



New World Technology

**Final Report on
Radiological Surveys and Support
Area 1222, Gorge Area
Picatinny Arsenal, New Jersey 07806-5000**

Revision 2

July 21, 2006

Prepared by:

New World Technology
448 Commerce Way
Livermore, CA 94551
(925) 443-7967

For:

Conti Environment and Infrastructure, Inc.
5210 Chairman's Court
Fredrick, MD 21703

TABLE OF CONTENTS

Section	Page
1.0 SUMMARY	1
2.0 SITE INFORMATION	1
2.1 SITE DESCRIPTION.....	1
2.2 SITE RADIOLOGICAL HISTORY	2
3.0 SCOPE OF ACTIVITIES.....	3
4.0 SUPPORT ACTIVITIES.....	3
4.1 INSTRUMENT SELECTION	7
4.1.1 Instruments for Gamma Scan Surveys	7
4.1.2 Instruments for Scan Surveys for Alpha and Beta Surface Activity	9
4.2 INSTRUMENT EQUATIONS.....	10
4.2.1 Instrument Efficiency.....	10
4.2.2 Minimum Detectable Concentration for Static Alpha and Beta Counts	11
4.2.3 Surface Efficiency (ϵ_s) for Surface Activity Measurements.....	12
4.2.4 Minimum Detectable Count Rate and Minimum Detectable Concentration for Beta and Gamma Scans	12
4.2.5 MDC for Gamma Scans of Surface Areas (2-inch by 2-inch NaI Probe)	13
4.3 RESPONSE CHECK SOURCES.....	14
4.4 BACKGROUND REFERENCE AREA	14
4.5 RADIOLOGICAL SURVEY RESULTS.....	16
4.5.1 Summary.....	16
5.0 QUALITY CONTROL AND QUALITY ASSURANCE.....	17
5.1 SELECTION OF PERSONNEL.....	17
5.2 TRAINING.....	17
5.3 WRITTEN PROCEDURES.....	18
5.4 INSTRUMENT SELECTION, OPERATION, MAINTENANCE, AND CALIBRATION.....	18
5.5 REVIEW OF SURVEY RESULTS	18
6.0 RECORDS	18
6.1 RECORDS GENERATION.....	18
7.0 REFERENCES	19

List of Figures, Tables, Appendixes and Attachments

Figure 1 Area 1222 Layout Diagram.....	5
Figure 2 U-238/Ra-226 Decay Chain	9
Figure 3 Area 1222 Background Reference Area.....	15
Table 1 - Background Gamma Measurement Data, 2350-1 # 95337	16

Attachment 1- NWT NRC Broad Scope Radioactive Material License

Attachment 2 – NRC Inspection Report (FORM 591M)

Attachment 3 – Daily Instrument Source Check Results

Appendix 1 – Land Area Surveys

Appendix 2 – Equipment and Materials Surveys

ACRONYMS AND ABBREVIATIONS

α	Alpha
Action Level	11,958 gross cpm
Aggregate	any rock, gravel or sand, together with whatever substances are for the time being incorporated in the rock, gravel or sand or naturally occur mixed with it
AOC	Areas of concern
ALARA	As Low As Reasonably Achievable
ANSI	American National Standard Institute
AR 11-9	The Army Radiation Safety Program
ARDEC	Armaments Research, Development & Engineering Center
AREA 1222	The Gorge
ARP	Army Radiation Permit
β	Beta
B	Background counts
Background Reference Area	an radiologically non-impacted area used for determining background radiation levels
Background Level	9,158 cpm gamma
Bkg	Background
cm	Centimeter
cm ²	Square centimeter
Conti	Conti Environment and Infrastructure
cpm	Counts per minute
Cs ¹³⁷	Cesium-137 Check Source
DA 3777	ARP Application
dpm	Disintegrations per minute
dpm/100cm ²	Disintegrations per minute per 100 square centimeters
DU	Depleted Uranium
eff	Efficiency
Felt Liner/Mat	a material used as a barrier to retard the mixture of two different soil layers
FOP	Field Operating Procedures
Frisk	Process of monitoring personnel for contamination. Frisking can be performed with hand-held survey instruments, automated monitoring devices or by a Radiological Control Technician
Ft	Feet
Ft ²	Square feet
g	Gram
HASP	Health and Safety Plan (HASP).
inst	Instrument
IAW	In Accordance with
LLD	Lower Level of Detection
m	Meters
m ²	Square meter
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual

MDA	Minimum Detectable Activity
MDC	Minimum Detectable Concentration
MDCR	Minimum Detectable Count Rate
mrem	Millirem
mrem/yr	Millirem per year
N/A	Not applicable
NaI	Sodium iodide
NIST	National Institute of Standards and Technology
NRC	Nuclear Regulatory Commission
NUREG	Nuclear Regulatory Guide
NWT	New World Technology, Inc.
OSHA	Occupational Safety and Health Administration
Pb ²¹⁴	Lead-214 Uranium-238 Series
pCi	Picocurie
Pit	The Open Detonation/Demil Pit located in Area 1222 of the Picatinny Arsenal
NWT	New World Technology
QA/QC	Quality Assurance / Quality Control
Ra ²²⁶	Radium-226 Uranium-238 Series
ROC	Radionuclide(s) of concern
RPO	Radiation Protection Officer
RCA	Radiologically Controlled Area
Release Criteria	Page 4
Release Limits	Page 4
RWP	Radiation Work Permit
σ	Standard deviation
S/N	Serial number
Scan Survey	Gamma detector response rate
Smear	a filter paper used for determining removable radioactive surface activity levels
SOP	Standing Operating Procedure
Static Survey	a radiation survey where the detector is held stationary over the object/material being surveyed, and a total count is collected for a fix period of time (i.e. 1- minute)
TEDE	Total effective dose equivalent
TLD	Thermoluminescent Dosimeter
Th ²³⁴	Thorium-234 – Uranium-238 Series
U ²³⁴	Uranium-234
U ²³⁵	Uranium-235
U ²³⁸	Uranium-238 (Depleted Uranium)
USA	U.S. Army
μ R/hr	Microroentgen per hour
μ Ci	Microcurie
WP	Work Plan
ZnS(Ag)	Silver activated zinc sulfide

1.0 SUMMARY

New World Technology (NWT) was contracted by Conti Environment and Infrastructure, Inc. (Conti) to perform radiological surveys and support for erosion control work in Area 1222 (the Gorge) at the US Army Picatinny Arsenal, NJ for Armaments Research, Development & Engineering Center (ARDEC). This support included walk over gamma scan surveys utilizing a grid with GPS readings from NWT's USA Project 99-109 and 99-109 RFD Mod 1 within the controlled, roped-off (see Appendix 1) area to confirm radiological conditions and contamination surveys of personnel and equipment before, during, and after work within the radiologically controlled area. The work areas included; the impacted areas consisting of the open detonation/demil pit hill, the Open Detonation /Demil Pit, the stockpile of soil encroaching on the contaminated Open Detonation/ Demil Pit area, the areas adjacent to the Open Detonation/Demil pit area, the ground surrounding two contaminated piles of soil, the piles themselves and the non-impacted areas of the Gorge.

The work was performed in two phases, 17 October 2005 to 26 October 2005 and 31 October 2005 to 18 November 2005.

The work was performed under NWT's NRC Broad Scope Radioactive Materials License # 04-27745-01, Attachment 1.

No areas surveyed exceeded the action level of 11,958 gross gamma cpm as presented in the work plan for the areas. There was no radiological contamination noted on personnel or equipment used for the work which exceeded background levels.

During the course of the work, the US Nuclear Regulatory Commission conducted an inspection of the area and the work. Although questions were later raised concerning aspects of the work, the results of the inspection concluded with no violations or findings noted. The Inspection Report, NRC Form 541, is included in this report at Attachment 2.

2.0 SITE INFORMATION

2.1 SITE DESCRIPTION

Area 1222, known as the Gorge, is located in the valley toward the northern end of the arsenal. It lies at the base of Copperas Mountain and is bounded by an unnamed mountain to the south east.

2.2 SITE RADIOLOGICAL HISTORY

The Open Detonation/Demil Pit was used for open detonation of munitions and as a demilitarization area. It was also used approximately 35 years ago for a limited number (possibly no more than 1 test) of hard impact tests of developmental items that contained depleted uranium (DU). Previous survey and remediation efforts have also identified small areas and quantities of Ra-226.

The identified radionuclides of concern were U-238 and its daughter products and Radium-226 and its daughter products.

A Characterization survey of the surface of the identified work areas in the Open Detonation / Demil Pit area of the Radiologically Controlled Area. was performed by NWT in October/November of 2001. Radium contamination (most likely a fragment of a luminescent gauge or dial) was found located at the bottom of the hill and in the Open Detonation/Demil Pit area. Depleted uranium contamination was found within the Open Detonation/Demil Pit area.

The Final Report, prepared by New World Technology, Revision 3, dated January 30, 2006, showed that the Gorge Area did not demonstrate compliance with the unrestricted use criteria established by the Nuclear Regulatory Commission without further investigation. The Final Report, prepared by New World Technology, Revision 3, dated January 30, 2006, also states that the surface of the Open Detonation/Demil Pit area as well as the surface of the hill bordering the Open Detonation/Demil Pit to the east meet the surface release criteria for unrestricted use, based on gamma scan readings of approximately 14,500 gross cpm and on a background of 12,000 gross cpm, from a radiological aspect only. Restricted use of the area would appear to be permissible provided the soil surface areas in question remain undisturbed, and the requested work approved by the ARDEC Radiation Protection Office with any applicable directed restrictions adhered to. However, absolutely no work or excavations requiring a depth of more than one foot below grade surface should be performed without radiological/UXO support. In fact the Army has indicated that per direction from the U.S. Nuclear Regulatory Commission (NRC) radiation surveys sufficiently below one foot from the surface of the soil both in the detonation pit area as well as the adjacent hill on which the water runoff diversion work was carried out will need to be performed at the time the Army wishes to obtain unrestricted radiological free release of the area.

This survey plan proposed a release level based on gamma scan readings of approximately 14,500 gross cpm based on a background of 12,000 gross cpm.

3.0 SCOPE OF ACTIVITIES

NWT provided a Senior Radiological Control Technician (RCT) equipped with the necessary smears and instrumentation to directly monitor/sweep the surface of work areas inside and outside of the RCA, personnel and equipment to ensure that there was no spread of radioactive materials from the RCA, no disturbance of soil within the RCA and that radiological conditions within the RCA remained within the previously existing parameters.

4.0 SUPPORT ACTIVITIES

The objectives of the radiological support for the project was to:

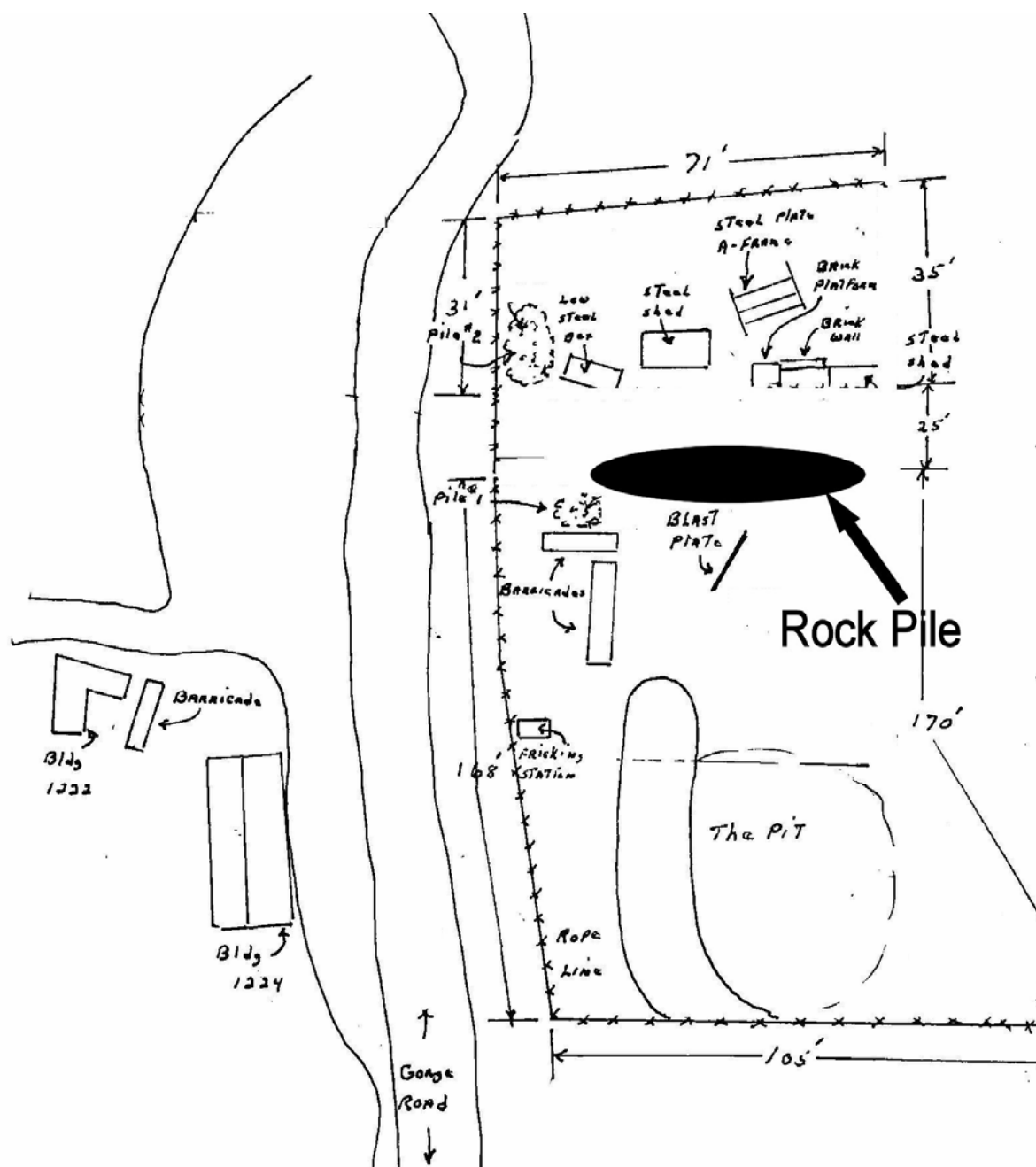
- Demonstrate that the surfaces inside and outside of the Radiologically Controlled Area of the Open Detonation/Demil Pit, surface of the hill bordering the Open Detonation / Demil Pit to the east, the stockpile of soil in the RCA and the pre-release criterion for personnel, equipment and materials meet the surface release criteria for unrestricted use with designated limitations from a radiological aspect only.
- Conduct a 100% RAD scan survey of the soil stockpiled in the RCA in one foot increments, and temporarily move it to the pile of soil and rock in the transient zone for immediate use in re-contouring the surface of the hill adjacent to the Open Detonation / Demil Pit in the RCA in preparation for the installation of rip rap along the steep sloped bank above the Open Detonation/Demil Pit area to improve on the drainage for the Gorge Test Area Facility. It was not the intent of the radiological scan surveys and support plan to release suspect soils or land areas for unrestricted use. It is NWT's opinion, based on the possibility of extended penetration of detonation fragments into the soil, that the Open Detonation / Demil Pit would have to be 100% gamma scan surveyed and sampled in 1 foot layers in order to be subsequently released for unrestricted use with designated limitations from a radiological standpoint. According to the Army, since neither the extent nor type(s) of prior DU testing in the Gorge Open Detonation/ Demil Pit area can be accounted for, the depth of such a survey would be based on both an assessment of

the depth to the frost line as well as consideration toward all types of explosive testing that had been conducted there. As a result such an approach would account for the deepest possible DU fragment penetration into the pit area or adjacent hill as well.

