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RADIOLOGICAL CHARACTERIZATION OF THE SOUTHFIELD/INACTIVE FLY ASH AREA AT THE FEMP SITE

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RADIOLOGICAL CHARACTERIZATION OF THE SOUTH FIELD/INACTIVE FLY ASH AREA AT THE FERNALD ENVIRONMENTAL MANAGEMENT PROJECT (FEMP) SITE

PREPARED BY: Industrial Radiological Safety & Training; Radiological Assessment and Instrumentation Group

APPROVED BY: M. E. Cretzer

DATE: 4-30-92

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SECTION 1.0 RADIOLOGICAL CHARACTERIZATION PLAN PURPOSE

The purpose of this survey plan is to define the methodology for the gross unidentified beta/gamma characterization of the South Field/Inactive Fly Ash Disposal Area at the Fernald Environmental Management Project (FEMP).

SECTION 2.0 SURVEY PLAN PURPOSE

This plan specifically outlines the methods to be employed for the characterization effort including selection of survey point locations, survey performance, reporting of survey data, documentation, and record keeping to ensure that the data collected is technically valid and legally defensible.

SECTION 3.0 CHARACTERIZATION METHODOLOGY

3.1 SURVEY POINT LOCATION METHODOLOGY

3.1.1 A map of the South Field area will be obtained from Drafting. This map will be an enlargement of a section of the FEMP site map stored on Executive Resource Associates, Inc., Computer Aided Design (CAD) system which will encompass the area to be characterized.

3.1.2 The North/South and East/West dimensions of the area to be characterized will be determined and the location of a point within the area will be selected by generating random North/South and East/West coordinates. This point will define the origin of a square survey grid for the area to be characterized. The grid will be generated with 50-foot divisions in North/South and East/West orientation and the grid will be superimposed over the map of the area to be characterized. The intersections of the grid within the area to be characterized will identify the locations where survey measurements will be taken. The point of grid origin will be calculated by determining the distance from two landmarks whose positions are known. The distances and direction of the origin of the grid from these two known landmarks will be noted on the grid map.

3.2 SAMPLE SIZE JUSTIFICATION

3.2.1 The appropriateness of the number of survey points used to characterize the area for gross beta/gamma radioactivity readings will be evaluated by the application of statistical equations outlined in "Test Methods for Evaluating Solid Waste" USEPA: Nov. 1986, VOL. 2: Field Manual Part 3 "Sampling".

3.2.2 The first equation to be utilized will be the calculation of the variance for the defined analyte. The purpose of this characterization has been determined

to be gross beta/gamma activity. The formula employed to calculate the variance follows:

$$S^2 = \frac{\sum_{i=1}^{n} X_i^2 - (\sum_{i=1}^{n} X_i)^2/n}{n-1}$$

3.2.3 The second equation to be utilized will calculate the number of sample points needed for characterization as follows:

$$n = \frac{t^2(.20)\ S^2}{\Delta^2}$$

Where: t^2 (.20) = the square of the 80% two-tailed t statistic for use in calculating the 80% confidence interval for the difference between the regulatory threshold and the mean with the degrees of freedom and initially based on the historical data set.

S^2 = the variance of the sample.

Δ = the regulatory threshold for an analyte minus the mean calculated concentration for that analyte.

3.2.4 Historical data for gross beta/gamma activity for the area to be characterized will be used to determine Δ. The regulatory threshold, for the purpose of this evaluation, will be considered to be 1000 DPM/100 cm^2 of gross beta/gamma activity, and 20 μR/hr above background for gamma radiation. See sample size justification calculations on page 6 for verification of sample size based on 50 foot grid sampling methodology.

3.3 PREVIOUSLY IDENTIFIED "HOT SPOTS"

Several areas within the South Field area have previously been identified as having gross beta/gamma readings of greater than 1000DPM/100cm^2 and gamma radiation levels exceeding 20 μR/hr above background. These areas have been previously posted as Regulated Areas and for the purpose of this survey plan, these previously identified areas, within the South Field area, will be considered to be separate stratum. Grid intersections falling within these areas will not be surveyed as part of the characterization.

3.4 LOCATION OF PREVIOUSLY DETERMINED SURVEY POINTS

3.4.1 The survey team leader will be supplied with the grid map of the area to be characterized. The survey team leader will locate the grid origin by use of

the known distances and direction from two known landmarks listed on the grid map of the area to be characterized. The survey team leader will supervise the location of the survey points in the following manner:

3.4.1.1 Using a pocket transit/compass to verify correct direction and a tape measure to verify distance, the survey team leader will supervise the placement of markers at 50 foot increments North and South of the grid origin until the North/South dimension of the area to be characterized has a marker every 50 feet excluding posted Regulated Areas which, as discussed earlier, will not be considered as part of the area to be characterized.

