GENERAL ATOMICS

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696/CAL-4044

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Subject: **Docket No. 70-734; SNM-696: Request to Release a Certain Portion of General Atomics' Facility to Unrestricted Use and Delete it from License SNM-696: Namely, GA's "Section A of the Building 2 Service Corridor"**

and

Dr. Ron Rogus (In Duplicate)
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Subject: **Radioactive Materials License No. 0145-37: Request to Release a Certain Portion of General Atomics' Facility to Unrestricted Use and Delete it from License 0145-37: Namely, GA's "Section A of the Building 2 Service Corridor"**

Dear Mr. Baker and Dr. Rogus:

As you are aware, General Atomics (GA) is continuing its efforts directed at decontaminating, as appropriate, and obtaining the release to unrestricted use of selected facilities and land areas at General Atomics. GA has recently completed the final radiological surveys of Section A of its Building 2 (Science Laboratories Building) Service Corridor, located on GA's Main Site.

GA's Building 2 contains approximately 142 laboratories, plus offices, hallways, and a service corridor which houses the utilities for the labs and offices. The laboratories were used during the past ~ 50 years primarily for research and development activities involving the use of radioactive material. Almost all of the 142 laboratories within Building 2 have been released to unrestricted use by both the U.S. Nuclear Regulatory Commission (NRC) and the State of California DHS Radiologic Health Branch (State). None of the laboratories in Building 2, or the projects occupying them, are authorized to use or store radioactive material in the service corridor.

The service corridor is approximately eight (8) feet wide and occupies the entire span of GA's semi-circular shaped Building 2. The Service Corridor is comprised of three levels: (1) The easily accessible ground floor or "Lower Level," also called Level 1 or the 1st Level, having a concrete floor; (2) The accessible middle level also called the 2nd Level, Level 2, or the "Upper Level," which has metal grating for its floor; and (3) The top level also called the overhead "Crawl Space," which has sporadic metal grate landings/flooring and is difficult to access. The majority of the overhead crawl space is occupied by piping, ventilation ducts, and electrical cables.

Building two is comprised of three arc-shaped sections which together form the semi-circular shape of the building. Due to the large size and complexity of Building 2, the service corridor in each of the three sections, i.e., Sections A, B, and C, is the subject of a separate release request. This release request only addresses **Section A** which occupies ~ ⅓ of the total service corridor and is located between lower labs and offices 502-565 and between upper labs and offices 602-651. The total Section A service corridor floor space area to be released to unrestricted use is approximately 11,380 ft^2 (~ 1,057 m^2), which includes all three levels, a number of side rooms, and a ventilation room above breezeway A.

The service corridor contains all of the utilities, heating and air conditioning, etc. needed to support activities in the laboratories. On occasion, contaminated equipment and 55 gallon drums containing low levels of liquid low-level radioactive waste were temporarily stored in the service corridor; this resulted in low levels of radioactive contamination in certain localized areas.

Samples of concrete surfaces within Section A of the Service Corridor that were found to be contaminated were collected and analyzed by gamma spectroscopy. The results indicated Cs-137, U-235 and U-238 were the contaminants. Decontamination activities (including: concrete scabbling, concrete cutting and removal, drain line and ventilation ducting removal and replacement, etc.) were conducted until residual radiation levels were well below the approved release criteria specified in GA's NRC- and State-approved Site Decommissioning Plan.

The enclosed report documents the results of GA's comprehensive radiological measurements and surveys conducted within Section A of the Building 2 Service Corridor. The results of these surveys demonstrate that the service corridor in "Section A" meets the NRC- and State- approved criteria for release to unrestricted use.

Accordingly, GA hereby requests the NRC and the State to release the Service Corridor in Section A of GA's Building 2, as described in the enclosed report, to unrestricted use and to delete it from GA's NRC and State special nuclear material and radioactive material licenses, respectively.

Consistent with decisions made during joint NRC, State of California and GA decommissioning coordination meetings, the NRC has the regulatory lead for the

release of the Building 2 Service Corridor to unrestricted use. Furthermore, in response to GA's request, the NRC has performed confirmatory surveys in Section A of the Building 2 Service Corridor on the basis of a substantial "draft" final survey report.

If you should have any questions regarding this request, or the enclosed report, please don't hesitate to contact Ms. Laura Q. Gonzales at (858) 455-2758 or laura.gonzales@gat.com, or me at (858) 455-2823 or keith.asmussen@gat.com.

Very truly yours,

Keith E. Asmussen

Keith E. Asmussen, Ph.D., Director
Licensing, Safety and Nuclear Compliance

Enclosure: GA report titled: "Final Radiological Survey Report for Section A of the Building 2 (Science Laboratories Building) Service Corridor" dated December 2006.

cc: Dr. D. Blair Spitzberg, Chief, NMSS Branch 3, Region IV
Mr. Robert Evans, Fuel Cycle Inspector, NRC Region IV
Mr. Jeff Wong, State of CA, Berkeley, CA
Ms. Barbara Hamrick, State of CA, Brea, CA

GENERAL ATOMICS'
FINAL RADIOLOGICAL SURVEY REPORT
FOR SECTION A OF THE BUILDING 2
(SCIENCE LABORATORIES BUILDING)
SERVICE CORRIDOR

Prepared By: William LaBonte, Richard Stowell and Laura Gonzales
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December 2006

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Introduction

General Atomics (GA) is continuing its efforts directed at decontaminating, as appropriate, and obtaining the release to unrestricted use of selected facilities and land areas at General Atomics.

GA has recently completed the Final Radiological Survey of the Service Corridor of Section A of GA's Building 2 (Science Laboratories Building), located on GA's Main Site.

GA's Building 2 is a semi-circular "C"-shaped building consisting of laboratories and offices with five breezeways. It is a three-level structure comprised of a lower-level, an upper-level and mezzanines. Building 2 was constructed in three phases with each being a partial arc of a semi-circular structure. These three portions of the building are referred to as Sections A, B and C. A service corridor runs through each of these sections and separates upper and lower levels in each section. (See Figures 2 through 2A).

The service corridor of Section A comprises ~ ⅓ of the total service corridor of Building 2, and is located between lower-level labs and offices 502-565 and upper-level labs and offices 602-651. The total floor space area to be released to unrestricted use is approximately 11,380 ft^2 (~ 1,057 m^2), which includes all three (3) levels, side rooms, and ventilation rooms above breezeway A (See Figures 2 and 2C).

GA is requesting both the Nuclear Regulatory Commission (NRC) and the State of California (DHS/RHB) to release Section A of the Building 2 Service Corridor to unrestricted use.

This report documents the results of GA's radiological measurements completed within Section A of the Building 2 Service Corridor. The results of these surveys demonstrate that the service corridor of Section A, herein referred to as "Section A," meets the NRC- and State- approved criteria for release to unrestricted use.

Site Description

Building 2, a.k.a. the Science Laboratories Building or "L" (for Laboratory) Building, is located on General Atomics' Main Site (see Figure 1). Building 2 contains approximately 142 laboratories, plus offices, hallways, and a service corridor which houses the utilities for the labs and offices (see Figure 2). The laboratories were used during the past ~50 years primarily for research and development activities involving the use of radioactive material.

All 142 laboratories within Building 2 were released to unrestricted use by both the NRC and the State of California in various "groups" of labs. Subsequently, GA has amended it's State DHS/RHB Radioactive Materials License to add 9 labs as authorized use locations. Of these, labs 517, 523, 530/532, 534, 560/562/564 were added to do work involving basic biological research carried out by GA's bioscience group, i.e., Diazyme, and lab 407 was added for work involving tritium diffusion studies. None of these laboratories are authorized to use or store radioactive materials in the service corridor of Building 2. The roof of Building 2 has been released to unrestricted use by the NRC. GA is awaiting the release of the roof by the State DHS/RHB.

The service corridor is approximately eight (8) feet wide and occupies the entire span of the semi-circular shaped Building 2 (see Figure 2). There are three levels within the Service Corridor: (1) The easily accessible ground floor or lower level, also called Level 1 or the 1st Level; having a concrete floor, (2) The accessible middle level, also called Level 2 or the 2nd Level; which has metal grating as the floor, and (3) The top level, also called the Overhead Crawl Space, which has periodic metal grate landings and is difficult to access. The majority of the overhead crawl space is occupied by piping, ventilation ducts, and electrical cables. These levels are shown in Figure 2A.

The service corridor contains all of the utilities, heating, and air conditioning needed by the laboratories. In addition, sewer drain lines which collect waste water from the laboratories and rest rooms are located beneath the first floor of the service corridor.

In 2000, the center three (3) feet of the concrete floor was removed and the sewer drain lines excavated throughout the entire length of the service corridor. A final radiological survey of the trench was performed in 2001. In April 2001, the report summarizing the results of this final radiological survey was submitted to the NRC and State of California, along with a request to release this trench to unrestricted use. The NRC released the trench to unrestricted use (SNM-696 license amendment #72) and the State DHS/RHB released the trench to unrestricted use (0145-37 license amendment #158). New sewer drain lines were installed, the trench was backfilled and a new concrete floor was poured in the center ~three feet of the first (lower) floor of the entire service corridor.

Due to the large size and complexity of the service corridor, it was sectioned off into three (3) survey sections): (1) Section A, (2) Section B and (3) Section C. This report only addresses **Section A** which is shown in greater detail in Figures 2B and 2C. Section A of the service corridor occupies ~ ⅓ of the total service corridor and is located between lower labs and offices 502-565 and between upper labs and offices 602-651. The I-beam numbers (or columns) in relation to the laboratories in Section A are also shown in Figures 2B and 2C.

In addition, there are a number of "side" rooms connected to, and accessible from the first floor of the service corridor which are also part of Section A. These "side" rooms are: (1) An electrical room which contains electrical transformers and switch gear, (2) A mechanical room, which is essentially a maintenance workshop, and (3) A room known as the "red room" which was used for DOD and DOE projects in the past (this room was divided into three (3) rooms after this final survey was completed). There is also a large ventilation room and an elevator machinery room above Breezeway A.

Section A is approximately 345 feet long. The lower level is approximately 9' 7" high, the second level is approximately 8'10" high, and the crawl space is approximately 7'10" high. The first (lower) level has a concrete floor (the center 3' of which is new concrete floor), the second level floor is mostly steel grating, and the crawl space only has sporadic metal grating landings over ~ ¼ of the total floor surface area (the remaining area is filled with piping, ducts, and electrical conduit/wires). The service corridor can be accessed either through doorways from some of the laboratories, at the breezeways which separate groups of laboratories, and from both ends of the semi-circular Building 2.

The total floor space of Section A is approximately 11,380 ft^2 (~ 1,057 m^2); which is comprised of the following locations/areas:

Location/Area	Area (ft^2)
First Level (lower level) floor area	2,760
Second Level (upper level)	2,760
Crawl Space (grated floor area)	690
Room 540-A	644
Mechanical Room	1,680
Electrical Room	840
Ventilation room at Breezeway A	1,970
Elevator Mechanical Room	36
	11,380

History of Use

The Service Corridor is used to provide utilities and other services to the Building 2 laboratories. On occasion, contaminated equipment and 55 gallon drums containing low levels of liquid radioactive waste were temporarily stored in the service corridor. These activities resulted in low levels of radioactive contamination in certain localized areas.

Decontamination Efforts and Classification

Decontamination Efforts

In 1994, a few ventilation ducts in the service corridor were identified as being contaminated with trace levels of radioactivity. In February 1994, all of the contaminated ducts, fans and motors that were found to be contaminated were removed and disposed of as low level radioactive waste at an authorized low-level radioactive waste disposal site. In May 1994, a survey of all of the ventilation systems remaining was completed and all additional contaminated equipment found was either removed and disposed of as low-level radioactive waste or decontaminated. Additional surveying was performed during this Final Survey.

Characterization surveys of the entire Service Corridor (i.e., Sections A, B and C) began in 1998. Samples of concrete surfaces found to be contaminated were collected and analyzed by gamma spectroscopy. The following areas within the Section A service corridor were identified as having elevated radioactivity:

1. First (lowest) level between I-beams (columns) A20 and A24, A17 and A18, A11 and A13, at C1, and between A1 and A2.
2. Second (upper) level I-beams between A11 and A13.
3. The Crawl Space (above the second level) between I-beams A11 and A13.

On the basis of gamma spectroscopy analyses of concrete samples, Cs-137 was identified near I-beam A12 at concentrations as high as ~38 pCi/g. Similarly, U-235 contamination (as high as ~25 pCi/g) and U-238 contamination (as high as ~29 pCi/g) was detected between I-beams A1 and A2, and at A12, and between A21 and A23. Most of the areas were small (i.e., < 1 m^2) and each of the areas were decontaminated at that time (circa 1998).

Additional decontamination prior to the Final Survey was performed in order to decontaminate each area to as close to normal background levels as reasonably achievable.

In 2001, all of the contaminated drain lines were excavated and disposed of as low level radioactive waste an authorized low-level radioactive waste disposal site. GA submitted a Final Radiological Survey Report to the NRC and State DHS/RHB for the resultant trench in April 2001 summarizing residual radiation levels and the results of gamma scan analyses of soil samples taken in the trench. The NRC subsequently performed a confirmatory survey and released the trench to unrestricted use (license amendment #72 to GA's SNM-696 license). In July 2004, the State DHS/RHB also released the trench to unrestricted use (license amendment #158). The trench, in the middle of the service corridor, was subsequently filled in with clean soil and covered with new concrete.

The original concrete that was broken/cut during the excavation of the contaminated drain lines was surveyed and the results confirmed radiation levels were well below release criteria. This concrete was placed in the former Soil Staging Area (SSA Bin T-31) and subsequently surveyed and released to unrestricted use by the NRC.

In January 2002, a Final Survey Plan for the Service Corridor was issued (Appendix A). The Plan was revised and supplements were later issued (in 2003), primarily as a result of crawl spaces and separate rooms being identified in the corridor which had not been specifically identified in the original survey plan. Elevated areas of radioactivity identified on surfaces in the crawl space were decontaminated by scabbling the concrete surfaces with powered hand tools. Contaminated grating was decontaminated, piping insulation was removed and piping was decontaminated, and sections of contaminated louver panels were replaced. All removed items were disposed of as low level radioactive waste at an authorized low level radioactive waste disposal facility.

Classification

The entire service corridor was initially classified as a **Non-Suspect Affected Area** for final survey purposes. The following areas were re-classified as **Suspect Affected Areas** after elevated radioactivity was detected in these areas:

1. First (lowest) level between I-beams (columns) A20 and A24, A17 and A18, A11 and A13, at C1, and between A1 and A2.
2. Second (upper) level I-beams between A11 and A13.
3. The Crawl Space (above the second level) between I-beams A11 and A13.

The side rooms and ventilation rooms above the breezeways were classified as **Unaffected Areas** because they had no history of radioactive material use, storage, or contamination.

Criteria for Release to Unrestricted Use

As Low As Reasonably Achievable (ALARA)

During its decommissioning efforts, GA always attempts to decontaminate to as close to natural background levels, and as far below the NRC- and State- approved release criteria, as is reasonably achievable.

Facilities and Equipment (and Asphalt or Concrete Surfaces)

The predominant contaminants, based on process knowledge and isotopic analyses of concrete surface samples, were identified as Cs-137, Co-60, U-235 and U-238. The NRC's and the State of

California's DHS/RHB criteria for release of facilities and equipment to unrestricted use are provided in Tables 1 and 2, respectively.

The applicable guidelines for enriched uranium, depleted uranium and beta/gamma emitters, (including Cs-137 and Co-60) are as follows:

5,000 dpm/100 cm^2, averaged over a 1 m^2 area
15,000 dpm/100 cm^2, maximum in a 100 cm^2 area if the average over 1 m^2 is met
1,000 dpm/100 cm^2, removable activity

Exposure Rate Guideline
Pursuant to the NRC and State of California approved release criteria, exposure rates measured at 1 m above the surface are not to exceed 10 μR/hr above natural background levels.

Instrumentation and Background Measurements

A list of instruments used during the radiological surveys is shown in Table 3. The table includes: (1) a description of the instrument, model number and its serial number, (2) a description of the detector (if applicable) and its serial number, (3) instrument ranges, (4) calibration due dates, (5) typical background readings and (6) calibration efficiencies (if applicable). All of the instruments used were calibrated semiannually and after repair, except for exposure rate meters which were calibrated quarterly.

Background Measurements for Instruments/Detectors
Building 13 on GA's main site was used for conducting background measurements with instruments used for the final survey because: (1) there is no history involving the use or storage of radioactive materials in Building 13, and (2) the various surfaces and construction materials found inside the Building 2 service corridor could also be found within and outside of Building 13. Background information, where appropriate, is included in Table 3.

Minimum Detectable Activity (MDA)
Minimum detectable activities (MDA's) for instruments used for fixed measurements, for each type of surface (see Table 3), were calculated using equation (5-2) from the NUREG/CR-5849 as shown below:

Equation (5-2)

$$MDA = \frac{2.71 + 4.65\sqrt{B_R \times t}}{t \times E \times \frac{A}{100}} (dpm/100cm^2)$$

Where:

B_R = background rate (cpm)
t = count time (min)
E = efficiency (counts/disintegration)
A = area of the detector (cm^2)

The MDA for scan surveys using the 434 cm^2 gas flow proportional detector (floor monitor) was calculated using equation 5-3 from the draft NUREG/CR-5849 (modified in accordance with the discussion on page 5.8 of the draft NUREG/CR-5849), as follows:

Equation (5-3):

$$MDA = \frac{X \times B_R}{E \times \frac{A}{100}} (dpm/100cm^2)$$

Where:

X = the multiple/portion of the background rate that can be discernable as an increase in instrument response by the surveyor (dependent on the type of instrument used).
B_R = background rate in (cpm)
E = efficiency
A = area of the detector (cm^2)

Exposure Rate Background

The typical exposure rate background for GA's site using a Ludlum Model 19 micro R meter is 12-18 µR/hr measured at 1 m from the surface of soil. This range of exposure rates can be measured south of Building 15 (an office building on the eastern portion of the GA site). Furthermore, measurements taken offsite in ten (10) different locations (nine (9) offsite and one (1) onsite at a non-impacted area near Building 15) over a period of 15 months also averaged ~ 15 µR/hr (measured at 1 m from the surface). The range of 12-18 µR/hr is typical at the GA site for the external dose rates measured at 1 meter from the surface. Background exposure rates in non-impacted areas, measured with the specific instruments used for this final survey, are identified in Table 3.

Final Surveys Performed

Objectives and Responsibilities

The objectives of the final survey plans were: (1) to demonstrate that the average surface residual contamination levels for each survey unit were below the approved release criteria, (2) to show that the maximum residual activity did not exceed three times the approved release criteria for average surface contamination value in an area up to 100 cm^2, and, (3) that the exposure rate measurements

taken in these areas, measured at 1 meter above the surface, were less than 10 μR/hr above background.

Survey Plans

A Final Survey Plan was developed based on the previous history of use, results of periodic surveys performed in the Building 2 Service Corridor, the radionuclides of concern, the potential for contamination, the various types of surfaces encountered and the classification of the various areas. A revision to this survey plan, which increased the amount of surveying, was issued in February, 2002. A supplement to this plan was issued to perform isotopic sampling of residual contamination and to perform surveys in the "side rooms" and crawl space. A second supplement to this plan was issued following the re-classification of areas with elevated activity levels found on previous surveys; the areas with elevated levels of activity were subsequently decontaminated. The survey Plan and it's supplements are provided in Appendix A.

Surveys were taken in accordance with approved survey plan(s) by qualified Health Physics Technicians having a minimum of three years health physics experience.

Every survey taken was documented on a daily basis to a worksheet/drawing showing the approximate locations surveyed/sampled. The documentation included the results of the measurements (including units), the technician's signature, date, instrument(s) used (including the model and serial number of both the ratemeter and detector), calibration due date, % efficiency, background readings (if applicable) and any other pertinent information.

Survey Summary

Comparisons of the Site Decommissioning Plan requirements with the actual Final Surveys performed in relation to the percentage of surface area scanned, number of measurements (i.e., number of fixed radiation measurements), exposure rate measurements (μR/hr), and gravel/tar samples taken are provided below:

Comparisons of Site Decommissioning Plan Requirements with Final Surveys Performed on the Building 2 Service Corridor, Section A

Survey Area[1]	Gridding Required ?	# of Direct Measurements Fixed α, β, or Wipes	Surface Scans α, β,	# of Exposure Rate Fixed Measurements (μR/hr)	Exposure Rate Scan Measurements (μR/hr)
D-Plan[2] Unaffected Area (required) →	Not Required	1 per 50 m^2 or 1 every ~7 m. Minimum of 15	10% floors & walls below 2 m	1 per 10 m^2 or 1 every ~3 m. Minimum of 71	10% accessible floors and walls below 2 m
Final Surveys Unaffected Area (performed) →	No	Total = 241 113 α 107 β 21 wipes	10% of floors & walls below 2 m	166 measurements	10% of floors and walls below 2 m
D-Plan[2] Non-Suspect Affected Area (required) →	Not Required	1 per 20 m^2 or 1 every 4.5 m. Minimum of 52	10% accessible floors & walls below 2 m.	1 per 10 m^2 or 1 every ~3 m. Minimum of 103	10% accessible floors and walls below 2 m.
Final Surveys Non-Suspect Affected Area (performed) →	No	Total = 544 190 α 222 β, 132 wipes	100% of accessible floors & walls (<2 m) 10% of walls (> 2 m) except middle 3' of new concrete floor	72 measurements (@ 1 m from surface)	100% of accessible floor & walls < 2 m 10% of walls > 2 m (except middle 3' of new concrete floor)
D-Plan[2] Suspect Affected Area (required) →	Yes, if feasible	1 per 4 m^2 or 1 every 2 m. Minimum of 76.	100% accessible floors and walls below 2m.	1 per 4 m^2 or 1 every 2 m. Minimum of 76.	100% accessible floors and walls below 2m.
Final Surveys Suspect Affected Area (performed) →	Yes, Where possible	Total = 241 79 α 87 β, 75 wipes	100% accessible floor & walls (< 2 m) & 10% of walls > 2 m (except middle 3' of new concrete floor)	264 measurements	100% of accessible floor and walls < 2 m and 10% of walls > 2 m (except middle 3' of new concrete floor)

(1) The total surface (Survey Required) area to be released:
Unaffected Area= ~ 5,169 ft^2 (~480 m^2), floor space only; 707 m^2 (floor and walls).
Non-Suspect Affected Area= ~11,079 ft^2 (~1,030 m^2), Old Floor Space and walls up to 2 m.
Suspect Affected Area= ~3,274 ft^2 (~305 m^2), Old Floor Space and walls up to 2 m.

(2) D-Plan = GA's NRC- and State- Approved Site Decommissioning Plan.

Results of the Final Surveys

The final radiological survey results for the Service Corridor in Section A of Building 2 are provided in figures and tables as noted below:

Non-Impacted Areas

Electrical Room

See Figures 52, 53, 54, and 55 for measurement locations and results, and, Table 5 for wipe analysis results. A summary of the survey results is as follows:

Alpha Fixed Activity: Two (2) measurements taken; both results were not discernable from normal background levels.

Beta Fixed Activity: Two (2) measurements taken; the highest result was 901 cp2m, which is below the MDA for the instrument used.

Alpha Scan Survey: 10% of floor surfaces and walls below 2 m were scanned with a 434 cm^2 gas flow proportional detector. The results ranged from 10 to 40 cpm (27 dpm/100 cm^2), which is less than the scan MDA for the instrument used.

Beta Scan Survey: 10% of floor surfaces and walls below 2 m were scanned with a 434 cm^2 gas flow proportional detector. The results ranged from 1500 to 1900 cpm (normal background levels).

Removable Radioactivity: Two (2) wipe samples were taken and analyzed for α and β activity. Both results were not discernible from normal background levels.

Exposure Rate Measurements: Two (2) exposure rate measurements were taken at 1 meter from the floor surfaces. The highest measurement was 24 μR/hr, which is well below the approved release criteria of 10 μR/hr above background (15 - 21 μR/hr).

Exposure Rate Surface Scans: 10% of floor surfaces and walls below 2 m were scanned with a 2" x 2" NaI (Tl) detector held within ~1" of the surface. The range was 17 to 22 μR/hr (normal background levels).

Mechanical Room

See Figures 48, 49, 50, and 51 for measurement locations and results, and, Table 5 for wipe analysis results A summary of the survey results is as follows:

Alpha Fixed Activity: Four (4) measurements taken; results were not distinguishable from normal background levels.

Beta Fixed Activity: Four (4) measurements taken; the highest result was 1106 cp2m, which is below the MDA for the instrument used.

Alpha Scan Survey: About 10% of floor surfaces and walls below 2 m were scanned using a 434 cm^2 gas flow proportional detector. The results ranged from 10 to 20 cpm (normal background levels).

Beta Scan Survey: About 10% of floor surfaces and walls below 2 m were scanned using a 434 cm^2 gas flow proportional detector. The results ranged from 1400 to 1900 cpm (normal background levels). Removable Radioactivity: Four (4) wipe samples were taken and analyzed for α and β activity. The results were not discernible from normal background levels.

Exposure Rate Measurements: Nineteen (19) exposure rate measurements were taken at 1 meter from the floor surfaces. The highest measurement was 24 μR/hr, which is far below the approved release criteria of 10 μR/hr above background (15 to 21 μR/hr).

Exposure Rate Surface Scans: About 10% of floor surfaces and walls below 2m were scanned using a 2" x 2" NaI (Tl) detector held within 1" of the surface. The range was 21 to 26 μR/hr (slightly higher than normal background ranges but well below the release criteria).

Storage rooms L-540-A, B, and C)

See Figures 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, and 70 for measurement locations and results, and, Table 5 for wipe analysis results. A summary of the survey results obtained in all three rooms is as follows:

Fixed Alpha Radioactivity: Seven (7) measurements taken; the results were not discernable from normal background levels.

Beta Fixed Activity: Seven (7) measurements taken; the highest result was 955 cp2m (below the MDA for the instrument used).

Alpha Scan Survey: About 10% of floor surfaces and walls below 2m were scanned using a 434 cm^2 gas flow proportional detector. The results ranged from 10 to 60 cpm (55 dpm/100 cm^2), which is far below the NRC- and State- approved release criteria.

Beta Scan Survey: About 10% of floor surfaces and walls below 2 m were scanned using a 434 cm^2 gas flow proportional detector. The results ranged from 1200 to 2200 cpm (610 dpm/100 cm^2); which is far below the NRC- and State- approved release criteria.

Removable Radioactivity: Seven (7) wipe samples were taken and analyzed for α and β activity. All results were not discernible from natural background activity levels.

Exposure Rate Measurements: Twenty-three (23) exposure rate measurements were taken at 1 meter from the floor surfaces. The highest measurement was 26 μR/hr, which is far less than the approved release criteria of 10 μR/hr above background (15 to 21 μR/hr).

Exposure Rate Surface Scans: About 10% of floor surfaces and walls below 2 m were scanned using a 2" x 2" NaI (Tl) detector held within 1" of the surface. The range was 12 to 26 μR/hr (slightly higher than normal background ranges but well below the release criteria).

Ventilation Room above Breezeway A

See Figures 71, 72, 73, and 74 for measurement locations and results, and Table 5 for wipe analysis results. A summary of the survey results is as follows:

Alpha Fixed Activity: Six (6) measurements taken, all results were at natural background activity levels.

Beta Fixed Activity: Six (6) measurements taken, the highest result was 488 cp2m on metal surfaces and 945 cp2m on concrete, which are less than the MDA for the instrument used.

Alpha Scan Survey: About 10% of floor surfaces and walls below 2 m were scanned using a 434 cm^2 gas flow proportional detector. The results ranged from 10 to 20 cpm, which is not distinguishable from normal background levels.

Beta Scan Survey: About 10% of floor surfaces and walls below 2 m were scanned using a 434 cm^2 gas flow proportional detector. The results ranged from 800 to 1000 cpm on metal and 1300-1600 cpm on concrete, which are readings not distinguishable from normal background levels.

Removable Radioactivity: Six (6) wipe samples were taken and analyzed for α and β activity. The results were not discernible from normal background levels.

Exposure Rate Measurements: Twenty-four (24) exposure rate measurements were taken at 1 meter from the surface. The highest measurement was 12 μR/hr, which is at normal background levels.

Exposure Rate Surface Scans: About 10% of floor surfaces and walls below 2 m were scanned using a 2" x 2" NaI(Tl) detector held within ~1" of the surface. The readings ranged from 7-11 μR/hr on metal surfaces and 10-16 μR/hr on concrete (not distinguishable from normal background levels).

Elevator Machinery Room

See Figures 56, 57, and 58 for measurement locations and results, and Table 5 for wipe analysis results. A summary of the survey results is as follows:

Alpha Fixed Activity: Two (2) measurements were taken; both results were at normal background levels.

Beta Fixed Activity: Two (2) measurements were taken; the highest result was 901 cp2m, which is less than the MDA for the instrument used.

Alpha Scan Survey: About 10% of floor surfaces and walls below 2m were scanned using a 434 cm^2 gas flow proportional detector. The results ranged from 10 to 20 cpm, which are not distinguishable from normal background levels.

Beta Scan Survey: About 10% of floor surfaces and walls below 2 m were scanned using a 434 cm^2 gas flow proportional detector. The results ranged from 1400 to 1700 cpm, which are not distinguishable from normal background levels.

Removable Radioactivity: Two(2) wipe samples were taken and analyzed for α and β activity. Both results were not discernible from normal background levels.

Exposure Rate Measurements: Two (2) exposure rate measurements were taken at 1 meter from the surface. The highest measurement was 18 μR/hr (normal background level).

Exposure Rate Surface Scans: About 10% of floor surfaces and walls below 2 m were scanned using a 2" x 2" NaI (Tl) detector held within 1" of the surface. The range was 17-22 μR/hr, which is at natural background levels.

Service Corridor Overhead Crawl Space

See Figures 75, 76, 77, 78, 79, 80, 81, 82, 83, and 84 for measurement locations and results. A summary of the survey results is as follows:

Exposure Rate Measurements: Eighty (80) exposure rate measurements were taken at 1 meter from the surface. The highest measurement was 12 μR/hr, which is not distinguishable from normal background levels.

Exposure Rate Surface Scans: About 10% of all accessible surfaces were scanned using a 2" x 2" NaI (Tl) detector held within 1" of the surface. The range was 7-12 μR/hr on metal and 11-15 μR/hr on concrete, which are not distinguishable from normal background levels.

Removable Radioactivity: Sixty (60) large area wipes samples were taken and analyzed for α and β activity with field instruments. None of the results were discernible from natural background levels.

External Surfaces of Overhead Crawl Space Vent Louvers

See Figures 85, 86, 87, 88, and 89 for measurement locations and results, and Table 5 for wipe analysis results. A summary of the survey results is as follows:

Alpha Fixed Activity: Ninety-two (92) measurements taken; the results were not distinguishable from normal background levels.

Beta Fixed Activity: Eighty-six (86) measurements taken, all measurements were at background levels.

Alpha Scan Survey: About 100% of accessible surfaces were scanned. All results were at natural background levels.

Beta Scan Survey: About 100% of accessible surfaces were scanned. All results were at natural background levels.

Removable Radioactivity: Twenty-four (24) large area wipes were taken and analyzed for α and β activity; all results were at natural background levels. Ninety-two (92) 100 cm^2 wipe samples were taken and analyzed for α and β activity. The results were not discernible from normal background levels.

Exposure Rate Surface Scans: About 100% of all accessible surfaces were scanned using a 2" x 2" NaI (Tl) detector held within 1" of the surface. The range was 8-10 μR/hr, which is at natural background levels.

Non-Suspect Affected Area

Fixed Alpha Measurements:

A total of 190 α fixed measurements were taken with the detector probe held within ~½" for about 1 minute. All of the measurements were at the natural background levels for the surfaces measured (0-20 cpm). See Figures 3, 4, 5, 6, and 7 for the 1st (lowest) level survey locations and results, and, Figures 28, 29, 30, 31, and 32 for the 2nd (upper) level survey locations and results.

Fixed Beta Measurements:

A total of 222 β fixed measurements were taken with the detector probe held within ½" for 2 minutes. The highest measurement was 1175 cp2m on the outside walls at column A-9 to A-10 on the 1st level (see figure 4). This result is less than the minimum detectable activity for the instrument used (<222 dpm/100 cm^2).

See Figures 3, 4, 5, 6, and 7 for the 1st (lower) level survey locations and results, and, Figures 28, 29, 30, 31, and 32 for the 2nd (upper) level survey locations and results.

Removable Contamination (Wipe) Surveys:
A total of 132 wipe samples were taken and analyzed for α and β activity. All results were not discernible from natural background activity levels. See Figures 3, 4, 5, 6, and 7 for the 1st level survey locations , Figures 28, 29, 30, 31, and 32 for the 2nd level survey locations, and Table 4 for results.

Alpha Scan Surveys:
Approximately 100% of the accessible floor and wall surfaces below 2 m (with the exception of the middle three (3) feet of new concrete floor), and 10 % of the accessible walls above 2 m were scanned for α activity. The results were not distinguishable from normal background activity levels. See Figures 8, 9, 10, 11, and 12 for the 1st level survey locations and results, and, Figures 33, 34, 35, 36, and 37 for the 2nd level survey locations and results.

Beta Scan Surveys:
100% of the accessible floor and wall surfaces below 2 m, with the exception of the middle three (3) feet of new floor material, and, 10 % of the accessible walls above 2m, was scanned for β activity. The highest activity level found was 2,480 cpm on the outside wall of the 2nd level between columns A-4 and A-5. This activity level is 545 dpm/100 cm^2, which is far below the NRC- and State- approved release criteria identified in GA's NRC- and State- approved Site Decommissioning Plan. See Figures 13, 14, 15, 16, and 17 for the 1st level survey locations and results, and, Figures 38, 39, 40, 41 and 42 for the 2nd second level survey locations and results.

Fixed Exposure Rate Measurements:
Seventy-two (72) exposure rate measurements were taken in the center of the service corridor, on the 1st and 2nd level, at one (1) meter from the floor surface and approximately one (1) meter from both the inside and outside walls (simultaneously). The results were not discernible from natural background levels. See Figures 18, 19, 20, 21, and 22 for the 1st level survey locations and results, and, Figures 43, 44, 45, 46 and 47 for the 2nd level survey locations and results.

Exposure Rate Scan Survey:
About 100% of the accessible floor and wall surfaces below 2 m, with the exception of the middle three (3) feet of new concrete floor, and 10% of the accessible walls above 2 m were scanned for α activity. The results were not discernible from normal background levels. See Figures 23, 24, 25, 26, and 27 for the 1st level survey locations and results, and, Figures 43, 44, 45, 46, and 47 for the 2nd level survey locations and results.

Suspect Affected Area

Fixed Alpha Measurements:
A total of 79 α measurements were taken with the detector probe held within ½" for 30 seconds to 1 minute. All measurements were at the natural background level for the surfaces measured (0-20 cpm). See Figures 92, 96, 99, 103, 107, 111, 115, 119, 123, 127, 131, 136, 140, 144, 148, 152, 156, 160, 164, 168, and 173 for survey locations and results.

Fixed Beta Measurements:
A total of 87 β measurements were taken with the detector probe held within ½" for 2 minutes. The highest measurement was 1409 cp2m on the outside walls at column A-20 to A-22 on the 1st level (see Figure 136). This result corresponds to 1183 dpm/100 cm^2 which far below the NRC- and State- approved release criteria. See Figures 92, 96, 99, 103, 107, 111, 115, 119, 123, 127, 131, 136, 140, 144, 148, 152, 156, 160, 164, 168, and 173 for survey locations and results.

Removable Contamination (Wipe) Surveys:
A total of 75, 100 cm^2 wipe samples were taken and analyzed for α and β activity. All results were not discernible from natural background activity levels. In addition, six (6) large are wipes were taken on piping, cables, etc, in the overhead in crawl spaces between A-11 and A-13. These were analyzed in the field for α and β activity. All results were at background levels. See Figures 92, 96, 99, 103, 107, 111, 115, 119, 123, 127, 131, 136, 140, 144, 148, 152, 156, 160, 164, 168, and 173 for survey locations, and, Table 5 for results.

Alpha Scan Surveys:
100% of the accessible floor and wall surfaces below 2 m, with the exception of the middle three (3) feet of new floor material, and 10% of the accessible walls above 2 m, was scanned for α activity. The highest measurement was 340 cpm at column A-11 to A-13, in the crawl space (see Figure 169). This measurement corresponds to 351 dpm/100 cm^2, which is far below the NRC- and State- approved release criteria. See Figures 90, 93, 97, 100, 104, 108, 112, 116, 120, 124, 128, 132, 137, 141, 145, 149, 153, 157, 161, 165, 169, and 174 for survey locations and results.

Beta Scan Surveys:
100% of the accessible floor and wall surfaces below 2 m, with the exception of the middle three (3) feet of new floor material, and 10% of the accessible walls above 2 m, was scanned for β activity. The highest activity level found was 2,600 cpm on the inside wall of the 1st level between columns A-11 and A-13. This activity level is equivalent to 458 dpm/100 cm^2, which is far below the NRC- and State- approved release criteria identified in GA's Site Decommissioning Plan. See Figures 90, 94, 97, 101, 105, 109, 113, 117, 121, 125, 129, 133, 134, 138, 142, 146, 150, 154, 158, 162, 166, 170, 171, and 175 for survey locations and results.

Fixed Exposure Rate Measurements:
A total 264 exposure rate measurements were taken in the center of the service corridor, on the 1st and 2nd level, at one (1) meter from the floor surface and approximately one (1) meter from both the inside and outside walls (simultaneously). All results were not discernible from natural background levels. See Figures 91, 95, 98, 102, 106, 110, 114, 118, 122, 126, 130, 135, 139, 143, 147, 151, 155, 159, 163, 167, and 172 for survey locations and results.

Exposure Rate Scan Survey:
Approximately 100% of the accessible floor and wall surfaces below 2 m, with the exception of the middle three (3) feet of new floor material, and 10% of the accessible walls above 2m, was scanned for α activity. All results were not discernible from natural background activity levels. See Figures 91, 95, 98, 102, 106, 110, 114, 118, 122, 126, 130, 135, 139, 143, 147, 151, 155, 159, 163, 167, and 172 for survey locations and results.

Confirmatory Surveys

A Confirmatory Survey was performed by GA Health Physics technicians who were not routinely assigned to the performance of the Final Survey. This survey was conducted during September and October, 2003 in accordance with a survey plan. The results of the confirmatory survey supports the results of the Final survey. All residual activity is far below the NRC- and State approved release criteria as defined in GA's NRC- and State- approved Site Decommissioning Plan. See Appendix B for the confirmatory survey plan, a survey summary, and the survey drawings showing the locations and results of all surveys performed.

Conclusion

Final residual contamination and radiation surveys, as well as the results of analyses of soil samples, as documented in this report, demonstrate that Section A of GA's Building 2 Service Corridor meets the NRC- and State- approved criteria for release to unrestricted use.

Table 1: USNRC'S ACCEPTABLE SURFACE CONTAMINATION LEVELS [1]			
Nuclides	Average[b,c,f] (dpm/100cm^2)	Maximum[b,d,f] (dpm/100 cm^2)	Removable[b,e,f] (dpm/100cm^2)
U-nat, ^{235}U, ^{238}U, & associated decay products	5,000 α	15,000 α	1,000 α
Transuranics, ^{226}Ra, ^{228}Ra, ^{230}Th, ^{228}Th, ^{231}Pa, ^{227}Ac, ^{125}I, ^{129}I	100	300	20
Th-nat, ^{232}Th, ^{90}Sr, ^{223}Ra, ^{224}Ra, ^{232}U, ^{126}I, ^{133}I, ^{131}I	1,000	3,000	200
Beta/gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except ^{90}Sr and other noted above.	5,000	15,000	1,000

a Where surface contamination by both alpha- and beta/gamma-emitting nuclides exists, the limits established for alpha- and beta/gamma-emitting nuclides should apply independently.

b As used in this table dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, an geometric factors associated with the instrumentation.

c Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.

d The maximum contamination level applies to an area of not more than 100 cm ^{2}.

e The amount of removable radioactive material per 100 cm ^{2} of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, then pertinent levels should be reduced proportionally and the entire surface should be wiped.

f The average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mRad/hr at 1 cm^2 and 1.0 mRad/hr at 1 cm^2, respectively, measured through not more than 7 milligrams per square centimeter of total absorber.

Table 2: STATE OF CA ACCEPTABLE SURFACE CONTAMINATION LEVELS [1]			
Nuclides[a]	Average[b,c,f] (dpm/100cm²)	Maximum[b,d,f] (dpm/100cm²)	Removable[b,e,f] (dpm/100cm²)
U-nat, ^{235}U, ^{238}U, & associated decay products	5,000	15,000	1,000
Transuranics, ^{226}Ra, ^{228}Ra, ^{230}Th, ^{228}Th, ^{231}Pa, ^{227}Ac, ^{125}I, ^{129}I	100	300	20
Th-nat, ^{232}Th, ^{90}Sr, ^{223}Ra, ^{224}Ra, ^{232}U, ^{126}I, ^{133}I, ^{131}I	1,000	3,000	200
Beta/gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except ^{90}Sr and other noted above	5,000	15,000	1,000

a Where surface contamination by both alpha- and beta/gamma-emitting nuclides exists, the limits established for alpha- and beta/gamma-emitting nuclides should apply independently.

b As used in this table dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, an geometric factors associated with the instrumentation.

c Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.

d The maximum contamination level applies to an area of not more than 100 cm^2.

e The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, then pertinent levels should be reduced proportionally and the entire surface should be wiped.

f The average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/hr at 1 cm^2 and 1.0 mrad/hr at 1 cm^2, respectively, measured through not more than 7 milligrams per square centimeter of total absorber.

[1] Guidelines For Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses For byproduct, Source, or Special Nuclear Material, also known as "Decon-1" incorporated into GA's State of CA Radioactive Materials License.

Table 3: Building 2 Service Corridor Section A List Of Instruments

Instrument	Detector	Range (cpm)	Calibration Due Date	Efficiency	Background	Description
Non-Suspect Affected Area Survey						
Ludlum Model 2221 S/N 84459	Ludlum Model 43-37 434 cm^2 gas flow proportional **Beta detector** S/N 086215	Four Linear Ranges 0-500,000 & one Log 50-500,000	07-24-02	31.08%	1840-2100 cpm on concrete, 1640 - 1850 cpm on cement block Scan MDA = 438 dpm/100 cm^2(concrete), 388 dpm/100 cm^2 (cement block)	Active Probe Area = 434 cm^2. The detector and rate meter are combined and mounted on a roll around cart. The instrument features a static-flow system, quick disconnects, a portable gas bottle and a means to adjust the height of the detector from the floor for optimum performance.
Ludlum Model 2221 S/N 154202	Ludlum Model 43-37 434 cm^2 gas flow proportional **Beta detector** S/N 149017	Four Linear Ranges 0-500,000 & one Log 50-500,000	07-06-04	30.39%	1300-2000 cpm on concrete, 1300-1500 cpm on cement block, 700-1300 cpm on metal. Scan MDA= 375 dpm/100 cm^2(concrete), 318 dpm/100 cm^2 (cement block), 227 dpm/100 cm^2 (metal)	Active Probe Area = 434 cm^2. The detector and rate meter are combined and mounted on a roll around cart. The instrument features a static-flow system, quick disconnects, a portable gas bottle and a means to adjust the height of the detector from the floor for optimum performance.
Ludlum Model 2221 S/N 148425	Ludlum Model 43-37 434 cm^2 gas flow proportional **Alpha detector** S/N 086236	Four Linear Ranges 0-500,000 & one Log 50-500,000	07-31-02	21.29%	10-30 cpm on concrete Scan MDA= 86 dpm/100 cm^2	Active Probe Area = 434 cm^2. The detector and rate meter are combined and mounted on a roll around cart. The instrument features a static-flow system, quick disconnects, a portable gas bottle and a means to adjust the height of the detector from the floor for optimum performance.
Ludlum Model 3 S/N 151348	Ludlum Model 44-10 NaI (Tl) Scintillator **Gamma detector** S/N 163169	Five Ranges 0-500 µR/hr	03-24-02, 05-22-02, 07-24-02	N/A	22-28 µR/hr @ contact 20-25 µR/hr @ 1m (in concrete room)	2 inch x 2 inch NaI (Tl) scintillator. Used for measuring external dose rates at the surface and at 1 meter.
Ludlum Model 3 S/N 153551	Ludlum Model 44-10 NaI (Tl) Scintillator **Gamma detector** S/N 155109	Five Ranges 0-500 µR/hr	07-09-02	N/A	22-28 µR/hr @ contact 20-25 µR/hr @ 1m (in concrete room)	2 inch x 2 inch NaI (Tl) scintillator. Used for measuring external dose rates at the surface and at 1 meter.

Table 3: Building 2 Service Corridor Section A List Of Instruments

Instrument	Detector	Range (cpm)	Calibration Due Date	Efficiency	Background	Description
Ludlum Model 3 S/N **153590**	Ludlum Model 44-10 NaI (Tl) Scintillator **Gamma detector** S/N 155190	Five Ranges 0-500 µR/hr	02-12-04	N/A	22-28 µR/hr @ contact 20-25 µR/hr @ 1m (in concrete room)	2 inch x 2 inch NaI (Tl) scintillator. Used for measuring external dose rates at the surface and at 1 meter.
Ludlum Model 2221 S/N **84423**	Ludlum Model 43-68 100 cm^2 gas flow proportional **Beta detector** S/N 119444	Four Linear Ranges 0-500,000 & one Log 50-500,000	06-10-02	34.39%	1042 cp2m on concrete MDA = 222 dpm/100 cm^2	Active Probe Area = 100 cm^2. The detector and rate meter are combined and mounted on a roll around cart. The instrument features a static-flow system, quick disconnects, a portable gas bottle and a means to adjust the height of the detector.
Ludlum Model 12 S/N **91103**	Ludlum Model 43-65 Alpha Scintillator ZnS(Ag) **Alpha detector** S/N 92192	Four Ranges 0-500,000	03-18-02	22.14%	0-20 cpm MDA =312 dpm/100 cm^2	Active Probe Area = 50 cm^2. Used for Alpha surveying and fixed measurements.
Ludlum Model 12 S/N **138801**	Ludlum Model 43-65 Alpha Scintillator ZnS(Ag) **Alpha detector** S/N 145696	Four Ranges 0-500,000	05-11-02	22.52%	0-20 cpm (all) MDA =309 dpm/100 cm^2	Active Probe Area = 50 cm^2. Used for Alpha surveying and fixed measurements.
Canberra Low Level α/β Counter Model 2404	Gas Flow Proportional Detector	N/A	As needed	~26-30%	Varies with Sample	Canberra Model 2404 Low Level α/β gas proportional counting system used to count wipes for removable contamination. Results are usually reported as dpm/100 cm^2.
Canberra Gamma Spectroscopy System	High Purity Germanium Detector	N/A	As needed	Varies with Sample	Varies with Sample	Gamma Spectroscopy MCA system using a high purity Germanium detector.

Table 3: Building 2 Service Corridor Section A List Of Instruments

Instrument	Detector	Range (cpm)	Calibration Due Date	Efficiency	Background	Description
Suspect Affected Area and Unaffected Area Survey						
Ludlum Model 2221 S/N **154202**	Ludlum Model 43-37 434 cm^2 gas flow proportional **Beta detector** S/N 14901	Four Linear Ranges 0-500,000 & one Log 50-500,000	04-01-03 09-26-03	30.17% 30.17%	1400-2000 cpm on concrete 1100-1600 cpm on cement block 900-1300 on metal w/copper over 1000-1400 concrete 1000-1300 on cement block w/ vinyl tile, plywood, copper over 1000-1400 concrete	Active Probe Area = 434 cm^2. The detector and rate meter are combined and mounted on a roll around cart. The instrument features a static-flow system, quick disconnects, a portable gas bottle and a means to adjust the height of the detector from the floor for optimum performance.
Ludlum Model 2221 S/N **154202** (cont)	Ludlum Model 43-37 434 cm^2 gas flow proportional **Beta detector** S/N 14901	Four Linear Ranges 0-500,000 & one Log 50-500,000	12-08-03	30.39%	1300-2000 cpm on concrete 1300-1500 cpm on cement block 700-1300 on metal	Active Probe Area = 434 cm^2. The detector and rate meter are combined and mounted on a roll around cart. The instrument features a static-flow system, quick disconnects, a portable gas bottle and a means to adjust the height of the detector from the floor for optimum performance.
Ludlum Model 2221 S/N **97287**	Ludlum Model 43-37 434 cm^2 gas flow proportional **Alpha detector** S/N 083293	Four Linear Ranges 0-500,000 & one Log 50-500,000	09-22-03 10-28-03 11-05-03	20.98% 20.98% 20.98%	0-30 cpm on concrete 0-20 cpm on cement block 0-20 cpm on metal w/ copper 0-10 cpm on concrete 0-10 cpm on cement block w/ vinyl tile, plywood, copper 0-20 cpm on concrete	Active Probe Area = 434 cm^2. The detector and rate meter are combined and mounted on a roll around cart. The instrument features a static-flow system, quick disconnects, a portable gas bottle and a means to adjust the height of the detector from the floor for optimum performance.

Table 3: Building 2 Service Corridor Section A List Of Instruments

Instrument	Detector	Range (cpm)	Calibration Due Date	Efficiency	Background	Description
Ludlum Model 2221 S/N **84734**	Ludlum Model 43-37 434 cm^2 gas flow proportional **Alpha detector** S/N 147965	Four Linear Ranges 0-500,000 & one Log 50-500,000	12-25-03	21.02%	0-30 cpm on concrete 0-20 cpm on cement block 0-20 cpm on metal	Active Probe Area = 434 cm^2. The detector and rate meter are combined and mounted on a roll around cart. The instrument features a static-flow system, quick disconnects, a portable gas bottle and a means to adjust the height of the detector from the floor for optimum performance.
Ludlum Model 2221 S/N **86302**	Ludlum Model 43-68 100 cm^2 gas flow proportional **Beta detector** S/N142547	Four Linear Ranges 0-500,000 & one Log 50-500,000	07-24-03 01-14-04 05-04-04	31.20% 31.20% 31.20%	822 ± 344 cp2m on concrete MDA 218 dpm/100 cm^2 scan 320-420 cpm 671 ± 126 cp2m on cement block MDA 197 dpm/100 cm^2 scan 220-340 cpm 435 ± 170 cp2m on metal MDA 160 dpm/100 cm^2 scan 180-280 cpm 822 ±344 cp2m on metal grating MDA 2185 dpm/100 cm^2	Active Probe Area = 100 cm^2. The detector and rate meter are combined on a roll around cart. The instrument features a static-flow system, quick disconnects and a portable gas bottle.
Ludlum Model 2221 S/N **86302** (cont)	Ludlum Model 43-68 100 cm^2 gas flow proportional **Beta detector** S/N142547	Four Linear Ranges 0-500,000 & one Log 50-500,000	07-24-03	31.20%	w/copper over: 578 ± 60 cp2m concrete MDA=183 dpm/100 cm^2 493 ± 50 cement blk MDA=170 dpm/100 cm^2 w/ vinyl tile, plywood, copper over 545 ± 58 concrete MDA=178 dpm/100 cm^2	Active Probe Area = 100 cm^2. The detector and rate meter are combined on a roll around cart. The instrument features a static-flow system, quick disconnects and a portable gas bottle.

Table 3: Building 2 Service Corridor Section A List Of Instruments

Instrument	Detector	Range (cpm)	Calibration Due Date	Efficiency	Background	Description
Ludlum Model 3 S/N 138880	Ludlum Model 44-9 15 cm^2 Beta/Gamma Detector S/N 145693	Four Ranges 0-600,000 cpm	07-18-03	24.64%	60-80 cpm on concrete 50-80 cpm om cement block 40-70 cpm on metal 50-80 cpm on insualtion	The instrument is used for beta/gamma surveying. The detector hs an active probe area of 15 cm^2.
	Ludlum Model 44-9 15 cm^2 Beta/Gamma Detector S/N 117851		03-11-04	26.14		
Ludlum Model 3 S/N 153551	Ludlum Model 44-10 NaI (Tl) Scintillator **Gamma detector** S/N 155109	Five Ranges 0-500 µR/hr	05-23-03 08-18-03 11-17-03	N/A	concrete 15-21 µR/hr contact 15-21 µR/hr @1meter cement block 14-19µR/hr contact 14-18 µR/hr @1meter Metal 9-13 µR/hr contact 10-13 µR/hr @1meter --- w/ copper 14-19 µR/hr concrete contact 13-19 µR/hr concrete @ 1 meter 14-18 µR/hr cement block contact 14-17 µR/hr cement block @ 1 meter	2 inch x 2 inch NaI (Tl) scintillator. Used for measuring external dose rates at the surface and at 1 meter.
Ludlum Model 12 S/N 138801	Ludlum Model 43-65 Alpha Scintillator ZnS(Ag) **Alpha detector** S/N 145696	Four Ranges 0-500,000 cpm	03-11-04 10-20-03	22.52% 22.52%	<20 cpm all surfaces MDA 209 dpm/100 cm^2	Active Probe Area = 50 cm^2. Used for Alpha surveying and fixed measurements.