The following steps were taken to meet the objectives.

Control points were established in accordance with the work plan and NWT Field Operating Procedures (FOP) and the project Health and Safety plan. See Figure 1.

Figure 1 Area 1222 Layout Diagram



- Survey instrumentation was source checked daily, prior to use, to ensure proper operation. Source check results are presented in Attachment 3
- The Gorge site survey consisted of a 100% gamma (photon) scan surveys using a Ludlum Model 44-10 2-inch by 2-inch NaI detectors coupled to Ludlum Model 2350-1 Data Loggers. For this effort, the survey methods focused on the gamma radiations emitted from radium and uranium and their daughter products. No areas were noted that exceeded the action level 11,958 gross gamma cpm for the surface scan surveys as determined in the original work plan (Reference 7.1).
- Scanning speeds were no greater than 1-foot per second for gamma instruments. The detector was held within proximity of four inches or less from the surface being surveyed. The detector was moved back and forth in a serpentine pattern to ensure 100% coverage of the surface being surveyed. The audible feature on the instrumentation together with its range indicator display was used to measure, record and identify surface locations having elevated levels of direct radiation..
- Equipment, materials and personnel were surveyed when exiting the controlled area. No readings were noted that exceeded 250 cpm beta and 2 cpm alpha background levels, with the defined release limits as defined in: "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Materials (NRC 1987), Office of Nuclear Material Safety and Safeguards (NMSS)."
 - a) 5,000 dpm/100 cm² beta-gamma, averaged over 1 m².
 - b) 15,000 dpm/100 cm² beta-gamma, maximum.
 - c) 1,000 dpm/100 cm² beta-gamma, removable.
 - d) 100 dpm/100 cm² alpha, averaged over 1 m².
 - e) 300 dpm/100 cm² alpha, maximum.
 - f) 20 dpm/100 cm² alpha, removable.
- The scan survey results were reviewed to identify any areas exceeding the specified action level or the stated release criteria, if detected.
- A temporary road was established after the soil that was stockpiled in the RCA had been incrementally 100% gamma scan surveyed down to one foot of the ground level along with an area extending out a distance of 10 feet around its entire perimeter. A felt liner/mat was laid down over the remaining one foot scanned area and covered with aggregate. The temporary road bisects the RCA to

allow access into the radiologically controlled area and has been left in situ.

- No readings exceeding the action levels were recorded prior to installation of the road.
- A thermoluminescent dosimeter (TLD) worn by the HP Technician was processed and recorded. The results were less than ($<$)10 mrem total effective dose equivalent (TEDE), the minimum reportable dose, for the term of the project.
- ARDEC issued Thermoluminescent dosimeters were kept on a storage rack in a secure and posted area.
- ARDEC Radiation Work Permit Number 05-18 authorized CONTI to perform surveys/inspections and drainage improvements in or near the demolition pit and on the adjacent hill and ARDEC Radiation Work Permit Number 05-20 covered all persons entering or passing through the Gorge Test Area who do not need to enter or work in the roped-off area near the Demolition Pit or the face of the adjacent hill.

4.1 INSTRUMENT SELECTION

Instruments were selected that were suitable for the physical and environmental conditions at the site,

The instruments and measurement methods selected were able to detect the radionuclide of concern from the uranium-238 series and the radium-226 series or radiation types of interest i.e. alpha, beta, and/or gamma and are, in relation to the survey, capable of measuring levels that are equal to or less than the release limits or action levels stated in Section 5.5.3 of the survey plan. Field survey methodology and techniques were in accordance with NWT FOPs.

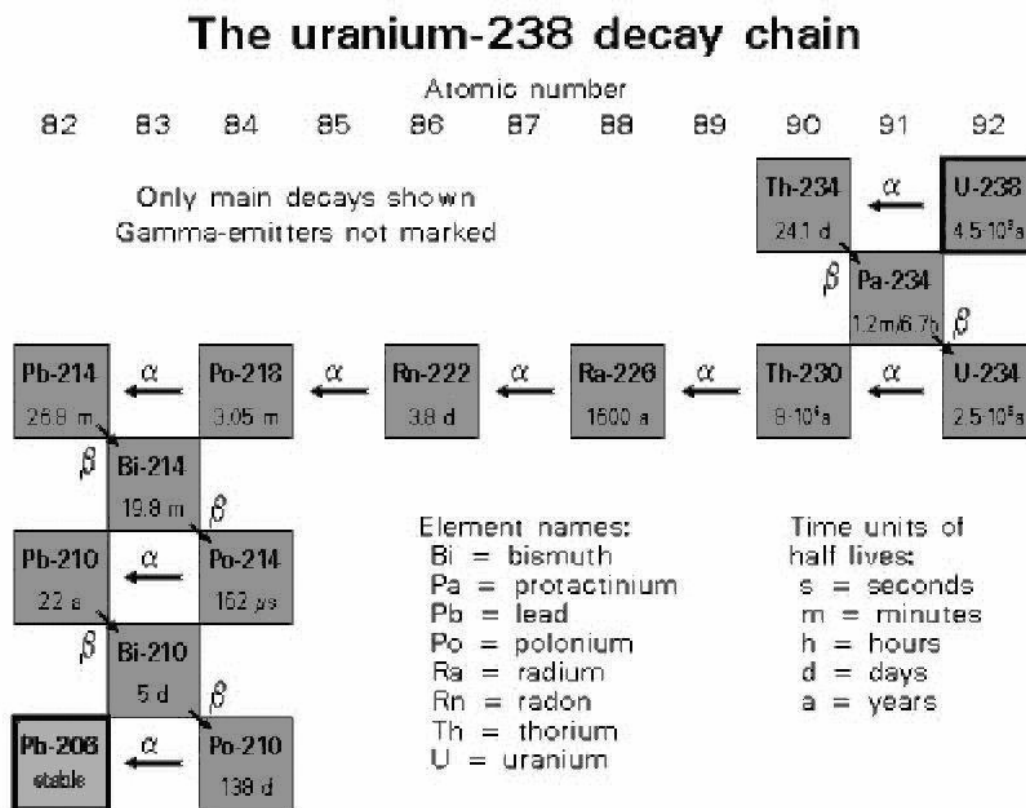
4.1.1 Instruments for Gamma Scan Surveys

Gamma count rate responses were used to determine whether specific areas exhibit residual radioactivity levels that were above site-specific action level of 11,958 gross cpm (rounded to 11,900 cpm). Gross gamma count rates were measured using a 2" by 2" sodium iodide (NaI) gamma scintillation detector

system (Ludlum Instruments Model 2350-1 Data Logger coupled to a Ludlum Instruments Model 44-10 NaI detector). This radiation detection system measures energies in the range of about 80 to 3,000 kilo electron volts (keV). This energy range includes gamma rays emitted by Radium-226, depleted uranium, and their decay products.

Scanning speeds were no greater than 1-foot per second for gamma instruments. The detector was held within proximity of four inches or less from the surface being surveyed. The detector was moved back and forth in a serpentine pattern to ensure 100% coverage of the surface being surveyed. The audible feature on the instrumentation together with its range indicator display was used to measure, record and identify surface locations having elevated levels from direct radiation monitoring. Figure 2 presents a diagram of the decay chain for U-238/Ra-226.

Figure 2 U-238/Ra-226 Decay Chain



4.1.2 Instruments for Scan Surveys for Alpha and Beta Surface Activity

Surface scan surveys for alpha and beta radiation were conducted with a Ludlum Model 43-89 large area scintillation probe and a Ludlum Model 2230 alpha/beta rate meter. The probes had 0.8 mg/cm² or 0.4 mg/cm² thick Mylar windows. The detector was moved over the surface being surveyed at a rate of one-half detector width per second. The detector was held within ¼" of the surface being surveyed. The audible feature on the instrumentation together with its range indicator display was used to measure, record and identify surface locations having elevated levels from direct radiation monitoring.

4.2 INSTRUMENT EQUATIONS

The following equations were used to calculate efficiencies, minimum detectable concentrations (MDCs) and minimum detectable count rates (MDCRs). These equations are presented in the *Multi-Agency Radiation Survey and Site Investigation Manual* (MARSSIM/NUREG-1575, 2000) for radiological surveys and remediation.

4.2.1 Instrument Efficiency

The instrument efficiency (ϵ_i) is defined as the ratio between the net count rate, in counts per minute (cpm), of the instrument and the surface emission rate of the calibration source for a specified geometry. The surface emission rate is the 2π particle fluence that is affected by both the attenuation and backscatter of the radiation emitted from the calibration source. Equation 1 was used to calculate the instrument efficiency in counts per particle; although, efficiency is typically reported as having no units or unitless.

Equation 1

$$\epsilon_i = \frac{R_{S+B} - R_B}{q_{2\pi} \left(\frac{W_A}{S_A} \right)}$$

Where:

- ϵ_i = instrument efficiency (count per particle)
- R_{S+B} = the gross count rate of the calibration measurement (cpm)
- R_B = the background count rate in cpm
- $q_{2\pi}$ = surface emission rate of the calibration source (NIST-traceable) [particles per minute (min)]
- W_A = active area of the detector window (cm²)
- S_A = area of the source (cm²)

The instrument efficiency is determined by obtaining static counts with the detector over a calibration source that has a NIST-traceable surface emission rate. The 2π particle fluence rate is corrected for decay, attenuation and scatter. Then the surface emission rate of the source must be corrected for the area subtended by the probe. Factors that can also affect the instrument's efficiency are discussed below:

- Efficiency Check Sources. Efficiency check sources that emit alpha or beta radiation with energies similar to those expected

from the contaminant in the field [similar to the expected ROC(s)] will be selected.

- Source Geometry Factors. Instrument efficiency will usually be determined with an efficiency check source equal to or greater than the area of the probe. If a source that is smaller than the probe is used, a conversion factor is applied to the MDC to account for the active region of the probe.
- Source-to-detector Distance. The detector efficiency will be calculated at a source-to-detector distance that is the same as the detector-to-surface distance used in the field.

4.2.2 Minimum Detectable Concentration for Static Alpha and Beta Counts

The static MDC is the level of radioactivity that is practically achievable by the overall measurement process. The conventional equation, Equation 2 was used to calculate instrument MDC in units of dpm per 100 cm²:

Equation 2

$$MDC = \frac{3 + 4.65\sqrt{R_B T_B}}{\epsilon_s \epsilon_i \frac{W_A}{100} T_B}$$

Where:

3+4.65 =	constant factor provided in MARSSIM
R_B	= background count rate (cpm)
T_B	= background counting time (min)
ϵ_i	= instrument efficiency (count per particle)
ϵ_s	= contaminated surface efficiency (particle per disintegration)
W_A	= active area of the detector window (cm ²)

In Equation 2, W_A is the size of the “active” area of the detector window. If the area of the detector window (cm²) does not equal 100 cm², it is necessary to convert the detector response to units of dpm per 100 cm².

4.2.3 Surface Efficiency (ϵ_s) for Surface Activity Measurements

The surface efficiency term in the preceding equations was used to determine the 4π total efficiency for a particular surface and condition. Suitable values are based on the radiation and radiation energy, and are primarily impacted by the backscatter and self-absorption characteristics of the surface on which the contamination exists in the field. Backscatter is most affected by the energy of the radiation and the density of the surface material. Self-absorption characteristics or attenuation are also a function of the radiation's energy and surface condition. In the absence of experimentally determined surface efficiencies, ISO-7503-1 [International Organization for Standardization (ISO), 1988] and NUREG-1507 (NRC, 1997), provide conservative recommendations for surface efficiencies. ISO-7503-1 recommends a surface efficiency of 0.5 for maximum beta energies exceeding 0.5 MeV and to use a surface efficiency of 0.25 for beta energies between 0.15 and 0.4 MeV and for alpha emitters (ISO, 1988; NRC, 1997). NUREG-1507 provides surface efficiencies based on studies performed for the NRC. In general, NUREG-1507 indicates that the ISO rule-of-thumb for surface efficiencies is conservative, particularly for beta-emitting radionuclides with end-point energies between 0.25 MeV and 0.4 MeV. At the Picatinny Arsenal a surface efficiency of 0.25 was used for alpha and beta emitters.

4.2.4 Minimum Detectable Count Rate and Minimum Detectable Concentration for Beta and Gamma Scans

The minimum detectable number of net source counts in the scan interval can be arrived at by multiplying the square root of the number of background counts (in the scan interval) by the detectability value associated with the desired performance (as reflected in d') as shown in Equation 3.

Equation 3

$$MDCR = d' \sqrt{b_i} \left(\frac{60}{i} \right)$$

Where:

- d' = index of sensitivity [α and β errors (performance criteria)]
- b_i = number of background counts in scan time interval (count)
- i = scan or observation interval (s)

The required rate of true positives was 95 percent, and the false positives was 5 percent. From Table 6.5 of the MARSSIM

(NUREG-1575, 2000), the value of d' , representing this performance goal, is 3.28.

The scan MDC is determined from the MDCR by applying conversion factors that account for detector and surface characteristics and surveyor efficiency. As discussed below, the MDCR accounts for the background level, performance criteria (d'), and observation interval. The observation interval during scanning is the actual time that the detector can respond to the contamination source. This interval depends on the scan speed, detector size in the direction of the scan, and area of elevated activity.

The scan MDC for beta surveys of structure surfaces was calculated using Equation 4.

