SOIL SAMPLING PLAN FOR
JEFFERSON COUNTY REMEDIATION LANDS
1990

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1. INTRODUCTION

Deposition of wind dispersed plutonium from the 903 Pad area contaminated soils on offsite lands east of Indiana Street. In 1985, as part of the offsite remediation project (Operable Unit #3), plutonium contaminated soil was mixed by tilling to reduce plutonium concentration to below the Colorado Department of Health (CDH) construction standard of 0.9 pCi/g. Soil samples taken in 1986 to assess the effectiveness of remediation, do not stand up to current data validation standards. New samples are needed to insure the effectiveness of past remedial actions and determine future work plans.

A 1985 out-of-court Lawsuit Settlement directs the remediation and revegetation of approximately 200 acres of land owned by Jefferson County. Soil samples taken in 1985, prior to remediation, show plutonium concentrations in the 0.03 to 3.0 picocuries per gram (pCi/g) range. As part of the Settlement Agreement, soil containing total plutonium concentrations greater than the Colorado Department of Health (CDH) construction standard of 0.9 pCi/g were tilled to reduce surface deposited plutonium. Remediation of the Jefferson County land was started in 1986 by tilling and revegetating approximately half of the 200 acre area. Tilling operations were performed on contour strips as presented in figures 1 and 2. 1986 data indicate that tilling was successful in reducing plutonium concentrations to below the CDH standard.

Influences from other Individual Hazardous Substance Sites (IHSS's) will not be a factor in this sampling procedure due to the distance to the offsite areas. Soil samples taken by this sampling plan could exceed the CDH construction standard of 0.9 pCi/g for protection of earthmovers working with contaminated soil.

The Jefferson County remediation lands are directly east of the Plant boundary and divided into two areas, the north area in Section 7 (T2S, R69W) and the south area in Section 18 (same T&R). This sampling plan addresses both areas.

2. PURPOSE FOR SAMPLING

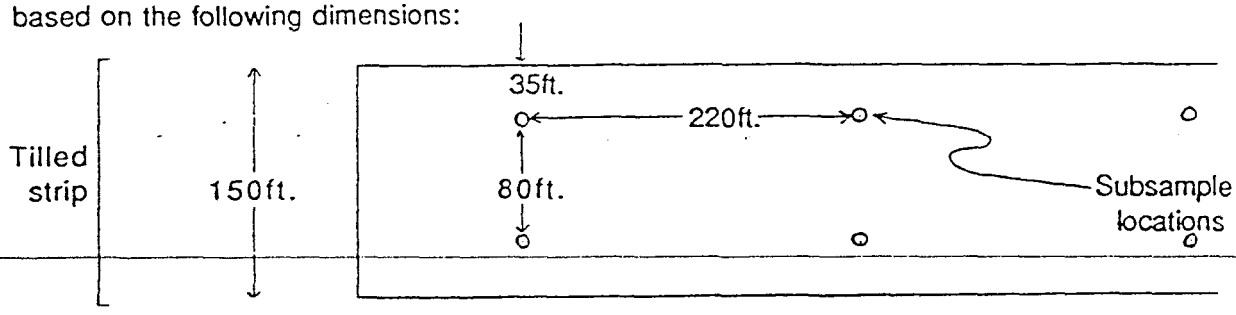
2.1 Sampling is necessary to document the attempts to reduce soil plutonium concentrations as mandated by the 1985 Settlement Agreement, McKay vs The United States. It is necessary to measure the soil plutonium levels and report the status of the remediation effort to Jefferson County.

2.2 As part of the ongoing offsite remediation project, current soil plutonium levels are needed to determine actions for 1991. The Offsite Remediation Project involves mixing the surface soil layer to a depth of 12 inches to reduce the plutonium concentration. The resulting soil disturbance must then be revegetated to control water and wind erosion. Sampling in 1985 indicated that tilling reduced plutonium concentrations but these data do not stand up to present data validation standards. Soil from areas where sample analyses yield plutonium levels greater than the CDH standard will be tilled again to reduce the plutonium concentration. Validatible soil analyses must be performed to determine if further tilling is necessary.

3. SAMPLING AND ANALYSIS

3.1 The sampling technique will follow the Colorado Department of Health (CDH) protocol as outlined in the Rocky Flats ER Program Standard Operating Procedure (SOP) No. 3.8.

3.2 Soil sampling will be conducted on numbered contour strips in Sections 7 and 18, as shown in figures 1 and 2. Systematic subsamples will be taken across the strip area and composited to make one sample per sampling area. Subsample sites will be located on the strips based on the following dimensions:



This distribution of subsample sites across a strip will provide a ratio of 26 sites per 10 acres. Table 1 presents the sample number designation, approximate acreage per strip sample area and number of subsamples to be composited per sample area.

