Naval Air Warfare Center Weapons Division, China Lake, CA

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CHINA LAKE SCOPING SURVEY PHASE I – DEPLETED URANIUM SITES

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13. ABSTRACT Between June 13, 2011 and May 10, 2012, Occupational Services, Inc. performed scoping surveys of ground and building surfaces for Depleted Uranium (DU) in 30 selected structures and 14 surrounding ground areas at the Naval Air Warfare Center Weapons Division (NAWCWD), China Lake site. In addition equipment and surrounding ground areas in three other locations were surveyed for the presence of Radium 226 (Ra-226). The areas evaluated for the DU scoping surveys were identified as potentially impacted in the Decommissioning Plan (DP), prepared for NAWCWD, by New World Technology in July 2007 and updated by Occupational Services Incorporated in 2012. The purpose of these surveys was to provide information to NAWCWD on which locations contained readily identifiable quantities of DU contamination, to support future characterization as Class 1, 2 or 3 areas for decommissioning. Until formal decommissioning, the information could be used by NAWCWD to determine which areas qualify for release from consideration as “Restricted Areas”, or if any of them should be added to the Restricted Areas controlled under the current Naval Radioactive Materials Permit 04-6530-L1NP (Reference D-1) until decommissioned. Of the buildings evaluated three were found to contain localized areas of DU contamination, although not greater than RAD-010 Table 2-2 contamination limits for DU. Of the outside areas evaluated six were found to contain localized areas of DU contamination. Four other areas were found to have contamination from commodities or devices containing radioactive material such as radium dials and gauges.			
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Acronyms and Abbreviations

cc	cubic centimeters
cm	centimeters
cpm	counts per minute
dpm	disintegrations per minute
DCGL	Derived Concentration Guideline Level
DP	Decommissioning Plan
DU	Depleted Uranium
g	gram
IAEA	International Atomic Energy Agency
Lc	Critical Level
MARSSIM	Multi-Agency Radiation Survey & Site Investigation Manual
MDC	Minimum Detectable Concentration
MML	Master Materials License
mrem	milliroentgen equivalent man.
NAWCWD	Naval Air Warfare Center Weapons Division
NRC	Nuclear Regulatory Commission
NWT	New World Technology
NRMP	Naval Radioactive Materials Permit
OSI	Occupational Services Incorporated
pCi	picocuries
Ra-226	Radium-226
RSO	Radiation Safety Officer
SNORT	Supersonic Naval Ordinance Research Track
U-234	Uranium-234
U-235	Uranium-235
U-238	Uranium-238
UXO	Unexploded Ordnance

Executive Summary

Occupational Services Incorporated (OSI) performed scoping surveys of 30 selected buildings or structures and 14 surrounding ground areas for Depleted Uranium (DU) at the Naval Air Warfare Center Weapons Division (NAWCWD), China Lake site. In addition equipment and surrounding ground areas in three more locations were surveyed for the presence of Radium 226 (Ra-226). The areas evaluated for DU were identified as potentially impacted in a Decommissioning Plan (DP), originally prepared for NAWCWD, by New World Technology (NWT) in 2007 (Reference D-2) and updated by Occupational Services Incorporated (OSI) in 2012 (Reference D-3). This phase of the China Lake Scoping Survey project did not include all of the buildings and land areas identified as potentially impacted in the updated DP. The main focus of this phase was on accessible areas with a higher probability of being contaminated with Depleted Uranium (DU) that have not yet been scheduled for decommissioning. The remaining areas will need to be surveyed in future phases of the China Lake scoping survey efforts. The purpose of the current surveys was to provide information to NAWCWD on which portions of the areas surveyed contained readily identifiable quantities of DU contamination, and to support future characterization as Class 1, 2 or 3 areas for final decommissioning planning purposes. This scoping survey information could be further used by NAWCWD to determine which areas should be added to the Restricted Areas controlled under the current Naval Radioactive Materials Permit (NRMP) 04-6530-L1NP, until decommissioned.

Surveys of buildings and structures included direct measurements with a survey meter and wipe tests of selected surfaces. The direct surveys were performed with gas flow proportional detectors operated in an alpha detection mode using both scanning and static measurement techniques. The scanning was used to identify areas of elevated activity, and follow up static measurements were then made at those locations as well as at other randomly selected positions. Wipe test samples were taken at selected positions where transfer of activity was likely, such as doorknobs, air vents, work surfaces etc. The results of the building surveys indicated 3 of the 30 buildings (00005, 12510 and 30973) had areas of low level contamination as noted on static survey measurements. No building areas indicated removable contamination on wipe test samples. The highest levels of fixed contamination were found in building 00005, rooms 1424, 1644 and 1646 (63 to 481 dpm/100cm^2). The contamination was found primarily in sinks, and at one location on a counter top. In building 12510, the contamination was found on the floor surfaces of the firing range. In building 30973 the contamination was found on the concrete floor.

Surveys of external ground areas were made with beta scintillation detectors. The surveys were conducted in a scanning mode. The scanning was used to identify areas of elevated activity where follow up measurements were then taken. Seven areas had no indication of elevated activity, and were used as reference background areas. The results from these areas indicated an average background radiation level of 214 cpm/100cm^2, with a standard deviation of 49 cpm/100cm^2. This equates to approximately 3,147 dpm/100cm^2. Based on the average background level, a detection level of 478 cpm gross count rate was established for identification of elevated activity. Results which exceed this detection level were considered elevated and potentially contaminated.

The results of the external land surveys indicated 6 of the 14 areas surveyed for DU had potential contamination (i.e. greater than 478 cpm/100cm^2 gross activity). The highest concentrations of contamination were located in the K-2 Small Caliber Gun Range, Kennedy Stand Air to Ground Test Area, Tower 11 Target Area and CT1 SA-1 Test Area. Lower levels of DU contamination were identified at CT4 and the supersonic naval ordnance research track (SNORT).

Surveys of the Aircraft Boneyard, B-29 & F-4 Area, COSO range and Salt Wells Dump Site, which included equipment, targets and aircraft debris, indicated contamination from commodities and devices containing radioactive material such as radium dials and gauges, but did not indicate the presence of DU.

Three hundred and forty six (346) scoping soil samples were collected and analyzed from selected areas to validate the presence of DU relative to natural uranium in the areas. The results of the soil sampling were consistent with the results of background and elevated activity with the highest percent of validated DU contamination in K-2 Small Caliber Gun Range, Kennedy Stands, and Tower 11. DU was not identified in soil samples taken in the reference background areas. DU was not identified in soil samples taken in areas with elevated counts in CT4 and SNORT.

An upper bound risk assessment for the maximum levels of DU identified on the surveys was performed and compared to the dose modeling results from RESRAD and prior risk assessments performed for China Lake. The results of the assessment indicated doses from the DU, even when assumed to be at the maximum concentration level identified on the scoping surveys and distributed throughout the soil volume, were less than 25 mrem/year to range workers or likely future occupants.

Purpose and Scope

Between June 13, 2011 and May 10, 2012, Occupational Services, Inc. performed scoping surveys of 30 building structures and 14 surrounding ground surface areas for Depleted Uranium (DU) at the Naval Air Warfare Center Weapons Division, China Lake, CA (NAWCWD) site. In addition equipment and surrounding ground areas in three more locations were surveyed for the presence of Radium 226 (Ra-226). The areas evaluated for DU were selected by the NAWCWD Radiation Safety Office (RSO) from locations previously identified as potentially impacted in a Decommissioning Plan (DP), originally prepared for NAWCWD, by New World Technology (NWT) in 2007 (Reference D-2) and updated by Occupational Services Incorporated (OSI) in 2012 (Reference D-3). The areas surveyed for Ra-226 were selected by the RSO from locations which included aircraft debris, weapons, vehicles and previous targets likely to contain radium dials and gauges.

This phase of the China Lake Scoping Survey project did not include all of the building and land areas identified as potentially impacted in the DP. The remaining buildings and land areas will need to be surveyed in future phases of the China Lake Scoping Survey project. The purpose of these surveys was to provide information to NAWCWD on which locations contained readily identifiable quantities of DU contamination to support future characterization as Class 1, 2 or 3 areas for final decommissioning planning. This information could further be used by NAWCWD to determine which areas qualify for release from consideration as “Restricted Areas”, or if the areas should be added to the Restricted Areas controlled under the current Naval Radioactive Materials Permit (NRMP) 04-6530-L1NP, until decommissioned.

The scope of this project included:

1. Identifying and selecting appropriate survey meters for performing the scoping surveys of buildings and outdoor areas for DU.
2. Performing direct surface monitoring surveys in a scanning mode of outdoor land areas.
3. Collecting and analyzing soil samples for the presence of DU.
4. Performing surface monitoring surveys in scanning and direct static modes of selected building surfaces.
5. Performing wipe test samples of selected building surfaces as applicable.
6. Analyzing the survey and sample results.

7. Developing geographical maps for outdoor land surveys which identify the location of survey measurements and the results. Developing appropriate building maps for building surveys which identify the location of static survey measurements and wipe samples, and the results.
8. Estimating the expected radiation background levels, including natural uranium in soils and rocks, and the variation in background in outdoor areas around the survey sites. Estimating the statistical deviation values relative to that background which might indicate the presence of DU contamination with the scanning instruments used.
9. Estimating the expected gross background radiation levels on building surfaces in the various survey sites. Estimating the statistical deviation values relative to those background levels which might indicate the presence of contamination in the static measurements taken with the instruments used.
10. Determining the range, mean, mode and variance of the background measurements identified in the various outdoor areas which contained natural uranium and thorium.
11. Estimating the potential upper boundary dose impacts resulting from the contamination identified in the various outdoor areas.
12. Providing a written report of the results including applicable assumptions, calculations and survey maps.

As noted in the DP, the primary contaminants to be surveyed for in this scope of work included DU rounds, fragments, and oxidation products. These contaminants are not expected to be uniformly deposited in the soil. Scoping soil sampling was performed in this initial phase of the project to verify if DU was present in surface soils. No excavation of buried material or removal of identified DU was performed, except for soil sampling or use in calibration and testing of instruments. The buildings and areas surveyed in this project are listed in Attachment 1.

Background

The historical assessment performed for the DP indicated that research, testing (including destructive), evaluation, mixing, incineration and storage of DU in ordnance and propellants, as well as disposal of DU waste was conducted at various periods of time at the China Lake site from the 1940s through the early 1990s. There is no current work occurring with DU material but there is residual DU stored and located at NAWCWD as result of the original work.
DU is considered a licensed material under US Nuclear Regulatory Commission (NRC) regulations, and must be controlled accordingly. NAWCWD has a current permit, 04-6530-L1NP, issued under the Naval Master Material License (MML) program, which authorizes the storage of DU at certain locations on the site, pending decommissioning. Section 9.A of the permit states such materials are authorized to be stored “on the Kennedy Stands Air-to-Ground Test Area, Tower 11 Target Area, K-2 Small Caliber Gun Range, and other areas yet to be identified, contaminated with DU projectiles and fragments as metallic solid or as oxides of depleted projectiles … ”.

In accordance with the permit, 04-6530-L1NP, other areas where DU contamination has been identified are to be controlled as they become known. Areas where DU is stored on the site are typically considered Restricted Areas, per the Title 10 CFR 20 definition. The Kennedy Stands Air-to-Ground Test Area, Tower 11 Target Area and K-2 Small Caliber Gun Range, were known to store and be contaminated with DU materials and are controlled and addressed in the existing permit and DP. However, other areas were recognized as *potentially* contaminated, and once contamination is verified, are to be controlled as applicable, until decommissioned or the material is removed.
NAWCWD needs to determine which areas must be controlled under the Permit for storage of DU and which areas would likely require remediation for decommissioning. Any area with detectable

levels of DU above background should be evaluated for control under the current permit, and identified for future decommissioning planning efforts.

To determine which other areas may be contaminated with DU for current control considerations and in preparation for decommissioning, special scoping surveys are required. Several Nuclear Regulatory Commission documents, such as NUREG 1575 (MARSSIM), provide guidelines for conducting such surveys. As noted in the MARSSIM guidance, these types of scoping surveys may be used to:

1. Support the classification of all or part of the sites or buildings as Class 3 areas for planning final surveys,
2. Obtain an estimate of the variability in the residual radioactivity concentration for the site, and,
3. Identify non-impacted areas that may be appropriate for reference areas and estimating the variability in radionuclide concentrations when the radionuclide of interest is present in the background.

The China Lake site includes several conditions which make the scoping surveys more difficult or unique in application. As noted in the DP, these conditions include:

1. The site is very large, with rough terrain, and is contaminated with discretely located depleted uranium, making generic soil sampling less representative of the distribution.
2. The site is still an active weapons testing range including unexploded ordnance (UEO), making identification and collection of depleted uranium projectiles and fragments below the surface extremely hazardous and requiring special permits, range escorts and controls.
3. The site contains varying levels of natural uranium and thorium in the rocks and soils.
4. The expected levels and variety of contamination within a given area are not consistent between areas due to the scope of work performed (i.e. exploded material distributions at some locations).

As a result of these conditions, initial scoping surveys under this phase of this project will be focused on scanning and direct static techniques as opposed to extensive soil sampling. These techniques are considered more effective for efficiently locating discrete contamination. Soil sampling will be conducted to determine if DU migrated from fragments into the surface soil. The sensitivity of the scoping survey measurements needs to be adequate enough to address the longer term decommissioning planning goal.

Of those areas with detectable levels of contamination, removal of the DU down to an acceptable level for decommissioning would be based on a dose release criterion determined under the specific decommissioning plan approved for the area. Per NUREG 1575 the Multi-Agency Radiation Survey & Site Investigation Manual (MARSSIM) “the release criterion is a regulatory limit expressed in terms of dose (mSv/y or mrem/y) or risk (cancer incidence or cancer mortality)”. However, it is noted that the release criterion cannot be directly measured, so exposure pathway modeling is used to calculate a radionuclide-specific concentration or surface area concentration that could result in a dose or risk equal to the release criterion. These calculated concentrations are called the derived concentration guideline level (DCGL). In general, the units for the DCGL are the same as the units for measurements performed to assess compliance (*e.g.*, Bq/kg or pCi/g, Bq/m^2 or dpm/100 cm^2). This allows direct comparisons between the survey results and the DCGL.

The contamination expected in an area relative to the DCGL is used to classify the area for decommissioning planning purposes. Areas are categorized as non- impacted, or impacted at the class 1, 2 or 3 level. Class 1 areas are impacted areas with concentrations of residual radioactivity that are expected to exceed the Derived Concentration Guideline Level (DCGL). Class 2 areas are

impacted areas where average concentrations of residual activity are not expected to exceed the DCGL, but there may be some localized areas of elevated activity. Class 3 areas are impacted areas that have a lower probability of containing residual radioactivity at all.

The DCGL is normally determined from assumptions that the contamination is uniform over large areas and is designated the DCGLw. When the contamination is localized into smaller areas of elevated contamination within the larger areas, a higher DCGL may be used. This higher level is designated "$DCGL_{EMC}$" and is usually limited to some multiple of the $DCGL_W$, such as a factor of 10. The selection of the DCGL is an important function prior to performing scoping and final surveys, since the sensitivity of the survey methods should ensure contamination at or above the DCGL will be identified when practicable.

The DCGL is derived from dose pathway modeling and is therefore dependent upon the radionuclide distribution, occupancy factors and use scenarios assumed for the specific area. The occupancy factors and use scenarios are dependent upon the type of release (unrestricted or restricted) selected for the DP. Since the areas involved in this phase of the scoping survey are extensive and varied in use, and no DP has been initiated for many of the locations, a single estimated unrestricted release DCGL will be used for scoping survey sensitivity assessment purposes. The most conservative DCGL values would be for the case of unrestricted release.

Separate DCGLS are often established for soil in pCi/g, and for building surfaces in dpm/100cm^2. Per NUREG 1575 (Reference D-7) the instruments used for surveys should have a sensitivity or Minimum Detectable Concentration (MDC) level which is less than the applicable DCGL. The MDC is considered the minimum detectable level of contamination that can be readily detected 95% of the time, and is dependent upon the background, the counting time, scan speed, the detector used, and the surveyor.

NUREG 1757, Vol. 1 (Reference D-8) provides a general screening DCGL of 14 pCi/g for uniformly distributed U-238 soil contamination, and allows for a more appropriate site specific DCGL to be determined. The site specific unrestricted $DCGL_W$ for DU for ground areas or soil from the NWT DP was provided as 120 pCi/g, and was conservatively based on full time occupancy for the sites. The updated DP provided an unrestricted $DCGL_W$ for DU in soil of 1,400 pCi/g, based on a more realistic occupancy factor for the outside areas at China Lake.

The DU activity concentration mix used for the DCGL determination was 83.7% U-238, 1.1% U-235 and 15.2% U-234 (99.8% U-238, 0.2% U-235, and 0.001% U-234 by weight). These values were retrieved from the International Atomic Energy Agency (IAEA) web site (Reference W-01). Since the land areas being evaluated are outdoor ranges and test areas, the site specific $DCGL_W$ from the updated DP of 1,400 pCi/g will be used for average soil or ground survey sensitivity estimation purposes in this project. A value of 14,000 pCi/g is used for the $DCGL_{EMC}$ for localized areas of elevated activity. OSI notes that the updated DP has not been reviewed and approved, and the proposed DCGL values may change.

No applicable site specific building surface contamination DCGLs were identified in the original or updated DP since it was focused on outside ground areas only. Using the EPA DandD software code Version 2.1 with its conservative default building occupancy scenario factors resulted in an unrestricted $DCGL_W$ for gross activity of DU of approximately 85 dpm/100cm^2. The associated $DCGL_{EMC}$ value is taken as ten times this value or 850 cpm/100cm^2. These values will be used to compare to the instrument sensitivity of building surveys for this project.

MARSSIM generally identifies surface contamination as material down to 15 cm in soil. Most current scanning survey techniques will not identify low levels of DU at this depth. Since excavation is not practical due to the unexploded ordnance (UXO) and environmental considerations, the actual detection levels for discrete fragments will be varied. The MDC will be based on the minimum detectable concentrations for the survey technique used with contamination assumed to be uniformly distributed through the volume up to 15 cm^2 depth.

The DCGL and MDC are quantities that should be estimated prior to surveys being taken so that appropriate instruments capable of meeting the criteria when practical are used. As noted in NCRP 58 this is different than the detection decision level or critical level (Lc) on a single count or result. The Lc is in units of counts or count rate, and is added to the background to compare directly to gross measurement values. The critical level is a determination that a specific measurement is differentiable from background, but does not represent a quantity that is differentiable 95% of the time, like the MDC.

As noted above, the desired MDC level for the scoping surveys is generally based on the DCGLw for the isotopes in question at the site. The DCGLw for building surfaces is taken as 85 dpm/100 cm^2. The $DCGL_W$ for soil was provided in the updated DP and the NUREG guidance in pCi/g, and was based on uniformly deposited material throughout the soil to a depth of 15 cm^2. This is normally taken as the average concentration over the survey area. The maximum survey area size for outdoor locations is 2,000 m^2 for Class 1 areas, and the minimum size for localized contamination is 1 m^2. Since scanning surveys will be used for outdoor ground scoping surveys to identify elevated measurement locations, this DCGL must be converted into some unit that is applicable to the survey method such as dpm/100 cm^2. It is understood that the survey method will have reduced detection of material with depth, and the primary contributor of uniformly deposited material will likely be the first 0.1 to 0.2 cm of soil below the ground surface. Assuming the DCGL of 120 pCi/g from the original DP, a soil density of 1.5 g/cc, with DU material deposited uniformly down to 15 cm, provides an average 100 cm^2 area concentration of approximately 6,000 dpm/100 cm^2 for each 0.15 cm depth (120 pCi/g *1.5g/cc *15cc/100cm^2 *2.22 dpm/pCi). If the updated DP $DCGL_W$ is used, the equivalent activity would be approximately 70,000 dpm/100 cm^2, for each 0.15 cm depth. The minimum detectable concentration (MDC) level of the scoping surveys should be less than this DCGL value where practicable.

Scanning surveys will be used to assess background radiation levels and variance in outdoor locations. For the purposes of this project, the survey areas will be individually evaluated for background and DU, and grouped for further analysis according to the levels and variation of the readings. Areas in which no DU fragments or elevated readings (i.e. readings above the Lc value) were found were grouped and assumed to represent background radiation levels, and were used as reference locations. Since the natural background in the area at China Lake has large variations in natural Uranium and Thorium an additional criteria to distinguish DU contaminants may be required. Verifying the presence of DU means ensuring that elevated measurements above average natural background levels are due to DU and not natural uranium. Gross results which indicate elevated activity should be examined through soil sampling for the ratio of U238 to U234. The ratio of U238 to U234 in natural uranium should be approximately one, however in DU the ratio will be approximately five. Soil samples taken in areas of elevated activity which have a U-238 to U-234 ratio in excess of three will be considered to contain residual DU contamination. The conservative factor of three was selected to account for variations in the chemical extraction efficiency and radioactivity analysis of soil samples.

Scanning and direct static measurements will be used to assess background radiation levels and variance in buildings and associated structures. Detection levels for building surveys will be based on the average background readings applicable to the building surfaces at that location. Scanning will be used to identify locations with elevated readings such that further investigation and static sampling can be performed at targeted positions. Additional wipe test samples will be taken on selected building surfaces to evaluate removable contamination levels.

Areas with levels of DU above the DCGL should be further evaluated for future decommissioning efforts. Areas with levels of DU above the Lc should be evaluated for control under the existing permit. Additional surveys and follow up soil sampling under the next phase of the scoping survey project should be conducted to complete the evaluation.

Methods, Assumptions and Procedures

Selection of Survey Equipment and Techniques

Survey instrumentation used for direct measurements must be capable of detecting the item of interest and must function effectively in the environment in which they are used. DU may be identified from alpha, beta or gamma analysis, or in some cases through metal detection. Typical detectors used for these applications include NaI (gamma scintillators), gas flow proportional (alpha/beta), scintillators (alpha/beta) and GM tubes. OSI determined that the fragments of DU at the site in outdoor ground areas had oxidized surfaces, visible as a yellow crust and coating, which essentially eliminated the ability to use alpha scanning or metal detection in those cases due to absorption or shielding. In addition the rough soil surface made alpha counting less efficient due to the inherent absorption and shielding. Finally outdoor areas included large areas of rough terrain with little ability to replenish gas for proportional counters. Thus the remaining detection options for outside areas included GM tubes, scintillators and NaI detectors.

It was determined that alpha counting with gas flow proportional detectors could effectively be used for internal building surveys. Contamination of building surfaces is assumed to be the result of transfer of contaminated soil or fragments from land contaminated use areas. OSI notes that many building surfaces have been coated, painted or treated multiple times since DU operations ceased. This phase of the survey project focused on surfaces as they currently exist. However, obvious surface debris was removed prior to surveying. The Ludlum 2241 with a 43-37 (425 cm^2) floor monitor and the 43-68 (100 cm^2) hand-held gas proportional detector in alpha mode were selected for building areas. Wipe samples were taken and analyzed for removable activity.

To determine the optimum detection techniques for the outside ground areas, 9 meter combinations were evaluated. As shown in Attachment 2, each meter was evaluated for background level, and then exposed to a reference source of approximately 9.8E4 pCi of DU. The estimated efficiency squared over the background (E^2/B) were calculated for each set. The model with the highest (E^2/B) which could function in the environmental conditions at the site and operate in a data logging mode was selected, which was the Ludlum 2350 & 43-93 detector in the beta mode for outside areas. A thin layer of protective Kapton tape was placed over the window and was included during the evaluation for efficiency and background.

To determine the reduction in response relative to the depth of the contaminated object for outside surveys, the DU reference source (an oxidized DU fragment containing approximately 9.8E4 pCi) was placed under various thicknesses of sand. As shown in Attachment 3, after 0.63 cm of sand, the

relative response dropped below 5%. For every 0.6 cm of additional material, the response dropped by an additional 3%. At depths of 2 cm, the response relative to the reference source was essentially background. Detection of larger or higher activity DU objects, i.e., a DU 20 mm penetrator, is still possible at greater depths up to 15 cm. However, the assumption that the first few millimeters of depth, would be the largest contributor to the counting signal was verified as suggested in the estimated DCGL sensitivity assessment.

To verify the instruments with the best performance also met the desired detection sensitivity, two assessments were performed. The first was to determine a scan MDC for the 2350 and 43-93 detector in beta mode, based on the expected background for outdoor land survey data. The second was to determine a static MDC value and optimum count time for the 2241 and 43-68 detector for the expected maximum background in the building surveys.

The scan MDC determination for the 2350 and 43-93 detector used an initial estimated background of 250 cpm based on preliminary land survey results. The 2350 and 43-93 detector was used in a data logging mode, with readings taken every second and logged every 30 seconds. The scan MDC ($dpm/100cm^2$) was calculated from equation 6.9 in NUREG 1507 based on an average scan speed of 5 cm/sec, a probe active area of 100 cm^2, and a sampling period of 1 second.

$$ScanMDC = \frac{MDCR}{\sqrt{p}e_i e_s \frac{probearea}{100cm^2}}$$

Where: MDCR is the minimum detectable count rat $MDCR = (60 * d' \sqrt{b_i}) / i$

> 60 is a conversion factor from seconds to minutes
> d is a sensitivity factor (2.48)
> b is the background counts in the time interval in which the measurement is made
> *i* is the time interval over which the measurement is made.
> e_I is the 2π instrument efficiency, taken as ~0.14
> e_S is the surface efficiency and is taken as 0.5 for beta mode based on ISO-7503
> p is the surveyor efficiency, normally 0.5
> probe area is 100 cm^2

The scan MDC for the 2350 and 43-93 detector in a 250 cpm background was determined to be approximately 6,200 $dpm/100cm^2$. This is below the equivalent $DCGL_W$ unrestricted release criteria of the updated 2012 DP (69,000 $dpm/100cm^2$ surface contamination or 1,400 pCi/g soil concentration).

The scan MDC is a reflection of the sensitivity of the measurement method and is the level of activity which can be detected 95% of the time in a given background with the scanning equipment used. Areas of elevated activity which appear statistically detectable from background are normally based on the critical level Lc, where b_i is again the background obtained during the measurement period or interval. An estimate of the critical count rate in cpm for scanning equipment can be obtained from

$$Lc = 2.33 * 60 * \sqrt{bi} / i$$

Under the same scan speed and sampling period considerations as defined above the Lc for the maximum expected background of 250 cpm (4 cps) is approximately 285 cpm. This means, for convenience of the field surveyors, that gross count rates in excess of about two times the background count rate (500 to 600 cpm) should be considered elevated or detectable.

The average background count rate (i.e. count rate in similar areas in which no elevated readings were found) was verified through the scoping surveys to be approximately 214 cpm based on over 9,000 data points. The average actual background determined from the scoping surveys was less than the initial estimated background and so the original scan MDC is conservative and can be used to effectively assess the minimum instrument sensitivity for the measurements performed. The actual scan MDC based on the reference background areas was 5,735 dpm/100cm^2 which is less than the equivalent DCGLw of 6,000 dpm/100 cm^2 from the original DP, as well as below the DCGLw of the updated DP. The actual Lc value was determined to be 264 cpm above an average background of 214 cpm (478 cpm total). Areas with activity in excess of the Lc on a scanning survey should be considered potentially contaminated or evaluated for further sampling and analysis even if the activity is less than the MDC or DCGL.

The MDC for static measurements taken in buildings depends on the background level and count time used. To determine the appropriate integrated count time for static measurements with the Ludlum 2241and 43-68 detector in alpha mode, an assessment of detection capabilities was performed at various expected background levels and count times. To ensure the MDC was below the estimated DCGL, a count time (*i*) of 10 minutes was selected for static surveys based on an estimated maximum background of 6 cpm (60 counts in 10 minutes). The MDC initial estimate and for each static survey was determined from NUREG 1507 equation 3.10:

$$MDC = \frac{3 + 4.65\sqrt{b_i}}{ie_i e_s \frac{probearea}{100cm^2}}$$

Where the surface efficiency of the proportional detectors in the alpha mode is taken as 0.25 based on ISO-7503. The MDC based on a 60-count background in 10 minutes was determined to be approximately 78 dpm/100 cm^2, which is below the $DCGL_W$ estimated value of 85 dpm/100cm^2 for building surfaces.

The MDC is a reflection of the sensitivity of the measurement method and is the level of activity which can be detected 95% of the time in a given background with the equipment used. The MDC is used to evaluate the sensitivity of a given measurement technique. Areas of elevated activity which appear statistically detectable from background on static counts are based on the critical level Lc, where b_i is again the background obtained during the measurement period or interval.

$$Lc = 2.33 * \sqrt{b_i}$$

Areas with activity in excess of the Lc on a static count should be considered potentially contaminated or evaluated for further sampling and analysis even if less than the MDC or DCGL.

Building Survey Procedures

Scanning, direct static surveys and wipe test sampling were conducted for internal building surfaces. Scanning surveys of building floors were performed with a Ludlum 2241, with a 43-37 (425 cm^2) gas proportional floor monitor. Scanning and static measurements of floors, walls, and other surfaces were performed with a 43-68 (100cm^2) hand held detector. Both meters were used in alpha mode. Background readings were obtained in reference areas with similar surfaces to the surfaces being surveyed. The floor monitor was operated in a scanning mode and a representative background count rate (cpm) obtained. The handheld detector was operated in a static mode and a 10 minute integrated background count obtained.

Scanning surveys of the floor, horizontal surfaces, drains, sinks and air return vents in the area being evaluated were performed at 1 to 2 cm/sec to identify elevated readings. Scanning was done over 100% of the accessible floor surfaces with the floor monitor and over selected areas of the other building surfaces with the hand held detector. Elevated readings were further investigated through static measurements. Static surveys were obtained with the hand held at areas with elevated readings and at randomly selected positions. The static measurements were integrated for 10 minutes at the sample location. Wipe test samples were obtained at random locations on the floor, horizontal surfaces, air return vents, door handles, and approximately 5% of the walls to chest height with standard 42.5 mm Whatman filters. Wipe test samples were analyzed with a 3" NaI well detector on a 1282 Compugamma CS unit optimized for DU using a NIST traceable reference source from Isotope Products Laboratories. Measurements obtained with the 2241 were recorded on the survey maps as total counts by the surveyor along with the location of any wipe samples obtained. The MDCs for the area were also recorded. Static measurement values that exceeded the Lc or MDC were highlighted on the survey map. Wipe test sample results were documented in separate tables attached to the survey maps.

Land Survey Procedures

Figure 1: Land Area Surveyor

Scanning surveys using the Ludlum 2350 & 43-93 in the Beta Mode (100 cm^2) were performed over external land surfaces at scanning speeds of 2 to 5 cm/sec to identify elevated soil readings. The 43-93 detectors were fitted to ergonomically designed handles. The handles allowed the surveyors to keep the detector at a fix distance from the ground surface and maintain a relatively constant scan speed, in a comfortable upright position. Elevated readings were further investigated. Elevated readings were generally taken as values consistently above two times the stable background value in accordance with the Lc assumptions. Direct surveys performed with the Ludlum 2350 were obtained in a data logging mode. The Ludlum 2350-1 data logger measurements were automatically logged every thirty seconds onto a handheld Trimble NOMAD 900B device with a Windows CE operating system with Trimble SOLO Forest GPS software installed. Additionally, in areas of elevated activity, results were logged in the NOMAD 900B manually at specific locations identified by the operator. The GPS device used to record sub-meter accuracy latitude and longitude measurements was a Hemisphere A100 antenna, worn by the surveyor in a backpack kit as shown in Figure 1. The photo was taken at OSI's facility in San Diego. The GPS system also logs date, time and elevation at each coordinate. The logged readings were downloaded daily from each surveyor's GPS systems and then plotted on GPS-based maps using ESRI's ArcGIS Desktop, version 10.0, to identify the survey data locations. In addition, areas of elevated readings were physically marked by

inserting 6” steel nails with marking whiskers.

Soil samples were taken in areas with elevated activity and at random locations in areas without elevated activity. The soil samples were analyzed for U-234, U-235 and U-238 through chemical separation and alpha spectroscopy.

Building Survey Results

The results of the building surveys are presented in Attachment 4, 5 and 6. For the building surveys a static MDC was evaluated for each surface based on the actual background readings on the reference surfaces and the static MDC equation noted above. The average background counts, static counts and MDCs for each area are provided in a summary table in Attachment 4. The static count results were also listed on the survey maps, along with the applicable average background count rates for the surfaces. If static readings were obtained at or above the Lc or MDC values the results were highlighted on the map. The results of the building surveys indicated three of the buildings (00005, 12510 and 30973) had areas of elevated contamination as noted on static survey measurements. There were nine localized areas of residual contamination within the three buildings that exceeded the Lc. Of those, eight also exceeded the MDC. The range of residual activity concentration on building surfaces was 63 to 481 dpm/100 cm^2. Although the values were detectable, they were less than the contamination limits specified in Table 2-2 of Rad 10 (Reference D-10). The highest levels of contamination were found in building 00005, rooms 1424, 1644 and 1646. The contamination was found primarily in sinks, and at one location on a counter top in this building. In building 12510, the contamination was found on the floor surfaces of the firing range. In building 30973 the contamination was found on the concrete floor. It was noted that the initial evaluation for MDC assumed a maximum background count rate of 70 cpm; however, two areas were found to exceed that initial background estimate. These areas were located on outside concrete docks for buildings 10522 and 10632, and had average background readings approximately 2 to 3 times the average in the other areas. The actual MDCs for these areas are above the estimated $DCGL_W$ for building surfaces, but not above the $DCGL_{EMC}$. Since the areas were discrete and isolated the $DCGL_{EMC}$ is the appropriate criteria to evaluate against, and the instruments were of adequate sensitivity to meet the survey requirements.

Wipe samples were analyzed for gross gamma contamination. Wipe tests from areas which indicated elevated activity on the static readings were also evaluated for alpha activity. Removable contamination was not detected on any wipe sample. The background, wipe test count results and MDCs for each wipe sample are provided in summary tables in Attachment 5. Approximately 700 wipe test samples were evaluated. The individual survey maps with the results of the static readings and the location of the wipe samples are provided in attachment 6.

Land Area Survey Results

The results of the land area surveys are summarized in Attachment 7 Table 7.1. The results were statistically analyzed to determine the maximum, minimum, mean, standard deviation, mode, skew and kurtosis of the data. Areas were designated by the common name of the location (CT1, CT2, T-11 etc.) and the name of the survey area (SA-1, SA-2, SA-3 etc.)

For external land surveys, since the background radiation was expected to include natural uranium and thorium in the outside soil and rocks, an evaluation of background levels and variation of the material was required. Results of external land surveys were evaluated to identify areas of lower count rates where no elevated readings were identified (i.e. no readings greater than the estimated Lc,). There were approximately 9,108 data points identified in reference background group across the

primary areas of CT1 (SA-2, SA-3), CT3 SA-1, CT4 (SA-1, SA-3, SA-4, SA-7, SA-9) CT6 SA-1, Launch Test Facility, B-4 Tracks, Detonation Physics Lab, X-Pad and Boondocks.

The results of the background assessment are included in Attachment 8. The mean count rate in each survey area and the standard deviation within the area were determined. The results for the group were plotted in a histogram and the maximum, minimum, mean, standard deviation, mode, skew and kurtosis of the data were evaluated. The distribution had a typical bell curve shape with mode and mean values which were very close and low values of kurtosis or skewing. This indicates a single population with a normal distribution. Based on the mean and variance values between the individual areas and the total group it was determined that all the areas within the groups could be represented as a single sample population with an average background count rate of 214 cpm. This will be used as the reference background count rate for the outdoor land surveys. Using an average background count rate of 214 cpm, results in a critical level (Lc) of approximately 264 cpm above background, or a gross count of 478 cpm.

There were approximately 94 soil samples taken in the selected reference background locations. None of the samples indicated U-238 to U-234 ratios in excess of three, which supports the assumption that there was no DU identified in these areas.

There were several areas identified with elevated readings in excess of the Lc determined above. Elevated readings are assumed to represent detectable radioactive material. These areas included the Aircraft Boneyard, B-29 and F-4 Area, COSO Range, CT1 (SA-1), CT4 (SA-2, SA-5, SA-6, SA-8, North Trails, Disposal Pit), K-2 Small Caliber Gun Range, Kennedy Stands, Salt Wells Dump Site, SNORT (Track, SA-1, SA-2), and Tower 11(SA-1, SA-2). Graphical histograms of the areas with greater than 10 measurements of elevated activity are provided in Attachment 12. Based on the histograms it is clear that the activity is not uniform over the surface, and occurs in very discrete locations and varying activity concentrations. Except for Kennedy Stands, K-2 Small Caliber Gun Range and Tower 11, none of the other areas with elevated counts are identified on the current Naval Radioactive Materials Permit.

The areas with the highest levels of maximum activity were K-2 Small Caliber Gun Range, Kennedy Stands, Tower 11, CT1 SA-1, CT4 SA-8 and SNORT SA-2. All of the elevated activity in the Aircraft Bone Yard, B-29 and F-4 Area, Coso Range and Salt Wells Dump Site, was associated with specific pieces of equipment, such as radium dials and gauges from aircraft, cannons or target vehicles and not DU. The remaining areas with elevated counts were associated with DU. The areas with the highest number of elevated counts, highest percentage of elevated counts to total counts and with the highest average activity are considered to be the most contaminated. These areas included K-2 Small Caliber Gun Range, Kennedy Stands, and T-11 SA-1 which are all included on the current Naval Radioactive Materials Permit. The remaining areas with elevated activity should be evaluated for inclusion on the permit and for future decommissioning considerations.

Non-Depleted Uranium Areas (3 Areas)

Aircraft Bone Yard

The surveys performed in the aircraft bone yard were focused in the general area around specific pieces of equipment. There were 177 measurements taken. Eighty eight percent (88%) of the measurements were below the Lc value, and 12% were above the Lc value. The ratio of greater than Lc values is lower than the ratio in the B29 & F4 area where similar targeted surveys were performed. The maximum activity was 15,363 cpm/100 cm^2, and the average was 637 cpm/100 cm^2. The average elevated activity was 4,197 cpm/100 cm^2. The maximum, average activity and average

elevated activity levels are consistent with the levels in the B29 & F4 area. The average is also consistent with the value in the COSO range for the limited number of data points obtained in that area. Although most of the data points in the aircraft bone yard were less than the Lc value, the average activity in this area was above the Lc value. This implies that a larger portion of the area surveyed was contaminated, or that the natural background was significantly higher in this area. Due to the fairly low level of data points, targeted nature of the surveys, non-uniform distribution of results, and association of elevated readings with specific pieces of equipment and commodities such as radium dials and gauges, the contamination was determined to be from radium and not DU or natural background. As shown in the frequency distribution in Attachment 12, the contamination was not uniformly distributed and appeared in discrete locations at different activity levels. Due to the lack of DU contamination preliminary soil sampling was not performed in this area.

B-29 and F-4 Area

The surveys performed in the B-29 and F-4 area were focused in the general area around specific pieces of aircraft debris. There were 57 measurements taken. Since less than 100 measurements were obtained, the data may not be representative of the survey area. However, the maximum and average data is consistent with the results in the aircraft bone yard where surveys around similar objects were performed. Forty two percent (42%) of the measurements were below the Lc value, and 58% were above the Lc value in this area The ratio of elevated to non-elevated readings was higher than the values in the aircraft bone yard. The maximum activity was 15,505 cpm/100 cm^2 and the average was 1,997 cpm/100 cm^2. The average elevated activity was 3,232 cpm/100 cm^2. The maximum, average and average elevated were consistent with the results in the aircraft boneyard. The average was also consistent with the average value in COSO range for the limited number of data points obtained in that area. The majority of points and the average activity in this area were above the Lc value. This implies that a larger portion of the area surveyed was contaminated, or that the natural background was significantly higher in this area. Due to the fairly low level of data points, targeted nature of the surveys, non-uniform distribution of results, and association of elevated readings with specific pieces of equipment and commodities such as radium dials and gauges, the elevated readings were determined to be from radium and not DU or natural background. As shown in the frequency distribution in Attachment 12 the contamination was not uniformly distributed and appeared in discrete locations at different activity levels. Due to the lack of DU contamination preliminary soil sampling was not performed in this area.

Coso Range

The surveys performed in this area were focused around specific pieces of equipment including cannons and targets. There were 10 measurements taken. Since less than 100 measurements were obtained, the data may not be representative of the survey area. However, the average of the data is consistent with the results in the aircraft bone yard and B29 & F-4 areas where surveys around similar objects were performed. Due to the targeted nature of the survey and the low number of sample points obtained, over 100% of the measurements taken were above the Lc value. The maximum value was 1,955 cpm/100cm^2, and the average was 1,133 cpm/100 cm^2, which is lower than the maximum found at the Aircraft Bone Yard and B-29 & F-4 areas. The elevated readings identified were associated with radioactive material in commodities such as radium dials and gauges and not DU contamination Although the statistics are not as strong due to the limited number of sample points, as shown in the histogram in Attachment 12, the contamination was clearly not uniformly distributed and appeared in discrete locations at different activity levels around the items surveyed. Although there was no DU identified in this area, the historical record indicated there may have been DU present; as a result, some limited soil sampling was performed in this area. As shown

in Attachment 10, all of the soil sampling results were less than a ratio of 3 for U-238 to U-234, which further suggests that no DU was present in the elevated readings.

Depleted Uranium Areas (14 Areas)

CT1 SA-1

The surveys performed in this area were general area scanning and were not focused around specific pieces of equipment. There were 75,843 measurements taken. Ninety nine percent (99%) of the measurements were less than the Lc value, and only 1% were greater than the Lc value. The average reading in CT1 SA-1was 305 cpm/100cm^2, which is less than the Lc value, but slightly higher than the averages in CT1 SA-2 and SA-3, which were both considered background reference areas. This means the majority of locations in CT1 SA-1 are at background levels with a limited area of elevated activity.

The maximum reading in CT1 SA-1was 292,252 cpm/100 cm^2, which is significantly higher than the areas with radium contamination, and higher than the maximum in most of the other areas with elevated readings (CT4 SA-2, SA-5, SA-6, SA-8, Salt Wells Dump Site, SNORT Track, SNORT SA-2 and T11 locations). The average elevated reading in CT1 SA-1was 10,120 cpm/100cm^2, which is also higher than the average elevated values in most of the areas with elevated readings. The average elevated activity in CT1 SA-1was consistent with the average elevated activity levels in CT4 SA-8, CT4 Disposal Pit, K-2 Small Caliber Gun Range, and SNORT SA-2. Since CT1 SA-1 is the only area in the CT1 area surveyed which indicated contamination, and the maximum levels were higher than many of the other areas with elevated readings, this implies specific work occurred with significant amounts of DU at limited locations in CT1. As shown in the mapped data for this location in Figure 44 of Attachment 9 the activity was concentrated in a given area and appears to have a directional dispersal pattern.

The elevated readings in this area were associated with discrete DU fragments. There was visual indication of DU fragments, along with elevated scanning results, at positions throughout the area. The ratio of the number of elevated counts to the total number of counts in this area is consistent with the ratios in CT4 SA-2, SA-5, SA-6, SA-8, SNORT Track, SA-1, SA-2, T-11 SA-2, but lower than K-2 Small Caliber Gun Range, Kennedy Stands and T-11 SA-1. This implies that although the maximum and average activity per fragment is high, overall there are fewer fragments or concentration of DU fragments in this survey area relative to K-2, Kennedy Stands and T-11 SA-1. The frequency distribution and histogram suggest that the contamination is not uniform, and appears in discrete isolated areas. Preliminary soil sampling was performed in this area. As shown in Attachment 10, of the 19 soil samples taken in this area 3 or 16% indicated the presence of DU.

CT-4 SA-2

The surveys performed in this area were general area scanning and were not focused around specific pieces of equipment. There were 545 measurements taken. Ninety nine percent (99%) of the measurements were less than the Lc value, and 1% were greater than the Lc value. This is consistent with the ratios in CT1 SA-1, CT4 SA-5, SA-6, SA-8, SNORT Track, SA-1, SA-2, T-11 SA-2, but lower than the ratios in K-2 Small Caliber Gun Range, Kennedy Stands and T-11 SA-1. The maximum reading was 3,003 cpm/100 cm^2, and the average reading was 230 cpm/100cm^2. The average reading was less than the Lc value. This means the majority of locations in CT4 SA-2 are at background levels with a limited area of elevated activity. The maximum and average readings were consistent with CT4 SA-5, SA-6, and SNORT Track. The average elevated reading was 1,704 cpm/100 cm^2, which is consistent with the average elevated readings in CT4 SA-5, SA-6, SNORT Track, SA-1 and T-11 SA-1 and SA-2. The elevated readings identified were associated with discrete

DU fragments. There was visual indication of DU fragments, along with elevated scanning results, at positions throughout the area. As shown by the large number of sample points obtained, and the limited number of DU fragments or elevated readings obtained, the frequency distribution and histogram suggest that the contamination is not uniform, and appears in discrete isolated areas. No soil samples were obtained in CT4 SA-2.

CT-4, SA-5

The surveys performed in this area were general area scanning and were not focused around specific pieces of equipment. There were 6,876 measurements taken. Ninety nine percent (99%) of the measurements were less than the Lc value, and 1% was greater than the Lc. This is consistent with the ratio in CT-1, SA-1, CT-4, SA-2, SA-6, SNORT Track, SA-1, SA-2, T-11 SA-2, but lower than the ratios in K-2 Small Caliber Gun Range, Kennedy Stands and T-11 SA-1. The maximum reading was 5,299 cpm/100 cm^2, and the average reading was 210 cpm/100cm^2. The average reading was less than the Lc value. This means the majority of locations in CT4 SA-5 are at background levels with a limited area of elevated activity. The average elevated reading was 1,733 cpm/100 cm^2, which is consistent with the average elevated readings in CT4 SA-2, SA-6, SNORT Track, SA-1, and T-11 SA-1 and SA-2. The elevated readings identified were associated with discrete DU fragments. There was visual indication of DU fragments, along with elevated scanning results, at positions throughout the area. As shown by the large number of sample points obtained, and the limited number of DU fragments or elevated readings obtained, the frequency distribution and histogram suggest that the contamination is not uniform, and appears in discrete isolated areas. There was only one soil sample taken in CR4 SA-5. The results of the soil sample did not indicate DU.

CT-4, SA-6

The surveys performed in this area were general area scanning and were not focused around specific pieces of equipment. There were 7,563 measurements taken. Over ninety nine percent (99%) of the measurements were less than the Lc value, and less than 1% was greater than the Lc value. This is consistent with the ratio in CT-1, SA-1, CT-4, SA-2, SA-5, SNORT Track, SA-1, SA-2, T-11 SA-2, but lower than the ratios in K-2 Small Caliber Gun Range, Kennedy Stands and T-11 SA-1. The maximum reading was 6,267 cpm/100 cm^2, and the average reading was 190 cpm/100cm^2. The average reading was less than the Lc. This means the majority of locations in CT4 SA-6 are at background levels with a limited area of elevated activity. The average elevated reading was 2,489 cpm/100 cm^2. This is consistent with the ratios and readings in CT-4, SA-2, SA-5, SNORT Track, SA-1, and T-11 SA-1 and SA-2. The elevated readings identified were associated with discrete DU fragments. There was visual indication of DU fragments, along with elevated scanning results, at positions throughout the area. As shown by the large number of sample points obtained, and the limited number of DU fragments or elevated readings obtained, the frequency distribution and histogram suggest that the contamination is not uniform, and appears in discrete isolated areas. There were two soil samples taken in CT4 SA-6, neither sample showed the presence of DU.

CT-4, SA-8

The surveys performed in this area were general area scanning and were not focused around specific pieces of equipment. There were 7,542 measurements taken. Over ninety nine percent (99%) of the measurements were less than the Lc value, and less than 1% were greater than the Lc value. This is consistent with the ratio in CT-1, SA-1, CT-4, SA-2, SA-5, SA-6, SNORT Track, SA-1, SA-2, T-11 SA-2, but lower than the ratios in K-2 Small Caliber Gun Range, Kennedy Stands and T-11 SA-1. The maximum reading was 20,028 cpm/100 cm^2, and the average reading was 179 cpm/100cm^2. The

average was less than the Lc. This means the majority of locations in CT4 SA-8 are at background levels with a limited area of elevated activity. The average elevated reading was 10,681 cpm/100 cm^2. This is consistent with the ratios and average elevated activity in CT-1, SA-1, CT4 SA-8, K-2 Small Caliber Gun Range and SNORT SA-2. The elevated readings identified were associated with discrete DU fragments. There was visual indication of DU fragments, along with elevated scanning results, at positions throughout the area. As shown by the large number of sample points obtained, and the limited number of DU fragments or elevated readings obtained, the frequency distribution and histogram suggest that the contamination is not uniform, and appears in discrete isolated areas. There were no soil samples taken in SA-8.

CT-4, North Trail

The surveys performed in this area were general area scanning and were not focused around specific pieces of equipment. There were only 4 measurements taken in this area, so the data is not statistically significant. Fifty percent (50%) of the measurements were less than the Lc value, and 50% were greater than the Lc value. The maximum reading was 711 cpm/100 cm^2, which is less than the maximum readings in the other areas with validated elevated counts. The average was 493 cpm/100 cm^2, which is also in excess of the Lc, and greater than the average in most of the other CT-4 areas. The average of the elevated counts was 663, which is less than the average of the validated elevated readings in the other areas. Due to the limited number of data points no histogram was generated for this location. There was one soil sample taken in CT4 North Trails, which showed no indication of DU.

CT-4, Disposal Pit

There are several potential disposal site areas in CT-4 according to the historical record. This site is only one of those locations, and may not be representative of the remaining disposal pits. The surveys performed in this area were general area scanning and were not focused around specific pieces of equipment. There were only seven measurements taken in this area, so the data is not statistically significant. Eighty six percent (86%) of the measurements were greater than the Lc value, and only 1 measurement (14%) was less than the Lc. The maximum reading was 36,126 cpm/100 cm^2 and the average was 6,665 cpm/100 cm^2, which are higher than the values found in the other CT-4 areas. Due to the limited number of data points no histogram was generated for this location. There was one soil sample taken in CT-4 Disposal Pit, which showed no indication of DU.

K-2 Small Caliber Gun Range

The surveys performed in this area were general area scanning primarily along the firing line and berm area and were not focused around specific pieces of equipment. There were 2,055 measurements taken in this area. Over eighty nine percent (89%) of the measurements were less than the Lc value, and eleven percent (11%) were greater than the Lc value. The maximum reading was 350,241 cpm/100 cm^2, and the average reading was 1,312 cpm/100cm^2. The average reading was above the Lc value. This indicates a high level of contamination in the area. The ratio of elevated activity was higher by a factor of 10 than most of the other areas except Kennedy Stands and Tower 11 SA-1. The average elevated reading was 10,061 cpm/100 cm^2, which is also higher than the average elevated activity in most areas but consistent with CT1 SA-1 and SNORT SA-2. This indicates a larger portion of the area surveyed is contaminated with DU, and the level of activity or size of fragments present is also higher. The elevated readings identified were associated with discrete DU fragments. There was visual indication of DU fragments, along with elevated scanning results, at positions throughout the area. As shown by the large number of sample points obtained, and the limited number of DU fragments or elevated readings obtained, the frequency distribution and histogram suggest that the contamination is not uniform, and appears in discrete isolated areas. Due

to the presence of DU in this area 31 soil samples were taken and analyzed. The results indicated that 13% of the samples showed DU based on the ratio of U238 to U234.

Kennedy Stands
The surveys performed in this area were general area scanning focused around the target vehicles in the area. There were 9,033 measurements taken in this area. Over eighty six percent (86%) of the measurements were less than the Lc value, and approximately 14% were greater than the Lc value. The ratio of elevated activity was higher by a factor of 10 than most of the other areas except K- and Tower 11 SA-1. This indicates a larger portion of the area is contaminated with DU The maximum reading was 172,607 cpm/100 cm^2, and the average reading was 812 cpm/100cm^2. The average reading was above the Lc value. This indicates a high level of contamination in the area. The maximum and average readings were significantly higher than the values in most other areas evaluated, excluding K-2. The average elevated reading was 4,440 cpm/100 cm^2. This average elevated activity is fairly consistent with the average elevated activity values for the other areas, excluding K-2, CT1 SA-1, CT4 SA-8 and SNORT SA-2. . The elevated readings identified were associated with discrete DU fragments. There was visual indication of DU fragments, along with elevated scanning results, at positions throughout the area. As shown by the large number of sample points obtained, and the limited number of DU fragments or elevated readings obtained, the frequency distribution and histogram suggest that the contamination is not uniform, and appears in discrete isolated areas. Due to the presence of DU, 32 soil samples were taken and analyzed. The results indicated that 30% of the samples showed DU based on the ratio of U-238 to U-234.

Salt Wells Dump Site
The surveys performed in this area were general area scanning; however, a survey was performed of a truck with a radium dial in the area. There were 389 measurements taken in this area. Over ninety nine percent (99%) of the measurements were less than the Lc value, and less than 1% were greater than the Lc value. The maximum reading was 2,637 cpm/100 cm^2, and the average reading was 215 cpm/100cm^2. The average reading was less than the Lc, which indicates most of the area is at background levels. There was only 1 elevated count, so the average elevated reading was 2,637 cpm/100 cm^2. The elevated count was obtained on the radium dial components of the truck. No other areas of elevated counts were identified. Due to the low number of elevated readings obtained, no histogram was generated for this location.

SNORT Track
The surveys performed in this area were general area scanning focused along the SNORT Track area, and were not focused around specific pieces of equipment such as targets or debris. There were 3,469 measurements taken in this area. Over ninety nine percent (99%) of the measurements were less than the Lc value, and less than 1% were greater than the Lc. The maximum reading was 4,952 cpm/100 cm^2, and the average reading was 218 cpm/100cm^2. The average reading was less than the Lc and indicates most of the area is at background levels. The average elevated reading was 1,433 cpm/100 cm^2. This is consistent with the ratios, and average activity levels in most of the other areas with elevated counts. The elevated readings identified were associated with discrete DU fragments. There was visual indication of DU fragments, along with elevated scanning results, at positions throughout the area. As shown by the large number of sample points obtained, and the limited number of DU fragments or elevated readings obtained, the frequency distribution and histogram suggest that the contamination is not uniform, and appears in discrete isolated areas.

