

June 1, 2009

Mr. Kelly W. Crooks
Chief Operations Division
Safety/Rad Waste Directorate
US Army - JMC
1 Rock Island Arsenal (AMSJM-SF)
Rock Island, IL 61299-6000

SUBJECT: NRC INSPECTION REPORT 04008767/2009-001 (DNMS) - LAKE CITY ARMY
AMMUNITION PLANT

Dear Mr. Crooks:

On March 21-22, 2009, the U.S. Nuclear Regulatory Commission (NRC) performed a Confirmatory Radiological Survey at the Lake City Army Ammunition Plant (LCAAP), located in Independence, MO. The purpose of the NRC's Confirmatory Survey was to assess and confirm the effectiveness of the Army's decommissioning and decontamination activities relating to the Area 10 Sand-Piles located on the LCAAP property. Specifically, the Confirmatory Survey included independent NRC radiological surveys and collection of soil samples in the vicinity of the Area 10 foot-print, and a general review of the Army's Area 10 final status survey data. At the conclusion of the March 22, 2009, on-site Confirmatory Survey, the NRC inspectors discussed the preliminary findings with members of your staff. On May 5, 2009, the inspectors completed an in-office review of the results of the analysis of the NRC soil samples collected during the inspection and conducted a telephone exit interview.

The Confirmatory Survey consisted of a review of the Army's final status survey data, field observations of activities in progress, and interviews with Army and decommissioning contractor personnel. The survey also included NRC gamma walkover surveys, collection of soil samples and independent analysis of the soil samples by the NRC. Specific areas examined during the inspection are identified in the enclosed report.

Based on the results of this survey, the NRC did not identify any violations. Nor did the NRC identify contamination remaining at the Area 10 site in excess of the Army's approved Decommissioning Plan unrestricted use limit for depleted uranium. To finalize the decommissioning of Area 10 for unrestricted use, it will be necessary for the Army to submit a license amendment requesting release of the site. Additionally, the amendment request must include a finalized Area 10 Status Survey Report, which documents and demonstrates that the Area 10 site condition is consistent with the NRC's approved decommissioning plan.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). The NRC's document system is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

K. Crooks

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We will gladly discuss any questions you may have regarding this NRC Confirmatory Survey.

Sincerely,

/RA by William G. Snell acting for/

Christine Lipa, Chief
Material Control, ISFSI,
Decommissioning Branch

Docket No. 040-08767
License No. SUC-01380

Enclosure:
Inspection Report 04008767/2009-001(DNMS)

cc w/encl: C. Sperry, U.S. Environmental Protection Agency
D. Childers, Director, Missouri Department of Natural Resources (MDNR)
R. A. Kucera, Director, Intergovernmental Cooperation
M. Barnes, MDNR

K. Crooks

-2-

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No.: 040-08767
License No.: SUC-01380

Report No.: 040-08767/2009-001 (DNMS)

Licensee: Lake City Army Ammunition Plant

Dates: March 21-22, 2009, with continuing in-office review through May 5, 2009

Inspectors: George M. McCann, Senior Health Physicist
Peter J. Lee, PHD, CHP, Health Physicist
Katie Streit, Health Physicist

Approved By: Christine Lipa, Chief
Material Controls, ISFSI and
Decommissioning Branch
Division of Nuclear Materials and Safety

EXECUTIVE SUMMARY

Lake City Army Ammunition Plant Inspection Report No. 040-08767/2009-001(DNMS)

The NRC conducted a confirmatory survey to evaluate the U.S. Army's success in remediating and decommissioning an area contaminated with depleted uranium (DU) located at the Army's Lake City Army Ammunition Plant (LCAAP). The LCAAP site is located on U.S. Highway 7 and 78 between Independence and Blue Springs, Missouri. The Army plant manufactures and tests small caliber conventional munitions.

During the 1960's and 1970's, the Army performed a small-scale munitions test operation using NRC licensed material (depleted uranium (DU)). These munitions were test fired on the LCAAP firing range. By 1968, the test program ceased and LCAAP was left with a number of DU rounds needing disposal. In 1971, the Army's munitions contractor proposed procedures for the disposal of the remaining rounds. This disposal activity involved shooting the rounds into a sand filled catch box. The catch box was filled with sand as an impact material. The impact material was periodically replaced in the catch box and placed in an on-site area identified as "Area 10."

