FORT McCLELLAN

ANNISTON, ALABAMA

COMMODITY SITE SURVEY REPORT

ALLIED TECHNOLOGY GROUP

MARCH 2000

McClellan Commodity Site Survey
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1 EXECUTIVE SUMMARY

The purpose of this report is to define the radiological data gathered by Allied Technology Group at Fort McClellan, AL for seventeen sites known as the Commodity Sites. Fort McClellan is under the Army Base Realignment and Closure Act (BRAC) as an installation for closure. These areas have been identified through the mechanism of an Historical Records Search as having radiological issues (the storage and/or routine maintenance of Army radioactive commodities). This data will be presented to justify the release of these areas for unrestricted use. The Commodity Sites consist of 15 Buildings and 2 Site Areas. The designated 15 buildings are as follows: (1) 228, (2) 256, (3) 257, (4) 303-A, (5) 335, (6) 337, (7) 338, (8) 339, (9) 341, (10) 345, (11) 350, (12) 812 ½, (13) 3181 Rooms: 35 & 36, (14) 3182, (15) 4416. The two designated site areas are: (1) Bromine Field and (2) Alpha Field. The release data was gathered in accordance with the guidance in NUREG-1575, 'Multi-Agency Radiation Survey and Site Investigation Manual" for the 15 buildings. The two designated site areas are an exception to this methodology and with these two areas historical data and analysis will be submitted for release justification.

2 HISTORICAL BACKGROUND

Fort McClellan lies adjacent to the city of Anniston, AL and within Calhoun County. During the Spanish American War (1898), units stationed at Camp Shipp in the Blue Mountain Area used the current site area for artillery training. Documented military use began in 1912 when the Alabama National Guard used part of the site as a Field Artillery Range. In 1915, then President Woodrow Wilson ordered 1,160 acres in Alabama reserved for military purposes. In 1917, Congress authorized the establishment of Camp McClellan. In 1929, the camp became officially designated as Fort McClellan. Following World War II, the fort was put into an inactive status in June of 1947. The Fort was reactivated in January of 1950. The Department of the Army established the Army Chemical Training Center at Fort McClellan in 1951 and academic instruction began at the US Army Chemical Corps School in September 1952. The Radiological Safety Support Unit, established in 1953, was an organization element of the Army Chemical Training Center at Fort McClellan. The Rad Unit, as it was commonly known, conducted radiological test, research, and development, which aided in the development of training and tactical doctrine. In 1963 the name of the US Army Chemical School changed to the US Army Chemical Center and School.

Fort McClellan is comprised of three areas: the Main Post, the Choccolocco Corridor, and the Pelham Range. The installation occupies 45,679 acres. The Main Post encompasses 19,000 acres and contains the majority of the facilities. The Army leased the Choccolocco Corridor, which occupies approximately 4,500 acres, from the state of

Alabama. It connects the Main Post with the Talladega National Forest to the east. The Pelham Range consists of approximately 22,000 acres west of the Main Post.

Radiological training began at Fort McClellan in 1952. The original Radiological Laboratories were located in Post Area No. 8 and consisted of five buildings: T-810, T-811, T-812, T-836, T-837 and a concrete vault for the storage of radioactive materials, primarily Radium and Cobalt-60.

In 1952, field training in Radiological Surveys was initiated. The first course area was known as Rattlesnake Gulch and used 48 curies of Co-60 in sources of 2 to 4 curies each. Approval was also given to use 10 sources of Co-60 in the CBR Familiarization Course at the Pelham Range.

In 1953, the Rattlesnake Gulch Survey Area was moved closer to the Summerall Gate road and re-named as Radiological Survey Area #1. A radioactive waste burial ground was established at the site of the new survey area and designated as the Chemical School Radioactive Burial Ground. In later years both the Radiological Survey Area #1 and burial area were referred to as being part of the Rattlesnake Gulch Area. Radioactive waste from the first Rattlesnake Gulch Area was removed and buried in the new burial area. The Radiological Survey Area #1 was used to dispose of radioactive material at the site from 1953 to 1957. A Field Hot Cell was constructed near Radiological Site #1 and was operated until the completion of the Permanent Hot Cell. Some material in this area was moved to the Pelham Range in 1958. Health Physics Division personnel conducted a cleanup of this area in 1971. Remnants of the Field Hot Cell were discovered buried in the Rattlesnake Gulch Area. The results of this cleanup are detailed in the After Action Report (AAR) which refers to the site as Iron Mountain due to its proximity to this area.

In 1957, the US Atomic Energy Commission began issuing Byproduct Material Licenses to the US Army Chemical School at Fort McClellan for activities at the Pelham Range Area and on the Main Post. In 1958 a second Temporary Hot Cell was constructed in the Radiological Laboratory (Building 3185). It was dismantled in 1958, and minutes of the Isotope Committee Meeting in 1958 state that the area was monitored and found to be free of contamination.

The Army Chemical School then established the Radiological Facilities, which included a Hot Cell Facility (Bldg. 3192), a Radiological Laboratory (Bldg. 3182), a Nuclear Accident Training Facility (Alpha Field behind Bldg. 3165), a Vault Radiological Laboratory (Bldg. 3180), a Radiological Training Facility (Bromine Field), a Personnel Decontamination Center (Bldg. 3185), and an Isotope and Scaler Laboratory (Bldg. 3181). The Hot Cell was connected to an underground drainage system leading to two underground storage tanks. A liquid waste disposal pit was also connected. Training at the Hot Cell included the use of Co-60 sources.

Training at the Radiological Laboratory Building (Bldg. 3182) included the use of radioactive sources. Radioactive sources were used at the alpha field. These sources were sealed and leak tested. The US Army Chemical Center and School staff stored radioactive material in the vault Radioactive Laboratory Building (Bldg. 3180). Building 3180 was demolished in 1989. Additional radiological storage was done at the radiological storage vault T-812½ (Bldg. 812½). Training was conducted at the Bromine Field, which included decontamination of vehicles and equipment with the short-lived isotope, Br-82. Bromine tanks, which were used to store the contaminated water containing Br-82, have been removed from the site. The Personnel Decontamination Facility was located in Building 3185. Radiation sources were routinely present and used in the Isotope and Scaler Laboratory, Building 3181.

The US Army Chemical School closed the Radiological Facilities in 1972 and removed the radioactive sources. The Chemical Corps School was deactivated in 1973.

The US Army Chemical School returned to Fort McClellan in 1979 and the Edwin R. Bradley Radiological Laboratory (Bldg. 2281) became the focus of radiation training where isotope sources were present. The US Army Chemical School also stored radioactive material in Building 4416. The Radiological Calibration Facility was located in Building 228. Sibert Hall (Bldg. 1081) was the last home to the nuclear, biological and chemical mission at Fort McClellan. These building were used until the US Army Chemical School closed and transferred to Fort Leonard Wood, MO in 1999.

3 COMMODITY SITES

The following describes the seventeen sites known as the Commodity Sites. A physical description of the site, the dates and use of the site, the radiological isotopes used at the site and the MARRSIM release criteria for the site are included. These affected sites were identified during the historical record search conducted for areas that were used on site for the storage and/or routine maintenance on Army radioactive commodities.

These sites are:

BUILDING 228
Status – Vacant

Built originally as a Quartermaster Maintenance Shop in 1936, the installation converted this building to a RADIAC calibration facility in 1978. In 1991, it was converted again for use by Explosive Ordnance personnel. The installation completely vacated the building in 1998. Real property records indicate the overall building dimensions are 69 ft x 123 ft, total square footage: 8,487. The Northeast corner of the South bay was surveyed as a MARSSIM Class III area.

The dimensions of this area were 28' x 40' for a total area of 1120 square feet. The radionuclides of concern were Pu-239 (AN/UDM-6 calibrator), Ni-63 and Sr-90 (AN/UDM-2 calibrator).

BUILDING 256
Status – Active

Built in 1954, the Directorate of Logistics used this structure as a warehouse. The radiological contamination potential comes from the fact that the installation historically used the building to store packaged, ready to ship Army radioactive commodities. Real property records indicate the dimensions are 300 ft x 80 ft with 40 ft 8 in x 18 ft 2 in offset, total square footage: 24,739. Actual measured dimensions of the building were 300 feet by 80 feet. The building was surveyed as a MARSSIM Class III area. The primary radionuclides of concern were Ni-63, H-3, Am-241 and Ra-226.

BUILDING 257
Status – Active

Built in 1941, the Directorate of Logistics used the structure as a warehouse. The potential radiological contamination comes from the fact that the installation packaged Army radioactive commodities in preparation for transport in this building. Real property record describes dimensions as 60 ft x 170 ft. Total square footage: 10,200. Actual measurements verified the measurements of the building as 60 feet by 170 feet. The primary radionuclides of concern were Ni-63, H-3, Ra-226, Am-241 and Th-232. The facility was surveyed as a MARSSIM Class III area.

BUILDING 303A
Status – Active

Built in 1942, it served as the Central Issue Facility for all soldier items, including radio-luminescent lensatic compasses. The building is currently in use by a local construction company. Real property records describe the building dimensions as 60 ft x 450 ft with 9 ft x 450 ft platform (dock). The total building footprint is 27,000 ft^2. The affected area or issue area measures 19 feet by 59 feet for a total square footage of 1121 ft^2.

The front portion of the building (i.e., the portion of the building that houses the issue desk or issue) was surveyed as a MARSSIM Class III area. The radionuclide of concern was H-3.

BUILDING 335
Status – Vacant

Built in 1941, the installation used the structure as a General Support vehicle maintenance shop. The Alabama National Guard formerly used the structure as a

storage building. Real property records indicate dimensions of 67 ft x 92 ft with 28 ft 6 in x 27 ft wing. Total square footage: 6,933. On site measurements verified these dimensions. The building was surveyed as a MARSSIM Class III area. The radionuclide of concern was Ra-226.

BUILDING 337
Status – Vacant

Built in 1941, the site used this building as a General Support vehicle maintenance shop. The Alabama National Guard formerly used the structure as a storage building. Real property record describes dimensions of 40 ft x 241 ft. Total square footage: 9,640. On site measurements verified these dimensions. The building was surveyed as a MARSSIM Class III area. The radionuclide of concern was Ra-226.

BUILDING 338
Status – Vacant

Built in 1941, the site used this building as a General Support vehicle maintenance shop. The Directorate of Community Activities currently uses the building as the Ft. McClellan Recycle Center. Real property records describe dimensions of 76 ft x 240 ft. On site measurements verified these dimensions. Total square footage: 18,240. The building was surveyed as a MARSSIM Class III area. The radionuclide of concern was Ra-226.

BUILDING 339
Status – Vacant

Built in 1943, the installation initially used this building as a General Support vehicle maintenance shop. The building was derelict, the north side had been removed and thus the building was open on this side. Real property records list dimensions of 56 ft x 140 ft with 20 ft x 135 ft wings. Total square footage: 10,540. On site measurements which included the original building footprint and the north side wing were 76 feet by 140 feet for a total square footage of 10640 ft ^{2}. The building was surveyed as a MARSSIM Class III area. The radionuclide of concern was Ra-226.

BUILDING 341
Status – Active

Picked up as "Found On Post" in 1977. This was originally a general storehouse used by the Defense Reutilization and Marketing Organization (DRMO). The Directorate of Environment currently uses it as a Hazardous Waste accumulation point. The measured dimensions are 40' x 100' for a total square footage of 4,000 ft^2. The building was surveyed as a MARSSIM Class II area. The primary radionuclides of concern were H-3 and Ra-226.

BUILDING 345
Status – Active

Built in 1977, DRMO used this structure as a general storage building. The Directorate of Environment currently uses the building for storage. The actual measurements of the structure are 40' x 100' and thus the total square footage is 4,000. The building will be surveyed as a MARSSIM Class II area. The primary radionuclides of concern were H-3 and Ra-226.

BUILDING 350
Status – Active

The installation built the structure 1991. Ft. McClellan designed it as General/Direct Support Maintenance shop. Direct Support Maintenance uses two bays for wipe testing/routine maintenance of M43A1 detectors and Continuous Air Monitors (CAMs). The square footage for entire building is 87,832 ft2. The maintenance areas of the building were surveyed as a MARSSIM Class III area. Three areas were indicated as affected areas. These areas were: (1) the Truck Bay which was 80' x 260' for a total square footage of 20,800, (2) Room 18-B which had measurements of 27' 4" by 46' 8" for a total square footage of 1303, and (3) Room 16-D which had measurements of 15' x 24' 5" for a total square footage of 366. The truck bay was so extensive in comparison to the other two rooms that these two areas were surveyed as two separate MARSSIM areas. The total area of the truck bay was thus 20,800 ft^2, and the total area of Rooms 18-B and 16-D was 1669 ft^2. The primary radionuclides of concern were Ra-226, Ni-63 and Am-241.

BUILDING 812-1/2
Status – Vacant

This is a very small (approximately 5' x 5' x 5') concrete structure that the installation used at one time as a storage vault for radium gauges. This structure was later used for chemical storage. The actual internal dimensions of this structure were 4' x 4' 6" and 4' 6" high. Thus the floor space of this structure was 18 ft^2. This building was surveyed as a MARSSIM Class III area. The primary radionuclide of concern was Ra-226.

BUILDING 3181, Room 35 and Room 36
Status – Vacant

The installation used rooms in question as a radiological laboratory. The original vent ducting above the sample area was surveyed to verify no contamination existed in this pathway. This building's affected rooms, Rooms 35 and 36, were surveyed as a MARSSIM Class II area. The overall dimensions of the two rooms was 34' x 34' 9" for a total square footage of 1190. The primary radionuclides of concern were Co-60, Mn-54, Cs-137, Au-198, Na-22, Ni-63 and P-32.

BUILDING 3182
Status – Vacant

Built in 1954 originally as an Applied Instruction Building, the Ft. McClellan Radiological Laboratories used one wing in conjunction with the "Hot Cell" facility. The building formerly served as the Military Police Corps museum. Total square footage is 11,696 ft2. The building was surveyed as a MARSSIM Class III area. The primary radionuclides of concern are H-3 and Ra-226.

BUILDING 4416
Status – Active

This is an ammunition magazine currently used by the Alabama National Guard and is currently empty. Special permission was required to enter this facility. Property records indicate the building dimensions are 11 ft x 24 ft. Actual measurements were 20' x 10' 8" internal floor space for a total square footage of 216. At one time, during the relocation of the Chemical Command to Fort McClellan, the installation used this structure to temporarily house sealed Co-60 and Cs-137 sources. The building was surveyed as a MARSSIM Class III area. The primary radionuclides of concern are Co-60 and Cs-137.

BROMINE FIELD
Status – Parking lot

Ft. McClellan used a portion of the parking lot near Building 3195 and the field adjacent to the parking lot as a decontamination training area. Several years ago, the Army would contaminate its equipment with Br-82 (2.4 day half-life) so personnel could practice decontamination procedures. This area is currently a parking lot and the area where the Bromine Tanks existed is a field, the tanks have long since been removed. A rationale will be provided in this document for the release of this area because of the short half-life of Br-82, the removal of all associated equipment, and the restructuring of the area by the inclusion of a parking lot over the area.

ALPHA FIELD
Status – Parking lot

Ft. McClellan used a portion of the parking lot near Building 3195 to simulate a radiation field. The site places uranium-233 plates on the ground for training purposes. A new building currently exists on this area. A rationale will be provided for the release of this area in this document.

Register Volume 63, No. 222, pages 64132 through 64134, contains a table on release limits to be used for license termination activities. This table of screening values (concentration limits) for surface contamination from the Federal Register contains just selected beta-gamma emitters. The screening values were calculated using the DanD Software Computer Code. The methods for determining doses from alpha emitters for surface contamination are omitted from this document. This is because the DanD Code uses such conservative default values, that the resultant screening values for alpha emitters are unreasonably restrictive and at impractical levels for field measurements. Thus for alpha emitters, the screening values or Derived Concentration Guideline Levels (DCGLs) will be based on the DanD Computer Code in which the resuspension factor is modified to a more realistic value of 10%. The following table contains all the beta-gamma and alpha emitting radionuclides listed in the Commodity Site Work Plan and their respective screening value (DCGL) as derived from the FR Table and/or DanD Code:

TABLE OF $DCGL_w$ FOR FT. McCLELAN COMMODITY SITE SURVEYS

Release Criteria Based on 25 mrem/y[1]	
Nuclide	**Release Criteria (dpm/100 cm^2)**
3H	1.23E+08
22Na	9.54E+03
32P	9.46E+06
45Ca	2.79E+06
54Mn	3.15E+04
60Co	7.04E+03
63Ni	1.81E+06
226Ra	3.13E+02
90Sr	8.76E+03
137Cs	2.80E+04
198Au	4.09E+06
233U	4.96E+00
241Am	2.68E+01
239Pu	2.00E+03
232Th	1.00e+03

1 Calculated using DanD & default building occupancy scenario, assuming 10% of the contamination resuspension factor derived from CR-5512 would be resuspended as breathable particles for alpha emitters.

This table reflects the release criteria that were applied to the various areas of the Fort McClellan Commodity Sites depending on the isotopes applicable to each area. These Derived Concentration Guideline Limits or Screening Limits are based on the assumption that the fraction of removable surface contamination is equal to 0.1 or no more than 10% of the area. Also in meeting with the criteria of Regulatory Guide DG-4006, *"Demonstrating Compliance with the Radiological Criteria for License Termination"*, Draft, Revised March 13, 1998, the ALARA principal was applied to all of the Commodity Site Surveys. Survey data was evaluated for release against the activity levels being as low as practical to background activity.

4.3 Area Classification

Specific MARSSIM survey classifications were defined by Fort McClellan for all areas except the two areas currently located beneath the parking lot next to Building 3195. Twelve areas were classified as Class III, i.e., based on site operating history, these areas were not expected to contain any residual radioactivity, or were expected to contain levels of residual radioactivity at a very small fraction of the $DCGL_W$. Three (3) areas were classified as Class II, i.e., there is some potential for residual radioactivity but is not expected to exceed the $DCGL_w$.

Because there were no Class I areas identified, there were no provisions to perform a test for elevated measurement comparison. Specific locations in an area which are identified as potentially requiring such testing, that area or a portion of that area will need to be reclassified as Class I.

4.4 Survey Units

For the Class III areas, MARSSIM does not place a limit on the size of survey units. For Class II areas, MARSSIM recommends a maximum survey unit size of 1,000 m^2 for building surfaces and 10,000 m^2 for land areas. Therefore, it was not necessary to divide any of the 17 areas into smaller survey units. Each area will represent one (1) survey unit.

The survey units included the floor and the lower two meters of each wall in the area. Contamination was not suspected on surfaces above two meters, but some judgmental samples were collected on exposed flat horizontal surfaces located above two meters.

4.5 Data Quality Indicators

- Precision was determined by comparison of replicate values from field measurements and sample analysis; the objective will be a relative percent difference of 30% or less at 50% of the criterion value.

- Accuracy was the degree of agreement with the true or known; the objective for this parameter was +/- 20% at 50% of the criterion value.

- Representativeness and comparability do not have numeric values. Performance for these indicators was assured through the selection and proper implementation of systematic sampling and measurement techniques.

- Completeness refers to the portion of the data that meets acceptance criteria and is therefore useable for statistical testing. The objective was 90% for this project. All data taken for this project met the data quality objectives and is documented within the following text.

4.6 Sampling Density

The number of direct measurements in each survey unit was dependent on several parameters, including the desired confidence of the decision criteria (decision errors), the presence and variation of background interference, some of which are briefly discussed below.

- **Decision Errors**

  Among the most important parameters affecting survey design and the number of measurements needed to satisfy the Data Quality Objectives are the acceptable decision errors. The Industrial Operations Command (IOC) has established the Type I (alpha) decision error at 0.05; this provides a confidence level of 95% that the statistical tests would not incorrectly determine that a surveyed area satisfied the release criteria when, in fact, it did not. Similarly, the IOC established the Type II (beta) decision error at 0.05; which provided a confidence level of 95% that the statistical tests would not incorrectly determine that a surveyed area did not satisfy release criteria when, in fact, it did. The Type II decision error was more restrictive than is usually recommended for such surveys. This more restrictive value typically had a potential consequence of indicating unnecessary remediation; however, considering the public relations consequences of failing to identify residual contamination, the more restrictive level was considered prudent.

- **Variability (σ)**

  The survey units in the commodity use areas were mostly Class III areas with a few Class II areas. It was anticipated that the measurement variability in these

areas would be similar to that in the background reference areas. The background surface activity levels for gross alpha and gross beta activity, standard deviation of measurements (σ), was equal to or less than 75% of average surface activity levels.

- **Number of Samples Indicated**

  A Type I error rate ( ) of 0.05 and a Type II error rate ( ) of 0.05 were assumed. The Lower Bound of the Gray Region (LBGR) was then set at half the $DCGL_w$, and a Relative Shift (Δ/σ) of 1.7 was calculated (MARSSIM recommended a value between 1 and 3). The number of data points in each survey unit and the background reference area was determined to be 15 (Table 5.3, MARSSIM). This number (N=15) applied to direct measurements as well as smears for determining the amount of removable activity (Table 1).

TABLE 1
SAMPLING REQUIREMENTS

Survey/Sampling Activities[a]	Area Classifications	
	Class II	Class III
Surface gamma scan	50%	Judgmental [b]
Surface alpha and beta scans	50%	Judgmental [b]
Direct measurements for gross alpha and gross beta activity	15 + 2 [c]	15 + 2 [c]
Measurement of removable alpha and beta surface activity	15 + 2 [c]	15 + 2 [c]
Measurements of removable H-3 activity (liquid scintillation) [d]	15 + 2 [c]	15 + 2 [c]

a. These activities refer to building floors and lower walls. In the case of upper walls/ceilings/ and overhead structures where there is very limited potential for residual contamination, judgmental scanning and measurements was performed.

b. Emphasis was placed on expansion joints, cracks, and any other location where residual contamination may have been accumulated.

c. Included survey measurements and required replicates.

d. These smears were collected only in the five (5) areas where H-3 is a radionuclide of concern.

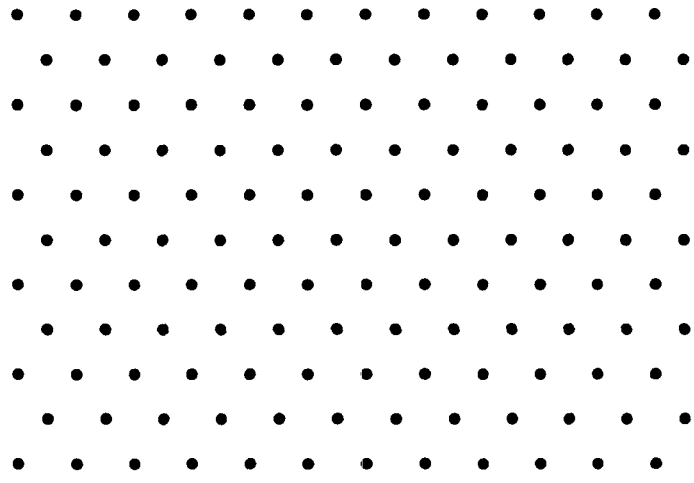
- **Selection of Sampling Locations in Survey Units**

  MARSSIM recommended a triangular sampling pattern with a random starting point to increase the probability of identifying small areas of elevated activity. (Figure 1 illustrates a triangular sampling pattern.)

This type pattern was used for the Commodity Use Areas. The spacing (L) between samples on a triangular pattern is determined by:

$$L = [\text{Survey Unit Area}/(0.866)\ (\text{number of samples})]^{1/2}$$

Figure 1 Triangular Sampling Pattern



The spacing value (L) was calculated using the previous shown equation, taking the square root of the total area of the affected area (floor and walls) divided by 0.866 and the total number of samples for the area (15). This was the horizontal spacing for the pattern between each sample point. The distance between horizontal lines or vertical spacing between points was called the B value. This was calculated by applying the Pythagorian Theorem to the triangular area. The hypotenuse of the triangle was the L value, the base of the triangle was L/2 and the right side of the triangle, B value, was the vertical spacing of the grid or the distance between horizontal rows.

$$B = (L^2 - (L/2)^2)^{1/2}$$

For Building 350, two areas were created because of the large size of the truck bay relative to two smaller affected areas, Rooms 18-D and Room 16-D. The L and B value for each affected building area are shown in the table below:

L&B Values

Building Area	Total Area (ft^2)	L Value (ft)	B Value (ft)
337	9,640	31' 8"	27' 5"
338	18,240	41' 2"	35' 8"
339	10,640	31'	26' 10"
341	4,000	20' 11"	18'
3181 (Rms 35/36)	1,190	13" 1"	11' 4"
345	4,000	20' 1"	18'
335	6,164	34' 11"	30' 2"
Building Area	**Total Area (ft^2)**	**L Value (ft)**	**B Value (ft)**
228	1,120	12' 4"	10' 8"
303-A	1,121	12' 7"	10' 10"
812 ½	18	2' 4"	2' 1"
257	4,200	31' 7"	27' 5"
4416	216	7' 3"	6' 3"
256	2,400	44' 7"	41' 2"
3182	14,002	31'	26' 9"
350 (truck bay)	20,800	49'	43' 9"
350 (Rm18-B/16-D)	1,669	15' 4"	13' 3"

- **Selection of Sampling Locations in Background Locations**
  Background areas were not gridded prior to sampling. Background samples from separate locations within the background area were collected, their location recorded as shown in Attachment 6, *Background Readings*, and placed with each area survey in the attachments.

4.7 Background Reference Area

Background (reference) levels of gross-alpha and gross-beta surface activity for applicable surfaces (e.g., concrete, brick, wood, or vinyl) were determined in a building of similar construction where there was no record of use or storage of radioactive materials. The following is a list of the Affected Structures and the areas, which were surveyed to determine, background (reference) levels. Background readings are shown in Attachment 6, *Background Readings,* and are documented in the survey data for each area located in the attachments. These background surveys are shown with each building in the Attachments.

Affected Structures and Areas

Affected Building	Background Building
337	234
338	234
339	225
341	425
3181 Room 35/36	3181 Room 41
345	425
335	234
228	234
303-A	Office Area
812 ½	215
257	262
4416	4415
256	234
3182	3181 Room 41
350	349

4.8 Survey Methodology

The performed survey activities consisted of the following:

- Surface gamma scans
- Surface alpha and beta scans,
- Measurements of total alpha and total beta surface activity,
- Measurements of removable alpha and beta surface activity, and
- Measurements of removable tritium (H^3) activity in selected areas.

4.9 Instrumentation and Sampling Techniques

The instrumentation and sampling protocols are briefly described below. Attachment 3 of the Sampling Analysis Plan (Attachment 1 of this report), *Table of Instrumentation for Radiological Surveys*, describes the instrumentation parameters and the detection sensitivities for those types of instruments used at the site. Attachment 2, *Instrument Calibrations*, shows documentation from a certified laboratory detailing the calibration and performance of the instruments used on site. The response of all instrumentation and detector/meter combinations to a National Institute of Standards and testing (NIST) referenced source was documented daily or prior to use and detailed in this attachment.

Attachment 3, *Daily Instrument Response Checks*, details the daily response checks and determined on-site detector sensitivities for the instruments used each day for site activities. Attachment 4, *Source Control*, shows the sources used to perform the on site daily instrument response checks.

- **Surface Gamma Scans**

  Easily accessible areas of the floor surface in the survey unit as well as the lower 2-m of any wall were scanned for gamma activity using a Bicron Micro R Meter. This instrument was held as close to the surface being scanned as the conditions allowed. Scanning was performed by moving the detector from side to side in a serpentine motion while progressing across the surface no faster than 0.5 m/s. The percent of the areas covered by the gamma scan is listed in Table 1 and documented in the attachments for each area. Calculations of the detector area as opposed to the area of the buildings to be surveyed were determined and applied to ensure that the areas surveyed met the minimum criteria.

- **Surface Alpha and Beta Scans**

  The floors were surveyed for alpha and beta activity with a large area floor monitor consisting of a Ludlum Model 231-1F gas proportional detector coupled to a Ludlum Model 2221 ratemeter/scaler. The lower 2-m of the walls in the area were surveyed with a Ludlum 43-68 detector, coupled with a Ludlum Model 2224 ratemeter scaler. The responses of these detector/meter combinations was checked with a National Institute of Standards and Testing (NIST) referenced source, or equivalent, prior to use, see Attachment 3, *Daily Instrument Response Checks*. The minimum percent of the area covered by the alpha-beta scan is listed in Table 1. Calculations of the detector area as opposed to the area of the buildings to be surveyed were determined and applied to ensure that the areas surveyed met the minimum criteria. The instruments were held as close to the surface being scanned as conditions allow. Scanning progressed across the surface no faster than one detector width per second.

- **Measurements of Total Alpha and Total Beta Surface Activity**

  A sampling grid was established in each area. One-minute counts were taken at each node of the survey grid in the area of interest with a Ludlum Model 43-68 100 cm^2 gas proportional detector coupled with a Ludlum Model 2224 ratemeter/scaler.

  Replicate measurements were required as part of the daily quality objectives dictated by MARSSIM and described in this text. Two replicate measurements were taken in each area from a random sampling location.

- **Measurements of Removable Alpha and Beta Surface Activity**

  Removable activity at each grid node was sampled by rubbing a 100 cm^2 area with smear media. The smear sample was properly labeled and packaged at the time it was collected. The standardized MARSSIM approach indicates that fifteen samples were to be collected for analysis per commodity site. Replicate measurements were required as part of the data quality objectives. Two replicate alpha-beta smear samples were collected in each area. Where removable alpha/beta activity was to be determined (or ruled-out); course swipe media was applied over a 100 cm^2 area. The swipe samples were maintained individually and shipped in batches for off-site analysis at the licensed ATG-Richland facility via a low background automated proportional counter. This data is shown in Attachment 24, *Alpha/Beta Counts Lab Data* and is summarized and placed with the data for each area survey in the attachments. Comparative analysis (QC) was performed on 10% of the samples analyzed by ATG via Paragon Analytical Laboratories, the contracted third party. A total of 282 gross alpha/gross beta samples were analyzed by ATG, 28 samples were forwarded for redundant counting at Paragon Analytical Laboratories. The alpha/beta redundant counting met the Data Quality Objectives and is shown Attachment 27, *Paragon Confirmatory Samples – Alpha/Beta Counts.*

- **Measurements of Removable H-3 Activity in Selected Areas**

  In five (5) areas, tritium (H-3) was listed as a radionuclide of concern. Smear samples were collected and placed immediately in liquid scintillation vials and sealed for H-3 analysis. These smear samples were collected beside the alpha-beta smear samples and thus were collected at every direct measurement location in the five (5) areas that listed H-3 as a radionuclide of concern. Replicate measurements were required as part of the data quality objectives. Two replicate tritium smear samples were collected in each area. The tritium replicate smear samples were collected at randomly selected sampling locations. A total of 128 tritium smear samples were collected and analyzed by ATG-Richland on a liquid scintillation counter. This data is shown in Attachment 25, *Tritium Counts Lab Data* and is summarized and placed with the data for each area survey in the attachments. Ten percent of the tritium smears samples or 13 samples were then forwarded to Paragon Analytical Laboratories for QA/QC backup analysis. These samples were batch shipped along with the chain-of-custody record to Richland for analysis by a liquid scintillation counter. The QA/QC samples were then sent to Paragon Analytical Laboratories for the backup analysis to satisfy DQO objectives. The tritium samples redundant counting met the Data Quality Objectives and is shown in Attachment 26, *Paragon Confirmatory Samples – Tritium Counts.*

4.10 Personnel Monitoring

All personnel involved with the activities on site were issued personnel monitoring devices (thermoluminescent dosimeters) for monitoring dose. No personnel received any measurable dose during the surveys for the Commodity Site Properties, thus personnel man-rem was 0.000. The results of the dose exposure monitoring are found in Attachment 7, *Dosimetry Report*.

5 FINAL SURVEY AREA RESULTS

5.1 Building 337

Built in 1941, this building was used as a General Support vehicle maintenance shop. It was last used by Alabama National Guard as a storage building. The building is inactive and currently not being used.

The area had suspect activity from the isotope of radium (Ra-226). The $DCGL_w$ for Ra-226 was 3.13 E+02 dpm/100 cm^2, and the loose surface contamination release criteria was 3.13E+01 dpm/100 cm^2. The area was classified as a MARSSIM Class III area and thus required a 10% scan of the floor area and lower 2 meters of wall surface. The results of all gamma scans for the area were at background. Surface alpha and beta scans were also at background levels. A total of 15 measurement points plus two redundant (QA) points were made. QA point measurements were consistent and met the DQA for the area. Measurements of total alpha and total beta surface activity were at background levels. Measurements of removable alpha and beta surface activity were less than MDA for alpha activity or <16.62 dpm/100 cm^2, and less than MDA for beta activity or < 48.07dpm/100 cm^2. No levels approached the DCGLs for the area. The ALARA guidelines were met in this area; no activity was detected above background or MDA levels. See Attachment 8, *FM01 Building 337 Survey Data*.

5.2 Building 338

Built in 1941, this site was previously used as a General Support vehicle maintenance shop. The last use of this vehicle was by the Directorate of Community Activities as the Fort McClellan Recycle Center. The building is currently inactive and empty.

The area had suspect activity from the isotope of radium (Ra-226). The $DCGL_w$ for Ra-226 was 3.13 E+02 dpm/100 cm^2, and the loose surface contamination release criteria was 3.13E+01 dpm/100 cm^2. The area was classified as a MARSSIM Class III area and

thus required a 10% scan of the floor area and lower 2 meters of wall surface. The results of all gamma scans for the area were at background. Surface alpha and beta scans were also at background levels. A total of 15 measurement points plus two redundant (QA) points were made. QA point measurements were consistent and met the DQA for the area. Measurements of total alpha and total beta surface activity were at background levels. Measurements of removable alpha and beta surface activity were less than MDA for alpha activity or <16.62 dpm/100 cm^2, and less than MDA for beta activity or < 48.07dpm/100 cm^2. No levels approached the DCGLs for the area. The ALARA guidelines were met in this area; no activity was detected above background or MDA levels. See Attachment 9, *FM02 Building 338 Survey Data.*

5.3 Building 339

Built in 1943 this building was initially used by the base as a General Support vehicle maintenance shop. This building is inactive and empty. The north wall had collapsed and been removed. An adjacent pad on the north side of the building was part of the survey area and had once had a support structure situated in this area.

The area had suspect activity from the isotope of radium (Ra-226). The $DCGL_w$ for Ra-226 was 3.13E+02 dpm/100 cm^2, and the loose surface contamination release criteria was 3.13E+01 dpm/100 cm^2. The area was classified as a MARSSIM Class III area and thus required a 10% scan of the floor area and lower 2 meters of wall surface. The results of all gamma scans for the area were at background. Surface alpha and beta scans were also at background levels. A total of 15 measurement points plus two redundant (QA) points were made. QA point measurements were consistent and met the DQA for the area. Measurements of total alpha and total beta surface activity were at background levels. Measurements of removable alpha and beta surface activity were less than MDA for alpha activity or <16.16 dpm/100 cm^2, and less than MDA for beta activity or <40.68 dpm/100 cm^2. No levels approached the DCGLs for the area. The ALARA guidelines were met in this area; no activity was detected above background or MDA levels. See Attachment 11, *FM05 Building 339 Survey Data.*

5.4 Building 341

This building was originally a general storehouse used by Defense Reutilization and Marketing Organization (DRMO). The last usage of the building was by the Directorate of Environment as a hazardous waste accumulation point. The building is currently inactive and empty.

The area had suspect activity from the isotope of radium (Ra-226) and tritium (H-3). The $DCGL_w$ for Ra-226 was 3.13E+02 dpm/100 cm^2, and the loose surface contamination release criteria was 3.13E+01 dpm/100 cm^2. The tritium $DCGL_w$ was

1.23E+08 dpm/100 cm^2, and the loose surface contamination release criteria was 1.23E+07 dpm/100 cm^2. The area was classified as a MARSSIM Class II area and thus required a 50% scan of the floor area and lower 2 meters of wall surface. The results of all gamma scans for the area were at background. Surface alpha and beta scans were also at background levels. A total of 15 measurement points plus two redundant (QA) points were made. QA point measurements were consistent and met the DQA for the area. Measurements of total alpha and total beta surface activity were at background levels. Measurements of removable alpha and beta surface activity were less than MDA for alpha activity or <16.62 dpm/100 cm^2, and less than MDA for beta activity or <48.07 dpm/100 cm^2. Measurements of removable tritium activity were all at or less than 59.59 dpm/100 cm^2. No levels approached the DCGLs for the area. The ALARA guidelines were met in this area; no activity was detected above background or MDA levels except for tritium removable activity that was at minimum levels of detection per the analysis. See Attachment 12, *FM06 Building 341 Survey Data*.

5.5 Building 3181

The post last used this building as the Military Police School. The building had two affected rooms, 35 and 36. These rooms had been used as a radiological laboratory. An old abandoned exhaust existed in the overhead from the hood area. An area was setup and part of the exhaust hood was removed and surveyed through two remaining 90 degree elbows, the last of which connected to vertical piping rising to the roof. This evolution was witnessed by Mr. Terry Williams of the Alabama Department of Public Health, Division of Radiation Control. All surveys of the ventilation duct were at background levels, especially the last elbow leading to the vertical rise, where contamination would have concentrated. The rest of the ventilation duct was abandoned in place. This area was designated as a MARSSIM Class II area and thus required 50% scan surveys of the area. The $DCGL_s$ and removable loose surface contamination guidelines are shown below:

Isotope	DCGL (dpm/100 cm^2)	Loose Surface Contamination Guidelines dpm/100 cm^2
Co-60	7.04E+03	7.04E+03
Mn-54	3.14E+04	3.14E+03
Cs-137	2.80E+04	2.80E+03
Au-198	4.09E+06	4.09E+05
Na-22	9.54E+03	9.54E+02
Ni-63	1.81E+06	1.81E+05
P-32	9.46E+06	9.46E+05
Ca-45	2.79E+06	2.79E+05
Br-82	•	•

- Not calculated due to the extremely short half life for Br-82, 35 hours.

50% of the floor area and lower 2 meters of wall surface were scanned. The results of all gamma scans were at background. Surface alpha and beta scans were also at background levels. A total of 17 measurement points plus two redundant (QA) points were made. QA point measurements were consistent and met the DQA for the area. Measurements of total alpha and total beta surface activity were at background levels. Note alpha levels were relatively high in this area from radon concentrations due to stone construction of the building, the fact that these two rooms were in the basement, and the lack of ventilation in the area. Measurements of removable alpha and beta surface activity were less than MDA for alpha activity or <16.62 dpm/100 cm^2, and less than MDA for beta activity or <48.07 dpm/100 cm^2. No levels approached the DCGLs for the area. The ALARA guidelines were met in this area; no activity was detected above background or MDA levels. See Attachment 13, *FM07 Building 3181 Survey Data*.

5.6 Building 345

This building was active and still in use as a warehouse. Built in 1977, it was designed as a general storage building. The Director of Environment currently uses the structure as a general storage building. The area had suspect activity from the isotope of radium (Ra-226) and tritium (H-3). The $DCGL_w$ for Ra-226 was 3.13E+02 dpm/100 cm^2, and the loose surface contamination release criteria was 3.13E+01 dpm/100 cm^2. The tritium $DCGL_w$ was 1.23E+08 dpm/100 cm^2, and the loose surface contamination release criteria was 1.23E+07 dpm/100 cm^2.

The area was classified as a MARSSIM Class II area and thus required a 50% scan of the floor area and lower 2 meters of wall surface. The results of all gamma scans for the area were at background. Surface alpha and beta scans were also at background levels. A total of 17 measurement points plus two redundant (QA) points were made. QA point measurements were consistent and met the DQA for the area. Measurements of total alpha and total beta surface activity were at background levels. Measurements of removable alpha and beta surface activity were less than MDA for alpha activity or <16.68 dpm/100 cm^2, and less than MDA for beta activity or <48.21 dpm/100 cm^2. Measurements of removable tritium activity were all at or less than 42.98 dpm/100 cm^2. No levels approached the DCGLs for the area. The ALARA guidelines were met in this area; no activity was detected above background or MDA levels except for tritium removable activity that was at minimum levels of detection per the analysis. See Attachment 14, *FM08 Building 345 Survey Data*.

5.7 Building 335

Built in 1941, this building was used as a General Support vehicle maintenance shop and was last used by Alabama National Guard as a storage building. The building is

inactive and currently not being used. The ceiling of the building has almost completely fallen in. ATG and base personnel had to clear the roofing from the floor of the building to allow surveys.

The area had suspect activity from the isotope of radium (Ra-226). The $DCGL_w$ for Ra-226 was 3.13 E+02 dpm/100 cm^2, and the loose surface contamination release criteria was 3.13E+01 dpm/100 cm^2. The area was classified as a MARSSIM Class III area and thus required a 10% scan of the floor area and lower 2 meters of wall surface. The results of all gamma scans for the area were at background. Surface alpha and beta scans were also at background levels. A total of 16 measurement points plus two redundant (QA) points were made. QA point measurements were consistent and met the DQA for the area. Measurements of total alpha and total beta surface activity were at background levels. Measurements of removable alpha and beta surface activity were less than MDA for alpha activity or <17.68 dpm/100 cm^2, and less than MDA for beta activity or < 48.21dpm/100 cm^2. No levels approached the DCGLs for the area. The ALARA guidelines were met in this area; no activity was detected above background or MDA levels. See Attachment 15, *FM09 Building 335 Survey Data.*

5.8 Building 228

This building was built in 1936 as a Quartermaster Maintenance Shop. The base converted this building to a RADIAC calibration facility in 1978. In 1991, it was converted a second time for use by Explosive Ordinance Personnel. The building was completely vacated in 1998 and remains that way currently. The building had three bays. The northeast corner of the southern bay was the affected area. Control of the building currently resides with the Fort McClellan Fire Department.

The area had suspect activity from Sr-90, Pu-239, and Ni-63. The $DCGL_w$ for Sr-90 was 8.76E+03 dpm/100 cm^2, for Pu-239 was 2.00E+03 dpm/100 cm^2, and for Ni-63 was 1.81E+06 dpm/100 cm^2. The corresponding loose surface contamination criteria for the area was thus for Sr-90 8.76E+02 dpm/100 cm^2, for Pu-239 was 2.00E+02 dpm/100 cm^2, and for Ni-63 was 1.81E+05 dpm/100 cm^2. The area was classified as a MARSSIM Class III area and thus required a 10% scan of the floor area and lower 2 meters of wall surface. The results of all gamma scans for the area were at background. Surface alpha and beta scans were also at background levels. A total of 15 measurement points plus two redundant (QA) points were made. QA point measurements were consistent and met the DQA for the area. Measurements of total alpha and total beta surface activity were at background levels. Measurements of removable alpha and beta surface activity were less than MDA for alpha activity or <8.95 dpm/100 cm^2, and less than MDA for beta activity or < 42.96 dpm/100 cm^2. No levels approached the DCGLs for the area. The ALARA guidelines were met in this area; no activity was detected above background or MDA levels. See Attachment 16, *FM010 Building 228 Survey Data.*

5.9 Building 303-A

This building is still active and in use by a private construction contractor. The building was built in 1942 and served as the Central Issue Facility for all soldier items, including radio-luminescent lensatic compasses. The north end of the building was the affected area.

This area had suspect activity from the isotope of radium (Ra-226) and tritium (H-3). The $DCGL_w$ for Ra-226 was 3.13E+02 dpm/100 cm^2, and the loose surface contamination release criteria was 3.13E+01 dpm/100 cm^2. The tritium $DCGL_w$ was 1.23E+08 dpm/100 cm^2, and the loose surface contamination release criteria was 1.23E+07 dpm/100 cm^2. The area was classified as a MARSSIM Class III area and thus required a 10% scan of the floor area and lower 2 meters of wall surface. The results of all gamma scans for the area were at background. Surface alpha and beta scans were also at background levels. A total of 15 measurement points plus two redundant (QA) points were made. QA point measurements were consistent and met the DQA for the area. Measurements of total alpha and total beta surface activity were at background levels. Measurements of removable alpha and beta surface activity were less than MDA for alpha activity or <9.79 dpm/100 cm^2, and less than MDA for beta activity or <41.97 dpm/100 cm^2. Measurements of removable tritium activity were all at or less than 46.34 dpm/100 cm^2. No levels approached the DCGLs for the area. The ALARA guidelines were met in this area; no activity was detected above background or MDA levels except for tritium removable activity that was at minimum levels of detection per the analysis. See Attachment 17, *FM11 Building 303-A Survey Data.*

5.10 Building 812 ½

This was a small structure that is inactive and not used. The structure was only 5' x 5' x 5' exterior dimensions with six inch thick concrete walls. The installation used this area at one time as a storage vault for radium gauges. Later the area was used to store hazardous materials.

This area had suspect activity from the isotope of radium (Ra-226) and tritium (H-3). The $DCGL_w$ for Ra-226 was 3.13E+02 dpm/100 cm^2, and the loose surface contamination release criteria was 3.13E+01 dpm/100 cm^2. The tritium $DCGL_w$ was 1.23E+08 dpm/100 cm^2, and the loose surface contamination release criteria was 1.23E+07 dpm/100 cm^2. The area was classified as a MARSSIM Class III area and thus required a 10% scan of the floor area and lower 2 meters of wall surface. In actuality because of the size a 100% scan of the area was performed including all interior wall, floor, and ceiling surfaces. The results of all gamma scans for the area were at background. Surface alpha and beta scans were also at background levels. A total of 18 measurement points plus two redundant (QA) points were made.

QA point measurements were consistent and met the DQA for the area. Measurements of total alpha and total beta surface activity were at background levels. Measurements of removable alpha and beta surface activity were less than MDA for alpha activity or <8.95 dpm/100 cm^2, and less than MDA for beta activity or <42.96 dpm/100 cm^2 except for one smear whose result was 115.26 dpm/100 cm^2. Measurements of removable tritium activity were all at or less than 55.93 dpm/100 cm^2. No levels approached the DCGLs for the area. The ALARA guidelines were met in this area; no activity was detected above background or MDA levels except for one beta smear and tritium removable activity that was at minimum levels of detection per the analysis. See Attachment 18, *FM12 Building 812 ½ Survey Data.*

5.11 Building 257

Built in 1941, the Directorate of Logistics used this structure as a warehouse. The potential radiological contamination came from the fact that the installation packaged Army radioactive commodities in preparation for transport in this building. This building is still active and in use as a storage area or warehouse. This area was designated as a MARSSIM Class III area and thus required 10% scan surveys of the area. The $DCGL_s$ and removable loose surface contamination guidelines are shown below:

Isotope	DCGL (dpm/100 cm^2)	Loose Surface Contamination Guidelines dpm/100 cm^2
H-3	1.23E+08	1.23E+07
Ra-226	3.13E+02	3.13E+01
Th-232	2.80E+04	2.80E+03
Ni-63	1.81E+06	1.81E+05
Am-241	2.68E+01	2.68E+00

The area was classified as a MARSSIM Class III area and thus required a 10% scan of the floor area and lower 2 meters of wall surface. The results of all gamma scans for the area were at background. Surface alpha and beta scans were also at background levels. A total of 15 measurement points plus two redundant (QA) points were made. QA point measurements were consistent and met the DQA for the area. Measurements of total alpha and total beta surface activity were at background levels. Measurements of removable alpha and beta surface activity were less than MDA for alpha activity or <8.95 dpm/100 cm^2, and less than MDA for beta activity or <42.96 dpm/100 cm^2. No levels approached the DCGLs for the area. The ALARA guidelines were met in this area; no activity was detected above background or MDA levels except for one beta smear and tritium removable activity that was at minimum levels of detection per the analysis. See Attachment 19, *FM13 Building 257 Survey Data.*

5.12 Building 4416

This is an ammunition magazine currently used by the Alabama National Guard to store chemical munitions. At the time of the survey the magazine was empty. The magazine had been used by the base as a temporary storage area for sealed sources, Co-60 and Cs-137 when the US Army Chemical School and Command was relocated to Fort McClellan in 1979.

The two isotopes of concern for the area are Co-60 and Cs-137. The $DCGL_w$ for Co-60 is 7.04E+03 dpm/100 cm^2 and the loose surface release criterion is 7.04E+02 dpm/100cm^2. The $DCGL_w$ for Cs-137 is 2.80E+04 dpm/100cm^2 and the loose surface release criterion is 2.80E+03 dpm/100cm^2. The area was classified as a MARSSIM Class III area and thus required a 10% scan of the floor area and lower 2 meters of wall surface. The results of all gamma scans for the area were at background. Surface alpha and beta scans were also at background levels. A total of 15 measurement point plus two redundant (QA) points were made. QA point measurements were consistent and met the DQA for the area. Measurements of total alpha and total beta surface activity were at background levels. Measurements of removable alpha and beta surface activity were less than MDA for alpha activity or <15.37 dpm/100 cm^2, and less than MDA for beta activity or < 46.39 dpm/100 cm^2. No levels approached the DCGLs for the area. The ALARA guidelines were met in this area; no activity was detected above background or MDA levels. See Attachment 20, *FM14 Building 4416 Survey Data*.

5.13 Building 256

Built in 1954, the Directorate of Logistics used this structure as a warehouse. The potential for radiological contamination comes from the fact that the installation historically used this building to store packaged, ready to ship Army radioactive commodities. This building is still in use by the base as a central storage warehouse. This area was designated as a MARSSIM Class III area and thus required 10% scan surveys of the area. The $DCGL_s$ and removable loose surface contamination guidelines are shown below:

$DCGL_s$

Isotope	DCGL (dpm/100 cm^2)	Loose Surface Contamination Guidelines dpm/100 cm^2
H-3	1.23E+08	1.23E+07
Ra-226	3.13E+02	3.13E+01
Th-232	2.80E+04	2.80E+03
Ni-63	1.81E+06	1.81E+05
Am-241	2.68E+01	2.68E+00

The area was classified as a MARSSIM Class III area and thus required a 10% scan of the floor area and lower 2 meters of wall surface. The results of all gamma scans for the area were at background. Surface alpha and beta scans were also at background levels. A total of 15 measurement points plus two redundant (QA) points were made. QA point measurements were consistent and met the DQA for the area. Measurements of total alpha and total beta surface activity were at background levels. Measurements of removable alpha and beta surface activity were less than MDA for alpha activity or <8.95 dpm/100 cm^2, and less than MDA for beta activity or <42.96 dpm/100 cm^2. No levels approached the DCGLs for the area. The ALARA guidelines were met in this area; no activity was detected above background or MDA levels except for one beta smear and tritium removable activity that was at minimum levels of detection per the analysis. See Attachment 21, *FM15 Building 267 Survey Data*.

5.14 Building 3182

Built in 1954 this building was originally designated as an Applied Instruction Building in which the Fort McClellan Radiological Laboratories used one wing in conjunction with the "Hot Cell' facility. The last role the building had was as the Military Police Museum. The building is currently empty and not used. The building had three main areas: a central main building, and two wings that swept back from the central main area at a slight angle and was thus were somewhat irregularly shaped. This building had 14 rooms and a large entrance area and hallway connecting the two wings. The wings were basically open with the remaining 12 rooms located in the main building area.

This area had suspect activity from the isotope of radium (Ra-226) and tritium (H-3). The $DCGL_w$ for Ra-226 was 3.13E+02 dpm/100 cm^2, and the loose surface contamination release criteria was 3.13E+01 dpm/100 cm^2. The tritium $DCGL_w$ was 1.23E+08 dpm/100 cm^2, and the loose surface contamination release criteria was 1.23E+07 dpm/100 cm^2. The area was classified as a MARSSIM Class III area and thus required a 10% scan of the floor area and lower 2 meters of wall surface The results of all gamma scans for the area were at background. Surface alpha and beta scans were at background levels except in three areas: a 2' x 2' area on the floor in room 6, two 4" x 4' areas on the north wall of room 16, and an 18" x 20" floor area in room 14. Upon the discovery of these areas a 100% gamma scan and a 100% alpha/beta surface scan was performed of all floor areas and wall areas up to two meters. No other areas above background were discovered during this scan. A total of 18 measurement points plus two redundant (QA) points were made. QA point measurements were consistent and met the DQA for the area. Measurements of total alpha and total beta surface activity were at background levels except in the three described areas. Measurements of removable alpha and beta surface activity were less than MDA for alpha activity or <15.37 dpm/100 cm^2, and less than MDA for beta activity or <46.39 dpm/100 cm^2. Measurements of removable tritium activity were all at or less than 37.69 dpm/100 cm^2.

Surface scan surveys of the three areas determined the following activity levels for each area:

Area of Bldg 3182	Survey	Net CPM/100 cm²	DPM/100 cm²
Room 6	alpha	5	31.25
(2' x 2' floor)	beta	4684	25,048
Room 14	alpha	4	25
(18" x 20"	beta	8389	44,861
Room 16	alpha	3	18.75
(2-4' x 4" wall areas)	beta	806	4,310

Samples of each of these areas were taken and shipped to ATG Richland for analysis. The results revealed only one isotope Cs-137 in each of the area samples. The results of this analysis may be seen in Attachment 29, *Gamma Spectroscopy Data.* The $DCGL_w$ for Cs-137 is 2.80E+04 dpm/100cm^2. The $DCGL_w$ was exceeded by the area in room 14 at 4.5e+04 dpm/100cm^2. The area in Room 6 essentially met the $DCGL_w$ at 2.5E+04 dpm/100cm^2. The wall area in Room 16 was below the $DCGL_w$ at 4.3E+03 dpm/100cm^2.

