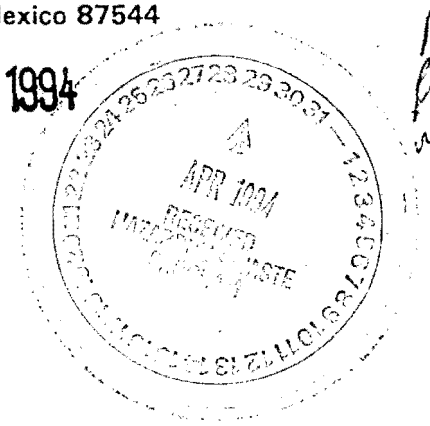
Department of Energy
Los Alamos Area Office
Albuquerque Operations Office
Los Alamos, New Mexico 87544

APR 22 1994



Mr. William Honker, Chief
RCRA Permits Branch
US Environmental Protection Agency
Region 6
1445 Ross Ave., Suite 1200
Dallas, Texas 75202-2733

Dear Mr. Honker:

The Los Alamos Area Office (LAAO) requests your authorization to proceed with work proposed in the enclosed Interim Measure Work Plan for Operable Unit (OU) 1079. The subject plan describes the action proposed to be taken to remove radioactive shrapnel from Technical Area 10 firing sites located in Bayo Canyon. The need for this action became apparent during recent geomorphic investigations at Bayo Canyon which resulted in the incidental discovery of fragments of debris with beta/gamma activities ranging up to 350,000 cpm. As Bayo Canyon is currently open to the public and under frequent use by children and adults for recreational purposes, we are recommending immediate action to reduce an imminent threat of exposure to people using the area. Because the shrapnel is disseminated across fields and roads used for hiking, biking and horseback riding, a risk of direct contact to humans exists, particularly if the material is handled or collected for souvenirs.

The radioactive fragments were released from firing sites during testing activities which took place between 1944 and 1963. These sites are listed in Table A of the Los Alamos National Laboratory (LANL) Hazardous and Solid Waste Amendments (Module VIII) Permit as Solid Waste Management Units (SWMU) 10-001 (a-d). Although the action proposed is associated with these SWMUs, the proposal for this Interim Measure does not represent a final remedy. Rather, the action is proposed as a final solution for removal of shrapnel. Removal of shrapnel has taken place, only on surface, over the last three decades, but this approach has not been effective. As the current proposal includes subsurface investigation and recovery of material, the remedy should effectively eliminate any further exposure of this material to the public.

This Interim Measure is proposed in accordance with the Module VIII Permit, which provides for the implementation of such actions when "actual and potential exposure to human and environmental receptors" is found to exist. Please let me know

at your earliest convenience if you approve of the plan and authorize LAAO to proceed.

If you have any questions regarding the proposal, please call me at (505) 665-7203.

Sincerely,

Theodore J. Taylor
Program Manager
Environmental Restoration Program

LESH:7TT-027

Enclosure

cc w/enclosure:
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RPF, LANL, MS-M707
K. Boardman, ERPO, AL

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INTERIM MEASURE SUMMARY

LANL OPERABLE UNIT 1079
BAYO CANYON - TA-10

SHRAPNEL REMOVAL FROM BAYO CANYON FIRING SITES

12 APRIL 1994

INTERIM MEASURE SUMMARY
Operable Unit 1079
Shrapnel Removal from Bayo Canyon Firing Sites

1.0 INTRODUCTION

A recent and unanticipated discovery of radiation-contaminated metallic fragments during geomorphic field investigations in Bayo Canyon [former Technical Area (TA-10) firing site] has clearly identified a potential avenue for public exposure to radiation levels in excess of allowed standards. Testing activities involving high explosives and radioactive elements at former TA-10 firing sites [SWMUs 10-001 (a-d)] represent the source of the contaminated shrapnel. The distribution of shrapnel from these activities covers a very large area surrounding these detonation points. All of the affected area surrounding the detonation points has been open to the public since 1967 when the former TA-10 property was transferred to the County of Los Alamos.

This Interim Measure proposes immediate corrective actions to locate and remove all firing-site-related shrapnel and debris based on the following considerations: a) the significant level of contamination found on the metal shrapnel fragments, b) the fact that the area of concern is freely accessed by the general public, c) the large quantity of shrapnel currently observable throughout the area of concern, and d) the large area affected (approximately 100 acres).

