

Remedial Investigation Concept Plan for Picatinny Arsenal

Volume 2: Descriptions of and Sampling
Plans for Remedial Investigation Sites

by P.A. Benioff, M.H. Bhattacharyya,* C. Biang, S.Y. Chiu,
S. Miller, T. Patton, R. Pearl, A. Yonk, and C.R. Yuen

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Environmental Assessment and Information Sciences Division
Argonne National Laboratory, Argonne, Illinois 60439-4801

prepared for

Commander, U.S. Army Toxic and Hazardous Materials Agency,
Aberdeen Proving Ground, Maryland 21010-5401

*Biological and Medical Research Division, ANL.

fall. The samples should be analyzed for explosives, propellants, TCL metals, and TCL volatiles.

15.6.4.2 Phase II

If significant contamination is detected during Phase I, an effort should be made to locate its source and extent. To accomplish this, it may be necessary to resample all locations indicating contamination, collect additional surface soil samples, drill soil borings, and install groundwater monitoring wells. It is not possible, at this time, to accurately define the number of surface soil samples or soil borings that would be needed. However, the number should be sufficient to fully define the contaminated areas. Additional air sampling may also be needed.

The presence and extent of groundwater contamination should be determined during Phase II by drilling and installing groundwater monitoring wells. The number of wells required will depend upon the extent of contamination. At a minimum, one well should be located upgradient of any contaminated area, and two downgradient of the area.

All samples collected during Phase II should be analyzed for significant parameters found at significant concentration levels during the Phase I investigation.

15.7 SITE 12 — BUILDING 656, MUNITIONS WASTE PIT

15.7.1 Site History

This small 0.75-ha (3-acre) Site is located adjacent to 20th Ave. on Green Pond Mountain at an elevation of 360 m (1,175 ft) above MSL. The Site is adjacent to the western boundary of PTA, about 853 m (2,800 ft) northwest of the inlet to Picatinny Lake (Fig. 15.6). Based on physical evidence of partially buried metallic objects, it may have been used as a dump. Dames & Moore (1989) report that steel armor plate and metal parts were being disposed of at the Site. However, personnel familiar with past operations of the Site do not recall waste pits ever being present. Previously, the Site had been used as a borrow pit (Dames & Moore 1989).

During interviews with ANL staff, PTA personnel reported that testing has gone on for a number of years at this Site, and it is possible that UXO could be present. They also reported that the Site used to be a warehouse for explosives and that other buildings were used to store black powder.

Gaven (1986, Attachment B) reports that an unlined waste pit, about 0.18 ha (0.7 acres) in area, existed at this Site. The pit, which is not fenced, is posted and covered.