For all other areas of Building 3182, no levels approached the DCGLs for the area. The ALARA guidelines were met in these areas. Activity was not detected above background or MDA levels in the rest of the building. Tritium removable activity was at minimum levels of detection per the analysis. See Attachment 22, *FM16 Building 3182 Survey Data.*

5.15 Building 350

This building was built by the installation in 1991. It was designed and used as General/Direct Support Maintenance Shop. Direct Support Maintenance used two bays of the building for wipe testing /routine maintenance of M43A1 detectors and CAMs. These two bays were rooms 18-B and 16-D. The eastern two-thirds of the truck bay was used for maintenance of military vehicles containing radium dials. Because of the large area of the truck bay (20,800 ft^2) as compared to the total area of the other two bays (1,669 ft^2), these two areas were surveyed as two separate MARSSIM areas.

The isotopes of concern and their limits in these areas were:

Isotope	DCGL (dpm/100 cm^2)	Loose Surface Contamination Guidelines dpm/100 cm^2
Ra-226	3.13E+02	3.13E+01
Ni-63	1.81E+06	1.81E+05
Am-241	2.68E+01	2.68E+00

The area was classified as a MARSSIM Class III area and thus required a 10% scan of the floor area and lower 2 meters of wall surface for all affected areas. The results of all gamma scans for the area were at background. Surface alpha and beta scans were also at background levels. A total of 28 measurement points plus four redundant (QA) points were made. QA point measurements were consistent and met the DQA for the area. Measurements of total alpha and total beta surface activity were at background levels. Measurements of removable alpha and beta surface activity were less than MDA for alpha activity or <12.56 dpm/100 cm^2, and less than MDA for beta activity or <42.37 dpm/100 cm^2 for the truck bay area. Measurements of removable alpha and beta surface activity were less than MDA for alpha activity or <9.79 dpm/100 cm^2, and less than MDA for beta activity or <48.35 dpm/100 cm^2 for bay areas 18-B and 16-D. No levels approached the DCGLs for the area. The ALARA guidelines were met in all areas as no activity was detected above background or MDA levels. See Attachment 23, *FM17 Building 350 Survey Data*.

5.16 Bromine Field

The Bromine Field consisted of two areas. A tank area where Br-82 was stored and about six feet vertically above this area and to the south a level field with a pad and curbing where the decontamination exercises would be conducted. The equipment would be contaminated with the Br-82, decontaminated on the pad that had drainage back to the tanks and then released. This training stopped in 1972 as documented in the Historical Records Search conducted by the Corp of Engineers, Nov. 1999.

Br-82 has a half-life of 35 hours. No DCGL's were calculated for Br-82 due to the short half-life. Any radioactive bromine that was spilled in the environment would have gone through over 7,000 half-lives. No matter what activity concentration of Br-82 was originally used in this area, no activity would be left after this amount of time. Additionally the original ground area where the pad existed has been graded and disturbed and a parking lot for Building 3195 constructed over the area. This area is recommended for final release without any additional actions.

5.17 Alpha Field

The Alpha Field existed adjacent (to the east) of the upper Bromine Field, where the decon pad originally existed. The Chemical School used the Alpha Field to simulate a radiation field similar to an area that might have been seen following the detonation of a nuclear device. The site placed uranium-233 (U-233) plates on designed pedestals of concrete at various locations in the field. The U-233 was electroplated to plates and then a ceramic coating was applied to bond the process. This is described in a letter from the manufacturer Oak Ridge National Laboratories in Attachment 30, *Alpha Field Data*. The material was well affixed to the plates.

The Chemical School possessed 500 plates, 450 with U-233 activity and 50 blank plates. Leak checks were performed periodically on the plates as required. Although a few of the plates showed leakage the amount of lost activity would have been miniscule. All 500 plates were inventoried to the present time and no plates were ever lost. The Chemical School ceased activity in this area in 1972. The blank plates have been discarded over the years. Four hundred of the plates have been disposed of as waste in May, 1999 through the Army Radiological Waste Office. Fifty of the active plates are still stored at the Chemical School at Fort Leonard Wood, Missouri. Please reference John May's Memorandum for Record of January 24, 2000 in Attachment 30, *Alpha Field Data.*

The former Alpha Field is currently part of the parking lot covering the Bromine Field and under half of the foundation of Building 3195 which has been constructed since the 1972 period. Based on the fact that there was no significant loss of any radioactive material in this area and the inaccessibility of the area and the disturbance of the original topsoil of this area, this area is recommended for final release without any additional actions.

5.18 Areas Identified During the Corp of Engineer's Historical Record Search

During the Historical Records Search conducted by the Corp of Engineers (COE) and submitted to the Army in November, 1999 there were six additional building identified. Building 810, 811, 812, 836 and 837 were training areas where radiological equipment was used as part of the training exercises. Building 836 no longer exists except for the foundation that is stone columns. Building 810, 811, 812 are single level buildings last used as classroom training areas. Building 837 is a two-story building of similar construction to the World War II barracks. All buildings are of wood frame construction.

Building 3185 was originally designated as the Decontamination Training Building and was used for decontamination practices involving hazardous materials including potential radioactive decontamination by the use of Br-82. This is a large single story building and was last used by the base as office spaces.

The physical layout of the areas is shown in diagrams in Attachment 28, *Building 810, 811, 812, 837, and 3185 Layout Data.* It is recommended that these buildings be classified as MARSSIM Class III areas and surveyed for release. A sweep over survey of the foundation with a NaI detector should be made and documented of the area under what was formerly Building 836 for any evidence of any residual activity above background levels.

6 FINAL RECOMMENDATIONS

The final recommendations are that all original commodity site surveys be approved for final release based on the data in this report with the exception of the three areas of Building 3182, the former MP School. The identified areas of this building, room 6, room 14, and room 16 which have small areas of activities approaching or above the $DCGL_w$ for cesium-137, the identified isotope of concern, should be decontaminated or remediated. Any generated waste during the remediation process should be packaged and shipped for disposal to an approved radiological waste disposal site. The three rooms should then be designated as MARSSIM Class I areas and resurveyed for release.

Buildings 810, 811, 812, 837, and 3185 which were identified during the Historical Records Search should be designated as MARSSIM Class III areas and surveyed for release. The area under the foundation of Building 836 should be surveyed and documented by a walkover gamma scan.

1

ATTACHMENT 1

FT. McCLELLAN COMMODITY SITE SURVEY SAMPLING AND ANALYSIS PLAN

(With Attachments)

Attachment 1	Description of the Commodity Site Survey Areas
Attachment 2	Gant Chart for the Commodity Site Survey Schedule of Activities
Attachment 3	Table of Instrumentation for Radiological Survey
Attachment 4	Description of Areas(15 Buildings, 2 Site Areas)

U.S. Army Fort McClellan
Fort McClellan, Alabama
HQ, IOC Project Number USA 99-100

Release Survey of Ft. McClellan Commodity Storage Sites

SAMPLING AND ANALYSIS PLAN

HEALTH AND SAFETY PLAN

QUALITY ASSURANCE PLAN

Prepared by:

Allied Technology Group, Inc.
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Oak Ridge, Tennessee 37830

October 1999

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RADIOLOGICAL SURVEY FOR UNRESTRICTED RELEASE
COMMODITY SITE AREAS
U.S. ARMY CHEMICAL SCHOOL
FORT McCLELLAN, ALABAMA

1.0 METHODOLOGY

1.1 General Approach

The guidance in NUREG-1575, Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), will be used as the technical basis for planning, performing, interpreting and documenting the radiological survey of the commodity use areas at Fort MeClellan. The MARSSIM process, developed collaboratively by the Nuclear Regulatory Commission, Environmental Protection Agency, Department of Energy, and Department of Defense, emphasizes the use of Data Quality Objectives (DQO) and Data Quality Assessment (DQA) processes, along with a sound quality assurance/quality control program.

The MARSSIM's objective is to describe a consistent approach for assessing building surface and surface soil final status surveys to meet established dose or risk-based release criteria, while at the same time encouraging an effective use of resources. The "graded approach" concept is also used to assure that the greatest survey efforts in those areas where there is the highest probability for residual contamination or greatest potential for adverse impacts of residual contamination.

Some of the site-specific information and methodologies that will be used in design and development of the radiological survey plan are described in the following paragraphs.

1.2 Historical Site Assessment

The historical site assessment (HSA) is an important step in the Radiation Survey and Site Investigation Process, as described in MARSSIM. The commodity sites at Fort McClellan consist of 15 Buildings and 2 Site Areas. The designated 15 buildings are as follows: (1) 228, (2) 256, (3) 257, (4) 303A, (5) 335, (6) 337, (7) 338, (8) 339, (9) 341, (10) 345, (11) 350, (12) 812 1&2, (13) 3181 Rooms: 35 & 36, (14) 3182, (15) 4416. The two designated site areas are: (1) the Bromine Field and (2) the Alpha Field. The Historical Site Assessment process for 15 of the 17 areas has been performed by Fort McClellan and that information will be used as the basis for designing the radiological survey and sampling of these areas. The exceptions are two parking lots identified as the Bromine Field and the Alpha Field that were used for training purposes. Additional investigation regarding the history of activities associated with these two

areas will be performed prior to conducting radiological survey and sampling activities in these two areas. A list of all Commodity Site Survey Areas with dimensions, status, RAM usage, suspected isotope, survey protocol, sample frequency, and analysis is in the attachments: Attachment 1, 'Description of the Commodity Site Survey Area' and Attachment 4, Description of Areas.

1.3 Contaminants and Derived Concentration Guideline Levels

The radionuclides of historical concern include both alpha emitters and beta-gamma emitters. The primary radionuclides vary for each area and include the following: Ra-226, Pu-239, Sr-90, Am-241, Co-60, Ca-45, Mn-54, Br-82, K-42, Cs-137, Au-198, Na-22, Ni-63, H-3, U-233, and P-32. These radionuclides existed mainly in sealed or contained form and the areas were primarily storage areas. Therefore, there is very little potential for contamination in most areas.

Regulatory Guide DG-4006, "Demonstrating Compliance with the Radiological Criteria for License Termination", Draft, Revised March 13, 1998, is under development by the NRC and will provide the NRC regulatory position on dose modeling, the final status survey, ALARA, and release limits for unrestricted use. This document does not address the release of contaminated material and equipment. *The Supplemental Information on the Implementation of the Final Rule on Radiological Criteria for License Termination Release Limits* published by NRC in the November 18, 1998 Federal Register Volume 63, No. 222, pages 64132 through 64134, contains a table on release limits to be used for license termination activities. This table of screening values (concentration limits) for surface contamination from the Federal Register contains just selected beta-gamma emitters. The screening values are calculated using the DanD Software Computer Code. The methods for determining doses from alpha emitters for surface contamination are omitted from this document. This is because the DanD Code uses such conservative default values, that the resultant screening values for alpha emitters are unreasonably restrictive and at impractical levels for field measurements. Thus for alpha emitters, the screening values or Derived Concentration Guideline Levels (DCGLs) will be based on the U.S. NRC, "Guidelines for Decontamination of Facilities and Equipment prior to release for Unrestricted Use of Licenses for Byproduct, Source, or Special Nuclear Material", (NRC, 1987). The following table contains all the beta-gamma emitting radionuclides listed in the Commodity Site Work Plan and their respective screening value (DCGL) as derived from the FR Table and/or DanD Code:

Release Criteria Based on

25 mrem/y[1]

NUCLIDE	Release Criteria (dpm/100 cm^2)
3H	1.23E+08
22Na	9.54E+03
32P	9.46E+06
45Ca	2.79E+06
54Mn	3.15E+04
60Co	7.04E+03
63Ni	1.81E+06
226Ra	3.13E+02
90Sr	8.76E+03
137Cs	2.80E+04
198Au	4.09E+06

1 Calculated using DanD & default building occupancy scenario

For the potential presence of Am-241, Pu-239, and Th-232, alpha emitters, in specific areas of the Commodity Site the following surface activity screening levels (DCGL) will be used as derived from the U.S. NRC, "Guidelines for Decontamination of Facilities and Equipment prior to release for Unrestricted Use of Licenses for Byproduct, Source, or Special Nuclear Material", (NRC, 1987).

- The $DCGL_W$ for uniform residual radioactivity concentration level within a survey unit is 100 disintegrations per minute per 100 square centimeter (dpm/100 cm^2) for gross alpha activity.

- The $DCGL_{rem}$ for removable activity is 20 dpm/100 cm^2 for gross alpha activity.

Each survey unit will be considered as meeting the unrestricted release criteria when both of the following conditions are met:

a) The residual contamination above background is below the $DCGL_W$.

AND

b) The residual removable contamination is below $DCGL_{rem}$.

1.4 Area Classification

Specific MARSSIM survey classifications have been defined by Fort McClellan for all areas except the two parking lots. Twelve areas have been classified as Class III, i.e., based on site operating history, these areas are not expected to contain any residual radioactivity, or are expected to contain levels of residual radioactivity at a very small fraction of the $DCGL_W$. Three (3) areas have been classified as Class II, i.e., there is some potential for residual radioactivity but is not expected to exceed the $DCGL_W$.

Because there are no Class I areas identified, there is no provision to perform a test for elevated measurement comparison. If specific locations in an area are identified that may require such testing, that area, or a portion of that area, will need to be reclassified as Class I.

If conditions are identified in any of the 17 areas during the survey that may warrant reclassification of the area, the IOC will be notified immediately.

1.5 Survey Units

For the Class III areas, MARSSIM does not place a limit on the size of survey units. For Class II areas, MARSSIM recommends a maximum survey unit size of 1,000 m^2 for building surfaces and 10,000 m^2 for land areas. Therefore, it is not necessary to divide any of the 17 areas into smaller survey units. Each area will represent one (1) survey unit.

The survey units will include the floor and the lower two meters of each wall in the area. Contamination is not suspected on surfaces above two meters, but some judgmental samples will be collected on exposed flat horizontal surfaces located above two meters.

1.6 Background Reference Area

Background (reference) levels of gross-alpha and gross-beta surface activity for applicable surfaces (e.g., concrete, brick, wood, or vinyl) will be determined in a building of similar construction where there is no record of use or storage of radioactive materials.

1.7 Survey Methodology

Field survey activities will consist of:

- Surface gamma scans,
- Surface alpha and beta scans,
- Measurements of total alpha and total beta surface activity,
- Measurements of removable alpha and beta surface activity, and
- Measurements of removable H-3 activity in selected areas.

1.7.1 Instrumentation and Sampling Techniques

The instrumentation and sampling protocols are briefly described below. See Attachment 3, 'Table of Instrumentation for Radiological Surveys' for instrument parameters and detection sensitivities for each type of instrument and its application.

Surface Gamma Scans

Easily assessable areas of the floor surface in the survey unit as well as the lower 2-m of any walls, will be scanned for gamma activity using a Bicron Micro R Meter. This instrument will be held as close to the surface being scanned as conditions allow. Scanning will be performed by

moving the detector from side to side in a serpentine motion while progressing across the surface no faster than 0.5 m/s. The percent of the area to be covered by the gamma scan is listed in Table 1.

1.7.1.1 Surface Alpha and Beta Scans

Easily assessable areas of the floor will be surveyed for alpha and beta activity with a large area floor monitor, consisting of a Ludlum Model 231-1F gas proportional detector coupled to a Ludlum Model 2221 ratemeter/scaler, or its equivalent. The lower 2-m of any walls in the area, and floor surfaces that are not assessable with large area floor monitor will be surveyed with a Ludlum 43-68 detector, coupled with a Ludlum Model 3/12 ratemeter scaler, or its equivalent. The responses of these detector/meters combinations will be checked with a National Institute of Standards and Testing (NIST) referenced source, or equivalent, prior to use.

The percent of the area to be covered by the alpha-beta scan is listed in Table 1. These instruments will be held as close to the surface being scanned as conditions allow. Scanning will progress across the surface no faster than one detector width per second.

1.7.1.2 Measurements of Total Alpha and Total Beta Surface Activity

A sampling grid will be established in each area, as described in Section 1.7.4. One minute counts will be taken with a Ludlum Model 43-68 100 cm^2 gas proportional detector coupled to a Ludlum Model 3/12 ratemeter/scaler, or its equivalent, at each node of the survey grid in the area of interest. The response of this detector/meter combination will be checked with a NIST referenced source, or equivalent, prior to use.

Replicate measurements are required as part of the data quality objectives described below. Two replicate alpha-beta counts will be taken in each area. One will be collected at a randomly selected sampling location on the floor, and the other from a randomly selected sampling location on a wall.

1.7.1.3 Measurements of Removable Alpha and Beta Surface Activity

Removable activity at each grid node will be sampled by rubbing a 100 cm^2 area with a smear media. The smear sample will be properly labeled and packaged at the time it is collected. The standardized MARSSIM approach indicates that fifteen samples are to be collected for analysis per commodity site. Where removable alpha/beta activity is to be determined (or ruled-out), course swipe media will be applied over a 100 cm^2 area. The swipe samples will be maintained individually, and properly shipped in batches for off-site analysis at the licensed ATG-Richland

facility via low background automated proportional counters. Comparative analysis (QC) will be performed on 10% of the samples analyzed by ATG via Mountain States Analytical, Inc. (MSAI), the contracted third party. Of the approximately 250 gross alpha/ gross beta samples to be analyzed by ATG, 25 samples will be forwarded for redundant counting at MSAI. Of the 90 samples analyzed via liquid scintillation counting at ATG, nine samples will be additionally screened by MSAI for comparison. Third party turn-around of analytical results from the date of sample receipt is assumed to be 10 days.

Replicate measurements are required as part of the data quality objectives described below. Two replicate alpha-beta smear samples will be collected in each area. One smear sample will be collected at a randomly selected sampling location on the floor and the other sample will be collected from a randomly selected sampling location on a wall.

1.7.1.4 Measurements of Removable H-3 Activity in Selected Areas

In five (5) areas, H-3 is listed as a radionuclide of concern and detection sensitivity for H-3 is rather high. However, it should be considered that potential for residual H-3 concentrations in excess of release limits is very low and the unrestricted release limits for H-3 are considerably higher than the 1,000 dpm/100 cm^2 that is used here. Even if there is residual H-3 activity, it will not be in the form of discrete hot spots, but rather diffused and spread around because of the nature of activities and traffic in such areas. Furthermore, in no instance, H-3 is the only radionuclide of concern in an area and chances are that if such contamination exists, there will also be other, more easily detectable radionuclides such as Ra-226 present.

To address this potential, however low, smear samples will be collected and placed immediately in liquid scintillation vials and sealed for analysis for H-3. These smear samples will be collected beside the alpha-beta smear samples collected at every direct measurement location in the five (5) areas that list H-3 as a radionuclide of concern.

Replicate measurements are required as part of the data quality objectives described below. Two replicate alpha-beta smear samples will be collected. in each area. One tritium smear sample will be collected at a randomly selected sampling location on the floor and the other sample will be collected from a randomly selected sampling location on a wall.

ATG-Richland will additionally provide Liquid Scintillation Counting (LSC) vials for placement of associated swipe samples for screening of low energy beta emitters, specifically tritium H-3. The samples will be batch shipped along with the chain-of-custody record to Richland, for analysis by a liquid scintillation counter. Calibration and QC data for the

laboratory instrumentation will be archived along with sample analytical results for the pending report.

1.7.2 Data Quality Indicators

As part of the DQO Process, the data quality indicators for precision, accuracy, representativeness, completeness, and comparability (PARCC) will be established as follows:

- Precision will be determined by comparison of replicate values from field measurements and sample analysis; the objective will be a relative percent difference of 30% or less at 50% of the criterion value.

- Accuracy is the degree of agreement with the true or known; the objective for this parameter will be +/- 20% at 50% of the criterion value.

- Representativeness and comparability do not have numeric values. Performance for these indicators is assured through the selection and proper implementation of systematic sampling and measurement techniques.

- Completeness refers to the portion of the data that meets acceptance criteria and is therefore useable for statistical testing. The objective is 90% for this project.

1.7.3 Sampling Density

The number of direct measurements in each survey unit is dependent on several parameters, including the desired confidence of the decision criteria (decision errors), the presence and variation of background interference, some of which are briefly discussed below.

1.7.3.1 Decision Errors

Among the most important parameters affecting survey design and the number of measurements needed to satisfy the Data Quality Objectives are the acceptable decision errors. The IOC has established the Type I (alpha) decision error at 0.05; this provides a confidence level of 95% that the statistical tests will not incorrectly determine that a surveyed area satisfies release criteria when, in fact, it does not. Similarly, the IOC has established the Type II (beta) decision error at 0.05; this provides a confidence level of 95% that the statistical tests will not incorrectly determine that a surveyed area does not satisfy release criteria when, in fact, it does. The Type II decision error is more restrictive than is usually recommended for such surveys. This more restrictive value typically has a potential consequence of indicating unnecessary remediation;

however, considering the public relations consequences of failing to identify residual contamination, the more restrictive level is considered prudent.

1.7.3.2 Variability (σ)

The survey units in the commodity use areas are mostly Class III areas with a few Class II areas. It is anticipated that the measurement variability in these areas will be similar to that in the background reference areas. At the background surface activity levels for gross alpha and gross beta activity, it is anticipated that the standard deviation of measurements (σ) will be equal to or less than 75% of average surface activity levels.

Once the direct measurements are actually performed, measurement variability will be monitored and if it is significantly larger than the assumed values, appropriate corrections will be made and the total number of measurements for the survey unit will be revised, accordingly.

1.7.3.3 Number of Samples Indicated

A Type I error rate (α) of 0.05 and a Type II error rate (β) of 0.05 are assumed. The Lower Bound of the Gray Region (LBGR) is set at half the $DCGL_w$, and a Relative Shift (Δ/σ) of 1.7 is calculated, (MARSSIM recommends a value between 1 and 3), the number of data points in each survey unit and the background reference area is found to be 15 (Table 5.3, MARSSIM).

This number (N=15) applies to direct measurements as well as smears for determining the amount of removable activity (Table 1).

Table 1 Sampling Requirements

Survey/Sampling Activities[a]	Area Classification	
	Class II	Class III
Surface gamma scan	50%	Judgmental[b]
Surface alpha and beta scans	50%	Judgmental[b]
Direct measurements for gross alpha and gross beta activity	15 + 2 [c]	15 + 2 [c]
Measurements of removable alpha and beta surface activity	15 + 2 [c]	15 + 2 [c]
Measurements of removable H-3 activity (liquid scintillation)[d]	15 + 2 [c]	15 + 2 [c]

[a] These activities refer to building floors and lower walls. In the case of upper walls/ceilings/ and overhead structures where there is very limited potential for residual contamination, judgmental scanning and measurements will be performed.

[b] Emphasis will be placed on expansion joints, cracks, and any other location where residual contamination may have been accumulated.

[c] Includes survey measurements and required replicates.

[d] These smears will be collected only in the five (5) areas where H-3 is a radionuclide of concern.

1.7.4 Selection of Sampling Locations in Survey Units

MARSSIM recommends a triangular sampling pattern with a random starting point to increase the probability of identifying small areas of elevated activity. (Figure 1 illustrates a triangular sampling pattern.) This type pattern will be used for the Commodity Use Areas, except where a triangular pattern is not practical, because of the size and shape of a specific area to be sampled; for such situations, a square sampling pattern may be used. For example a square pattern is more practical to install and implement than a triangular pattern for survey areas having one dimension less than the calculated average spacing between samples. The spacing (L) between samples on a triangular pattern is determined by:

$$L = [\text{Survey Unit Area}/(0.866)\ (\text{number of samples})]^{1/2}$$

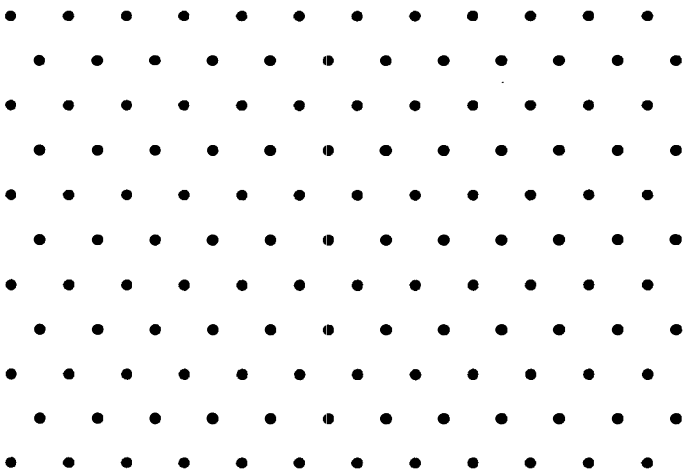

Figure 1 Triangular Sampling Pattern

For a Class II survey unit area of 120 m^2 and 15 samples, the area represented by each sample is approximately 8 m^2. The spacing between samples on a triangular pattern for this area is about 3 m. If unusual survey unit dimensions and surface features prevent collection of an adequate number of systematic data points for statistical testing, additional points may be obtained from randomly selected locations within the survey unit.

A hypothetical Class II survey unit in a building with an area of 120 m^2 (including the walls) and walls running north-south and east west is used to demonstrate how a survey grid with a triangular pattern may be established. Select a random starting point in the southwest corner of the survey unit. Next, lay out an east-west line of samples separated by 3-m intervals until the end of the survey unit is reached. Then set up the next line in the grid by locating a point 2.6 m north (or south) and 1.5 m east (or west) of one of these locations, and lay out a second, parallel, east-west line of samples separated by 3-m intervals until the end of the survey unit is reached. Repeat this process until the survey entire area (including the walls up to 2 m) is covered by the triangular pattern.

Alternatively, the grid spacing of the smallest survey unit can be determined, and this grid spacing can be applied to all Class II or Class III survey units. This will result in more grid nodes than is required, and a subset of 15 grid locations can be sampled.

For irregular shaped survey units, where use of east west and north-south grid lines may be inconvenient, the baseline for the sampling pattern may follow the long axis of the survey unit to facilitate implementation.

1.7.5 Selection of Sampling Locations in Background Locations

Background areas do not have to be gridded prior to sampling. It is sufficient to collect background samples from separate locations within the background area and record their approximate location.

2.0 MOBILIZATION AND SURVEY EXECUTION

Instrument calibration and personnel mobilization will be closely coordinated with the approval of this Sampling and Analysis Plan and the access to the defined base locations. The initial mobilization will target instrument set-up, representative background measurements, and surveys of accessible and already vacated survey locations. Subsequent survey campaigns are to be coordinated over the period of time necessary for present occupants to vacate the premises, and within a timely manner to minimize the latency for authorizing future facility tenants from moving in. As many as three distinct survey events are scheduled and budgeted, including mobilization of personnel. The project instrumentation will be dedicated to the effort, and secure storage on-site will be established with the coordination of base personnel.

Custodial records (Department of the Army Radiation Permits –DARP) will be completed for radioactive calibration and/or check sources brought on-site. Security will be ensured through locked storage containers and designated facility areas. MSDS forms will accompany the project material (i.e., P-10 gas for detectors).

The initial mobilization /survey campaign will include the participation of the Project Manager, the Project Certified Health Physicist, the lead health physics evaluator, and two survey technicians. Targeted vacant commodity sites will be surveyed by the team to standardize the survey technique, record collection, sample acquisition, quality control, and sample shipment. Additional surveys will require the on-site efforts of the lead health physics evaluator and the two survey technicians, with off-site data review/reduction, sample analysis, and third party QC analysis.

3.0 PROJECT SCHEDULE

A comprehensive outline of the schedule for all activities associated with the Commodity Storage Survey effort is shown in Attachment 2, 'Gant Chart for the Commodity Site Survey Schedule of Activities'. This Gant Chart shows the layout of the schedule including the different phases and tasks required to accomplish this effort, the sequence for each task and expected duration, the start and end dates and the associated predecessor for each task. A total of 653 hours is budgeted for the on-site survey effort to ensure defensible and appropriately documented evidence for the release survey, which equates to twenty-two calendar days for a three-member crew, working up to ten hour days.

4.0 DATA EVALUATION

All survey data will be carefully screened and reviewed by the Project Lead Evaluator, the Project Manager, and the Project Health Physicist. The scan surveys and sample results will be evaluated against the unrestricted release criteria to ensure that the area meets the release criteria. This unrestricted release criteria is:

a) The residual contamination above background is below the $DCGL_w$.

b) The residual removable contamination is below $DCGL_{rem}$.

If any area is at or exceeds the unrestricted release criteria, the Industrial Operations Command will be immediately notified. An evaluation will then be conducted by the Project Lead Evaluator, the Project Manager, and the Project Health Physicist on whether the area may need to be reclassified and/or additional surveys and samples taken and evaluated. If reclassification is required, a Change to the Scope of Work will be required and an amendment to the work plan will be authored and submitted for approval.

5.0 FINAL REPORT

The final project survey report will document the comprehensive investigation effort, including the substantiation of discreet area classifications. The MARSSIM protocol will be adhered to in data analysis and statistical testing of results for determination of suitability for unconditional release or the necessity for subsequent action. The final report will documents all surveys and samples including associated QA documentation for these reports. Instrument calibrations will also be included along with source checks and source pedigrees to legitimize the associated surveys.

6.0 ATTACHMENTS

U.S. Army Fort McClellan
Fort McClellan, Alabama
HQ, IOC Project Number USA 99-100

Release Surveys for Commodity Storage Sites

QUALITY ASSURANCE PLAN

Prepared by:

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October 1999

U.S. ARMY FORT McCLELLAN

Release Surveys for Commodity Storage Sites

QUALITY ASSURANCE PLAN

APPROVAL PAGE

October 1999

Concurrence: _____

Lee Young, Project Manager Date

Concurrence: _____

Joel Cehn, Project QA Manager Date

Recommended
For Approval: _____

Mike Styvaert, IOC Health Physicist Date

Approval: _____

Nuclear Regulatory Commission Date

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1.0 INTRODUCTION

1.1 Background

Allied Technology Group (ATG) has been contracted by the U.S. Army Industrial Operations Command (IOC) Radioactive Waste Disposal Office for the radiological release surveys of commodity storage sites at Fort McClellan near Anniston, Alabama. As a supporting part of the overall work plan for the project, this Project Quality Assurance Plan has been integrated into the Decommissioning Plan to provide the necessary controls to successfully complete the contract requirements. Performance of project activities is obligated to ATG under contract DAAA09-98-C-0039, Modification P00003. The internal ATG project number if 10036.02.

1.2 Scope and Objectives

The project Quality Assurance Plan has been developed to meet the applicable regulations and requirements and to assure compliance with the work objective, and requirements of the project Sampling and Analysis Plan (SAP) and the Project Health and Safety Plan (HASP).

Management and supervisory personnel will be on site to provide instruction and guidance to project personnel in the implementation of this plan.

2.0 QUALITY ASSURANCE PROGRAM

2.1 Project Quality Assurance Plan

The Project Quality Assurance Plan is committed to ensuring that all activities to be performed during this radiological survey project which affect quality are prescribed by and performed in accordance with procedures. The Project Quality Assurance Plan is implemented for the activities specified in the Sampling and Analysis Plan and the Project Health and Safety Plan for the Fort McClellan project. The Project Quality Assurance Plan highlights project specific aspects of the applicable quality assurance elements. The specific quality assurance tasks are defined in the plan.

2.2 Quality Assurance Training

The Project Manager or designated alternate will perform the initial quality assurance training of the project personnel at the start of the project.

If additional personnel are added to the project, they will receive quality assurance training prior to participation in the project activities. Quality assurance training will consist of a review and discussion of the project Sampling and Analysis Plan and supporting documents which shall include the ATG Field Operating Procedures and any additional procedures referenced in the Sampling and Analysis Plan, Health and Safety Plan and the Quality Assurance Plan. Special emphasis will be placed on documentation of work, quality control checks, equipment performance, identification and control of radioactive material and safety procedures.

Each participant shall acknowledge that he/she has received training and that he/she understands the quality assurance requirements relevant to the project by signing and dating the Training Record, ATG Form 027

2.3 Technical Training and Personnel Qualifications

Allied Technology Group management will review written statements of qualification and resumes with reference to the position necessary to perform the work as described in the Sampling and Analysis Plan to establish personnel capabilities and qualification to perform the assigned task. If comparison of personnel qualification, including education, experience, and training do not fulfill the requirements of the position description to meet project needs, appropriate training including "read and study" and "on-the-job" training will be performed or other appropriately qualified individuals will be assigned to perform the task.

The Project Manager or designated alternate shall review all personnel qualifications and determine the type of training or experience required to ensure that an individual is qualified to perform the work. This review will be documented on the Review of Personnel Qualification, ATG Form 103. Personnel records shall be maintained in the quality assurance record file and shall include a record of the initial qualifications, documentation of review by the Project Manager or designated alternate and acceptance of current qualifications or the need for additional training and a record of the completion of training. Project management shall monitor the performance of individuals involved in activities affecting quality and shall determine if there is a need for retraining or replacement. Retraining or replacement of individuals will be initiated immediately upon identification of the need for such actions. The following guidelines shall be used to determine the proficiency and ability of the workers assigned to this project:

2.3.1 Qualification Requirements:

2.3.1.1 Physically capable of performing the work tasks.

2.3.1.2 Demonstrated capability to perform the specific function in accordance with approved procedures.

2.3.1.3 Familiarity with technical aspects of the equipment and procedures, and capability to verify that the equipment is in proper working condition.

2.3.2 Capability Demonstration:

2.3.2.1 The Project Manager or designated alternate shall determine the type of training or experience required to determine if personnel are qualified to perform the specific tasks.

2.3.2.2 The individual workers shall review the approved project Plans.

2.3.2.3 The individual workers shall demonstrate their understanding of the project Plans.

2.3.3 Support Personnel

2.3.3.1 Minimum personnel will be used to support the survey.

2.3.3.2 All support personnel at Fort McClellan will be trained on the applicable hazards on which they are working. This training shall be documented on Training Record ATG Form 027.

2.3.3.3 All support personnel involved in the survey activities shall be monitored for exposure (TLD).

2.3.3.4 All support personnel involved in the survey activities shall be under the direct surveillance of the ATG Lead Investigator (HP) while performing work.

3.0 ORGANIZATION

The Project Quality Assurance Plan oversight will be performed by Headquarters, Industrial Operations Command and the base Chemical School. The ATG Quality Assurance Director

will report independently of the on-site project management. The Industrial Operations Command will perform unannounced inspections to include a review of ATG QA/QC procedures and their implementation on site during the survey activities.

The QA Manager is responsible for assuring that the Project Quality Assurance Plan is implemented and is adhered to on site. All project records and documents will be submitted to the QA Manager for final approval.

The Project Manager reports to the QA Manager, for the purpose of QA/QC control, and will act as an on-site quality auditor. The on-site audit reports and records will be submitted to the QA Manager. Quality items that will impact the performance of the contract will be immediately submitted to IOC. Copies of all reports, records or correspondence will be maintained on site for review.

4.0 CONTROL OF DATA

4.1 Planning

The work tasks necessary to complete this contract will be performed in a planned, systematic manner. To assure adequate project planning, the Sampling and Analysis Plan will be approved prior to the start of work. The Sampling and Analysis Plan will specify the required data collection and records to verify that the contract commitments have been met.

4.2 Data Collection

Data collection will be performed by the individual performing the tasks or their supervisor. Data collection will be performed in accordance with the Sampling and Analysis Plan, Project Quality Assurance Plan and the Project Health and Safety Plan requirements.

4.3 Documentation

Data collection shall be fully documented on the appropriate data records and daily project logs. All records shall be complete and thorough as possible hand written, legible and in ink. Personnel making a change to a record shall cross out the old entry with one line, add the new information and initial and date the change. Under no circumstances shall the old entry be scratched out, whited out, erased or otherwise removed or made illegible. When applicable, an explanation should accompany the

change or correction.

4.4 Quality Control Checks

All data shall be reviewed and checked by a technically qualified person such as the Corporate Health Physicist or the Project Manager. If the Project Manager does the Quality Control check, then he/she shall not review their own work. These checks shall be made to assure that both the technical, operational and quality assurance requirements have been met.

The following guidelines will be used to perform the quality control checks:

4.4.1 Verify that the record contains;

4.4.1.1 The project name or task description

4.4.1.2 Name or initials of the performer

4.4.1.3 Date of performance

4.4.1.4 Page number if pertinent.

4.4.2 And, if applicable, that the record has;

4.4.2.1 Conformed with the appropriate procedures

4.4.2.2 Instrument calibration data (instrument identification, calibration date, certificate of calibration, etc.) of survey instruments used is current

4.4.2.3 Completeness and adequacy of the performance and documentation

4.4.2.4 Accuracy of material documented.

If the material being checked conforms to the guidelines, the individual performing the quality control check shall sign and date the record. If the material is rejected, it shall be handled in one of two ways:

4.4.2.4.1 Discuss and correct minor deviations with responsible personnel resulting in subsequent acceptance or,

4.4.2.4.2 Initiate corrective action procedures in the form of a Nonconformance Report, Form ATGF-108.

4.5 Management Review

The Project Manager or designated alternate shall review all data records prior to submitting them to the QA Manager. The same steps shall be taken with the review that are taken with the quality control checks.

5.0 PROCUREMENT DOCUMENT CONTROL

Procurement or acquisition of packages, plastic bags, protective clothing, safety equipment and radiological survey equipment, etc. may be needed to perform the work tasks. The procurement documents and packing lists will be reviewed upon receipt by the Project Manager or designated alternate to verify that appropriate quality assurance and technical requirements have been met. These records will be maintained with the other project records.

6.0 SAMPLING AND ANALYSIS PLAN

The Sampling and Analysis Plan for the activities at Fort McClellan and the associated supporting documents shall be reviewed and approved by Allied Technology Group management, IOC, and the pertnant regulatory agencies (i.e., NRC, EPA, State).

The Sampling and Analysis Plan will have systematically numbered steps and pages, a cover page and an approval page. Distribution of copies to pertinent personnel will be accordance with Section 7 of this Quality Assurance Plan, Document Control.

If revisions to the Sampling and Analysis Plan are necessary during the performance of the project, ATG shall submit any major changes to the NRC for approval. Minor plan revisions or minor field changes that do not affect the quality of work, objectives, or cause a potential health and safety impact will not require submittal to the NRC for approval. Major changes include revisions that would result in an unreviewed safety question or a change in a license condition. In accordance with Administrative Procedure AROP No. 102, 'Revisions to the Operational Procedures' and the use of Form 104, 'Project Work Plan Change Request', the Project Manager or designated alternate will review all proposed changes to determine if the change is significant. All changes will be documented and highlighted by change bars in the

right margins of the text.

7.0 DOCUMENT CONTROL

The Sampling and Analysis Plan and associated supporting documents shall be issued as a controlled document to assure that the current approved revision is in use. Controlled copies of these documents will be issued to project personnel by the Project Manager or designated alternate who will maintain a distribution list of the controlled copies. Personnel assigned controlled documents will be required to acknowledge receipt of the document and all subsequent revisions to the document.

A document Distribution Record, ATG Form 105, shall be maintained to assure that current documents are distributed. When issuing a current document or document revision, a Document Transmittal Record, ATG Form 106 shall be submitted to the recipient. This record will demonstrate that current documents have been issued and are in use. The transmittal record shall be acknowledged and returned to the QA Director.

The recipient of the controlled document shall return the document to the QA Director when the requirements for its use ends. Upon return of the controlled document, the QA Director shall enter the date of return on the Document Distribution Record.

8.0 INSPECTIONS

All quality-affecting work activities data shall be reviewed and checked by an independent Quality Assurance person, per Section 4.4, Quality Control Checks, to verify that they meet project requirements. For radiological measurements, quality control inspections will be performed by randomly verifying survey techniques and survey meter results.

The Project Manager or designated alternate will be responsible for completing the Daily Quality Control Checklist, ATG Form 107. The checklist is designed to account for project Decommissioning Plan activities that pertain to project tasks and radiation protection concerns.

Unsatisfactory items will be immediately rectified to bring the item to a satisfactory condition. The checklist is to be completed at the end of each shift for that days activities.

9.0 CONTROL OF MEASURING AND TEST EQUIPMENT

Measuring and test equipment shall be controlled and properly maintained to assure that the indicated results are accurate. Measuring and test equipment will not be used for any other purpose than that which the manufacturer intended. The equipment shall be stored, when not in use, in a controlled area so that environmental or physical damage does not occur. Only personnel qualified to use the equipment will be allowed to perform work with the equipment.

Measuring and test equipment that do not perform properly or do not provide good, reproducible results shall be taken out of service. The equipment shall be tagged with an "out of service" tag and removed from the normal equipment storage area.

9.1 Calibration

Radiological survey meters will be supplied from the ATG Oak Ridge Technical Support Office. Meters used by ATG, Inc. are calibrated by a certified calibration facility at a minimum frequency of annually.

Copies of the primary calibration certificates will be sent with the meters to the job site. In addition, survey meters have an attached calibration sticker that indicate the calibration date and the calibration due date. Radiation survey meter performance testing and maintenance will be performed in accordance with the Radiation Survey Procedure.

10.0 HANDLING, STORAGE AND SHIPPING

All radioactive material will be packaged, handled and stored according to the appropriate health and safety procedures. Packages (swipe samples) shall meet the Department of Transportation (DOT) regulations. The Project Manager (or designated ATG lead inspector) shall inspect and sign the shipping airbills.

11.0 CONTROL ON NONCONFORMANCE ITEMS

Procedures have been established and documented to control equipment and activities that do not conform to work plan requirements or whose quality does not meet the intended use. Nonconforming items, including reviewed data, shall be identified, documented, segregated or disposed of as appropriate. Nonconformance includes noncompliance with the technical procedures, contract documents or errors in documented analyses or results. Nonconformance reports shall be prepared, including a description of the nonconformance

and the proposed corrective action or disposition such as accept, reject, repair or rework. Nonconforming items or data shall be marked as nonconforming and shall not be used in any further activity until corrective action has been satisfactorily completed or an acceptable disposition approved by the Project QA Manager.

Persons determining corrective action or disposition shall have demonstrated competence, have an adequate understanding of the requirement, and have access to pertinent background information. Proposed corrective action or disposition and completion of corrective action shall be reviewed and approved in accordance with Section 12.0, Corrective Action.

11.1 Identification and Reporting of Nonconformances

A nonconformance exists if there is a deviation from or noncompliance with the Sampling and Analysis Plan or contract specifications. Nonconformances also include major errors in documented analysis, data or results and deficiencies in documentation or any other aspect of the project that affects quality. Personnel who identify a nonconformance shall report the condition by:

11.1.1 Completing Part A of the Nonconformance Report, ATG Form 108;

11.1.2 Request a nonconformance number from the Project Manager or designated alternate;

11.1.3 Distribute the nonconformance report to IOC, the Project Manager or designated alternate, and the Project QA Manager;

11.1.4 Notification of all nonconformances and copies of all Nonconformance Reports will be provided to the IOC Health Physicist and the NRC Representative.

11.2 Evaluation of Nonconformance Reports

IOC and the Project QA Manager will review the nonconformance report to determine if any of the following conditions exist and document the findings by completing Part B of the Nonconformance Report.

11.2.1 IOC may elect to evaluate the nonconformance item with the Project Manager or designated alternate, and Project QA Manager to determine if the nonconformance item could invalidate the results of ongoing work. If the nonconformance(s) incident in any way affects the health of workers and/or

the environment, it shall be reported to all appropriate facility personnel. If work is stopped, it shall be so noted on the nonconformance report. All affected work shall be immediately stopped and the Project QA Director notified. Work shall not be restarted until corrective action is approved and work authorized to restart by IOC.

11.2.2 If the nonconformance constitutes a significant condition adverse to quality, determine the cause of the condition. Examples of significant conditions adverse to quality include significant failures to implement the project Sampling and Analysis Plan or major errors in data or analysis which had previously been approved.

11.2.3 If the nonconformance has any impact on previously obtained data or reports submitted to the Fort McClellan or the IOC representatives, the Project Manager or designated alternate shall note the impact in the remarks section of the nonconformance report and notify in writing all individuals and organizations that may be affected by the nonconformance and resulting data.

11.3 Tracking Nonconformance Reports

The Project QA Director shall monitor nonconformance reports to determine if trends adverse to quality are developing. If such trends are developing, such as repetitive reports related to a particular activity, a written report will be submitted to all project personnel identifying the particular problem. The Director will evaluate the identified problem and propose and implement a written corrective action program to prevent recurrence of the nonconformance.

12.0 CORRECTIVE ACTION

Corrective action for conditions adverse to quality will be determined and implemented in a timely manner. Conditions adverse to quality are any of the following: failures, malfunctions, deficiencies, defective items and nonconformances. A significant condition adverse to quality is one which, if uncorrected, could have a serious effect on safety, operability or validity of data. The cause of the condition will be determined and action taken to preclude the recurrence of the nonconformance item. IOC shall verify that the corrective action has been implemented and, if necessary, that the Detailed Work Plan has been revised.

12.1 Recommendation of Corrective Action

The project personnel that recommend the corrective action will document the recommendation on Part C of the Nonconformance Report. In the case of a nonconformance which is a significant condition adverse to quality, the corrective action shall be such as to preclude recurrence of the non-conformance. The recommended corrective action will be reviewed and approved by IOC.

12.2 Corrective Action Implementation and Verification

The approved corrective action shall be implemented by the appropriate project personnel. When implementation is verified by IOC, the Project QA Manager, and the Project Manager, Part D of the Nonconformance Report will be completed. The completed nonconformance report will be maintained on site with the nonconformance record log in the project file.

13.0 QUALITY ASSURANCE RECORDS

A quality assurance records system for the project will be implemented and maintained. Records shall be in ink, legible, identifiable and retrievable. The quality assurance records will be sufficiently detailed to properly reflect all work activities in the performance of this contract.

These records may be in the form of data sheets, notes, graphs, comments, computations and other graphic or written data generated in connection with the work activities. Records will be considered valid only if the individual completing the record has initialed or signed and dated the record. If revisions or changes to the quality assurance records are required, the changes will be made to the original records by crossing out the old entry with one line, adding the new information and initialing and dating the change.

The Project Manager or designated alternate will be responsible for maintaining and protecting the records. The records will be maintained on site with the project files. File access will be limited to project personnel and authorized contract personnel. At the completion of the project, the Project Manager or designated alternate will submit all project QA records to the QA Director. A copy of all project documents will be provided with the Final Report to the Fort McClellan representative, IOC Health Physicist, and IOC Contracting Officer.

14.0 QUALITY ASSURANCE AUDITS

No formal quality assurance audits are planned for this activity. A quality assurance audit

may be performed if the QA Director deems necessary. Quality Assurance records will be evaluated and audited by the QA Director at the end of the project.

15.0 REFERENCES

15.1 U.S. Code of Federal Regulations, Title 10, "Energy", Part 19 and Part 20.

15.2 U.S. Code of Federal Regulations, Title 29, "Labor", Part 120.

15.3 U.S. Code of Federal Regulations, Title 40, "Protection of the Environment".

15.5 NUREG-1575 / EPA 402-R-97-016, "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)", December 1997.

15.6 U.S. Nuclear Regulatory Commission Division of Industrial and Medical Safety, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material (August 1987)".

15.7 Allied Technology Group "Health and Safety Plan for the Release Survey of Fort McClellan Commodity Storage Sites'".

15.8 Allied Technology Group "Sampling and Analysis Plan for the Release Survey of Fort McClellan Commodity Storage Sites".

16.0 FORMS

16.1	ATGF-027	Training Attendance Record
16.2	ATGF-103	Review of Personnel Qualifications
16.3	ATGF-104	Project Work Plan Change Request
16.4	ATGF-105	Document Distribution Record
16.5	ATGF-106	Document Transmittal Record
16.6	ATGF-107	Daily Quality Control Checklist
16.7	ATGF-108	NonConformance Report

TRAINING RECORD

TRAINING DATE:	INSTRUCTOR:
LOCATION:	TOTAL CLASS HOURS:
TRAINING COURSE TITLE:	
SCOPE OF TRAINING:	

NAME OF STUDENT	SOCIAL SECURITY NO.	SIGNATURE

TRAINING APPROVED BY (Project Director):

REVIEW OF PERSONNEL QUALIFICATIONS

NAME:	POSITION:
EDUCATION, TRAINING AND EXPERIENCE:	
QUALIFICATIONS ACCEPTED (Yes / No)	**ADDITIONAL TRAINING REQUIRED:**
NOT FIT FOR DUTY:	
REVIEWED BY (PROJECT DIRECTOR):	**DATE:**
ADDITIONAL TRAINING ASSIGNMENT:	
QUALIFICATIONS ACCEPTED (Yes / No)	
REVIEWED BY (PROJECT DIRECTOR):	**DATE:**

PROJECT WORK PLAN CHANGE REQUEST

CHANGE REQUESTED BY:	DATE:

REASON FOR CHANGE:

CHANGE REQUESTED:

SIGNATURE:	DATE:

WORK CHANGE REQUEST REVIEWED BY (Health and Safety Officer):

REMARKS:

DISPOSITION OF WORK PLAN CHANGE REQUEST:

FINAL WORK CHANGE REQUEST REVIEW:

ROJECT DIRECTOR:

DOCUMENT DISTRIBUTION RECORD

NAME OF DOCUMENT:	
DOCUMENT REVISION:	**DOCUMENT DATE:**
NAME AND TITLE OF RECIPIENT	**DATE SENT**
APPROVED BY (Project Director):	

DOCUMENT TRANSMITTAL RECORD

AME AND TITLE OF RECIPIENT:	
DOCUMENT NAME:	
REVISION NUMBER:	DOCUMENT DATE:
INSTRUCTIONS OR REMARKS:	

DOCUMENT SENT BY THE PROJECT DIRECTOR TO:

NAME:		TELEPHONE:	
STREET ADDRESS	CITY	STATE	ZIP

PLEASE COMPLETE THE FOLLOWING, SIGN AND RETURN TO SENDER:

☐ I acknowledge that I received the document or document revision and that I have updated my records.

☐ I am returning the document with this transmittal record.