2.0 SITE BACKGROUND AND ENVIRONMENTAL SETTING

Former TA-10 (Bayo Site) is located in Bayo Canyon between Kwage Mesa to the south and Otowi Mesa to the north (see Figures 1 and 2). The site was located on the canyon floor; however, the nature of the firing site activities affected an area greater than 100 acres surrounding the detonation points. This area included not only the canyon floor but also the talus slopes near the cliff faces, the adjacent mesa tops, and to some degree the canyons to the north and south of the site. Bayo Canyon is currently undeveloped and is open to the public for recreational use.

Former TA-10 (Bayo Site) was used as a firing site from approximately 1944 through 1963, and also housed a radiochemistry laboratory to facilitate preparation of the shots. TA-10 was constructed to test assemblies containing conventional high explosives (HE) that included components fashioned from depleted or natural uranium. The assemblies were loaded with a lanthanum (^{140}La) source of several hundred to several thousand curies (Ci) for blast diagnostics. The ^{140}La (half-life 40.3 hours) was contaminated with a small portion of strontium (^{90}Sr) (half-life 28.8 years). The ^{140}La was separated from its host material and prepared as a source in the radiochemistry building.

Detonation of the assemblies at the firing sites dispersed uranium and source activity to both air and ground. The firing sites were located at the west end of TA-10 and the radiochemistry laboratory and associated structures are at the east end (Figure 2). Over the operational life of the firing sites a total of 254 shots were fired containing an

estimated 69 000 kg of high explosives, 5 380 kg of uranium, 1 322 400 Ci of ^{140}La, and 40 Ci of ^{90}Sr. It is the remaining shrapnel from these firing sites activities that is to be recovered in accordance with this plan.

Bayo Site decontamination and decommissioning (D&D) activities started in 1960 with the demolition and/or burning of several buildings. Explosives testing at TA-10 ceased altogether in 1961; and site-wide decommissioning of both the firing sites, the radiochemistry laboratory, and associated structures was completed in 1963.

3.0 INTERIM MEASURE RATIONALE

Several radioactively contaminated shrapnel fragments were found during geomorphic mapping activities at the former TA-10 firing site in Bayo Canyon in September 1993. These pieces of shrapnel had very low activity levels of approximately 800 counts per minute (cpm) beta/gamma. Since background for that area is around 200 cpm beta/gamma, a follow-up investigation with the Health and Safety Group (HS-1) was initiated to corroborate the findings. During a brief (an hour or so) search for contaminated shrapnel, one fragment was found that exhibited a dose reading of 8 mrem/hour, with an activity level of 350 000 cpm beta/gamma. Other pieces of shrapnel and debris were found with radioactive contamination that ranged from 800 to 12 000 cpm beta/gamma.

Since this cursory site investigation for radioactively contaminated shrapnel easily produced several pieces with significant contamination, and since the former firing site area now belongs to the County of Los Alamos and is freely accessible to the public, it is reasonable and prudent to conclude that many other radioactively contaminated pieces of shrapnel exist among the many remaining pieces at the site and may present a hazard to the general public. Not only is the area freely accessible to the public, it is actually used almost continuously by adult and adolescent hikers, horseback riders, bicyclist, and joggers. Housing developments have expanded eastward on the mesa tops such that houses now overlook the former firing site area. A key concern is that some of the recreational users will collect interesting looking pieces of shrapnel that happen to be contaminated.

Based on considerations of potential hazards, along with considerations of knowingly leaving radioactively contaminated shrapnel on public property, it makes sense to find and remove the potential hazard before it becomes an issue. This interim measure has been developed to do just that: find and remove all metal shrapnel, both surface and subsurface, from the former TA-10 firing site.

The surface and subsurface consideration is important. Past efforts to remove shrapnel from the firing sites have always been limited to picking up surface debris. During the 20 year operational life of the firing site, much of the shrapnel must have become buried so that the large quantities now present in Bayo Canyon were not obvious during previous cleanup activities. Therefore, one must assume that contaminated shrapnel may still be buried and will present a future hazard if it is not located and removed along with the surface shrapnel.