Table 3: Building 2 Service Corridor Section A List Of Instruments

Instrument	Detector	Range (cpm)	Calibration Due Date	Efficiency	Background	Description
Ludlum Model 12 S/N 138738	Ludlum Model 43-65 Alpha Scintillator ZnS(Ag) **Alpha detector** S/N 73360	Four Ranges 0-500,000 cpm	04-30-04	21.02%	<20 cpm all surfaces MDA 224 dpm/100 cm^2	Active Probe Area = 50 cm^2. Used for Alpha surveying and fixed measurements.
Ludlum Model 12 S/N 72676	Ludlum Model 43-65 Alpha Scintillator ZnS(Ag) **Alpha detector** S/N 89920	Four Ranges 0-500,000 cpm	12-09-03	22.14%	<20 cpm all surfaces MDA 212 dpm/100 cm^2	Active Probe Area = 50 cm^2. Used for Alpha surveying and fixed measurements.
Ludlum Model 12 S/N91051	Ludlum Model 43-65 Alpha Scintillator ZnS(Ag) **Alpha detector** S/N 094053	Four Ranges 0-500,000 cpm	04-15-03 10-14-03	21.77% 21.77%	<20 cpm all surfaces MDA 216 dpm/100 cm^2	Active Probe Area = 50 cm^2. Used for Alpha surveying and fixed measurements.
Ludlum Model 12 S/N 91103	Ludlum Model 43-65 Alpha Scintillator ZnS(Ag) **Alpha detector** S/N 92192	Four Ranges 0-500,000 cpm	10-14-03	22.14%	<20 cpm all surfaces MDA 212 dpm/100 cm^2	Active Probe Area = 50 cm^2. Used for Alpha surveying and fixed measurements.
Canberra Low Level α/β Counter Model 2404	Gas Flow Proportional Detector	N/A	as needed	~26-30%	Varies with Sample	Canberra Model 2404 Low Level α/β gas proportional counting system used to count wipes for removable contamination. Results are usually reported as dpm/100 cm^2.
Canberra Gamma Spectroscopy System	High Purity Germanium Detector	N/A	as needed	Varies with Sample	Varies with Sample	Gamma Spectroscopy MCA system using a high purity Germanium detector.

Table 4: Building 2 Service Corridor, Wipe Sample Analysis Results					
Non-Suspect Affected Area (Note: breaks in sample numbering sequence occurs due to re-classification)					
Sample Number	α in dpm/100 cm^2	β in dpm/100 cm^2	Sample Number	α in dpm/100 cm^2	β in dpm/100 cm^2
1	<20	<20	231	<20	<20
2	<20	<20	232	<20	<20
3	<20	<20	233	<20	<20
4	<20	<20	234	<20	<20
5	<20	<20	235	<20	<20
6	<20	<20	236	<20	<20
19	<20	<20	237	<20	<20
20	<20	<20	238	<20	<20
21	<20	<20	239	<20	<20
22	<20	<20	244	<20	<20
23	<20	<20	245	<20	<20
24	<20	<20	246	<20	<20
25	<20	<20	247	<20	<20
26	<20	<20	248	<20	<20
27	<20	<20	249	<20	<20
28	<20	<20	250	<20	<20
29	<20	<20	251	<20	<20
30	<20	<20	252	<20	<20
31	<20	<20	253	<20	<20
32	<20	<20	254	<20	<20
33	<20	<20	255	<20	<20
34	<20	<20	256	<20	<20
35	<20	<20	257	<20	<20
36	<20	<20	258	<20	<20
37	<20	<20	259	<20	<20

Table 4: Building 2 Service Corridor, Wipe Sample Analysis Results					
Non-Suspect Affected Area (Note: breaks in sample numbering sequence occurs due to re-classification)					
Sample Number	α in dpm/100 cm^2	β in dpm/100 cm^2	Sample Number	α in dpm/100 cm^2	β in dpm/100 cm^2
38	<20	<20	260	<20	<20
39	<20	<20	261	<20	<20
46	<20	<20	344	<20	<20
47	<20	<20	345	<20	<20
48	<20	<20	346	<20	<20
49	<20	<20	347	<20	<20
50	<20	<20	348	<20	<20
51	<20	<20	349	<20	<20
52	<20	<20	350	<20	<20
53	<20	<20	351	<20	<20
54	<20	<20	352	<20	<20
55	<20	<20	353	<20	<20
56	<20	<20	354	<20	<20
57	<20	<20	355	<20	<20
58	<20	<20	356	<20	<20
59	<20	<20	357	<20	<20
60	<20	<20	358	<20	<20
61	<20	<20	359	<20	<20
62	<20	<20	360	<20	<20
63	<20	<20	361	<20	<20
64	<20	<20	362	<20	<20
65	<20	<20	363	<20	<20
66	<20	<20	364	<20	<20
67	<20	<20	365	<20	<20
68	<20	<20	370	<20	<20

Table 4: Building 2 Service Corridor, Wipe Sample Analysis Results					
Non-Suspect Affected Area (Note: breaks in sample numbering sequence occurs due to re-classification)					
Sample Number	α in dpm/100 cm^2	β in dpm/100 cm^2	Sample Number	α in dpm/100 cm^2	β in dpm/100 cm^2
69	<20	<20	371	<20	<20
70	<20	<20	372	<20	<20
71	<20	<20	373	<20	<20
72	<20	<20	374	<20	<20
218	<20	<20	375	<20	<20
219	<20	<20	376	<20	<20
220	<20	<20	377	<20	<20
221	<20	<20	378	<20	<20
222	<20	<20	379	<20	<20
223	<20	<20	380	<20	<20
224	<20	<20	381	<20	<20
225	<20	<20	382	<20	<20
226	<20	<20	383	<20	<20
227	<20	<20	384	<20	<20
228	<20	<20	385	<20	<20
229	<20	<20	386	<20	<20
230	<20	<20	387	<20	<20

Table 5: Building 2 Service Corridor, Wipe Sample Analysis Results		
Unaffected Area and Suspect Affected Area		
Sample Number	α in dpm/100 cm²	β in dpm/100 cm²
Mechanical Room, Electrical Room, Elevator Machinery Room, and L-504-A Figures 51, 55, 58, 66 & 70		
1	<20	<20
2	<20	<20
3	<20	<20
4	<20	<20
5	<20	<20
6	<20	<20
7	<20	<20
8	<20	<20
9	<20	<20
10	<20	<20
11	<20	<20
12	<20	<20
13	<20	<20
14	<20	<20
15	<20	<20
Ventilation Room Above Breezeway A Figure 74		
1	<20	<20
2	<20	<20
3	<20	<20
4	<20	<20
5	<20	<20
6	<20	<20
Overhead Crawl Space Vent Louvers Figure 88		
1	<20	<20
2	<20	<20
3	<20	<20
4	<20	<20
5	<20	<20
6	<20	<20
7	<20	<20
8	<20	<20
9	<20	<20
10	<20	<20
11	<20	<20
12	<20	<20
13	<20	<20
14	<20	<20
15	<20	<20
16	<20	<20
17	<20	<20
18	<20	<20

Table 5: Building 2 Service Corridor, Wipe Sample Analysis Results					
Unaffected Area and Suspect Affected Area					
Sample Number	α in dpm/100 cm^2	β in dpm/100 cm^2	Sample Number	α in dpm/100 cm^2	β in dpm/100 cm^2
19	<20	<20	41	<20	<20
20	<20	<20	42	<20	<20
21	<20	<20	43	<20	<20
22	<20	<20	44	<20	<20
23	<20	<20	45	<20	<20
24	<20	<20	46	<20	<20
25	<20	<20	47	<20	<20
26	<20	<20	48	<20	<20
27	<20	<20	49	<20	<20
28	<20	<20	50	<20	<20
29	<20	<20	51	<20	<20
30	<20	<20	52	<20	<20
31	<20	<20	53	<20	<20
32	<20	<20	54	<20	<20
33	<20	<20	55	<20	<20
34	<20	<20	56	<20	<20
35	<20	<20	57	<20	<20
36	<20	<20	58	<20	<20
37	<20	<20	59	<20	<20
38	<20	<20	60	<20	<20
39	<20	<20	61	<20	<20
40	<20	<20	62	<20	<20

Table 5: Building 2 Service Corridor, Wipe Sample Analysis Results					
Unaffected Area and Suspect Affected Area					
Sample Number	α in dpm/100 cm²	β in dpm/100 cm²	Sample Number	α in dpm/100 cm²	β in dpm/100 cm²
63	<20	<20	85	<20	<20
64	<20	<20	86	<20	<20
65	<20	<20	87	<20	<20
66	<20	<20	88	<20	<20
67	<20	<20	89	<20	<20
68	<20	<20	90	<20	<20
69	<20	<20	91	<20	<20
70	<20	<20	92	<20	<20
71	<20	<20	First (Lowest) Level C-1 to A-2 Figures 92, 96 & 99		
72	<20	<20	1	<20	<20
73	<20	<20	2	<20	<20
74	<20	<20	3	<20	<20
75	<20	<20	4	<20	<20
76	<20	<20	5	<20	<20
77	<20	<20	6	<20	<20
78	<20	<20	7	<20	<20
79	<20	<20	8	<20	<20
80	<20	<20	9	<20	<20
81	<20	<20	First (Lowest) Level A-11 to A-13 Figures 103, 107 & 111		
82	<20	<20	1	<20	<20
83	<20	<20	2	<20	<20
84	<20	<20			

Table 5: Building 2 Service Corridor, Wipe Sample Analysis Results					
Unaffected Area and Suspect Affected Area					
Sample Number	α in dpm/100 cm²	β in dpm/100 cm²	Sample Number	α in dpm/100 cm²	β in dpm/100 cm²
3	<20	<20	2	<20	<20
4	<20	<20	3	<20	<20
5	<20	<20	4	<20	<20
6	<20	<20	5	<20	<20
7	<20	<20	6	<20	<20
8	<20	<20	7	<20	<20
9	<20	<20	8	<20	<20
10	<20	<20	9	<20	<20
11	<20	<20	10	<20	<20
12	<20	<20	11	<20	<20
13	<20	<20	12	<20	<20
14	<20	<20	First (Lowest) Level A-22 to A-24 Figures 140, 144 & 148		
First (Lowest) Level A-17 to A-18 Figures 115, 119 & 123			1	<20	<20
1	<20	<20	2	<20	<20
2	<20	<20	3	<20	<20
3	<20	<20	4	<20	<20
4	<20	<20	5	<20	<20
5	<20	<20	6	<20	<20
6	<20	<20	7	<20	<20
First (Lowest) Level A-20 to A-22 Figures 127, 131 & 136			8	<20	<20
1	<20	<20	9	<20	<20
			10	<20	<20

Table 5: Building 2 Service Corridor, Wipe Sample Analysis Results					
Unaffected Area and Suspect Affected Area					
Sample Number	α in dpm/100 cm^2	β in dpm/100 cm^2	Sample Number	α in dpm/100 cm^2	β in dpm/100 cm^2
11	<20	<20	6	<20	<20
12	<20	<20	7	<20	<20
Second (Middle) Level A-11 to A-13 Figures 152, 156 & 160			8	<20	<20
1	<20	<20	9	<20	<20
2	<20	<20	10	<20	<20
3	<20	<20			
4	<20	<20			
5	<20	<20			
6	27	<20			
7	<20	<20			
8	<20	<20			
9	<20	<20			
10	<20	<20			
11	<20	<20			
12	<20	<20			
Overhead Crawl Space A-11 to A-13 Figures 164, 168 & 173					
1	<20	<20			
2	<20	<20			
3	<20	<20			
4	<20	<20			
5	<20	<20			

Figure 1: GA's Main Site and Sorrento Valley Site

Building Numbers Names

Building 1	Administration
Building 2	Science Laboratories A, B, C
Building 7	Cafeteria
Building 9	Office/Lab Building
Building 10	Office Building/Health Physics
Building 13	Technical Office Building
Building 14	Technical Office East
Building 15	Technical Office East
Building 19	Swimming Pool Building
Building 21	TRIGA Building
Building 22	Inertial Fusion Development Building
Building 23	Former Hot Cell Site
Building 25	Former Liquid Waste Processing Building
Building 27	Space Power Building
Building 29	Office Building
Building 29-2	Landscaper's Building
Building 30	Office/Lab Building (Former LINAC Complex)
Building 31	Storage/Nuclear Calibration
Building 31-2	Lab Building
Building 33	ICF Lab Building
Building 33-1	ICF Office Building
Building 33-5	Painters Building
Building 34	Fusion DIII-D Building
Building 34-1	Fusion DIII-D Capacitor Building
Building 34-2	Fusion DIII-D Lab Building
Building 34-3	Fusion DIII-D Storage Building
Building 35	Test Tower Building
Building 35-1	Facilities (& Shipping & Receiving)
Building 36	Experimental Building
Building 37	Sorrento Valley Building A
Building 39-1	Storage Building
Building 42	Laboratory Building (QA)
Building 45	Machine Shop
Building 63	3550 Dunhill St.
Building 64	11030 Roselle St.
Building 65	11040 Roselle St.
Building 66	3520 Dunhill St.
Building 66	3510 Dunhill St.

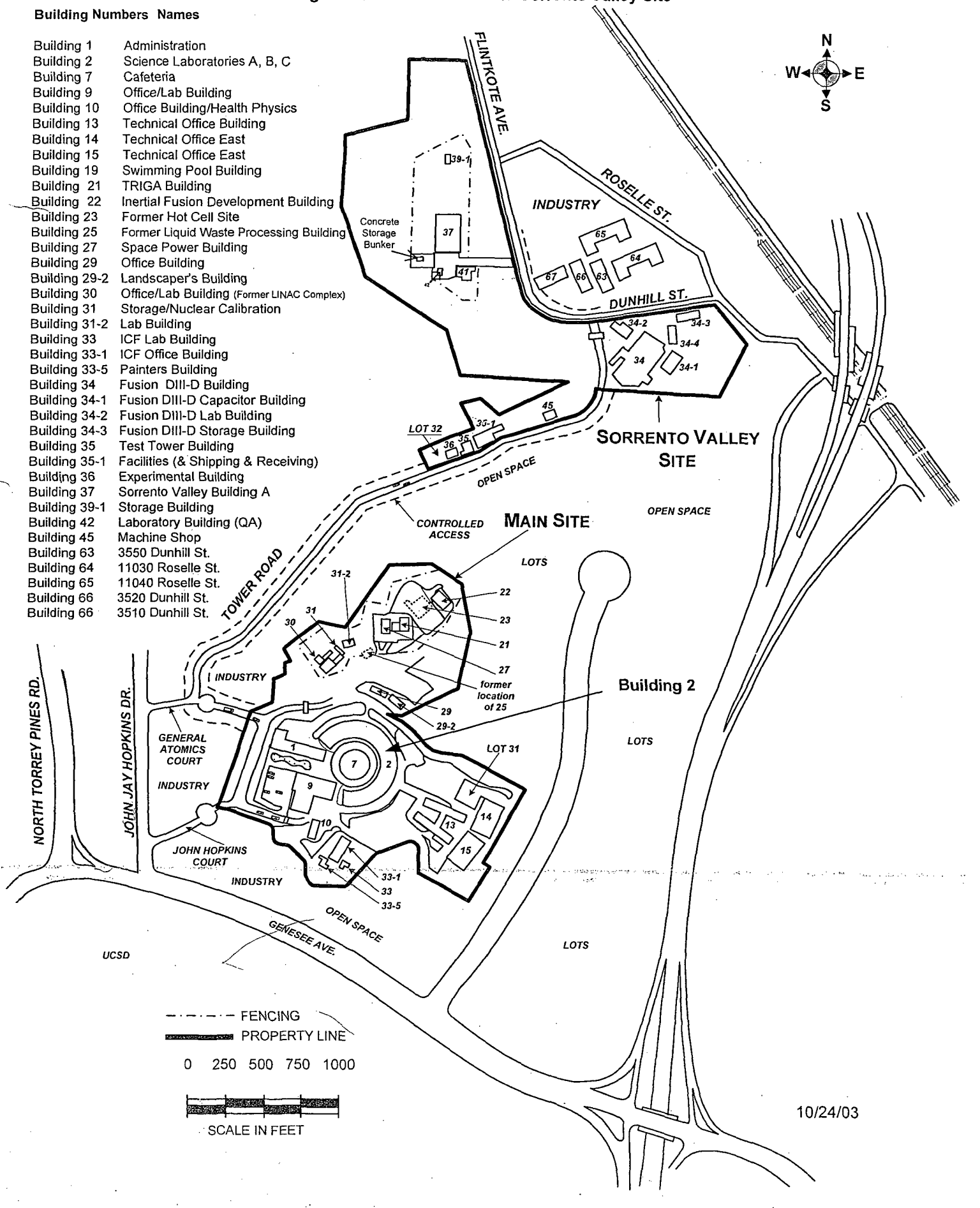


Figure 2: Sections A, B and C of Building 2

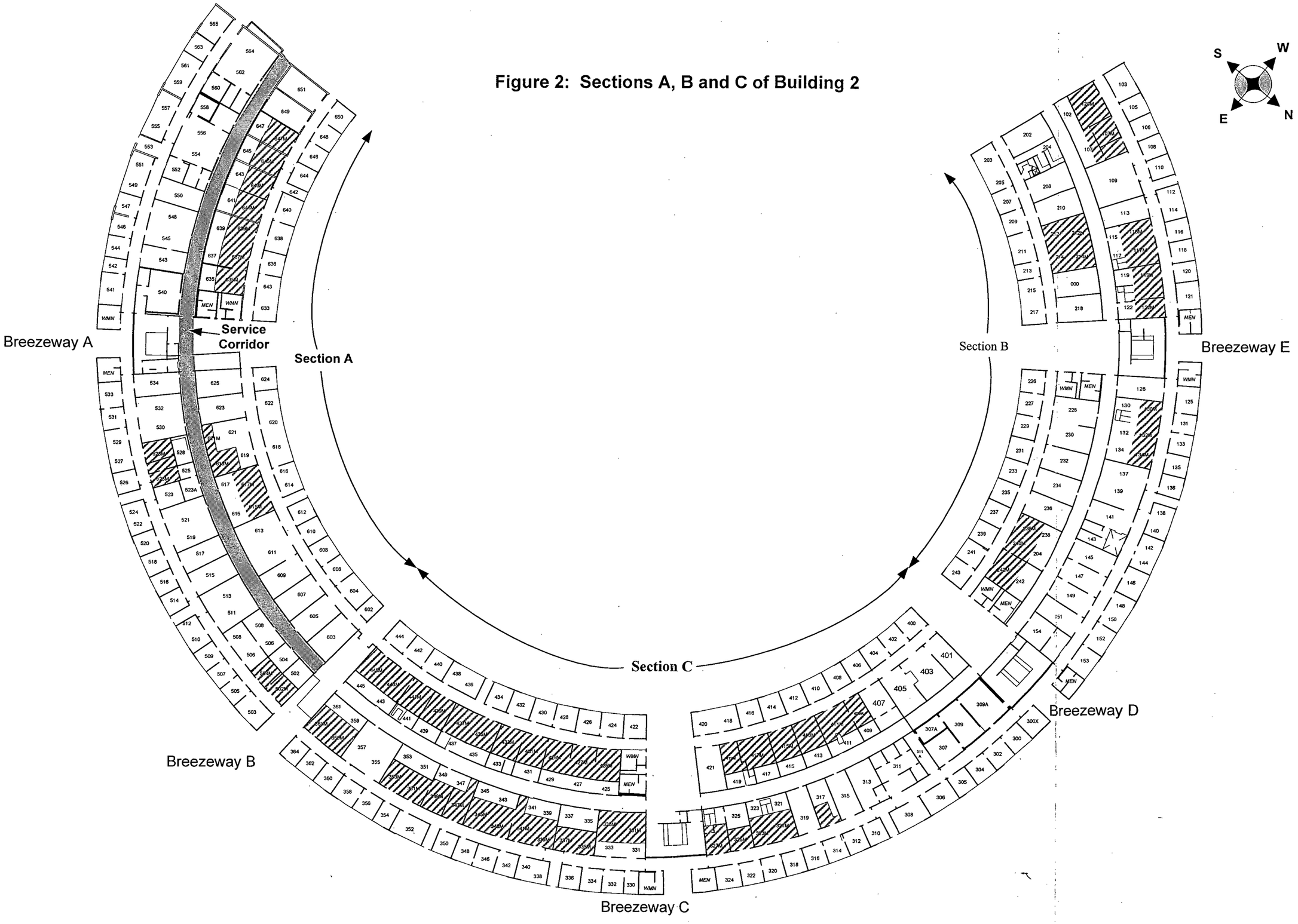
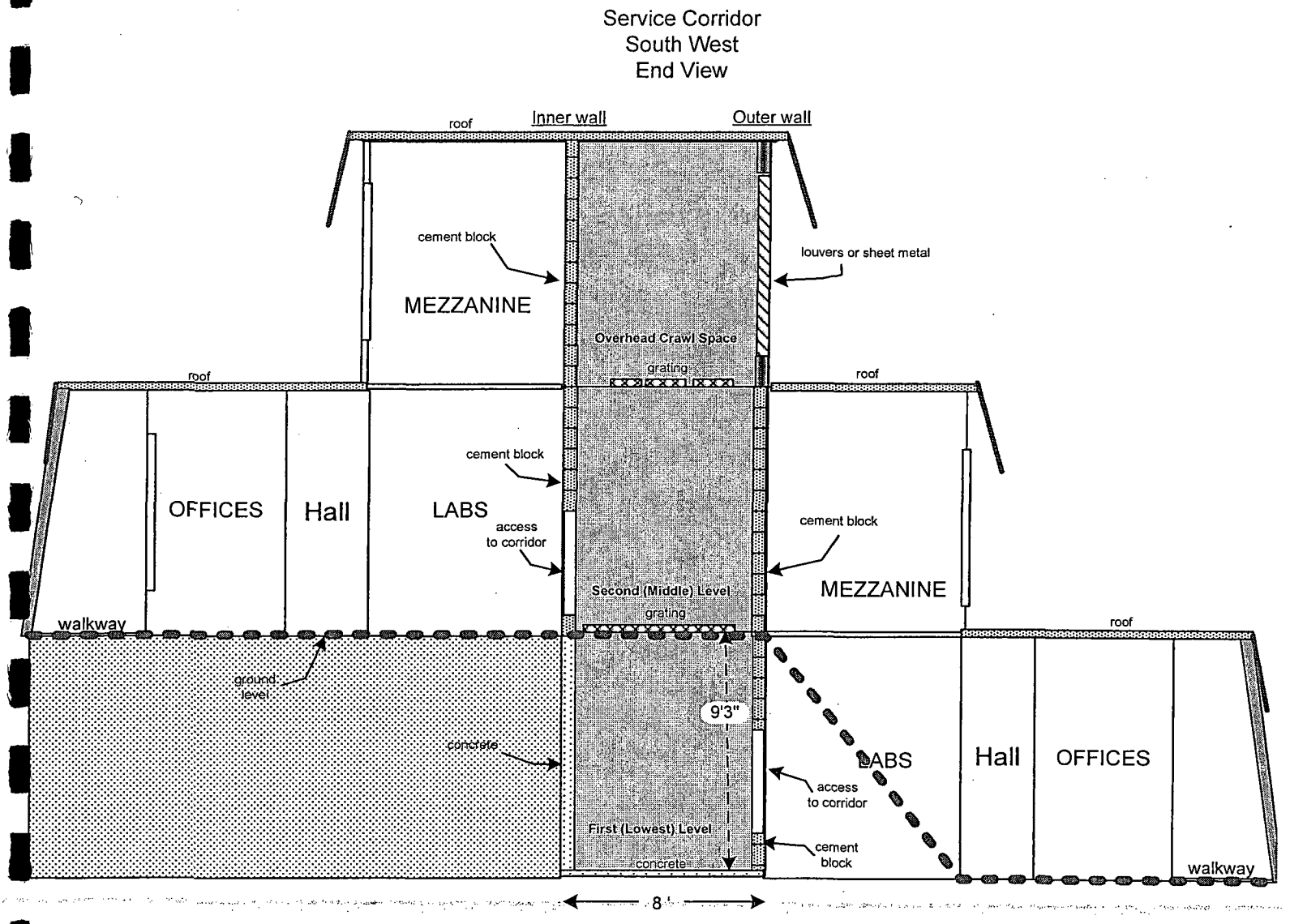
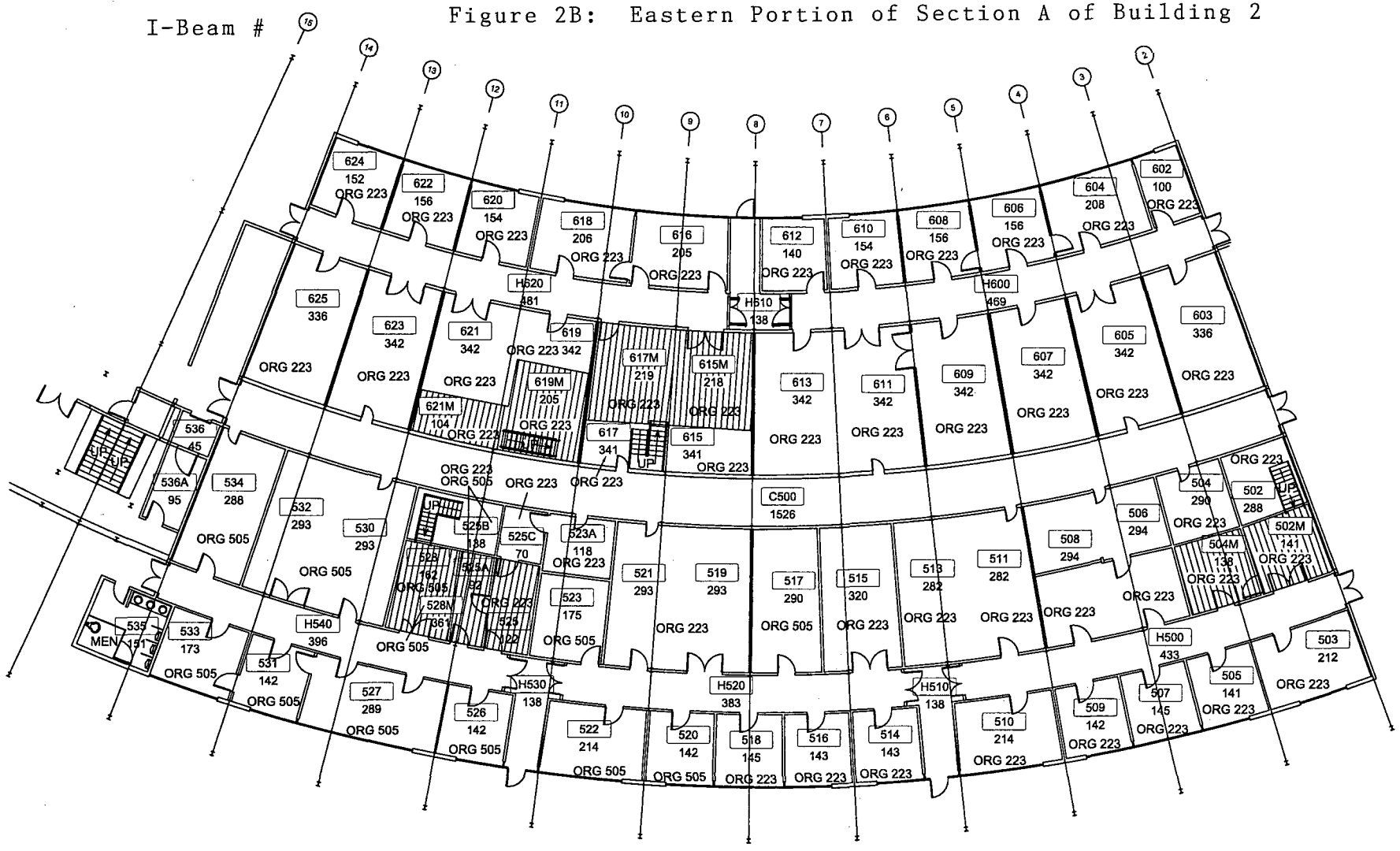


Figure 2A: Building 2 End View



Drawing NOT to Scale

Figure 2B: Eastern Portion of Section A of Building 2



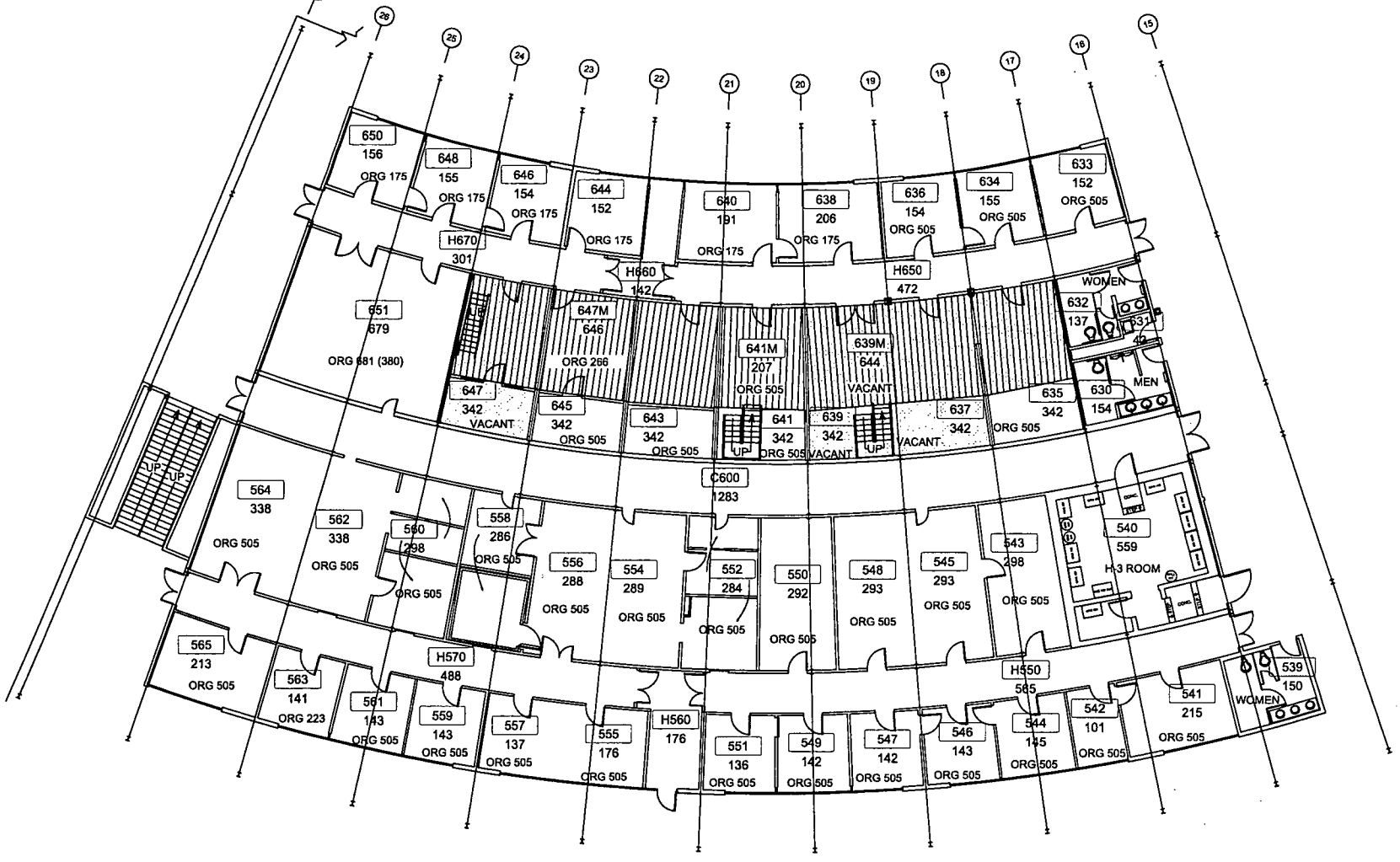
SCALE: 1/16" = 1' AT 11X17

GENERAL ATOMICS

FAC. ENG. NO.	SHEET NO.	DATE	BUILDING: BUILDING 02
OCC-02	05	10/30/06	FLOOR: 502 - 536 & 602 - 625
			DESCRIPTION: OCCUPANCY

I-Beam # (27) (28) (26) (25) (24) (23) (22) (21) (20) (19) (18) (17) (16) (15)

Figure 2C: Western Portion of Section A of Building 2



SCALE: 1/16" = 1' AT 11X17

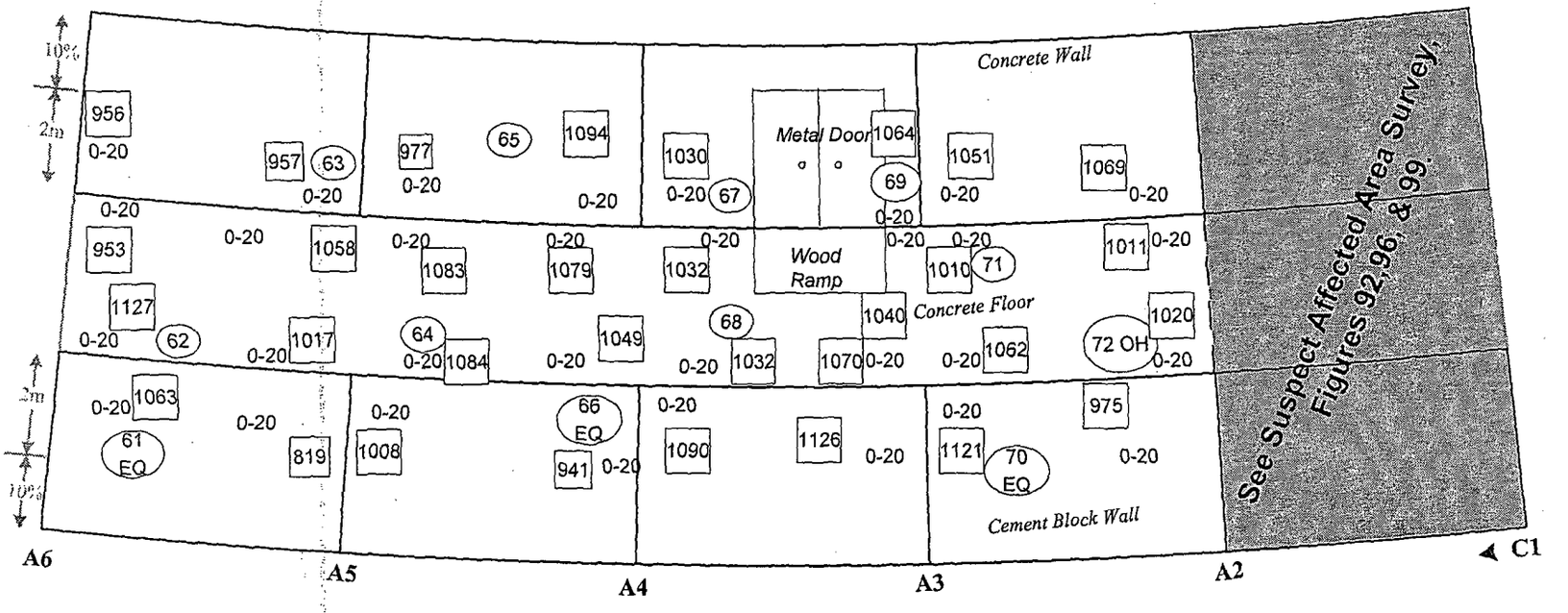
VACANT

GENERAL ATOMICS

FAC. ENG. NO.	SHEET NO.	DATE
OCC-02	06	10/30/06

BUILDING: BUILDING 02
FLOOR: 539 - 565 & 630 - 651
DESCRIPTION: OCCUPANCY

Figure 3: Building 2 Service Corridor, Section A, Non-Suspect Affected Area, Level 1, Column C-1 to A-6, Fixed Alpha and Beta Measurement Locations and Results, and, Wipe Survey Locations.



The Highest β Result (1127 cp2m) = 122 dpm/100 cm², which is < MDA.

Location	Building 2 Service Corridor	
Instruments	Model 12	Model 2221
Serial Number	91103	84423
Calibration Due	3/18/02	6/10/02
	22.14%	34.39%
α β γ	α	β
Probe Number	092192	119444
Probe Size cm²	50cm²	100 cm²
Background	0-20 cpm	1042 cp2m
MDA in DPM/100 cm²	312	222
Surveyors: S. Finchum/ B. Hunter	Date: 01/25/02	

All α Results = Natural Background.

See Table 4 for Wipe analysis Results.

LEGEND

- # = Alpha in CPM

[#] =Beta in CP2M

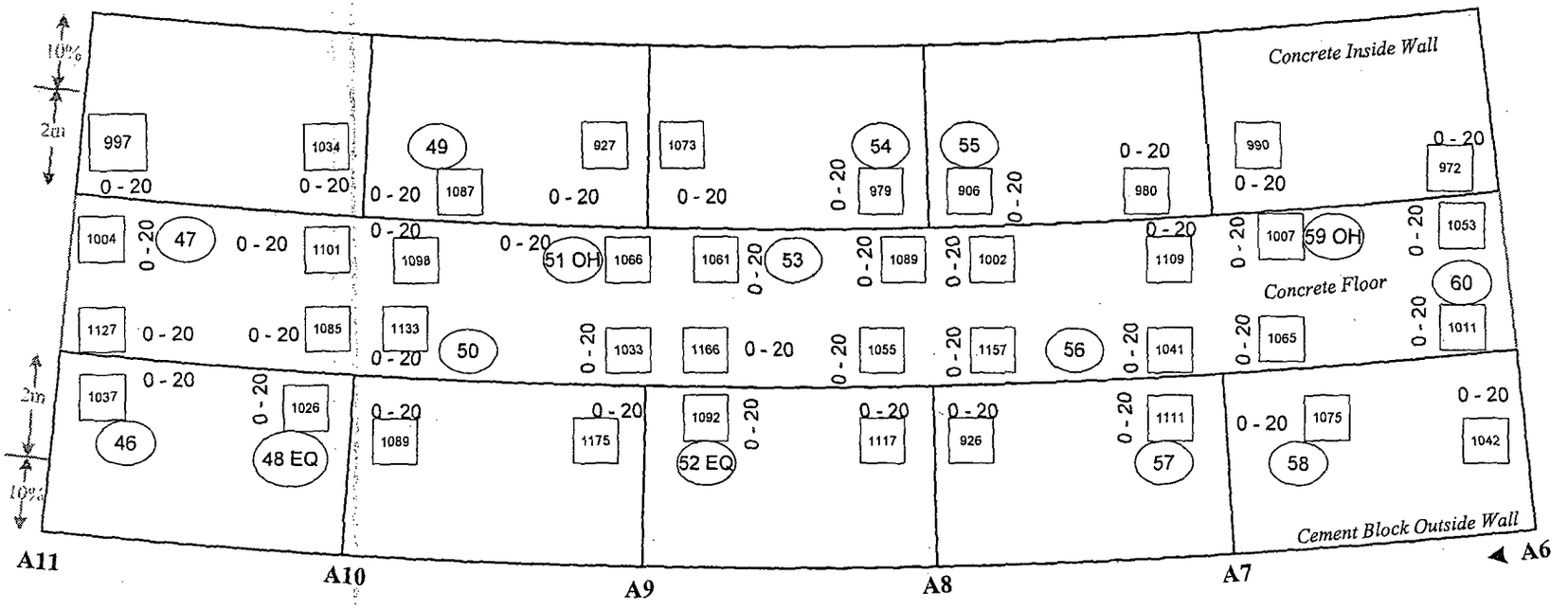
(#) = wipe location

EQ=Equipment wipe

OH= Overhead wipe

A# = Column Number

Figure 4: Building 2 Service Corridor, Section A, Non-Suspect Affected Area, Level 1, Column A-6 to A- 11 Fixed Alpha and Beta Measurement Locations and Results, and Wipe Survey Locations.



Location	Building 2 Service Corridor	
Instruments	Model 12	Model 2221
Serial Number	91103	84423
Calibration Due	3/18/02	6/10/02
Efficiency	22.14%	34.39%
α β γ	α	β
Probe Number	092192	119444
Probe Size cm²	50cm²	100 cm²
Background	0-20 cpm	1042 cp2m
MDA(dpm/100cm²)	312	222
Surveyors: S. Finchum/ B. Hunter Date: 01/24 & 25/ 02		

The Highest β Result (1175 cp2m) = 193 dpm/100 cm², which is < MDA.

All α Results = Natural Background.

See Table 4 for Wipe analysis Results.

LEGEND

- # = Alpha in CPM

[#] =Beta in CP2M

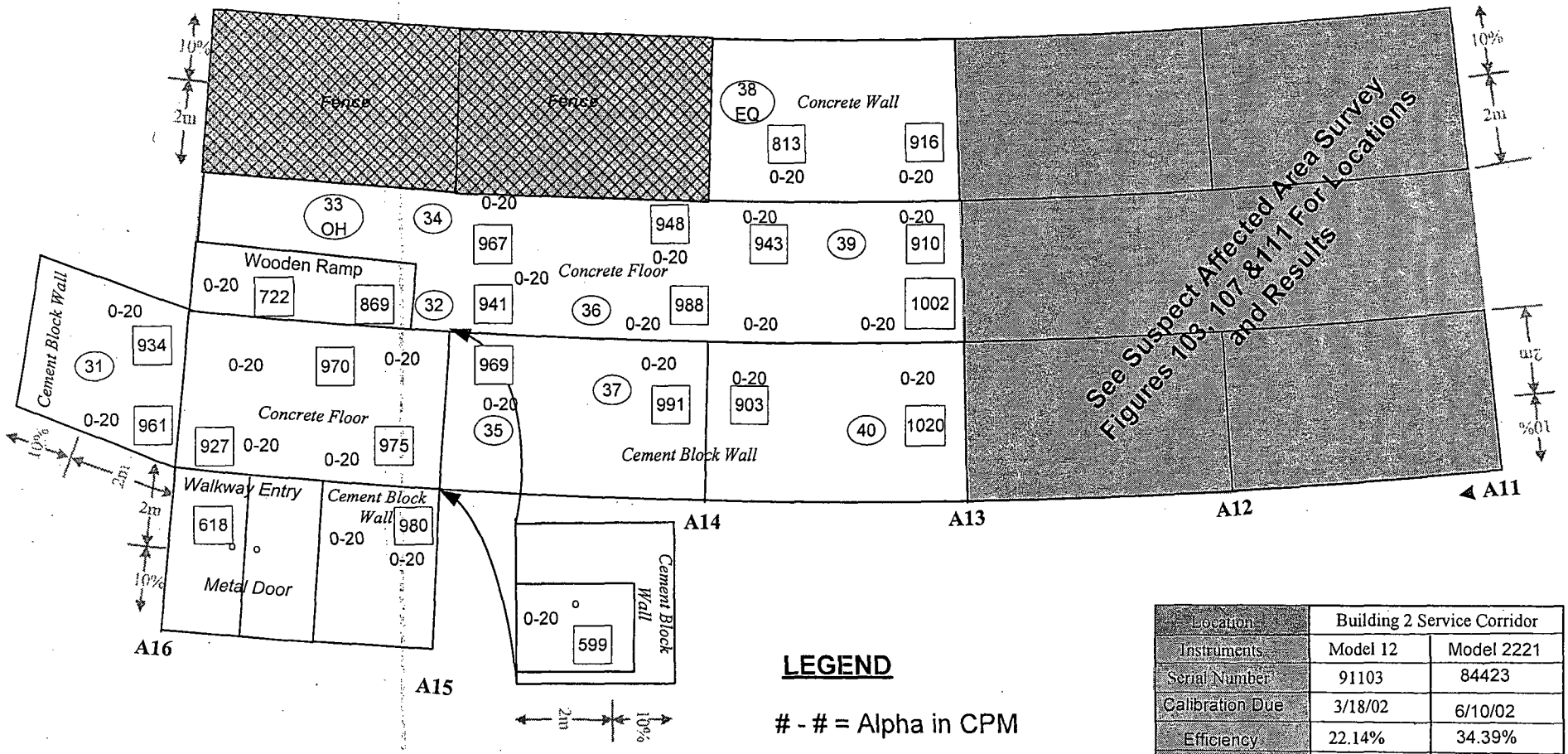
(#) = wipe location

EQ=Equipment wipe

OH= Overhead wipe

A# = Column Number

Figure 5: Building 2 Service Corridor, Section A, Non-Suspect Affected Area, Level 1, Column A-11 to A-16 Fixed Alpha and Beta Measurement Locations and Results, and Wipe Survey Locations.



The Highest β Result (1020 cp2m) = Natural Background

All α Results = Natural Background.

See Table 4 for Wipe analysis Results.

LEGEND

- # = Alpha in CPM

[#] =Beta in CP2M

(#) = wipe location

EQ=Equipment wipe

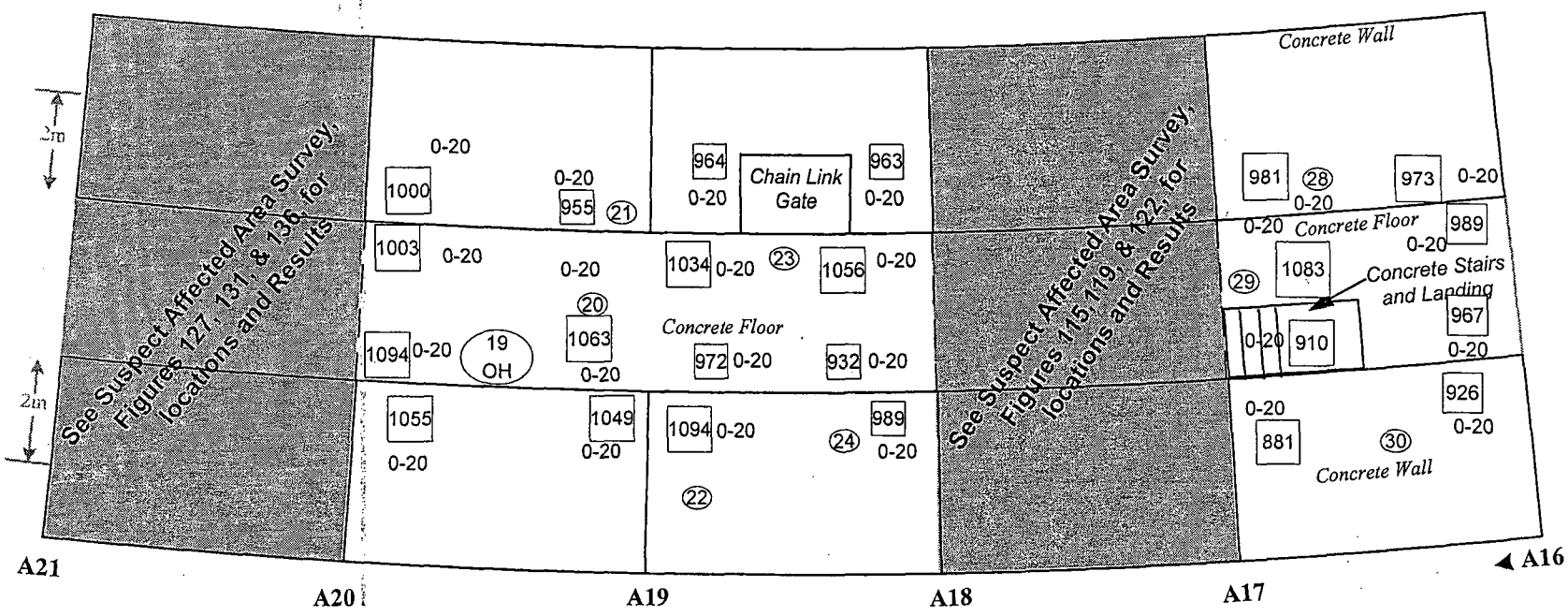
OH= Overhead wipe

A# = Column Number

Location	Building 2 Service Corridor	
Instruments	Model 12	Model 2221
Serial Number	91103	84423
Calibration Due	3/18/02	6/10/02
Efficiency	22.14%	34.39%
α β γ	α	β
Probe Number	092192	119444
Probe Size cm²	50cm²	100 cm²
Background	0-20 cpm	1042 cp2m
MDA in DPM/100 cm²	312	222

Surveyors: S. Finchum/ B. Hunter Date: 01/23&24/02

Figure 6: Building 2 Service Corridor, Section A, Non-Suspect Affected Area, Level 1, Column A-16 to A-21 Fixed Alpha and Beta Measurement Locations and Results, and Wipe Survey Locations.



Location	Building 2 Service Corridor	
Instruments	Model 12	Model 2221
Serial Number	91103	84423
Calibration Due	3/18/02	6/10/02
Efficiency	22.14%	34.39%
α β γ	α	β
Probe Number	092192	119444
Probe Size cm^2	50cm^2	100 cm^2
Background	0-20 cpm	1042 cp2m
MDA in DPM/100 cm^2	312	222
Surveyors: S. Finchum/ B. Hunter Date: 01/23/02		

LEGEND

- # = Alpha in CPM

[#] =Beta in CP2M

(#) = wipe location
EQ=Equipment wipe
OH= Overhead wipe

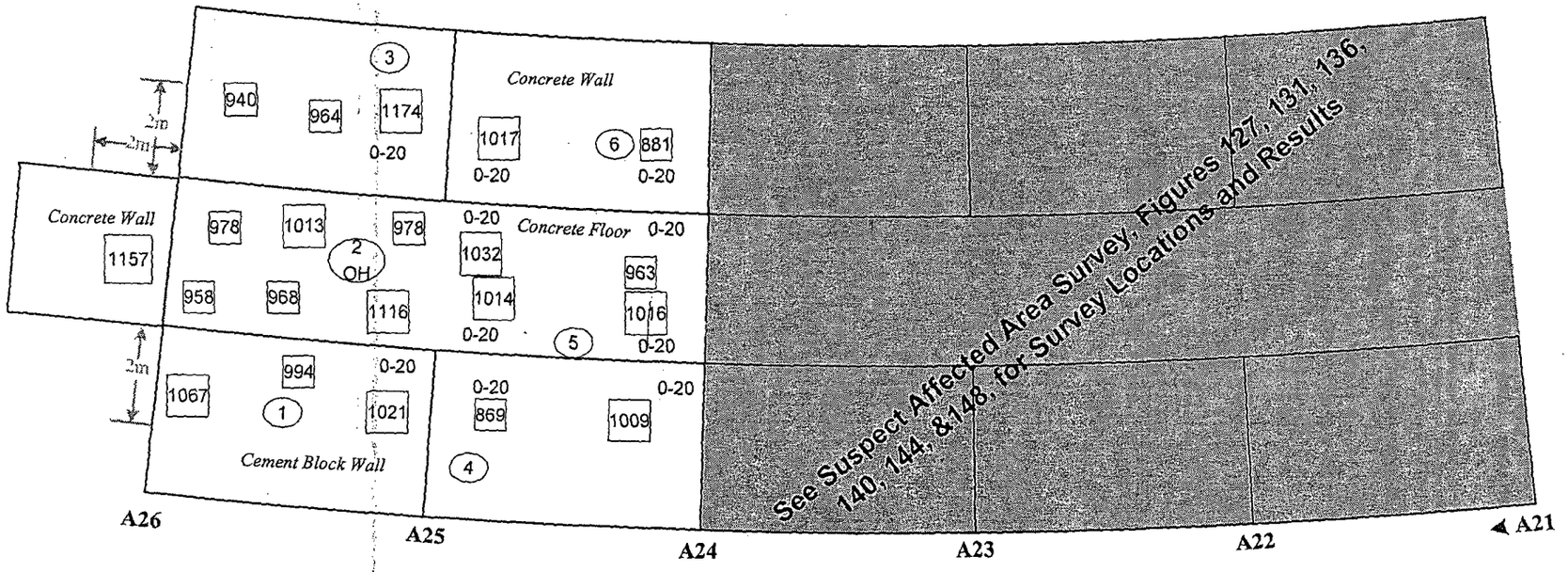
A# = Column Number

The Highest β Result (1094 cp2m) = < MDA

All α Results = Natural Background.

See Table 4 for Wipe analysis Results.

Figure 7: Building 2 Service Corridor, Section A, Non-Suspect Affected Area, Level 1, Column A-21 to A-26 Fixed Alpha and Beta Measurement Locations and Results, and Wipe Survey Locations.