3.3 The CDH standard of compositing 25 subsamples per 10 acres into one sample is prorated to calculate the number of subsamples per strip area (example: 13 subsamples per 5 acres). Each map shows the sample number designation for each strip sampling area. The longest strips in Section 7 are larger than 10 acres thus they are divided in half. Three strip areas are further divided because they had greater soil plutonium concentrations in 1985 and required a greater number of tillage passes to reduce the plutonium level below the 0.9 pCi/g standard. The sampling density is much greater than required by CDH to minimize future tilling if found necessary.

3.4 Transportation of the samples to an offsite laboratory under contract by ER will be the responsibility of the contractor. The contractor will follow ER health and safety plan, and QA/QC procedures. Soil samples shall be analyzed for plutonium 239 and 240.

4. DATA ANALYSIS AND INTERPRETATION

4.1 Data will be analyzed for adherence to the CDH plutonium in soil construction standard of 0.9 pCi/g. Land area's with soil plutonium values less than 0.9 pCi/g will not require further tilling. Land area's with soil plutonium values greater than 0.9pCi/g will require more tilling. If tilling is required, the area will be sampled after tilling using the sampling procedure outlined above. Tilling and subsequent sampling would continue until the soil plutonium values were below 0.9pCi/g.

Table 1. The following table presents the sample number designation, approximate acreage per strip sample area and number of subsamples to be composited per sample area in Sections 7 and 18.

	Sample number designation	Approximate acreage	Number of samples
Sec. 7	1a	3	8
	1b	3	8
	2a	7	18
	2b	4	10
	2c	4	10
	3a	8	20
	3b	3	8
	3c	3	8
	4a	8	20
	4b	8	20
	5	5	13
	6	5	13
	7	4	10
	8	5	13
	9	6	15
	10	5	13
	11	3	8
Sec. 18	12a	4	10
	12b	4	10
	13a	5	13
	13b	5	13
	14a	4	10
	14b	4	10
	15a	4	10
	15b	4	10

Total number of samples to be analyzed = 25

Figure 1. Jefferson County land in Section 7 undergoing remedial action, showing location of tilled contour strips and soil sample number designation.