SIGNATURE:	DATE:

DOCUMENT TRANSMITTAL RECORD COMPLETE AND APPROVED

SIGNATURE (Project Director):	DATE:

DAILY QUALITY CONTROL CHECKLIST

DATE: _____

		S	NS
1.	PERSONNEL MONITORING		
	DOSIMETRY		
	RWP REQUIREMENTS MET		
	RWP ACCESS LOG COMPLETE		
2.	INDUSTRIAL SAFETY		
	HARD HATS AND EQUIPMENT SAFETY GLASSES WORN		
	SAFETY EQUIPMENT USED		
	WORK AREAS SECURED		
	SAFETY RULE VIOLATIONS INVESTIGATED		
3.	WORK PLAN REQUIREMENTS		
	WORK PLAN PROCEDURES FOLLOWED		
	SCHEDULE COMMITMENTS MET		
	WORK AREAS CLEANED AND SET UP FOR NEXT DAY		
4.	RADIATION SURVEYS		
	ROUTINE SURVEYS COMPLETE		
	AREA POSTINGS UPDATED		
	BARRELS LABELED		
	SURVEY RESULTS ACCEPTABLE		
5.	STOP WORK CONDITIONS		
	STOP WORK ORDERS INVESTIGATED		
	CORRECTIVE ACTION IMPLEMENTED		

S = SATISFACTORY **NS = NOT SATISFACTORY**

SIGNATURE (Health and Safety Officer):	**DATE:**

NONCONFORMANCE REPORT

NONCONFORMANCE REPORT NO: _____

PART A			
Description of Nonconformance:			
PART B			
Evaluation of Nonconformance:			
Work Stoppage Required (Yes / No)?		Impacts Previous Data (Yes / No)?	
SIGNATURE:		**DATE:**	
PART C			
Recommended Corrective Action:			
SIGNATURE:		**DATE:**	
PART D			
Corrective Action Implemented:			
Corrective Action to Nonconformance Approved:			
ATG Health & Safety Officer	**Date**	**ATG Project Director**	**Date**

ATTACHMENT 1

DESCRIPTION OF THE COMMODITY SITE SURVEY AREAS

FORT McCLELLAN, ALABAMA

U.S. Army Fort McClellan HQ, IOC Project Number USA 98-046 Commodity Site Survey
ATG Project No. 10036
IOC Contract No. DAAA09-98-C-0039 Modification No. P00003

Item	Facility	Location	Dimensions Length (Ft)	Dimensions Width (Ft)	Floor Area (Ft^2)	Survey Area (Ft^2)	Survey Area (M^2)	Status	RAM Useage	Suspect Isotopes	Survey Protocol	Sample Frequency	Analysis 3rd Party α/β	Analysis 3rd Party LSC	Survey Effort man-hrs
1	Bldg 228	NE Corner	40	28.5	1140	1962	182	Vacant	Radiac Cal	Sr-90,Pu-239 Ni-63	Class III	10%	15	0	7.65
2	Bldg 256	Entirety	300	80	24000	28560	2653	Active	Pkg'd Material	H-3, Radium	Class III	10%	15	15	57.06
		w/ Off-set	40.67	18.17	739	1445	134		Storage, Compass	Th-232, Ni-63 Am-241		10%			6.68
3	Bldg 257	Entirety	170	60	10200	12960	1204	Active	Material Pkg'ing Consolid. Sup Bldg Compass/Lenses	H-3, Radium Th-232, Ni-63 Am-241	Class III	10%	15	15	28.08
4	Bldg 303A	A End	20	10	200	560	52	Active	Central Issue	Radium	Class III	10%	15	15	5.04
		Source Storage Cabinet Area - ONLY							Lensatic Compasses	H-3					
5	Bldg 335	Entirety	67	92	6164	8072	750	Vacant	General Support	Radium	Class III	10%	15	0	19.00
		w/ Wing >	28.5	27	769.5	1435.5	133		Vehicle Maint.		Class III	10%			6.67
6	Bldg 337	Entirety	241	40	9640	13012	1209	Vacant	General Support Vehicle Maint.	Radium	Class III	10%	15	0	28.18
7	Bldg 338	Entirety	240	76	18240	22032	2047	Active	General Support Vehicle Maint.	Radium	Class III	10%	15	0	44.94
8	Bldg 339	Entirety	140	56	7840	9352	869	Vacant	Vehicle Maint.	Radium	Class III	10%	15	0	21.38
			135	20	2700	2700	251	Vacant	Shop	Radium	Class III	10%			9.02
9	Bldg 341	Entirety	100	40	4000	5680	528	Active	General Storage No RAM Mission	H-3, Radium	Class II	50%	15	15	56.77
10	Bldg 345	Entirety	100	40	4000	5680	528	Active	General Storage No RAM Mission	H-3, Radium	Class II	50%	15	15	56.77
11	Bldg 350	3 Areas	260	80	20800	24880	2311	Active	Motor Pool	Radium	Class III	10%	15	0	50.23
			25	50	1250	2150	200	Active	Equip Maint.	Am-241,Ni-63	Class III	10%			7.99
			20	20	400	880	82	Active	Equip Maint.	Am-241,Ni-63	Class III	10%			5.64
12	812-1/2	Entirety	4	4	16	80	7	Vacant	Radiac Cal	Ra / H-3	Class III	10%	15	15	4.15
	Small Bunker	Between T-812 & T-813													
13	Bldg 3181	Rms 35,35	15	7	105	369	34	Vacant	Storage Vault	Co-60,Cs-137	Class II	50%	15	0	7.43
	&	Duct to Roof	15.5	6	93	351	33		Fume Hood	Ca-45, Mn-54	Class II	50%			7.26
			20.5	20.5	420.25	912.25	85		Liq. Source	Ni-63, AU-198	Class II	50%			12.47
			13.5	10	135	417	39		Plating	Na-22, Br-82	Class II	50%			7.87
		Duct >	25	1'						& P-32					6
14	Bldg 3182	Entirety	58	58	3364	4756	442	Active	Rad Labs	Radium, H-3	Class III	10%	15	15	12.84
			58	58	3364	4756	442		MP Artifacts	Radium, H-3	Class III	10%			12.84
			25	22	550	1114	103			Radium, H-3	Class III	10%			6.07
			14	12	168	480	45			Radium, H-3	Class III	10%			4.89
			17	12	204	552	51			Radium, H-3	Class III	10%			5.03
			24	14	336	792	74			Radium, H-3	Class III	10%			5.47
			20	14	280	688	64			Radium, H-3	Class III	10%			5.28
			92	7	644	1832	170			Radium, H-3	Class III	10%			7.40
			14	11	154	454	42			Radium, H-3	Class III	10%			4.84
			35	22	770	1454	135			Radium, H-3	Class III	10%			6.70
			34	23	782	1466	136			Radium, H-3	Class III	10%			6.72
15	Bldg 4416	Entirety	24	11	264	684	64	Active	Ammo Magazine	Cs-137, Co-60	Class III	10%	15	0	5.27
16	Bromine Field	Parking Lot at Bldg 3195	75	75	5625	5625	523	Vacant	Survey Training	Br-82	Pending	Research	0	0	16.00
17	Old Alpha Field	Parking Lot at Bldg 3195	200	200	40000	40000	3716	Vacant	Survey Training	U-233	Pending	Research	0	0	16.00
	Subtotals												225	105	572
														Man-days	57
														Work Days	19

U.S. Army Fort McClellan HQ, IOC Project Number USA 98-046 Commodity Site Survey
ATG Project No. 10036
IOC Contract No. DAAA09-98-C-0039 Modification No. P00003

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3	Bldg 257	Entirety	170	60	10200	12960	1204	Active	Material Pkg'ing Consolid. Sup Bldg Compass/Lenses	H-3, Radium Th-232, Ni-63 Am-241	Class III	10%	15	15	28.08
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			135	20	2700	2700	251	Vacant	Shop	Radium	Class III	10%			9.02
9	Bldg 341	Entirety	100	40	4000	5680	528	Active	General Storage No RAM Mission	H-3, Radium	Class II	50%	15	15	56.77
10	Bldg 345	Entirety	100	40	4000	5680	528	Active	General Storage No RAM Mission	H-3, Radium	Class II	50%	15	15	56.77
11	Bldg 350	3 Areas	260	80	20800	24880	2311	Active	Motor Pool	Radium	Class III	10%	15	0	50.23
		1 Survey	25	50	1250	2150	200	Active	Equip Maint.RM 9	Am-241,Ni-63	Class III	10%			7.99
		Unit	20	20	400	880	82	Active	Equip Maint.RM 16-	Am-241,Ni-63	Class III	10%			5.64
12	812-1/2	Entirety	4	4	16	80	7	Vacant	Radiac Cal	Ra / H-3	Class III	10%	15	15	4.15
	Small Bunker Between T-812 & T-813														
13	Bldg 3181	Rms 35,35	15	7	105	369	34	Vacant	Storage Vault	Co-60,Cs-137	Class II	50%	15	0	7.43
		& Duct to Roof	15.5	6	93	351	33		Fume Hood	Ce-45, Mn-54	Class II	50%			7.26
			20.5	20.5	420.25	912.25	85		Liq. Source	Ni-63, AU-196	Class II	50%			12.47
			13.5	10	135	417	39		Plating	Na-22, Br-82	Class II	50%			7.87
		Duct >	25	1'	(Surveys at Lower Two Bends of Ducting)					& P-32			5	0	6
14	Bldg 3182	Entirety	58	58	3364	4756	442	Active	Rad Labs	Radium, H-3	Class III	10%	15	15	12.84
			58	58	3364	4756	442		MP Artifacts	Radium, H-3	Class III	10%			12.84
			25	22	550	1114	103			Radium, H-3	Class III	10%			6.07
			14	12	168	480	45			Radium, H-3	Class III	10%			4.89
			17	12	204	552	51			Radium, H-3	Class III	10%			5.03
			24	14	336	792	74			Radium, H-3	Class III	10%			5.47
			20	14	280	688	64			Radium, H-3	Class III	10%			5.28
			92	7	644	1832	170			Radium, H-3	Class III	10%			7.40
			14	11	154	454	42			Radium, H-3	Class III	10%			4.84
			35	22	770	1454	135			Radium, H-3	Class III	10%			6.70
			34	23	782	1466	136			Radium, H-3	Class III	10%			6.72
15	Bldg 4416	Entirety	24	11	264	684	64	Active	Ammo Magazine	Cs-137, Co-60	Class III	10%	15	15	5.27
16	Bromine Field	Parking Lot at Bldg 3195	75	75	5625	5625	523	Vacant	Survey Training	Br-82	Pending	Research	0	0	16.00
17	Old Alpha Field	Parking Lot at Bldg 3195	200	200	40000	40000	3716	Vacant	Survey Training	U-233	Pending	Research	0	0	16.00
	Subtotals												230	120	572
														Man-days	57
														Work Days	19

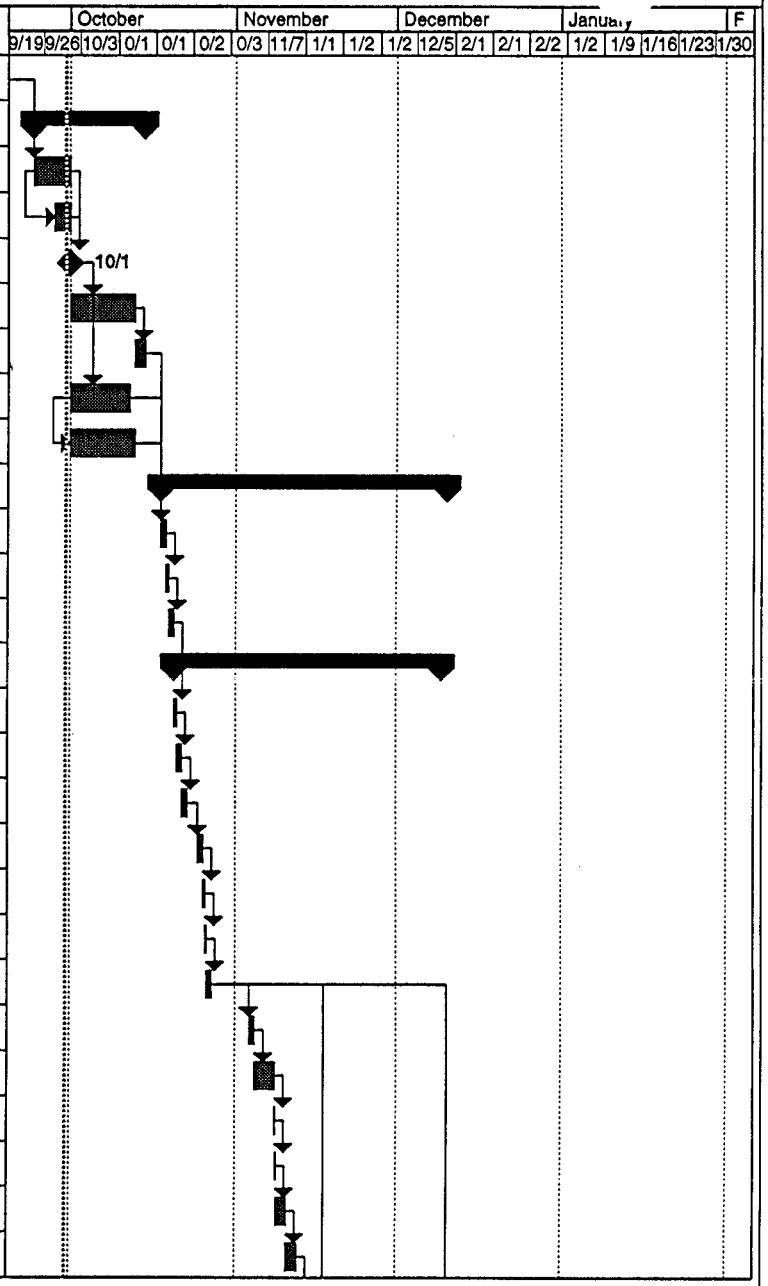
ATTACHMENT 2

GANT CHART FOR THE COMMODITY SITE SURVEY SCHEDULE OF ACTIVITIES

FORT McCLELLAN, ALABAMA

ATC
For
Commodity Sites Survey

ID	WBS	Task Name	Duration	Start	Finish	Predecessors
1	1	Delivery Order / NTP	0 days	Thu 8/26/99	Thu 8/26/99	
2	2	**Phase I**	**15 days**	**Fri 9/24/99**	**Thu 10/14/99**	
3	2.1	Develop SAP	5 days	Fri 9/24/99	Thu 9/30/99	1FS+20 days
4	2.2	Edit HASP & QAP	3 days	Tue 9/28/99	Thu 9/30/99	3SS+2 days
5	2.3	Submit Plans	0 days	Fri 10/1/99	Fri 10/1/99	4,3
6	2.4	Plans Review / Comment	8 days	Fri 10/1/99	Tue 10/12/99	5
7	2.5	Edit / Finalize Plans	2 days	Wed 10/13/99	Thu 10/14/99	6
8	2.6	Instrument Calibration	7 days	Fri 10/1/99	Mon 10/11/99	5
9	2.7	Procurement	8 days	Fri 10/1/99	Tue 10/12/99	8SS
10	3	**Phase II**	**37.95 days**	**Mon 10/18/99**	**Fri 12/10/99**	
11	3.1	Mobilization 1	1 day	Mon 10/18/99	Mon 10/18/99	9FS+3 days,8,7
12	3.2	Site Specific Training	0.5 days	Tue 10/19/99	Tue 10/19/99	11
13	3.3	Instrument Set-up	1 day	Tue 10/19/99	Wed 10/20/99	12
14	3.4	**Site Surveys**	**34.45 days**	**Wed 10/20/99**	**Thu 12/9/99**	
15	3.4.1	Bldg 228, NW Corner	0.5 days	Wed 10/20/99	Wed 10/20/99	13
16	3.4.2	Bldg 335	1 day	Thu 10/21/99	Thu 10/21/99	15
17	3.4.3	Bldg 337	1 day	Fri 10/22/99	Fri 10/22/99	16
18	3.4.4	Bldg 339	1 day	Mon 10/25/99	Mon 10/25/99	17
19	3.4.5	Bldg 812 1/2	0.25 days	Tue 10/26/99	Tue 10/26/99	18
20	3.4.6	A & B Fields Lit Invetsigation	0.5 days	Tue 10/26/99	Tue 10/26/99	19
21	3.4.7	Demobilization 1	1 day	Tue 10/26/99	Wed 10/27/99	20
22	3.4.8	Mobilization 2	1 day	Wed 11/3/99	Thu 11/4/99	21FS+5 days
23	3.4.9	Bldg 3181 Rms 35, 36 & Ducting	1.5 days	Thu 11/4/99	Mon 11/8/99	22
24	3.4.10	Bromine Field	0.25 days	Mon 11/8/99	Mon 11/8/99	23
25	3.4.11	Old Alpha Field	0.25 days	Mon 11/8/99	Mon 11/8/99	24
26	3.4.12	Bldg 341	2 days	Mon 11/8/99	Wed 11/10/99	25
27	3.4.13	Bldg 256	2.2 days	Wed 11/10/99	Fri 11/12/99	26

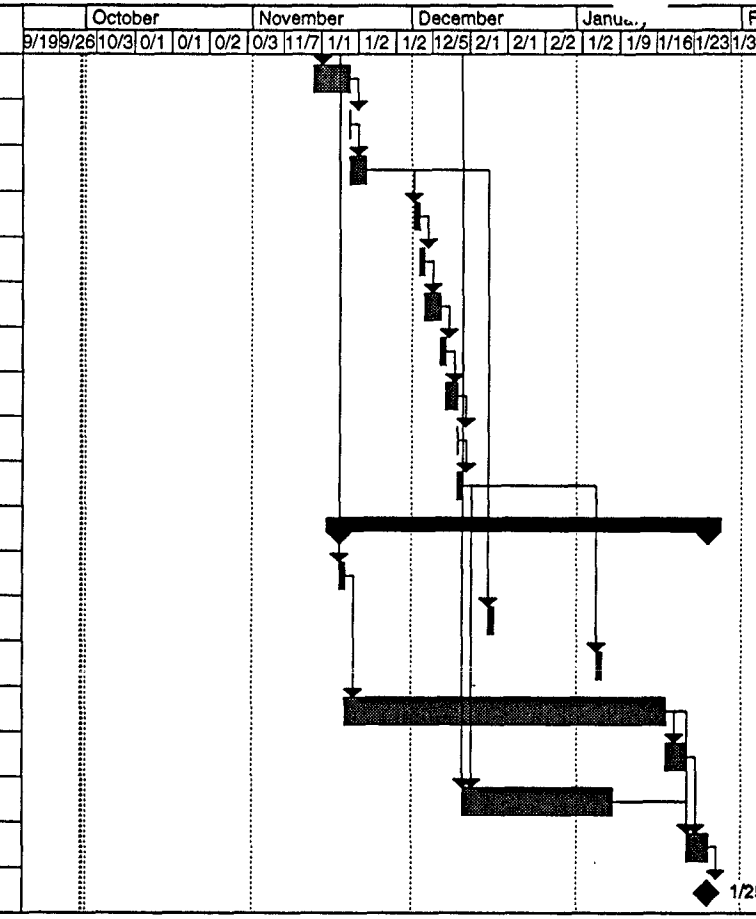


Project: IOC Project USA 99-100
Date: Thu 9/30/99

Task
Split
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Split
Rolled Up Milestone
Rolled Up Progress
External Tasks
Project Summary

ATG I
For
Commodity [illegible] Sites Survey

ID	WBS	Task Name	Duration	Start	Finish	Predecessors
28	3.4.14	Bldg 257	4.2 days	Fri 11/12/99	Fri 11/19/99	27
29	3.4.15	Bldg 303A	0.2 days	Fri 11/19/99	Fri 11/19/99	28
30	3.4.16	Demobilization 2	1 day	Fri 11/19/99	Mon 11/22/99	29
31	3.4.17	Remobilization 3	1 day	Wed 12/1/99	Thu 12/2/99	30FS+5 days
32	3.4.18	Bldg 338	0.75 days	Thu 12/2/99	Fri 12/3/99	31
33	3.4.19	Bldg 345	1 day	Fri 12/3/99	Mon 12/6/99	32
34	3.4.20	Bldg 350	1.1 days	Mon 12/6/99	Tue 12/7/99	33
35	3.4.21	Bldg 3182	2.5 days	Tue 12/7/99	Thu 12/9/99	34
36	3.4.22	Bldg 4416	0.25 days	Thu 12/9/99	Thu 12/9/99	35
37	3.5	Final Demobilization	1 day	Thu 12/9/99	Fri 12/10/99	36
38	4	**Phase III**	**45 days**	**Wed 11/17/99**	**Tue 1/25/00**	
39	4.1	Batch 1 Analytical Results	1 day	Wed 11/17/99	Thu 11/18/99	21FS+15 days
40	4.2	Batch 2 Analytical Results	1 day	Wed 12/15/99	Thu 12/16/99	30FS+15 days
41	4.3	Batch 3 Analytical Results	1 day	Tue 1/4/00	Wed 1/5/00	37FS+15 days
42	4.4	Data Review	38 days	Thu 11/18/99	Mon 1/17/00	39
43	4.5	Data Assembly	4 days	Mon 1/17/00	Fri 1/21/00	42
44	4.6	Survey Evaluation	18 days	Fri 12/10/99	Fri 1/7/00	21,30,37
45	4.7	Report Summary	2 days	Fri 1/21/00	Tue 1/25/00	44,42,43
46	4.8	Submit Report	0 days	Tue 1/25/00	Tue 1/25/00	45



Project: IOC Project USA 99-100
Date: Thu 9/30/99

Task
Split
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Split
Rolled Up Milestone
Rolled Up Progress
External Tasks
Project Summary

ATTACHMENT 3

TABLE OF INSTRUMENTATION FOR RADIOLOGICAL SURVEY

FORT McCLELLAN, ALABAMA

INSTRUMENTATION FOR RADIOLOGICAL SURVEY

This table illustrates the radiological detection and measurement instrumentation to be employed for the survey activities, along with typical parameters and detection sensitivities for the type of instrument and its application.

Type of Measurement	Instrumentation		Background Rate	4π Efficiency	Detector Sensitivity
	Detector	Meter			
Surface Scan (beta-gamma)	Gas Proportional Ludlum 43-68	Ratemeter Ludlum Model 3, Model 18 or Equivalent	400 cpm	0.15	980 DPM/100cm^2
Surface Activity (alpha)	Gas Proportional Ludlum 43-68	Scaler Ludlum Model 3, Model 18 or Equivalent	5 cpm	0.15	110 DPM/100cm^2
Exposure Rates (beta-gamma)	Tissue Equivalent Detector	Bicron Micro R Meter	-	-	< 1 μR/hr
Accessibility Surface Scan Dose Rates	Gas Proportional Ludlum Model 239-1F	Rate Meter Ludlum Model 2221 or Equivalent	10 cpm α	.17	23 DPM / Probe Area
			400 cpm βγ	.25	98 DPM / Probe Area

Scan Sensitivity based on:

$$\text{MDA (DPM/100cm}^2) = 4.65 \sqrt{\frac{\text{Background (cpm)}}{\frac{2 \times \text{Tc (min)}}{\text{Efficiency} \times A/100}}}$$

Surface Measurement Sensitivity based on:

$$\text{MDA (DPM/100cm}^2) = 2.71 + 4.65 \sqrt{\frac{\text{Background (cpm)} \times \text{Tc (min)}}{\text{Efficiency} \times A/100}}$$

ATTACHMENT 4

DESCRIPTION OF AREAS
(15 BUILDINGS, 2 SITE AREAS)

COMMODITY SITE STORAGE AREA DESCRIPTIONS

FT. McCLELLAN

BUILDING 228

Status – Vacant

Floor plans exist for this building. Built originally as a Quartermaster Maintenance Shop in 1936, the installation converted this building to a RADIAC calibration facility in 1978. In 1991, it was converted again for use by Explosive Ordnance personnel. The installation completely vacated the building in 1998. Real property records indicate the overall building dimensions are 69 ft x 123 ft, total square footage: 8,487. The Northwest corner of the South bay will be surveyed as a MARSSIM Class III area. The radionuclides of concern are Pu-239 (AN/LJDM-6 calibrator), Ni-63 and Sr-90 (AN/UDM-2 calibrator).

BUILDING 256

Status – Active

Floor plans exist for this building. Built in 1954, the Directorate of Logistics used this structure as warehouse. The radiological contamination potential comes from the fact that the installation historically used the building to store packaged, ready to ship Army radioactive commodities. Real property records indicate the dimensions are 300 ft x 80 ft with 40 ft 8 in x 18 ft 2 in offset, total square footage: 24,739. The building will be surveyed as a MARSSIM Class III area. The primary radionuclides of concern are Ni-63, H-3, Ra-226, Am-241 and Ra-226.

BUILDING 257

Status – Active

Floor plans exist for this building. Built in 1941, the Directorate of Logistics used the structure as a warehouse. The potential radiological contamination comes from the fact that the installation packaged Army radioactive commodities in preparation for transport in this building. Real property record describes dimensions as 60 ft x 170 ft. Total square footage: 10,200. The primary radionuclides of concern are Ni-63, H-3, Ra-226, Am-241 and Th-232. The facility will be surveyed as a MARSSIM Class III area.

BUILDING 303A

Status – Active

Built in 1942, it serves as the Central Issue Facility for all soldier items, including radio-luminescent lensatic compasses. Real property records describe the building dimensions as 60 ft x 450 ft with 9 ft x 450 ft platform (dock). The total building footprint is 27,000 ft2.

The front portion of the building (i.e., the portion of the building that houses the issue desk) will be surveyed as a MARSSIM Class III area. The radionuclide of concern is H-3.

BUILDING 335

Status – Active

No floor plans exist for this building. Built in 1941, the installation used the structure as a General Support vehicle maintenance shop. The Alabama National Guard currently uses the structure as a storage building. Real property records indicate dimensions of 67 ft x 92 ft with 28 ft 6 in x 27 ft wing. Total square footage: 6,933. The building will be surveyed as a MARSSIM Class III area. The radionuclide of concern is Ra-226.

BUILDING 337

Status – Active

No floor plans exist for this building. Built in 1941, the site used this building as a General Support vehicle maintenance shop. The Alabama National Guard currently uses the structure as a storage building. Real property record describes dimensions of 40 ft x 241 ft. Total square footage: 9,640. The building will be surveyed as a MARSSIM Class III area. The radionuclide of concern is Ra-226.

BUILDING 338

Status – Active

No floor plans exist for this building. Built in 1941, the site used this building as a General Support vehicle maintenance shop. The Directorate of Community Activities currently uses the building as the Ft. McClellan Recycle Center. Real property records describe dimensions of 76 ft x 240 ft. Total square footage: 18,240. The building will be surveyed as a MARSSIM Class III area. The radionuclide of concern is Ra-226.

BUILDING 339

Status – Inactive

No floor plans exist for this building. Built in 1943, the installation initially used this building as a General Support vehicle maintenance shop. The building is derelict, falling down on one side. Real property records list dimensions of 56 ft x 140 ft with 20 ft x 135 ft wings. Total square footage: 10,540. The building will be surveyed as a MARSSIM Class III area. The radionuclide of concern is Ra-226.

BUILDING 341

Status – Active

No floor plans exist for this building. Picked up as "Found On Post" in 1977. This was originally a general storehouse used by the Defense Reutilization and Marketing Organization (DRMO). The Directorate of Environment currently uses it as a Hazardous Waste accumulation point. Total square footage is 4,040 ft2. The building will be surveyed as a MARSSIM Class II area. The primary radionuclides of concern are H-3 and Ra-226.

BUILDING 345

Status – Active

No floor plans exist for this building. Built in 1977, DRMO used this structure as a general storage building. The Directorate of Environment currently uses the building for storage. Dimensions are unavailable, but records indicate the total square footage is 4,040. The building will be surveyed as a MARSSIM Class II area. The primary radionuclides of concern are H-3 and Ra-226.

BUILDING 350

Status – Active

Floor plans exist for this building. The installation built the structure 1991. Ft. McClellan designed it as General/Direct Support Maintenance shop. Direct Support Maintenance uses two bays for wipe testing/routine maintenance of M43A1 detectors and CAMs. The square footage for entire building is 87,832 ft2. The maintenance areas of the building will be surveyed as a MARSSIM Class III area. The primary radionuclides of concern are Ra-226, Ni-63 and Am-241.

BUILDING 812-1/2

Status – Inactive

This is a very small (approximately 5' x 5' x 5') concrete structure that the installation used at one time as a storage vault for radium gauges. The building will be surveyed as a MARSSIM Class III area. The primary radionuclide of concern is Ra-226.

BUILDING 3181, Room 35 and Room 36

Status – Inactive

Floor plans are available. The installation used rooms in question as a radiological laboratory. Another Army agency allegedly surveyed the rooms several months ago, but cannot locate the survey data. This building will be surveyed as a MARSSIM Class II area. The primary radionuclides of concern are Co-60, Mn-54, Cs-137, Au-198, Na-22, Ni-63 and P-32.

BUILDING 3182

Status – Active

No floor plans are available for this building. Built in 1954 originally as an Applied Instruction Building, the Ft. McClellan Radiological Laboratories used one wing in conjunction with the "Hot Cell" facility. The building currently serves as the Military Police Corps museum. Total square footage is 11,696 ft2. The building will be surveyed as a MARSSIM Class III area. The primary radionuclides of concern are H-3 and Ra-226.

BUILDING 4416

Status – Active

This is an ammunition magazine currently used to store chemical munitions. Special permission be required to enter this facility. Property records indicate the building dimensions are 11 ft x 24 ft. At one time the installation used this structure to temporarily house sealed Co-60 and Cs-137 sources. The building will be surveyed as a MARSSIM Class III area. The primary radionuclides of concern are Co-60 and Cs-137.

BROMINE FIELD

Status – Parking lot

Ft. McClellan used a portion of the parking lot near building 3195 and the field adjacent to the parking lot as a decontamination training area. Several years ago, the site would contaminate Army equipment with Br-77 (2.4 day half-life) so personnel could practice decontamination procedures. A search will be conducted of the history of this operation, survey data will be collected, and/or the rationale for a rule-out presented, and a written discussion of the findings will be placed in the Final Report.

ALPHA FIELD

Status – Parking lot

Ft. McClellan used a portion of the parking lot near building 3195 to simulate a radiation field. The site placed uranium-233 plates on the ground for training purposes. A search will be conducted of the history of this operation, survey data will be collected, and/or the rationale for a rule-out presented, and a written discussion of the findings will be placed in the Final Report.

AMSIO-SF (385-11e)

MEMORANDUM FOR AMSIO-ACE-D (Mr. Matthys)

SUBJECT: Request for Proposal, Allied Technology Group (ATG), Release Surveys for Ft. McClellan Commodity Storage Sites, Project Number USA 99-100

1. The attached scope of work (SOW) is for conducting radiological release surveys at 17 buildings and outdoor areas at Ft. McClellan.

2. Please forward the SOW to ATG and request they submit a cost estimate and technical proposal. We recommend ATG for this effort based on their vicinity to the project site, their familiarity with this type effort and the fact that they have an extensive working relationship with the site.

3. The POC is Mr. Mike Styvaert, AMSIO-SF, extension 20880, E-mail address StyvaertM.

KELLY W. CROOKS
Leader, Operations Team
Safety/Rad Waste Team

DESCRIPTION OF WORK
DEPARTMENT OF THE ARMY
US ARMY CHEMICAL SCHOOL

FORT McCLELLAN, ALABAMA
RADIOLOGICAL SURVEYS FOR COMMODITY USE AREAS
USA 99-100

Fort McClellan is comprised of three parts; the Main Post, the Choccolocco Corridor and the Pelham Range. The installation occupies 45,679 acres adjacent to Anniston, AL. The Main Post encompasses 19,000 acres and contains the majority of the facilities. The Army leases the Choccolocco Corridor, which occupies approximately 4,500 acres from the state of Alabama. It connects the Main Post with the Talladega National Forest to the east. The Pelham Range consists of approximately 22,000 acres west of the Main Post.

The Army Base Closure and Realignment Committee (BRAC) has identified Fort McClellan as an installation for closure. The Army must resolve several radiological issues before closing the installation. This scope of work is for the buildings and areas that Ft. McClellan used for the storage and routine maintenance on Army radioactive commodities.

The contractor shall develop a radiological survey plan describing the survey methodologies and techniques that they will follow for release of the identified structures. This scope does not address any decontamination or decommissioning waste. The contractor shall use the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), NUREG-1575 for designing the final release survey. We will address future remedial actions and or disposal activities under a separate scope of work.

All operations must comply with all applicable federal, state, and municipal laws, rules and regulations including the Defense Appropriations Act as it pertains to the use of ozone depleting substances.

SCOPE OF WORK

FORT McCLELLAN, ALABAMA
RADIOLOGICAL SURVEYS FOR COMMODITY USE AREAS

1. COORDINATION. The contractor shall coordinate all project activities with the installation Environmental Coordinator, Ms. Lisa Kingsbury and the HQ, IOC Project Officer, Mr. Mike Styvaert:

U.S. Army Chemical School,
ATTN: ATZN-CM-AHP (Mr. John May),
Fort McClellan, AL 36205-5020
Telephone (205) 848-5737/4115
E-mail: mayj@mcclellan-cmls.army.mil

U.S. Army Chemical School,
ATTN: (Ms. Lisa Kingsbury),
Fort McClellan, AL 36205-5020
Telephone (205) 848-7455
E-mail: kingsburyl@mcclellan-emh2.army.mil

U.S. Army Industrial Operations Command
ATTN: AMSIO-SF, (Mr. Mike Styvaert)
Rock Island, IL 61299-6000
Telephone (309) 782-0880
FAX: (309) 782-2988
E-mail: styvaertm@ioc.army.mil

2. REGULATORY CONCERNS. The contractor shall adhere to the surface release limits prescribed in "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses, By-product, Source, or Special Nuclear Materials, (NRC 1987)".

2.1. The contractor shall obtain required permits, licenses and authorizations from federal, state, and municipal agencies necessary to complete this effort.

2.2. The contractor shall obtain a Department of Army Radiation Permit (DARP) IAW Army Regulation (AR) 385-11 for radioactive material brought on-site for more than 15 days. This includes check sources. The contractor may obtain copies of the DARP application form (DA 3777) from the Army POC listed in paragraph 1.

2.3. In accordance with the Defense Appropriations Act, the contractor, in performing the efforts as defined by this scope of work, shall in no way construe the government direction as supporting, suggesting, or directing the use of ozone depleting substances. The contractor shall specifically bid and perform all contractual efforts in compliance with this Act.

3. FACILITIES, EQUIPMENT AND SUPPLIES. The installation will provide limited office space, restroom facilities, telephone lines, facsimile equipment and access to a copy machine. The

contractor shall supply all other services, facilities, supplies and equipment necessary to complete this scope of work.

4. WORK PLANS AND HEALTH AND SAFETY PLAN. The contractor shall, as a deliverable item, prepare a Radiological Work Plan that details the proposed final status survey methodology. The contractor shall submit the Plan and receive approval by the IOC, Fort McClellan, the EPA, the NRC and the State of Alabama before the fieldwork begins. After completion of the field work and survey effort, the contractor shall prepare a Final Report, which is a deliverable item and considered complete once the IOC, Fort McClellan and the regulatory agencies have reviewed and accepted it.

4.1. Survey Plan. The contractor's Survey Plan shall address the safety procedures for on-site work, survey and sampling procedures and criteria, and the radiation protection procedures to minimize potential exposures. The Plan shall address the overall technical approach, sampling and analysis and Quality Assurance/Quality Control (QA/QC). The contractor shall follow the survey design guidance prescribed in MARSSIM, NUREG-1575.

4.1.1. MARSSIM Parameters.

a. Derived Concentration Guideline Values (DCGLs). For surfaces, the contractor shall use the residual surface contamination limits specified in "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Materials (NRC 1987)" as the DCGLs.

b. Decision Errors. The contractor shall assume Type I and Type II decision errors of 0.05 for the initial survey design. The values are subject to change after review by the NRC and other applicable regulatory agencies.

c. Sample Variability. Direct measurement frequency is directly related to the assumed final status survey sample variability. The contractor shall identify the proposed methodology for estimating sample variability and the plan for correcting the survey if the actual sample variability exceeds the assumed value.

d. Scan Minimal Detectable Concentration (MDC). The instrumentation scanning MDC may impact the sample frequency for the final status survey. The contractor shall prepare the survey work plan to include a discussion and the rationale for their scanning instrumentation selection.

e. Area Factors. The contractor survey design shall incorporate the MARSSIM area factor provisions for small-elevated areas of contamination that exceed the DCGL.

f. Area Classifications. We have defined the specific MARSSIM survey classifications in section 5 of this scope of work. If the contractor finds discrepancies with our assumptions during the actual survey work, they shall immediately notify the installation and IOC. We will then investigate the possibility of revising the area classification.

4.2. Health and Safety Plan. The contractor shall develop a Health and Safety Plan (HASP) specific to this project. Radiation protection standards of 10 CFR 20 and OSHA standards of 29 CFR 1910.120 apply for worker and public protection and shall be incorporated into the HASP. The contractor shall provide operational health physics procedures for all tasks to ensure personnel exposures, environmental releases and contamination are controlled to ALARA (as low as reasonable achievable).

4.2.1. The HASP shall address procedures to reduce hazards and protect workers. Existing site hazards include heavy equipment operations, noise hazards, and unstable building structures. Surveyors shall coordinate each day for access to survey areas, and will notify area supervisors of their actions. Contractor personnel shall use safety equipment such as goggles and hearing protection as appropriate. Examples of expected procedures are:

4.2.2. Prior to a new action occurring, the work is analyzed to determine what possible hazards, safety and radiation, might exist. Once done, procedures are implemented to reduce the risk of these hazards. A certified Health Physicist shall review these procedures.

4.2.3. All contractor personnel shall receive, as a minimum, a briefing on the hazards of the work area, the expected dose, and possible biological effects from receiving that exposure. All contractor personnel working in a restricted area shall wear personal monitoring devices.

4.2.4. The environment in all buildings and surrounding areas is expected to be very low dose rate, and the greatest danger from a radiation safety viewpoint is potential contamination. For most of the operations, only disposable anti-contamination clothing is required. For operations where a possible inhalation hazard exists, NIOSH approved respirators with HEPA filters will be used.

4.2.5. Control areas shall be established at the boundary to any area where the spread of contamination is possible. In addition, any material or equipment leaving the controlled area shall be monitored for contamination using appropriate instrumentation.

4.2.6. The contractor may encounter hazardous materials other than radioactive materials during the survey effort. These materials are likely to include as a minimum, lead based paint, PCB's (including that in light fixture ballasts), mercury (potentially in switches, controls and light tubes and fixtures)

and asbestos. The contractor shall identify procedures for the safe handling of such materials in the HASP.

4.3. QA/QC Plan. The contractor shall describe their proposed QA/QC procedures and protocols. All laboratory analysis shall conform to SW-846. If the contractor proposes to use an "in-house" laboratory for sample analysis then, as a minimum, 10% of the samples shall be duplicated and analyzed by an independent third party laboratory. The contractor shall verify instrument operation each day with a check source before use.

5. SITE SPECIFICS. The contractor shall develop and conduct radiological release surveys for the following 17 buildings and areas at Fort McClellan. The contractor shall design the survey protocol to bias sample locations towards areas with the greatest contamination potential (i.e., rough cracked surfaces, joints, corners, drain traps, change rooms, utility access points, etc.).

(1) Bldg 228. Status - Vacant. We have floor plans for this building. Built originally as a Quartermaster Maintenance Shop in 1936, the installation converted this building to a RADIAC calibration facility in 1978. In 1991, they converted it again for use by Explosive Ordnance personnel. The installation completely vacated the building in 1998. Real property records indicate the overall building dimensions are 69 ft x 123 ft, total square footage: 8,487. The contractor shall survey the NW corner of the South bay as a MARSSIM class III area. The radionuclides of concern are Pu-239 (AN/LJDM-6 calibrator), Ni-63 and Sr-90 (AN/UDM-2 calibrator).

(2) Building 256. Status - Active. We have floor plans for this building. Built in 1954, the Directorate of Logistics used this structure as warehouse. The radiological contamination potential comes from the fact that the installation historically used the building to store packaged, ready to ship Army radioactive commodities. Real property records indicate the dimensions are 300 ft x 80 ft with 40 ft 8 in x 18 ft 2 in offset, total square footage: 24,739. The contractor shall survey the building as a MARSSIM class III area. The primary radionuclides of concern are Ni-63, H-3, Ra-226, Am-241 and Ra-226.

(3) Building 257. Status - Active. We have floor plans for this building. Built in 1941, the Directorate of Logistics used the structure as a warehouse. The potential radiological contamination comes from the fact that the installation packaged Army radioactive commodities in preparation for transport in this building. Real property record describes dimensions as 60 ft x 170 ft. Total square footage: 10,200. The primary radionuclides of concern are Ni-63, H-3, Ra-226, Am-241 and Th-232.

(4) Building 303A. Status - Active. Built in 1942, it serves as the Central Issue Facility for all soldier items,

including radio-luminescent lensatic compasses. Real property records describe the building dimensions as 60 ft x 450 ft with 9 ft x 450 ft platform (dock). The total building footprint is 27,000 ft2. The contractor shall survey the front portion of the building (i.e., the portion of the building that houses the issue desk) as a MARSSIM class III area. The radionuclide of concern is H-3.

(5) Building 335. Status - Active. No floor plans exist for this building. Built in 1941, the installation used the structure as a General Support vehicle maintenance shop. The Alabama National Guard currently uses the structure as a storage building. Real property records indicate dimensions of 67 ft x 92 ft with 28 ft 6 in x 27 ft wing. Total square footage: 6,933. The contractor shall survey the building as a MARSSIM class III area. The radionuclide of concern is Ra-226.

(6) Building 337. Status - Active. No floor plans exist for this building. Built in 1941, the site used this building as a General Support vehicle maintenance shop. The Alabama National Guard currently uses the structure as a storage building. Real property record describes dimensions of 40 ft x 241 ft. Total square footage: 9,640. The contractor shall survey the building as a MARSSIM class III area. The radionuclide of concern is Ra-226.

(7) Building 338. Status - Active. No floor plans exist for this building. Built in 1941, the site used this building as a General Support vehicle maintenance shop. The Directorate of Community Activities currently uses the building as the Ft McClellan Recycle Center. Real property records describe dimensions of 76 ft x 240 ft. Total square footage: 18,240. The contractor shall survey the building as a MARSSIM class III area. The radionuclide of concern is Ra-226.

(8) Building 339. Status - Inactive. No floor plans exist for this building. Built in 1943, the installation initially used this building as a General Support vehicle maintenance shop. The building is derelict, falling down on one side. Real property records list dimensions of 56 ft x 140 ft with 20 ft x 135 ft wings. Total square footage: 10,540. The contractor shall survey the building as a MARSSIM class III area. The radionuclide of concern is Ra-226.

(9) Building 341. Status - Active. Will check for availability of floor plans. Picked up as "Found On Post" in 1977. This was originally a general storehouse used by the Defense Reutilization and Marketing Organization (DRMO). The Directorate of Environment currently uses it as a Hazardous Waste accumulation point. Total square footage is 4,040 ft2. The contractor shall survey the building as a MARSSIM class II area. The primary radionuclides of concern are H-3 and Ra-226.

(10) Building 345. Status - Active. Will check for availability of floor plans. Built in 1977, DRMO used this structure as a general storage building. The Directorate of Environment currently uses the building for storage. Dimensions are unavailable, but records indicate the total square footage is 4,040. The contractor shall survey the building as a MARSSIM class II area. The primary radionuclides of concern are H-3 and Ra-226.

(11) Building 350. Status - Active. We have floor plans for this building. The installation built the structure 1991. Ft. McClellan designed it as General/Direct Support Maintenance shop. Direct Support Maintenance uses two bays for wipe testing/routine maintenance of M43A1 detectors and CAMs. The square footage for entire building is 87,832 ft2. The contractor shall survey the maintenance areas of the building as a MARSSIM class III area. The primary radionuclides of concern are Ra-226, Ni-63 and Am-241.

(12) Building 812-1/2. Status - Inactive. This is a very small (approximately 5' x 5' x 5') concrete structure that the installation used at one time as a storage vault for radium gauges. The contractor shall survey the building as a MARSSIM class III area. The primary radionuclide of concern is Ra-226.

(13) Building 3181, rooms 35 and 36. Status - Inactive. Floor plans are available. The installation used rooms in question as a radiological laboratory. Another Army agency allegedly surveyed the rooms several months ago, but cannot locate the survey data. The contractor shall survey the building as a MARSSIM class II area. The primary radionuclides of concern are Co-60, Mn-54, Cs-137, Au-198, Na-22, Ni-63 and P-32.

(14) Building 3182. Status - Active. Will check for availability of floor plans. Built in 1954 originally as an Applied Instruction Building, the Ft. McClellan Radiological Laboratories used one wing in conjunction with the "Hot Cell" facility. The building currently serves as the Military Police Corps museum. Total square footage is 11,696 ft2. The contractor shall survey the building as a MARSSIM class III area. The primary radionuclides of concern are H-3 and Ra-226.

(15) Building 4416. Status - Active. This is an ammunition magazine currently used to store chemical munitions. Contractor will need special permission to enter this facility. Property records indicate the building dimensions are 11 ft x 24 ft. At one time the installation used this structure to temporarily house sealed Co-60 and Cs-137 sources. The contractor shall survey the building as a MARSSIM class III area. The primary radionuclides of concern are Co-60 and Cs-137.

(16) Bromine Field. Status - Parking lot. Ft. McClellan used a portion of the parking lot near building 3195 and the field adjacent to the parking lot as a decontamination training

area. Several years ago, the site would contaminate Army equipment with Br-77 (2.4 day half-life) so personnel could practice decontamination procedures. The contractor shall research the history of this operation, collect a very limited amount of survey data and provide a written discussion of the findings in the final report.

(17) Alpha Field. Status - Parking lot. Ft. McClellan used a portion of the parking lot near building 3195 to simulate a radiation field. The site placed uranium-233 plates on the ground for training purposes. The contractor shall research the history of this operation, collect a limited amount of survey data and provide a written discussion of the findings in the final report.

6. SCHEDULE. We expect the installation to vacate the majority of the active structures by the end of September 1999. In some instances new tenants are ready to move in as soon as the Ft. McClellan activities cease. Therefore, the release survey timing on some structures is critical. The contractor shall make up to four separate mobilizations to Ft. McClellan to release portions of the building inventory listing. The contractor shall respond to survey scheduling changes with as little as a 5 working day notification.

7. PERSONNEL. The contractor shall propose a project manager with a minimum of 3-years experience in conducting environmental remediation/restoration efforts, primarily with radioactive material.

7.1. The contractor shall provide resumes of technical personnel with the project proposal.

7.2. On-site personnel must have the training mandated by 29 CFR 1910.120 (40 hours plus 3 days on-site experience). Supervisors shall have 8 hours of additional supervisory training. The contractor shall provide written evidence of current Occupational Safety and Health Administration training for each person performing work and a Corporate certification that each person is medically capable of working on a hazardous waste site.

7.3. Contractor personnel shall receive and document a briefing on the hazards of the work area, the expected dose, and possible biological effects from receiving that exposure.

8. FINAL REPORT. The contractor shall provide as a deliverable item 6 hard copies of a draft final report within 30 days after completion of the on site activities. The contractor shall incorporate Army and regulator comments within 30 days of receipt.

8.1. The contractor shall provide as a deliverable item 7 hard copies and 2 compact disc (CD) copies of a comprehensive final report detailing all radiological release surveys. The final

report for the Ft. McClellan commodity sites shall detail the survey procedures, instrumentation used, findings, results, suggestions, and QA/QC practices and documentation. The report shall address, in detail, the methodology used for the detection, removal, and packaging of any radioactive contamination recovered as a result of the effort. The report shall address residual radioactive contamination that was not remediated during the survey effort, as well as hazardous materials and/or wastes identified during the on-site effort.

8.2. The report shall address the contractor's Quality Assurance program, including calibration dates and certificates and details (including records) on how they calibrated and field checked portable instruments.

8.3. The contractor shall describe (in terms of MARSSIM, NUREG-1575 requirements) the final survey design and how the results meet the MARSSIM statistical tests.

8.4. The contractor-prepared plans and reports developed under this effort will become the property of the U.S. Army. The Army reserves the right to distribute the documents without restriction.

8.5. The contractor shall coordinate final report activities with Mr. Styvaert.

9. REFERENCES.

a. NUREG-1575, Multi-Agency Radiation Survey and Site Investigation Manual, MARSSIM, December 1997.

b. NUREG-1500, Working Draft Regulatory Guide on Release Criteria for Decommissioning: NRC Staff s Draft for Comment.

c. Memorandum, Subject: DA-Wide Policy on Radiological Surveys at BRAC Commodity Sites, dated January 20, 1998.

CLASS I OZONE DEPLETING CHEMICALS (ODC)

T I

A technical evaluation of the Procurement Request (PR) **Ft. McClellan, Commodity Site Surveys, USA 99-100**
(Description of Supply or Service)
was performed on **7/16/99** and I do hereby state to the contracting officer that to the best of my knowledge and belief:

_____1. The above referenced procurement request is for a commercial item. Therefore, no review for ODC was performed.

X 2. Based on a comparison of the specifications and standards contained in this PR and the DOD list of military specifications and standards that call out the use of ozone depleting chemicals (ODC), I have found no specifications or standards that require the use of a class I ozone depleting chemical (ODC) or a requirement for the use of such a substance or that can be met only through use of such a substance.

_____3. Replacement substances or alternate technologies have been incorporated where applicable; therefore, this PR no longer contains any class I ODC or contractual requirements that can be met only by use of such a substance. These changes have been identified to the contracting officer in writing for inclusion in the solicitation Section C or the purchase description as changes to the appropriate technical documents. If this action is a modification or extension to an existing contract awarded before 1 June 1993 and meets the ODC review criteria, the ODC substitutes or alternate technology will result in an estimated ODC avoidance of _____ pounds. (List pounds saved for each substitute used in modifications to existing contracts awarded before 1 June 1993.)

_____4. This PR contains the following specification or standard that require the use of class I ODC or requirements that can only be met by use of a substance:

List of ODC Requirement(s) Estimated Pounds of ODC

_____

Signature **//signed//**
Name **Michael S. Styvaert**
(Technical Evaluator/Reviewer)
Organization **HQ, IOC; AMSIO-SF**
Date **7/16/99**

(If block 4 is checked, the approval pursuant to Section 326, Public Law 102-484, is provided below.)

I hereby certify to the approving official that a suitable substitute or alternative technology for the class I ODS is not currently available.

Name_____
(Approved Technical Representative)
Organization_____
Date_____

U.S. Army Fort McClellan
Fort McClellan, Alabama
HQ, IOC Project Number USA 99-100

Release Survey of Ft. McClellan Commodity Storage Sites

HEALTH AND SAFETY PLAN

Prepared by:

Allied Technology Group, Inc.
669 Emory Valley Road
Oak Ridge, TN 37830

October 1999

U.S. ARMY FORT McCLELLAN

RELEASE SURVEY FOR COMMODITY STORAGE SITES

PROJECT HEALTH AND SAFETY PLAN

APPROVAL PAGE

October 1999

Concurrence: _____ Date: _____
Lee A. Young, ATG Project Manager

Concurrence: _____ Date: _____
Frank Whitaker, Project Lead

Concurrence: _____ Date: _____
Joel Cehn, CHP, ATG Corporate Radiation Safety Officer

Concurrence: _____ Date: _____
John W. May, U.S. Army Chemical School Radiation Protection Officer

Concurrence: _____ Date: _____
Mike Styvaert, IOC Health Physicist

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1.0 INTRODUCTION

The Project Health and Safety Plan incorporates the health and safety procedures and practices to be followed during the activities specified in the Fort McClellan'Commodity Storage Sites' Sampling and Analysis Plan (SAP). This Project Health and Safety Plan will be used to support the work activities and will be verified with the guidelines specified in the Allied Technology Group, Inc. (ATG) Corporate Health and Safety Plan. This Project Health and Safety Plan includes radiological, industrial, environmental, and biological health and safety concerns and considerations.

The radiological surveys of the 'Commodity Sites' at Fort McClellan are to be performed by ATG under contract number DAAA09-98-C-0039 Modification number P00003; internally tracked as ATG project number 10036.02.

2.0 SCOPE OF WORK

The fifteen (15) buildings and two (2) outdoor sites which comprise the 'Commodity Storage Sites' at Fort McClellan near Anniston, Alabama will be radiologically surveyed by ATG personnel following the guidelines specified in the project-specific Sampling and Analysis Plan. The verification surveys are to achieve unconditional release using the protocols of the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM, NUREG-1575) for the historical general license use areas.

No adverse impacts are expected during the performance of this contract. There will be no expected air emissions, liquid releases, personnel exposures or environmental impacts during the Class 2 and 3 area surveys. The work tasks will be performed by trained and qualified personnel. Project oversight and monitoring will additionally be performed by trained and qualified personnel in accordance with the Health and Safety Plan procedures.

3.0 HAZARD ASSESSMENT

Hazard assessment will be evaluated in eight categories; radiological hazards, industrial hazards, environmental hazards, bloodborne pathogens, lead hazards, polychlorinated biphenyls (PCBs), asbestos and mercury hazards. Appropriate personnal protective equipment, monitoring devices and data acquisition will be applied for existing potential and actual hazards.

3.1 Radiological Hazards

It is expected that an individual performing work on this project will receive an external occupational exposure of less than 10 millirem (mRem), which is the sensitivity limit of the TLD vendor. Existant conditions yield essentially

'background' radiation levels, and only a rule-out of elevated surface contamination is anticipated. However, the suspected potentially present radionuclides of concern in the buildings are Pu-239, Ni-63, Sr-90, H-3, Ra-226, Am-241, Th-232, Co-60, Mn-54, Cs-137, Au-198, Na-22, and P-32. The ATG crew is entirely comprised of appropriately trained and qualified health physics technicians, and both corporate and project oversight is provided by Certified Health Physicists. There is little potential for loose contamination, if it exists, to be suspended by project activities such that airborne contamination attributes to an internal dose concern. Project tasks entail surveying into facilities for discernment of the gross radiological characterization, and the structures/areas will be otherwise uninhabited by base occupants during the surveys.

In the event that residual contamination is found to warrant area re-classification up to and including ultimate decontamination and subsequent verification surveys, the airborne concentration will be maintained below the the acceptable airborne concentration limit of 10% of DAC for the isotope of interest or respiratory protection will be worn in order to ensure that there will not be an internal radiological hazard.

Additional exposure to radiation will come from the reference sources used in performance tests of the radiation detection equipment and from the samples taken to assess the potential hazards. The reference sources will be used by the radiation protection technicians and will be maintained in a labeled and locked container. Samples taken to monitor the potential hazards will be sealed and handled appropriately and in as short amount of time as possible. The radiation protection technicians will screen and package the samples employing the appropriate precautions to prohibit personal cross-contamination and limit external exposure.

3.2 Industrial Hazards

Industrial hazards for this project should be limited to mechanical failures, possible heavy loads (moving residual materials to access survey areas), suspended loads, physical stress (climbing, lifting, reaching) and extreme temperature exposure. Lifting, suspending, moving and packaging of materials could cause wear and tear on the equipment or fatigue to the workers. Mechanical failure will be reduced by using equipment in near new condition and not over-loading the equipment. Equipment will be visually inspected prior to each use to reduce the potential for failure. Personnel safety equipment shall be required for field work on this project. Safety shoes, hard hats, and safety glasses will be required for personnel at the discretion of the Project Manager or designated alternate.

Physical stress could occur if an individual tries to lift items that are too heavy or

oversized. Individual lifting limits will be 50 lbs. Items that are odd shaped or bulky will be lifted by more than one individual or by a mechanical means.

Accidents will be handled on a case by case basis and will be evaluated by theProject Manager or designated alternate to determine if preventive measures can be applied to preclude the accident from recurring.

Complications from high temperature exposure, such as heat stress, will be handled with medical treatment as deemed necessary by the Project Manager or designated alternate. The timing of the project reduces the concern for heat stress and raises the alternative cold weather issue to some extent. Under either cold or high temperature scenarios, the first round of treatment is prevention through appropriate training, monitoring, and regimented practices.

3.3 Environmental Hazards

Hazards from the environment could most likely occur from abnormal weather, an accident or from carelessness while performing the work tasks. Controlling the amount of unsealed material, at any given time, will reduce the extent of an environmental impact. Affected materials, as suspected prior to screening and as verified by subsequent radiological monitoring, will be addressed as soon as practical. Immediate project action regarding discovered elevated surface contamination will include prominant posting and notification of site (base) and client (IOC) representatives.

Other environmental hazards which may be encountered and for which precautions should be extended for avoidance in the static areas may be lighting constraints, insects (bees, ticks, spiders), snakes, rodent and bird infestation and/or droppings, high wind and precipitation.

3.4 Bloodborne Pathogens

Bloodborne pathogens are micro-organisms in human blood that can cause disease. Although health care workers have long worked with the threat of exposure to bloodborne pathogens, exposure was viewed in a different light once AIDS was recognized.

Because the virus that causes AIDS is said to always be fatal, there has been increased concern about bloodborne pathogens in the last 15 years. AIDS, however, is not the only source of concern; other diseases caused by micro-organisms include malaria, syphilis and hepatitis-B virus (HBV).

The purpose of this plan is to establish requirements with the intent to protect those employees who have a significant potential of exposure to Bloodborne Pathogens which may cause such disease as Human Immunodeficiency Virus and Hepatitis-B Virus. Principally at risk are those designated to be first-aid providers/first-responders. Specific information is found in section 4.2.6.