Location	Building 2 Service Corridor	
Instruments	Model 12	Model 2221
Serial Number	91103	84423
Calibration Due	3/18/02	6/10/02
Efficiency	22.14%	34.39%
α β γ	α	β
Probe Number	092192	119444
Probe Size cm²	50cm²	100 cm²
Background	0-20 cpm	1042 cp2m
MDA in DPM/100 cm²	312	222
Surveyors: S. Finchum/ B. Hunter Date: 01/22/02		

LEGEND

- # = Alpha in CPM

[#] =Beta in CP2M

(#) = wipe location

EQ=Equipment wipe

OH= Overhead wipe

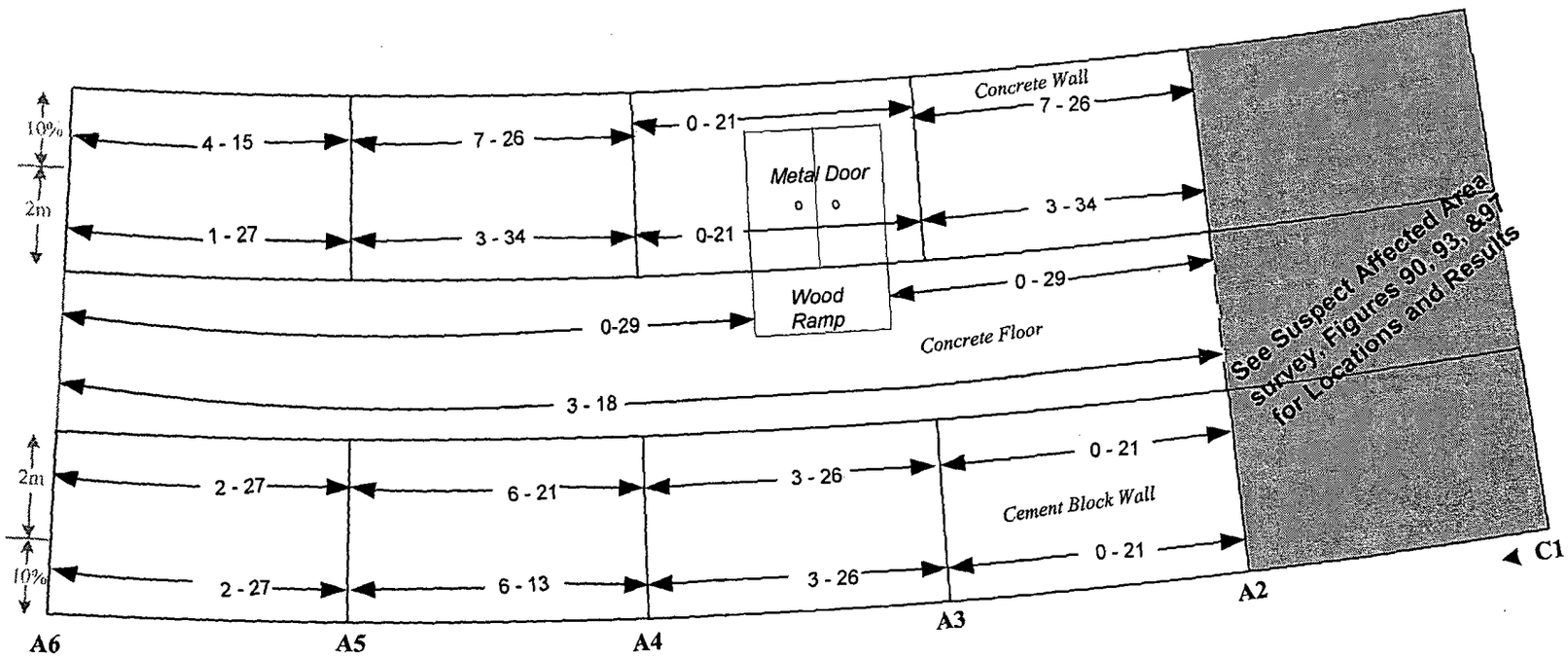
A# = Column Number

The Highest β Result (1094 cp2m) = < MDA

All α Results = Natural Background.

See Table 4 for Wipe analysis Results.

Figure 8: Building 2 Service Corridor, Section A, Non-Suspect Affected Area, Level 1, Column C-1 to A-6, Alpha Scan Measurement Locations and Results



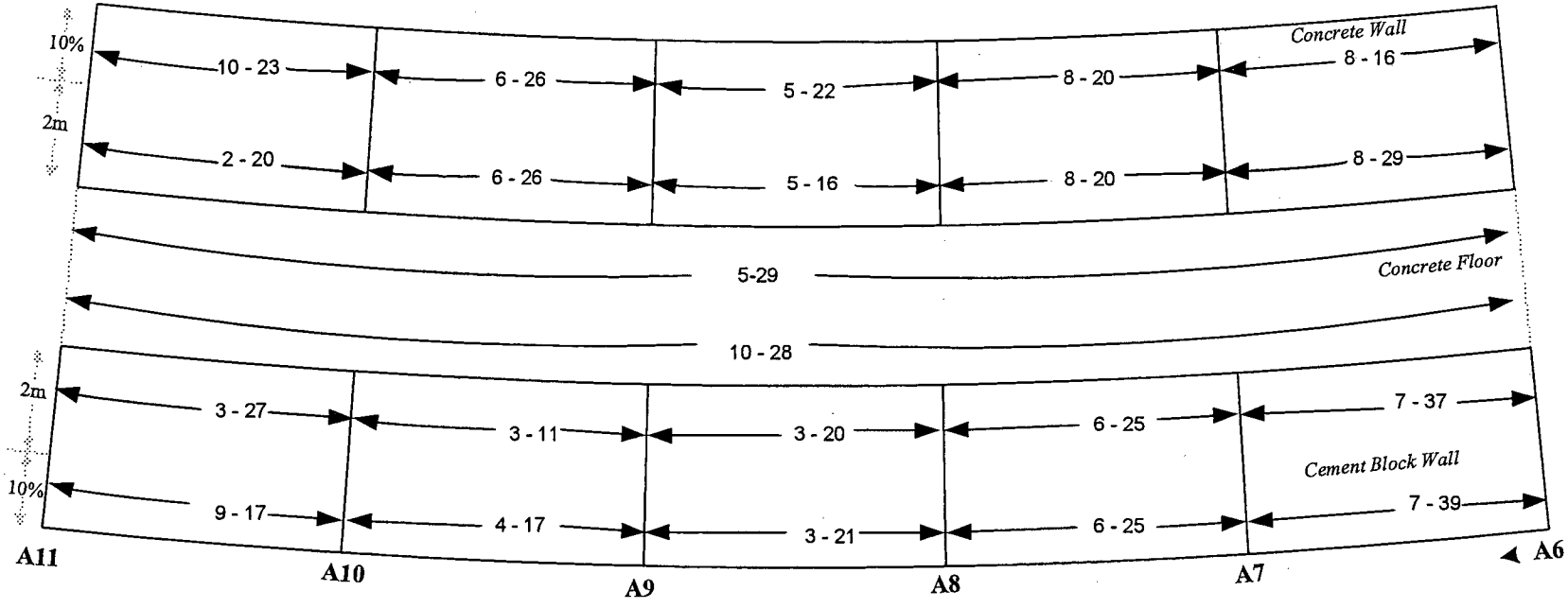
Location	Building 2 Service Corridor
Instruments	Ludlum Model 2221
Serial Number	148425
Calibration Due	06/02/02
Efficiency	21.29%
α β γ	α
Probe Number	086236
Probe Size cm^2	434 cm^2
Background	10 - 40 cpm
MDA(dpm/100cm^2)	86
Surveyors: W. Schuck	Date: 1/28/02

 # - # = α Range in cpm

100% of Original floor and walls up to 2m surfaces scanned, 10% of walls above 2m

The Highest α Result (34 cpm) = Natural Background

Figure 9: Building 2 Service Corridor, Section A, Non-Suspect Affected Area, Level 1, Column A-6 to A-11, Alpha Scan Measurement Locations and Results



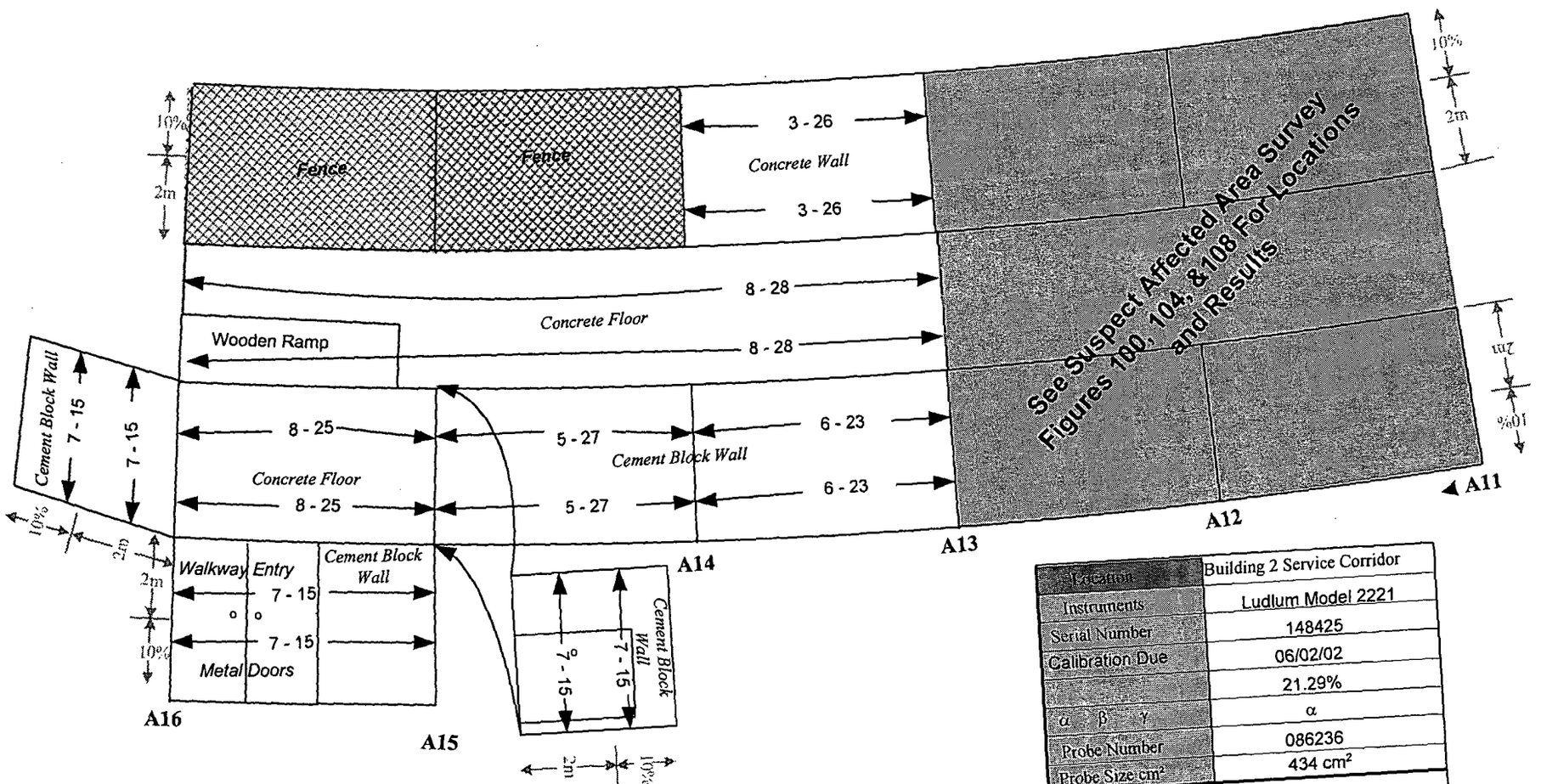
Location	Building 2 Service Corridor
Instruments	Ludlum Model 2221
Serial Number	148425
Calibration Due	06/02/02
Efficiency	21.29%
α β γ	α
Probe Number	086236
Probe Size cm^2	434 cm^2
Background	10 - 40 cpm
MDA(dpm/100cm^2)	86
Surveyors: S. Finchum/ B. Hunter Date: 1/25/02	

 # - # = α Range in cpm

100% of floor and walls up to 2m surfaces scanned, 10% of walls above 2m

The Highest α Result (39 cpm) = Natural Background

Figure 10: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 1, Column A-11 to A-16, Alpha Scan Measurement Locations and Results



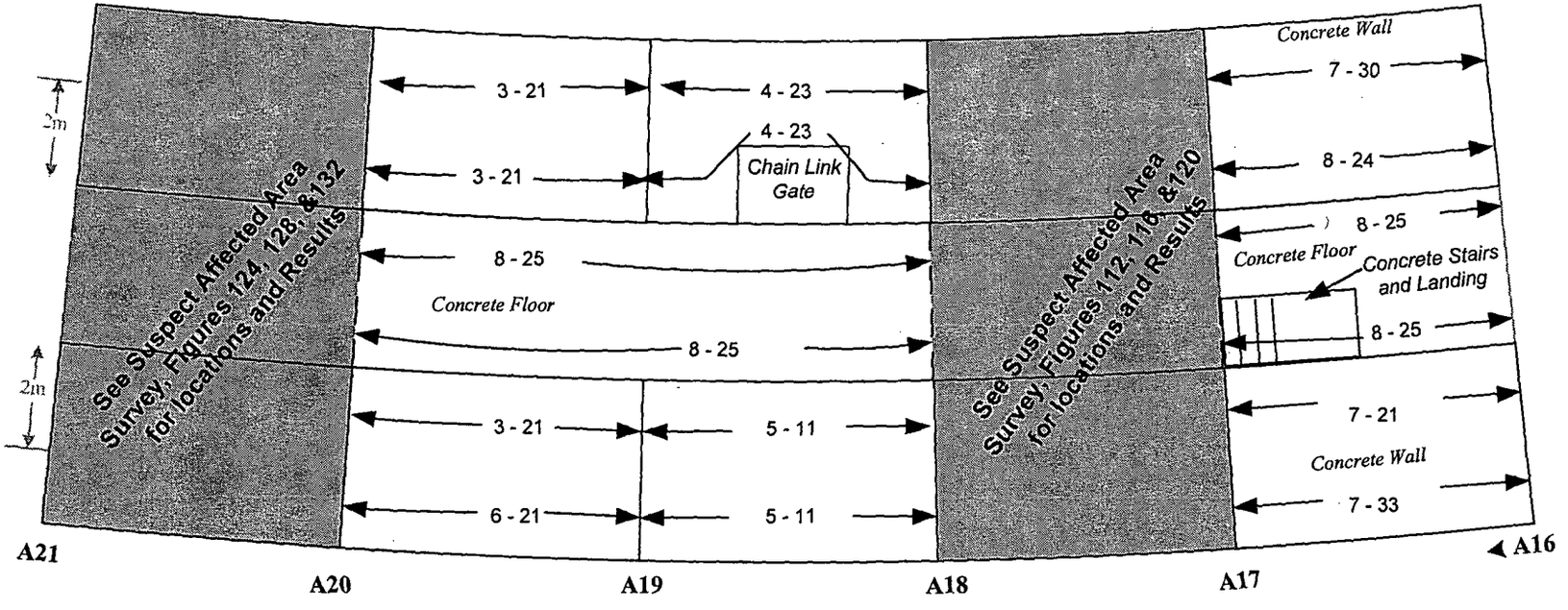
Location	Building 2 Service Corridor
Instruments	Ludlum Model 2221
Serial Number	148425
Calibration Due	06/02/02
	21.29%
α β γ	α
Probe Number	086236
Probe Size cm^2	434 cm^2
Background cpm	10 - 40 on all surfaces
MDA(dpm/100cm^2) x=4	86 on all surfaces
Surveyors: S. Finchum/ B. Hunter Date: 1/28-30/02	

 # - # = α Range in cpm.

100% of floor and wall surfaces up to 2m scanned, 10% above 2 m

The Highest α Result on concrete (28 cpm) = Natural Background

Figure 11: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 1, Column A-16 to A-21, Alpha Scan Measurement Locations and Results



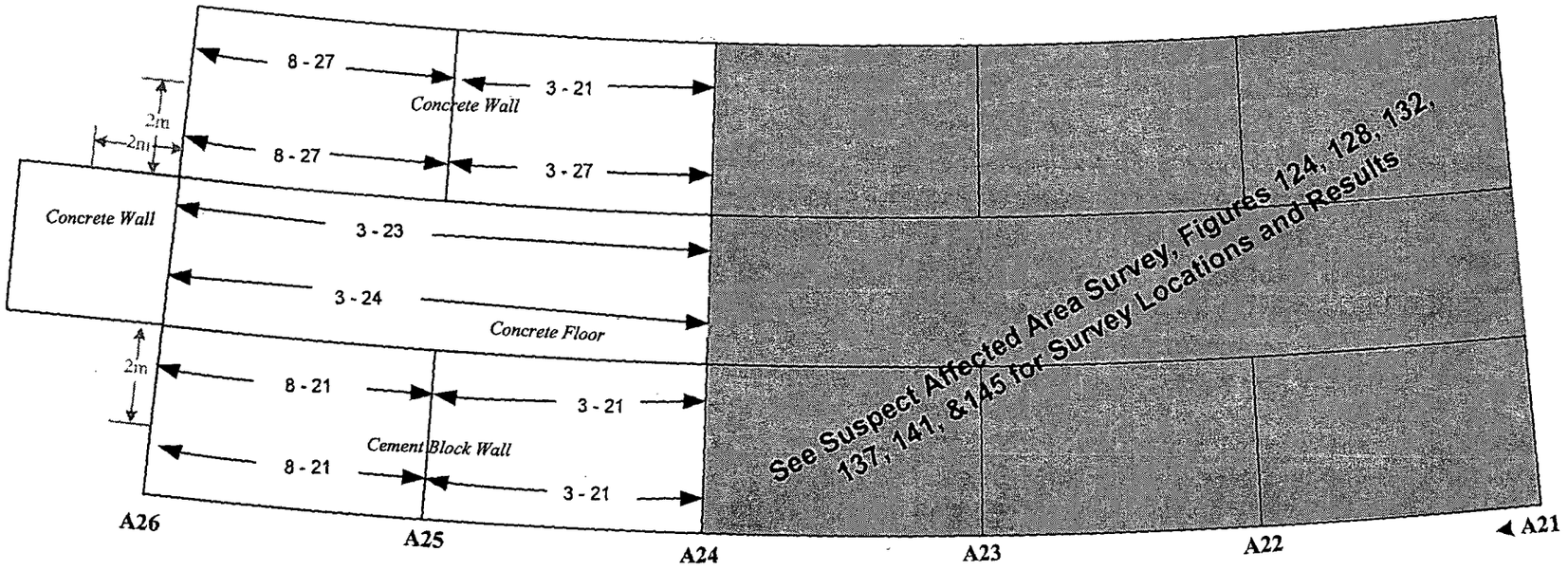
Location	Building 2 Service Corridor
Instruments	Ludlum Model 2221
Serial Number	148425
Calibration Due	06/02/02
Efficiency	21.29%
α β γ	α
Probe Number	086236
Probe Size cm^2	434 cm^2
Background	10 - 40 cpm
MDA(dpm/100cm^2)	86
Surveyors: W. Schuck/J. Sullivan Date: 1/24/02	

 # - # = α Range in cpm

The Highest α Result (33 cpm) = Natural Background

100% scan on floor and walls up to 2m, 10% on walls above 2m.

Figure 12: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 1, Column A-21 to A-26, Alpha Scan Measurement Locations and Results



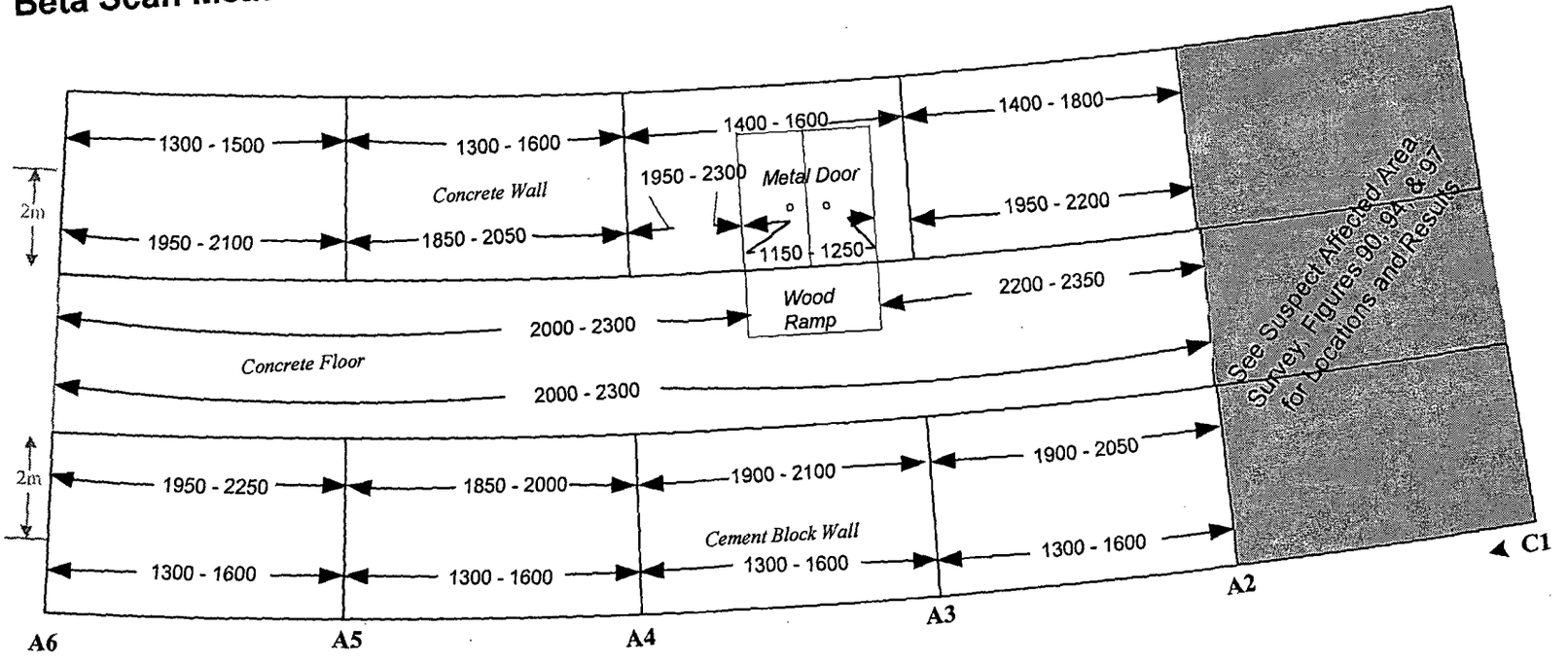
Location	Building 2 Service Corridor
Instruments	Ludlum Model 2221
Serial Number	148425
Calibration Due	06/02/02
Efficiency	21.29%
α β γ	α
Probe Number	086236
Probe Size cm^2	434 cm^2
Background	10 - 40 cpm
MDA (dpm/100cm^2)	86
Surveyors: W. Schuck/J. Sullivan Date: 1/22/02	

 # - # = α Range in cpm

100% of floor and walls up to 2m surfaces scanned, 10% of walls above 2m

The Highest α Result (27 cpm) = Natural Background

Figure 13: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 1, Column C-1 to A-6, Beta Scan Measurement Locations and Results



Location	Building 2 Service Corridor	
Instruments	Ludlum Model 2221	Ludlum Model 2221
Serial Number	84459	154202
Calibration Due	07/24/02	07/06/04
Efficiency	31.08%	30.39%
α β γ	β	β
Probe Number	086215	149017
Probe Size cm^2	434 cm^2	434 cm^2
Background cpm	1840 - 2100 , concrete 1640 - 1850, cement block	1300 - 2000 , concrete, 700 - 1300 , metal 1300 - 1500, cement block
MDA (dpm/100cm^2) X=0.3	438 on concrete 388 on cement block	375 on concrete, 227 on metal, 318 on cement block
Surveyors: S. Finchum/ B. Hunter 1/30&31/02		Surveyors: R. Stowell/ G. Sayer Date: 01/07/04

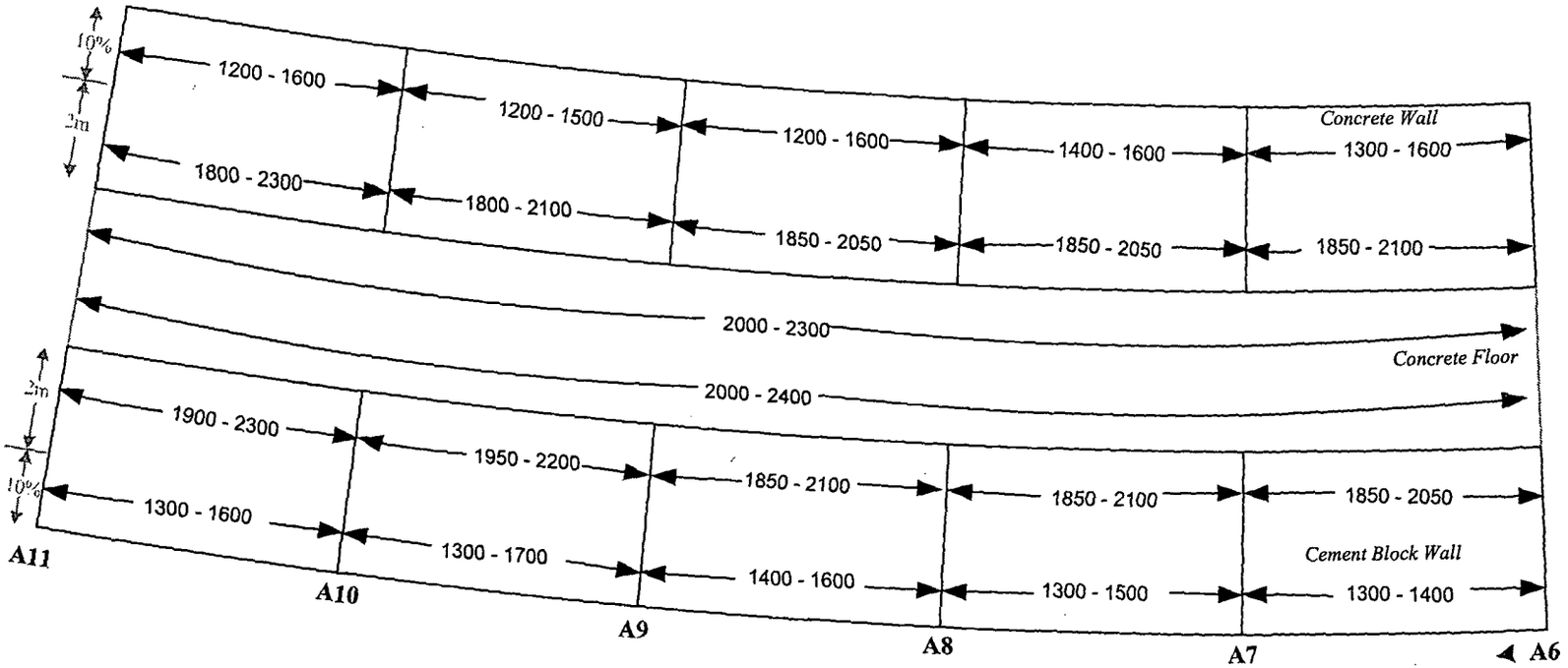
 # - # = β Range in cpm.

100% of original floor and wall surfaces up to 2m , and 10% of wall above 2m scanned.

The Highest β Result (2350 cpm) = 282 dpm/100 cm^2 which is <MDA

Note: Measurements above 2 m taken on 01/07/04.

Figure 14: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 1, Column A-6 to A-11, Beta Scan Measurement Locations and Results



Location	Building 2 Service Corridor	
Instruments	Ludlum Model 2221	Ludlum Model 2221
Serial Number	84459	154202
Calibration Due	07/24/02	07/06/04
Efficiency α β γ	31.08% β	30.39% β
Probe Number	086215	149017
Probe Size cm^2	434 cm^2	434 cm^2
Background cpm	1840 - 2100 , concrete 1640 - 1850, cement block	1300 - 2000 , concrete, 700 - 1300 , metal 1300 - 1500, cement block
MDA($dpm/100cm^2$) $\chi = 0.3$	438 on concrete 388 on cement block	375 on concrete, 227 on metal, 318 on cement block
Surveyors: S. Finchum/ B. Hunter		Surveyors: R. Stowell/ G. Sayer
1/30&31/02		Date: 01/07/04

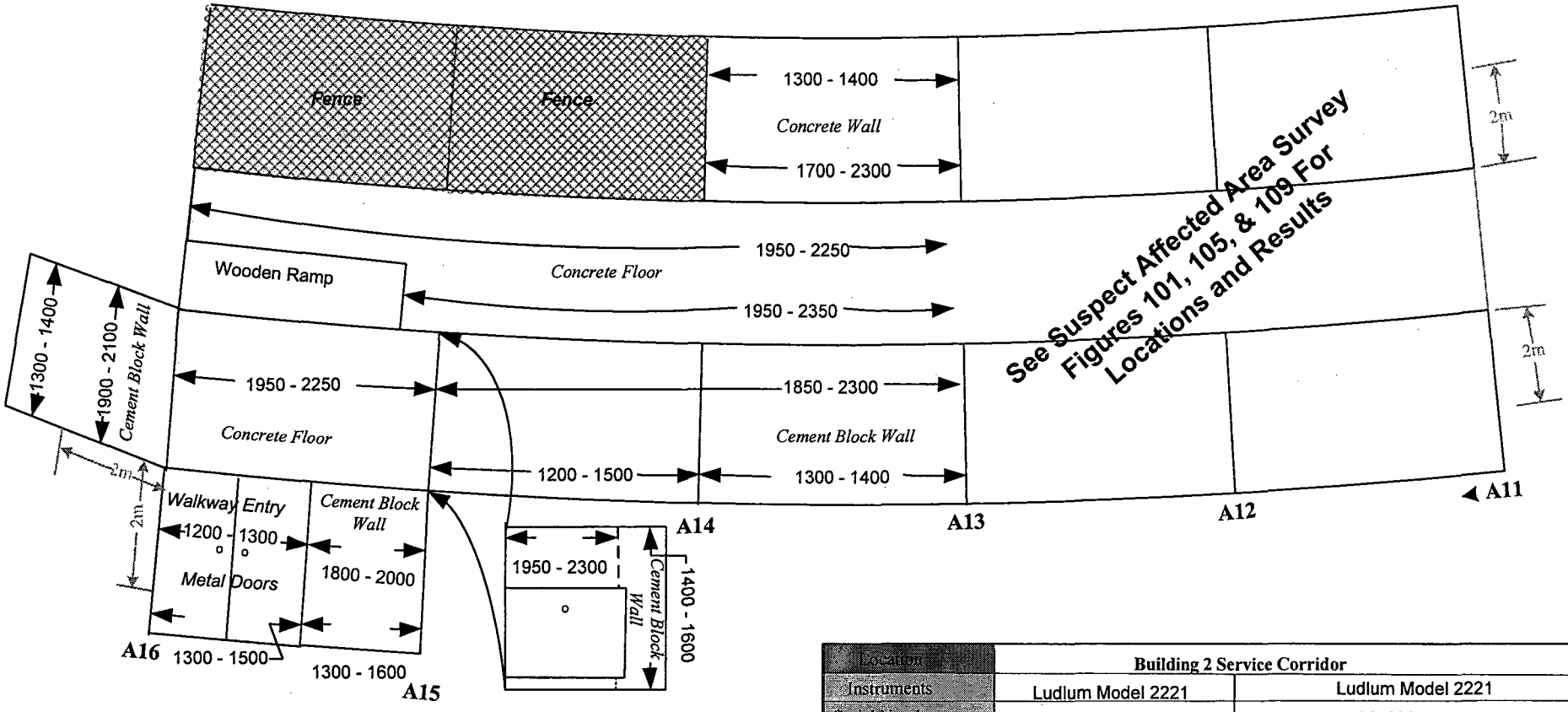
 # - # = β Range in cpm.

100% of original floor and wall surfaces up to 2m , and 10% of walls above 2m scanned.

The Highest β Result (2400 cpm) = 319 dpm/100 cm^2, which is <MDA.

Note: Measurements above 2 m taken on 01/07/04.

Figure 15: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 1, Column A-11 to A-16, Beta Scan Measurement Locations and Results



 # - # = β Range in cpm.

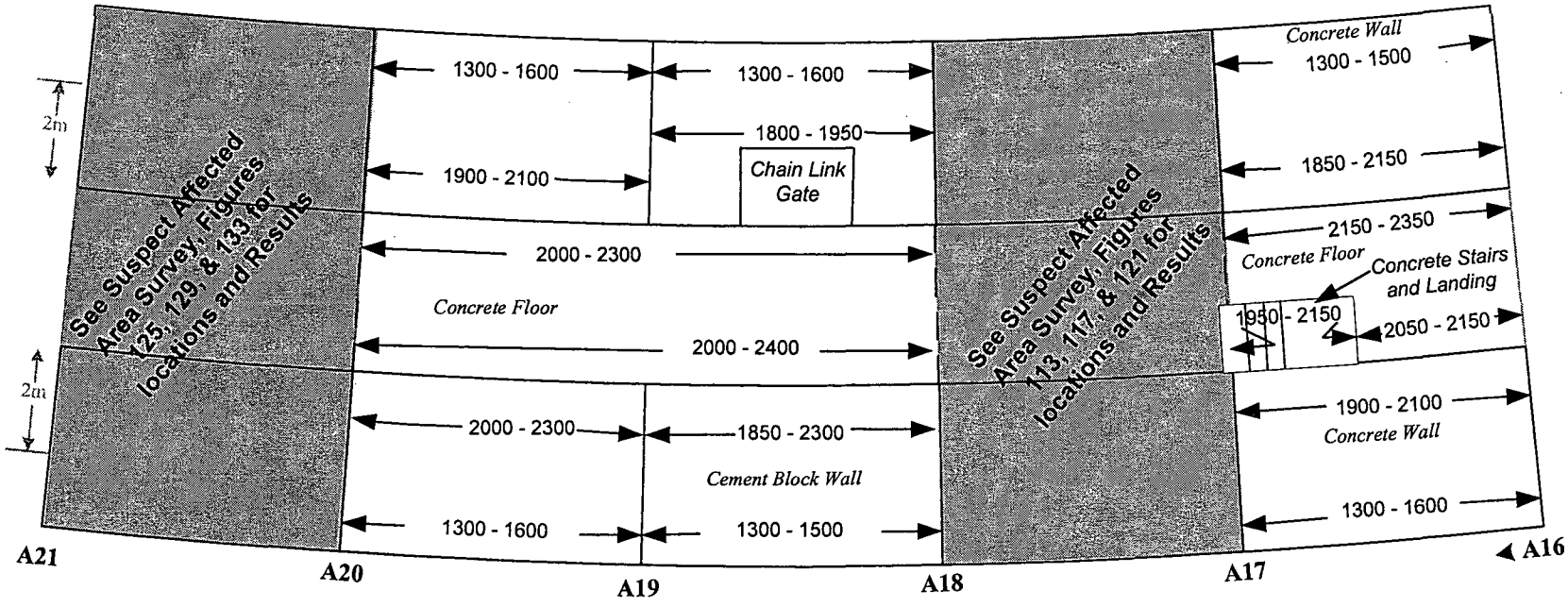
100% of original floor and wall surfaces up to 2m and 10% of walls above 2m scanned.

The Highest β Result on concrete (2350cpm) = 282 dpm/100 cm², which is <MDA.

Note: Measurements above 2 m taken on 01/07/04.

Location	Building 2 Service Corridor	
Instruments	Ludlum Model 2221	Ludlum Model 2221
Serial Number	84459	154202
Calibration Due	07/24/02	07/06/04
Efficiency	31.08%	30.39%
α β γ	β	β
Probe Number	086215	149017
Probe Size cm^2	434 cm^2	434 cm^2
Background cpm	1840 - 2100 , concrete 1640 - 1850, cement block	1300 - 2000 , concrete, 700 - 1300 , metal 1300 - 1500, cement block
MDA (dpm/100cm^2) X=0.3	438 on concrete 388 on cement block	375 on concrete, 227 on metal, 318 on cement block
Surveyors: S. Finchum/ B. Hunter 1/28 -30/02		Surveyors: R. Stowell/ G. Sayer Date: 01/07/04

Figure 16: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 1, Column A-16 to A-21, Beta Scan Measurement Locations and Results



Location	Building 2 Service Corridor	
Instruments	Ludlum Model 2221	Ludlum Model 2221
Serial Number	84459	154202
Calibration Due	07/24/02	07/06/04
Efficiency	31.08%	30.39%
α β γ	β	β
Probe Number	086215	149017
Probe Size cm^2	434 cm^2	434 cm^2
Background cpm	1840 - 2100 , concrete 1640 - 1850, cement block	1300 - 2000 , concrete, 700 - 1300 , metal 1300 - 1500, cement block
MDA(dpm/100cm^2) X=0.3	438 on concrete 388 on cement block	375 on concrete, 227 on metal, 318 on cement block
Surveyors: S. Finchum/ B. Hunter 1/28 -02/01/02		Surveyors: R. Stowell/ G. Sayer Date: 01/07/04

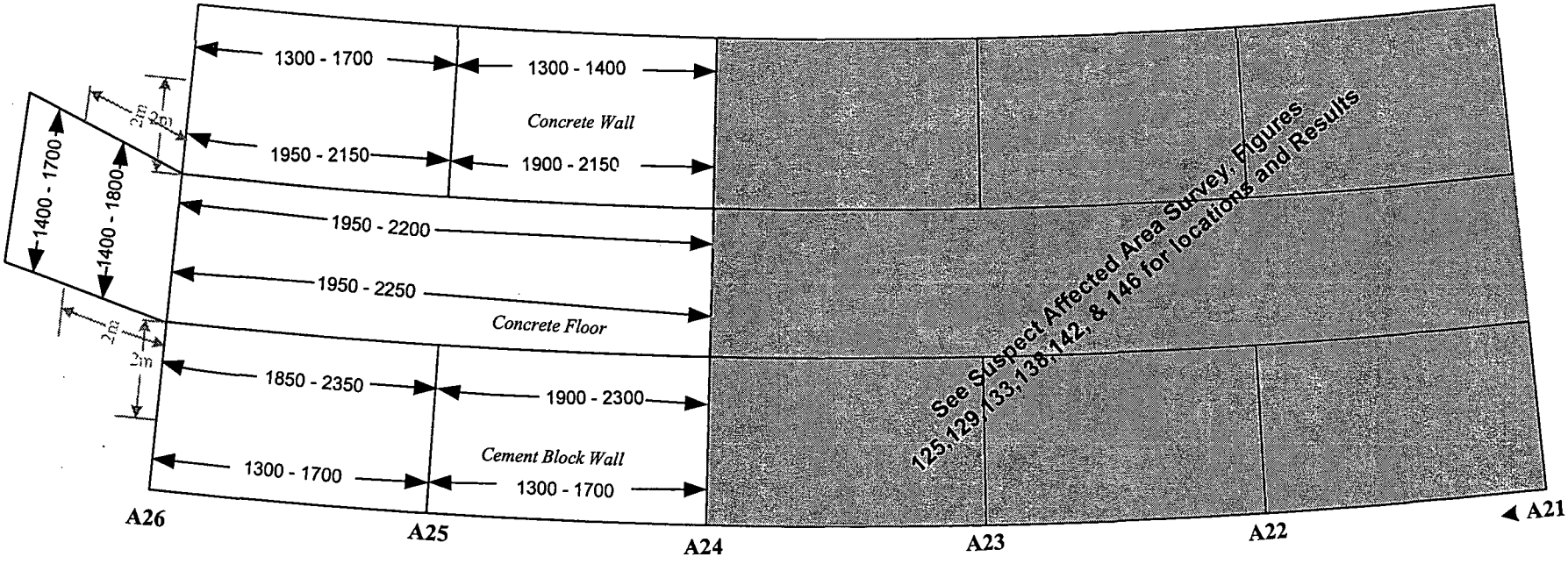
 # - # = β Range in cpm.

100% of original floor and wall surfaces up to 2m , and 10% of walls above 2m scanned.

The Highest β Result (2400 cpm) = 319 dpm/100 cm^2, which is <MDA

Note: Measurements above 2 m taken on 01/07/04.

Figure 17: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 1, Column A-21 to A-26, Beta Scan Measurement Locations and Results



Location	Building 2 Service Corridor	
Instruments	Ludlum Model 2221	Ludlum Model 2221
Serial Number	84459	154202
Calibration Due	07/24/02	07/06/04
Efficiency	31.08%	30.39%
α β γ	β	β
Probe Number	086215	149017
Probe Size cm^2	434 cm^2	434 cm^2
Background cpm	1840 - 2100 , concrete 1640 - 1850, cement block	1300 - 2000 , concrete, 700 - 1300 , metal 1300 - 1500, cement block
MDA(dpm/100cm^2) x=0.3	438 on concrete 388 on cement block	375 on concrete, 227 on metal, 318 on cement block
Surveyors: S. Finchum/ B. Hunter 1/28 -02/01/02		Surveyors: R. Stowell/ G. Sayer Date: 01/07/04

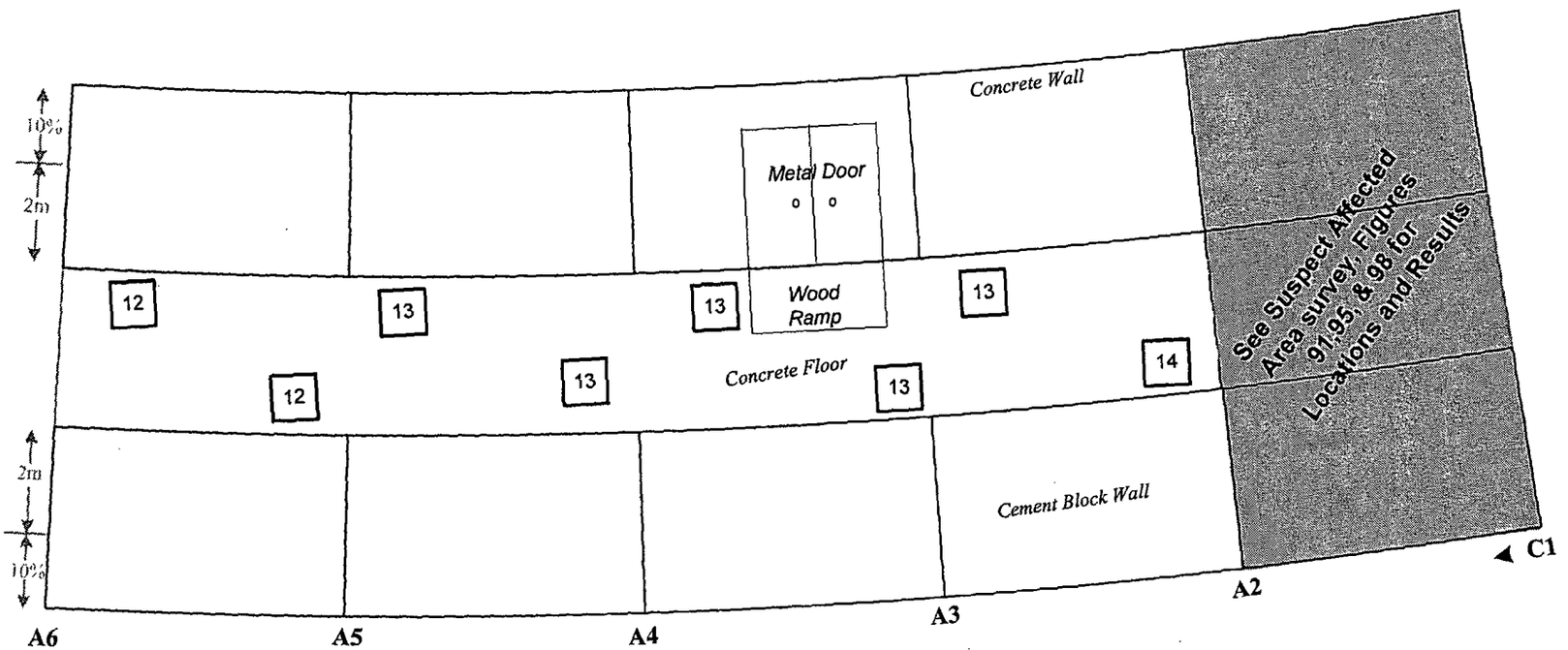
 # - # = β Range in cpm.

100% of original floor and wall surfaces up to 2m , and 10% of walls above 2m scanned.

The Highest β Result (2350 cpm) = 282 dpm/100 cm^2, which is <MDA

Note: Measurements above 2 m and on end wall taken on 01/07/04.

Figure 18: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 1, Column C-1 to A-6, Fixed Exposure Rate Measurement Locations and Results



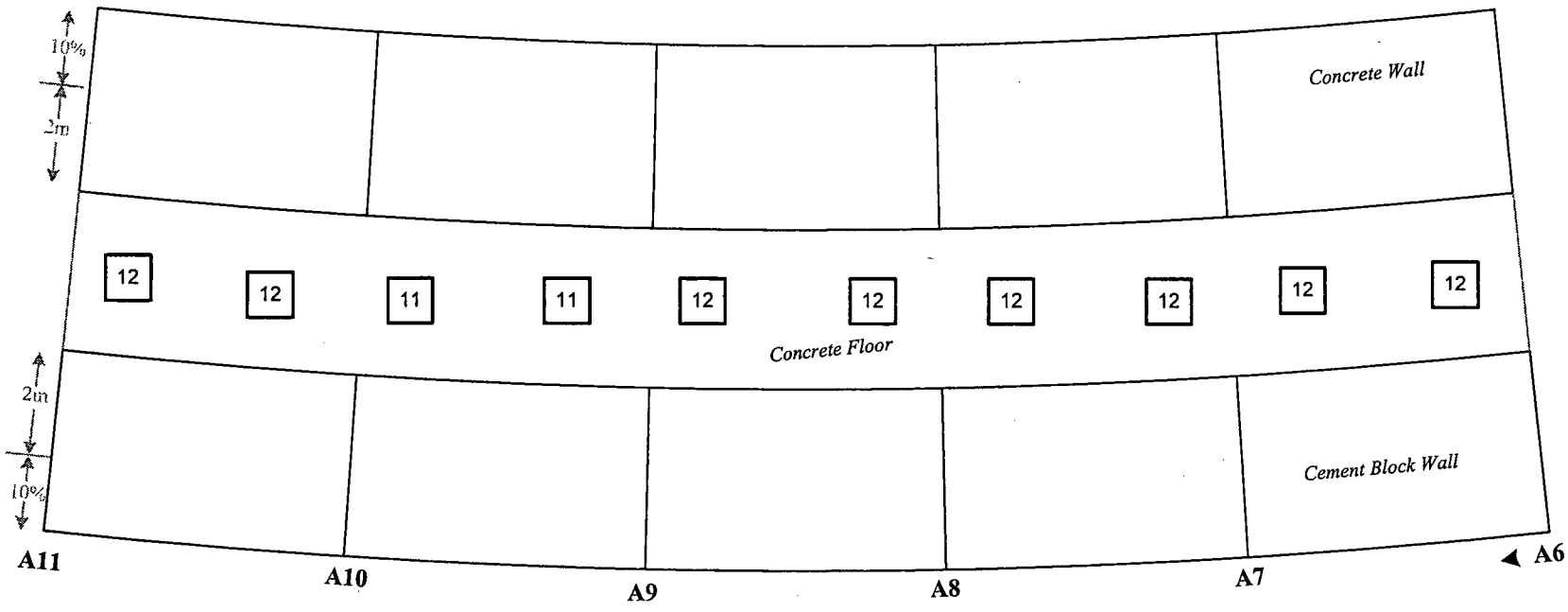
Location	Building 2 Service Corridor
Instruments	Ludlum Model 3
Serial Number	151348
Calibration Due	07/24/02
Efficiency	NA
α β γ	γ
Probe Number	163169
Probe	2 x 2 NaI(Tl)
Typical Background in μR/hr	13-15, @ 1m, Concrete 20-25, @ 1m in Enclosed Concrete Spaces

Surveyors : B. Hunter Date: 4/29/02

[#] = Exposure Rate @ 1 meter in μR/hr.

The Highest γ Result (14 μR/hr) = Natural Background

Figure 19: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 1, Column A-6 to A-11, Fixed Exposure Rate Measurement Locations and Results

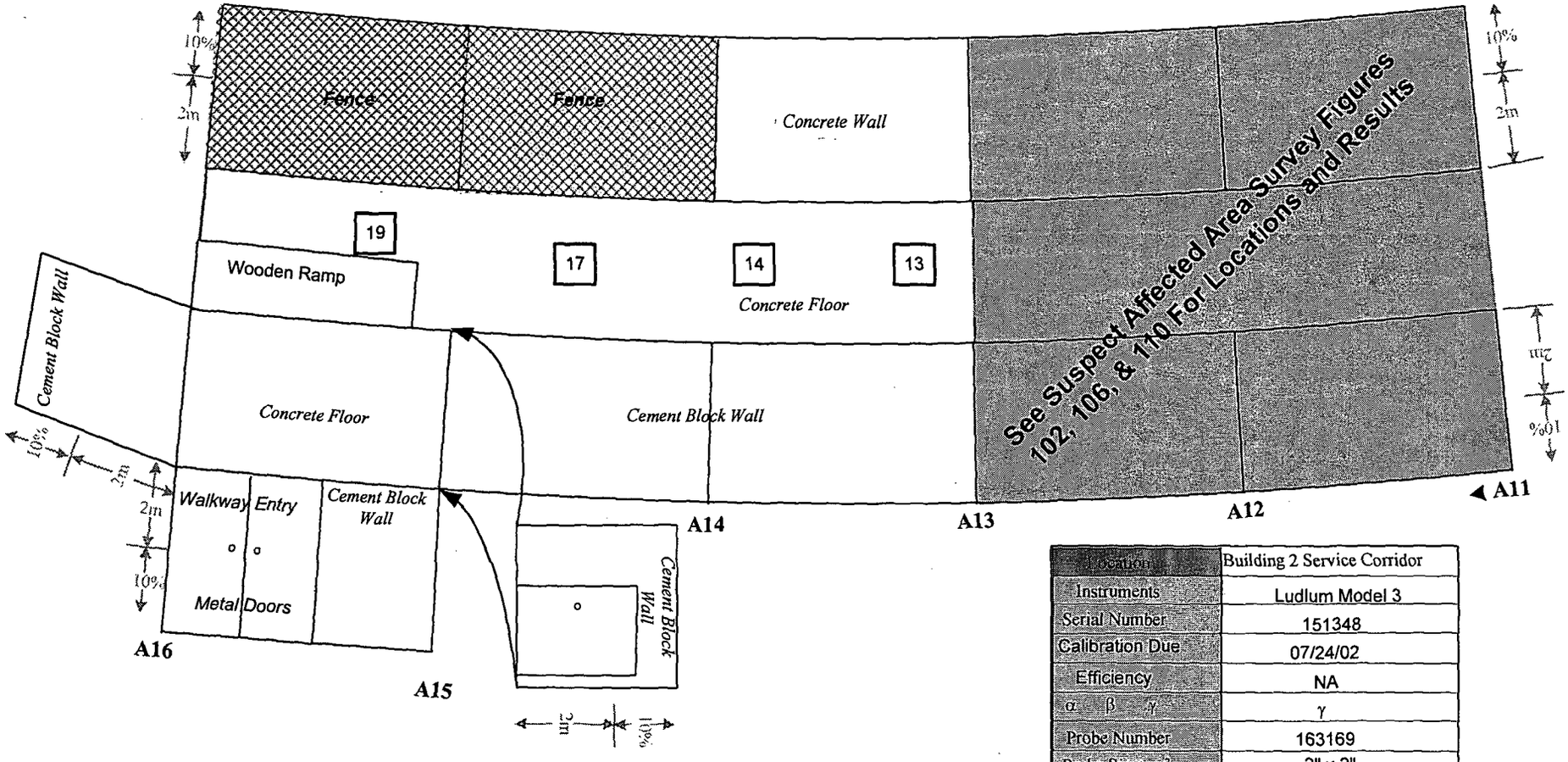


Location	Building 2 Service Corridor
Instruments	Ludlum Model 3
Serial Number	151348
Calibration Due	07/24/02
Efficiency	NA
α β γ	γ
Probe Number	163169
Probe Size cm^2	2" x 2"
Typical Background in μR/hr	13-15, @ 1m, Concrete 20-25, @ 1m in Enclosed Concrete Spaces
Surveyors: S. Finchum/ B. Hunter Date: 04/29/02	

[#] = Exposure Rate @ 1 meter in μR/hr.