The results are consistent with the findings and distribution in SNORT SA-1 as well. The distribution is similar to SNORT SA-2, except that SA-2 did have a higher maximum activity. There were 9 soil samples taken around the SNORT area including the Track, SA-1 and SA-2. No soil samples indicated the presence of DU even those taken in SA-2. This is consistent with the assumption that the area is not heavily contaminated with DU and that the DU occurs in very isolated areas not uniformly distributed throughout the soil volume.

SNORT SA-1,

The surveys performed in this area were general area scanning and were not focused around specific pieces of equipment. There were 1,612 measurements taken in this area. Over ninety nine percent (99%) of the measurements were less than the Lc value, and less than 1% were greater than the Lc.. The maximum reading was 1,093 cpm/100 cm^2, and the average reading was 248 cpm/100cm^2. The average reading was less than the Lc, which indicates that most of the area is at background levels. The average elevated reading was 805 cpm/100 cm^2. This is consistent with the ratios and the average elevated activity in most of the other areas with elevated counts. The elevated readings identified were associated with discrete DU fragments. There was visual indication of DU fragments, along with elevated scanning results, at positions throughout the area. As shown by the large number of sample points obtained, and the limited number of DU fragments or elevated readings obtained, the frequency distribution and histogram suggest that the contamination is not uniform, and appears in discrete isolated areas.

SNORT SA-2

The surveys performed in this area were general area scanning and were not focused around specific pieces of equipment. There were 5,000 measurements taken in this area. Over ninety nine percent (99%) of the measurements were less than the Lc value, and less than 1% were greater than the Lc value. This is consistent with the ratios in most of the areas. The maximum reading was 50,669 cpm/100 cm^2, and the average reading was 242 cpm/100cm^2. The average reading was less than the Lc which indicates most of the area is at background levels. The maximum reading was less than CT-1 SA-1, K-2 , Kennedy Stands and Tower 11 SA-1, but was higher than the maximum readings in the other areas evaluated. However, the average reading was consistent with the average readings in most of the other locations with elevated activity. This indicates although there were some limited high activity sources, the bulk of the DU is similar in activity to the other locations with elevated counts. The average elevated reading was 13,771 cpm/100 cm^2. The average elevated activity is higher than the average elevated activity value for most of the other areas except for K-2, CT1 SA-1 and CT4 SA-8. This indicates some larger fragments of DU are distributed around this area. The ratio of elevated to non-elevated measurements is consistent with the ratios in most of the other areas with elevated counts, even though the average elevated counts were higher. This indicates a smaller number of fragments are present than in K2 or Kennedy Stands, but the typical fragments that are present may be larger in size or activity. The elevated readings identified were associated with discrete DU fragments. There was visual indication of DU fragments, along with elevated scanning results, at positions throughout the area. As shown by the large number of sample points obtained, and the limited number of DU fragments or elevated readings obtained, the frequency distribution and histogram suggest that the contamination is not uniform, and appears in discrete isolated areas

Tower 11 SA-1

The surveys performed in this area were general area scanning and were not focused around specific pieces of equipment. There were 24,036 measurements taken. About eighty five percent (85%) of the measurements were less than the Lc value, and 15% were greater than the Lc value. This ratio is

higher than most of the other areas excluding K-2 and Kennedy Stands. The maximum reading was 163,565cpm/100 cm^2, and the average reading was 490 cpm/100cm^2. The maximum reading was significantly higher than the maximum readings in most other areas evaluated, excluding CT1 SA-1, K-2 and Kennedy Stands. The average reading was greater than the Lc value and was also higher than most of the other areas evaluated excluding K-2 and Kennedy Stands. The higher ratios and average activity levels means a larger fraction of the area is contaminated. The average elevated reading was 2,434 cpm/100 $cm^{2.}$, which is consistent with many of the other areas with elevated activity. This implies that the size and activity level of fragments is about the same as the other areas. The elevated readings identified were associated with discrete DU fragments. There was visual indication of DU fragments, along with elevated scanning results, at positions throughout the area. As shown by the large number of sample points obtained, and the limited number of DU fragments or elevated readings obtained, the frequency distribution and histogram suggest that the contamination is not uniform, and appears in discrete isolated areas. Due to the presence of DU, 25 soil samples were taken in T11 SA-1. Forty eight percent of the samples showed the presence of DU based on U238 to U234 activity. This is the highest ratio of confirmed DU activity in soil samples in any of the areas evaluated.

Tower 11 SA-2

The surveys performed in this area were general area scanning and were not focused around specific pieces of equipment. There were 8,256 measurements taken in this area. Approximately ninety nine percent (99%) of the measurements were less than the Lc value, and about 1% were greater than the Lc value. The maximum reading was 11,024 cpm/100 cm^2, and the average reading was 204 cpm/100cm^2. These ratios, maximum and average values are consistent with most of the other areas with elevated readings. The average value was less than the Lc, which implies most of the area is at background levels. The average elevated reading was 1,720 cpm/100 cm^2. This is consistent with the average elevated activity in most of the areas with elevated activity. The elevated readings identified were associated with discrete DU fragments. There was visual indication of DU fragments, along with elevated scanning results, at positions throughout the area. As shown by the large number of sample points obtained, and the limited number of DU fragments or elevated readings obtained, the frequency distribution and histogram suggest that the contamination is not uniform, and appears in discrete isolated areas. Due to the presence of DU some limited soil sampling was performed in this area. Due to the presence of DU, nine soil samples were taken in this area. One sample or eleven percent of the samples showed the presence of DU based on the U238 to U234 ratios.

Soil Sampling:

Soil samples were obtained in various areas both with and without elevated activity. The surveyors collected 500 grams of soil to a depth of 15 cm. The soil was placed in a collection container and shaken to achieve a uniform mixture. Samples were then placed in labeled poly bags, double bagged and prepared for shipment with Chain of Custody forms to the laboratory for analysis. A list of the sample locations is provided in Attachment 10. The soil sampling results were analyzed for the ratio of U-238 to U-234. Ratio results which exceeded a factor of three were considered to be DU. As expected none of the reference background areas in which soil sampling was performed showed any indication of DU activity. None of the areas with identified Ra-226 commodity contamination showed any confirmation of DU. Four of the remaining areas CT1 SA-1, K-2 SMALL CALIBER GUN RANGE, Kennedy Stands, and Tower 11 showed at least 1 sample with DU based on the U238 to U234 ratio. The areas with the highest concentrations of DU in soil samples were K-2 Small Caliber Gun Range, Kennedy Stands and Tower 11 SA-1. This is consistent with the results of the surface scanning in those areas. Both CT1 SA-1 and T-11 SA-2 had confirmed DU but at a lower percentage of soil samples. This is consistent with the surface scanning results in those areas as well. The other areas

surveyed in which elevated counts of DU were identified (CT4 and SNORT) did not show any confirmation of DU via soil sampling.

Radiological Assessment of DU:
A detailed risk assessment of the DU contamination was performed by the University of Massachusetts (Reference D-4). Although not specifically identified in this report, the areas referenced in this evaluation were subsequently determined to be the Kennedy Stands Air to Ground Test Area. The assessment concluded that no concerns for human health effects were warranted based on the levels of material present, and the environmental conditions and use considerations of the site. This assessment included inhalation, ingestion and direct exposure considerations for the maximally exposed current worker and potential future exposed individuals.

This conclusion is consistent with the research by the U.S. Department of Health and Human Services that no human cancer of any type has been observed as a result of exposure to natural or depleted uranium. Reviews of the scientific literature conducted by RAND and the Agency for Toxic Substances and Disease Registry (an agency within the Department of Health and Human Services) concluded that current evidence suggests that radiation from inhaled or ingested depleted uranium is an unlikely health hazard. Both RAND and Agency reviews found that no human cancer attributable to radiation from natural uranium is documented in the literature. Since natural uranium is more radioactive than DU, these results indicate that DU represents an even lesser risk of causing cancer." – Reference: GAO Report Mar 2000) This claim is further substantiated by recent VA report published in Federal Register Vol 75, No. 45, Mar 2010.

As noted in the general literature and used in the risk assessment the most important radiological risk to depleted uranium (DU) occurs when it is taken into the body, absorbed by the blood, and then carried to tissues and organs where it can potentially cause damage. There are three pathways that DU can enter the body; by inhalation (breathing dust), ingestion (drinking or eating), and through wound contamination (DU fragments embedded in the skin). The wound contamination was not considered in the prior assessment, and is not addressed here since it's assumed to be an isolated event, and not appropriate for general risk assessment considerations. Casual skin contact or simply being near soil contaminated with DU material at the levels expected at NAWCWD is also not considered a significant external radiological hazard.

Most of the DU found at the site was in the form of solid fragments, which are generally too large to be inhaled directly. There is a potential for dust to occur from erosion of the fragments, but the magnitude of dust due to normal environmental conditions would be a small fraction of the original values noted on the survey, except as indicated below for detonation scenarios.

The area is an active ordinance site with significant access restrictions and is not used for farming, or social activities. The nature of the work in the area would not provide significant opportunity for material to be ingested or inhaled, except as trace quantities of erosion produced dust as noted above. This is further discussed in the DP.

Studies were undertaken by the Argonne National Laboratory to determine the mobility of DU in the soil at NAWS (Ref. D-6). The summary of that study and the Risk Assessment noted above concluded that DU is not mobile in the soil and hydrological conditions existing at NAWS China Lake and that the reasonable maximum exposure (RME) in any likely exposure scenario would be approximately 13 mrem/year." The exposure to a current range worked was estimated at less than 3.4 mrem/year. In addition the Risk Assessment noted given the desert environment and the rate at

which groundwater is being removed from the aquifer that underlies the base, no alternative use model as suggested in NUREG 1757, where an individual could be exposed to 25 mrem/year Total Effective Dose Equivalent (TEDE), is considered likely far into the foreseeable future.

A detailed radiological risk assessment of human exposure to DU from casual contact at the site is beyond the scope of this report. However, a general assessment of our collected information to date can used to estimate an upper human exposure boundary and compare that with the previous risk assessment levels. Based on the previous risk assessment and discussions with Troy Williams and John Bradford it was determined that the maximum duration of exposure for a range worker at the sites with the highest measured activity would be much less than 40 days per year (8 hour work days). The average was expected to be around 10 days per year. For conservatism 40 days per year was assumed, which is consistent with the worst case scenario from the prior risk assessment. This equates to an occupancy factor in the area of approximately 0.04.

Inhalation

The level of human exposure through inhalation of dust particles from DU contamination in the soil is a function of a number of complex factors, such as; the proximity of the worker to the source of contamination, the physical (solubility) and chemical (oxide) form of DU, the degree of dispersion into the local environment, and particle sizes and density of the dusts produced.

The highest count rate observed to date is 350,000 counts per minutes (cpm) measured at the K-2 SMALL CALIBER GUN RANGE gun range. This represents a significantly small fraction (<< 1%) of the total surface area thus far surveyed. The overall average for this same area is approximately 1,300 cpm, and the mode is 180 cpm. The 90th percentile value for this area was 536 cpm, and the 90th percentile value for the elevated activity in this area was 26,894 cpm. Per the previous risk assessment, the 90th percentile value should be used in the risk assessment. However, for the upper bound assessment of this report we will use the maximum of 350,000 cpm.

Using the total efficiency for the survey meter results in a maximum activity of 2.3 uCi for the 350,000 cpm fragment. Although this was found as a single object, for the upper bound assessment, the full value will be assumed to be in a dust form and distributed in a 1,500 cc section of soil (15 cm depth x 100 cm^2). For the standard volume and density of soil at 1.5 g/cc, the maximum soil concentration is about 1,030 pCi/g.

To be inhaled, material must be removed from the soil and resuspended in the breathing zone area of the individual. Limited data are available describing possible re-suspension of DU particles once deposited on soil. Data presented in References D-11 and D-12, suggests re-suspension factors for DU oxides to range from 3.3×10^{-8} (no mechanical disturbance) to 1.9×10^{-4} (vigorous work activity). Since the site contains UXO materials and is environmentally protected (no off road vehicles are allowed in these areas), vigorous work in the locations where DU was identified is considered unlikely. A median value of 2 E-6 is assumed for the re-suspension factor.

Assuming a worker is exposed on a daily basis to the maximum activity of 2.3 uCi as dust on the soil surface, with a re-suspension factor of 2 E-6, and assuming the worker inhales all the material re-suspended results in a worst case daily intake of 4.6E-6 uCi. The annual whole body dose is then estimated to be less than 0.5 mrem (40 work days). This estimate is based on the Annual Limit of Intake (ALI) of 2 µCi which is associated with a 5 rem committed effective dose equivalent (CEDE), in accordance with Title 10, Code of Federal Regulation, Part 20 (10 CFR 20). This is an extremely conservative upper-bound estimate of the maximally exposed worker in these areas.

As an alternative approach, similar to the method used in the previous risk assessment, the maximum annual inhalation dose Di can be calculated from:

Di = Cs * IhR* (1/PEF) * CF*EF *DCF

Where Cs is the radionuclide concentration in pCi/g
IhR is the inhalation rate in m^3/day
PER is the particulate emission factor in m^3/kg soil
CF is the conversion g/kg
EF is the exposure frequency days/year
DCF is the dose conversion in mrem/pCi

The default PEF is approximately 1E8 to 1E9, the maximum inhalation rate is 20 m^3/day, the exposure period is still taken as 40 days/year and the DCF is approximately 0.02. Assuming the maximum soil contamination 1030 pCi/g results in a dose of less than 0.02 mrem/year.

As a follow up verification, 9 air samples were taken at 4 locations in one of the survey areas with elevated activity (CT-1 SA-1). One set of samples was placed on a fence outside of the work area away from the areas where DU contamination was identified. This sample set was used as the reference background. The remaining samples were taken in the breathing zone of the workers in the survey area. Maps of the areas where the air samples were taken and the results are provided in Attachment 11.

The samples were analyzed with a Ludlum 2200 scalar and 43-10 alpha scintillation detector to ensure that the minimum detectable concentration (MDC) of the counting system would be less than 10% of a DAC for U-238 (2E-12 uCi/cc). The results indicated no breathing zone samples in excess of 10% of the DAC for U-238. There were detectable counts just above the detection level (Lc) for the analysis counter on one breathing zone sample (Tech 1 M1), all other breathing zone samples had no detectable activity.

The surveys were conducted in the conditions present at the time of the evaluation. OSI notes that, these conditions can change due to operations, such as vehicle and personnel movement, detonation of ordnance or environmental considerations, which may cover or uncover DU contaminated objects or may cause fragments to be relocated. The air speed and turbulence on the two days of sampling was relatively calm. Air speeds were less than 5 mph. These conditions are representative of approximately 50% of the sampling days from June 13^{th} to September 29^{th}, 2011. The normal prevailing winds are from the Southwest. Since the assessment assumed maximum contamination levels and resuspension factors, the resulting upper bound estimates are not expected to change even if job site conditions are altered.

Ingestion

The impact on health after ingestion depends on the amount of available DU compounds present in ingested material, which in turn is dependent on the concentration of DU in the environment. In most scenarios in which uranium has been released into the environment, the potential exists for inadvertent ingestion of quantities of soil contaminated with DU by direct transmission. However, it is also assumed that it could migrate to surface or groundwater. Using these as sources for drinking water, agricultural land and recreational purposes can lead to human exposure either directly or

through the food chain. As noted in the DP, the migration of the DU to water has already been evaluated and found to not be a viable pathway source.

Although a small amount of dust particles inhaled goes to the digestive pathway, the predominant factor for inadvertent ingestion of quantities of soil contaminated with DU would most likely occur from hand to mouth transmission, and the relative magnitude of exposure will depend greatly on the habits and behavior of an individual.

Since the fragments occur as discrete objects which would not likely, adhere to the skin for transfer to the mouth, the ingestion is not considered a highly likely scenario. However to again estimate an upper bound based on the results found to date, worst case assumptions can be made.

Using an approach similar to the method used in the previous risk assessment the maximum annual inhalation dose Dh can be calculated from

Dh = Cs*IR*CF*EF*DCF

Where Cs is the radionuclide concentration in soil pCi/g
IR is the soil ingestion rate
CF is the unit conversion g/mg
EF is the exposure frequency day/year
DCF is the dose conversion in mrem/pCi

The maximum ingestion rate for a range works is estimated at less than 100 mg/d, the worst case scenario for someone digging in the soil would be 200 mg/d. The exposure period is taken as 40 days, and the dose conversion factor is approximately 2.7E-4 mrem/pCi. Assuming the soil concentration is 1,030 pCi/g results in a dose of approximately 2 mrem/year.

The values for inhalation and ingestion dose are consistent with the values determined in the prior risk assessment and indicate exposures of less than 25 mrem per year are expected even at the maximum concentration levels identified during the DU scoping surveys. As a separate comparison the dose was modeled using RESRAD Version 6.5 and a uniform soil concentration of 1,030 pCi/g, an inhalation rate of 8,400 m^3/y inhalation, a soil ingestion rate of 73 g/y and an occupancy factor of 0.04. The results of the RESRAD analysis indicated a maximum dose of approximately 7 mrem/year.

Conclusion

The China Lake site includes buildings and land areas contaminated with DU, Radium-226, and possibly Thorium as a result of earlier weapons testing operations. The methods used for building and land area surveys in this report were effective in identifying surface activity in concentrations less than the proposed DCLG values.

The building surveys indicated 3 of the buildings (00005, 12510 and 30973) had areas of elevated contamination. There were nine localized areas of residual contamination within the three buildings that exceeded the Lc. The highest levels of contamination were found in building 00005, rooms 1424, 1644 and 1646. The contamination was found primarily in sinks, and at one location on a counter top in this building. In building 12510, the contamination was found on the floor surfaces of the firing range. In building 30973 the contamination was found on the concrete floor. These contamination levels are less than RAD-010 Table 2-2 contamination limits for DU.

The land areas in which no elevated activity was identified included the Boondocks, B-4 Track, CT-1 (SA-2 and SA-3), CT3 (SA-1), CT4 (SA-1, SA-3, SA-4, SA-7, SA-9), CT6 (SA-1), Detonation Physics Lab, Launch Test Facility, X-Pad. These areas were used as reference background locations to determine baseline natural uranium and thorium in the environment. Areas which did indicate elevated activity were the Aircraft Boneyard, B-29 and F-4 Area, COSO Range, CT1 (SA-1), CT4 (SA-2, SA-5, SA-6, SA-8, North Trails, Disposal Pit), K-2 Small Caliber Gun Range, Kennedy Stands, Salt Wells Dump Site, SNORT (Track, SA-1, SA-2), and Tower 11(SA-1, SA-2). Except for Kennedy Stands, K-Small Caliber Gun Range and Tower 11, none of the other areas with elevated counts are identified on the current Naval Radioactive Materials Permit. In four of the areas with elevated activity, Aircraft Bone Yard, B-29 and F-4 Area, Salt Wells Dump Site and Coso Range, all of the elevated activity was associated with specific pieces of equipment, such as radium dials and gauges from aircraft, cannons or target vehicles and not DU. The remaining areas with elevated counts were associated with DU.

Soil sampling results taken in the reference background areas supported that no DU was present in those locations. Soil sampling in the areas with the highest levels of elevated counts (K-2 Kennedy Stands, Tower 11, and CT1 SA-1) were consistent with the survey results and indicated the presence of DU in selected locations. The DU contamination in the soil in these areas was not uniform. Soil sampling from the remaining areas with elevated counts Aircraft Boneyard, B-29 and F-4 Area, COSO Range, CT4 (SA-2, SA-5, SA-6, SA-8, SA-9, North Trails, Disposal Pit), Salt Wells Dump Site, SNORT (Track, SA-1, SA-2), and Tower 11 SA-2, showed no indication of DU. This is consistent with the assumption that the DU is present in isolated areas only as fragments, and is not uniformly distributed throughout the soil volume.

An upper bound risk assessment based on the maximum activity identified on the land area surveys was performed. The values for inhalation and ingestion dose from this upper bound assessment were consistent with the values determined in the prior risk assessment by the University of Massachusetts. The results indicate exposures of less than 25 mrem per year are expected even at the maximum concentration levels identified during the DU scoping surveys. As a separate comparison the dose was modeled using RESRAD Version 6.5 and a uniform soil concentration of 1,030 pCi/g. The results of the RESRAD analysis also indicated a maximum dose of less than 7 mrem/year.

Recommendations

Additional scanning surveys of the other land areas identified in the DP as potentially impacted should be completed in preparation for final decommissioning of the site and to provide information on areas that should be controlled under the NRMP. The command should decide whether to include land areas identified during the scoping surveys as contaminated with DU, such as CT1 SA-1, in the existing DU Naval Radioactive Materials Permit 04-6530-L1NP.

References

Documents
D-1 04-6530-L1NP

D-2 Decommissioning Plan for Naval Air Weapons Station China Lake, New World Technology.

D-3 NAWCWD-OSI-2012-4-23 Rev 0, dated April 23, 2012, UPDATED DECOMMISSIONING PLAN for K-2 SMALL CALIBER GUN RANGE, KENNEDY STANDS, and TOWER 11 – NAVAL AIR WEAPONS STATION CHINA LAKE

D-4 Callahan, B., Kostecki, P., Reece, K. Human Health Risk Assessment at a Depleted Uranium Site, *Soil & Sediment Contamination*, 13:597-609, 2004

D-5 Federal Register Vol 75, No. 45, Mar 2010.

D-6 Special Publication SP-2142-ENV, Mobility of Depleted Uranium in Soil at the Naval Air Weapons Station China Lake, Prepared by Argonne National Laboratory, September 2003

D-7 NUREG 1575 Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)

D-8 NUREG 1757 Consolidated NMNSS Decommissioning Guidance

D-9 2003-09 Report: Argonne Lab Report SP-2142 DU Mobility of DU in Soil at NAWS China Lake

D-10 NAVSEA S0420-AA-RAD-010 REVISION 1A, RADIOLOGICAL AFFAIRS SUPPORT PROGRAM MANUAL

D-11 DTRA / NTPR - Standard Operating Procedures Manual ID01 –Doses to Organs from Intake of Radioactive Materials *Revision No.: 1.3a Date: March 31, 2010 Page* 1 *of* 45

D-12 The health hazards of depleted uranium munitions ANNEXE C: Assessments of depleted uranium intakes from use of depleted uranium on the battlefield, M. R Bailey (NRPB), J. Marriage (AWE), J. Shaw (AWE) and C. Walsh (NRPB)

Websites
W-01 http://www.iaea.org/NewsCenter/Features/DU/du_qaa.shtml#q1

Attachment 1 – Table of Areas Surveyed

Table 1.1 Areas Surveyed

Area/Building Name	Subarea/Room
Building 00005	1424B
	1647
	1652
	1644 & 1646
Building 01124	
Building 01389	
Building 03882	
Building 10540-1	
Building 10540-2	
Building 10562	
Building 10630	
Building 10634	
Building 11640	
Building11681	
Building 12510	
Building 12520	
Building 13060	
Building 13090	
Building 13100	
Building 13470	
Building 15510	
Building 15560	
Building 15570	
Building 15700	
Building 30973	
Building 31003	
Building 31018	
Building 31024	
Building 31110	
Building 31123	
Building 10518	
Building 10522	
Building 10632	
B-4 Track	
Boondock	SA-1
COSO Range	
CT1	SA-1
	SA-2
	SA-3
CT3	SA-1
CT4	SA-1

	SA-2
	SA-3
	SA-4
	SA-5
	SA-6
	SA-7
	SA-8
	SA-9
	North Trails
	Disposal Pit
CT6	SA-1
Detonation Physics Lab	
K-2 Small Caliber Gun Range	
Kennedy Stands	
Launch Test Facility	LT-3
Salt Wells Dump Site	
SNORT Track	Track
	SA-1
	SA-2
Tower11	SA-1
	SA-2
X-Pad	

Attachment 2 – Selection of Instruments

Table 2.1 Instrument Evaluations

Detector	BKG c/m	DU c/m	4π dpm DU	pCi DU	pCi/g	4π %Eff c/d	LLD (c/m)	E^2/B
Ludlum model 3 & 44-17 1cm thick - 2" Dia. Nal scintillation detector (15 cm^2)	2,900	20,000	216,893	97,700	398,774	7.9%	162	0.02
Ludlum model 3 & 44-10 2" Nal scintillation (15 cm^2) 63 and 93 off of th-234	15,000	18,000	216,893	97,700	398,774	1.4%	367	0.0001
Ludlum model 3 & 44-9 G-M Pancake detector (15 cm^2)	40	1,400	216,893	97,700	398,774	0.6%	19	0.01
Ludlum 2350 & 43-93 in Beta Mode (100 cm^2)	320	15,000	216,893	97,700	398,774	6.8%	54	0.14
Ludlum 2350 & 44-17 optimized for low energy	600	3,700	216,893	97,700	398,774	1.4%	73	0.0034
Ludlum 2350-1 & 44-10 2" Nal scintillation detector (window of DU)	7,000	10,500	216,893	97,700	398,774	1.6%	251	0.0004
Ludlum 2241 & 43-93 in Beta Mode (100 cm^2) Cannot operate in data logging mode	300	17,000	216,893	97,700	398,774	7.7%	52	0.19
Ludlum 2241 & 43-93 in Beta Mode (100 cm^2) with Kapton tape on window. Cannot operate in data logging mode	300	15,000	216,893	97,700	398,774	6.8%	52	0.15
Ludlum 2350 & 43-37 Floor Monitor in Beta Mode (425 cm2)	1500	15,000	216,893	97,700	398,774	6.2%	116	0.02

Attachment 3 – Depth of Burial Testing

A sample DU fragment with 216,893 dpm activity (97,700 pCi) was placed at various depths in sand. Measurements were then performed with a Ludlum 2350 data logger and 43-93 probe (with kapton tape over window) operated in beta mode on the surface of the sand. The results of the measurements are shown in table 3.1 below

Table 3.1 Depth of Burial Measurements

Distance	Inches	cm	cpm	% Measured
~BKG on sand:	0	0	450	
With Source	0	0	13,500	100%
	0.25	0.635	600	4.4%
	0.5	1.27	550	4.1%
	0.75	1.905	500	3.7%
	1	2.54	450	3.3%

Figure 2: Depth of Burial Measurements

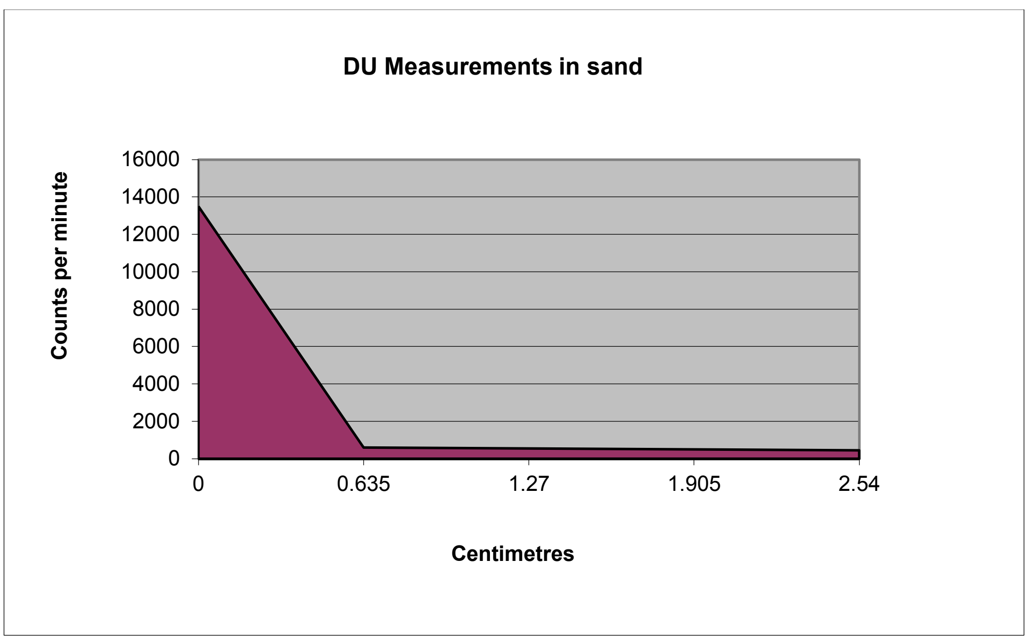


Figure 3: Background Depth Measurements

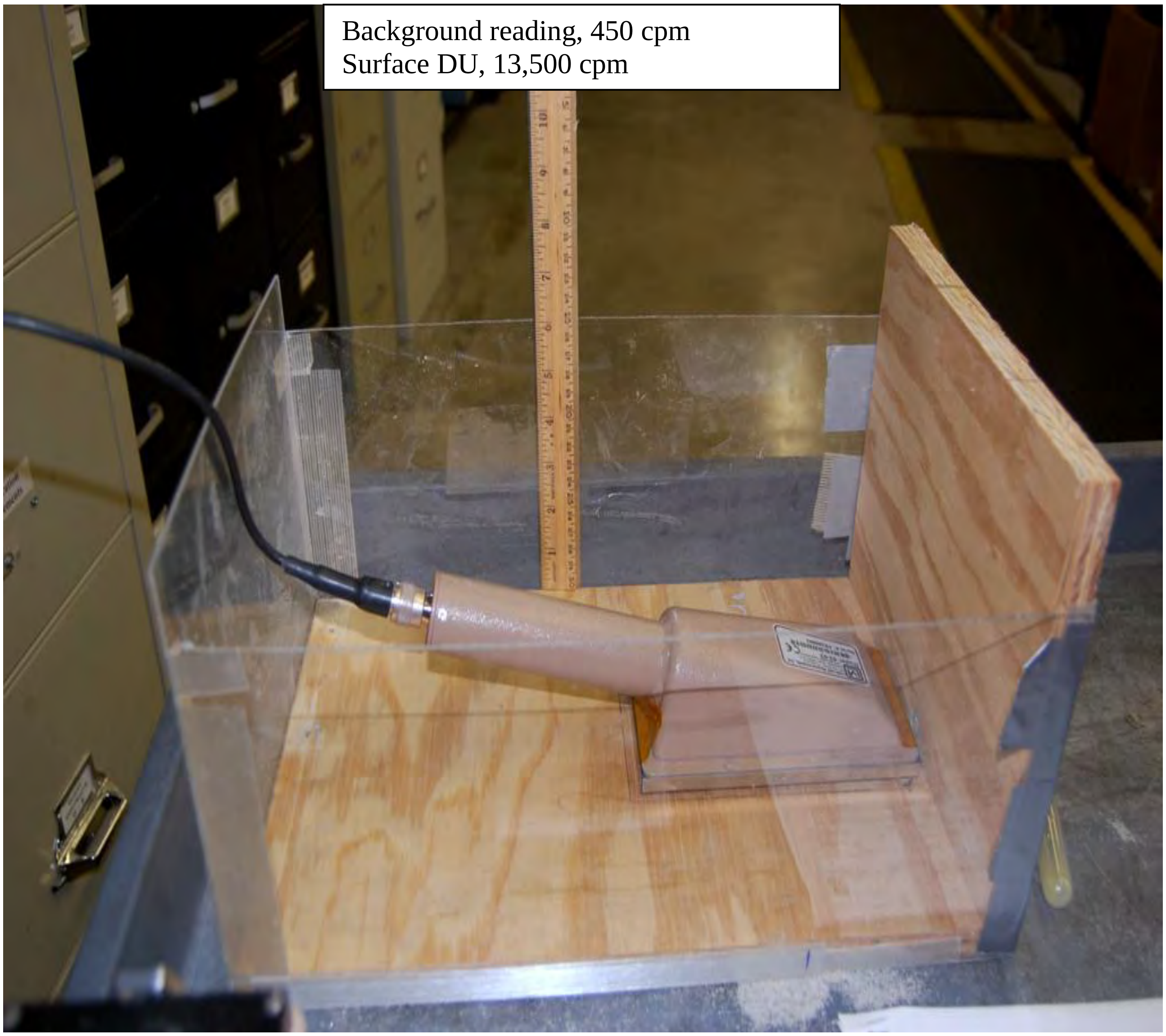
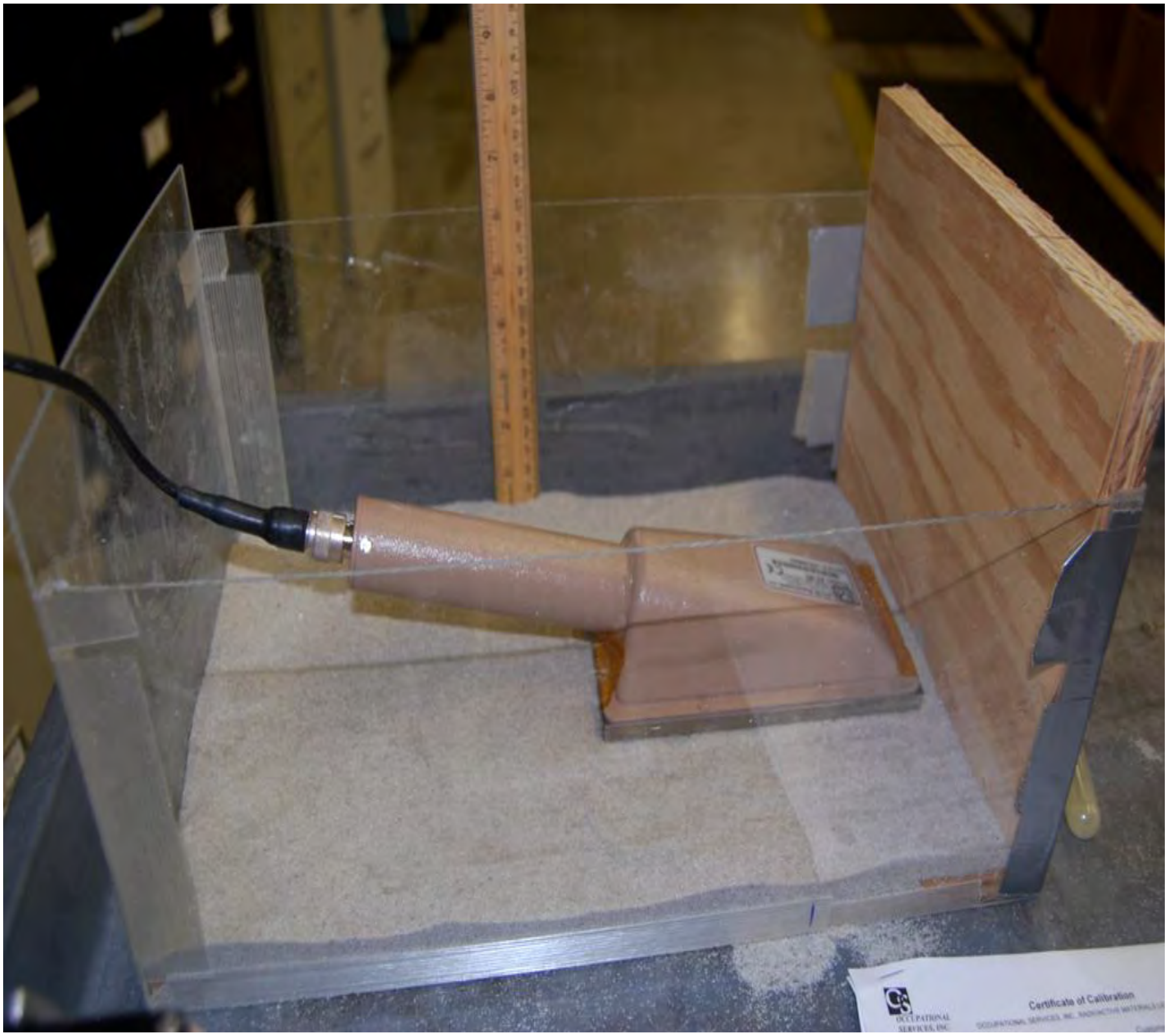


Figure 4: 0.25" Depth Measurement

0.25 inches sand, 600 cpm


Certificate of Calibration

Attachment 4 – Building Survey Static Measurements

Table 4.1 Building Static Measurements

#	Static Counts	Type of Survey	Building Number	Survey Results in dpm/100 cm^2 DU (10 minute integrated count time)	Survey Location	AVG. BKG (Counts)	MDC (dpm/100cm^2)	Lc - Critical Level (dpm/100cm^2)
1	262	43-68 Gas Proportional (DU)	00005 - Room 1424B	481	Linoleum Tile	16.5	43	19
2	8	43-68 Gas Proportional (DU)	00005 - Room 1424B	-17	Linoleum Tile	16.5	43	19
3	17	43-68 Gas Proportional (DU)	00005 - Room 1424B	1	Linoleum Tile	16.5	43	19
4	11	43-68 Gas Proportional (DU)	00005 - Room 1424B	-11	Linoleum Tile	16.5	43	19
5	10	43-68 Gas Proportional (DU)	00005 - Room 1647	4	Linoleum Tile	8	32	13
6	8	43-68 Gas Proportional (DU)	00005 - Room 1647	0	Linoleum Tile	8	32	13
7	5	43-68 Gas Proportional (DU)	00005 - Room 1647	-6	Linoleum Tile	8	32	13
8	50	43-68 Gas Proportional (DU)	00005 - Room 1647	82	Linoleum Tile	8	32	13
9	22	43-68 Gas Proportional (DU)	00005 - Room 1652	-5	Linoleum Tile	24.5	51	23
10	27	43-68 Gas Proportional (DU)	00005 - Room 1652	5	Linoleum Tile	24.5	51	23
11	19	43-68 Gas Proportional (DU)	00005 - Room 1652	-11	Linoleum Tile	24.5	51	23
12	15	43-68 Gas Proportional (DU)	00005 - Room 1652	-19	Linoleum Tile	24.5	51	23
13	47	43-68 Gas Proportional (DU)	00005 - Room 1644 & 1646	63	Linoleum Tile	15	41	18
14	18	43-68 Gas Proportional (DU)	00005 - Room 1644 & 1646	6	Linoleum Tile	15	41	18
15	11	43-68 Gas Proportional (DU)	00005 - Room 1644 & 1646	-8	Linoleum Tile	15	41	18
16	11	43-68 Gas Proportional (DU)	00005 - Room 1644 & 1646	-8	Linoleum Tile	15	41	18
17	171	43-68 Gas Proportional (DU)	00005 - Room 1644 & 1646	306	Linoleum Tile	15	41	18
18	46	43-68 Gas Proportional (DU)	01124	-15	Concrete	53.5	73	33
19	45	43-68 Gas Proportional (DU)	01124	-17	Concrete	53.5	73	33
20	53	43-68 Gas Proportional (DU)	01124	-1	Concrete	53.5	73	33
21	19	43-68 Gas Proportional (DU)	01389	-2	Sealed Concrete	20	47	20
22	3	43-68 Gas Proportional (DU)	01389	-33	Sealed Concrete	20	47	20
23	22	43-68 Gas Proportional (DU)	01389	4	Sealed Concrete	20	47	20
24	22	43-68 Gas Proportional (DU)	01389	4	Sealed Concrete	20	47	20
25	15	43-68 Gas Proportional (DU)	01389	-10	Sealed Concrete	20	47	20
26	21	43-68 Gas Proportional (DU)	01389	2	Sealed Concrete	20	47	20
27	27	43-68 Gas Proportional (DU)	03882	-4	Sealed Concrete	29	55	25
28	33	43-68 Gas Proportional (DU)	03882	8	Sealed Concrete	29	55	25
29	21	43-68 Gas Proportional (DU)	03882	-16	Sealed Concrete	29	55	25
30	28	43-68 Gas Proportional (DU)	03882	-2	Sealed Concrete	29	55	25
31	27	43-68 Gas Proportional (DU)	10540	-7	Sealed Concrete	30.5	56	25
32	29	43-68 Gas Proportional (DU)	10540	-3	Sealed Concrete	30.5	56	25
33	33	43-68 Gas Proportional (DU)	10540	5	Sealed Concrete	30.5	56	25
34	33	43-68 Gas Proportional (DU)	10540	5	Sealed Concrete	30.5	56	25
35	9	43-68 Gas Proportional (DU)	10540	-42	Sealed Concrete	30.5	56	25
36	34	43-68 Gas Proportional (DU)	10562	4	Sealed Concrete	32	57	26
37	33	43-68 Gas Proportional (DU)	10562	2	Sealed Concrete	32	57	26
38	36	43-68 Gas Proportional (DU)	10562	8	Sealed Concrete	32	57	26
39	14	43-68 Gas Proportional (DU)	10630	1	Linoleum Tile	13.5	39	17

#	Static Counts	Type of Survey	Building Number	Survey Results in dpm/100 cm^2 DU (10 minute integrated count time)	Survey Location	AVG. BKG (Counts)	MDC ($dpm/100cm^2$)	Lc - Critical Level ($dpm/100cm^2$)
40	12	43-68 Gas Proportional (DU)	10630	-3	Linoleum Tile	13.5	39	17
41	16	43-68 Gas Proportional (DU)	10630	5	Linoleum Tile	13.5	39	17
42	13	43-68 Gas Proportional (DU)	10630	-1	Linoleum Tile	13.5	39	17
43	10	43-68 Gas Proportional (DU)	10634	-2	Sealed Concrete	11	36	15
44	11	43-68 Gas Proportional (DU)	10634	0	Sealed Concrete	11	36	15
45	33	43-68 Gas Proportional (DU)	10634	21	Concrete	22.5	49	22
46	19	43-68 Gas Proportional (DU)	10634	-7	Concrete	22.5	49	22
47	17	43-68 Gas Proportional (DU)	11640	-6	Sealed Concrete	20	47	20
48	13	43-68 Gas Proportional (DU)	11640	-14	Sealed Concrete	20	47	20
49	17	43-68 Gas Proportional (DU)	11640	-6	Sealed Concrete	20	47	20
50	20	43-68 Gas Proportional (DU)	11640	0	Sealed Concrete	20	47	20
51	25	43-68 Gas Proportional (DU)	11681	-7	Linoleum Tile	28.5	55	24
52	15	43-68 Gas Proportional (DU)	11681	-26	Linoleum Tile	28.5	55	24
53	26	43-68 Gas Proportional (DU)	11681	-5	Linoleum Tile	28.5	55	24
54	48	43-68 Gas Proportional (DU)	11681	15	Asphalt	40.5	64	29
55	33	43-68 Gas Proportional (DU)	11681	-15	Asphalt	40.5	64	29
56	36	43-68 Gas Proportional (DU)	11681	-9	Asphalt	40.5	64	29
57	40	43-68 Gas Proportional (DU)	11681	-1	Asphalt	40.5	64	29
58	90	43-68 Gas Proportional (DU)	12510	124	Steel (Firing Bay)	27	53	24
59	157	43-68 Gas Proportional (DU)	12510	255	Steel (Firing Bay)	27	53	24
60	69	43-68 Gas Proportional (DU)	12510	82	Steel (Firing Bay)	27	53	24
61	43	43-68 Gas Proportional (DU)	12510	31	Steel (Firing Bay)	27	53	24
62	32	43-68 Gas Proportional (DU)	12510	10	Steel (Firing Bay)	27	53	24
63	21	43-68 Gas Proportional (DU)	12510	-12	Steel (Firing Bay)	27	53	24
64	12	43-68 Gas Proportional (DU)	12510	-6	Sealed Concrete	15	41	18
65	17	43-68 Gas Proportional (DU)	12510	4	Sealed Concrete	15	41	18
66	13	43-68 Gas Proportional (DU)	12520	-1	Linoleum Tile	13.5	39	17
67	12	43-68 Gas Proportional (DU)	12520	-3	Linoleum Tile	13.5	39	17
68	14	43-68 Gas Proportional (DU)	12520	1	Linoleum Tile	13.5	39	17
69	12	43-68 Gas Proportional (DU)	12520	-3	Linoleum Tile	13.5	39	17
70	11	43-68 Gas Proportional (DU)	12520	-5	Linoleum Tile	13.5	39	17
71	13	43-68 Gas Proportional (DU)	12520	-1	Linoleum Tile	13.5	39	17
72	14	43-68 Gas Proportional (DU)	13060	4	Linoleum Tile	12	37	16
73	16	43-68 Gas Proportional (DU)	13060	8	Linoleum Tile	12	37	16
74	14	43-68 Gas Proportional (DU)	13060	4	Linoleum Tile	12	37	16
75	13	43-68 Gas Proportional (DU)	13060	2	Linoleum Tile	12	37	16
76	7	43-68 Gas Proportional (DU)	13060	-10	Linoleum Tile	12	37	16
77	12	43-68 Gas Proportional (DU)	13060	0	Linoleum Tile	12	37	16
78	10	43-68 Gas Proportional (DU)	13060	-4	Linoleum Tile	12	37	16
79	12	43-68 Gas Proportional (DU)	13060	0	Linoleum Tile	12	37	16
80	24	43-68 Gas Proportional (DU)	13090	6	Sealed Concrete	21	48	21
81	17	43-68 Gas Proportional (DU)	13090	-8	Sealed Concrete	21	48	21
82	18	43-68 Gas Proportional (DU)	13100	0	Linoleum Tile	18	45	19

#	Static Counts	Type of Survey	Building Number	Survey Results in dpm/100 cm^2 DU (10 minute integrated count time)	Survey Location	AVG. BKG (Counts)	MDC ($dpm/100cm^2$)	Lc - Critical Level ($dpm/100cm^2$)
83	16	43-68 Gas Proportional (DU)	13100	-4	Linoleum Tile	18	45	19
84	12	43-68 Gas Proportional (DU)	13100	-12	Linoleum Tile	18	45	19
85	16	43-68 Gas Proportional (DU)	13100	-4	Linoleum Tile	18	45	19
86	19	43-68 Gas Proportional (DU)	13100	2	Linoleum Tile	18	45	19
87	16	43-68 Gas Proportional (DU)	13100	-4	Linoleum Tile	18	45	19
88	26	43-68 Gas Proportional (DU)	13100	16	Linoleum Tile	18	45	19
89	16	43-68 Gas Proportional (DU)	13100	-4	Linoleum Tile	18	45	19
90	14	43-68 Gas Proportional (DU)	13100	-8	Linoleum Tile	18	45	19
91	20	43-68 Gas Proportional (DU)	13100	4	Linoleum Tile	18	45	19
92	18	43-68 Gas Proportional (DU)	13100	0	Linoleum Tile	18	45	19
93	14	43-68 Gas Proportional (DU)	13100	-8	Linoleum Tile	18	45	19
94	24	43-68 Gas Proportional (DU)	13470	-13	Sealed Concrete	30.5	56	25
95	20	43-68 Gas Proportional (DU)	13470	-21	Sealed Concrete	30.5	56	25
96	31	43-68 Gas Proportional (DU)	13470	1	Sealed Concrete	30.5	56	25
97	29	43-68 Gas Proportional (DU)	13470	-3	Sealed Concrete	30.5	56	25
98	28	43-68 Gas Proportional (DU)	13470	-5	Sealed Concrete	30.5	56	25
99	14	43-68 Gas Proportional (DU)	15510	2	Sealed Concrete	13	39	16
100	13	43-68 Gas Proportional (DU)	15510	0	Sealed Concrete	13	39	16
101	12	43-68 Gas Proportional (DU)	15510	-2	Sealed Concrete	13	39	16
102	4	43-68 Gas Proportional (DU)	15510	-18	Sealed Concrete	13	39	16
103	28	43-68 Gas Proportional (DU)	15560	12	Linoleum Tile	22	49	21
104	27	43-68 Gas Proportional (DU)	15560	10	Linoleum Tile	22	49	21
105	19	43-68 Gas Proportional (DU)	15560	-6	Linoleum Tile	22	49	21
106	14	43-68 Gas Proportional (DU)	15560	-16	Linoleum Tile	22	49	21
107	20	43-68 Gas Proportional (DU)	15560	-4	Linoleum Tile	22	49	21
108	18	43-68 Gas Proportional (DU)	15560	-8	Linoleum Tile	22	49	21
109	15	43-68 Gas Proportional (DU)	15570	-22	Plywood	26	52	23
110	24	43-68 Gas Proportional (DU)	15570	-4	Plywood	26	52	23
111	11	43-68 Gas Proportional (DU)	15700	-5	Linoleum Tile	13.5	39	17
112	12	43-68 Gas Proportional (DU)	15700	-3	Linoleum Tile	13.5	39	17
113	12	43-68 Gas Proportional (DU)	15700	-3	Linoleum Tile	13.5	39	17
114	14	43-68 Gas Proportional (DU)	15700	1	Linoleum Tile	13.5	39	17
115	13	43-68 Gas Proportional (DU)	15700	-1	Linoleum Tile	13.5	39	17
116	13	43-68 Gas Proportional (DU)	15700	-1	Linoleum Tile	13.5	39	17
117	11	43-68 Gas Proportional (DU)	15700	-5	Linoleum Tile	13.5	39	17
118	12	43-68 Gas Proportional (DU)	15700	-3	Linoleum Tile	13.5	39	17
119	9	43-68 Gas Proportional (DU)	15700	-9	Linoleum Tile	13.5	39	17
120	13	43-68 Gas Proportional (DU)	15700	-1	Linoleum Tile	13.5	39	17
121	11	43-68 Gas Proportional (DU)	15700	-5	Linoleum Tile	13.5	39	17
122	12	43-68 Gas Proportional (DU)	15700	-3	Linoleum Tile	13.5	39	17
123	13	43-68 Gas Proportional (DU)	15700	-1	Linoleum Tile	13.5	39	17
124	19	43-68 Gas Proportional (DU)	15700	11	Linoleum Tile	13.5	39	17
125	28	43-68 Gas Proportional (DU)	30973	-59	Concrete	58	75	35

#	Static Counts	Type of Survey	Building Number	Survey Results in dpm/100 cm^2 DU (10 minute integrated count time)	Survey Location	AVG. BKG (Counts)	MDC ($dpm/100cm^2$)	Lc - Critical Level ($dpm/100cm^2$)
126	60	43-68 Gas Proportional (DU)	30973	4	Concrete	58	75	35
127	55	43-68 Gas Proportional (DU)	30973	-6	Concrete	58	75	35
128	184	43-68 Gas Proportional (DU)	30973	247	Concrete	58	75	35
129	30	43-68 Gas Proportional (DU)	31003	-4	Concrete	32	57	26
130	34	43-68 Gas Proportional (DU)	31003	4	Concrete	32	57	26
131	36	43-68 Gas Proportional (DU)	31003	8	Concrete	32	57	26
132	27	43-68 Gas Proportional (DU)	31003	-10	Concrete	32	57	26
133	54	43-68 Gas Proportional (DU)	31018	2	Concrete	53	72	33
134	54	43-68 Gas Proportional (DU)	31018	2	Concrete	53	72	33
135	45	43-68 Gas Proportional (DU)	31018	-16	Concrete	53	72	33
136	52	43-68 Gas Proportional (DU)	31018	-2	Concrete	53	72	33
137	58	43-68 Gas Proportional (DU)	31024	4	Concrete	56	74	34
138	56	43-68 Gas Proportional (DU)	31024	0	Concrete	56	74	34
139	29	43-68 Gas Proportional (DU)	31110	0	Sealed Concrete	29	55	25
140	32	43-68 Gas Proportional (DU)	31110	6	Sealed Concrete	29	55	25
141	22	43-68 Gas Proportional (DU)	31110	-14	Sealed Concrete	29	55	25
142	28	43-68 Gas Proportional (DU)	31110	-2	Sealed Concrete	29	55	25
143	30	43-68 Gas Proportional (DU)	31110	2	Sealed Concrete	29	55	25
144	31	43-68 Gas Proportional (DU)	31123	8	Sealed Concrete	27	53	24
145	28	43-68 Gas Proportional (DU)	31123	2	Sealed Concrete	27	53	24
146	28	43-68 Gas Proportional (DU)	31123	2	Sealed Concrete	27	53	24
147	24	43-68 Gas Proportional (DU)	31123	-6	Sealed Concrete	27	53	24
148	29	43-68 Gas Proportional (DU)	31123	4	Sealed Concrete	27	53	24
149	27	43-68 Gas Proportional (DU)	31123	0	Sealed Concrete	27	53	24
150	22	43-68 Gas Proportional (DU)	31123	-10	Sealed Concrete	27	53	24
151	30	43-68 Gas Proportional (DU)	31123	6	Sealed Concrete	27	53	24
152	12	43-68 Gas Proportional (DU)	10518	1	Linoleum Tile	11.5	37	15
153	13	43-68 Gas Proportional (DU)	10518	3	Linoleum Tile	11.5	37	15
154	111	43-68 Gas Proportional (DU)	10522	-25	Concrete	124	107	51
155	96	43-68 Gas Proportional (DU)	10522	-55	Concrete	124	107	51
156	222	43-68 Gas Proportional (DU)	10632	18	Concrete	213	139	67
157	210	43-68 Gas Proportional (DU)	10632	-6	Concrete	213	139	67

***Sample locations containing activity greater than the calculated minimum detectable concentration are highlighted in orange.**
***Sample locations containing activity greater than the Lc are highlighted in yellow**

Attachment 5 – Building Survey Wipe Test Data

Gamma Wipe Test Counting Data – Building 00005, Room 1424B

Table 5.1 Gamma Wipe Data Building 00005, Room 142B

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	60	8147	n/a	n/a	17%	42
Depleted Uranium Source Counts	60	1761049	175783	DU		
1	60	8272	13	<MDC		
2	60	8259	11	<MDC		
3	60	8175	3	<MDC		
4	60	8075	-7	<MDC		
5	60	8027	-12	<MDC		
6	60	8137	-1	<MDC		
7	60	8158	1	<MDC		
8	60	8048	-10	<MDC		
9	60	8026	-12	<MDC		
10	60	8151	0	<MDC		
11	60	8187	4	<MDC		
12	60	8147	0	<MDC		
13	60	8018	-13	<MDC		
14	60	8264	12	<MDC		
15	60	8106	-4	<MDC		
16	60	8224	8	<MDC		
17	60	8198	5	<MDC		
18	60	8012	-14	<MDC		
19	60	8143	0	<MDC		

$$* \ MDC_{(DepletedUranium)} = \frac{3 + 4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