3.4.1.2 Using a pocket transit/compass to verify correct direction and a tape measure to verify distance, the survey team leader will supervise the placement of markers at 50 foot increments East and West of each the previously placed markers until the entire area to be characterized has markers placed at the previously determined grid intersections excluding posted Regulated Areas.

3.5 RADIOLOGICAL SURVEY METHODOLOGY

3.5.1 The survey team will, under the direction of the survey team leader, establish the instrument background for G-M detectors on "slow response" with "pancake" probes and a Micro R-Meter in an adjacent low background area. The background readings will be recorded on the appropriate survey sheet. Meter readings will be allowed to stabilize for at least 30 seconds before background readings are recorded.

3.5.2 At each marked survey point location, within the area to be characterized, the survey team, under the direction of the survey team leader, will take measurements with both the G-M detection and Micro R-Meter instrumentation. The results will be recorded on the appropriate survey sheet. Meter readings will be allowed to stabilize for at least 30 seconds before recording results. Micro R-Meter readings should be taken in all four (4) major compass headings allowing 30 seconds for stabilization. Record the highest readings. Any Micro R-meter reading over 20 μR/hr should be noted along with the directional reading for further investigation.

3.5.3 All G-M instrument readings will be taken at a distance of 1/2 inch above the ground, where feasible. All Micro R-Meter readings will be taken at waist level, (approximately 3 feet).

3.5.4 G-M instrumentation probes will be periodically cross-checked for contamination by another G-M instrument. Verify that no radioactive material contamination of the G-M probes has occurred. Micro R-Meter instruments will be checked for contamination, if such contamination is suspected.

NOTE: Drop cloths or other protective cover will be used to shield equipment that will at any time be placed on the ground.

3.6 TREATMENT OF SURVEY DATA

3.6.1 Raw survey data from G-M detection instrumentation will be converted to DPM/100 cm^2 by applying a 10% efficiency to the calculated counts per minute above background.

3.6.2 A log will be maintained by field personnel. This log shall, as a minimum, contain the following information:

- Date activity started
- Daily start/finish times for activities performed
- Location of activities performed
- Purpose of activities performed
- Instrumentation and equipment utilized
- Signature of individuals performing activities
- Unusual circumstances encountered in field

3.7 HEALTH AND SAFETY

3.7.1 The area to be characterized contains hills and some areas of debris. Survey team members shall exercise care in negotiating this uneven terrain.

3.7.2 Due to the large surface area to be characterized, the foliage present in the area, and other natural and manmade cover, the possibility of hazardous contact with stinging insects should be considered. Individuals allergic to insect stings should take adequate precautions before performing field survey activities. In addition, personnel should be alert for animals that might present a hazard.

3.7.3 Adequate protective clothing should be on hand if entry into regulated areas or entry into newly discovered contamination, above the limits for a regulated area, can occur.

3.7.4 Survey personnel should attempt to stay in visual contact with at least one other survey team member.

3.8 DISPOSITION OF DATA

The report will include a narrative summary of the activity. The report will include copies of maps, log sheets, raw field data, interpreted data, and will show the equations or methods used in data interpretation. The final section of the report will include any comments or recommendations by the Radiological Assessment group. This report will be distributed and maintained in Radiological Assessment files.

3.9 SAMPLE SIZE JUSTIFICATION CALCULATIONS

3.9.1 Calculation of the Variance of the Sample

$$S^2 = \frac{\sum_{i=1}^{n} X_i^2 - (\sum_{i=1}^{n} X_i)^2/n}{n-1}$$

Where X_i^2 is calculated to be equal to 15,450,000 based on actual field measurements as represented by the data in Section 5.0 of this report.

Where X_i is calculated to be equal to 42,500 based on actual field measurements as represented by the data in Section 5.0 of this report.

Where n is 256 based on the number of sample points actually measured during the survey activities of the characterization.

Therefore $S^2 = \frac{(15,450,000) - (42,500)^2/256}{256 - 1} = \underline{32,919}$

3.9.2 Calculation of Appropriate Sample Size

$$n = \frac{t^2 (.20) S^2}{\Delta^2}$$

Where t(.20) = 1.282

Where S^2 from the equation above = 32,919

Where the mean G-M detector data result for the 256 survey locations = 166 dpm/100 cm^2, as derived from the data in Section 5.0

Where Δ is equal to the determined threshold of 1000 dpm/100 cm^2 minus the mean G-M detector data result.

Therefore $n = \frac{(1.282)^2 (32,919)}{(834)^2} = \underline{0.08}$

3.9.3

It can therefore be concluded based on the described criteria that the 50 foot Survey Grid has resulted in an adequate number of survey points for the purpose of the radiological characterization.

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SECTION 4.0 RADIOLOGICAL CHARACTERIZATION SUMMARY OF ACTIVITIES

4.1 The boundary of the area on the FEMP site to be characterized was the radiologically controlled area of the South Field/Inactive Fly Ash area.