The Highest γ Result (12 μR/hr) = Natural Background

Figure 20: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 1, Column A-11 to A-16, Fixed Exposure Rate Measurement Locations and Results

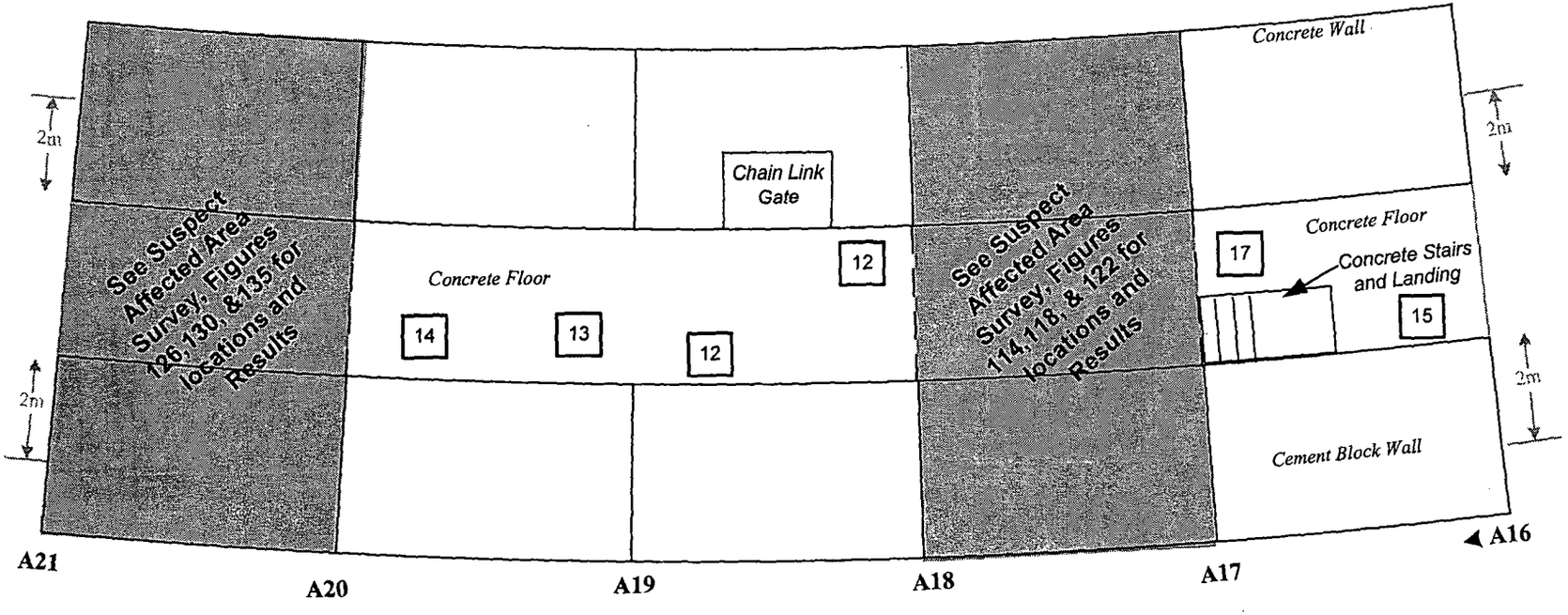


Location	Building 2 Service Corridor
Instruments	Ludlum Model 3
Serial Number	151348
Calibration Due	07/24/02
Efficiency	NA
α β γ	γ
Probe Number	163169
Probe Size cm^2	2" x 2"
Typical Background in μR/hr	13-15, @ 1m, Concrete 20-25, @ 1m in Enclosed Concrete Spaces
Surveyors: S. Finchum/ B. Hunter	Date: 04/29/02

[#] = Exposure Rate @ 1 meter in μR/hr.

The Highest γ Result (19 μR/hr) = Natural Background

Figure 21: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 1, Column A-16 to A-21, Fixed Exposure Rate Measurement Locations and Results

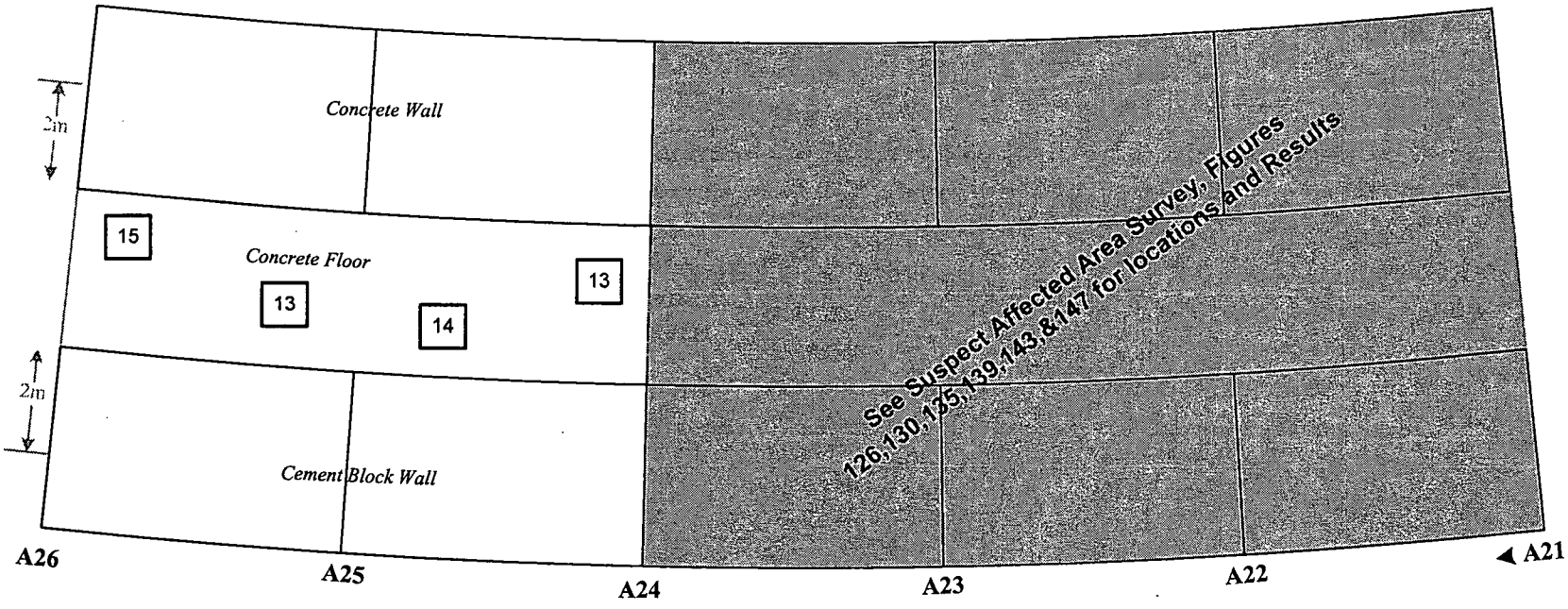


Location	Building 2 Service Corridor
Instruments	Ludlum Model 3
Serial Number	151348
Calibration Due	03/24/02
Efficiency	NA
α β γ	γ
Probe Number	163169
Probe Size cm^2	2" x 2"
Typical Background in μR/hr	13-15, @ 1m, Concrete 20-25, @ 1m in Enclosed Concrete Spaces
Surveyors: B. Hunter	Date: 04/29/02

[#] = Exposure Rate @ 1 meter in μR/hr.

The Highest γ Result (17 μR/hr) = Natural Background

Figure 22: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 1, Column A-21 to A-26, Fixed Exposure Rate Measurement Locations and Results

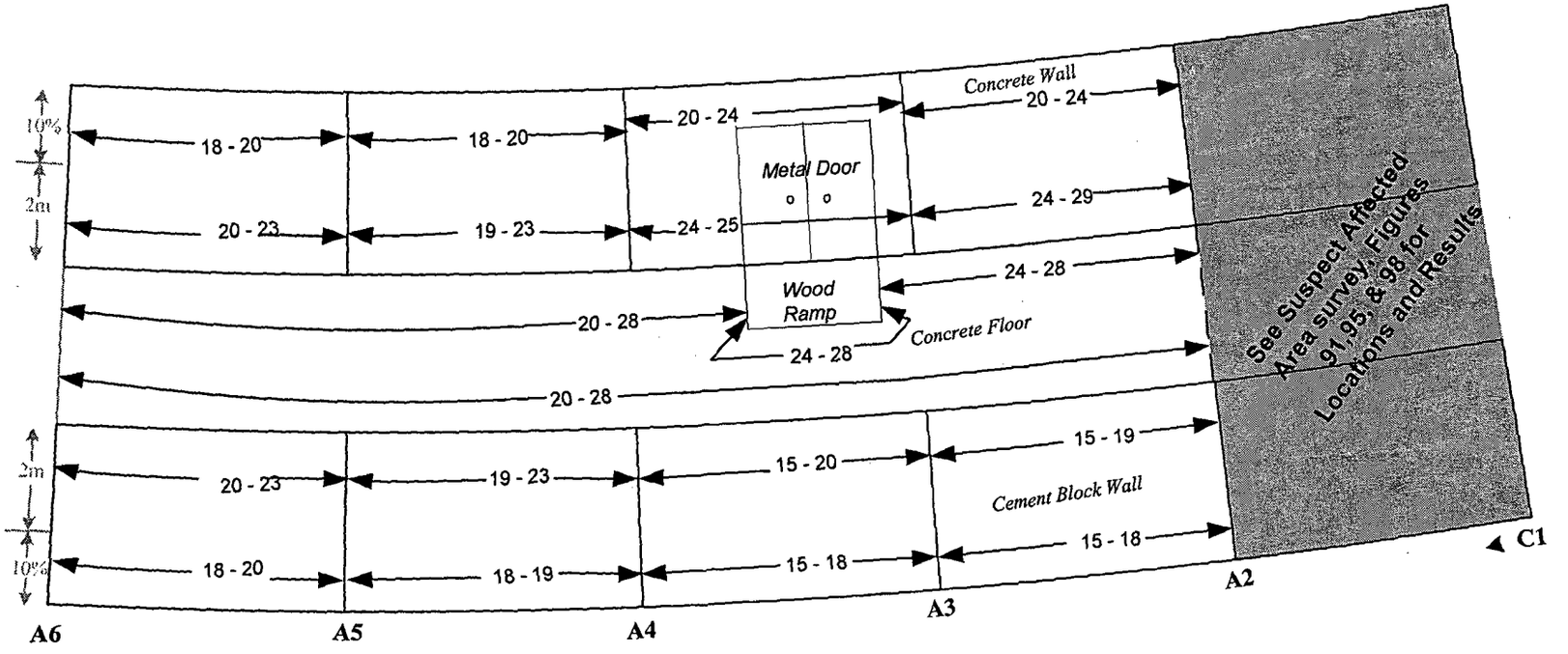


Location	Building 2 Service Corridor
Instruments	Ludlum Model 3
Serial Number	153551
Calibration Due	07/09/02
Efficiency	NA
α β γ	γ
Probe Number	155109
Probe	2 x 2 NaI(Tl)
Typical Background in μR/hr	13-15, @ 1m, Concrete 20-25, @ 1m in Enclosed Concrete Spaces
Surveyors: J. Sullivan	Date: 04/24/02

[#] = Exposure Rate @ 1 meter in μR/hr.

The Highest Exposure Rate Result (15 μR/hr) = Natural Background

Figure 23: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 1, Column C-1 to A-6, Exposure Rate Scan Measurement Locations and Results



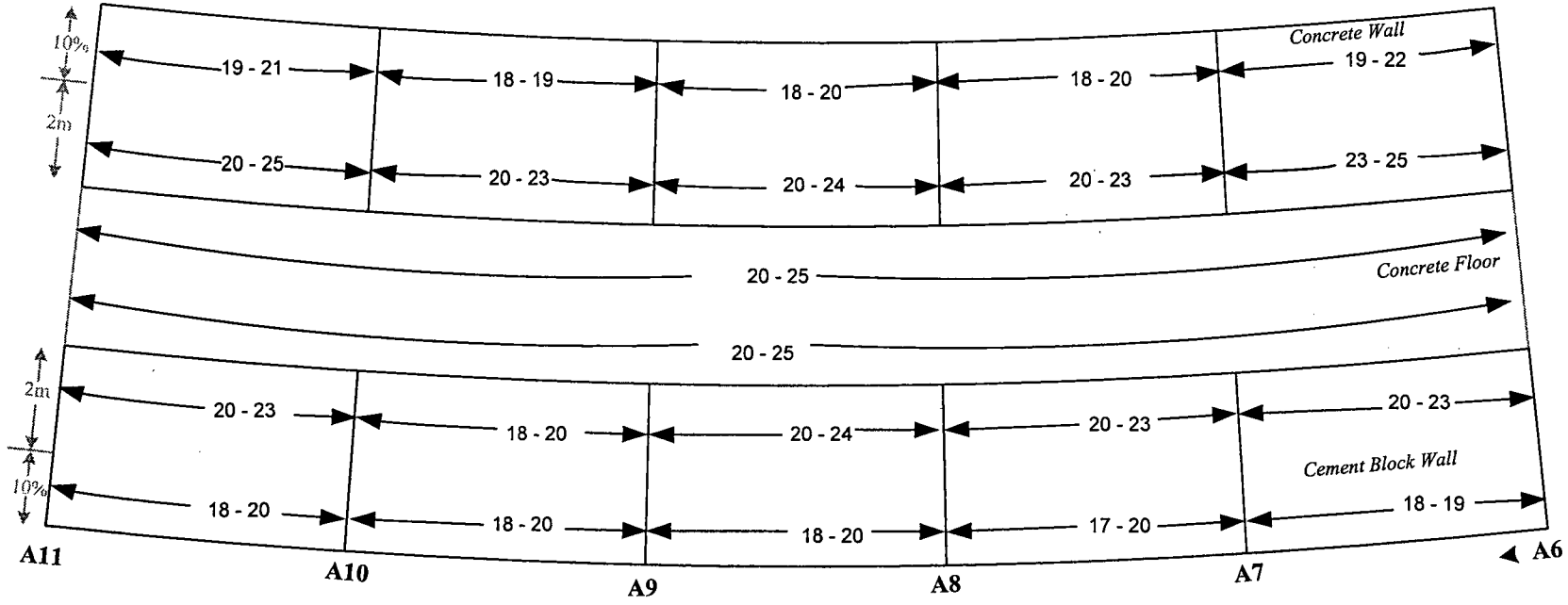
Location	Building 2 Service Corridor
Instruments	Ludlum Model 3
Serial Number	151348
Calibration Due	03/24/02 & 5/22/02
Efficiency	NA
α β γ	γ
Probe Number	163169
Probe	2 x 2 NaI(Tl)
Typical Background in µR/hr	22-28 @ contact in Enclosed Concrete Spaces
Surveyors: W. Schuck/J. Sullivan Date: 3/12/02	
Surveyors : B. Hunter/ S. Finchum Date: 5/22/02	

 # - # = Exposure Rate Range in Micro-R/hr.

100% of Original floor and walls up to 2m surfaces scanned, 10% of walls above 2m

The highest exposure rate measurement was 29 µR/hr.

Figure 24: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 1, Column A-6 to A-11, Exposure Rate Scan Measurement Locations and Results



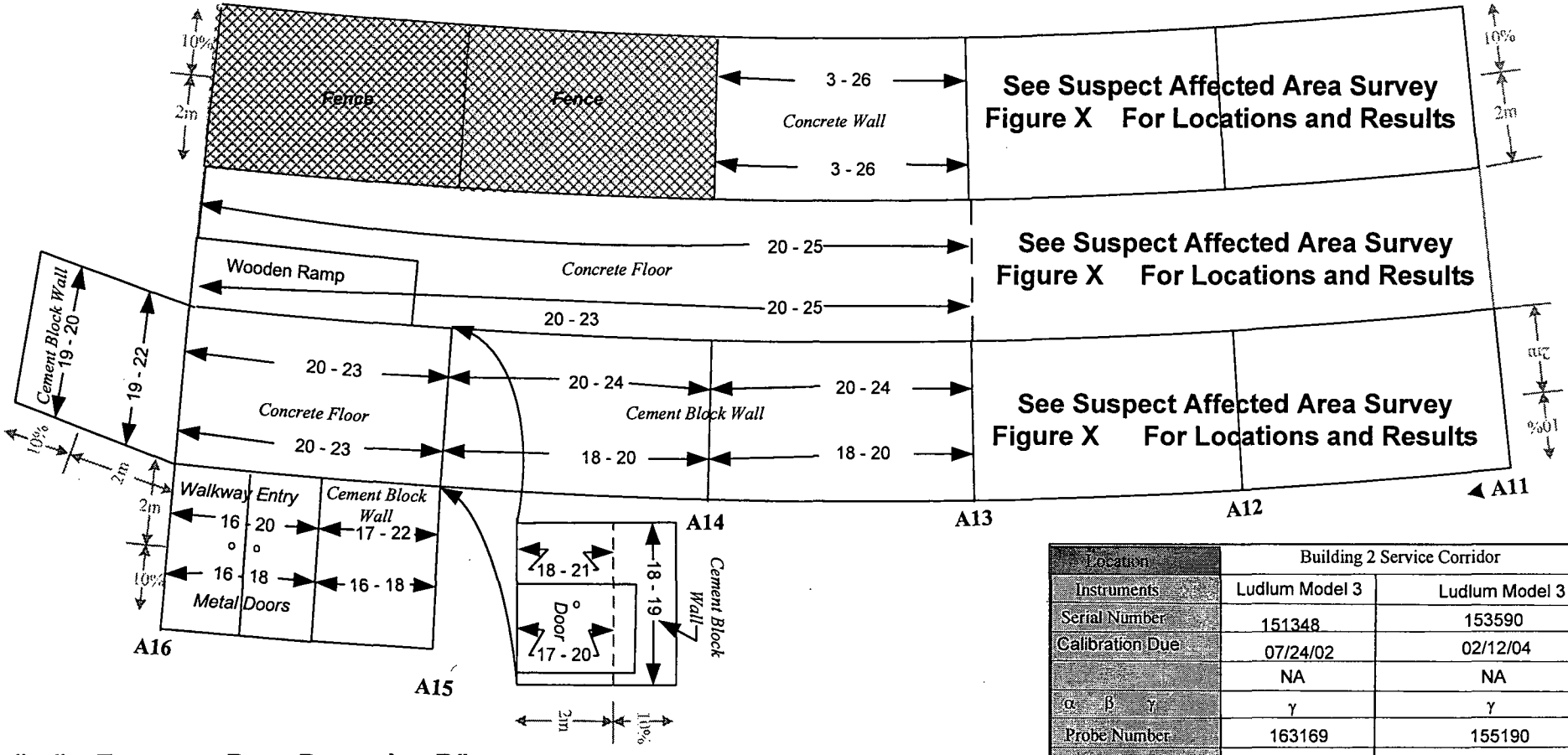
Location	Building 2 Service Corridor
Instruments	Ludlum Model 3
Serial Number	151348
Calibration Due	07/24/02
Efficiency	NA
α β γ	γ
Probe Number	163169
Probe Size cm²	2" x 2"
Typical Background in μR/hr	22-28 @ contact in Enclosed Concrete Spaces
Surveyors: S. Finchum/ B. Hunter Date: 05/02/02	

 # - # = Exposure Range in micro-R/hr

100% of Original floor and walls up to 2m surfaces scanned, 10% of walls above 2m

The Highest Exposure Rate Result (25 μR/hr) = Natural Background

Figure 25: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 1, Column A-11 to A-16, Exposure Rate Scan Measurement Locations and Results



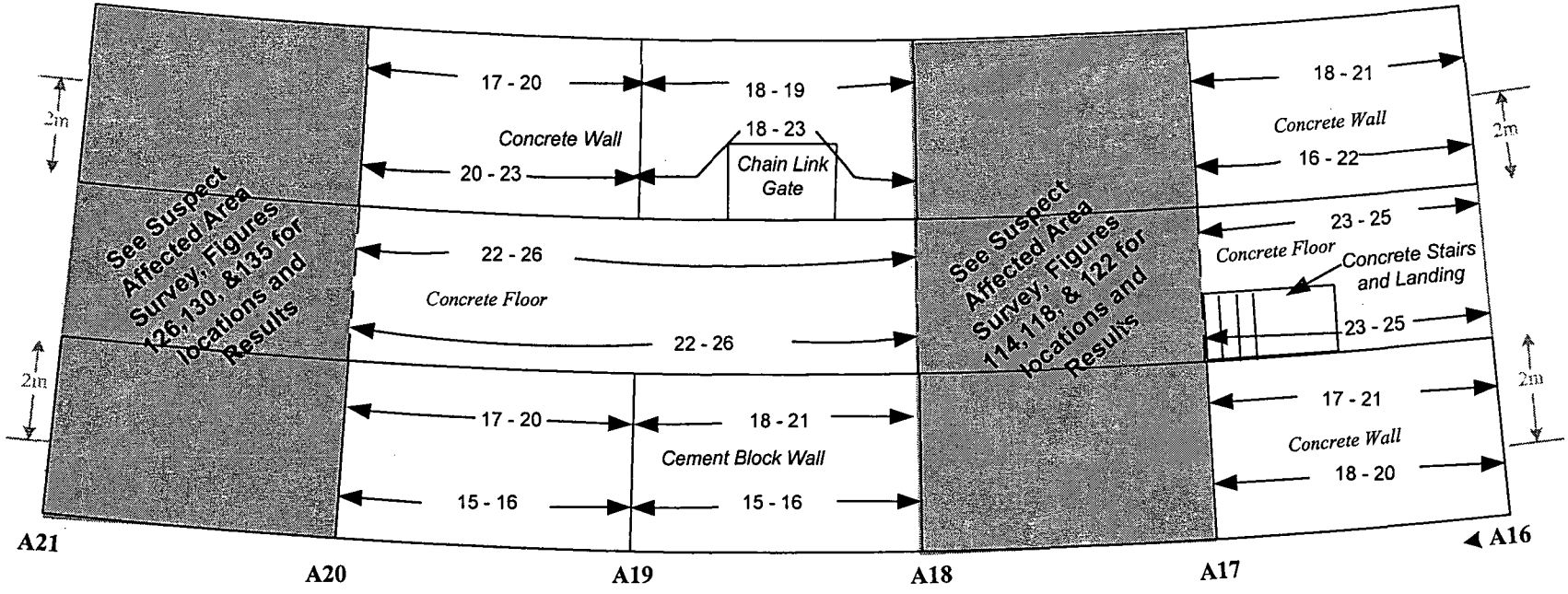
 # - # = Exposure Rate Range in μR/hr.

100% of Original floor and wall surfaces up to 2m scanned, 10% above 2 m

The Highest Exposure Rate Result (26 μR/hr) = Natural Background

Location	Building 2 Service Corridor	
Instruments	Ludlum Model 3	Ludlum Model 3
Serial Number	151348	153590
Calibration Due	07/24/02	02/12/04
	NA	NA
α β γ	γ	γ
Probe Number	163169	155190
Probe Size cm²	2" x 2" NaI	2" x 2" NaI
Typical Background in μR/hr	22-28 @ contact in Enclosed Concrete Spaces	22-28 @ contact in Enclosed Concrete Spaces
Surveyors: S. Finchum/ B. Hunter Date: 05/22/02		Surveyors: R. Stowell/ G. Sayer Date: 01/06/04

Figure 26: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 1, Column A-16 to A-21, Exposure Rate Scan Measurement Locations and Results



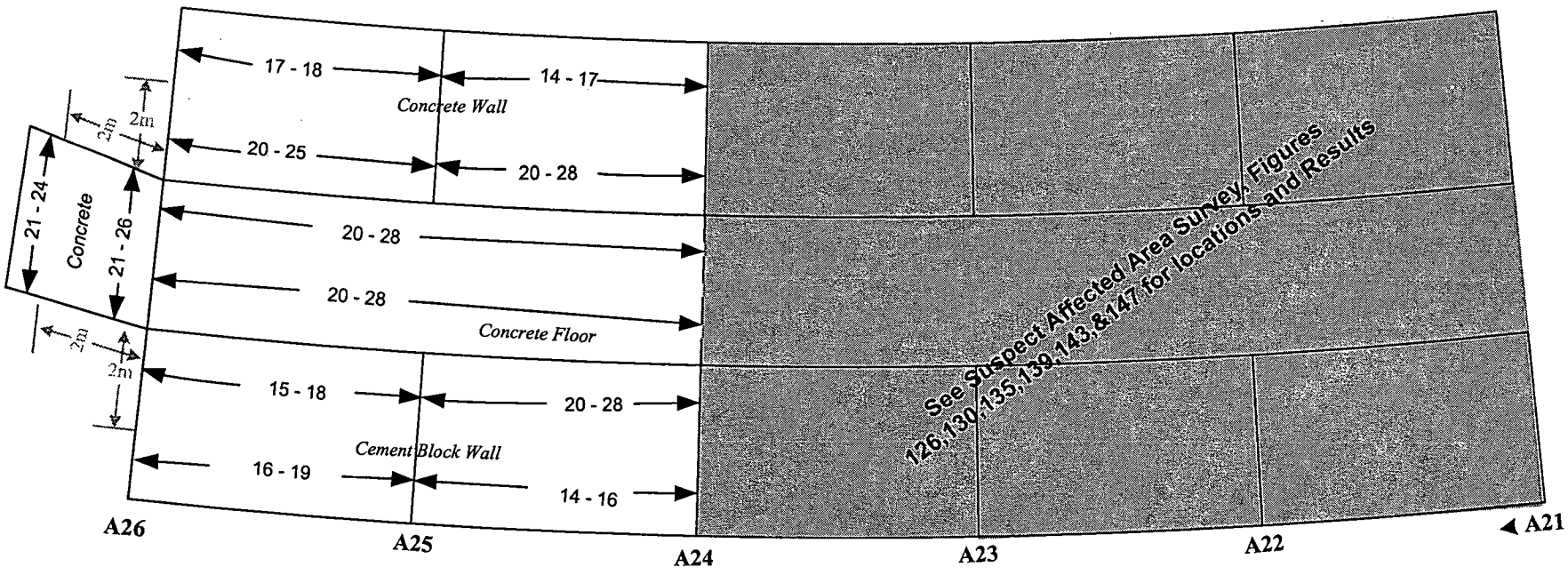
Location	Building 2 Service Corridor	
Instruments	Ludlum Model 3	Ludlum Model 3
Serial Number	151348	153590
Calibration Due	03/24/02	02/12/04
Efficiency	NA	NA
α β γ	γ	γ
Probe Number	163169	155109
Probe	2 x 2 NaI(Tl)	2 x 2 NaI(Tl)
Typical Background in μR/hr	22-28 @ contact in Enclosed Concrete Spaces	22-28 @ contact in Enclosed Concrete Spaces
Surveyors: W. Schuck Date: 01/11/02		Surveyors: R. Stowell/G. Sayer Date: 01/06/04

 # - # = Exposure Rate Range in μR/hr.

The Highest Exposure Rate Result (26 μR/hr) = Natural Background

100% scan on Original floor and walls up to 2m, 10% of Walls Above 2m.

Figure 27: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 1, Column A-21 to A-26, Exposure Rate Scan Measurement Locations and Results



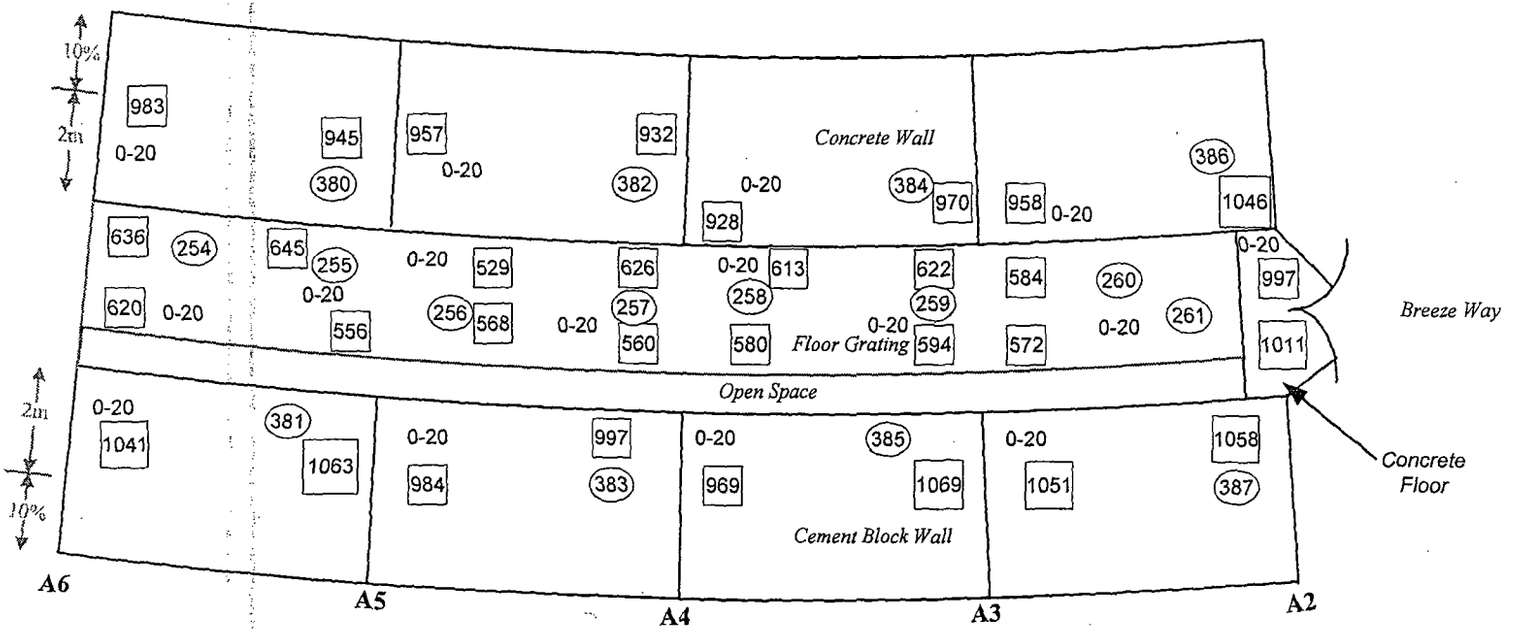
Location	Building 2 Service Corridor	
Instruments	Ludlum Model 3	Ludlum Model 3
Serial Number	151348	153590
Calibration Due	07/24/02	02/12/04
	NA	NA
α β γ	γ	γ
Probe Number	163169	155190
Probe Size cm²	2" x 2" NaI	2" x 2" NaI
Typical Background in μR/hr	22-28 @ contact in Enclosed Concrete Spaces	22-28 @ contact in Enclosed Concrete Spaces
Surveyors: S. Finchum/ B. Hunter Date: 05/22/02		Surveyors: R. Stowell/ G. Sayer Date: 01/06/04

 # - # = Exposure Rate Range in μR/hr

100% Scan of Original Floor and Walls up to 2m, 10% of Walls Above 2 m.

The Highest Exposure Rate Result (28 μR/hr) = Natural Background

Figure 28: Building 2 Service Corridor, Section A, Non-Suspect Affected Area, Level 2, Column A-2 to A-6, Fixed Alpha and Beta Measurement Locations and Results, and Wipe Survey Locations



Location	Building 2 Service Corridor	
Instruments	Model 12	Model 2221
Serial Number	91103	84423
Calibration Due	3/18/02	6/10/02
	22.14%	34.39%
α β γ	α	β
Probe Number	092192	119444
Probe Size cm²	50cm²	100 cm²
Background	0-20 cpm	1042 cp2m
MDA in DPM/100 cm²	312	222
Surveyors: S. Finchum and B. Hunter	Date: 04/24 - 05/02/02	

The Highest β Result (1069 cp2m) = 39 dpm/100 cm², which is < MDA.

All α Results = Natural Background.

See Table 4 for Wipe analysis Results.

LEGEND

- # = Alpha in CPM

[#] =Beta in CP2M

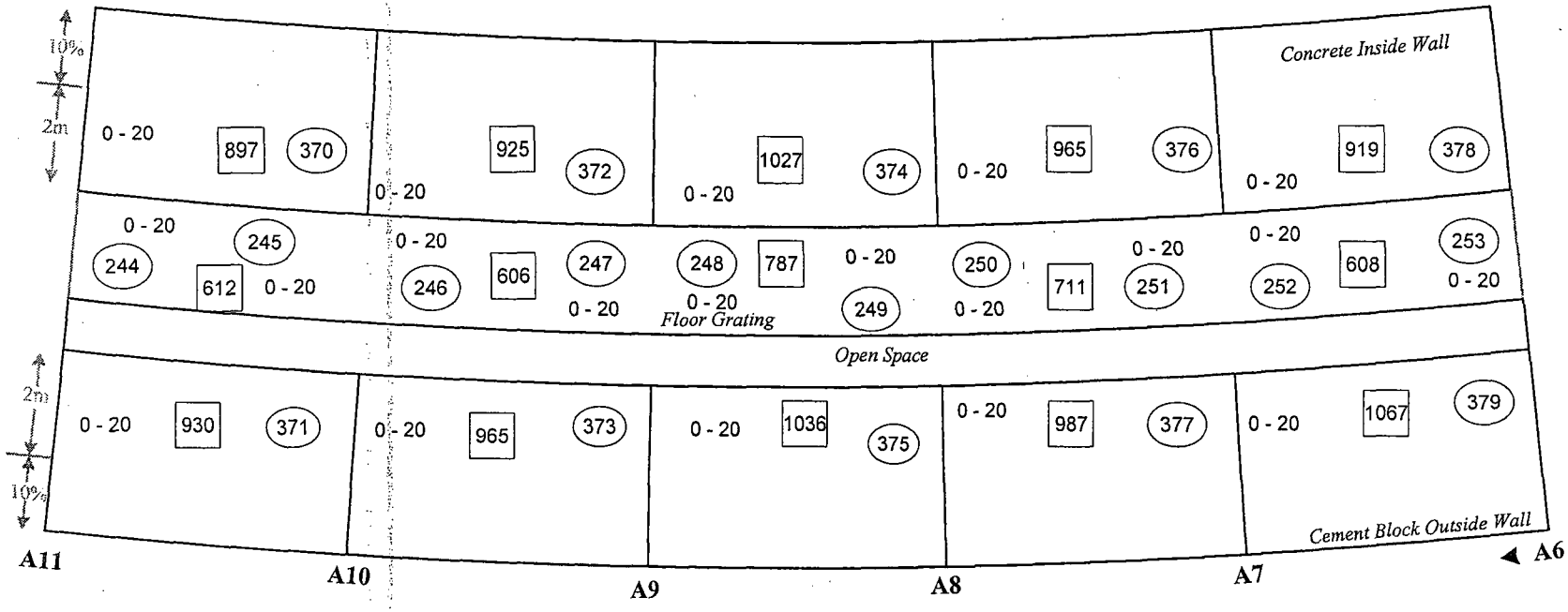
(#) = wipe location

EQ=Equipment wipe

OH= Overhead wipe

A# = Column Number

Figure 29: Building 2 Service Corridor, Section A, Non-Suspect Affected Area, Level 2, Column A-6 to A-11, Fixed Alpha and Beta Measurement Locations and Results, and Wipe Survey Locations



Location	Building 2 Service Corridor	
Instruments	Model 12	Model 2221
Serial Number	91103	84423
Calibration Due	3/18/02	6/10/02
Efficiency	22.14%	34.39%
α β γ	α	β
Probe Number	092192	119444
Probe Size cm²	50cm²	100 cm²
Background	0-20 cpm	1042 cp2m
MDA(dpm/100cm²)	312	222
Surveyors: S. Finchum/ B. Hunter	Date: 04/25 - 05/02/ 02	

The Highest β Result (1067 cp2m) = 36 dpm/100 cm², which is < MDA.

All α Results = Natural Background.

See Table 4 for Wipe analysis Results.

LEGEND

- # = Alpha in CPM

[#] =Beta in CP2M

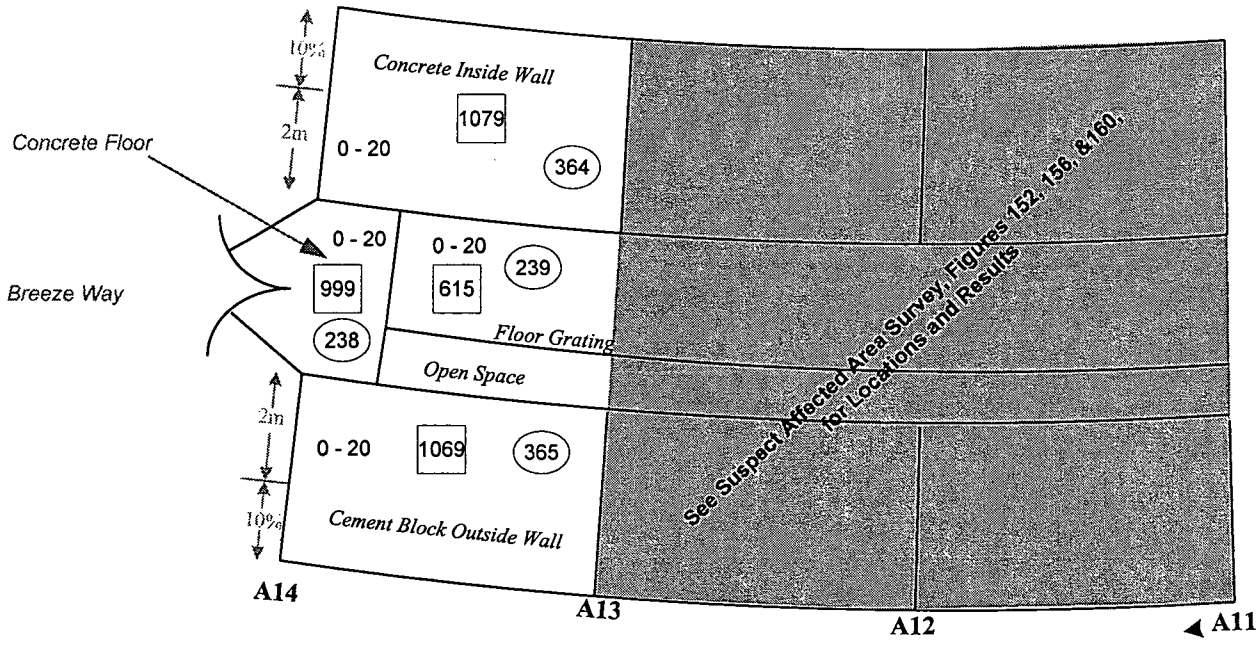
(#) = wipe location

EQ=Equipment wipe

OH= Overhead wipe

A# = Column Number

Figure 30: Building 2 Service Corridor, Section A, Non-Suspect Affected Area, Level 2, Column A-11 to A-14, Fixed Alpha and Beta Measurement Locations and Results, and Wipe Survey Locations



Location	Building 2 Service Corridor	
Instruments	Model 12	Model 2221
Serial Number	91103	84423
Calibration Due	3/18/02	6/10/02
Efficiency	22.14%	34.39%
α β γ	α	β
Probe Number	092192	119444
Probe Size cm²	50cm²	100 cm²
Background	0-20 cpm	1042 cp2m
MDA(dpm/100cm²)	312	222
Surveyors: S. Finchum/ B. Hunter	Date: 04/25 - 05/02/ 02	

The Highest β Result (1079 cp2m) = 54 dpm/100 cm², which is < MDA.

All α Results = Natural Background.

See Table 4 for Wipe analysis Results.

LEGEND

- # = Alpha in CPM

[#] =Beta in CP2M

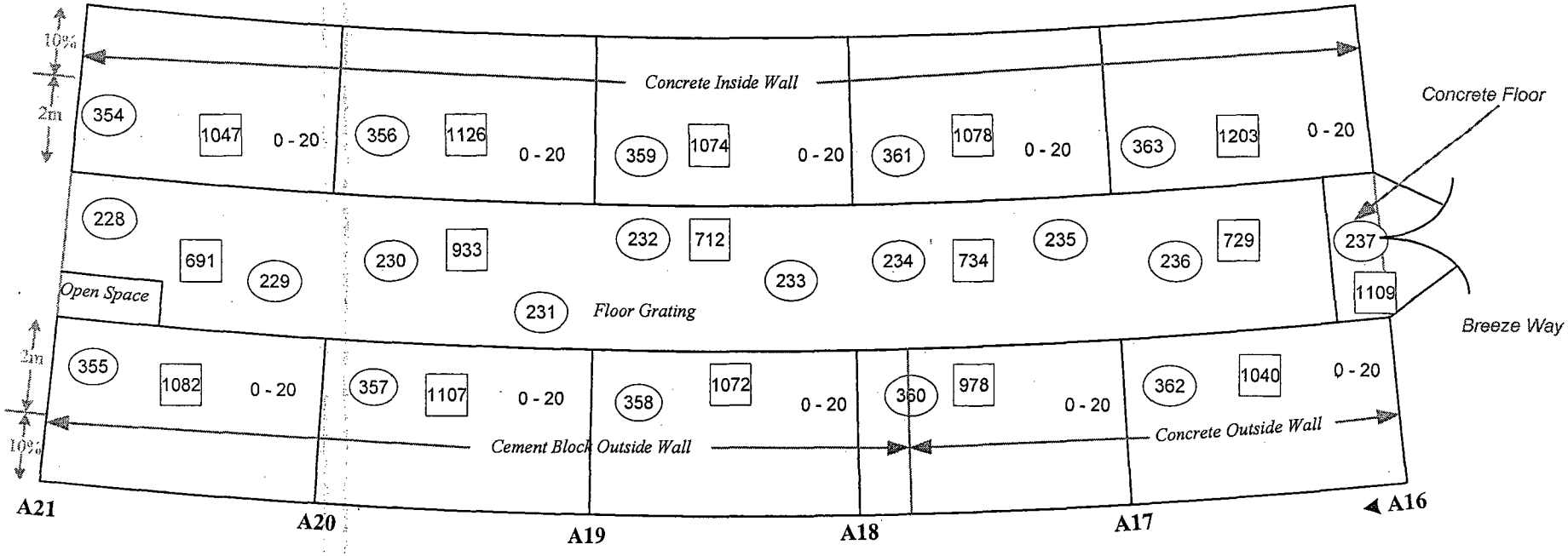
(#) = wipe location

EQ=Equipment wipe

OH= Overhead wipe

A# = Column Number

Figure 31: Building 2 Service Corridor, Section A, Non-Suspect Affected Area, Level 2, Column A-16 to A-21, Fixed Alpha and Beta Measurement Locations and Results, and Wipe Survey Locations



Location	Building 2 Service Corridor	
Instruments	Model 12	Model 2221
Serial Number	91103	84423
Calibration Due	3/18/02	6/10/02
Efficiency	22.14%	34.39%
α β γ	α	β
Probe Number	092192	119444
Probe Size cm²	50cm²	100 cm²
Background	0-20 cpm	1042 cp2m
MDA(dpm/100cm²)	312	222

Surveyors: S. Finchum/ B. Hunter Date: 04/25 - 05/01/ 02

The Highest β Result (1203 cp2m) = 234 dpm/100 cm² .

All α Results = Natural Background.

See Table 4 for Wipe analysis Results.

LEGEND

- # = Alpha in CPM

[#] =Beta in CP2M

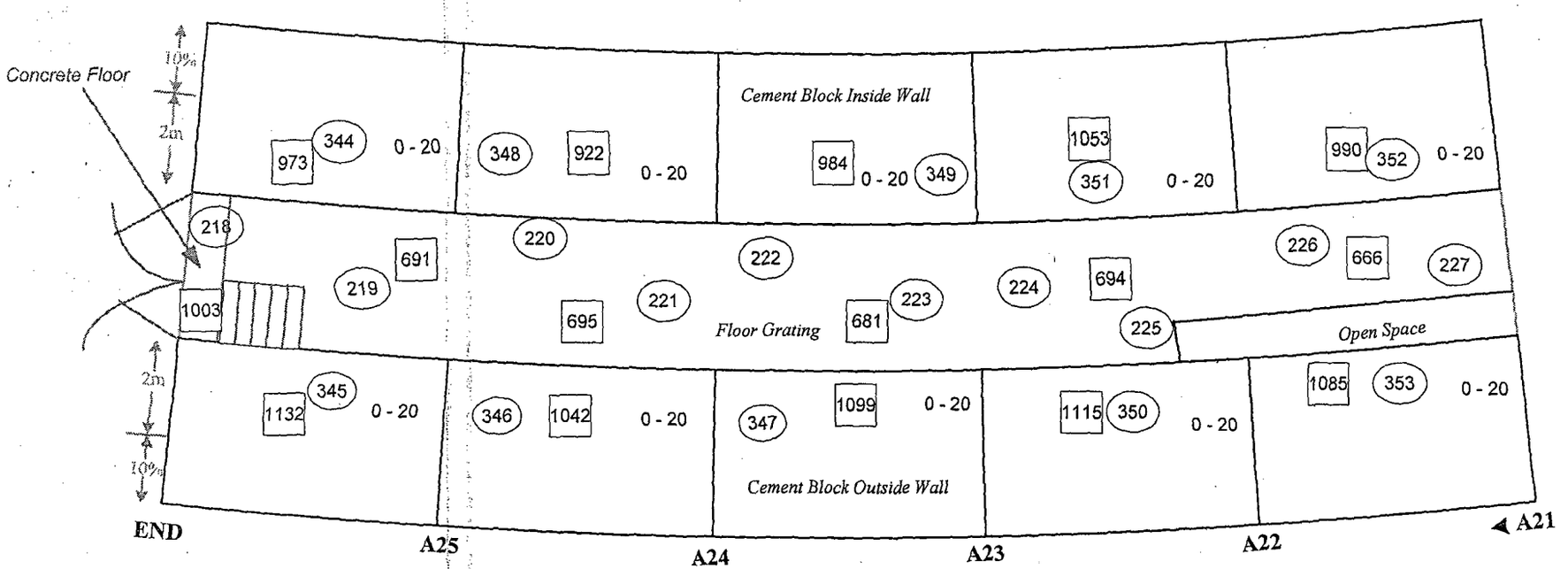
(#) = wipe location

EQ=Equipment wipe

OH= Overhead wipe

A# = Column Number

Figure 32: Building 2 Service Corridor, Section A, Non-Suspect Affected Area, Level 2, Column A-21 to End, Fixed Alpha and Beta Measurement Locations and Results, and Wipe Survey Locations



Location	Building 2 Service Corridor	
Instruments	Model 12	Model 2221
Serial Number	91103	84423
Calibration Due	3/18/02	6/10/02
Efficiency	22.14%	34.39%
α β γ	α	β
Probe Number	092192	119444
Probe Size cm²	50cm²	100 cm²
Background	0-20 cpm	1042 cp2m
MDA(dpm/100cm²)	312	222
Surveyors: S. Finchum/ B. Hunter	Date: 04/25 - 05/01/ 02	

The Highest β Result (1132 cp2m) = 131dpm/100 cm², Which is <MDA.

All α Results = Natural Background.

See Table 4 for Wipe analysis Results.