3.5 Lead

Lead-based paint is expected to be present or an issue of concern at the project site. Either chipping paint or lead-based paint material having already fallen to the ground due to deterioration of a facility and lack of upkeep may be prevelant. Proper PPE and training guidelines will be followed in accordance with 29 CFR 1926.62. These areas will be avoided by all employees if at all possible. As applicable to the scope of the survey effort, identification of the potential for the presence of lead and avoidance (PPE or literal occupancy) is the matter of course.

3.6 Polychlorinated Biphenyls (PCBs)

It is possible that PCBs could be encountered during work activities on this project (i.e. light fixture ballasts). Should this be the case, the PCB containing materials will be handled, if necessary, with radiological controls in place. Proper PPE and training will be performed in accordance with the guidelines set forth in 40 CFR 761, 40 CFR 302, 40 CFR 116, and 40 CFR 117. These items will be avoided by all employees under routine project tasking.

3.7 Asbestos

Asbestos could be encountered during work activities on this project. Proper PPE and training guidelines will be followed in accordance to 29 CFR 1101, 40 CFR 61, and 40 CFR 763. Proper precautions will be taken to prevent any airborne releases. Suspected Asbestos Containing Material (ACM) will be covered, if necessary, and avoided by all employees.

3.8 Mercury

Mercury is potentially a concern at the site and may be present in such items as switches, controls and light tubes, and fixtures. Proper PPE and training guidelines will be followed in accordance with 29 CFR 1910.95 and 29 CFR 1910.252. Proper precautions will be taken to prevent any release to the workers or to members of the public. These materials will be covered if necessary and avoided by all employees.

4.0 WORKER PROTECTION

4.1 Personnel Protection

The field work on the surveying of the 'Commodity Storage Sites' involves the hazards typically present during radiation work, in addition to the dynamic conditions from unstable building structures . In general, ATG work procedures are in effect for safety of our workers and others. However, the following points are to be emphasized.

4.1.1 Contamination Control

ATG will conduct all work activities with radiological controls in place, using qualified and appropriately trained personnel. Proper PPE will be worn when entering the controlled areas and will be discarded appropriately upon exiting. The activity on this project does not represent a significant hazard but should not be allowed to be distributed outside of the controlled area in order to maintain doses to personnel ALARA.

4.1.2 Industrial Safety

Industrial safety is an important consideration on this job. There are several existing hazards that are of concern on this job site. These hazards include heavy equipment operations, noise hazards, and unstable building structures.

4.1.2.1 Heavy equipment operations exist throughout the site. All personnel will receive a pre-job briefing on all existing job-site hazards. Personnel will be made aware of areas in which heavy machinery is being used. The buddy system will be employed on this contract, thus providing a spotter for each other. Personnel will notify the operator(s) if they are to be performing work in proximity where equipment operations are taking place.

4.1.2.2 Noise hazards are a concern with the work being performed on site. Existing conditions in the area will be monitored and noise-suppression will be used if necessary. If noise levels in the work area reach or exceed 85 dBA, hearing protection will be required. The hearing protection provided must be able to lower noise levels below 85dBA when worn.

4.1.2.3 Unstable building structures are a concern with some of the buildings on-site. A pre-job briefing will be performed with all the

employees before work begins to highten their awareness concerning these areas. If possible, these areas will be barricaded off to prevent any unauthorized access.

4.1.2.4 All personnel will be required to wear safety glasses, steel toe shoes, and hard hats while in any work area during operations. These requirements may be altered at the discretion of the Project Manager or designee.

4.1.3 Procedures

4.1.3.1 Site Control

The work site will be clearly marked and access will be limited to ATG personnel and authorized visitors. Walkways and paths will be rerouted as necessary to limit access to the area. Postings will be in place to notify people of restricted access, hazards associated, and PPE required.

4.1.3.2 Confined Space Entry

A confined space is any space that has a limited means of egress and is subject to an accumulation of toxic or flammable contaminants or has an oxygen-deficient atmosphere. Confined spaces include, but are not limited to, storage tanks, process vessels, bins, boilers, ventilation, or exhaust ducts, sewers, underground utility vaults, tunnels, pipelines, and open-top spaces more than four feet in depth such as pits, tubs, vaults, and vessels.

A confined space will not be entered until atmospheric conditions are monitored and the area is verified safe. A valid "Confined Space Entry Permit" must be posted, reviewed, and in effect prior to entry. Fuel operated equipment will not be used in or near the opening or air intake for a confined space due to the potential for carbon monoxide build up. Confined space blowers will be used if necessary to ventilate the area and refresh the air. All entrants and spotters must review the rescue procedures before entry. All personnel entering the confined space must wear a safety harness with a secured lifeline in the event they need to be pulled out of the area.

A spotter will remain in continuous visual and voice contact with

personnel in the confined space. The spotter must account for all entrants and will not leave the post unless relieved by a competent person. The area will be continuously monitored while personnel are in the confined space due to the potential of changing atmospheric conditions.

4.1.3.3 Hazardous Energy Control

All personnel that work on or near energy sources should have completed and documented Site Training which covered this subject. Danger tags are used only to prevent operation of a switch, valve, or piece of equipment in cases where someone may get hurt or equipment may be damaged. Lockout/Tagout procedures will be used to prevent energy sources from becoming energized while personnel or equipment are in the area. The personnel working in the hazardous energy area must personally lock and tag the energy source out. A signed and dated tag will be placed on the system after it is locked out.

The system must be tested after locking to ensure it is de-energized prior to starting work. Prior approval must be obtained before de-energizing a system. Only the person that placed the lockout/tagout on a system can remove it and only after all personnel are clear from the work area. All personnel that are working in the area must have their own lockout / tagout in place on the system. Personnel cannot remove a lockout/tagout that was put in place by someone else. Once a tag is removed it must be destroyed and a new one used each time a system is locked out.

All electrical components will be treated as if they are energized regardless if lockout/tagout procedures are in place. Personal protective equipment will be inspected and worn when working on energy systems. Test equipment will be used to ensure systems are de-energized. Grounding equipment will be applied after the system has been de-energized. Caution must be used when removing enclosure covers, panels, or opening doors to expose electrical systems.

Work on or near electrical circuits will only be performed by qualified personnel who have been authorized to do the work.

Non-metal frame safety glasses are required when performing

electrical work. Other conductive items such as metal hard hats, rings, watches, necklaces, earrings, etc. will not be worn when working on or near electrical systems. Electrical rated rubber gloves must be inspected for cracks, punctures, tears, etc. prior to wearing them.

Hand tools and power tools rated and insulated for electrical work will be used on or near power sources. Drills and penetrating equipment must be grounded so that accidental contact with an unexpected energized electrical source will be cleared quickly by the circuit protective device. Double insulated equipment cannot be relied on to provide protection when accidental contact is made with energized circuits.

4.1.3.4 Tools

Equipment and tools will be used for their specific design and not rigged for purposes other than those specified by the manufacturer. Tools will not be used beyond their designed capacity. Tools will be inspected prior to each use. Damaged or worn tools will not be used and will be taken out of service. Tools taken out of service will be marked with a "Do Not Use" tag or sticker until they can be properly disposed of or repaired. Tool subject to impact will be dressed to prevent flying steel fragments. Tools cannot be brought into or out of a radiological area without prior approval from a health physics technician.

4.1.3.5 Ladders

Ladders will be inspected prior to each use. Ladders will not be painted except to be marked with an identifier. If ladders must be placed in a doorway, the door will be barricaded and warning signs will be posted. If the doorway is a marked exit, then the door cannot be barricaded and a spotter must be used. A hand line will be used to raise or lower tools or materials so personnel do not carry anything in their hands when ascending or descending a ladder. The ladder position will be changed as often as necessary to prevent excessive leaning or stretching on a ladder. When working from a ladder, both feet will be kept on the rungs and the person will be facing the ladder. If it is necessary to work backwards from a ladder, then the person must wear a safety belt and be tied off to a secure area and not to the ladder. Only one person is allowed on a ladder

at one time unless "two-man" stepladders are being used. Metal ladders will not be used for electric welding or near any electrical lines or services. Ladders may be used on scaffolds only if secured and the user is tied off with a safety belt. If a ladder must be built to use on-site, it must conform with established OSHA standards and be approved by the Health and Safety Representative or designated alternate. Areas around the top and base of the ladder must be cleared of tripping hazards. Ladders will not be placed against moving objects. Broken or damaged ladders will not be used. Ladders to be repaired must be tagged out and taken out of service. Step off distance from ladders must not exceed one foot.

4.1.3.6 Straight and Extension Ladders

Straight and extension ladders must be placed using a 4:1 ratio (for every 4 feet in height from the ground to the point of contact on the supporting surface, the ladder base must be placed 1 foot away from the supporting surface). Ladders must extend at least 3 feet beyond the supporting object. The ladder must have non-skid safety feet and be secured. When the extension ladder is raised to the desired height, the safety dogs or latches must be engaged and the extension rope secured to a rung on the base section of the ladder. Extension ladders must overlap a minimum of three rungs.

4.1.3.7 Stepladders

Stepladders must have all four feet on a level surface. The spreaders must be locked in place. Stepladders will not be used as a straight ladder. Tools or materials will not be placed on steps or the platform. The maximum height for stepladders without a safety platform is 12 feet and with a safety platform is 16 feet. If a ladder is over eight feet in height, it will be tied off.

4.1.3.8 Weather Conditions

The weather conditions may include possible thundershowers during the anticipated work schedule. If the potential for lightening is present, work will be stopped and personnel will move to a safe sheltered area until weather conditions improve. Any other severe or adverse weather conditions may require work to be stopped and personnel to move to a sheltered area.

4.1.3.9 Inadequate Lighting

Work performed on-site must have adequate lighting. If daylight does not provide the adequate 5-foot candle requirement (29 CFR 1910.120) then artificial light must be provided or all work must stop in time for personnel to exit the area during adequate daylight.

4.1.3.10 Good Housekeeping

Personnel will be expected to maintain good housekeeping within and around the work site. Materials or equipment that could be potential trip hazards will be moved out of walkways. Uneven walkways will be cleared or have restricted access. Materials will not be stacked in such a way that they may fall on personnel or equipment. Open pits will be roped off and labeled to prevent falls.

4.1.3.11 Electrical

Only power sources rated to handle the load required for equipment on-site will be used. Power sources will be required to have ground fault circuit interrupters unless the equipment has built in ground faults. Ground faults will be tested daily prior to using electrical equipment. Electrical equipment, plugs, and extension cords will be used and stored away from water sources. Electrical equipment that is not properly grounded, damaged, insulated, or have exposed wiring will be taken out of service and marked "Do Not Use". Extension cords with frays, exposed wire, damaged or missing prongs, or not insulated will be taken out of service and marked "Do Not Use". Electrical equipment cords and extension cords can not be taped to cover damaged areas or for any other reasons. Metal or conductive ladders will not be used near energized electrical lines or equipment.

4.1.3.12 Dust

Work operations will be designed as to generate little or no dust. Airborne concentrations will be monitored. Personnel will wear the proper PPE in accordance with RWP requirements if dust is generated.

4.1.3.13 Noise

Heavy equipment used on-site may generate elevated noise levels and will require hearing protection. Noise levels will be monitored and noise-suppression will be used when possible. If noise levels reach or exceed 85 dBA, hearing protection will be required and the area should be posted "Hearing Protection Required". The hearing protection provided must be able to lower noise levels below 85 dBA when worn.

4.1.3.14 Motor Vehicles

ATG personnel will abide by all traffic laws on base as well as pedestrian right-of-ways. Speed limits will be adhered to and seat belts will be worn by all passengers in the vehicle. Drivers will have a current drivers license and will not drive under the influence of drugs or alcohol. Special precautions will be taken in the event that road conditions become hazardous.

4.1.3.15 Hazardous Material Storage

No more than 10 gallons of flammable/combustible materials will be stored on-site unless these materials are stored in an approved flammable storage cabinet or tank. Chemicals stored together must be compatible. Containers must be stored in an area that has limited traffic and little chance for containers to be broken, toppled, or spilled. A spill kit will be kept on-site in the unlikely event that a spill were to occur. Appropriate personnel at Fort McClellan will be notified immediately in the event of a spill. Containers should be placed in a designated posted area. The storage area should be diked if possible. The fire department must be aware of where the storage area is located and what it contains. Flammable and/or combustible materials must be stored away from ignition sources. All containers must be properly labeled and an MSDS must be on-site for the material. Gas cylinders must be secured in an upright position with a cap over the valve when not in use.

4.1.3.16 Fire Awareness

Fire extinguishers will be on-site in a designated area readily accessible to personnel. Combination ABC fire extinguishers will be provided and inspected by a qualified person on a monthly basis or as needed. Personnel will be trained in the proper use of a fire extinguisher. Exits will be clearly marked to the containment tent in the event of a fire. Directional arrows will be placed around the lower portion of the tent to guide personnel to the closest exit. The fire department will be notified immediately in the event of a fire.

4.1.3.17 First Aid

A first aid kit will be on-site in a designated area clearly identified by a "First Aid" sign. The first aid kit will be readily accessible to personnel and visitors to the site. A minimum of two personnel trained in first aid/CPR will be present at the site at all times work is being performed.

4.1.4 Respiratory Protection

Respiratory protection may be required during certain operations. All personnel assigned respiratory protection must be medically qualified, trained on the use of the equipment, and when appropriate, have qualitative fit testing. All personnel in respirators must be clean shaven. All respirators must be cleaned and checked daily. Engineering practices may be employed to reduce airborne contamination. Respiratory protection will be mandated for area workers when the concentration of airborne contamination is found to $\geq$ 10% of the DAC for the specific isotope of interest.

4.1.5 Personnel Dose

The commodity site areas typically have no history of the use/handling of loose radioactive materials. Direct surface measurements will be obtained for comparison with background radiation levels in close proximity. Any finding of significant contamination will require re-classification of the area and deferred actions. External dosimetry is not required by regulation. However, as a conservative measure, ATG will require dosimetry for all project personnel.

4.1.6 Radiation Work Permit

The routine verification surveys to be performed of the commodity sites DO NOT warrant the adoption of an RWP. Should widespread elevated contamination be discovered, area re-classification will be planned and subsequent action which involves the increased potential for personal exposures will require implementation under a completed RWP.

Should site conditions and an expanded contractual scope of work issuance of a Radiation Work Permit (RWP), all personnel working at the Fort McClellan project will be assigned to a specific Radiation Work Permit, (ATGF-002 - Previously ATG Form 113), applicable to the job being performed (see note in section 4.1.6). A Radiation Work Permit Sign In Sheet (ATGF-023) will be attached to each Radiation Work Permit if deemed necessary by the Project Manager or designee. All personnel assigned to a job, requiring a Radiation Work Permit, shall sign the RWP Sign In Sheet.

4.1.7 ALARA (As Low As Reasonably Achievable)

It is the intent of all radiological work practices that the efforts performed will be done in such a manner as to subject the individual to the lowest possible dose. Practices that will ensure these are compliant to the project Sampling and Analysis Plan, Health and Safety Plan, and Quality Assurance Plan. Also, activities will be in compliance to procedural practices detailed in ATG Field Procedure, AD-004, 'Administrative/Regulatory/ALARA Compliance - Policy and Procedure' and ATG Field Procedures. All radiological work activities will be performed under radiation work permits (see note in section 4.1.6). Morning 'tailgate meetings' will be held to discuss safety issues and brief all personnel on the daily scheduled work activities and the performance of assigned tasks. These tailgate meetings will be documented and signed by all individuals in attendance on ATG Form ATGF-027, 'Daily Training Record'. All equipment will be tested before being used in the field. All individuals involved in the performance of the work have 'stop work authority'. If for any reason a job is not being performed safely or correctly, the job may be stopped and management notified until the situation may be remedied.

4.2 Personnel Monitoring

Occupational exposure will be continually monitored for all personnel on this ATG project. Personnel monitoring for this project will be supplied by Allied Technology Group using the following procedure.

4.2.1 Occupational Exposure Guides

Allied Technology Group Administrative Control Levels per calendar year;

4.2.1.1	Whole Body	1.0 Rem
4.2.1.2	Extremities	5.0 Rem
4.2.1.3	Skin	5.0 Rem

The ATG Corporate Health Physicist shall approve any authorization for exposure above the annual control levels. This approval will only be given if the dose is necessary and shown to maintain collective dose on the project ALARA.

4.2.2 Site Registration Form

All personnel assigned to work on the project must complete a Site Registration Form, ATG Form 109, prior to starting work. Completed Site Registration Forms will be retained with the personnel exposure files.

4.2.3 Occupational Radiation Exposure History

Before an individual will be permitted to work in a controlled area, a U.S. Nuclear Regulatory Commission Form 4 must be completed and reviewed by the Project Manager or designee.. Exposure results shall be listed on the NRC Form 4.

An Occupational Radiation Exposure History Letter, (ATGF Form 047) will be completed for all personnel assigned to the job. Copies of this letter are sent to the individual and the Allied Technology Group office in Oak Ridge, TN., within 30 days of obtaining the monitoring results.

4.2.4 Thermoluminecent Dosimetry

TLDs shall be the permanent record of an individual's occupational radiation exposure. The TLDs used by Allied Technology Group are supplied and

evaluated by a NVLAP approved vendor. All personnel assigned to the project will be issued a TLD for the job or on a monthly basis as the work requires.

The individual's name, social security number, issue date, and a date of return are to be recorded on the TLD Issue Log, (ATG Form 111a). In the event of a lost TLD, immediate notification to the Project Manager or designee. is required. A Lost TLD Report (ATG Form 111), will be completed and filed in the individual's exposure file. TLD results will be documented. The NRC Form 4 will be updated when the TLD results are received and will be maintained in the individual's exposure file.

4.2.5 Bioassays

Routine bioassay sampling and analysis is not required for the base survey activities, unless elevated contamination is found AND subsequent action is contractually committed. In which case, entry bioassay samples will be collected to provide a baseline, and exit bioassay samples will be submitted at project completion. The samples (urine) will be analyzed per third party gamma spectroscopy to determine the extent of uptake and to calculate the attributing dose, if any, as warranted. Dependant upon the discrete work areas involved and the identity of suspected radioisotopes relevant to the location, additional analytical parameters may be required.

4.2.6 Bloodborne Pathogens

The purpose of this notice is to establish requirements with the intent to protect those employees who have a significant potential of exposure to Bloodborne Pathogens which may cause such disease's as Human Immunodeficiency Virus and Hepatitis-B Virus.

Key Definitions:

Bloodborne Pathogens: Micro-organisms present in human blood that can cause disease in humans include, but are not limited to, Hepatitis-B virus (HBV) and Human Immunodeficiency Virus (HIV).

Exposure Incidents: A specific eye, mouth, other mucous membrane, non-intact skin or penetrable contact with blood or other potentially infectious materials that results from performing required tasks.

Occupational Exposure: A reasonably anticipated skin, eye, mucous

membrane or other penetrable contact with blood or other potentially infectious material that might result from performing required tasks.

Penetrable Contact: A piercing of mucous membranes or the skin barrier by means of a needle stick, human bite, cut and/or abrasion.

Potentially Infectious Materials: Materials that might be present in a first-aid emergency, including blood, vomit, urine or other body fluids.

4.2.7 ATG Field Project Potential

ATG has conducted a thorough evaluation of the processes and tasks which are performed in relation to Contractual Field Projects and has determined the potential for employee exposure to be minimal. However, because of the potential for accidents and injuries resulting in the possible contact of body fluids, ATG shall require additional training. Although the likelihood of accidental exposure is minimal, the following information shall be discussed with assigned site personnel prior to work activity.

4.2.8 The following is the ATG policy for field operations.

Training: All ATG personnel who receive Basic First-Aid training and are designated as Emergency Medical Response personnel shall receive additional training in Occupational Bloodborne Pathogen awareness.

Vaccinations: All ATG personnel trained in Basic First-Aid shall be offered the Hepatitis-B series of inoculations at no cost to the individual. This shall be offered on a voluntary basis and because the risk is minimal and First-Aid treatment of others is voluntary, no statement of refusal of the vaccine shall be required. All ATG personnel who are designated and certified as Emergency Medical Technicians shall be required to receive the Hepatitis-B inoculations. This shall be at no cost to the individual.

Handling of Sharps: All ATG personnel who handle materials containing sharps shall be required to wear puncture resistant gloves. Any injuries received while working with such materials shall be reported to their immediate supervisor. In addition, personnel exposed to blood or other body fluids while aiding an injured individual, no matter how minor, shall report to their immediate supervisor. The supervisor shall then promptly log and report the incident to the Project Manager.

Protective Equipment: Protective Equipment such as gloves, masks and

respiratory barriers are provided in each first-aid kit. All personnel responding to a first-aid situation in which there is a potential for exposure to blood or other body fluids are expected to use these devices for protection of both themselves and the personnel they are aiding.

4.3 Training

Individuals assigned to this project will be trained and qualified radiation workers. Training records will be supplied as part of the Project Quality Assurance Plan. Training specific to the project will be performed prior to the start of work by the Project Lead Investigator and recorded on the Training Record, (ATGF Form 027 - Previous ATG Form 102). Requirements of the Project Decommissioning Plan, Project Quality Assurance Plan and the Project Health and Safety Plan will be covered in the on-site training.

4.4 Decontamination

Contamination control barriers will be established and personal protective equipment will be required to minimize the potential for areas or personnel to become contaminated. In the event that personnel contamination is detected, the following procedure will be used to remove or contain the contamination.

4.4.1 Explanation

This section is a follow-up to ATG Field Procedure, HP-OP-0 1 3, Personnel Decontamination which describes how a radiation worker detects personal contamination. Once detected, this procedure will explain where and how to decontaminate to acceptable levels. It further provides for ongoing documentation to assure adequate review and improvement of existing procedures.

4.4.2 Decontamination Methods

4.4.2.1 Personnel Decontamination

When contamination is found on the worker, the worker shall notify a Health Physics Technician and the Project Manager or designee. immediately that he/she has become contaminated. The worker will indicate where he/she believes the contamination occurred, and the route taken to where the surface contamination was detected. This information will assist the Health Physics Technician in determining which areas to survey to avoid the contamination of

other personnel. After notifying the Health Physics Technician, the individual who is contaminated shall, if possible, isolate the contaminated item or items by the use of clean plastic bags and remain in the personnel survey area. Any method of decontamination used will require monitoring and documentation of the results for each step in the procedure. All liquids used for decontamination purposes, will be considered contaminated and handled as radioactive waste. A spray solution of RadiacWash or equivalent mild detergent solution should be used as the primary agent to remove skin contamination. RadiacWash foam will be sprayed on the contaminated area, allowed to soak for a few minutes, then wiped clean. Radiation surveys will be performed between each wash.

NOTE: UNDER NO CIRCUMSTANCES WILL THE SKIN BE ABRADED WITHOUT DIRECT MEDICAL SURVEILLANCE. NOTIFY THE ATG RADIATION SAFETY OFFICER AND THE CORPORATE RADIATION SAFETY OFFICER SHOULD THIS BE RECOMMENDED.

Additional washing may be required if the affected area contamination levels are not reduced to below acceptable limits. If needed, lava soap, a soft brush and small amounts of water can be used with light pressure to produce a heavy lather. Only wash 3 times for about 2 minutes each. Rinse and monitor. Use care not to scratch or erode the skin. Apply lanolin or hand cream to prevent chapping. Continued washing will abrade the skin. Any additional decontamination techniques shall be approved by the Radiation Safety Officer on a case by case basis.

4.4.2.2 Clothing Decontamination

When contamination is found on clothing, the worker shall immediately notify a Health Physics Technician and inform him/her of the situation, including where the worker believes the contamination occurred and the route taken to where the contamination was detected. This information will assist the Health Physics Technician in determining which areas to survey to avoid the contamination of other personnel. The contaminated clothing shall be removed, taking special care not to further contaminate additional clothing or personnel. The item(s) shall be surveyed to determine the degree of contamination. Depending on the source of

contamination, decontamination methods such as using tape to adhere the contamination to or scraping a shoe with a knife may be used. If the contaminated item cannot be easily decontaminated without using soap and water methods, the item shall be disposed of as radioactive waste.

4.4.3 Documentation

In order to fully assess the degree of contamination, the skin dose to personnel and to critique the incidents to improve future procedures, documentation is necessary. Documentation of the event should start and continue from the initial detection of contamination to the final release. Personnel contamination that requires decontamination will be classified in two categories, skin and clothing. A separate form shall be used for each, along with a Contamination Report Index, (ATG Form 116) to chronologically categorize all personnel contamination.

A Personnel Contamination Report, (ATG Form 117), and a Clothing Contamination Report, (ATG Form 118) shall be completed by the individual performing the decontamination and submitted to the Project Manager for evaluation and filing. The Contamination Report Index shall be maintained by the Project Manager. The contamination reports shall be maintained in the individual's exposure file.

5.0 SAFETY RULES

5.1 Purpose

The purpose of the safety rules section is to provide a code of conduct which will allow for a smooth operation of the job site with as little time loss as possible due to violation of Safety Rules and Regulations. The safety rules apply to both the workers assigned to the project and visitors.

5.2 General Requirements

Compliance with the Safety Rules is considered a condition of employment, and as such, disciplinary action may be taken for violations as necessary. Safety rule violation and disciplinary action will be determined by ATG management. All workers have the responsibility to report safety violations to their supervisor.

5.3 Safety Rules

The following safety rules have been compiled and reviewed by ATG management and will be accepted by all employees prior to employment. A copy of the Safety Rules and Regulations will be available at the job site and will be made available to any employee requesting a personal copy.

5.3.1 Employees must be in working clothes and ready for work at the designated starting time.

5.3.2 Employees may take lunch breaks only during designated times and must eat in the assigned area while on the job site. There will be no smoking, eating or drinking while handling any hazardous materials or within the work site.

5.3.3 Personnel will not quit work before the time designated for the conclusion of the work shift. There will be sufficient time allocated for removal of protective clothing or work clothes.

5.3.4 Employees must report to work each regularly scheduled work day. One hour call in time will be allowed to notify your superior of an absence. Excessive absentees will not be tolerated.

5.3.5 No employee will report to work under the influence of alcohol or drugs. Likewise, it is forbidden to carry or use alcohol or drugs on the job site or company property.

5.3.6 Personnel must comply with both verbal and written instructions from the Project Manager or designee..

5.3.7 All personal work injuries must be reported to the Project Manager or designee. or Health and Safety Representative (or designated alternate).

5.3.8 All unsafe conditions, or unsafe acts must be reported to the Project Manager or designee..

5.3.9 Any required personal protective devices and clothing must be properly worn by all personnel while on the job site.

5.3.10 Radiological monitoring equipment such as air samplers must not be tampered with or altered.

5.3.11 Good housekeeping by all personnel is considered mandatory.

5.3.12 Employees will not engage in malicious horse play, practical jokes or mischief while on the job site.

5.3.13 Fighting or attempting bodily injury to another employee while on the job site is not permitted.

5.3.14 Carrying a concealed weapon on the job site is expressly forbidden.

5.3.15 Falsifying company records or falsifying data will not be tolerated and will result in disciplinary action.

5.3.16 Equipment marked "Out Of Service" or "Do Not Use" shall not be used.

5.4 Disciplinary Actions

The following steps will be administered in a fair and nondiscriminatory manner:

5.4.1 All Disciplinary actions will be documented and maintained in the employee's personnel file.

5.4.2 Supervisory personnel are responsible for giving appropriate and specific safety instructions and are responsible for assuring that the instructions are clearly understood.

5.4.3 A violation of the safety rules will be promptly corrected. The violations will be documented by the supervisor and the employee will be given a copy of the written violation report.

5.4.4 Individual safety rule violations will be assessed on their merit with appropriate consideration given to the seriousness of the violation, the effect on the other employees, the employee's prior work record and previous safety violations. Any disciplinary action to be taken will be approved by the Project Manager or designee..

5.4.5 There may be some situations where the safety rule violation is so serious that modification or total disregard of the steps may be warranted. In these situations the employee may be suspended or terminated. It is suggested that in cases of this type, the employee be suspended pending the outcome of a full investigation of the incident and the employee's previous safety history. When this method is followed, the results of the investigation should

determine the severity of the discipline to be administered.

6.0 STOP WORK CONDITIONS

During the performance of this contract, certain conditions may be encountered that will require specific work tasks to be immediately halted. Conditions such as; discovery of explosive materials, excessive contamination levels in an uncontrolled environment, high wind speeds, extreme high or low temperatures, severe storms or flash floods. Depending on the specific work task that is being performed at the time on such an adverse condition, work may be halted until a safe condition exists to restart the task.

If time permits, the Project Manager or designated alternate will communicate with the Government representative to determine the appropriate action to be taken at a given time. The following guidelines will be used to aid in determining stop work conditions.

6.1 Excessive Contamination Levels in non-controlled areas means that contamination levels in excess of 1000 dpm/100 cm^2 have been detected in non contamination controlled areas. All work tasks will immediately be halted and a concerted effort will be made to clean the affected area. The Radiation Safety Officer will be immediately notified of such conditions and work will not restart without his approval. This activity will be documented in the Daily work log and by survey documentation.

6.2 The guidance for the determination of working conditions for heat stress will be determined per the guidance given in the American Conference of Governmental and Industrial Hygienists (ACGIH), "Threshold limit values for Chemical Substances and Physical Agents and Biological Exposure Indices" under the Heat Stress Section. Working conditions will be explained to the workers each day by the Health and Safety Representative or designated alternate during the safety meetings and documented in the Final Report.

Extreme High Temperatures means in excess of 105 degrees. Heat stress to the workers may occur. When high temperatures are occurring, specific work tasks that are hampered will be halted. Work tasks that require physical work or work tasks that protective clothing is required may be affected. The Project Manager or designated alternate will evaluate the conditions and determine if work tasks will be halted.

6.3 Extreme Low Temperatures means less than 10 degrees. When low temperatures are occurring, specific work tasks that are hampered will be halted. The Project Manager or designated alternate will evaluate the conditions and determine if work tasks will be halted

6.4 High Wind Speed means a steady wind speed in excess of 25 mph or wind gusts of 40 mph that seem to be ongoing throughout the day. Unsealed sources of radioactive material may be spread to uncontrolled areas if wind speeds are excessive. During high wind speeds the soil packaging activity will be performed inside a sheltered area but may still be affected by steady winds or wind gusts. If excessive winds are encountered, the soil packaging activity will cease and the soil containers will be sealed and the remaining soil covered with plastic. Other work activities may be halted at the discretion of the Site Coordinator..

6.5 Severe Storms or Flash Floods could cause all work tasks to be halted. Water damage to the controlled areas and wind barriers will cause all work tasks to be halted until the areas can be repaired. Should these type of conditions occur, the equipment and areas will be secured and evacuated. Prior to the restart of work, the Site Coordinator will receive approval from the contract administrator or the Radiation Safety Officer.

6.6 Natural Disasters will be handled on a case by case basis. Depending on the type and magnitude of the disaster, work operations will be determined by the Site Coordinator.

6.7 Discovery of unidentified underground utilities could cause all work tasks to be halted until the utilities are identified and disconnected by the proper authorities.

6.8 Unauthorized person(s) entering the exclusion zone would constitute work to be stopped and the proper authorities notified. The incident would be properly documented.

7.0 ACCIDENT REPORTING

NOTE: All accidents, injuries, fires, or any emergency incidents will be reported following the guidance of the Section 10.0 of this procedure, the EMERGENCY PLAN, under part 10.3 'Radiological Incident'.

7.1 Insurance

ATG's Worker Compensation Carrier has the responsibility for the following:

7.1.1 Making sure that every claimant is entitled to a fair investigation of his/her claim and a prompt decision as to its merit.

7.1.2 Determining how much a particular liability case is worth and negotiating a settlement within that range.

7.1.3 Making sure that cases of no liability, tenuous liability or those tainted by fraud are vigorously resisted.

7.1.4 Consulting with the company's Controller on all claims requiring settlement in excess of $5,000.00.

7.1.5 Consulting with the company's President or Vice President on all claims requiring settlement in excess of $10,000.00.

7.1.6 Maintaining the risk management reporting system, the risk detail report and forwarding monthly report updates to the company's President or Vice President.

7.2 Accident or Injury Reporting Requirements

All injuries shall be promptly reported to the ATGProject Manager or designee., and the Fort McClellan Safety Office.

To make sure that each incident is properly and appropriately reported and recorded, the Foreman's Report of Injury or Illness (ATG Form 133) is required. The Foreman's Report of Injury or Illness will provide all of the information to generate the employees first report of an injury. It can also be used as the company's medical authorization. The Foreman's Report of Injury or Illness must be completed in detail for every accident, injury or illness which occurs to an ATG employee, visitor or subcontractor either in connection with or on company property or on a contracted job site. Every effort should be made to complete this form as quickly as possible following notification of the incident. The injured worker's foreman is responsible for completing this form. Once completed, the form should be reviewed and signed by the Health and Safety Representative or designated alternate and a copy forwarded to the insurance carrier. Copies shall be provided to U.S. Army Industrial Operations Command.

Accidents resulting in any fatality, lost-time injury or illness, hospitalization of 3 or more personnel, or property damage to government or contractor property (which occurred during performance of the contract) equal to or exceeding $2000.00 must be telephonically reported to USA, IOC as soon as possible, but not later than 2 hours after occurrence and reported in writing within 5 days of occurrence on DA Form-285. All other accidents/incidents must be reported by telephone to USA, IOC, (309) 782-0880, within 8 hours of occurrence.

7.3 Employee's First Report of Injury

Each state within the United States has either developed its own Employer's First Report of Injury Form or has indicated a willingness to accept a suitable substitute. Generally where a state does not have its own form, the substitute is that form used by the employer's Workman's Compensation Carrier. Every state requires some type of injury notification.

The Project Manager or his/her designee shall report immediately by telephone, or in writing, to the nearest District Office of the Division of Occupational Safety and Health any serious injury, accident or death of an employee. "Immediately" is defined for this purpose to mean as soon as practical but no longer than twenty four hours after the employer knows of or should have known of the death, illness or serious injury. The Project Manager will notify the nearest office of the Division of Occupational Safety and Health whenever a State, County, or Local Fire or Police Agency is called to an accident involving an employee that has suffered a serious injury, illness or death.

7.4 OSHA Forms

The OSHA Form 200 Log and Summary of Occupational Injury and Illness along with the OSHA Form 101, Supplementary Record, will be completed and maintained at the ATG Corporate office in Fremont, California.

The corporate office has the responsibility to record and report OSHA reportable incidents. All forms are available on request.

8.0 HAZARD COMMUNICATION PROGRAM

8.1 Purpose

The purpose of this written Hazard Communication Program is to comply with the requirements of the Code of Federal Regulations, Title 29, Part 1910.1200, "Hazard Communication". This program is site specific.

8.2 Policy

ATG as an employer engaged in a business within the Standard Industrial Classification, Codes 20 through 39, where chemicals or hazardous materials are either used or are produced for use. This program will assure that the hazards of all chemicals found in the work place will be evaluated and that information concerning their hazard will be transmitted to all affected employees.

The known hazard that will be handled on this project will be radioactive material and potential biological hazards. The hazards have been evaluated in this Project Health and Safety Plan. Communication to the employees will be handled in the project training and verified through the Project Quality Assurance Plan. Identification of the radiological hazard is required by posting radiological controlled areas and labeling containers or items that contain radioactive material in accordance with 10 CFR 20. All potential biological hazards will be properly labeled and the work site will have the proper postings.

Any currently unknown hazards will be handled in the same manner when they are encountered. The Project Manager or designated alternate will be responsible for conducting the evaluation, communication and identification.

Material Safety Data Sheets (MSDS) will be provided for all materials brought onto the site. All MSDS's will be placed alphabetically in a labeled notebook and in a designated highly visible area that is readily accessible for personnel and visitors. A copy of all MSDS's for the materials on-site will be provided to the fire department. The fire department will also be notified of the quantity of the material and the storage location. All personnel will be briefed on the materials on-site, the location of the MSDS's, and the proper way to use the MSDS's.

9.0 PROJECT ROLES AND RESPONSIBILITIES

ATG Project Manager

The Project Manager or his/her designee is responsible for the overall project. He/she is to assure the project meets the objectives and contracted commitments. He/she has the direct management responsibility and authority for cost, schedule, quality and technical performances of all activities in support of the project. He/she is ultimately responsible for the implementation of all quality related activities. Other responsibilities include: selecting project staff and assigning duties, budgets and schedules, and identifying and resolving project specific problems. The Project Manager will assure the tasks are completed in a professional, efficient, and safe manner.

ATG Project Lead Investigator

The ATG Project Lead Investigator or his designated alternate will have overall responsibility for ATG's on-site conduct of the project and will report to the Project Manager for oversight and management control. He/she will be the primary point of contact. He/she is responsible for implementing and monitoring compliance with the operations plan and implementing corrective actions.

ATG Field Personnel

ATG Field Personnel will take all reasonable precautions to prevent injury to themselves and to their fellow workers by remaining alert to potential harmful situations. All tasks must be performed in accordance with the Project Sample Analysis Plan and the Health and Safety Plan. Any unsafe conditions must be reported immediately to the Project Manager or designated alternate. Personnel must report any medical conditions that may be affected by the work environment. All injuries must be reported - no matter how minor. The Field Personnel must read and comply with all postings and rules at the work site. Spilling and splashing of materials must be kept to a minimum. Good housekeeping must be maintained within and around the work area.

10.0 EMERGENCY PLAN

The objective of emergency response actions is to minimize adverse health risks to site workers, the environment, and local community. The Project Manager or designee. will be the site emergency coordinator.

The following is a course of action for any accidents or emergencies that may occur during this project and the immediate actions to be pursued. In any situation outside the scope of the work identified in this work plan, the actions taken should be to stabilize the area, notify appropriate personnel, contain the area and prevent unauthorized personnel from entering the area (thus minimizing their exposure and contact), surveying the area for all hazards, and then formulating a plan for recovery from the accident or situation. The following will be performed prior to work on site:

a. Locate the nearest telephone.

b. Confirm and post emergency telephone numbers.

c. Post site map of work areas marked with evacuation routes.

d. Inventory and check site emergency equipment and supplies.

e. If a radio is supplied, ensure it is charged and in good working condition.

Work is expected to be performed by ATG personnel over weekend periods and during installation non-duty hours. Special arrangements will be made with the appropriate emergency service organizations.

10.1 Evacuations

In the event of an emergency that requires evacuation of the site, verbal instructions will be given by the Health and Safety Representative or designated alternate. During an emergency evacuation, personnel will proceed to the assembly point designated on the map unless conditions cause the assembly point to be unstable or harmful. Verbal instructions will be given if evacuation beyond the assembly point is required. Personnel working on-site should not take time to monitor for contamination unless time allows. Contaminated personnel and areas they have been in contact with will be monitored when the conditions are stable and considered safe.

The following conditions would require evacuation:

- Fire
- Chemical Release
- Radiological Release
- Any event that an injury is incurred
- Any other event that would cause the working conditions to be unstable and no longer safe

The Project Manager or designee. will account for all personnel, ascertain information about the emergency, and advise further instructions to the on-site personnel.

In the event that an evacuation occurs, the following will be performed prior to reentry:

a. The conditions resulting in the evacuation have been corrected.

b. The hazards have been reassessed.

c. The Work Plan and Health and Safety Plan have been revised accordingly and approved by the Project Manager or designee., and the appropriate facility personnel.

d. Site personnel have been informed on changes to the site and work conditions.

e. Site personnel have been informed on precautions to take and any change in PPE requirements.

f. TheProject Manager or designee. has given the approval for reentry.

10.2 Medical Emergencies

If a situation occurs that results in the injury of personnel or visitors, the following actions shall be taken:

10.2.1 Stop all work activities. Ensure the area is in a safe condition.

10.2.2 Qualified personnel will provide first aid to the injured person.

10.2.3 In the event the injury is severe, the Project Manager or designee. will act as the emergency point of contact. Ensure the emergency personnel are aware that contamination may be present.

10.2.4 For any incident, accident, or injury, notify the Emergency Response Organization at phone number 911, the Base Security Post, and the ATG Project Manager or designated alternate.

10.2.5 If the injuries and time allow, the injured person will be surveyed for contamination and decontaminated if necessary.

10.2.6 If a hazardous material gets on the person's skin or eyes, the area will be flushed immediately with clean water until medical personnel arrive.

10.2.7 If a person succumbs to heat stress, the following should be used as a guide:

a. Heat cramps: Caused by heavy sweating and inadequate water and electrolyte replacement.

Symptoms: muscle spasms; pain in the hands, feet, and abdomen.

Treatment: drink Gatorade to replace fluids and electrolytes.

b. Heat Exhaustion: Caused by sustained exertion in a heated environment. Lack of acclimatization and failure to properly rehydrate may contribute.

Symptoms: clammy skin; heavy sweating; dizziness; nausea; and fainting.

Treatment: Promptly remove individual to a cooler environment and give water or Gatorade to replace fluids and electrolytes. If medical assistance is needed, contact emergency personnel

immediately.

c. Heat stroke: the most serious form of heat stress occurs when temperature regulation fails and the body temperature rises to critical levels.

Symptoms: Red, hot, and dry skin; lack of, or reduced perspiration; nausea; dizziness or confusion; strong rapid pulse; and coma.

Treatment: Immediately summon emergency medical services. While waiting for emergency services to arrive, and if facilities are available, cool person by immersion in cold water or by wrapping in a wet sheet with vigorous fanning with cool dry air. Treat for shock.

d. High concentrations will be identified by the Threshold Limit Values (TLVs) for Chemical Substances and Physical Agents and Biological Exposure Indices (BEIs) as referenced in the Reference List.

10.3 Radiological Incident

A radiation incident may be defined as an unforseen occurrence, either actual or suspected, involving exposure or radiation. An accident is considered to occur over a short period of time, from seconds up to several days. Chronic occupational or other long-term exposure is not considered accidental.

There are two ways in which humans can be exposed to ionizing radiation:

1. External. The source of ionizing radiation may be outside of the body so that the radiation strikes the individual and is absorbed. Radiation from x-ray generators, particle accelerators, sealed sources of radionuclides, and reactors are examples. The radiation may be beta, gamma, or neutron. Alpha emitters present no significant external hazard.

2. Internal. The source of ionizing radiation may gain entrance into the human body by inhalation, ingestion, injection, or absorption through intact or abraded skin. Radionuclides may also be formed within the body following exposure to an external source of neutrons. All persons who are known or suspected to have been internally exposed to radioactive material will be reported to the Fort McClellan Radiation Protection Office.

SPECIFIC GUIDELINES

In the event of an emergency, the Project Manager or designee. will assume control of the situation and direct activities until relieved by proper authority. The exact actions and sequence of actions to be taken will be determined by the nature of the emergency. The following actions are typical responses to emergency situations, however, the sequence of these actions are highly variable.

10.3.1 Stop all work activities

10.3.2 Leave the area in a safe condition

10.3.3 Limit the radiation exposure and the spread of radiation contamination, if undue hazard to personnel does not result. For example:

a. Return sources to shield containers
b. Place absorbent material on spills
c. Turn off ventilation and equipment
d. Extinguish flames, heaters, etc.
e. Restrict access to the area

10.3.4 Perform radiological surveys (airborne, contamination, and radiation) to determine the nature and extent of the release and spread of contamination.

10.3.5 Contain the area with herculite or an equivalent material to prevent the continued spread of radioactive material and/or hazardous material to the environment.

10.3.6 Evacuate and survey all personnel to a identified safe area.

NOTE: In the event of any injury, this will take precedence to evacuate and place the injured individual in a safe condition. Immediate medical attention will be obtained for any injuries occurring during this operation. All injuries will result in immediate work stoppage and evaluation of the conditions prior to recommencing activities under the direction of the Project Manager or designated alternate.

10.3.7 Radioactively contaminated personnel will receive all necessary medical care and treatment at the earliest practical time.

10.3.8 Radiation and radioactive contamination will not deter medical personnel in efforts to save life or limb, although slightly different techniques must be employed, e.g. rotating medical personnel to minimize exposure to any one individual, keep individual exposures As Low As Reasonably Achievable (ALARA), etc.

10.3.9 Radioactively contaminated personnel will be decontaminated at the earliest opportunity consistent with their medical needs.

10.3.10 Every effort will be made to minimize radiation exposure and the spread of contamination during medical treatment.

10.3.11 The ATG Project Manager or designated alternate will advise the Site RPO of the extent of contamination and exposure of the individual.

10.3.12 At the earliest possible time consistent with the patient's medical needs, the attending physician will allow decontamination to begin. Decontamination will be provided under the guidance of ATG Radiation Protection personnel.

10.3.13 All contaminated clothing, equipment, and waste material will be retained by ATG Radiation Protection personnel.

10.3.14 Contaminated valuables will be retained by ATG Radiation Protection personnel who will account for them, and will decontaminate them as soon as the situation permits so that they may be returned or disposed of properly. Valuables and personal property will not be disposed of as contaminated waste without written consent of the owner.

10.3.15 Formulate a recovery plan, obtain approval as required, and commence recovery operations.

10.4 Responsibilities

10.4.1 Personnel

All personnel are responsible for the following:

Become thoroughly familiar with the contents of this regulation prior to using radioactive material.

Take adequate precautionary measures to protect all personnel from unnecessary exposure to radiation.

Seek advice and assistance from ATG Radiation Protection personnel concerning the safety of an operation.

Prescribe rules, procedures, or protocols for the use of radioactive materials under his control to ensure proper and safe use. These will be made available to any radiation worker in the area and will be furnished for review and comment by Allied Technology Group.

Ensure that all rules, procedures, and practices of radiation safety are rigorously followed in the work area.

Report actual or potential emergency situations to the Project Manager or designee..

Promptly contact ATG Radiation Protection personnel. Exposed individual(s) should cooperate in any and all attempts to evaluate his/her radiation exposure.

If working with radioactive material, maintain a current inventory of the quantity of radioactive material on hand to be readily available to the RPO upon request. The inventory will include the radionuclide(s), current activity, and form.

Evacuating the area immediately.

If qualified, provide first aid to the injured.

10.4.2 Management

All supervisors are responsible for the following:

Anticipate hazardous conditions and prevent them from occurring.

Ensure personnel are trained on emergency situations.

Ensure emergency contact numbers are current.

Ensure evacuation routes are clear.

Alert emergency personnel and act as the point of contact.

Account for all personnel.

The overall health and safety of their workers.

Limiting possible radiation exposure to the general public.

Notification of the Base RPO if a radiation incident should occur involving contractors.

Generation of a written report of all incidents involving radiological hazards including the following as a minimum:

- The type of radiation incident: internal contamination, external contamination, or exposure.
- The number of contaminated individuals and their condition.
- The type of radioactive material.
- Efforts, if any, that have been made to decontaminate the individual at the accident site.

Levels of radiation measured on the patient.

10.4.3 The Fort McClellan Radiation Protection Office will respond to all radiological emergencies and will:

Provide technical advice as necessary.

Arrange for additional resources, e.g. personnel, supplies, and equipment.

Provide assistance as needed.

Provide advice and radiation monitoring.

Provide exposure control and monitoring of staff personnel attending the patient.

Direct decontamination of the personnel at the earliest time consistent with medical needs.

If required, make a prompt investigation of the incident.

Issue specific guidance to minimize exposure of the staff or spread of

contamination.

Such guidance will be developed on the scene by the Fort McClellan Radiation Protection Office.

Make appropriate reports to MEDCOM, the Nuclear Regulatory Commission (NRC), and other agencies in accordance with pertinent directives.

10.4.4 Medical Personnel

The medical personnel present at the scene of an accident will:

Evaluate the injury

Apply first aid

Take the person to a designated decontamination area

Employ contamination control measures

Follow recommendations whenever possible since radioactive contamination can necessitate very costly decontamination operations and result in the loss of facilities for many days.

Notify the Fort McClellan Radiation Protection Office.

10.5 Safety Signals

Vehicle, tractor, and portable gas-operated horns are used for safety signals as follows:

One Long Blast	**WARNING ALARM** - prepare for emergency response
Two Short Blasts	**ACTIVATION ALARM** - initiate emergency response activities as directed by the Project Manager or designee..
Three Short Blasts	**ALL CLEAR** - return to normal activities.

10.6 Emergency Information

Emergencies may include fires, fire hazards, accidents requiring first aid, or other incidents requiring emergency procedures. ATG and its subcontractors will, at all times, minimize potential emergencies. The following section lists emergency phone numbers which should be posted in all work areas:

EMERGENCY PHONE NUMBERS

Ambulance (Fire Department)	(256) 848-2315
Hospital (Emergency Room)	(256) 235-8900
Fire Department	(256) 820-1117
Security	(256) 848-5159 or 3560
Center for Disease Control (CDC)	(404) 452-4100
RCRA Hotline	(800) 424-9346
Poison Control Center	(619) 543-6000
National Response Center	(800) 424-8802

DIRECTIONS TO HOSPITAL

The nearest hospital is Stringfellow Memorial of Anniston which is 5 miles from the project site on 301 East 18th Street

10.7 Key ATG Personnel

POSITION	NAME	PHONE	PAGER
Project Manager	Lee Young	(800) 348-5389	(888) 352-2010
Project Lead Investigator	Frank Whitaker	(800) 348-5389	(800) 690-6403
Corp. Health Physicist	Joel Cehn	(800) 227-2840	

10.8 Key Contracting Personnel

POSITION	NAME	PHONE
US Army IOC Health Physicist	Mike Styvaert	(309) 782-0880
US Army IOC Contract Officer	Robert Matthys	(309) 782-5554

10.9 Key Facility Personnel

POSITION	NAME	PHONE
Fort McClellan RPO	John May	(256) 848-5737
Fort McClellan Env Comp.	Lisa Kingsbury	(256) 848-7455

11.0 SPILL PREVENTION AND CONTROL

Spill prevention control shall be as follows:

The use and spread of materials will be initially prevented by the elimination of unnecessary materials being introduced to the site. The basic survey effort requires that only exempt quantity radioactive check sources, instrument batteries, and P-10 gas (10% methane, 90% argon) be mobilized for routine use.

The control of spills is thus intended for encountered or discovered materials on the base as the result of or during the radiological surveys.

11.1 Spill Response

If a spill of hazardous material occurs, the following actions will be taken:

Notify the Project Manager or designated alternates immediately.

Take immediate measures to control and contain the spill within site boundaries.

Keep unnecessary personnel away, isolate the hazardous area, and deny entry.

Stay upwind and keep out of low-lying areas.

Allow no flares, smoking, or flames in the hazard area.

For liquids, keep combustibles away from the spilled material.

Take necessary steps to clean up the spill and all contaminated material.

12.0 ACRONYMS

ACGIH	American Conference of Governmental and Industrial Hygienists
ALARA	As Low As Reasonably Achievable
ATG	Allied Technology Group
BEI	Biological Exposure Indices
CDC	Center for Disease Control
CFR	Code of Federal Regulations
EOD	Explosive Ordnance Disposal
HBV	Hepatitis-B Virus
IOC	Industrial Operations Command
LEL	Lower Explosive Limit
MSDS	Material Safety Data Sheet
NRC	Nuclear Regulatory Commission
OSHA	Occupational Safety & Health Association
PPE	Personnel Protective Equipment
RCRA	Resources Conservation and Recovery Act
RPO	Radiation Protection Office(r)
RSO	Radiation Safety Officer
RWP	Radiation Work Permit
TLD	Thermoluminescent Dosimeter
TLV	Threshold Limit Value
UXO	Unexploded Ordnance

13.0 REFERENCES

29 CFR 1910, OSHA Standards for General Industry.

29 CFR 1926, OSHA Standards for Construction.

U.S. Nuclear Regulatory Commission Division of Industrial and Medical Safety, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material".

ATG Corporate Health and Safety Manual.

ATG "Decommissioning Plan for the Fort McClellan 'Burial Mound' for the IOC, December 1998.

ATG "Project Quality Assurance Plan for the Fort McClellan 'Burial Mound' for the IOC, December 1998.

ATG Respiratory Protection Program.

American Conference of Governmental Industrial Hygienists (ACGIH), "Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices".

ANSI A14 Series - 1992, Safety Standard for Ladders.

ANSI B30 Series, Safety Standards for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Stings.

ANSI B56 Series, Safety Standard for Powered industrial Trucks.

ANSI Z41 - 1991, Personnel Protection - Protective Footwear.

ANSI Z49.1 - Safety in Welding and Cutting.

ANSI Z87.1 - 1989, Practice for Occupational and Educational Eye and Face Protection.

ANSI Z89.1 - 1986, Protective Headwear for Industrial Workers.

ANSI Zl 17.1 - 1989. Safety Requirements for Confined Spaces.

NUREG/CR 2082 "Monitoring for Compliance with Decommissioning Termination Survey Criteria".

NUREG-1575, "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)"

NUREG-1515, "A Non-Parametric Statistical Mehodololgy for the Design and Analysis of Final Status Decommissioning Surveys".

NUREG-1517, "Minimum Detectable Concentrations with Typical Survey Instruments for Various Contaminants and Field Conditions".

NRC Decommissions and Regulatory Issue Branch Technical Position, "A Summary of NRC and Interim Radiological Cleanup Criteria and Current Dose Rates" (Nov, 1992).

NUREG/CR5512,"Residual Contamination from Decommissioning".

Industrial Radiation Study No. 27-MH-0987-R2-97, Pelham Range Burial Mound Site Fort McClellan, Alabama 29 August - 15 September 1995 and 14-28 January 1996, U. S. Army Center for Health Promotion and Preventive Medicine.