Equation 4

$$\text{Scan MDC} = \frac{\text{MDCR}}{\sqrt{p} \varepsilon_i \varepsilon_s \frac{W_A}{100 \text{ cm}^2}}$$

Where:

MDCR	Is discussed in Section 4.2.4
p	= surveyor efficiency factor
ε_i	= instrument efficiency (count per particle)
ε_s	= contaminated surface efficiency (particle per disintegration)
W_A	= area of the detector window (cm^2)

4.2.5 MDC for Gamma Scans of Surface Areas (2-inch by 2-inch NaI Probe)

The scan MDC (in pCi/g) for land areas is based on the area of elevated activity, depth of contamination, and the radionuclide (energy and yield of gamma emissions.) To establish the scan MDC, the relationship between the detector's net count rate to net exposure rate must be established first. This is accomplished by determining the MDCR and then applying a surveyor efficiency factor. The MDCR was calculated using Equation 5 with the following variables:

$$\begin{aligned} d' &= 3.28 \\ b_i &= 9158 \text{ cpm} / (60 \text{ seconds per minute} / 6 \text{ second observation}) = 915 \text{ counts per second} \\ i &= 6 \text{ second} \end{aligned}$$

Equation 5

$$MDCR_{Surveyor} = \frac{MDCR}{\sqrt{p}}$$

The $MDCR_{Surveyor}$ can then be calculated assuming a surveyor efficiency (p) of 0.5 and the estimated background count rate of 9,158 cpm (taken from a non-impacted area in Area 1222) and assuming a 6-second scan observation interval as follows:

$$MDCR_{Surveyor} = \frac{MDCR}{\sqrt{p}} = \frac{993}{\sqrt{0.5}} = 1404 \text{ cpm}$$

Note: All instrument calculated MDC and MDCR values are presented with the surveys in Appendices 1 and 2.

4.3 RESPONSE CHECK SOURCES

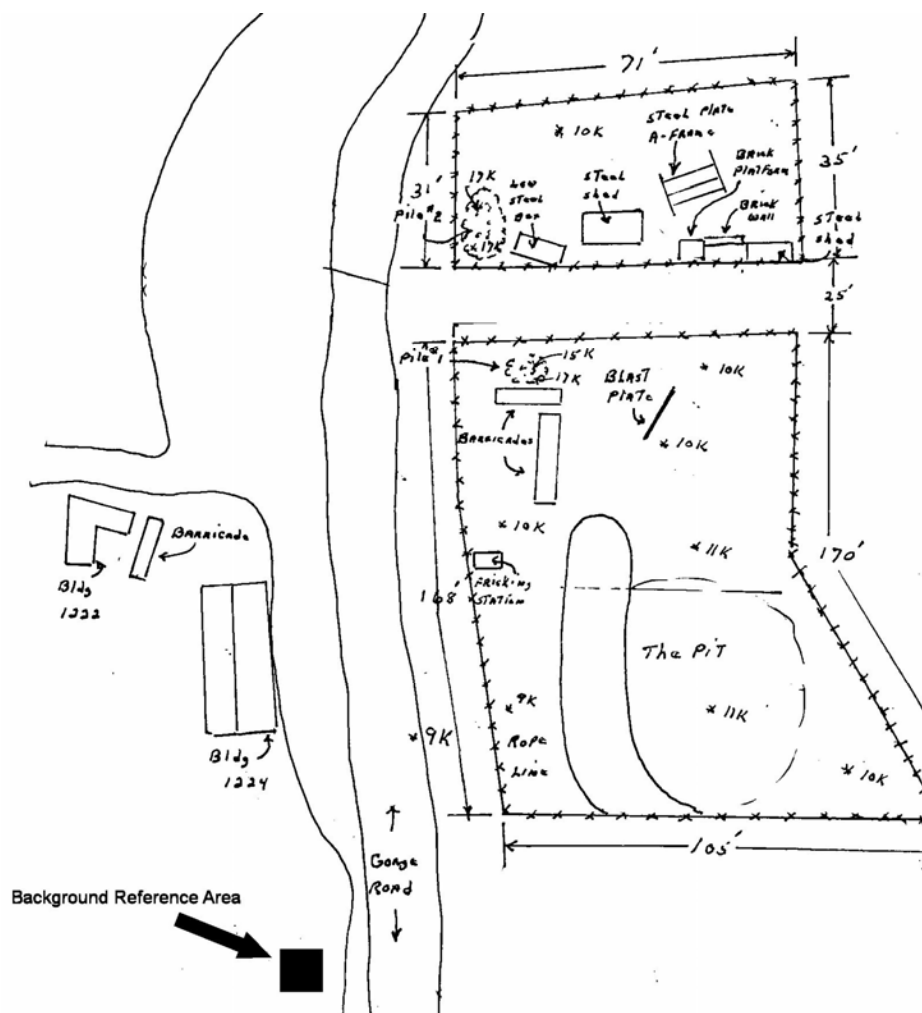
All sources used for calibration or daily response checks for the survey were representative of the instrument's response to the identified radionuclides and are traceable to NIST. The sources used during the surveys were ^{137}Cs , ^{99}Tc , and ^{230}Th which were stored in a locked box in a secure area while on site.

An ARP application form DA 3777 was completed in accordance with the requirements outlined in AR 11-9 for the radioactive check sources brought on site and provided to the Picatinny Arsenal's ARDEC Radiation Protection Office.

4.4 BACKGROUND REFERENCE AREA

A total of 24 individual baseline readings with a 2 x 2 NaI detector equipped instrument were obtained to establish a site background level. Background was established at 9158 cpm. Figure 3 presents a map showing the location of the background reference area.

Figure 3 Area 1222 Background Reference Area



- Instrument background for the Ludlum Model 2350-1 was established based on readings presented in Table 1 below.

Table 1 - Background Gamma Measurement Data, 2350-1 # 95337

Meter Model #: 2350-1
 Meter S/N: 95337
 Cal Due Date: 10/13/2006
 Surveyed By: Richard Kountz

Survey Point	Reference Area	Date Surveyed	Gross CPM
1	Soil	10/17/2005	9110
2	Soil	10/17/2005	8885
3	Soil	10/17/2005	9310
4	Soil	10/17/2005	9570
5	Soil	10/17/2005	9446
6	Soil	10/17/2005	8611
7	Soil	10/17/2005	8919
8	Soil	10/17/2005	9567
9	Soil	10/17/2005	9316
10	Soil	10/17/2005	8959
11	Soil	10/17/2005	9084
12	Soil	10/17/2005	8739
13	Soil	10/17/2005	9047
14	Soil	10/17/2005	9510
15	Soil	10/17/2005	9083
16	Soil	10/17/2005	9391
17	Soil	10/17/2005	8808
18	Soil	10/17/2005	8963
19	Soil	10/17/2005	9570
20	Soil	10/17/2005	9127
21	Soil	10/17/2005	9008
22	Soil	10/17/2005	9347
23	Soil	10/17/2005	9046
24	Soil	10/17/2005	9384
Average:			9158
Standard Deviation:			278

This background indicates a conservative actual background level when compared with the estimated background value used in the work plan calculations for the MDCR, and validates the action level presented in the plan of 2800 cpm above background as a conservative value for the land area walk over gamma scan surveys.

4.5 RADIOLOGICAL SURVEY RESULTS

4.5.1 Summary

The land areas surveyed indicated gamma levels throughout the work areas ranged between 8,000 and 11,000 gross cpm. The readings are less than the action level presented in the work plan and show agreement with the results of the previous survey of the work area performed by NWT.

All smear and scan surveys of incoming and outgoing equipment materials and personnel showed no reading which exceeded the background levels of 2 cpm alpha and 200 cpm beta.

The NRC performed a site inspection 15 November 2005 to ensure compliance with regulations. The inspection consisted of a review of records and work activities at the Gorge. There were questions raised by the regulators concerning what was perceived to be an unrestricted release of soils from the RCA to the pile of soil and rock in the transient zone until it was explained that the soil and rock that had been removed from the RCA had been monitored in segments of one foot layers, placed in the transient zone after verifying its non contamination status, only to immediately be returned to the RCA to re-contour the hill adjacent to the Open Detonation/Demil Pit for improving the drainage in the Gorge Test Area Facility.

The intent of all radiological scan survey measurements and smears during this project was to ensure no spread of radioactive materials from the roped off RCA or contamination of personnel or equipment and to confirm that the surface scan areas of the impacted and non impacted areas were compliant with action levels presented in the Work Plan.

Following conference calls with the NRC and all involved parties, an Inspection Report, NRC Form 541, was issued with the result of no violations or findings concerning the inspection. A copy of the inspection report is presented at Attachment 2.

5.0 QUALITY CONTROL AND QUALITY ASSURANCE

5.1 SELECTION OF PERSONNEL

The HP technician was selected based upon qualification and prior experience at these types of surveys.

5.2 TRAINING

All personnel were trained on site emergency procedures and the Conti Site Health and Safety Plan (HASP).

5.3 WRITTEN PROCEDURES

All survey tasks were performed and controlled by compliance with NWT's FOPs approved work plan and ARDEC Radiation Work Permits.

5.4 INSTRUMENT SELECTION, OPERATION, MAINTENANCE, AND CALIBRATION

The instruments and systems were calibrated on an annual frequency using the manufacturer's calibration protocol to National Institute of Standards and Technology (NIST) traceable sources.

All instruments and detectors were inspected and source checked daily prior to use to verify proper operation.

NWT procedures for calibration, maintenance, accountability, operation and quality control of radiation detection instruments implement the guidelines established in American National Standard Institute (ANSI) standard ANSI N323-1978 and ANSI N42.17A-1989.

5.5 REVIEW OF SURVEY RESULTS

The scan survey reports and scan survey data from the background reference area, the grid within the RCA and from the smears taken of the equipment were reviewed by two separate, knowledgeable people to verify all documentation was complete and accurate. This included the surveyor and either the NWT Program Manager or his designee.

6.0 RECORDS

6.1 RECORDS GENERATION

Records of unrestricted release surveys on project equipment were documented and are presented in Appendix 2 of this report with land area surveys presented in Appendix 1.

7.0 REFERENCES

- 7.1 NWT Survey Plan, *Radiological Surveys and Support, Area 1222, Gorge Area, Picatinny Arsenal, New Jersey Revision 1*, July 12, 2005
- 7.2 New World Technology Final Report, *Radiological Surveys and Sampling Area 1222, ARDEC, Picatinny Arsenal, New Jersey, Project No. USA 99-109, RFP, MOD I, Revision 1*, January 30, 2006
- 7.3 New World Technology Final Report, *Picatinny Arsenal, Radiological Remediation/Release Surveys and Sampling Project, Project No. USA 99-109, Revision 3*, January 30, 2006.

ATTACHMENT 1
NWT Broad Scope Radioactive Material License
04-27745-01

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee		
1. New World Environmental, Incorporated dba: New World Technology		3. License number 04-27745-01
2. 448 Commerce Way Livermore, California 94550		4. Expiration date February 28, 2013
		5. Docket No. 030-36174 Reference No.
6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Any byproduct material listed in 10 CFR 33.100, Schedule A	A. Any, except sealed sources	A. As specified in 10 CFR 33.100, Schedule A, Column I
B. Any byproduct material listed in 10 CFR 33.100, Schedule A	B. Any sealed sources, plated sources, seeds, plaques, needles	B. Not to exceed 100 curies per source
C. Any byproduct material with Atomic Nos. 84-104	C. Any, except sealed sources	C. 1 curie total
D. Any byproduct material with Atomic Nos. 84-104	D. Any sealed sources, plated sources, seeds, plaques, needles	D. 1 curie total
E. Source material	E. Any	E. 10,000 kilograms
F. Special nuclear material	F. Any	F. 350 grams uranium-235, or 200 grams of plutonium, or 200 grams uranium-233, or any combination of these provided the sum of the ratios of the quantities does not exceed unity

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License Number

04-27745-01

Docket or Reference Number

030-36174

9. Authorized use:

A. through D. For receipt, storage, use, and or possession incidental to any activity as follows:

- (1) Any activity related to site characterization, decontamination and decommissioning of facilities, equipment, and containers;
- (2) Solidification and treatment of waste;
- (3) Packaging and repackaging of customer waste for transport; and
- (4) Transport in packages or containers approved for use under the provisions of 10 CFR Part 71, for transfer to licensees authorized to receive the materials, in accordance with the terms and conditions of licenses issued by the NRC or an Agreement State.

CONDITIONS

10. Licensed materials shall be used only at temporary job sites of the licensee anywhere in the United States where the U.S. Nuclear Regulatory Commission maintains jurisdiction for regulating the use of licensed material, including areas of exclusive federal jurisdiction within Agreement States. Except for calibration sources, reference standards, and radioactively contaminated equipment owned by the licensee, possession of licensed material at each temporary job site shall be limited to material originating from each site. This material must either be transferred to an authorized recipient or remain at the site after licensee activities are completed.

If the jurisdiction status of a federal facility within an Agreement State is unknown, the licensee should contact the federal agency controlling the job site in question to determine whether the proposed job site is an area of exclusive federal jurisdiction. Authorization for use of radioactive materials at job sites in Agreement States not under exclusive federal jurisdiction shall be obtained from the appropriate state regulatory agency.

11. A. Licensed material shall be used by, or under the supervision of, individuals designated in writing by the Radiation Safety Officer, Donald "Doc" Dennis.
- B. The Radiation Safety Officer for this license is Donald "Doc" Dennis.
12. In addition to the possession limits in Item 8, the licensee shall further restrict the possession of licensed material to quantities below the limits specified in 10 CFR 30.72 which require consideration of the need for an emergency plan for responding to a release of licensed material.
13. The licensee shall not take ownership of licensed material in excess of the possession limits in Item 8 without prior notification and written approval from the NRC.