LEGEND

- # = Alpha in CPM

[#] =Beta in CP2M

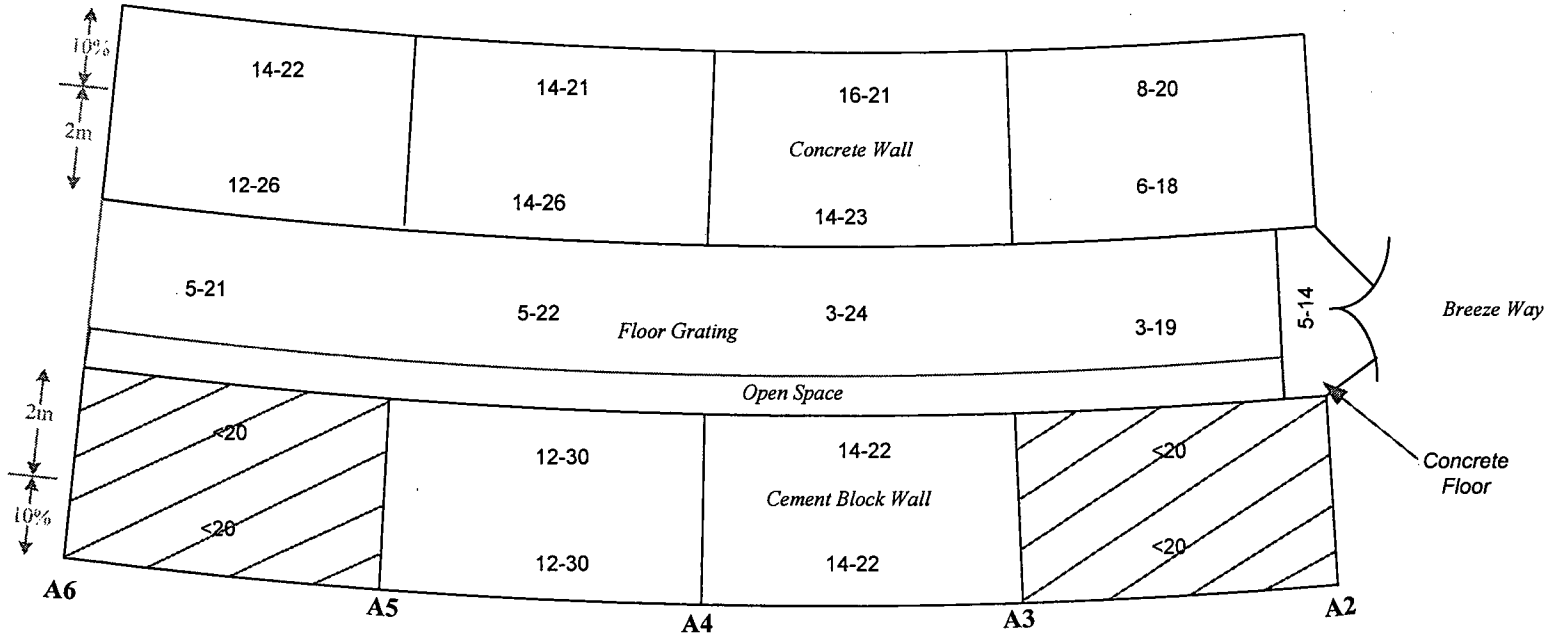
(#) = wipe location

EQ=Equipment wipe

OH= Overhead wipe

A# = Column Number

Figure 33: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 2, Column A-2 to A-6, Alpha Scan Measurement Locations and Results



Location	Building 2 Service Corridor	
Instruments	Ludlum Model 2221	Ludlum Model 12
Serial Number	148425	138801
Calibration Due	07/31/02	05/11/02
Efficiency	21.29%	22.52%
α β γ	α	α
Probe Number	086236	145696
Probe Size cm²	434 cm²	50 cm²
Background	10 - 40 cpm	0 - 20 cpm
MDA(dpm/100cm²)	86	309
Surveyors: S. Finchum/ B. Hunter	Date: 04/25 - 05/09/02	

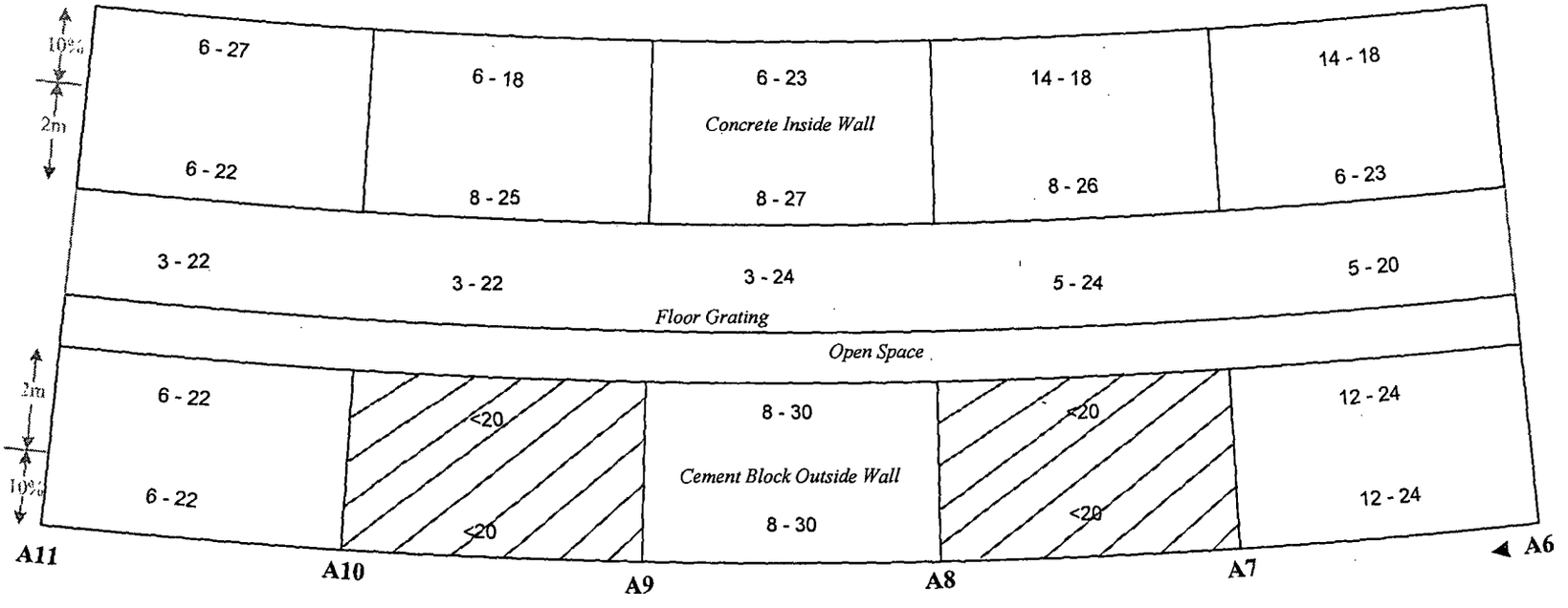
 # - # = α Range in cpm

100% of floor grating and accessible walls up to 2m surfaces scanned, 10% of walls above 2m

The Highest α Result (30 cpm) = Natural Background

= Area surveyed with a 50 cm² probe

Figure 34: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 2, Column A-6 to A-11, Alpha Scan Measurement Locations and Results



Location	Building 2 Service Corridor	
Instruments	Ludlum Model 2221	Ludlum Model 12
Serial Number	148425	138801
Calibration Due	07/31/02	05/11/02
Efficiency	21.29%	22.52%
α β γ	α	α
Probe Number	086236	145696
Probe Size cm²	434 cm²	50 cm²
Background	10 - 40 cpm	0 - 20 cpm
MDA(dpm/100cm²)	86	309
Surveyors: S. Finchum/ B. Hunter	Date: 04/25 - 05/09/02	

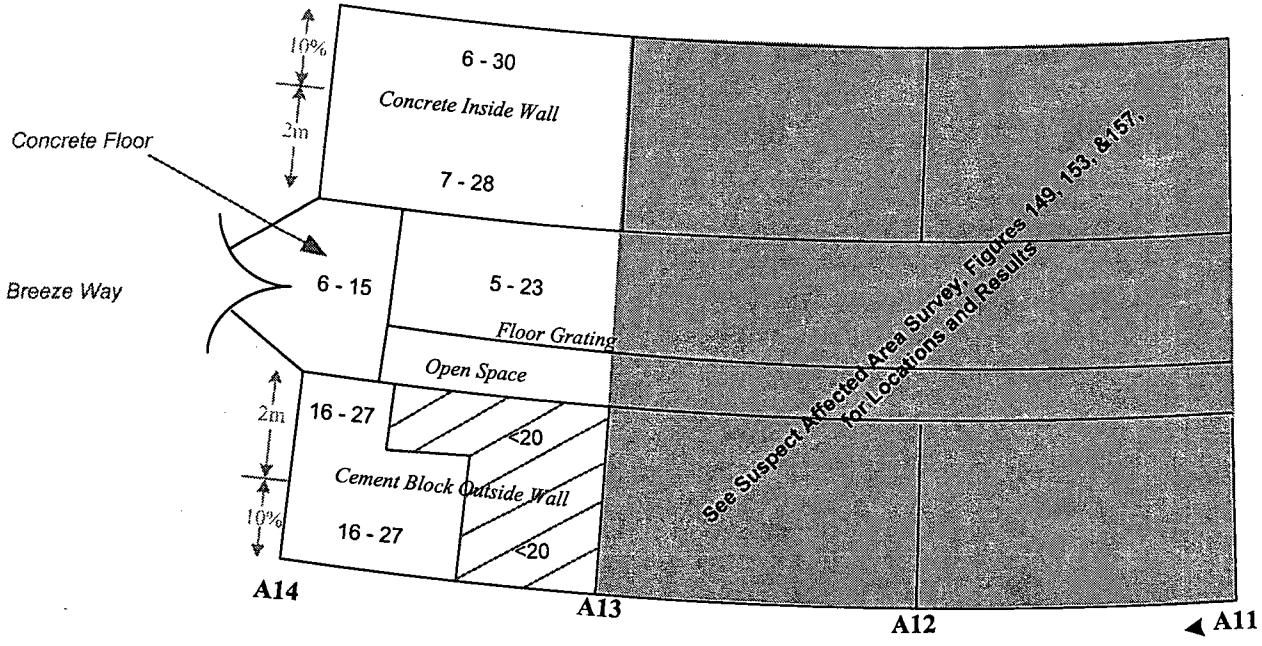
 # - # = α Range in cpm

100% of floor grating and accessible walls up to 2m surfaces scanned, 10% of walls above 2m

The Highest α Result (30 cpm) = Natural Background

= Area surveyed with a 50 cm² probe

Figure 35: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 2, Column A-11 to A-14, Alpha Scan Measurement Locations and Results



Location	Building 2 Service Corridor	
Instruments	Ludlum Model 2221	Ludlum Model 12
Serial Number	148425	138801
Calibration Due	07/31/02	05/11/02
Efficiency	21.29%	22.52%
α β γ	α	α
Probe Number	086236	145696
Probe Size cm^2	434 cm^2	50 cm^2
Background	10 - 40 cpm	0 - 20 cpm
MDA(dpm/100cm^2)	86	309
Surveyors: S. Finchum/ B. Hunter	Date: 04/25 - 05/09/02	

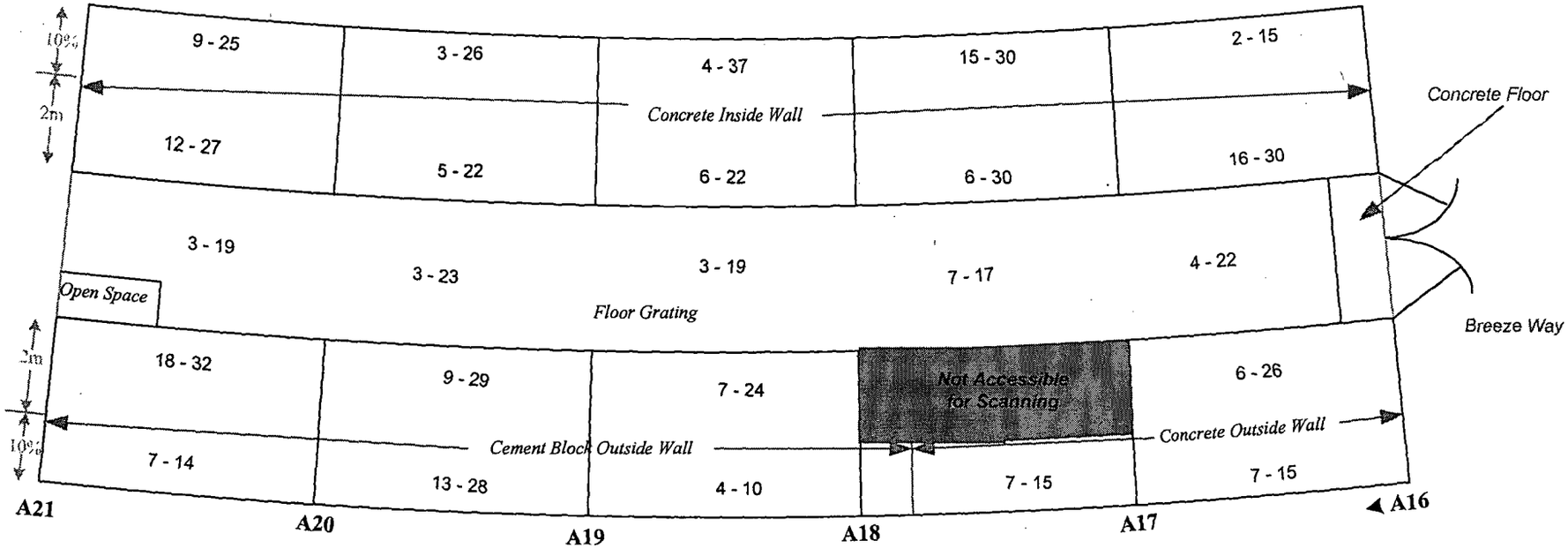
 # - # = α Range in cpm

100% of floor grating and accessible walls up to 2m surfaces scanned, 10% of walls above 2m

The Highest α Result (30 cpm) = Natural Background

= Area surveyed with a 50 cm^2 probe

Figure 36: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 2, Column A-16 to A-21, Alpha Scan Measurement Locations and Results



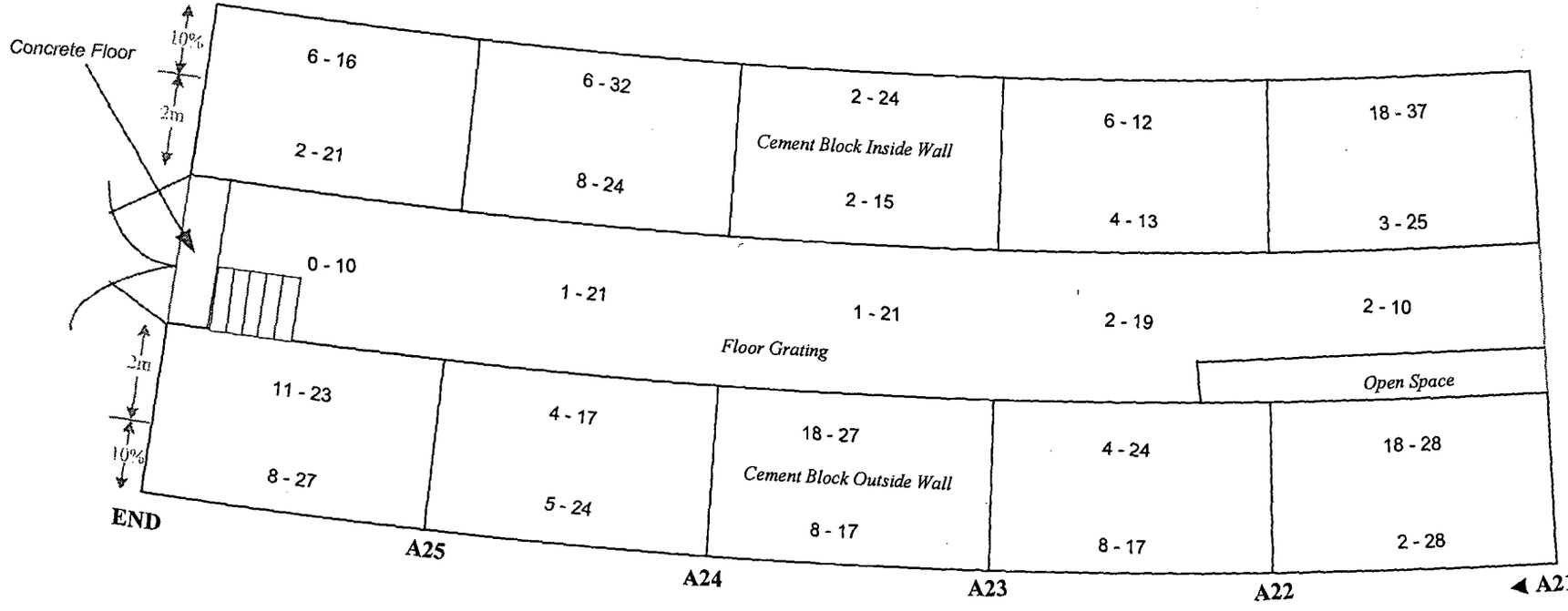
Location	Building 2 Service Corridor
Instruments	Ludlum Model 2221
Serial Number	148425
Calibration Due	07/31/02
Efficiency	21.29%
α β γ	α
Probe Number	086236
Probe Size cm^2	434 cm^2
Background	10 - 40 cpm
MDA(dpm/100cm^2)	86
Surveyors: J. Sullivan	Date: 03/27/02

 # - # = α Range in cpm

100% of floor grating and accessible walls up to 2m surfaces scanned, 10% of walls above 2m

The Highest α Result (37 cpm) = Natural Background

Figure 37: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 2, Column A-21 to End, Alpha Scan Measurement Locations and Results



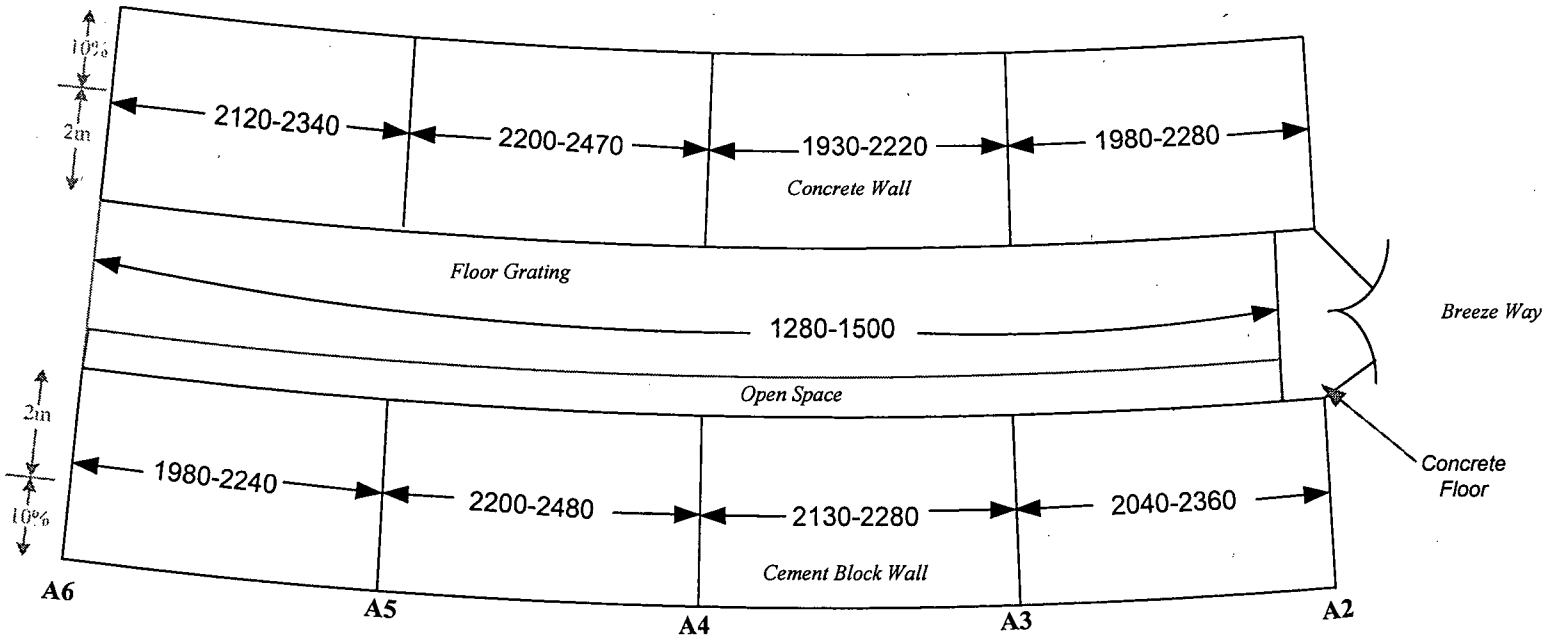
Location	Building 2 Service Corridor
Instruments	Ludlum Model 2221
Serial Number	148425
Calibration Due	07/31/02
Efficiency	21.29%
α β γ	α
Probe Number	086236
Probe Size cm²	434 cm²
Background	10 - 40 cpm
MDA(dpm/100cm²)	86
Surveyors: J. Sullivan	Date: 03/27/02

 # - # = α Range in cpm

100% of floor grating and walls up to 2m surfaces scanned, 10% of walls above 2m

The Highest α Result (37 cpm) = Natural Background

Figure 38: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 2, Column A-2 to A-6, Beta Scan Measurement Locations and Results



Location	Building 2 Service Corridor
Instruments	Ludlum Model 2221
Serial Number	84459
Calibration Due	09/27/02
Efficiency	31.08%
α β γ	β
Probe Number	086215
Probe Size cm^2	434 cm^2
Background	1840-2100 cpm, concrete
	1640-1850 cpm (cement Block)
Surveyors: S. Finchum/ J. Sullivan Date: 05/03 - 05/06/02	

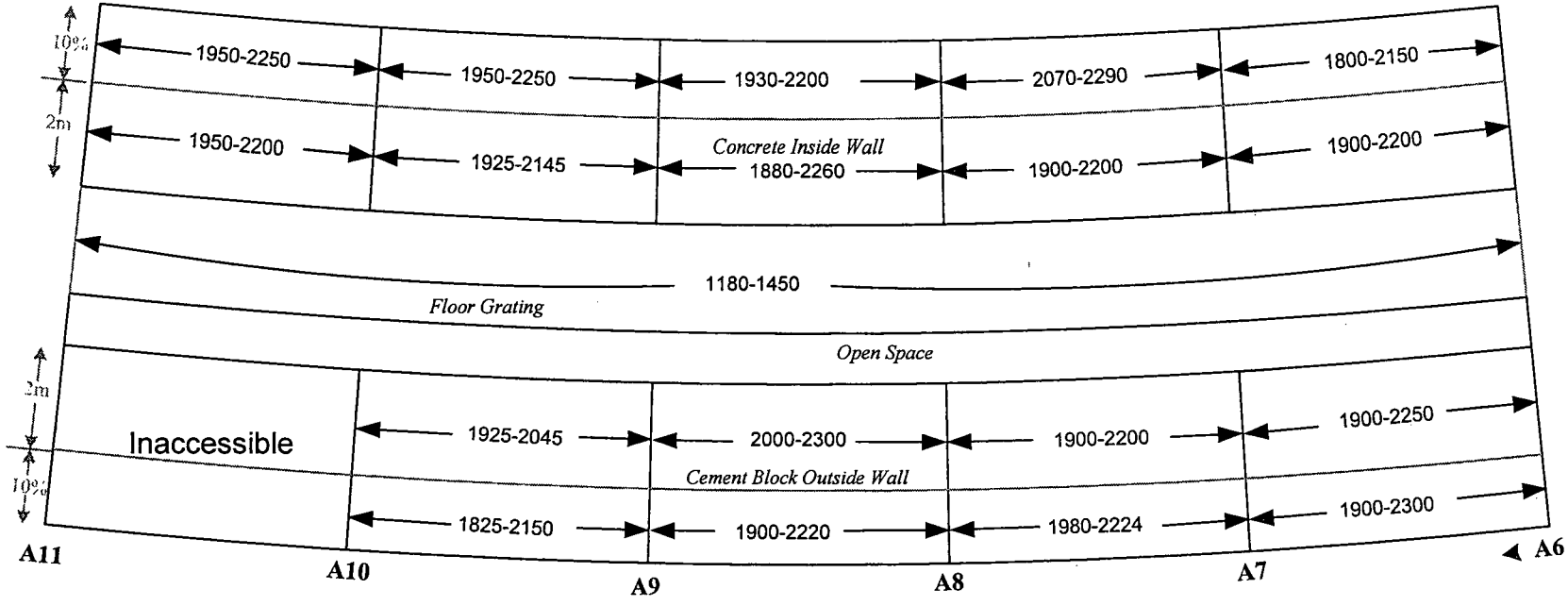
- #### = β Range in cpm

100% of floor grating and accessible walls up to 2m surfaces scanned, 10% of walls above 2m

The Highest β Result (2480 cpm on cement block wall) = 545 dpm/100 cm^2

Scan MDA =388 dpm/100 cm^2, on cement block

Figure 39: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 2, Column A-6 to A-11, Beta Scan Measurement Locations and Results



Location	Building 2 Service Corridor
Instruments	Ludlum Model 2221
Serial Number	84459
Calibration Due	09/27/02
Efficiency	31.08%
α β γ	β
Probe Number	086215
Probe Size cm²	434 cm²
Background	1840-2100 cpm, concrete
	1640-1850 cpm (cement Block)

Surveyors: J. Sullivan Date: 05/03/02

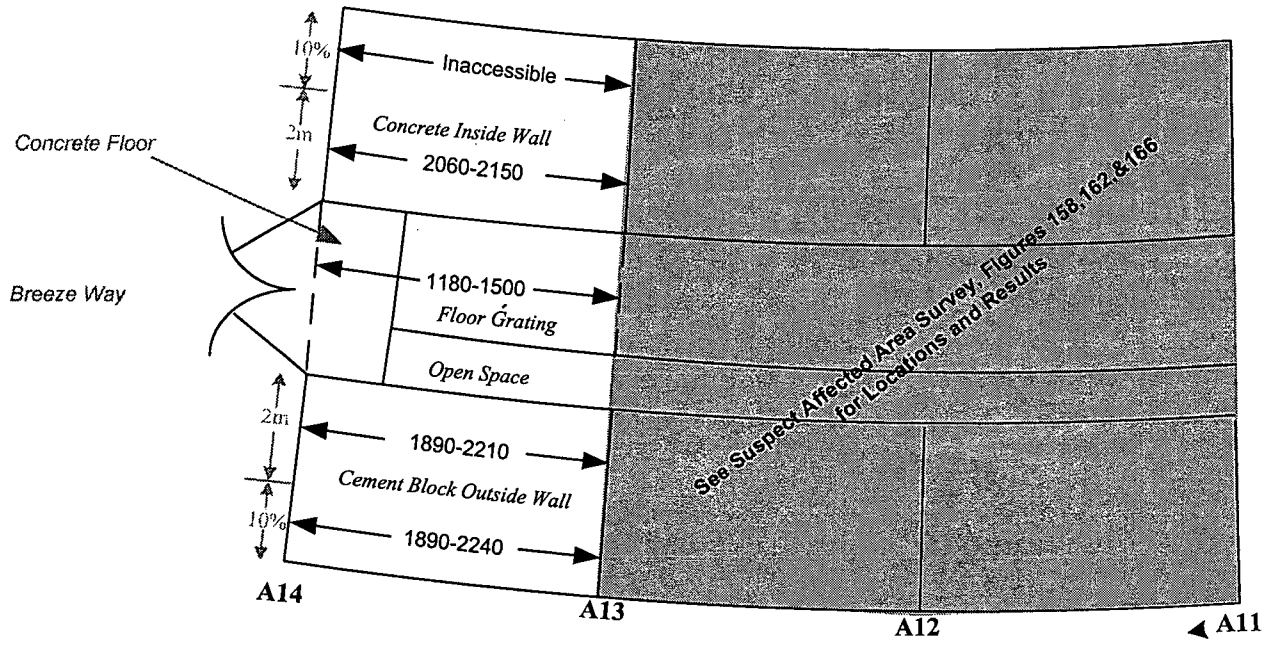
- #### = β Range in cpm

100% of floor grating and accessible walls up to 2m surfaces scanned, 10% of walls above 2m

The Highest β Result (2300 cpm on cement block wall) = 411 dpm/100 cm²

Scan MDA =388 dpm/100 cm², on cement block

Figure 40: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 2, Column A-11 to A-14, Beta Scan Measurement Locations and Results



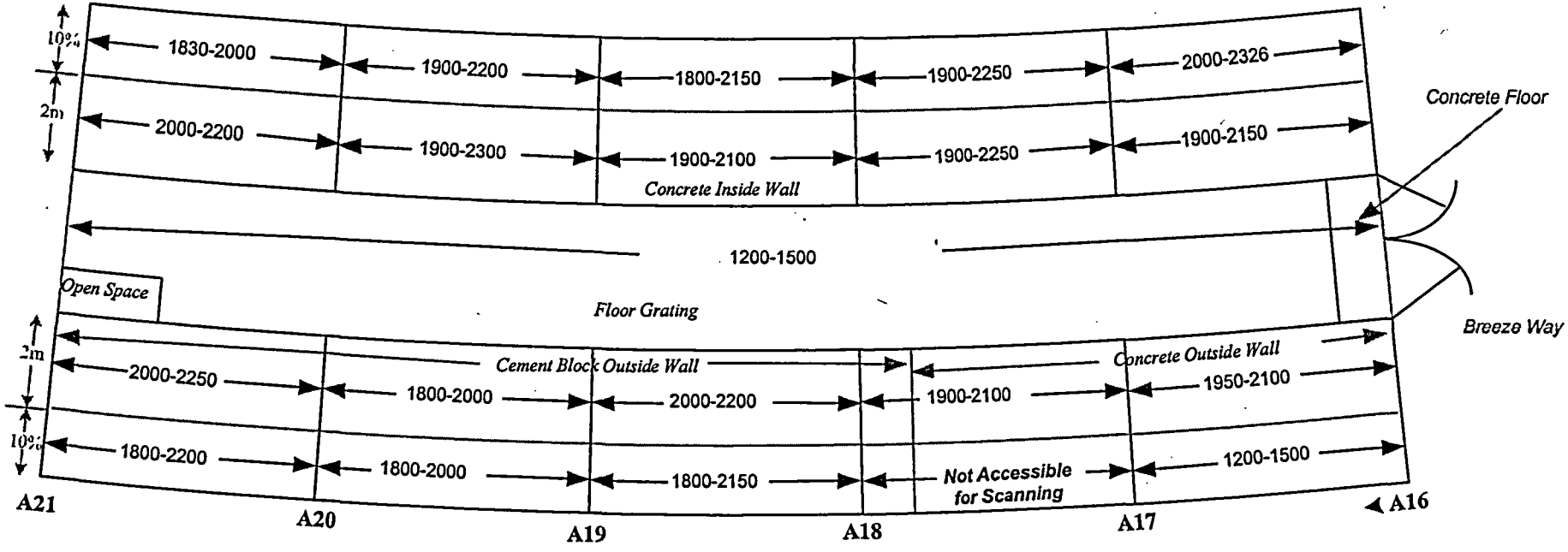
Location	Building 2 Service Corridor
Instruments	Ludlum Model 2221
Serial Number	84459
Calibration Due	09/27/02
Efficiency	31.08%
α β γ	β
Probe Number	086215
Probe Size cm^2	434 cm^2
Background	1840-2100 cpm, concrete
	1640-1850 cpm (cement Block)
Surveyors: J. Sullivan	Date: 05/03/02

- #### = β Range in cpm

100% of floor grating and accessible walls up to 2m surfaces scanned, 10% of walls above 2m

The Highest β Result (2240 cpm on cement block wall) = < MDA (388dpm/100 cm^2)

Figure 41: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 2, Column A-16 to A-21, Beta Scan Measurement Locations and Results



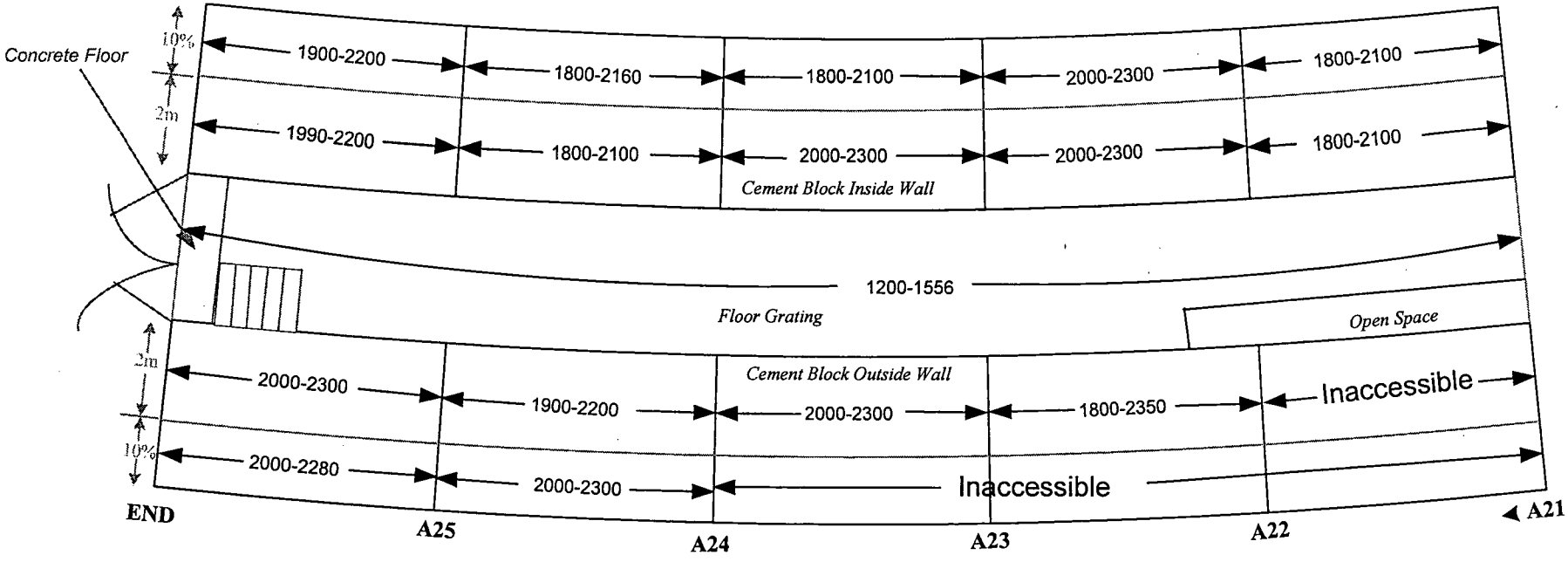
Location	Building 2 Service Corridor
Instrument	Ludlum Model 2221
Serial Number	84459
Calibration Due	09/27/02
Efficiency	31.08%
α, β, γ	β
Probe Number	086215
Probe Size, cm²	434 cm²
Background	1840-2100 cpm, concrete 1640-1850 cpm (cement Block)
Surveyors: J. Sullivan	Date: 05/02/02

- #### = β Range in cpm

100% of floor grating and accessible walls up to 2m surfaces scanned, 10% of walls above 2m

The Highest β Result (2250 cpm on cement block wall) = < MDA (388dpm/100 cm²)

Figure 42: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 2, Column A-21 to End, Beta Scan Measurement Locations and Results



Location	Building 2 Service Corridor
Instruments	Ludlum Model 2221
Serial Number	84459
Calibration Due	09/27/02
Efficiency	31.08%
α β γ	β
Probe Number	086215
Probe Size cm^2	434 cm^2
Background	1840-2100 cpm, concrete
	1640-1850 cpm (cement Block)
Surveyors: J. Sullivan	Date: 05/02/02

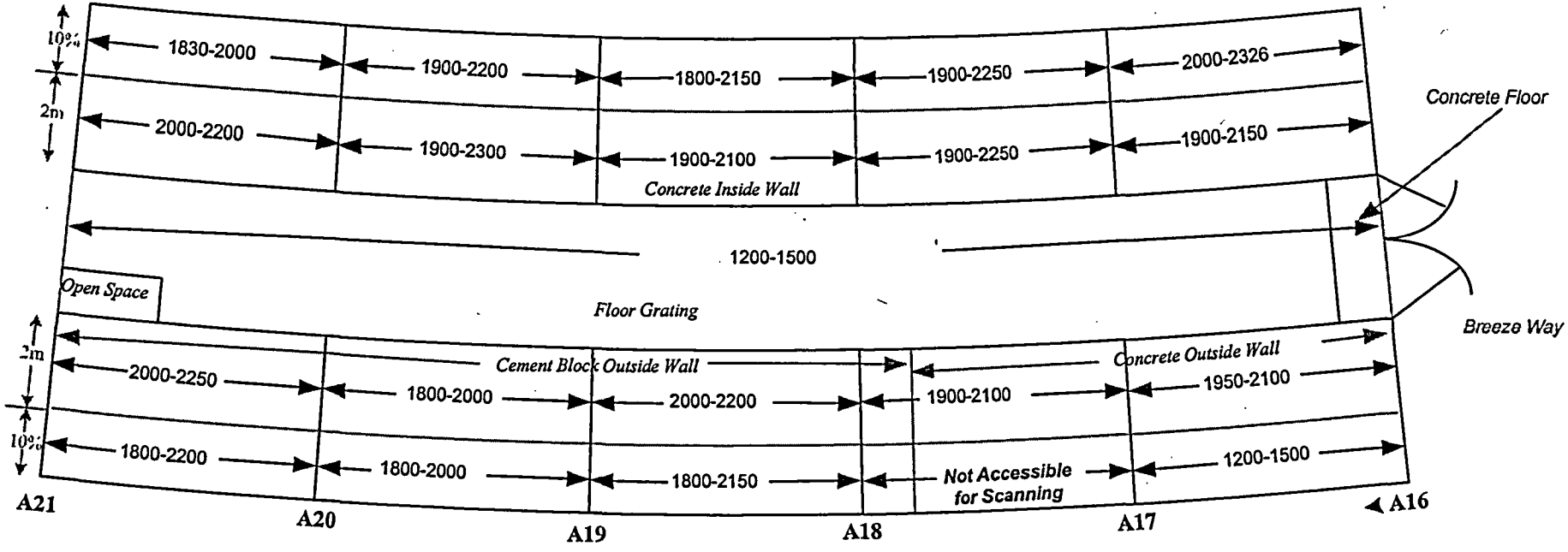
- #### = β Range in cpm

100% of floor grating and walls up to 2m surfaces scanned, 10% of walls above 2m

The Highest β Result (2350 cpm on cement block wall) = 449 dpm/100 cm^2

Scan MDA for Cement Block = 388dpm/100 cm^2

Figure 41: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 2, Column A-16 to A-21, Beta Scan Measurement Locations and Results



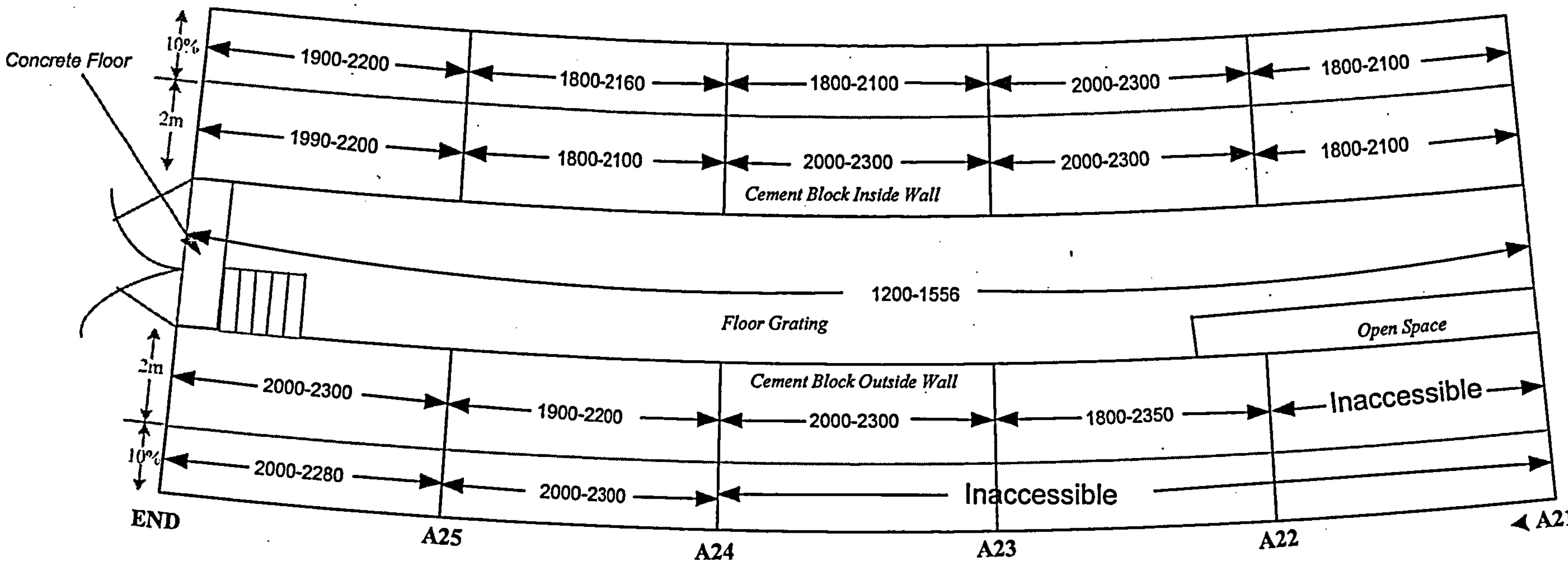
Location	Building 2 Service Corridor
Instrument	Ludlum Model 2221
Serial Number	84459
Calibration Due	09/27/02
Efficiency	31.08%
α, β, γ	β
Probe Number	086215
Probe Size, cm²	434 cm²
Background	1840-2100 cpm, concrete 1640-1850 cpm (cement Block)
Surveyors: J. Sullivan	Date: 05/02/02

- #### = β Range in cpm

100% of floor grating and accessible walls up to 2m surfaces scanned, 10% of walls above 2m

The Highest β Result (2250 cpm on cement block wall) = < MDA (388dpm/100 cm²)

Figure 42: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 2, Column A-21 to End, Beta Scan Measurement Locations and Results



Location	Building 2 Service Corridor
Instruments	Ludlum Model 2221
Serial Number	84459
Calibration Due	09/27/02
Efficiency	31.08%
α, β, γ	β
Probe Number	086215
Probe Size cm²	434 cm²
Background	1840-2100 cpm, concrete
	1640-1850 cpm (cement Block)

Surveyors: J. Sullivan Date: 05/02/02

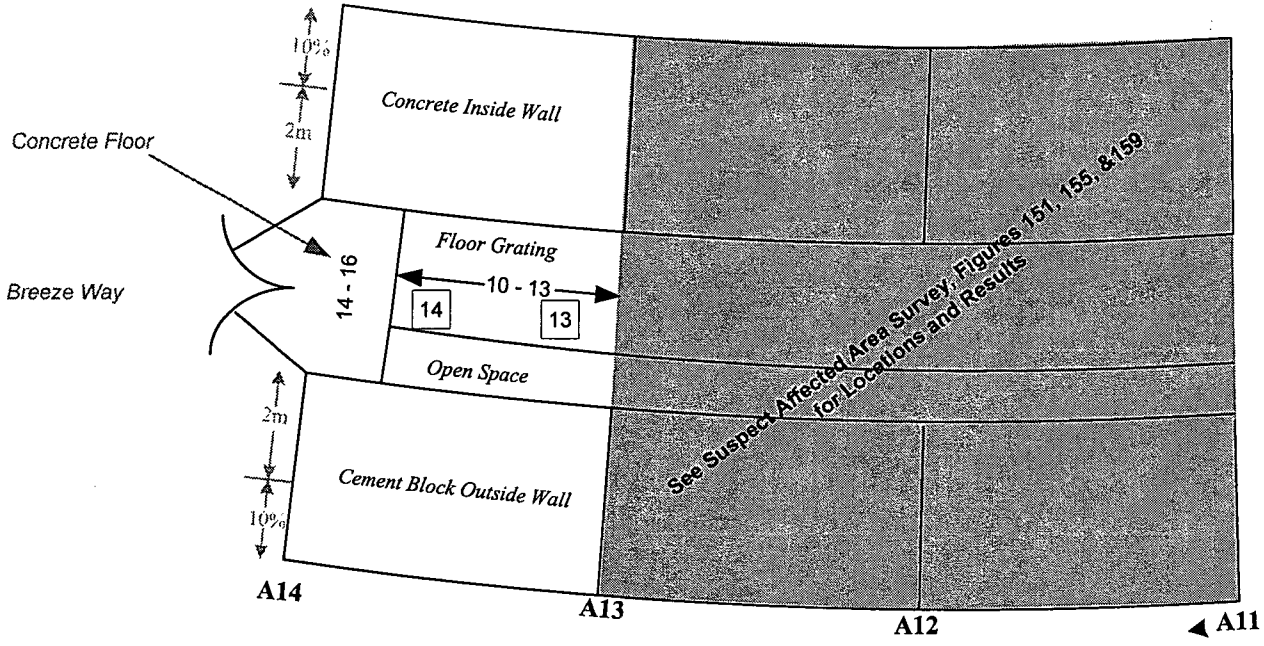
- #### = β Range in cpm

100% of floor grating and walls up to 2m surfaces scanned, 10% of walls above 2m

The Highest β Result (2350 cpm on cement block wall) = 449 dpm/100 cm²

Scan MDA for Cement Block = 388dpm/100 cm²

Figure 45: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 2, Column A-11 to A-14, Exposure Rate Scan and Fixed Measurement Locations and Results



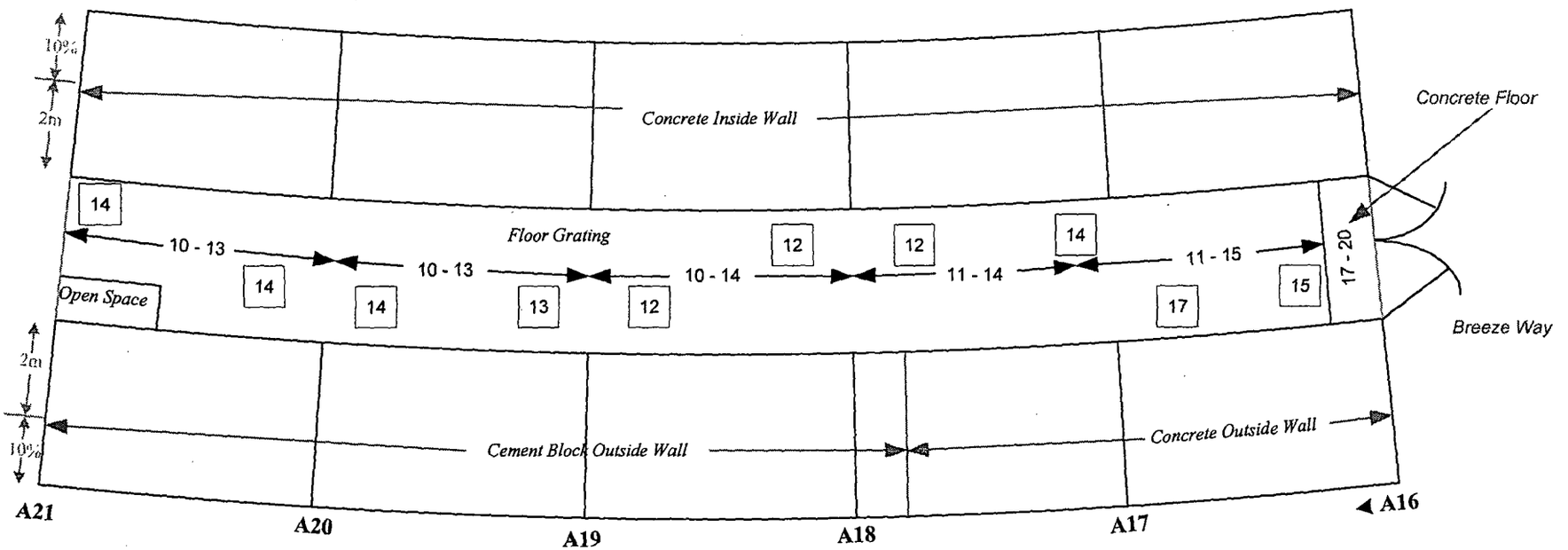
Location	Building 2 Service Corridor
Instruments	Ludlum Model 3
Serial Number	151348
Calibration Due	07/24/02
Efficiency	NA
α β γ	γ
Probe Number	163169
Probe	2 x 2 NaI(Tl)
Typical Background in μR/hr	13-15 @ 1m, Concrete. 20-25 @ 1m, and 22-28 @Contact, in Enclosed Concrete Spaces.
Surveyors : B. Hunter	Date: 4/29/02

 # - # = γ Range in μR/hr, 100% of floor grating surfaces scanned.

[#] =Exposure Rate @ 1 meter from the surface in μR/hr.

The Highest Fixed γ Result (14 μR/hr @ 1 meter) = Natural Background.

Figure 46: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 2, Column A-16 to A-21, Exposure Rate Scan and Fixed Measurement Locations and Results

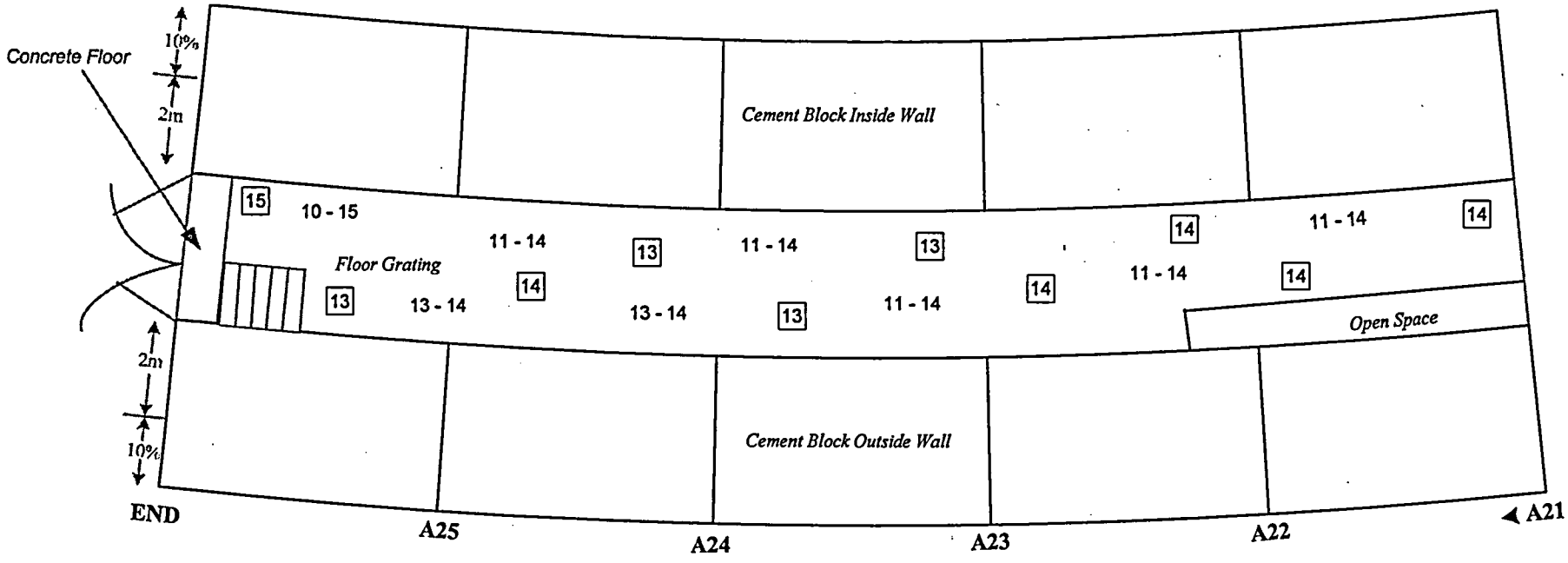


Location	Building 2 Service Corridor
Instruments	Ludlum Model 3
Serial Number	151348
Calibration Due	07/24/02
Efficiency	NA
α β γ	γ
Probe Number	163169
Probe	2 x 2 NaI(Tl)
Typical Background in μR/hr	13-15 @ 1m, Concrete. 20-25 @ 1m, and 22-28 @Contact, in Enclosed Concrete Spaces.
Surveyors : B. Hunter	Date: 4/29/02

 # - # = γ Range in μR/hr, 100% of floor grating surfaces scanned.

[#] =Exposure Rate @ 1 meter from the surface in μR/hr.

Figure 47: Building 2 Service Corridor, Area A, Non-Suspect Affected Area, Level 2, Column A-21 to End, Exposure Rate Scan and Fixed Measurement Locations and Results



Location	Building 2 Service Corridor
Instruments	Ludlum Model 3
Serial Number	153551
Calibration Due	07/09/02
α, β, or γ	γ
Probe Number	155109
Probe	2 x 2 NaI(Tl)
Background in µR/hr	10 - 15

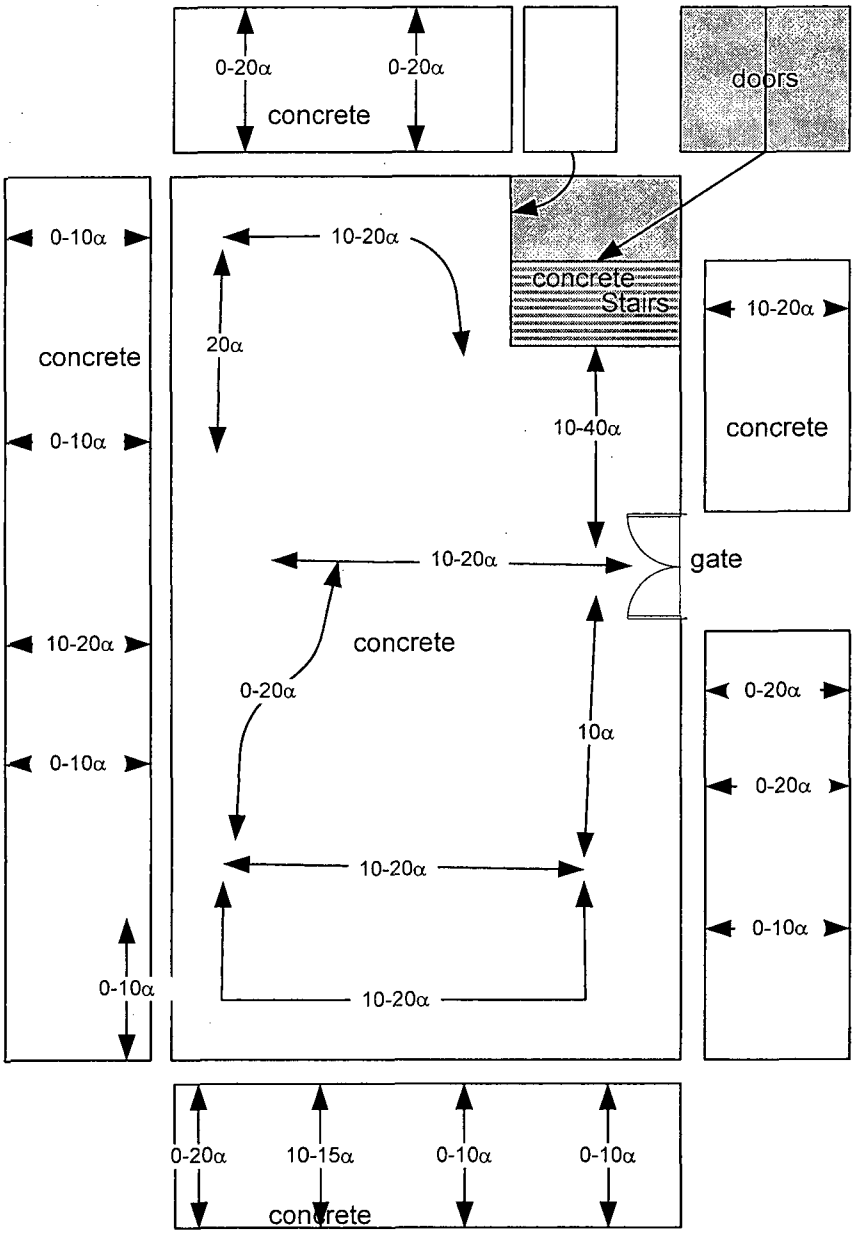
Surveyor: J. Sullivan Date: 04/24/02

- # = γ Range in µR/hr, 100% of floor grating surfaces scanned.

[#] =Exposure Rate @ 1 meter from the surface in µR/hr.

The Highest Fixed γ Result (15 µR/hr @ 1 meter) = Natural Background.

Figure 48: Building 2 Service Corridor Section A Mechanical Room
Alpha Scan Measurement Locations and Results



Notes:

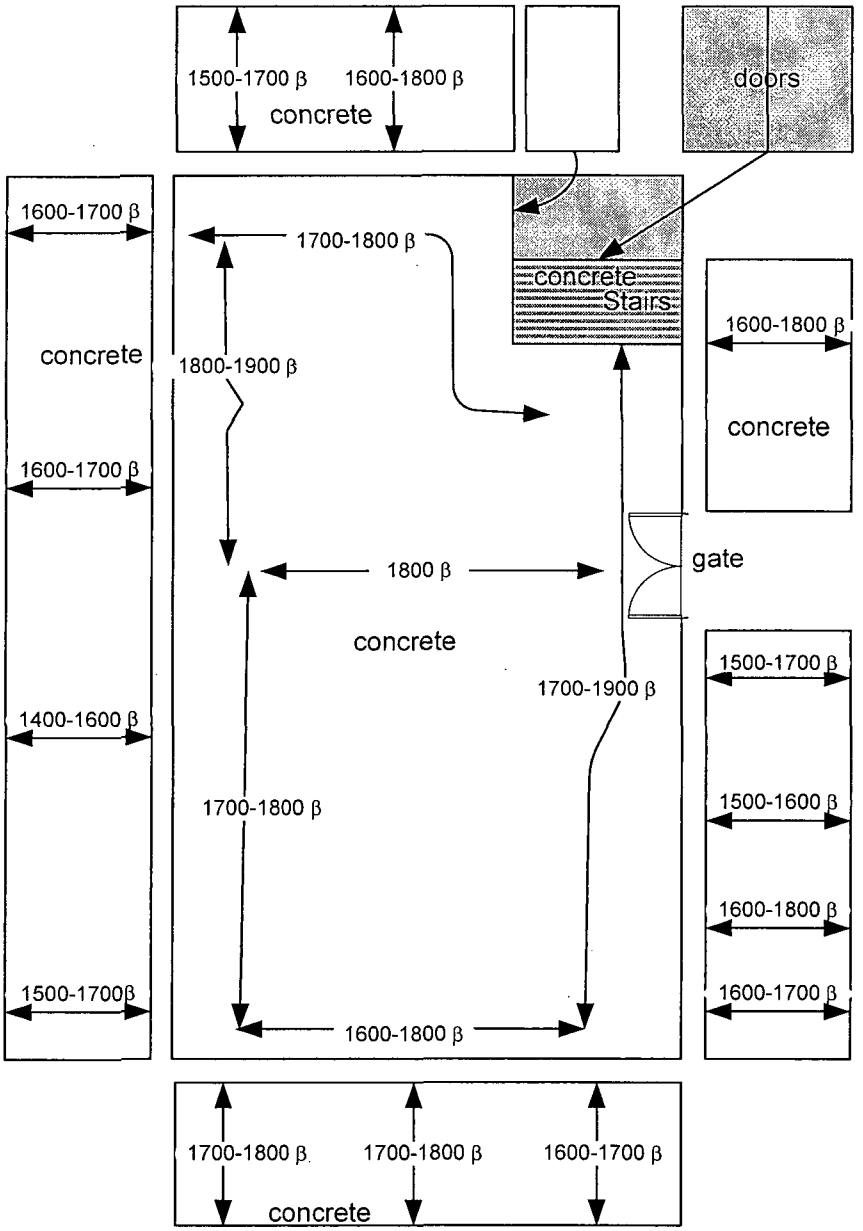
1. 10% of floor and walls 2 meters and below scanned.
2. ◄ #-#α ► Denotes alpha scan in cpm.