The LCAAP site was included in the NRC's Site Decommissioning Management Program (SDMP) on March 29, 1990, because of the depleted uranium (DU) contamination. The U.S. Environmental Protection Agency (EPA) pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) initiated remediation of the site in the 1980s, and the LCAAP site was included on the National Priorities List in 1987. The EPA proposed the site for remediation under CERCLA because of extensive non-radiological contamination. In SECY-01-0088, the NRC proposed to defer the cleanup of Area 10 to the EPA.

In a June 13, 2001 NRC memorandum, it was stated in part that "The Commission has approved the staff recommendation to defer remediation oversight of the depleted uranium contamination located in Area 10 of the Lake City Army Ammunition Plant (LCAAP) to the Environmental Protection Agency (EPA)." The Commission also approved the staff recommendation to remove the LCAAP from the NRC SDMP, with the understanding that the LCAAP license would not be considered for termination until Area 10 remediation has also been completed, which was known that it may not take place until 2008.

In 2001, the NRC deferred its decommissioning oversight authority for Area 10 to the EPA in order to facilitate the remediation of both chemical and radiological contaminants without imposing dual regulation. The intent was that EPA would assume oversight responsibility for the remediation of Area 10 as part of its overall regulatory oversight authority at LCAAP under the Federal Facilities Agreement. The NRC retained responsibility for reviewing EPA's determination as to whether Area 10 had been successfully remediated, and for ensuring that the remediation complied with the NRC release criteria for unrestricted use, as specified in the Army's NRC Source Material license No. SUC-1380.

On August 8, 2001, the NRC amended the Army's license changing the Area 10 cleanup schedule to December 31, 2008. As part of the licensing action, the NRC reserved the right to review any documentation upon which either EPA, Missouri Department of Natural Resources (MDNR) or the licensee base the finding that Area 10 satisfies NRC cleanup criteria. Also, NRC reserved the right to perform a confirmatory survey of this area.

The Army's decommissioning contractor completed the processing of the Area 10 sand piles during December 2008, and completed the final status survey of the Area 10 sand pile footprint during March 2009. To facilitate and ensure close communication between the responsible regulatory agencies, the NRC inspectors coordinated this confirmatory survey with the Missouri Department of Natural Resources (MDNR) and the U.S. Environmental Protection Agency (EPA). The NRC inspectors were accompanied by representatives of MDNR and EPA during this survey. The final step in satisfying the NRC and EPA agreement will be the submission of a license amendment to the NRC, with a Final Status Survey Report attached that requests release of the Area 10, and documents that residual contamination is consistent with criteria specified in the Army's NRC approved Decommissioning Plan.

Final Status and Confirmatory Surveys

- The inspectors concluded, based on independent radiation surveys, collection and analyses of soil samples, and review of the licensee's survey report data, that the Area 10 footprint, which under-laid the former spent bullet catcher sand, met the licensee's unrestricted release criteria as defined in the LCCAP Decommissioning Plan.

Report Details¹

1.0 Closeout Inspection and Survey (IP 83890)

a. Inspection Scope

The NRC inspectors performed an independent confirmatory radiological survey of the soils underlying the former Area 10 sand-pile storage area to identify residual depleted uranium. The NRC Confirmatory Survey Plan initially specified that a 10% gamma walkover radiation survey of the surface soils would be performed using calibrated survey meters, such as Sodium Iodide scintillation detectors, which included the Field Instrument for the Detection of Low Energy Radiation (FIDLER)), and Geiger-Mueller (GM) survey instruments with beta-gamma pancake probes attached. The scope of the walk-over survey was expanded to approximately 20% after a few elevated spots were identified in a ravine on the site. The inspectors also collected 20 soil samples for analysis from biased and other areas, which were randomly picked by the inspectors. The bias areas identified by the inspectors were low-lying areas, water run-off areas or areas identified as having elevated radiation readings on the Area 10 footprint.

The NRC inspectors used the Army's "Draft Area 10 Sand Piles Removal Action, Final Status Survey Report , Lake City Army Ammunition Plant Independence, Missouri," dated February 2009, as a reference prior to and during the conduct of the NRC's confirmatory survey. The Army's Draft Final Status Survey Report was developed by the Army and its decommissioning contractor using guidance contained in the "Area 10 Sand Piles Removal Action, Final Status Survey Plan, Lake City Army Ammunition Plant, Independence, Missouri." The MDNR and EPA accepted the Army's Survey Plan during October 2008. The inspectors also interviewed the Army's decommissioning contractors' personnel regarding the conduct of the final status survey and collection of soil samples.