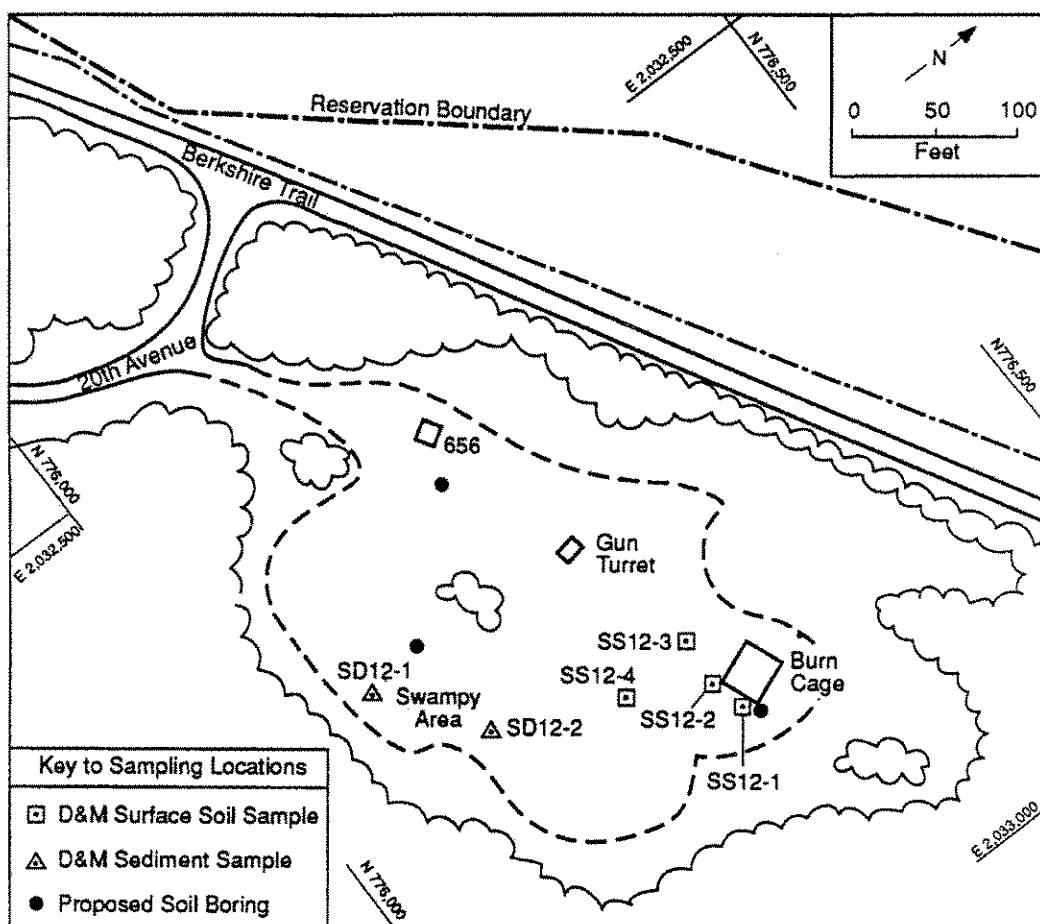


FIGURE 15.6 Layout of Site 12, the Munitions Waste Pit near Building 656
 (Sources: Map adapted from USACE 1984b; sampling locations from Dames & Moore 1989)

15.7.2 Geology and Hydrology

Site 12 is located on top of the Green Pond Mountain. The underlying bedrock is Green Pond Conglomerate. No surface water bodies or streams are found in the area; however, a swampy area is located along the southern boundary of the Site. Detailed hydrogeological information is not available, as no monitoring wells have been drilled at the Site.

Soils at the Site have been mapped as the Rockaway and Rock Outcrop Associations (Eby 1976). These soils are deep, well to moderately well drained, and strongly sloping to very steep, stony sandy loams. The soils overlie granitic gneiss, quartzite, and conglomerate. Bedrock is at the surface, in places, in the form of strongly sloping to very steep rock outcrops. In other places the depth to bedrock is more than 3 m (10 ft), and depth varies greatly within short horizontal distances. Soils in this association have slow permeability (Eby 1976).

15.7.3 Existing Contamination

The amounts and kinds of materials disposed of at this Site and their composition remain unknown. Ludemann et al. (1981) report that the types of hazards present at this Site could include acids, pickling liquors, cyanide, phenols, metals, live ammunition, and propellants (rocket).

To evaluate the pollution potential of this area, Dames & Moore (1989) collected four soil samples and two sediment samples at the locations shown in Fig. 15.6. Analytical results are presented in Tables 15.10 and 15.11. Soil samples SS12-1 and -2 were collected from the perimeter of the metal cage, which may have been used for burning of explosives. Samples SS12-3 and -4 were collected from areas where there is evidence of testing activities. Results of the soil sample analyses for sulfate, barium, priority pollutant metals, and explosives are summarized in Table 15.10.

Sediment samples SD12-1 and -2 were collected from the small, swampy area at the base of an embankment. Results of the sediment sample analyses for sulfate, nitrate, nitrite, barium, priority pollutant metals, and explosives are summarized in Table 15.11.

The soil data in Table 15.10 show the presence of explosives contamination (up to 97 ppm nitroglycerin and some RDX, and DNTs, and TNT) and metal contamination (up to 1,400 ppm copper and possibly lead and mercury) in both the metal cage and testing area. The sediment data in Table 15.11 suggest the presence of lead (up to 120 ppm) and possibly cadmium (up to 12 ppm) and arsenic contamination.