K = Efficiency(cpm / dpm)

T = Time(minutes)

$$MDC_{(DepletedUranium)} = \frac{3 + 4.65\sqrt{8147}}{(.17)(60)} = 42 dpm/100cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$* \ Counting - Efficiency: \frac{[counts(source) - counts(background)]}{[source(d/m)][CountingTime(t)]}$$

$$* \ Counting - Efficiency - (DepletedUranium): \frac{[1761049 - 8147]}{[175{,}783][60]} = 17\%$$

Alpha Wipe Test Counting Data – Building 00005, Room 1424B

Table 5.2 Alpha Wipe Data Building 00005, Room 142B

Sample Number	Time Count (minutes)	Alpha Counts	Activity (dpm/100cm^2)	Isotope	Efficiency U-238 c/d	MDC (dpm/100cm^2)
Background	10	35	n/a	n/a	25%	12
U-238 Source Counts	10	249	87	U-238		
1	10	34	0	<MDC		
2	10	33	-1	<MDC		
3	10	51	6	<MDC		
4	10	47	5	<MDC		
5	10	33	-1	<MDC		
6	10	39	2	<MDC		
7	10	36	0	<MDC		
8	10	35	0	<MDC		
9	10	25	-4	<MDC		
10	10	21	-6	<MDC		
11	10	39	2	<MDC		
12	10	32	-1	<MDC		
13	10	34	0	<MDC		
14	10	34	0	<MDC		
15	10	31	-2	<MDC		
16	10	45	4	<MDC		
17	10	43	3	<MDC		
18	10	38	1	<MDC		
19	10	35	0	<MDC		

$$* MDC_{(Alpha)} = \frac{3 + 4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$K = Efficiency\ (cpm / dpm)$

$T = Time\ (\text{minutes})$

$$MDC_{(Alpha)} = \frac{3 + 4.65\sqrt{35}}{(.25)(10)} = 12 dpm/100cm^2$$

Gamma Wipe Test Counting Data – Building 00005, Room 1647

Table 5.3 Gamma Wipe Data Building 00005, Room 1647

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	60	8147	n/a	n/a	13%	53
Depleted Uranium Source Counts	60	1761049	221320	Th-230		
1	60	8211	8	<MDC		
2	60	8018	-16	<MDC		
3	60	8194	6	<MDC		
4	60	8018	-16	<MDC		
5	60	7938	-26	<MDC		
6	60	8359	27	<MDC		
7	60	8178	4	<MDC		
8	60	8257	14	<MDC		
9	60	8120	-3	<MDC		
10	60	8236	11	<MDC		
11	60	8389	31	<MDC		
12	60	8217	9	<MDC		
13	60	8244	12	<MDC		
14	60	8083	-8	<MDC		
15	60	8145	0	<MDC		
16	60	8096	-6	<MDC		
17	60	8174	3	<MDC		
18	60	8088	-7	<MDC		
19	60	8194	6	<MDC		
20	60	8211	8	<MDC		

$$* \, MDC_{(Depleted\,Uranium)} = \frac{3 + 4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$$K = Efficiency(cpm / dpm)$$

$$T = Time(\text{minutes})$$

$$MDC_{(Depleted\,Uranium)} = \frac{3 + 4.65\sqrt{8147}}{(.13)(60)} = 53 dpm / 100cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$* \, Counting - Efficiency : \frac{[counts(source) - counts(background)]}{[source(d/m)][Counting\,Time(t)]}$$

$$* \, Counting - Efficiency - (Depleted\,Uranium) : \frac{[1761049 - 8147]}{[221320][60]} = 13\%$$

Alpha Wipe Test Counting Data – Building 00005, Room 1647

Table 5.4 Alpha Wipe Data Building 00005, Room 1647

Sample Number	Time Count (minutes)	Alpha Counts	Activity (dpm/100cm^2)	Isotope	Efficiency U-238 c/d	MDC (dpm/100cm^2)
Background	10	35	n/a	n/a	25%	12
U-238 Source Counts	10	249	87	U-238		
1	10	54	8	<MDC		
2	10	49	6	<MDC		
3	10	46	4	<MDC		
4	10	28	-3	<MDC		
5	10	33	-1	<MDC		
6	10	40	2	<MDC		
7	10	43	3	<MDC		
8	10	31	-2	<MDC		
9	10	38	1	<MDC		
10	10	34	0	<MDC		
11	10	36	0	<MDC		
12	10	40	2	<MDC		
13	10	46	4	<MDC		
14	10	39	2	<MDC		
15	10	51	6	<MDC		
16	10	43	3	<MDC		
17	10	38	1	<MDC		
18	10	29	-2	<MDC		
19	10	36	0	<MDC		
20	10	50	6	<MDC		

$$* \, MDC_{(Alpha)} = \frac{3 + 4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$K = Efficiency \, (cpm / dpm)$

$T = Time \, (\text{minutes})$

$$MDC_{(Alpha)} = \frac{3 + 4.65\sqrt{35}}{(.25)(10)} = 12 dpm/100cm^2$$

Gamma Wipe Test Counting Data – Building 00005, Room 1652

Table 5.5 Gamma Wipe Data Building 00005, Room 1652

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	60	8147	n/a	n/a	13%	53
Depleted Uranium Source Counts	60	1761049	221320	Th-230		
1	60	8078	-9	<MDC		
2	60	8102	-6	<MDC		
3	60	8165	2	<MDC		
4	60	8217	9	<MDC		
5	60	8075	-9	<MDC		
6	60	8183	5	<MDC		
7	60	8139	-1	<MDC		
8	60	8169	3	<MDC		
9	60	8101	-6	<MDC		
10	60	8209	8	<MDC		
11	60	8055	-12	<MDC		
12	60	8103	-6	<MDC		
13	60	8182	4	<MDC		
14	60	8175	4	<MDC		
15	60	8113	-4	<MDC		
16	60	8072	-9	<MDC		
17	60	8254	14	<MDC		
18	60	8207	8	<MDC		
19	60	8353	26	<MDC		
20	60	8153	1	<MDC		

$$* \; MDC_{(Depleted Uranium)} = \frac{3 + 4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$$K = Efficiency(cpm/dpm)$$

$$T = Time(\text{minutes})$$

$$MDC_{(Depleted Uranium)} = \frac{3 + 4.65\sqrt{8147}}{(.13)(60)} = 53 dpm/100cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$* \; Counting - Efficiency : \frac{[counts(source) - counts(background)]}{[source(d/m)][Counting Time(t)]}$$

$$* \; Counting - Efficiency - (Depleted Uranium) : \frac{[1761049 - 8147]}{[221320][60]} = 13\%$$

Alpha Wipe Test Counting Data – Building 00005, Room 1652

Table 5.6 Alpha Wipe Data Building 00005, Room 1652

Sample Number	Time Count (minutes)	Alpha Counts	Activity (dpm/100cm^2)	Isotope	Efficiency U-238 c/d	MDC (dpm/100cm^2)
Background	10	35	n/a	n/a	25%	12
U-238 Source Counts	10	249	87	U-238		
1	10	26	-4	<MDC		
2	10	31	-2	<MDC		
3	10	39	2	<MDC		
4	10	38	1	<MDC		
5	10	35	0	<MDC		
6	10	34	0	<MDC		
7	10	35	0	<MDC		
8	10	23	-5	<MDC		
9	10	36	0	<MDC		
10	10	29	-2	<MDC		
11	10	38	1	<MDC		
12	10	41	2	<MDC		
13	10	30	-2	<MDC		
14	10	25	-4	<MDC		
15	10	45	4	<MDC		
16	10	30	-2	<MDC		
17	10	49	6	<MDC		
18	10	37	1	<MDC		
19	10	32	-1	<MDC		
20	10	44	4	<MDC		

$$* \; MDC_{(Alpha)} = \frac{3 + 4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$K = Efficiency\ (cpm/dpm)$

$T = Time\ (minutes)$

$$MDC_{(Alpha)} = \frac{3+4.65\sqrt{35}}{(.25)(10)} = 12 dpm/100cm^2$$

Gamma Wipe Test Counting Data – Building 00005, Rooms 1644 & 1646

Table 5.7 Gamma Wipe Data Building 00005, Rooms 1644 & 1646

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	60	8147	n/a	n/a	13%	53
Depleted Uranium Source Counts	60	1761049	221320	Th-230		
1	60	8214	8	<MDC		
2	60	8218	9	<MDC		
3	60	8141	-1	<MDC		
4	60	8155	1	<MDC		
5	60	8052	-12	<MDC		
6	60	8116	-4	<MDC		
7	60	8148	0	<MDC		
8	60	8163	2	<MDC		
9	60	8205	7	<MDC		
10	60	7862	-36	<MDC		
11	60	8198	6	<MDC		
12	60	8246	12	<MDC		
13	60	8162	2	<MDC		
14	60	8122	-3	<MDC		
15	60	8138	-1	<MDC		
16	60	8299	19	<MDC		
17	60	8229	10	<MDC		
18	60	8053	-12	<MDC		
19	60	8252	13	<MDC		
20	60	8155	1	<MDC		
21	60	8099	-6	<MDC		
22	60	8119	-4	<MDC		
23	60	8171	3	<MDC		

$$* MDC_{(Depleted Uranium)} = \frac{3 + 4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$$K = Efficiency(cpm / dpm)$$

$$T = Time(\text{minutes})$$

$$MDC_{(Depleted Uranium)} = \frac{3 + 4.65\sqrt{8147}}{(.13)(60)} = 53 dpm / 100 cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$* Counting - Efficiency : \frac{[counts(source) - counts(background)]}{[source(d/m)][Counting Time(t)]}$$

$$* Counting - Efficiency - (Depleted Uranium): \frac{[1761049 - 8147)]}{[221320][60]} = 13\%$$

Alpha Wipe Test Counting Data – Building 00005, Rooms 1644 & 1646

Table 5.8 Alpha Wipe Data Building 00005, Rooms 1644 & 1646

Sample Number	Time Count (minutes)	Alpha Counts	Activity (dpm/100cm^2)	Isotope	Efficiency U-238 c/d	MDC (dpm/100cm^2)
Background	10	35	n/a	n/a	25%	12
U-238 Source Counts	10	249	87	U-238		
1	10	30	-2	<MDC		
2	10	36	0	<MDC		
3	10	35	0	<MDC		
4	10	34	0	<MDC		
5	10	50	6	<MDC		
6	10	31	-2	<MDC		
7	10	42	3	<MDC		
8	10	38	1	<MDC		
9	10	37	1	<MDC		
10	10	33	-1	<MDC		
11	10	51	6	<MDC		
12	10	43	3	<MDC		
13	10	35	0	<MDC		
14	10	35	0	<MDC		
15	10	39	2	<MDC		
16	10	43	3	<MDC		
17	10	37	1	<MDC		
18	10	34	0	<MDC		
19	10	35	0	<MDC		
20	10	41	2	<MDC		
21	10	29	-2	<MDC		
22	10	33	-1	<MDC		
23	10	38	1	<MDC		

$$* \; MDC_{(Alpha)} = \frac{3 + 4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$K = Efficiency\ (cpm / dpm)$

$T = Time\ (\text{minutes})$

$$MDC_{(Alpha)} = \frac{3 + 4.65\sqrt{35}}{(.25)(10)} = 12 dpm/100cm^2$$

Gamma Wipe Test Counting Data – Building 01124

Table 5.9 Gamma Wipe Data Building 01124

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
1	30	4072	-60	<MDC		
2	30	4342	36	<MDC		
3	30	4258	6	<MDC		
4	30	4308	24	<MDC		
5	30	4249	3	<MDC		
6	30	4280	14	<MDC		
7	30	4262	8	<MDC		
8	30	4220	-7	<MDC		
9	30	4228	-4	<MDC		
10	30	4226	-5	<MDC		
11	30	4226	-5	<MDC		

$$* MDC_{(Depleted\,Uranium)} = \frac{3 + 4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$K = Efficiency(cpm / dpm)$

$T = Time(\text{minutes})$

$$MDC_{(Depleted\,Uranium)} = \frac{3 + 4.65\sqrt{4240}}{(.09)(30)} = 109 dpm / 100cm^2$$

$$* Counting - Efficiency :$$

$$\frac{[counts(source) - counts(background)]}{[source(d/m)][Counting\,Time(t)]}$$

$$* Counting - Efficiency - (Depleted\,Uranium) :$$

$$\frac{[414508 - 4240]}{[146764][30]} = 9\%$$

Gamma Wipe Test Counting Data – Building 01389

Table 5.10 Gamma Wipe Data Building 01389

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
1	30	4240	0	<MDC		
2	30	4242	1	<MDC		
3	30	4394	55	<MDC		
4	30	4135	-38	<MDC		
5	30	4307	24	<MDC		
6	30	4203	-13	<MDC		
7	30	4291	18	<MDC		
8	30	4210	-11	<MDC		
9	30	4194	-16	<MDC		
10	30	4225	-5	<MDC		
11	30	4194	-16	<MDC		
12	30	4183	-20	<MDC		
13	30	4228	-4	<MDC		
14	30	4209	-11	<MDC		
15	30	4250	4	<MDC		
16	30	4188	-19	<MDC		
17	30	4208	-11	<MDC		
18	30	4261	8	<MDC		
19	30	4201	-14	<MDC		
20	30	4291	18	<MDC		
21	30	4258	6	<MDC		
22	30	4163	-28	<MDC		
23	30	4240	0	<MDC		
24	30	4183	-20	<MDC		
25	30	4258	6	<MDC		
26	30	4268	10	<MDC		
27	30	4304	23	<MDC		
28	30	4278	14	<MDC		
29	30	4355	41	<MDC		
30	30	4101	-50	<MDC		

$$* MDC_{(Depleted Uranium)} = \frac{3 + 4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$$K = Efficiency(cpm / dpm)$$

$$T = Time(\text{minutes})$$

$$MDC_{(Depleted Uranium)} = \frac{3 + 4.65\sqrt{4240}}{(.09)(30)} = 109 dpm / 100cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$* Counting - Efficiency : \frac{[counts(source) - counts(background)]}{[source(d/m)][Counting Time(t)]}$$

$$* Counting - Efficiency - (Depleted Uranium) : \frac{[(414508 - 4240)]}{[146764][30]} = 9\%$$

Gamma Wipe Test Counting Data – Building 03882

Table 5.11 Gamma Wipe Data Building 03882

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
1	30	4201	-14	<MDC		
2	30	4272	11	<MDC		
3	30	4147	-33	<MDC		
4	30	4248	3	<MDC		
5	30	4302	22	<MDC		
6	30	4247	3	<MDC		
7	30	4298	21	<MDC		
8	30	4293	19	<MDC		
9	30	4350	39	<MDC		
10	30	4148	-33	<MDC		
11	30	4227	-5	<MDC		
12	30	4268	10	<MDC		
13	30	4261	8	<MDC		
14	30	4256	6	<MDC		
15	30	4174	-24	<MDC		
16	30	4285	16	<MDC		
17	30	4286	16	<MDC		
18	30	4264	9	<MDC		
19	30	4232	-3	<MDC		
20	30	4161	-28	<MDC		
21	30	4282	15	<MDC		
22	30	4279	14	<MDC		
23	30	4185	-20	<MDC		
24	30	4124	-41	<MDC		

$$* \, MDC_{(Depleted\,Uranium)} = \frac{3 + 4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$K = Efficiency(cpm / dpm)$

$T = Time(\text{minutes})$

$$MDC_{(Depleted\,Uranium)} = \frac{3 + 4.65\sqrt{4240}}{(.09)(30)} = 109 dpm / 100cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$* \, Counting - Efficiency :$$

$$\frac{[counts(source) - counts(background)]}{[source(d/m)][Counting\,Time(t)]}$$

$$* \, Counting - Efficiency - (Depleted\,Uranium) :$$

$$\frac{[414508 - 4240]}{[146764][30]} = 9\%$$

Gamma Wipe Test Counting Data – Building 15560

Table 5.12 Gamma Wipe Data Building 15560

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	60	8147	n/a	n/a	9%	75
Depleted Uranium Source Counts	60	832587	146764	DU		
1	60	7993	-27	<MDC		
2	60	8055	-16	<MDC		
3	60	7924	-40	<MDC		
4	60	8131	-3	<MDC		
5	60	8248	18	<MDC		
6	60	8052	-17	<MDC		
7	60	8051	-17	<MDC		
8	60	8062	-15	<MDC		
9	60	8083	-11	<MDC		
10	60	8132	-3	<MDC		
11	60	7984	-29	<MDC		
12	60	8162	3	<MDC		
13	60	8197	9	<MDC		
14	60	8170	4	<MDC		
15	60	8197	9	<MDC		
16	60	8245	17	<MDC		
17	60	8288	25	<MDC		
18	60	8154	1	<MDC		
19	60	8157	2	<MDC		
20	60	8231	15	<MDC		
21	60	8092	-10	<MDC		
22	60	8122	-4	<MDC		
23	60	8124	-4	<MDC		
24	60	8358	38	<MDC		
25	60	7990	-28	<MDC		
26	60	8145	0	<MDC		
27	60	8122	-4	<MDC		
28	60	8278	23	<MDC		
29	60	8086	-11	<MDC		
30	60	8098	-9	<MDC		
31	60	8258	20	<MDC		
32	60	8063	-15	<MDC		
33	60	8275	23	<MDC		
34	60	8321	31	<MDC		
35	60	8151	1	<MDC		
36	60	8120	-5	<MDC		
37	60	8061	-15	<MDC		
38	60	8221	13	<MDC		
39	60	8198	9	<MDC		
40	60	8230	15	<MDC		

$$*\ MDC_{(Depleted\,Uranium)} = \frac{3+4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$$K = Efficiency(cpm/dpm)$$

$$T = Time(\text{minutes})$$

$$MDC_{(Depleted\,Uranium)} = \frac{3+4.65\sqrt{8147}}{(.09)(60)} = 75 dpm/100cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$*\ Counting - Efficiency:$$

$$\frac{[counts(source) - counts(background)]}{[source(d/m)][Counting\,Time(t)]}$$

$$*\ Counting - Efficiency - (Depleted\,Uranium):$$

$$\frac{[832587 - 8147]}{[146764][60]} = 9\%$$

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	60	8147	n/a	n/a	9%	75
Depleted Uranium Source Counts	60	832587	146764	DU		
41	60	8208	11	<MDC		
42	60	8096	-9	<MDC		
43	60	8212	12	<MDC		
44	60	8078	-12	<MDC		
45	60	8170	4	<MDC		
46	60	8203	10	<MDC		
47	60	8001	-26	<MDC		
48	60	8273	22	<MDC		
49	60	8273	22	<MDC		
50	60	8235	16	<MDC		
51	60	8237	16	<MDC		
52	60	7952	-35	<MDC		
53	60	8181	6	<MDC		
54	60	8354	37	<MDC		
55	60	8171	4	<MDC		
56	60	8083	-11	<MDC		
57	60	8078	-12	<MDC		
58	60	7856	-52	<MDC		
59	60	8044	-18	<MDC		
60	60	8077	-12	<MDC		
61	60	8030	-21	<MDC		
62	60	8130	-3	<MDC		
63	60	8038	-19	<MDC		
64	60	8121	-5	<MDC		
65	60	8102	-8	<MDC		
66	60	8224	14	<MDC		
67	60	8195	9	<MDC		
68	60	8242	17	<MDC		
69	60	8267	21	<MDC		
70	60	8074	-13	<MDC		
71	60	8066	-14	<MDC		
72	60	8123	-4	<MDC		
73	60	8106	-7	<MDC		
74	60	8124	-4	<MDC		
75	60	8089	-10	<MDC		
76	60	7961	-33	<MDC		
77	60	8099	-9	<MDC		
78	60	8017	-23	<MDC		
79	60	8280	24	<MDC		
80	60	8056	-16	<MDC		
81	60	8168	4	<MDC		
82	60	8175	5	<MDC		
83	60	7984	-29	<MDC		
84	60	7910	-42	<MDC		

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	60	8147	n/a	n/a	9%	75
Depleted Uranium Source Counts	60	832587	146764	DU		
85	60	8067	-14	<MDC		
86	60	8105	-7	<MDC		
87	60	8000	-26	<MDC		
88	60	8211	11	<MDC		
89	60	7985	-29	<MDC		
90	60	8015	-23	<MDC		
91	60	7987	-28	<MDC		
92	60	8056	-16	<MDC		
93	60	8138	-2	<MDC		
94	60	7943	-36	<MDC		
95	60	8138	-2	<MDC		
96	60	8056	-16	<MDC		
97	60	7964	-33	<MDC		
98	60	8057	-16	<MDC		
99	60	8072	-13	<MDC		
100	60	8047	-18	<MDC		
101	60	8038	-19	<MDC		
102	60	8514	65	<MDC		
103	60	8148	0	<MDC		
104	60	8285	25	<MDC		
105	60	8202	10	<MDC		
106	60	8276	23	<MDC		
107	60	8141	-1	<MDC		
108	60	8040	-19	<MDC		
109	60	8211	11	<MDC		
110	60	8102	-8	<MDC		
111	60	8200	9	<MDC		
112	60	8145	0	<MDC		
113	60	8209	11	<MDC		
114	60	8006	-25	<MDC		
115	60	8056	-16	<MDC		
116	60	8182	6	<MDC		
117	60	7941	-37	<MDC		
118	60	8158	2	<MDC		
119	60	8052	-17	<MDC		
120	60	8214	12	<MDC		

Gamma Wipe Test Counting Data – Building 15570

Table 5.13 Gamma Wipe Data Building 15570

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
1	30	4164	-27	<MDC		
2	30	4217	-8	<MDC		
3	30	4322	29	<MDC		
4	30	4099	-50	<MDC		
5	30	4281	15	<MDC		
6	30	4218	-8	<MDC		
7	30	4231	-3	<MDC		
8	30	4223	-6	<MDC		

$$* \, MDC_{(Depleted\,Uranium)} = \frac{3 + 4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$$K = Efficiency(cpm / dpm)$$

$$T = Time(\text{minutes})$$

$$MDC_{(Depleted\,Uranium)} = \frac{3 + 4.65\sqrt{4240}}{(.09)(30)} = 109 dpm / 100cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$* \, Counting - Efficiency:$$

$$\frac{[counts(source) - counts(background)]}{[source(d/m)][Counting\,Time(t)]}$$

$$* \, Counting - Efficiency - (Depleted\,Uranium):$$

$$\frac{[414508 - 4240]}{[146764][30]} = 9\%$$

Gamma Wipe Test Counting Data – Building 15510

Table 5.14 Gamma Wipe Data Building 15510

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	60	8147	n/a	n/a	9%	75
Depleted Uranium Source Counts	60	832587	146764	DU		
1	60	8171	4	<MDC		
2	60	8142	-1	<MDC		
3	60	8045	-18	<MDC		
4	60	7989	-28	<MDC		
5	60	8085	-11	<MDC		
6	60	8126	-4	<MDC		
7	60	8084	-11	<MDC		
8	60	8122	-4	<MDC		
9	60	8148	0	<MDC		
10	60	8009	-25	<MDC		
11	60	8127	-4	<MDC		
12	60	8113	-6	<MDC		
13	60	8076	-13	<MDC		
14	60	8291	26	<MDC		
15	60	8104	-8	<MDC		
16	60	8055	-16	<MDC		
17	60	8061	-15	<MDC		
18	60	7944	-36	<MDC		
19	60	8170	4	<MDC		
20	60	8070	-14	<MDC		
21	60	8077	-12	<MDC		
22	60	7853	-52	<MDC		
23	60	8108	-7	<MDC		
24	60	8220	13	<MDC		
25	60	8159	2	<MDC		
26	60	8100	-8	<MDC		
27	60	8175	5	<MDC		
28	60	8001	-26	<MDC		
29	60	7972	-31	<MDC		
30	60	8156	2	<MDC		
31	60	8010	-24	<MDC		
32	60	7995	-27	<MDC		
33	60	7996	-27	<MDC		
34	60	8155	1	<MDC		
35	60	8353	37	<MDC		
36	60	8088	-11	<MDC		
37	60	8153	1	<MDC		
38	60	8279	23	<MDC		
39	60	8071	-14	<MDC		

$$* MDC_{(Depleted Uranium)} = \frac{3 + 4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$K = Efficiency(cpm / dpm)$

$T = Time(\text{minutes})$

$$MDC_{(Depleted Uranium)} = \frac{3 + 4.65\sqrt{8147}}{(.09)(60)} = 75 dpm / 100 cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$* Counting - Efficiency : \frac{[counts(source) - counts(background)]}{[source(d/m)][Counting Time(t)]}$$

$$* Counting - Efficiency - (Depleted Uranium) : \frac{[832587 - 8147]}{[146764][60]} = 09\%$$

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	60	8147	n/a	n/a	9%	75
Depleted Uranium Source Counts	60	832587	146764	DU		
40	60	8199	9	<MDC		
41	60	8110	-7	<MDC		
42	60	8205	10	<MDC		
43	60	8056	-16	<MDC		
44	60	8060	-15	<MDC		
45	60	8137	-2	<MDC		
46	60	8278	23	<MDC		
47	60	8083	-11	<MDC		
48	60	8054	-17	<MDC		
49	60	8163	3	<MDC		
50	60	8186	7	<MDC		
51	60	8135	-2	<MDC		
52	60	8191	8	<MDC		
53	60	8206	11	<MDC		
54	60	8198	9	<MDC		
55	60	8245	17	<MDC		
56	60	8207	11	<MDC		
57	60	8096	-9	<MDC		
58	60	8111	-6	<MDC		
59	60	8184	7	<MDC		
60	60	7906	-43	<MDC		
61	60	8116	-6	<MDC		
62	60	8116	-6	<MDC		
63	60	8169	4	<MDC		
64	60	7999	-26	<MDC		
65	60	8222	13	<MDC		
66	60	8132	-3	<MDC		
67	60	8148	0	<MDC		
68	60	8182	6	<MDC		
69	60	8136	-2	<MDC		
70	60	8116	-6	<MDC		
71	60	7962	-33	<MDC		
72	60	8227	14	<MDC		
73	60	8261	20	<MDC		
74	60	8146	0	<MDC		
75	60	8147	0	<MDC		
76	60	8303	28	<MDC		
77	60	8167	4	<MDC		
78	60	8130	-3	<MDC		
79	60	8183	6	<MDC		
80	60	8099	-9	<MDC		
81	60	8232	15	<MDC		
82	60	8099	-9	<MDC		
83	60	8260	20	<MDC		

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	60	8147	n/a	n/a	9%	75
Depleted Uranium Source Counts	60	832587	146764	DU		
84	60	8165	3	<MDC		
85	60	8041	-19	<MDC		
86	60	8117	-5	<MDC		
87	60	8175	5	<MDC		
88	60	8041	-19	<MDC		
89	60	8089	-10	<MDC		
90	60	8266	21	<MDC		
91	60	8222	13	<MDC		
92	60	8153	1	<MDC		
93	60	8044	-18	<MDC		
94	60	8175	5	<MDC		
95	60	8263	21	<MDC		
96	60	8123	-4	<MDC		
97	60	8132	-3	<MDC		
98	60	8150	1	<MDC		
99	60	7938	-37	<MDC		
100	60	8059	-16	<MDC		
101	60	8070	-14	<MDC		
102	60	8062	-15	<MDC		
103	60	8211	11	<MDC		
104	60	7904	-43	<MDC		
105	60	8139	-1	<MDC		
106	60	8181	6	<MDC		
107	60	8185	7	<MDC		
108	60	8215	12	<MDC		
109	60	8022	-22	<MDC		
110	60	8072	-13	<MDC		
111	60	8006	-25	<MDC		
112	60	8006	-25	<MDC		
113	60	8210	11	<MDC		
114	60	8223	14	<MDC		
115	60	8098	-9	<MDC		
116	60	7989	-28	<MDC		
117	60	8158	2	<MDC		
118	60	8184	7	<MDC		
119	60	8095	-9	<MDC		
120	60	8135	-2	<MDC		

Gamma Wipe Test Counting Data – Building 13100

Table 5.15 Gamma Wipe Data Building 13100

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
1	30	4108	-47	<MDC		
2	30	4140	-36	<MDC		
3	30	4181	-21	<MDC		
4	30	4056	-66	<MDC		
5	30	4111	-46	<MDC		
6	30	4034	-74	<MDC		
7	30	4019	-79	<MDC		
8	30	4182	-21	<MDC		
9	30	3990	-89	<MDC		
10	30	4060	-64	<MDC		
11	30	4248	3	<MDC		
12	30	4121	-43	<MDC		
13	30	4144	-34	<MDC		
14	30	4198	-15	<MDC		
15	30	4066	-62	<MDC		
16	30	4149	-33	<MDC		
17	30	4018	-79	<MDC		
18	30	3987	-91	<MDC		
19	30	4185	-20	<MDC		
20	30	4145	-34	<MDC		
21	30	4020	-79	<MDC		
22	30	4152	-31	<MDC		
23	30	4066	-62	<MDC		
24	30	4042	-71	<MDC		
25	30	4138	-36	<MDC		
26	30	4127	-40	<MDC		
27	30	4042	-71	<MDC		
28	30	4011	-82	<MDC		
29	30	4012	-82	<MDC		
30	30	4224	-6	<MDC		
31	30	4078	-58	<MDC		
32	30	4054	-67	<MDC		
33	30	4148	-33	<MDC		
34	30	4123	-42	<MDC		
35	30	4157	-30	<MDC		
36	30	4083	-56	<MDC		
37	30	4175	-23	<MDC		
38	30	4206	-12	<MDC		
39	30	4342	36	<MDC		
40	30	4330	32	<MDC		
41	30	4313	26	<MDC		
42	30	4359	43	<MDC		
43	30	4248	3	<MDC		
44	30	4332	33	<MDC		

$$* \ MDC_{(Depleted\,Uranium)} = \frac{3 + 4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$$K = Efficiency(cpm/dpm)$$

$$T = Time(\text{minutes})$$

$$MDC_{(Depleted\,Uranium)} = \frac{3 + 4.65\sqrt{4240}}{(.09)(30)} = 109 dpm/100cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$*Counting - Efficiency: \frac{[counts(source) - counts(background)]}{[source(d/m)][Counting\,Time(t)]}$$

$$*Counting - Efficiency - (Depleted\,Uranium): \frac{[414508 - 4240]}{[146764][30]} = 9\%$$

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
45	30	4219	-8	<MDC		
46	30	4246	2	<MDC		
47	30	4241	0	<MDC		
48	30	4235	-2	<MDC		
49	30	4281	15	<MDC		
50	30	4327	31	<MDC		
51	30	4362	44	<MDC		
52	30	4224	-6	<MDC		
53	30	4192	-17	<MDC		
54	30	4217	-8	<MDC		
55	30	4154	-31	<MDC		
56	30	4243	1	<MDC		
57	30	4212	-10	<MDC		
58	30	4149	-33	<MDC		
59	30	4186	-19	<MDC		
60	30	4250	4	<MDC		
61	30	4300	21	<MDC		
62	30	4291	18	<MDC		
63	30	4221	-7	<MDC		
64	30	4306	24	<MDC		
65	30	4282	15	<MDC		
66	30	4275	13	<MDC		
67	30	4269	10	<MDC		
68	30	4193	-17	<MDC		
69	30	4138	-36	<MDC		
70	30	4319	28	<MDC		

Gamma Wipe Test Counting Data – Building 13090

Table 5.16 Gamma Wipe Data Building 13090

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm²)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm²)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
1	30	4200	-14	<MDC		
2	30	4234	-2	<MDC		
3	30	4182	-21	<MDC		
4	30	4140	-36	<MDC		
5	30	4284	16	<MDC		
6	30	4196	-16	<MDC		
7	30	4281	15	<MDC		
8	30	4171	-25	<MDC		
9	30	4152	-31	<MDC		
10	30	4264	9	<MDC		
11	30	4259	7	<MDC		

$$* \ MDC_{(Depleted\,Uranium)} = \frac{3 + 4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$K = Efficiency(cpm / dpm)$

$T = Time(\text{minutes})$

$$MDC_{(Depleted\,Uranium)} = \frac{3 + 4.65\sqrt{4240}}{(.09)(30)} = 109 dpm / 100 cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$* \ Counting - Efficiency: \frac{[counts(source) - counts(background)]}{[source(d/m)][Counting\,Time(t)]}$$

$$* \ Counting - Efficiency - (Depleted\,Uranium): \frac{[414508 - 4240]}{[146764][30]} = 9\%$$

Gamma Wipe Test Counting Data – Building 13060

Table 5.17 Gamma Wipe Data Building 13060

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
1	30	4252	4	<MDC		
2	30	4201	-14	<MDC		
3	30	4223	-6	<MDC		
4	30	4140	-36	<MDC		
5	30	4151	-32	<MDC		
6	30	4280	14	<MDC		
7	30	4301	22	<MDC		
8	30	4227	-5	<MDC		
9	30	4223	-6	<MDC		
10	30	4275	13	<MDC		
11	30	4221	-7	<MDC		
12	30	4198	-15	<MDC		
13	30	4242	1	<MDC		
14	30	4241	0	<MDC		
15	30	4281	15	<MDC		
16	30	4257	6	<MDC		
17	30	4235	-2	<MDC		
18	30	4232	-3	<MDC		
19	30	4263	8	<MDC		
20	30	4327	31	<MDC		
21	30	4229	-4	<MDC		
22	30	4217	-8	<MDC		
23	30	4280	14	<MDC		
24	30	4120	-43	<MDC		
25	30	4209	-11	<MDC		
26	30	4225	-5	<MDC		
27	30	4163	-28	<MDC		
28	30	4277	13	<MDC		
29	30	4164	-27	<MDC		
30	30	4176	-23	<MDC		
31	30	4275	13	<MDC		
32	30	4097	-51	<MDC		
33	30	4272	11	<MDC		
34	30	4139	-36	<MDC		
35	30	4243	1	<MDC		
36	30	4174	-24	<MDC		
37	30	4219	-8	<MDC		
38	30	4221	-7	<MDC		
39	30	4169	-25	<MDC		

$$* MDC_{(Depleted Uranium)} = \frac{3 + 4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$K = Efficiency(cpm / dpm)$

$T = Time(\text{minutes})$

$$MDC_{(Depleted Uranium)} = \frac{3+4.65\sqrt{4240}}{(.09)(30)} = 109 dpm/100cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$* Counting - Efficiency : \frac{[counts(source) - counts(background)]}{[source(d/m)][Counting Time(t)]}$$

$$* Counting - Efficiency - (Depleted Uranium): \frac{[414508 - 4240]}{[146764][30]} = 9\%$$

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
40	30	4241	0	<MDC		
41	30	4139	-36	<MDC		
42	30	4079	-58	<MDC		
43	30	4085	-55	<MDC		
44	30	4139	-36	<MDC		
45	30	4242	1	<MDC		
46	30	4153	-31	<MDC		
47	30	4257	6	<MDC		
48	30	4104	-49	<MDC		
49	30	4273	12	<MDC		
50	30	4166	-26	<MDC		
51	30	4185	-20	<MDC		

Gamma Wipe Test Counting Data – Building 12520

Table 5.18 Gamma Wipe Data Building 12520

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
1	30	4313	26	<MDC		
2	30	4340	36	<MDC		
3	30	4159	-29	<MDC		
4	30	4324	30	<MDC		
5	30	4257	6	<MDC		
6	30	4164	-27	<MDC		
7	30	4240	0	<MDC		
8	30	4240	0	<MDC		
9	30	4321	29	<MDC		
10	30	4154	-31	<MDC		
11	30	4332	33	<MDC		
12	30	4182	-21	<MDC		
13	30	4296	20	<MDC		
14	30	4258	6	<MDC		
15	30	4128	-40	<MDC		
16	30	4278	14	<MDC		
17	30	4126	-41	<MDC		
18	30	4210	-11	<MDC		
19	30	4271	11	<MDC		
20	30	4286	16	<MDC		
21	30	4303	23	<MDC		
22	30	4218	-8	<MDC		
23	30	4189	-18	<MDC		
24	30	4278	14	<MDC		
25	30	4314	26	<MDC		
26	30	4245	2	<MDC		
27	30	4228	-4	<MDC		
28	30	4142	-35	<MDC		
29	30	4160	-29	<MDC		
30	30	4222	-6	<MDC		
31	30	4174	-24	<MDC		
32	30	4159	-29	<MDC		
33	30	4108	-47	<MDC		
34	30	4216	-9	<MDC		
35	30	4271	11	<MDC		
36	30	4224	-6	<MDC		
37	30	4276	13	<MDC		
38	30	4206	-12	<MDC		
39	30	4339	35	<MDC		

$$* MDC_{(Depleted Uranium)} = \frac{3+4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$K = Efficiency(cpm/dpm)$

$T = Time(\text{minutes})$

$$MDC_{(Depleted Uranium)} = \frac{3+4.65\sqrt{4240}}{(.09)(30)} = 109 dpm/100cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$*Counting-Efficiency: \frac{[counts(source)-counts(background)]}{[source(d/m)][Counting Time(t)]}$$

$$*Counting-Efficiency-(DepletedUranium): \frac{[414508-4240]}{[146764][30]} = 9\%$$

Gamma Wipe Test Counting Data – Building 12510

Table 5.19 Gamma Wipe Data Building 12510

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
1	30	4222	-6	<MDC		
2	30	4387	53	<MDC		
3	30	4198	-15	<MDC		
4	30	4238	-1	<MDC		
5	30	4220	-7	<MDC		
6	30	4144	-34	<MDC		
7	30	4229	-4	<MDC		
8	30	4121	-43	<MDC		
9	30	4221	-7	<MDC		
10	30	4099	-50	<MDC		
11	30	4230	-4	<MDC		
12	30	4328	31	<MDC		
13	30	4214	-9	<MDC		
14	30	4224	-6	<MDC		
15	30	4259	7	<MDC		
16	30	4230	-4	<MDC		
17	30	4157	-30	<MDC		
18	30	4304	23	<MDC		
19	30	4189	-18	<MDC		
20	30	4126	-41	<MDC		
21	30	4178	-22	<MDC		
22	30	4245	2	<MDC		
23	30	4173	-24	<MDC		
24	30	4308	24	<MDC		
25	30	4340	36	<MDC		

$$* MDC_{(Depleted\,Uranium)} = \frac{3+4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$$K = Efficiency(cpm / dpm)$$

$$T = Time(\text{minutes})$$

$$MDC_{(Depleted\,Uranium)} = \frac{3+4.65\sqrt{4240}}{(.09)(30)} = 109 dpm/100cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$* Counting - Efficiency : \frac{[counts(source) - counts(background)]}{[source(d/m)][Counting\,Time(t)]}$$

$$* Counting - Efficiency - (Depleted\,Uranium): \frac{[414508 - 4240]}{[146764][30]} = 9\%$$

Gamma Wipe Test Counting Data – Building 13470

Table 5.19 Gamma Wipe Data Building 13470

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
1	30	4136	-37	<MDC		
2	30	4186	-19	<MDC		
3	30	4221	-7	<MDC		
4	30	4196	-16	<MDC		
5	30	4238	-1	<MDC		
6	30	4319	28	<MDC		
7	30	4206	-12	<MDC		
8	30	4256	6	<MDC		
9	30	4205	-13	<MDC		
10	30	4153	-31	<MDC		
11	30	4260	7	<MDC		
12	30	4180	-21	<MDC		
13	30	4202	-14	<MDC		
14	30	4221	-7	<MDC		
15	30	4219	-8	<MDC		
16	30	4225	-5	<MDC		
17	30	4361	43	<MDC		
18	30	4237	-1	<MDC		
19	30	4265	9	<MDC		
20	30	4107	-48	<MDC		
21	30	4306	24	<MDC		
22	30	4328	31	<MDC		
23	30	4254	5	<MDC		
24	30	4219	-8	<MDC		
25	30	4281	15	<MDC		
26	30	4261	8	<MDC		
27	30	4281	15	<MDC		
28	30	4241	0	<MDC		
29	30	4329	32	<MDC		
30	30	4357	42	<MDC		
31	30	4192	-17	<MDC		
32	30	4269	10	<MDC		
33	30	4231	-3	<MDC		
34	30	4171	-25	<MDC		

$$* MDC_{(Depleted Uranium)} = \frac{3 + 4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$K = Efficiency(cpm/dpm)$

$T = Time(\text{minutes})$

$$MDC_{(Depleted Uranium)} = \frac{3 + 4.65\sqrt{4240}}{(.09)(30)} = 109 dpm/100cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$* Counting - Efficiency: \frac{[counts(source) - counts(background)]}{[source(d/m)][Counting Time(t)]}$$

$$* Counting - Efficiency - (Depleted Uranium): \frac{[414508 - 4240]}{[146764][30]} = 9\%$$

Gamma Wipe Test Counting Data – Building 11640

Table 5.20 Gamma Wipe Data Building 11640

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
1	30	4300	21	<MDC		
2	30	4227	-5	<MDC		
3	30	4241	0	<MDC		
4	30	4272	11	<MDC		
5	30	4100	-50	<MDC		
6	30	4252	4	<MDC		
7	30	4306	24	<MDC		
8	30	4241	0	<MDC		
9	30	4223	-6	<MDC		
10	30	4178	-22	<MDC		
11	30	4211	-10	<MDC		
12	30	4258	6	<MDC		
13	30	4342	36	<MDC		
14	30	4316	27	<MDC		
15	30	4158	-29	<MDC		
16	30	4272	11	<MDC		
17	30	4220	-7	<MDC		
18	30	4166	-26	<MDC		
19	30	4182	-21	<MDC		
20	30	4317	28	<MDC		

$$* MDC_{(Depleted\,Uranium)} = \frac{3 + 4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$$K = Efficiency(cpm/dpm)$$

$$T = Time(\text{minutes})$$

$$MDC_{(Depleted\,Uranium)} = \frac{3+4.65\sqrt{4240}}{(.09)(30)} = 109 dpm/100cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$* Counting - Efficiency:$$

$$\frac{[counts(source) - counts(background)]}{[source(d/m)][Counting\,Time(t)]}$$

$$* Counting - Efficiency - (Depleted\,Uranium):$$

$$\frac{[414508 - 4240]}{[146764][30]} = 9\%$$

Gamma Wipe Test Counting Data – Building 10634

Table 5.21 Gamma Wipe Data Building 10634

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	60	8147	n/a	n/a	9%	75
Depleted Uranium Source Counts	60	832587	146764	DU		
1	60	8154	1	<MDC		
2	60	8192	8	<MDC		
3	60	8250	18	<MDC		
4	60	8183	6	<MDC		
5	60	7970	-32	<MDC		
6	60	8211	11	<MDC		
7	60	8160	2	<MDC		
8	60	8200	9	<MDC		
9	60	8157	2	<MDC		
10	60	8120	-5	<MDC		
11	60	8024	-22	<MDC		
12	60	8010	-24	<MDC		
13	60	8069	-14	<MDC		
14	60	8019	-23	<MDC		
15	60	8081	-12	<MDC		
16	60	8267	21	<MDC		
17	60	8156	2	<MDC		
18	60	7970	-32	<MDC		
19	60	8104	-8	<MDC		
20	60	8336	34	<MDC		
21	60	8095	-9	<MDC		
22	60	8247	18	<MDC		
23	60	7998	-27	<MDC		
24	60	8016	-23	<MDC		
25	60	8062	-15	<MDC		
26	60	8092	-10	<MDC		
27	60	7976	-30	<MDC		
28	60	8220	13	<MDC		
29	60	8048	-18	<MDC		
30	60	8165	3	<MDC		
31	60	8282	24	<MDC		
32	60	8226	14	<MDC		
33	60	8089	-10	<MDC		
34	60	8059	-16	<MDC		

$$* MDC_{(Depleted\,Uranium)} = \frac{3+4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$$K = Efficiency(cpm/dpm)$$

$$T = Time(\text{minutes})$$

$$MDC_{(Depleted\,Uranium)} = \frac{3+4.65\sqrt{8147}}{(.09)(60)} = 75 dpm/100cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$* Counting - Efficiency: \frac{[counts(source) - counts(background)]}{[source(d/m)][Counting\,Time(t)]}$$

$$* Counting - Efficiency - (Depleted\,Uranium): \frac{[832587-8147]}{[146764][60]} = 9\%$$

Gamma Wipe Test Counting Data – Building 10630

Table 5.22 Gamma Wipe Data Building 10630

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
1	30	4228	-4	<MDC		
2	30	4283	15	<MDC		
3	30	4199	-15	<MDC		
4	30	4207	-12	<MDC		
5	30	4175	-23	<MDC		
6	30	4270	11	<MDC		
7	30	4368	46	<MDC		
8	30	4349	39	<MDC		
9	30	4162	-28	<MDC		
10	30	4244	1	<MDC		
11	30	4230	-4	<MDC		
12	30	4167	-26	<MDC		
13	30	4220	-7	<MDC		
14	30	4229	-4	<MDC		
15	30	4140	-36	<MDC		
16	30	4027	-76	<MDC		
17	30	4208	-11	<MDC		
18	30	4139	-36	<MDC		
19	30	4221	-7	<MDC		
20	30	4260	7	<MDC		
21	30	4238	-1	<MDC		
22	30	4163	-28	<MDC		
23	30	4242	1	<MDC		
24	30	4229	-4	<MDC		
25	30	4226	-5	<MDC		
26	30	4184	-20	<MDC		
27	30	4145	-34	<MDC		
28	30	4249	3	<MDC		
29	30	4201	-14	<MDC		
30	30	4213	-10	<MDC		
31	30	4138	-36	<MDC		
32	30	4315	27	<MDC		
33	30	4221	-7	<MDC		
34	30	4275	13	<MDC		
35	30	4208	-11	<MDC		
36	30	4196	-16	<MDC		
37	30	4094	-52	<MDC		
38	30	4242	1	<MDC		
39	30	4274	12	<MDC		
40	30	4292	19	<MDC		

$$* MDC_{(Depleted Uranium)} = \frac{3 + 4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$K = Efficiency(cpm / dpm)$

$T = Time(\text{minutes})$

$$MDC_{(Depleted Uranium)} = \frac{3 + 4.65\sqrt{4240}}{(.09)(30)} = 109 dpm / 100 cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$* Counting - Efficiency : \frac{[counts(source) - counts(background)]}{[source(d/m)][Counting Time(t)]}$$

$$* Counting - Efficiency - (Depleted Uranium) : \frac{[414508 - 4240]}{[146764][30]} = 9\%$$

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
41	30	4224	-6	<MDC		
42	30	4215	-9	<MDC		
43	30	4056	-66	<MDC		
44	30	4230	-4	<MDC		
45	30	4237	-1	<MDC		
46	30	4238	-1	<MDC		
47	30	4222	-6	<MDC		
48	30	4206	-12	<MDC		
49	30	4152	-31	<MDC		
50	30	4244	1	<MDC		
51	30	4232	-3	<MDC		
52	30	4219	-8	<MDC		
53	30	4071	-60	<MDC		
54	30	4202	-14	<MDC		
55	30	4089	-54	<MDC		
56	30	4191	-18	<MDC		
57	30	4265	9	<MDC		
58	30	4233	-3	<MDC		
59	30	4155	-30	<MDC		
60	30	4238	-1	<MDC		
61	30	4281	15	<MDC		
62	30	4141	-35	<MDC		
63	30	4256	6	<MDC		
64	30	4285	16	<MDC		
65	30	4179	-22	<MDC		
66	30	4302	22	<MDC		
67	30	4175	-23	<MDC		
68	30	4448	74	<MDC		
69	30	4281	15	<MDC		
70	30	4209	-11	<MDC		
71	30	4159	-29	<MDC		
72	30	4211	-10	<MDC		
73	30	4226	-5	<MDC		
74	30	4283	15	<MDC		
75	30	4239	0	<MDC		
76	30	4333	33	<MDC		
77	30	4215	-9	<MDC		
78	30	4269	10	<MDC		
79	30	4206	-12	<MDC		
80	30	4309	25	<MDC		
81	30	4247	3	<MDC		
82	30	4306	24	<MDC		
83	30	4243	1	<MDC		
84	30	4314	26	<MDC		

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
85	30	4157	-30	<MDC		
86	30	4252	4	<MDC		
87	30	4294	19	<MDC		
88	30	4225	-5	<MDC		
89	30	4257	6	<MDC		
90	30	4209	-11	<MDC		
91	30	4176	-23	<MDC		
92	30	4160	-29	<MDC		
93	30	4258	6	<MDC		
94	30	4313	26	<MDC		
95	30	4299	21	<MDC		
96	30	4322	29	<MDC		
97	30	4223	-6	<MDC		
98	30	4232	-3	<MDC		
99	30	4183	-20	<MDC		
100	30	4177	-23	<MDC		
101	30	4173	-24	<MDC		

Gamma Wipe Test Counting Data – Building 10562

Table 5.23 Gamma Wipe Data Building 10562

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
1	30	4067	-62	<MDC		
2	30	4147	-33	<MDC		
3	30	4214	-9	<MDC		
4	30	4142	-35	<MDC		
5	30	4063	-63	<MDC		
6	30	4166	-26	<MDC		
7	30	4233	-3	<MDC		
8	30	4250	4	<MDC		
9	30	4101	-50	<MDC		
10	30	4194	-16	<MDC		
11	30	4297	20	<MDC		
12	30	4238	-1	<MDC		
13	30	4202	-14	<MDC		

$$* \, MDC_{(Depleted\,Uranium)} = \frac{3+4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$$K = Efficiency(cpm/dpm)$$

$$T = Time(\text{minutes})$$

$$MDC_{(Depleted\,Uranium)} = \frac{3+4.65\sqrt{4240}}{(.09)(30)} = 109\,dpm/100cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$* \, Counting - Efficiency: \frac{[counts(source) - counts(background)]}{[source(d/m)][Counting\,Time(t)]}$$

$$* \, Counting - Efficiency - (Depleted\,Uranium): \frac{[414508 - 4240]}{[146764][30]} = 9\%$$

Gamma Wipe Test Counting Data – Building 10540

Table 5.24 Gamma Wipe Data Building 10540

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
1	30	4148	-33	<MDC		
2	30	4201	-14	<MDC		
3	30	4153	-31	<MDC		
4	30	4160	-29	<MDC		
5	30	4256	6	<MDC		
6	30	4245	2	<MDC		
7	30	4275	13	<MDC		
8	30	4171	-25	<MDC		
9	30	4320	29	<MDC		
10	30	4239	0	<MDC		
11	30	4239	0	<MDC		
12	30	4240	0	<MDC		
13	30	4161	-28	<MDC		
14	30	4300	21	<MDC		
15	30	4135	-38	<MDC		
16	30	4192	-17	<MDC		
17	30	4240	0	<MDC		
18	30	4216	-9	<MDC		
19	30	4324	30	<MDC		
20	30	4226	-5	<MDC		
21	30	4313	26	<MDC		
22	30	4162	-28	<MDC		
23	30	4283	15	<MDC		
24	30	4254	5	<MDC		
25	30	4151	-32	<MDC		
26	30	4323	30	<MDC		
27	30	4329	32	<MDC		
28	30	4143	-35	<MDC		
29	30	4242	1	<MDC		
30	30	4204	-13	<MDC		
31	30	4181	-21	<MDC		
32	30	4212	-10	<MDC		
33	30	4287	17	<MDC		
34	30	4241	0	<MDC		
35	30	4149	-33	<MDC		
36	30	4216	-9	<MDC		
37	30	4278	14	<MDC		
38	30	4139	-36	<MDC		
39	30	4248	3	<MDC		

$$* MDC_{(Depleted\,Uranium)} = \frac{3 + 4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$$K = Efficiency(cpm / dpm)$$

$$T = Time(\text{minutes})$$

$$MDC_{(Depleted\,Uranium)} = \frac{3 + 4.65\sqrt{4240}}{(.09)(30)} = 109 dpm / 100 cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$* Counting - Efficiency:$$

$$\frac{[counts(source) - counts(background)]}{[source(d/m)][Counting\,Time(t)]}$$

$$* Counting - Efficiency - (Depleted\,Uranium):$$

$$\frac{[414508 - 4240]}{[146764][30]} = 9\%$$

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
40	30	4363	44	<MDC		
41	30	4126	-41	<MDC		
42	30	4355	41	<MDC		
43	30	4202	-14	<MDC		
44	30	4205	-13	<MDC		

Gamma Wipe Test Counting Data – Building 10522

Table 5.25 Gamma Wipe Data Building 10522

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
1	30	4189	-18	<MDC		
2	30	4257	6	<MDC		
3	30	4355	41	<MDC		
4	30	4232	-3	<MDC		
5	30	4280	14	<MDC		
6	30	4252	4	<MDC		
7	30	4279	14	<MDC		
8	30	4203	-13	<MDC		
9	30	4240	0	<MDC		
10	30	4307	24	<MDC		
11	30	4231	-3	<MDC		
12	30	4168	-26	<MDC		
13	30	4240	0	<MDC		
14	30	4177	-23	<MDC		
15	30	4188	-19	<MDC		
16	30	4152	-31	<MDC		
17	30	4254	5	<MDC		
18	30	4249	3	<MDC		

$$* MDC_{(Depleted\,Uranium)} = \frac{3+4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$$K = Efficiency(cpm/dpm)$$

$$T = Time(\text{minutes})$$

$$MDC_{(Depleted\,Uranium)} = \frac{3+4.65\sqrt{4240}}{(.09)(30)} = 109 dpm/100cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$*Counting - Efficiency: \frac{[counts(source) - counts(background)]}{[source(d/m)][Counting\,Time(t)]}$$

$$*Counting - Efficiency - (Depleted\,Uranium): \frac{[414508-4240]}{[146764][30]} = 9\%$$