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**License Number
04-27745-01Docket or Reference Number
030-36174

14. The licensee shall notify the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011, ATTN: Director, Division of Nuclear Material Safety, in writing at least 14 days before initiating activities under this license at a temporary job site, excluding routine packaging or repackaging for purposes of transporting and not requiring a job or site specific work package, and characterization and/or final surveys where radioactive materials and/or radiation are not likely to be detected. This notification shall include:
- A. The estimated type, quantity, and physical/chemical forms of licensed material to be used;
 - B. The specific site location;
 - C. A description of planned activities including waste management and disposition;
 - D. The estimated start date and completion date for the job; and
 - E. The name and title of a point of contact for the job, including information on how to contact the individual.
15. This license does not authorize the use of licensed material at temporary job sites for uses already specifically authorized by a customer's license. If a customer also holds a license issued by the NRC or an Agreement State, the licensee shall establish a written agreement between the licensee and the customer specifying which licensee activities shall be performed under the customer's license and supervision, and which licensee activities shall be performed under the licensee's supervision pursuant to this license. The agreement shall include a commitment by the licensee and the customer to ensure safety, and any commitments by the licensee to help the customer clean up the temporary job site if there is an accident. A copy of this agreement shall be included in the notification required by License Condition 14.
16. The licensee shall maintain records of information important to decommissioning each temporary job site at the applicable job site pursuant to 10 CFR 30.35(g), 40.36(f), and 70.25(g). The records shall be made available to the customer upon request. At the completion of activities at a temporary job site, the licensee shall transfer these records to the customer for retention.
17. Pursuant to 10 CFR 30.11, 40.14, and License Condition 10., the licensee is exempted from the requirements of 10 CFR 30.35, 40.36, and 70.25 to establish decommissioning financial assurance.
18. If approved by a Radiation Safety Officer specifically identified in this license, the licensee may take reasonable action in an emergency that departs from conditions in this license when the action is immediately needed to protect public health and safety and no action consistent with all license conditions that can provide adequate or equivalent protection is immediately apparent. The licensee shall notify the NRC before, if practicable, and in any case immediately after taking such emergency action using the reporting procedure specified in 10 CFR 30.50 (c).

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**License Number
04-27745-01Docket or Reference Number
030-36174

19. Within 30 days of completing decontamination and decommissioning activities at each job site location, the licensee shall notify the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011, ATTN: Director, Division of Nuclear Material Safety, in writing of the temporary job site status and the disposition of any licensed material used.
20. Sealed sources or detector cells containing licensed material shall not be opened or sources removed from source holders by the licensee.
21. A. Sealed sources and detector cells shall be tested for leakage and/or contamination at intervals not to exceed 6 months or at such other intervals as specified by the certificate of registration referred to in 10 CFR 32.210.
- B. Notwithstanding Paragraph A of this Condition, sealed sources designed to emit alpha particles shall be tested for leakage and/or contamination at intervals not to exceed 3 months.
- C. In the absence of a certificate from a transferor indicating that a leak test has been made within 6 months prior to the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.
- D. Sealed sources need not be leak tested if:
- (i) they contain only hydrogen-3; or
 - (ii) they contain only a radioactive gas; or
 - (iii) the half-life of the isotope is 30 days or less; or
 - (iv) they contain not more than 100 microcuries of beta and/or gamma emitting material or not more than 10 microcuries of alpha emitting material; or
 - (v) they are not designed to emit alpha particles, are in storage, and are not being used. However, when they are removed from storage for use or transferred to another person, and have not been tested within the required leak test interval, they shall be tested before use or transfer. No sealed source or detector cell shall be stored for a period of more than 10 years without being tested for leakage and/or contamination.

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License Number

04-27745-01

Docket or Reference Number

030-36174

- E. The leak test shall be capable of detecting the presence of 0.005 microcuries of radioactive material on the test sample. If the test reveals the presence of 0.005 microcuries or more of removable contamination, a report shall be filed with the U.S. Nuclear Regulatory Commission in accordance with 10 CFR 30.50(b)(2), and the source shall be removed immediately from service and decontaminated, repaired, or disposed of in accordance with Commission regulations. The report shall be filed within 5 days of the date the leak test result is known with the U.S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011, ATTN: Director, Division of Nuclear Materials Safety. The report shall specify the source involved, the test results, and corrective action taken.
- F. Tests for leakage and/or contamination shall be performed by the licensee or by other persons specifically licensed by the Commission or an Agreement State to perform such services.
21. The licensee shall conduct a physical inventory every 6 months to account for all sources and/or devices received and possessed under the license.
22. The licensee is authorized to transport licensed material only in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."
23. This license does not authorize the import of byproduct material wastes.
24. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The U.S. Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.
- A. Application dated May 10, 2002
B. Letter dated August 16, 2002
C. Letter dated November 5, 2002
D. Letter dated February 21, 2003

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date: February 27, 2003By: 

Jack E. Whitten, Senior Materials Analyst
Nuclear Materials Licensing Branch
Region IV
Arlington, Texas 76011

ATTACHMENT 2

NRC Inspection Report
Form 541



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-4005

December 28, 2005

Mike Wilson
CEO
New World Environmental, Incorporated
448 Commerce Way
Livermore, California 94551

SUBJECT: NRC INSPECTION REPORT 030-36174/05-002 (FORM 591M)

Dear Mr. Wilson:

This letter refers to the safety inspection conducted on November 15 through December 16, 2005, at a temporary job site at Picatinny Arsenal located in Picatinny, New Jersey. The inspection was an examination of activities as they relate to safety and compliance with the Commission's rules and regulations. Within these areas, the inspection consisted of a selective examination of procedures and representative records. A final exit interview was conducted with your Radiation Safety Officer, Mr. Doc Dennis on December 16, 2005.

Within the scope of this inspection no violations or deviations were identified; therefore, no response to this letter or the enclosed NRC Form 591M is required.

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

Should you have any questions concerning this letter, please contact the undersigned at (817) 860-8140.

Sincerely,

/RA/
Lawrence Donovan, Health Physicist
Nuclear Materials Inspection Branch

Docket No.: 030-36174
License No. 04-27745-01

Enclosure: As stated

cc w/enclosure:
New Jersey Radiation Control Program Director
California Radiation Control Program Director

New World Environmental, Incorporated - 2-

bcc (via ADAMS/E-Mail distribution):

MSMallett

TPGwynn

LDWert

MRShaffer

JEWhitten

LDonovan

KEGardin

NMIB

RIV Materials Docket File (5th Floor)

SUNSI Review Completed: ADAMS: ☒ Yes ☐ No Initials: ld

☒ Publicly Available ☒ Non-Sensitive

DOCUMENT NAME: s:\dnms\!nmib\!donovan\53617402.wpd

final r:_dnms

RIV:DNMS:NMIB	C:NMIB
LDonovan	MRShaffer
/RA/	/RA/
12/28/05	12/29/05

OFFICIAL RECORD COPY

T=Telephone

E=E-mail

F=Fax

NRC FORM 591M PART 1 (10-2003) 10 CFR 2.201		U.S. NUCLEAR REGULATORY COMMISSION	
SAFETY INSPECTION REPORT AND COMPLIANCE INSPECTION			
1. LICENSEE/LOCATION INSPECTED: New World Environmental, Incorporated dba: New World Technology 448 Commerce Way Livermore, California 94551		2. NRC/REGIONAL OFFICE USNRC Region IV 611 Ryan Plaza Drive Arlington, Texas 76011-4005	
REPORT NUMBER(S) 05-002			
3. DOCKET NUMBER(S) 030-36174	4. LICENSEE NUMBER(S) 04-27745-01	5. DATE(S) OF INSPECTION 11/15/2005 through 12/16/2005	
LICENSEE: The inspection was an examination of the activities conducted under your license as they relate to radiation safety and to compliance with the Nuclear Regulatory Commission (NRC) rules and regulations and the conditions of your license. The inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations by the inspector. The inspection findings are as follows:			
<div><div><input checked="" type="checkbox"/></div><div>1. Based on the inspection findings, no violations were identified.</div></div> <div><div><input type="checkbox"/></div><div>2. Previous violation(s) closed.</div></div> <div><div><input type="checkbox"/></div><div>3. The violation(s), specifically described to you by the inspector as non-cited violations, are not being cited because they were self-identified, non-repetitive, and corrective action was or is being taken, and the remaining criteria in the NRC Enforcement Policy, NUREG-1600, to exercise discretion, were satisfied.</div></div> <div><div></div><div>Non-Cited Violation(s) was/were discussed involving the following requirement(s) and Corrective Action(s):</div></div> <div><div><input type="checkbox"/></div><div>4. During this inspection certain of your activities, as described below and/or attached, were in violation of NRC requirements and are being cited. This form is a NOTICE OF VIOLATION, which may be subject to posting in accordance with 10 CFR 19.11.</div></div> <div><div></div><div>(Violations and Corrective Actions)</div></div>			
Licensee's Statement of Corrective Actions for Item 4, above.			
I hereby state that, within 30 days, the actions described by me to the inspector will be taken to correct the violations identified. This statement of corrective actions is made in accordance with the requirements of 10 CFR 2.201 (corrective steps already taken, corrective steps which will be taken, date when full compliance will be achieved). I understand that no further written response to NRC will be required, unless specifically requested.			
Title	Printed Name	Signature	Date
LICENSEE'S REPRESENTATIVE			
NRC INSPECTOR	Betsy Ullrich, Senior Health Physicist	/RA L. Donovan for/	12/28/2005
NRC FORM 591M PART 1 (10-2003)			

ATTACHMENT 3

Daily Instrument Source Check Results

Ambient Background Data Sheets

Project/Location:	Picatinny Arsenal			
Instrument Model:	2360		Instrument Serial No.	193692
Last Calibration Date:	10/13/2005			
Detector Model:	43-89		Detector Serial No.:	197359
Today's Date:	10/17/2005		Data Collected by:	Richard Kountz
X	Alpha		Beta-Gamma	Other
Remarks: Instrument Ambient Background				
Type of Surface:	Air		Count Time:	1 Minutes
Count Number		$(x - \bar{x})$		$(x - \bar{x})^2$
1	1	-0.17		0.03
2	2	0.83		0.69
3	0			
4	1	-0.17		0.03
5	2	0.83		0.69
6	0			
7	1	-0.17		0.03
8	0			
9	0			
10	1	-0.17		0.03
11	2	0.83		0.69
12	1	-0.17		0.03
13	2	0.83		0.69
14	0			
15	2	0.83		0.69
16	1	-0.17		0.03
17	1	-0.17		0.03
18	0			
19	1	-0.17		0.03
20	1	-0.17		0.03
21	0			
22	2	0.83		0.69
23	3	1.83		3.36
24	1	-0.17		0.03
25	3	1.83		3.36
26	2	0.83		0.69
27	3	1.83		3.36
28	1	-0.17		0.03
29	1	-0.17		0.03
30	0			
Mean Count: \bar{x}	1.17		SUM	3.72
Standard Deviation (σ)	0.95		Variance:	0.13
Background Count Rate:	1.17		CPM + -	2.85
			CPM	
Calculations Completed by:		Richard Kountz		Date: 10/17/2005
Reviewed by:		Daniel Spicuzza		Date: 10/17/2005

Project/Location:	Picatinny Arsenal			
Instrument Model:	2360		Instrument Serial No.	193692
Last Calibration Date:	10/13/2005			
Detector Model:	43-89		Detector Serial No.:	197359
Today's Date:	10/17/2005		Data Collected by:	Richard Kountz
	Alpha	X	Beta-Gamma	Other
Remarks: Instrument Ambient Background				
Type of Surface:	Air		Count Time:	1 Minutes
Count Number		$(x - \bar{x})$		$(x - \bar{x})^2$
1	220	8.60		73.96
2	214	2.60		6.76
3	229	17.60		309.76
4	187	-24.40		595.36
5	196	-15.40		237.16
6	252	40.60		1648.36
7	244	32.60		1062.76
8	203	-8.40		70.56
9	195	-16.40		268.96
10	203	-8.40		70.56
11	212	0.60		0.36
12	208	-3.40		11.56
13	199	-12.40		153.76
14	213	1.60		2.56
15	225	13.60		184.96
16	251	39.60		1568.16
17	192	-19.40		376.36
18	192	-19.40		376.36
19	191	-20.40		416.16
20	214	2.60		6.76
21	222	10.60		112.36
22	203	-8.40		70.56
23	211	-0.40		0.16
24	227	15.60		243.36
25	190	-21.40		457.96
26	237	25.60		655.36
27	198	-13.40		179.56
28	207	-4.40		19.36
29	212	0.60		0.36
30	195	-16.40		268.96
Mean Count: \bar{x}	211.40		SUM	7441.20
Standard Deviation (σ)	18.05		Variance:	256.59
Background Count Rate:	211.40		CPM + -	54.15 CPM
Calculations Completed by:	Richard Kountz			Date: 10/17/2005
Reviewed by:	Daniel Spicuzza			Date: 10/17/2005

Project/Location:	Picatinny Arsenal			
Instrument Model:	2350-1		Instrument Serial No.	95337
Last Calibration Date:	10/13/2005			
Detector Model:	44-10		Detector Serial No.:	O20381
Today's Date:	10/17/2005		Data Collected by:	Richard Kountz
	Alpha	2350-1	Beta-Gamma	X Gamma
Remarks: Instrument Ambient Background				
Type of Surface:	Air		Count Time:	1 Minutes
Count Number		$(x - \bar{x})$		$(x - \bar{x})^2$
1	9466	235.07		55256.34
2	9442	211.07		44549.14
3	8872	-358.93		128833.14
4	9361	130.07		16917.34
5	9012	-218.93		47931.80
6	9628	397.07		157661.94
7	9553	322.07		103726.94
8	9411	180.07		32424.00
9	9378	147.07		21628.60
10	9623	392.07		153716.27
11	8762	-468.93		219898.47
12	9262	31.07		965.14
13	9518	287.07		82407.27
14	9017	-213.93		45767.47
15	9494	263.07		69204.07
16	8851	-379.93		144349.34
17	9105	-125.93		15859.20
18	9470	239.07		57152.87
19	9194	-36.93		1364.07
20	9608	377.07		142179.27
21	8884	-346.93		120362.74
22	9140	-90.93		8268.87
23	9149	-81.93		6713.07
24	9267	36.07		1300.80
25	9205	-25.93		672.54
26	8952	-278.93		77803.80
27	8786	-444.93		197965.67
28	8791	-439.93		193541.34
29	9338	107.07		11463.27
30	9389	158.07		24985.07
Mean Count: \bar{x}	9230.93		SUM	1541792.69
Standard Deviation (σ)	274.48		Variance:	53165.27
Background Count Rate:	9230.93		CPM + -	823.45 CPM
Calculations Completed by:	Richard Kountz			Date: 10/17/2005
Reviewed by:	Daniel Spicuzza			Date: 10/17/2005