4.2 The coordinates of the boundaries of the area to be characterized were determined based on the State Planar coordinate system.

4.3 A set of random North/South and East/West coordinates were generated by a random number program on a computer. This set of coordinates was used to generate the origin of a survey grid which would encompass the area to characterized. A representation of this survey grid was generated, and superimposed over a map of the area to be characterized.

4.4 A set of North/South and East/West distances from a known landmark (ground water well) to an intersection of the previously established grid map was determined. These coordinates were used to generate the starting point for the establishment of the survey grid in the area to be characterized.

4.5 Using a tape measure to measure distance and a pocket transit/compass to determine direction, a survey point location flag was placed in the area to coincide with the previously selected grid origin.

4.6 Using the survey point location flag established in 5.0 as a starting point, survey point location flags were placed at 50 foot intervals in North/South and East/West directions until a grid of survey point location flags was established within the area.

4.7 After the survey point location flags had been placed, they were labeled alpha/numerically along the East/West direction starting at the survey point location flag in the furthest Northwest section.

4.8 Three survey teams equipped with G-M detection instrumentation and Micro R-Meters took measurements at each marked survey point location. G-M readings were taken at 0.5 inches while Micro R-Meter readings were taken at waist level (approximately 3 feet). These readings were recorded by survey team personnel.

4.9 An additional survey team conducted a background survey, at 100 foot intervals, immediately outside of the boundary of the area. Refer to Appendix B for background radiological survey results.

4.10 Raw survey data from G-M detection instrumentation was corrected for detector efficiency and surface area by multiplying net counts per minute by a correction factor of 10. Micro R-Meter data was reported uncorrected.

4.11 The instrument background established for the G-M instrumentation was 60 cpm. The instrument background established for the Micro R-Meter was 10 micro R/hr.

4.12 The grid map represented on Attachment A was developed from field measurements and relative survey point location flags. The actual flag placement in the field was based on relation to a known landmark (ground water well). All flags have been left in place pending future decisions regarding this area.

SECTION 5.0 GEIGER-MUELLER SURVEY DATA

RADIOLOGICAL SURVEY DATA SHEET

DETECTION INSTRUMENT TYPE: G-M DETECTOR WITH PANCAKE TYPE DETECTOR PROBE

LOCATION OF SURVEY ACTIVITY: SOUTH FIELD/INACTIVE FLY ASH AREA

DATE OF SURVEY ACTIVITIES: APRIL 17, 1992 - APRIL 23, 1992

GRID LOCATION	DPM/100CM²	GRID LOCATION	DPM/100CM²
A-1	200	E-4	200
A-2	200	E-5	BKG
B-1	400	E-6	100
B-2	200	E-7	300
B-3	200	E-8	300
C-1	400	E-9	200
C-2	600	E-10	400
C-3	200	E-11	BKG
C-4	200	E-12	200
C-5	BKG	F-1	300
C-6	400	F-2	100
D-1	BKG	F-3	200
D-2	200	F-4	100
D-3	100	F-5	700
D-4	100	F-6	400
D-5	200	F-7	400
D-6	300	F-8	300
D-7	200	F-9	200
E-1	100	F-10	100
E-2	300	F-11	200
E-3	BKG		

RADIOLOGICAL SURVEY DATA SHEET

DETECTION INSTRUMENT TYPE: G-M DETECTOR WITH PANCAKE TYPE DETECTOR PROBE

LOCATION OF SURVEY ACTIVITY: SOUTH FIELD/INACTIVE FLY ASH AREA

DATE OF SURVEY ACTIVITIES: APRIL 17, 1992 - APRIL 23, 1992

GRID LOCATION	DPM/100CM²	GRID LOCATION	DPM/100 CM²
G-1	BKG	H-7	BKG
G-2	BKG	H-8	BKG
G-3	BKG	H-9	BKG
G-4	200	H-10	BKG
G-5	BKG	H-11	100
G-6	BKG	H-12	100
G-7	BKG	H-13	1000
G-8	BKG	H-14	200
G-9	BKG	H-15	300
G-10	200	H-16	200
G-11	200	H-17	600
G-12	100	I-1	100
G-13	100	I-2	BKG
G-14	500	I-3	BKG
G-15	600	I-4	BKG
H-1	BKG	I-5	BKG
H-2	100	I-6	400
H-3	BKG	I-7	BKG
H-4	100	I-8	BKG
H-5	BKG	I-9	300
H-6	BKG	I-1	300