4.0 PROPOSED INTERIM ACTION TECHNICAL APPROACH AND IMPLEMENTATION

The technical approach of this Interim Measure is to locate and remove ferrous and non-ferrous man-made materials in the upper four feet of the soil column by performing a thorough surface geophysical survey of the area. The four foot depth is based on the available geomorphic data that indicate the maximum thickness of material that has been deposited in the last 40 years, and therefore may contain man-made materials, is approximately 3.5 ft.

Since the materials that exhibit elevated radioactivity appear to be confined to small pieces of ferrous and non-ferrous metals, they are suitable for detection with specialized surface geophysical tools.

The surface geophysical survey will be performed using magnetometer- and induction-based geophysical tools for the detection of ferrous and non-ferrous man-made materials in the upper four feet of the soil column. The survey will continue out to the edges of the 100-ft by 100-ft geodetic grid spaces which are intercepted by a radius of 1 200 ft, or to the canyon wall, whichever comes first. Additionally, the mesa tops on both the north (Otowi Mesa) and south (Kwage Mesa) sides of the firing sites and a corridor, approximately 100-ft wide down the centers of each of two drainage channels that flow east from the firing site area will be screened, as shown by Figure 3. This area corresponds to the approximate radius of known radioactive-contaminated debris. In addition, the drainage channels will be screened to a point approximately 2 100 ft downstream of the edge of the 1 200-ft radius.

Verification of the Interim Measure effectiveness will be achieved by an independent contractor performing a second geophysical survey. The size of the area to be re-surveyed will be determined statistically.

5.0 SCHEDULE

The Interim Measure field activities outlined are expected to require approximately 100 work days to complete and could begin by spring, 1994. We are estimating that two field crews will be used to cover approximately an acre per day. This screening rate is an estimate and will naturally vary as a function of shrapnel density and ruggedness of terrain. A gantt chart schedule showing the full range of activities associated with this Interim Measure is given in figure 4.