Chi-Square Test Data Sheets

Project/Location:		Picatinny Arsenal			
Instrument Model:		2360		Instrument Serial No.	193692
Last Calibration Date:		10/13/2005	Background Count Rate:		1 C _B
Detector Model:		43-89	Detector Serial No.:		197359
Today's Date:		10/17/2005	Data Collected by:		Ricard Kountz
Source ID:		564-33-1	Activity	4,222 alphas/min	Efficiency: 28.5 %
Radionuclide:		Th-230	CPM	CPM	
Count Number	(Gross) C _G	(Net) C _I		(C _I - c̄)	(C _I - c̄) ²
1	1243	1242		37.60	1413.76
2	1243	1242		37.60	1413.76
3	1214	1213		8.60	73.96
4	1203	1202		-2.40	5.76
5	1198	1197		-7.40	54.76
6	1149	1148		-56.40	3180.96
7	1276	1275		70.60	4984.36
8	1156	1155		-49.40	2440.36
9	1221	1220		15.60	243.36
10	1145	1144		-60.40	3648.16
11	1221	1220		15.60	243.36
12	1160	1159		-45.40	2061.16
13	1202	1201		-3.40	11.56
14	1206	1205		0.60	0.36
15	1234	1233		28.60	817.96
16	1199	1198		-6.40	40.96
17	1209	1208		3.60	12.96
18	1185	1184		-20.40	416.16
19	1217	1216		11.60	134.56
20	1227	1226		21.60	466.56
Total	24108	24088		SUM	21664.8
Mean Count: c̄		1204			
Chi Squared Value (C ²):		17.99	10.11 - 30.14	Standard Deviation:	34
+ 20% Value:		1445	- 20% Value:		964
Calculations Completed by:			Richard Kountz		Date: 10/17/2005
Reviewed by:			Daniel Spicuzza		Date: 10/17/2005

Project/Location:		Picatinny Arsenal			
Instrument Model:		2360		Instrument Serial No.	193692
Last Calibration Date:		10/13/2005	Background Count Rate:		211 C _B
Detector Model:		43-89	Detector Serial No.:		197359
Today's Date:		10/17/2005	Data Collected by:		Ricard Kountz
Source ID:	564-13-3	Activity	16,030	betas/min	Efficiency: 15.3 %
Radionuclide:	Tc-99	CPM	CPM		
Count Number	(Gross) C _G	(Net) C _I		(C _I - c̄)	(C _I - c̄) ²
1	2596	2385		-74.70	5580.09
2	2710	2499		39.30	1544.49
3	2678	2467		7.30	53.29
4	2603	2392		-67.70	4583.29
5	2598	2387		-72.70	5285.29
6	2747	2536		76.30	5821.69
7	2652	2441		-18.70	349.69
8	2664	2453		-6.70	44.89
9	2677	2466		6.30	39.69
10	2747	2536		76.30	5821.69
11	2741	2530		70.30	4942.09
12	2625	2414		-45.70	2088.49
13	2695	2484		24.30	590.49
14	2673	2462		2.30	5.29
15	2727	2516		56.30	3169.69
16	2642	2431		-28.70	823.69
17	2651	2440		-19.70	388.09
18	2712	2501		41.30	1705.69
19	2595	2384		-75.70	5730.49
20	2681	2470		10.30	106.09
Total	53414	49194		SUM	48674.2
					Σ(C _I - c̄) ²
Mean Count: c̄		2460			
Chi Squared Value (C ²):		19.79	10.11 - 30.14	Standard Deviation:	51
+ 20% Value:		2952	- 20% Value:	1968	
Calculations Completed by:			Richard Kountz		Date: 10/17/2005
Reviewed by:			Daniel Spicuzza		Date: 10/17/2005

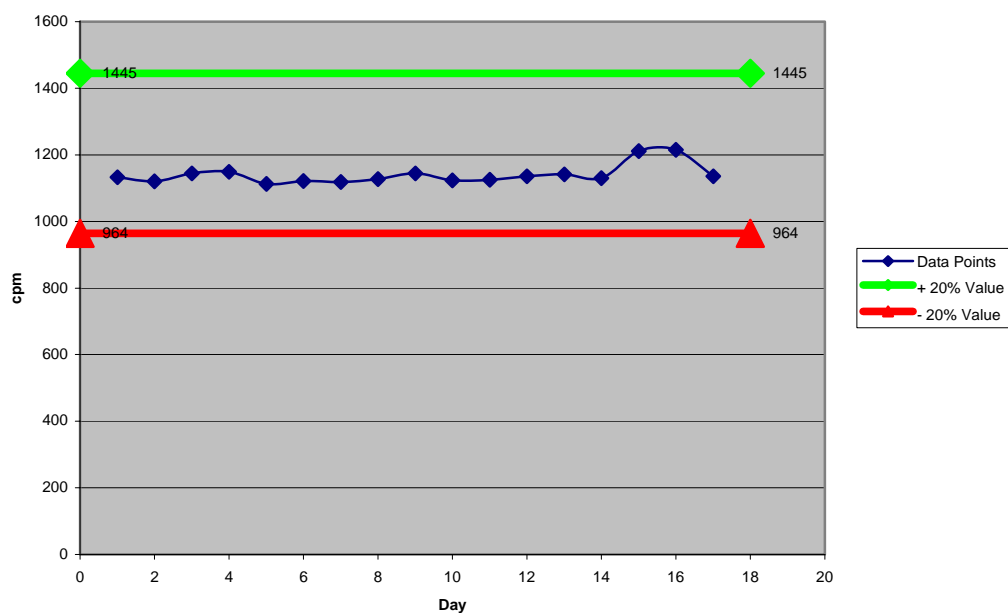
Project/Location:		Picatinny Arsenal			
Instrument Model:		2350-1		Instrument Serial No.	95337
Last Calibration Date:		10/13/2005	Background Count Rate:		9231 C_B
Detector Model:		44-10	Detector Serial No.:		O20381
Today's Date:	10/17/2005	Data Collected by:		Ricard Kountz	
Source ID:	A7-275	Activity	99,590 dpm	Efficiency:	N/A %
Radionuclide:	Cs-137	CPM	CPM		
Count Number	(Gross) C_G	(Net) C_I		$(C_I - \bar{c})$	$(C_I - \bar{c})^2$
1	129095	119864		531.50	282492.25
2	128223	118992		-340.50	115940.25
3	128375	119144		-188.50	35532.25
4	128500	119269		-63.50	4032.25
5	128355	119124		-208.50	43472.25
6	128570	119339		6.50	42.25
7	128396	119165		-167.50	28056.25
8	128492	119261		-71.50	5112.25
9	128326	119095		-237.50	56406.25
10	128235	119004		-328.50	107912.25
11	128766	119535		202.50	41006.25
12	128669	119438		105.50	11130.25
13	128197	118966		-366.50	134322.25
14	129237	120006		673.50	453602.25
15	128025	118794		-538.50	289982.25
16	128945	119714		381.50	145542.25
17	128026	118795		-537.50	288906.25
18	129238	120007		674.50	454950.25
19	128665	119434		101.50	10302.25
20	128935	119704		371.50	138012.25
Total	2571270	2386650		SUM	2646755 $\Sigma(C_I - \bar{c})^2$
Mean Count: \bar{c}		119333			
Chi Squared Value (C^2):	22.18	10.11 - 30.14	Standard Deviation:	373	
+ 20% Value:	143199	- 20% Value:	95466		
Calculations Completed by:			Richard Kountz	Date:	10/17/2005
Reviewed by:			Daniel Spicuzza	Date:	10/17/2005

Response Check Logs

Project: Picatinny Arsenal

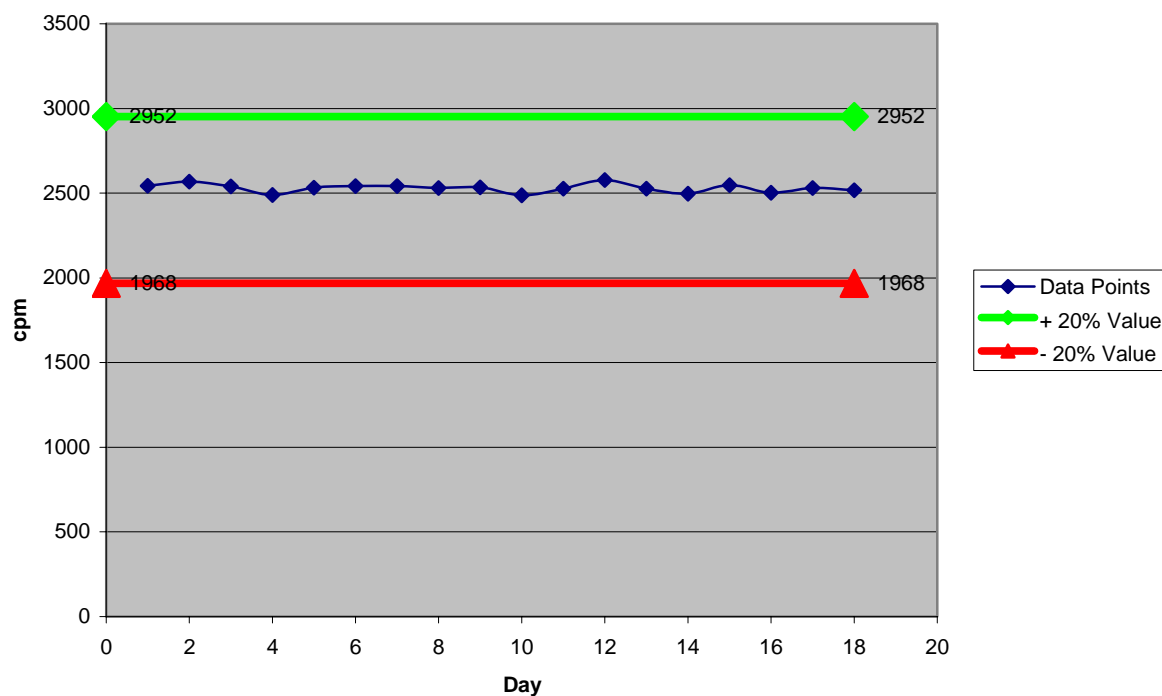
DATE	MODEL/TYPE (Meter/Detector)	S/N (Meter/Detector)	PHYSICAL DAMAGE Y/N	CAL. DUE DATE	SOURCE I.D Th-230	SOURCE ACTIVITY (Alphas/Min)	BACKGROUND CPM	READING CPM	Net CPM	EFF. %	PASS/ FAIL (P/F)	TECH. INIT.
10/17/2005	2360/43-89	193692/197359	N	10/13/2006	564-33-1	4,222	1	1134	1133	27	P	DK
10/18/2005	2360/43-89	193692/197359	N	10/13/2006	564-33-1	4,222	1	1121	1120	27	P	DK
10/19/2005	2360/43-89	193692/197359	N	10/13/2006	564-33-1	4,222	1	1145	1144	27	P	DK
10/20/2005	2360/43-89	193692/197359	N	10/13/2006	564-33-1	4,222	0	1149	1149	27	P	DK
10/21/2005	2360/43-89	193692/197359	N	10/13/2006	564-33-1	4,222	1	1114	1113	26	P	DK
10/24/2005	2360/43-89	193692/197359	N	10/13/2006	564-33-1	4,222	2	1123	1121	27	P	DK
10/25/2005	2360/43-89	193692/197359	N	10/13/2006	564-33-1	4,222	1	1119	1118	26	P	DK
11/7/2005	2360/43-89	193692/197359	N	10/13/2006	564-33-1	4,222	2	1129	1127	27	P	DK
11/8/2005	2360/43-89	193692/197359	N	10/13/2006	564-33-1	4,222	0	1144	1144	27	P	DK
11/9/2005	2360/43-89	193692/197359	N	10/13/2006	564-33-1	4,222	1	1124	1123	27	P	DK
11/10/2005	2360/43-89	193692/197359	N	10/13/2006	564-33-1	4,222	1	1126	1125	27	P	DK
11/11/2005	2360/43-89	193692/197359	N	10/13/2006	564-33-1	4,222	1	1137	1136	27	P	DK
11/14/2005	2360/43-89	193692/197359	N	10/13/2006	564-33-1	4,222	0	1141	1141	27	P	DK
11/15/2005	2360/43-89	193692/197359	N	10/13/2006	564-33-1	4,222	2	1132	1130	27	P	DK
11/16/2005	2360/43-89	193692/197359	N	10/13/2006	564-33-1	4,222	1	1212	1211	29	P	DK
11/17/2005	2360/43-89	193692/197359	N	10/13/2006	564-33-1	4,222	1	1216	1215	29	P	DK
11/18/2005	2360/43-89	193692/197359	N	10/13/2006	564-33-1	4,222	1	1137	1136	27	P	DK