14.0 FORMS

ATG Form-027	Training Record
ATG Form-047	Occupational Radiation Exposure History Letter
ATG Form-109	Site Registration
ATG Form-112	Radiation Exposure Record
ATG Form-116	Contamination Report Index
ATG Form-117	Personnel Contamination Report
ATG Form-118	Clothing Contamination Report
ATG Form-133	Foreman's Report of Injury or Illness

TRAINING RECORD

TRAINING DATE:	INSTRUCTOR:
LOCATION:	TOTAL CLASS HOURS:
TRAINING COURSE TITLE:	
SCOPE OF TRAINING:	

NAME OF STUDENT	SOCIAL SECURITY NO.	SIGNATURE

TRAINING APPROVED BY (Project Director):

Allied Technology Group, Inc.
47375 Fremont Blvd.
Fremont, California 94538
(800) 227-2840

OCCUPATIONAL RADIATION EXPOSURE HISTORY
Exposure Year 1999

Name:_____ Social Security Number:_____

Address:_____ Date of Birth:_____

City:_____ State: _____ Zip: _____

The Occupational Radiation Exposure listed below was received by the above individual while assigned by Allied Technology Group

Project/Location Monitored	Monitoring Method TLD/Film Badge	Record/Estimate	NRC License Number(s):
	TLD Badge #		

Abbreviations: NC - Not Calculated ND - None Detected NM - Not Monitored SA - See attached

Monitoring Period		Deep-Dose Equivalent			Shallow-Dose Equivalent		LDE	CEDE	CDE	TEDE	TODE
From	To	X or γ	Neutron	Total DDE	Skin SDE, WB	Extremity SDE, ME	Lens	$H_{E,50}$	$H_{T,50}$	DDE+CEDE	DDE+CDE

THIS REPORT IS FURNISHED TO YOU UNDER THE PROVISIONS OF THE NUCLEAR REGULATORY COMMISSION REGULATION 10 CFR PART 20 TITLED "STANDARDS FOR PROTECTION AGAINST RADIATION". YOU SHOULD PRESERVE THIS REPORT FOR FURTHER REFERENCE. ALL DOSE EQUIVALENT VALUES ARE REPORTED IN MILLIREM.

Radiation Safety Officer:_____ Date:_____

SITE REGISTRATION FORM
ALLIED TECHNOLOGY GROUP, INC.

PERSONAL INFORMATION			
Name:			Date:
Social Security:	Date of Birth:	Project Name:	
Permanent Address:			
City:		State:	Zip:

EMPLOYER INFORMATION	
Employer's Name:	
Employer's Address:	
Name of Emergency Contact:	
Address of Emergency Contact:	
Emergency Contact Phone:	
Signature:	

MEDICAL HISTORY		
List any condition or ailment that may affect your ability to perform your job:		
Indicate if you are epileptic or diabetic:		
List any allergies you have:		
List any medications you are now taking:		
Last Tetanus Shot date:	Date of Last Physical:	
Signature:		Date:

FINAL PAYCHECK ADDRESS	
Address:	
City:	
Phone:	
FedEx: ☐	Check box at left if you want your check Federal Expressed to you. ATG must deduct a **$15.00** fee from your final pay for this service. If not checked, paycheck will be sent regular mail.

1995 RADIATION EXPOSURE RECORD

AME:	
SOCIAL SECURITY NO:	BIRTH DATE:
EXTREMITY BADGE NO:	LM BADGE NO:
LIFETIME WHOLE BODY EXPOSURE:	

	WHOLE BODY	SKIN	EXTREMITIES		LIFETIME HIGHEST WHOLE BODY
			LEFT	RIGHT	
JANUARY					
FEBRUARY					
MARCH					
QUARTER TOTALS					
APRIL					
MAY					
JUNE					
QUARTER TOTALS					
JULY					
AUGUST					
SEPTEMBER					
QUARTER TOTALS					
OCTOBER					
NOVEMBER					
DECEMBER					
QUARTER TOTALS					
ANNUAL TOTALS					

CONTAMINATION REPORT INDEX

DATE	DATE	TYPE CLOTHING PERSONNEL	LOCATION OF CONTAMINATION	COMMENTS

PERSONNEL CONTAMINATION REPORT

NAME	DATE
LOCATION WHERE CONTAMINATION OCCURRED:	RWP#
EXTENT OF CONTAMINATION:	
A. INITIAL SURVEY RESULTS:	
B. SURVEY RESULTS AFTER DECONTAMINATION:	
C. RELEASE SURVEY RESULTS:	

SKIN DOSE EVALUATION:

A. Maximum contamination level conversion from dpm to mrad/hr maximum skin dose rate

_____ dpm (4,000 dpm/mrad/hr) = _____ mrad/hr.

B. Maximum skin dose rate Total time skin contaminated

Total maximum skin dose _____ mrad/hr x_____ hr* =_____ mrad**.

* If skin contamination cannot be removed, assume a residence time of 48 hours. Contact the Radiation Safety Officer in all cases where skin contamination cannot be reduced below 1000 dpm.

** If 75 mrad, contact the Radiation Safety Officer. (75 mrad is equivalent to 75000 cpm on the skin for 4 hours.)

RADIATION SAFETY OFFICER COMMENTS:

SIGNATURE (TECHNICIAN)	DATE
SIGNATURE (INDIVIDUAL)	DATE
SIGNATURE (SUPERVISOR)	DATE

CLOTHING CONTAMINATION REPORT

NAME:	BADGE NO.:
WORK AREA:	
DATE OF OCCURRENCE:	TIME OF OCCURRENCE:
LOCATION WHERE CONTAMINATION OCCURRED:	
JOB BEING PERFORMED:	
WAS WORK COVERED BY RWP? ☐ YES OR ☐ NO	IF YES, RWP#
ANTI-C's WORN? ☐ YES OR ☐ NO	
DESCRIBE:	
EXTENT OF CONTAMINATION, INCLUDING APPROXIMATE AREA:	
CAUSE OF CONTAMINATION:	
METHOD OF DECONTAMINATION:	
RADIATION PROTECTION COMMENTS:	
SURVEY SECTION:	
A. INITIAL SURVEY RESULTS:	
B. AFTER DECONTAMINATION:	
C. RELEASE SURVEY RESULTS:	
HEALTH AND SAFETY OFFICER	DATE
INDIVIDUAL'S SIGNATURE	DATE

FOREMAN'S REPORT OF ACCIDENT, INJURY OR ILLNESS

EMPLOYER'S NAME:	
EMPLOYER'S ADDRESS:	
WORK LOCATION:	
WORK LOCATION ADDRESS:	
EMPLOYEE'S NAME:	DATE OF BIRTH:
EMPLOYEE'S ADDRESS:	
IS THIS A WORK RELATED INJURY OR ILLNESS? ☐ YES ☐ NO ☐ N/A	
DATE OF OCCURRENCE:	TIME OF OCCURRENCE:
ACCIDENT OR INJURY DESCRIPTION:	
IS THIS A LOST TIME ACCIDENT, INJURY OR ILLNESS? ☐ YES ☐ NO	
IS THIS AN OSHA RECORDABLE ACCIDENT OR ILLNESS? ☐ YES ☐ NO	
WAS MEDICAL TREATMENT NECESSARY? ☐ YES ☐ NO	
EMPLOYEE SIGNATURE	DATE
WITNESS SIGNATURE	DATE
WITNESS SIGNATURE	DATE
FOREMAN'S SIGNATURE	DATE
PROJECT MANAGER SIGNATURE	DATE

2

ATTACHMENT 2

INSTRUMENT CALIBRATIONS

Designer and Manufacturer of Scientific and Industrial Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 915-235-5494
501 OAK STREET FAX NO. 915-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

CUSTOMER ALLIED TECHNOLOGY GROUP ORDER NO. 239056 / 243662

Bicron Model MICRO REM Serial No. B.500 2

Mfg. _____ Model _____ Serial No. _____

Cal. Date 14-Oct-99 Cal Due Date 14-Oct-00 Cal. Interval 1 Year Meterface 0-200urem/

Check mark ☑ applies to applicable instr. and/or detector IAW mfg. spec. T. 73 °F RH 35 % Alt 706.8 mm Hg

☐ New Instrument Instrument Received ☑ Within Toler. +-10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☑ Mechanical ck. ☑ Meter Zeroed ☐ Background Subtract ☐ Input Sens. Linearity
☐ F/S Resp. ck ☑ Reset ck. ☐ Window Operation ☐ Geotropism
☐ Audio ck. ☐ Alarm Setting ck. ☐ Batt. ck. (Min. Volt) _____ VDC

☐ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. ☑ Calibrated in accordance with LMI SOP 14.9 rev 12/19/89.

Instrument Volt Set _____ V Input Sens. _____ mV Det. Oper. _____ V at _____ mV Threshold Dial Ratio _____ = _____ mV

☐ HV Readout (2 points) Ref./Inst. _____ / _____ V Ref./Inst. _____ / _____ V

COMMENTS:

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
x 1000	150 mR/hr	160	150
x 1000	50 mR/hr	55	50
x 100	15 mR/hr	155	150
x 100	5 mR/hr	52	50
x 10	1500 uR/hr	140	150
x 10	500 uR/hr	50	50
x 1	150 uR/hr	140	150
x 1	100 uR/hr	90	100
x0.1	15 uR/hr	140	150
x0.1			

*Uncertainty within ± 10% C.F. within ± 20% _____ **Range(s) Calibrated Electronically**

	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*		REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Digital Readout				Log Scale			

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978 State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources:

Cs-137 Gamma S/N ☐ 1162 ☑ G112 ☑ M565 ☐ 5105 ☐ T1008 ☐ T879 ☐ E552 ☑ E551 ☐ Neutron Am-241 Be S/N T-304

☐ Alpha S/N _____ ☐ Beta S/N _____ ☐ Other _____

n 500 S/N _____ ☐ Oscilloscope S/N _____ ☐ Multimeter S/N _____

Calibrated By: Conrad Salinas Date 14 Oct 99

Reviewed By: Rhonda Hann Date 15 Oct 99

Designer and Manufacturer of Scientific and Industrial Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 915-235-5494
501 OAK STREET FAX NO. 915-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

CUSTOMER ALLIED TECHNOLOGY GROUP ORDER NO. 226586/237672

Mfg. Bicron Model MICRO REM Serial No. B504Z

Mfg. _____ Model _____ Serial No. _____

Cal. Date 23-Dec-98 Cal Due Date 23-Dec-99 Cal. Interval 1 Year Meterface 0-200 uRem

Check mark ☑ applies to applicable instr. and/or detector IAW mfg. spec. T. 73 °F RH 25 % Alt 700.8 mm Hg

☐ New Instrument Instrument Received ☐ Within Toler. +-10% ☑ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☑ Mechanical ck. ☑ Meter Zeroed ☐ Background Subtract ☐ Input Sens. Linearity
☐ F/S Resp. ck ☐ Reset ck. ☐ Window Operation ☐ Geotropism
☐ Audio ck. ☐ Alarm Setting ck. ☐ Batt. ck. (Min. Volt) _____VDC

☐ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. ☑ Calibrated in accordance with LMI SOP 14.9 rev 12/19/89.

Instrument Volt Set _____ V Input Sens. _____ mV Det. Oper. _____ V at _____ mV Threshold Dial Ratio _____ = _____ m

☐ HV Readout (2 points) Ref./Inst. _____ / _____ V Ref./Inst. _____ / _____ V

COMMENTS:

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
x1000	150 mR/hr	140	150
x1000	50 mR/hr	45	50
x100	15 mR/hr	140	150
x100	5 mR/hr	45	50
x10	1.5 mR/hr	135	150
x10	500 uR/hr	45	55
x1	200 uR/hr	165	200
x1	100 uR/hr	90	100
x0.1	15 uR/hr	135	150
x0.1	NC	NC	NC

*Uncertainty within ± 10% C.F. within ± 20% _____ **Range(s) Calibrated Electronically**

	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*		REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Digital Readout				Log Scale			

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1997 State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources:

Cs-137 Gamma S/N ☐ 1162 ☑ G112 ☑ M565 ☐ 5105 ☐ T1008 ☐ T879 ☐ E552 ☑ E551 ☐ Neutron Am-241 Be S/N T-30

☐ Alpha S/N _____ ☐ Beta S/N _____ ☐ Other _____

☐ m 500 S/N _____ ☐ Oscilloscope S/N _____ ☐ Multimeter S/N _____

Calibrated By: _____ Date 23 Dec 98

Reviewed By: _____ Date 24. Dec. 98

FORM C22A 09/17/98

Designer and Manufacturer of Scientific and Industrial Instruments

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 915-235-5494
501 OAK STREET FAX NO. 915-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

CERTIFICATE OF CALIBRATION

CUSTOMER ALLIED TECHNOLOGY GROUP ORDER NO. 233643/ 241068

Mfg. Ludlum Measurements, Inc. Model 3 Serial No. 102554

Mfg. Ludlum Measurements, Inc. Model 44-9 Serial No. pr 128044

Cal. Date 16-Jun-99 Cal Due Date ~~16-Dec-99~~ June-00 Cal. Interval ~~6 Months~~ 1yr Meterface 202-002

Check mark ☑ applies to applicable instr. and/or detector IAW mfg. spec. T. 72 °F RH 46 % Alt 706.8 mm Hg

☐ New Instrument Instrument Received ☑ Within Toler. +-10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☑ Mechanical ck. ☑ Meter Zeroed ☐ Background Subtract ☐ Input Sens. Linearity
☑ F/S Resp. ck ☑ Reset ck. ☐ Window Operation ☑ Geotropism
☑ Audio ck. ☐ Alarm Setting ck. ☑ Batt. ck. (Min. Volt) 2.2 VDC
☑ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. ☐ Calibrated in accordance with LMI SOP 14.9 rev 12/19/89.

Instrument Volt Set 900 V Input Sens. 36 mV Det. Oper. 900 V at 36 mV Threshold Dial Ratio ____ = ____ m

☐ HV Readout (2 points) Ref./Inst. ____ / ____ V Ref./Inst. ____ / ____ V

COMMENTS:

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
X 100	400 K cpm	4K	4K
X 100	100 K cpm	1K	1K
X 10	40 K cpm	4K	4K
X 10	10 K cpm	1K	1K
X 1	4 K cpm	4K	4K
X 1	1 K cpm	1K	1K
X 0.1	400 cpm	4K	4K
X 0.1	100 cpm	1K	1K

*Uncertainty within ± 10% C.F. within ± 20% ALL Range(s) Calibrated Electronically

	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Digital Readout			

	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Log Scale			

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978 State of Texas Calibration License No. LO-196

Reference Instruments and/or Sources:

Cs-137 Gamma S/N ☐ 1162 ☑ G112 ☐ M565 ☐ 5105 ☐ T1008 ☐ T879 ☐ E552 ☑ E551 ☐ Neutron Am-241 Be S/N T-3

☐ Alpha S/N ____ ☐ Beta S/N ____ ☐ Other ____

☑ m 500 S/N 54680 ☐ Oscilloscope S/N ____ ☑ Multimeter S/N 69101832

Calibrated By: [signature] Date 16 June-99

Reviewed By: [signature] Date 20 Jun 99

FORM C22A 05/05/99

Designer and Manufacturer
of
Scientific and Industrial
Instruments

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 915-235-5494
501 OAK STREET FAX NO. 915-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

CONVERSION CHART

Customer ALLIED TECHNOLOGY GROUP Date 16-Jun-99 Order #. 233643/ 241068

Model 3 Serial No. 102554 Detector Model 44-9 Serial No. pr 128044

Source Cs-137 194.6 mCi Cs-137 20 mCi High Voltage 900 V

Input Sensitivity 36 mV

Reference Point	"As Found" Readings (CPM): Meter Reading	Range/Scale	After Adjustment Readings (CPM): Meter Reading	Range/Scale
150 mR/hr	3.65K	X100	3.65K	X100
50 mR/hr	1.6K	" "	1.6K	" "
15 mR/hr	4.9K	X10	4.9K	X10
5 mR/hr	1.8K	" "	1.8K	" "
1.5 mR/hr	4.5K	X1	4.5K	X1
1.0 mR/hr	3K	" "	3K	" "

Signature: [signature] Date 16-June-99

Designer and Manufacturer of Scientific and Industrial Instruments

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 915-235-5494
501 OAK STREET FAX NO. 915-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

CERTIFICATE OF CALIBRATION

CUSTOMER ALLIED TECHNOLOGY GROUP ORDER NO. 233643 / 241068

Mfg. Ludlum Measurements, Inc. Model 3 Serial No. 102498

P. Ludlum Measurements, Inc. Model 44-9 Serial No. PR 100924

Cal. Date 17-Jun-99 Cal Due Date ~~17-Dec-99~~ 17 Jun 00 Cal. Interval 6 Months Meterface 202-002

Check mark ☑ applies to applicable instr. and/or detector IAW mfg. spec. T. 72 °F RH 45 % Alt 710.8 mm Hg

☐ New Instrument Instrument Received ☑ Within Toler. +-10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☑ Mechanical ck. ☑ Meter Zeroed ☐ Background Subtract ☐ Input Sens. Linearity
☑ F/S Resp. ck ☑ Reset ck. ☐ Window Operation ☑ Geotropism
☑ Audio ck. ☐ Alarm Setting ck. ☑ Batt. ck. (Min. Volt) 2.2 VDC
☑ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. ☐ Calibrated in accordance with LMI SOP 14.9 rev 12/19/89.

Instrument Volt Set 900 V Input Sens. 35 mV Det. Oper. 900 V at 35 mV Threshold Dial Ratio ____ = ____ m

☐ HV Readout (2 points) Ref./Inst. ____ / ____ V Ref./Inst. ____ / ____ V

COMMENTS:

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
X 100	400k cpm	4K	4K
X 100	100k cpm	1K	1K
X 10	40k cpm	4K	4K
X 10	10k cpm	1K	1K
X 1	4k cpm	4K	4K
X 1	1k cpm	1K	1K
X 0.1	400cpm	4K	4K
X 0.1	100cpm	1K	1K

*Uncertainty within ± 10% C.F. within ± 20% ALL Range(s) Calibrated Electronically

	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*		REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Digital Readout				Log Scale			

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1997 State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources:

Cs-137 Gamma S/N ☐ 1162 ☑ G112 ☐ M565 ☐ 5105 ☐ T1008 ☐ T879 ☐ E552 ☑ E551 ☐ Neutron Am-241 Be S/N T-30

☐ Alpha S/N ____ ☐ Beta S/N ____ ☐ Other ____

☑ m 500 S/N 104542 ☐ Oscilloscope S/N ____ ☑ Multimeter S/N 50100581

Calibrated By: V. Lee Alvarado Date 17 Jun 99

Reviewed By: Rhonda Hann Date 20 Jun 99

FORM C22A 09/17/98

Designer and Manufacturer
of
Scientific and Industrial
Instruments

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 915-235-5494
501 OAK STREET FAX NO. 915-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

CONVERSION CHART

Customer ALLIED TECHNOLOGY GROUP Date 17-Jun-99 Order #. 233643 / 241068

Model 3 Serial No. 102498 Detector Model 44-9 Serial No. PR100929

Source Cs-137 194.6 mCi / Cs-137 20 mCi High Voltage 900 V

Input Sensitivity 35 mV

Reference Point	"As Found" Readings (CPM): Meter Reading	Range/Scale	After Adjustment Readings (CPM): Meter Reading	Range/Scale
150 mR/hr	3.7K	X100	3.7K	X100
50 mR/hr	1.6K	X100	1.6K	X100
15 mR/hr	4.7K	~~X100~~ X10	4.7K	X10
5 mR/hr	1.7K	X10	1.7K	X10
1.5 mR/hr	4.8K	X1	4.8K	X1
1.0 mR/hr	3.3K	X1	3.3K	X1

Signature: V. Lee Alvarado Date 17 Jun 99

FORM C17-1A 05/20/98

Designer and Manufacturer of Scientific and Industrial Instruments

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 915-235-5494
501 OAK STREET FAX NO. 915-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

CERTIFICATE OF CALIBRATION

CUSTOMER ALLIED TECHNOLOGY GROUP ORDER NO. 233643/ 241068

1. Ludlum Measurements, Inc. Model 12 Serial No. 125308

.g. Ludlum Measurements, Inc. Model 43-68 Serial No. PR 129327

Cal. Date 15-Jun-99 Cal Due Date ~~15-Dec-99~~ CG 15-Jun-00 Cal. Interval ~~6 Months~~ 1 YEAR CG Meterface 202-356

Check mark ☑ applies to applicable instr. and/or detector IAW mfg. spec. T. 72 °F RH 50 % Alt 708.8 mm Hg

☐ New Instrument Instrument Received ☑ Within Toler. +-10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☑ Mechanical ck. ☑ Meter Zeroed ☐ Background Subtract ☐ Input Sens. Linearity
☑ F/S Resp. ck ☑ Reset ck. ☐ Window Operation ☑ Geotropism
☑ Audio ck. ☐ Alarm Setting ck. ☑ Batt. ck. (Min. Volt) 2.2 VDC

☑ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. ☐ Calibrated in accordance with LMI SOP 14.9 rev 12/19/89.

Instrument Volt Set Comments V Input Sens. 4 mV Det. Oper. Comments V at 4 mV Threshold Dial Ratio = m

☑ HV Readout (2 points) Ref./Inst. 509 / 500 V Ref./Inst. 2016 / 2000 V

COMMENTS:
HV Alpha: 1250v
HV Beta: 1750v

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
X 1000	400 K cpm	400	400
X 1000	100 K cpm	100	100
X 100	40 K cpm	400	400
X 100	10 K cpm	100	100
X 10	4 K cpm	400	400
X 10	1 K cpm	100	100
X 1	400 cpm	400	400
X 1	100 cpm	100	100

*Uncertainty within ± 10% C.F. within ± 20% ALL Range(s) Calibrated Electronically

	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*		REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Digital Readout				Log Scale			

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978 State of Texas Calibration License No. LO-196

Reference Instruments and/or Sources:

Cs-137 Gamma S/N ☐ 1162 ☐ G112 ☐ M565 ☐ 5105 ☐ T1008 ☐ T879 ☐ E552 ☐ E551 ☐ Neutron Am-241 Be S/N T-3

☑ Alpha S/N Pu-239 12800cpm ☑ Beta S/N Tc-99 14300 cpm ☐ Other

m 500 S/N 134709 ☐ Oscilloscope S/N ☑ Multimeter S/N 57390613

Calibrated By: Conrad Salinas Date 15 Jun 99

Reviewed By: Rhonda Harris Date 20 Jun 99

FORM C22A 05/05/99

Designer and Manufacturer
of
Scientific and Industrial
Instruments

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 915-235-5494
501 OAK STREET FAX NO. 915-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

Bench Test Data

Detector 43-68 Serial No. PR 129327 Order #. 233643/ 241068

Customer ALLIED TECHNOLOGY GROUP

Counter 12 Serial No. 125308 Counter Input Sensitivity 4 mV

Count Time 6pm Distance Source to Detector Surface

Other

High Voltage	Background	Isotope Pu-239 Size 12 800 cpm	Isotope Tc-99 Size 14300 cpm	Isotope Size	Isotope Size
1050	0	6k			
1100	1	6k			
1150	2	6k			
1200	1	6k			
1250	3	6.5k			
1300	3	6.5k			
1350	5	6.5k			
1400	12	6.5k			
1600	160		8k		
1650	200		8.5k		
1700	260		9k		
1750	300		9k		
1800	350		9k		
1850	380		9k		

☐ Gas proportional detector count rate decreased ≤ 10% after 15 hour static test using 39" cable.

Signature Conrad Talindo Date 15 Jun 99

um Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities o other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration technique The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1997. State of Texas Calibration License No. LO-19

Designer and Manufacturer of Scientific and Industrial Instruments

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 915-235-5494
501 OAK STREET FAX NO. 915-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

CERTIFICATE OF CALIBRATION

CUSTOMER ALLIED TECHNOLOGY GROUP ORDER NO. 235398/241941

'g. Ludlum Measurements, Inc. Model 12 Serial No. 121291

g. Ludlum Measurements, Inc. Model 43-68 Serial No. PR061081

Cal. Date 20-Jul-99 Cal Due Date 20-Jul-00 Cal. Interval 1 Year Meterface 202-356

Check mark ☑ applies to applicable instr. and/or detector IAW mfg. spec. T. 76 °F RH 45 % Alt 707.8 mm Hg

☐ New Instrument Instrument Received ☑ Within Toler. +-10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☑ Mechanical ck. ☑ Meter Zeroed ☐ Background Subtract ☐ Input Sens. Linearity
☑ F/S Resp. ck ☑ Reset ck. ☐ Window Operation ☑ Geotropism
☑ Audio ck. ☐ Alarm Setting ck. ☑ Batt. ck. (Min. Volt) 2.2 VDC

☑ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. ☐ Calibrated in accordance with LMI SOP 14.9 rev 12/19/89.

Instrument Volt Set Comments V Input Sens. 4 mV Det. Oper. Comments V at 4 mV Threshold Dial Ratio = m

☑ HV Readout (2 points) Ref./Inst. 492 / 500 V Ref./Inst. 2004 / 2000 V

COMMENTS:

