**25,000**	**4,200**	**820**
108	CLJ-DSS53-2	<50	640	**410**	**29,000**	**7,800**	**730**
15	CLJ-DSS54-1	<50	400	<50	<200	1,200	<500
16	CLJ-DSS55-1	<50	770	<50	310	**4,300**	<500
49	CLJ-DSS55-2	<50	<200	<50	<200	1,300	<500
69	CLJ-DSS55-3	<50	<200	<50	<200	490	<500
17	CLJ-DSS56-1	<50	<200	<50	260	210	<500
21	CLJ-DSS57-1	<50	<200	<50	**>Limit**	**>Limit**	**630**
22	CLJ-DSS58-1	<50	<200	<50	<200	<200	<500
23	CLJ-DSS59-1	<50	<200	<50	**4,100**	<200	<500
24	CLJ-DSS60-1	<50	<200	<50	**137,000**	**115,000**	<500
52	CLJ-DSS60-2	<50	910	<50	**33,000**	**21,000**	<500
73	CLJ-DSS60-3	<50	490	<50	**17,000**	**8,100**	<500
25	CLJ-DSS61-1	<50	<200	<50	2,000	<200	<500
42	CLJ-DSS61-2	<50	850	<50	**13,000**	**7,500**	610
74	CLJ-DSS61-3	<50	<200	<50	1,600	830	<500
37	CLJ-DSS62-1	<50	**3,600**	**140**	670	**4,600**	<500
54	CLJ-DSS62-2	<50	<200	<50	<200	<200	<500
34	CLJ-DSS63-1	<50	<200	<50	490	<200	<500
31	CLJ-DSS63-2	<50	<200	<50	<200	<200	<500
26	CLJ-DSS64-1	<50	<200	<50	**95,000**	**75,000**	<500
43	CLJ-DSS64-2	<50	2,500	<50	**98,000**	**50,000**	**1,282**
75	CLJ-DSS64-3	<50	740	<50	**50,000**	**15,000**	<500
119	CLJ-DSS64-4	<50	790	<50	**49,000**	**10,000**	490
159	CLJ-DSS64-5	<50	<200	<50	**8,500**	2,600	<500
27	CLJ-DSS65-1	<50	**12,000**	<50	**236,000**	**14,000**	<500
44	CLJ-DSS65-2	<50	**19,000**	<50	**304,000**	**274,000**	**1,900**
76	CLJ-DSS65-3	<50	<200	<50	2,200	370	<500