Gamma Wipe Test Counting Data – Building 10518

Table 5.26 Gamma Wipe Data Building 10518

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
1	30	4157	-30	<MDC		
2	30	4247	3	<MDC		
3	30	4312	26	<MDC		
4	30	4140	-36	<MDC		
5	30	4295	20	<MDC		
6	30	4263	8	<MDC		
7	30	4159	-29	<MDC		
8	30	4249	3	<MDC		
9	30	4236	-1	<MDC		
10	30	4231	-3	<MDC		
11	30	4247	3	<MDC		
12	30	4301	22	<MDC		
13	30	4085	-55	<MDC		
14	30	4280	14	<MDC		
15	30	4178	-22	<MDC		
16	30	4224	-6	<MDC		
17	30	4303	23	<MDC		
18	30	4203	-13	<MDC		
19	30	4166	-26	<MDC		
20	30	4199	-15	<MDC		
21	30	4275	13	<MDC		
22	30	4245	2	<MDC		
23	30	4152	-31	<MDC		
24	30	4299	21	<MDC		
25	30	4256	6	<MDC		

$$* MDC_{(Depleted Uranium)} = \frac{3 + 4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$K = Efficiency(cpm / dpm)$

$T = Time(\text{minutes})$

$$MDC_{(Depleted Uranium)} = \frac{3 + 4.65\sqrt{4240}}{(.09)(30)} = 109 dpm / 100 cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$* Counting - Efficiency :$$

$$\frac{[counts(source) - counts(background)]}{[source(d/m)][Counting Time(t)]}$$

$$* Counting - Efficiency - (Depleted Uranium):$$

$$\frac{[414508 - 4240]}{[146764][30]} = 9\%$$

Gamma Wipe Test Counting Data – Building 31123

Table 5.27 Gamma Wipe Data Building 31123

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
1	30	4357	42	<MDC		
2	30	4418	64	<MDC		
3	30	4122	-42	<MDC		
4	30	4137	-37	<MDC		
5	30	4282	15	<MDC		
6	30	4217	-8	<MDC		
7	30	4241	0	<MDC		
8	30	4202	-14	<MDC		
9	30	4244	1	<MDC		
10	30	4220	-7	<MDC		
11	30	4252	4	<MDC		
12	30	4179	-22	<MDC		
13	30	4189	-18	<MDC		
14	30	4255	5	<MDC		
15	30	4256	6	<MDC		
16	30	4325	30	<MDC		
17	30	4242	1	<MDC		
18	30	4172	-24	<MDC		
19	30	4355	41	<MDC		
20	30	4259	7	<MDC		
21	30	4200	-14	<MDC		
22	30	4271	11	<MDC		
23	30	4209	-11	<MDC		
24	30	4182	-21	<MDC		
25	30	4311	25	<MDC		
26	30	4200	-14	<MDC		
27	30	4275	13	<MDC		
28	30	4284	16	<MDC		
29	30	4182	-21	<MDC		

$$*\ MDC_{(Depleted\,Uranium)} = \frac{3 + 4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$$K = Efficiency(cpm/dpm)$$

$$T = Time(\text{minutes})$$

$$MDC_{(Depleted\,Uranium)} = \frac{3+4.65\sqrt{4240}}{(.09)(30)} = 109 dpm/100cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$*\ Counting - Efficiency:$$

$$\frac{[counts(source) - counts(background)]}{[source(d/m)][Counting\ Time(t)]}$$

$$*\ Counting - Efficiency - (Depleted\,Uranium):$$

$$\frac{[414508 - 4240]}{[146764][30]} = 9\%$$

Gamma Wipe Test Counting Data – Building 31110

Table 5.28 Gamma Wipe Data Building 31110

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
1	30	4257	6	<MDC		
2	30	4230	-4	<MDC		
3	30	4214	-9	<MDC		
4	30	4101	-50	<MDC		
5	30	4230	-4	<MDC		
6	30	4214	-9	<MDC		
7	30	4250	4	<MDC		
8	30	4371	47	<MDC		
9	30	4218	-8	<MDC		
10	30	4237	-1	<MDC		
11	30	4218	-8	<MDC		
12	30	4260	7	<MDC		
13	30	4304	23	<MDC		
14	30	4311	25	<MDC		
15	30	4242	1	<MDC		
16	30	4265	9	<MDC		
17	30	4134	-38	<MDC		
18	30	4225	-5	<MDC		
19	30	4232	-3	<MDC		
20	30	4206	-12	<MDC		
21	30	4323	30	<MDC		
22	30	4056	-66	<MDC		
23	30	4166	-26	<MDC		

$$* \ MDC_{(Depleted\,Uranium)} = \frac{3+4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$$K = Efficiency(cpm/dpm)$$

$$T = Time(\text{minutes})$$

$$MDC_{(Depleted\,Uranium)} = \frac{3+4.65\sqrt{4240}}{(.09)(30)} = 109 dpm/100cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$*Counting - Efficiency: \frac{[counts(source) - counts(background)]}{[source(d/m)][Counting\,Time(t)]}$$

$$*Counting - Efficiency - (Depleted\,Uranium): \frac{[414508-4240]}{[146764][30]} = 9\%$$

Gamma Wipe Test Counting Data – Building 31024

Table 5.29 Gamma Wipe Data Building 31024

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	60	8147	n/a	n/a	9%	75
Depleted Uranium Source Counts	60	832587	146764	DU		
1	60	8184	7	<MDC		
2	60	8003	-26	<MDC		
3	60	8259	20	<MDC		
4	60	8081	-12	<MDC		
5	60	8083	-11	<MDC		
6	60	8013	-24	<MDC		
7	60	8176	5	<MDC		
8	60	8177	5	<MDC		
9	60	8003	-26	<MDC		
10	60	8217	12	<MDC		
11	60	8276	23	<MDC		
12	60	8114	-6	<MDC		
13	60	8194	8	<MDC		
14	60	8093	-10	<MDC		
15	60	8036	-20	<MDC		
16	60	8137	-2	<MDC		

$$* MDC_{(Depleted Uranium)} = \frac{3 + 4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$$K = Efficiency(cpm / dpm)$$

$$T = Time(\text{minutes})$$

$$MDC_{(Depleted Uranium)} = \frac{3 + 4.65\sqrt{8147}}{(.09)(60)} = 75 dpm / 100 cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$* Counting - Efficiency :$$

$$\frac{[counts(source) - counts(background)]}{[source(d/m)][Counting Time(t)]}$$

$$* Counting - Efficiency - (Depleted Uranium) :$$

$$\frac{[832587 - 8147)]}{[146764][60]} = 9\%$$

Gamma Wipe Test Counting Data – Building 31018

Table 5.30 Gamma Wipe Data Building 31018

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	60	8147	n/a	n/a	9%	75
Depleted Uranium Source Counts	60	832587	146764	DU		
1	60	8084	-11	<MDC		
2	60	8176	5	<MDC		
3	60	8093	-10	<MDC		
4	60	8077	-12	<MDC		
5	60	8113	-6	<MDC		
6	60	8105	-7	<MDC		
7	60	8110	-7	<MDC		
8	60	8099	-9	<MDC		
9	60	8211	11	<MDC		
10	60	8064	-15	<MDC		
11	60	8076	-13	<MDC		
12	60	8283	24	<MDC		
13	60	8135	-2	<MDC		
14	60	8059	-16	<MDC		
15	60	8034	-20	<MDC		
16	60	8085	-11	<MDC		
17	60	8079	-12	<MDC		
18	60	8105	-7	<MDC		
19	60	8142	-1	<MDC		
20	60	8190	8	<MDC		

$$* MDC_{(Depleted\,Uranium)} = \frac{3+4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$$K = Efficiency(cpm/dpm)$$

$$T = Time(\text{minutes})$$

$$MDC_{(Depleted\,Uranium)} = \frac{3+4.65\sqrt{8147}}{(.09)(60)} = 75dpm/100cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$*Counting - Efficiency: \frac{[counts(source) - counts(background)]}{[source(d/m)][Counting\,Time(t)]}$$

$$*Counting - Efficiency - (Depleted\,Uranium): \frac{[832587-8147]}{[146764][60]} = 9\%$$

Gamma Wipe Test Counting Data – Building 31003

Table 5.31 Gamma Wipe Data Building 31003

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
1	30	4210	-11	<MDC		
2	30	4212	-10	<MDC		
3	30	4259	7	<MDC		
4	30	4309	25	<MDC		
5	30	4279	14	<MDC		
6	30	4250	4	<MDC		
7	30	4339	35	<MDC		
8	30	4257	6	<MDC		
9	30	4197	-15	<MDC		
10	30	4219	-8	<MDC		
11	30	4245	2	<MDC		
12	30	4200	-14	<MDC		
13	30	4184	-20	<MDC		
14	30	4240	0	<MDC		
15	30	4017	-80	<MDC		
16	30	4287	17	<MDC		
17	30	4190	-18	<MDC		
18	30	4306	24	<MDC		

$$* MDC_{(Depleted\,Uranium)} = \frac{3+4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$K = Efficiency(cpm/dpm)$

$T = Time(\text{minutes})$

$$MDC_{(Depleted\,Uranium)} = \frac{3+4.65\sqrt{4240}}{(.09)(30)} = 109 dpm/100cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$*Counting - Efficiency: \frac{[counts(source) - counts(background)]}{[source(d/m)][Counting\,Time(t)]}$$

$$*Counting - Efficiency - (Depleted\,Uranium): \frac{[414508 - 4240]}{[146764][30]} = 9\%$$

Gamma Wipe Test Counting Data – Building 30973

Table 5.32 Gamma Wipe Data Building 30973

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
1	30	4170	-25	<MDC		
2	30	4385	52	<MDC		
3	30	4265	9	<MDC		
4	30	4318	28	<MDC		
5	30	4308	24	<MDC		
6	30	4229	-4	<MDC		
7	30	4190	-18	<MDC		
8	30	4240	0	<MDC		
9	30	4276	13	<MDC		
10	30	4211	-10	<MDC		
11	30	4341	36	<MDC		
12	30	4329	32	<MDC		
13	30	4355	41	<MDC		
14	30	4365	45	<MDC		
15	30	4220	-7	<MDC		
16	30	4304	23	<MDC		
17	30	4344	37	<MDC		
18	30	4146	-34	<MDC		
19	30	4211	-10	<MDC		
20	30	4252	4	<MDC		
21	30	4229	-4	<MDC		

$$* MDC_{(Depleted\,Uranium)} = \frac{3 + 4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$$K = Efficiency(cpm / dpm)$$

$$T = Time(\text{minutes})$$

$$MDC_{(Depleted\,Uranium)} = \frac{3 + 4.65\sqrt{4240}}{(.09)(30)} = 109 dpm / 100 cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$* Counting - Efficiency : \frac{[counts(source) - counts(background)]}{[source(d/m)][Counting\,Time(t)]}$$

$$* Counting - Efficiency - (Depleted\,Uranium) : \frac{[414508 - 4240]}{[146764][30]} = 9\%$$

Gamma Wipe Test Counting Data – Building 15700

Table 5.33 Gamma Wipe Data Building 15700

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
1	30	4209	-11	<MDC		
2	30	4354	41	<MDC		
3	30	4154	-31	<MDC		
4	30	4191	-18	<MDC		
5	30	4091	-53	<MDC		
6	30	4341	36	<MDC		
7	30	4219	-8	<MDC		
8	30	4248	3	<MDC		
9	30	4176	-23	<MDC		
10	30	4290	18	<MDC		
11	30	4257	6	<MDC		
12	30	4209	-11	<MDC		
13	30	4307	24	<MDC		
14	30	4247	3	<MDC		
15	30	4146	-34	<MDC		
16	30	4274	12	<MDC		
17	30	4216	-9	<MDC		
18	30	4306	24	<MDC		
19	30	4282	15	<MDC		
20	30	4279	14	<MDC		
21	30	4307	24	<MDC		
22	30	4334	34	<MDC		
23	30	4261	8	<MDC		
24	30	4434	69	<MDC		
25	30	4117	-44	<MDC		
26	30	4206	-12	<MDC		
27	30	4294	19	<MDC		
28	30	4262	8	<MDC		
29	30	4248	3	<MDC		
30	30	4151	-32	<MDC		
31	30	4139	-36	<MDC		
32	30	4261	8	<MDC		
33	30	4200	-14	<MDC		
34	30	4236	-1	<MDC		
35	30	4319	28	<MDC		
36	30	4189	-18	<MDC		
37	30	4192	-17	<MDC		
38	30	4145	-34	<MDC		
39	30	4290	18	<MDC		
40	30	4205	-13	<MDC		

$$* MDC_{(Depleted\,Uranium)} = \frac{3 + 4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$K = Efficiency(cpm/dpm)$

$T = Time(\text{minutes})$

$$MDC_{(Depleted\,Uranium)} = \frac{3+4.65\sqrt{4240}}{(.09)(30)} = 109 dpm/100cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$* Counting - Efficiency:$$

$$\frac{[counts(source) - counts(background)]}{[source(d/m)][Counting\,Time(t)]}$$

$$* Counting - Efficiency - (Depleted\,Uranium):$$

$$\frac{[414508 - 4240]}{[146764][30]} = 9\%$$

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
41	30	4176	-23	<MDC		
42	30	4208	-11	<MDC		
43	30	4212	-10	<MDC		
44	30	4221	-7	<MDC		
45	30	4122	-42	<MDC		
46	30	4179	-22	<MDC		
47	30	4309	25	<MDC		
48	30	4302	22	<MDC		
49	30	4287	17	<MDC		
50	30	4190	-18	<MDC		
51	30	4300	21	<MDC		
52	30	4168	-26	<MDC		
53	30	4208	-11	<MDC		
54	30	4248	3	<MDC		
55	30	4153	-31	<MDC		
56	30	4138	-36	<MDC		
57	30	4148	-33	<MDC		
58	30	4181	-21	<MDC		
59	30	4214	-9	<MDC		
60	30	4181	-21	<MDC		
61	30	4423	65	<MDC		
62	30	4352	40	<MDC		
63	30	4250	4	<MDC		
64	30	4285	16	<MDC		
65	30	4169	-25	<MDC		
66	30	4212	-10	<MDC		
67	30	4312	26	<MDC		
68	30	4262	8	<MDC		
69	30	4297	20	<MDC		
70	30	4256	6	<MDC		
71	30	4235	-2	<MDC		
72	30	4299	21	<MDC		
73	30	4236	-1	<MDC		
74	30	4232	-3	<MDC		
75	30	4098	-51	<MDC		
76	30	4341	36	<MDC		
77	30	4189	-18	<MDC		
78	30	4207	-12	<MDC		
79	30	4203	-13	<MDC		
80	30	4226	-5	<MDC		
81	30	4244	1	<MDC		
82	30	4194	-16	<MDC		
83	30	4213	-10	<MDC		
84	30	4258	6	<MDC		

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
85	30	4300	21	<MDC		
86	30	4241	0	<MDC		
87	30	4263	8	<MDC		
88	30	4350	39	<MDC		
89	30	4285	16	<MDC		
90	30	4068	-62	<MDC		
91	30	4172	-24	<MDC		

Gamma Wipe Test Counting Data – Building 11681

Table 5.34 Gamma Wipe Data Building 11681

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
1	30	4164	-27	<MDC		
2	30	4372	47	<MDC		
3	30	4156	-30	<MDC		
4	30	4300	21	<MDC		
5	30	4226	-5	<MDC		
6	30	4293	19	<MDC		
7	30	4303	23	<MDC		
8	30	4221	-7	<MDC		
9	30	4286	16	<MDC		
10	30	4303	23	<MDC		
11	30	4306	24	<MDC		
12	30	4217	-8	<MDC		
13	30	4165	-27	<MDC		
14	30	4240	0	<MDC		
15	30	4391	54	<MDC		
16	30	4306	24	<MDC		
17	30	4354	41	<MDC		
18	30	4259	7	<MDC		
19	30	4186	-19	<MDC		
20	30	4297	20	<MDC		
21	30	4296	20	<MDC		
22	30	4253	5	<MDC		
23	30	4280	14	<MDC		
24	30	4164	-27	<MDC		
25	30	4268	10	<MDC		
26	30	4191	-18	<MDC		
27	30	4338	35	<MDC		
28	30	4342	36	<MDC		
29	30	4344	37	<MDC		
30	30	4251	4	<MDC		
31	30	4197	-15	<MDC		
32	30	4163	-28	<MDC		

$$* MDC_{(Depleted Uranium)} = \frac{3 + 4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$$K = Efficiency(cpm/dpm)$$

$$T = Time(\text{minutes})$$

$$MDC_{(Depleted Uranium)} = \frac{3 + 4.65\sqrt{4240}}{(.09)(30)} = 109 dpm/100cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$*Counting - Efficiency:$$

$$\frac{[counts(source) - counts(background)]}{[source(d/m)][Counting Time(t)]}$$

$$*Counting - Efficiency - (Depleted Uranium):$$

$$\frac{[414508 - 4240]}{[146764][30]} = 9\%$$

DU Wipe Test Counting Data – Building 10632

Sample Number	Time Count (minutes)	Counts	Activity Depleted Uranium (dpm/100cm^2)	Isotope	Efficiency Depleted Uranium c/d	MDC (dpm per 100cm^2)
Background	30	4240	n/a	n/a	9%	109
Depleted Uranium Source Counts	30	414508	146764	DU		
1	30	4193	-17	<MDC		
2	30	4335	34	<MDC		
3	30	4354	41	<MDC		
4	30	4277	13	<MDC		
5	30	4315	27	<MDC		
6	30	4316	27	<MDC		
7	30	4334	34	<MDC		
8	30	4315	27	<MDC		
9	30	4206	-12	<MDC		

$$* \ MDC_{(Depleted Uranium)} = \frac{3 + 4.65\sqrt{COUNT_{(BACKGROUND)}}}{KT}$$

$$K = Efficiency(cpm/dpm)$$

$$T = Time(\text{minutes})$$

$$MDC_{(Depleted Uranium)} = \frac{3 + 4.65\sqrt{4240}}{(.09)(30)} = 109 dpm/100cm^2$$

*MDC calculation is from NUREG- 1507 equation 3-10. Wipe tests are taken over an area of 100 cm^2.

$$* Counting - Efficiency : \frac{[counts(source) - counts(background)]}{[source(d/m)][Counting Time(t)]}$$

$$* Counting - Efficiency - (Depleted Uranium): \frac{[414508 - 4240]}{[146764][30]} = 9\%$$

* Gamma analysis performed with Wallac 1282 Compugamma Universal Gamma Counter (s/n 820739) optimized for DU using a DU reference gamma source containing ~175,783 dpm

* Alpha analysis performed with Ludlum model 2200 scaler (s/n 43012) with Ludlum model 43-10 zinc sulfide alpha counter (s/n 57240) . System optimized with a NIST traceable U-238 depleted uranium alpha source from Isotope Products Laboratory

Attachment 6 - Building Survey Maps

Figure 5: Building 00005 Room1424B

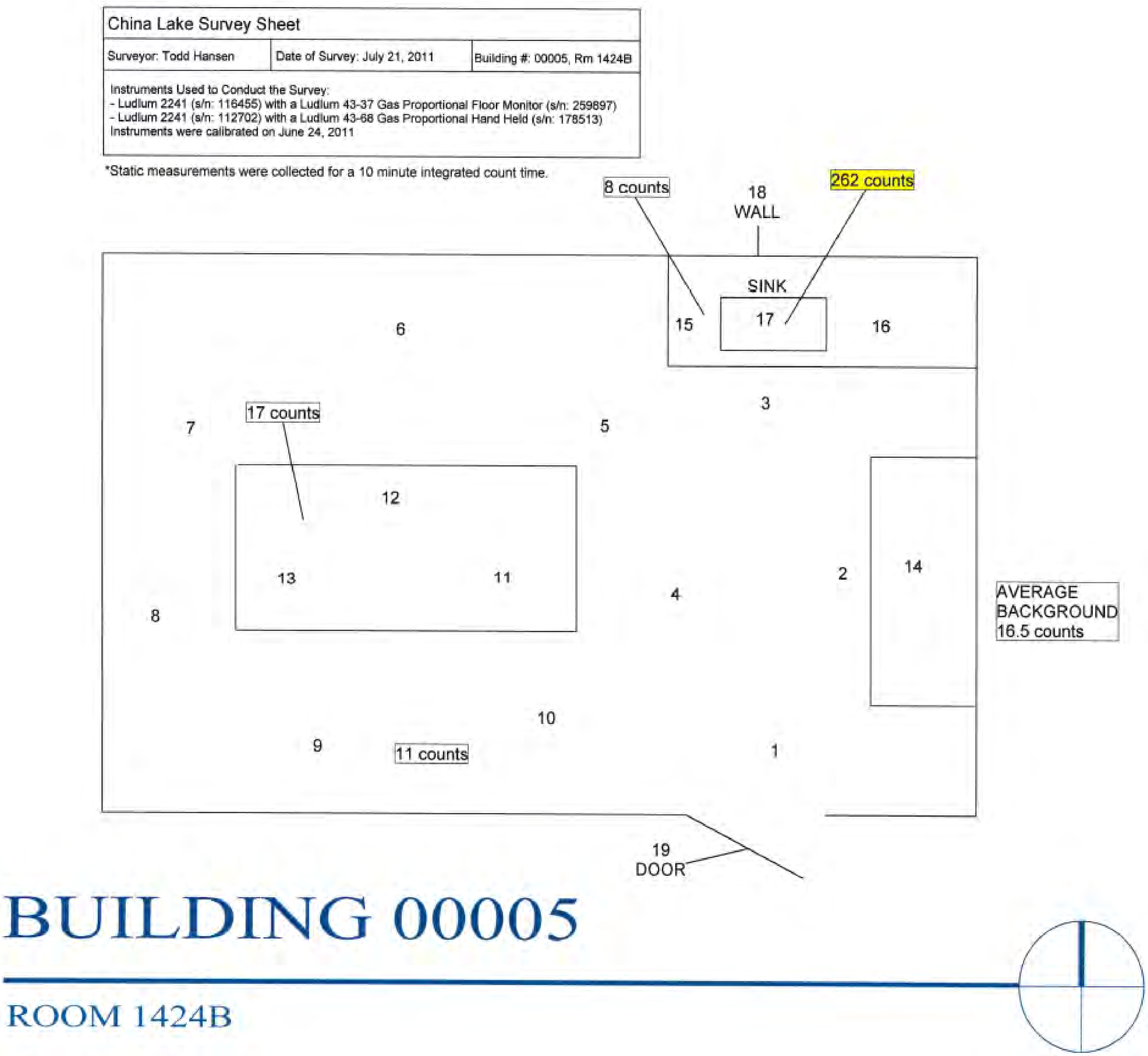


Figure 6: Building 00005 Room 1647

China Lake Survey Sheet		
Surveyor: Todd Hansen	Date of Survey: July 20, 2011	Building #: 00005, Rm 1647
Instruments Used to Conduct the Survey: - Ludlum 2241 (s/n: 116455) with a Ludlum 43-37 Gas Proportional Floor Monitor (s/n: 259897) - Ludlum 2241 (s/n: 112702) with a Ludlum 43-68 Gas Proportional Hand Held (s/n: 178513) Instruments were calibrated on June 24, 2011		

*Static measurements were collected for a 10 minute integrated count time.

The numbers on the drawings indicate location of wipe test sample locations.

The rectangles contain values of static readings. The units are counts.

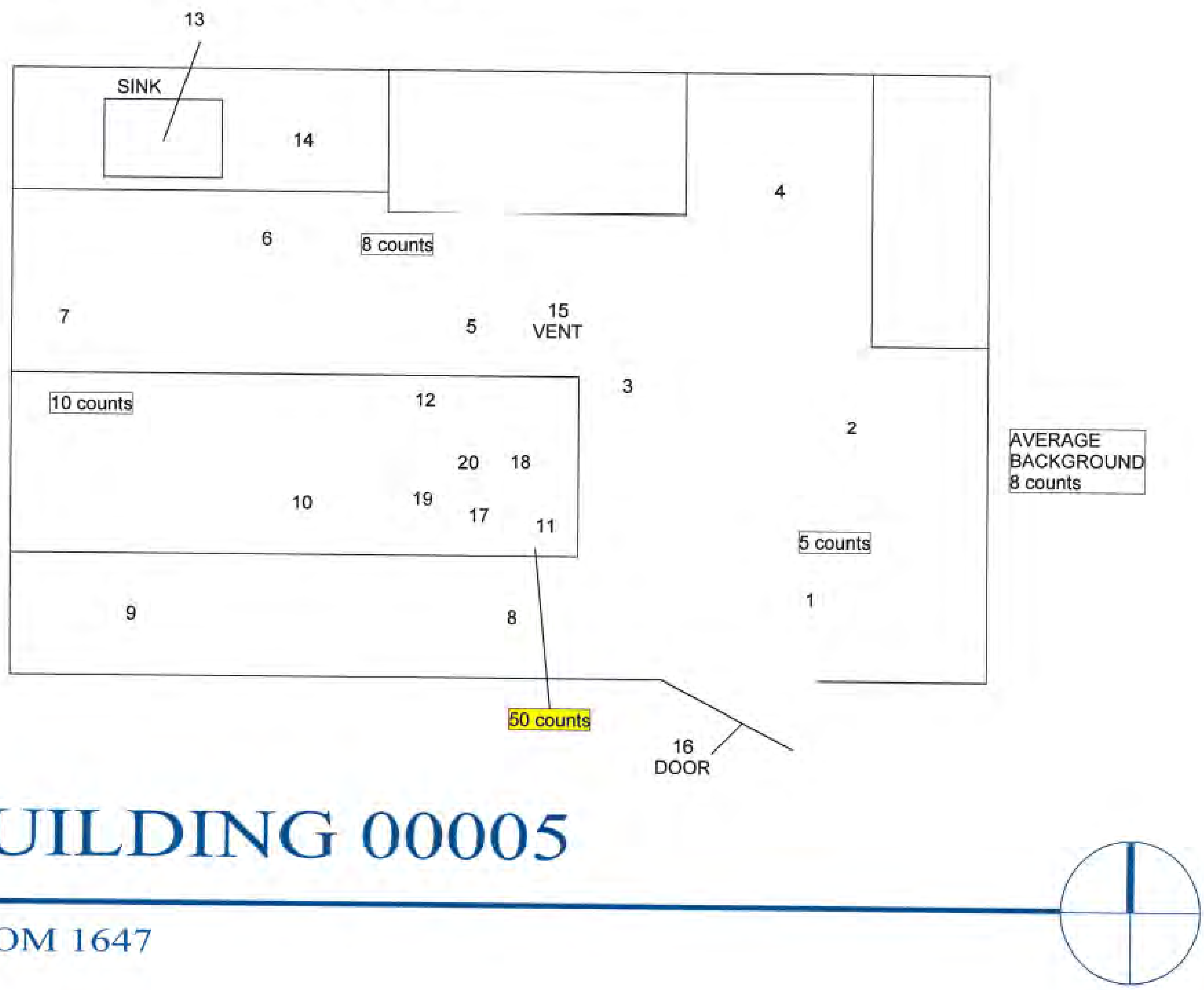


Figure 7: Building 00005 Room 1652

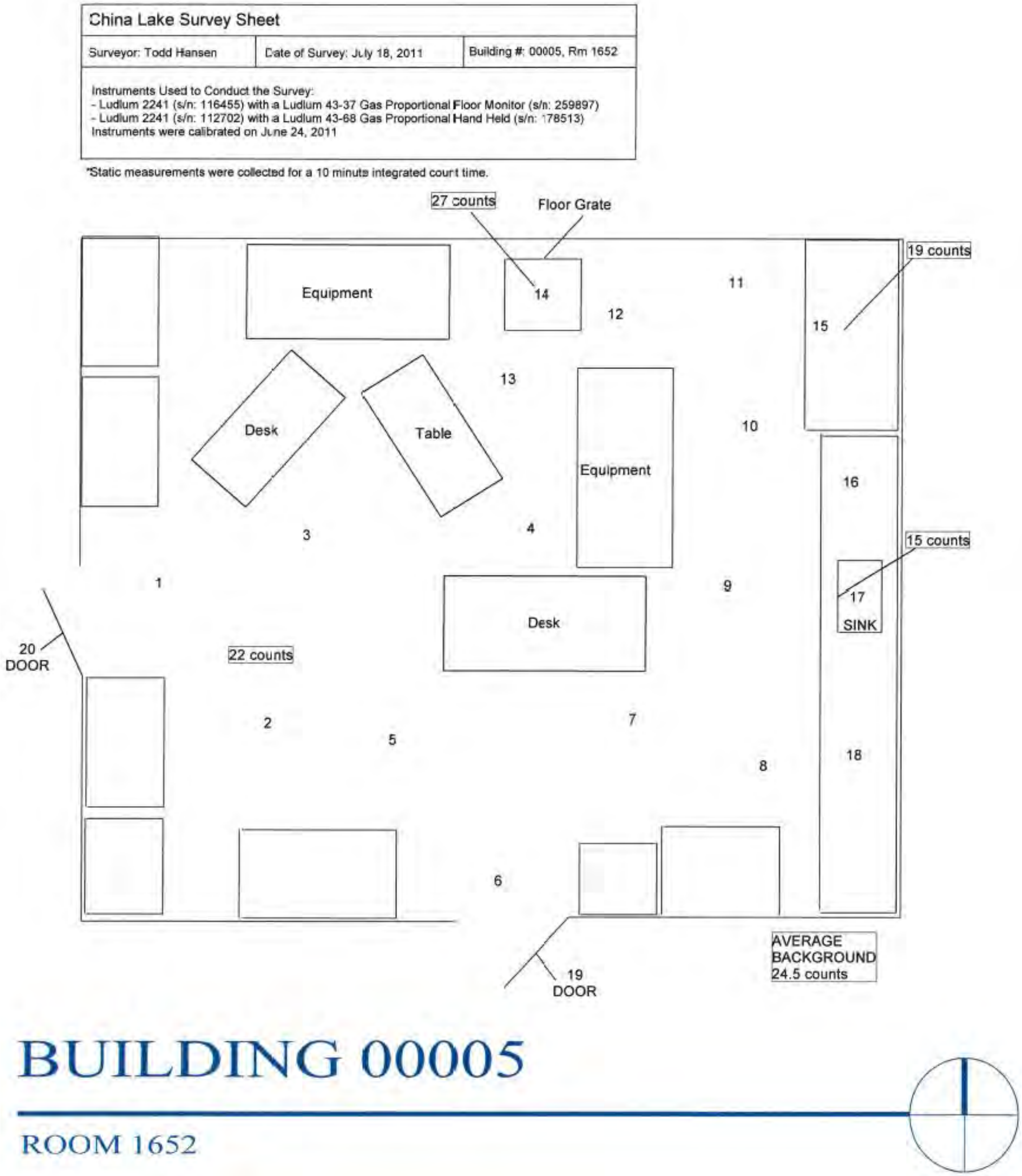


Figure 8: Building 00005 Room 1644 & 1646

China Lake Survey Sheet		
Surveyor: Todd Hansen	Date of Survey: July 21, 2011	Building #: 01124
Instruments Used to Conduct the Survey: - Ludlum 2241 (s/n: 116455) with a Ludlum 43-37 Gas Proportional Floor Monitor (s/n: 259897) - Ludlum 2241 (s/n: 112702) with a Ludlum 43-68 Gas Proportional Hand Held (s/n: 178513) Instruments were calibrated on June 24, 2011		

*Static measurements were collected for a 10 minute integrated count time.

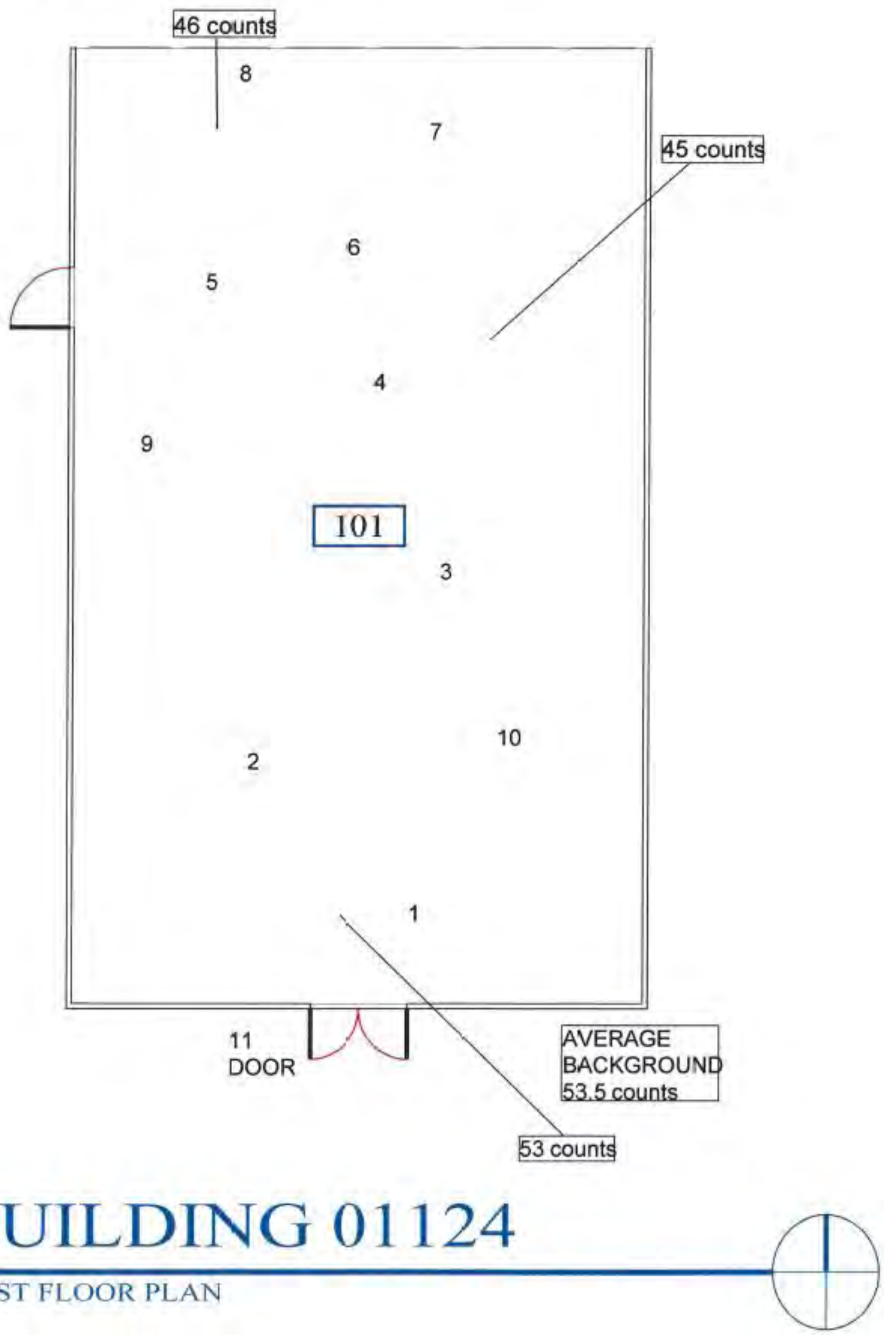


Figure 9: Building 01124

Figure 10: Building 01389

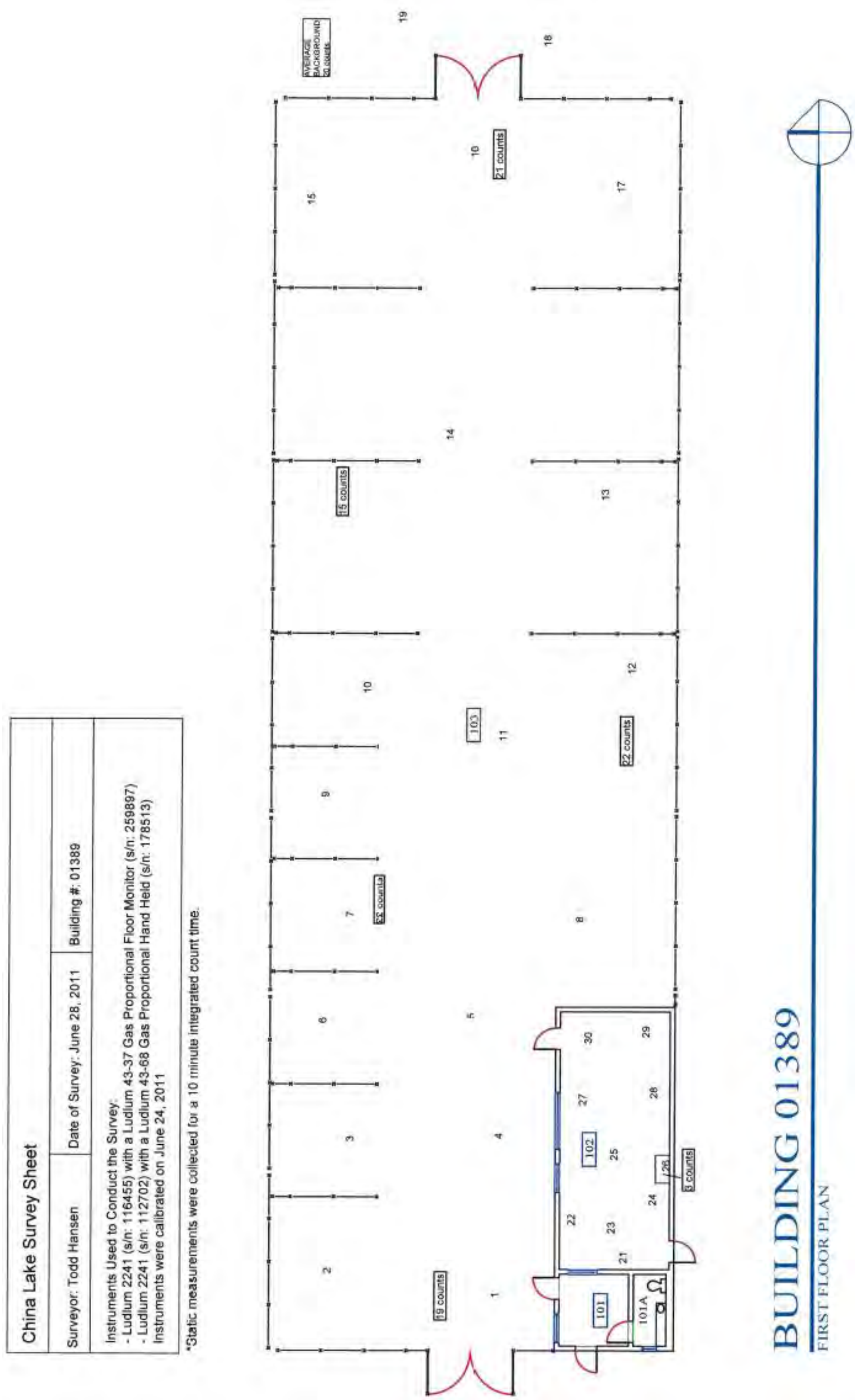


Figure 11: Building 13100

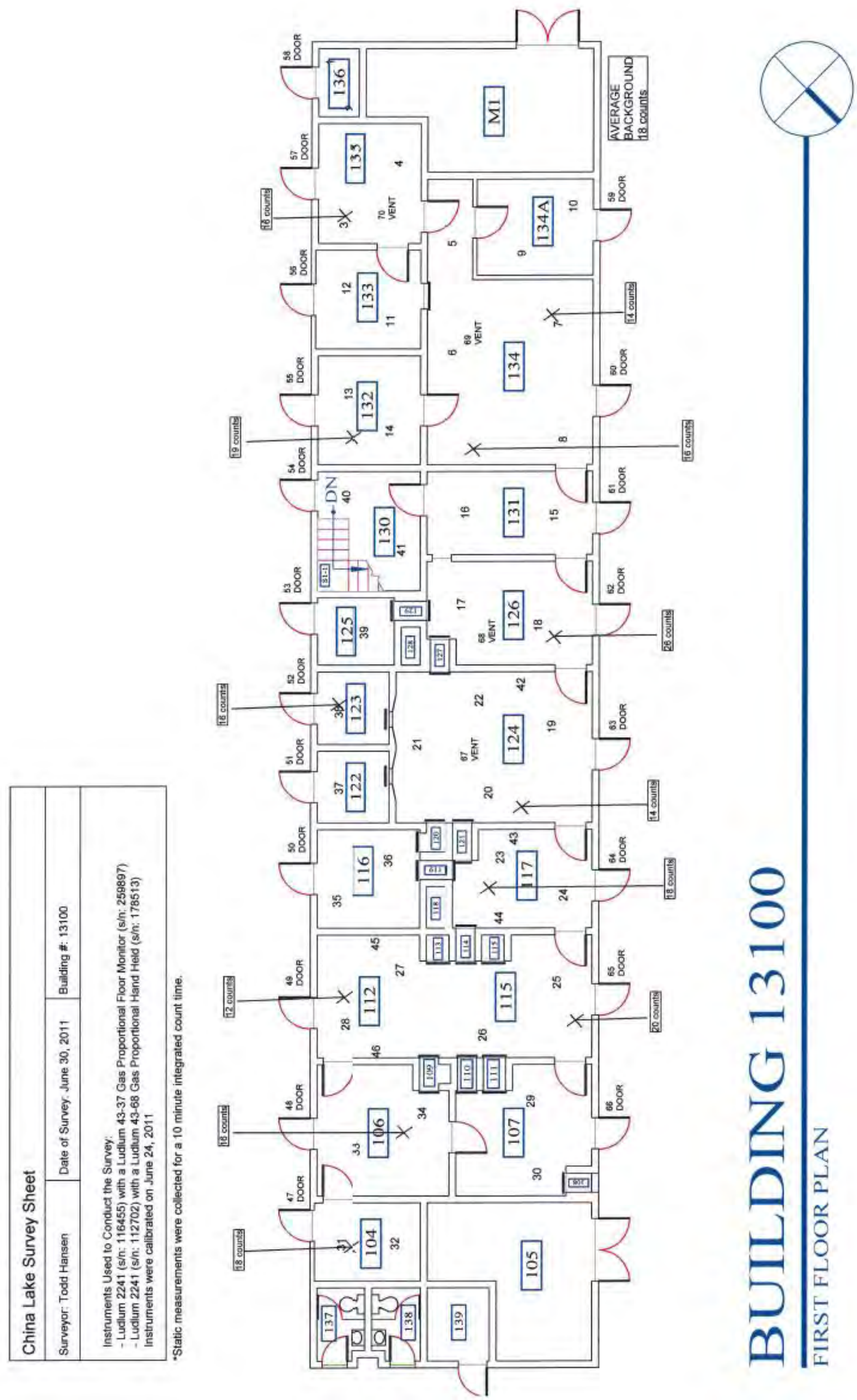


Figure 12: Building 13470

China Lake Survey Sheet		
Surveyor: Todd Hansen	Date of Survey: July 20, 2011	Building #: 13470
Instruments Used to Conduct the Survey: - Ludlum 2241 (s/n: 116455) with a Ludlum 43-37 Gas Proportional Floor Monitor (s/n: 259897) - Ludlum 2241 (s/n: 112702) with a Ludlum 43-68 Gas Proportional Hand Held (s/n: 178513) Instruments were calibrated on June 24, 2011		

*Static measurements were collected for a 10 minute integrated count time.

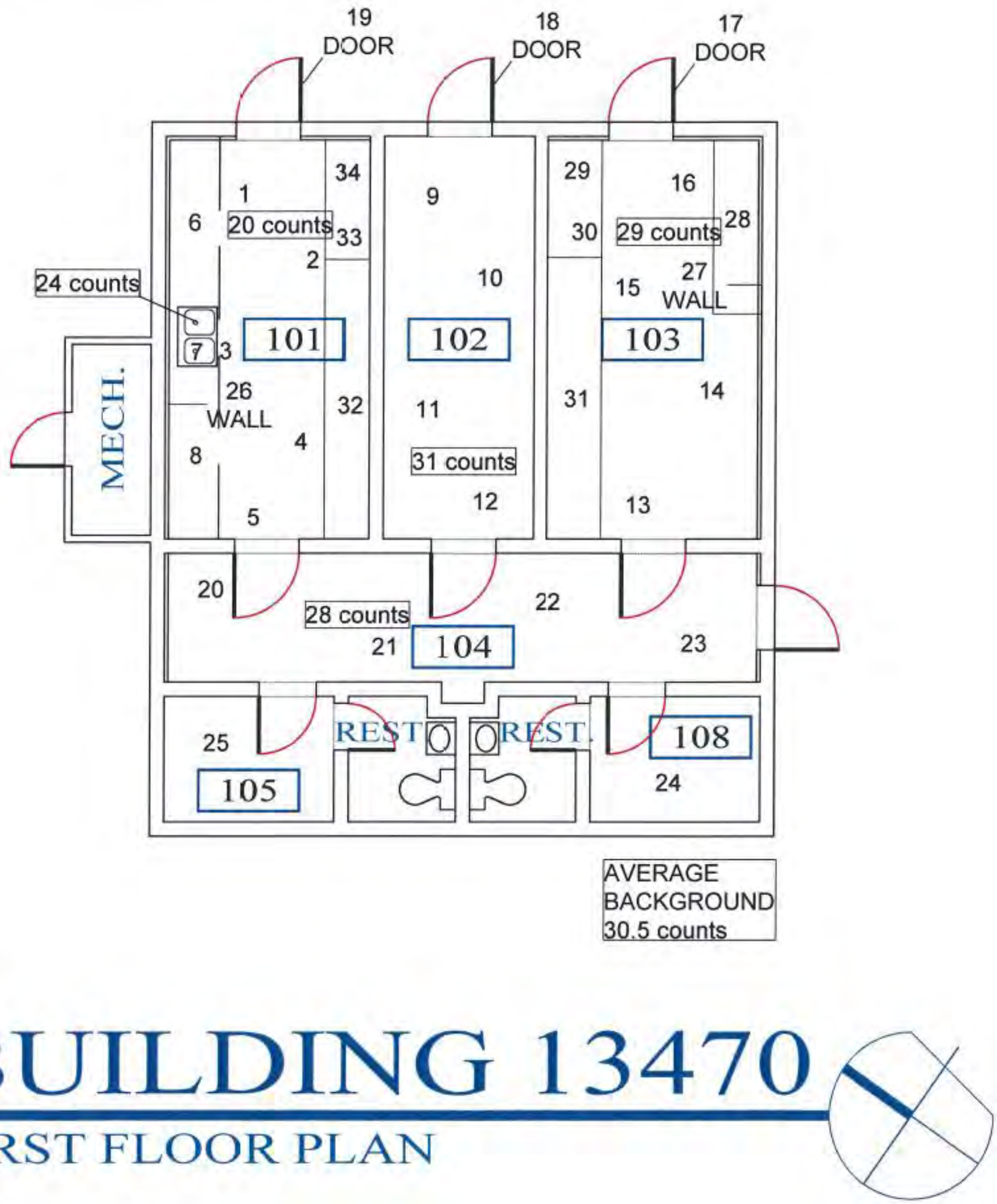


Figure 13: Building 15510

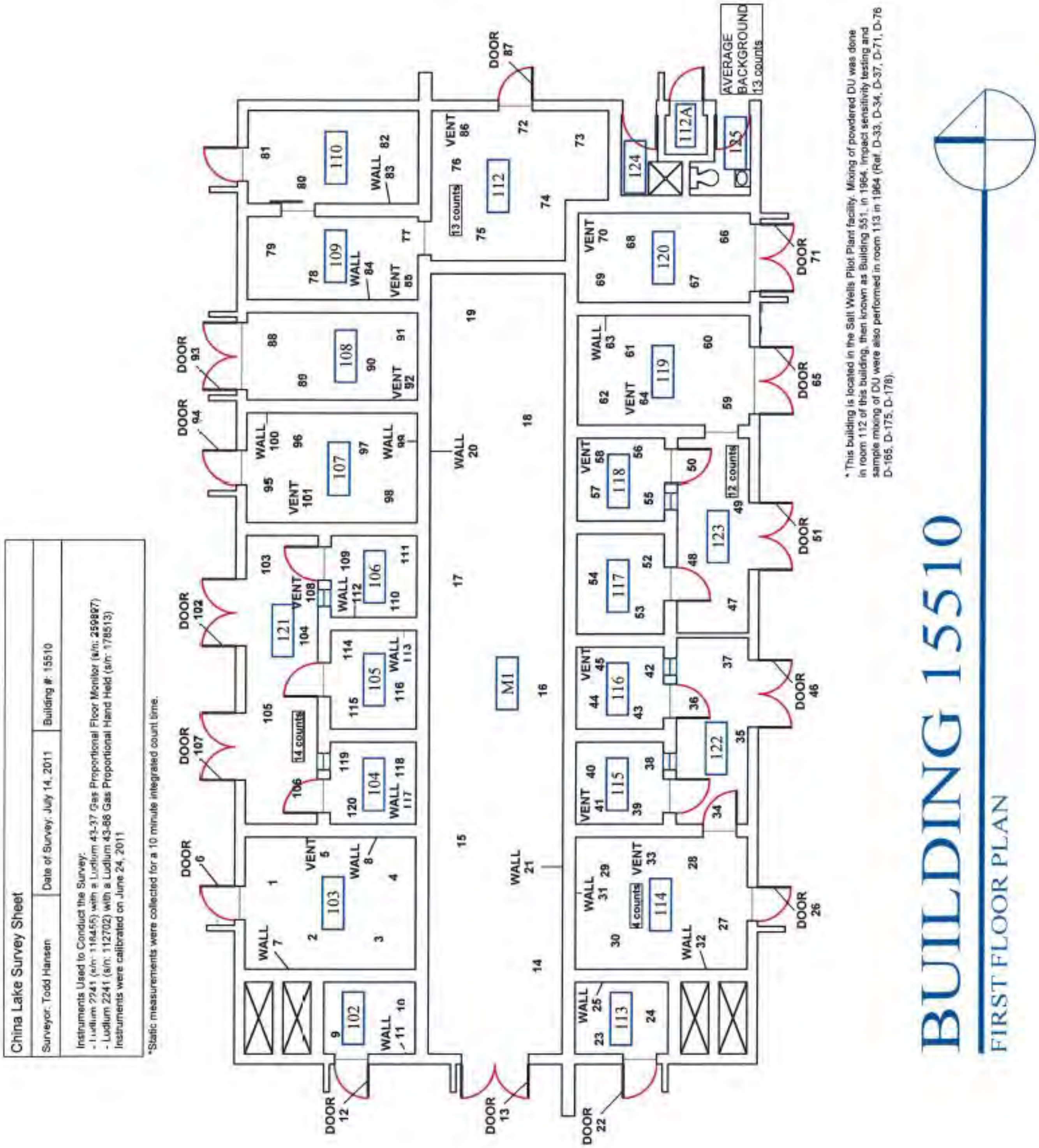

China Lake Survey Sheet
Surveyor: Todd Hansen
Date of Survey: July 14, 2011
Building #: 15510
Instruments Used to Conduct the Survey:
- Ludlum 2241 (s/n: 116455) with a Ludlum 43-37 Gas Proportional Floor Monitor (s/n: 259897)
- Ludlum 2241 (s/n: 112702) with a Ludlum 43-68 Gas Proportional Hand Held (s/n: 178513)
Instruments were calibrated on June 24, 2011
*Static measurements were collected for a 10 minute integrated count time.
AVERAGE BACKGROUND 13 counts
* This building is located in the Salt Wells Pilot Plant facility. Mixing of powdered DU was done in room 112 of this building, then known as Building 551, in 1964. Impact sensitivity testing and sample mixing of DU were also performed in room 113 in 1964 (Ref. D-33, D-34, D-37, D-71, D-76 D-165, D-175, D-178).
BUILDING 15510
FIRST FLOOR PLAN

Figure 14: Building 15560

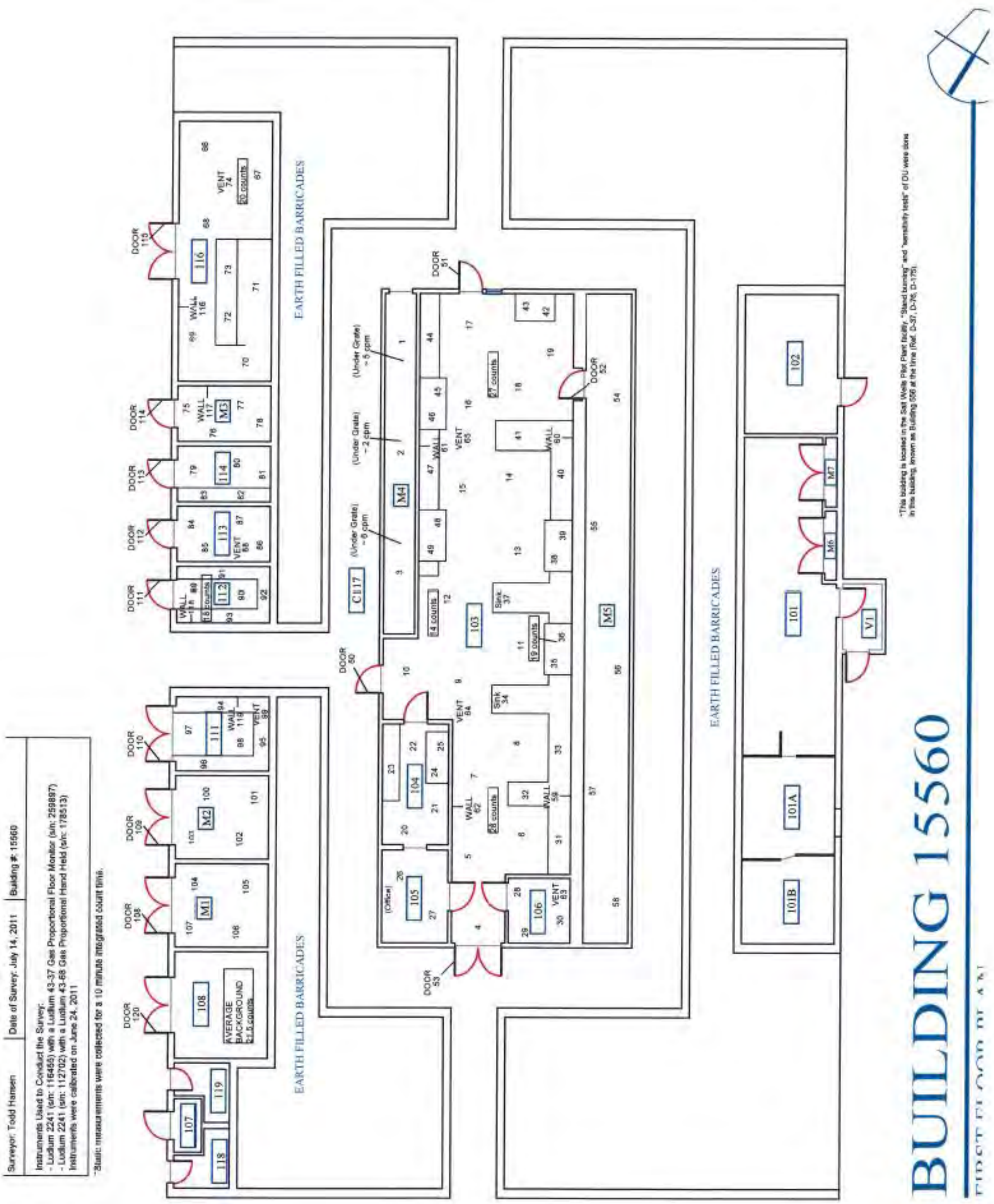


Figure 15: Building 15570

China Lake Survey Sheet		
Surveyor: Todd Hansen	Date of Survey: June 27, 2011	Building #: 15570

Instruments Used to Conduct the Survey:
- Ludlum 2241 (s/n: 116455) with a Ludlum 43-37 Gas Proportional Floor Monitor (s/n: 259897)
- Ludlum 2241 (s/n: 112702) with a Ludlum 43-68 Gas Proportional Hand Held (s/n: 178513)

Instruments were calibrated on June 24, 2011

*Static measurements were collected for a 10 minute integrated count time.