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High Voltage: 1(Alpha) = 1250V
              2(Beta) = 1700V
Instrument calibrated with a 39"cable
```

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
X 1000	400 K cpm	400	400
X 1000	100 K cpm	100	100
X 100	40 K cpm	400	400
X 100	10 K cpm	100	100
X 10	4 K cpm	400	400
X 10	1 K cpm	100	100
X 1	400 cpm	400	400
X 1	100 cpm	100	100

*Uncertainty within ± 10% C.F. within ± 20% ALL Range(s) Calibrated Electronically

	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*		REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Digital Readout				Log Scale			

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978 State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources:

Cs-137 Gamma S/N ☐ 1162 ☐ G112 ☐ M565 ☐ 5105 ☐ T1008 ☐ T879 ☐ E552 ☐ E551 ☐ Neutron Am-241 Be S/N T-30

☑ Alpha S/N Pu239#8743 ☑ Beta S/N Tc99#635/83 ☐ Other

☐ m 500 S/N 70648 ☐ Oscilloscope S/N ☑ Multimeter S/N 61730074

Calibrated By: Louis Martinez Date 20-Jul-99

Reviewed By: Bill Henson Date 21-Jul-99

FORM C22A 05/05/99

Designer and Manufacturer
of
Scientific and Industrial
Instruments

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 915-235-5494
501 OAK STREET FAX NO. 915-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

Bench Test Data

Detector 43-68 Serial No. PR061081 Order #. 235398/241941

Customer ALLIED TECHNOLOGY GROUP

Counter 12 Serial No. 121291 Counter Input Sensitivity 4 mV

Count Time CPM Distance Source to Detector surface

Other

High Voltage	Background	Isotope Pu239 Size 12.8 Kcpm	Isotope Tc99 Size 14.3Kcpm	Isotope Size	Isotope Size
1100	0	6K			
1150	1	6K			
1200	1	6K			
1250	0	6K			
1300	1	6K			
1350	5	6K			
1400	24	6K			
1600	200		8K		
1650	260		8.5K		
1700	280		8.5K		
1750	290		8.5K		
1800	400		10K		

☑ Gas proportional detector count rate decreased ≤ 10% after 15 hour static test using 39" cable.

Signature Lai Martin BH Date 20-Jul-99 21-Jul-99

m Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of ...er International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1997. State of Texas Calibration License No. LO-19

Designer and Manufacturer
of
Scientific and Industrial
Instruments

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 915-235-5494
501 OAK STREET FAX NO. 915-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

Functional Check

Customer ALLIED TECHNOLOGY GROUP Order #. 235398/241941

This Certifies that Ludlum Model 239-1F Serial No. RN012633 has been functionally checked.
Refer to applicable instrument manuals for specific operating instructions.

Check performed by Lori Martin BH Date 20-Jul-99 21-Jul-99

Designer and Manufacturer of Scientific and Industrial Instruments

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 915-235-5494
501 OAK STREET FAX NO. 915-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

CERTIFICATE OF CALIBRATION

CUSTOMER ALLIED TECHNOLOGY GROUP ORDER NO. 233643/ 241068

"g. Ludlum Measurements, Inc. Model 2224 Serial No. 132159

g. Ludlum Measurements, Inc. Model 43-68 Serial No. PR 134485

Cal. Date 15-Jun-99 Cal Due Date ~~15 Dec 99~~ 15-Jun-00 CG Cal. Interval ~~6 Months~~ 1 YEAR CG Meterface 202-783

Check mark ☑ applies to applicable instr. and/or detector IAW mfg. spec. T. 72 °F RH 50 % Alt 708.8 mm Hg

☐ New Instrument Instrument Received ☑ Within Toler. +-10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☑ Mechanical ck. ☑ Meter Zeroed ☐ Background Subtract ☐ Input Sens. Linearity
☑ F/S Resp. ck ☑ Reset ck. ☑ Window Operation ☑ Geotropism
☑ Audio ck. ☐ Alarm Setting ck. ☑ Batt. ck. (Min. Volt) 2.2 VDC

☑ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. ☐ Calibrated in accordance with LMI SOP 14.9 rev 12/19/89.

Instrument Volt Set 1600 V Input Sens. Comments mV Det. Oper. 1600 V at Comments mV Threshold Dial Ratio = m

☑ HV Readout (2 points) Ref./Inst. 515 / 500 V Ref./Inst. 1998 / 2000 V

COMMENTS:

Alpha Threshold: 120mV
Beta Threshold: 4mV
Beta Window: 40mV
Overload check but not set
HV set with detector not connected
Firmware 390063

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
X 1000	400Kcpm	400	400
X 1000	100Kcpm	100	100
X 100	40Kcpm	400	400
X 100	10Kcpm	100	100
X 10	4Kcpm	400	400
X 10	1Kcpm	100	100
X 1	400cpm	400	400
X 1	100cpm	100	100

*Uncertainty within ± 10% C.F. within ± 20%

ALL Range(s) Calibrated Electronically

	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Digital Readout	400 K cpm	399751	399751
	40 K cpm	39981	39981
	4 K cpm	3998	3998
	400 cpm	400	400
	40 cpm	40	40

	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Log Scale			

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978 State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources:

Cs-137 Gamma S/N ☐ 1162 ☐ G112 ☐ M565 ☐ 5105 ☐ T1008 ☐ T879 ☐ E552 ☐ E551 ☐ Neutron Am-241 Be S/N T-30

☑ Alpha S/N Pu-239 12800cpm ☑ Beta S/N ~~Tc-99 14300cpm~~ ~~Sr-90/Y-90 7385cpm~~ ☐ Other

☑ m 500 S/N 134709 ☐ Oscilloscope S/N ☑ Multimeter S/N 57390613

Calibrated By: Conrad Salinas Date 15 Jun 99

Reviewed By: Rhonda Harris Date 20 Jun 99

FORM C22A 05/05/99

Designer and Manufacturer
of
Scientific and Industrial
Instruments

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 915-235-5494
501 OAK STREET FAX NO. 915-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

Bench Test Data For Detector

Detector 43-68 Serial No. PR 134485 Order #. 233643/ 241068

Customer ALLIED TECHNOLOGY GROUP Alpha Input Sensitivity 120 mV

Counter 2224 Serial No. 132159 Beta Input Sensitivity 4 mV

Count Time 1Minute Beta Window 40 mV

Other _____ Distance Source to Detector Surface

High Voltage	Background		Isotope Pu-239 Size 12800cpm		Isotope Sr-90/Y-90 Size 7385cpm		Isotope Tc-99 Size ~~Fe-9~~ 14300cpm	
	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta
1550	0	124	5374	410	1	3004	4	6750
1575	0	182	5614	469	1	3718	8	7341
1600	0	226	5682	555	5	4150	7	7349
1625	2	283	5973	613	13	4405	27	7089
1650	1	342	6003	585	45	4435	173	6952

☑ Gas Proportional detector count rate decreased ≤ 10% after 15 hour static test using 39" cable.

☐ Gas proportional detector count rate decreased ≤ 10% after 5 hour static test using 39" cable and alpha/beta counter.

Signature Conrad Rolands Date 15 Jun 99

Designer and Manufacturer of Scientific and Industrial Instruments

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 915-235-5494
501 OAK STREET FAX NO. 915-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

CERTIFICATE OF CALIBRATION

CUSTOMER ALLIED TECHNOLOGY GROUP ORDER NO. 233643/ 241068

Mfg. Ludlum Measurements, Inc. Model 2224 Serial No. 132147

Ind. Ludlum Measurements, Inc. Model 43-68 Serial No. PR 134001

Cal. Date 15-Jun-99 Cal Due Date ~~15-Dec-99~~ 15 Jun-00 CG Cal. Interval ~~6 Months~~ 1 YEAR CG Meterface 202-783

Check mark ☑ applies to applicable instr. and/or detector IAW mfg. spec. T. 72 °F RH 50 % Alt 708.8 mm Hg

☐ New Instrument Instrument Received ☑ Within Toler. +-10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☑ Mechanical ck. ☑ Meter Zeroed ☐ Background Subtract ☐ Input Sens. Linearity
☑ F/S Resp. ck ☑ Reset ck. ☑ Window Operation ☑ Geotropism
☑ Audio ck. ☐ Alarm Setting ck. ☑ Batt. ck. (Min. Volt) 2.2 VDC

☑ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. ☐ Calibrated in accordance with LMI SOP 14.9 rev 12/19/89.

Instrument Volt Set 1600 V Input Sens. Comments mV Det. Oper. 1600 V at Comments mV Threshold Dial Ratio = m

☑ HV Readout (2 points) Ref./Inst. 507 / 500 V Ref./Inst. 1994 / 2000 V

COMMENTS:

Alpha Threshold: 120mV
Beta Threshold: 4mV
Beta Window: 40mV
Overload check but not set
HV set with detector not connected
Firmware 390063

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
X 1000	400Kcpm	400	400
X 1000	100Kcpm	100	100
X 100	40Kcpm	400	400
X 100	10Kcpm	100	100
X 10	4Kcpm	400	400
X 10	1Kcpm	100	100
X 1	400cpm	400	400
X 1	100cpm	100	100

*Uncertainty within ± 10% C.F. within ± 20% ALL Range(s) Calibrated Electronically

	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*		REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Digital Readout	400 K cpm	399424	399424	Log Scale			
	40 K cpm	39956	39956				
	4 K cpm	3997	3997				
	400 cpm	400	400				
	40 cpm	40	40				

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978 State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources:

Cs-137 Gamma S/N ☐ 1162 ☐ G112 ☐ M565 ☐ 5105 ☐ T1008 ☐ T879 ☐ E552 ☐ E551 ☐ Neutron Am-241 Be S/N T-30

☑ Alpha S/N Pu-239 12800cpm ☑ Beta S/N Tc-99 4300cpm, Sr-90/Y-90 2235cpm ☐ Other

☑ m 500 S/N 134709 ☐ Oscilloscope S/N ☑ Multimeter S/N 57390613

Calibrated By: Conrad Salinas Date 15 Jun 99

Reviewed By: Rhonda Harris Date 20 Jun 99

FORM C22A 05/05/99

Designer and Manufacturer
of
Scientific and Industrial
Instruments

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 915-235-5494
501 OAK STREET FAX NO. 915-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

Bench Test Data For Detector

Detector 43-68 Serial No. PR 134001 Order #. 233643/ 241068

Customer ALLIED TECHNOLOGY GROUP Alpha Input Sensitivity 120 mV

Counter 2224 Serial No. 132147 Beta Input Sensitivity 41 mV

Count Time 1Minute Beta Window 40 mV

Other _____ Distance Source to Detector Surface

High Voltage	Background		Isotope Pu-239 Size 12800cpm		Isotope Sr-90/Y-90 Size 7785cpm		Isotope Tc-99 Size 14300cpm	
	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta
1550	0	126	4917	463	0	2959	9	6641
1575	0	158	5466	491	0	3480	7	7113
1600	0	224	5569	569	4	3992	8	7151
1625	1	242	5607	563	2	4243	18	7065
1650	2	332	5884	594	16	43	63	6964

☑ Gas Proportional detector count rate decreased ≤ 10% after 15 hour static test using 39" cable.

☐ Gas proportional detector count rate decreased ≤ 10% after 5 hour static test using 39" cable and alpha/beta counter.

Signature Conrad Salinas Date 15 Jun 99

Designer and Manufacturer of Scientific and Industrial Instruments

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 915-235-5494
501 OAK STREET FAX NO. 915-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

CERTIFICATE OF CALIBRATION

CUSTOMER ALLIED TECHNOLOGY GROUP ORDER NO. 239056/243662

Ludlum Measurements, Inc. Model 2224 Serial No. 160668

Mfg. Ludlum Measurements, Inc. Model 43-37 Serial No. PR088824

Cal. Date 15-Oct-99 Cal Due Date 15-Oct-00 Cal. Interval 1 Year Meterface 202-783

Check mark ☑ applies to applicable instr. and/or detector IAW mfg. spec. T. 75 °F RH 41 % Alt 703.8 mm Hg

☑ New Instrument Instrument Received ☐ Within Toler. +-10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☑ Mechanical ck. ☑ Meter Zeroed ☐ Background Subtract ☐ Input Sens. Linearity
☑ F/S Resp. ck ☑ Reset ck. ☑ Window Operation ☑ Geotropism
☑ Audio ck. ☐ Alarm Setting ck. ☑ Batt. ck. (Min. Volt) 2.2 VDC

☑ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. ☐ Calibrated in accordance with LMI SOP 14.9 rev 12/19/89.

Instrument Volt Set 1675 V Input Sens. Comments mV Det. Oper. 1675 V at Comments mV Threshold Dial Ratio = mV

☑ HV Readout (2 points) Ref./Inst. 500 / 500 V Ref./Inst. 2010 / 2000 V

COMMENTS:
Beta Thres. = 4mV
Beta Win. = 40mV
Alpha Thres. = 100mV
High voltage set with detector disconnected.
Overload checked, but not set
Calibrated using a 5' cable
Firmware # ~~39000W~~ 39006N03

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
X1000	400 K cpm		400
X1000	100 K cpm		100
X100	40 K cpm		400
X100	10 K cpm		100
X10	4 K cpm		400
X10	1 K cpm		100
X1	400cpm		400
X1	100cpm		100

*Uncertainty within ± 10% C.F. within ± 20% ALL Range(s) Calibrated Electronically

	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Digital Readout	400 K cpm		40001 (6)
	40 K cpm		4000
	4 K cpm		400
	400 cpm		40
	40 cpm		4

	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Log Scale			

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978 State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources:

Cs-137 Gamma S/N ☐ 1162 ☐ G112 ☐ M565 ☐ 5105 ☐ T1008 ☐ T879 ☐ E552 ☐ E551 ☐ Neutron Am-241 Be S/N T-304

☑ Alpha S/N Pu239#8743 ☑ Beta S/N Tc99#635/83,Sr90#443-69-3 ☐ Other

1500 S/N 70648 ☐ Oscilloscope S/N ☑ Multimeter S/N 61730074

Calibrated By: Lori Martin Date 15-Oct-99

Reviewed By: Rhonda Hann Date 15 Oct 99

Designer and Manufacturer
of
Scientific and Industrial
Instruments

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 915-235-5494
501 OAK STREET FAX NO. 915-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

Bench Test Data For Detector

Detector 43-37 Serial No. PR088924 Order #. 239056/243662

Customer ALLIED TECHNOLOGY GROUP Alpha Input Sensitivity 100 mV

Counter 2224 Serial No. 160668 Beta Input Sensitivity 4 mV

Count Time 1Minute Beta Window 40 mV

Other _____ Distance Source to Detector surface

High Voltage	Background		Isotope Am239 Size 12.8Kcpm		Isotope Tc99 Size 14.3Kcpm		Isotope Sr90 Size 0.01112μC	
	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta
1625	0	346	4595	652	7	6391	3	9176
1650	5	480	4598	774	8	7069	3	10231
1675	6	613	5018	964	12	7481	13	12240
1700	4	673	5017	1280	20	7585	30	13718

☐ Gas Proportional detector count rate decreased ≤ 10% after 15 hour static test using 39" cable.

☑ Gas proportional detector count rate decreased ≤ 10% after 5 hour static test using 39" cable and alpha/beta counter.

Signature Lori Martin Date 15-Oct-99

FORM C48 12/09/97

Designer and Manufacturer
of
Scientific and Industrial
Instruments

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 915-235-5494
501 OAK STREET FAX NO. 915-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

Functional Check

Customer ALLIED TECHNOLOGY GROUP Order #. 239056/243662

This Certifies that Ludlum Model 239-1F Serial No. RN012633 has been functionally checked.
Refer to applicable instrument manuals for specific operating instructions.

Check performed by Lois Martin Date 15-Oct-99

Designer and Manufacturer of Scientific and Industrial Instruments

Work Order: 239056

TAG #: 243662

LUDLUM MEASUREMENTS,
POST OFFICE BOX 810 PH:
501 OAK STREET FAX:
SWEETWATER, TEXAS 79556. U.S.A.

Received: 10/14/9 **Received Via:** FEPO **Condition Received:** FAIR

SHIP TO:
ALLIED TECHNOLOGY GROUP
~~609 EMORY VALLEY ROAD~~
~~OAK RIDGE TN 37830~~
Ft McClellan, AL

BILL TO:
ALLIED TECHNOLOGY GROUP
PO BOX 1638
FREMONT CA 94538

CUSTOMER #: 08441

Reason for Return: Calibration **Cal Interval \ Special Instructions:** 1 YR / SPEC INSTR / NEW 2224

Comments: Item 2: re-faced window, clean + baked
Item 3: replaced missing screws on flow box, checked
New 2224, cal'd with item 2

ITEM	QTY	PART #	DESCRIPTION	PRICE	COST
01	1.00 EA	MICRO REM	*B500Z		
02*	1.00 EA	43-37	M 43-37 FOR REPAIR/CAL *PR088824		
03*	1.00 EA	239-1F	M 239-1F FOR REPAIR/CAL *RN012633		

(Kept Large Box)

ITEM	QTY	PART #	DESCRIPTION	PRICE	COST
3	3	17-8537	8-32 X 5/16 screw	.25	.75
3	3	26-9010	#8 lockwasher	.25	.75
New	1	48-2494	M2224 AtB Scalar/Ratemeter	995.00	995.0
2	1	7085-398	Gas plug	—	

Instrument Calibrated: 1 at 45.00 Total Parts Cost: 996.50 Sub Total Calibration, Parts, and Labor: 1271.50

Secondary Detectors: 1 at 15.00 Total Calibration Charge: 125.00 Shipping Charges:

Extended Calibration: 1 at 65.00 Total Labor: 100.00 Total Charges:

Labor: 2 hour(s) at $ 50.00 per hour

Signed: Conrad Salinda / Lori Martin Date: 15-Oct-99

Q/ ased Rhonda Hamm Date: 15 Oct 99

DO NOT PAY! INVOICE TO FOLLOW

Date: 10/15/99 Contacted: BARB WHITAKER By:

PO Number: 103TN90241 Return Ship: UPS Phone #: (510) 490-3008

ATG Catalytics, Inc.
Oct/29/1999 10:11:19AM

HEADER INFORMATION in MAR00423.S0 DEMIN SUPPLY TO BOILER

Identification
- User : KSW
- Card : 1
- Detector : GEM-20200
- Geometry : marinelli
- Sample : TEST
- Channels : 8192

Acquisition
- Started : Oct/29/1999 10:01:12AM
- Stopped : Oct/29/1999 10:11:12AM
- True Time : 600.021 sec
- Live Time : 600.000 sec
- Dead Time : 0.00 %
- Gross Count : 717 counts
- Gross Rate : 1.195 cps

Sample
Sample Quantity 1000 ± 100 ml

Energy Calibration Jul/23/1999 9:40:49AM 99D01G04.S0
Resolution Calibration May/21/1999 1:26:12PM 99D01G04.S0
Efficiency Calibration May/24/1999 5:19:49PM 99D01G04.S0
Isotope Library ISO_QCEP.LIB Sep/20/1999 11:40:12AM

No Activity Detected
10/29/99

DAILY INSTRUMENT RESPONSE CHECK LOG

PROJECT: FORT McCLELLAN

DATE	MODEL/TYPE	S/N	PHYSICAL DAMAGE Y/N	CAL DUE DATE	SOURCE I.D.	ACTIVITY	BKRD	READING	EFF	PASS/ FAIL P/F	TECH INIT
10/26/99	LUDLUM MODEL 3	102554	N	6-16-00	93TC 470	45,200 DPM	40 cpm	4,400 cpm	10%	P	DK
10/26/99	LUDLUM MODEL 3	102498	N	6-17-00	93TC 470	45,200 DPM	40 cpm	4,600 CPM	10%	P	DK
10/26/99	LUDLUM MODEL 239-1F MODEL 2224	160668	N	10-15-00	95TH100(487)	24,600 DPM	0 cpm	4 155 cpm	BETA 17%	P	DK
	MODEL 43-37	088824	N	10-15-00	95TC100(0488)	28,800 DPM	811 cpm	5,837	BETA 17%	P	DK
10/26/99	LUDLUM MODEL 2224	132134	N	6/15/00	95TC100(0488)	28,800	261 cpm	5540	BETA 18.3%	P	FW
	DETECTOR 43-68	134001	N	"	95TH100(487)	24,600 DPM	6 cpm	4040	ALPHA 16.4%	P	FW
10/26/99	LUDLUM MODEL 2224	132155	N	6/15/00	95TH100(487)	24,600 DPM	2 cpm	4067 3979 DKN	Alpha 16.5%	P	DKN
	DETECTOR 43-68	134485	N	"	95TC100(0488)	28,800 DPM	281 cpm	5357	BETA 19.6%	P	DKN
10-26-99	MICRO BICRON REM	B 5662	N	10-14-00	DU #2	mR/HR	8 mR	100 mR	N/A	P	DK
10-26-99	MICRO BICRON REM	B 5042	N	12-23-99	DU #2	mR/HR	7 mR	90 mR	N/A	P	DK
10-26-99	LUDLUM MODEL 12	121291	N	6-20-00	95TH100(487)	24,600 DPM	0 cpm	4700 cpm	ALPHA 17.9%	P	FW
	DETECTOR 43-68	061081	N	6-20-00	"	—	—	—	—	—	—
10-26-99	LUDLUM MODEL 12	125308	N	6-15-00	95TC100(0488)	28,800 DPM	400 cpm	7000 cpm	BETA 22.9%	P	FW
	DETECTOR 43-68	129327	N	6-15-00	—	—	—	—	—	—	—
10-27-99	MICRO-REM BICRON	B 500 Z	N	10-14-00	DU #2	uR/HR	8 uR	140 uR	N/A	P	DKN
10-27-99	LUDLUM MODEL 3	102554	N	6-16-00	93TC 470	45,200 dpm	40 cpm	4,400 cpm	10%	P	DK
10-27-99	LUDLUM MODEL 3	102498	N	6-17-00	93TC 470	45,200 dpm	40 cpm	4,600 cpm	10%	P	DK
10-27-99	LUDLUM Model 239-1F model 2224	160668	N	10-15-00	95TH100(487)	24,600 DPM	16	4,283 cpm	ALPHA 17.3%	P	DKN

DAILY INSTRUMENT RESPONSE CHECK LOG

PROJECT: Fort McCLELLAN

DATE	MODEL/TYPE	S/N	PHYSICAL DAMAGE Y/N	CAL DUE DATE	SOURCE I.D.	ACTIVITY	BKRD	READING	EFF	PASS/ FAIL P/F	TECH INIT
10-27-99	Ludlum Model 239-1F Model 43-37	088824	N	10-15-00	95TC100(0488)	28,800 DPM	850 cpm	6435 cpm	BETA 19%	P	DKM
10-27-99	Ludlum Model 2224	132159	N	6-15-00	95TH100(487)	24,600 DPM	2 cpm	4106 cpm	ALPHA 16.6 %	P	DKM
	Detector 43-68	134485	N	↓	95TC100(0488) DKM	28,800 DPM	276 cpm	5537 cpm	BETA 18.2 %	P	DKM
10-28-99	Bicron micro-rem	B 5002	N	10-14-00	Du # 2	uR/Hr	8 uR	300 uR DKM	N/A	P	DKM
10-28-99	Bicron Micro rem	B 5042	N	12-23-99	Du # 2	uR/HR	8 uR	300 cpm	N/A	P	DKM
10-28-99	Ludlum Model 239-1F Model 2224	160668	N	10-15-00	95TH100(487)	24,600 DPM	7 cpm	4192 cpm	Alpha 17.0 %	P	DKM
	Model 43-37	088824	N	10-15-00	95TC100(0488)	28,800 DPM	904 cpm	6568 cpm	Beta 19.6 %	P	DKM
10-28-99	Model 2224	132159 DKM 160668	N	10-15-00	95TH100(487)	24,600 DPM	DKM 71 cpm	4050 cpm	Alpha 16.4 %	P	DKM
	Detector 43-68	134485	N	10-15-00	95TC100(0488)	28,800 DPM	151 cpm 462 DKM cpm	5340 462 DKM cpm	Beta 18%	P	DKM
10-29-99	micro-rem Bicron 5002	5002	N	10-14-00	Du # 2	uR/HR	8 uR	150 uR DKM cpm	NA	P	DKM
10-29-99	Ludlum Model 239-1F Model 2224	160668	N	10-15-00	95TH100(487)	24,600 DPM	7 cpm	4148 cpm	Alpha 16.8%	P	DKM
	Model 43-37	088824	N	10-15-00	95TC100(0488)	28,800 DPM	768 cpm	6267 cpm	BETA 19.0 %	P	DKM
10-29-99	Ludlum Model 2224	132159	N	6-15-00	95TH100(487)	24,600 DPM	3 cpm	3953 cpm	Alpha 16.0 %	P	DKM
	Detector 43-68	134485	N	6-15-00	95TC100(0488)	28,800 DPM	238 cpm	5522 cpm	Beta 18.3 %	P	DKM
11-1-99	micro-rem Bicron 5002	5002	N	10-14-00	Du # 2	uR/HR	8 uR	300 uR DKM cpm	NA	P	DKM
11-1-99	Ludlum Model 239-1F Model 2224	160668	N	10-15-00	95TH100(487)	24,600 DPM	10 cpm	3987 cpm	Alpha 16.1 %	P	DKM
	Model 43-37	088824	N	10-15-00	95TC100(0488)	28,800 DPM	467 cpm	6147 cpm	Beta 19.7%	P	DKM
				N A							

DAILY INSTRUMENT RESPONSE CHECK LOG

PROJECT: Fort McClellan

DATE	MODEL/TYPE	S/N	PHYSICAL DAMAGE Y/N	CAL DUE DATE	SOURCE I.D.	ACTIVITY	BKRD	READING	EFF	PASS/ FAIL P/F	TECH INIT
11-1-99	Model 2224	132159	N	10-15-00	95TH100(487)	24,600 DPM	Alpha 1 cpm	1044 cpm	Alpha 16.4 %	P	DKM
	Model 43-68	134485	N	10-15-00	95TH100(0488)	28,800 DPM	Beta 232 cpm	5567 cpm	Beta 18.5 %	P	DKM
11-2-99	Micro-Rem BICRON Ludlum 239-1F	B 5002	N	10-14-00	DU # 2	DKM 300 uR/HR	8 uR	300 uR	NA	P	DKM
11-2-99	Model 2224	160663	N	10-15-00	95TH100(497)	24,600 DPM	Alpha 2 cpm	3960 cpm	Alpha 16.0 %	P	DKM
	PR 43-37	088824	N	10-15-00	95TC100(0498)	28,800 DPM	Beta 958 cpm	6687 cpm	Beta 19.8 %	P	DKM
11-2-99	Model 2224	132159	N	10-15-00	95TH100(487)	24,600 DPM	Alpha 0 cpm	3944 cpm	Alpha 16.0 %	P	DKM
	PR 43-68	134485	N	10-15-00	95TC100(0488)	28,800 DPM	Beta 287 cpm	5566 cpm	Beta 18.3 %	P	DKM
11-2-99	Model 2224	132147	N	6-15-00	95TH100(487)	24,600 DPM	DKM Alpha +3 cpm	3999 cpm	~~Beta~~ DKM Alpha 16.2 %	P	DKM
	PR 43-68	134001	N	6-15-00	95TC100(0488)	28,800 DPM	Beta 118 cpm	~~5343~~ ~~18.1~~ DKM cpm	Beta 18.1 %	P	DKM
11-3-99	Bicron	DKM ~~B 5~~ 5002	N	10-14-00	DU # 2	uR/hr	8 uR	300 uR	NA	P	DKM
11-3-99	Ludlum 239-1F M-2224	160668	N	10-15-00	95TH100(487)	24,600 DPM	Alpha 5 cpm	3955 cpm	Alpha 16.0 %	P	DKM
	PR 43-37	088824	N	10-15-00	95TC100(0488)	28,800 DPM	Beta 957 cpm	6594 cpm	Beta 19.9 %	P	DKM
11-3-99	M-2224	132147	N	6-15-00	95TH100(487)	24,600 DPM	Alpha 2 cpm	3997 cpm	Alpha 16.2 %	P	DKM
	PR 43-68	134001	N	6-15-00	95TC100(0488)	28,800 DPM	Beta 242 cpm	5593 cpm	Beta 18.5 %	P	DKM
11-3-99	Bicron	B-5002	N	10-14-00	DU # 2	uR/Hr	8 uR	300 uR	N/A	P	DK
	Model 3 Ludlum	102554	N	6-16-00	TC 99 93TC4201591	45,200 dpm	40 cpm	80,000 cpm	10%	P	DK
11-4-99	Bicron	B-5002	N	10-14-00	DU # 2	uR/Hr	8 uR	300 uR	N/A	P	DK
	Bicron	B-5002	N	12-13-99	DU # 2	uR/Hr	8 uR	300 uR	N/A	P	DK

DAILY INSTRUMENT RESPONSE CHECK LOG

PROJECT: Ft. McClellan

DATE	MODEL/TYPE	S/N	PHYSICAL DAMAGE Y/N	CAL DUE DATE	SOURCE I.D.	ACTIVITY	BKRD	READING	EFF	PASS/ FAIL P/F	TECH INIT
11-4-99	M-2224 239-1F	160668	N	10-15-00	95 TH100 (487)	24,600 DPM	9 cpm	3945 cpm	α 16.0 %	P	DK
	PR 43-37	088824	N	↓	95 TC100 (0488)	28,800 DPM	890 cpm	6115 cpm	β⁻ 18.1 %	P	DK
11-4-99	M-2224	132159	N	10-15-00	95TH100 (487)	24,600 DPM	4 cpm	3970 cpm	α 16.1 %	P	DK
	PR 43-68	134485	N	10-15-00	95TC100 (0488)	28,800 DPM	264 cpm	5789 cpm	β⁻ 19.1 %	P	DK
11-5-99	Bicron	B-500-2	N	10-14-00	DU # 2	mR/HR	8 mR	300 cpm uR DU	N/A	P	DK
11-5-99	M-2224 239-1F	160668	N	10-15-00	95TH100 (487)	24,600 DPM	16 cpm	3972 cpm	α 16.0 %	P	DK