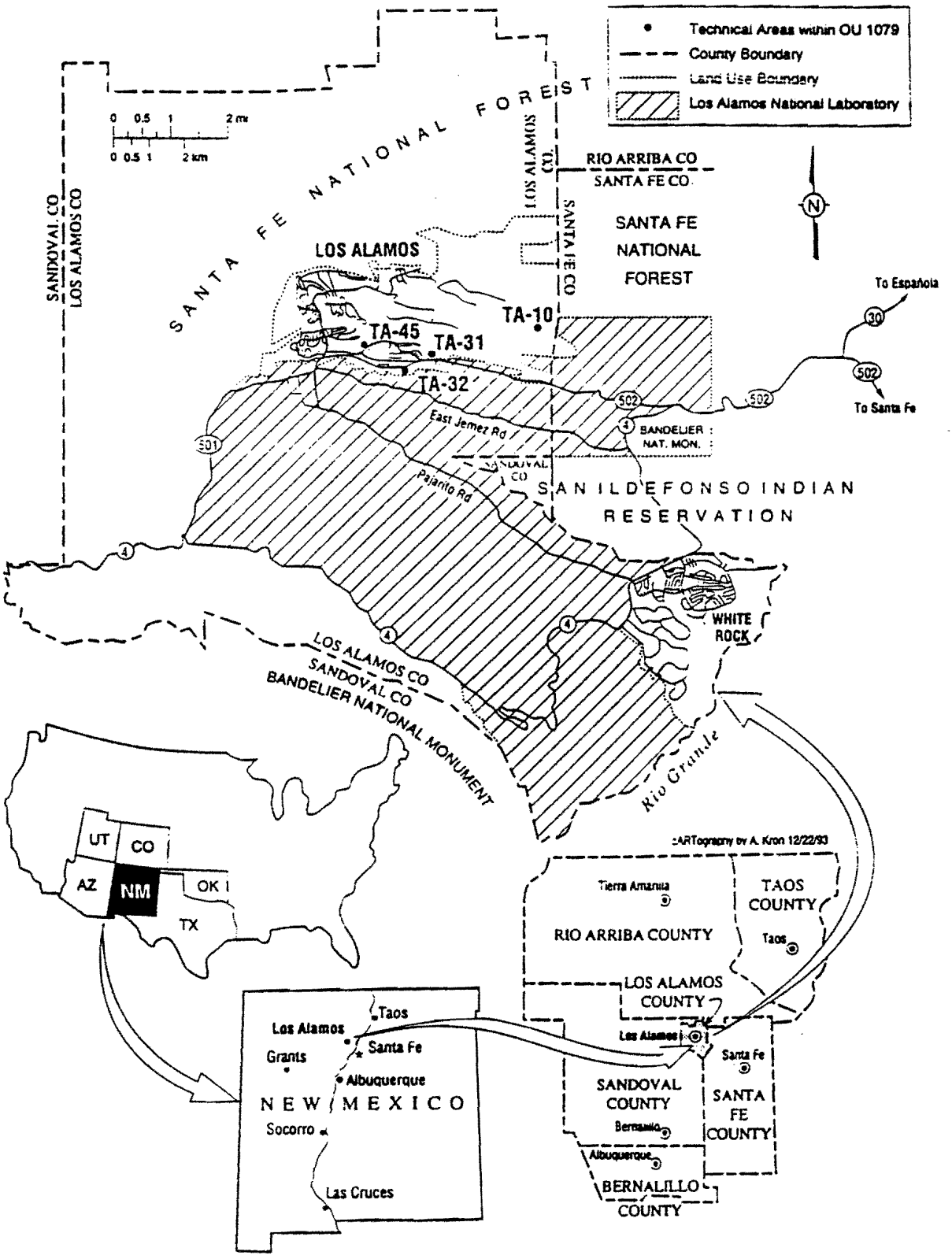
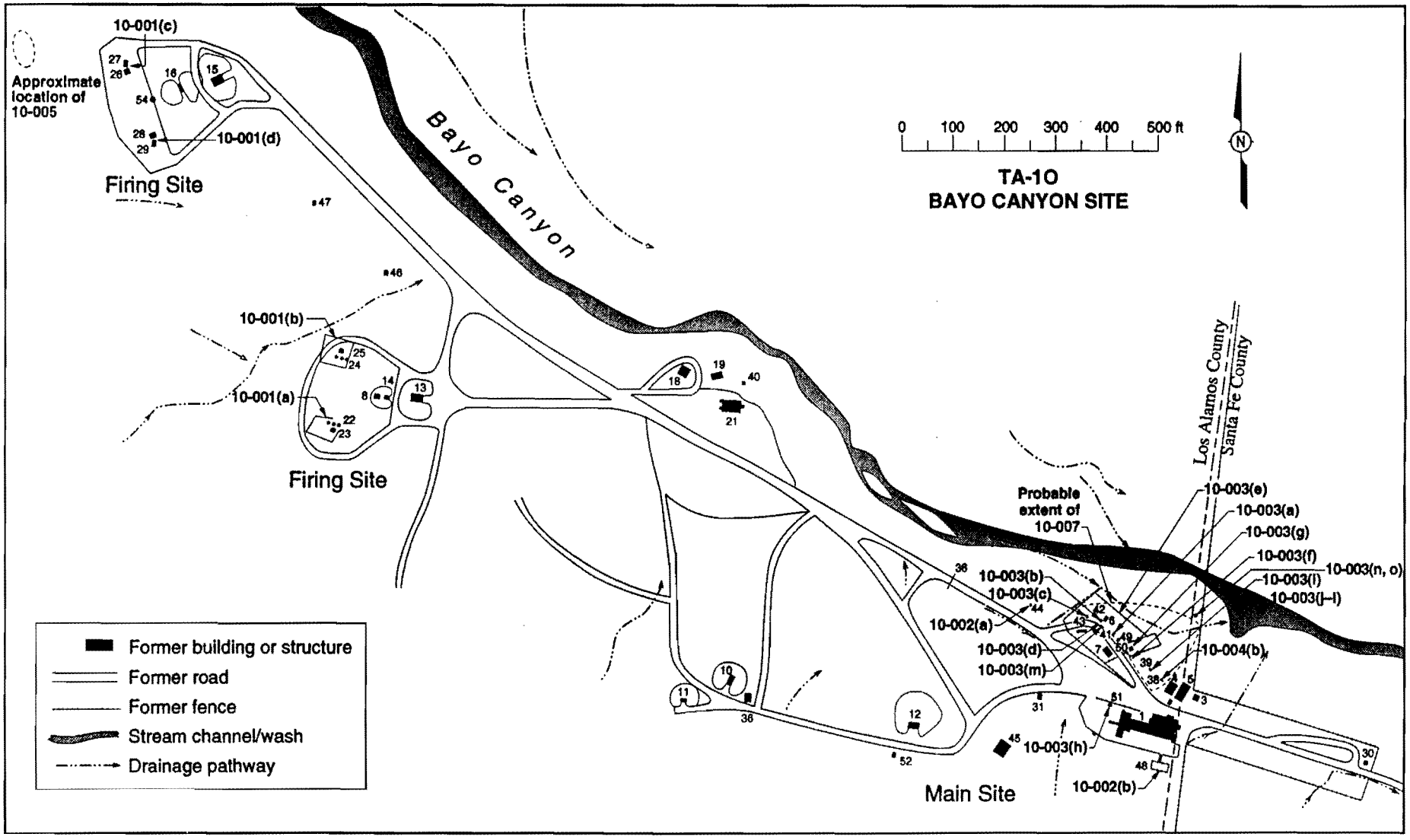