Control Chart



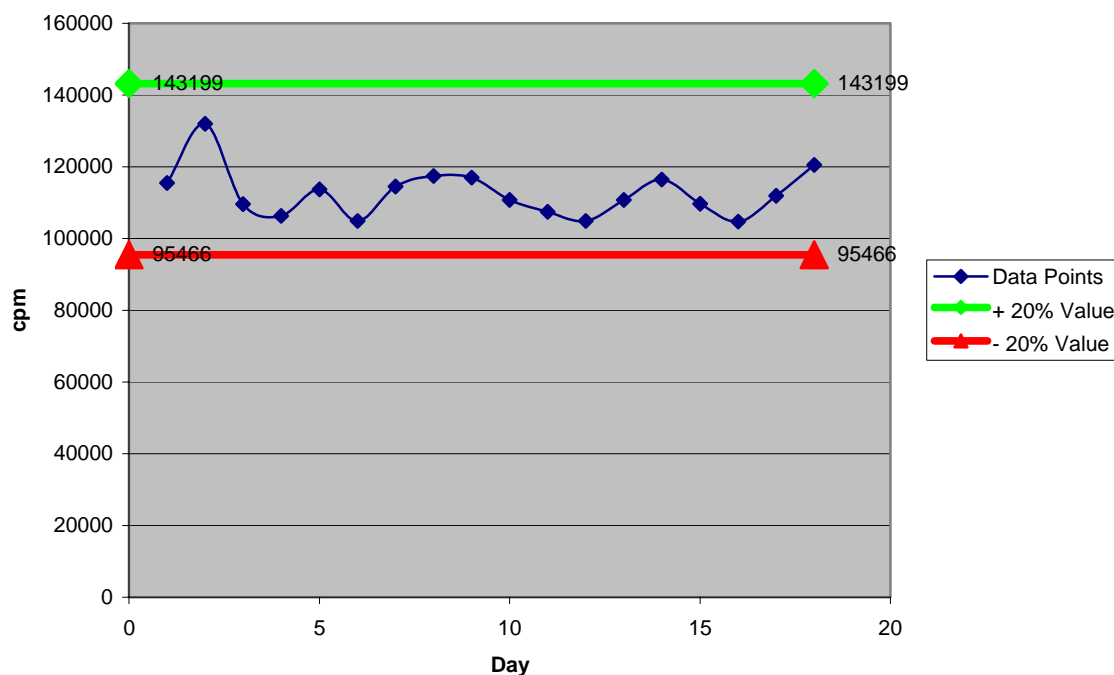
Project: Picatinny Arsenal												
DATE	MODEL/TYPE (Meter/Detector)	S/N (Meter/Detector)	PHYSICAL DAMAGE Y/N	CAL. DUE DATE	SOURCE I.D Tc-99	SOURCE ACTIVITY (Betas/Min)	BACKGROUND CPM	READING CPM	Net CPM	EFF. %	PASS/ FAIL (P/F)	TECH. INIT.
10/17/2005	2360/43-89	193692/197359	N	10/13/2006	564-13-3	16,030	202	2745	2543	16	P	DK
10/18/2005	2360/43-89	193692/197359	N	10/13/2006	564-13-3	16,030	199	2767	2568	16	P	DK
10/19/2005	2360/43-89	193692/197359	N	10/13/2006	564-13-3	16,030	205	2744	2539	16	P	DK
10/20/2005	2360/43-89	193692/197359	N	10/13/2006	564-13-3	16,030	209	2698	2489	16	P	DK
10/21/2005	2360/43-89	193692/197359	N	10/13/2006	564-13-3	16,030	203	2735	2532	16	P	DK
10/24/2005	2360/43-89	193692/197359	N	10/13/2006	564-13-3	16,030	199	2740	2541	16	P	DK
10/25/2005	2360/43-89	193692/197359	N	10/13/2006	564-13-3	16,030	205	2746	2541	16	P	DK
10/26/2005	2360/43-89	193692/197359	N	10/13/2006	564-13-3	16,030	205	2735	2530	16	P	DK
11/7/2005	2360/43-89	193692/197359	N	10/13/2006	564-13-3	16,030	213	2748	2535	16	P	DK
11/8/2005	2360/43-89	193692/197359	N	10/13/2006	564-13-3	16,030	183	2671	2488	16	P	DK
11/9/2005	2360/43-89	193692/197359	N	10/13/2006	564-13-3	16,030	201	2728	2527	16	P	DK
11/10/2005	2360/43-89	193692/197359	N	10/13/2006	564-13-3	16,030	189	2766	2577	16	P	DK
11/11/2005	2360/43-89	193692/197359	N	10/13/2006	564-13-3	16,030	206	2732	2526	16	P	DK
11/14/2005	2360/43-89	193692/197359	N	10/13/2006	564-13-3	16,030	202	2698	2496	16	P	DK
11/15/2005	2360/43-89	193692/197359	N	10/13/2006	564-13-3	16,030	195	2742	2547	16	P	DK
11/16/2005	2360/43-89	193692/197359	N	10/13/2006	564-13-3	16,030	189	2692	2503	16	P	DK
11/17/2005	2360/43-89	193692/197359	N	10/13/2006	564-13-3	16,030	205	2736	2531	16	P	DK
11/18/2005	2360/43-89	193692/197359	N	10/13/2006	564-13-3	16,030	207	2724	2517	16	P	DK

Control Chart



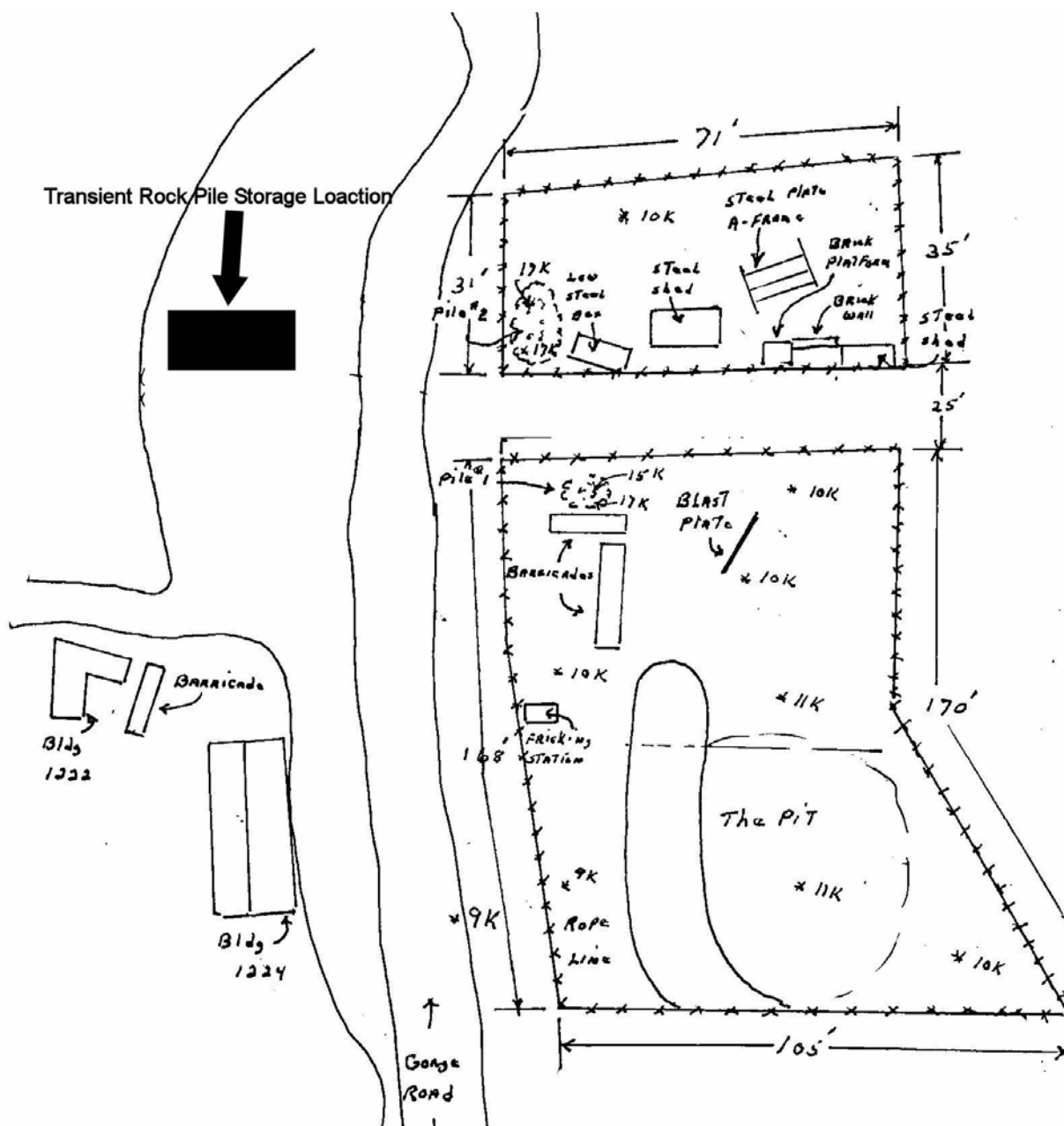
Project: Picatinny Arsenal												
DATE	MODEL/TYPE (Meter/Detector)	S/N (Meter/Detector)	PHYSICAL DAMAGE Y/N	CAL. DUE DATE	SOURCE I.D Cs-137	SOURCE ACTIVITY dpm	BACKGROUND CPM	READING CPM	Net CPM	EFF. %	PASS/ FAIL (P/F)	TECH. INIT.
10/17/2005	2350-1/44-10	95337/020381	N	10/13/2006	A7-275	99,590	8000	123489	115489	N/A	P	DK
10/18/2005	2350-1/44-10	95337/020381	N	10/13/2006	A7-275	99,590	8000	140006	132006	N/A	P	DK
10/19/2005	2350-1/44-10	95337/020381	N	10/13/2006	A7-275	99,590	8000	117590	109590	N/A	P	DK
10/20/2005	2350-1/44-10	95337/020381	N	10/13/2006	A7-275	99,590	9000	115302	106302	N/A	P	DK
10/21/2005	2350-1/44-10	95337/020381	N	10/13/2006	A7-275	99,590	8000	121732	113732	N/A	P	DK
10/24/2005	2350-1/44-10	95337/020381	N	10/13/2006	A7-275	99,590	9000	113897	104897	N/A	P	DK
10/25/2005	2350-1/44-10	95337/020381	N	10/13/2006	A7-275	99,590	9000	123489	114489	N/A	P	DK
10/26/2005	2350-1/44-10	95337/020381	N	10/13/2006	A7-275	99,590	8000	125456	117456	N/A	P	DK
11/7/2005	2350-1/44-10	95337/020381	N	10/13/2006	A7-275	99,590	8000	124992	116992	N/A	P	DK
11/8/2005	2350-1/44-10	95337/020381	N	10/13/2006	A7-275	99,590	9000	119734	110734	N/A	P	DK
11/9/2005	2350-1/44-10	95337/020381	N	10/13/2006	A7-275	99,590	8000	115486	107486	N/A	P	DK
11/10/2005	2350-1/44-10	95337/020381	N	10/13/2006	A7-275	99,590	9000	113854	104854	N/A	P	DK
11/11/2005	2350-1/44-10	95337/020381	N	10/13/2006	A7-275	99,590	8000	118759	110759	N/A	P	DK
11/14/2005	2350-1/44-10	95337/020381	N	10/13/2006	A7-275	99,590	9000	125438	116438	N/A	P	DK
11/15/2005	2350-1/44-10	95337/020381	N	10/13/2006	A7-275	99,590	9000	118654	109654	N/A	P	DK
11/16/2005	2350-1/44-10	95337/020381	N	10/13/2006	A7-275	99,590	8000	112675	104675	N/A	P	DK
11/17/2005	2350-1/44-10	95337/020381	N	10/13/2006	A7-275	99,590	9000	120953	111953	N/A	P	DK
11/18/2005	2350-1/44-10	95337/020381	N	10/13/2006	A7-275	99,590	9000	129537	120537	N/A	P	DK

Control Chart



Appendix 1

Land Area Walkover Surveys



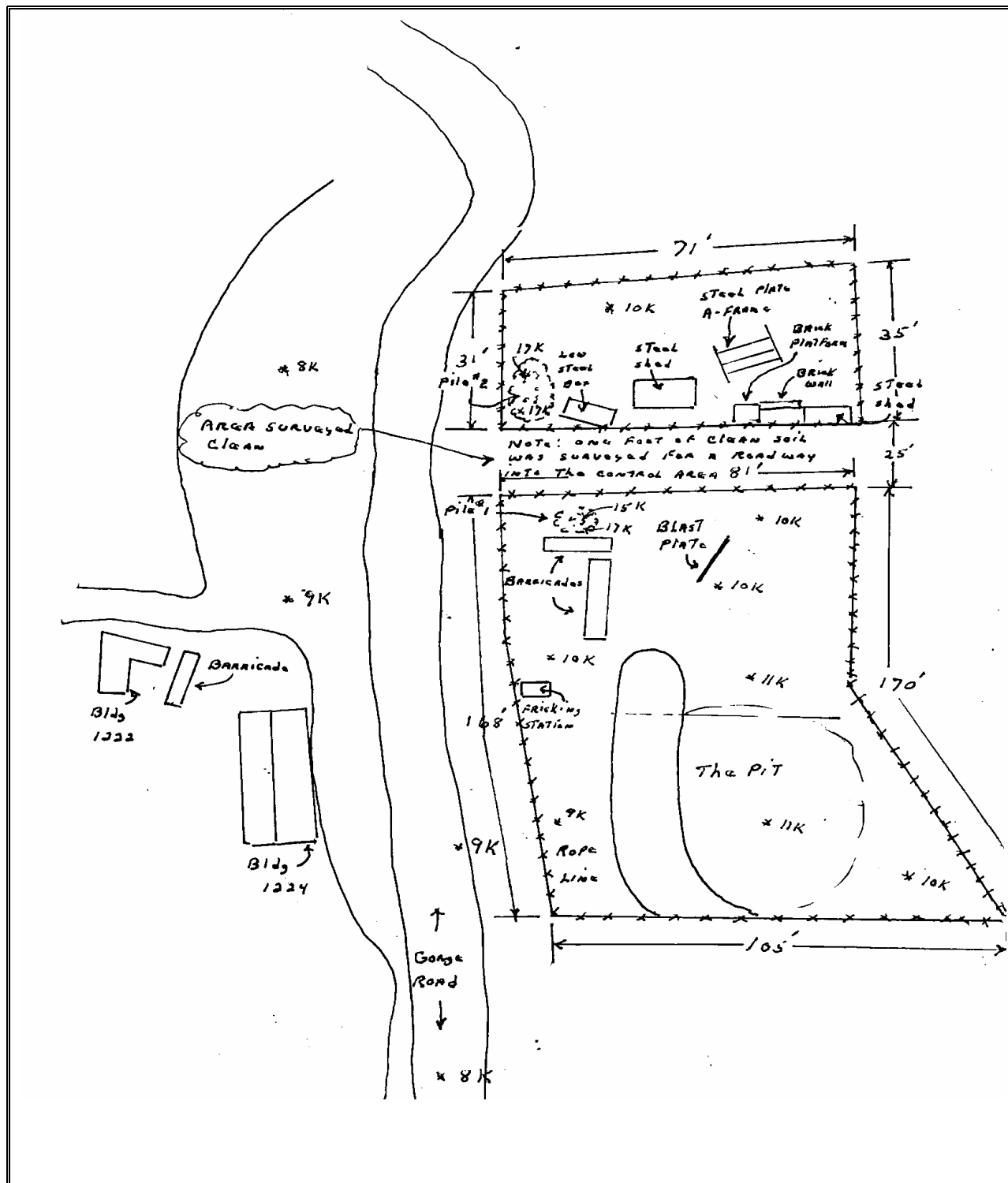
RADIOLOGICAL SURVEY REPORT

NWTS #: N/A

Page 1 of 2

DATE: 11/10/05	INSTRUMENTATION USED						
TIME: 1400	MODEL	S/N	EFF. %	BKRD	CAL. DUE DATE		
SURVEYOR: Richard Kountz	2350-1 44-10	95337 020381	N/A	8-9K	10-13-06		
LOCATION: Picatinny Arsenal Gorge Area	N/A	N/A	N/A	N/A	N/A		
REVIEWED BY: Dan Spicuzza	N/A	N/A	N/A	N/A	N/A		
Smear Locations Circled; Dose Rates = mR/hr							
PURPOSE OF SURVEY: <u>Establish radiological conditions and controls in area.</u>					SMEAR RESULTS RESULTS = DPM/100cm ² UNLESS NOTED		
See Page 2 of 2 for survey map. Walkover gamma scan survey results of the RCA area were between 8,000 to 11,000 cpm. Scan MDCR: 1404 net cpm/10562 gross cpm. Remarks: <u>K = 1,000 cpm.</u> ✕✕✕✕ : Denotes controlled area boundary. No swipe or soil samples were collected because the scope of the project did not involve the release of any soils.					#	βγ	α
					N/A	N/A	N/A
					N/A	N/A	N/A
					N/A	N/A	N/A
					N/A	N/A	N/A
					N/A	N/A	N/A
					N/A	N/A	N/A
					N/A	N/A	N/A
					N/A	N/A	N/A
					N/A	N/A	N/A