	PR 43-37	088824	N	↓	95TC100 (0488)	28,800 DPM	928 cpm	6609 cpm	β⁻ 20.0 %	P	DK
11-5-99	M-2224	132159	N	↓	95TH100 (487)	24,600 DPM	2 cpm	3937 cpm	α 16.0 %	P	DK
	PR 43-68	134485	N	↓	95TC100 (0488)	28,800 DPM	224 cpm	5794 cpm	β⁻ 19.3 %	P	DK
11-8-99	M-2224 239-1F	160668	N	10-15-00	95TH100 (487)	24,600 DPM	11 cpm	3922 cpm	α 16.0 %	P	DK
	PR 43-37	088824	N	↓	95TC100 (0488)	28,800 DPM	878 cpm	6098 cpm	β⁻ 18.1 %	P	DK
	M-2224	132159	N	↓	95TH100 (487)	24,600 DPM	0 cpm	5471 cpm	α 18.3 %	P	DK
	PR 43-68	134485	N	↓	95TC100 (0488)	28,800 DPM	172 cpm	3944 cpm	β⁻ 16.0 %	P	DK
11-8-99	Bicron	B 500-2	N	10-14-00	DU # 2	mR/HR	8 mR	300 cpm uR DU	NA	P	DK
11-9-99	M-2224 239-1F	160668	N	10-15-00	95TH100 (487)	24,600 DPM	7 cpm	3955 cpm	α 16.0 %	P	DK
	PR 43-37	088824	N	↓	95TC100 (0488)	28,800 DPM	827 cpm	6193 cpm	β⁻ 18.6 %	P	DK
11-9-99	M-2224	132159	N	↓	95TH100 (487)	24,600 DPM	2 cpm	3950 cpm	α 16.0 %	P	DK
	PR 43-68	134485	N	↓	95TC100 (0488)	28,800 DPM	227 cpm	5600 cpm	β⁻ 18.6 %	P	DK

DAILY INSTRUMENT RESPONSE CHECK LOG

PROJECT: Ft. McClellan

DATE	MODEL/TYPE	S/N	PHYSICAL DAMAGE Y/N	CAL DUE DATE	SOURCE I.D.	ACTIVITY	BKRD	READING	EFF	PASS/ FAIL P/F	TECH INIT
11-9-99	Bicron	B 500Z	N	10-14-00	Du # 2	mR/hr	8 mR	300 mR	NA	P	DKM
11-10-99	Bicron	B 500 Z	N	10-14-00	Du # 2	mR/hr	8 mR	300 mR	NA	P	DKM
11-10-99	M-2224 239-1F	160668	N	10-15-00	95 TH100 (0487)	24,600 DPM	8 cpm	4024 cpm	α 16.3 %	P	DKM
	PR 43-37	088824	N		95TC100(0488)	28,800 DPM	873 cpm	6215 cpm	β- 18.5 %	P	DKM
11-10-99	M-2224	132159	N		95TH100(0487)	24,600 DPM	4 cpm	4037 cpm	α 16.4 %	P	DKM
	PR - 43-68	134485	N		95TC100(0488)	28,800 DPM	264 cpm	5545 cpm	β- 18.3 %	P	DKM
11-11-99	Bicron	B500Z	N	10-14-00	Du # 2	mR/hr	8 mR	300 mR	NA	P	DKM
11-11-99	M-2224 239-1F	160668	N	10-15-00	95TH100(0487)	24,600 DPM	7 cpm	3950 cpm	α 16.0 %	P	DKM
	PR 43-37	088824	N		95TC100(0488)	28,800 DPM	956 cpm	6427 cpm	β- 18.9 %	P	DKM
11-11-99	M-2224	132159	N		95TH100(0487)	24,600 DPM	2 cpm	3942 cpm	α 16.0 %	P	DKM
	PR 43-68	134485	N		95TC100(0488)	28,800 DPM	271 cpm	5522 cpm	β- 18.2 %	P	DKM
11-12-99	Bicron	B500Z	N	10-14-00	Du # 2	mR/hr	8 mR	300 mR	NA	P	DKM
11-12-99	M-2224 239-1F	160668	N	10-15-00	95TH100(487)	24,600 DPM	4 cpm	3941 cpm	α 16.0 %	P	DKM
	PR 43-37	088824	N		95TC100(0488)	28,800 DPM	864 cpm	6477 cpm	β- 19.4 %	P	DKM
11-12-99	M-2224	132159	N		95TH100(487)	24,600 DPM	5 cpm	3939 cpm	α 16.0 %	P	DKM
	PR 43-68	134485	N		95TC100(0488)	28,800 DPM	213 cpm	5727 cpm	β- 19.1 %	P	DKM
					N/A						

DAILY INSTRUMENT RESPONSE CHECK LOG

PROJECT: FT. McClellan

DATE	MODEL/TYPE	S/N	PHYSICAL DAMAGE Y/N	CAL DUE DATE	SOURCE I.D.	ACTIVITY	BKRD	READING	EFF	PASS/ FAIL P/F	TECH INIT
11-15-99	Bicron	B 500 2	N	10-14-00	Du #2	µR/hr	8 µR	300 µR	N/A	P	DK JL
11-15-99	M-2224 (239-1F)	160668	N	10-15-00	95TH100 (487)	24,600 dpm	7 cpm	3945 cpm	α 16.0 %	P	DK JL
	PR 43-37	088824	N	↓	95TC100 (0488)	28,800 dpm	911 cpm	6138 cpm	β- 18.1 %	P	DK JL
11-15-99	M-2224	132159	N	↓	95TH100 (487)	24,600 dpm	6 cpm	3939 cpm	α 16.0 %	P	DK JL
	PR 43-68	134485	N	↓	95TC100 (0488)	28,800 dpm	162 cpm	5522 cpm	β- 18.6 %	P	DK JL
11-16-99	Bicron	B 500 2	N	10-14-00	Du #2	µR/hr	8 µR	300 µR	N/A	P	DK JL
11-16-99	M-2224 (239-1F)	160668	N	10-15-00	95TH100 (487)	24,600 dpm	6 cpm	3945 cpm	α 16.0 %	P	DK JL
	PR 43-37	088824	N	↓	95TC100 (0488)	28,800 dpm	880 cpm	6115 cpm	β- 18.1 %	P	DK JL
11-16-99	M-2224	132159	N	↓	95TH100 (487)	24,600 dpm	5 cpm	3939 cpm	α 16.0 %	P	DK JL
	PR 43-68	134485	N	↓	95TC100 (0488)	28,800 dpm	190 cpm	5534 cpm	β- 18.5 %	P	DK JL
11-17-99	Bicron	B 5002	N	10-14-00	Du #2	DK 8 µR/hr	DK 300 8 µR	300 µR	N/A	P	DK JL
11-17-99	M-2224 (239-1F)	160668	N	10-15-00	95TH100 (487)	24,600 dpm	4 cpm	3949 cpm	α 16.0 %	P	DK JL
	PR 43-37	088824	N	↓	95TC100 (0488)	28,800 dpm	801 cpm	6478 cpm	β- 19.7 %	P	DK JL
11-17-99	M-2224	132159	N	↓	95TH100 (487)	24,600 dpm	0 cpm	3937 cpm	α 16.0 %	P	DK JL
	PR 43-68	134485	N	↓	95TC100 (0488)	28,800 dpm	100 cpm	5502 cpm	β- 18.7 %	P	DK JL
11-18-99	Bicron	B 5002	N	10-14-00	Du #2	µR/hr DK	8 µR	300 µR	N/A	P	DK JL
	M-2224 (239-1F)	160668	N	10-15-00	95TH100 (487)	24,600 dpm	4 cpm	3941 cpm	α 16.0 %	P	DK JL
	PR 43-37	088824	N	↓	95TC100 (0488)	28,800 dpm	712 cpm	5993 cpm	β- 18.3 %	P	DK JL

DAILY INSTRUMENT RESPONSE CHECK LOG

PROJECT: FT. McClellan

DATE	MODEL/TYPE	S/N	PHYSICAL DAMAGE Y/N	CAL DUE DATE	SOURCE I.D.	ACTIVITY	BKRD	READING	EFF	PASS/ FAIL P/F	TECH INIT
11-18-99	M-2224	132159	N	10-15-00	95TH100(0487)	24,600 Dpm	1 cpm	3935 cpm	< 16.0 %	P	DKM
	PR 43-68	134485	N	10-15-00	95TC100(0488)	28,800 Dpm	285 cpm	5505 cpm	B- 18.1	P	DKM
11-19-99	Bicron	B-5002	N	10-14-00	DU # 2	uR/hr	8 uR	300 uR	NA	P	DKM
	M-2224 (239-1F)	160668	N	10-15-00	95TH100 (487)	24,600 Dpm	4 cpm	3942 cpm	< 16.0 %	P	DKM
	PR-43-37	088824	N		95TC100(0488)	28,800 Dpm	729 cpm	6150 cpm	B- 18.8 %	P	DKM
	M-2224	132159	N		95TH100(487)	24,600 Dpm	0 cpm	3932 cpm	< 16.0 %	P	DKM
	PR 43-68	134485	N		95TC100(0488)	28,800 Dpm	150 cpm	5408 cpm	B- 18.7 %	P	DKM
11-21-99	Bicron	B-5002	N	10-14-00	DU # 2	uR/hr	8 uR	300 uR	NA	P	DKM
	M-2224 (239-1F)	160668	N	10-15-00	95TH100(487)	24,600 DPM	6 cpm	3949 cpm	< 16.0 %	P	DKM
	PR 43-37	088824	N		95TC100(0488)	28,800 DPM	745 cpm	5950 cpm	B- 18.0 %	P	DKM
	M-2224	132159	N		95TH100(487)	24,600 DPM	1 cpm	3937 cpm	< 16.0 %	P	DKM
	PR 43-68	134485	N		95TC100(0488)	28,800 DPM	215 cpm	5420 cpm	B- 18.0 %	P	DKM
11-22-99	Bicron	B5002	N	10-14-00	DU # 2	uR/hr	8 uR	300 uR	N/R	P	DKM
	M-2224 (239-1F)	160668	N	10-15-00	95TH100(487)	24,600 DPM	6 cpm	3946 cpm	< 16.0 %	P	DKM
	PR 43-37	088824	N		95TC100(0488)	28,800 DPM	739 cpm	5944 cpm	B- 18.0 %	P	DKM
	M-2224	132159	N		95TH100(487)	24,600 DPM	1 cpm	3931 cpm	< 16.0 %	P	DKM
	PR 43-69	134485	N		95TC100(0488)	28,800 DPM	209 cpm	5428 cpm	B- 18.0 %	P	DKM
					N/A						

DAILY INSTRUMENT RESPONSE CHECK LOG

PROJECT: Ft. McClellan

DATE	MODEL/TYPE	S/N	PHYSICAL DAMAGE Y/N	CAL DUE DATE	SOURCE I.D.	ACTIVITY	BKRD	READING	EFF	PASS/ FAIL P/F	TECH INIT
11-23-99	Bicron	B5002	N	10-14-00	Du #2	mR/hr	8 uR	300 uR	N/A	P	DK JL
	M-2224 (239-1F)	160668	N	10-15-00	95TH100(487)	24,600 DPM	5 cpm	3951 cpm	<16.0 %	P	DK JL
	PR 43-37	088824	N		95TC100(0488)	28,800 DPM	730 cpm	5954 cpm	B- 18.1 %	P	DK JL
	M-2224	132159	N		95TH100(487)	24,400 DPM	0 cpm	3940 cpm	<16.0 %	P	DK JL
↓	PR 43-68	134485	N	↓	95TC100(0488)	28,800 DPM	199 cpm	5399 cpm	B- 18.0 %	P	DK JL
11-24-99	Bicron	B5002	N	10-14-00	Du #2	mR/hr	8 uR	300 uR	N/A	P	DK JL
	M-2224(239-1F)	160668	N	10-15-00	95TH100(487)	24,600 DPM	4 cpm	3961 cpm	<16.0 %	P	DK JL
	PR 43-37	088824	N		95TC100(0488)	28,800 DPM	751 cpm	5962 cpm	B- 18.0 %	P	DK JL
	M-2224	132159	N		95TH100(487)	24,600 DPM	2 cpm	3946 cpm	<16.0 %	P	DK JL
↓	PR 43-68	134485	N	↓	95TC100(0488)	28,800 DPM	207 cpm	5402 cpm	B- 18.0 %	P	DK JL
11-29-99	Bicron	B 500 2	N	10-14-00	Du # 2	mR/hr	8 uR	300 uR	N/A	P	DK JL
	M-2224(239-1F)	160668	N	10-15-00	95TH100(487)	24,600 DPM	7 cpm	3972 cpm	<16.1 %	P	DK JL
	PR 43-37	088824	N		95TC100(0488)	28,800 DPM	968 cpm	6283 ~~15.4~~ cpm	B- 18.4 %	P	DK JL
	M-2224	132159	N		95TH100(487)	24,600 DPM	4 cpm	3952 cpm	<16.0 %	P	DK JL
↓	PR 43-68	134485	N	↓	95TC100(0488)	28,800 DPM	234 cpm	5707 cpm	B- 19.0 %	P	DK JL
11-30-99	Bicron	B-500-2	N	10-14-00	Du # 2	mR/hr	8 uR	300 uR	NA	P	DK JL
	M-2224(239-1F)	160668	N	10-15-00	95TH100(487)	24,600 DPM	6 cpm	3964 cpm	<16.0 %	P	DK JL
↓	PR 43-37	088824	N	↓	95TC100(0488)	28,800 DPM	997 cpm	6249 cpm	B- 18.2 %	P	DK JL

DAILY INSTRUMENT RESPONSE CHECK LOG

PROJECT: Ft. McClellan

DATE	MODEL/TYPE	S/N	PHYSICAL DAMAGE Y/N	CAL DUE DATE	SOURCE I.D.	ACTIVITY	BKRD	READING	EFF	PASS/ FAIL P/F	TECH INIT
11-30-99	M-2224	132159	N	10-15-00	95TH100(0487)	24,600 DPM	7 cpm	3977 cpm	α 16.1 %	P	DKM
↓	PR 43-68	134485	N	↓	95TC100(0488)	28,800 DPM	259 cpm	5489 cpm	β^- 18.1 %	P	DKM
12-2-99	BICRON	B-500-2	N	10-14-00	DU #2	uR/HR	8 uR	300 uR	NA	P	DKM
↓	M-2224(239-1F)	160668	N	10-15-00	95TH100(487)	24,600 dpm	10 cpm	3955 cpm	α 16.0 %	P	DKM
↓	PR 43-37	088824	N	↓	95TC100(0488)	28,800 dpm	894 cpm	6266 cpm	β^- 18.6 %	P	DKM
↓	M-2224	132159	N	↓	95TH100(487)	24,600 dpm	3 cpm	3936 cpm	α 16.0 %	P	DKM
↓	PR 43-68	134485	N	↓	95TC100(0488)	28,800 dpm	271 cpm	5475 cpm	β^- 18.0 %	P	DKM
12-3-99	BICRON	B-500-2	N	10-14-00	DU #2	uR/HR	8 uR	300 uR	NA	P	DKM
↓	M-2224(239-1F)	160668	N	10-15-00	95TH100(487)	24,600 DPM	9 cpm	3975 cpm	α 16.1 %	P	DKM
↓	PR 43-37	088824	N	↓	95TC100(0488)	28,800 DPM	920 cpm	6195 cpm	β^- 18.3 %	P	DKM
↓	M-2224	132159	N	↓	95TH100(487)	24,600 DPM	9 cpm	3955 cpm	α 16.0 %	P	DKM
↓	PR 43-68	DKM ~~133~~ 134485	N	↓	95TC100(0488)	28,800 DPM	301 cpm	5502 cpm	β^- 18.0 %	P	DKM
				N							
				A							

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ATTACHMENT 4

SOURCE CONTROL

SOURCE DIRECTORY

SOURCE MASTER / CUSTODIAN DIRECTORY
(Circle applicable type)

Custodian Name:	Physical Inventory Performed By:
Frank Whitaker	Debora K. Goldston

Project / Location: FT. McCLELLAN / Anniston, AL.

ATG Source #	Location	Serial No.	Isotope	Inventory Date	Remarks
95TH 100 0487	FT. McCLELLAN	0487	Th 230	10-26-99	A Source 100 cm² (24,600 dpm)
95 TC 100 0488	FT. Mc CLELLAN	0488	Tc 99	10-26-99	B Source 100 cm² (28,800 dpm)
93 TC 470 1591	FT. Mc CLELLAN	1591	Tc 99	10-26-99	BA Disc Source (45,200 dpm)
#2	FT. Mc CLELLAN		D/U Bullet	10-26-99	
93TC 470 1591	Oak Ridge, TN	1591	TC 99	11-5-99	Returned to oak Ridge by Frank Whitaker

Reviewed and Approved By:	Date:

SOURCE DIRECTORY

SOURCE MASTER / CUSTODIAN DIRECTORY
(Circle applicable type)

Custodian Name:	Physical Inventory Performed By:
Frank Whitaker	Debora K. Goldston

Project / Location: FT. McCLELLAN / Anniston, AL.

ATG Source #	Location	Serial No.	Isotope	Inventory Date	Remarks
95TH 100 0487	FT. McCLELLAN	0487	Th 230	10-26-99	A Source 100 cm² (24,600 Dpm)
95 Tc 100 0487	FT. Mc CLELLAN	0488	Tc 99	10-26-99	B Source 100 cm² (28,800 dpm)
93 Tc 470 1591	FT. Mc CLELLAN	1591	Tc 99	10-26-99	BY Disc Source (45,200 dpm)
#2	FT. Mc CLELLAN		D/U Bullet	10-26-99	
93TC 470 1591	Oak Ridge, TN	1591	TC 99	11-5-99	Returned to oak Ridge by Frank Whitaker

Reviewed and Approved By:	Date:

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ATTACHMENT 5

RADIATION / CONTAMINATION SURVEY LOG

RADIATION / CONTAMINATION
SURVEY LOG

ATG #	DATE	TIME	PROJECT	DESCRIPTION OF SURVEY	# of PAGES	TECH INITIALS
FM-01	10-27-99	1430	FORT McClellan	Bldg # 337 FINAL Release	12	DK
FM-02	10-28-99	1030		Bldg # 338 FINAL RELEASE	12	DK
FM-03	10-29-99	1000		SHIPMENT SURVEY OF AMERICIUM check SOURCES FOR LEAKAGE	1	DK
FM-04	11-1-99	0850		SHIPMENT SURVEY OF AMERICIUM check SOURCES OUTSIDE OF BOX	1	DK
FM-05	11-1-99	1100		Bldg # 334 FINAL RELEASE	8	DK
FM-06	11-2-99	1006		Bldg # 341 FINAL RELEASE	10	DK
FM-07	11-3-99	1000		Bldg # 3181 FINAL RELEASE	11	DK
FM-08	11-4-99	1106		Bldg # 345 FINAL RELEASE	16	DK
FM-09	11-5-99	0930		Bldg # 335 FINAL RELEASE	10	DK
FM-10	11-8-99	1245		Bldg # 328 FINAL Release	8	DK
FM-11	11-10-99	0930		Bldg # 303-A FINAL RELEASE	8	DK
FM-12	11-11-99	1000		Bldg # 812 1/2 FINAL RELEASE	9	DK
FM-13	11-12-99	1100		Bldg # 257 FINAL Release	8	DK
FM-14	11-15-99	1300		Bldg # 441L FINAL Release	9	DK
FM-15	11-15-99	1530		Bldg # 25L FINAL RELEASE	10	DK
FM-16	11-23-99	1400		Bldg # 3132 FINAL RELEASE	34	DK
FM-17	11-30-99	1060		Bldg # 350 FINAL Release	25	DK

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ATTACHMENT 6

BACKGROUND READINGS

* 2nd Background Readings Taken for Back up.

BACKGROUND AND EFFICIENCY

For _____ 1999

Instrument ID: Bicron ID: B-500-2

2224 160668
Probe 088824
2224 132159
Probe 134485

Date	Bkgd α	Bkgd βγ	Bldg #	Eff. Alpha	Micro "R" Bkg	Eff Beta/ Gamma	Initials
10-27-99	15	728	#337	17.3	5 mR	19.0	DK
	6	223		16.6		18.2	
10-28-99	5	421	#338	17.0	5 mR	19.6	DK
	1	151		16.4		18.0	
10-29-99	2	848	#339	16.8	6 mR	19.0	DK
	2	237		16.0		18.3	
11-2-99	6	446	#341	16.0	4 mR	19.8	DK
	3	137		16.0		18.3	
11-3-99	11	1216	#3181	16.6	20 mR	19.9	DK
	3	346	Room-35	16.2		18.5	
11-4-99	6	512	#345	16.0	4 mR	18.1	DK
	2	142		16.1		19.1	
11-5-99	7	432	#335	16.0	4 mR	20.0	DK
	1	106		16.0		19.3	
11-8-99	11	862	#228	16.6	10 mR	18.1	DK
	2	222		16.0		19.3	
* 11-8-99	9	1182	#3181	16.0	16 mR	19.2	DK
	3	309	Room-341	16.2		18.2	

* 2 Background Readings Taken For Back up.

BACKGROUND AND EFFICIENCY

For _____ 1999

Instrument ID: Bicron ID: B-500-2

2224 — 160668

Proce — 088824

2224 — 132159

Proce — 134485

Date	α	Bkgd βγ	Bldg #	Eff. Alpha	micro R" BKg	Eff Beta/ Gamma	Initials
11-10-99	1	428	# 303-A	16.3	5 mR	18.5	DK
	1	155		16.4		18.3	
11-11-99	1	127	# 812 1/2	16.0	2 mR	18.2	DK
11-12-99	11	512	# 257	16.0	4 mR	18.1	DK
	3	139		16.0		19.1	
11-15-99	4	280	# 4416	16.0	7 mR	18.6	D.K
	12	970		16.0		18.1	
* 11-15-99	9	981	# 4415	16.0	6 mR	18.6	DK
	1	319		16.0		18.1	
11-15-99	14	1245	# 256	16.0	12 mR	18.1	DK
	2	387		16.0		18.6	
11-23-99	4	712	# 3182	16.0	12 mR	18.3	DK
	0	100		16.0		18.7	
* 11-30-99	2	189	# 349	16.0	3 mR	18.2	DK
	1	115		16.1		18.1	
11-30-99	8	448	# 350	16.0	3 mR	18.2	DK
	5	217		16.1		18.1	
* 11-30-99	11	512	# 349	16.0	3 mR	18.2	DK
	16	475		16.1		18.1	

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ATTACHMENT 7

DOSIMETRY REPORT

ATG
McClellan Commodity Site Survey

Eberline ,simetry Services
7021 Pan American Fwy NE
Albuquerque, NM 87109
(505) 345-9931 Voice (505) 761-5410 Fax
(888) 343-8537 Toll-Free

NVLAP

The dosimetry processsor is accredited by NVLAP of the U.S. Department of Commerce as having the competence to perform specified test in accordance with prescribed test methods and accreditation criteria.

Current TLD Occupational Radiation Exposure H ,rt

Approved for use in lieu of NRC Form 5

Charles Lamborn

Customer No. 08427

Dosages As Of: 1/31/00

Badge Number / Body Location	Work Facility / Work Location	Name / Birthdate	Age	Sex	ID / ID Type	Service 1 / Freq. 2	Date Issued / Date Returned	Dose for Period (mrem) Note 3	Deep	Lens	Dose for Period (mrem) Neutron	Shallow	Extremity	Accumulated Dose (mrem) for Calendar Quarter Deep	Lens	Shallow	Extremity	Accumulated Dose (mrem) for Calendar Year Deep	Lens	Shallow	Extremity	Perm. Annual Deep (rem) Accum. Lifetime Deep (rem)
00000		CONTROL				T	12/1/99		24					65								5
					S	M	12/20/99							207								0
00001						T	12/1/99		0	5				0	5	13						5
					S	M	12/20/99		13					0	5	13						0
00002						T	12/1/99		0	0				0	0	0						5
					S	M	12/20/99		0					0	0	0						0
00003						T	12/1/99		0	0				0	0	0						5
					S	M	12/20/99		0					0	0	0						0
00004						T	12/1/99		0	0				0	0	0						5
					S	M	12/20/99		0					0	0	0						0
00005						T	12/1/99		0	0				12	12	12						5
					S	M	12/20/99		0					12	12	12						0.012
00006						T	12/1/99		0	0				0	0	0						5
					S	M	12/20/99		0					0	0	0						0
00007						T	12/1/99		0	0				0	0	0						5
					S	M	12/20/99		0					0	0	0						0
00008						T	12/1/99		0	0				0	0	0						5
					S	M	12/20/99		0					0	0	0						0
00009						T	12/1/99		0	0				0	0	0						5
					S	M	12/20/99		0					0	0	0						0
00020						T	12/1/99		0	0				0	0	0						5
						M	12/20/99		0					0	0	0						0

1 Service Codes	2 Frequency Codes	3 Note Codes
T,D - Whole Body	W - Weekly	C - Badge damaged
H,R - Ring Badge	B - BiWeekly	E - Reported by telephone or wire
J,L - Ankle Badge	M - Monthly	F - Badge not used
K,W - Wrist Badge	P - BiMonthly	G - Explanation attached
N,E - Neutron	Q - Quarterly	X - Contaminated
A Badge	S - SemiAnnual	Z - Calculated control
	A - Annual	P - Planned exposure
	I - Irregular	

Company	ALLIED TECHNOLOGY GROUP
Attention	BARBARA WHITAKER
Address	669 EMORY VALLEY ROAD
	OAK RIDGE, TN 37830

BADGE ISSUE LOG

PROJECT / LOCATION: **Fort McClellan Survey, Anniston, AL**				BADGE SERIES NO: **October 1999 08427-0001 - 0005**	
BADGE NO.	NAME	SOCIAL SECURITY NUMBER	NRC FORM 4 COMPLETE Y/N	PERIOD MONITORED FROM/TO	DATE OF BIRTH
00001			Y	10/25/99 - 12/3/99	
00002			N	10/25/99 - 12/3/99	
00003			N	10/25/99 - 12/3/99	
00004					
00005					

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ATTACHMENT 8

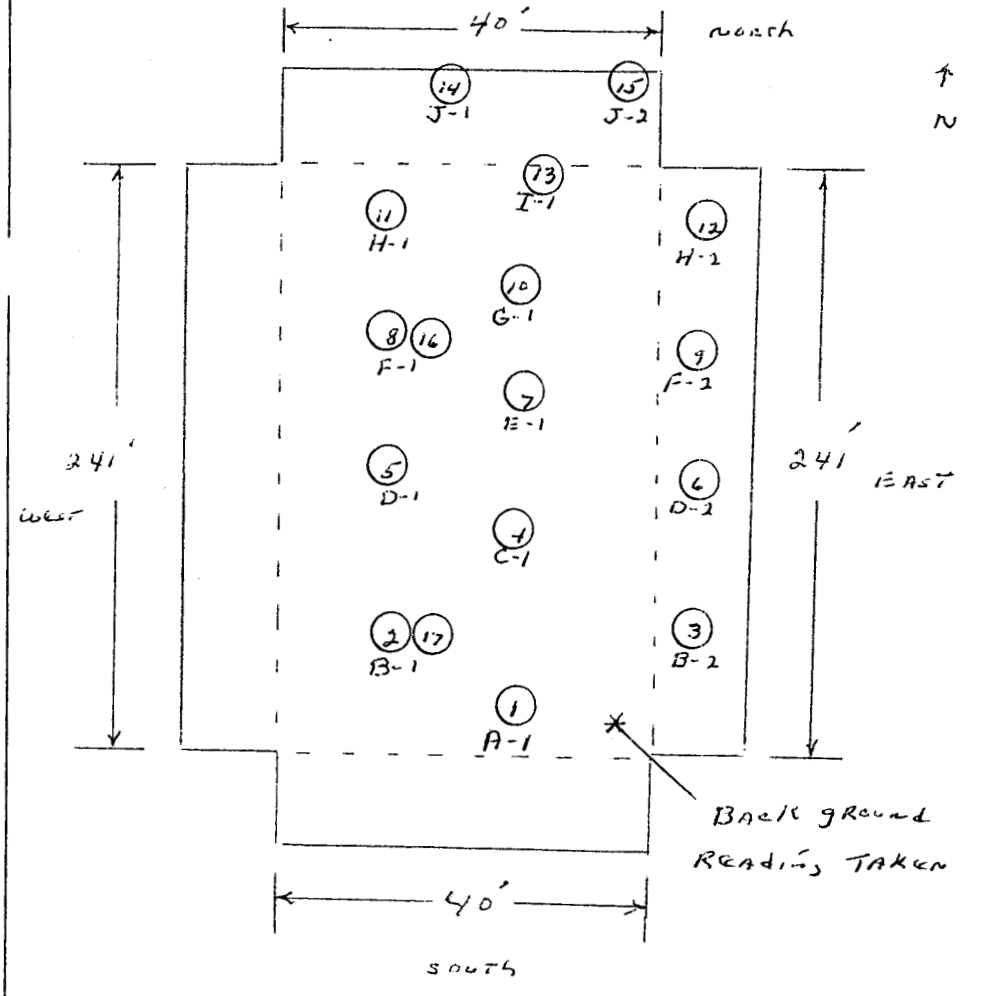
FM01 BUILDING 637 SURVEY DATA

RADIOLOGICAL SURVEY REPORT

ATGS #: FM-01 BLDG 337

DATE: 10-27-99	INSTRUMENTATION USED				
TIME: 1030	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldston / D. Kountz	BICRON	B-5002	N/A	5 uR	10-14-00
LOCATION: Bldg. ~~776~~ 337	Pancake 43-71 / 2224	088824 / 16 0668	α 17.3 % / B- 19	α 15 cpm / B- 728	10-15-00
REVIEWED BY: Jack Whitacker	Pancake 43-68 / 2224	134485 / 132159	α 16.6 % / B- 18.2	α 6 cpm / B- 223	6-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A %		

PURPOSE OF SURVEY: FINAL RELEASE SURVEY



SMEAR RESULTS

RESULTS = DPM/100cm²
UNLESS OTHERWISE NOTED

#	βγ	α
	See Attached Sheet	
	N/A	

Remarks: SMEAR LOCATIONS (ALPHA/BETA)

RADIOLOGICAL SURVEY REPORT

ATGS #: FM-01

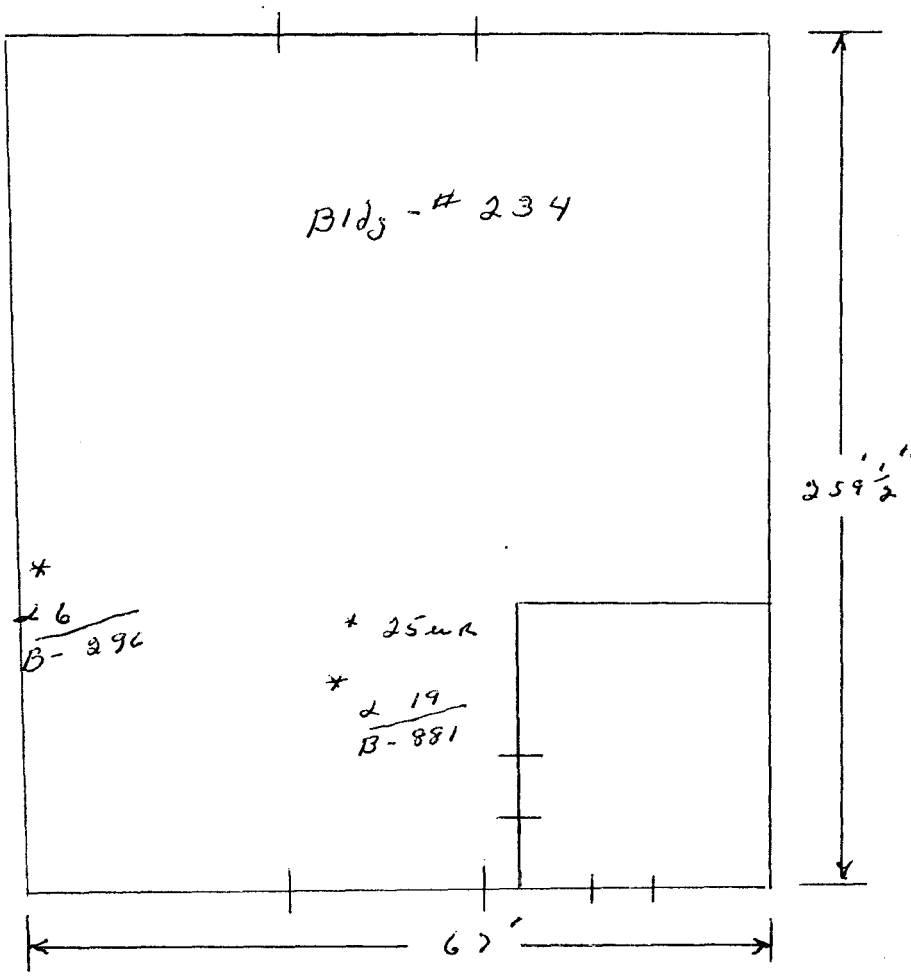
DATE: 12-2-99	INSTRUMENTATION USED				
TIME: 1230	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldstein / D. Hoover	BICRON	B-500-2	N/A	25 mR	10-14-00
LOCATION: Bldg - # 234	PROBE 43-68 / 2224	088824 / 160668	α 16 % B-18.6	α 19 / B-881 cpm	10-15-00
REVIEWED BY:	PROBE 43-68 / 2224	134485 / 132159	α 16 % B-18	α 6 / B-296 cpm	10-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A		

PURPOSE OF SURVEY: 2 α Background Readings Taken in Bldg # 234

SMEAR RESULTS

RESULTS = DPM/100cm²
UNLESS OTHERWISE NOTED

#	βγ	α



Remarks: All Readings are in cpm unless otherwise noted

Blds 337

RADIOLOGICAL SURVEY REPORT

ATGS #: FM-01

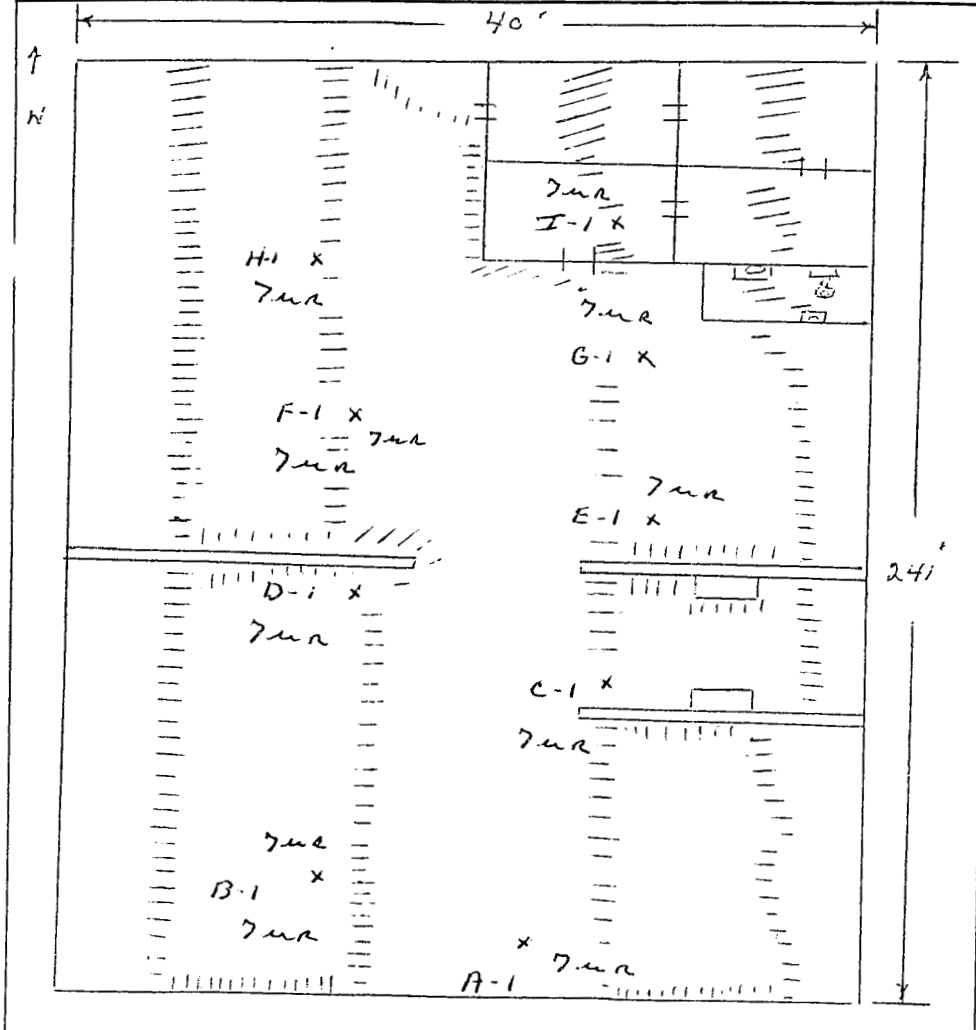
DATE: 10-27-99	INSTRUMENTATION USED				
TIME: 1630	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldstein / D. Kountz	Bicron	13-5002	N/A	5 mR	10-14-00
LOCATION: Bldg ~~335~~ 337	Ludlum 43-37 2224	098124 / 160668	α 17.3% β 19%	α 15 cpm β 728	10-15-00
REVIEWED BY: Frank Whitcher	Ludlum 43-68 2224	134481 / 132159	α 16.6% β 18.2%	α 6 cpm β 223	6-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A		

PURPOSE OF SURVEY: FINAL RELEASE SURVEY

NOTE: SCANS WERE 18" PASSES ON FLOOR

SMEAR RESULTS

RESULTS = DPM/100cm²
UNLESS OTHERWISE NOTED



#	βγ	α

Remarks: MICRO "R" READINGS TAKEN ON SURFACE. ||||| = SHOW AREA WHERE ALPHA, BETA AND GAMMA SCANS WERE TAKEN

ALL SCAN SURVEYS ARE AT BACKGROUND LEVELS for ALPHA BETA GAMMA DETECTION.

BLDG 337

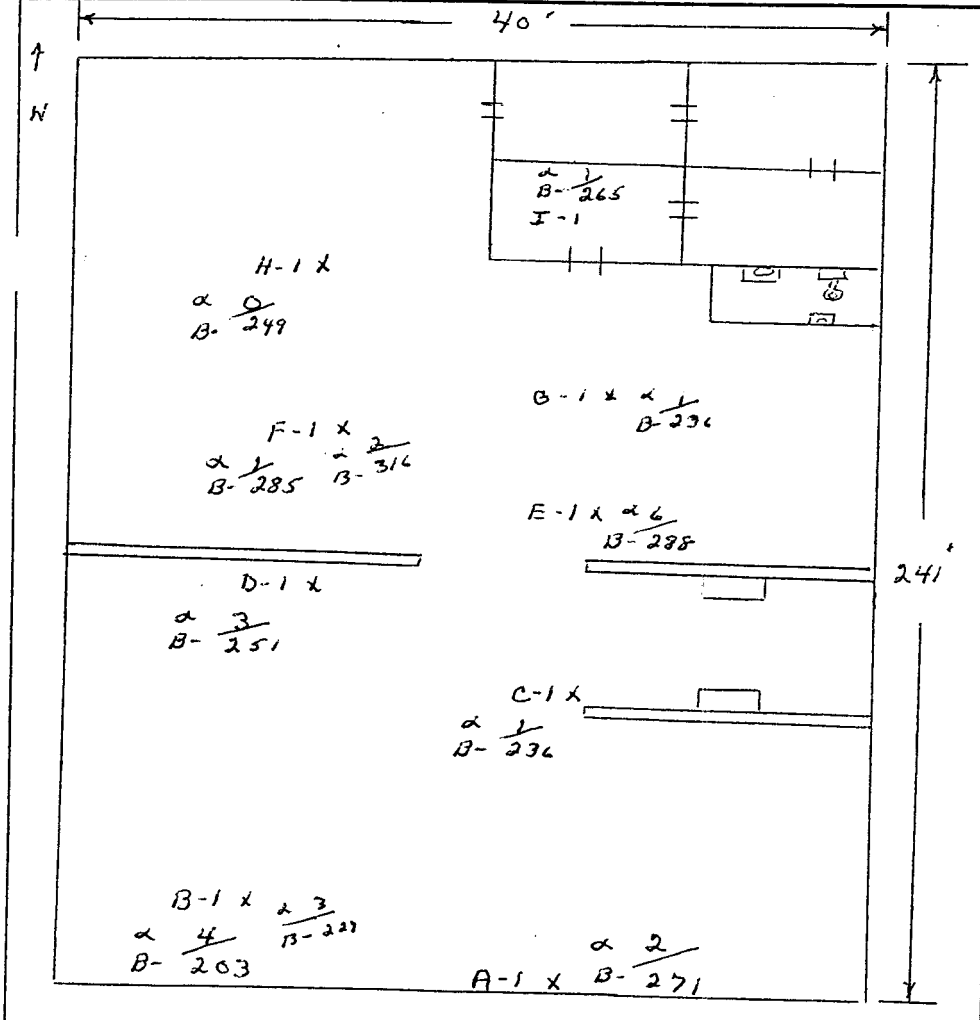
RADIOLOGICAL SURVEY REPORT

ATGS #: FM-01

DATE: 10-22-99	INSTRUMENTATION USED				
TIME: 1030	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldston / Dc Kountz	Bicron B-5002 Dc	B-5002	N/A	5 uR	10-14-00
LOCATION: Bldg ~~335~~ 337	Ludlum 43-37 2224	98824 / 160668	α 13.3 / β 19	α 1.5 / β 328	10-15-00
REVIEWED BY: Frank Whitten	Ludlum 43-68 2224	134485 / 132159	α 16.6 / β 18.2	α 6 / β 233	6-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A		

PURPOSE OF SURVEY: FINAL RELEASE SURVEY

BLDG. 337



#	βγ	α

SMEAR RESULTS

RESULTS = DPM/100cm² UNLESS OTHERWISE NOTED

Remarks: ONE MINUTE ALPHA AND BETA SURFACE ACTIVITY READINGS. ALL READINGS ARE in CPM UNLESS OTHERWISE NOTATED

BLDG. 337

RADIOLOGICAL SURVEY REPORT

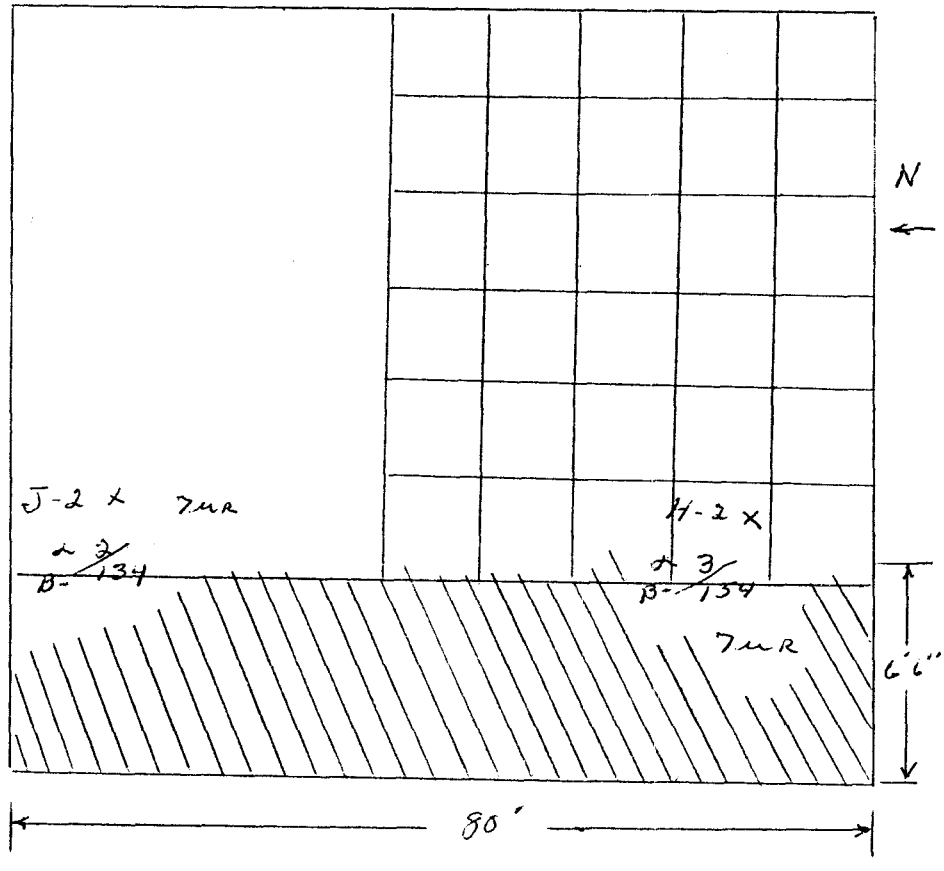
ATGS #: FM-01

DATE: 10-27-99	INSTRUMENTATION USED				
TIME: 1030	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldston / D. Kovacs	BICRON	B-5002	N/A	5 mR	10-14-00
LOCATION: Bldg 335 ~~337~~ PK-1	Ludlum 43-37 2224	98824 160668	α 17.39% β 19%	α 15 cpm β 2200 cpm	10-15-00
REVIEWED BY: Mark Whitch	Ludlum 43-68 2224	134485 132159	α 16.6% β 18.2%	α 6 cpm β 2230 cpm	6-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A		

PURPOSE OF SURVEY: FINAL RELEASE SURVEY

NOTE: SCANS WERE 6" PASSES ON WALLS

||| = shows where ALPHA, BETA AND GAMMA SCANS were TAKEN



SMEAR RESULTS

RESULTS = DPM/100cm²
UNLESS OTHERWISE NOTED

#	βγ	α

Remarks: ONE MINUTE ALPHA AND BETA SURFACE ACTIVITY READINGS, ALSO MICRO "R" READINGS TAKEN ON SURFACE

ALL SCAN READINGS ARE AT BACKGROUND UNLESS OTHERWISE NOTATED. for ALPHA / BETA Activity.

ALL READINGS ARE IN CPM UNLESS OTHERWISE NOTATED

BLDG 337

RADIOLOGICAL SURVEY REPORT

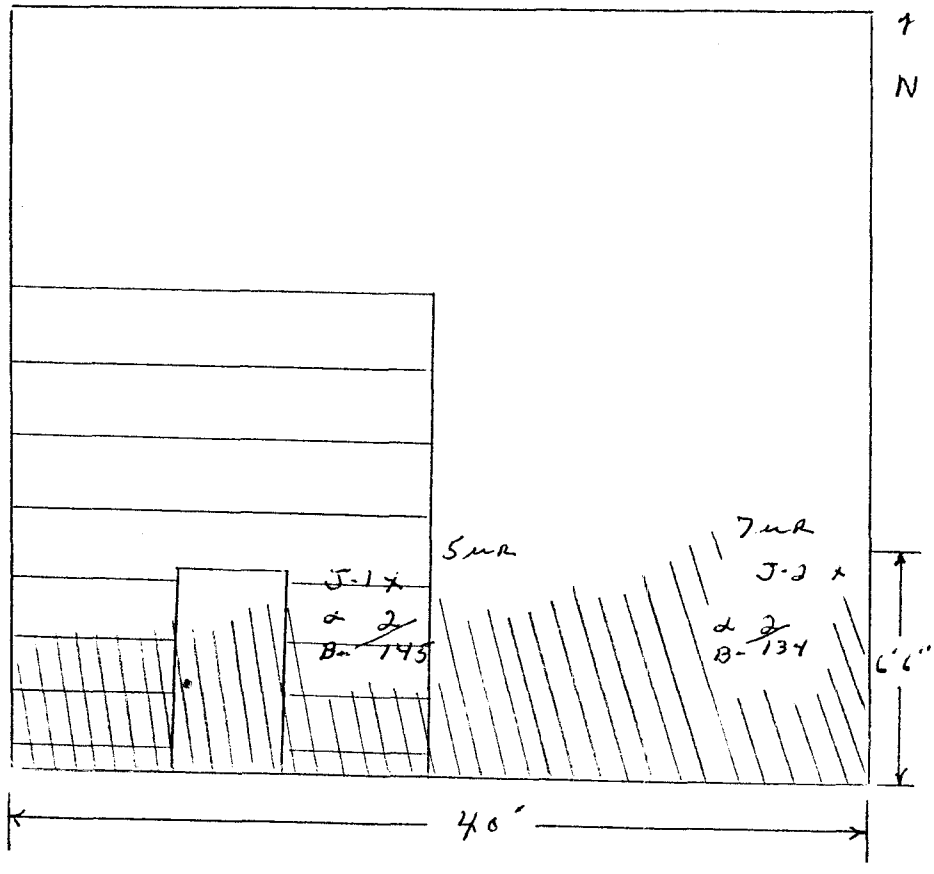
ATGS #: FM-01

DATE: 10-27-99	INSTRUMENTATION USED				
TIME: 1030	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldston / D. Koontz	BICRON	13-5002	N/A	5 mR	10-14-00
LOCATION: Bldg ~~335~~ 337	PROBE 43-37	098824	α 17.3%	α 15 cpm	
	2224	160668	β 19%	β- 738 cpm	10-15-00
REVIEWED BY: Frank White	PROBE 43-68	134485	α 16.6%	α 6 cpm	
	2224	132159	β 18.2%	β- 2336 cpm	6-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A		

PURPOSE OF SURVEY: FINAL RELEASE SURVEY

NOTE: SCANS WERE 6" PASSES ON WALLS

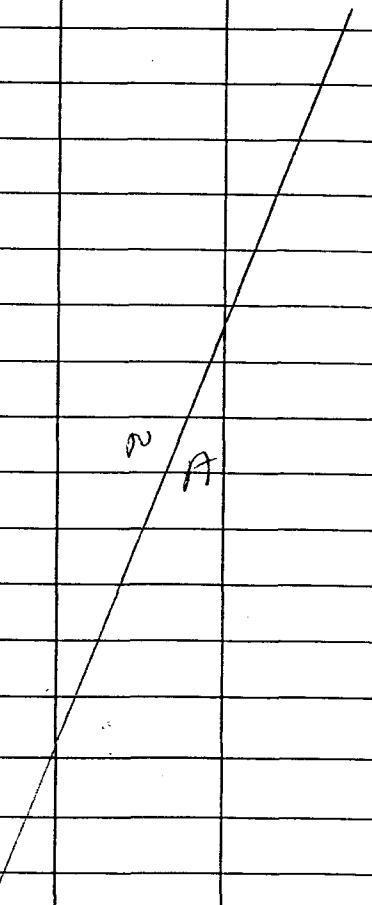
|||| = SHOWS AREA WHERE ALPHA, BETA AND GAMMA SCANS WERE TAKEN



SMEAR RESULTS

RESULTS = DPM/100cm²
UNLESS OTHERWISE NOTED

#	βγ	α



Remarks: ONE MINUTE ALPHA AND BETA SURFACE ACTIVITY READINGS, ALSO MICRO "R" READINGS TAKEN ON SURFACE

ALL SCAN READINGS ARE AT BACKGROUND LEVELS FOR ALPHA/BETA ACTIVITY

ALL READINGS ARE IN CPM UNLESS OTHERWISE NOTATED.

BLDG. 337

RADIOLOGICAL SURVEY REPORT

ATGS #: FM-01

DATE: 10-27-99	INSTRUMENTATION USED				
TIME: 1036	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldstein / D. Kounts	B-C RON	B-5002	N/A	5 uR	10-14-00
LOCATION: Bldg. ~~335~~ 337	PRoLe 43-1200 2224	98824 160668	α 17.3% β 19%	α 15 cpm β-228 cpm	10-15-00
REVIEWED BY: Frank White	PRoLe 43-68 2224	134485 132159	α 16.6% β 18.2%	α 6 cpm β-203 cpm	6-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A		

PURPOSE OF SURVEY: FINAL RELEASE SURVEY

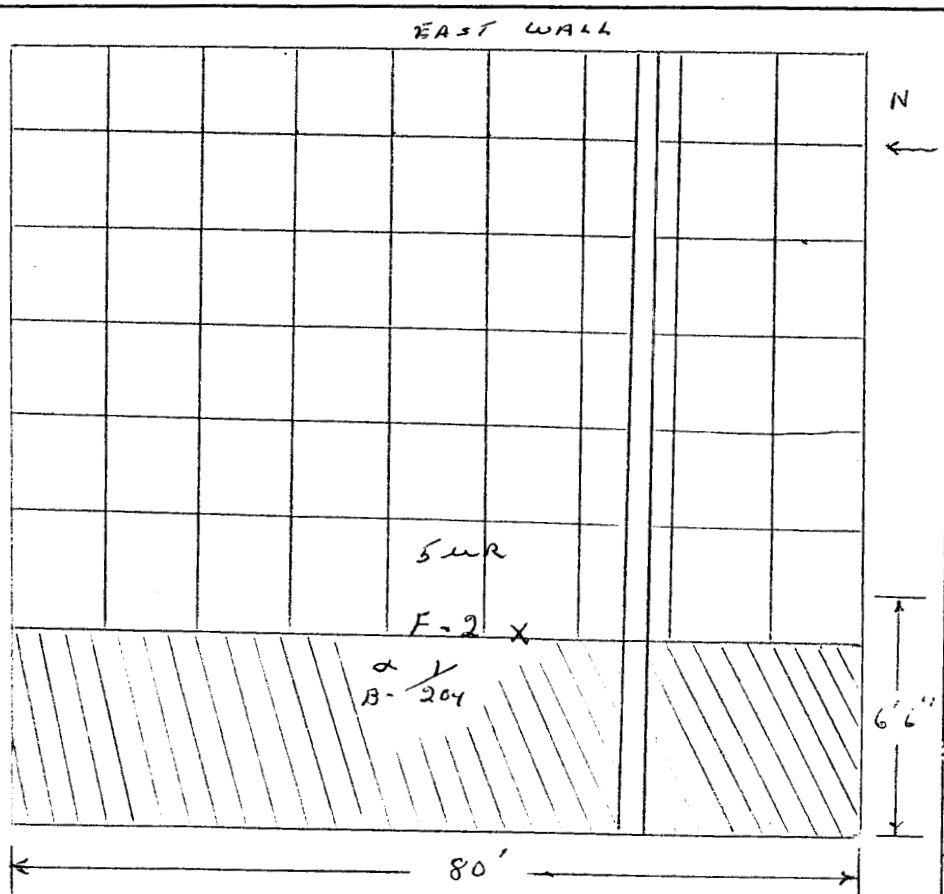
NOTE: SCANS WERE 6" PASSES ON WALLS

\\\\ = SHOWS AREA WHERE ALPHA, BETA AND GAMMA SCANS WERE TAKEN

SMEAR RESULTS

RESULTS = DPM/100cm²
UNLESS OTHERWISE NOTED

#	βγ	α



Remarks: ONE MINUTE ALPHA AND BETA SURFACE ACTIVITY READINGS, ALSO MICRO "R" READINGS TAKEN ON SURFACE

ALL SCAN READINGS ARE AT BACKGROUND LEVELS FOR ALPHA/BETA ACTIVITY.

BLDG 337

RADIOLOGICAL SURVEY REPORT

ATGS #: FM-01

DATE: 10-27-99	INSTRUMENTATION USED				
TIME: 1030	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldstein / D. Kounts	Bicron	13-5002	N/A	5 mR	10-14-00
LOCATION: Bldg ~~335~~ 337	PRM 43-32 2224	88824 / 160468	α 17.3% β 19%	α 15 cpm β 228 cpm	6-15-00
REVIEWED BY: Frank White	PRM 43-68 2224	134485 / 132159	α 16.6% β 18.2%	α 6 cpm β 223 cpm	6-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A		

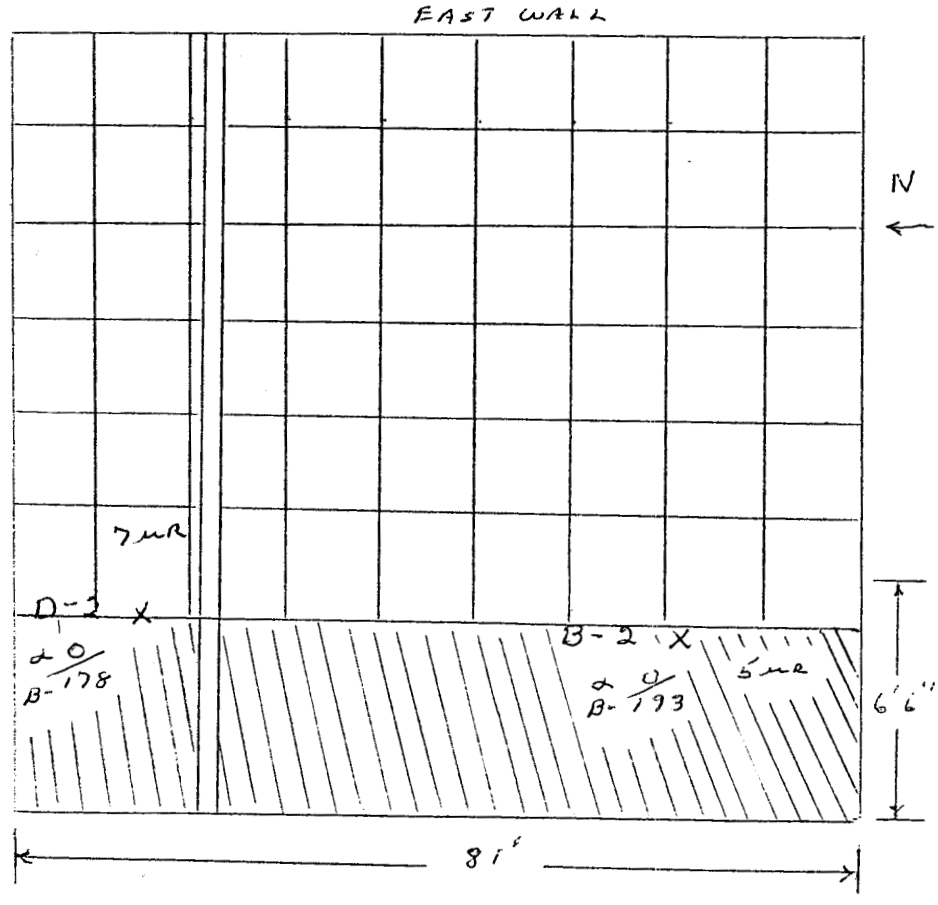
PURPOSE OF SURVEY: FINAL RELEASE SURVEY

NOTE: SCANS WERE 6" PASSES ON WALLS
\\\\ = shows AREA WHERE ALPHA, BETA AND GAMMA SCANS WERE TAKEN

SMEAR RESULTS

RESULTS = DPM/100cm²
UNLESS OTHERWISE NOTED

#	βγ	α



Remarks: ONE MINUTE ALPHA AND BETA SURFACE ACTIVITY READINGS, ALSO MICRO "R" READINGS TAKEN ON SURFACE

ALL SCAN READINGS ARE AT BACKGROUND LEVELS FOR ALPHA / BETA ACTIVITY.