b. Observations and Findings

Following the removal of the over-lying sand pile material from Area 10, the decommissioning contractor divided the approximate 6 acre Area 10 foot print into ten Class 1 and one Class 2 survey units, employing a NUREG-1575, "Multi-Agency Radiation Survey and Site Investigation Manual" methodology (Figure 3-1: Final Status Survey Results – Soil Survey Units), Attachment 1. The contractor performed a 100% ground walk-over survey (GWS) in each of the ten Class 1 underlying soil survey units, and surveyed a minimum of 50% of the adjacent soil Class 2 survey unit, which included an area approximately 5 meters wide surrounding the perimeter of the sand pile footprint, as well as the swale between the footprint and a down-gradient pond. The purpose of the GWS was to locate and remove any remaining DU projectiles or fragments following the removal of sand pile material, as well as to identify areas of

¹ A list of acronyms used in the report is included at the end of the Report Details.

elevated radioactivity for the collection of biased surface soil samples. The Army's NRC license limited DU contamination for unrestricted use for residual underlying and adjacent soil to 35 picocuries per gram (pCi/g) of total uranium. The contractor collected systematic soil samples from a total of 154 locations, and 13 samples were obtained from biased locations. Analytical results for these samples were all below the approved soil release limit.

During the NRC walkover gamma survey, areas that were identified greater than two times the ambient background radiation levels, approximately 12,000 counts per minute, were marked with flags. The NRC inspectors also performed side-by-side comparison radiation measurements with the Army's contractor. The NRC's and the contractor's survey instrument measurements were consistent with each other. The elevated gamma radiation levels were located and documented by the decommissioning contractor using a global positioning satellite (GPS) unit, and were documented in Figure 1, "Caberra Gamma Walkover Survey and DU Fragment Locations," Attachment 2.

Except for 18 small spots with elevated radiation levels in a small area overlapping two survey units, all other survey units surveyed by the NRC were consistent with ambient radiation background levels. The Army remediated the areas found with elevated radiation levels. Small pieces of DU fragments were found in 17 of the identified locations. Following remediation by the decommissioning contractor all areas were found to be consistent with ambient radiation background levels. One of the areas identified as being elevated could not be relocated. As a result of the identification of the elevated spots, the NRC inspectors increased the percentage of its walk-over survey from 10% to approximately 20%, focusing on biased areas such as erosion ravines and run-off areas. No other elevated locations were identified by the NRC inspectors.

The inspectors selected 20 areas for collection of soil samples from judgmental and random areas. The samples were split with the Army's contractor. Six of the samples were collected from areas previously identified with elevated radiation levels after remediation, and twelve of the samples were randomly collected from areas in the Area 10 footprint with emphasis on run off collection areas and ditches. One sample was collected near a pond, which is down gradient from the Area 10 footprint. A non-impacted area near the Area 10 footprint was selected for the collection of a background sample. This sample was collected in a wooded area up-gradient from the Area 10 footprint. The soil sample locations were located and documented by the Army's decommissioning contractor using a global positioning satellite (GPS) unit, and are documented in Figure 2, "Caberra Gamma Walkover Survey Results and Regulatory Agency Sample Locations," Attachment 3.

The 20 samples were sent to the NRC's contract laboratory, Oak Ridge Institute for Science and Education (ORISE) for analysis. The ORISE analytical results for the soil samples can be found in the NRC's Electronic Reading Room at <http://www.nrc.gov/reading-rm/adams.html>. From this site, you can access the NRC's Agencywide Document Access and Management System (ADAMS), which provides text and image files of NRC's public documents. (See ADAMS ML090980164)

The results for total Uranium, excluding one sample, ranged from 0.7 to 8.8 pCi/g, with a background result of 4.7 pCi/g. One outlying sample was found with a result of total Uranium of 34.4 pCi/g. In this sample, the NRC laboratory contractor found two small DU fragments in the sample. After removal of the fragments, the soil was recounted with a result of 7.27 pCi/g. All these results are below the licensee's NRC approved unrestricted release criteria of 35 pCi/g for total uranium activity. The results for U-238 ranged from 0.67 to 6.12 pCi/g, all below the licensee's approved soil unrestricted release criteria of 29.2 pCi/g. The results for U-235 ranged from 0.10 to 0.25 pCi/g, which is below the 8 pCi/g specified in the NRC's NUREG-1757, Vol. 1, Table B.2 "Screening Values (pCi/g) of Common Radionuclides for Soil Surface Contamination Levels." The background for U-238 was 1.48 pCi/g.

c. Conclusion

The inspectors concluded, based on independent radiation surveys, collection and analyses of soil samples, and review of the licensee's survey report data, that the Area 10 footprint, which under-laid the former spent bullet catcher sand, met the licensee's unrestricted release criteria as defined in the LCCAP Decommissioning Plan.