Instrument	
Model	Ludlum 2221
Serial Number	97287
Probe	434 cm^2 α
Probe Serial #	083293
Cal Due Date	09-22-03
Efficiency	20.98%
Background	0-30 cpm
Scan MDA	49 dpm/100 cm^2

Survey conducted by: R. Stowell & G. Sayer
Date :03-27-03

Figure 48

Figure 49: Building 2 Service Corridor Section A Mechanical Room
Beta Scan Measurement Locations and Results



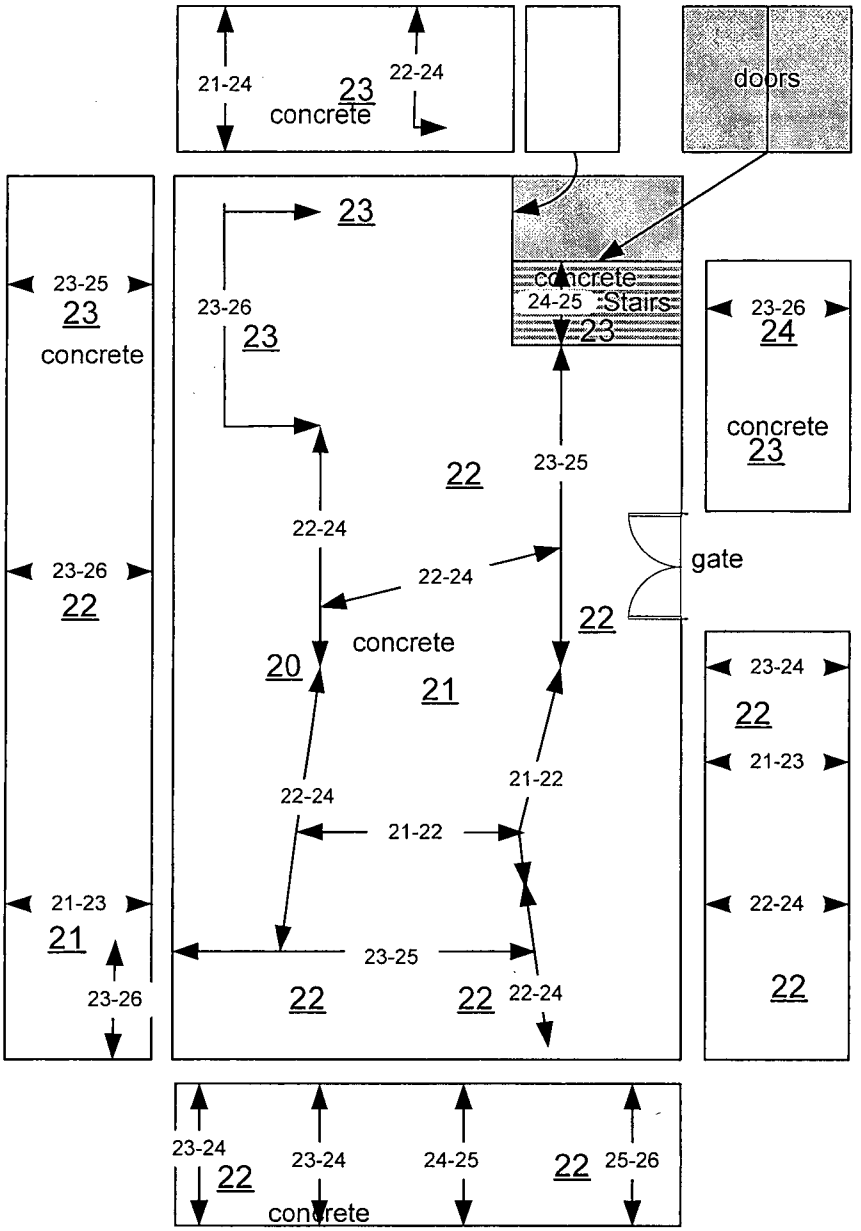
Notes:

1. 10% of floor and walls 2 meters and below scanned.
2. ◄ #-#β ► Denotes beta scan in cpm.

Instrument	
Model	Ludlum 2221
Serial Number	154202
Probe	434 cm^2 β
Probe Serial #	149017
Cal Due Date	04-01-03
Efficiency	30.17%
Background	1400-2000 cpm
Scan MDA	389 dpm/100 cm^2

Survey conducted by: R. Stowell & G. Sayer
Date: 03-24-03

Figure 50: Building 2 Service Corridor Section A Mechanical Room
Fixed Exposure Rate and Exposure Rate Scan Measurement Locations and Results



Notes:

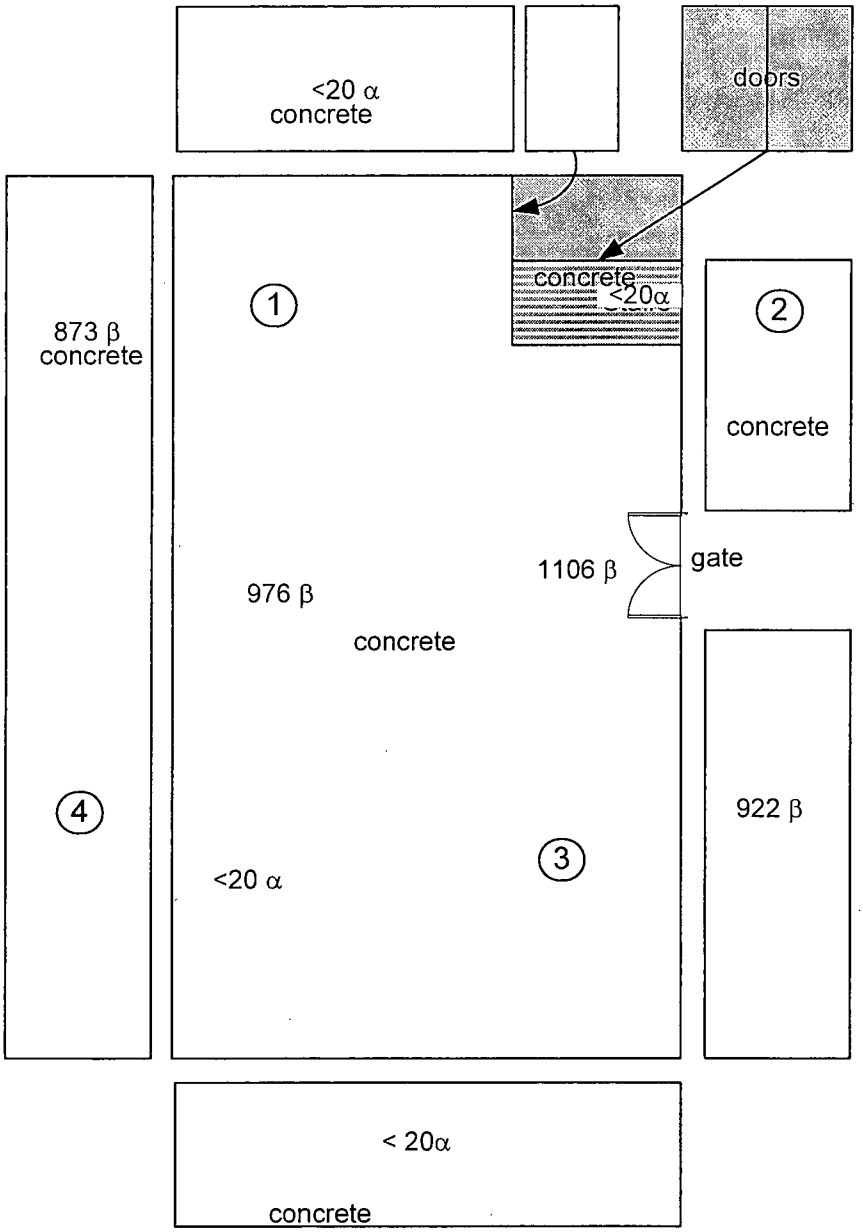
1. ## Denotes fixed exposure rate measurement, in μR/hr, taken at ~ 1 meter from the surface.
2. ◄ #-# ► Denotes exposure rate surface scan in μR/hr.
3. 10% of floor and walls 2 meters and below were scanned.

Instrument	
Model	Ludlum 3
Serial Number	153551
Probe	2" X 2" NaI γ
Probe Serial #	155109
Cal Due Date	05-23-05
Bkgd. contact	15-21 μR/hr
Bkgd @1 meter	15-21μR/hr

Survey conducted by: R Stowell
Dates: 03-26-03 & 03-27-03

Figure 50

Figure 51: Building 2 Service Corridor Section A Mechanical Room
Alpha and Beta Fixed Measurement Locations and Results and Wipe Survey Locations



Notes:

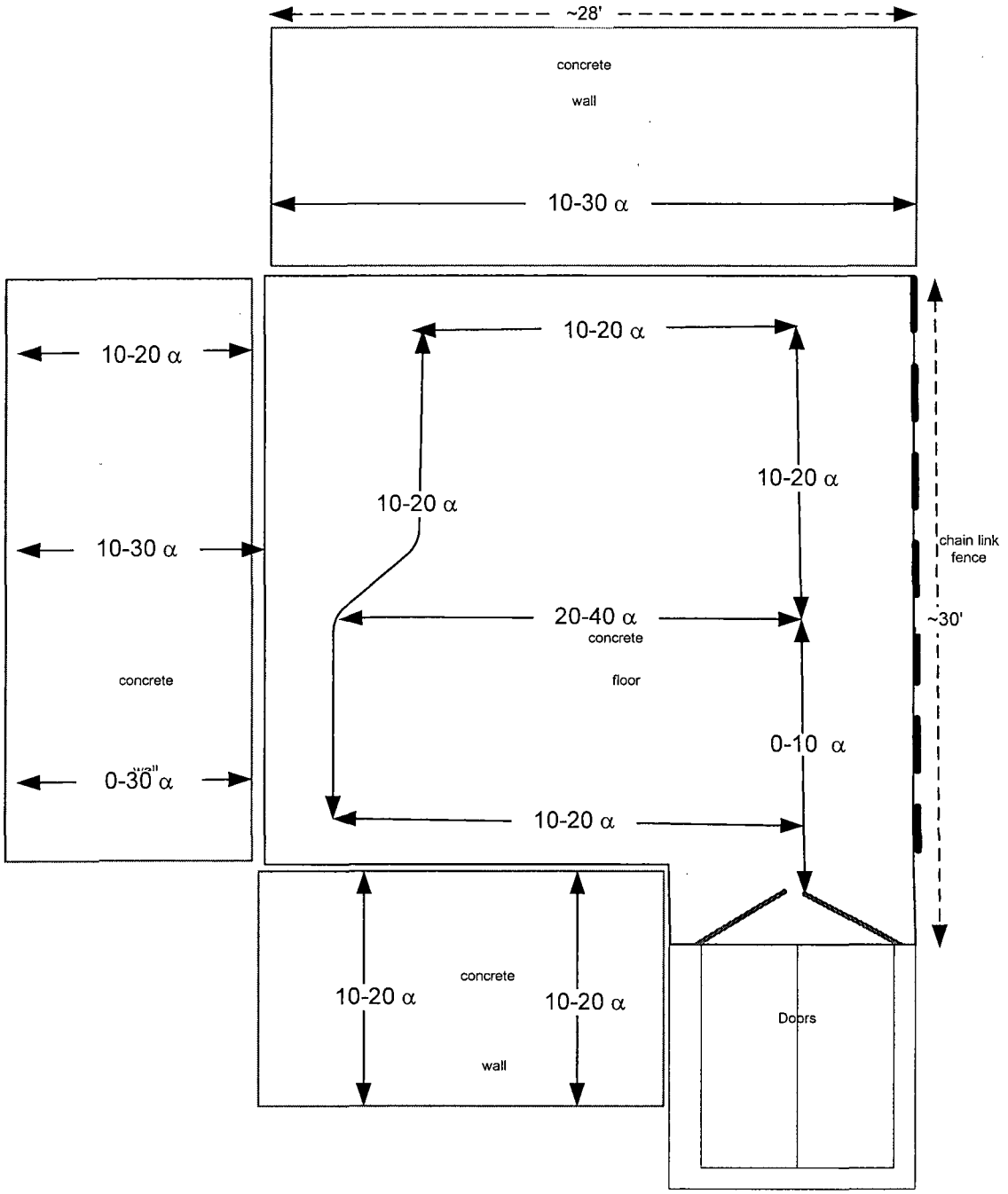
1. ##α Denotes alpha fixed measurement in cpm.
2. ###β Denotes beta fixed measurement in cp2m.
3. (#) Denotes wipe location, wipe results are provided in Table 5.

	Instruments	
Model	Ludlum 12	Ludlum 2221
Serial Number	91051	86302
Probe	50 cm^2 α	100 cm^2 β
Probe Serial #	094053	142547
Cal Due Date	04-15-03	07-24-03
Efficiency	21.77 %	31.20
Background	< 20 cpm	822+/-344 cp2m
MDA	216 dpm/100 cm^2	218 dpm/100 cm^2

Survey conducted by: R. Stowell & G. Sayer
Date: 03-31-03

Figure 51

Figure 52: Building 2 Service Corridor Section A Electrical Room
Alpha Scan Measurement Locations and Results



Notes:

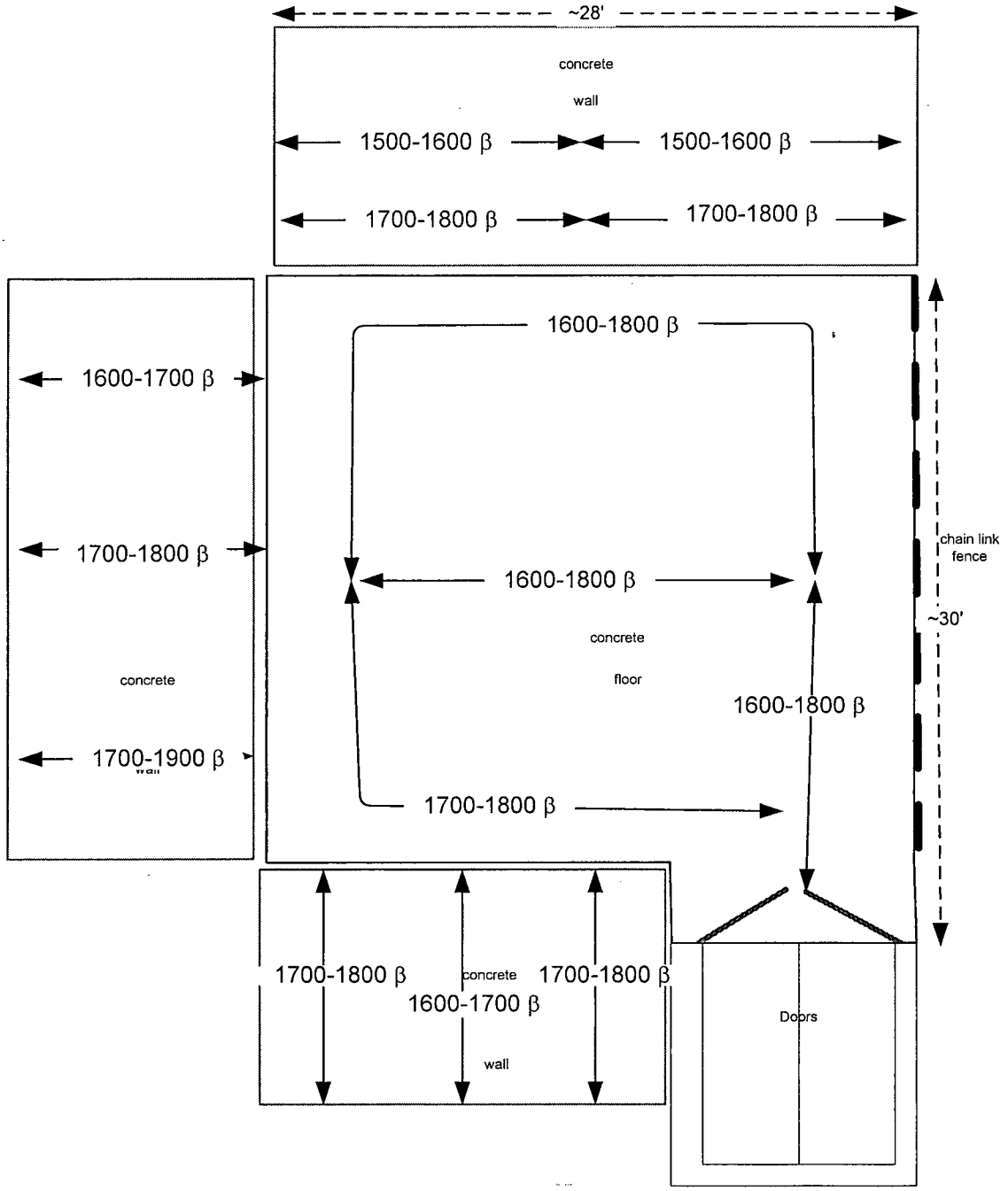
1. 10% of floor and walls 2 meters and below scanned.
2. ◄ #-#α ► Denotes alpha scan in cpm.

Instrument	
Model	Ludlum 2221
Serial Number	97287
Probe	434 cm^2 α
Probe Serial #	083293
Cal Due Date	09-22-03
Efficiency	20.98%
Background	0-30 cpm
Scan MDA	49 dpm/100 cm^2

Survey conducted by: R. G. Sayer
Date :03-27-03

Figure 52

Figure 53: Building 2 Service Corridor Section A Electrical Room
Beta Scan Measurement Locations and Results



Notes:

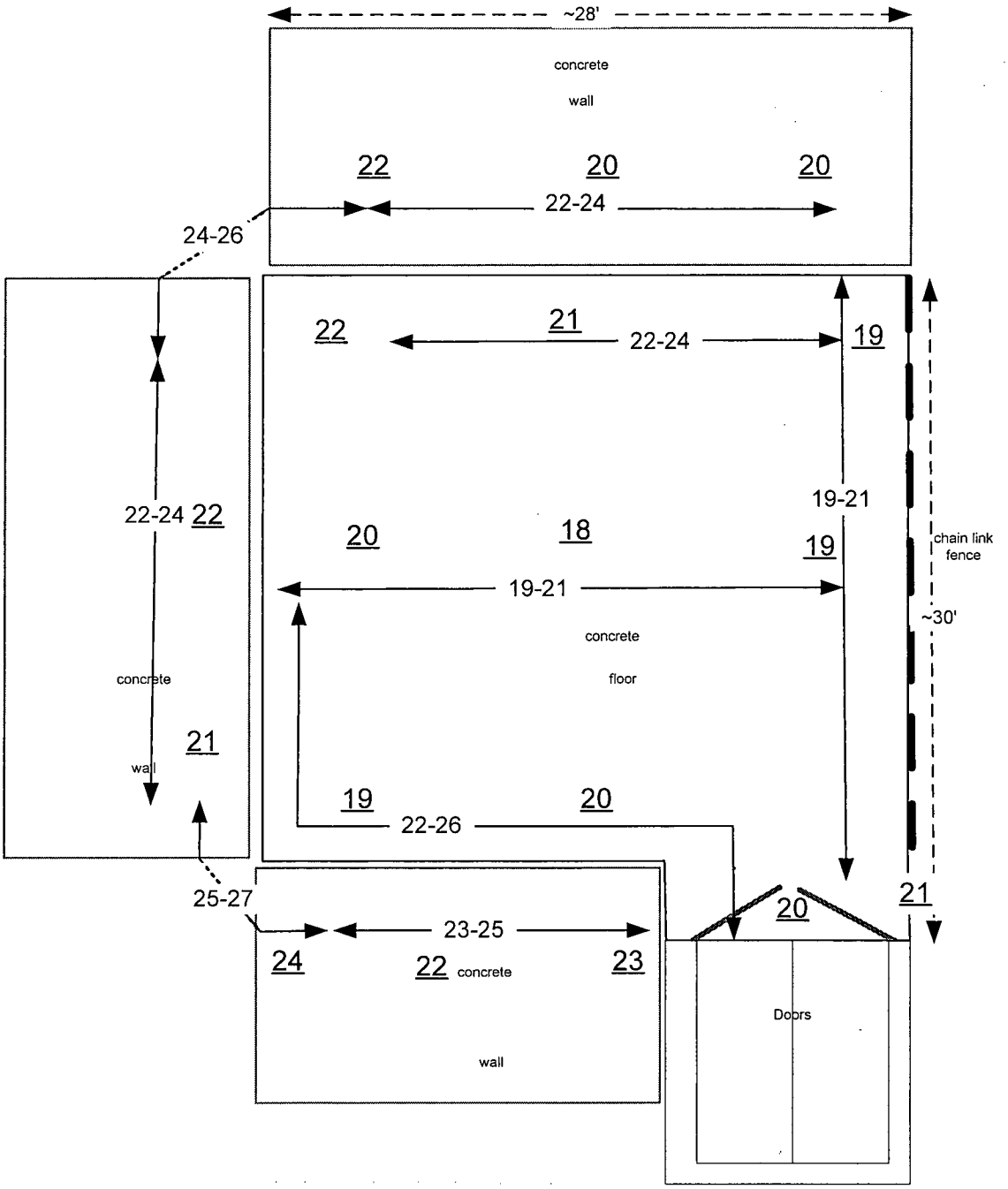
1. 10% of floor and walls 2 meters and below scanned.
2. ◄ #-#β ► Denotes beta scan in cpm.

Instrument	
Model	Ludlum 2221
Serial Number	154202
Probe	434 cm^2 β
Probe Serial #	149017
Cal Due Date	04-01-03
Efficiency	30.17%
Background	1400-2000 cpm
Scan MDA	389 dpm/100 cm^2

Survey conducted by: R. Stowell & G. Sayer
Date: 03-24-03

Figure 53

Figure 54: Building 2 Service Corridor Section A Electrical Room
Fixed Exposure Rate and Exposure Rate Scan Measurement Locations and Results



Notes:

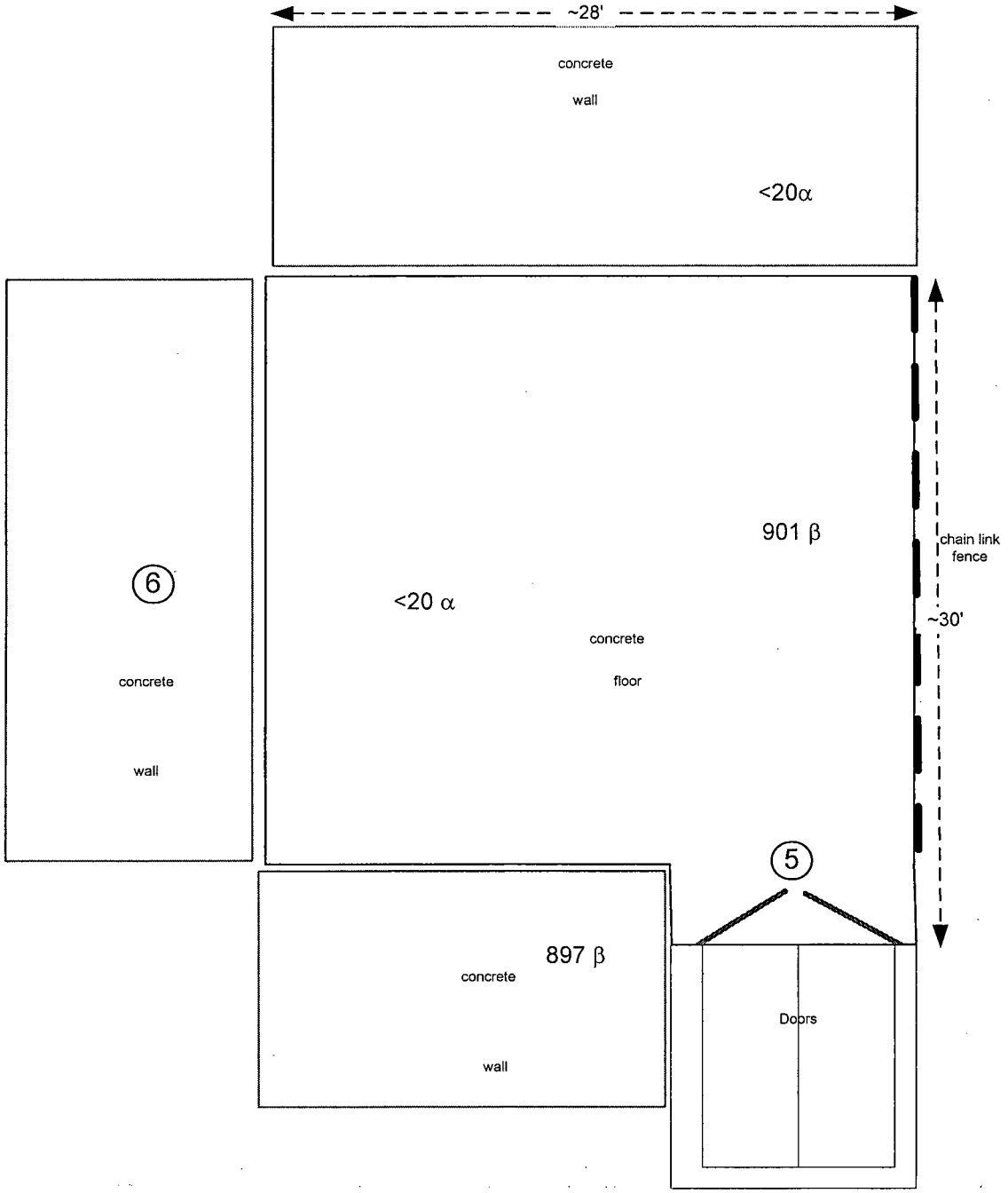
1. ## Denotes fixed exposure rate measurement, in μR/hr, taken at ~ 1 meter from the surface.
2. ← #-# → Denotes exposure rate surface scan in μR/hr.
3. 10% of floor and walls 2 meters and below were scanned.

Instrument	
Model	Ludlum 3
Serial Number	153551
Probe	2" X 2" NaI γ
Probe Serial #	155109
Cal Due Date	05-23-05
Bkgd contact	15-21 μR/hr
Bkgd @1 meter	15-21μR/hr

Surveys conducted by: R Stowell
Dates: 03-26-03 & 03-28-03

Figure 54

Figure 55: Building 2 Service Corridor Section A Electrical Room Alpha and Beta Fixed Measurement Locations and Results and Wipe Survey Locations



Notes:

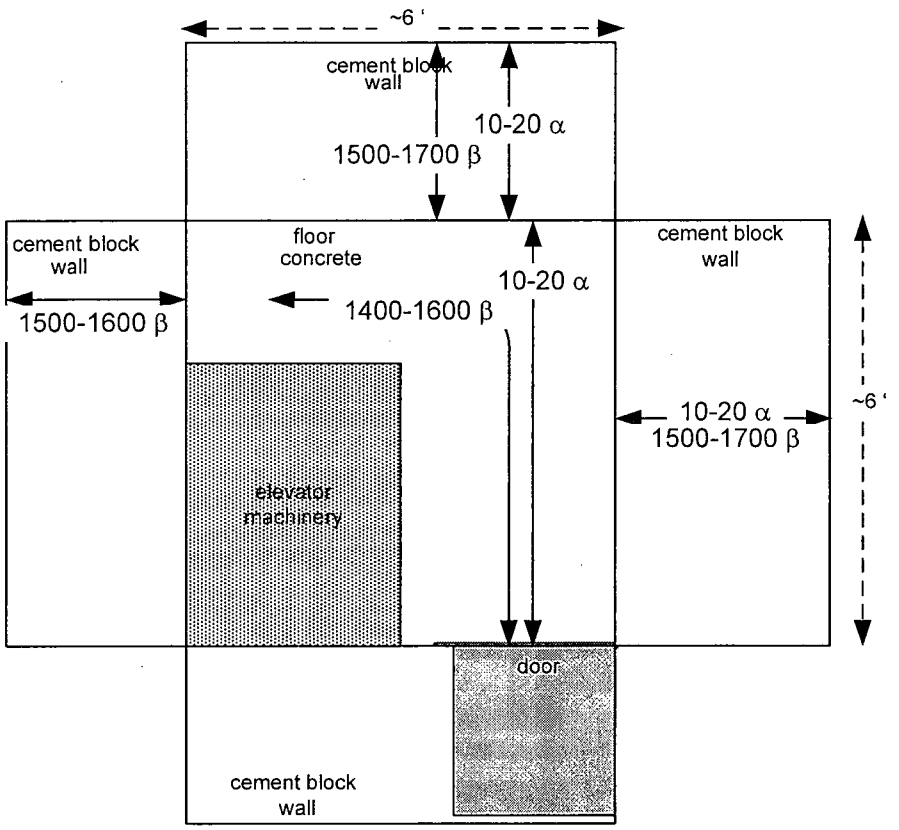
1. ##α Denotes alpha fixed measurement in cpm.
2. ###β Denotes beta fixed measurement in cp2m.
3. (#) Denotes wipe location, wipe results are provided in Table 5.

Instruments		
Model	Ludlum 12	Ludlum 2221
Serial Number	91051	86302
Probe	50 cm^2 α	100 cm^2 β
Probe Serial #	094053	142547
Cal Due Date	04-15-03	07-24-03
Efficiency	21.77 %	31.20
Background	< 20 cpm	822+/-344 cp2m
MDA	216 dpm/100 cm^2	218 dpm/100 cm^2

Survey conducted by: R. Stowell & G. Sayer
Date: 03-31-03

Figure 55

Figure 56: Building 2 Service Corridor Section A Elevator Machinery Room at Breezeway A
Alpha and Beta Scan Measurement Locations and Results



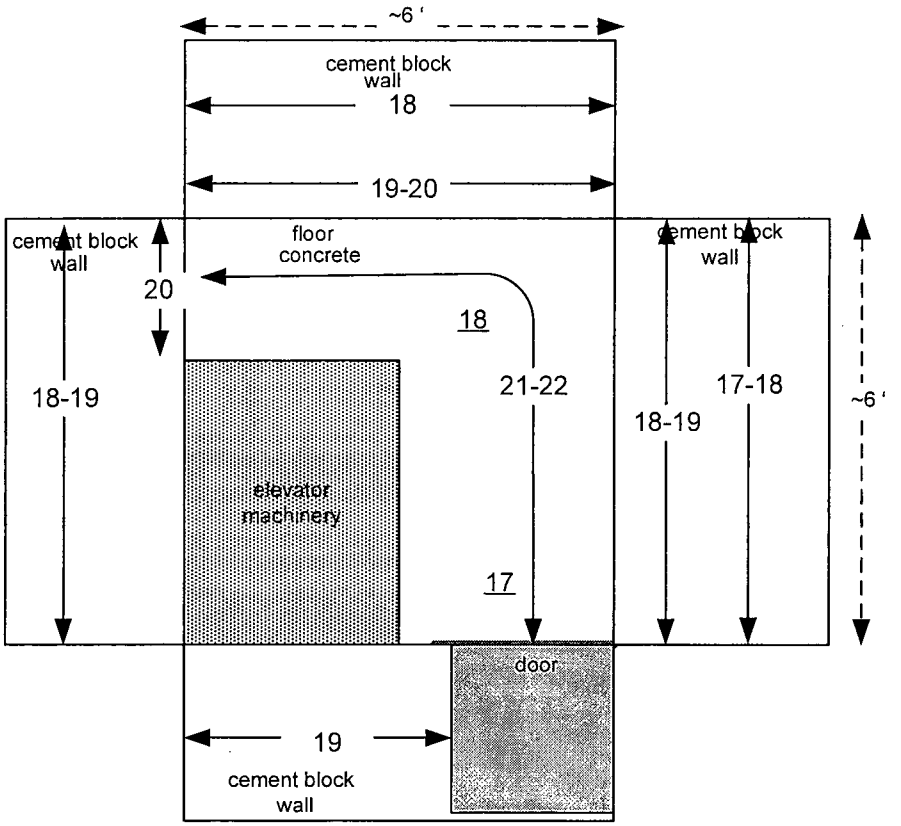
Instruments		
Model	Ludlum 2221	Ludlum 2221
Serial Number	154202	97287
Probe	434 cm^2 β	434 cm^2 α
Probe Serial #	149017	083293
Cal Due Date	04-01-03	09-22-03
Efficiency	30.17%	20.98%
Bkgd. concrete	1400-2000 cpm	0-30 cpm
Scan MDA concrete	389 dpm/ 100 cm^2	49 dpm/ 100 cm^2
Bkgd. cement block	1100-1600 cpm	0-20 cpm
Scan MDA cement blk	309 dpm/ 100 cm^2	33 dpm/ 100 cm^2

Notes:

1. 10% of floor and walls 2 meters and below were scanned.
2. ← #-# α → Denotes alpha scan in cpm.
3. ← #-# β → Denotes beta scan in cpm.

Surveys conducted by: R. Stowell & G. Sayer
Dates: 03-24-03 & 03-27-03

Figure 57: Building 2 Service Corridor Section A Elevator Machinery Room at Breezeway A
Fixed Exposure Rate and Exposure Rate Scan Measurement Locations and Results



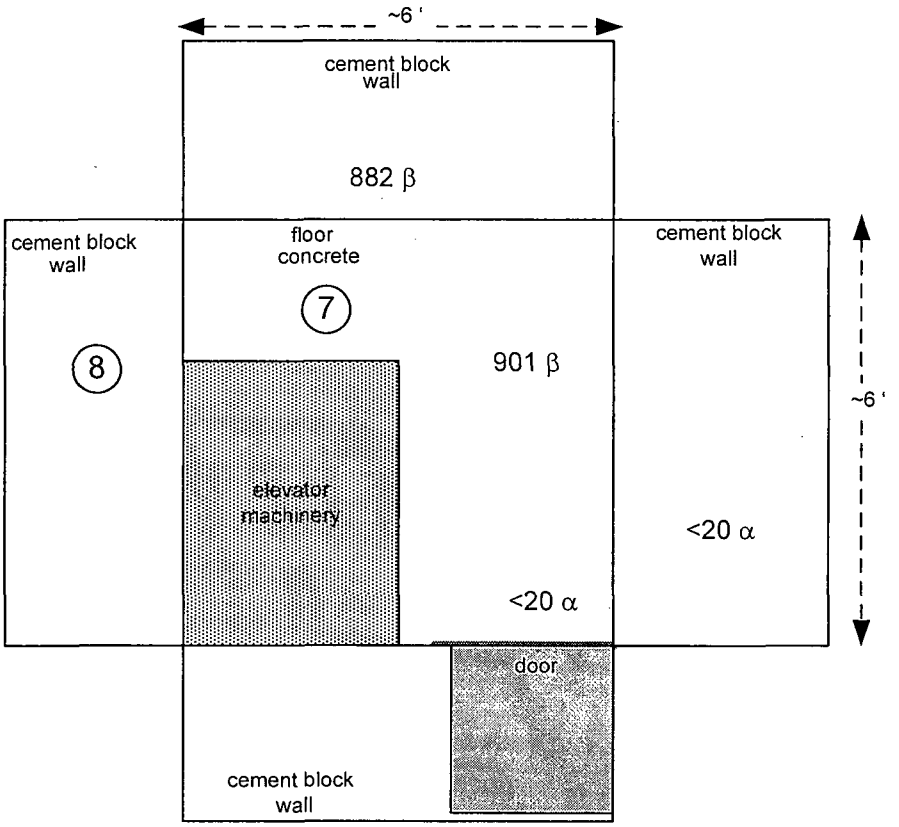
Instrument		
Model	Ludlum 3	
Serial Number	153551	
Probe	2" X 2" Nal γ	
Probe Serial #	155109	
Cal Due Date	05-23-03	
Background	contact	@ 1 meter
concrete	15–21 μR/hr	15–21 μR/hr
cement block	14-19 μR/hr	14-18 μR/hr

Notes:

1. ## Denotes fixed exposure rate measurement, in μR/hr, taken at ~ 1 meter from the surface.
2. ◄ ##-## ► Denotes exposure rate surface scan in μR/hr.
3. 10% of floor and walls 2 meters and below were scanned.

Surveys conducted by: R. Stowell & G. Sayer
Dates: 03-25-03 & 03-26-03

Figure 58: Building 2 Service Corridor Section A Elevator Machinery Room at Breezeway A
Fixed Alpha and Beta Measurement Locations and Results and Wipe Survey Locations



Instruments		
Model	Ludlum 12	Ludlum 2221
Serial Number	91051	86302
Probe	50 cm^2 α	100 cm^2 β
Probe Serial #	094053	142547
Cal Due Date	04-15-03	07-24-03
Efficiency	21.77%	31.20%
Bkgd. concrete	<20 cpm	882+/-344 cp2m
MDA concrete	216 dpm/ 100 cm^2	218 dpm/ 100 cm^2
Bkgd. cement block	<20 cpm	671+/-126 cp2m
MDA cement blk	216 dpm/ 100 cm^2	197 dpm/ 100 cm^2

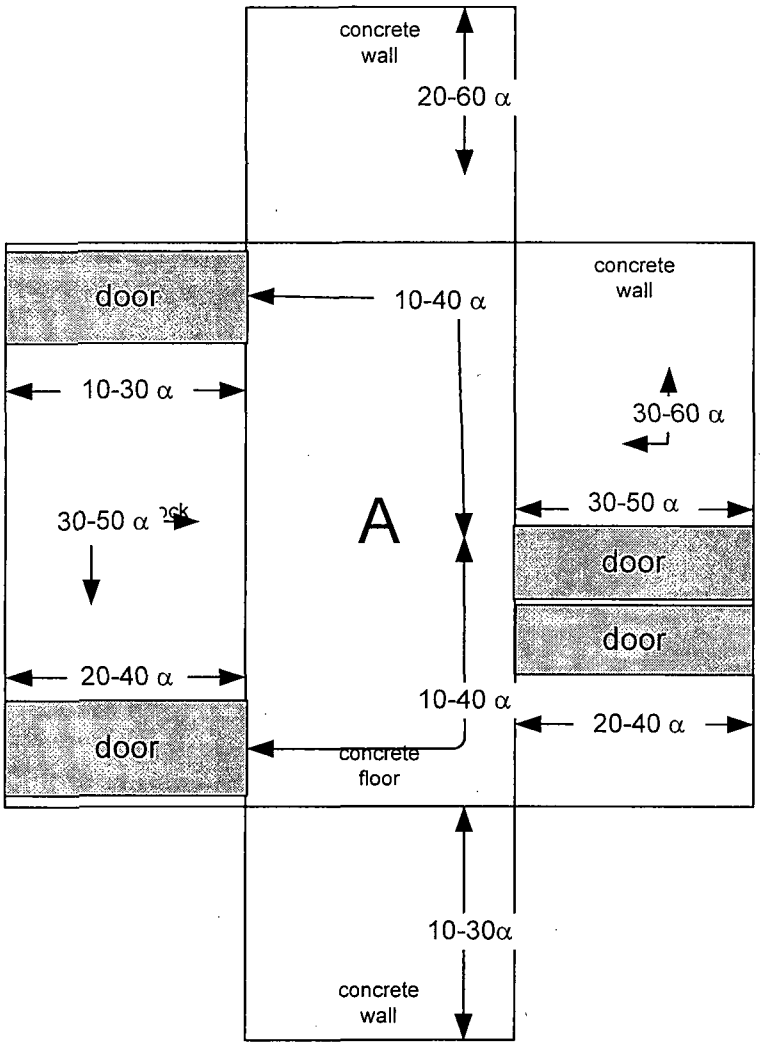
Notes:

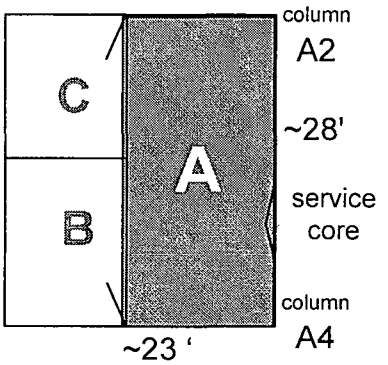
1. ## α Denotes fixed alpha measurement in cpm.
2. ### β Denotes fixed beta measurement in cp2m.
3. (#) Denotes wipe location. Wipe results are provided in Table 5.

Surveys conducted by: R. Stowell & G. Sayer
Date: 03-31-03

Figure 58

Figure 59: Building 2 Service Corridor Section A Storage Room, L-504-A, Room A
Alpha Scan Measurement Locations and Results





L-504-A
Storage Room

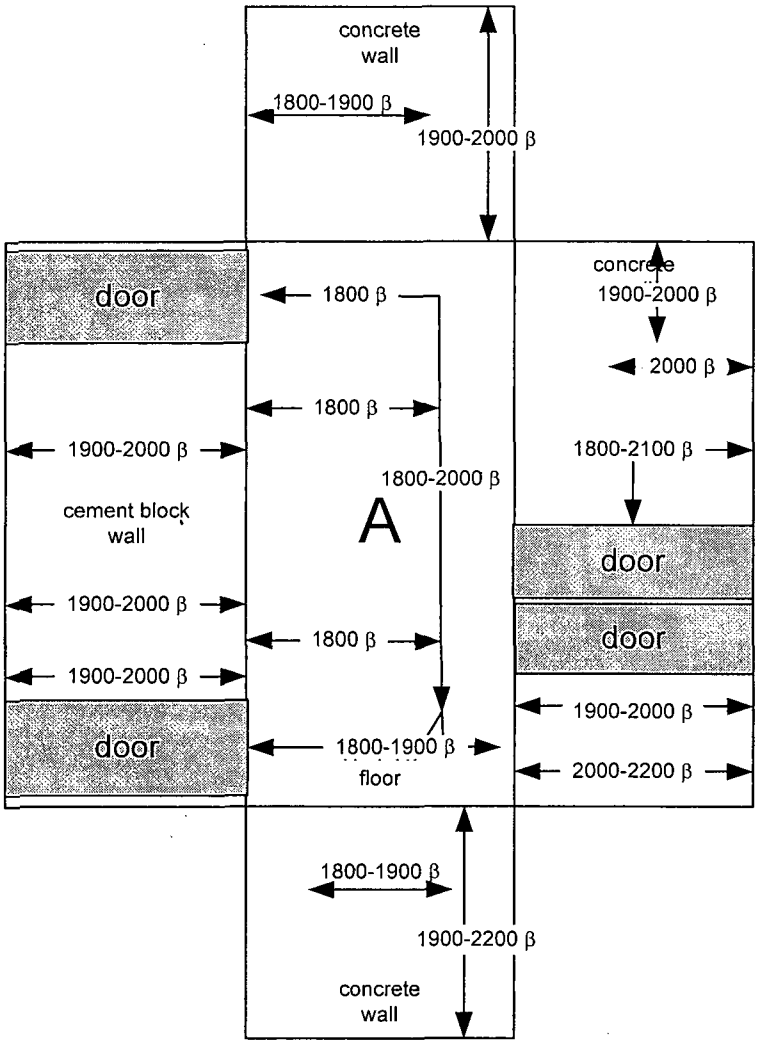
Instrument	
Model	Ludlum 2221
Serial Number	97287
Probe	434 cm^2 α
Probe Serial #	083293
Cal Due Date	09-22-03
Efficiency	20.98%
Bkgd copper/conc	0-10 cpm
Scan MDA	16 dpm/100 cm^2
Bkgd cop/cem blk	0-10 cpm
Scan MDA	16 dpm/100 cm^2
Bkgd. Floor	0-20 cpm
Scan MDA	33 dpm/100 cm^2

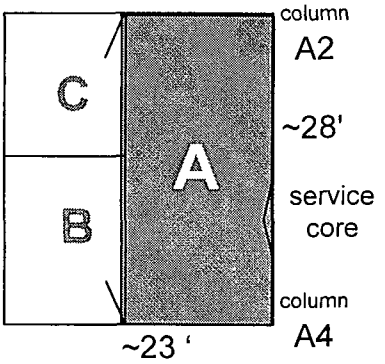
Notes:

1. 10% of floor and walls 2 meters and below scanned.
2. ◄ #-#α ► Denotes alpha scan in cpm.

Survey conducted by: R. Stowell & G. Sayer
Date: 03-31-03

Figure 60: Building 2 Service Corridor Section A Storage Room, L-504-A, Room A
Beta Scan Measurement Locations and Results





L-504-A
Storage Room

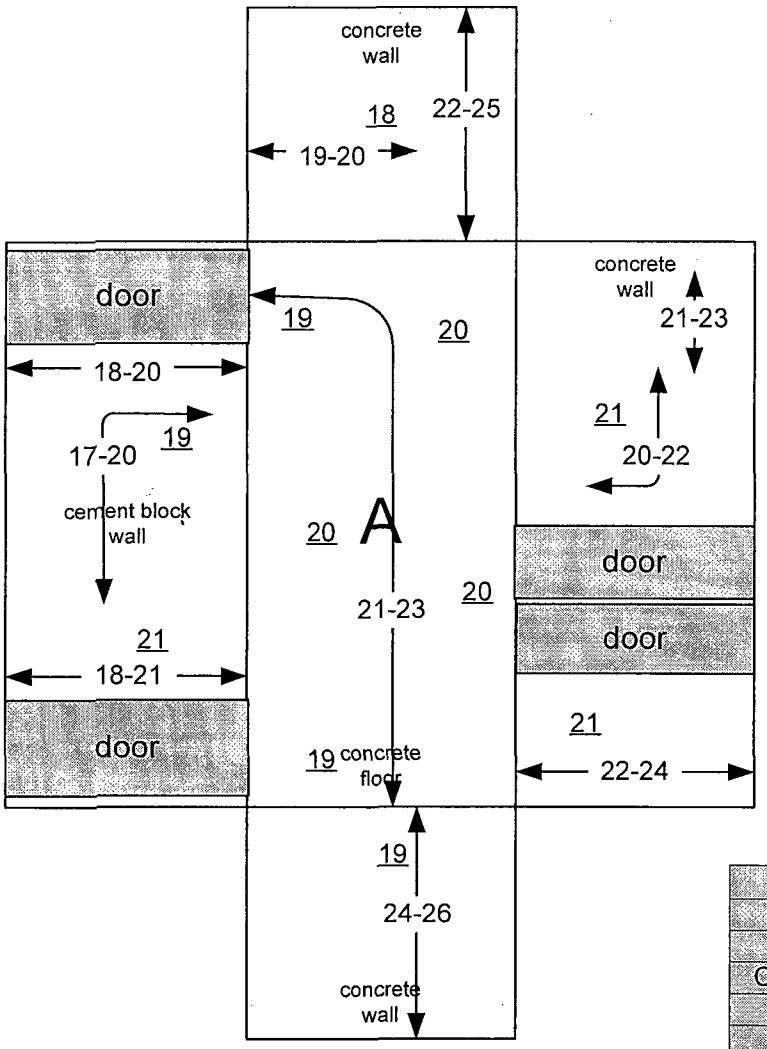
Instrument	
Model	Ludlum 2221
Serial Number	154202
Probe	434 cm² β
Probe Serial #	149017
Cal Due Date	04-01-03
Efficiency	30.17%
Bkgd oncrete	1400-2000 cpm
Scan MDA	389 dpm/100 cm²
Bkgd cement blk	1100-1600 cpm
Scan MDA	309 dpm/100 cm²

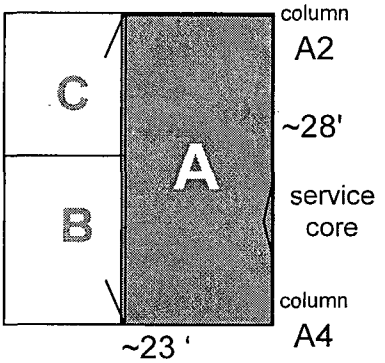
Notes:

1. 10% of floor and walls 2 meters and below scanned.
2. ← #-# β → Denotes beta scan in cpm.

Survey conducted by: R. Stowell & G. Sayer
Dates: 03-24-03 & 03-25-05

Figure 61: Building 2 Service Corridor Section A Storage Room, L-504-A, Room A
Exposure Rate Fixed Measurement and Exposure Rate Scan Measurement
Locations and Results





L-504-A
Storage Room

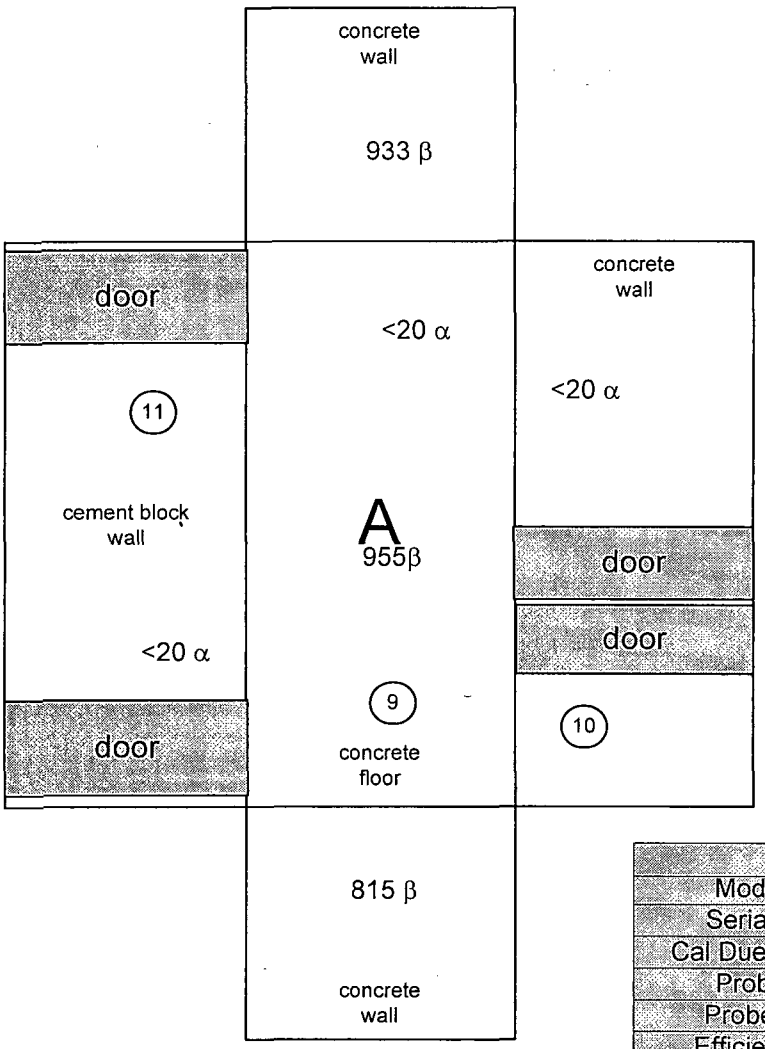
Instrument		
Model	Ludlum 3	
Serial #	153551	
Cal Due Date	05-23-03	
Probe	2" X 2" Nal γ	
Probe #	155109	
Background	contact	@ 1 meter
concrete	15-21 μR/hr	15-21 μR/hr
cement block	14-19μR/hr	14-18μR/hr

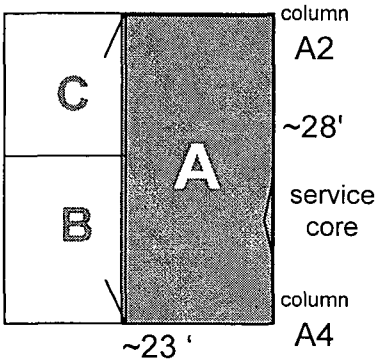
Notes:

1. ## Denotes fixed exposure rate measurement, in μR/hr, taken at ~ 1 meter from the surface.
2. ◄ ##-## ► Denotes exposure rate surface scan in μR/hr.
3. 10% of floor and walls 2 meters and below were scanned.

Surveys conducted by: R. Stowell
Dates: 03-26-03 & 03-28-03

Figure 62: Building 2 Service Corridor Section A Storage Room, L-504-A, Room A
Alpha and Beta Fixed Measurement Locations and Results and Wipe Survey Locations





L-504-A
Storage Room

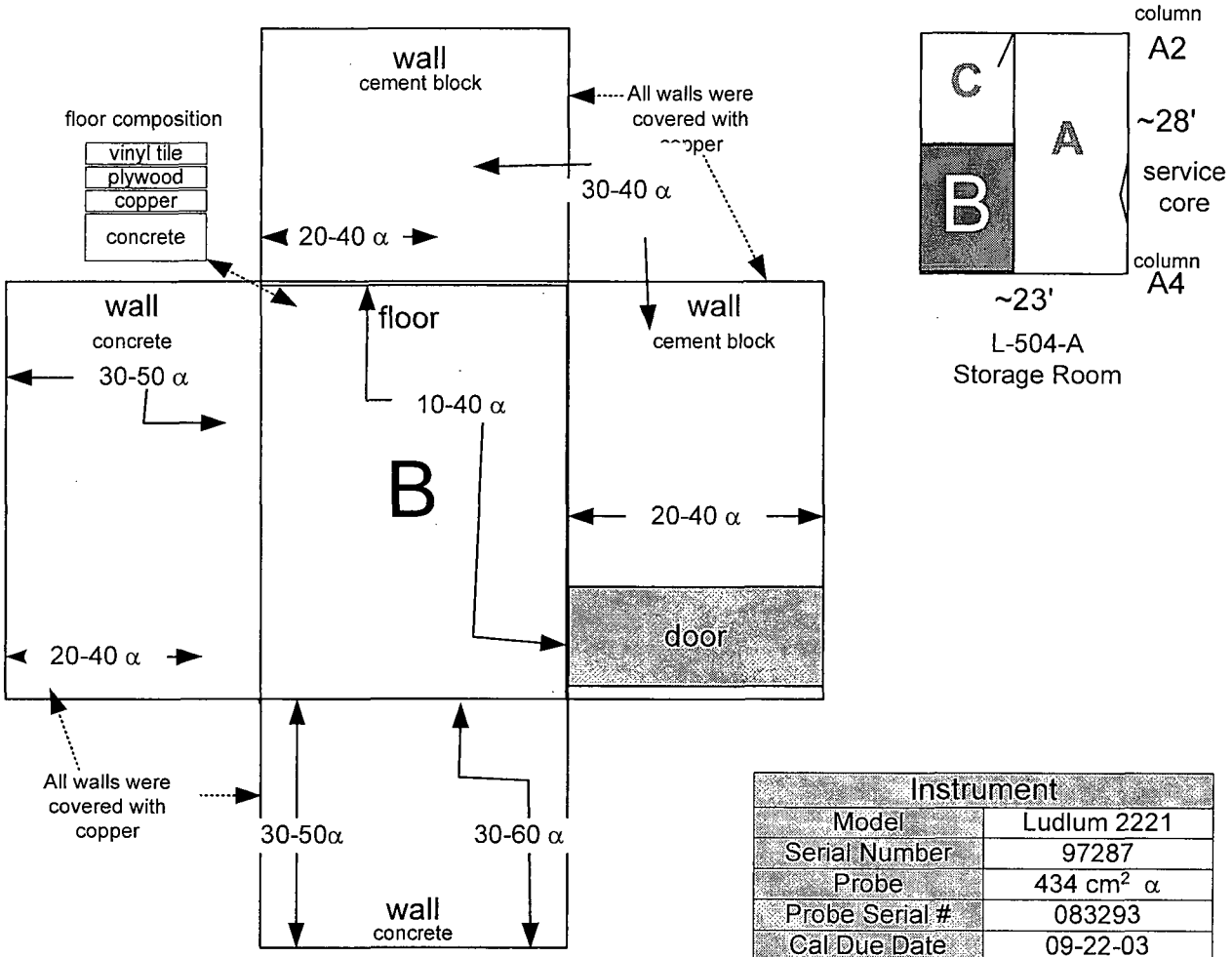
Instruments		
Model	Ludlum 12	Ludlum 2221
Serial #	91051	86302
Cal Due Date	04-15-03	07-24-03
Probe	50 cm^2 α	100 cm^2 β
Probe #	094053	142547
Efficiency	21.77%	31.20%
Bkgd. concrete	<20cpm	822+/344 cp2m
MDA	216 dpm/100 cm^2	218dpm/100 cm^2
Bkgd.cement block	<20cpm	671+/-126 cp2m
MDA	216dpm/100 cm^2	197dpm/100 cm^2

Notes:

1. ##α Denotes alpha fixed measurement in cpm.
2. ###β Denotes beta fixed measurement in cp2m.
3. (#) Denotes wipe location, wipe results are provided in Table 5.