RADIOLOGICAL SURVEY DATA SHEET

DETECTION INSTRUMENT TYPE: G-M DETECTOR WITH PANCAKE TYPE DETECTOR PROBE

LOCATION OF SURVEY ACTIVITY: SOUTH FIELD/INACTIVE FLY ASH AREA

DATE OF SURVEY ACTIVITIES: APRIL 17, 1992 - APRIL 23, 1992

GRID LOCATION	DPM/100CM^2	GRID LOCATION	DPM/100CM^2
I-11	BKG	J-12	100
I-12	700	J-13	BKG
I-13	200	J-14	300
1-14	200	J-15	BKG
I-15	BKG	J-16	BKG
I-16	200	J-17	300
I-17	100	J-18	100
I-18	300	J-19	BKG
I-19	1200	J-20	200
I-20	BKG	J-21	200
J-1	BKG	K-1	400
J-2	400	K-2	200
J-3	200	K-3	400
J-4	BKG	K-4	BKG
J-5	200	K-5	200
J-6	200	K-6	200
J-7	400	K-7	400
J-8	200	K-8	BKG
J-9	BKG	K-9	BKG
J-10	BKG	K-10	BKG
J-11	BKG	K-11	200

RADIOLOGICAL SURVEY DATA SHEET

DETECTION INSTRUMENT TYPE: G-M DETECTOR WITH PANCAKE TYPE DETECTOR PROBE

LOCATION OF SURVEY ACTIVITY: SOUTH FIELD/INACTIVE FLY ASH AREA

DATE OF SURVEY ACTIVITIES: APRIL 17, 1992 - APRIL 23, 1992

GRID LOCATION	DPM/100CM^2	GRID LOCATION	DPM/100CM^2
K-12	BKG	L-13	BKG
K-13	200	L-14	300
K-14	BKG	L-15	300
K-15	100	L-16	200
K-16	200	L-17	100
K-17	300	M-1	400
K-18	BKG	M-2	BKG
K-19	BKG	M-3	BKG
K-20	200	M-4	BKG
L-1	200	M-5	BKG
L-2	BKG	M-6	400
L-3	200	M-7	400
L-4	400	M-8	BKG
L-5	400	M-9	100
L-6	200	M-10	200
L-7	400	M-11	BKG
L-8	BKG	M-12	400
L-9	200	M-13	200
L-10	400	M-14	100
L-11	100	M-15	BKG
L-12	BKG	M-16	300

RADIOLOGICAL SURVEY DATA SHEET

DETECTION INSTRUMENT TYPE: G-M DETECTOR WITH PANCAKE TYPE DETECTOR PROBE

LOCATION OF SURVEY ACTIVITY: SOUTH FIELD/INACTIVE FLY ASH AREA

DATE OF SURVEY ACTIVITIES: APRIL 17, 1992 - APRIL 23, 1992

GRID LOCATION	DPM/100CM²	GRID LOCATION	DPM/100CM²
N-1	200	P-2	BKG
N-2	200	P-3	400
N-3	BKG	P-4	BKG
N-4	BKG	P-5	400
N-5	400	P-6	200
N-6	200	P-7	200
N-7	BKG	P-8	BKG
N-8	100	Q-1	BKG
N-9	200	Q-2	200
N-10	100	Q-3	200
N-11	100	Q-4	200
O-1	200	Q-5	BKG
O-2	400	Q-6	100
O-3	200	Q-7	BKG
O-4	100	Q-8	200
O-5	BKG	R-1	200
O-6	BKG	R-2	BKG
O-7	300	R-3	600
O-8	100	R-4	200
O-9	200	R-5	400
P-1	200	R-6	300

RADIOLOGICAL SURVEY DATA SHEET

DETECTION INSTRUMENT TYPE: G-M DETECTOR WITH PANCAKE TYPE DETECTOR PROBE

LOCATION OF SURVEY ACTIVITY: SOUTH FIELD/INACTIVE FLY ASH AREA

DATE OF SURVEY ACTIVITIES: APRIL 17, 1992 - APRIL 23, 1992

GRID LOCATION	DPM/100CM^2	GRID LOCATION	DPM/100CM^2
R-7	300	U-7	BKG
S-1	BKG	U-8	BKG
S-2	200	V-1	BKG
S-3	200	V-2	200
S-4	600	V-3	BKG
S-5	200	V-4	200
S-6	BKG	V-5	BKG
S-7	400	V-6	BKG
T-1	100	V-7	200
T-2	BKG	V-8	BKG
T-3	200	W-1	BKG
T-4	BKG	W-2	BKG
T-5	600	W-3	200
T-6	400	W-4	200
T-7	BKG	W-5	400
U-1	200	W-6	BKG
U-2	200	W-7	BKG
U-3	BKG	W-8	BKG
U-4	400	X-1	BKG
U-5	100	X-2	BKG
U-6	200	X-3	BKG