Lab ID	Sample Number	Heptachlor (ug/kg)	4,4'-DDE (ug/kg)	Dieldrin (ug/kg)	4,4'-DDD (ug/kg)	4,4'-DDT (ug/kg)	Chlordane ((ug/kg)
	Action Limits	*179*	*3,000*	*50*	*4,000*	*3,000*	*621*
28	CLJ-DSS66-1	<50	730	<50	**77,000**	**11,000**	<500
39	CLJ-DSS66-2	<50	940	<50	**70,000**	**42,000**	570
114	CLJ-DSS66-3	<50	290	<50	**20,000**	**15,000**	<500
160	CLJ-DSS66-4	<50	1,200	<50	**65,000**	**90,000**	<500
29	CLJ-DSS67-1	<50	<200	<50	<200	<200	<500
30	CLJ-DSS67-2	<50	<200	<50	<200	<200	<500
33	CLJ-DSS68-1	<50	<200	<50	<200	<200	<500
36	CLJ-DSS69-1	<50	370	<50	100	<200	<500
32	CLJ-DSS70-1	<50	<200	<50	<200	<200	<500
35	CLJ-DSS71-1	<50	200	<50	680	1,000	<500
51	CLJ-DSS72-1	<50	610	<50	2,700	**4,400**	<500
70	CLJ-DSS72-2	<50	<200	<50	<200	<200	<500
40	CLJ-DSS73-1	<50	750	**200**	1,400	**34,000**	<500
107	CLJ-DSS73-2	<50	<200	**270**	300	**6,800**	<500
161	CLJ-DSS73-3	<50	490	**97**	850	**15,000**	<500
46	CLJ-DSS74-1	<50	<200	<50	330	<200	<500
47	CLJ-DSS75-1	<50	<200	<50	350	1,300	<500
38	CLJ-DSS76-1	<50	720	<50	**82,000**	<200	<500
58	CLJ-DSS76-2	<50	**>Limit**	<50	**>Limit**	**>Limit**	330
45	CLJ-DSS77-1	**480**	1,400	<50	**93,000**	**3,300**	**2,300**
77	CLJ-DSS77-2	<50	720	<50	**22,000**	**18,000**	<500
115	CLJ-DSS77-3	<50	560	<50	**9,200**	**3,000**	<500
162	CLJ-DSS77-4	<50	220	<50	**9,000**	**3,600**	<500
48	CLJ-DSS78-1	<50	220	<50	**21,000**	590	<500
78	CLJ-DSS78-2	<50	<200	<50	1,900	1,100	<500
60	CLJ-DSS79-1	<50	**>Limit**	<50	**>Limit**	**>Limit**	**870**
55	CLJ-DSS80-1	<50	250	<50	<200	380	<500
110	CLJ-DSS81-1	<50	400	<50	**23,000**	940	380
63	CLJ-DSS82-1	<50	250	<50	<200	<200	<500
64	CLJ-DSS83-1	<50	<200	<50	<200	<200	<500
65	CLJ-DSS84-1	<50	<200	<50	<200	<200	<500
71	CLJ-DSS85-1	**220**	990	**430**	**4,400**	**210,000**	**2,200**
109	CLJ-DSS85-2	**190**	750	**180**	1,800	**50,000**	**2,300**
172	CLJ-DSS85-3	<50	460	**130**	1,200	**23,000**	<500
190	CLJ-DSS85-4	<50	<200	**190**	**5,200**	**35,000**	**2,600**
85	CLJ-DSS86-1	<50	<200	<50	<200	<200	<500
66	CLJ-DSS87-1	<50	<200	<50	<200	<200	<500
62	CLJ-DSS88-1	<50	<200	<50	<200	290	<500
67	CLJ-DSS89-1	<50	<200	<50	720	<200	<500
68	CLJ-DSS90-1	<50	<200	<50	<200	<200	<500
59	CLJ-DSS91-1	<50	<200	<50	<200	<200	<500
57	CLJ-DSS92-1	<50	<200	<50	<200	<200	<500
81	CLJ-DSS93-1	<50	<200	<50	1,900	930	<500
82	CLJ-DSS94-1	<50	2,000	<50	**161,000**	**66,000**	<500
87	CLJ-DSS94-2	<50	410	<50	**27,000**	**8,800**	<500
83	CLJ-DSS95-1	<50	<200	<50	<200	<200	<500