15.7.4 Proposed RI Plan

15.7.4.1 Phase I

A surface reconnaissance of the Site should first be conducted to locate any obvious signs of contamination. This survey should be followed by a geophysical survey to locate UXO, drums, and other buried objects. All UXO located by the survey should be removed, and any located buried drums should be sampled and removed.

To characterize the contamination potential of the subsurface soils at this Site, a maximum of six soil borings should be drilled. If the pit is located, at least three soil borings should be drilled near the pit to a depth 0.3 m (12 in.) below its bottom. Three additional soil borings should be drilled, one near sediment sampling location SD12-1, another near Bldg. 656, and the third just east of surface soil sampling location SS12-1. Soil samples should be collected from each boring over a 0.6-m (2-ft) interval from the top, middle, and bottom of each boring for a total of 18 samples. Suggested boring locations are shown in Fig. 15.6.

Samples should be analyzed for TCL metals, explosives, propellants, nitrate, nitrite, gross alpha, and gross beta.

TABLE 15.10 Selected Analytical Results for Soil Samples from Site 12 (ppm)

Parameter	Metal Cage Samples		Testing Area Samples	
	SS12-1	SS12-2	SS12-3	SS12-4
Mercury	1.47	1.38	2.36	0.23
Arsenic	>10	8.58	2.97	3.45
Cadmium	6.3	11	5.5	2.2
Chromium	51	37	5.9	8.5
Lead	>5	64	6.7	BDL
Barium	41.9	46.3	83.9	27.6
Beryllium	BDL	0.44	0.55	0.39
Copper	>50	320	BDL	1,400
Zinc	153	151	244	427
Sulfate	91.1	105	BDL	BDL
RDX	BDL	BDL	11	BDL
1,3-Dinitrobenzene	BDL	BDL	12.1	BDL
2,4-Dinitrotoluene	BDL	11.7	BDL	BDL
2,4,6-Trinitrotoluene	BDL	BDL	BDL	8.84
Nitroglycerin	BDL	97	39	13

^aBDL means below detection limit. Table lists only the parameters that were detected in one or more samples.

Source: Dames & Moore 1989.

Since the Site is inactive and the pit area is reportedly covered, air samples are not needed in Phase I.

15.7.4.2 Phase II

If significant contamination is detected during Phase I, an effort should be made to locate its source and extent. To accomplish this, it may be necessary to resample all locations indicating contamination, collect additional surface soil samples, drill soil borings, and install groundwater monitoring wells. It is not possible, at this time, to accurately define the number of surface soil samples or soil borings that would be needed. However, the number should be sufficient to fully define the contaminated areas. Air samples may also be needed.

The presence and extent of groundwater contamination should be determined during Phase II by drilling and installing groundwater monitoring wells. The number of

**TABLE 15.11 Selected Analytical Results
for Sediment Samples from Site 12
(ppm)^a**

Parameter	SD12-1	SD12-2
Mercury	0.266	BDL
Arsenic	12.3	16
Cadmium	12	0.27
Chromium, total	7	11
Lead	120	16
Barium	116	39.5
Beryllium	BDL	0.46
Copper	21.3	18.5
Nickel	BDL	16
Zinc	116	99.4

^aBDL means below detection limit.
Table lists only the parameters
that were detected in one or more
samples.

Source: Dames & Moore 1989.

wells required will depend upon the extent of contamination. At a minimum, one well should be located upgradient of any contaminated area and two downgradient of the area.

All samples collected during Phase II should be analyzed for significant parameters identified during the Phase I investigation.

15.8 SITE 13 — BUILDING 640, MUNITIONS/PYROTECHNICS TEST AREA

15.8.1 Site History

This inactive Site is located on the top of Green Pond Mountain at an elevation of about 340 m (1,125 ft) above MSL. Access to the Site is via Bear Swamp Road to Bell Road then to Nicholls Road, which runs along the northwest side of the Site (Fig. 15.7). The Site is about 2.2 ha (5.5 acres) in extent and contains eight structures and portions of Nicholls Road.