Survey conducted by: R. Stowell & G. Sayer
Date: 03-31-03

Figure 63: Building 2 Service Corridor Section A Storage Room, L-504-A, Room B
Alpha Scan Measurement Locations and Results



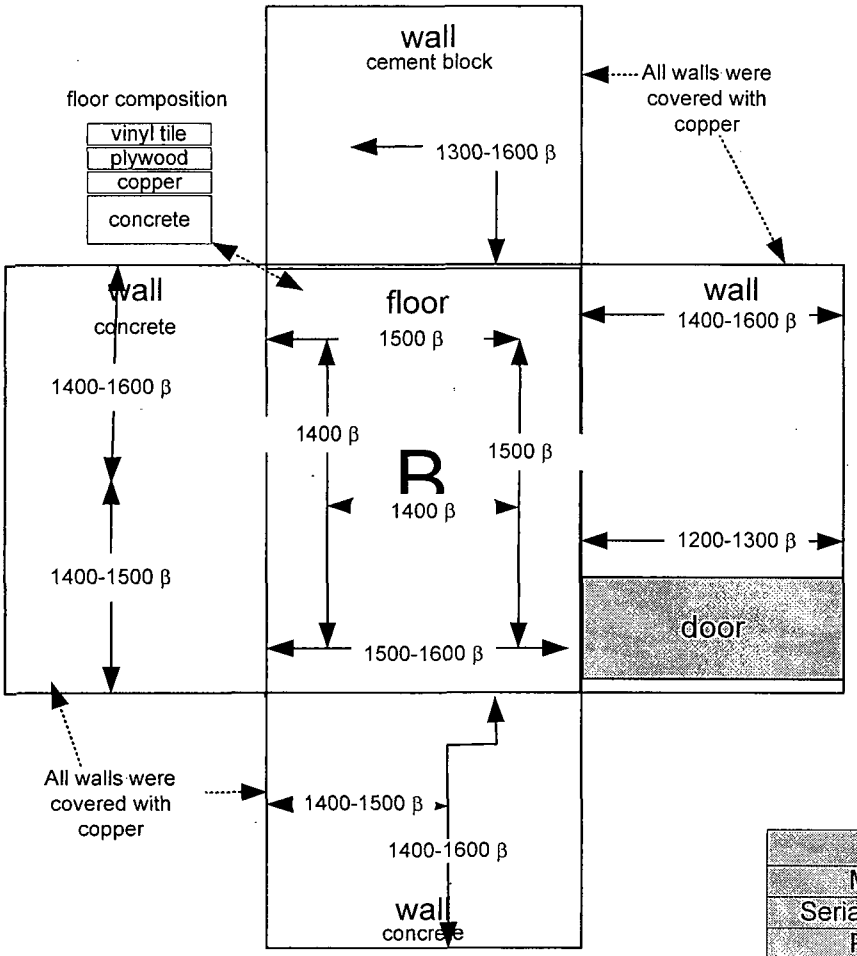
Instrument	
Model	Ludlum 2221
Serial Number	97287
Probe	434 cm^2 α
Probe Serial #	083293
Cal Due Date	09-22-03
Efficiency	20.98%
Bkgd copper/conc	0-10 cpm
Scan MDA	16 dpm/100 cm^2
Bkgd cop/cem blk	0-10 cpm
Scan MDA	16 dpm/100 cm^2
Bkgd. Floor	0-20 cpm
Scan MDA	33 dpm/100 cm^2

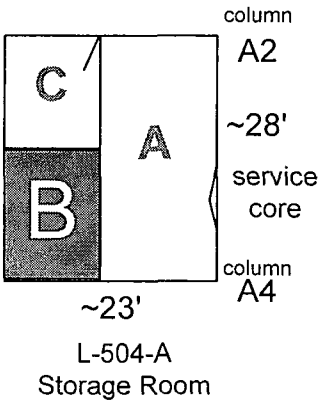
Notes:

1. 10% of floor and walls 2 meters and below scanned.
2. ◄ #-#α ► Denotes alpha scan in cpm.

Survey conducted by: R. Stowell & G. Sayer
Date: 03-31-03

Figure 64: Building 2 Service Corridor Section A Storage Room, L-504-A, Room B
Beta Scan Measurement Locations and Results





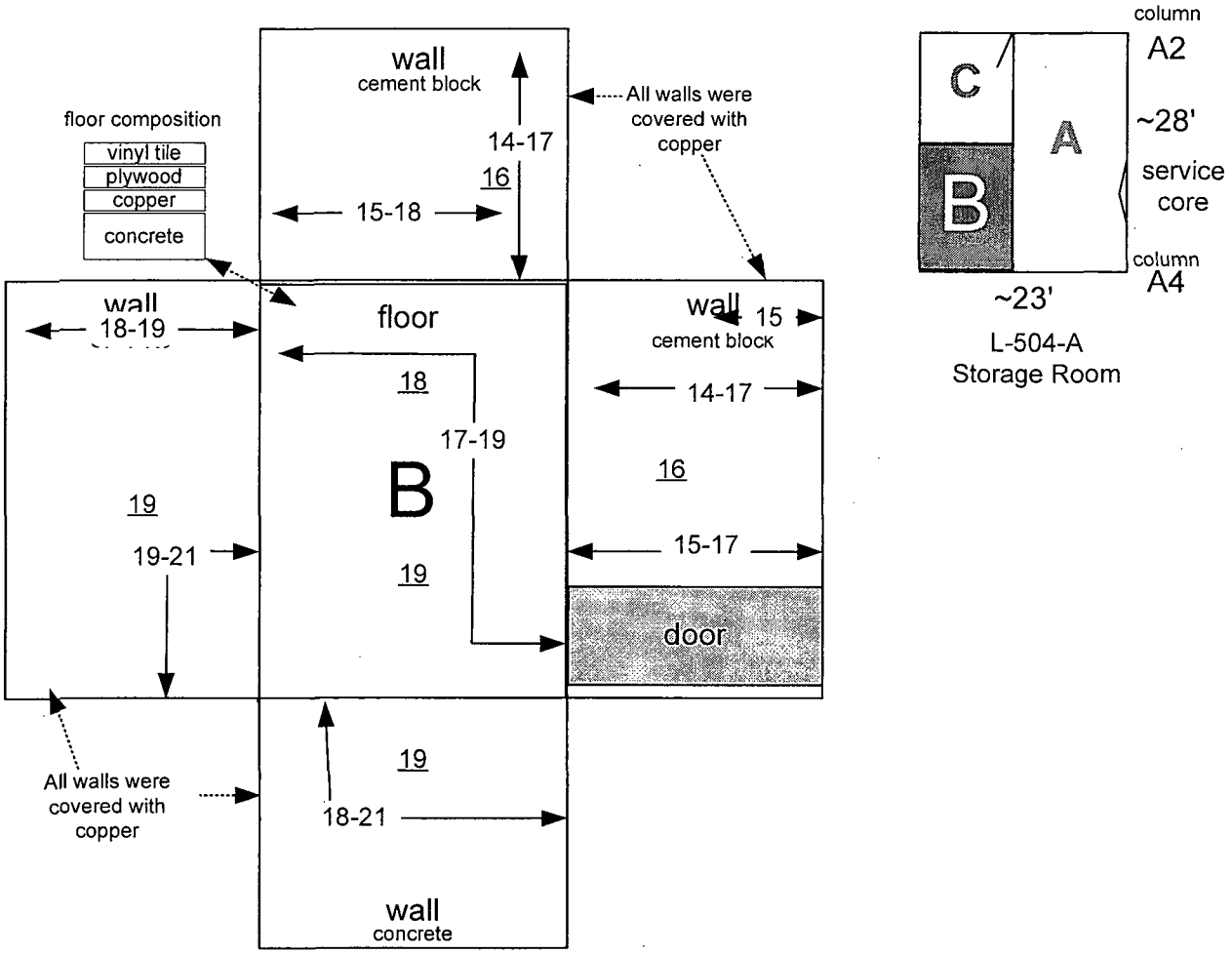
Instrument	
Model	Ludlum 2221
Serial Number	154202
Probe	434 cm² β
Probe Serial #	149017
Cal Due Date	04-01-03
Efficiency	30.17%
Bkgd cop/concrete	1000-1400cpm
Scan MDA	275 dpm/100 cm²
Bkgd cop/cem blk	1000-1300 cpm
Scan MDA	263 dpm/100 cm²
Bkgd Floor	1000-1400 cpm
Scan MDA	275 dpm/100 cm²

Notes:

1. 10% of floor and walls 2 meters and below scanned.
2. ← #-# β → Denotes beta scan in cpm.

Survey conducted by: G. Sayer & R. Stowell
Dates: 03-24-03 & 03-25-03

Figure 65: Building 2 Service Corridor Section A Storage Room, L-504-A, Room B Exposure Rate Fixed Measurement and Exposure Rate Scan Measurement Locations and Results



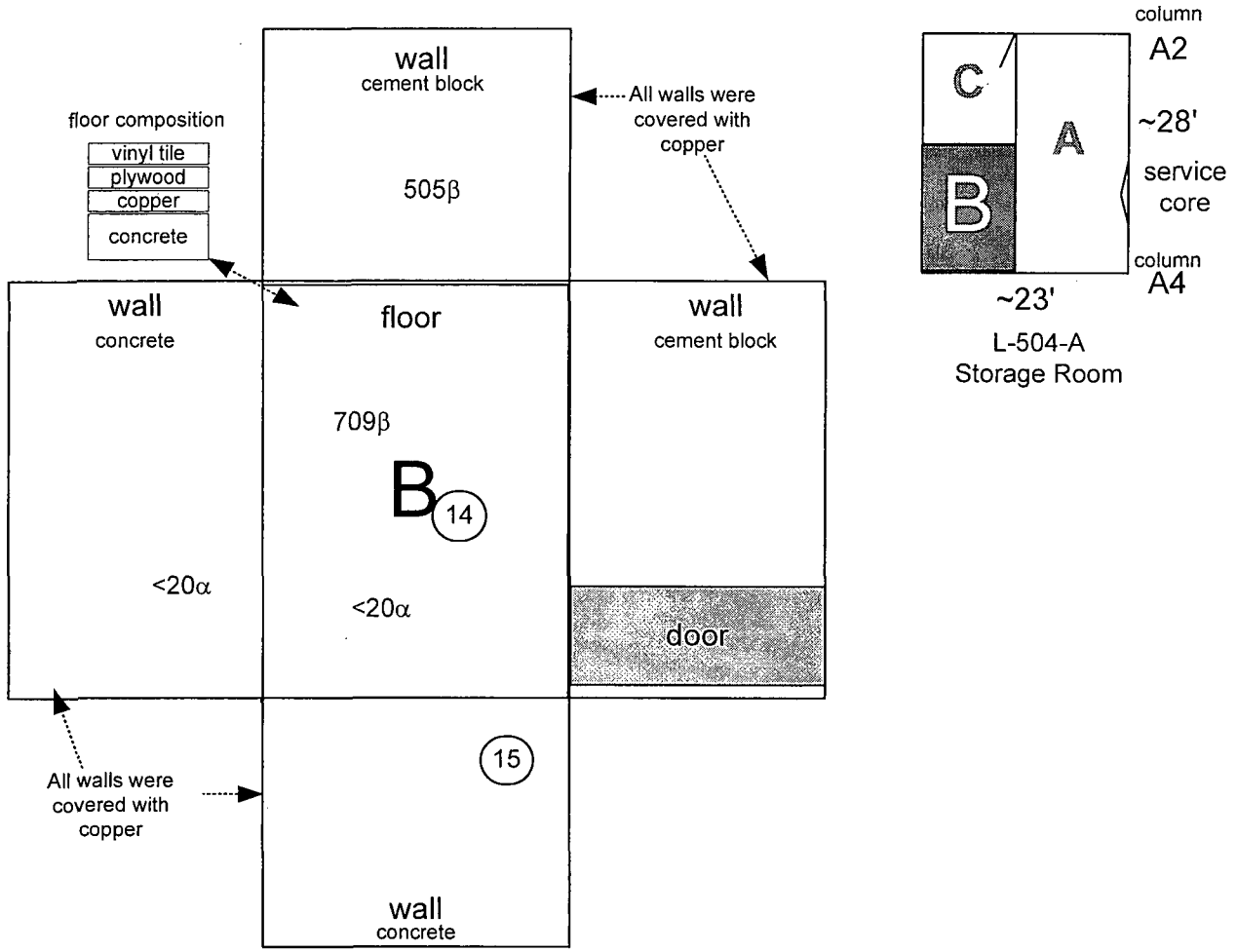
Instrument		
Model	Ludlum 3	
Serial #	153551	
Cal Due Date	05-23-03	
Probe	2" X 2" NaI γ	
Probe #	155109	
Background	contact	@ 1 meter
copper/concrete	14-19 μR/hr	13-19 μR/hr
copper/cem blk	14-18 μR/hr	14-17 μR/hr

Notes:

1. ## Denotes fixed exposure rate measurement, in μR/hr, taken at ~ 1 meter from the surface.
2. ◄ ##-## ► Denotes exposure rate surface scan in μR/hr.
3. 10% of floor and walls 2 meters and below were scanned.

Surveys conducted by: R. Stowell
Dates: 03-28-03

Figure 66: Building 2 Service Corridor Section A Storage Room, L-504-A, Room B
Alpha and Beta Fixed Measurement Locations and Results and Wipe Survey Locations



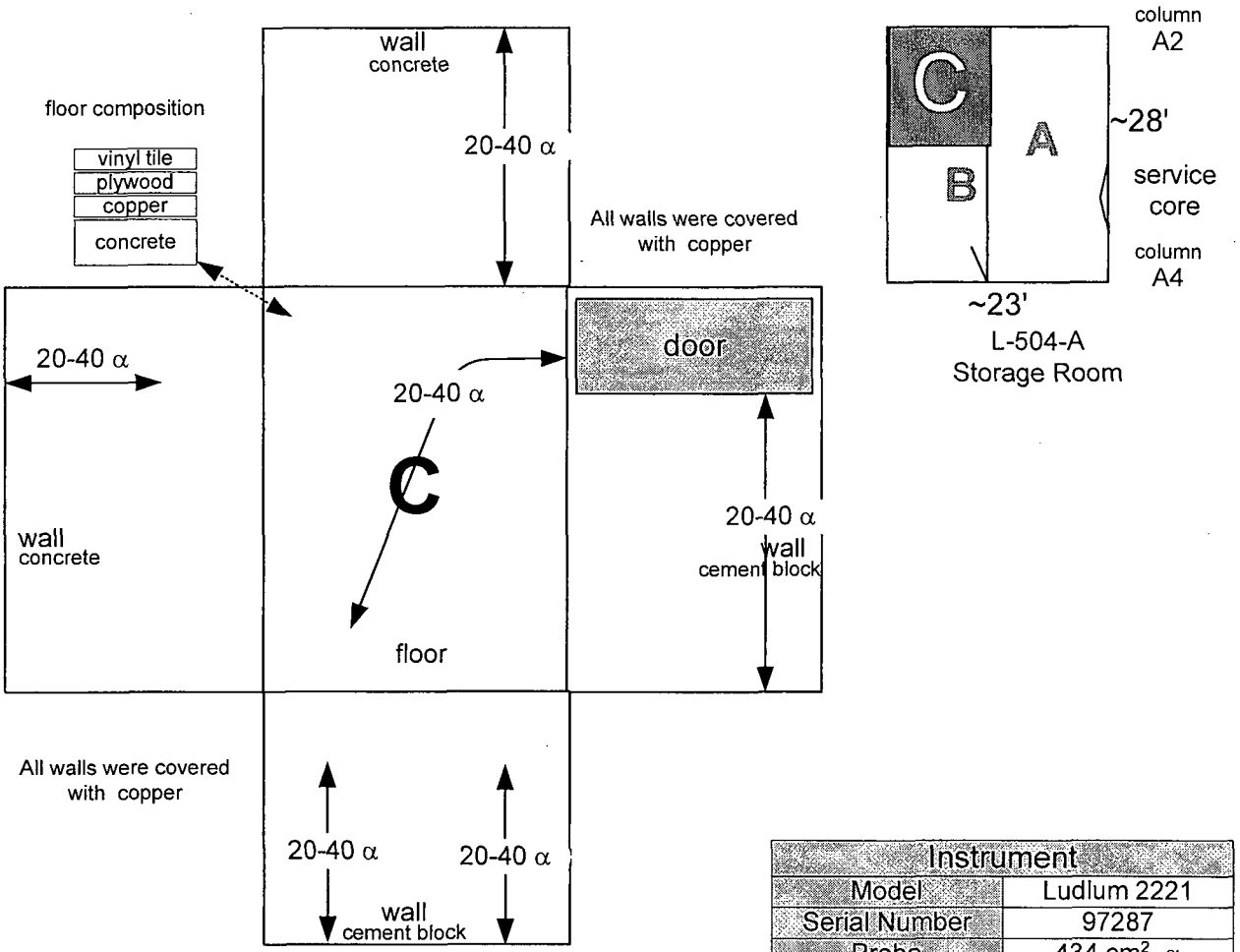
Instruments				
Model	Ludlum 12		Ludlum 2221	
Serial #	91051		86302	
Cal Due Date	04-15-03		07-24-03	
Probe	50 cm^2 α		100 cm^2 β	
Probe #	094053		142547	
Efficiency	21.77%		31.20%	
Surface	Background	MDA	Background	MDA
copper/concrete	<20 cpm	216 dpm/100 cm^2	578+/-60 cp2m	218 dpm/100 cm^2
copper/cem.block	<20 cpm	216 dpm/100 cm^2	493+/-50 cp2m	170 dpm/100 cm^2
floor	<20 cpm	216 dpm/100 cm^2	545+/- 58 cp2m	178 dpm/100 cm^2

Notes:

1. ##α Denotes alpha fixed measurement in cpm.
2. ###β Denotes beta fixed measurement in cp2m.
3. (#) Denotes wipe location, wipe results are provided in Table 5.

Survey conducted by: R. Stowell & G. Sayer
Date: 03-31-03

Figure 67: Building 2 Service Corridor Section A Storage Room, L-504-A, Room C
Alpha Scan Measurement Locations and Results



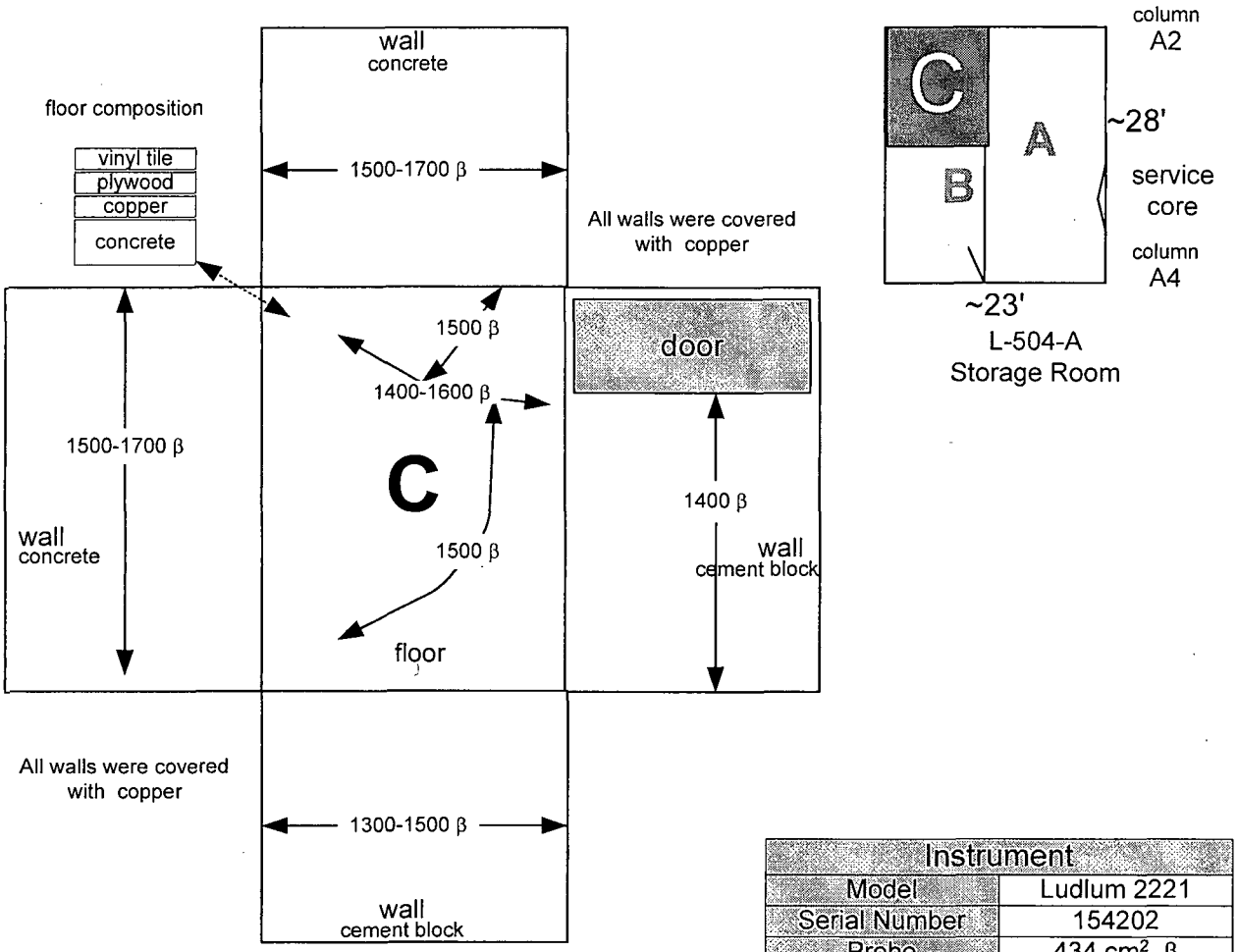
Instrument	
Model	Ludlum 2221
Serial Number	97287
Probe	434 cm² α
Probe Serial #	083293
Cal Due Date	09-22-03
Efficiency	20.98%
Bkgd copper/conc	0-10 cpm
Scan MDA	16 dpm/100 cm²
Bkgd cop/cem blk	0-10 cpm
Scan MDA	16 dpm/100 cm²
Bkgd Floor	0-20 cpm
Scan MDA	33 dpm/100 cm²

Notes:

1. 10% of floor and walls 2 meters and below scanned.
2. ◄ #-# α ► Denotes alpha scan in cpm.

Survey conducted by: R. Stowell & G. Sayer
Date: 03-31-03

Figure 68: Building 2 Service Corridor Section A Storage Room, L-504-A, Room C
Beta Scan Measurement Locations and Results



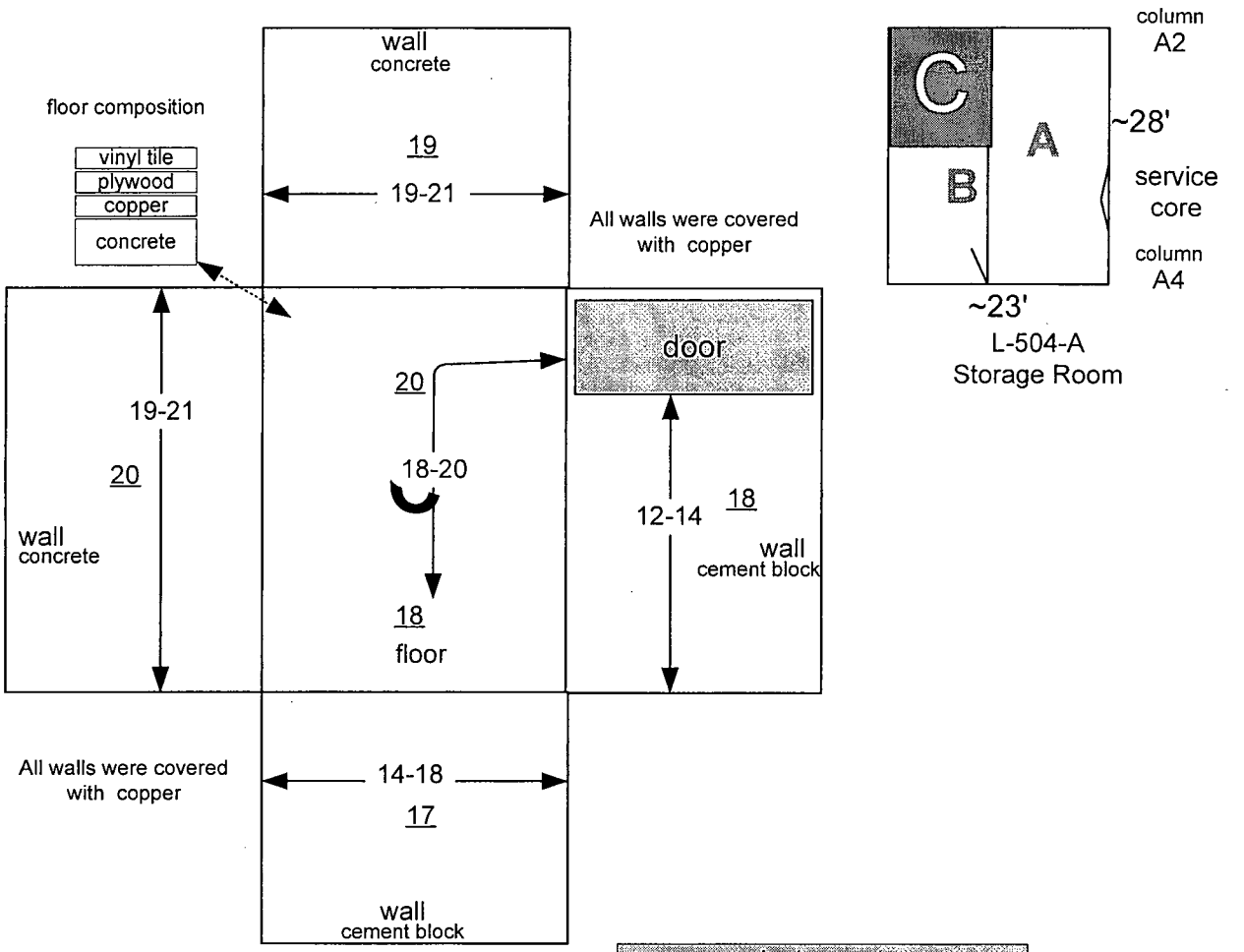
Instrument	
Model	Ludlum 2221
Serial Number	154202
Probe	434 cm² β
Probe Serial #	149017
Cal Due Date	04-01-03
Efficiency	30.17%
Bkgd cop/concrete	1000-1400cpm
Scan MDA	275 dpm/100 cm²
Bkgd cop/cem blk	1000-1300 cpm
Scan MDA	263 dpm/100 cm²
Bkgd. Floor	1000-1400 cpm
Scan MDA	275 dpm/100 cm²

Notes:

1. 10% of floor and walls 2 meters and below scanned.
2. ← #-# β → Denotes beta scan in cpm.

Survey conducted by: G./ Sayer & R. Stowell
Dates: 03-24-03 & 03-25-03

Figure 69: Building 2 Service Corridor Section A Storage Room, L-504-A, Room C
Exposure Rate Fixed Measurement and Exposure Rate Scan Measurement
Locations and Results



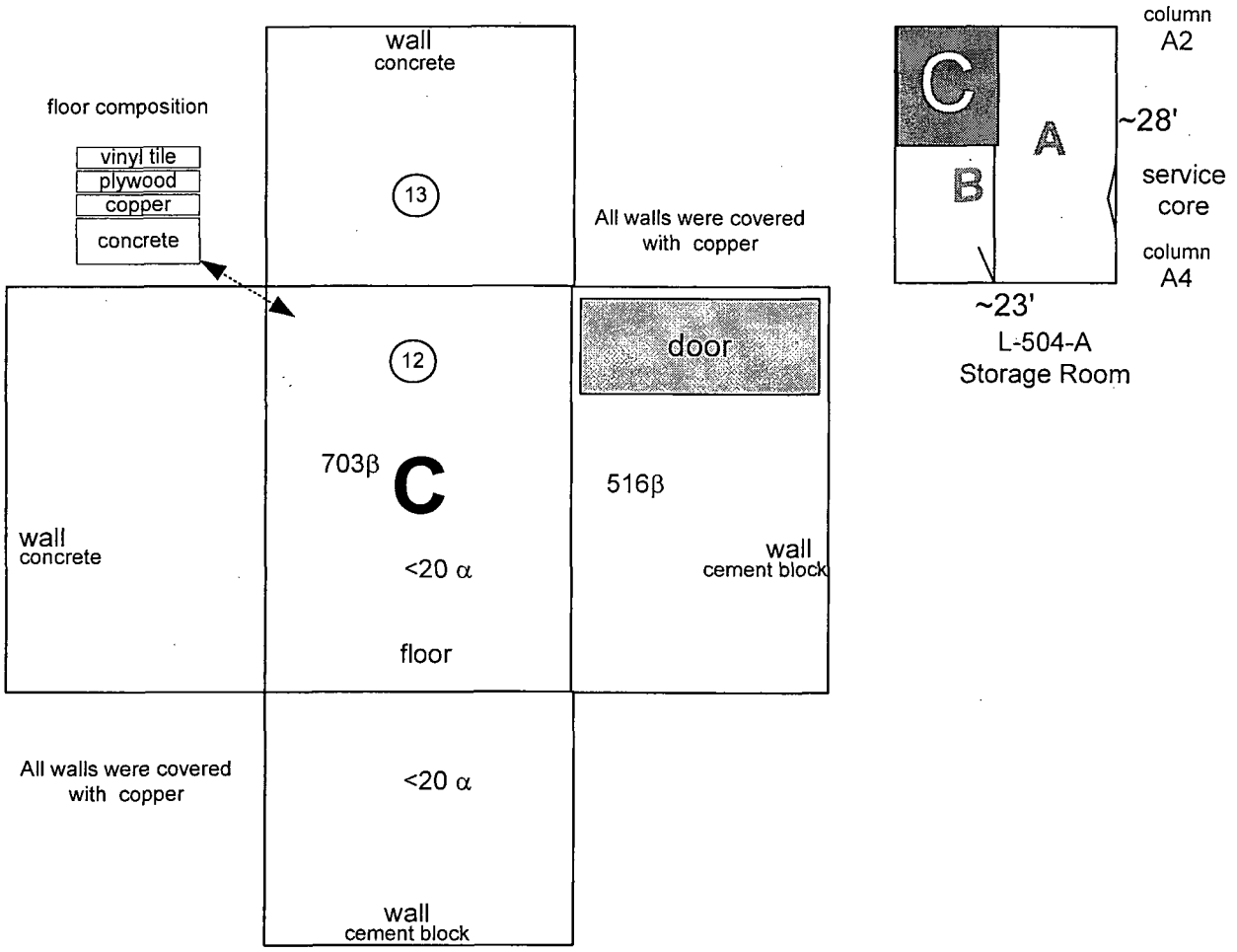
Instrument		
Model	Ludlum 3	
Serial #	153551	
Cal Due Date	05-23-03	
Probe	2" X 2" NaI γ	
Probe #	155109	
Background	contact	@ 1 meter
copper/concrete	14-19 μR/hr	13-19 μR/hr
copper/cem blk	14-18 μR/hr	14-17 μR/hr

Notes:

1. ## Denotes fixed exposure rate measurement, in μR/hr, taken at ~ 1 meter from the surface.
2. ◄ ##-## ► Denotes exposure rate surface scan in μR/hr.
3. 10% of floor and walls 2 meters and below were scanned.

Surveys conducted by: R. Stowell
Dates: 03-26-03 & 03-28-03

Figure 70: Building 2 Service Corridor Section A Storage Room, L-504-A, Room C
Alpha and Beta Fixed Measurement Locations and Results and Wipe Survey Locations



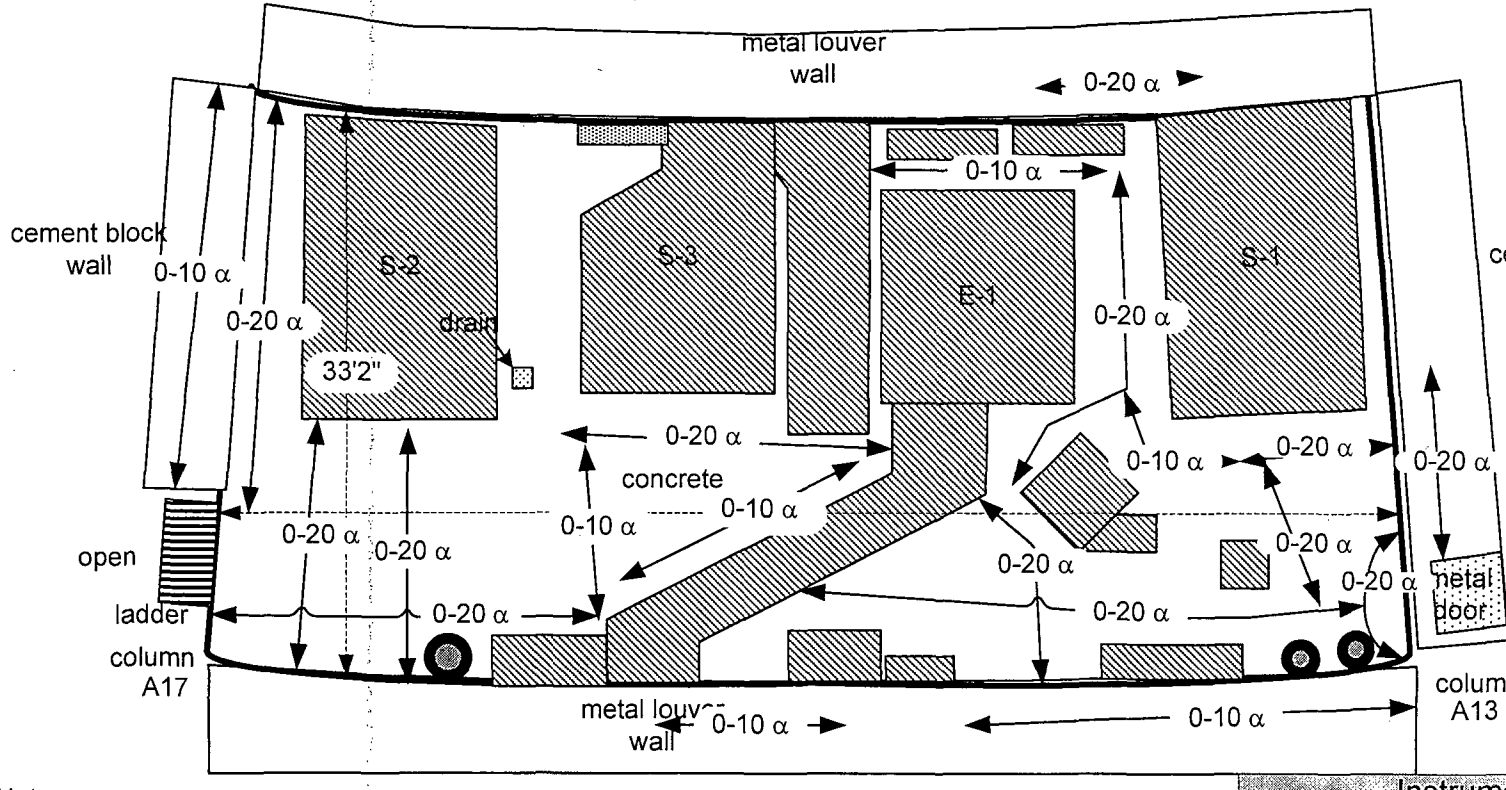
Instruments				
Model	Ludlum 12		Ludlum 2221	
Serial #	91051		86302	
Cal Due Date	04-15-03		07-24-03	
Probe	50 cm^2 α		100 cm^2 β	
Probe #	094053		142547	
Efficiency	21.77%		31.20%	
Surface	Background	MDA	Background	MDA
copper/concrete	<20 cpm	216 dpm/100 cm^2	578+/-60 cp2m	218 dpm/100 cm^2
copper/cem.block	<20 cpm	216 dpm/100 cm^2	493+/-50 cp2m	170 dpm/100 cm^2
floor	<20 cpm	216 dpm/100 cm^2	545+/- 58 cp2m	178 dpm/100 cm^2

Notes:

1. ##α Denotes alpha fixed measurement in cpm.
2. ###β Denotes beta fixed measurement in cp2m.
3. (#) Denotes wipe location, wipe results are provided in Table 5.

Surveys conducted by: R. Stowell & G. Sayer
Date: 03-31-03

Figure 71: Building 2 Service Corridor Section A Vent Room Above Breezeway A
Alpha Scan Measurement Locations and Results



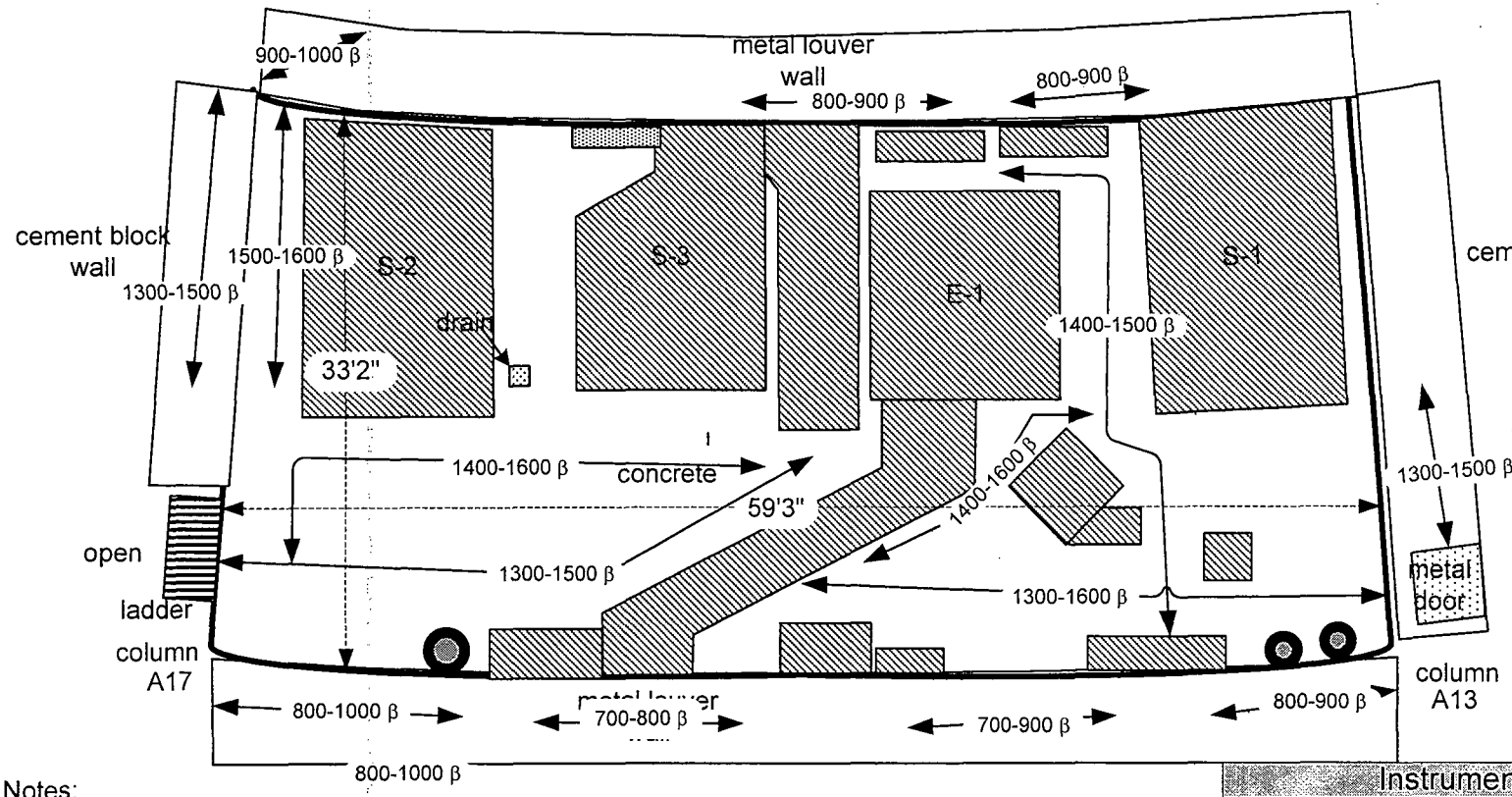
Notes:

1. 10% of floor and walls 2 meters and below scanned.
2. ◄ #-#α ► Denotes alpha scan in cpm.

Instrument	
Model	Ludlum 2221
Serial Number	97287
Probe	434 cm^2 α
Probe Serial #	083293
Cal Due Date	09-22-03
Efficiency	20.98%
Bkgd concrete	0-30 cpm
Scan MDA	49 dpm/100 cm^2
Bkgd cement block	0-20 cpm
Scan MDA	33 dpm/100 cm^2
Bkgd Metal	0-20 cpm
Scan MDA	33 dpm/100 cm^2

Survey conducted by: G. Sayer
Date: 04-14-03

Figure 72: Building 2 Service Corridor Section A Vent Room Above Breezeway A
Beta Scan Measurement Locations and Results



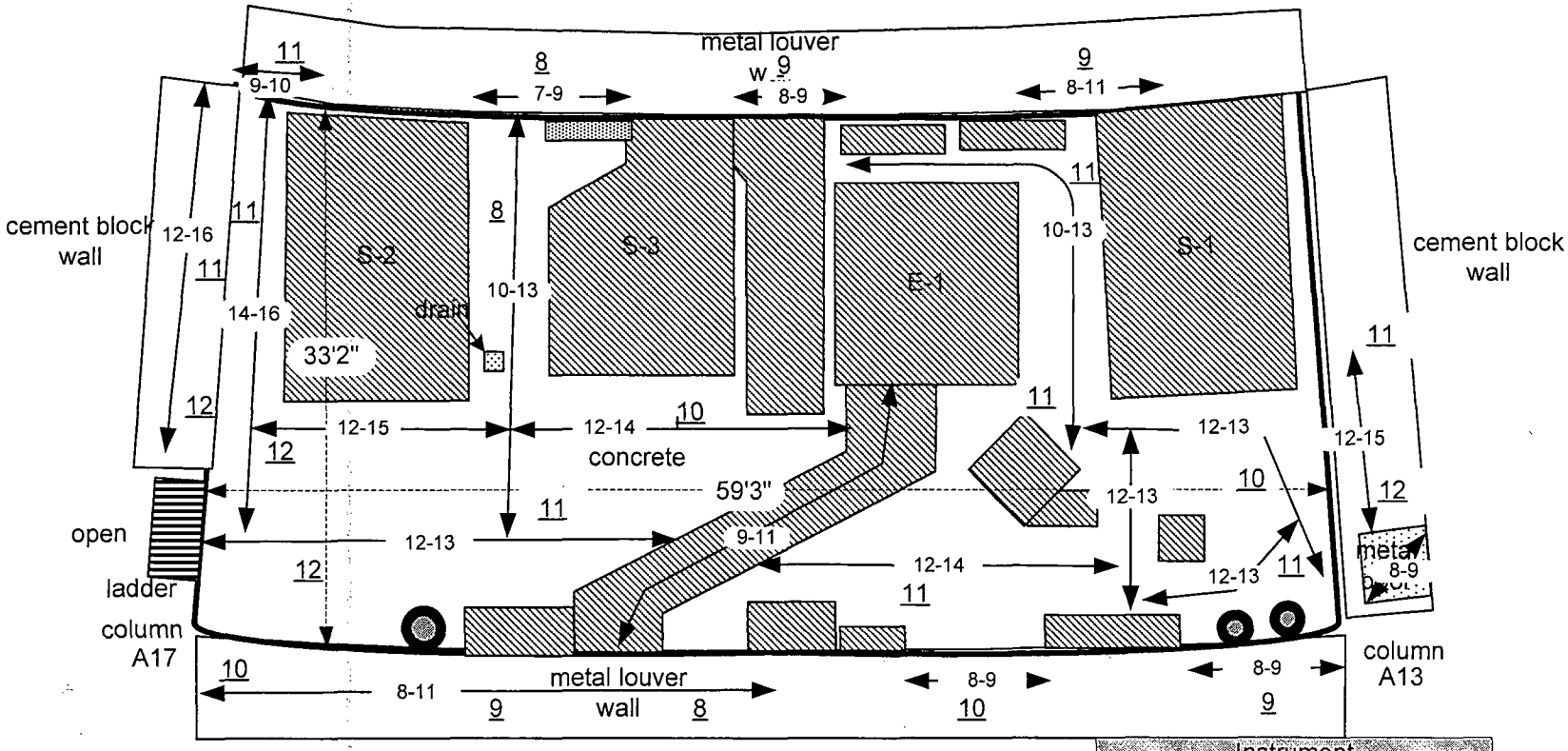
Notes:

1. 10% of floor and walls 2 meters and below scanned.
2. ← #-# β → Denotes beta scan in cpm.

Instrument	
Model	Ludlum 2221
Serial Number	154202
Probe	434 cm^2 β
Probe Serial #	149017
Cal Due Date	09-26-03
Efficiency	30.17%
Bkgd concrete	1400-2000 cpm
Scan MDA	389 dpm/100 cm^2
Bkgd cement block	1100-1600 cpm
Scan MDA	309 dpm/100 cm^2
Bkgd metal	900-1300 cpm
Scan MDA	252 dpm/100 cm^2

Survey conducted by: R. Stowell
Date: 04-14-03

Figure 73: Building 2 Service Corridor Section A Vent Room Above Breezeway A
Exposure Rate Fixed Measurement and Exposure Rate Scan Measurement Locations and Results



Notes:

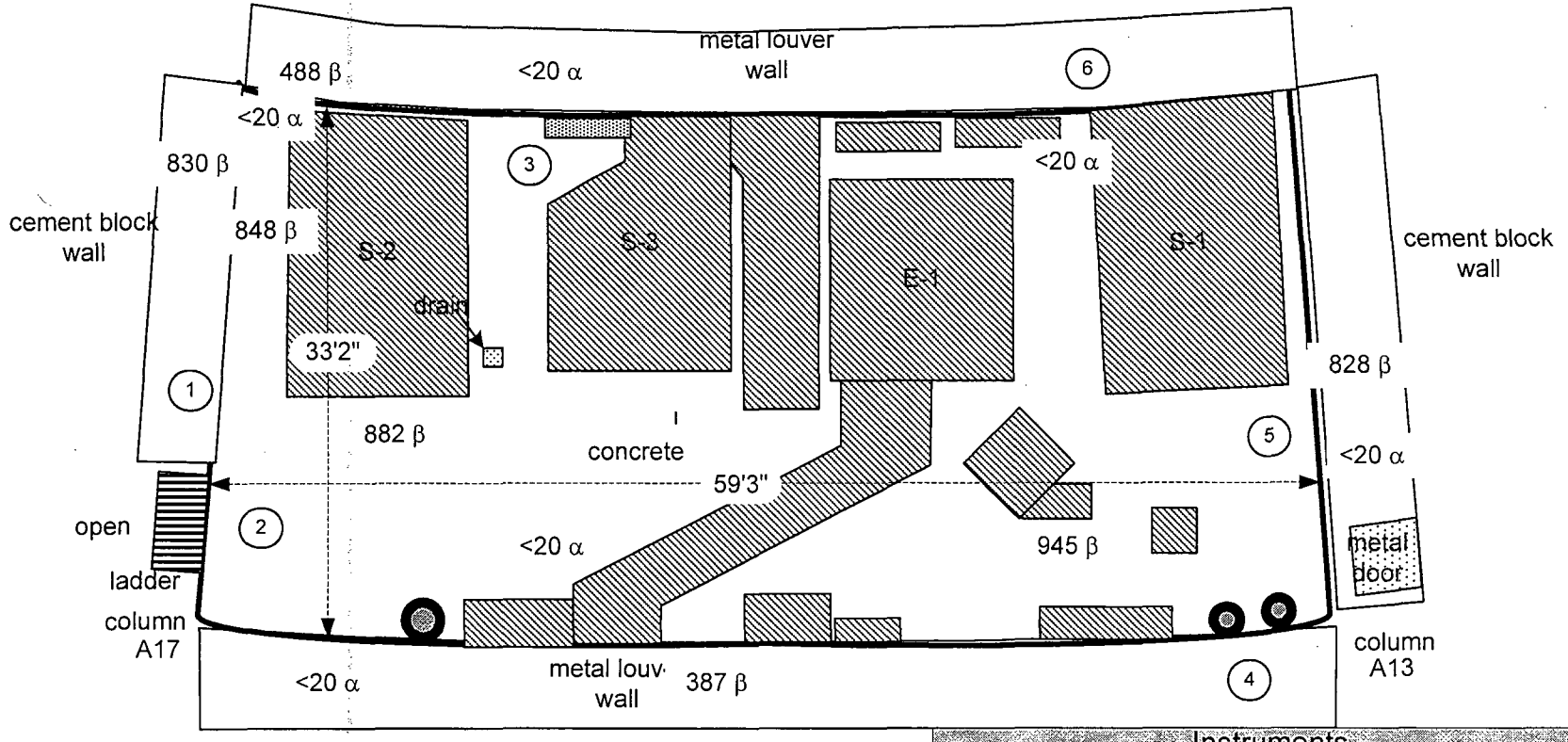
1. ## Denotes fixed exposure rate measurement, in μR/hr, taken at ~ 1 meter from the surface.
2. ◄ ##-## ► Denotes exposure rate surface scan in μR/hr.
3. 10% of floor and walls 2 meters and below were scanned.