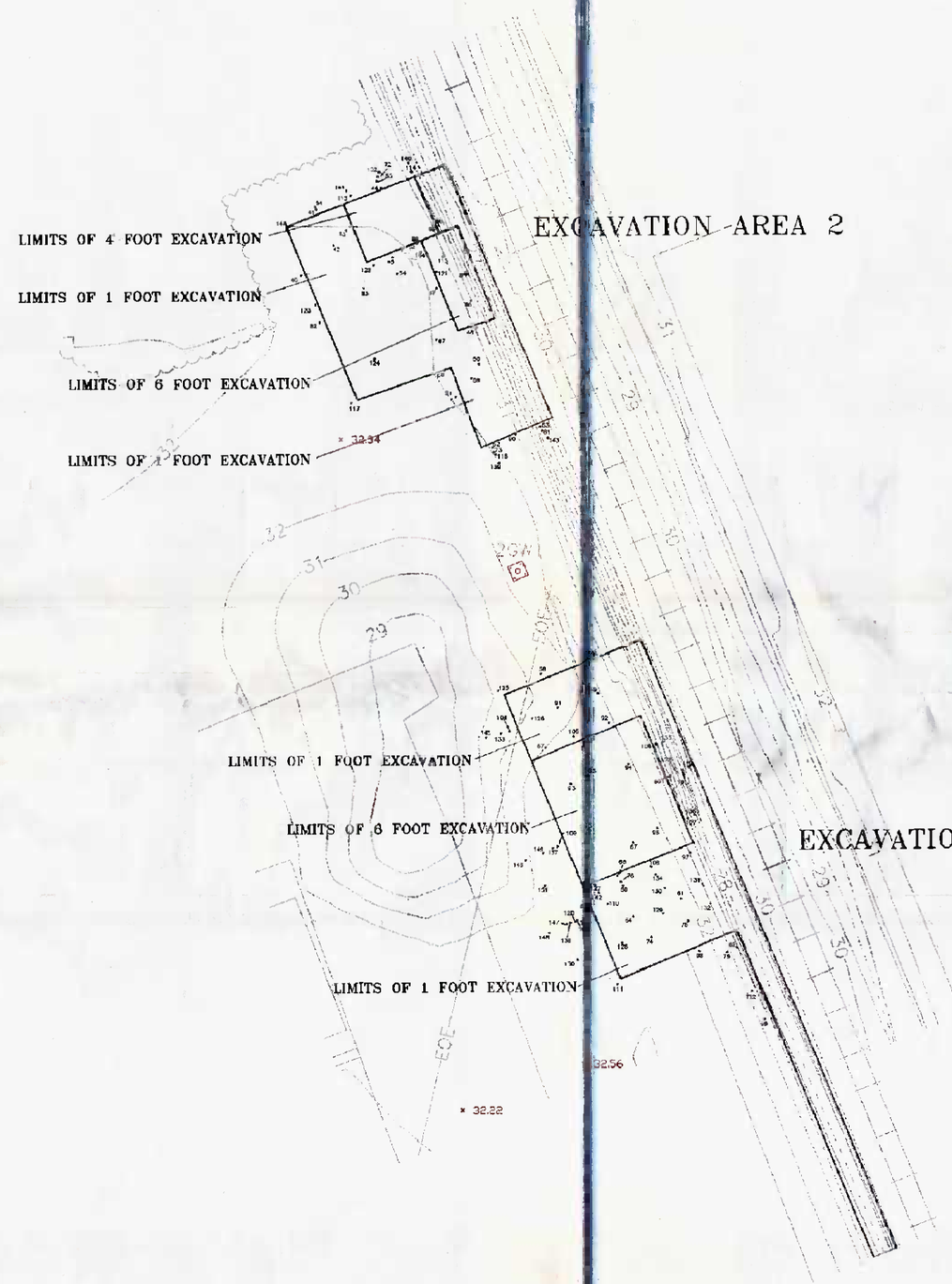
Lab ID	Sample Number	Heptachlor (ug/kg)	4,4'-DDE (ug/kg)	Dieldrin (ug/kg)	4,4'-DDD (ug/kg)	4,4'-DDT (ug/kg)	Chlordane ((ug/kg)
	Action Limits	*179*	*3,000*	*50*	*4,000*	*3,000*	*621*
84	CLJ-DSS96-1	62	530	<50	**23,000**	**18,000**	<500
89	CLJ-DSS96-2	<50	79	<50	2,300	1,800	<500
61	CLJ-DSS97-1	<50	<200	<50	<200	<200	<500
56	CLJ-DSS98-1	<50	1,560	<50	360	1,300	<500
53	CLJ-DSS99-1	<50	1,400	<50	590	1,300	<500
79	CLJ-DSS100-1	<50	210	<50	**8,900**	1,000	<500
116	CLJ-DSS100-2	<50	<200	**200**	230	<200	<500
152	CLJ-DSS100-3	<50	<200	**110**	<200	510	<500
173	CLJ-DSS100-4	<50	<200	<50	2,100	200	<500
80	CLJ-DSS101-1	<50	**6,700**	<50	**220,000**	**125,000**	<500
117	CLJ-DSS101-2	<50	<200	<50	1,900	1,100	<500
72	CLJ-DSS102-1	<50	<200	<50	<200	790	<500
90	CLJ-DSS103-1	<50	200	<50	<200	250	<500
91	CLJ-DSS104-1	<50	**27,000**	<50	**13,000**	**290,000**	<500
134	CLJ-DSS104-2	<50	<200	<50	<200	230	<500
92	CLJ-DSS105-1	<50	<200	<50	350	<200	<500
93	CLJ-DSS106-1	<50	<200	<50	2,700	**6,100**	<500
120	CLJ-DSS106-2	<50	840	<50	**24,000**	**36,000**	<500
94	CLJ-DSS107-1	<50	1,500	<50	**39,000**	**68,000**	<500
121	CLJ-DSS107-2	<50	430	**320**	**20,000**	**14,000**	<500
95	CLJ-DSS108-1	<50	240	<50	**11,000**	540	<500
122	CLJ-DSS108-2	<50	<200	<50	700	<200	<500
96	CLJ-DSS109-1	<50	570	<50	**63,000**	**12,000**	<500
135	CLJ-DSS109-2	<50	<200	<50	1,400	640	<500
97	CLJ-DSS110-1	79	2,200	<50	**81,000**	**198,000**	**1,400**
123	CLJ-DSS110-2	<50	1,200	**640**	**52,000**	**121,000**	**960**
153	CLJ-DSS110-3	<50	1,800	<50	**64,000**	**156,000**	**800**
174	CLJ-DSS110-4	<50	1,800	<50	**70,000**	**173,000**	<500
98	CLJ-DSS111-1	<50	<200	<50	<200	<200	<500
99	CLJ-DSS112-1	<50	480	<50	<200	1,000	<500
100	CLJ-DSS113-1	<50	<200	<50	<200	1,500	<500
112	CLJ-DSS114-1	<50	<200	**240**	220	2,900	<500
175	CLJ-DSS114-2	<50	<200	<50	<200	940	<500
113	CLJ-DSS115-1	<50	860	**160**	3,600	**60,000**	<500
163	CLJ-DSS115-2	<50	**3,500**	**330**	**21,000**	**297,000**	<500
111	CLJ-DSS116-1	<50	430	**430**	200	**3,000**	<500
101	CLJ-DSS117-1	<50	<200	<50	<200	<200	<500
106	CLJ-DSS118-1	<50	<200	<50	<200	<200	<500
164	CLJ-DSS118-2	<50	200	<50	290	**3,200**	<500
124	CLJ-DSS119-1	<50	2,900	**1,400**	**108,000**	**112,000**	**1,400**
118	CLJ-DSS120-1	<50	820	<50	**31,000**	2,500	<500
154	CLJ-DSS120-2	<50	<200	<50	640	310	<500
207	CLJ-DSS120-4	<50	<200	<50	1,900	550	<500
136	CLJ-DSS121-1	<50	<200	<50	<200	<200	<500
137	CLJ-DSS122-1	<50	<200	**80**	<200	<200	<500
176	CLJ-DSS122-2	<50	<200	<50	<200	<200	<500