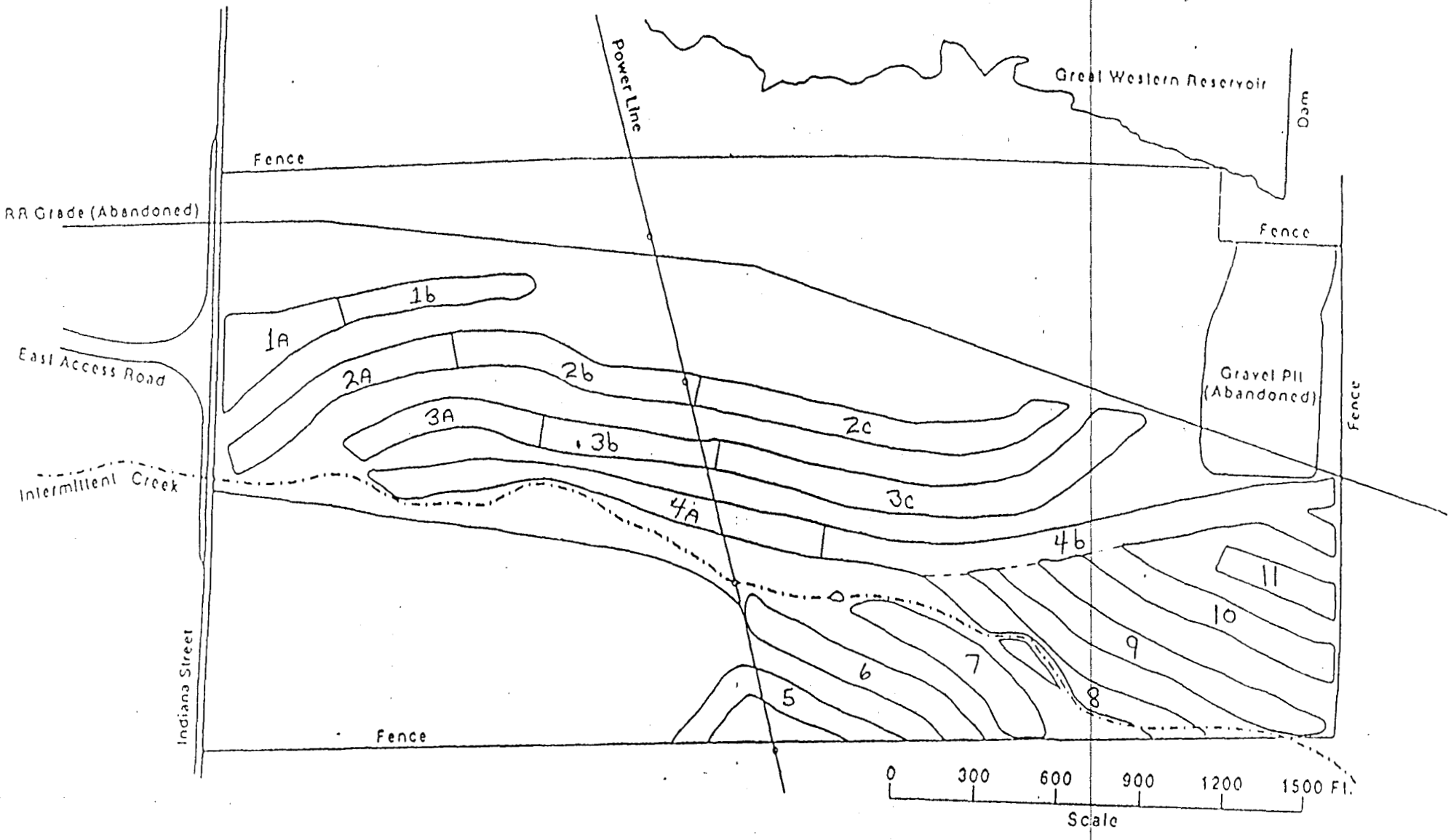
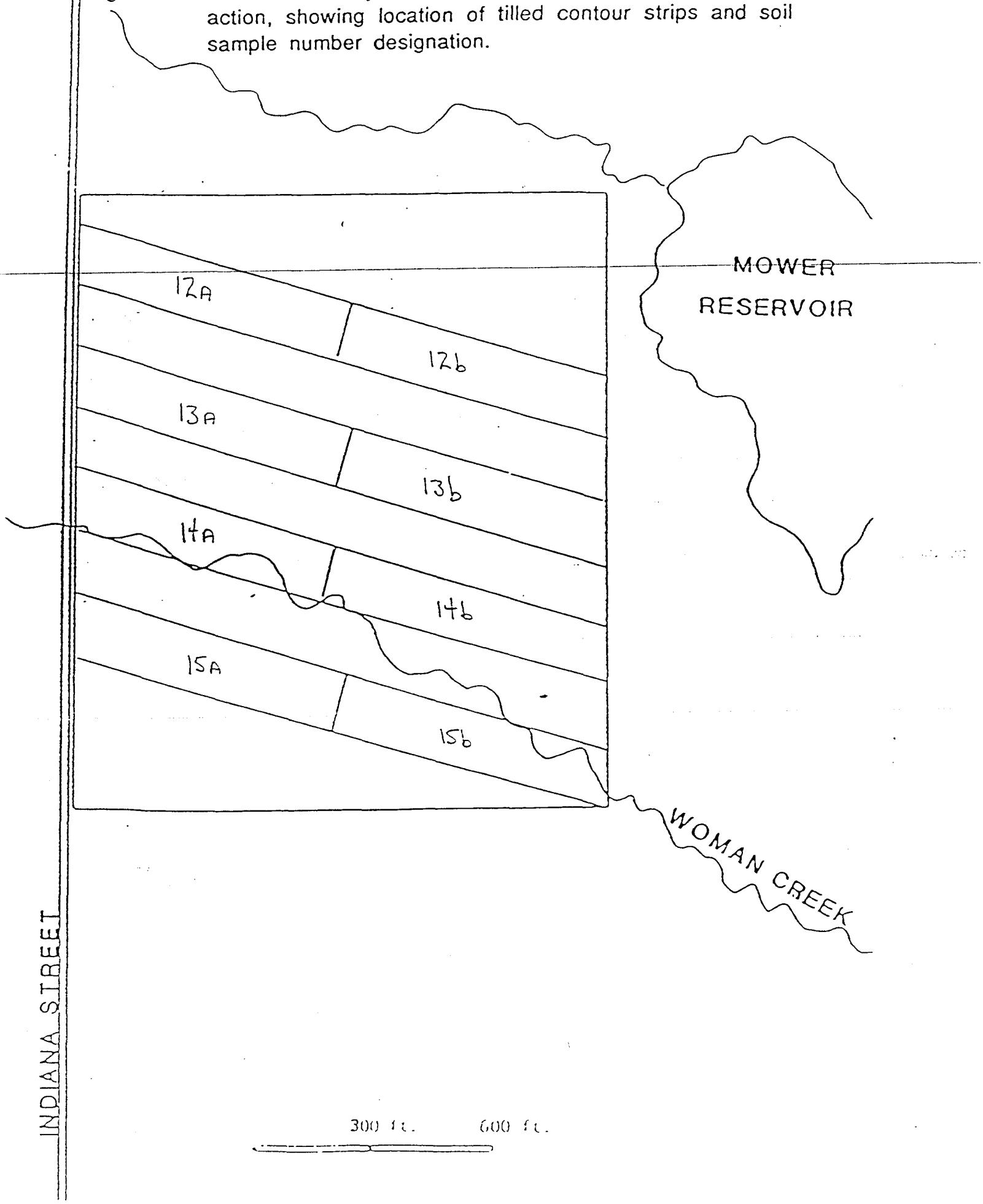



Figure 2. Jefferson County land in Section 18 undergoing remedial action, showing location of tilled contour strips and soil sample number designation.