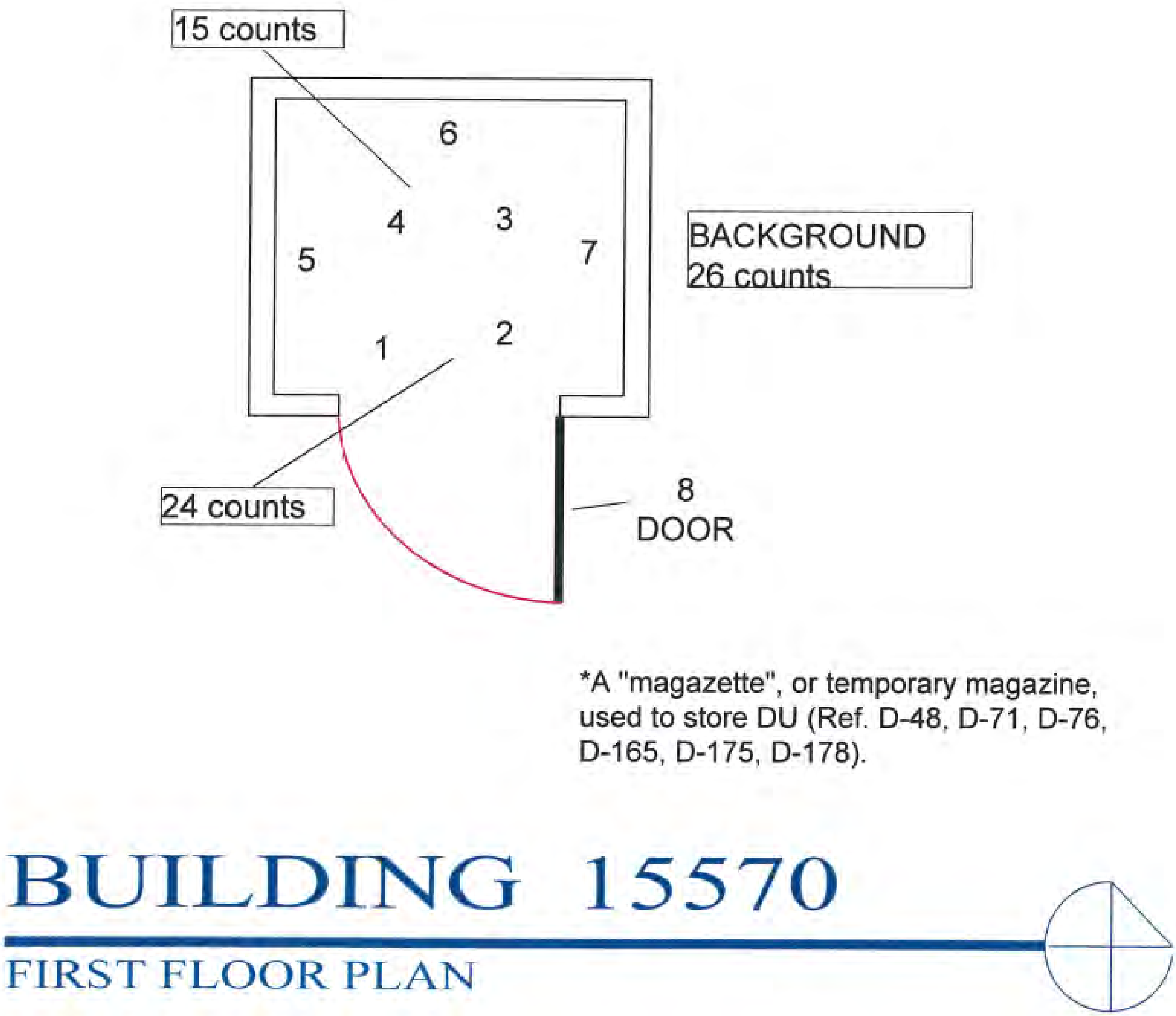
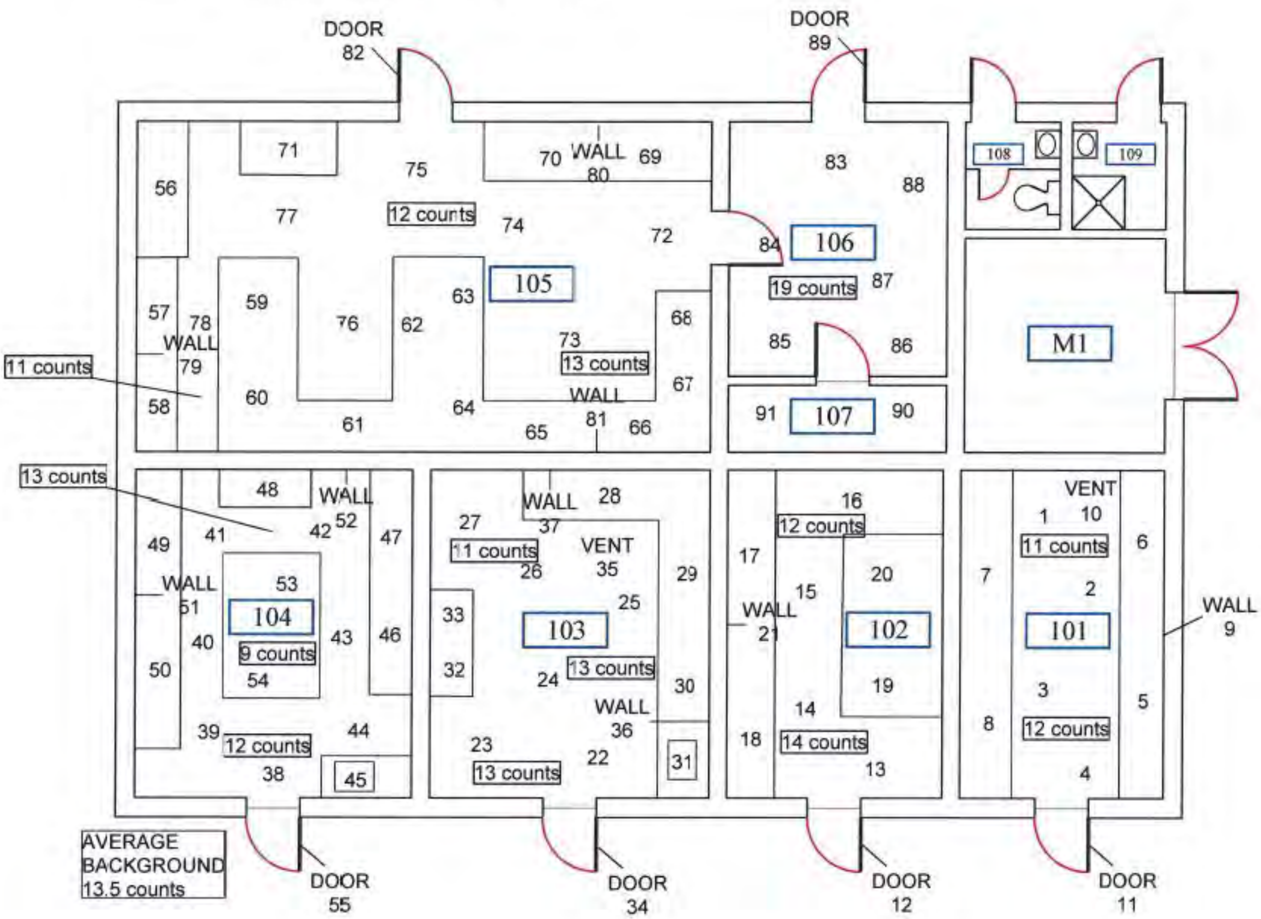


Figure 16: Building 15700

China Lake Survey Sheet		
Surveyor: Todd Hansen	Date of Survey: June 27, 2011	Building #: 15700
Instruments Used to Conduct the Survey: - Ludlum 2241 (s/n: 116455) with a Ludlum 43-37 Gas Proportional Floor Monitor (s/n: 259897) - Ludlum 2241 (s/n: 112702) with a Ludlum 43-68 Gas Proportional Hand Held (s/n: 178513) Instruments were calibrated on June 24, 2011		

*Static measurements were collected for a 10 minute integrated count time.



*Located in the SWPP and may also have been a site where DU was used.

BUILDING 15700

FIRST FLOOR PLAN

Figure 17: Building 03882

China Lake Survey Sheet		
Surveyor: Todd Hansen	Date of Survey: July 21, 2011	Building #: 03882
Instruments Used to Conduct the Survey: - Ludlum 2241 (s/n: 116455) with a Ludlum 43-37 Gas Proportional Floor Monitor (s/n: 259897) - Ludlum 2241 (s/n: 112702) with a Ludlum 43-68 Gas Proportional Hand Held (s/n: 178513) Instruments were calibrated on June 24, 2011		

*Static measurements were collected for a 10 minute integrated count time.

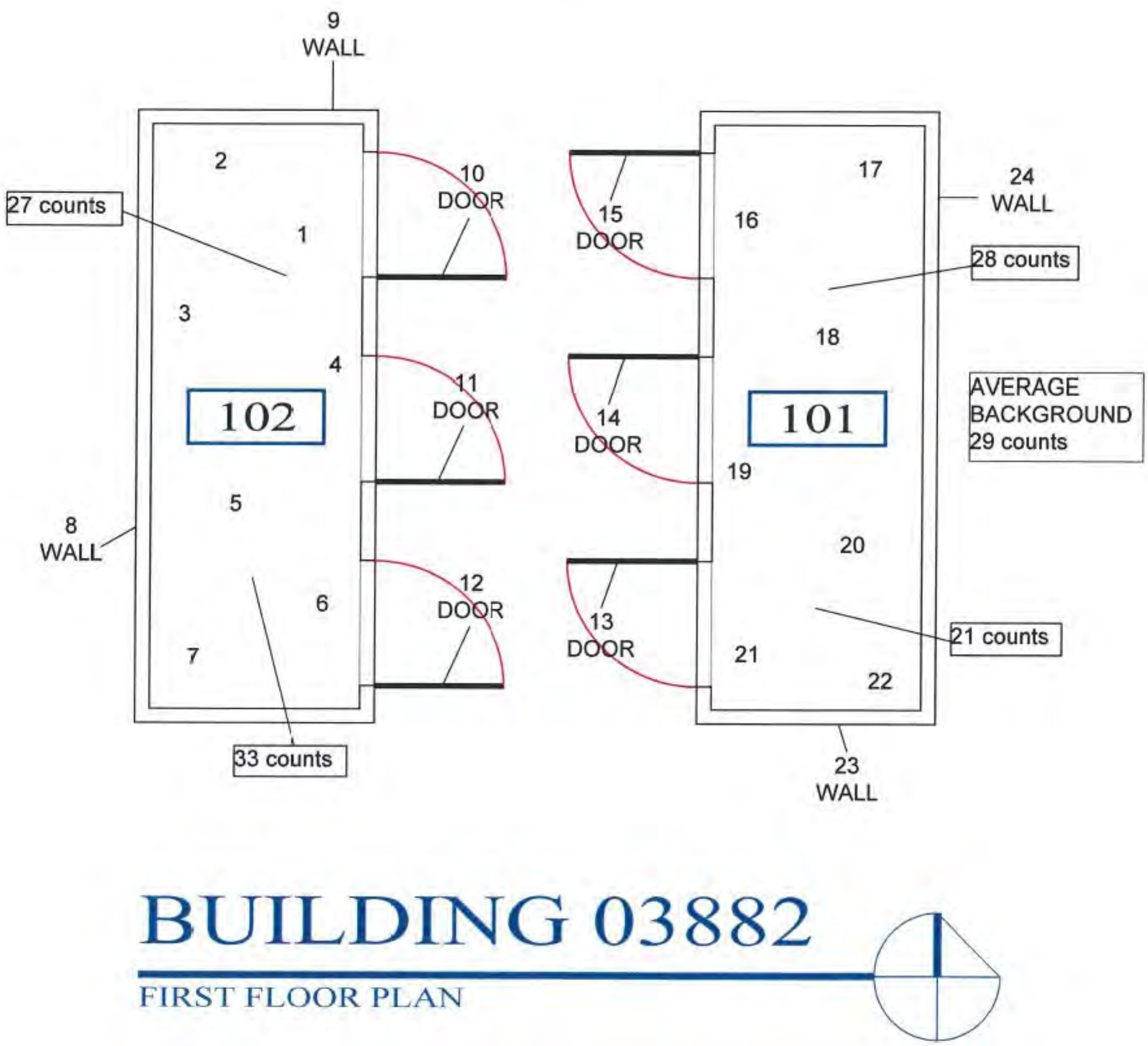


Figure 18: Building 10540 First Floor

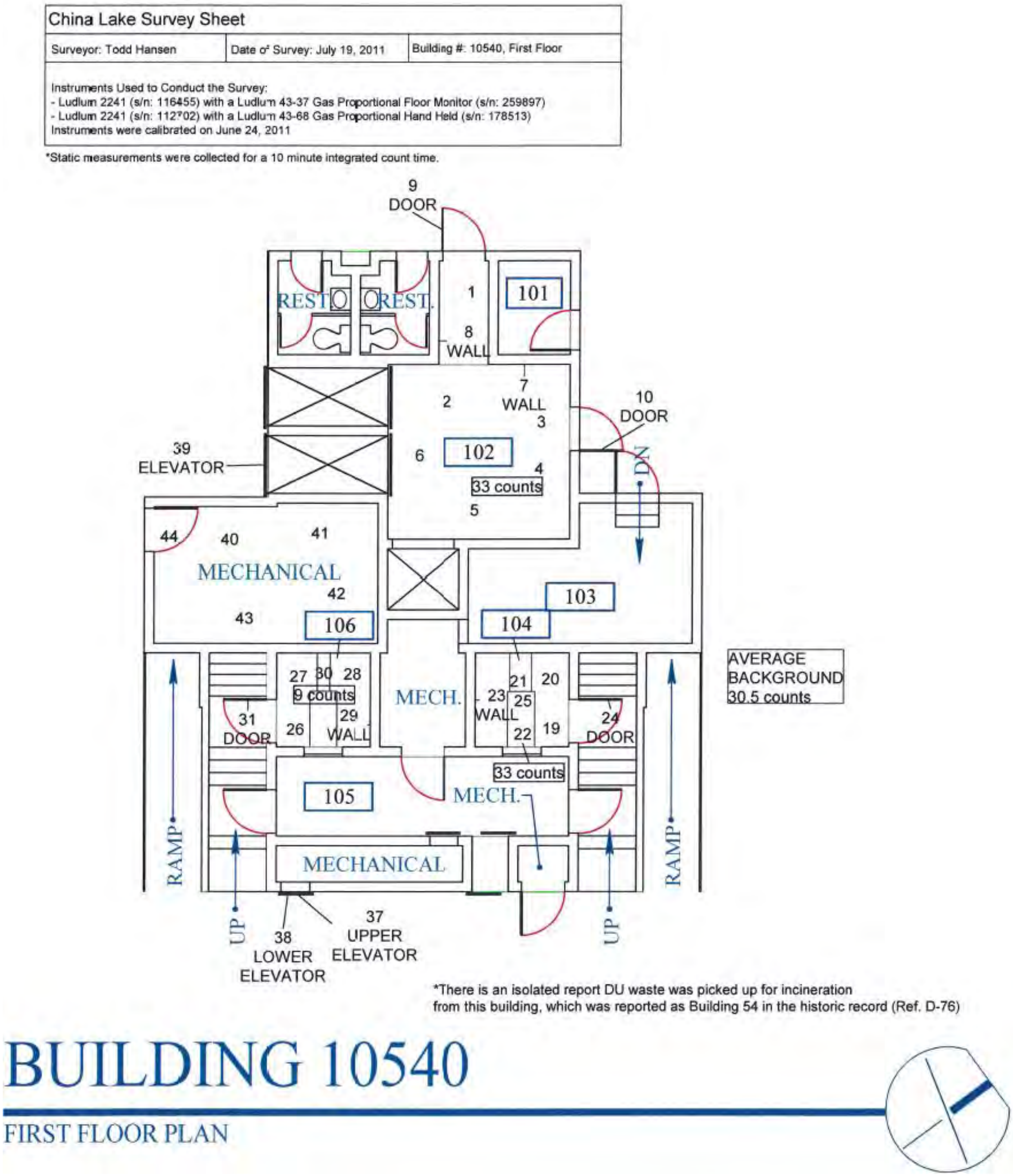
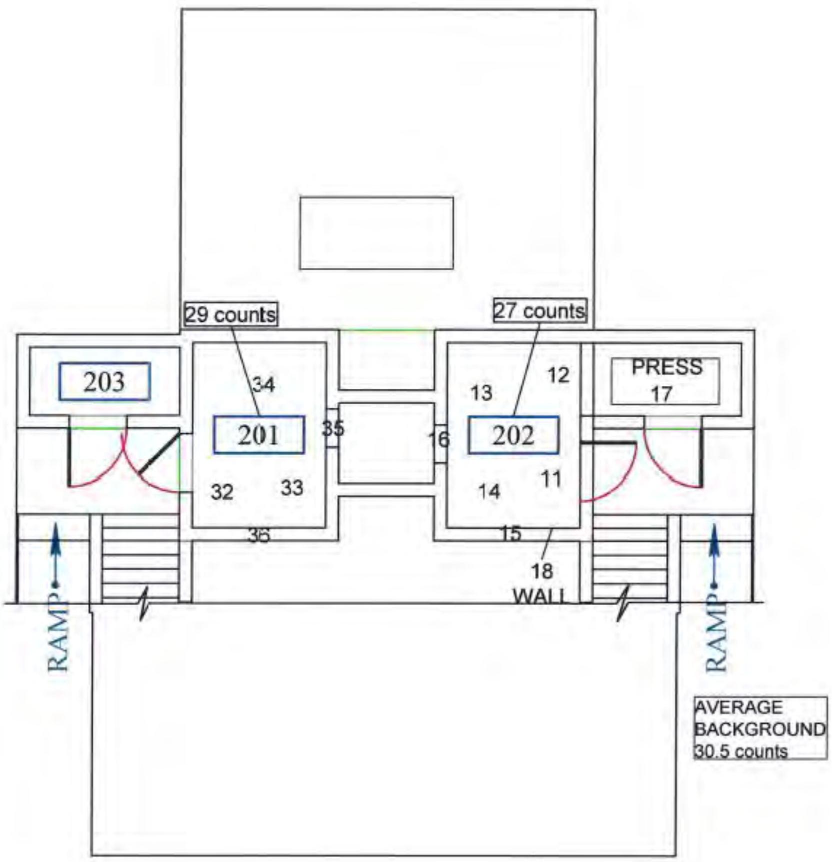


Figure 19: Building 10540 Second Floor

China Lake Survey Sheet		
Surveyor: Todd Hansen	Date of Survey July 19, 2011	Building #: 10540, Second Floor
Instruments Used to Conduct the Survey: - Ludlum 2241 (s/n: 116455) with a Ludlum 43-37 Gas Proportional Floor Monitor (s/n: 259897) - Ludlum 2241 (s/n: 112702) with a Ludlum 43-68 Gas Proportional Hand Held (s/n: 178513) Instruments were calibrated on June 24, 2011		

*Static measurements were collected for a 10 minute integrated count time.

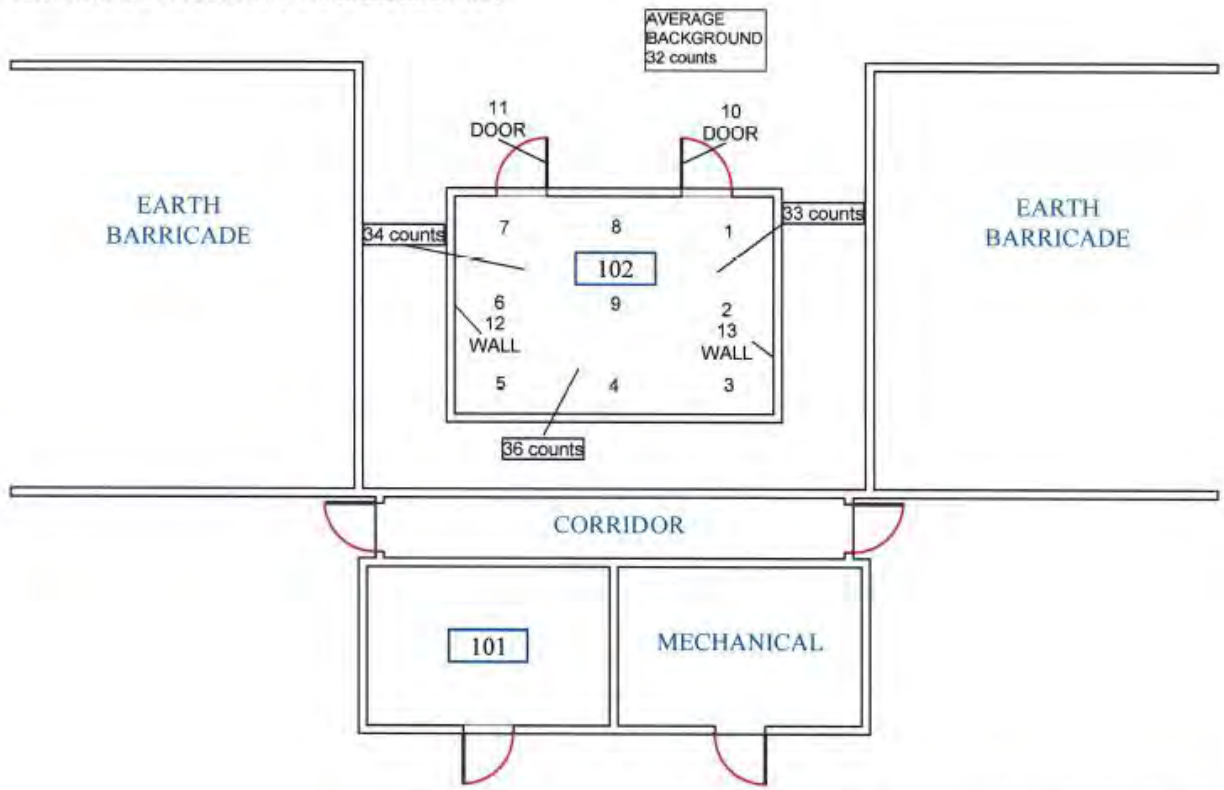


*There is an isolated report DU waste was picked up for incineration from this building, which was reported as Building 54 in the historic record (Ref. D-76)

Figure 20: Building 10562

China Lake Survey Sheet		
Surveyor: Todd Hansen	Date of Survey: July 19, 2011	Building #: 10562
Instruments Used to Conduct the Survey: - Ludlum 2241 (s/n: 116455) with a Ludlum 43-37 Gas Proportional Floor Monitor (s/n: 259897) - Ludlum 2241 (s/n: 112702) with a Ludlum 43-68 Gas Proportional Hand Held (s/n: 178513) Instruments were calibrated on June 24, 2011		

*Static measurements were collected for a 10 minute integrated count time.



*DU was processed in a "Cowles Dissolver" in this building, which was reported as Building 56B in the historic record (Ref. D-37, D-76).

BUILDING 10562

FIRST FLOOR PLAN

Figure 21: Building 10630

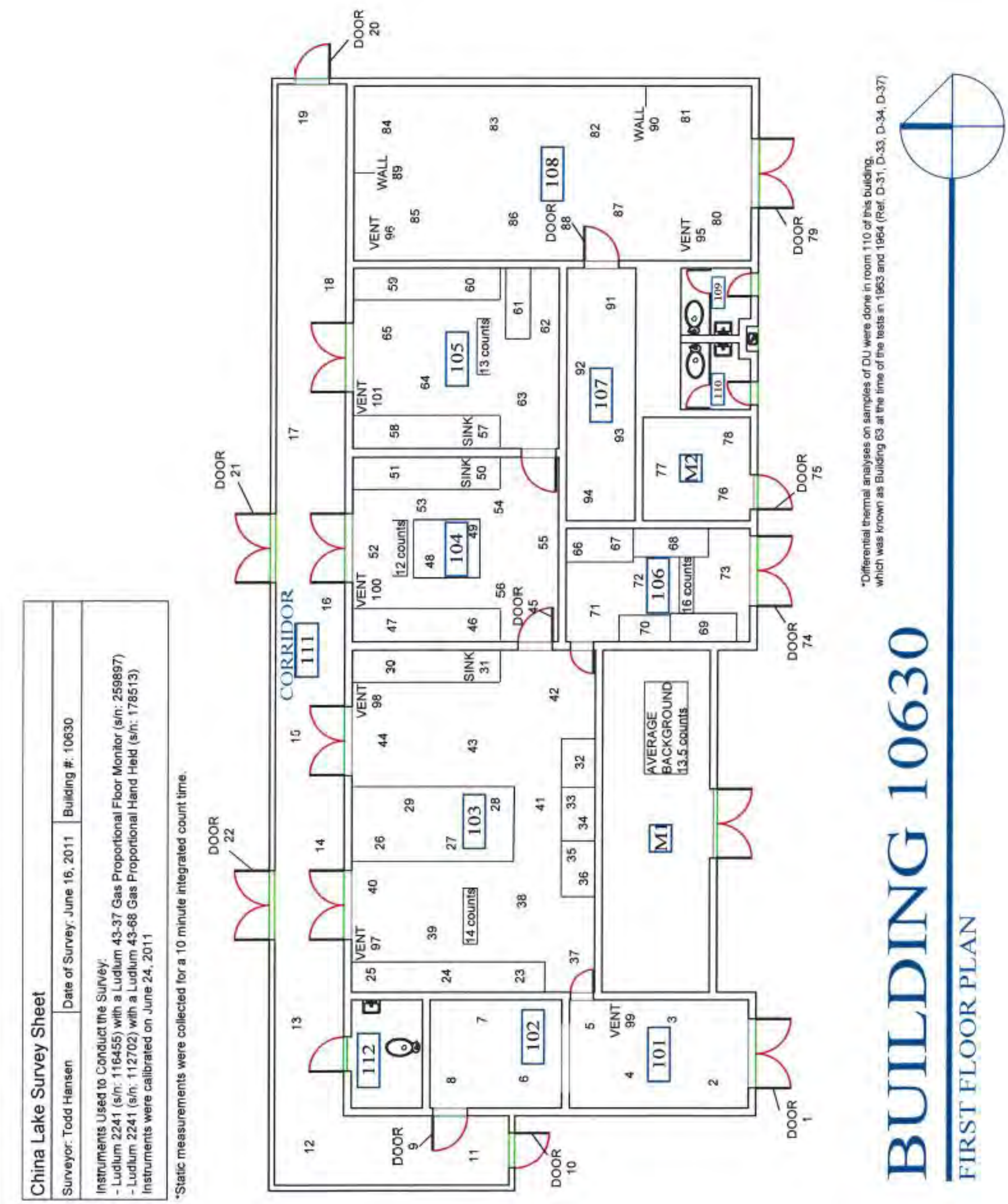


Figure 22: Building 10634

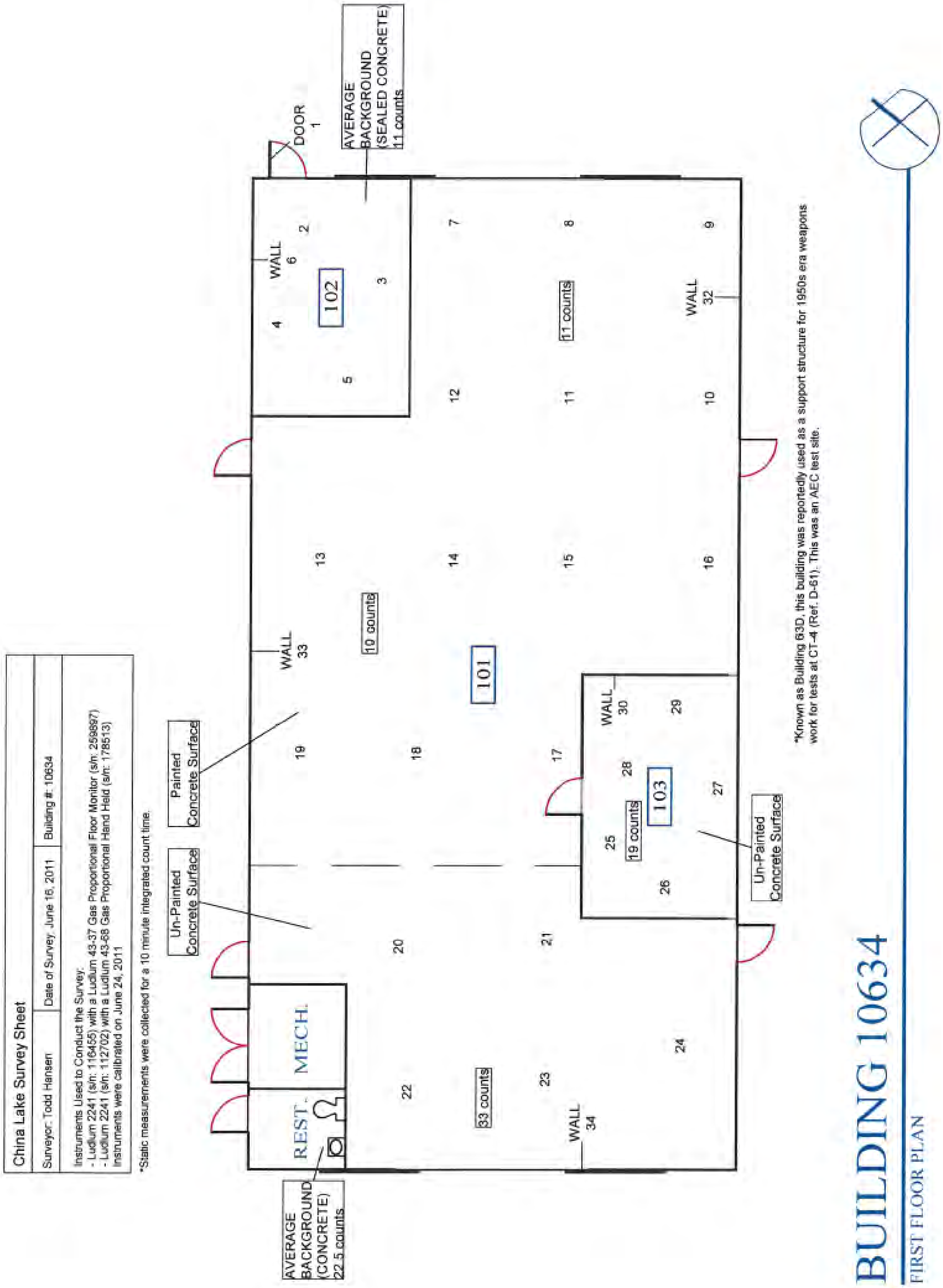

China Lake Survey Sheet
Surveyor: Todd Hansen
Date of Survey: June 16, 2011
Building #: 10634
Instruments Used to Conduct the Survey:
- Ludlum 2241 (s/n: 116455) with a Ludlum 43-37 Gas Proportional Floor Monitor (s/n: 259897)
- Ludlum 2241 (s/n: 112702) with a Ludlum 43-68 Gas Proportional Hand Held (s/n: 178513)
Instruments were calibrated on June 24, 2011
*Static measurements were collected for a 10 minute integrated count time.
AVERAGE BACKGROUND (SEALED CONCRETE) 11 counts
DOOR 1
AVERAGE BACKGROUND (CONCRETE) 22.5 counts
Painted Concrete Surface
Un-Painted Concrete Surface
Un-Painted Concrete Surface
102
101
103
MECH.
REST.
11 counts
10 counts
19 counts
33 counts
WALL 6
WALL 32
WALL 33
WALL 30
WALL 34
1 2 3 4 5 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29
*Known as Building 63D, this building was reportedly used as a support structure for 1950s era weapons work for tests at CT-4 (Ref. D-61). This was an AEC test site.
BUILDING 10634
FIRST FLOOR PLAN

Figure 23: Building 10518

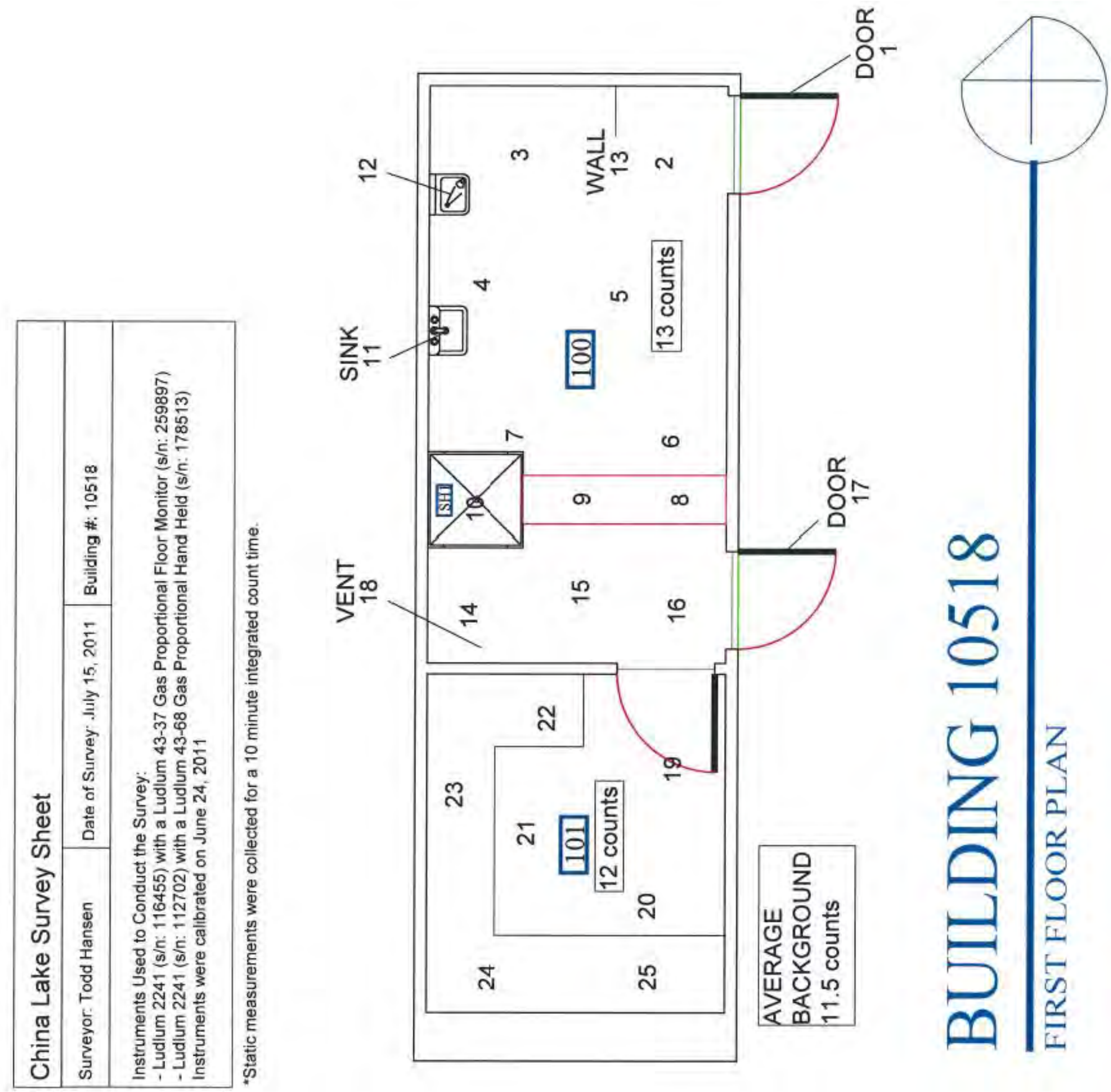


Figure 24: Building 10522

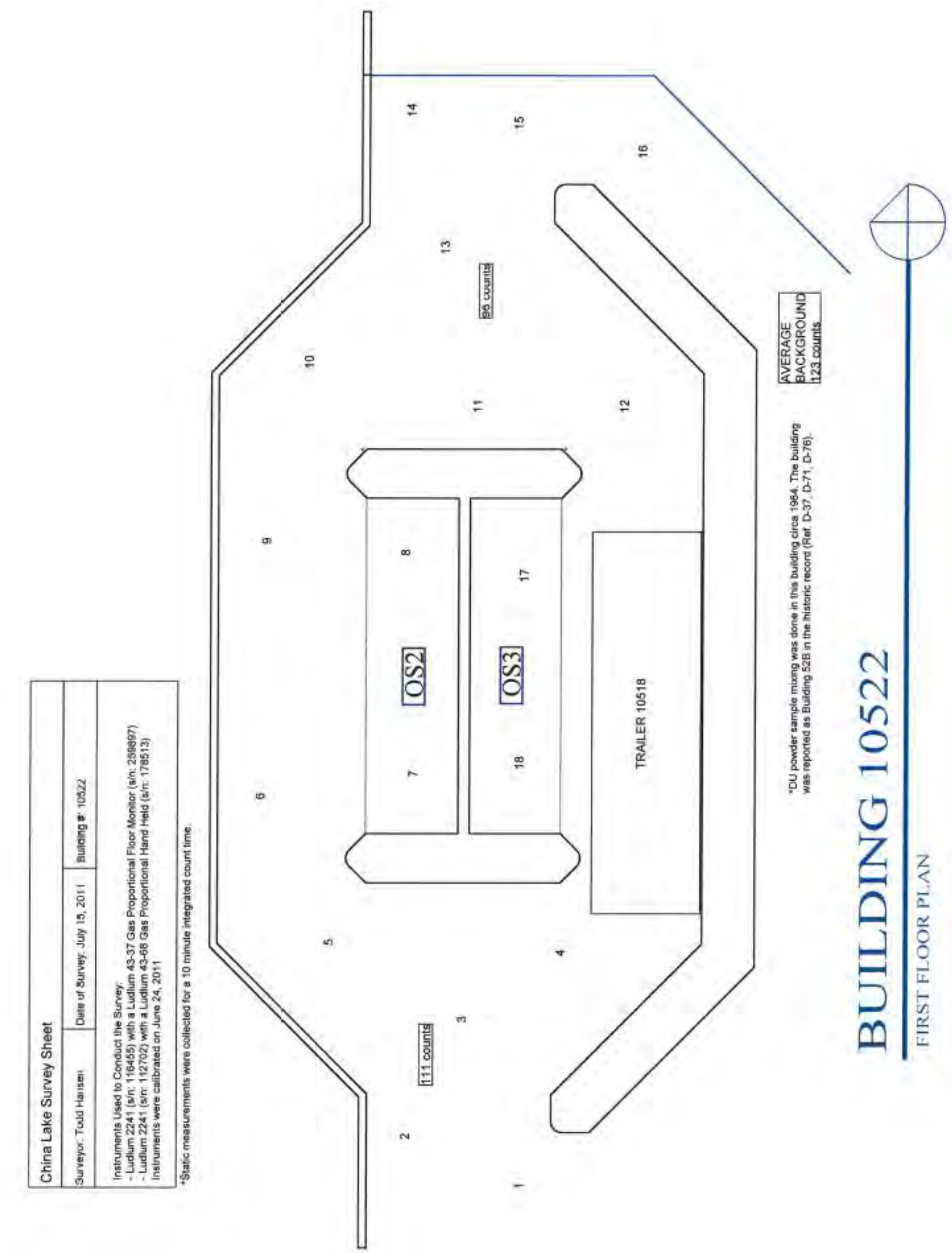


Figure 25: Building 10632

China Lake Survey Sheet		
Surveyor: Todd Hansen	Date of Survey: July 15, 2011	Building #: 10522
Instruments Used to Conduct the Survey: - Ludlum 2241 (s/n: 116455) with a Ludlum 43-37 Gas Proportional Floor Monitor (s/n: 259897) - Ludlum 2241 (s/n: 112702) with a Ludlum 43-68 Gas Proportional Hand Held (s/n: 178513) Instruments were calibrated on June 24, 2011		

*Static measurements were collected for a 10 minute integrated count time.

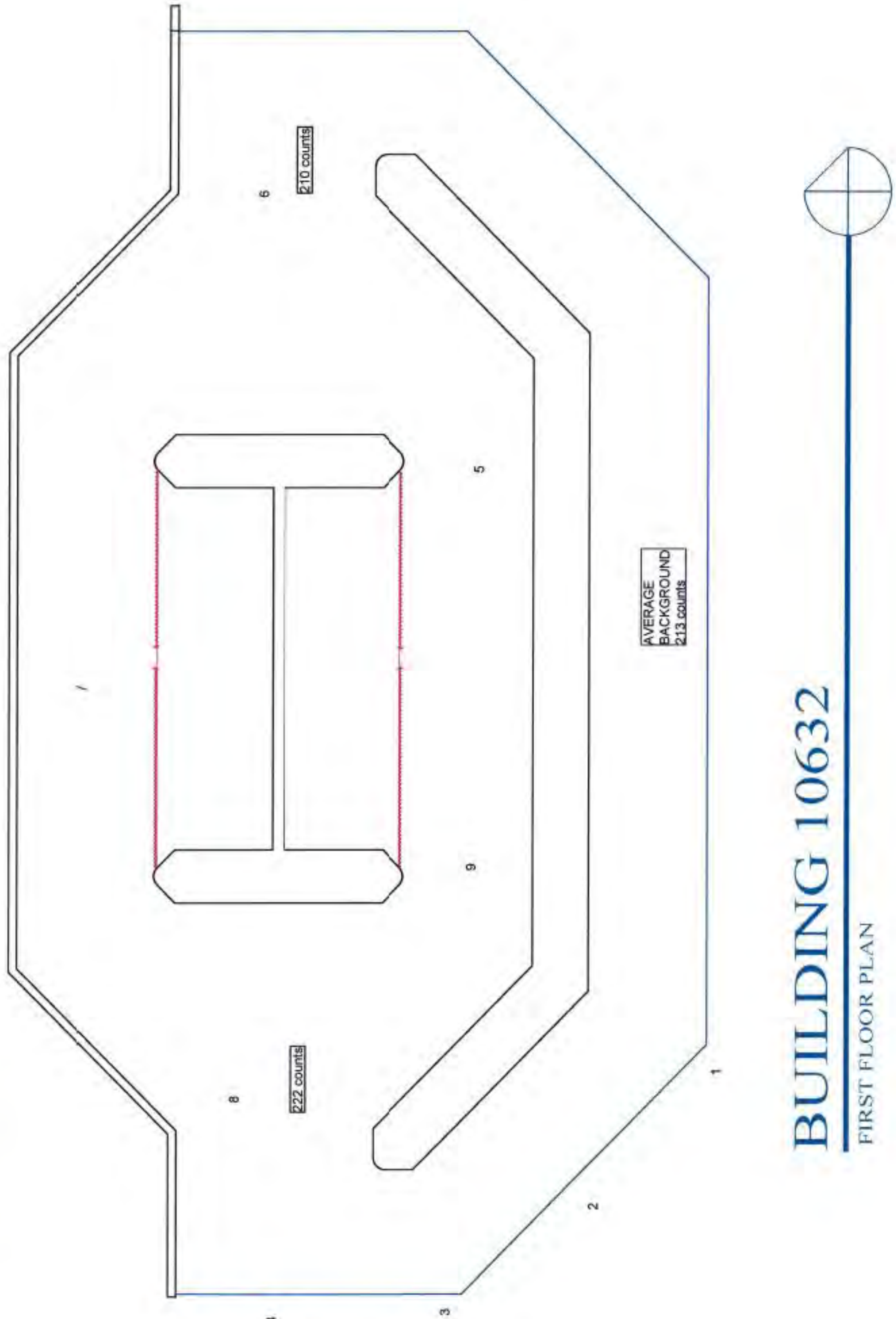


Figure 26: Building 11640

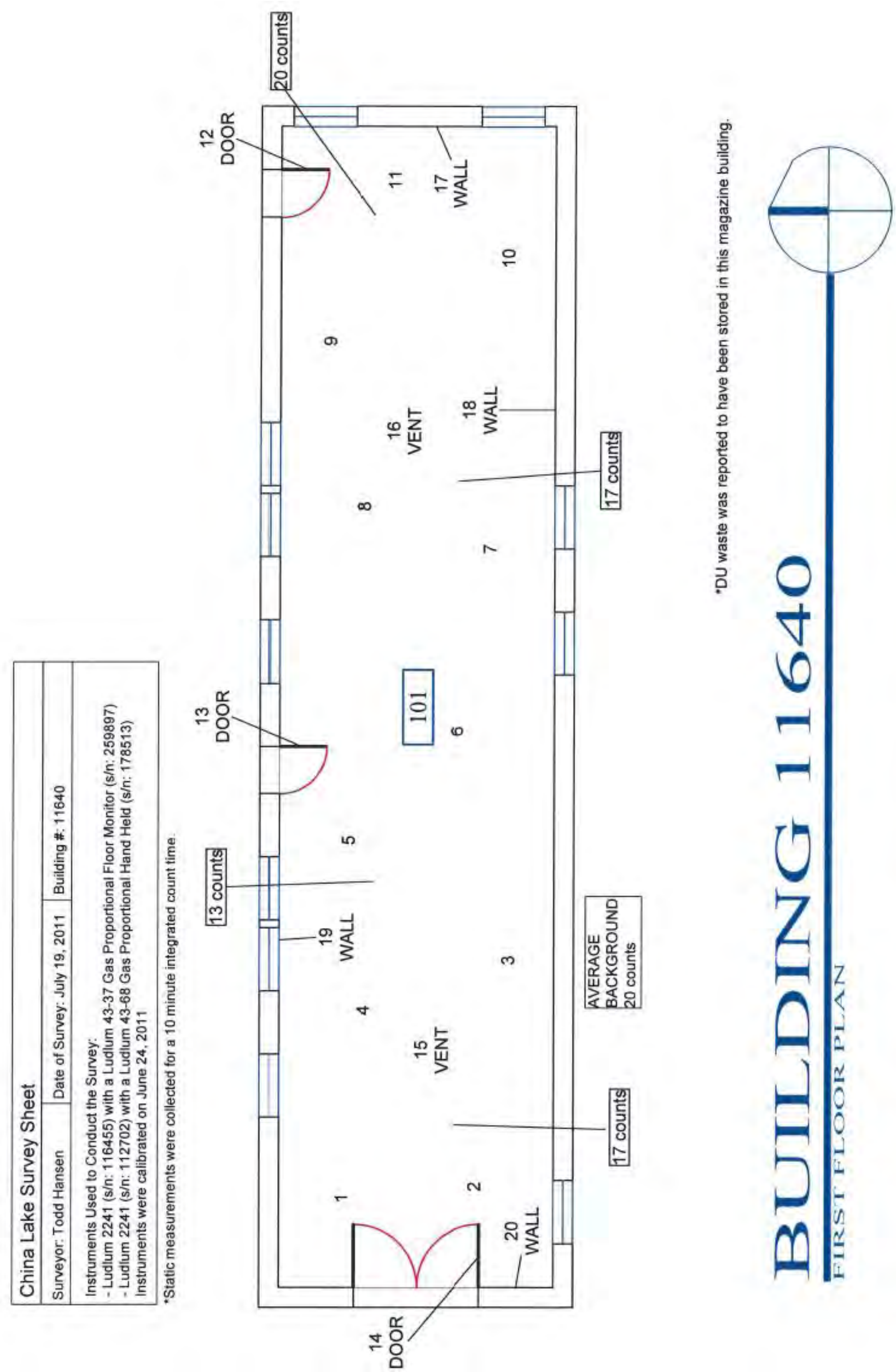


Figure 27: Building 11681

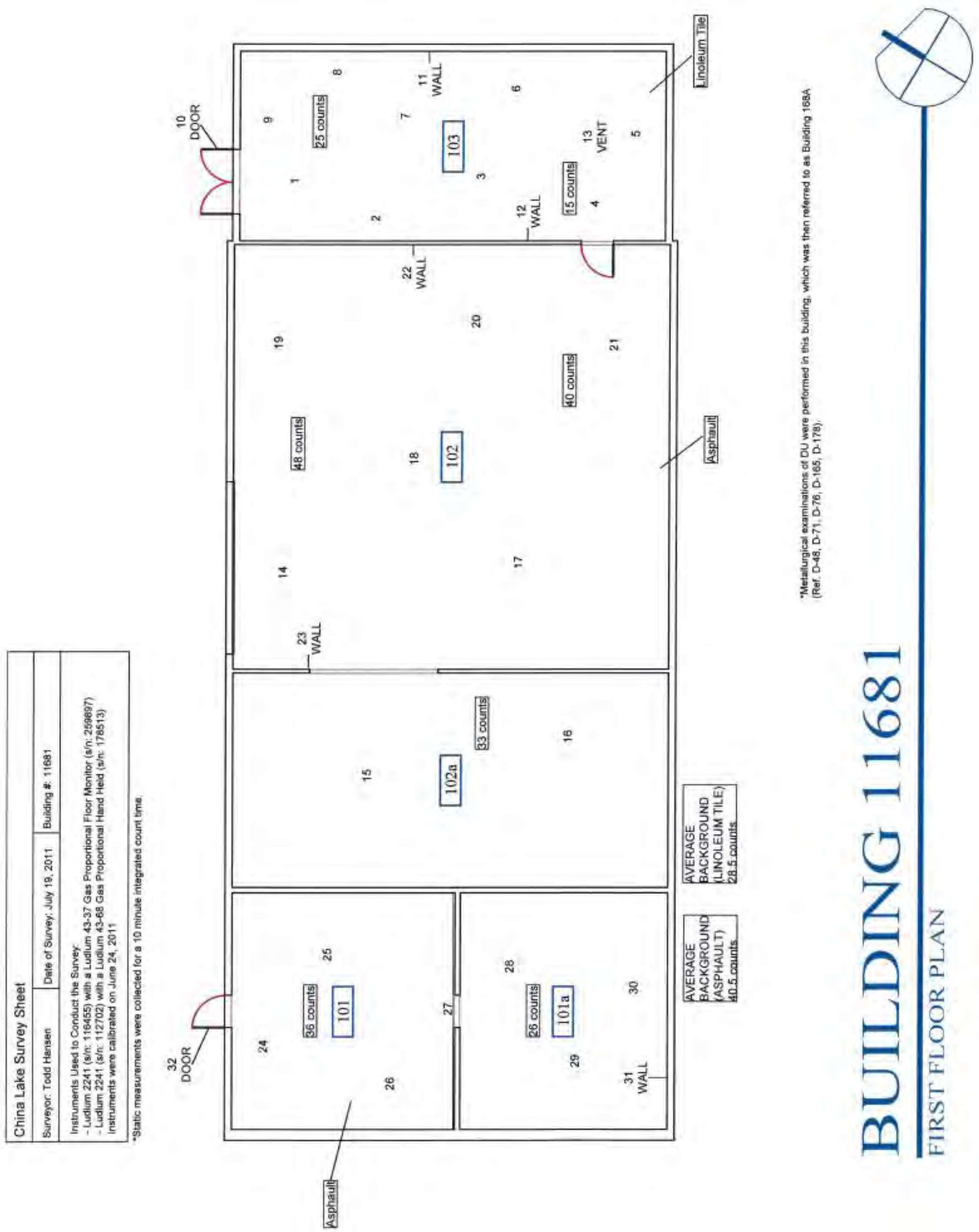


Figure 28: Building 12510

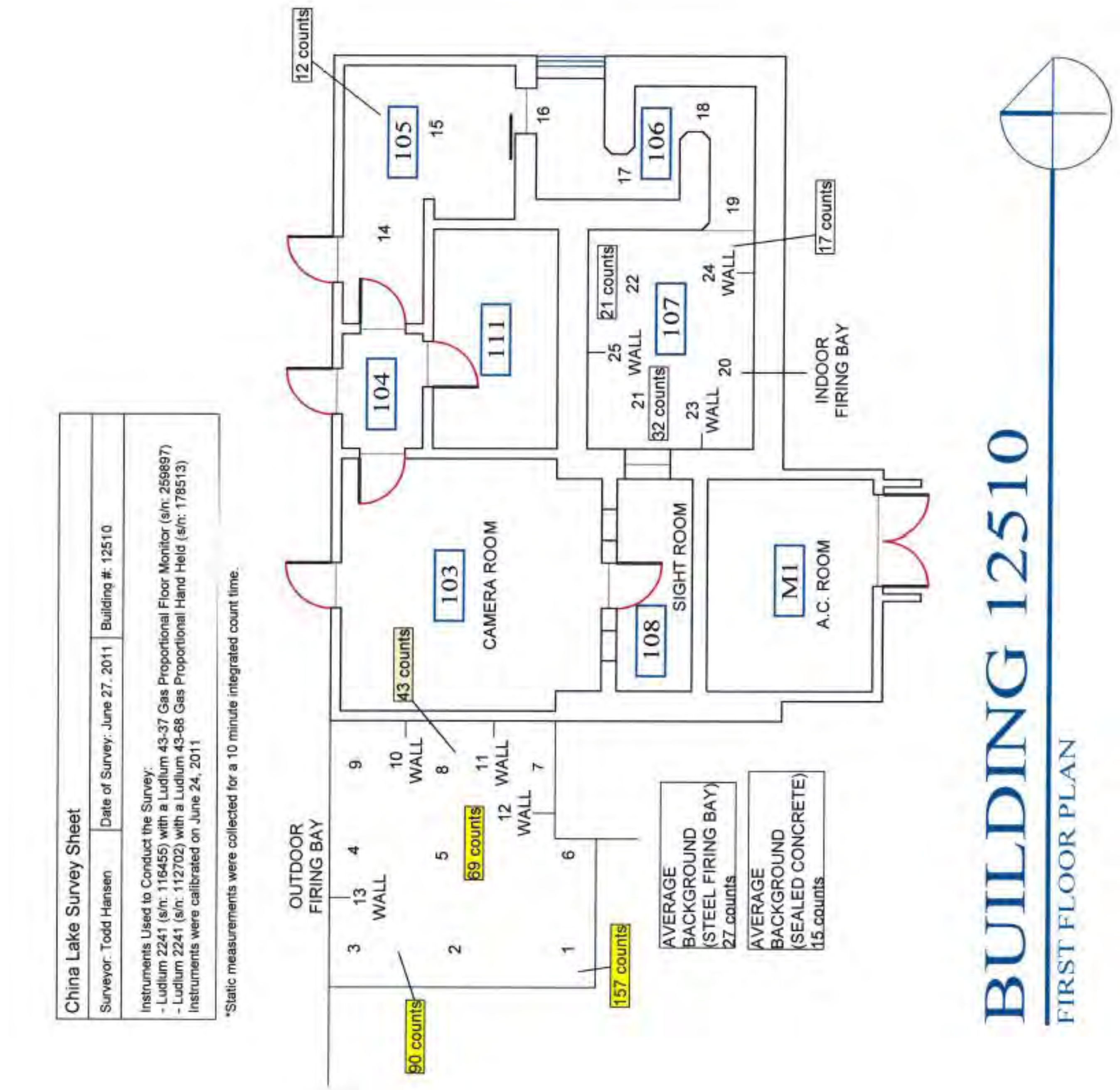
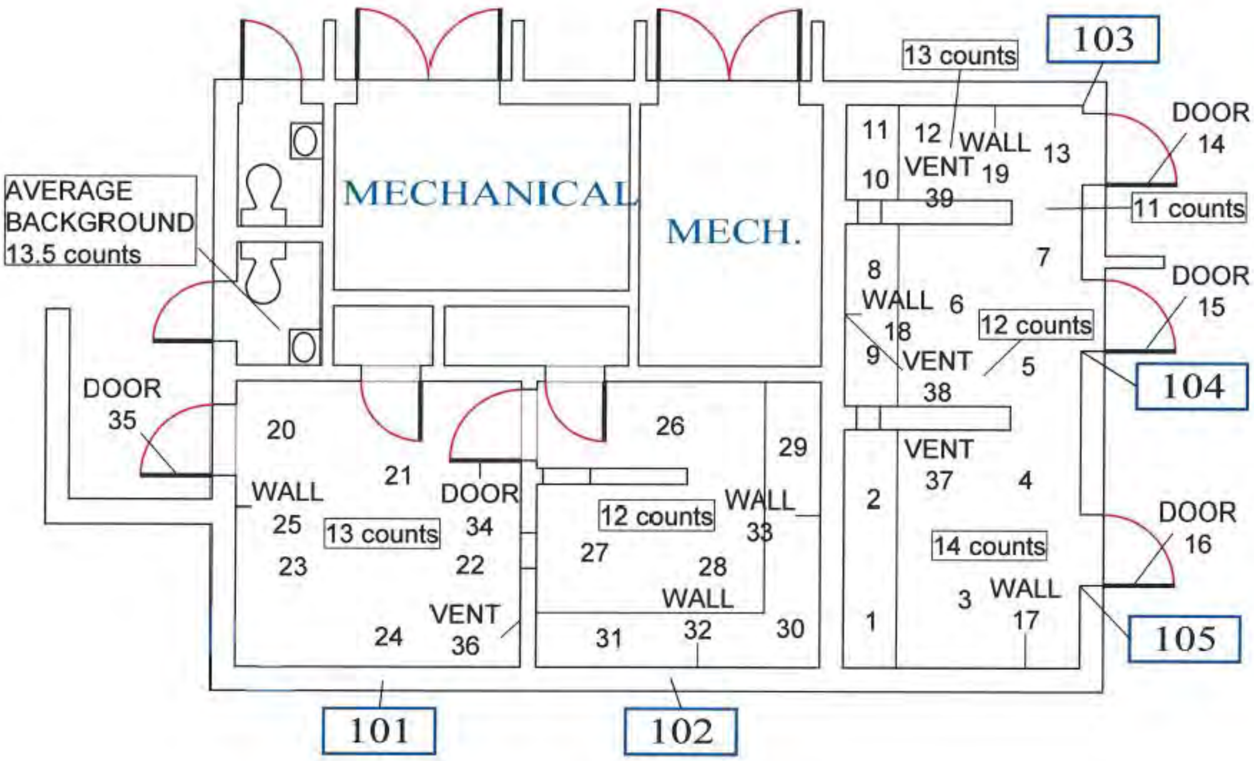

China Lake Survey Sheet
Surveyor: Todd Hansen
Date of Survey: June 27, 2011
Building #: 12510
Instruments Used to Conduct the Survey:
- Ludlum 2241 (s/n: 116455) with a Ludlum 43-37 Gas Proportional Floor Monitor (s/n: 259897)
- Ludlum 2241 (s/n: 112702) with a Ludlum 43-68 Gas Proportional Hand Held (s/n: 178513)
Instruments were calibrated on June 24, 2011
*Static measurements were collected for a 10 minute integrated count time.
OUTDOOR FIRING BAY
90 counts
157 counts
69 counts
43 counts
13 WALL
10 WALL
11 WALL
12 WALL
CAMERA ROOM
103
104
111
105
106
107
108
12 counts
21 counts
32 counts
17 counts
25 WALL
23 WALL
24 WALL
21
22
20
INDOOR FIRING BAY
SIGHT ROOM
A.C. ROOM
M1
AVERAGE BACKGROUND (STEEL FIRING BAY) 27 counts
AVERAGE BACKGROUND (SEALED CONCRETE) 15 counts
BUILDING 12510
FIRST FLOOR PLAN

Figure 29: Building 12520

China Lake Survey Sheet		
Surveyor: Todd Hansen	Date of Survey: June 27, 2011	Building #: 12520
Instruments Used to Conduct the Survey: - Ludlum 2241 (s/n: 116455) with a Ludlum 43-37 Gas Proportional Floor Monitor (s/n: 259897) - Ludlum 2241 (s/n: 112702) with a Ludlum 43-68 Gas Proportional Hand Held (s/n: 178513) Instruments were calibrated on June 24, 2011		

*Static measurements were collected for a 10 minute integrated count time.