Lab ID	Sample Number	Heptachlor (ug/kg)	4,4'-DDE (ug/kg)	Dieldrin (ug/kg)	4,4'-DDD (ug/kg)	4,4'-DDT (ug/kg)	Chlordane ((ug/kg)
	Action Limits	***179***	***3,000***	***50***	***4,000***	***3,000***	***621***
191	CLJ-DSS122-3	<50	<200	<50	<200	<200	<500
138	CLJ-DSS123-1	<50	<200	<50	<200	880	<500
139	CLJ-DSS124-1	<50	<200	<50	<200	<200	<500
140	CLJ-DSS125-1	<50	<200	<50	<200	1,400	<500
141	CLJ-DSS126-1	<50	<200	<50	<200	<200	<500
125	CLJ-DSS127-1	130	940	**590**	**45,000**	**63,000**	<500
165	CLJ-DSS127-2	110	1,900	<50	**94,000**	**113,000**	**1,500**
170	CLJ-DSS127-3	<50	680	<50	**34,000**	**46,000**	520
126	CLJ-DSS128-1	<50	<200	<50	<200	<200	<500
127	CLJ-DSS129-1	<50	<200	**86**	<200	<200	<500
166	CLJ-DSS129-2	<50	<200	<50	<200	<200	<500
171	CLJ-DSS129-3	<50	<200	<50	<200	<200	<500
128	CLJ-DSS130-1	<50	1,300	<50	**138,000**	**11,000**	**640**
177	CLJ-DSS130-2	<50	1,400	<50	**96,000**	**25,000**	570
192	CLJ-DSS130-3	<50	1,900	<50	**93,000**	**58,000**	**1,300**
193	CLJ-DSS130-4	<50	<200	<50	210	320	<500
129	CLJ-DSS131-1	69	<200	<50	<200	<200	<500
130	CLJ-DSS132-1	<50	<200	<50	<200	<200	<500
142	CLJ-DSS133-1	<50	<200	<50	<200	<200	<500
131	CLJ-DSS134-1	<50	<200	<50	450	<200	<500
132	CLJ-DSS135-1	68	2,600	<50	**36,000**	**92,000**	<500
133	CLJ-DSS136-1	67	1,600	<50	**63,000**	**51,000**	**810**
143	CLJ-DSS137-1	<50	700	**390**	<200	2,000	<500
178	CLJ-DSS137-2	<50	<200	<50	1,100	420	<500
155	CLJ-DSS138-1	**210**	1,500	<50	**66,000**	**35,000**	<500
179	CLJ-DSS138-2	<50	2,400	<50	**28,000**	**44,000**	**750**
167	CLJ-DSS139-1	93	**10,000**	<50	**26,000**	**358,000**	<500
180	CLJ-DSS139-2	<50	<200	<50	<200	470	<500
181	CLJ-DSS140-1	<50	<200	<50	<200	240	<500
194	CLJ-DSS140-2	<50	<200	<50	**7,000**	1,900	<500
168	CLJ-DSS141-1	79	**4,900**	<50	**18,000**	**133,000**	<500
182	CLJ-DSS141-2	<50	1,200	**180**	3,300	**65,000**	<500
169	CLJ-DSS142-1	**540**	**3,700**	<50	**136,000**	**232,000**	**4,100**
183	CLJ-DSS143-1	<50	<200	**85**	**5,900**	<200	<500
184	CLJ-DSS144-1	<50	<200	<50	<200	<200	<500
195	CLJ-DSS144-2	<50	<200	<50	<200	<200	<500
156	CLJ-DSS145-1	<50	<200	<50	<200	880	<500
157	CLJ-DSS146-1	<50	<200	<50	<200	<200	<500
158	CLJ-DSS147-1	<50	<200	**410**	<200	**91,000**	<500
185	CLJ-DSS147-2	<50	460	**160**	**7,600**	**8,600**	<500
196	CLJ-DSS147-3	<50	<200	<50	<200	<200	<500
197	CLJ-DSS147-4	<50	<200	<50	360	1,300	<500
186	CLJ-DSS148-1	<50	720	<50	2,900	**45,000**	<500
198	CLJ-DSS148-2	<50	<200	<50	<200	770	<500
199	CLJ-DSS148-3	<50	<200	<50	<200	730	<500
200	CLJ-DSS148-4	<50	<200	<50	370	1,600	<500