2.0 Exit Meeting Summary

The inspectors presented preliminary inspection findings to the licensee and licensee contractor at the conclusion of the onsite inspection activity on March 22, 2009. The inspectors discussed the final inspection findings, which included the NRC's independent analysis of soil samples on May 5, 2009. The licensee did not identify any documents or processes reviewed by the inspectors as proprietary.

PARTIAL LIST OF PERSONS CONTACTED

Clint Sperry, US Environmental Protection Agency, Region V
Margy Barnes, Missouri Department of Natural Resources
Frank Whitaker, Army
Barb Duletsky, Cabrera
Hank Siegrist, Cabrera

INSPECTION PROCEDURES USED

IP 83890 Closeout Inspections and Surveys

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened None

Closed None

Discussed None

ATTACHMENTS:

As stated

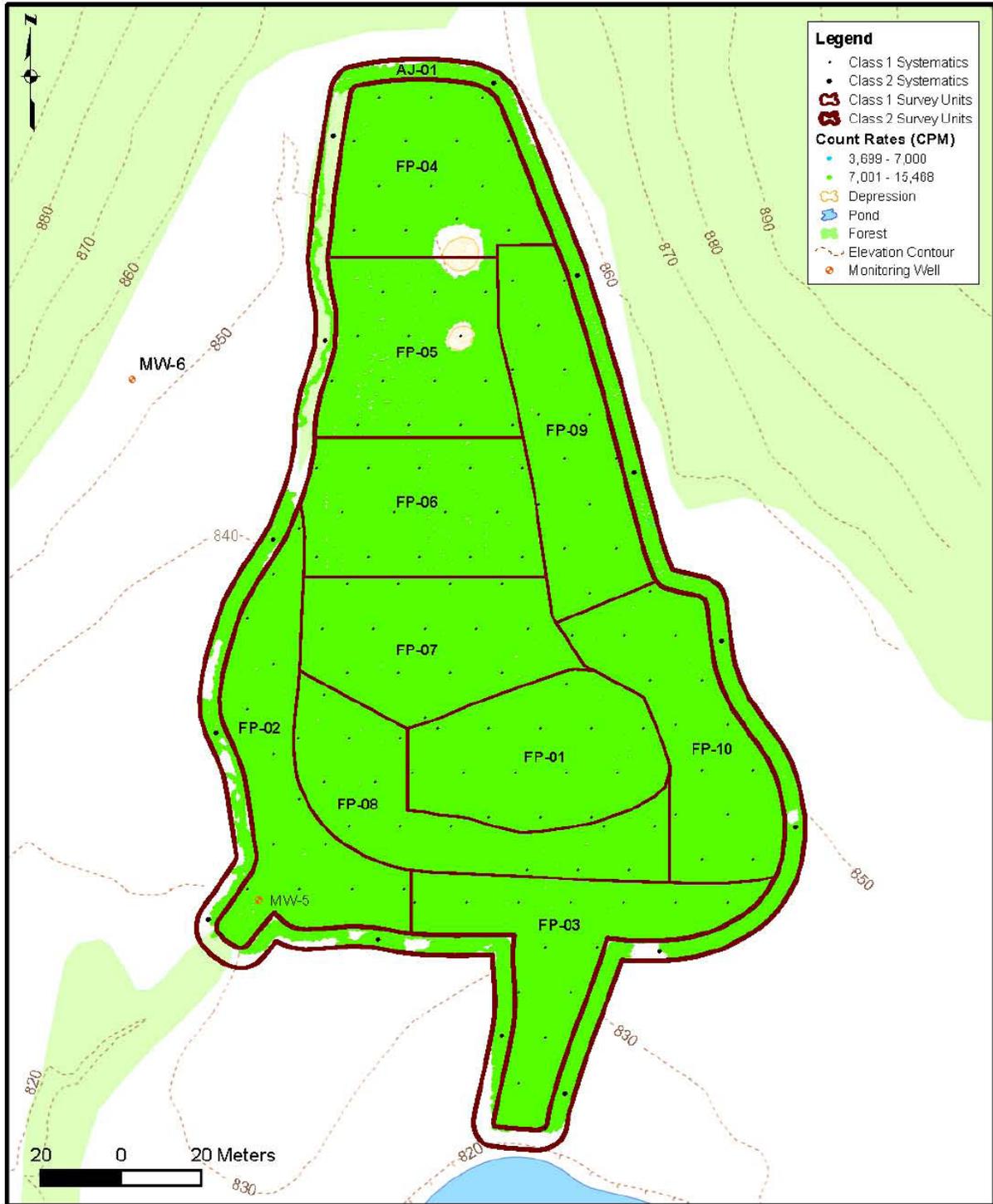
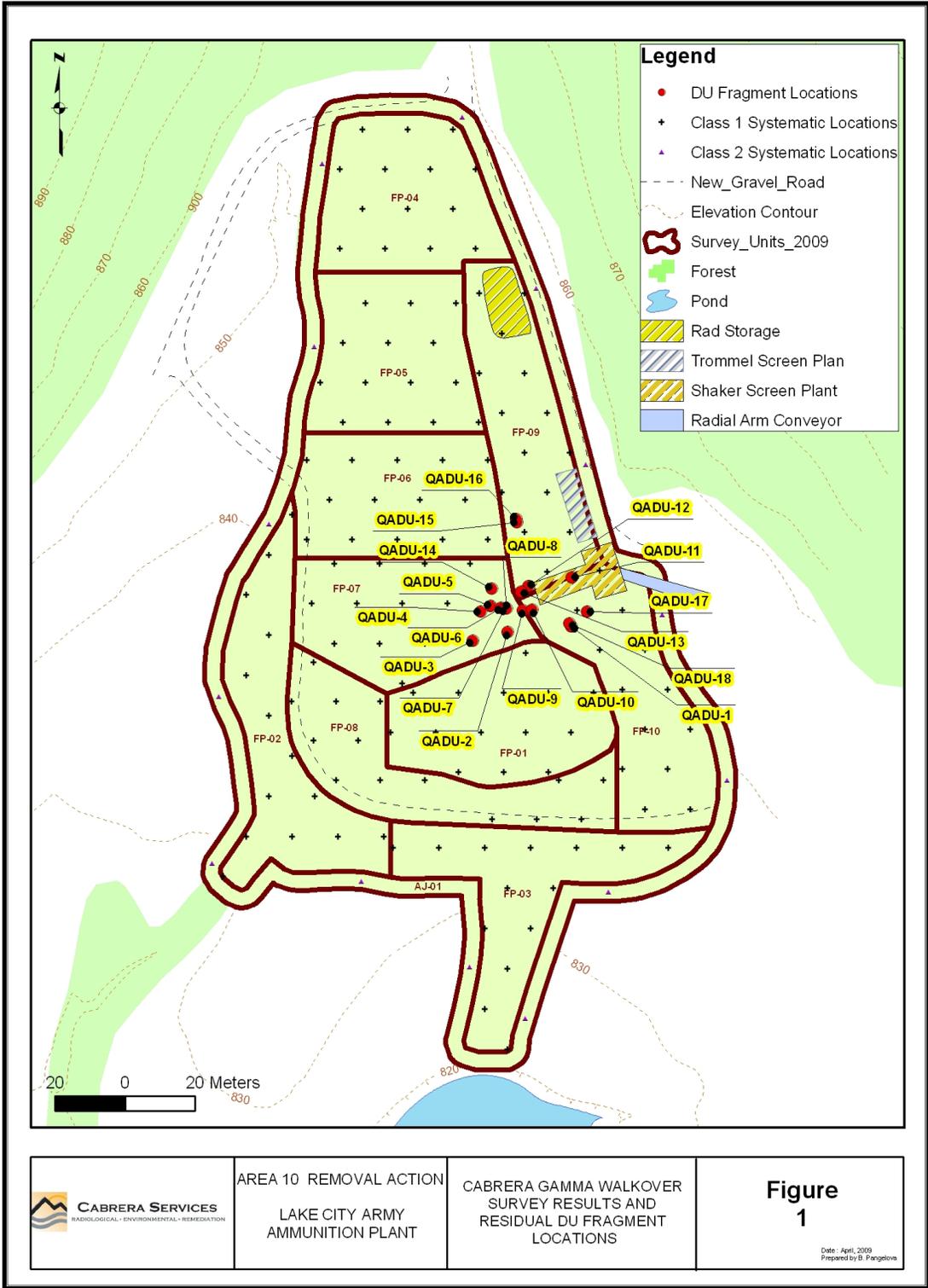