*This building is located in the Salt Wells Pilot Plant faciltiy. Testing of DU was suggested as potentially having been done in this building, known as Building 252 at the time (Ref. D-76, D-133, D-175). There is no confirmation of any sush testing in this building in the available historic record.

BUILDING 12520

FIRST FLOOR PLAN

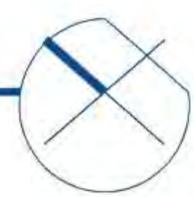


Figure 30: Building 13060

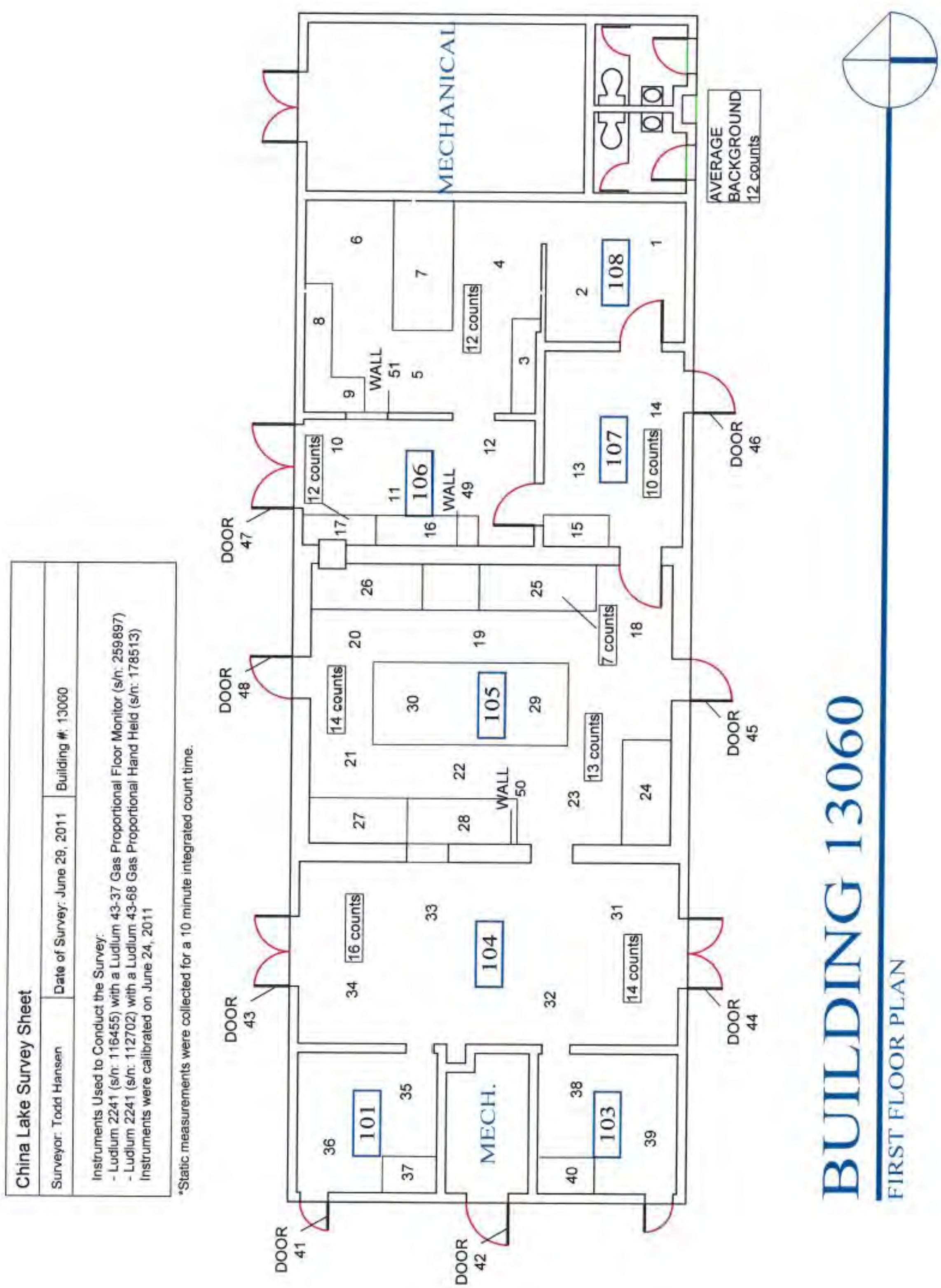
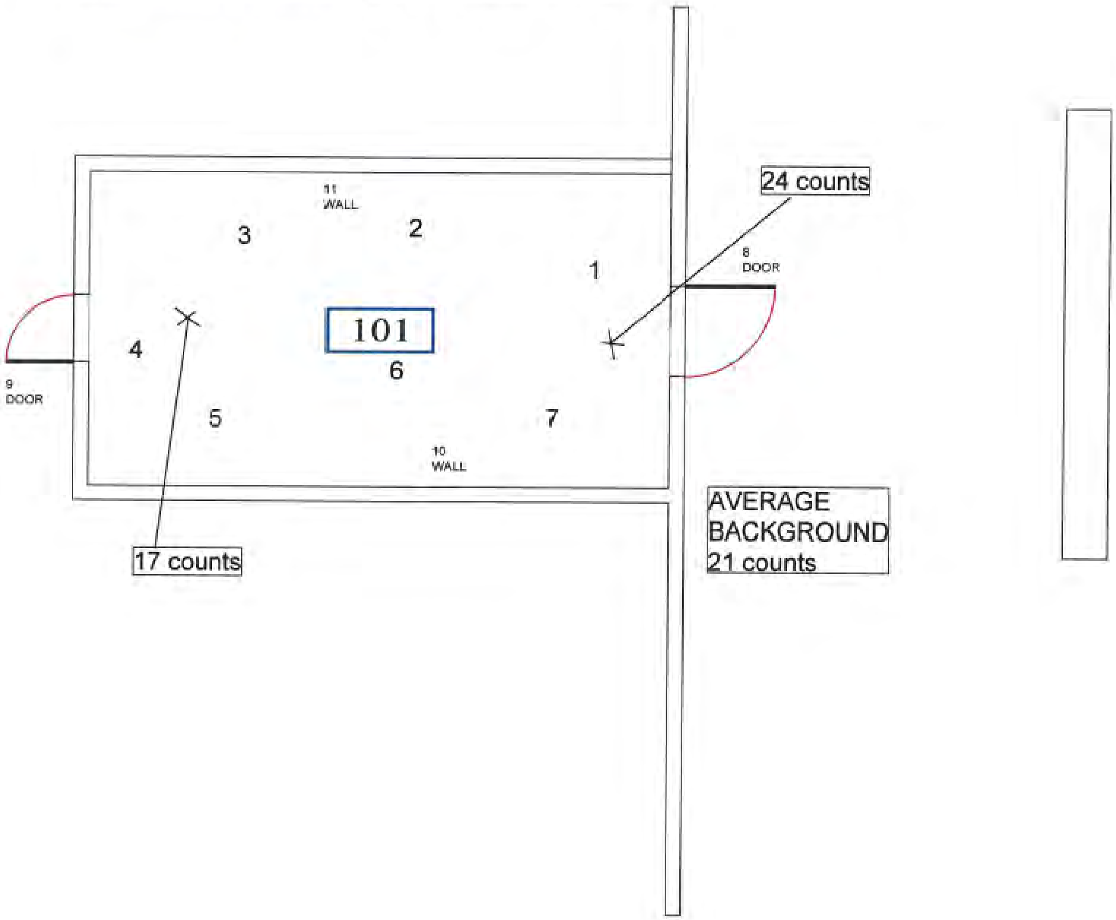


Figure 31: Building 13090

China Lake Survey Sheet		
Surveyor: Todd Hansen	Date of Survey: June 30, 2011	Building #: 13090
Instruments Used to Conduct the Survey: - Ludlum 2241 (s/n: 116455) with a Ludlum 43-37 Gas Proportional Floor Monitor (s/n: 259897) - Ludlum 2241 (s/n: 112702) with a Ludlum 43-68 Gas Proportional Hand Held (s/n: 178513) Instruments were calibrated on June 24, 2011		

*Static measurements were collected for a 10 minute integrated count time.



*Known as Building 309 in the historic record, this structure was reportedly used to store DU materials (Ref. D-76, D-165, D-175, D-178).

BUILDING 13090

FIRST FLOOR PLAN

Figure 32: Building 30973

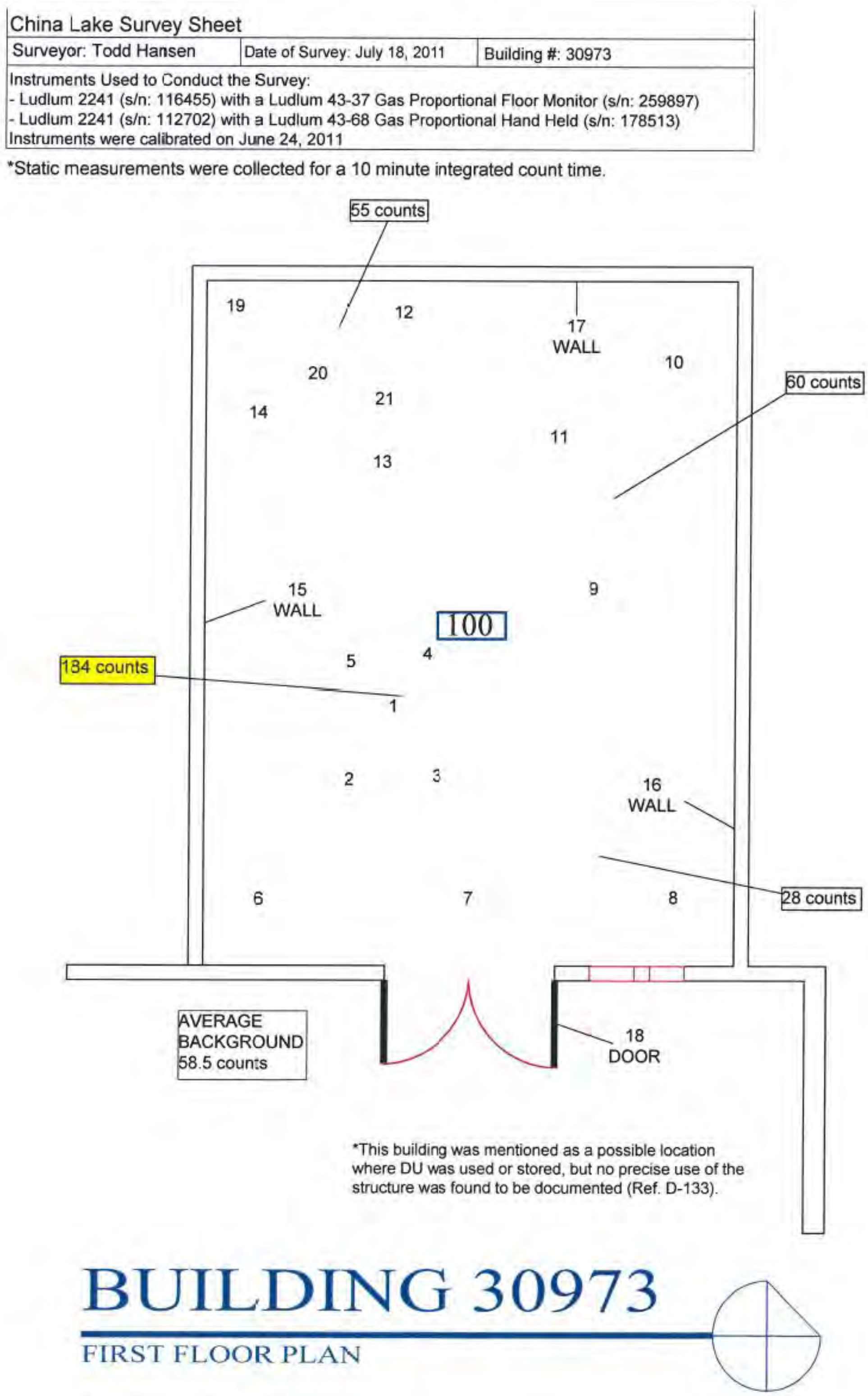


Figure 33: Building 31003

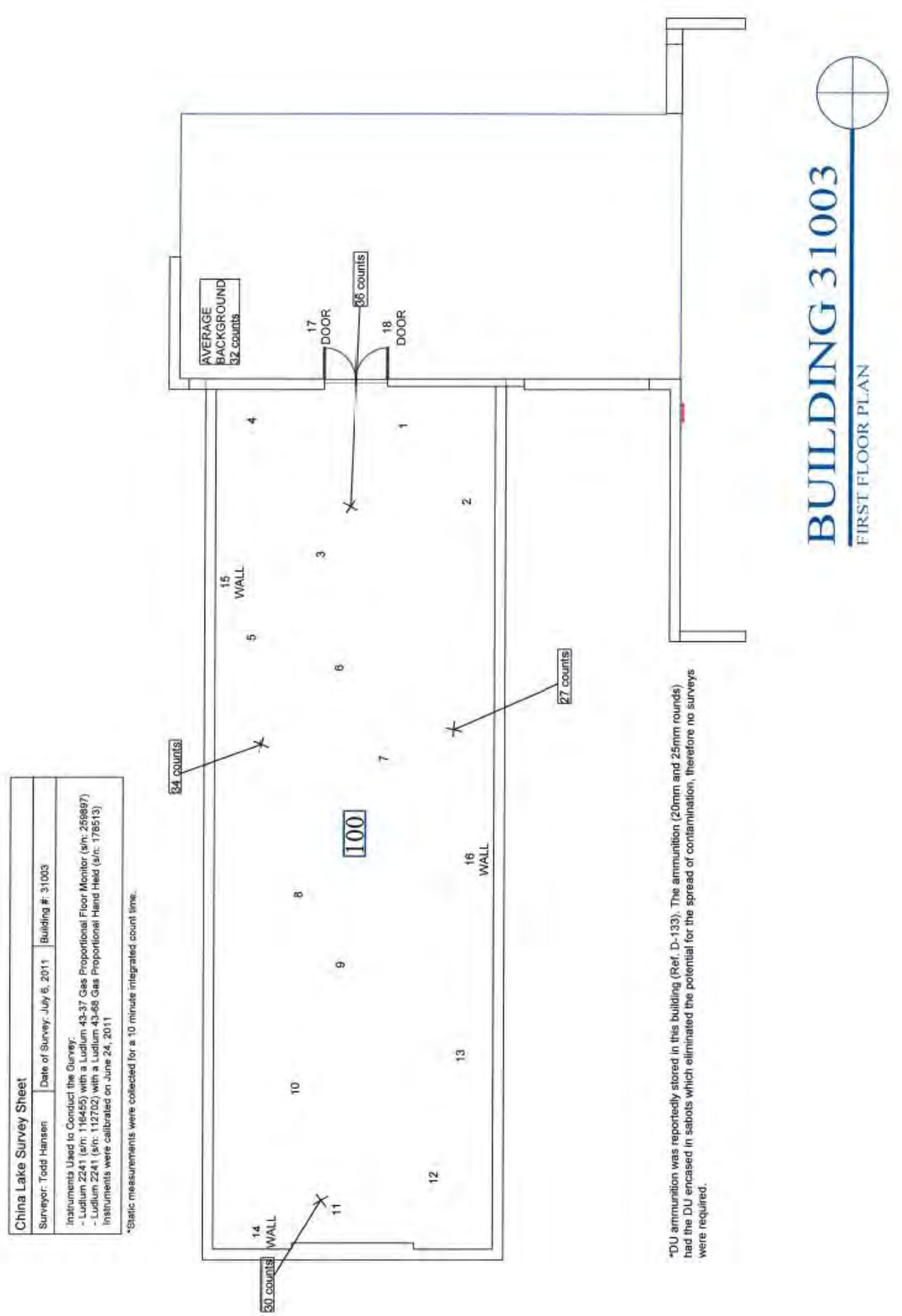

China Lake Survey Sheet
Surveyor: Todd Hansen
Date of Survey: July 6, 2011
Building #: 31003
Instruments Used to Conduct the Survey:
- Ludlum 2241 (s/n: 116455) with a Ludlum 43-37 Gas Proportional Floor Monitor (s/n: 259897)
- Ludlum 2241 (s/n: 112702) with a Ludlum 43-68 Gas Proportional Hand Held (s/n: 178513)
Instruments were calibrated on June 24, 2011
*Static measurements were collected for a 10 minute integrated count time.
AVERAGE BACKGROUND 32 counts
36 counts
17 DOOR
18 DOOR
34 counts
27 counts
30 counts
14 WALL
15 WALL
16 WALL
100
1
2
3
4
5
6
7
8
9
10
11
12
13
BUILDING 31003
FIRST FLOOR PLAN
*DU ammunition was reportedly stored in this building (Ref. D-133). The ammunition (20mm and 25mm rounds) had the DU encased in sabots which eliminated the potential for the spread of contamination, therefore no surveys were required.

Figure 34: Building 31018

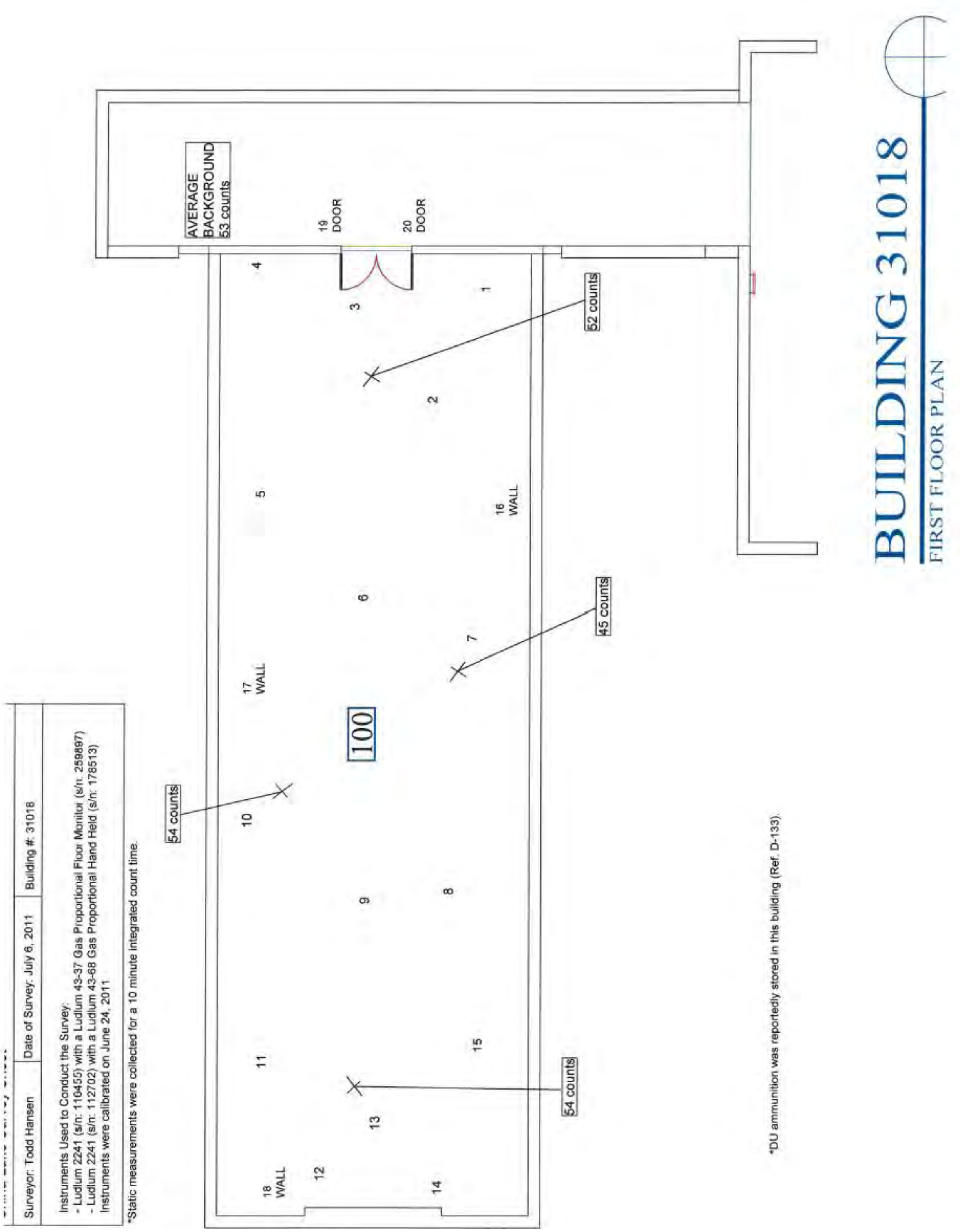


Figure 35: Building 31024

China Lake Survey Sheet		
Surveyor: Todd Hansen	Date of Survey: July 6, 2011	Building #: 31024
Instruments Used to Conduct the Survey: - Ludlum 2241 (s/n: 116455) with a Ludlum 43-37 Gas Proportional Floor Monitor (s/n: 259897) - Ludlum 2241 (s/n: 112702) with a Ludlum 43-68 Gas Proportional Hand Held (s/n: 178513) Instruments were calibrated on June 24, 2011		

*Static measurements were collected for a 10 minute integrated count time.

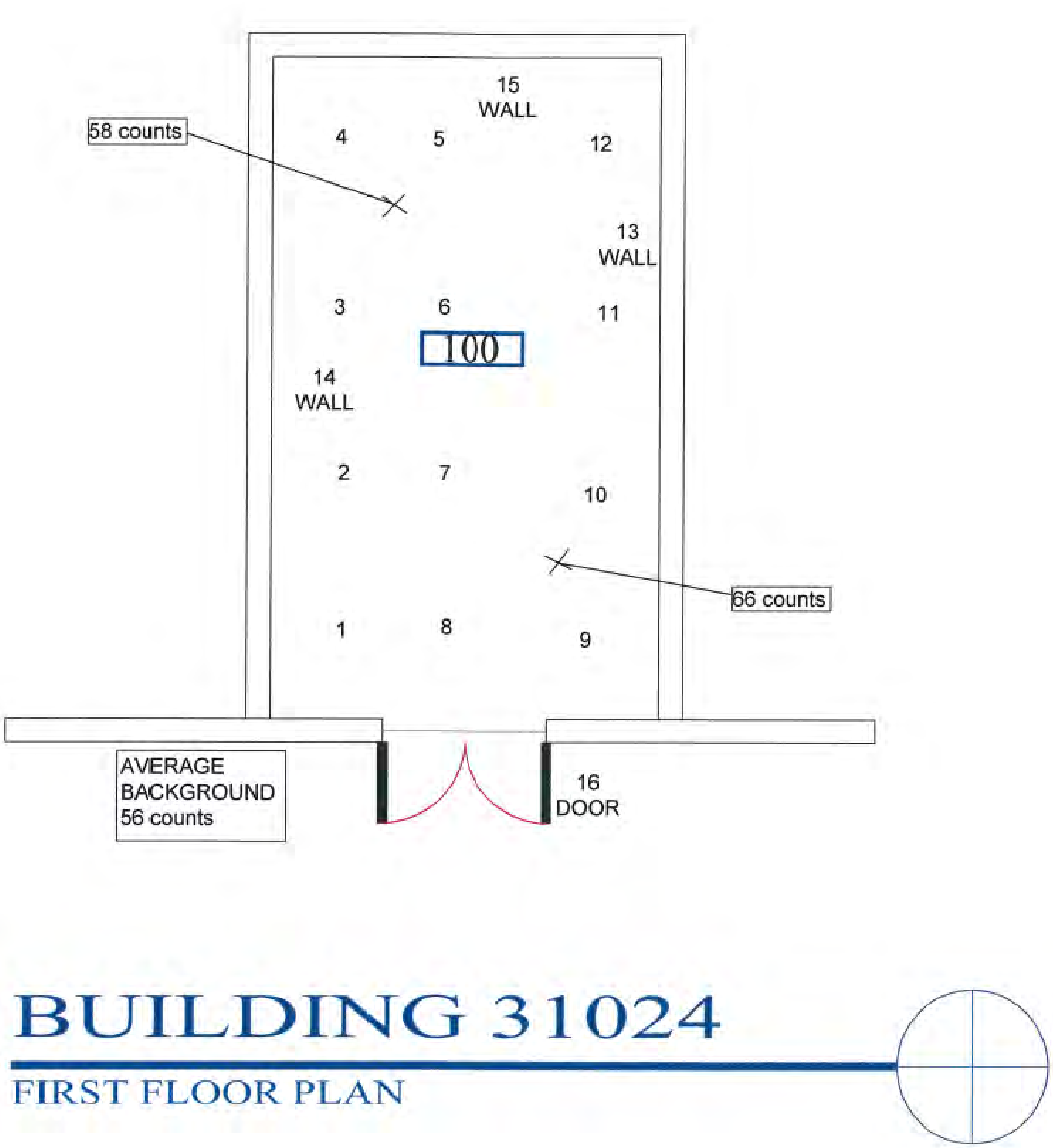


Figure 36: Building 31110

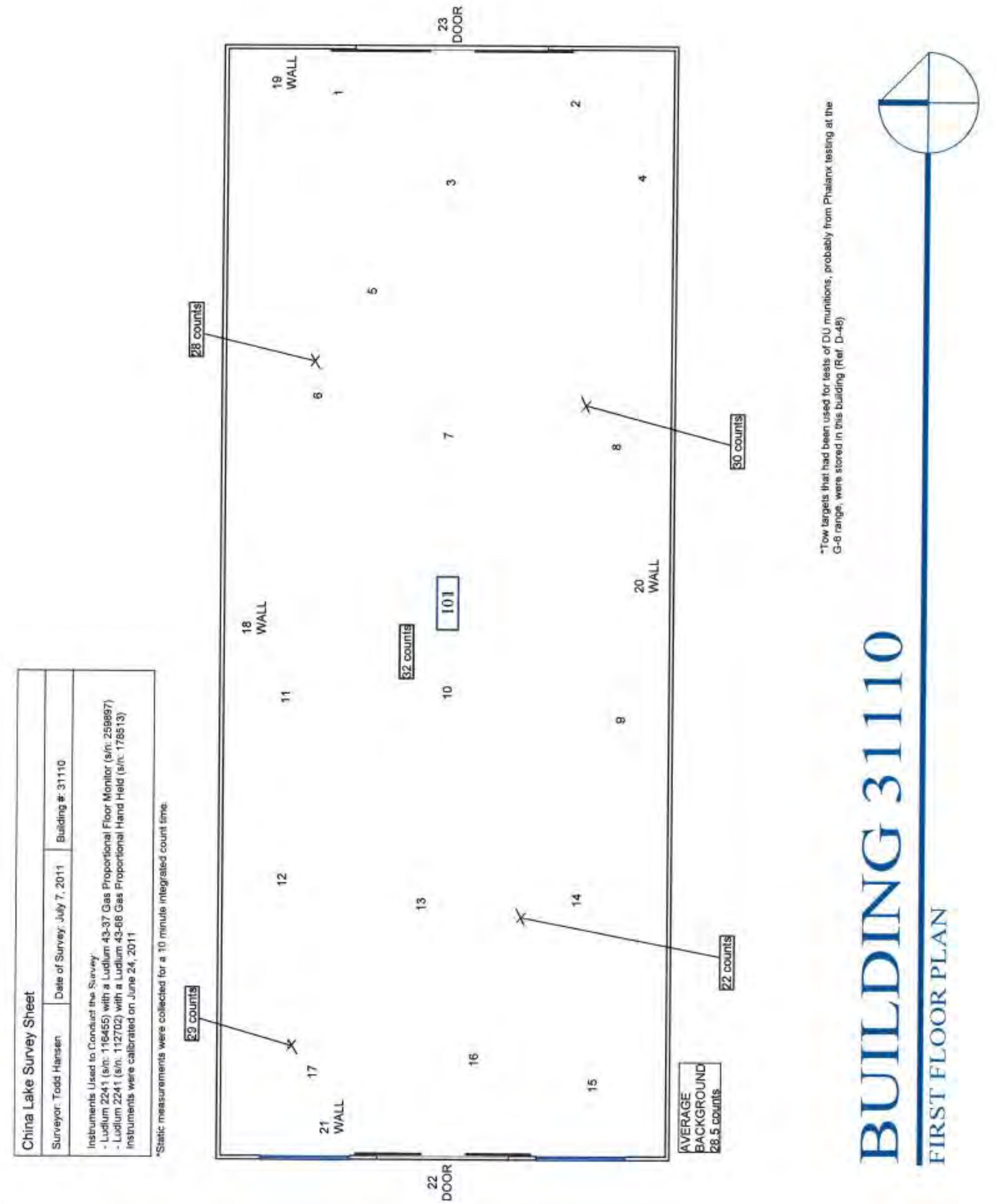
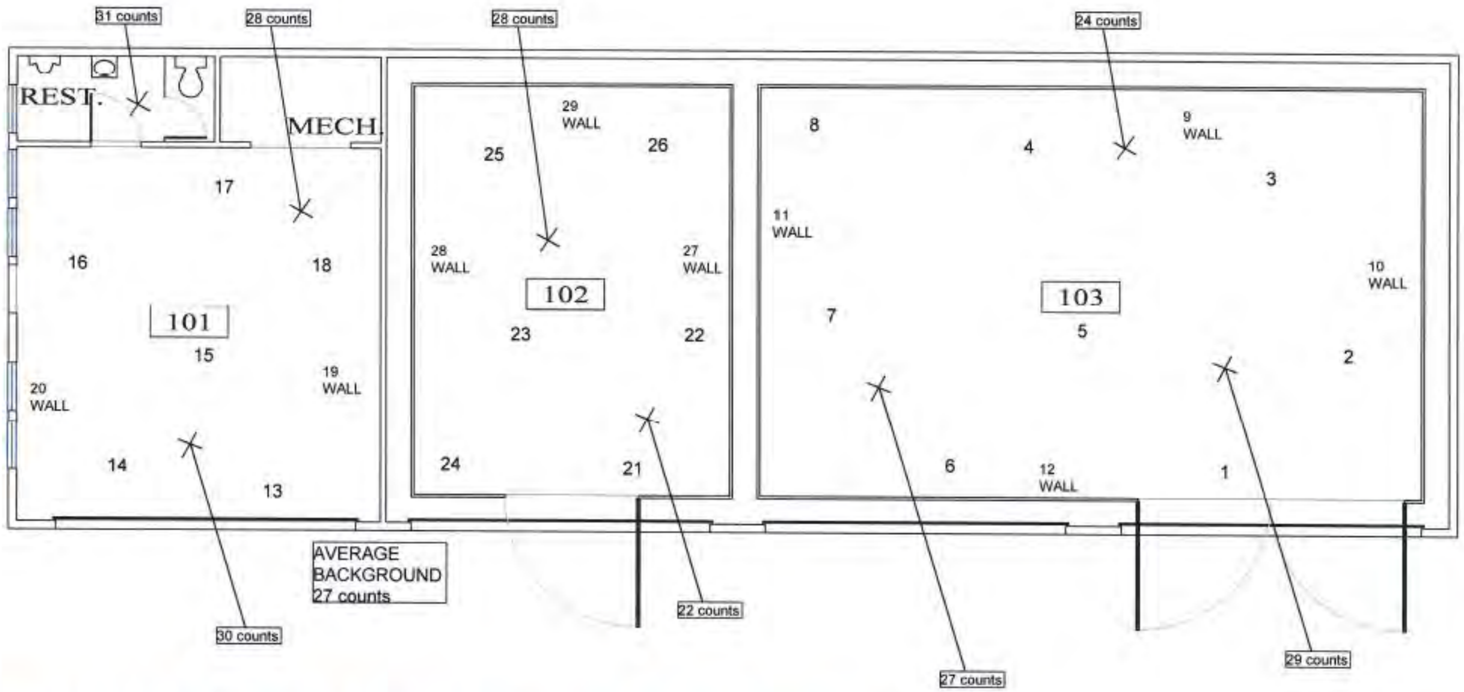


Figure 37: Building 31123

China Lake Survey Sheet		
Surveyor: Todd Hansen	Date of Survey: July 1, 2011	Building #: 31123
Instruments Used to Conduct the Survey: - Ludlum 2241 (s/n: 116455) with a Ludlum 43-37 Gas Proportional Floor Monitor (s/n: 259897) - Ludlum 2241 (s/n: 112702) with a Ludlum 43-68 Gas Proportional Hand Held (s/n: 178513) Instruments were calibrated on June 24, 2011		

*Static measurements were collected for a 10 minute integrated count time.



BUILDING 31123

FIRST FLOOR PLAN

Attachment 7 – Land Area Survey Summary

Table 7.1 Statistical Analysis of All Data Points

Area	Count N	Max	Min	Average	Mode	Standard Deviation	Skew	Kurtosis
Aircraft Bone Yard	177	15363	69	637	131	2027	5.5	32.6
B-4 Track	256	248	69	166	181	30	0.2	0.2
B-29 & F-4 Area	57	15505	71	1997	345	3203	2.8	9.0
Boondock	1559	364	139	225	240	38	0.3	0.0
COSO Range	10	1955	767	1133	767	432	1.5	1.0
CT1 SA-1	75843	292252	100	305	184	3595	56	3572
SA-2	302	328	134	233	221	32	-0.2	0.3
SA-3	150	297	130	228	228	31	-0.5	0.2
CT3 SA-1	801	365	158	258	242	32	-0.0	-0.1
CT4 SA-1	505	321	130	226	242	33	-0.1	-0.2
SA-2	545	3003	137	230	204	172	12	153
SA-3	321	338	154	233	240	37	0.4	-0.2
SA-4	946	348	130	228	248	34	0.2	-0.2
SA-5	6876	5299	128	210	193	10	21	512
SA-6	7563	6267	87	190	168	127	41	1915
SA-7	306	234	99	161	167	24	0.2	0.0
SA-8	7542	20028	64	179	168	341	50	2634
SA-9	1744	432	86	179	144	39	1.2	3.5
North Trails	4	711	290	493	NA	605	0.1	-4.4
Disposal Pit	7	36126	443	6665	NA	13068	2.6	6.7
CT6	926	360	143	248	265	34	0.1	0.2
Detonation Physics Lab	397	394	148	258	341	49	0.3	-0.6
K-2 Small Caliber Gun Range	2055	350241	111	1312	180	10481	22	636
Kennedy Stands	9033	172607	112	812	196	5136	8	465
Launch Test Facility	1050	292	13	204	222	31	-0.3	0.8
Salt Wells Dump Site	389	2637	94	215	158	131	16	302
SNORT	3469	4952	128	218	230	111	26	1013

Area	Count N	Max	Min	Average	Mode	Standard Deviation	Skew	Kurtosis
Track								
SNORT SA-1	1612	1093	142	248	218	55	5.0	625
SNORT SA-2	5000	50669	128	242	166	1512	27	782
T-11 SA-1	24036	163565	101	490	161	8650	34	1493
SA-2	8256	11024	100	204	176	258	25	793
X-Pad	1589	287	66	156	153	33	0.6	0.7

Table 7.2 Summary Analysis of Areas with Elevated Activity

Area	Count N	Max	Min	Average	Mode	Standard Deviation	Skewness	Kurtosis
Aircraft Bone Yard	21	15363	487	4197	NA	4588	1.5	1.2
B-29 & F-4 Area	33	15505	481	3232	713	3769	2.1	4.7
COSO Range	10	1955	767	1133	767	432	1.5	1.0
CT1 SA-1	779	292252	478	10120	488	34092	5	34
CT4 SA-2	6	3003	1049	1704	NA	692	1.6	3.2
SA-5	38	5299	487	1733	621	1394	1.0	-0.4
SA-6	10	6267	605	2489	6267	2526	1.0	-1.2
SA-8	5	20028	580	10681	NA	8967	-0.4	-2.9
North Trails	2	711	615	663	NA	68	NA	NA
Disposal Pit	6	36126	578	7702	NA	13996	2.4	5.8
K-2 Small Caliber Gun Range	220	350241	484	10630	566	30539	7.4	72
Kennedy Stands	1566	172607	479	4440	482	13275	7.4	65
Salt Wells Dump Site	1	2637	2637	NA	NA	NA	NA	NA
SNORT Track	12	4952	594	1433	NA	1230	2.5	6.7
SA-1	5	1093	496	805	NA	232	-0.1	-0.8
SA-2	24	50669	512	13771	NA	17454	1.1	-0.3
T-11 SA-1	3108	163565	479	2434	493	7742	13	207
SA-2	96	11024	484	1720	1060	1824	3	11

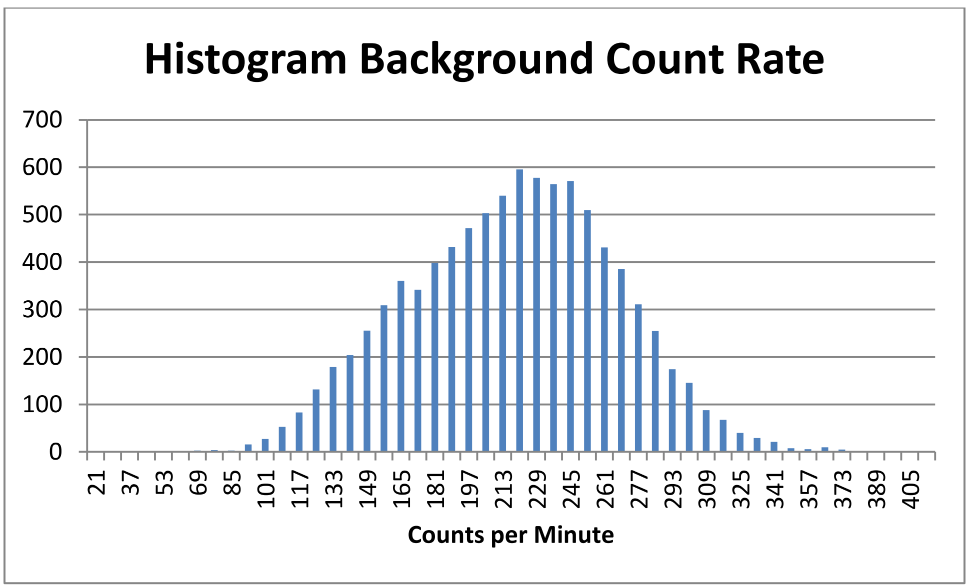
Attachment 8 – Land Area Background Evaluations

Areas with no elevated readings evaluated for background variations included Boondocks, B-4 Track, CT-1 (SA-2 and SA-3), CT3 (SA-1), CT4 (SA-1, SA-3, SA-4, SA-7), CT6 (SA-1), Detonation Physics Lab, Launch Test Facility, X-Pad

Table 8.1 Summary of Background Statistics

Count N	9108
Max	394
Min	13
Mean	214
Standard Deviation	49
Mode	240
Skew	-0.1
Kurtosis	-0.3