Lab ID	Sample Number	Heptachlor (ug/kg)	4,4'-DDE (ug/kg)	Dieldrin (ug/kg)	4,4'-DDD (ug/kg)	4,4'-DDT (ug/kg)	Chlordane ((ug/kg)
	Action Limits	***179***	***3,000***	***50***	***4,000***	***3,000***	***621***
187	CLJ-DSS149-1	<50	650	<50	**11,000**	1,600	<500
188	CLJ-DSS150-1	<50	<200	<50	<200	720	<500
201	CLJ-DSS150-2	<50	<200	<50	<200	270	<500
202	CLJ-DSS150-3	<50	<200	<50	<200	460	<500
203	CLJ-DSS150-4	<50	<200	<50	<200	<200	<500
189	CLJ-DSS151-1	<50	<200	<50	<200	650	<500
204	CLJ-DSS151-2	<50	<200	<50	<200	<200	<500
205	CLJ-DSS151-3	<50	<200	<50	<200	<200	<500
206	CLJ-DSS151-4	<50	<200	<50	<200	<200	<500

4.0 ADDITIONAL EXCAVATION REQUIREMENTS

Based on the data collected through field screening of soil samples, the excavation limits for Excavation Areas 1, 2 and 3 must be extended. Using a CADD cut and fill software, and inputting data for surveyed elevations before excavation, after initial excavation, and for final proposed excavation, an additional 250 cubic yards of soil must be excavated and transported off-site for disposal. Additional post-excavation confirmation sampling will be performed as per the original delivery order plans and specifications, and the approved delivery order work plans.