RADIOLOGICAL SURVEY DATA SHEET

DETECTION INSTRUMENT TYPE: G-M DETECTOR WITH PANCAKE TYPE DETECTOR PROBE

LOCATION OF SURVEY ACTIVITY: SOUTH FIELD/INACTIVE FLY ASH AREA

DATE OF SURVEY ACTIVITIES: APRIL 17, 1992 - APRIL 23, 1992

GRID LOCATION	DPM/100CM^2
X-4	BKG
X-5	100
X-6	400
X-7	BKG
X-8	BKG

SECTION 6.0 MICRO R-METER SURVEY DATA

RADIOLOGICAL SURVEY DATA SHEET

DETECTION INSTRUMENT TYPE: MICRO R-METER (μR/HR)

LOCATION OF SURVEY ACTIVITY: SOUTH FIELD/INACTIVE FLY ASH AREA

DATE OF SURVEY ACTIVITIES: APRIL 17, 1992 - APRIL 23, 1992

GRID LOCATION	μR/HR	GRID LOCATION	μR/HR
A-1	12	E-4	12
A-2	11	E-5	15
B-1	9	E-6	13
B-2	9	E-7	19
B-3	12	E-8	15
C-1	10	E-9	13
C-2	11	E-10	13
C-3	9	E-11	12
C-4	9	E-12	13
C-5	12	F-1	11
C-6	12	F-2	10
D-1	10	F-3	10
D-2	11	F-4	12
D-3	12	F-5	17
D-4	13	F-6	14
D-5	14	F-7	14
D-6	14	F-8	13
D-7	12	F-9	13
E-1	11	F-10	13
E-2	10	F-11	14
E-3	10		

RADIOLOGICAL SURVEY DATA SHEET

DETECTION INSTRUMENT TYPE: MICRO R-METER (μR/HR)

LOCATION OF SURVEY ACTIVITY: SOUTH FIELD/INACTIVE FLY ASH AREA

DATE OF SURVEY ACTIVITIES: APRIL 17, 1992 - APRIL 23, 1992

GRID LOCATION	μR/HR	GRID LOCATION	μR/HR
G-1	11	H-7	12
G-2	10	H-8	11
G-3	12	H-9	11
G-4	11	H-10	11
G-5	14	H-11	10
G-6	12	H-12	11
G-7	11	H-13	20 (North)
G-8	13	H-14	15
G-9	14	H-15	15
G-10	13	H-16	14
G-11	10	H-17	34 (West)
G-12	11	I-1	9
G-13	15	I-2	9
G-14	22 (West)	I-3	9
G-15	22 (North)	I-4	9
H-1	10	I-5	9
H-2	9	I-6	12
H-3	10	I-7	14
H-4	11	I-8	13
H-5	12	I-9	10
H-6	12	I-10	10

RADIOLOGICAL SURVEY DATA SHEET

DETECTION INSTRUMENT TYPE: MICRO R-METER (μR/HR)

LOCATION OF SURVEY ACTIVITY: SOUTH FIELD/INACTIVE FLY ASH AREA

DATE OF SURVEY ACTIVITIES: APRIL 17, 1992 - APRIL 23, 1992

GRID LOCATION	μR/HR	GRID LOCATION	μR/HR
I-11	11	J-12	11
I-12	13	J-13	11
I-13	10	J-14	10
1-14	10	J-15	13
I-15	10	J-16	14
I-16	13	J-17	14
I-17	12	J-18	12
I-18	15	J-19	11
I-19	32 (West)	J-20	13
I-20	13	J-21	17
J-1	9	K-1	10
J-2	10	K-2	10
J-3	10	K-3	10
J-4	9	K-4	10
J-5	7	K-5	9
J-6	8	K-6	9
J-7	10	K-7	13
J-8	11	K-8	11
J-9	11	K-9	9
J-10	10	K-10	9
J-11	10	K-11	10

RADIOLOGICAL SURVEY DATA SHEET

DETECTION INSTRUMENT TYPE: MICRO R-METER (μR/HR)

LOCATION OF SURVEY ACTIVITY: SOUTH FIELD/INACTIVE FLY ASH AREA

DATE OF SURVEY ACTIVITIES: APRIL 17, 1992 - APRIL 23, 1992

GRID LOCATION	μR/HR	GRID LOCATION	μR/HR
K-12	11	L-13	11
K-13	11	L-14	10
K-14	14	L-15	11
K-15	15	L-16	11
K-16	11	L-17	11
K-17	11	M-1	12
K-18	11	M-2	12
K-19	12	M-3	11
K-20	13	M-4	12
L-1	11	M-5	12
L-2	8	M-6	11
L-3	9	M-7	13
L-4	10	M-8	11
L-5	11	M-9	10
L-6	15	M-10	11
L-7	14	M-11	11
L-8	12	M-12	10
L-9	10	M-13	10
L-10	12	M-14	10
L-11	12	M-15	11
L-12	13	M-16	10

RADIOLOGICAL SURVEY DATA SHEET

DETECTION INSTRUMENT TYPE: MICRO R-METER (μR/HR)