Figure 38: Background Histogram



Attachment 9 – Land Area Survey Maps

Figure 39: Aircraft Boneyard

Figure 40: B-4 Tracks

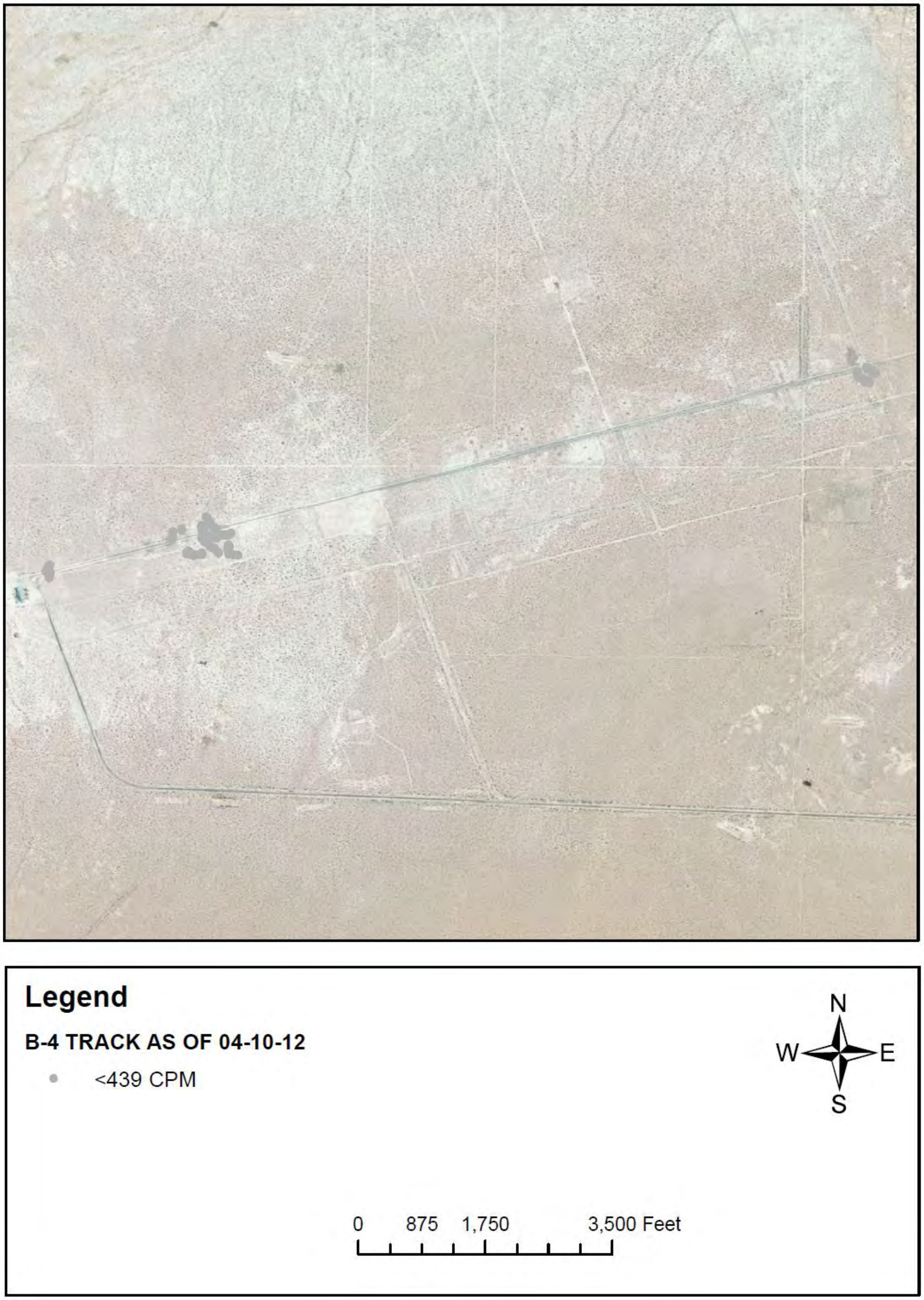


Figure 41: B-29 & F-4 Area


Legend
PointName
Radium
N
W
E
S
0 175 350 700 Feet

Figure 42: Boondock

Figure 43: COSO Range

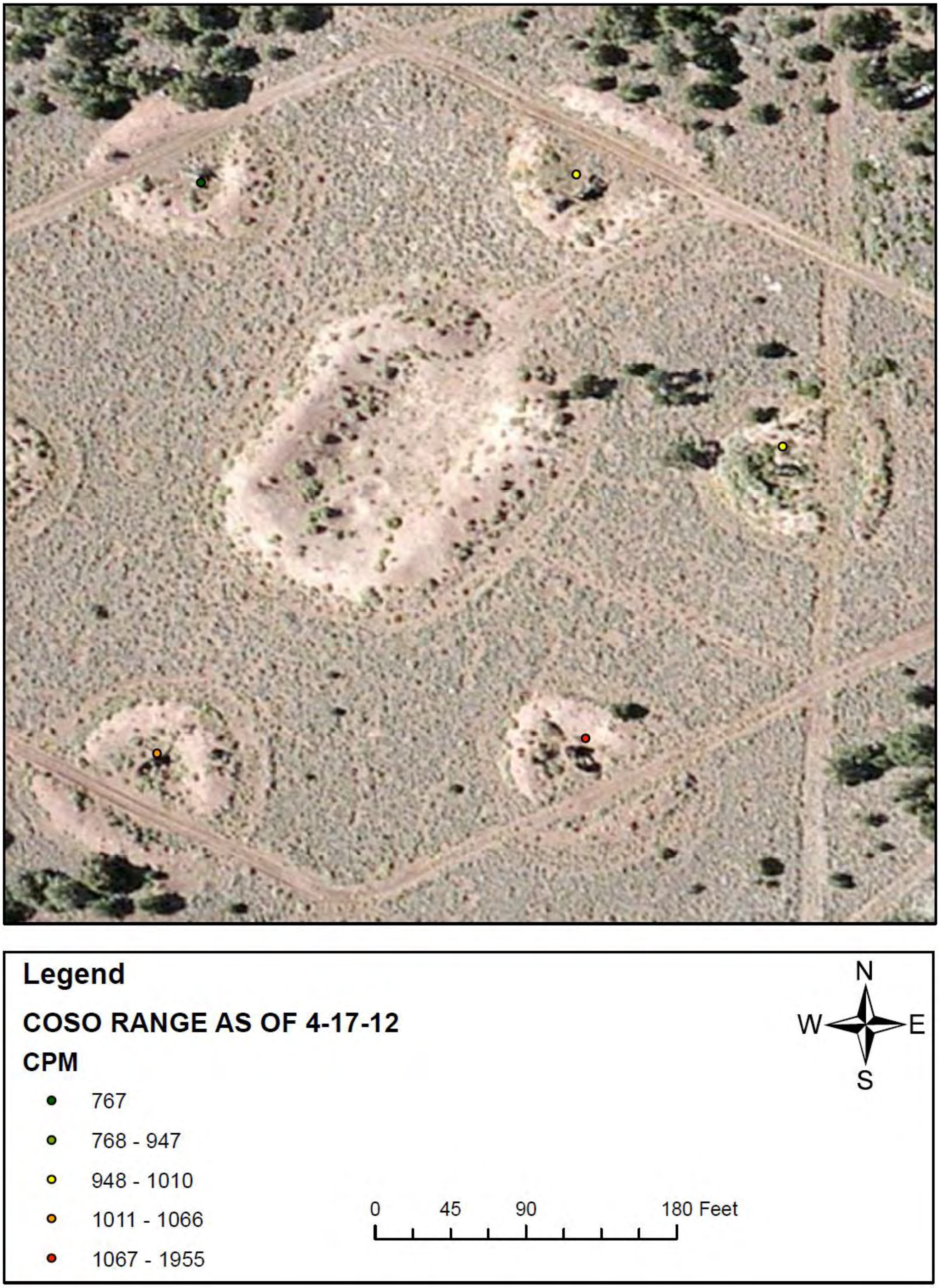


Figure 44: CT1 SA-1

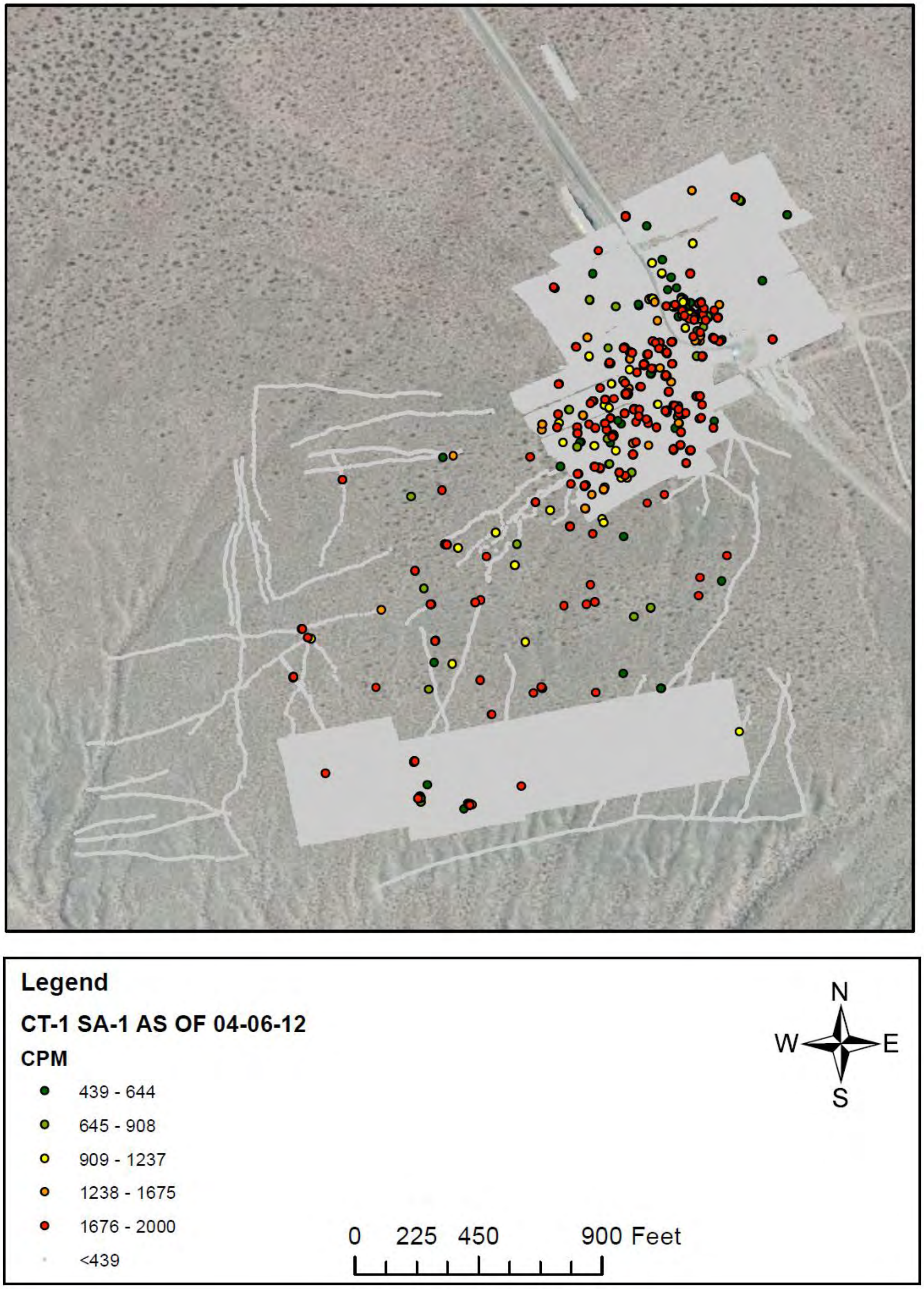


Figure 45: CT1 SA-2

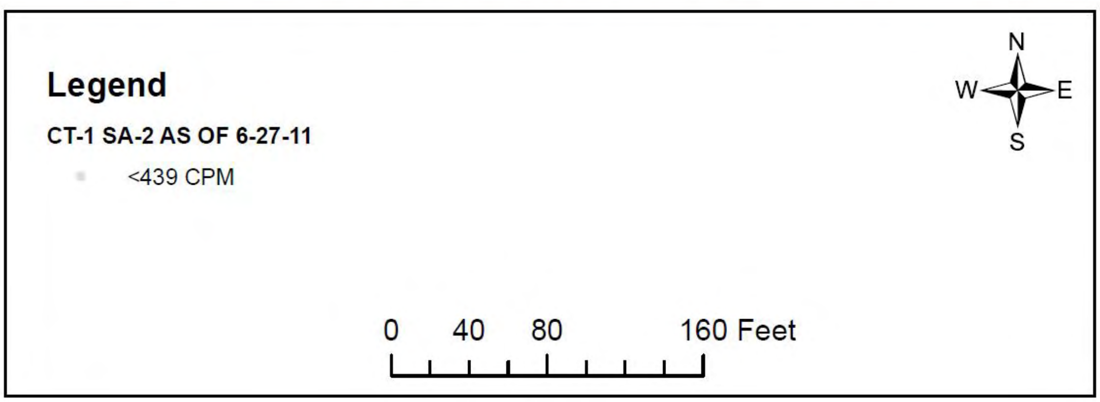

Legend
CT-1 SA-2 AS OF 6-27-11
<439 CPM
N
W
E
S
0
40
80
160 Feet

Figure 46: CT1 SA-3

Figure 47: CT3 SA-1

Figure 48; CT4 All Areas

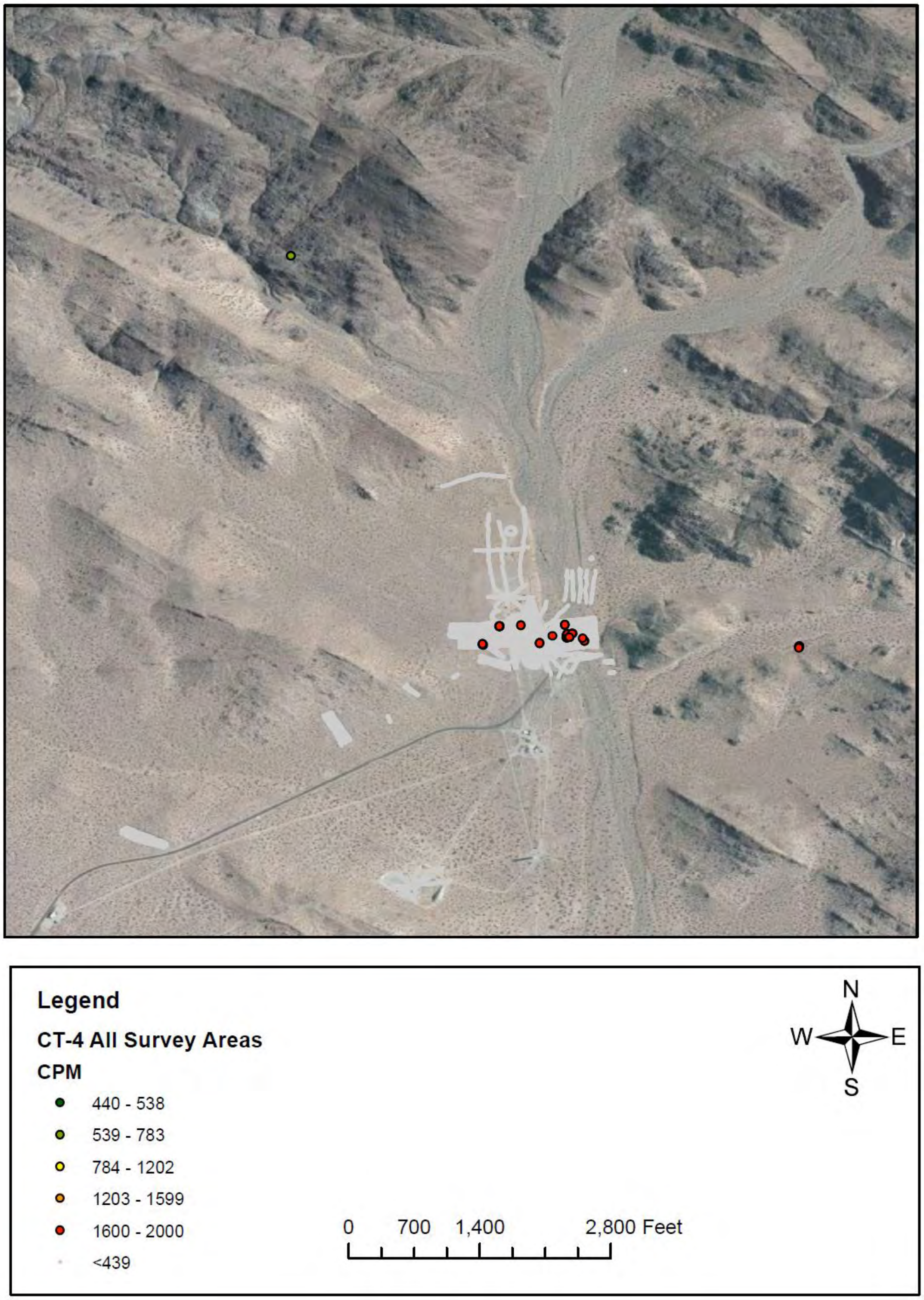
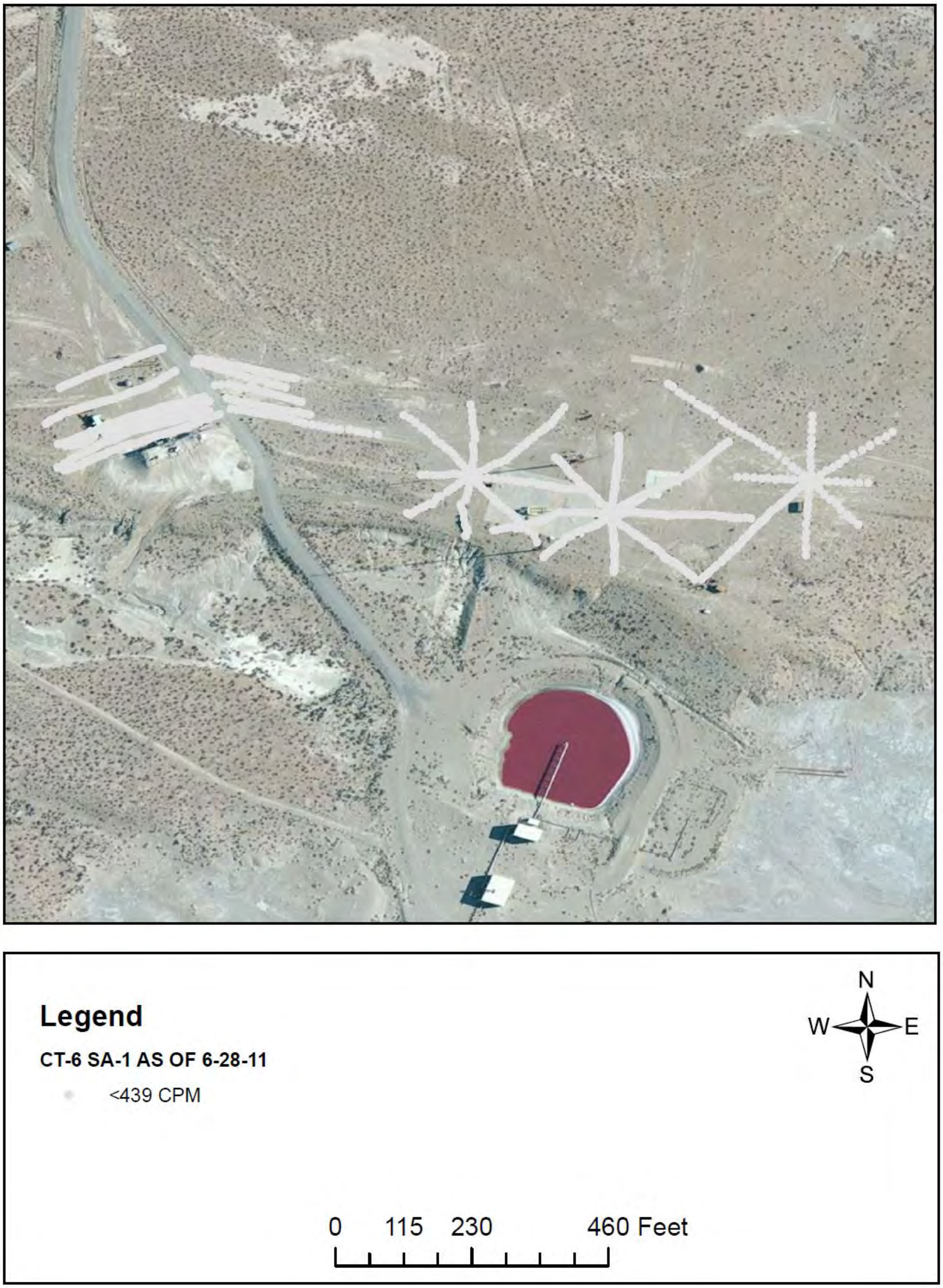


Figure 49: CT6



atta

Figure 50: Detonation Physics Lab

Figure 51: K-2 SMALL CALIBER GUN RANGE

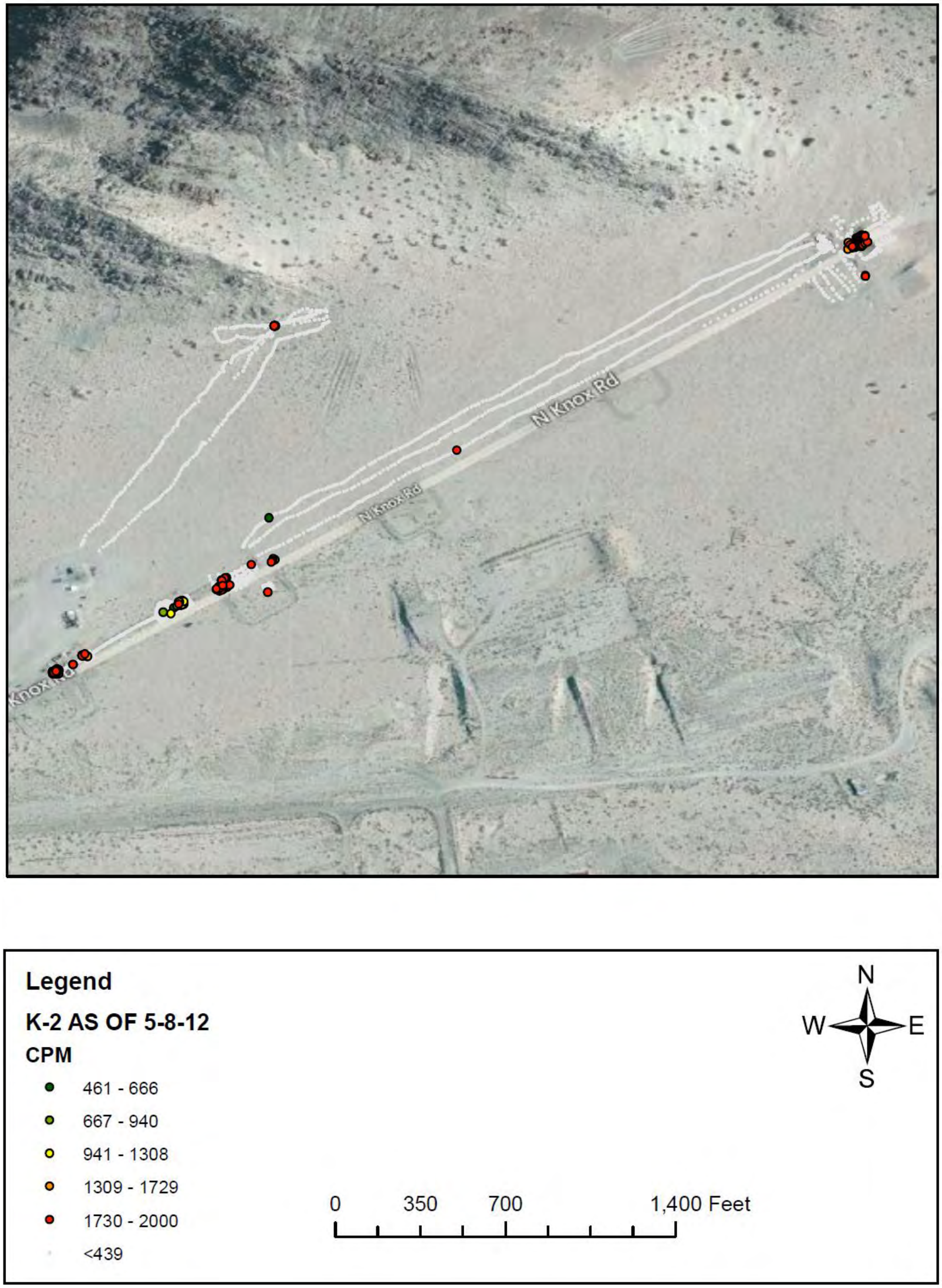


Figure 52: Kennedy Stands

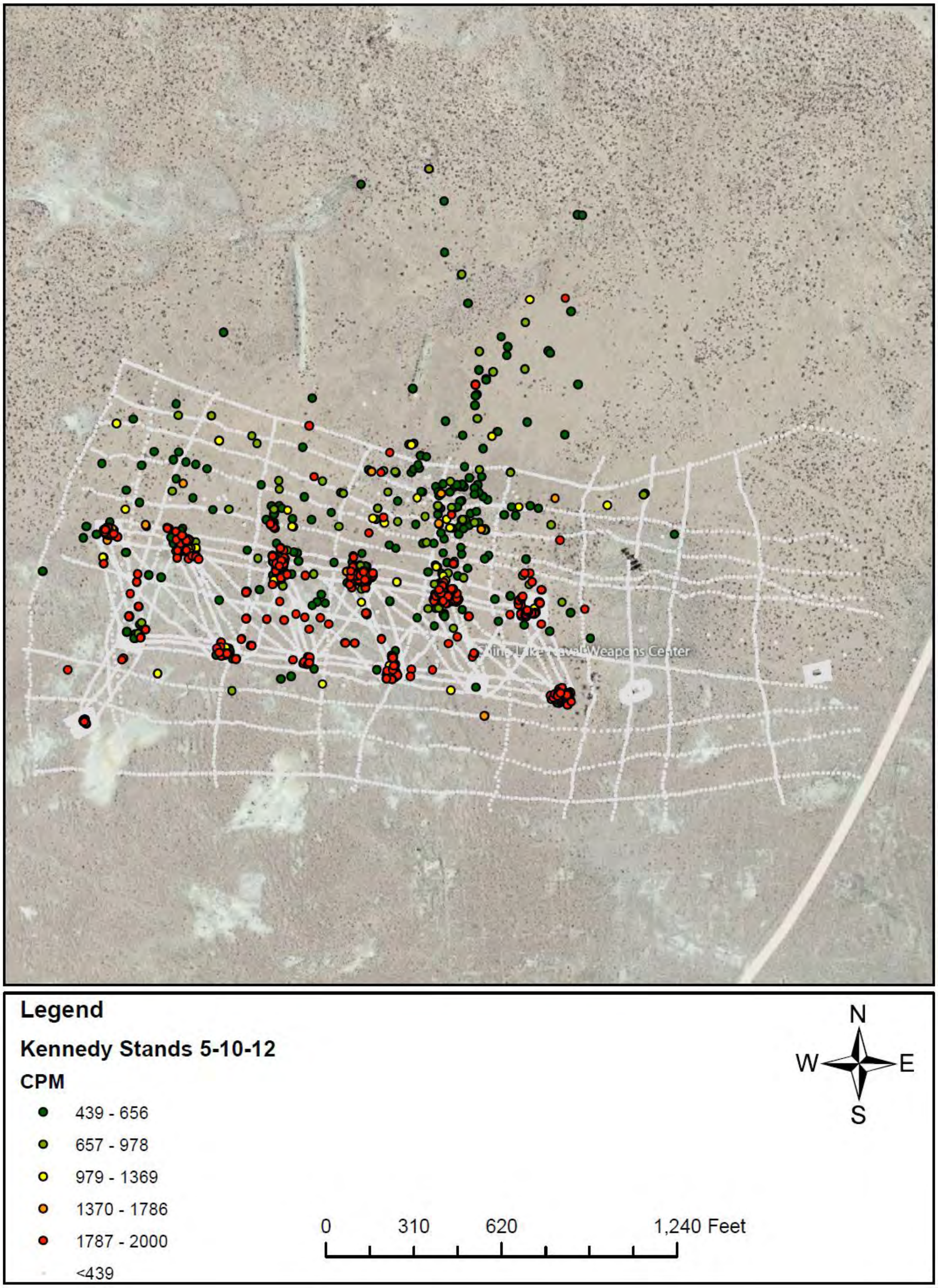


Figure 53: Launch Test Facility

Figure 54: Salt Wells Dump Site

Figure 55: SNORT Track

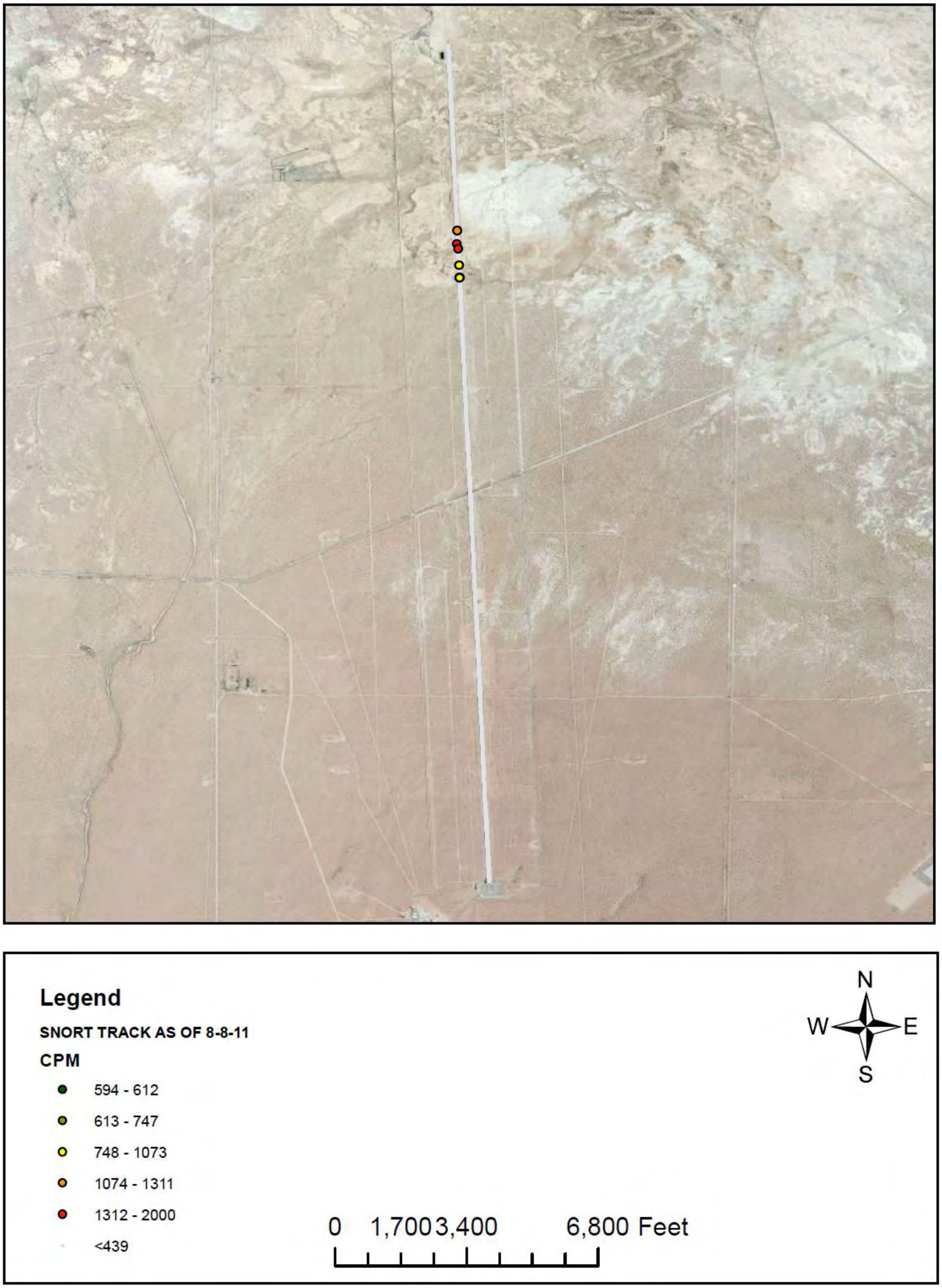


Figure 56: SNORT SA-1

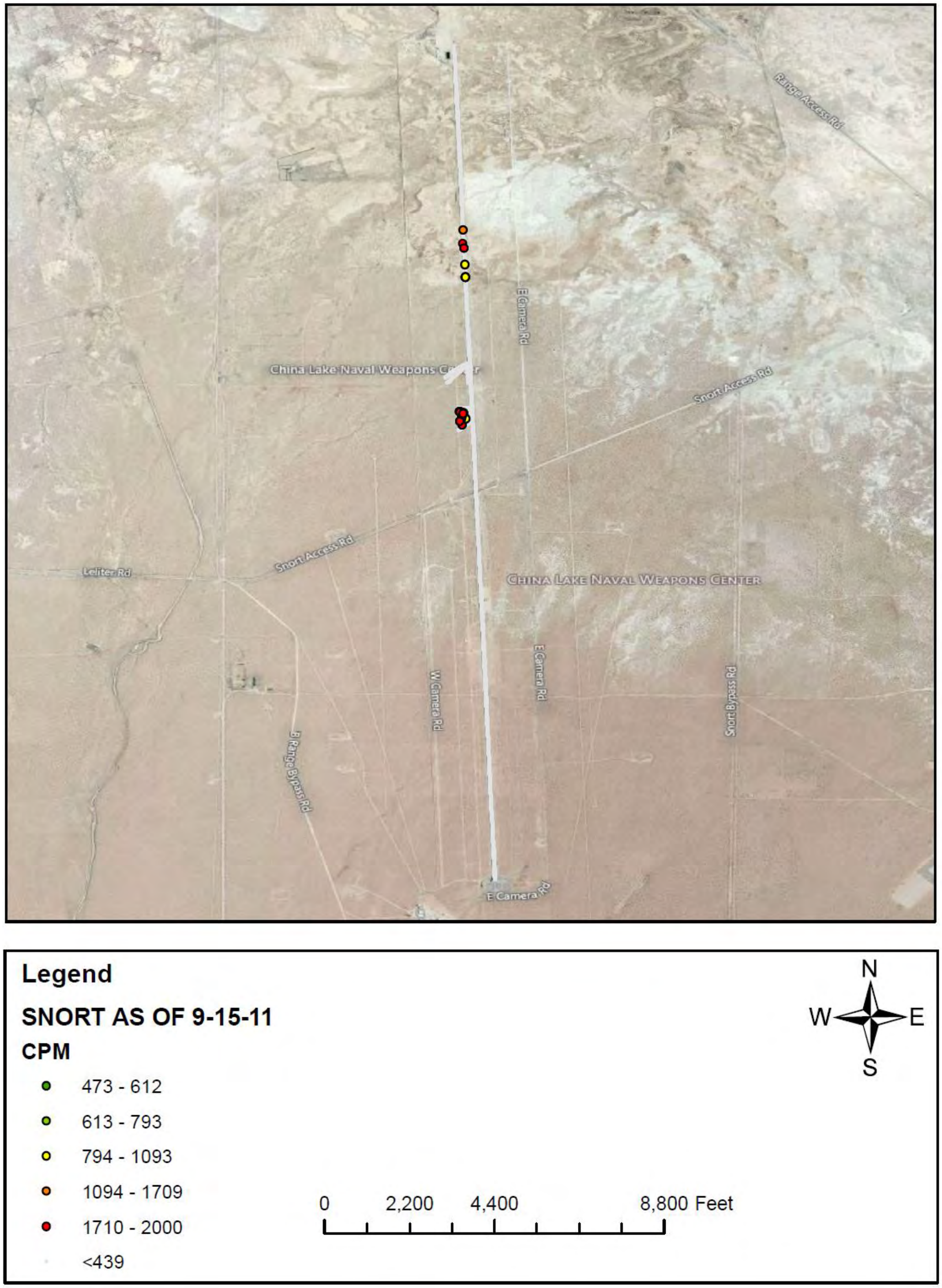


Figure 57: SNORT SA-2

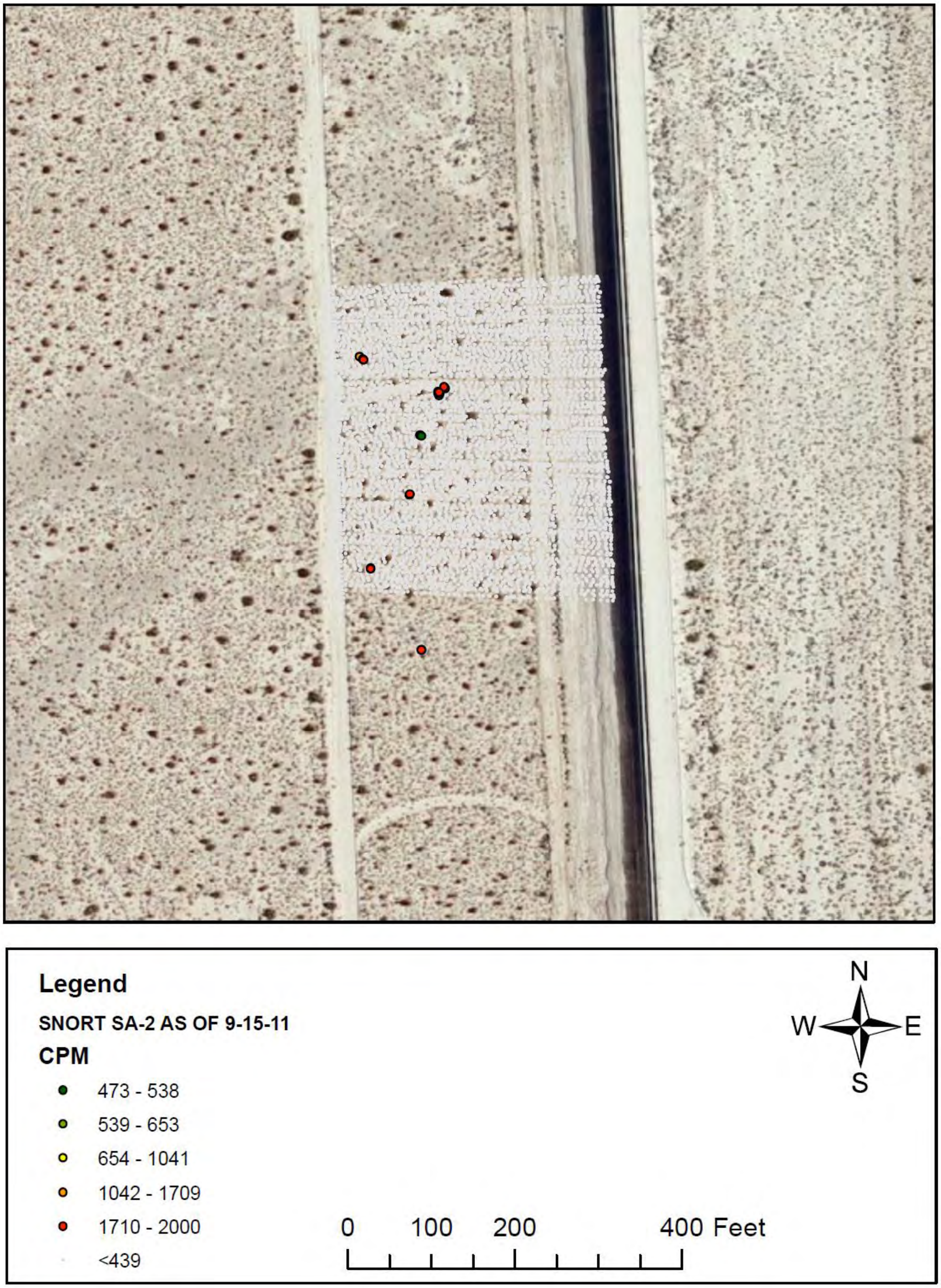

Legend
SNORT SA-2 AS OF 9-15-11
CPM
473 - 538
539 - 653
654 - 1041
1042 - 1709
1710 - 2000
<439
N
W
E
S
0
100
200
400 Feet

Figure 58: T-11 SA-1 & SA-2

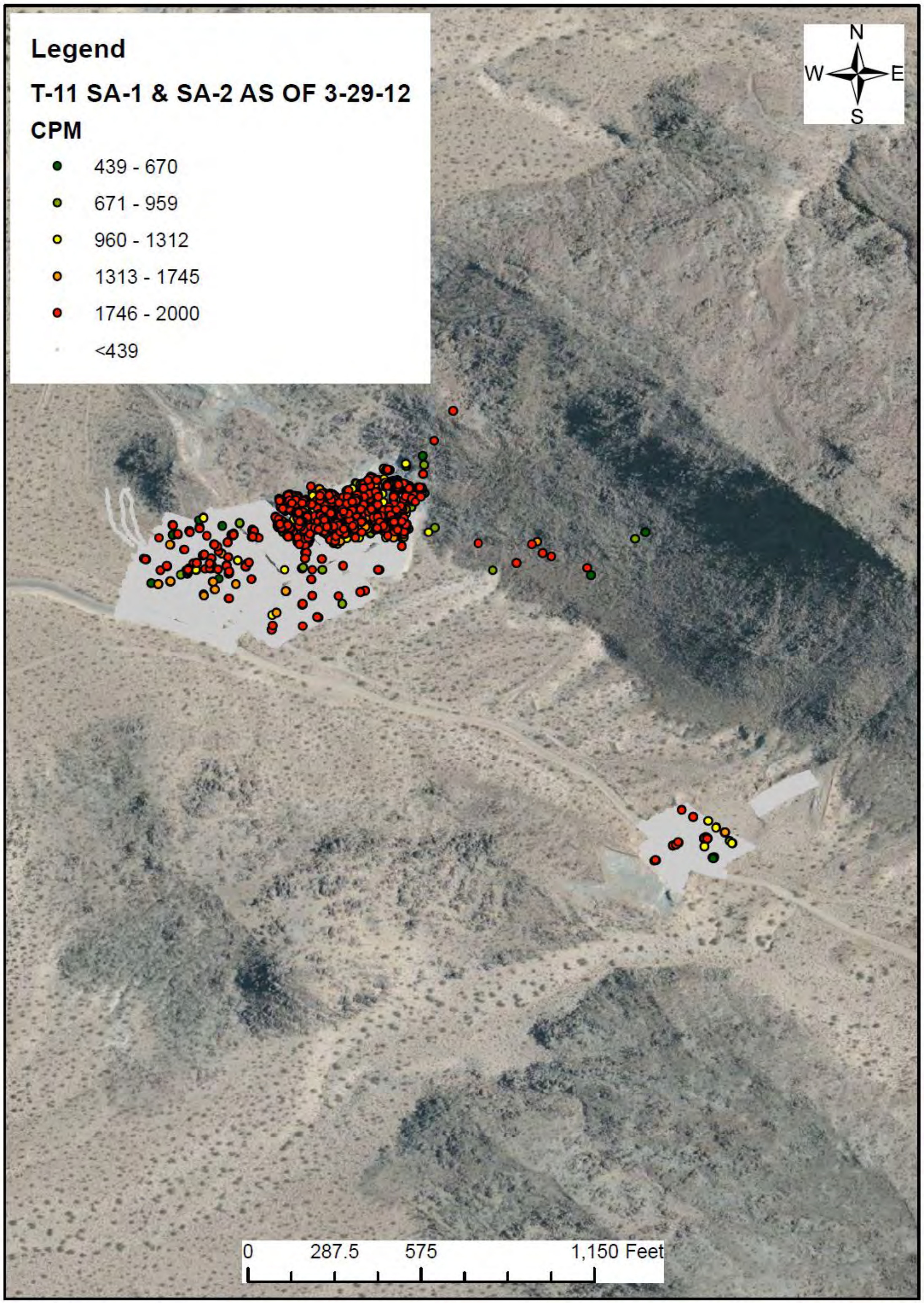
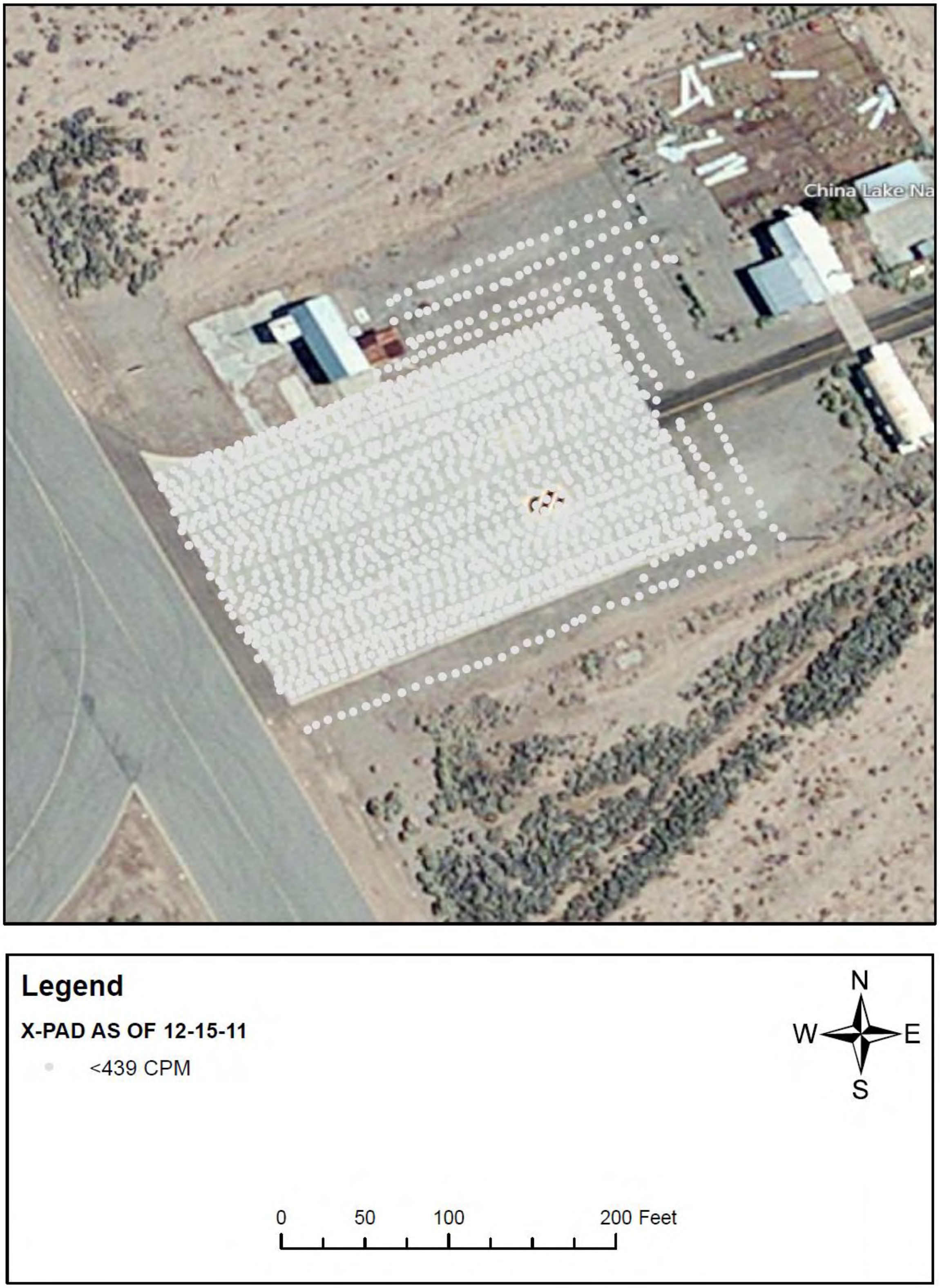


Figure 59: X Pad



Attachment 10 – Soil Sample Locations and Results

Table 10.1 Sample Locations

Location	Num.	Y (Degrees Lat.)	X (Degrees Long.)	U-234 pCi/g	U-235 pCi/g	U-238 pCi/g	Ratio U-238 to U-234	Total pCi/g
Airport Lake	1	35.902818	-117.72393	0.46	0.09	0.34	0.75	0.89
Airport Lake	2	35.9030502	-117.72457	0.64	0.02	0.57	0.89	1.24
Airport Lake	3	35.9024797	-117.72423	0.69	0.04	0.93	1.34	1.66
Airport Lake	4	35.90222	-117.7239	24.11	0.65	26.14	1.08	50.89
Airport Lake	5	35.9041158	-117.72986	0.68	0.01	0.62	0.91	1.31
Airport Lake	6	35.9003335	-117.71488	0.97	0.03	0.77	0.80	1.78
Airport Lake	7	35.8999113	-117.71469	0.91	0.02	0.78	0.86	1.71
Airport Lake	8	35.89899	-117.70878	1.21	0.04	0.82	0.68	2.07
Airport Lake	9	35.8918837	-117.70079	0.40	0.03	0.33	0.83	0.75
Airport Lake	10	35.8937256	-117.70568	1.45	0.06	1.12	0.77	2.64
Airport Lake	11	35.8940265	-117.70492	1.23	0.03	1.22	0.99	2.48
Airport Lake	12	35.8952567	-117.71011	1.09	0.01	1.04	0.96	2.14
Airport Lake	13	35.8974102	-117.71576	1.16	0.03	0.90	0.78	2.09
Airport Lake	14	35.896616	-117.72355	1.24	0.05	1.19	0.96	2.48
Airport Lake	15	35.8985213	-117.73059	0.95	0.05	0.86	0.91	1.86
Airport Lake	16	35.9009377	-117.73496	0.88	0.02	0.84	0.95	1.74
Airport Lake	17	35.905018	-117.73622	1.02	0.04	0.93	0.91	1.99
Airport Lake	18	35.9053773	-117.73384	0.96	0.02	0.95	0.99	1.94
Airport Lake	19	35.9025409	-117.73148	0.88	0.02	0.81	0.92	1.71

Location	Num.	Y (Degrees Lat.)	X (Degrees Long.)	U-234 pCi/g	U-235 pCi/g	U-238 pCi/g	Ratio U-238 to U-234	Total pCi/g
Airport Lake	20	35.8945968	-117.72252	1.67	0.08	1.57	0.94	3.32
BD	1	35.7095443	-117.52964	0.26	0.03	0.22	0.84	0.51
BD	2	35.709299	-117.53019	0.16	0.01	0.22	1.38	0.39
BD	3	35.7097608	-117.53147	0.32	0.03	0.30	0.92	0.64
BD	5	35.71096	-117.53131	0.26	0.01	0.29	1.14	0.56
BD	6	35.7111098	-117.53081	0.43	0.01	0.30	0.69	0.74
BD	8	35.7107042	-117.52963	0.38	0.00	0.30	0.78	0.68
BD	9	35.710713	-117.52849	0.28	0.01	0.30	1.09	0.59
BD	10	35.7103323	-117.52824	0.31	0.01	0.30	0.99	0.62
BD	11	35.7098478	-117.5284	0.35	0.01	0.30	0.87	0.66
BD	13	35.709336	-117.52838	0.24	0.03	0.23	0.95	0.49
BD	15	35.7087022	-117.52891	0.09	0.01	0.02	0.26	0.11
BD	17	35.7082537	-117.52934	1.08	0.01	0.96	0.89	2.05
BD	18	35.7089333	-117.52945	0.38	0.01	0.49	1.27	0.88
BD	19	35.7092307	-117.52955	0.38	0.02	0.33	0.87	0.72
BD	20	35.70948	-117.52917	1.13	0.02	0.98	0.87	2.13
B-2	1	35.8008018	-117.83107	0.05	0.00	0.11	2.20	0.16
B-2	2	35.8013647	-117.83146	0.71	0.03	0.56	0.78	1.29
B-2	3	35.8017245	-117.83228	0.46	0.01	0.41	0.90	0.88
B-2	5	35.801205	-117.83378	0.44	0.01	0.41	0.92	0.86
B-2	7	35.8002465	-117.83326	0.34	0.01	0.29	0.87	0.64
B-2	8	35.7994358	-117.83269	0.44	0.00	0.45	1.02	0.89
B-2	10	35.7996998	-117.83151	0.51	0.01	0.34	0.66	0.86
B-2	12	35.8017385	-117.83086	0.33	0.00	0.26	0.79	0.59
B-2	13	35.8022153	-117.8318	0.40	0.00	0.30	0.74	0.70
B-2	14	35.802271	-117.83334	0.54	0.02	0.52	0.96	1.08
B-2	15	35.8014608	-117.83433	0.57	0.05	0.40	0.71	1.02
B-2	16	35.8003052	-117.834	0.76	0.04	0.66	0.87	1.47
B-2	17	35.7996815	-117.83364	0.29	0.03	0.33	1.14	0.65
B-2	18	35.7990367	-117.83303	0.46	0.03	0.40	0.88	0.88
B-2	19	35.798727	-117.83215	0.44	0.00	0.43	0.96	0.87
B-3	3	35.7316776	-117.79593	2.76	0.10	2.37	0.86	5.24
B-3	4	35.7327177	-117.79604	1.93	0.11	2.04	1.05	4.08
B-3	5	35.7327662	-117.79519	0.70	0.02	0.71	1.02	1.43
B-3	9	35.7369203	-117.77123	0.95	0.03	0.67	0.71	1.65
B-3	11	35.7361437	-117.77266	0.60	0.03	0.65	1.07	1.28
B-3	13	35.730619	-117.79655	0.88	0.03	0.94	1.06	1.85
B-3	14	35.730098	-117.79756	1.40	0.50	1.39	0.99	3.29
B-3	15	35.7294392	-117.79651	1.06	0.24	0.82	0.78	2.12

Location	Num.	Y (Degrees Lat.)	X (Degrees Long.)	U-234 pCi/g	U-235 pCi/g	U-238 pCi/g	Ratio U-238 to U-234	Total pCi/g
B-3	16	35.7297773	-117.79449	1.25	0.18	1.23	0.98	2.65
B-3	17	35.7303275	-117.79348	1.40	0.20	0.99	0.70	2.59
B-3	18	35.7311223	-117.79319	1.15	0.07	1.03	0.90	2.25
B-3	19	35.737386	-117.77275	0.89	0.05	0.70	0.79	1.63
B-3	20	35.7381817	-117.77328	0.62	0.00	0.59	0.96	1.21
B-3	21	35.7382855	-117.7724	0.91	0.03	0.87	0.96	1.80
B-3	22	35.7380575	-117.77154	0.63	0.03	0.42	0.67	1.07
B-4	2	35.7062893	-117.80399	0.47	0.02	0.48	1.04	0.97
B-4	3	35.7066805	-117.80202	0.53	0.01	0.37	0.70	0.91
B-4	4	35.7071178	-117.79978	0.90	0.01	0.72	0.80	1.64
B-4	6	35.7085436	-117.79508	0.64	0.02	0.60	0.94	1.26
B-4	7	35.7092543	-117.7922	0.49	0.04	0.34	0.70	0.87
B-4	8	35.7101927	-117.78879	0.54	0.02	0.47	0.87	1.04
B-4	10	35.7137515	-117.77451	0.39	0.01	0.41	1.05	0.81
B-4	11	35.7064292	-117.80594	0.40	0.02	0.33	0.82	0.76
B-4	12	35.706734	-117.80424	0.60	0.02	0.51	0.86	1.13
B-4	14	35.7076573	-117.80012	0.64	0.04	0.59	0.92	1.27
B-4	15	35.7083225	-117.79802	0.55	0.02	0.57	1.03	1.14
B-4	16	35.7091583	-117.79521	0.44	0.02	0.52	1.18	0.98
B-4	18	35.7107263	-117.78882	0.78	0.02	0.67	0.86	1.46
B-4	19	35.7116112	-117.78486	0.64	0.02	0.52	0.82	1.18
B-4	20	35.7141157	-117.77454	0.37	0.00	0.32	0.88	0.70
Cole Flats	1	36.1323562	-117.63227	1.05	0.05	0.89	0.85	1.98
Cole Flats	3	36.1288553	-117.63331	0.63	0.01	0.55	0.87	1.19
Cole Flats	5	36.126849	-117.63081	0.39	0.01	0.36	0.93	0.75
Cole Flats	8	36.1263303	-117.63337	0.43	0.04	0.49	1.14	0.95
Cole Flats	9	36.1238	-117.63327	0.22	0.02	0.49	2.21	0.72
Cole Flats	10	36.1233413	-117.63353	0.35	0.02	0.40	1.15	0.77
Cole Flats	12	36.1208547	-117.62817	0.45	0.06	0.47	1.03	0.98
Cole Flats	14	36.1210487	-117.63219	0.34	0.02	0.44	1.30	0.79
Cole Flats	15	36.1221929	-117.63731	0.32	0.02	0.42	1.30	0.76
Cole Flats	16	36.1224139	-117.63784	0.74	0.04	0.67	0.92	1.44
Cole	19	36.1287697	-117.6342	0.41	0.01	0.39	0.93	0.81

Location	Num.	Y (Degrees Lat.)	X (Degrees Long.)	U-234 pCi/g	U-235 pCi/g	U-238 pCi/g	Ratio U-238 to U-234	Total pCi/g
Flats								
Cole Flats	20	36.1282588	-117.63467	0.54	0.01	0.62	1.15	1.16
Cole Flats	22	36.1277448	-117.63031	0.46	0.00	0.34	0.74	0.81
Cole Flats	23	36.1255523	-117.63342	0.53	0.02	0.42	0.80	0.97
Cole Flats	24	36.1253875	-117.63437	0.46	0.00	0.43	0.92	0.90
Cole Flats	25	36.123563	-117.63232	0.97	0.01	0.88	0.92	1.86
Cole Flats	27	36.121135	-117.62723	0.53	0.01	0.40	0.75	0.93
Cole Flats	28	36.1207705	-117.62718	0.72	0.06	0.70	0.96	1.48
Cole Flats	29	36.1200142	-117.63173	0.28	0.00	0.23	0.81	0.51
Cole Flats	32	36.121122	-117.6372	0.88	0.02	0.78	0.89	1.68
CT-1	31	35.6741263	-117.49348	0.27	0.02	0.30	1.12	0.59
CT-1	33	35.6733952	-117.49313	0.40	0.03	0.23	0.58	0.66
CT-1	34	35.673101	-117.49273	0.21	0.01	0.25	1.20	0.47
CT-1	36	35.6731653	-117.49207	0.31	0.04	0.34	1.09	0.68
CT-1	37	35.6734637	-117.49152	0.37	0.03	0.30	0.82	0.69
CT-1	42	35.6729403	-117.49315	2.07	0.20	6.24	3.01	8.52
CT-1	44	35.6704285	-117.49603	0.29	0.01	0.24	0.84	0.55
CT-1	45	35.6707592	-117.49561	0.25	0.02	0.28	1.12	0.55
CT-1	47	35.6718788	-117.49528	0.35	0.00	0.29	0.82	0.64
CT-1	50	35.6715498	-117.49341	0.20	0.02	0.16	0.82	0.38
CT-1	52	35.6738707	-117.48914	0.34	0.01	0.35	1.03	0.71
CT-1	55	35.6702512	-117.48881	0.64	0.03	0.57	0.88	1.24
CT-1	56	35.6704682	-117.48914	1.39	0.06	1.05	0.75	2.50
CT-3	1	35.6798418	-117.48365	0.27	0.03	0.27	0.98	0.57
CT-3	2	35.679647	-117.48343	0.59	0.02	0.59	1.00	1.20
CT-3	3	35.6795657	-117.4832	0.45	0.01	0.31	0.69	0.77
CT-3	4	35.6795567	-117.48282	0.36	0.00	0.38	1.04	0.75
CT-3	5	35.679813	-117.48255	1.39	0.04	1.29	0.93	2.72
CT-3	6	35.6802888	-117.4826	0.74	0.01	0.76	1.02	1.51
CT-3	7	35.6805728	-117.48214	0.29	0.00	0.37	1.25	0.67
CT-3	8	35.6804913	-117.48168	0.35	0.02	0.35	1.01	0.72
CT-3	9	35.6800723	-117.48297	0.73	0.04	0.59	0.81	1.36
CT-3	10	35.679826	-117.48303	0.47	0.03	0.37	0.79	0.87
CT-3	11	35.6798797	-117.48329	0.53	0.03	0.41	0.77	0.97