OHM Remediation Services Corp.
Norcross, Georgia
A Subsidiary of OHM Corporation

SUBMITTED: _____ PROJECT MANAGER: _____ DATE: _____
APPROVED: _____ SR. PROJECT ENGINEER: _____ DATE: _____
APPROVED: _____ DEPT. MANAGER: _____ DATE: _____

AT FULL SCALE (IF NOT 2"-SCALE ACCORDINGLY)
CADD FILE: MAP16207.DWG
DRAWN: J. COLLINS
DESIGNED: YOUR NAME
CHECKED: _____
CHECKED: _____

ZONE	REV.	DESCRIPTION	BY	DATE	APP.

REVISIONS

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION — NORFOLK, VIRGINIA
LANTDIV RAC CONTRACT N62470-93-D-3032 — DELIVERY ORDER NO. 0023
OPERABLE UNIT NO. 5 — MARINE CORPS BASE, CAMP LEJEUNE, N.C.

DELINEATION OF PESTICIDES CONTAMINATED SOILS

SAMPLE LOCATION MAP

DRAWING NUMBER: 16207-1
SHEET NUMBER: 1 of 3
DATE: 9/8/94

EXCAVATION AREA 1

LEGEND

- INITIAL CONFIRMATION SAMPLE LOCATION
19 BELOW CLEANUP GOALS (7-22-94)
- INITIAL CONFIRMATION SAMPLE LOCATION
19 ABOVE CLEANUP GOALS (7-27-94)
- SAMPLE LOCATIONS AND DEPTH PERFORMED FOR
93-1 MODIFICATION No. 1 FOR DELINEATION OF PESTICIDES (AUG 94)

RED SAMPLE RESULTS ABOVE CLEANUP GOALS

BLUE SAMPLE RESULTS BELOW CLEANUP GOALS

DEPTH OF EXCAVATION FROM EXISTING GRADE

- 1 FOOT
- 2 FEET
- 3 FEET
- 1 FEET
- 5 FEET

-60 0 30 60
SCALE-1" = 60FT

CONTOURS ARE BASED ON A SUBJECTIVE INTERPRETATION OF AVAILABLE INFORMATION.

OHM Remediation Services Corp.
Norcross, Georgia
A Subsidiary of OHM Corporation

SUBMITTED: _____ PROJECT MANAGER: _____ DATE _____
APPROVED: _____ SR. PROJECT ENGINEER _____ DATE _____
APPROVED: _____ DEPT. MANAGER _____ DATE _____

AT FULL SCALE (IF NOT 'F' SCALE ACCORDINGLY)
CADD FILE: AREA1.DWG
DRAWN: J. COLLINS
DESIGNED: YOUR NAME
CHECKED: _____
CHECKED: _____

REVISIONS

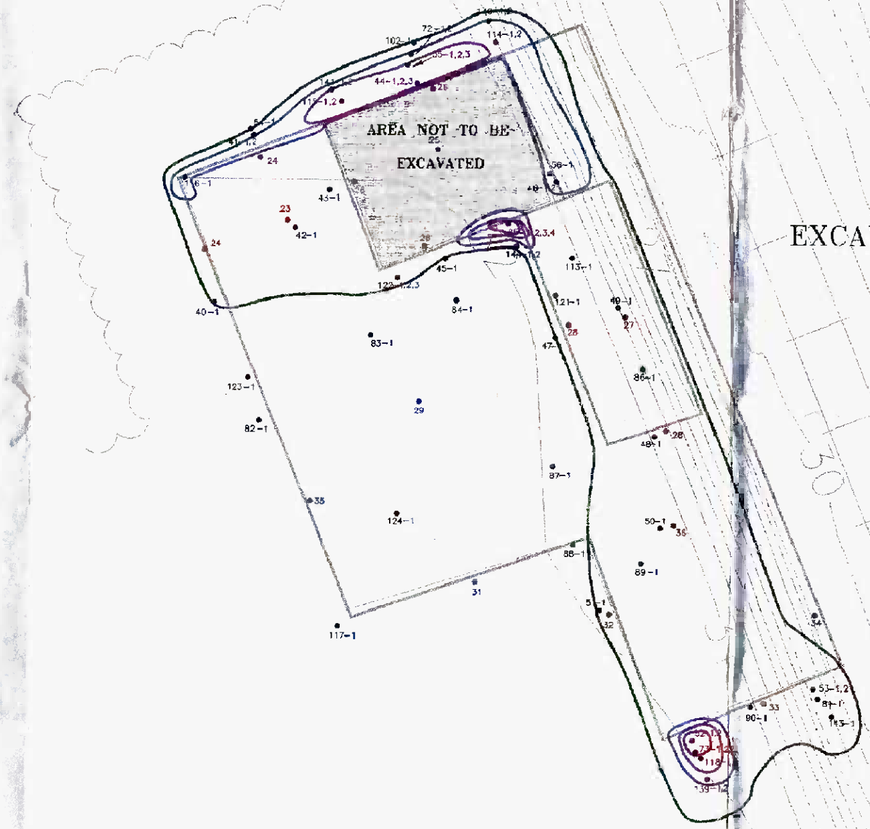
ZONE	REV.	DESCRIPTION	BY	DATE	APP.