Figure 1. Location of areas with OU 1079 SWMUs.

Fig. 2. Locations of SWMUs at TA-10 Bayo Canyon Site.



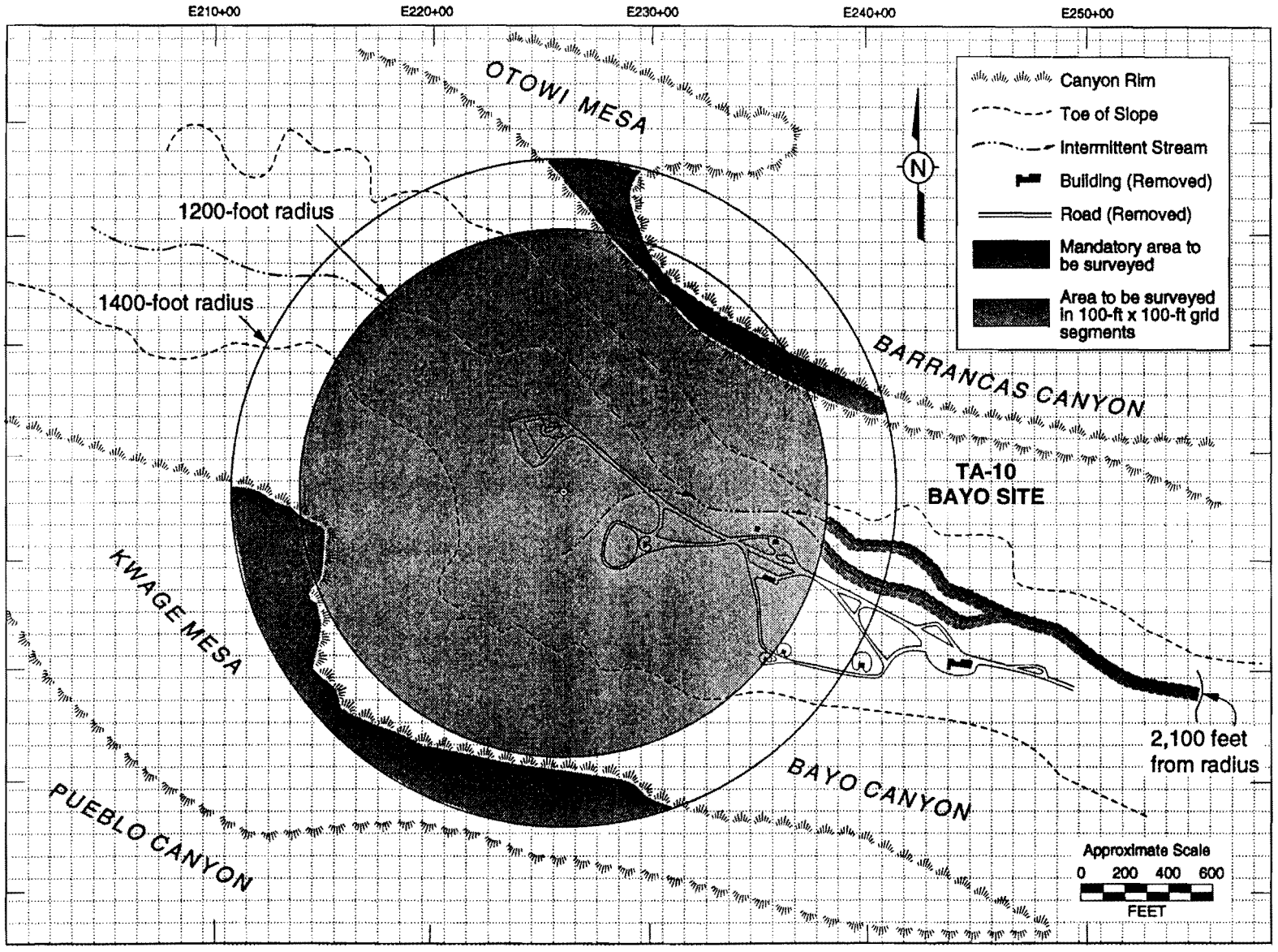


Figure 3. Area of coverage for geophysical survey.

ID	Activity Description	Duration	Scheduled Start
1	**Bayo Canyon Firing Site Shrapnel Removal**	**365d**	**Jan 1 '94**
2	**Prepare VCA Plan**	**75d**	**Jan 1 '94**
3	Complete Draft of Bayo Canyon VCA Plan	15d	Jan 1 '94
4	LANL Review of Bayo Canyon VCA Plan	20d	Jan 24 '94
5	Revise Bayo Canyon VCA Plan	10d	Feb 21 '94
6	DOE Review of Bayo Canyon VCA Plan	30d	Mar 7 '94
7	*Bayo Canyon VCA Plan Approved by DOE*	*0d*	*Apr 15 '94*
8	Bayo Canyon VCA Public Comment Period	45d	Apr 18 '94
9	**Prepare for Field Operations**	**33d**	**Apr 15 '94**
10	Prepare Bayo Canyon VCA Waste Management Plan	5d	Apr 15 '94
11	Prepare Bayo Canyon VCA Site Specific HASP	15d	Apr 15 '94
12	Prepare Other Bayo Canyon VCA Field Support Documentation	15d	Apr 15 '94
13	Conduct Bayo Canyon VCA Readiness Review	2d	May 6 '94
14	Mobilize personnel to perform Bayo Canyon VCA Geodetic survey	1d	May 10 '94
15	Conduct Bayo Canyon VCA Geodetic Survey	15d	May 11 '94
16	**Perform Geophysical Survey/ Fragment Removal**	**132d**	**May 12 '94**
17	Prepare Site for Bayo Canyon VCA Field Work	5d	May 12 '94
18	Mob. Bayo Canyon VCA Geophys Personnel / Provide task specific training	5d	Jun 17 '94