ALL READINGS ARE IN CPM UNLESS OTHERWISE NOTATED

BLDG. 337

RADIOLOGICAL SURVEY REPORT

ATGS #: FM-01

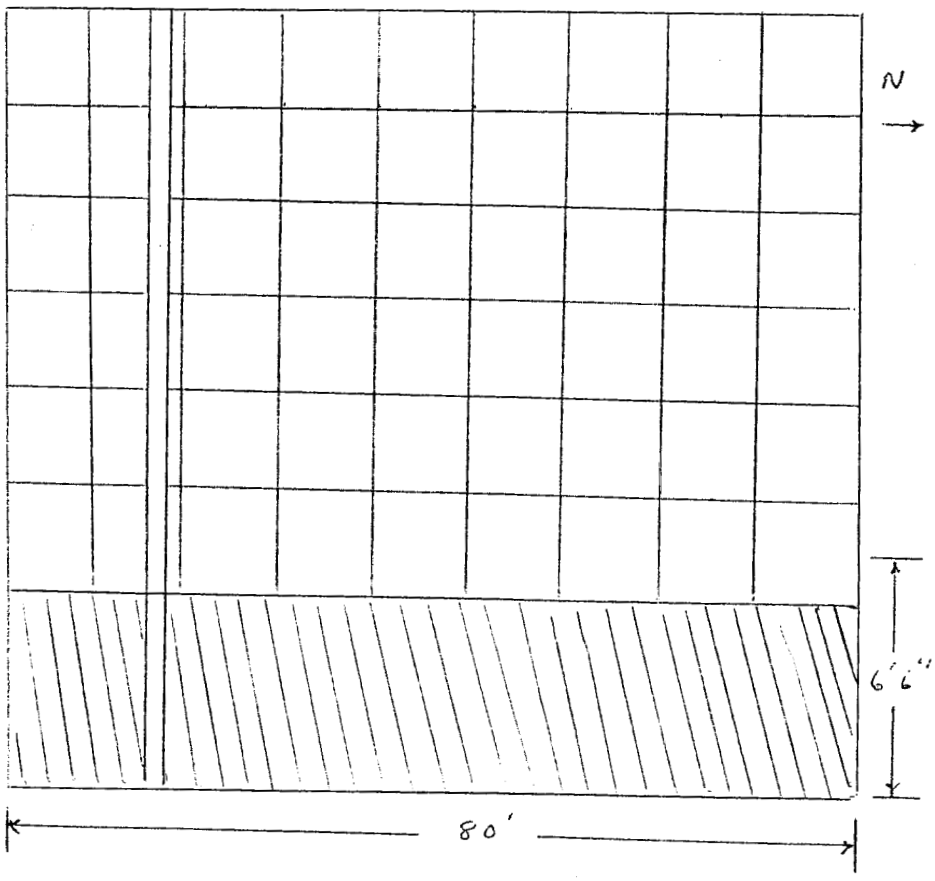
DATE: 10-23-99	INSTRUMENTATION USED				
TIME: 1030	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldstein / D. Kounts	BICRON	B-5002	N/A	5 cpm	10-14-00
LOCATION: Bldg. ~~335~~ 337	Probe 43-37 / 2224	88824 / 160668	α 11.3% / β 19.9%	α 15 cpm / β 328 cpm	10-15-00
REVIEWED BY: Frank Whitcher	Probe 43-68 / 2224	134485 / 132159	α 16.0% / β 18.2%	α 6 cpm / β 223 cpm	6-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A		

PURPOSE OF SURVEY: FINAL RELEASE SURVEY

NOTE: SCANS WERE 6" PASSES ON WALLS

SMEAR RESULTS

RESULTS = DPM/100cm²
UNLESS OTHERWISE NOTED



#	βγ	α

Remarks: ||| = SHOW AREA WHERE ALPHA, BETA AND GAMMA SCANS WERE TAKEN

ALL SCAN READINGS ARE AT BACKGROUND LEVELS for ALPHA/BETA ACTIVITY.

BLDG. 337

RADIOLOGICAL SURVEY REPORT

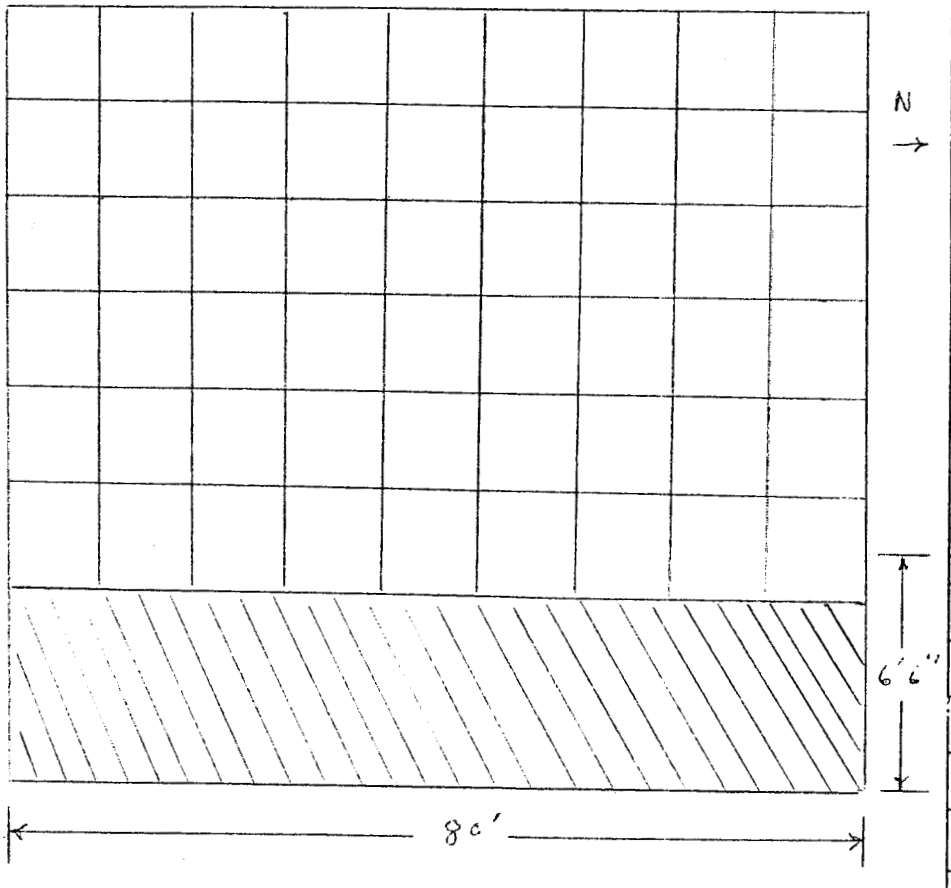
ATGS #: FM-01

DATE: 10-27-99	INSTRUMENTATION USED				
TIME: 1030	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldstein / D. Kounts RA'S	BICRON	B-5002	N/A	5 cpm	10-14-00
LOCATION: Bldg ~~335~~ 337	PROBE 43-37 2224	088824 / 160665	α 17.3% β 19%	α 15 cpm β 2358 cpm	10-15-00
REVIEWED BY: Frank Whitted	PROBE 43-68 2224	134485 / 132158	α 16.6% β 18.2%	α 5 cpm β 2336 cpm	6-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A		

PURPOSE OF SURVEY: FINAL RELEASE SURVEY

NOTE: SCANS WERE 6" PASSES ON WALLS

BLDG 337



SMEAR RESULTS

RESULTS = DPM/100cm² UNLESS OTHERWISE NOTED

#	βγ	α

Remarks: \\\ = SHOW AREA WHERE ALPHA, BETA AND GAMMA SCANS WERE TAKEN

ALL SCAN READINGS ARE AT BACKGROUND LEVELS FOR ALPHA/BETA ACTIVITY

BLDG. 337

RADIOLOGICAL SURVEY REPORT

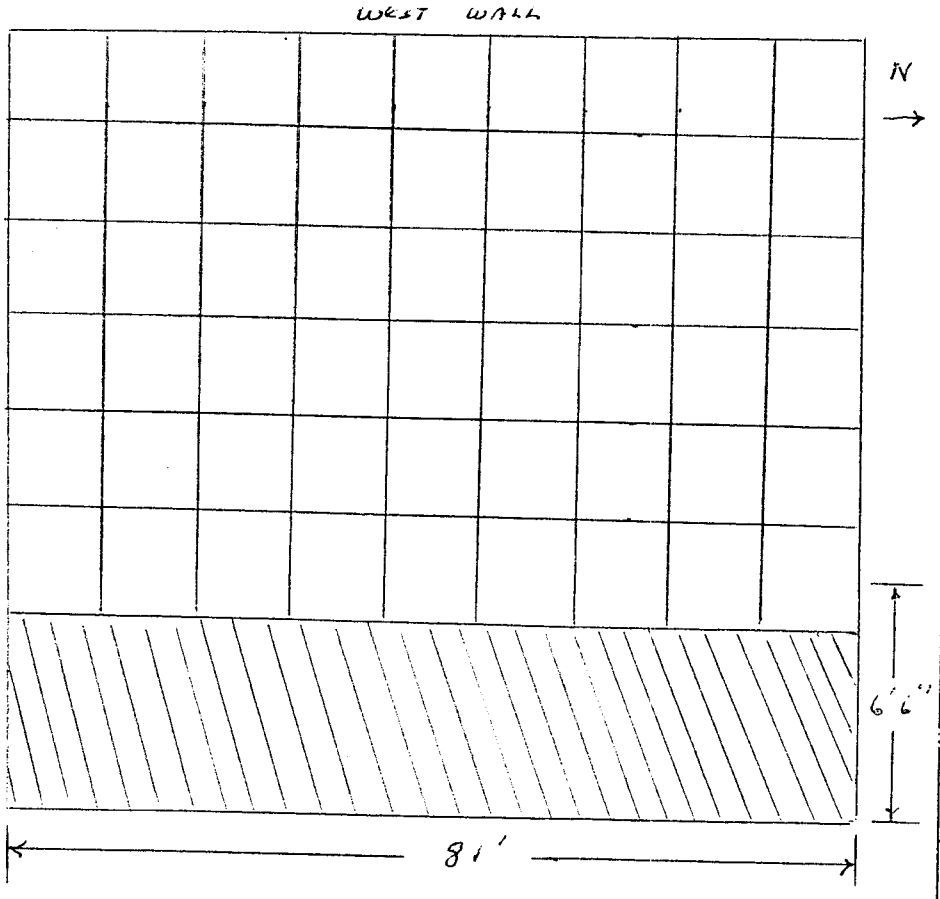
ATGS #: FM-01

DATE: 10-27-99	INSTRUMENTATION USED				
TIME: 1030	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldstein / D. Kounte	B1CRGN	B-5002	N/A	5 mR	10-14-00
LOCATION: Bldg 335 337	PROBE 43-37 2224	088824 16C668	α 17.3% β- 19%	α 15 cpm β- 1238cpm	10-15-00
REVIEWED BY: Frank Munter	PROBE 42-43 2224	134481 132158	α 16.6% β- 18.2%	α 6 cpm β- 2234cpm	6-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A		

PURPOSE OF SURVEY: FINAL RELEASE SURVEY

NOTE! SCANS WERE 6" PASSES ON WALLS

BLDG 337



SMEAR RESULTS

RESULTS = DPM/100cm² UNLESS OTHERWISE NOTED

#	βγ	α

Remarks: ▨ = SHOW AREA WHERE ALPHA, BETA AND GAMMA SCANS WERE TAKEN

ALL READINGS ARE AT BACK GROUND LEVELS FOR ALPHA / BETA ACTIVITY

BLDG. 337

RADIOLOGICAL SURVEY REPORT

ATGS #: FM-01

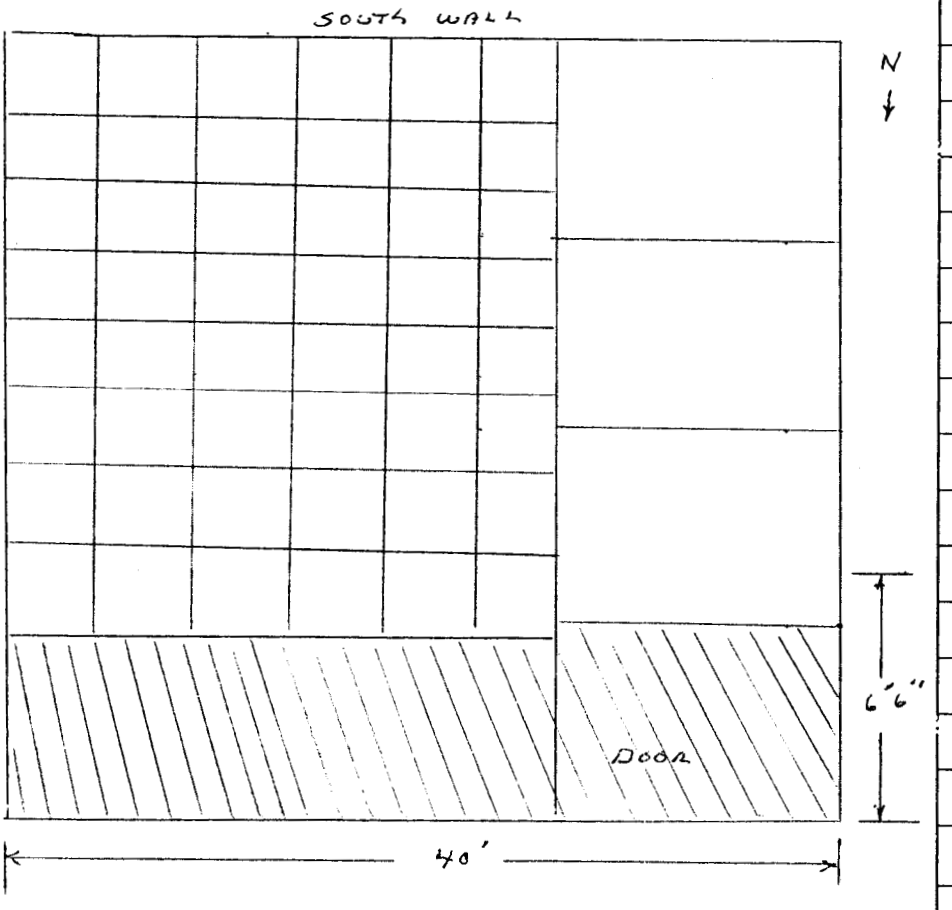
DATE: 10-27-99	INSTRUMENTATION USED				
TIME: 1030	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldstein / D. Kounce	BICRON	B-5002	N/A	5 uR	10-14-00
LOCATION: Bldg 335 ~~337~~ Field	PROBE 43-37 2224	088734	α 17.3%	α 15 cpm	
		160668	β 19%	β 222 cpm	10-15-00
REVIEWED BY: Frank Whitch	PROBE 43-68 2224	134485	α 16.6%	α 6 cpm	
		132159	β 15.2%	β 223 cpm	6-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A		

PURPOSE OF SURVEY: FINAL RELEASE SURVEY

NOTE: SCANS WERE 6" PASSES ON WALLS

SMEAR RESULTS

RESULTS = DPM/100cm²
UNLESS OTHERWISE NOTED



#	βγ	α

Remarks: ▨ = SHOW AREA WHERE ALPHA, BETA AND GAMMA SCANS WERE TAKEN

ALL SCAN READINGS ARE AT BACKGROUND LEVELS FOR ALPHA/BETA RADIOACTIVITY

McClellan
Bldg-337

Number	Smear Location	Alpha Activity DPM/100 sq cm	Beta Activity DPM/100 sq cm
1	A-1	<16.62	<48.07
2	B-1	<16.62	<48.07
3	B-2	<16.62	<48.07
4	C-1	<16.62	<48.07
5	D-1	<16.62	<48.07
6	D-2	<16.62	<48.07
7	E-1	<16.62	<48.07
8	F-1	<16.62	<48.07
9	F-2	<16.62	<48.07
10	G-1	<16.62	<48.07
11	H-1	<16.62	<48.07
12	H-2	<16.62	<48.07
13	I-1	<16.62	<48.07
14	J-1	<16.62	<48.07
15	J-2	<16.62	<48.07
16	F-1	<16.62	<48.07
17	B-1	<16.62	<48.07
* QA SMEARS			

9

ATTACHMENT 9

FM02 BUILDING 338 SURVEY DATA

ATG
McClellan Commodity Site Survey

BLDG. 338

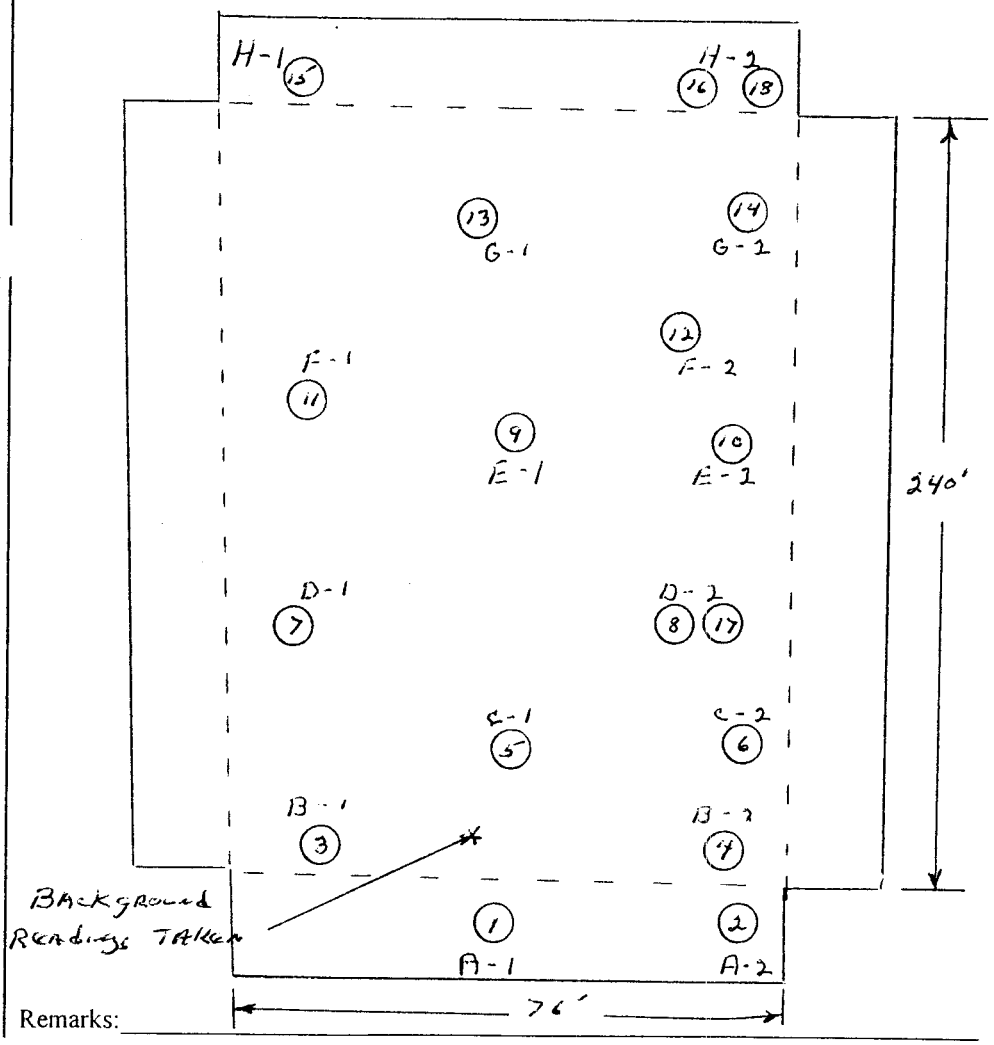
RADIOLOGICAL SURVEY REPORT

ATGS #: FM-02

DATE: 10-28-99	INSTRUMENTATION USED				
TIME: 1330	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldstein / D. Kovacs	Bicron	13-5042	N/R	5 uR	12-23-99
LOCATION: Bldg 338	Ludlum 43-37 2224	058824 160665	α 17% β- 19.6%	α 5 Cpm β- 42 Kpm	10-15-00
REVIEWED BY: Frank Whitcher	Ludlum 43-68 2224	134485 133159	α 16.4% β- 18%	α 1 Cpm β- 151 Cpm	10-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A		

PURPOSE OF SURVEY: FINAL RELEASE SURVEY

← N



Remarks: SMEARS LOCATION

#	βγ	α
	See Attached Sheet	

SMEAR RESULTS

RESULTS = DPM/100cm² UNLESS OTHERWISE NOTED

RADIOLOGICAL SURVEY REPORT

ATGS #: FM-02

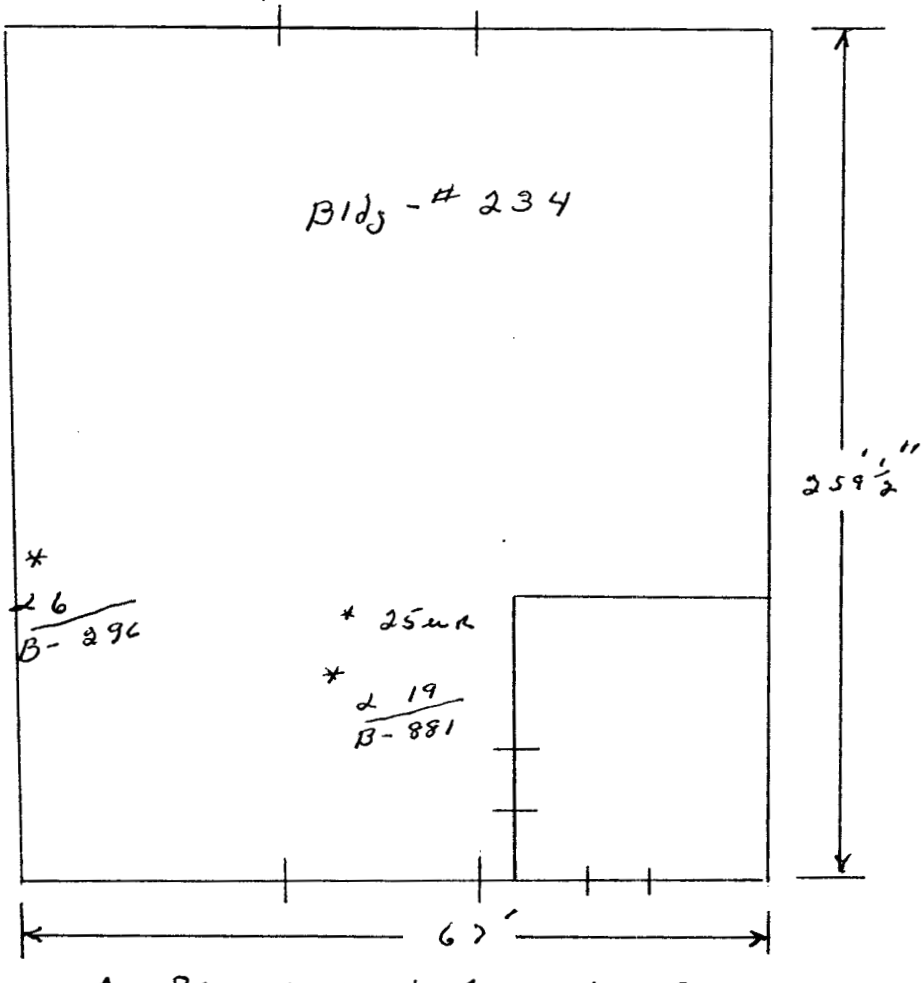
DATE: 12-2-99	INSTRUMENTATION USED				
TIME: 1230	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldstein / D. Holcomb	BICRON	B-500-2	N/A	25 uR	10-14-00
LOCATION: Bldg - # 234	PRAC 48-32 2224	088834 / 160668	α 16 % B-18.6	α 19 cpm B-881	10-15-00
REVIEWED BY:	PRAC 43-48 2224	134485 / 132159	α 16 % B-18	α 6 cpm B-296	10-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)	~	~	N/A	~	~

PURPOSE OF SURVEY: 2 α Background Readings Taken in Bldg # 234

SMEAR RESULTS

RESULTS = DPM/100cm²
UNLESS OTHERWISE NOTED

#	βγ	α



Remarks: All Readings are in Cpm unless otherwise NOTATED

BLDG 338

RADIOLOGICAL SURVEY REPORT

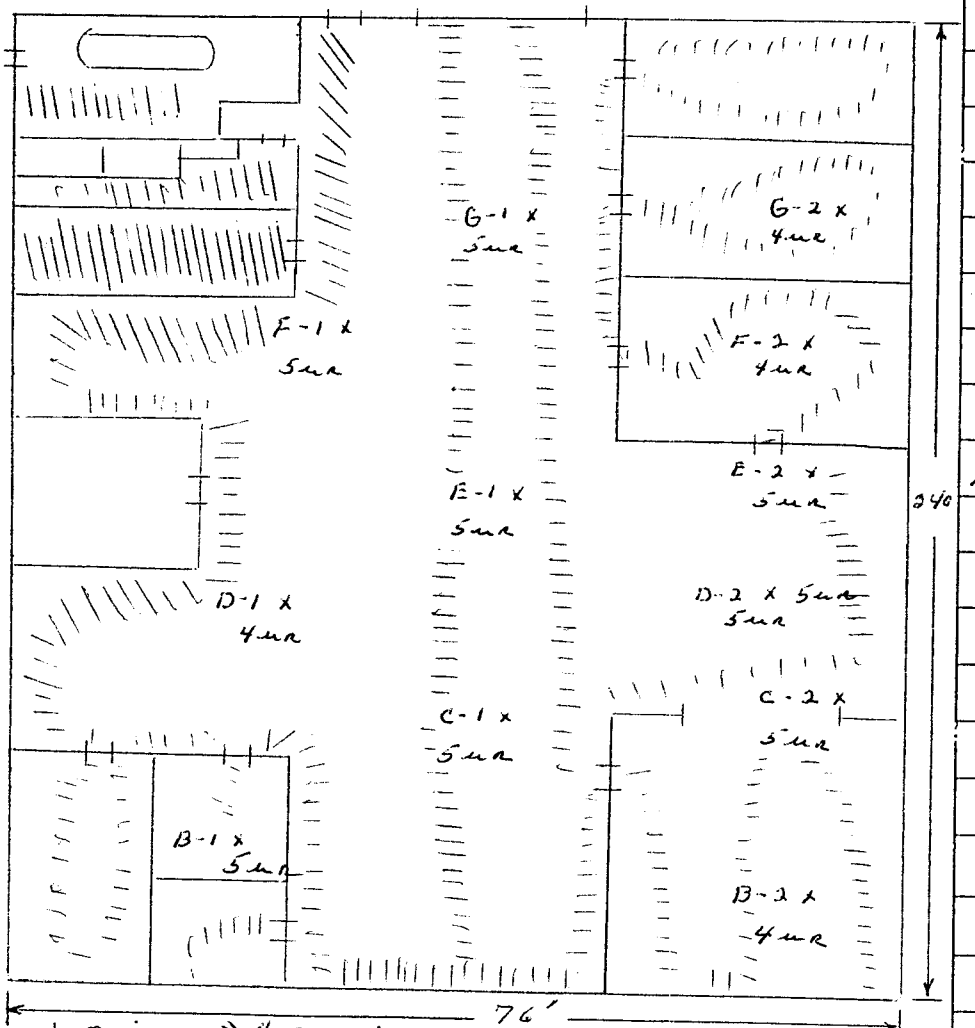
ATGS #: FM-02

DATE: 10-28-99	INSTRUMENTATION USED				
TIME: 1330	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldstein / D. Koontz	BICRON	B5642	N/A	5 mR	12-23-99
LOCATION: Bldg 338	PRM 43-37 2224	088824 160668	α 17.9% β 19.6%	α 5 cpm β 42 cpm	10-15-00
REVIEWED BY: Frank Whitch	PRM-43-68 2224	134485 132159	α 16.4% β 18%	α 31 cpm β 151 cpm	10-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A		

PURPOSE OF SURVEY: FINAL RELEASE SURVEY

NOTE: SCANS WERE 18" PASSES ON FLOOR

← N



#	βγ	α
1	N	A

SMEAR RESULTS

RESULTS = DPM/100cm²
UNLESS OTHERWISE NOTED

Remarks: MICRO "R" READINGS TAKEN ON SURFACE

\\\\ = SHOWS AREA WHERE ALPHA, BETA AND GAMMA SCANS WERE TAKEN

ALL SCAN SURVEYS ARE AT BACKGROUND LEVELS FOR ALPHA / BETA ACTIVITY

BLDG. 338

RADIOLOGICAL SURVEY REPORT

ATGS #: FM-02

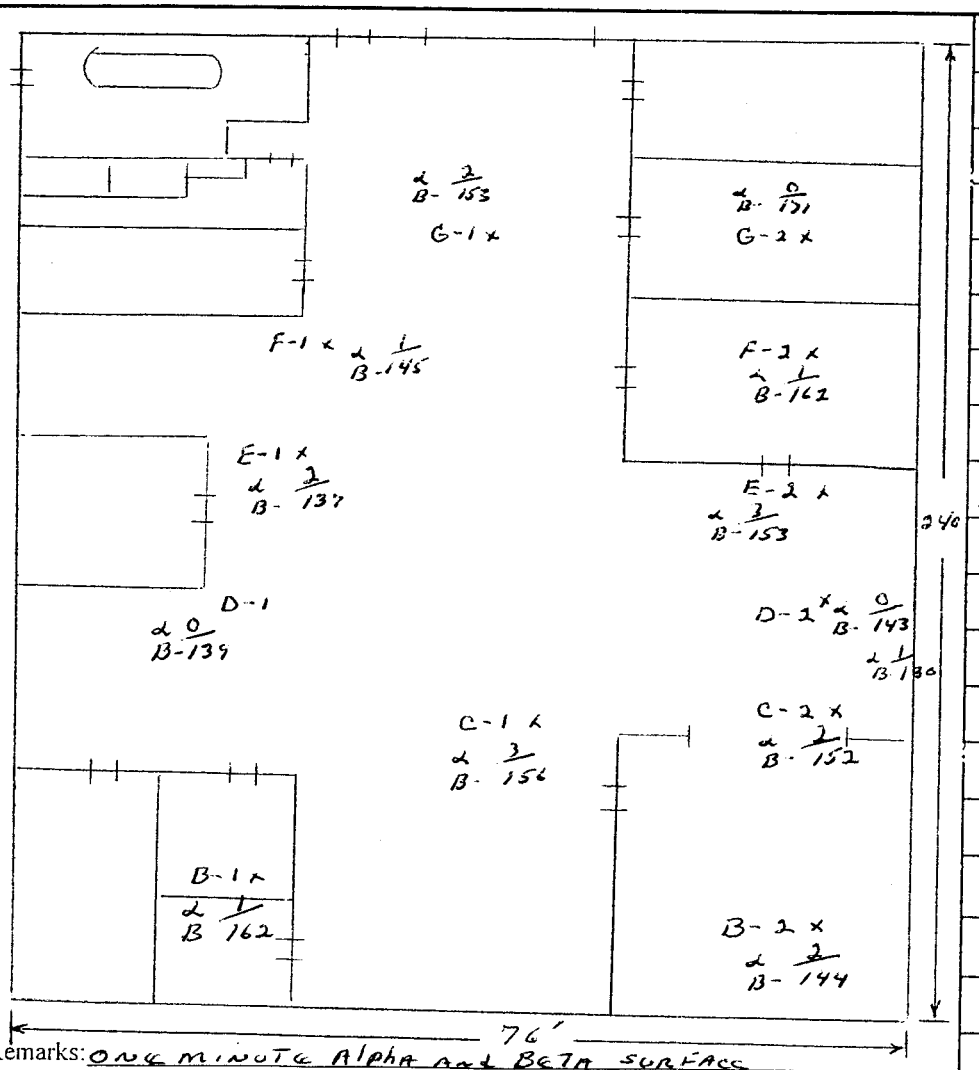
DATE: 10-28-99	INSTRUMENTATION USED				
TIME: 1330	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldstein / D. Kountz	BICRON	B5042	N/A	5 uR	12-23-99
LOCATION: Bldg 338	PRM 43-37 2224	08824 160668	α 17% β 19.6%	α 5 cpm β 421 cpm	10-15-00
REVIEWED BY: Frank White	PRM 43-68 2224	134485 132159	α 16.4% β 18%	α 1K ± 1 cpm β 151 cpm	10-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A		

PURPOSE OF SURVEY: FINAL RELEASE SURVEY

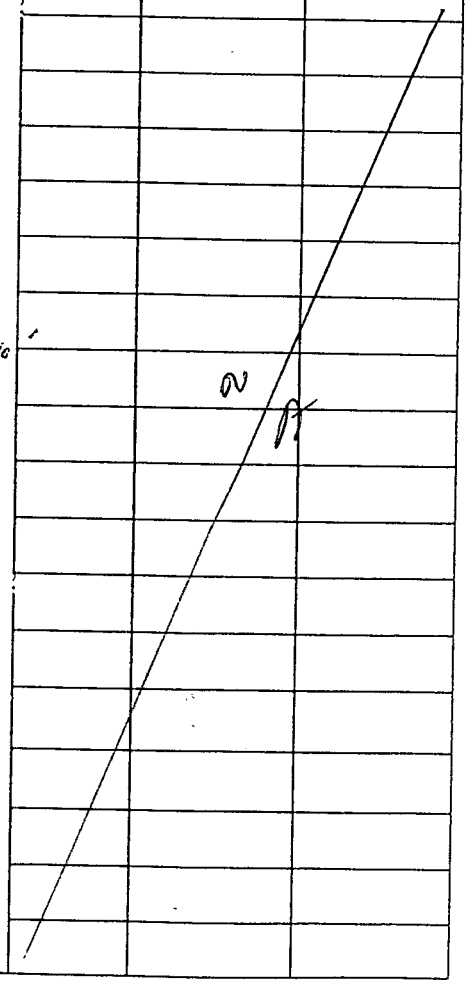
← N

SMEAR RESULTS

RESULTS = DPM/100cm²
UNLESS OTHERWISE NOTED



#	βγ	α



Remarks: ONE MINUTE ALPHA AND BETA SURFACE ACTIVITY READINGS

ALL READINGS ARE IN CPM UNLESS OTHERWISE NOTATED

BLDG 338

RADIOLOGICAL SURVEY REPORT

ATGS #: F-M-02

DATE: 10-28-99	INSTRUMENTATION USED				
TIME: 1330	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldston / D. Kountz	BICRON	13-504-2	N/A	5 cpm	12-23-99
LOCATION: Bldg 338	PROBE 43-31 / 2224	088824 / 160668	α 17 / β-γ 16	α 5 / β-γ 421	10-15-00
REVIEWED BY: Frank Wheeler	PROBE 43-28 / 2224	134485 / 132159	α 16.4 / β-γ 18	α 1 / β-γ 151	10-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A		

PURPOSE OF SURVEY: FINAL RELEASE SURVEY

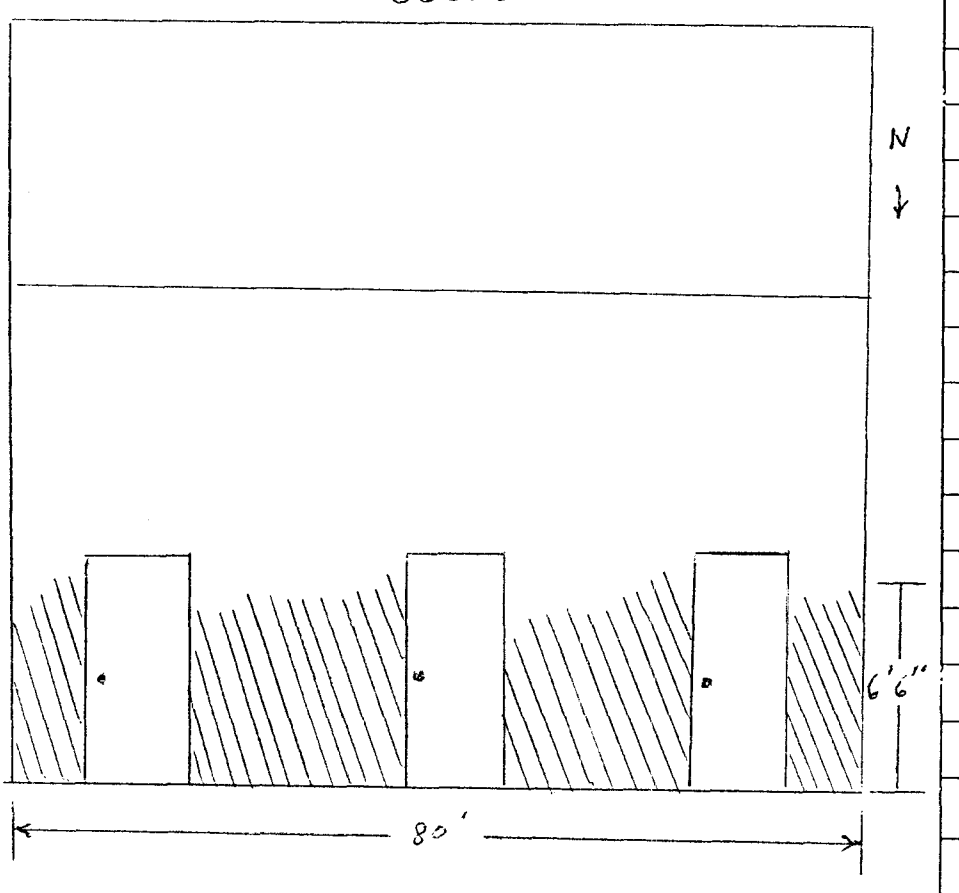
NOTE: SCANS WERE 6" PASSES ON WALLS

BLDG 338

SMEAR RESULTS

RESULTS = DPM/100cm² UNLESS OTHERWISE NOTED

#	βγ	α
	N/A	



Remarks: ||| = SHOWS AREA WHERE ALPHA, BETA AND GAMMA SCANS WERE TAKEN

ALL READINGS ARE AT BACKGROUND LEVELS FOR ALPHA/BETA ACTIVITY.

BLDG 338

RADIOLOGICAL SURVEY REPORT

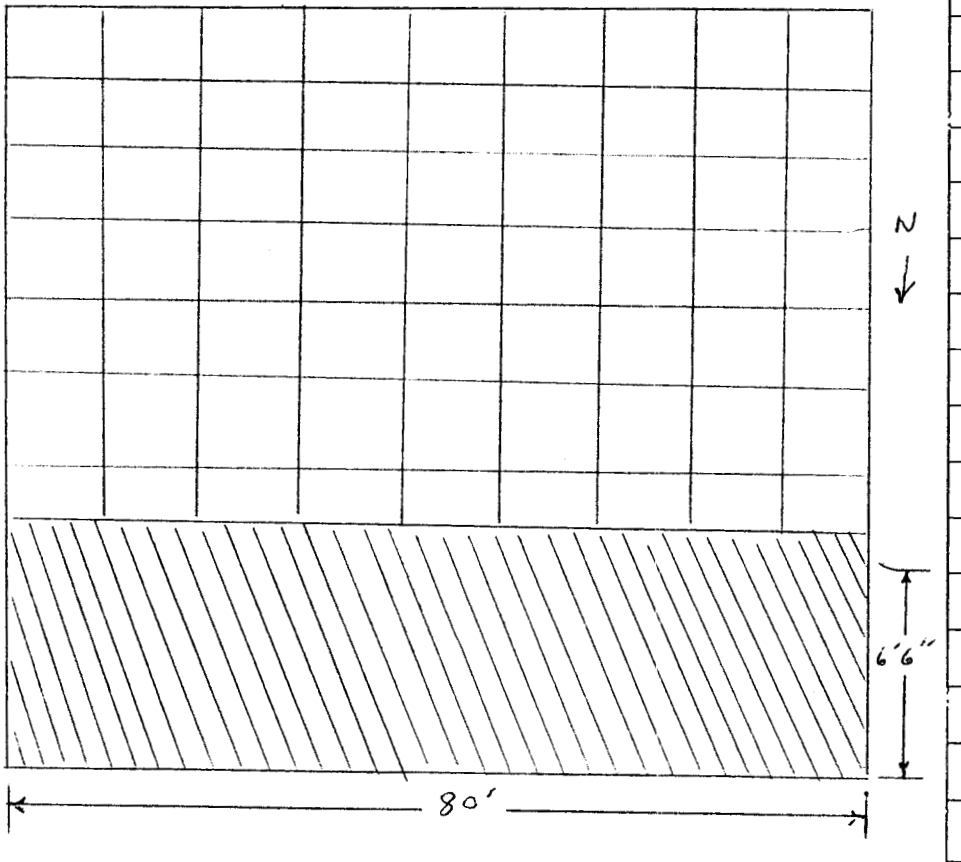
ATGS #: FM1-02

DATE: 10-28-99	INSTRUMENTATION USED				
TIME: 1330	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldstein / D. Kovitch	Bicron	13-504-2	N/A	5 cpm	12-23-99
LOCATION: Bldg. 338	Prac 43-31 / 2224	08824 / 160668	α 17 β-γ 19.6	α 5 β-γ 421	10-15-00
REVIEWED BY: Frank Whitten	Prac 43-68 / 2224	134485 / 132159	α 16.4 β-γ 18	α 1 β-γ 151	10-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A		

PURPOSE OF SURVEY: FINAL RELEASE SURVEY

NOTE: SCANS WERE 6" PASSES ON WALLS

BLDG. 338



SMEAR RESULTS

RESULTS = DPM/100cm² UNLESS OTHERWISE NOTED

#	βγ	α

Remarks: ||| = SHOWS AREA WHERE ALPHA, BETA and GAMMA SCANS WERE TAKEN

ALL READINGS ARE AT BACKGROUND LEVELS for ALPHA / BETA ACTIVITY.

BLDG. 338

RADIOLOGICAL SURVEY REPORT

ATGS #: FM-02

DATE: 10-28-99	INSTRUMENTATION USED				
TIME: 1330	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldstein / D. Kounce	BICRON	13-504-2	N/A	S&B	12-23-99
LOCATION: Bldg 338	PRM-43-37	98824	α 17	α 5	
	2224	166665	β- 19.6	β- 421	10-15-00
REVIEWED BY:	PRM-43-65	134485	α 16.4	α 1	
	2224	132159	β- 18	β- 151	10-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A		

PURPOSE OF SURVEY: FINAL RELEASE SURVEY

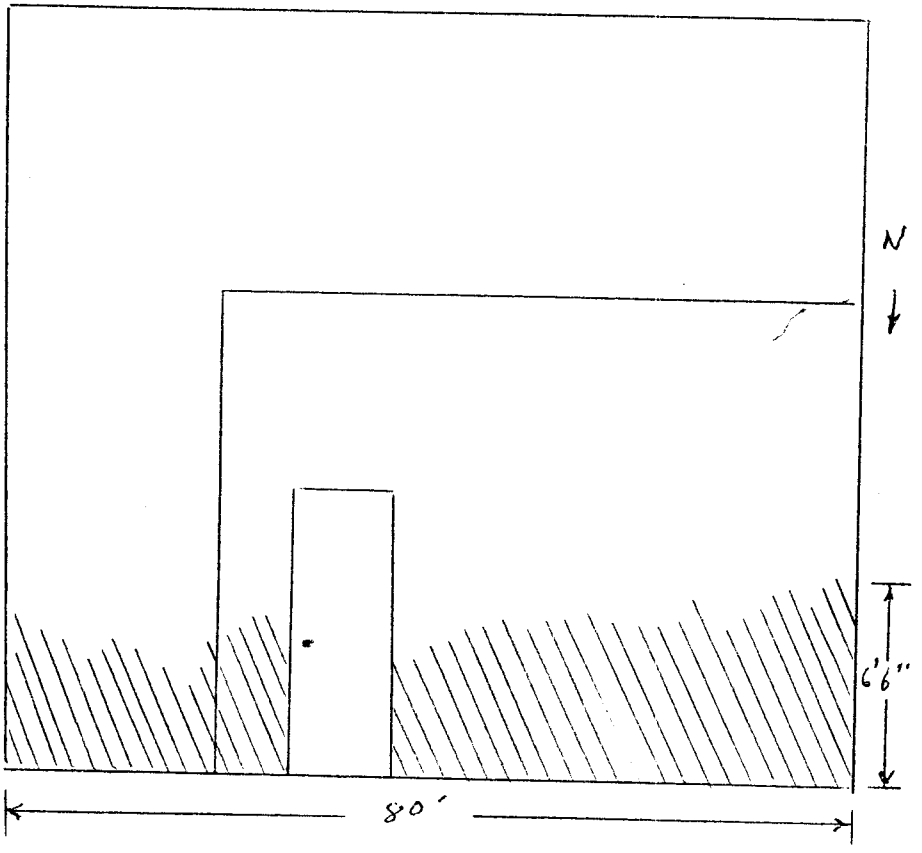
NOTE: SCANS WERE 6" PASSES ON WALLS

BLDG 338

SMEAR RESULTS

RESULTS = DPM/100cm²
UNLESS OTHERWISE NOTED

#	βγ	α



Remarks: ///// = SHOWS AREA WHERE ALPHA, BETA AND GAMMA SCANS WERE TAKEN

ALL SCAN READINGS ARE AT BACKGROUND READINGS FOR ALPHA/BETA ACTIVITY

BLDG. 338

RADIOLOGICAL SURVEY REPORT

ATGS #: FM-02

DATE: 10-28-99	INSTRUMENTATION USED				
TIME: 1330	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldstone / D. Koultis	Bicron	B-504-2	N/A	5 uR	12-23-98
LOCATION: Bldg 338	Rad 43-37 / 2224	088824 / 160668	α 13 / B- 19.6	α 5 / B- 421	10-15-00
REVIEWED BY: [signature]	Rad 43-68 / 2224	134485 / 132151	α 16.4 / B- 18	α 1 / B- 151	10-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A		

PURPOSE OF SURVEY: FINAL RELEASE SURVEY

NOTE: SCANS WERE 6" PASSES ON WALLS

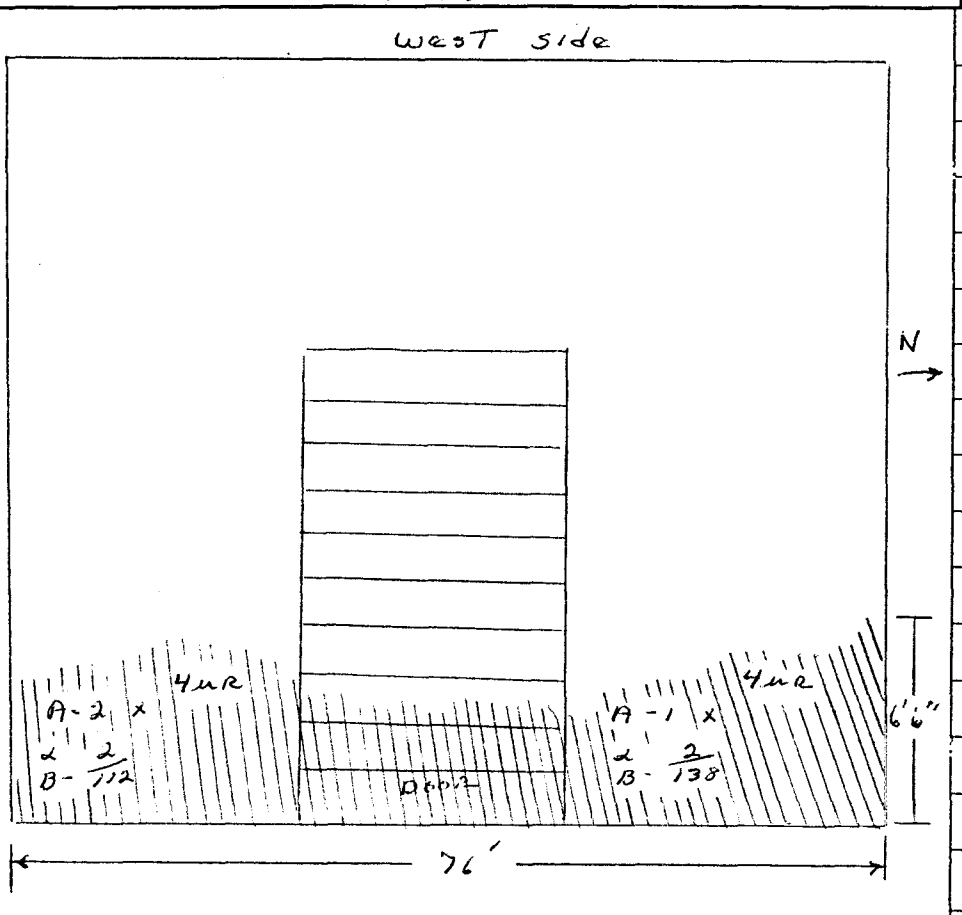
1331 = SHOWS AREA WHERE ALPHA, BETA AND GAMMA SCANS WERE TAKEN

BLDG. 339

SMEAR RESULTS

RESULTS = DPM/100cm²
UNLESS OTHERWISE NOTED

#	βγ	α



Remarks: ONE MINUTE ALPHA AND BETA SURFACE ACTIVITY READINGS, ALSO MICRO "R" READINGS TAKEN ON SURFACE

ALL SCAN READINGS ARE AT BACKGROUND LEVELS FOR ALPHA/BETA ACTIVITY

BLDG. 338

RADIOLOGICAL SURVEY REPORT

ATGS #: FM-02

DATE: 10-28-99	INSTRUMENTATION USED				
TIME: 1330	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldstein/D. Kowalik	ISICRON	B-504-2	N/A	5 mR	12-23-99
LOCATION: BLDG 338	PROBE 43-37 2224	098824 160168	α 17 B- 19.6	α 5 B- 421	10-15-00
REVIEWED BY: Frank Whitcher	PROBE-43-68 2224	134485 132159	α 16.4 B- 18	α 1 B- 151	10-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A		

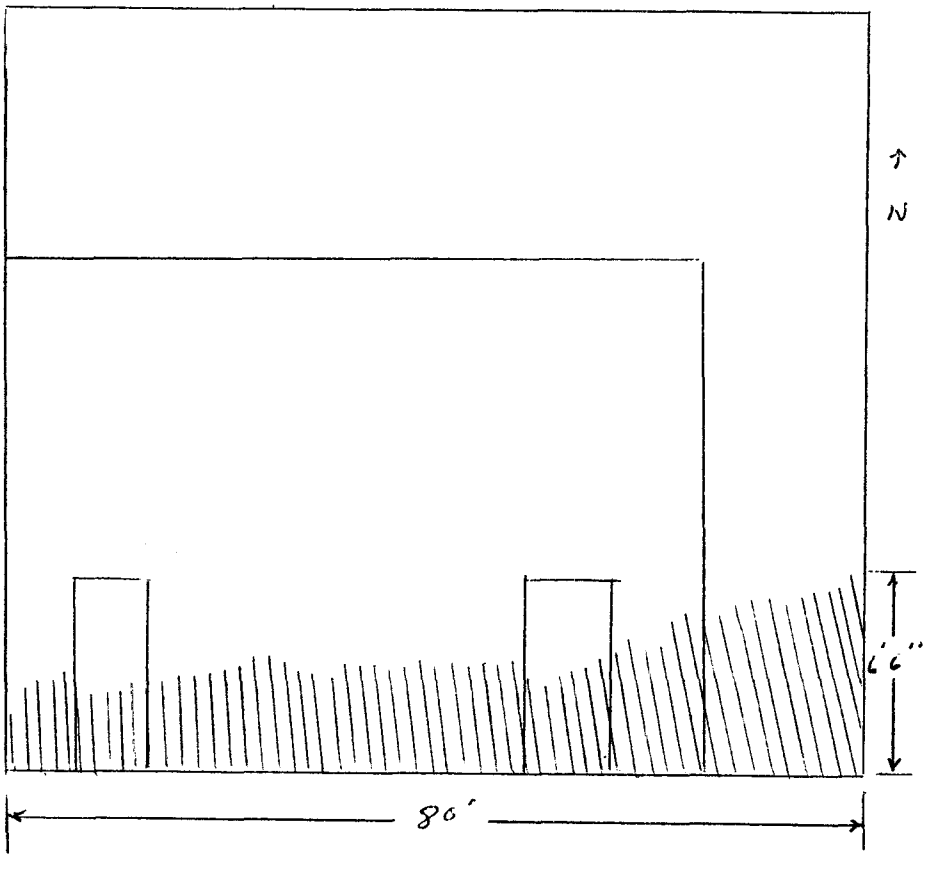
PURPOSE OF SURVEY: FINAL RELEASE SURVEY

NOTE: SCANS WERE 6" PASSES ON WALLS

BLDG. 338

SMEAR RESULTS

RESULTS = DPM/100cm²
UNLESS OTHERWISE NOTED



#	βγ	α

N/A

Remarks: {} = shows AREA where ALPHA, BETA and GAMMA SCANS were TAKEN

ALL SCAN READINGS ARE AT BACKGROUND LEVELS for ALPHA/BETA ACTIVITY.

BLDG 338

RADIOLOGICAL SURVEY REPORT

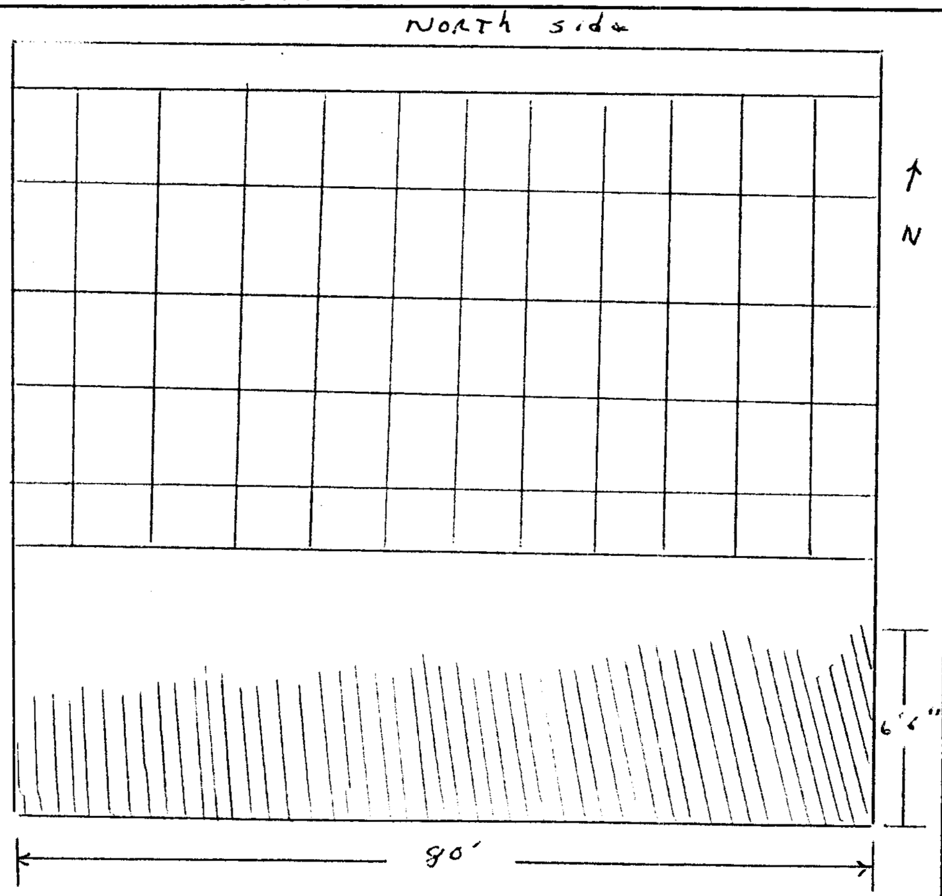
ATGS #: FM-02

DATE: 10-28-99	INSTRUMENTATION USED				
TIME: 1330	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldston/D. Kountz	Bicron	B504-Z	N/A	5 uR	12-23-99
LOCATION: Bldg 338	PROBE 43-37 / 2224	088824 / 160668	α 17 / β 19.6	α 6 / β 421	10-15-00
REVIEWED BY: Frank Whitaker	PROBE 43-68 / 2224	134485 / 122159	α 16.4 / β 18	α 1 / β 151	10-15-00
Smear Locations Circled. Dose Rates = microR/hr ($\mu R/hr$)			N/A		

PURPOSE OF SURVEY: FINAL Release Survey

NOTE: SCANS WERE 6" PASSES ON WALLS

BLDG. 338



SMEAR RESULTS RESULTS = DPM/100cm² UNLESS OTHERWISE NOTED		
#	βγ	α
	N/A	

Remarks: ⸾⸾⸾ = shows AREA where Alpha, BETA and GAMMA SCANS were TAKEN

ALL SCAN SURVEYS ARE AT BACKGROUND LEVELS for ALPHA/BETA/GAMMA ACTIVITY.

BLDG. 338

RADIOLOGICAL SURVEY REPORT

ATGS #: Fm-02

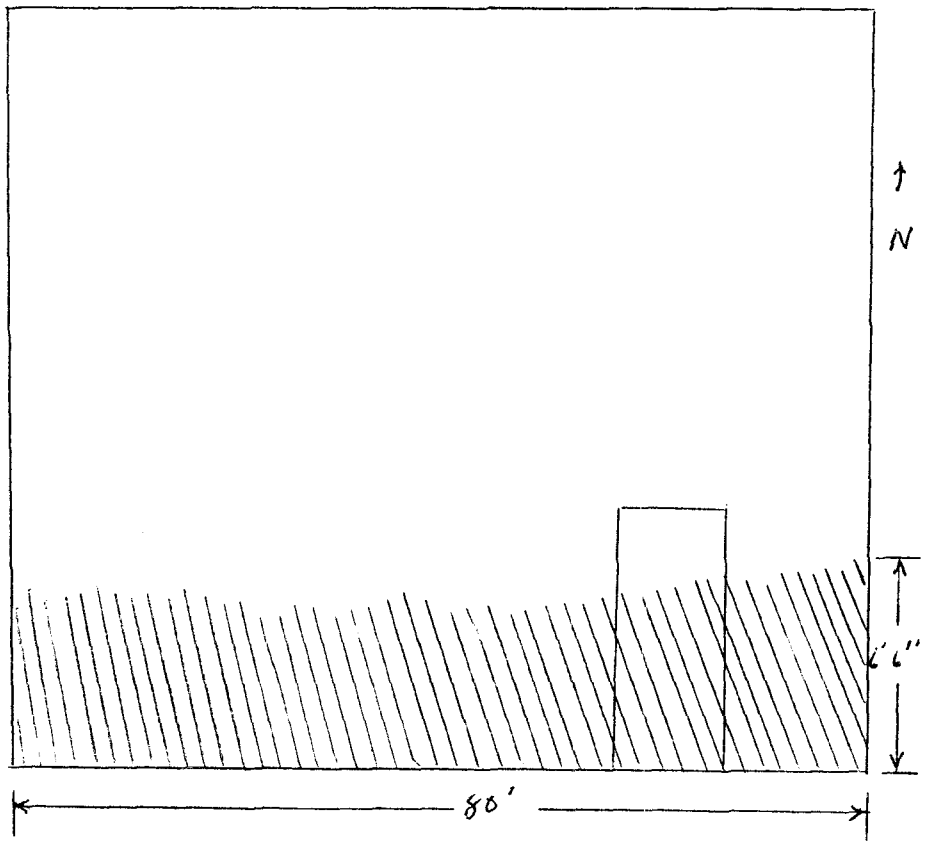
DATE: 10-28-99	INSTRUMENTATION USED				
TIME: 1330	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldstone / D. Kowitz	BICRON	8504-2	N/A	SUR	12-23-99
LOCATION: Bldg 338	PRM-43-37 / 2224	098814 / 160668	α 17 / β-γ 19.6	α 5 / β-γ 421	10-15-00
REVIEWED BY: Frank Whitcher	PRM-43-68 / 2224	134485 / 132154	α 16.4 / β-γ 18	α 1 / β-γ 151	10-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A		

PURPOSE OF SURVEY: FINAL RELEASE SURVEY

NOTE: SCANS WERE 6" PASSES ON WALLS

BLDG. 338

NORTH side



SMEAR RESULTS

RESULTS = DPM/100cm²
UNLESS OTHERWISE NOTED

#	βγ	α

Remarks: ▨ = shows AREA where ALPHA, BETA and GAMMA SCANS were TAKEN

ALL SCAN SURVEYS ARE AT BACKGROUND LEVELS for ALPHA/BETA ACTIVITY.

BLDG 338

RADIOLOGICAL SURVEY REPORT

ATGS #: FM-02

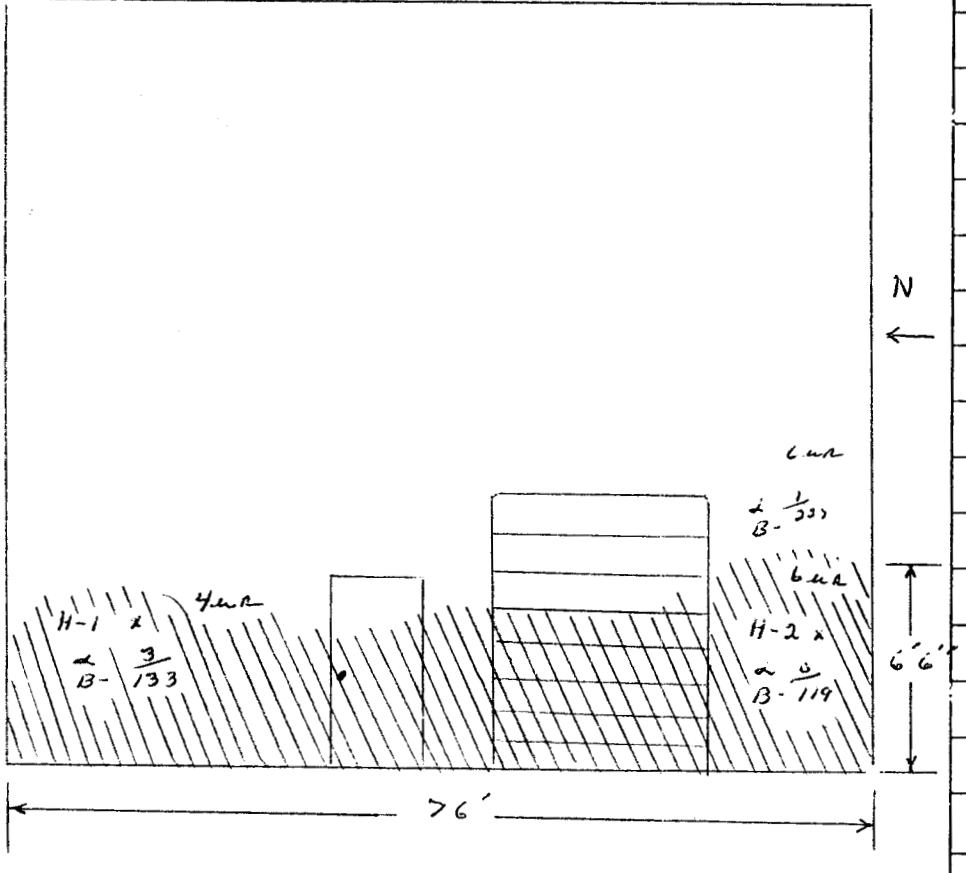
DATE: 10-28-99	INSTRUMENTATION USED				
TIME: 1330	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldston/D. Kounts	BICRON	B-5042	N/A	5 uR	12-23-99
LOCATION: Bldg. 338	PRICE 43-31 2224	98834 160668	α 17 B- 1916	α 5 B 491	10-15-00
REVIEWED BY: Frank Whitcher	PRICE 43-68 2224	134485 132159	α 16.4 B- 18	α 1 B 151	10-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A		

PURPOSE OF SURVEY: FINAL RELEASE SURVEY

NOTE: SCANS WERE 6" PASSES ON WALLS

=3 hours AREA where ALPHA, BETA AND GAMMA SCANS were TAKEN

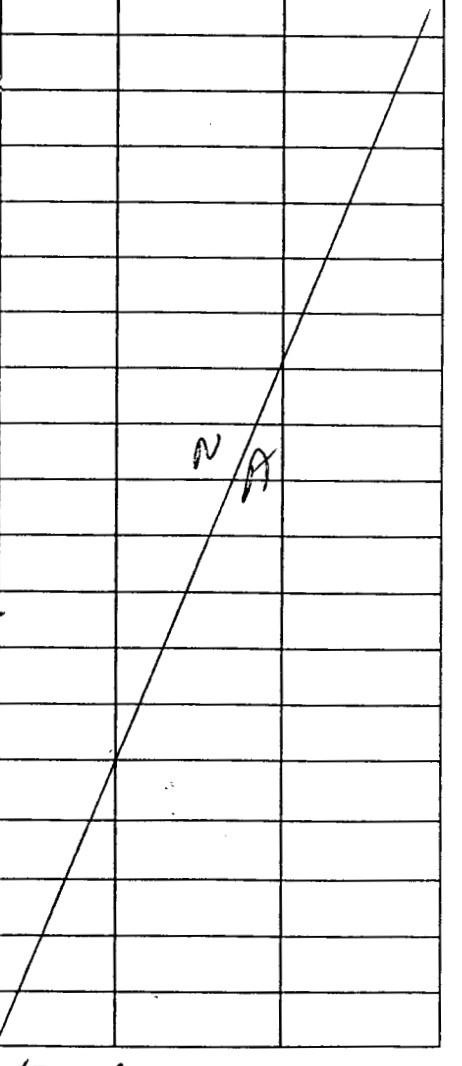
BLDG. 338 EAST side



SMEAR RESULTS

RESULTS = DPM/100cm²
UNLESS OTHERWISE NOTED

#	βγ	α



Remarks: ONE MINUTE ALPHA AND BETA SURFACE ACTIVITY READINGS, ALSO MICRO "R" READINGS TAKEN ON SURFACE

ALL SCAN SURVEYS ARE OF ROCK GROUND LEVELS FOR ALPHA/BETA RADIOACTIVITY

McClellan
Bldg-338

Number	Smear Location	Alpha Activity DPM/100 sq cm	Beta Activity DPM/100 sq cm
1	A-1	<16.62	<48.07
2	A-2	<16.62	<48.07
3	B-1	<16.62	<48.07
4	B-2	<16.62	<48.07
5	C-1	<16.62	<48.07
6	C-2	<16.62	<48.07
7	D-1	<16.62	<48.07
8	D-2	<16.62	<48.07
9	E-1	<16.62	<48.07
10	E-2	<16.62	<48.07
11	F-1	<16.62	<48.07
12	F-2	<16.62	<48.07
13	G-1	<16.62	<48.07
14	G-2	<16.62	<48.07
15	H-1	<16.62	<48.07
16	H-2	<16.62	<48.07
17	D-2	<16.62	<48.07
18	H-2	<16.62	138
* QA SMEARS			

10

ATTACHMENT 10

FM03/04 SURVEY DATA FOR AM SOURCE SHIPMENT

ATG
McClellan Commodity Site Survey

RADIOLOGICAL SURVEY REPORT

ATGS #: FM-03

DATE: 10-29-99	INSTRUMENTATION USED				
TIME: 1000	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: Richard Kuntz	M-3 }	102554	10%	50 cpm	6-16-00
LOCATION: Ft. McCLELLAN Anniston, AL. COBRA Training Facility	probe 44-9 }	128044		N	A
REVIEWED BY: Frank C Mitchell	M-2224	132159	Alpha 16%	3 cpm	6-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)	PROBE 43-68 }	134485	Beta 18.3%	238 cpm	6-15-00

PURPOSE OF SURVEY: To Release For shipment off site

Am.241 Detection Cells - 18 Cells

3x M43A1s and solo Detector Cells.

SMEAR#

1. Z03-C-21681
2. Z03-C-50222
3. Z03-C-50314
4. Z03-C-30729
5. Z03-C-26476
6. Z03-C-24560
7. Z03-C-03535
8. Z03-C-29920
9. Z03-C-09524
10. Z03-C-14093
11. Z03-C-21580
12. Z03-C-10514
13. Z03-C-25262
14. Z03-C-03946
15. Z03-C-20884
16. Z03-C-14693
17. Z03-C-21188
18. Z03-C-32305

Remarks: Each cell approximately 2½" x 3". Smeared all outer surfaces.

SMEAR RESULTS

RESULTS = DPM/100cm² UNLESS OTHERWISE NOTED

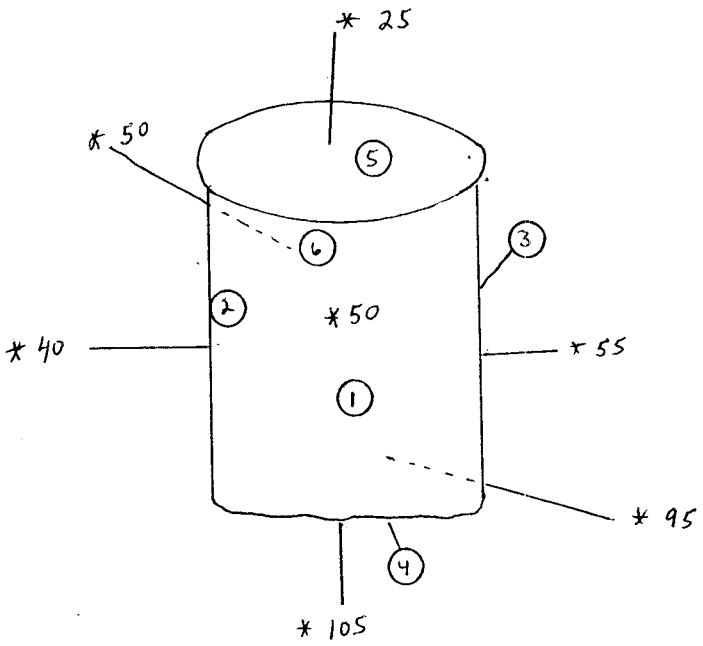
#	βγ	α
1	< 1,000	< 100 ~~20~~ DPM
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18	↓	↓
	N	A

RADIOLOGICAL SURVEY REPORT

ATGS #: FM-04

DATE: 11-1-99	INSTRUMENTATION USED				
TIME: 0850	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldston	Micro-rem Bicron	B500Z	NA	20 μR	10-14-2000
LOCATION: Ft. McClellan, Anniston, AL.	M-2224	132159	Alpha 16.4 %	Alpha 1 cpm	10-15-2000
REVIEWED BY: Daniel C. Waters	PR-43-68	134485	Beta 18.5 %	Beta 232 cpm	10-15-2000
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N	A	

PURPOSE OF SURVEY: Shipment survey of Americium Check Sources



Remarks: Highest reading on bottom of container 105 uR/HR

* = Contact

SMEAR RESULTS

RESULTS = DPM/100cm²
UNLESS OTHERWISE NOTED

#	βγ	α
1	< 1K	< 100
2		
3		
4		
5		
6		
		A
	N	

11

ATTACHMENT 11

FM05 BUILDING 339 SURVEY DATA

ATG
McClellan Commodity Site Survey

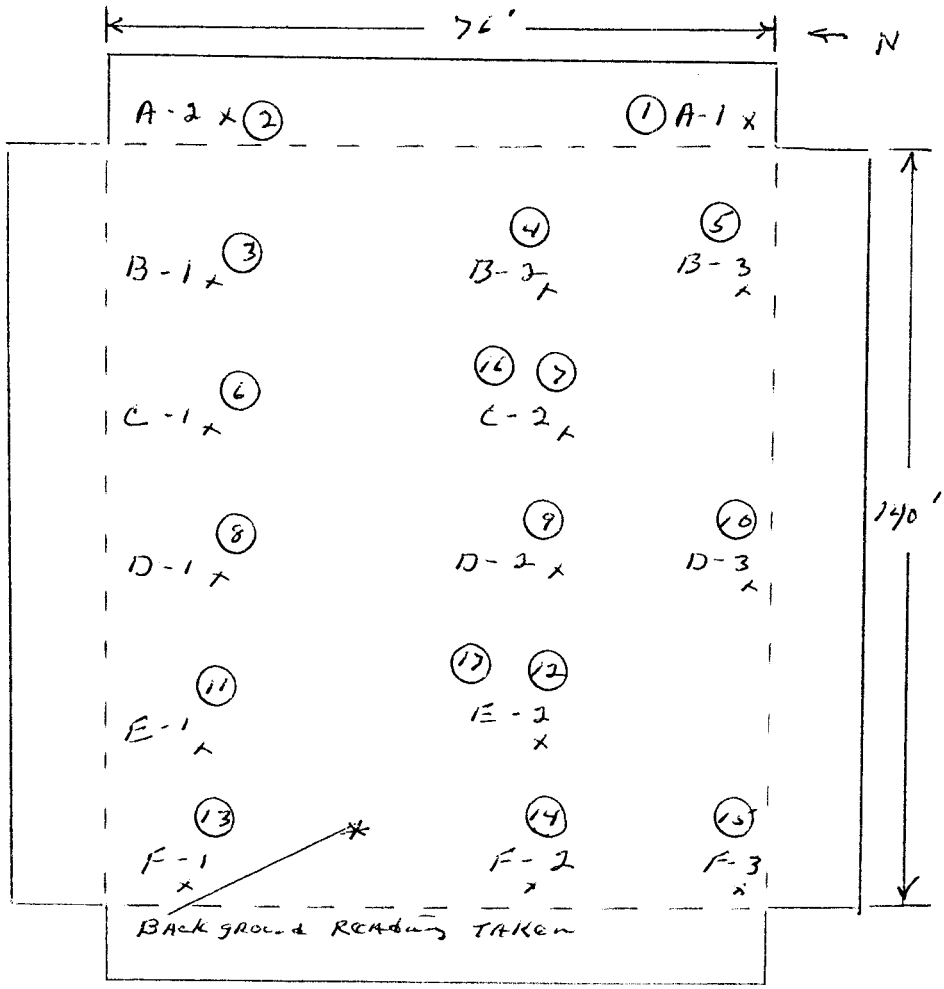
BLDG 339

RADIOLOGICAL SURVEY REPORT

ATGS #: FM-05

DATE: 10-29-99	INSTRUMENTATION USED				
TIME: 1300	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldston / D. Kowartz	Bicron	B500Z	N/A	0 uR	10-14-00
LOCATION: Bldg # 339	PR U3-37 M-2224	04224 160668	< 16.8 B- 19.0	< 2 cpm B- 214 cpm	10-15-00
REVIEWED BY: [signature]	PR 43-68 M-2224	134485 132159	< 16.0 B- 18.3	< 2 cpm B- 237 cpm	10-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A		

PURPOSE OF SURVEY: Final Release Survey
BLDG 339



SMEAR RESULTS
RESULTS = DPM/100cm²
UNLESS OTHERWISE NOTED

#	βγ	α
	See	
	Attached	
	sheet	
	N/A	

Remarks: SMEAR LOCATION

RADIOLOGICAL SURVEY REPORT

ATGS #: FM-05

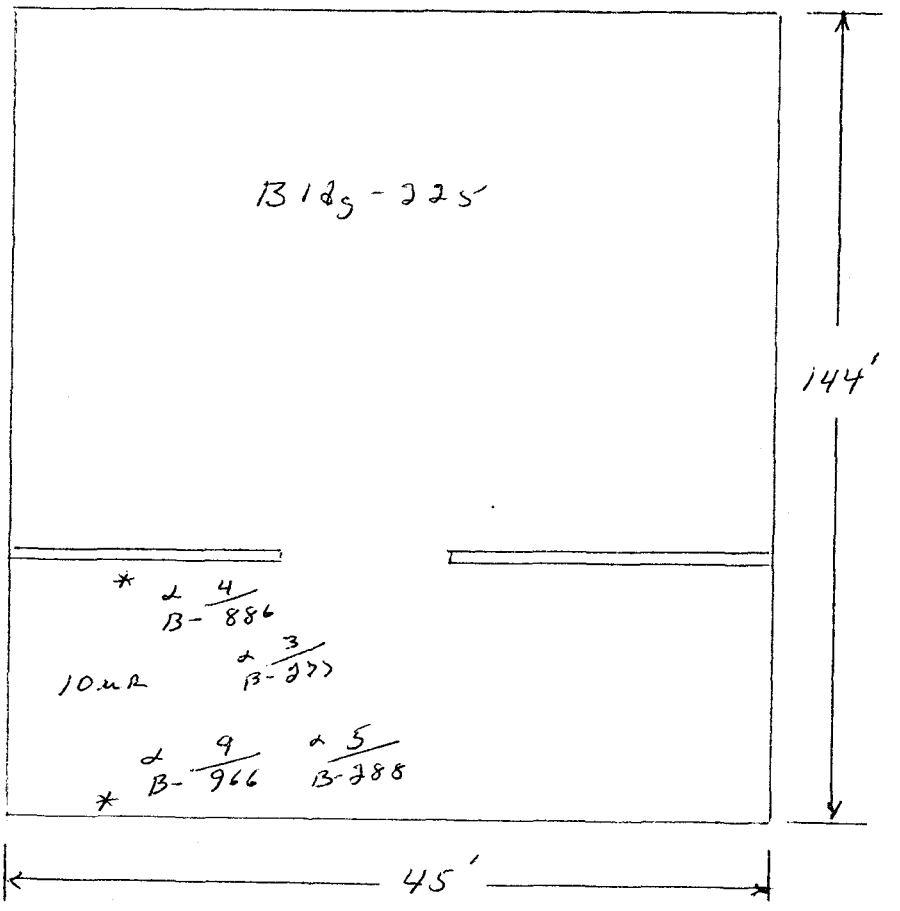
DATE: 12-2-98	INSTRUMENTATION USED				
TIME: 1130	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldstow / D. Kowles	BICRON	B-500-2	N/A	10 uR	10-14-00
LOCATION: Bldg - 225	PRAC 43-32 2224	088824 160668	α 16 B-18.6	α 9 B-966	10-15-00
REVIEWED BY: Frank Wheel	PRAC 43-44 2224	134455 132159	α 16 B-18	α 5 B-288	10-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A		

PURPOSE OF SURVEY: 2nd Background Readings Taken in Bldg # 225

SMEAR RESULTS

RESULTS = DPM/100cm² UNLESS OTHERWISE NOTED

#	βγ	α



Remarks:

ALL READINGS ARE IN CPM UNLESS OTHERWISE NOTED

BLDG 339

RADIOLOGICAL SURVEY REPORT

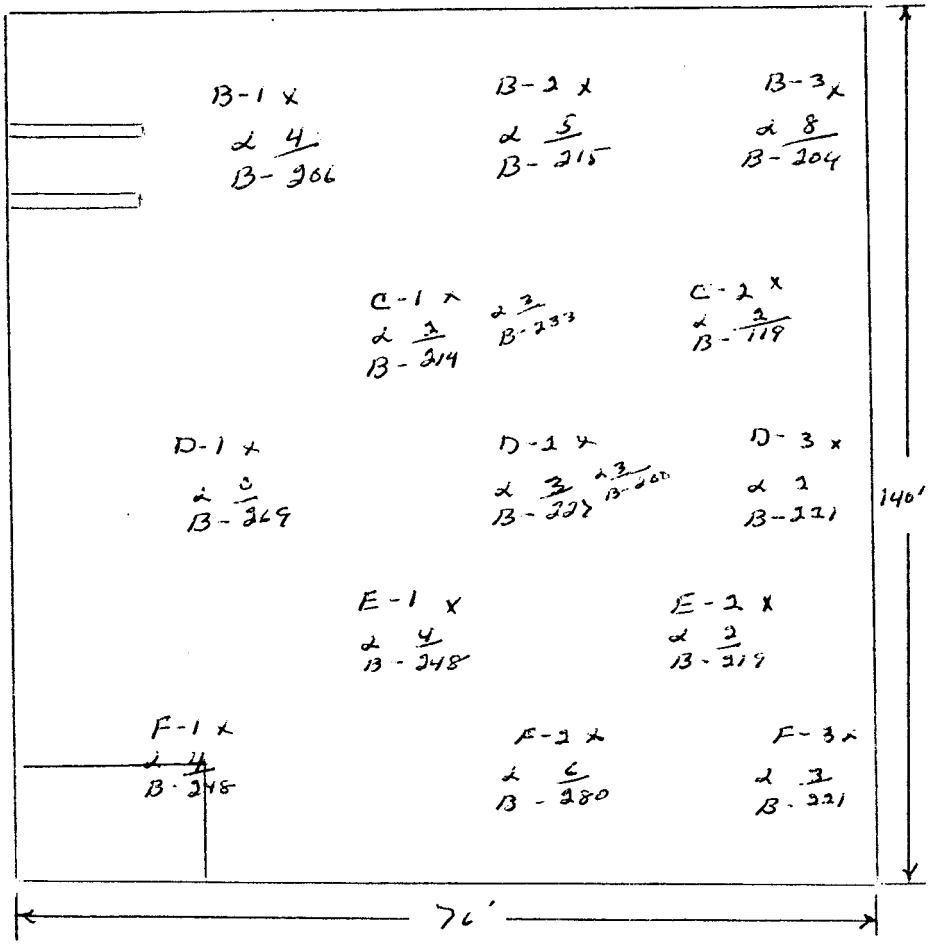
ATGS #: FM-05

DATE: 10-29-99	INSTRUMENTATION USED				
TIME: 1300	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldston / D. Hunter	BICRON	B-5062	N/A	6 cpm	10-14-00
LOCATION: Bldg # 339	PR 43-3'1 M-2224	088624 160668	α 16.8 β 19.0	α 2 cpm β 548 cpm	10-15-00
REVIEWED BY: Frank Whitten	PR 43-68 M-2224	134495 132154	α 16.0 β 18.3	α 2 cpm β 237 cpm	10-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A		

PURPOSE OF SURVEY: FINAL RELEASE SURVEY

BLDG 339

← N



SMEAR RESULTS

RESULTS = DPM/100cm²
UNLESS OTHERWISE NOTED

#	βγ	α

Remarks: One Minute Alpha and Beta Surface Activity Readings in counts per minute

BLDG 339

RADIOLOGICAL SURVEY REPORT

ATGS #: FM-05

DATE: 10-29-99	INSTRUMENTATION USED				
TIME: 1300	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldstein / D. Kountz	BICRON	B-506-2	N/A	6 uR	10-14-00
LOCATION: Bldg 339	PRAC 43-37 2224	088824	α 16.8 β 19	α 1 β-843	10-15-00
REVIEWED BY: Frank Whitel	PRAC 43-45 2224	134485 132159	α 16 β-18.5	α 2 β-231	10-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A		

PURPOSE OF SURVEY: FINAL RELEASE SURVEY

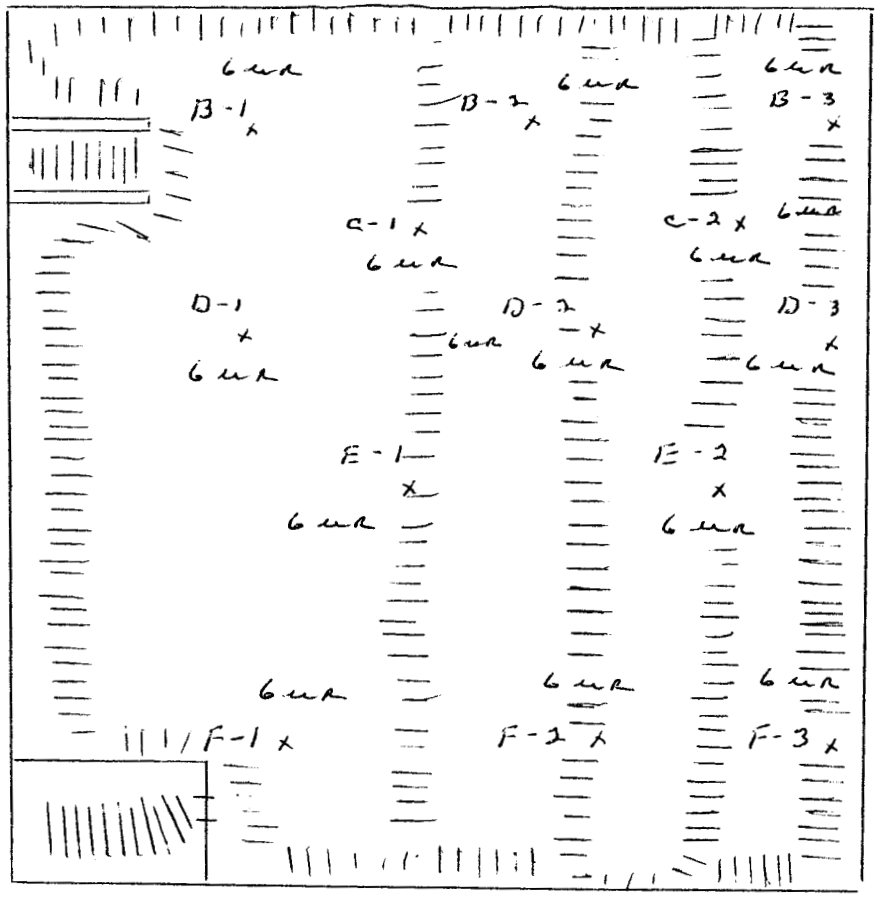
NOTE: SCANS WERE 18" PASSES ON FLOOR

BLDG 339 ← N

SMEAR RESULTS

RESULTS = DPM/100cm² UNLESS OTHERWISE NOTED

#	βγ	α
	N/A	



Remarks: MICRO "R" READINGS TAKEN ON SURFACE

SSS = shows where ALPHA, BETA and GAMMA SCANS WERE TAKEN

ALL SCAN SURVEYS ARE AT BACKGROUND LEVELS FOR ALPHA/BETA ACTIVITY

BLDG 339

RADIOLOGICAL SURVEY REPORT

ATGS #: FM-05-04 DIL

DATE: 10-29-99	INSTRUMENTATION USED				
TIME: 1300	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldston / Dickson	Bicron	B 5002	N/A	6 uR	10-14-00
LOCATION: Bldg 339	M-2224 PR 43-37	160668 088824	α 16.8 β- 19.0	α 2 cpm β- 848 cpm	10-15-00
REVIEWED BY: Frank Wheeler	M-2224 PR 43-68	132159 134485	α 16.0 β- 18.3	α 2 β- 237	10-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A		

PURPOSE OF SURVEY: Final Release Survey

NOTE: SCANS WERE 6" PASSES ON WALLS

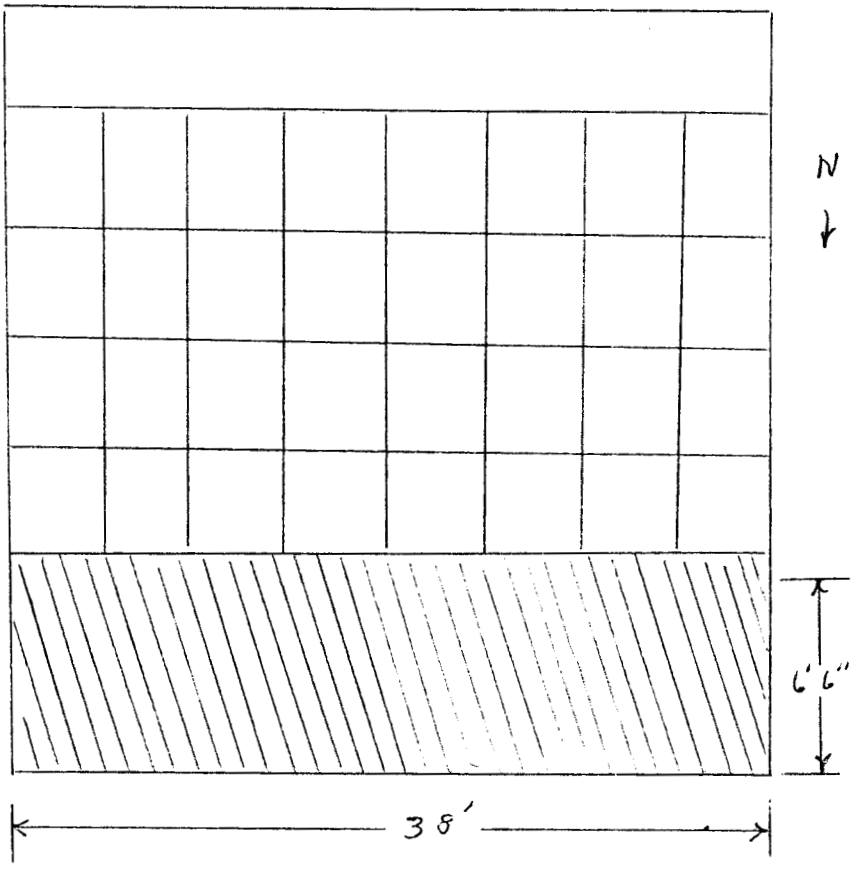
BLDG. 339

SMEAR RESULTS

RESULTS = DPM/100cm²
UNLESS OTHERWISE NOTED

#	βγ	α
	N	
	A	

SOUTH side



Remarks: (##) = shows AREA where ALPHA, BETA and GAMMA SCANS WERE TAKEN

ALL SCAN SURVEYS ARE AT BACKGROUND LEVELS FOR ALPHA / BETA ACTIVITY

BLDG 339

RADIOLOGICAL SURVEY REPORT

ATGS #: FM-05-04 DU

DATE: 10-29-99	INSTRUMENTATION USED				
TIME: 1300	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldstein / D. Kounts	Bicron	B5002	N/A	6 μR	10-14-00
LOCATION: Bldg 339	Probe 43-37 2224	160668	α 16.8 B- 19	α 2 B- 348	10-15-00
REVIEWED BY: Monte Whitaker	Probe 43-68 2224	134485 132159	α 16 B- 18.3	α 2 B- 037	10-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A		

PURPOSE OF SURVEY: FINAL RELEASE SURVEY

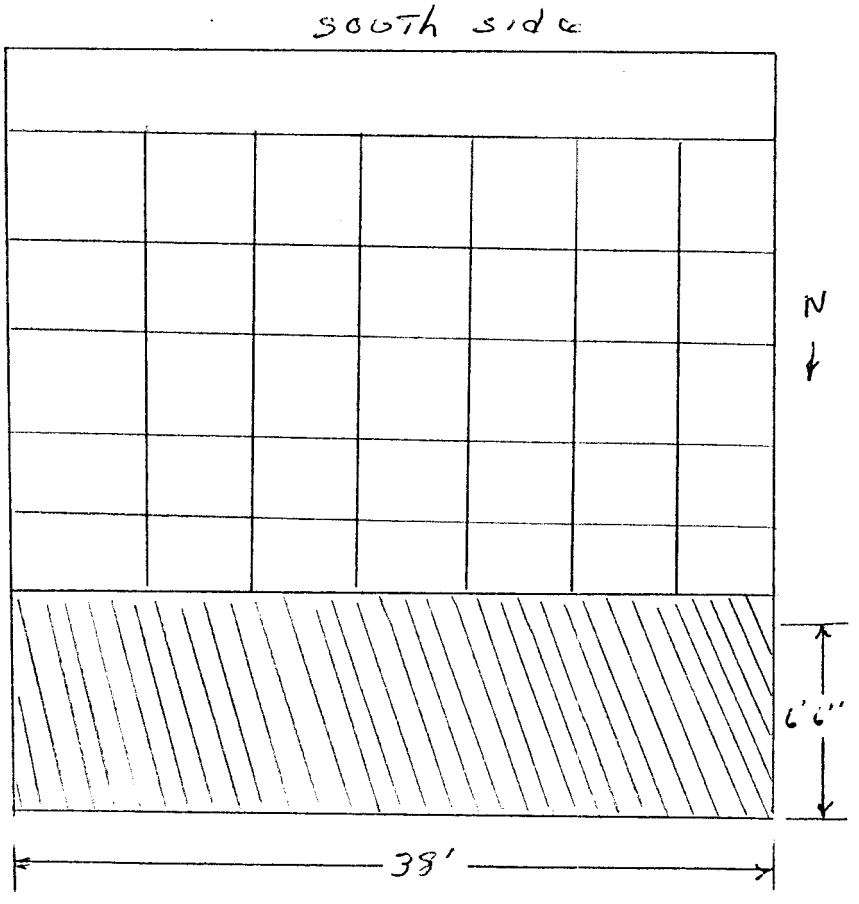
NOTE: SCANS WERE 6" PASSES ON WALLS

BLDG. 339

SMEAR RESULTS

RESULTS = DPM/100cm²
UNLESS OTHERWISE NOTED

#	βγ	α



Remarks: ▨ = SHOWS AREA WHERE ALPHA, BETA AND GAMMA SCANS WERE TAKEN

ALL SCAN SURVEYS ARE AT ROCK GROUND LEVELS FOR DLOAD/REMOVABLE ACTIVITY.

BLDG. 339

RADIOLOGICAL SURVEY REPORT

ATGS #: FM-05-094 DIL

DATE: 10-29-99	INSTRUMENTATION USED				
TIME: 1300	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D.GOLDSTON / D.KOUNTZ	BICRON	B-500-2	N/A	6 cpm	10-14-00
LOCATION: Bldg 339	PROBE 43-37 / 2224	085834 / 160668	α 16.8 / B-19	α 2 / B-848	10-15-00
REVIEWED BY: Frank White	PROBE 43-68 / 2224	134485 / 132159	α 16 / B-18.3	α 2 / B-237	10-15-00
Smear Locations Circled. Dose Rates = microR/hr (μR/hr)			N/A		

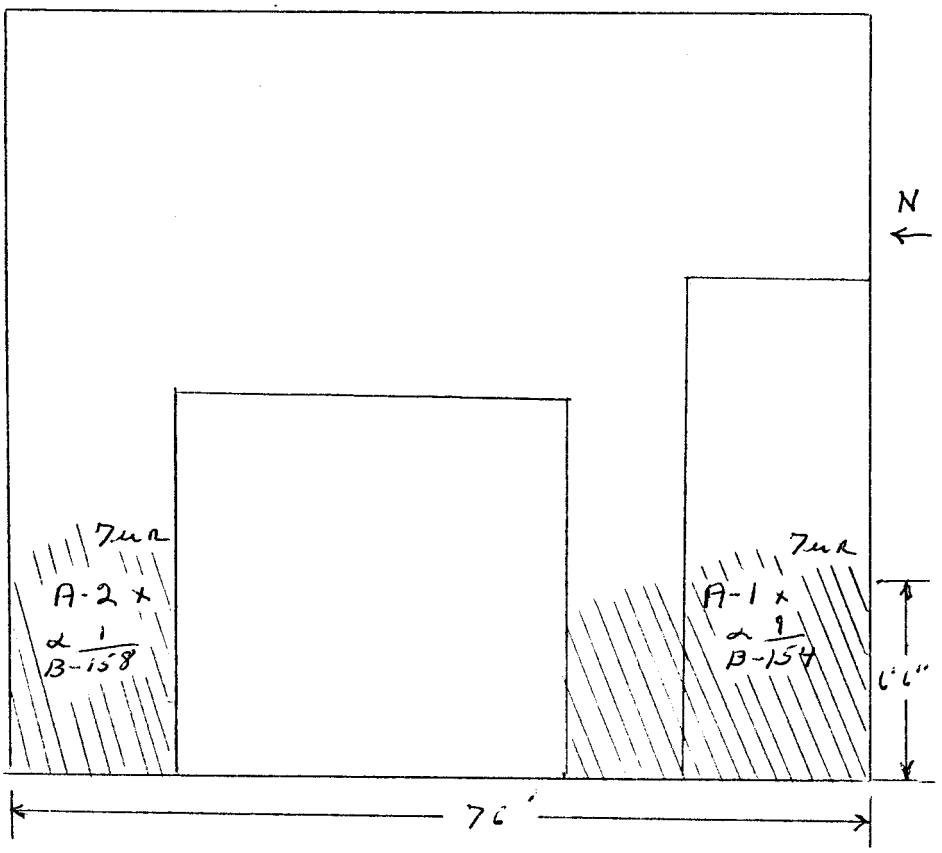
PURPOSE OF SURVEY: FINAL RELEASE SURVEY

NOTE: SCANS WERE 6" PASSES ON WALLS

BLDG. 339

SMEAR RESULTS

RESULTS = DPM/100cm²
UNLESS OTHERWISE NOTED



#	βγ	α

Remarks: ▨ = shows AREA where ALPHA/BETA AND GAMMA SCANS WERE TAKEN

ALL SCAN SURVEYS ARE AT BACKGROUND LEVELS FOR ALPHA/BETA ACTIVITY

BLDG. 339

RADIOLOGICAL SURVEY REPORT

ATGS #: FM-05

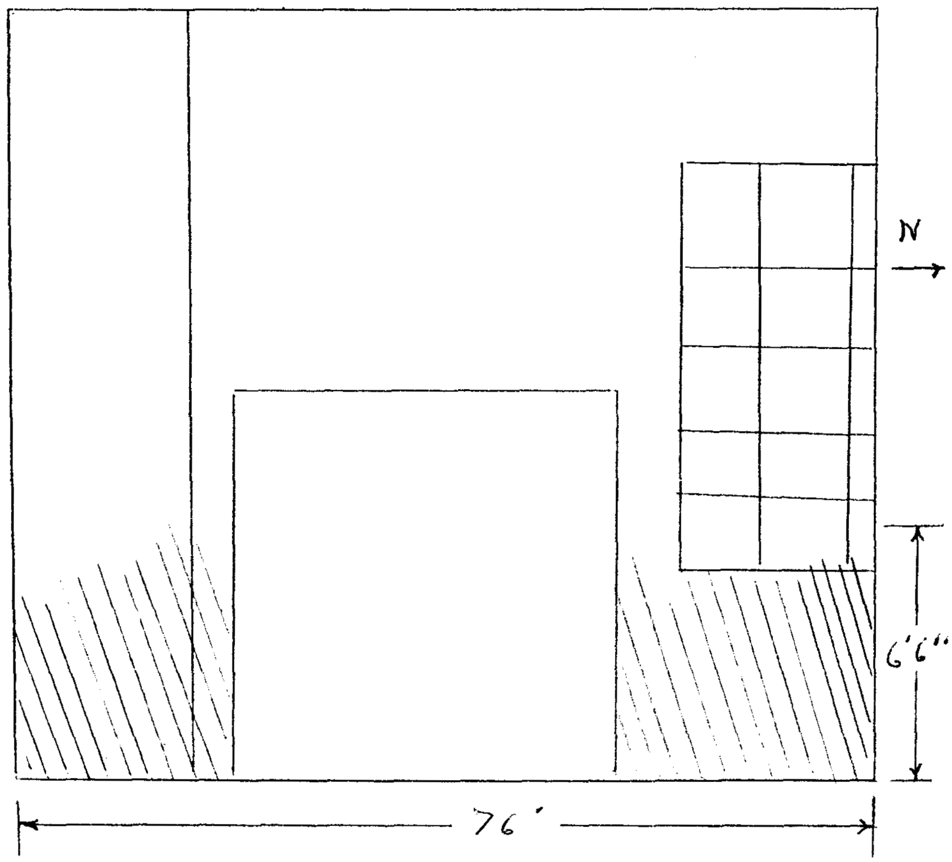
DATE: 10-29-99	INSTRUMENTATION USED				
TIME: 1300	MODEL	SERIAL #	EFF.%	BKGRD	CAL. DUE DATE
SURVEYOR: D. Goldstein / D. Kovacs	BICRON	B-500-Z	N/A	6 µR	10-14-00
LOCATION: Bldg 339	PROC 43-37 / 2224	0 8834 / 160668	α 16.8 / B-19	α 8 / B-848	10-15-00
REVIEWED BY: Frank White	PROC 43-68 / 2224	134485 / 132159	α 16 / B-18.3	α 2 / B-237	10-15-00
Smear Locations Circled. Dose Rates = microR/hr (µR/hr)	—	—	N/A	—	—

PURPOSE OF SURVEY: FINAL RELEASE SURVEY

NOTE: SCANS WERE 6" PASSES ON WALLS

BLDG. 339

WEST SIDE



SMEAR RESULTS RESULTS = DPM/100cm² UNLESS OTHERWISE NOTED		
#	βγ	α
N/A		

Remarks: ⌇⌇⌇⌇ = shows AREA WHERE ALPHA, BETA AND GAMMA SCANS WERE TAKEN

ALL SCAN SURVEYS ARE AT BACKGROUND LEVELS FOR ALPHA/BETA ACTIVITY

McClellan
Bldg-339

Number	Smear Location	Alpha Activity DPM/100 sq cm	Beta Activity DPM/100 sq cm
1	A-1	<16.16	<40.68
2	A-2	<16.16	<40.68
3	B-1	<16.16	<40.68
4	B-2	<16.16	<40.68
5	B-3	<16.16	<40.68
6	C-1	<16.16	<40.68
7	C-2	<16.16	<40.68
8	D-1	<16.16	<40.68
9	D-2	<16.16	<40.68
10	D-3	<16.16	<40.68
11	E-1	<16.16	<40.68
12	E-2	<16.16	<40.68
13	F-1	<16.16	<40.68
14	F-2	<16.16	<40.68
15	F-3	<16.16	<40.68
16	* C-2	<16.16	<40.68
17	* E-2	<16.16	<40.68
* QA SMEARS			