NWTS #: N/A

Page 2 of 2

RADIOLOGICAL SURVEY REPORT

NWTS #: N/A

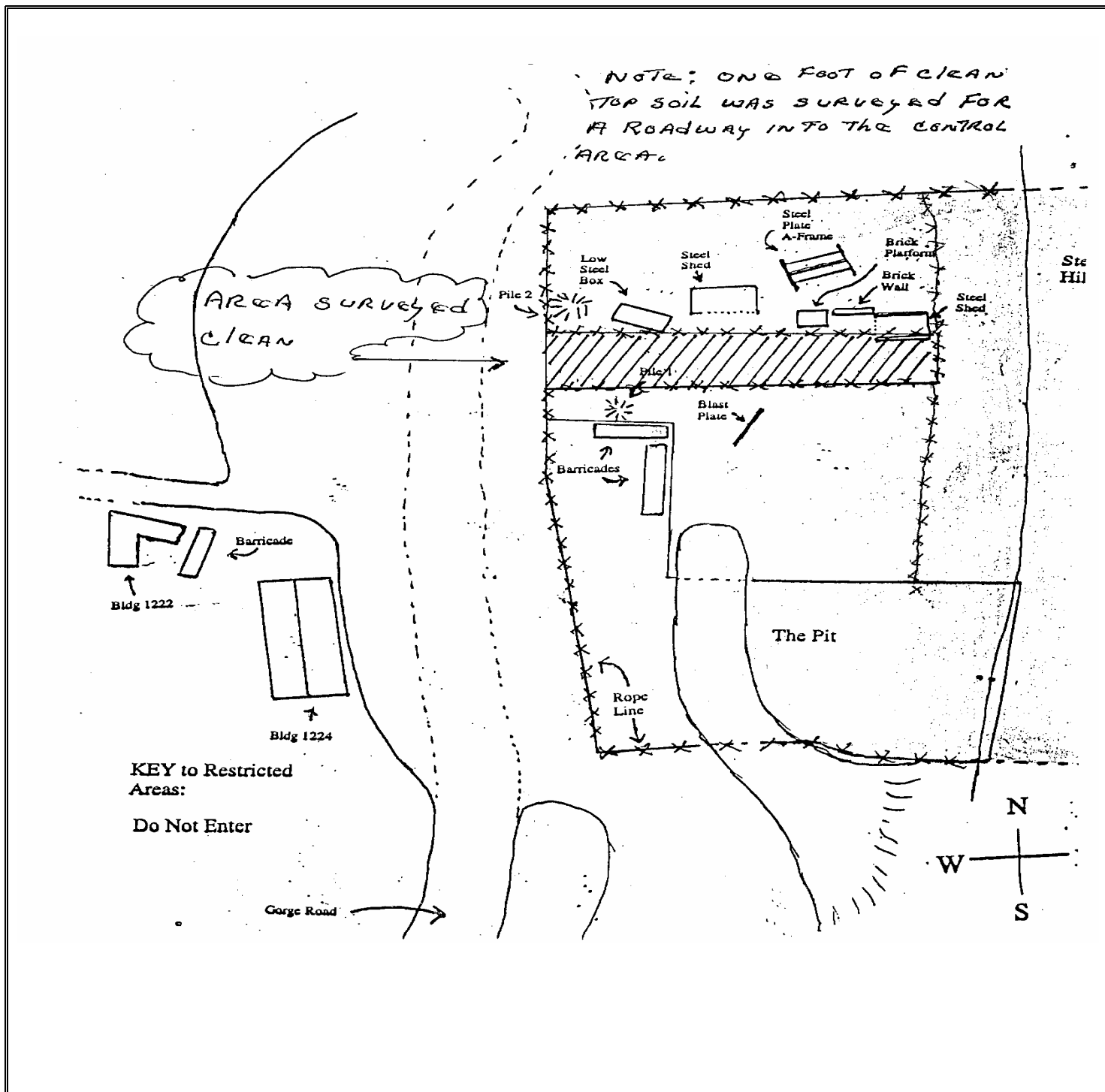
Page 1 of 2

DATE: 11/17/05	INSTRUMENTATION USED						
TIME: 1300	MODEL	S/N	EFF.%	BKRD	CAL. DUE DATE		
SURVEYOR: Richard Kountz	2350-1 44-10	95337 020381	N/A	8-9K	10-13-06		
LOCATION: Picatinny Arsenal Gorge Area	N/A	N/A	N/A	N/A	N/A		
REVIEWED BY: Dan Spicuzza	N/A	N/A	N/A	N/A	N/A		
Smear Locations Circled; Dose Rates = mR/hr							
PURPOSE OF SURVEY: <u>Post job survey of temporary road.</u>					SMEAR RESULTS RESULTS = DPM/100cm ² UNLESS NOTED		
See Page 2 of 2 for survey map. Walkover gamma scan survey results of the temporary road were between 8,000 to 10,000 cpm. Scan MDCR: 1404 net cpm/10562 gross cpm. Remarks: <u>K = 1,000 cpm.</u> xxxx : Denotes controlled area boundary. No swipe or soil samples were collected because the scope of the project did not involve the release of any soils.					#	βγ	α
					N/A	N/A	N/A
					N/A	N/A	N/A
					N/A	N/A	N/A
					N/A	N/A	N/A
					N/A	N/A	N/A
					N/A	N/A	N/A
					N/A	N/A	N/A
					N/A	N/A	N/A
					N/A	N/A	N/A
					N/A	N/A	N/A
					N/A	N/A	N/A

RADIOLOGICAL SURVEY REPORT

NWTS #: N/A

Page 2 of 2



RADIOLOGICAL SURVEY REPORT

NWTS #: N/A

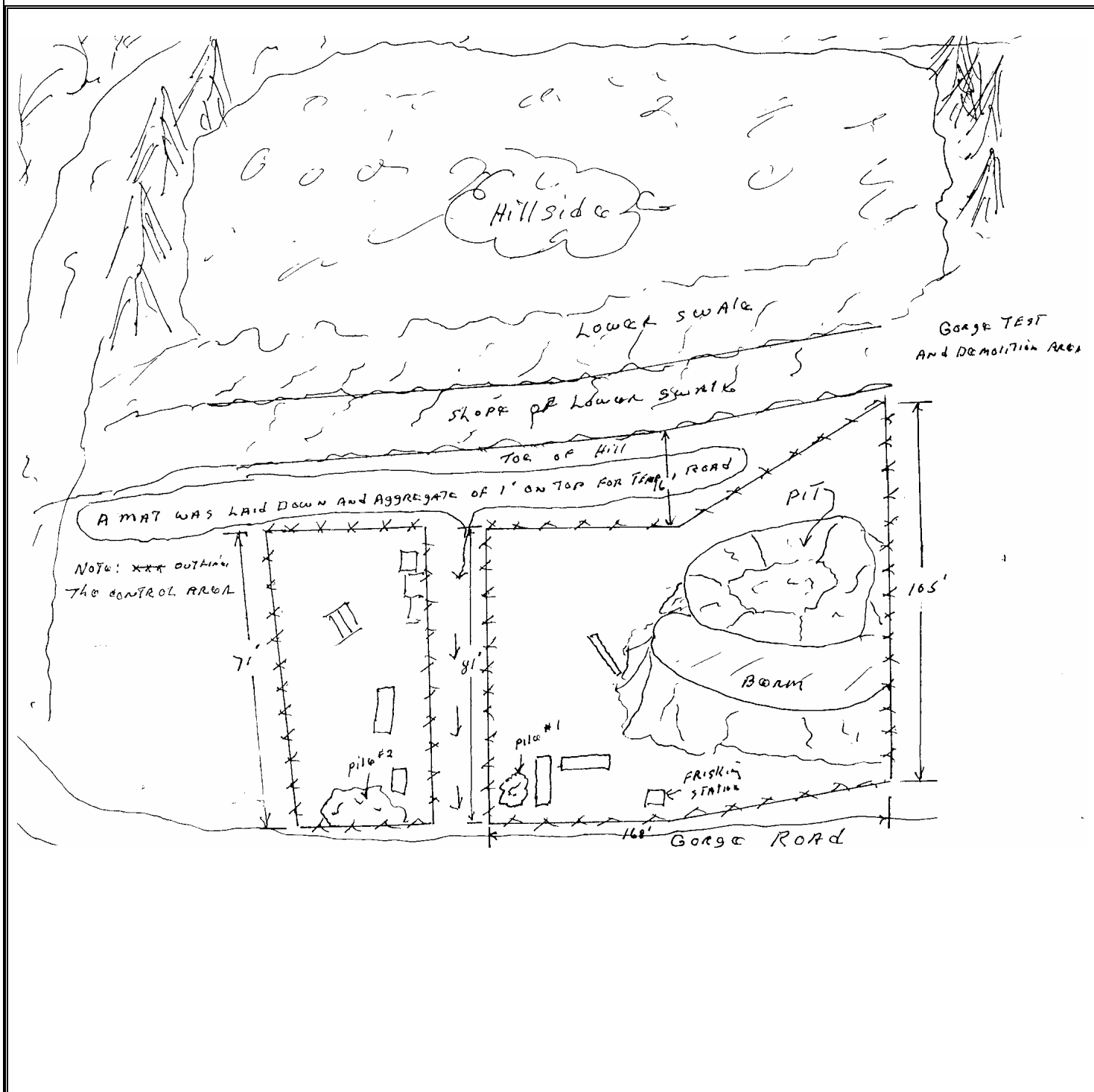
Page 1 of 2

DATE: 11/14/05	INSTRUMENTATION USED						
TIME: 1000	MODEL	S/N	EFF. %	BKRD	CAL. DUE DATE		
SURVEYOR: Richard Kountz	2350-1 44-10	95337 020381	N/A	8-9K	10-13-06		
LOCATION: Picatinny Arsenal Gorge Area	N/A	N/A	N/A	N/A	N/A		
REVIEWED BY: Dan Spicuzza	N/A	N/A	N/A	N/A	N/A		
Smear Locations Circled; Dose Rates = mR/hr							
PURPOSE OF SURVEY: <u>Setup and establish work areas.</u>					SMEAR RESULTS RESULTS = DPM/100cm ² UNLESS NOTED		
<p>See Page 2 of 2 for survey map.</p> <p>Walkover gamma scan survey results of the RCA area were between 8,000 to 11,000 cpm.</p> <p>Scan MDCR: 1404 net cpm/10562 gross cpm.</p> <p>Remarks: <u>K = 1,000 cpm.</u></p> <p>xxxx : Denotes controlled area boundary.</p> <p>No swipe or soil samples were collected because the scope of the project did not involve the release of any soils.</p>					#	βγ	α
					N/A	N/A	N/A
					N/A	N/A	N/A
					N/A	N/A	N/A
					N/A	N/A	N/A
					N/A	N/A	N/A
					N/A	N/A	N/A
					N/A	N/A	N/A
					N/A	N/A	N/A
					N/A	N/A	N/A
					N/A	N/A	N/A
					N/A	N/A	N/A
					N/A	N/A	N/A

RADIOLOGICAL SURVEY REPORT

NWTS #: N/A

Page 2 of 2



APPENDIX 2

Equipment Surveys

RADIOLOGICAL SURVEY REPORT

NWTS #: N/A

Page 1 of 2

DATE: 10/19/05	INSTRUMENTATION USED				
TIME: 1300	MODEL	S/N	EFF. %	BKRD CPM	CAL. DUE DATE
SURVEYOR: Richard Kountz	2360 43-89	193692 199359	$\beta\gamma$ 16 α 28	200-250 $\beta\gamma$ 1-2 α	10-13-06
LOCATION: Picatinny Arsenal Gorge Area	N/A	N/A	N/A	N/A	N/A
REVIEWED BY: Bill Haney	N/A	N/A	N/A	N/A	N/A
Smear Locations Circled; Dose Rates = mR/hr					

PURPOSE OF SURVEY: <u>Survey of Incoming equipment.</u>	SMEAR RESULTS		
	RESULTS = DPM/100cm ² UNLESS NOTED		
See Page 2 of 2 for survey map.	#	$\beta\gamma$	α
	1	188	0
	2	204	1
	3	200	1
	4	213	0
	5	197	1
	6	209	0
	7	202	0
	8	199	1
	9	210	0
	10	194	0
	N/A	N/A	N/A
	N/A	N/A	N/A
	N/A	N/A	N/A
	N/A	N/A	N/A
	N/A	N/A	N/A
	N/A	N/A	N/A
Alpha Static MDC: 54 dpm/100cm ² Beta Static MDC: 977 dpm/100cm ² Alpha Scan Probability: {(100 dpm/100cm ² /56%)(300 dpm/100cm ² /91%)} Beta Scan MDC: 3,810-4,260 dpm/100cm ² Static measurements were taken for 2-minutes. All accessible areas were 100 % direct scan surveyed. No detectable alpha-beta activity over background levels were detected.			

RADIOLOGICAL SURVEY REPORT

NWTS #: N/A

Page 2 of 2

10-17-05
Dick Kountz
Picatinny Gorge
PURPOSE of
Survey - Incoming Equip.

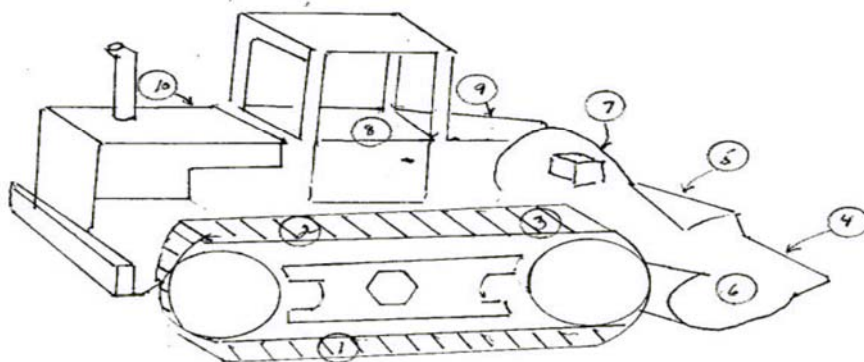
INSTRUMENTATION USED

Model	S/N	Bkg.	CAL Due to
2360	173692	200pm	10-13-06
Prolo			
43-89	199359		

SMENA RESULTS

All \leq Bkg.