19	Conduct Bayo Canyon VCA Geophysical Survey/Fragment Removal	100d	Jun 24 '94
20	**Perform Waste Management**	**140d**	**Jul 11 '94**
21	Bayo Canyon VCA Waste Characterization Sample Collection	90d	Jul 11 '94
22	Bayo Canyon VCA Waste Characterization Sample Analysis	100d	Jul 11 '94
23	Bayo Canyon VCA Waste Disposal	120d	Aug 8 '94
24	**Perform Verification**	**15d**	**Nov 11 '94**
25	Bayo Canyon VCA Verification	15d	Nov 11 '94
26	**Bayo Canyon VCA Report**	**125d**	**Dec 2 '94**
27	Write Bayo Canyon VCA Report	20d	Dec 2 '94
28	LANL Review of Draft Bayo Canyon VCA Report	15d	Jan 2 '95
29	Inc. LANL Comments in Draft Bayo Canyon VCA Report	10d	Jan 23 '95
30	Prepare DOE Draft of Bayo Canyon VCA Report	5d	Feb 3 '95
31	*Submit DOE Draft of Bayo Canyon VCA Report*	*0d*	*Feb 10 '95*
32	DOE Review of Bayo Canyon VCA Report	20d	Feb 13 '95
33	Inc. DOE Comments in Bayo Canyon VCA Report	10d	Mar 13 '95
34	Prepare EPA Draft of Bayo Canyon VCA Report	5d	Mar 24 '95
35	*Bayo Canyon VCA Report Draft to EPA*	*0d*	*Mar 31 '95*
36	EPA Review of Bayo Canyon VCA Report	20d	Apr 3 '95
37	Inc. EPA Comments in Bayo Canyon VCA Report	10d	May 1 '95
38	Prepare Final Bayo Canyon VCA Report	10d	May 12 '95
39	*Final Bayo Canyon VCA Report to EPA*	*0d*	*May 26 '95*
40	*Bayo Canyon VCA Complete*	*0d*	*May 26 '95*