LOCATION OF SURVEY ACTIVITY: SOUTH FIELD/INACTIVE FLY ASH AREA

DATE OF SURVEY ACTIVITIES: APRIL 17, 1992 - APRIL 23, 1992

GRID LOCATION	μR/HR	GRID LOCATION	μR/HR
N-1	12	P-2	8
N-2	11	P-3	11
N-3	13	P-4	11
N-4	10	P-5	10
N-5	10	P-6	10
N-6	11	P-7	10
N-7	10	P-8	9
N-8	10	Q-1	10
N-9	10	Q-2	9
N-10	9	Q-3	10
N-11	10	Q-4	11
O-1	10	Q-5	11
O-2	9	Q-6	11
O-3	10	Q-7	10
O-4	10	Q-8	10
O-5	10	R-1	11
O-6	10	R-2	11
O-7	10	R-3	10
O-8	10	R-4	10
O-9	10	R-5	10
P-1	11	R-6	10

RADIOLOGICAL SURVEY DATA SHEET

DETECTION INSTRUMENT TYPE: MICRO R-METER (μR/HR)

LOCATION OF SURVEY ACTIVITY: SOUTH FIELD/INACTIVE FLY ASH AREA

DATE OF SURVEY ACTIVITIES: APRIL 17, 1992 - APRIL 23, 1992

GRID LOCATION	μR/HR	GRID LOCATION	μR/HR
R-7	10	U-7	9
S-1	10	U-8	12
S-2	9	V-1	11
S-3	11	V-2	11
S-4	9	V-3	9
S-5	10	V-4	11
S-6	10	V-5	11
S-7	11	V-6	10
T-1	11	V-7	12
T-2	10	V-8	12
T-3	9	W-1	12
T-4	12	W-2	11
T-5	12	W-3	11
T-6	9	W-4	11
T-7	12	W-5	9
U-1	11	W-6	11
U-2	19	W-7	11
U-3	10	W-8	13
U-4	9	X-1	11
U-5	9	X-2	16
U-6	11	X-3	11

RADIOLOGICAL SURVEY DATA SHEET

DETECTION INSTRUMENT TYPE: MICRO R-METER (μR/HR)

LOCATION OF SURVEY ACTIVITY: SOUTH FIELD/INACTIVE FLY ASH AREA

DATE OF SURVEY ACTIVITIES: APRIL 17, 1992 - APRIL 23, 1992

GRID LOCATION	μR/HR
X-4	10
X-5	10
X-6	12
X-7	12
X-8	15

SECTION 7.0 COMMENTS/RECOMMENDATIONS

7.1 The South Field and Inactive Fly Ash areas both contain substantial amounts of what appears to b construction debris visible on, or partially buried in, the ground. This material consisted of woo boards, broken concrete, asphalt, rebar and transite siding and/or roofing material. Additional materia not natural to the area consisted of old tires (one noticed), and small quantities of paper and glas garbage.

7.2 All survey point locations were outside previously posted regulated areas.

7.3 Weather conditions during survey activities varied between the low 60°s and the high 70° (Fahrenheit). No survey measurements were taken during or within 8 hours of periods of significan rainfall.

7.4 Those areas where measurements exceed pre-established regulatory or administrative thresholds wil be subject to more detailed radiological surveillance activities and posting, as is appropriate fo controlled and regulated areas.

7.5 Those areas significantly over background levels will be subject to more detailed investigation.

7.6 At the time of this report Radiological Assessment personnel are currently engaged in follow-up evaluation activities for the South Field/Inactive Fly Ash area.

SECTION 8.0 FOLLOW-UP ACTIONS

8.1 On April 29, 1992, Radiological Assessment and Instrumentation Group personnel performed a follow-up investigation of the South Field/Inactive Fly Ash Area which had been identified in the characterization effort to contain areas of radiation which merited further investigation for the purpose of implementing any required radiological controls.

8.2 The investigation was conducted by returning to these previously identified areas and by scanning the ground in all major compass directions with G-M detectors in order to determine the existence and boundaries of areas which exceeded 1000 dpm/100 cm^2.

8.3 Four new areas with radiological survey readings in excess of 1000 dpm/100 cm^2 were confirmed, posted, and isolated with radiological warning barriers.

8.4 Three of these areas were determined to contain soils with surface readings up to 3000 dpm/100 cm^2. (See Attachment A)

8.5 One area was found to contain, on the surface, what appeared to be two fragments approximately 1.5 inches by .75 inches of suspect Yellow Cake. Additionally, there was smaller particles of this material embedded into the soil. Radiation readings on the larger pieces of material ranged to 600,000 dpm. The Regulated area containing the suspect material mentioned above is located at grid location H-13.

8.6 The four newly identified and four previously identified Regulated Areas are identified on the map in Attachment A. These areas have been numbered on the map for reference.