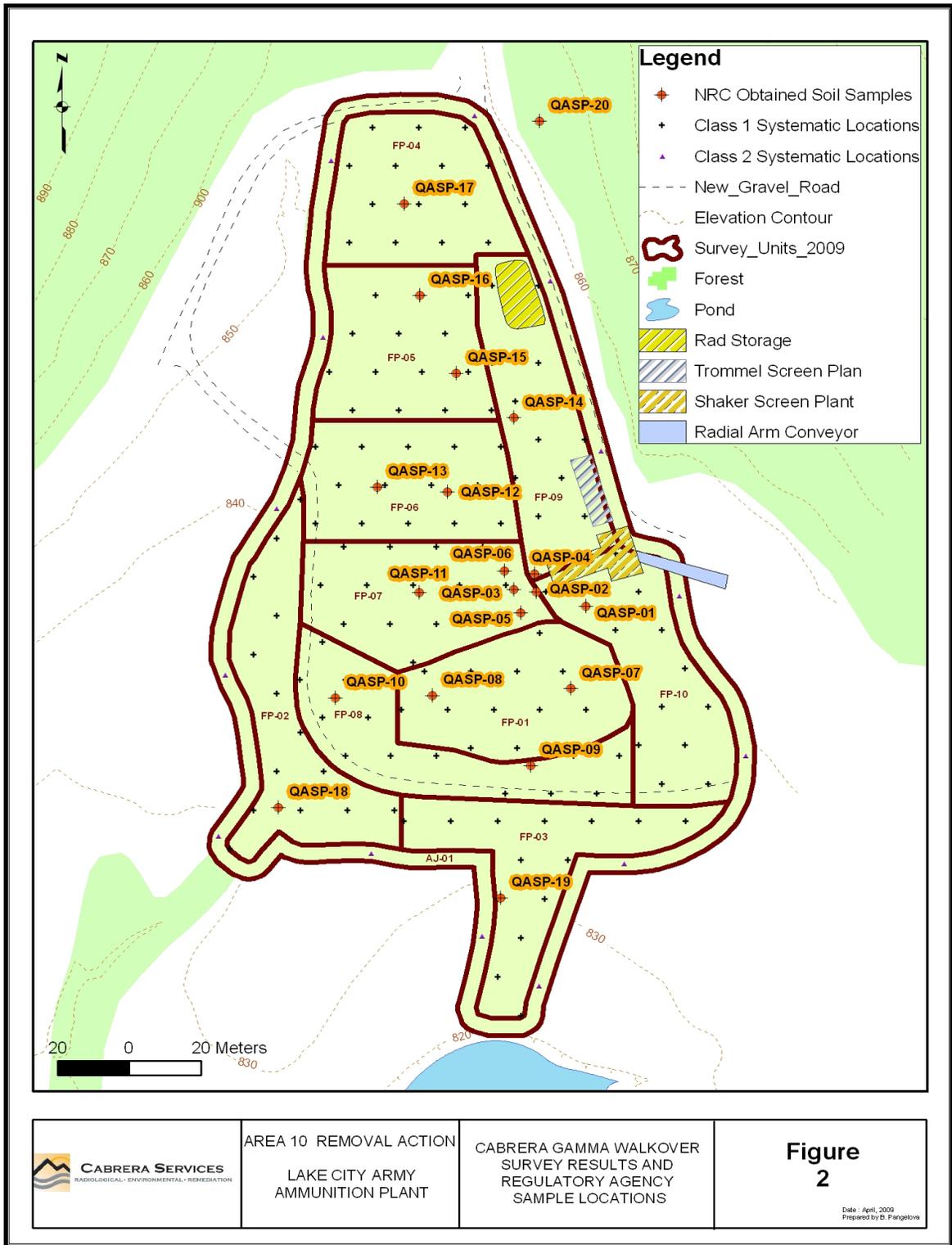
Figure 3-1: Final Status Survey Results - Soil Survey Units



AREA 10 REMOVAL ACTION
LAKE CITY ARMY
AMMUNITION PLANT

CABRERA GAMMA WALKOVER
SURVEY RESULTS AND
RESIDUAL DU FRAGMENT
LOCATIONS

Figure 1



AREA 10 REMOVAL ACTION
LAKE CITY ARMY
AMMUNITION PLANT

CABRERA GAMMA WALKOVER
SURVEY RESULTS AND
REGULATORY AGENCY
SAMPLE LOCATIONS

Figure 2
Date: April, 2002
Prepared by: B. Pangelova