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION — NORFOLK, VIRGINA
LANTDIV RAC CONTRACT N62470-93-D-3032 — DELIVERY ORDER NO. 0023
OPERABLE UNIT NO. 5 — MARINE CORPS BASE, CAMP LEJEUNE, N.C.

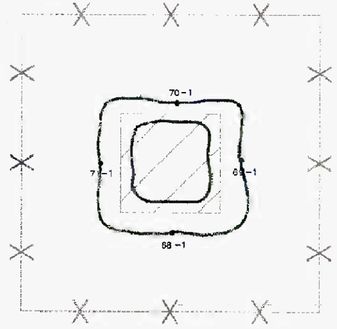
REMEDIATION OF PESTICIDE CONTAMINATED EXCAVATION AREA 1 SOILS

SAMPLE LOCATION MAP

DRAWING NUMBER: 16207-2
SHEET NUMBER: 2 of 3
DATE: 9/8/94



EXCAVATION AREA 2



EXCAVATION AREA 3

LEGEND

- INITIAL CONFIRMATION SAMPLE LOCATION 19 BELOW CLEANUP GOALS (7-22-94)
- INITIAL CONFIRMATION SAMPLE LOCATION 19 ABOVE CLEANUP GOALS (7 22 94)
- SAMPLE LOCATIONS AND DEPTH PERFORMED FOR 93-1 MODIFICATION No. 1 FOR DELINEATION OF PESTICIDES (AUG. 94)

RED SAMPLE RESULTS ABOVE CLEANUP GOALS

BLUE SAMPLE RESULTS BELOW CLEANUP GOALS

DEPTH OF EXCAVATION FROM EXISTING GRADE

- 1 FOOT
- 2 FEET
- 3 FEET
- 4 FEET
- 5 FEET

-60 0 30 60
SCALE- 1" =60FT

CONTOURS ARE BASED ON A SUBJECTIVE INTERPRETATION OF AVAILABLE INFORMATION.

OHM Remediation Services Corp.
Norcross,Georgia
A Subsidiary of OHM Corporation

SUBMITTED: _____ PROJECT MANAGER: DATE: _____
APPROVED _____ SR. PROJECT ENGINEER DATE: _____
APPROVED: _____ DEPT. MANAGER DATE: _____

AT FULL SCALE (IF NOT 2"-SCALE ACCORDINGLY)
CADD FILE AREA2.DWG
DRAWN: J. COLLINS
DESIGNED: YOUR NAME
CHECKED: _____
CHECKED: _____

REVISIONS

ZONE	REV.	DESCRIPTION	BY	DATE	APP.

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND

ATLANTIC DIVISION

NAVAL STATION NORFOLK, VIRGINIA

LANTDIV RAC CONTRACT N62470-93-D-3032 DELIVERY ORDER NO. 0023

OPERABLE UNIT NO. 5 MARINE CORPS BASE, CAMP LEJEUNE, N.C.

REMEDIATION OF PESTICIDE CONTAMINATED EXCAVATION AREA 2 & 3 SOILS

SAMPLE LOCATION MAP

DRAWING NUMBER: 16207-3
SHEET NUMBER: 3 of 3
DATE: 9/6/94