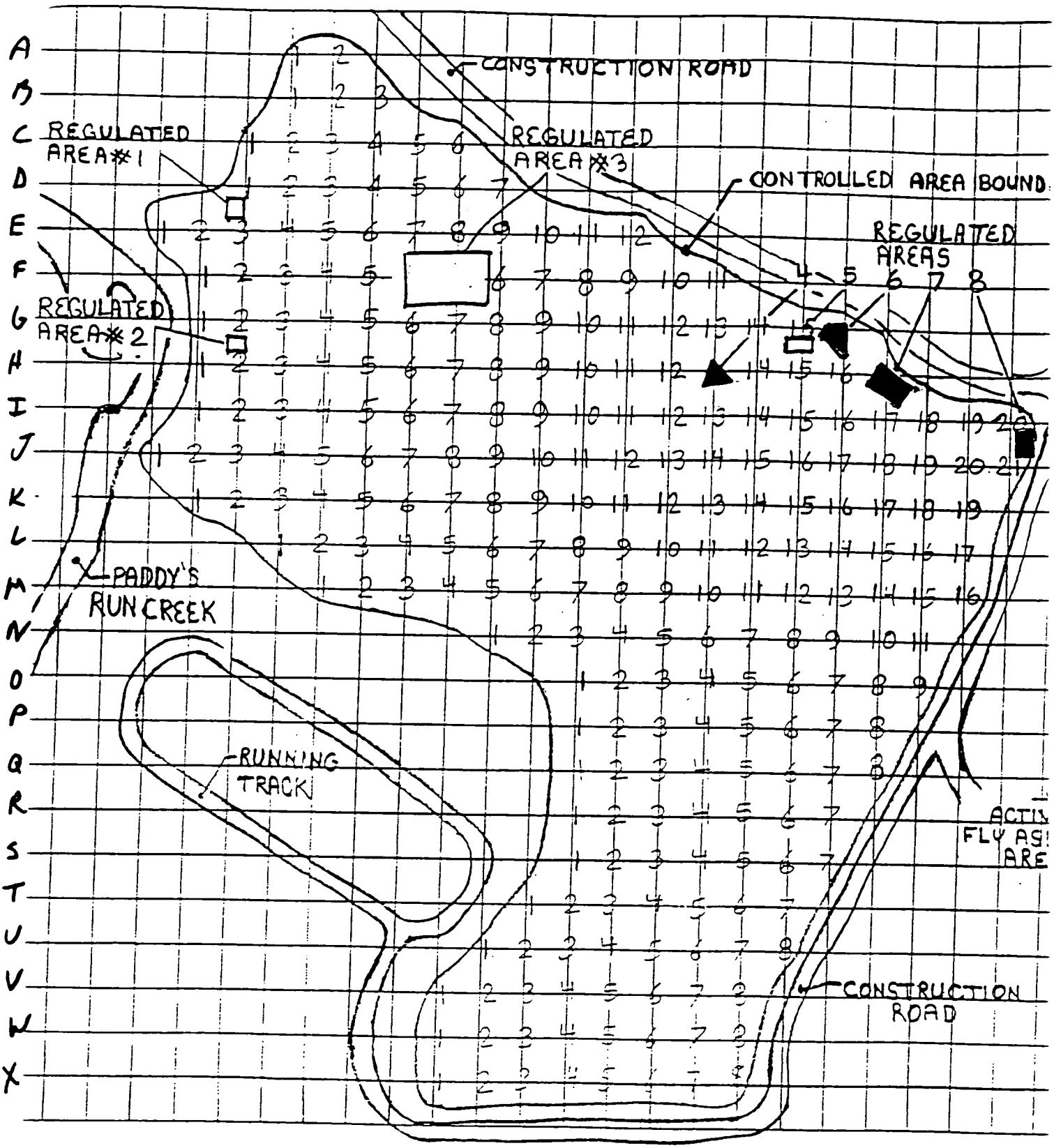
ATTACHMENT A

Grid Map of South Field/Inactive Fly Ash Area at the Fernald Environmental Management Project Site.

A DESCRIPTION OF THE REGULATED AREAS

Area #1	A roped area approximately five foot by five foot square with radioactive contaminated transite (1 foot by 2 foot) and a 1 gallon clear plastic bag of contaminted soil.
Area #2	A three foot by four foot roped area with fixed radioactively contaminated surface soil.
Area #3	A twenty by thirty foot roped area with fixed radioactively contaminated surface soil. contamination.
Area #4	A roped area, two feet by five feet, containing two pieces of yellow material approximately two inches long and one inch in diameter.
Area #5	A four foot by six foot area containing fixed radioactively contaminated surface soil.
Area #6	A triangularly roped area with sides approximately four feet, six feet, and eight feet in length, with fixed radioactively contaminated surface soil.
Area #7	A roped area, ten feet by fifteen feet, with fixed radioactively contaminated surface soil.
Area #8	A three foot by ten foot rooped area with fixed radioactively contaminated soil.