Location	Num.	Y (Degrees Lat.)	X (Degrees Long.)	U-234 pCi/g	U-235 pCi/g	U-238 pCi/g	Ratio U-238 to U-234	Total pCi/g
CT-3	12	35.6804353	-117.48322	0.54	0.03	0.50	0.93	1.07
CT-3	13	35.6807408	-117.48298	0.52	0.04	0.41	0.80	0.97
CT-3	14	35.6807332	-117.48258	0.37	0.03	0.42	1.12	0.82
CT-3	15	35.6802113	-117.48274	0.89	0.02	0.64	0.72	1.55
CT-3	16	35.6800903	-117.48324	0.92	0.03	0.89	0.96	1.84
CT-4	3	35.7003855	-117.46914	0.22	0.00	0.18	0.79	0.40
CT-4	4	35.7004408	-117.46871	0.24	0.01	0.28	1.19	0.54
CT-4	6	35.7000567	-117.46746	0.35	0.01	0.37	1.06	0.74
CT-4	10	35.7038749	-117.46909	0.32	0.01	0.31	0.98	0.64
CT-4	12	35.7002762	-117.45964	0.28	0.00	0.28	1.01	0.56
CT-4	13	35.6938885	-117.47152	0.28	0.01	0.22	0.80	0.51
CT-4	18	35.7006227	-117.46575	0.25	0.03	0.33	1.29	0.60
CT-4	23	35.7013582	-117.46727	0.23	0.00	0.23	1.01	0.46
CT-4	25	35.7038072	-117.46749	0.36	0.02	0.31	0.86	0.68
CT-4	27	35.712759	-117.47329	0.49	0.09	0.33	0.69	0.91
CT-4	28	35.6933763	-117.47033	0.24	0.02	0.33	1.35	0.60
CT-4	30	35.6977707	-117.47263	0.31	0.00	0.26	0.83	0.57
CT-6	2	35.6664977	-117.52213	0.51	0.03	0.41	0.81	0.95
CT-6	4	35.6664827	-117.52093	0.44	0.02	0.39	0.89	0.85
CT-6	5	35.6663748	-117.51995	0.38	0.02	0.24	0.63	0.64
CT-6	6	35.6659903	-117.51902	0.34	0.00	0.25	0.74	0.59
CT-6	7	35.6662928	-117.51841	0.30	0.02	0.29	0.96	0.60
CT-6	8	35.6658433	-117.51786	0.49	0.01	0.45	0.91	0.95
CT-6	9	35.6663947	-117.52488	0.49	0.01	0.41	0.84	0.90
CT-6	10	35.6662735	-117.52531	0.32	0.02	0.21	0.67	0.56
CT-6	12	35.6658383	-117.52598	0.45	0.03	0.35	0.78	0.83
CT-6	13	35.6656262	-117.52253	0.39	0.01	0.28	0.72	0.67
CT-6	15	35.6654812	-117.52127	0.37	0.01	0.28	0.74	0.66
CT-6	17	35.6654088	-117.51982	0.29	-0.02	0.27	0.95	0.53
CT-6	18	35.665497	-117.51881	0.37	0.03	0.28	0.76	0.69
CT-6	20	35.6667042	-117.52405	0.36	0.01	0.44	1.23	0.80
CT-6	21	35.6660708	-117.52395	0.43	0.02	0.32	0.75	0.76
Coso Range	1	36.189123	-117.73775	0.42	0.10	0.46	1.11	0.99
Coso Range	5	36.1930575	-117.73013	0.49	0.08	0.41	0.83	0.98
Coso Range	6	36.1934717	-117.73016	0.52	0.13	0.51	0.98	1.17
Coso Range	8	36.1943969	-117.72604	1.01	0.27	1.03	1.01	2.31

Location	Num.	Y (Degrees Lat.)	X (Degrees Long.)	U-234 pCi/g	U-235 pCi/g	U-238 pCi/g	Ratio U-238 to U-234	Total pCi/g
Coso Range	10	36.2002187	-117.72873	0.41	0.05	0.34	0.84	0.80
Coso Range	12	36.2006583	-117.72884	0.55	0.07	0.55	1.00	1.16
Coso Range	13	36.2064374	-117.72165	1.23	0.17	1.15	0.94	2.55
Coso Range	16	36.2067898	-117.72256	0.64	0.18	0.64	1.00	1.45
Coso Range	17	36.207326	-117.72217	0.94	0.23	0.74	0.79	1.91
Coso Range	18	36.2073096	-117.7216	0.74	0.18	0.88	1.18	1.80
Coso Range	20	36.1880422	-117.73817	0.91	0.15	0.93	1.03	2.00
Coso Range	21	36.1883773	-117.7385	1.29	0.24	1.06	0.83	2.59
Coso Range	23	36.1920102	-117.73394	0.46	0.13	0.25	0.54	0.84
Coso Range	24	36.191871	-117.7326	0.99	0.42	0.74	0.75	2.16
Coso Range	27	36.1937397	-117.72959	1.04	0.29	0.91	0.87	2.24
Coso Range	28	36.1939417	-117.73039	0.94	0.16	0.63	0.67	1.73
Coso Range	29	36.194691	-117.72618	0.84	0.18	0.61	0.72	1.62
Coso Range	30	36.1945518	-117.72377	0.46	0.10	0.65	1.41	1.20
Coso Range	31	36.2007063	-117.7281	1.02	0.21	0.99	0.97	2.23
Coso Range	32	36.2012703	-117.72869	1.12	0.27	0.88	0.78	2.27
Dead Man's Canyon	1	35.8191757	-117.5813	0.30	0.02	0.31	1.03	0.63
Dead Man's Canyon	3	35.8178403	-117.58105	0.35	0.02	0.30	0.86	0.67

Location	Num.	Y (Degrees Lat.)	X (Degrees Long.)	U-234 pCi/g	U-235 pCi/g	U-238 pCi/g	Ratio U-238 to U-234	Total pCi/g
Dead Man's Canyon	9	35.812616	-117.58347	0.21	0.01	0.17	0.78	0.39
Dead Man's Canyon	11	35.8150108	-117.58564	0.18	0.01	0.14	0.77	0.33
Dead Man's Canyon	12	35.8164232	-117.5863	0.32	0.01	0.35	1.10	0.67
Dead Man's Canyon	15	35.8173238	-117.58836	0.37	0.02	0.43	1.15	0.82
Dead Man's Canyon	19	35.8190465	-117.58288	0.46	0.01	0.45	0.98	0.92
Dead Man's Canyon	22	35.8179797	-117.58323	0.29	0.00	0.23	0.80	0.53
Dead Man's Canyon	25	35.8162993	-117.58448	0.33	0.00	0.41	1.25	0.74
Dead Man's Canyon	30	35.8146795	-117.58484	0.42	0.01	0.31	0.73	0.74
Drop Zone	3	35.826497	-117.62836	0.48	0.02	0.30	0.63	0.80
Drop Zone	5	35.828099	-117.63282	0.12	0.01	0.18	1.46	0.31
Drop Zone	7	35.8223078	-117.63035	0.24	0.02	0.22	0.94	0.48
Drop Zone	17	35.8290932	-117.62748	0.20	0.01	0.26	1.32	0.47
Drop Zone	22	35.8296215	-117.62332	0.27	0.03	0.22	0.81	0.52
Drop Zone	25	35.8322758	-117.63479	0.16	0.01	0.14	0.87	0.32
Drop Zone	27	35.833453	-117.62828	0.27	0.01	0.20	0.73	0.47
Drop Zone	29	35.8348393	-117.6247	0.29	0.01	0.25	0.87	0.55
Drop Zone	32	35.8279123	-117.61939	0.22	0.03	0.19	0.88	0.43
Drop Zone	34	35.823052	-117.6225	0.16	0.01	0.13	0.81	0.29

Location	Num.	Y (Degrees Lat.)	X (Degrees Long.)	U-234 pCi/g	U-235 pCi/g	U-238 pCi/g	Ratio U-238 to U-234	Total pCi/g
G-4 Track	1	35.8714598	-117.73059	0.68	0.07	0.88	1.29	1.64
G-4 Track	2	35.8702471	-117.73061	0.78	0.04	0.76	0.97	1.58
G-4 Track	3	35.8686051	-117.73092	0.83	0.03	0.75	0.90	1.60
G-4 Track	4	35.8669987	-117.73112	1.16	0.06	1.06	0.91	2.28
G-4 Track	5	35.864868	-117.73177	1.18	0.05	1.13	0.96	2.36
G-4 Track	6	35.8714337	-117.72954	1.09	0.05	0.93	0.85	2.07
G-4 Track	7	35.8701948	-117.72997	1.40	0.04	1.33	0.95	2.76
G-4 Track	8	35.8685427	-117.73022	1.17	0.07	1.05	0.90	2.29
G-4 Track	9	35.8669723	-117.7306	1.07	0.05	1.04	0.97	2.16
G-4 Track	10	35.8646933	-117.73124	0.90	0.03	0.72	0.79	1.65
G-6	1	35.8325025	-117.60627	0.17	0.01	0.27	1.57	0.45
G-6	2	35.8318945	-117.60663	0.26	0.02	0.25	0.94	0.53
G-6	3	35.831117	-117.60743	0.25	0.01	0.22	0.89	0.48
G-6	4	35.8312985	-117.60846	0.56	0.04	1.83	3.26	2.43
G-6	5	35.8317857	-117.60797	0.34	0.02	0.27	0.79	0.63
G-6	6	35.8323155	-117.60703	0.20	0.02	0.27	1.35	0.49
G-6	7	35.8333715	-117.6066	0.34	0.02	0.34	1.01	0.70
G-6	8	35.8339853	-117.60727	0.23	0.01	0.23	1.01	0.47
G-6	10	35.833167	-117.60798	0.14	0.01	0.24	1.72	0.39
G-6	12	35.8327567	-117.60736	0.20	0.02	0.18	0.89	0.40
K-2	1	35.7496462	-117.54885	3.51	0.88	18.70	5.33	23.09
K-2	2	35.749646	-117.54885	0.26	0.00	0.30	1.18	0.56
K-2	4	35.749717	-117.54884	0.20	0.02	0.30	1.56	0.52
K-2	5	35.7497182	-117.54885	19.71	4.17	116.84	5.93	140.71
K-2	8	35.7497475	-117.54888	2.57	0.15	17.75	6.92	20.46
K-2	11	35.7497677	-117.5489	0.29	0.00	0.23	0.80	0.52
K-2	14	35.7498298	-117.54891	2.19	0.05	16.47	7.52	18.71
K-2	16	35.7498678	-117.54891	0.27	0.02	0.30	1.14	0.59
K-2	17	35.74988	-117.54887	0.33	0.01	0.34	1.03	0.69
K-2	19	35.749973	-117.54885	0.34	0.01	0.26	0.76	0.60
K-2	21	35.7500362	-117.54874	0.36	0.01	0.36	0.99	0.73
K-2	22	35.7500533	-117.54868	0.20	0.01	0.28	1.39	0.49
K-2	23	35.7500888	-117.54862	0.31	0.02	0.32	1.03	0.65

Location	Num.	Y (Degrees Lat.)	X (Degrees Long.)	U-234 pCi/g	U-235 pCi/g	U-238 pCi/g	Ratio U-238 to U-234	Total pCi/g
K-2	25	35.7501687	-117.54865	0.36	0.03	0.32	0.90	0.71
K-2	26	35.7501857	-117.54862	0.29	0.25	0.25	0.86	0.80
K-2	27	35.7501822	-117.54859	0.57	0.03	0.58	1.03	1.18
K-2	28	35.7502173	-117.54856	0.35	0.02	0.31	0.91	0.67
K-2	29	35.7501838	-117.54854	0.31	0.01	0.22	0.71	0.54
K-2	30	35.750151	-117.54852	0.59	0.01	0.35	0.59	0.96
K-2	31	35.7501255	-117.54848	0.28	0.01	0.27	1.00	0.56
Kennedy Stands	1	35.7341412	-117.64667	3.21	0.09	3.31	1.03	6.60
Kennedy Stands	2	35.7343454	-117.6475	0.27	0.00	0.39	1.46	0.66
Kennedy Stands	3	35.7340991	-117.64787	0.34	0.02	0.29	0.85	0.65
Kennedy Stands	4	35.7335008	-117.64763	0.65	0.05	2.80	4.33	3.49
Kennedy Stands	5	35.7328282	-117.64731	1.45	0.12	9.34	6.46	10.91
Kennedy Stands	6	35.7329167	-117.64814	0.84	0.07	4.95	5.88	5.86
Kennedy Stands	7	35.7335041	-117.64841	3.05	0.22	22.11	7.26	25.38
Kennedy Stands	8	35.7335099	-117.65035	0.34	0.01	0.38	1.10	0.74
Kennedy Stands	9	35.7332533	-117.65068	1.23	0.09	5.47	4.44	6.79
Kennedy Stands	10	35.7335007	-117.65101	1.21	0.02	1.21	1.00	2.44
Kennedy Stands	11	35.7338143	-117.65135	0.18	0.01	0.29	1.61	0.49
Kennedy Stands	12	35.7326253	-117.65175	1.04	0.04	0.92	0.88	1.99
Kennedy Stands	13	35.7327552	-117.65109	0.41	0.02	0.35	0.86	0.79
Kennedy Stands	14	35.7334212	-117.64979	2.03	0.08	4.58	2.26	6.69
Kennedy Stands	15	35.7334084	-117.64938	0.30	0.01	0.37	1.24	0.68
Kennedy Stands	16	35.7334655	-117.64875	0.48	0.01	0.71	1.48	1.19

Location	Num.	Y (Degrees Lat.)	X (Degrees Long.)	U-234 pCi/g	U-235 pCi/g	U-238 pCi/g	Ratio U-238 to U-234	Total pCi/g
Kennedy Stands	17	35.73368	-117.64793	0.35	0.01	0.60	1.72	0.95
Kennedy Stands	18	35.7338277	-117.64657	0.29	0.02	0.39	1.36	0.70
Kennedy Stands	19	35.7337908	-117.64681	0.56	0.01	0.56	1.00	1.13
Kennedy Stands	20	35.734224	-117.64774	0.25	0.01	0.36	1.44	0.62
Kennedy Stands	21	35.7347458	-117.64836	0.35	0.00	0.31	0.88	0.66
Kennedy Stands	22	35.7337578	-117.64925	2.25	0.19	16.88	7.49	19.32
Kennedy Stands	23	35.7334868	-117.64915	0.32	0.00	0.35	1.08	0.67
Kennedy Stands	24	35.7333397	-117.64984	0.31	0.02	0.90	2.90	1.22
Kennedy Stands	25	35.7338867	-117.65008	6.92	0.74	58.36	8.43	66.02
Kennedy Stands	26	35.733799	-117.65051	0.20	0.00	0.29	1.44	0.49
Kennedy Stands	27	35.7340185	-117.65096	0.33	0.03	1.48	4.50	1.83
Kennedy Stands	28	35.7341893	-117.65169	0.39	0.02	1.13	2.93	1.54
Kennedy Stands	29	35.733246	-117.65149	1.37	0.06	1.26	0.92	2.69
Kennedy Stands	30	35.7327978	-117.65044	0.48	0.01	0.43	0.90	0.92
Kennedy Stands	31	35.732173	-117.64826	0.26	0.00	0.34	1.32	0.60
Kennedy Stands	32	35.7322652	-117.64751	0.36	0.01	0.42	1.16	0.79
SNORT	1	35.724382	-117.74164	0.35	0.02	0.50	1.43	0.36
SNORT	2	35.7216273	-117.74121	0.38	0.00	0.36	0.94	0.39
SNORT	3	35.7188057	-117.74114	0.62	0.03	0.58	0.94	0.65
SNORT	4	35.7161907	-117.74073	0.53	0.02	0.50	0.95	0.55
SNORT	5	35.7134347	-117.74032	0.52	0.01	0.49	0.95	0.53
SNORT	6	35.7107218	-117.74063	0.42	0.02	0.41	0.96	0.44
SNORT	7	35.7051425	-117.74029	0.33	0.02	0.32	0.96	0.35
SNORT	8	35.7023652	-117.74021	0.39	0.02	0.36	0.91	0.41

Location	Num.	Y (Degrees Lat.)	X (Degrees Long.)	U-234 pCi/g	U-235 pCi/g	U-238 pCi/g	Ratio U-238 to U-234	Total pCi/g
SNORT	9	35.6996383	-117.74005	0.26	0.00	0.20	0.76	0.26
T-11	1	35.7950386	-117.5707	0.40	0.03	0.49	1.24	0.92
T-11	2	35.795162	-117.57092	0.38	0.02	0.42	1.10	0.82
T-11	4	35.7953859	-117.57127	0.41	0.02	0.47	1.16	0.90
T-11	7	35.7951576	-117.57117	0.48	0.03	0.89	1.88	1.39
T-11	8	35.7953558	-117.57043	0.39	0.02	0.63	1.63	1.04
T-11	9	35.795692	-117.57076	0.93	0.07	5.41	5.81	6.42
T-11	10	35.7952532	-117.57065	0.55	0.03	0.50	0.90	1.08
T-11	11	35.7949147	-117.57026	0.61	0.05	0.60	1.00	1.25
T-11	13	35.7951775	-117.5695	1.59	0.07	4.53	2.85	6.19
T-11	14	35.792769	-117.5668	1.78	0.16	10.73	6.04	12.66
T-11	15	35.7924957	-117.56663	0.80	0.04	0.92	1.16	1.76
T-11	17	35.7929945	-117.56615	0.53	0.04	0.93	1.75	1.50
T-11	18	35.7929955	-117.56571	0.54	0.38	0.58	1.07	1.49
T-11	19	35.7931237	-117.56542	0.54	0.05	0.34	0.62	0.93
T-11	20	35.7810725	-117.5974	0.64	0.03	0.62	0.97	1.28
T-11	23	35.7961393	-117.56939	0.71	0.04	3.52	4.99	4.26
T-11	26	35.7959412	-117.56914	0.89	0.06	3.83	4.32	4.78
T-11	27	35.79558	-117.56918	0.37	0.02	1.12	3.03	1.51
T-11	28	35.7956472	-117.56974	1.21	0.07	6.20	5.14	7.48
T-11	29	35.7958483	-117.57003	1.55	0.12	8.40	5.43	10.07
T-11	33	35.7957848	-117.57038	1.17	0.09	6.41	5.50	7.67
T-11	34	35.7954233	-117.57003	0.75	0.03	3.20	4.28	3.98
T-11	35	35.7956682	-117.56998	0.94	0.07	5.52	5.88	6.53
T-11	36	35.795983	-117.5697	0.99	0.06	4.43	4.49	5.47
T-11	37	35.795817	-117.56959	1.72	0.08	8.63	5.03	10.42
T-11	38	35.7955723	-117.56954	0.62	0.04	1.38	2.22	2.04
T-11	40	35.7929547	-117.56638	0.87	0.06	5.88	6.79	6.80
T-11	42	35.7932935	-117.56624	0.39	0.04	0.33	0.86	0.76
T-11	43	35.7933053	-117.56601	0.31	0.01	0.31	0.99	0.63
T-11	44	35.7933962	-117.56567	0.28	0.01	0.22	0.78	0.51
T-11	45	35.7935013	-117.56534	0.45	0.01	0.26	0.58	0.72
T-11	47	35.7812692	-117.59733	0.38	0.01	0.38	0.99	0.77
T-11	48	35.7814533	-117.59683	0.28	0.02	0.28	0.98	0.57
T-11	49	35.781606	-117.59676	0.26	0.00	0.22	0.84	0.49
X-3	1	35.8438528	-117.64571	0.12	0.00	0.14	1.15	0.27
X-3	2	35.8437752	-117.64571	0.48	0.02	0.46	0.96	0.96
X-3	3	35.843773	-117.64561	0.13	0.01	0.09	0.68	0.23
X-3	4	35.8438625	-117.64557	0.18	0.00	0.17	0.93	0.35
X-3	5	35.8434961	-117.64692	0.13	0.00	0.13	1.02	0.27

Location	Num.	Y (Degrees Lat.)	X (Degrees Long.)	U-234 pCi/g	U-235 pCi/g	U-238 pCi/g	Ratio U-238 to U-234	Total pCi/g
X-3	7	35.8434553	-117.64706	0.12	0.00	0.17	1.41	0.29
X-3	9	35.8435578	-117.64713	0.17	0.01	0.20	1.18	0.38
X-3	10	35.843426	-117.64699	0.11	0.00	0.05	0.48	0.16
X-3	11	35.8341212	-117.64654	11.12	0.40	11.20	1.01	22.71
X-3	12	35.834109	-117.64656	8.29	0.35	8.33	1.00	16.96
X-3	13	35.8341417	-117.64658	9.11	0.29	9.25	1.02	18.65
X-3	14	35.8341108	-117.64659	3.82	0.13	3.69	0.97	7.64
X-3	15	35.834123	-117.64658	7.69	0.31	8.17	1.06	16.16
X-3	16	35.8341718	-117.6466	0.50	0.02	0.46	0.90	0.98
X-3	17	35.83417	-117.64653	1.79	0.04	1.82	1.02	3.64
X-3	18	35.8341237	-117.64656	2.92	0.10	3.17	1.09	6.20
X-3	19	35.8341007	-117.64664	13.43	13.44	13.44	1.00	40.30
X-3	20	35.8340737	-117.64648	0.21	0.00	0.18	0.83	0.39
X-3	21	35.843683	-117.64561	0.10	0.00	0.07	0.69	0.17
X-3	22	35.8437153	-117.64578	0.08	0.00	0.10	1.28	0.18
X-3	23	35.8433952	-117.64728	0.30	0.00	0.34	1.13	0.64

Attachment 11 – Air Sample Location and Results

Figure 60: Air Sample Locations

Samples were analyzed on October 12, 2011 with a Ludlum 2200 scaler, S/N 43012, and a 43-10 alpha detector, S/N PRO57240. The source used to determine the efficiency was U-238, S/N 1130-58.

Table 11.1 Air Sample Results

Sample Date	Sample Type	Sample Counts	Count Time (minutes)	Concentration uCi/cc	Counting Efficiency	Collection Efficiency	Volume (cc)	Shielding factor alpha	MDC uCi/cc
9/28/2011	Background M1	2976	700	4.66052E-12	0.25	0.99	378045	0.85	1.80E-12
	Tech 1 M1	2914	700	1.15091E-12	0.25	0.99	270542	0.85	1.80E-12
	Tech 2 M1	2863	700	3.92163E-13	0.25	0.99	280294	0.85	1.80E-12
9/28/2011	Background A1	2816	700	2.97610E-12	0.25	0.99	427563	0.85	1.80E-12
	Tech 1 A1	2841	700	3.63111E-13	0.25	0.99	403970	0.85	1.80E-12
	Tech 2 A1	2862	700	5.37018E-13	0.25	0.99	402257	0.85	1.80E-12
9/29/2011	Background M2	2863	700	2.08428E-12	0.25	0.99	679485	0.85	1.80E-12
	Tech 1 M2	2848	700	4.17544E-14	0.25	0.99	644559	0.85	1.80E-12
	Tech 2 M2	2904	700	2.18975E-13	0.25	0.99	669335	0.85	1.80E-12
	Counter Background	2400	700						

Attachment 12 – Histograms - Land with Elevated Counts

Non-DU radionuclides found in commodities

Figure 61: Histogram Aircraft Bone Yard

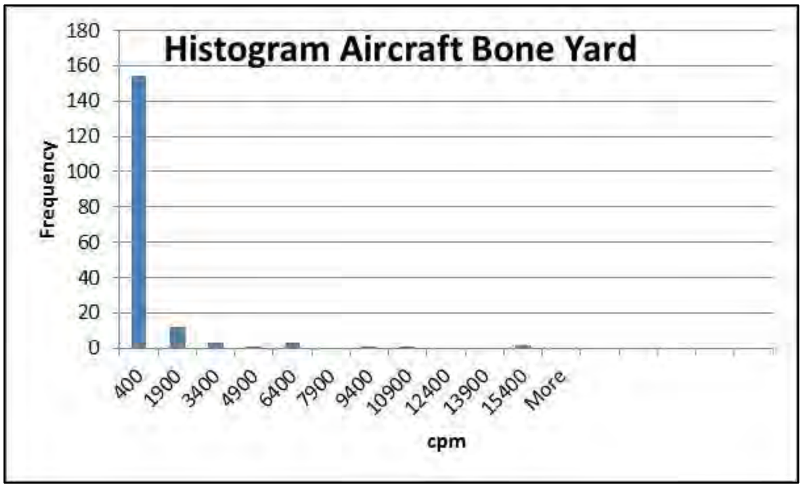


Figure 62: Histogram B-29 & F-4

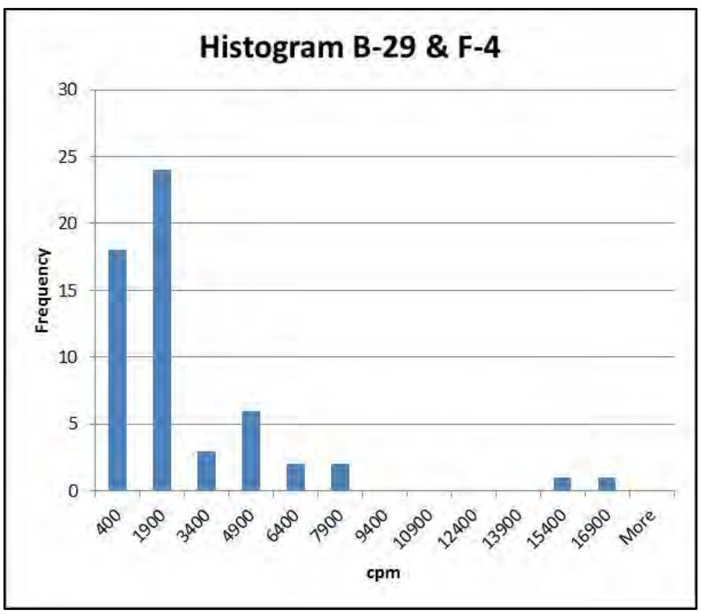
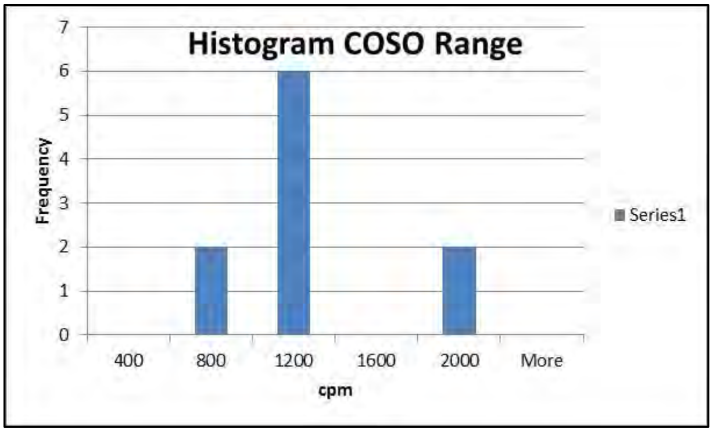


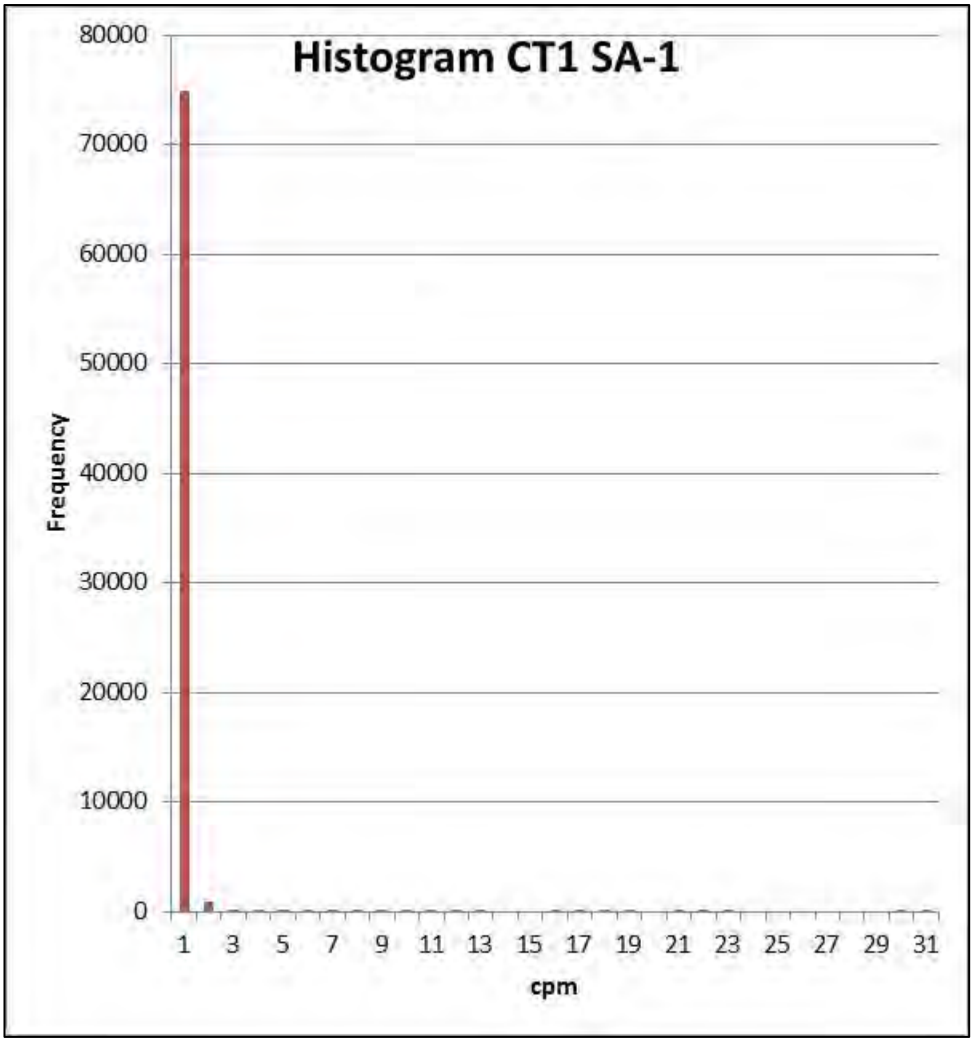
Figure 63: Histogram COSO Range


Histogram COSO Range
Frequency
cpm
0
1
2
3
4
5
6
7
400
800
1200
1600
2000
More
Series1

Attachment 12 – Histogram of Land Areas with Elevated Counts

Depleted Uranium (DU) fragments and metal pieces

Figure 64: Histogram CT1 SA-1



Attachment 12 – Histogram of Land Areas with Elevated Counts, continued

Depleted Uranium (DU) fragments and metal pieces

Figure 65: Histogram CT4 SA-2

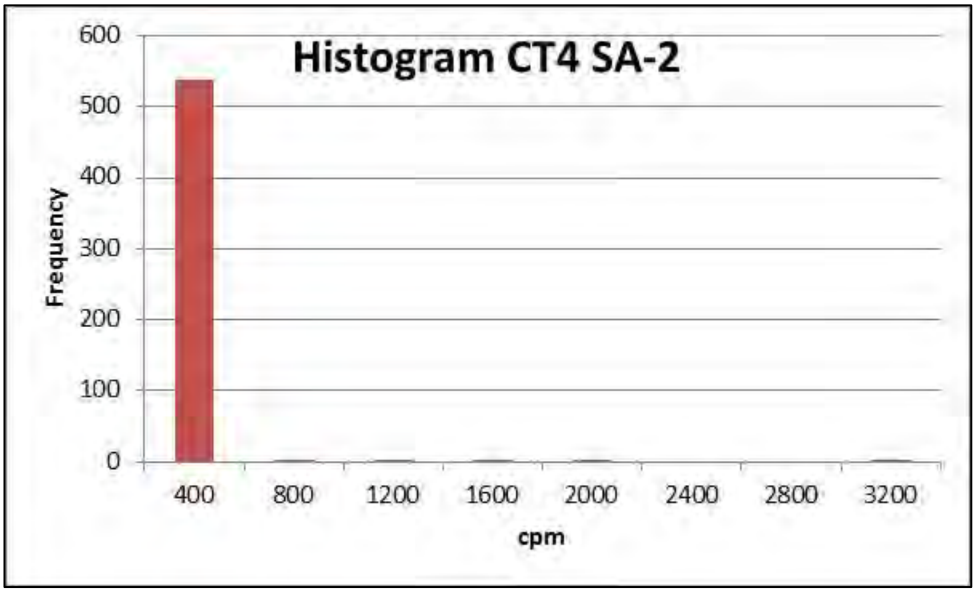
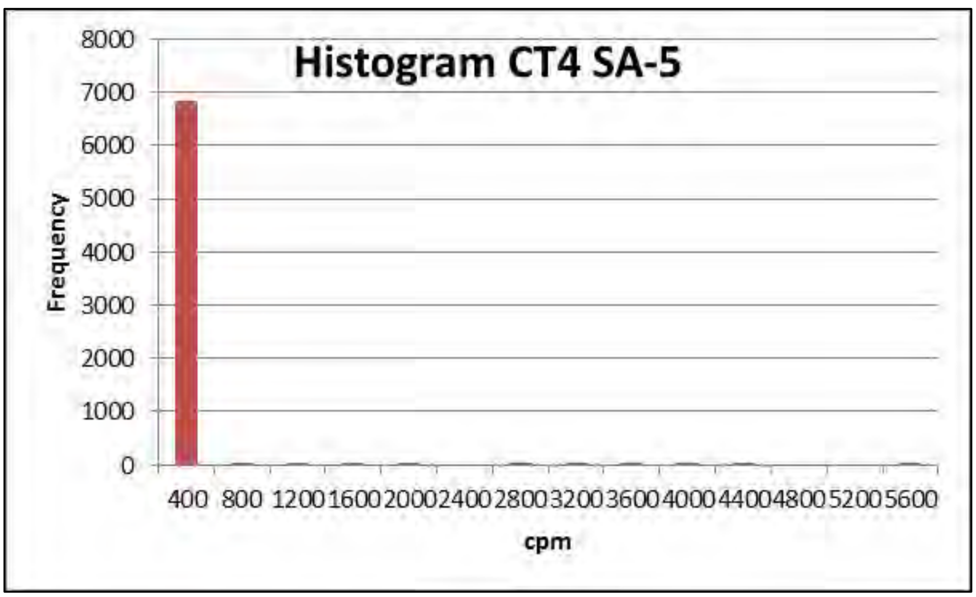


Figure 66: Histogram CT4 SA-5



Attachment 12 – Histogram of Land Areas with Elevated Counts, continued

Depleted Uranium (DU) fragments and metal pieces

Figure 67: Histogram CT4 SA-6

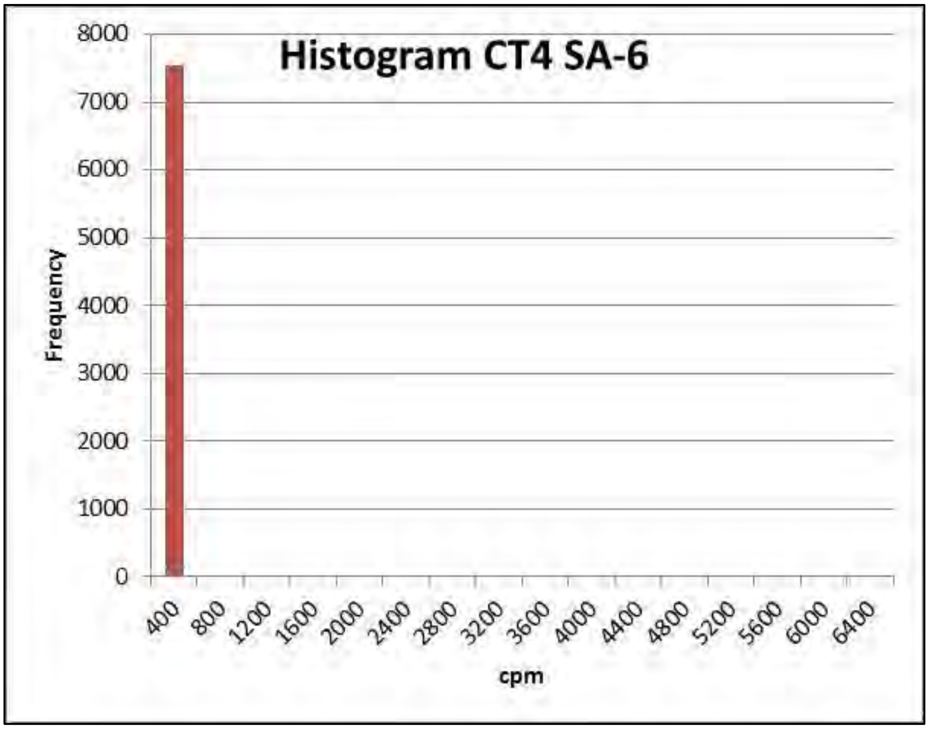
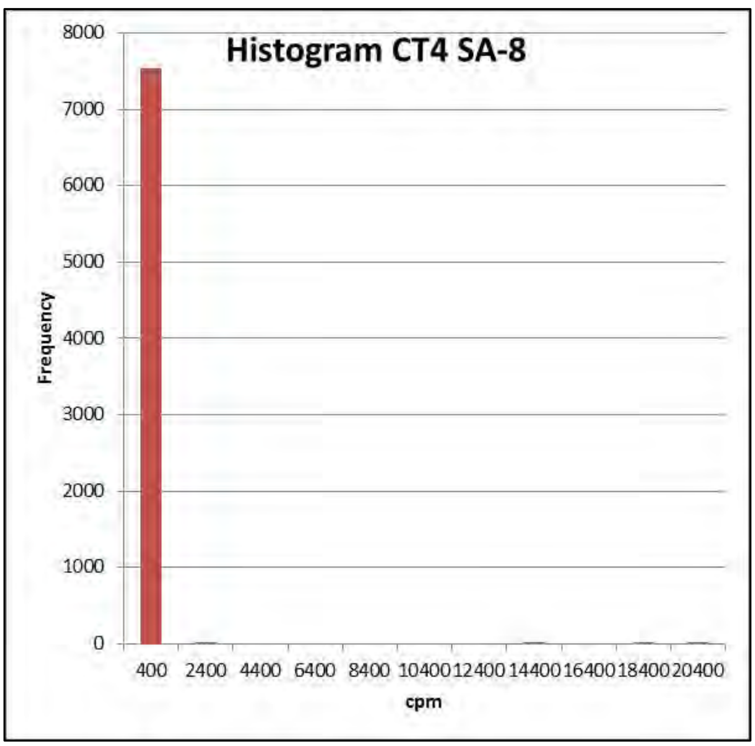


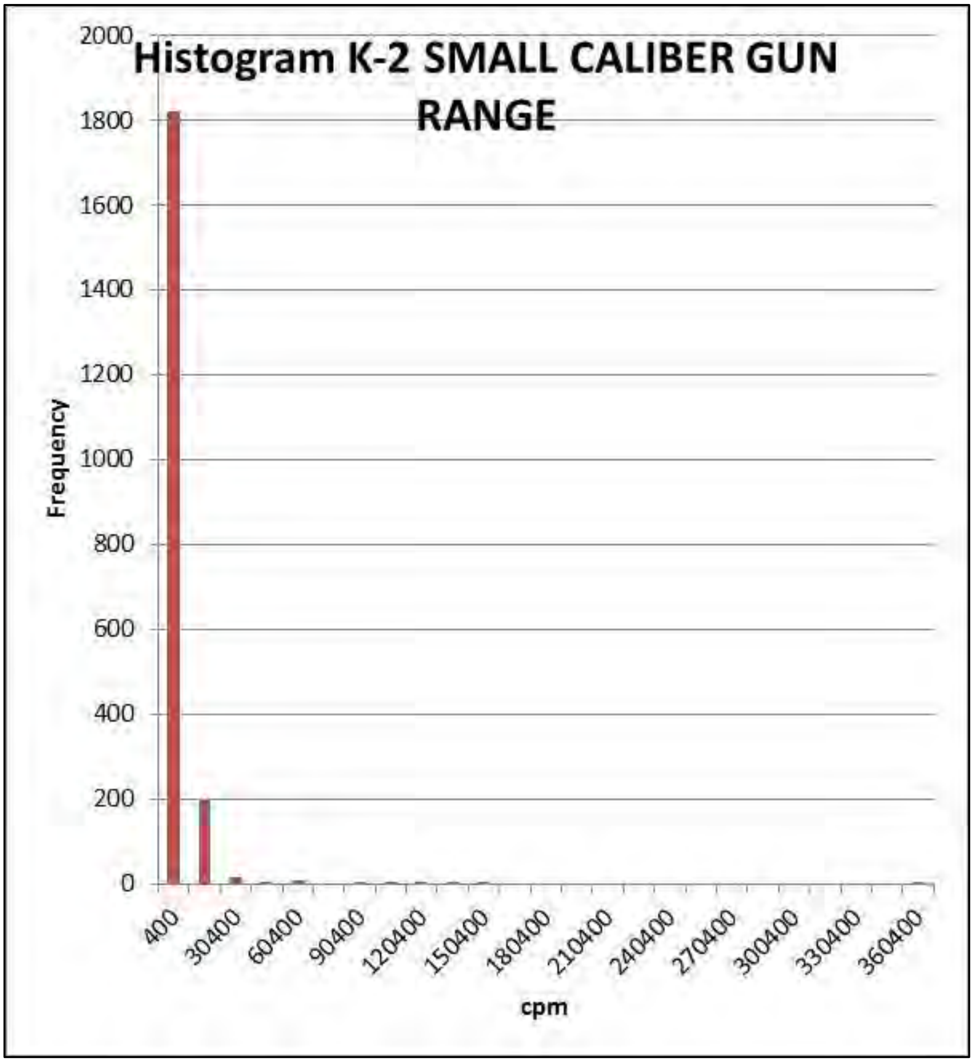
Figure 68: Histogram CT4 SA-8



Attachment 12 – Histogram of Land Areas with Elevated Counts, continued

Depleted Uranium (DU) fragments and metal pieces

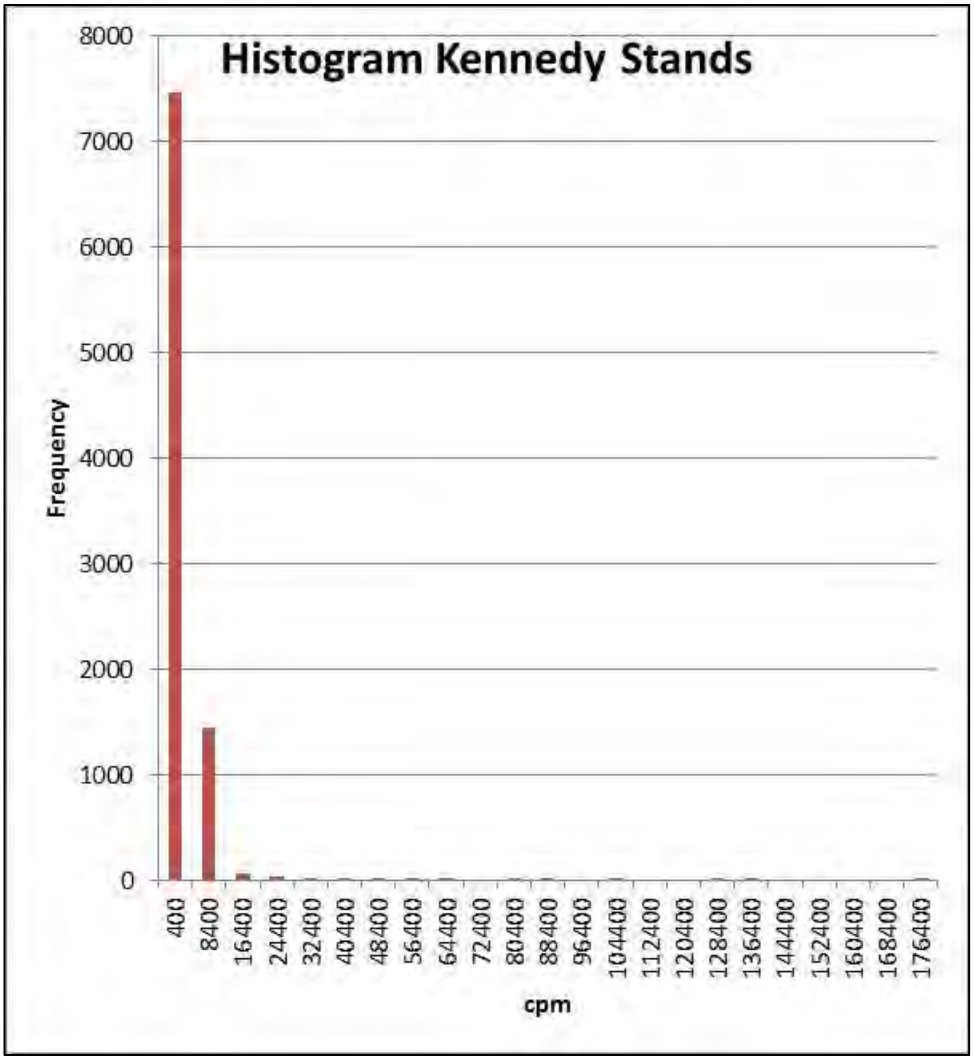
Figure 69: Histogram K-2 Small Caliber Gun Range



Attachment 12 – Histogram of Land Areas with Elevated Counts, continued

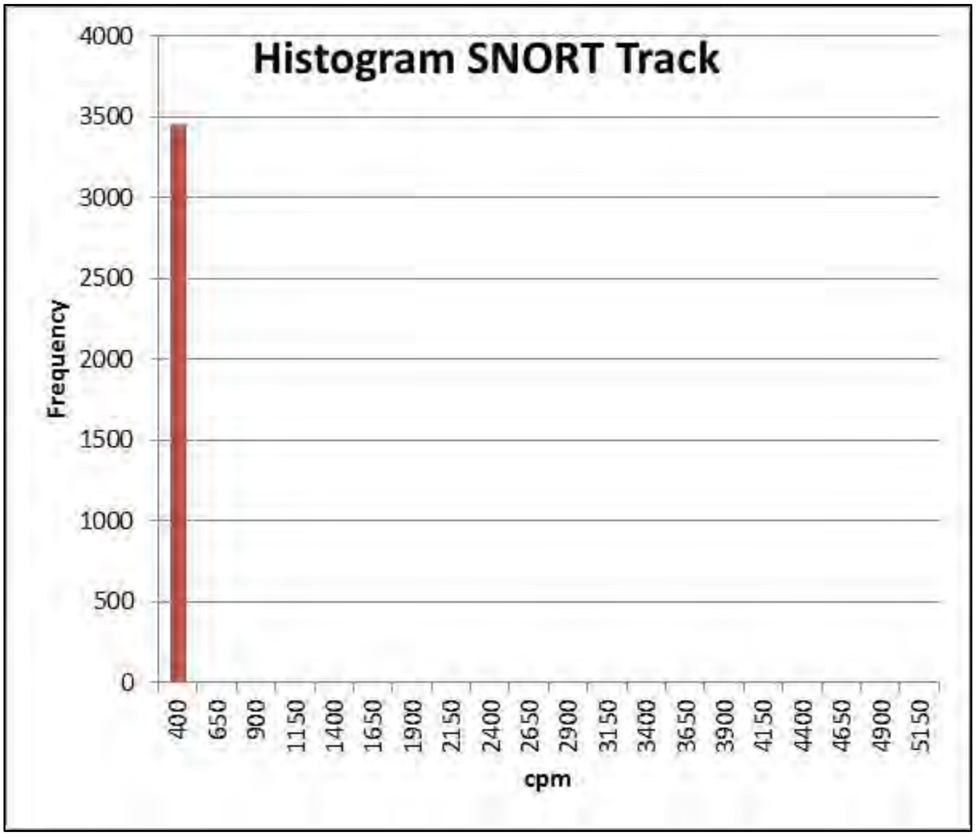
Depleted Uranium (DU) fragments and metal pieces

Figure 70: Histogram Kennedy Stands



Attachment 12 – Histogram of Land Areas with Elevated Counts, continued
Depleted Uranium (DU) fragments and metal pieces

Figure 71: Histogram SNORT Track



Attachment 12 – Histogram of Land Areas with Elevated Counts, continued
Depleted Uranium (DU) fragments and metal pieces

Figure 72: Histogram SNORT SA-1

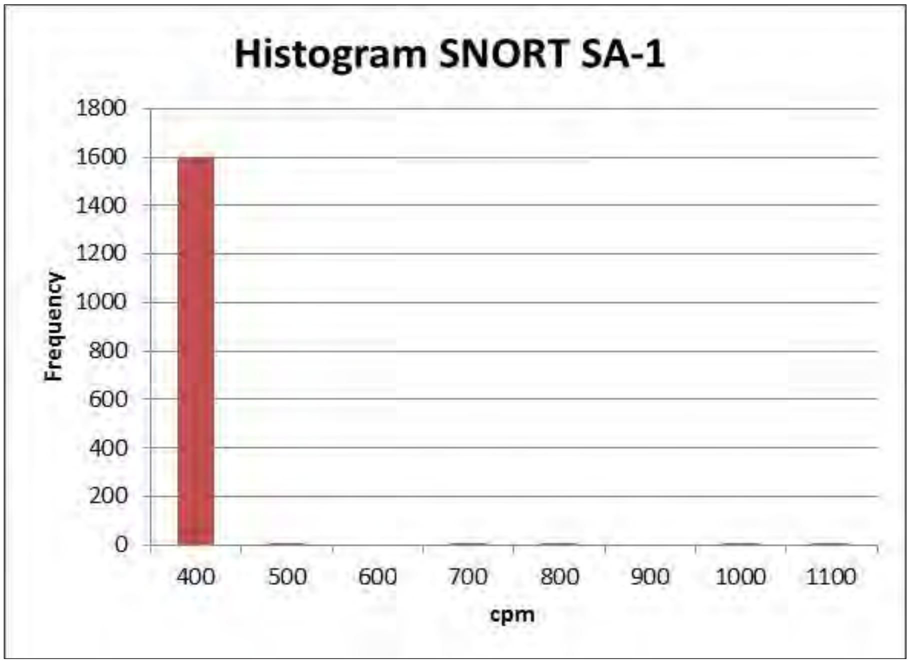
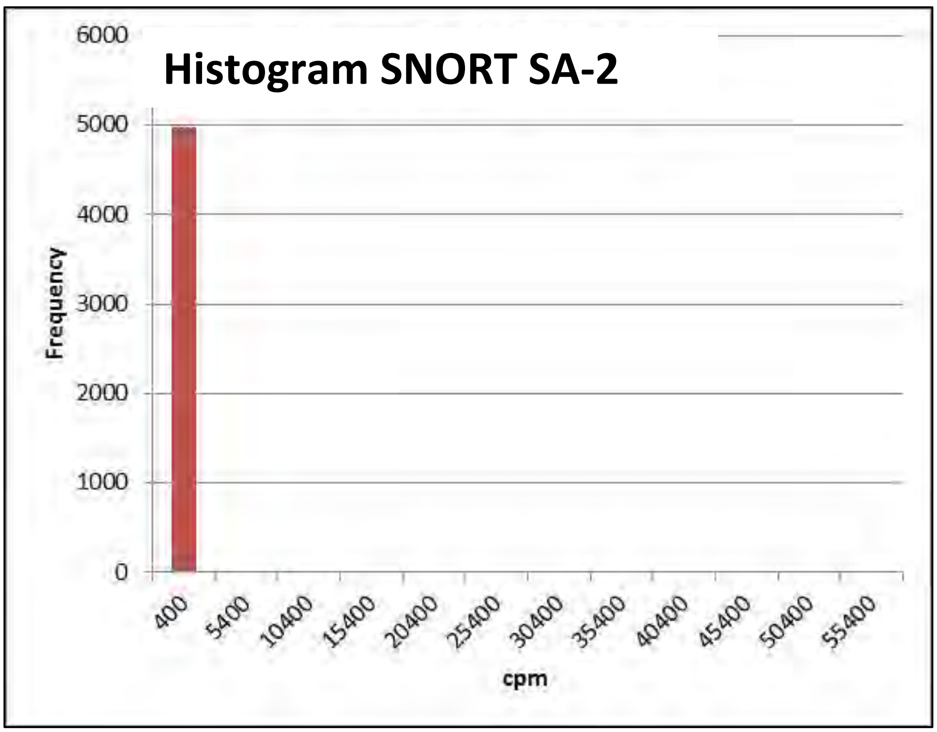


Figure 73: Histogram SNORT SA-2



Attachment 12 – Histogram of Land Areas with Elevated Counts, continued
Depleted Uranium (DU) fragments and metal pieces

Figure 74: Histogram T-11 SA-1

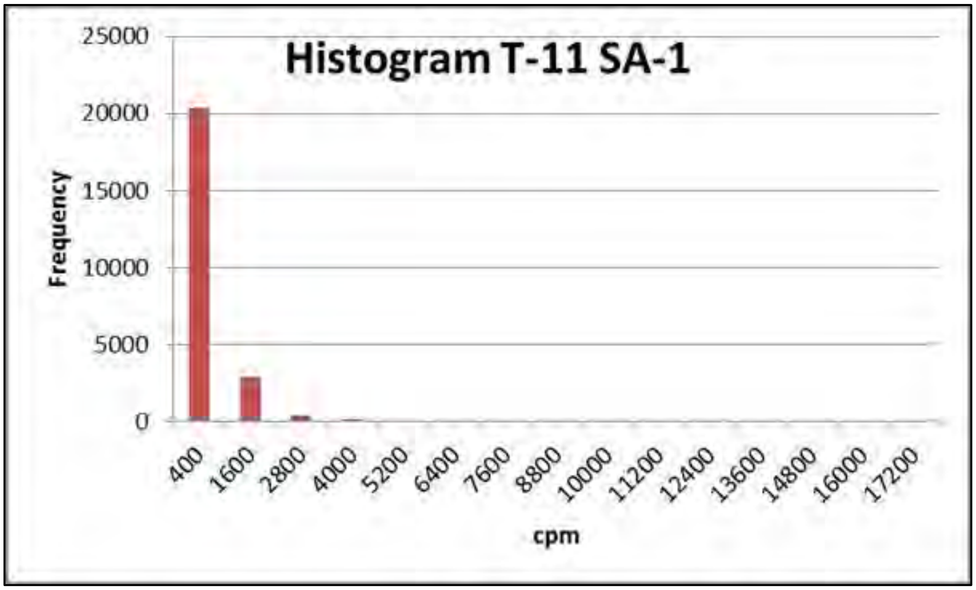


Figure 75: Histogram T-11 SA-2