SMENA LOCATIONS CIRCLED



RADIOLOGICAL SURVEY REPORT

NWTS #: N/A

Page 1 of 2

DATE: 11/15/05	INSTRUMENTATION USED					
TIME: 1500	MODEL	S/N	EFF.%	BKRD CPM	CAL. DUE DATE	
SURVEYOR: Richard Kountz	2360 43-89	193692 199359	$\beta\gamma$ 16 α 28	200-250 $\beta\gamma$ 1-2 α	10-13-06	
LOCATION: Picatinny Arsenal Gorge Area	N/A	N/A	N/A	N/A	N/A	
REVIEWED BY: Bill Haney	N/A	N/A	N/A	N/A	N/A	
Smear Locations Circled; Dose Rates = mR/hr						
PURPOSE OF SURVEY: <u>Survey of Outgoing equipment.</u>				SMEAR RESULTS RESULTS = DPM/100cm ² UNLESS NOTED		
See Page 2 of 2 for survey map.				#	$\beta\gamma$	α
				1	224	0
				2	221	1
				3	223	1
				4	187	0
				5	214	0
				6	217	1
				7	193	0
				8	188	0
				9	200	1
				10	221	0
				11	233	0
				12	221	1
				13	223	0
14	206	0				
Alpha Static MDC: 54 dpm/100cm ² Beta Static MDC: 977 dpm/100cm ² Alpha Scan Probability: {(100 dpm/100cm ² /56%)(300 dpm/100cm ² /91%)} Beta Scan MDC: 3,810-4,260 dpm/100cm ² Static measurements were taken for 2-minutes. All accessible areas were 100 % direct scan surveyed. No detectable alpha-beta activity over background levels were detected.				N/A	N/A	N/A

RADIOLOGICAL SURVEY REPORT

NWTS #: N/A

Page 2 of 2

11-18-05

Dick Kaunke
Picatinny Gorge

PURPOSE OF SURVEY
OUT GOING Equip

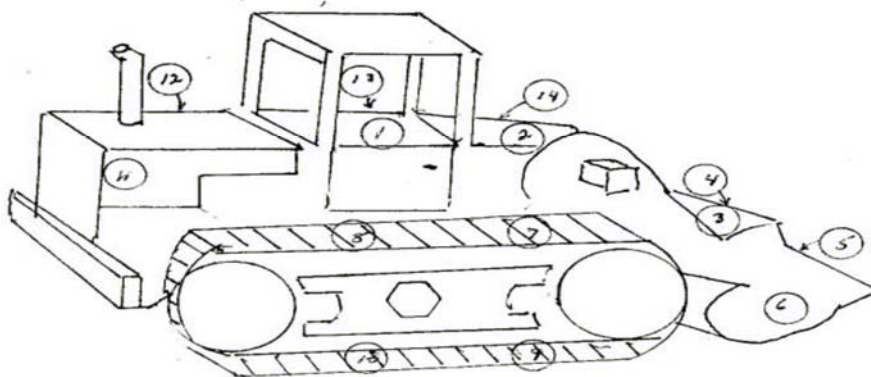
INSTRUMENTATION USED

Model	S/N	Bkg.	Cal. Due
2360	199672	200pm	10-13-0
PRO6	199359		
43-89			

SMEAR LOCATION CIRCLED

SMEAR RESULTS

All \leq Bkg.



RADIOLOGICAL SURVEY REPORT

NWTS #: N/A

Page 1 of 2

DATE: 10/18/05	INSTRUMENTATION USED					
TIME: 0900	MODEL	S/N	EFF. %	BKRD CPM	CAL. DUE DATE	
SURVEYOR: Richard Kountz	2360 43-89	193692 199359	$\beta\gamma$ 16 α 28	200-250 $\beta\gamma$ 1-2 α	10-13-06	
LOCATION: Picatinny Arsenal Gorge Area	N/A	N/A	N/A	N/A	N/A	
REVIEWED BY: Bill Haney	N/A	N/A	N/A	N/A	N/A	
Smear Locations Circled; Dose Rates = mR/hr						
PURPOSE OF SURVEY: <u>Survey of Incoming equipment.</u>				SMEAR RESULTS RESULTS = DPM/100cm ² UNLESS NOTED		
See Page 2 of 2 for survey map.				#	$\beta\gamma$	α
				1	186	0
				2	205	0
				3	200	0
				4	194	1
				5	178	0
				6	208	1
				7	211	0
				8	195	0
				9	197	0
				10	204	1
				N/A	N/A	N/A
				N/A	N/A	N/A
N/A	N/A	N/A				
N/A	N/A	N/A				
N/A	N/A	N/A				

Alpha Static MDC: 54 dpm/100cm²
Beta Static MDC: 977 dpm/100cm²
Alpha Scan Probability: {(100 dpm/100cm²/56%)(300 dpm/100cm²/91%)}
Beta Scan MDC: 3,810-4,260 dpm/100cm²
Static measurements were taken for 2-minutes.

All accessible areas were 100 % direct scan surveyed.

No detectable alpha-beta activity over background levels were detected.

RADIOLOGICAL SURVEY REPORT

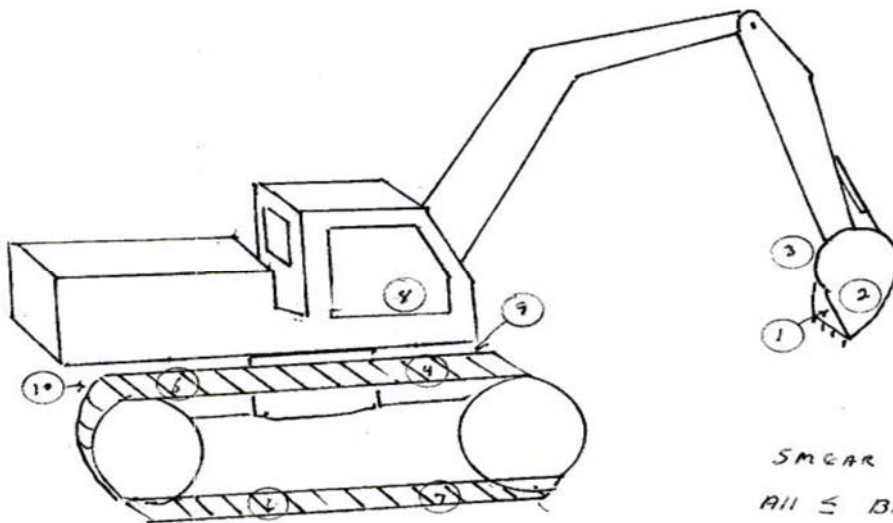
NWTS #: N/A

Page 2 of 2

10-18-05
Diak Kountz
Picatinny Gorge
PURPOSE OF SURVEY
Incoming Equip.

INSTRUMENTATION USED
CAL. DUE DATE 15-07
Model S/N BKg.
2368 193672 20 cpm
PROLO 199357
42-97

SMear Locations CIRCLED:



SMear RESULTS
All \leq BKg.

NEW WORLD TECHNOLOGY FORM NWT-001

RADIOLOGICAL SURVEY REPORT

NWTS #: N/A

Page 1 of 2

DATE: 11/15/05	INSTRUMENTATION USED					
TIME: 1600	MODEL	S/N	EFF.%	BKRD CPM	CAL. DUE DATE	
SURVEYOR: Richard Kountz	2360 43-89	193692 199359	$\beta\gamma$ 16 α 28	200-250 $\beta\gamma$ 1-2 α	10-13-06	
LOCATION: Picatinny Arsenal Gorge Area	N/A	N/A	N/A	N/A	N/A	
REVIEWED BY: Bill Haney	N/A	N/A	N/A	N/A	N/A	
Smear Locations Circled; Dose Rates = mR/hr						
PURPOSE OF SURVEY: <u>Survey of Outgoing equipment.</u>				SMEAR RESULTS RESULTS = DPM/100cm ² UNLESS NOTED		
See Page 2 of 2 for survey map.				#	$\beta\gamma$	α
				1	203	0
				2	211	1
				3	202	1
				4	201	0
				5	189	0
				6	206	1
				7	175	0
				8	204	0
				9	215	1
				10	200	0
				11	185	0
				12	204	1
				13	202	0
14	199	1				
Alpha Static MDC: 54 dpm/100cm ² Beta Static MDC: 977 dpm/100cm ² Alpha Scan Probability: {(100 dpm/100cm ² /56%)(300 dpm/100cm ² /91%)} Beta Scan MDC: 3,810-4,260 dpm/100cm ² Static measurements were taken for 2-minutes. All accessible areas were 100 % direct scan surveyed. No detectable alpha-beta activity over background levels were detected.				N/A	N/A	N/A

NEW WORLD TECHNOLOGY FORM NWT-001

RADIOLOGICAL SURVEY REPORT

NWTS #: N/A

Page 2 of 2

11-18-03

Dick Kaunth
Picatinny Gorge

PURPOSE OF SURVEY
outgoing Equip

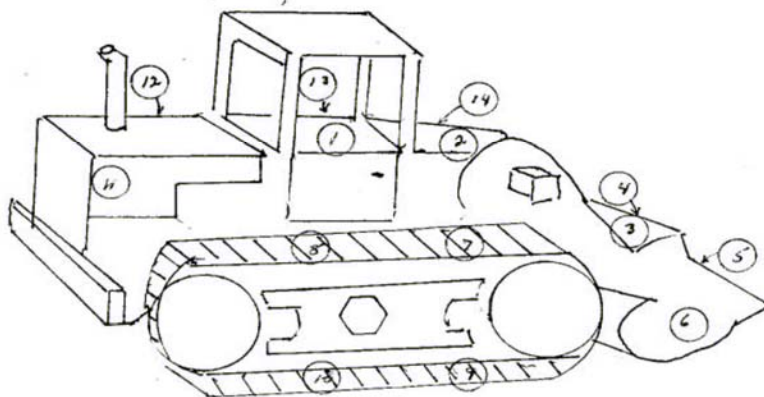
INSTRUMENTATION USED

Model	S/N	Bkg.	Cal. Due	Date
2360	193692	20cpm	10-13-06	
PRO6	199359			
43-89				

SMEAR LOCATION CIRCLED

SMEAR RESULTS

All \leq Bkg.



RADIOLOGICAL SURVEY REPORT

NWTS #: N/A

Page 1 of 2

DATE: 11/9/05	INSTRUMENTATION USED					
TIME: 0900	MODEL	S/N	EFF. %	BKRD CPM	CAL. DUE DATE	
SURVEYOR: Richard Kountz	2360 43-89	193692 199359	$\beta\gamma$ 16 α 28	200-250 $\beta\gamma$ 1-2 α	10-13-06	
LOCATION: Picatinny Arsenal Gorge Area	2350-1 44-10	95337 020381	N/A	8-9K	10-13-06	
REVIEWED BY: Bill Haney		N/A	N/A	N/A	N/A	
Smear Locations Circled; Dose Rates = μ R/hr						
PURPOSE OF SURVEY: <u>Survey of safe store UXO box.</u>				SMEAR RESULTS RESULTS = DPM/100cm ² UNLESS NOTED		
<p>See Page 2 of 2 for survey map.</p> <p>2350-1 Scan MDCR: 1404 net cpm/10562 gross cpm.</p> <p>Alpha Static MDC: 54 dpm/100cm²</p> <p>Beta Static MDC: 977 dpm/100cm²</p> <p>Alpha Scan Probability: {(100 dpm/100cm²/56%)(300 dpm/100cm²/91%)}</p> <p>Beta Scan MDC: 3,810-4,260 dpm/100cm²</p> <p>Static measurements were taken for 2-minutes.</p> <p>All accessible areas were 100 % direct scan surveyed.</p> <p>No detectable alpha-beta activity over background levels were detected.</p>				#	$\beta\gamma$	α
				1	176	0
				2	165	0
				3	191	1
				4	199	0
				5	188	0
				6	203	1
				7	186	0
				8	210	1
				9	205	0
				10	209	0
				11	199	1
				12	212	0
N/A	N/A	N/A				
N/A	N/A	N/A				
N/A	N/A	N/A				

RADIOLOGICAL SURVEY REPORT

NWTS #: N/A

Page 2 of 2

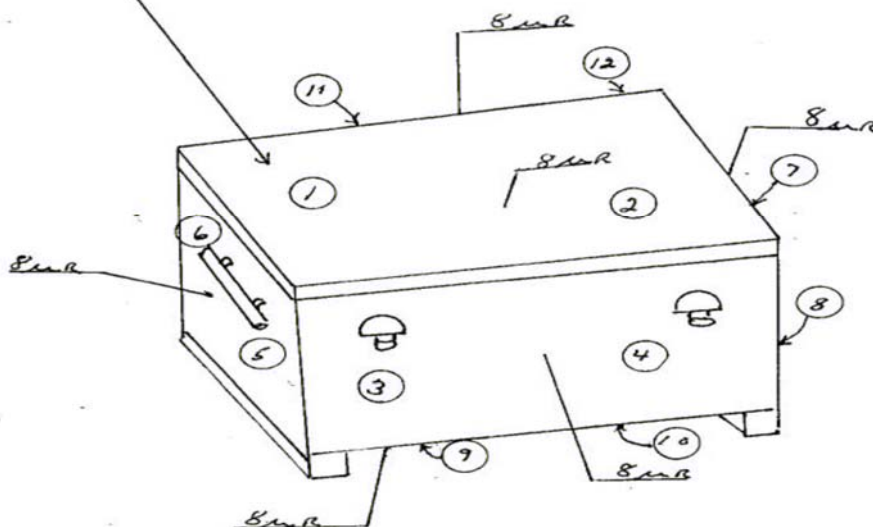
INSTRUMENTATION USED

Model PRO60
2360 43-89
2350-1 44-10

SMEAR RESULTS:
All were LESS THAN 13Kg.
BKg. was 8K to 16K cpm
SMEAR LOCATION CIRCLED

Dose Rates were in $\mu R/HR$
All readings were \leq BKg.
BKg = $8 \mu R/HR$

SAFE Holding AREA
STORAGE BOX FOR
MUNITIONS DEBRIS AND SCRAP
NOTE: BOX WAS LOCKED AFTER
SCRAP WAS SURVEYED
CLEAN.



DICK KOUNTS
11-9-05