NOTE: All areas have very thick vegitative cover.



□ - PREVIOUSLY ESTABLISHED REGULATED AREAS

■ - NEWLY ESTABLISHED REGULATED AREAS

ATTACHMENT B

Radiological Background Survey Report

Fernald Site
IRS&T - RADIOLOGICAL SAFETY

RADIOLOGICAL SURVEY REPORT

[redacted]

DATE: 1/23/92	LOCATION: SOUTHFIELD AREA
TIME: 1000	LEVEL (INACTIVE FLYASH AREA) 580"
REASON FOR SURVEY	CHECK BACKGROUND LEVELS OUTSIDE CONTROLLED AREA FEN ALL READINGS TAKEN ~3 FT. FROM BOUNDARY ROPE. - ALL READINGS REPORTED AS GROSS READINGS - WEATHER: SUNNY, 70°F, CALM

[redacted] PAGE: 1 of 0

INSTRUMENTS

MODEL	SERIAL NUMBER	TYPE (α, β, γ)	CALIBRATION-DUE DATE	BKGD. (cpm)	EFF./CF	MDA (dpm)	INSP./PERFORMA TEST SAT? YES	NO
BICRON	A318P	β/γ	8/92	N/A	N/A	N/A	✓	
LUDLUM 19	47111	γ	7/92	N/A	N/A	N/A	✓	
				GROSS CPM			MICROREM	

ITEM NUMBER	LOCATION AND/OR DESCRIPTION	DPM/100cm² ALPHA REMOVABLE	DPM/100cm² ALPHA FIXED PLUS REMOVABLE	RW ~~DPM/100cm²~~ BETA-GAMMA REMOVABLE	BETA-GAMMA FIXED PLUS REMOVABLE	CORRECTED DOSE RATE ~~(MREM/HR)~~ γ CONTACT	β/γ CONTACT	γ AT ~3 FT.	β/γ AT ___ F
1	DUE NORTH OF E-10	N/A	N/A	N/A	80	N/A	N/A	10	N/A
2	DUE NORTH OF C-6				60			11	
3	DUE NORTH OF B-3				40			11	
4	NW CORNER BOUNDARY				60			10	
5	DUE WEST OF C-1				60			12	
6	DUE NORTH OF E-2				60			10	
7	DUE WEST OF E-1				60			9	
8	DUE WEST OF G-1				60			10	
9	DUE WEST OF I-1				60			10	
10	SW CORNER BOUNDARY				50			8	
11	DUE SOUTH OF K-2				60			10	
12	DUE SOUTH OF M-1				60			11	
13	DUE SOUTH OF M-3				80			11	
14	DUE SOUTH OF N-1				60			11	
15	DUE WEST OF P-1				60			10	
16	DUE WEST OF R-1				50			8	
17	DUE WEST OF T-1				60			11	
18	DUE WEST OF V-1				60			10	

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2	Facility Supervisor
3	Operable Unit Manager

NOTIFICATION OF SURVEY RESULTS

SUPERVISOR NOTIFIED	TIME	DATE	NOTIFIED BY	REVIEWED BY	DATE
				AJH	4/24/92

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Fernald Site
IRS&T - RADIOLOGICAL SAFETY

RADIOLOGICAL SURVEY REPORT - CONTINUATION SHEET

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EM NUMBER	LOCATION AND/OR DESCRIPTION	DPM/100cm² ALPHA		~~DPM/100cm²~~ BETA-GAMMA		CORRECTED DOSE RATE (~~MREM/HR~~)			
		REMOVABLE	FIXED PLUS REMOVABLE	REMOVABLE	FIXED PLUS REMOVABLE	γ CONTACT	β/γ CONTACT	γ AT ~3 FT.	β/γ AT ___
19	DUE SOUTH OF X-1	N/A	N/A	N/A	60	N/A	N/A	9	N/A
20	DUE SOUTH OF X-3				60			8	
21	DUE SOUTH OF X-5				60			9	
22	DUE SOUTH OF X-7				60			9	
23	DUE EAST OF X-8				80			10	
24	DUE EAST OF V-8				60			10	
25	DUE EAST OF T-7				60			10	
26	DUE EAST OF R-7				60			8	
27	DUE EAST OF P-8				60			9	
28	DUE EAST OF N-11				80			10	
29	DUE EAST OF L-17				60			9	
30	DUE EAST OF J-21				80			11	
31	DUE NORTH OF I-20				80			12	
32	DUE NORTH OF I-18				120			17	
33	DUE NORTH OF H-16				180			26	
34	DUE NORTH OF G-14				160			24	
35	DUE NORTH OF F-10				80			12	
36	DUE NORTH OF E-11				60			10	

FS-F-1993-2 (REV ...)