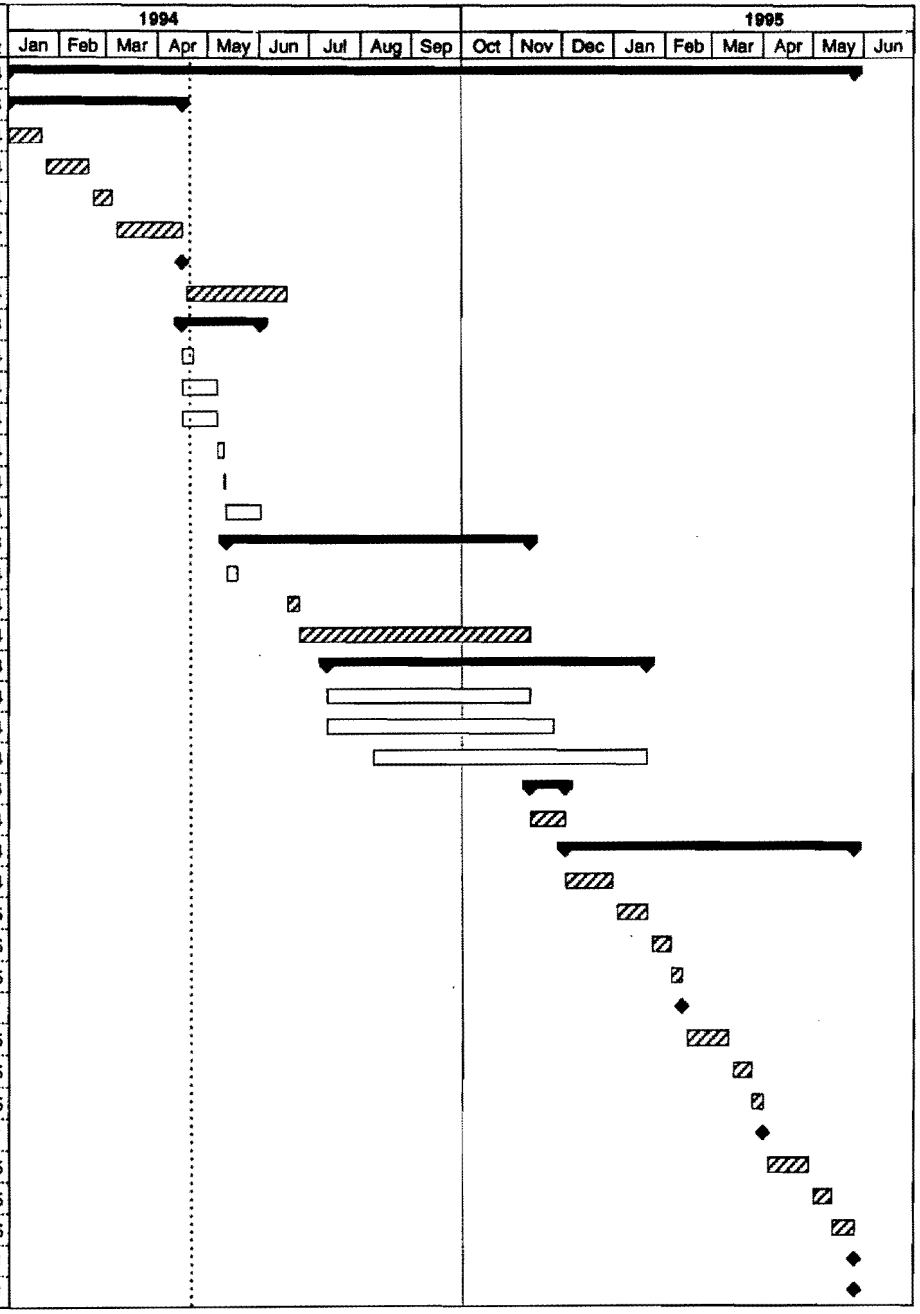


Figure 4. Bayo Canyon Shrapnel Removal Schedule