Instrument		
Model	Ludlum 3	
Serial #	153551	
Cal Due Date	05-23-03	
Probe	2" X 2" Nal γ	
Probe #	155109	
Background	contact	@ 1 meter
concrete	15-21 μR/hr	15-21 μR/hr
cement block	14-19 μR/hr	14-18 μR/hr
metal	9-13 μR/hr	10-13 μR/hr

Surveys conducted by: R. Stowell & G. Sayer
Date: 04-11-03

Figure 73

Figure 74: Building 2 Service Corridor Section A Vent Room Above Breezeway A
Alpha and Beta Fixed Measurement Locations and Results and Wipe Survey Locations



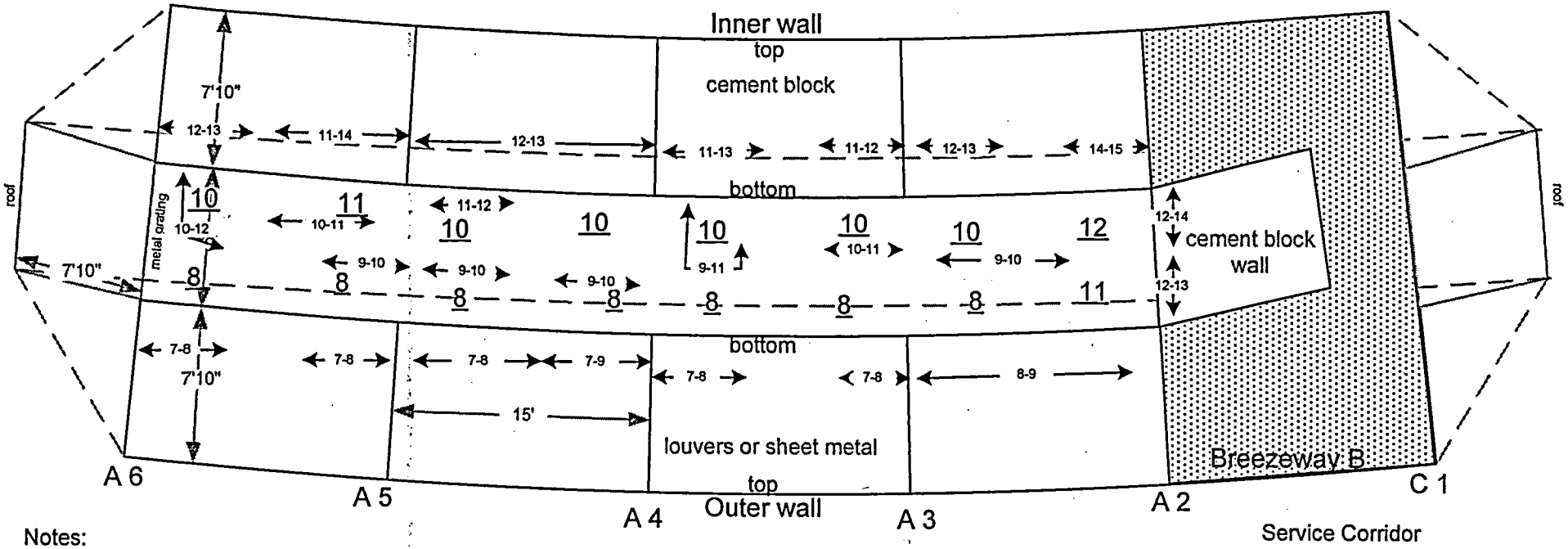
Notes:

1. ##α Denotes alpha fixed measurement in cpm.
2. ###β Denotes beta fixed measurement in cp2m.
3. (#) Denotes wipe location, wipe results are provided in Table 5.

Survey conducted by: R. Stowell & G. Sayer
Dates: 04-14-03 & 04-15-03

Instruments		
Model	Ludlum 12	Ludlum 2221
Serial #	91051	86302
Cal Due Date	04-15-03	07-24-03
Probe	50 cm^2 α	100 cm^2 β
Probe #	094053	142547
Efficiency	21.77%	31.20%
Bkgd. concrete	<20cpm	822+/344 cp2m
MDA	216 dpm/100 cm^2	218 dpm/100 cm^2
Bkgd cement block	<20cpm	671+/-126 cp2m
MDA	216 dpm/100 cm^2	197 dpm/100 cm^2
Bkgd metal	<20 cpm	435+/-170 cp2m
MDA	216 dpm/100 cm^2	160 dpm/100 cm^2

Figure 75: Building 2 Service Corridor Overhead Crawl Space Column C 1 to A 6
Exposure Rate Fixed and Exposure Rate Scan Measurement Locations and Results

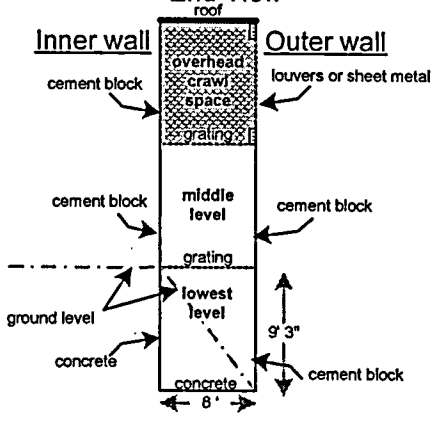


Notes:

1. ## Denotes exposure rate fixed measurement taken ~ 1 meter from the surface.
2. ← #-## → Denotes exposure rate surface scan. A minimum of 10% of the surface scanned.
3. Scans taken ~ 1 inch from the surface on walls and on vent ducts, pipes, etc. in the overhead.
4. All values are in μR/hr.

Instrument		
Model	Ludlum 3	
Serial #	153551	
Cal Due Date	05-23-03	
Probe	2" x 2" NaI	
Probe Serial #	155109	
Backgrounds	@ 1 meter	contact
Bkgd cem blk	14-18 μR/hr	14-19 μR/hr
Bkgd metal	10-13 μR/hr	9-13 μR/hr

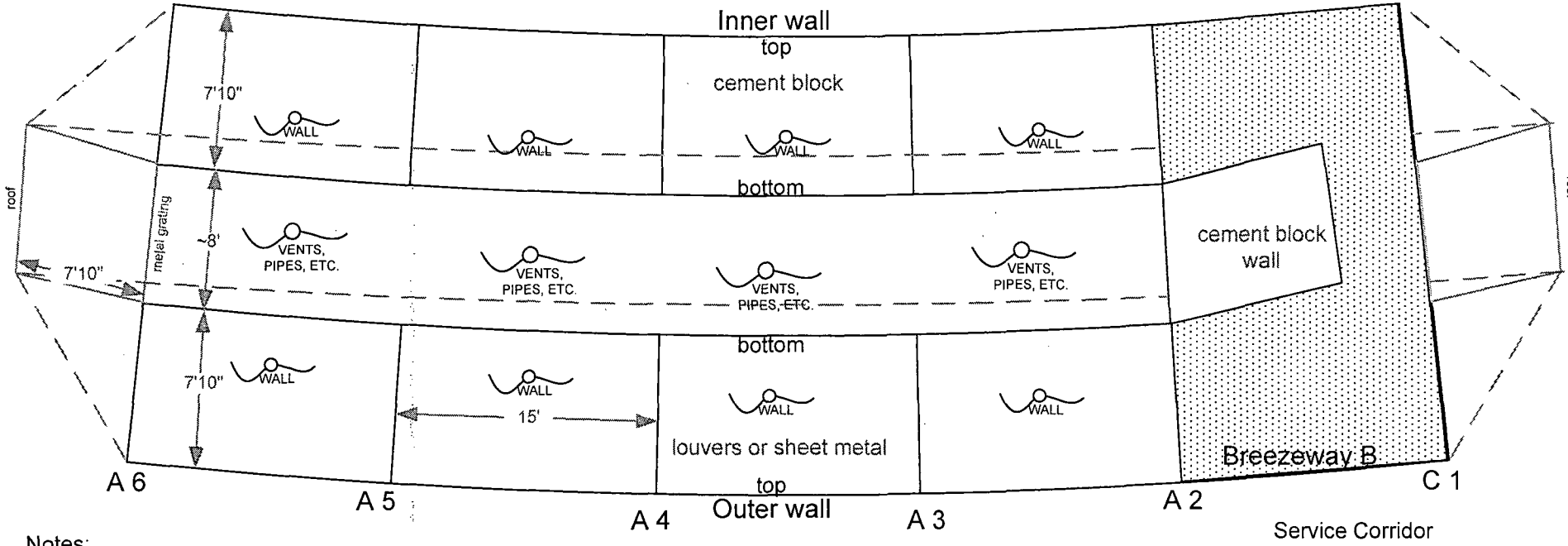
Service Corridor
End View



Surveys conducted by: G. Sayer & R. Stowell
Dates: 04-02-03 & 04-10-03

Figure 75

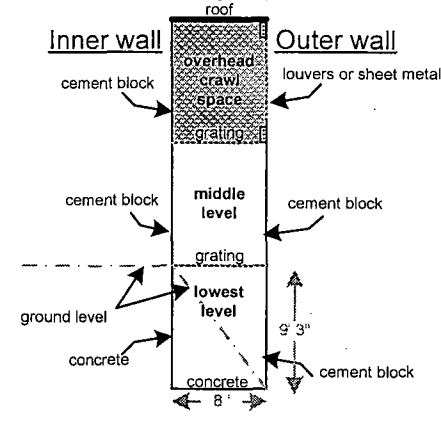
Figure 76: Building 2 Service Corridor Overhead Crawl Space Column C 1 to A 6
Large Area Wipe Locations and Results



Notes:

1. Large area wipes were taken on the walls and on vent ducts, pipes, etc. in the overhead.
2. Denotes large area (Masslinn) wipe .
3. No activity above background, alpha or beta, was detected.

Service Corridor
End View

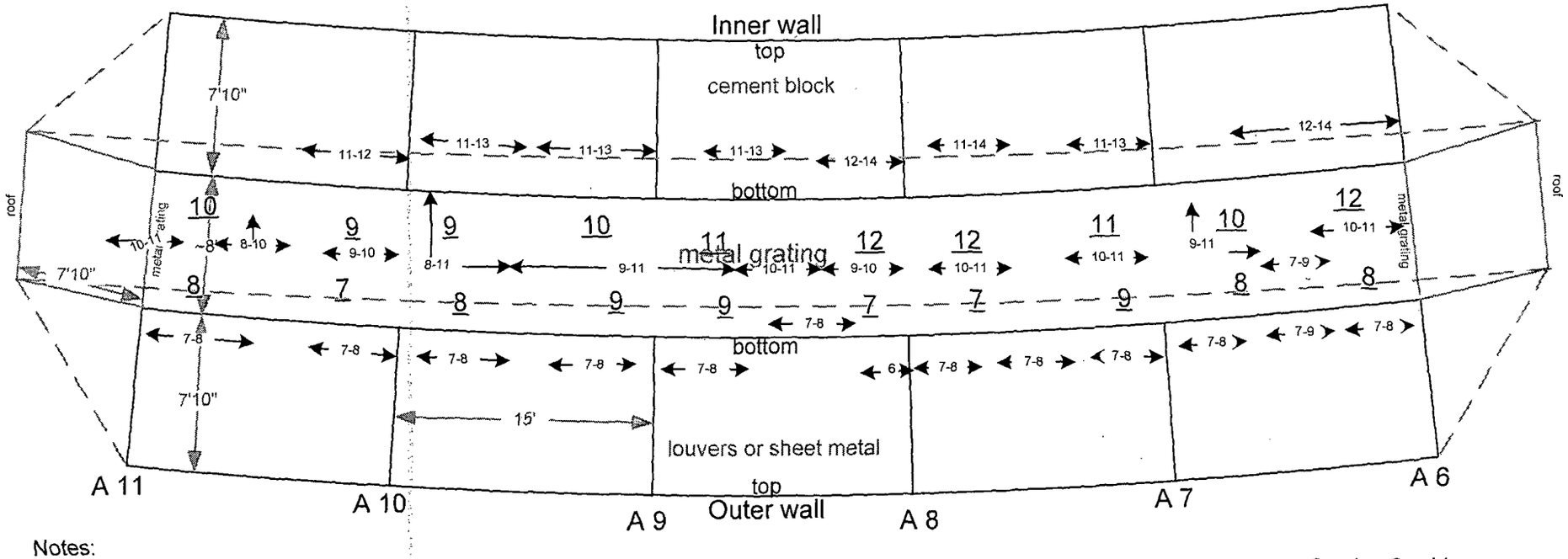


Instruments		
Model	Ludlum 3	Ludlum 12
Serial #	138880	91103
Cal Due Date	07-18-03	10-14-03
Probe	15 cm^2 β–γ	50 cm^2 α
Probe Serial #	145963	092192
Efficiency	24.64%	22.14%
Bkgd	40-80 cpm	<20 cpm

Survey conducted by: G. Sayer & R. Stowell
Date: 04-16-03

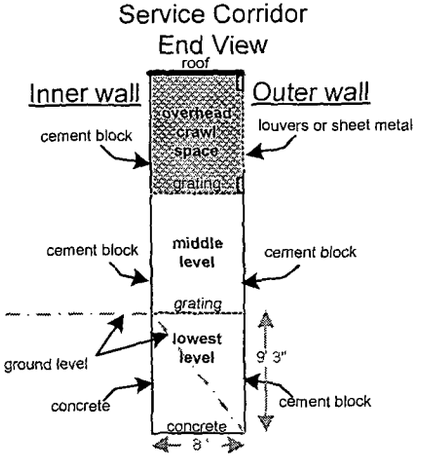
Figure 76

Figure 77: Building 2 Service Corridor Overhead Crawl Space Column A 6 to A 11
Exposure Rate Fixed and Exposure Rate Scan Measurement Locations and Results



Notes:

1. ## Denotes exposure rate fixed measurement taken ~ 1 meter from the surface.
2. ← ### → Denotes exposure rate surface scan . A minimum of 10% of the surface scanned.
3. Scans taken ~ 1 inch from the surface on walls and on vent ducts, pipes, etc. in the overhead.
4. All values are in μR/hr.

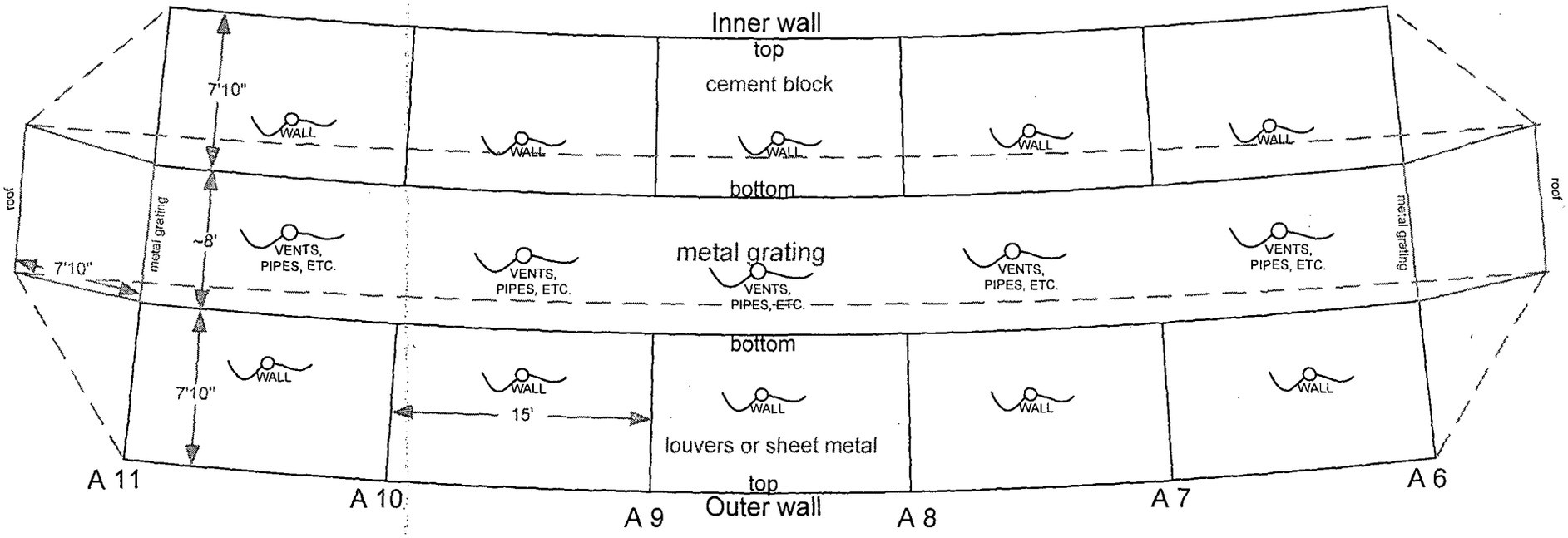


Instrument		
Model	Ludlum 3	
Serial #	153551	
Cal Due Date	05-23-03	
Probe	2" x 2" NaI	
Probe Serial #	155109	
Backgrounds	@ 1 meter	contact
Bkgd cem blk	14-18 μR/hr	14-19 μR/hr
Bkgd metal	10-13 μR/hr	9-13 μR/hr

Surveys conducted by: G. Sayer & R. Stowell
Dates: 04-02-03 & 04-10-03

Figure 77

Figure 78: Building 2 Service Corridor Overhead Crawl Space Column A 6 to A 11
Large Area Wipe Locations and Results

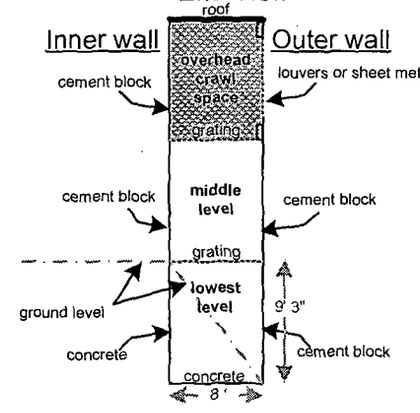


Notes:

1. Large area wipes were taken on the walls and on vent ducts, pipes, etc. in the overhead.
2. ∩ Denotes large area (Masslinn) wipe.
3. No activity, alpha or beta, above background was detected.

Instruments		
Model	Ludlum 3	Ludlum 12
Serial #	138880	91103
Cal Due Date	07-18-03	10-14-03
Probe	15 cm² β–γ	50 cm² α
Probe Serial #	145963	092192
Efficiency	24.64%	22.14%
Bkgd	40-80 cpm	<20 cpm

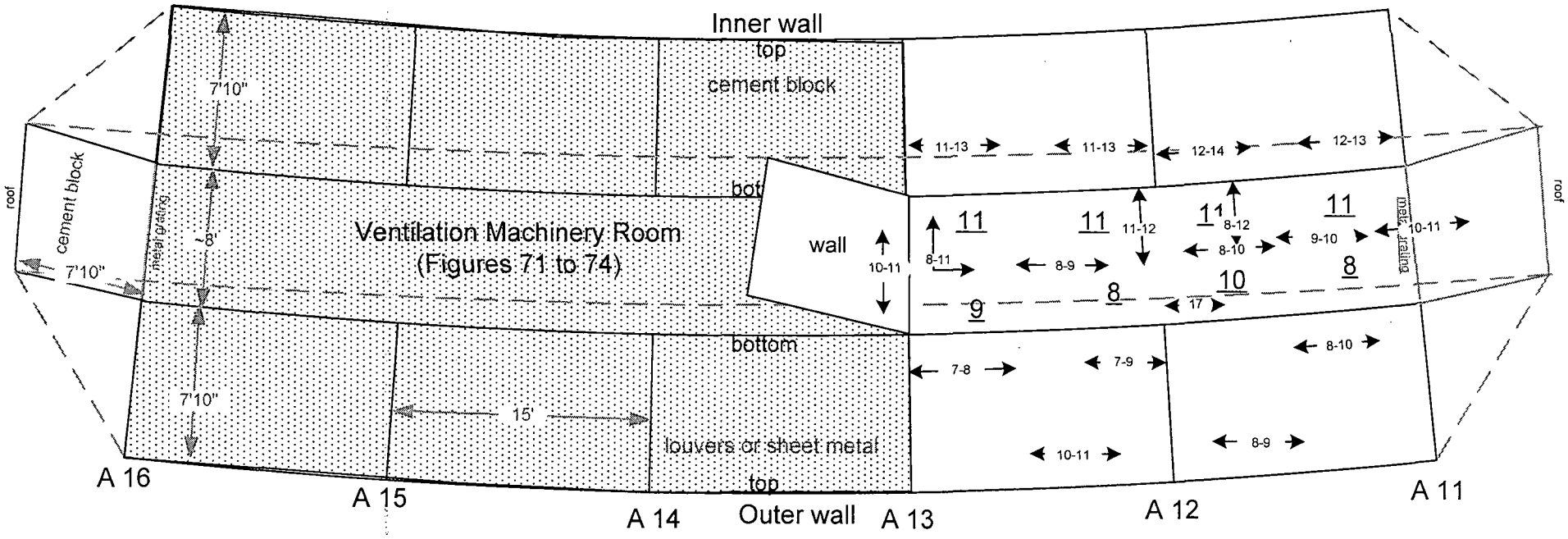
Service Corridor
End View



Surveys conducted by: G. Sayer & R. Stowell
Date: 04-16-03

Figure 78

Figure 79: Building 2 Service Corridor Overhead Crawl Space Column A 11 to A 16
Exposure Rate Fixed and Exposure Rate Scan Measurement Locations and Results

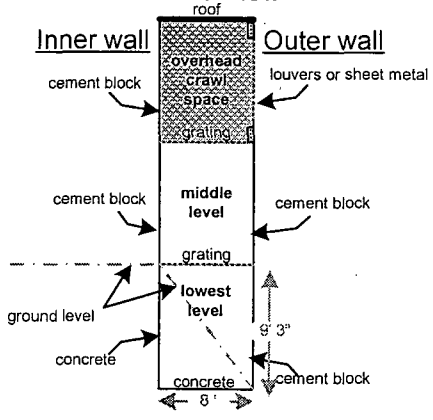


Notes:

1. ## Denotes fixed measurement taken ~ 1 meter from the surface.
2. ◄— ##-## —► Denotes surface scan location. A minimum of 10% of the surface scanned.
3. Scans taken ~ 1 inch from the surface on walls and on vent ducts, pipes, etc. in the overhead.
4. All values are in μR/hr.

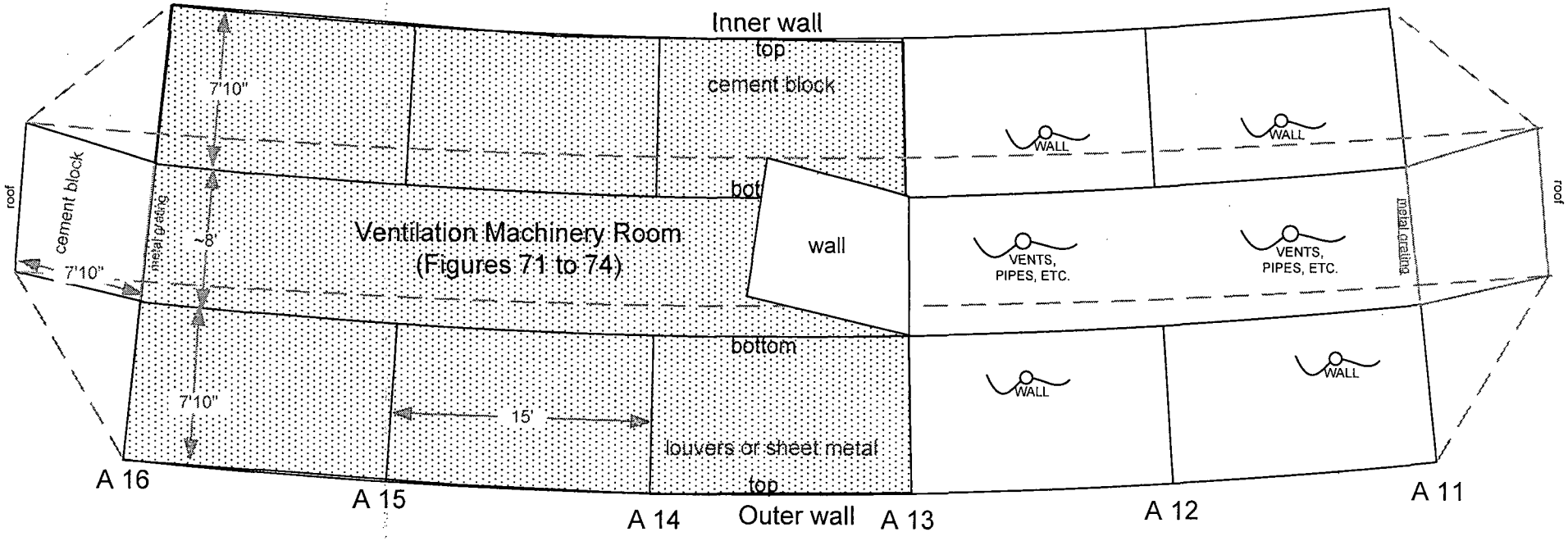
Instrument		
Model	Ludlum 3	
Serial #	153551	
Cal Due Date	05-23-03	
Probe	2" x 2" NaI	
Probe Serial #	155109	
Backgrounds	@ 1 meter	contact
Bkgd cem blk	14-18 μR/hr	14-19 μR/hr
Bkgd metal	10-13 μR/hr	9-13 μR/hr

Service Corridor
End View



Surveys conducted by: R. Stowell & G. Sayer
Dates: 04-02-03, 04-03-03 & 04-10-03

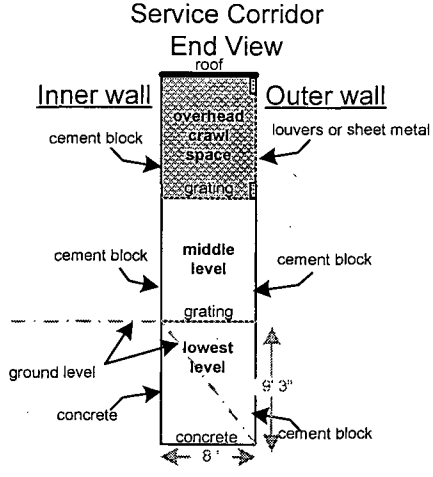
Figure 80: Building 2 Service Corridor Overhead Crawl Space Column A 11 to A 16
Large Area Wipe Locations and Results



Notes:

1. Large area wipes were taken on the walls and on vent ducts, pipes, etc. in the overhead.
2. Denotes large area (Masslinn) wipe.
3. No activity, alpha or beta, above background was detected.

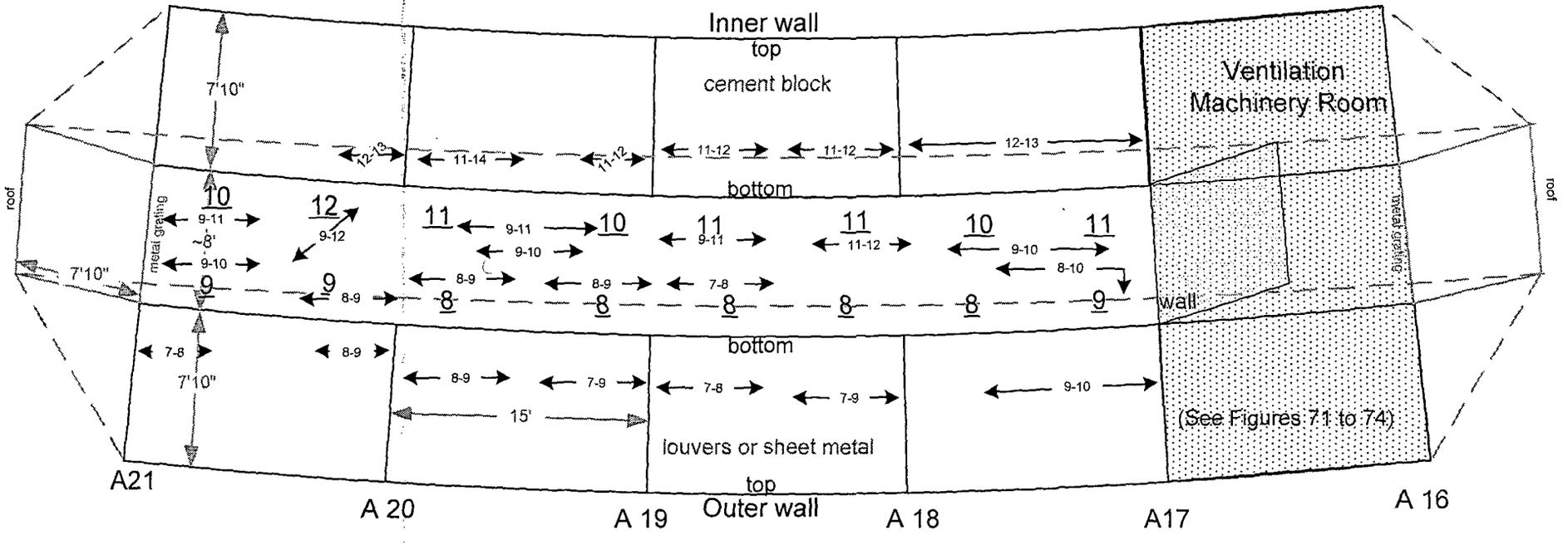
Instruments		
Model	Ludlum 3	Ludlum 12
Serial #	138880	91103
Cal Due Date	07-18-03	10-14-03
Probe	15 cm^2 β–γ	50 cm^2 α
Probe Serial #	145963	092192
Efficiency	24.64%	22.14%
Bkgd	40-80 cpm	<20 cpm



Survey conducted by: R. Stowell & G. Sayer
Date: 04-16-03

Figure 80

Figure 81: Building 2 Service Corridor Overhead Crawl Space Column A 16 to A 21
Exposure Rate Fixed and Exposure Rate Scan Measurement Locations and Results

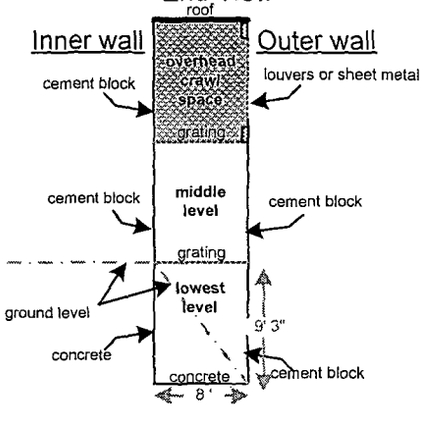


Notes:

1. ## Denotes exposure rate fixed measurement taken ~ 1 meter from the surface.
2. ← #-## → Denotes exposure rate surface scan. A minimum of 10% of the surface scanned.
3. Scans taken ~ 1 inch from the surface on walls and on vent ducts, pipes, etc. in the overhead.
4. All values are in μR/hr.

Instrument		
Model	Ludlum 3	
Serial #	153551	
Cal Due Date	05-23-03	
Probe	2" x 2" NaI	
Probe Serial #	155109	
Backgrounds	@ 1 meter	contact
Bkgd cem blk	14-18 μR/hr	14-19 μR/hr
Bkgd metal	10-13 μR/hr	9-13 μR/hr

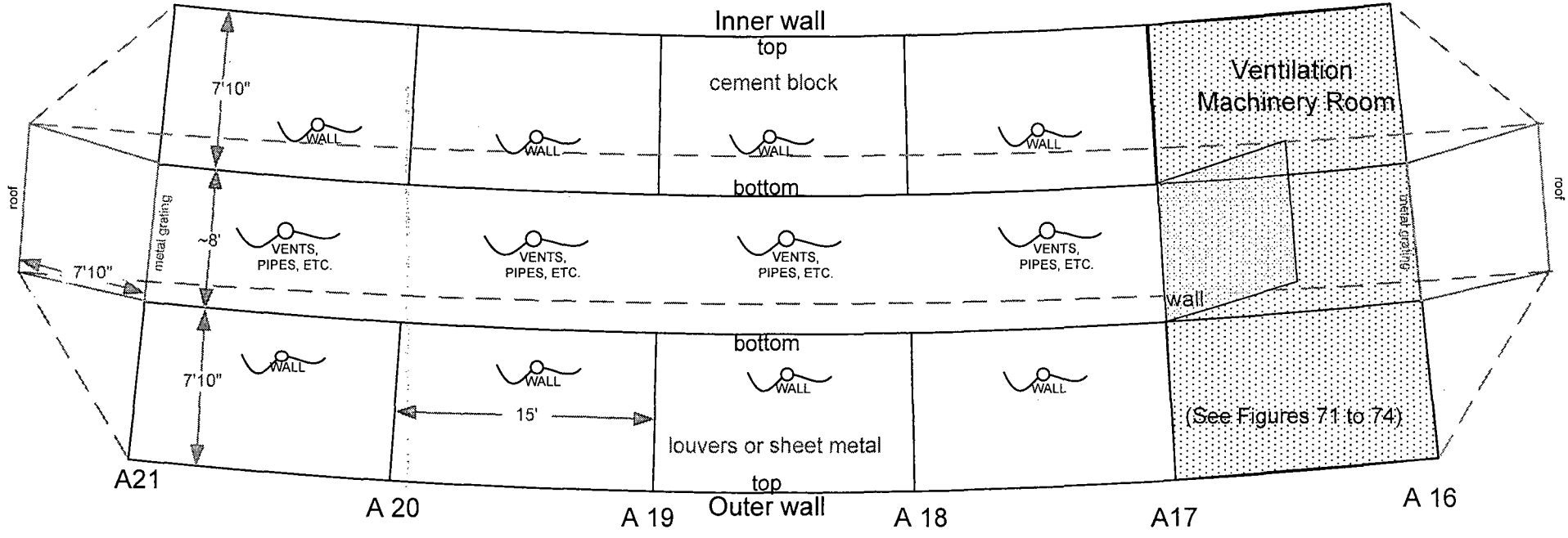
Service Corridor
End View



Surveys conducted by: G. Sayer & R. Stowell
Date: 04-02-03

Figure 81

Figure 82: Building 2 Service Corridor Overhead Crawl Space Column A 16 to A 21
Large Area Wipe Locations and Results

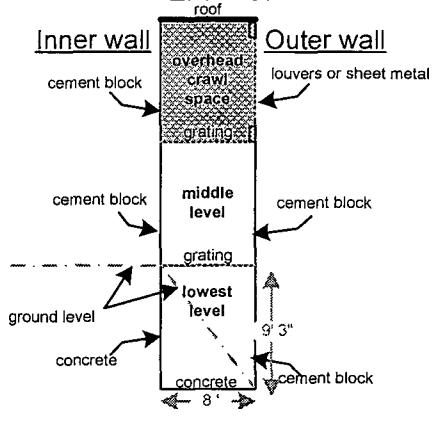


Notes:

1. Large area wipes were taken on the walls and on vent ducts, pipes, etc. in the overhead.
2. Denotes large area (Masslinn) wipe.
3. No activity, alpha or beta, above background was detected.

Instruments		
Model	Ludlum 3	Ludlum 12
Serial #	138880	91103
Cal Due Date	07-18-03	10-14-03
Probe	15 cm² β–γ	50 cm² α
Probe Serial #	145963	092192
Efficiency	24.64%	22.14%
Bkgd	40-80 cpm	<20 cpm

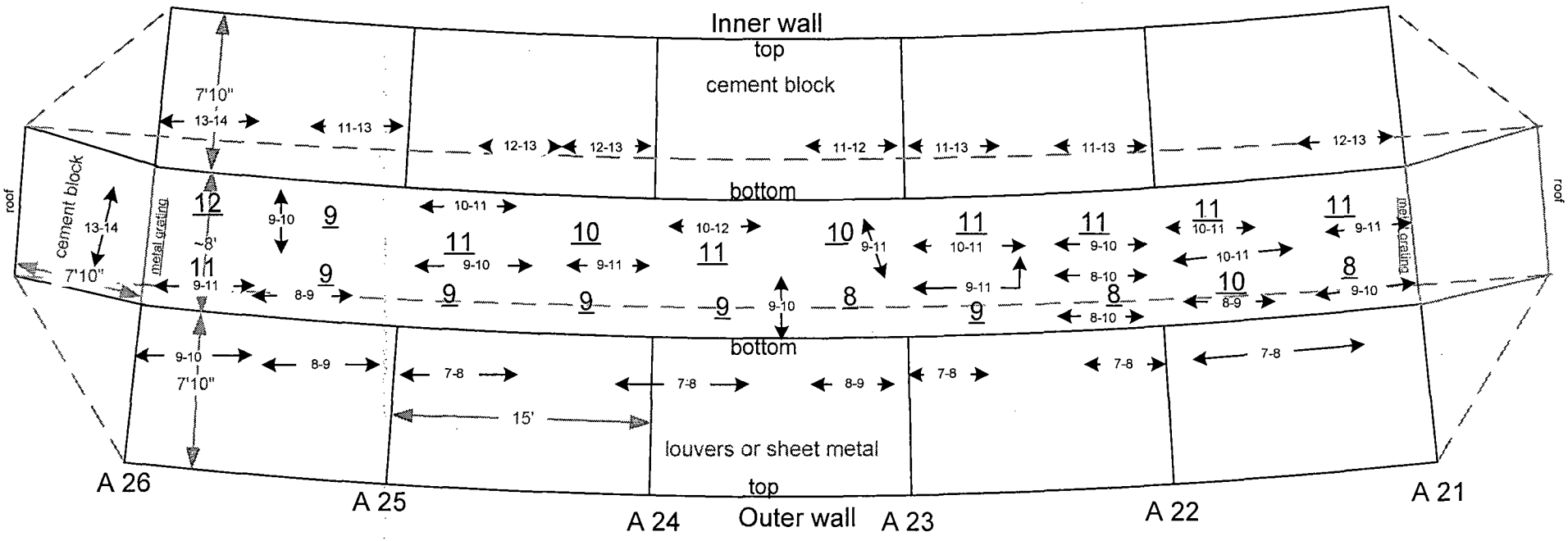
Service Corridor
End View



Survey conducted by: G. Sayer & R. Stowell
Date: 04-16-03

Figure82

Figure 83: Building 2 Service Corridor Overhead Crawl Space Column A 21 to A 26
Exposure Rate Fixed and Exposure Rate Scan Measurement Locations and Results

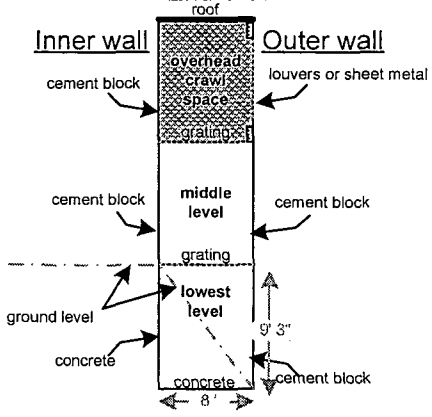


Notes:

1. ## Denotes exposure rate fixed measurement taken ~ 1 meter from the surface.
2. ← ##-## → Denotes exposure rate surface scan. A minimum of 10% of the surface scanned.
3. Scans taken ~ 1 inch from the surface on walls and on vent ducts, pipes, etc. in the overhead.
4. All values are in μR/hr.

Instrument		
Model	Ludlum 3	
Serial #	153551	
Cal Due Date	05-23-03	
Probe	2" x 2" NaI	
Probe Serial #	155109	
Backgrounds	@ 1 meter	contact
Bkgd cem blk	14-18 μR/hr	14-19 μR/hr
Bkgd metal	10-13 μR/hr	9-13 μR/hr

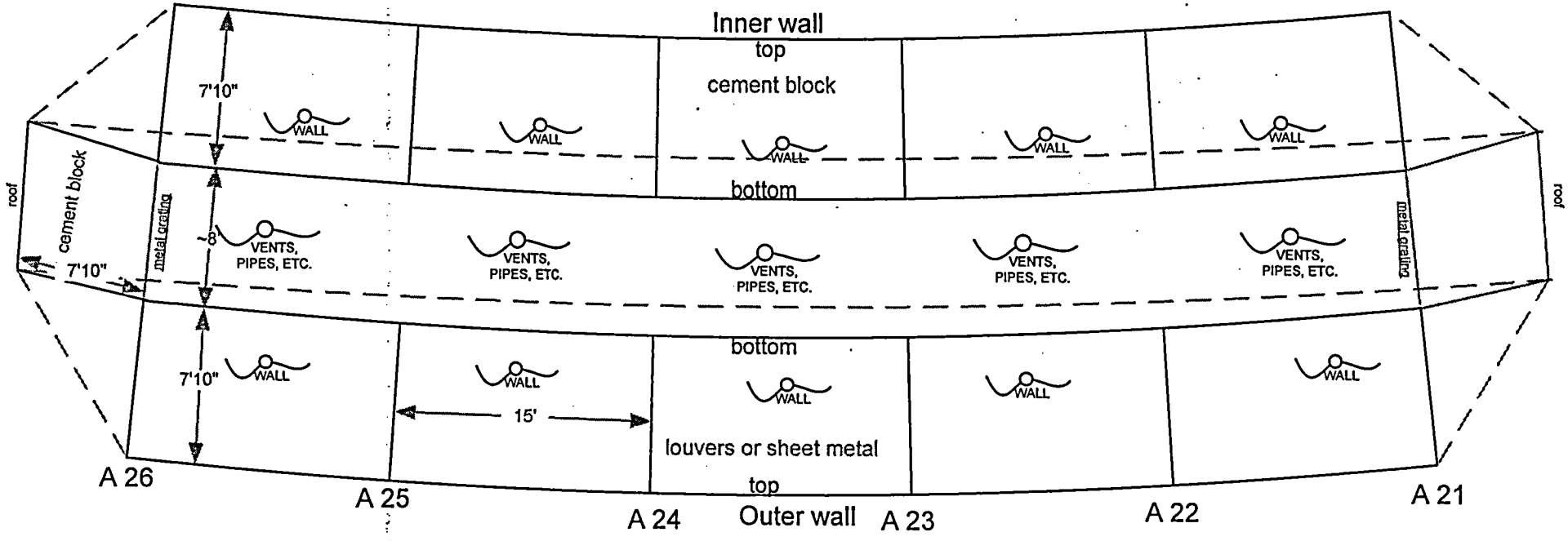
Service Corridor
End View



Surveys conducted by: R. Stowell & G. Sayer
Date: 04-02-03

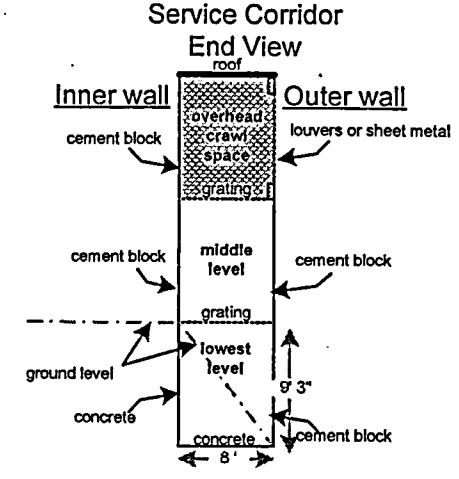
Figure 83

Figure 84: Building 2 Service Corridor Overhead Crawl Space Column A 21 to A 26
Large Area Wipe Locations and Results



Notes:

1. Large area wipes were taken on the walls and on vent ducts, pipes, etc. in the overhead.
2. Denotes large area (Masslinn) wipe.
3. No activity, alpha or beta, above background was detected.

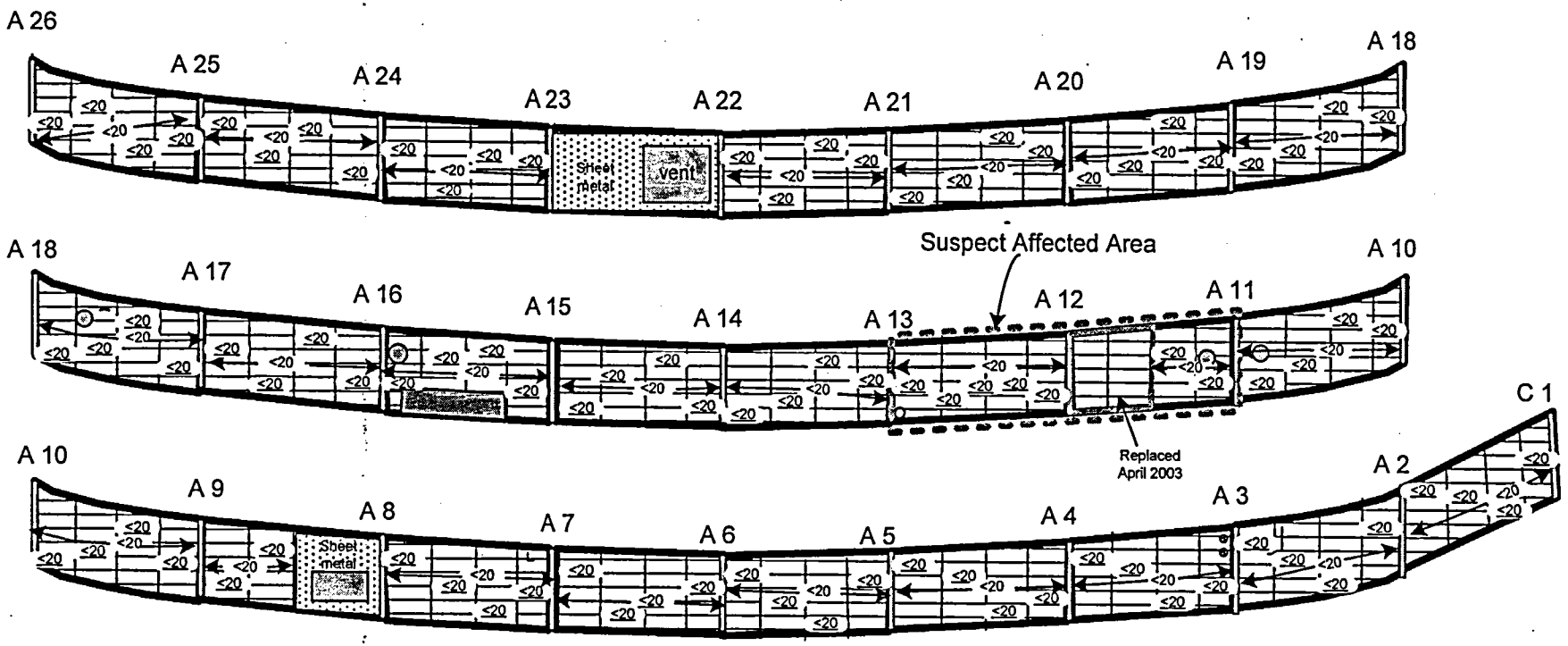


Instruments		
Model	Ludlum 3	Ludlum 12
Serial #	138880	91103
Cal Due Date	07-18-03	10-14-03
Probe	15 cm² β–γ	50 cm² α
Probe Serial #	145963	092192
Efficiency	24.64%	22.14%
Bkgd	40-80 cpm	<20 cpm

Survey conducted by: R. Stowell & G. Sayer
Dates: 04-15-03 to 04-16-03

Figure 84

Figure 85: Building 2 Service Corridor Section A Overhead Crawl Space Vent Louvers External Surface Alpha Fixed Measurement and Scan Locations and Results



Notes:

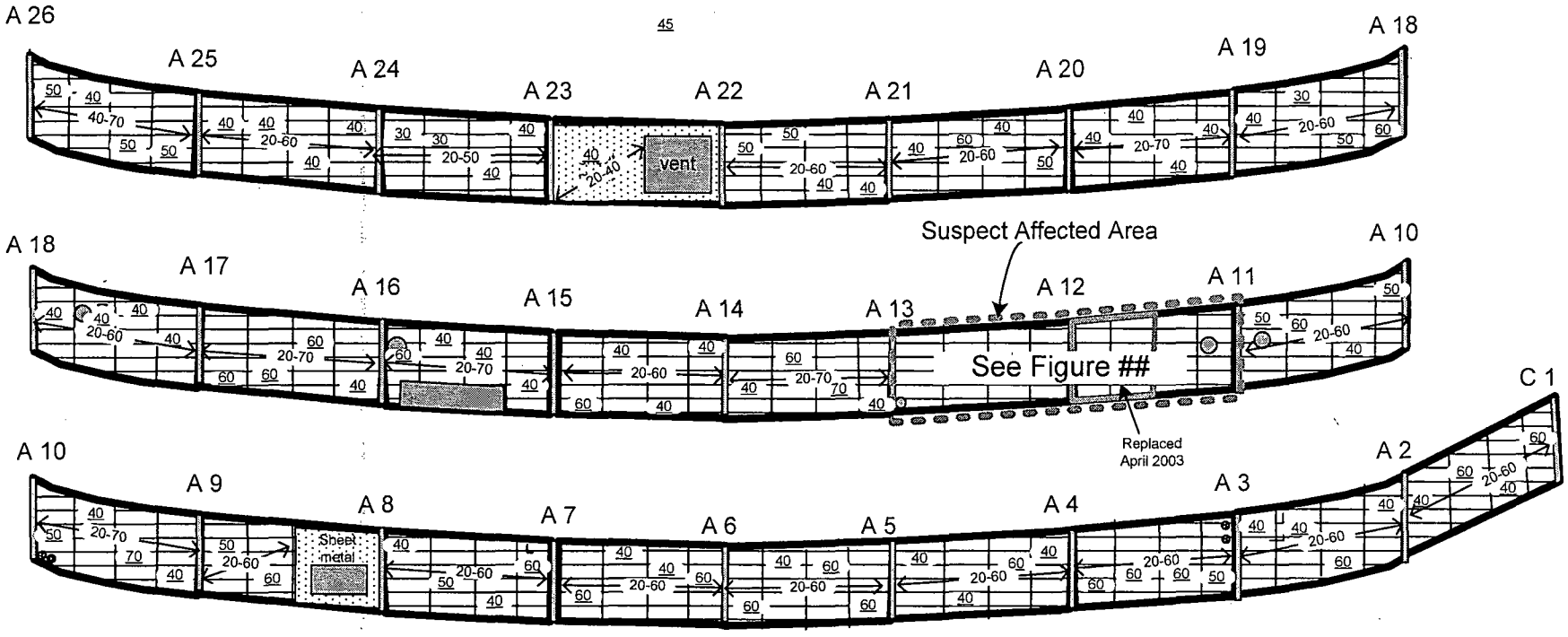
1. ## Denotes alpha fixed measurement in cpm.
2. ←— ##—→ Denotes alpha scan range in cpm.
3. 100% of accessible surface scanned in Suspect Affected Area, A-11 to A-13, except the louvers replaced in April 2003.
4. 10% of surface scanned in Unaffected Area (the remainder of the louvers).

Instrument	
Model	Ludlum 12
Serial Number	138738
Cal Due Date	04-30-04
Probe	50 cm^2 α
Probe Serial #	073360
Efficiency	21.02%
Background	<20 cpm

Survey Conducted by: R. Stowell
Dates: 11-03-03 to 11-05-03

Figure 85

Figure 86: Building 2 Service Corridor Section A Overhead Crawl Space Vent Louvers External Surface Beta Fixed Measurement and Scan Locations and Results



Notes:

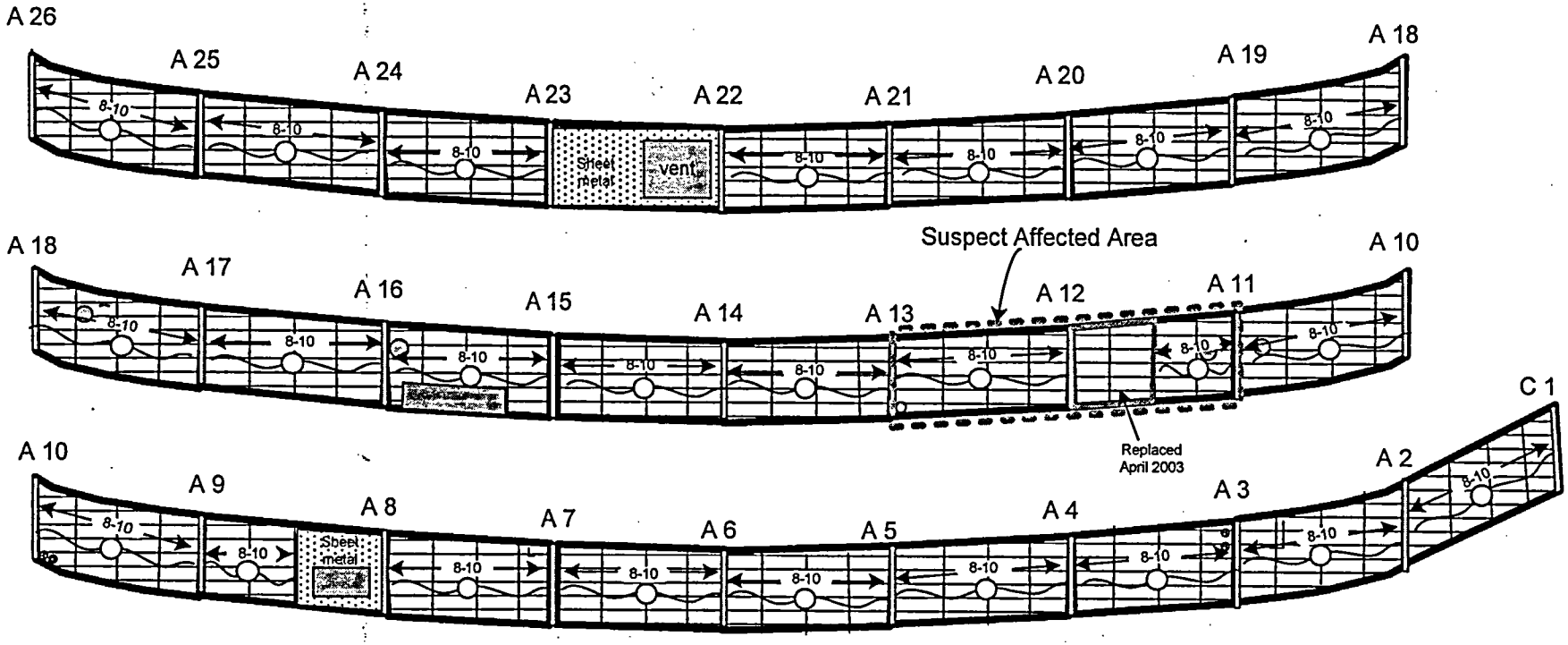
1. ## Denotes fixed beta measurement in cpm.
2. ← ##-## → Denotes Beta scan in cpm.
3. 10% of surface scanned.

Instrument	
Model	Ludlum 3
Serial #	138880
Cal Due Date	03-11-04
Probe	15 cm^2 β
Probe #	117851
Efficiency	26.14%
Background	20-60 cpm

Survey Conducted by: G Sayer
Dates: 11-04-03 to 11-05-03

Figure 86

Figure 87: Building 2 Service Corridor Section A Overhead Crawl Space\Vent Louvers External Surface Exposure Rate Scan and Large Area Wipe Locations and Results



Notes:

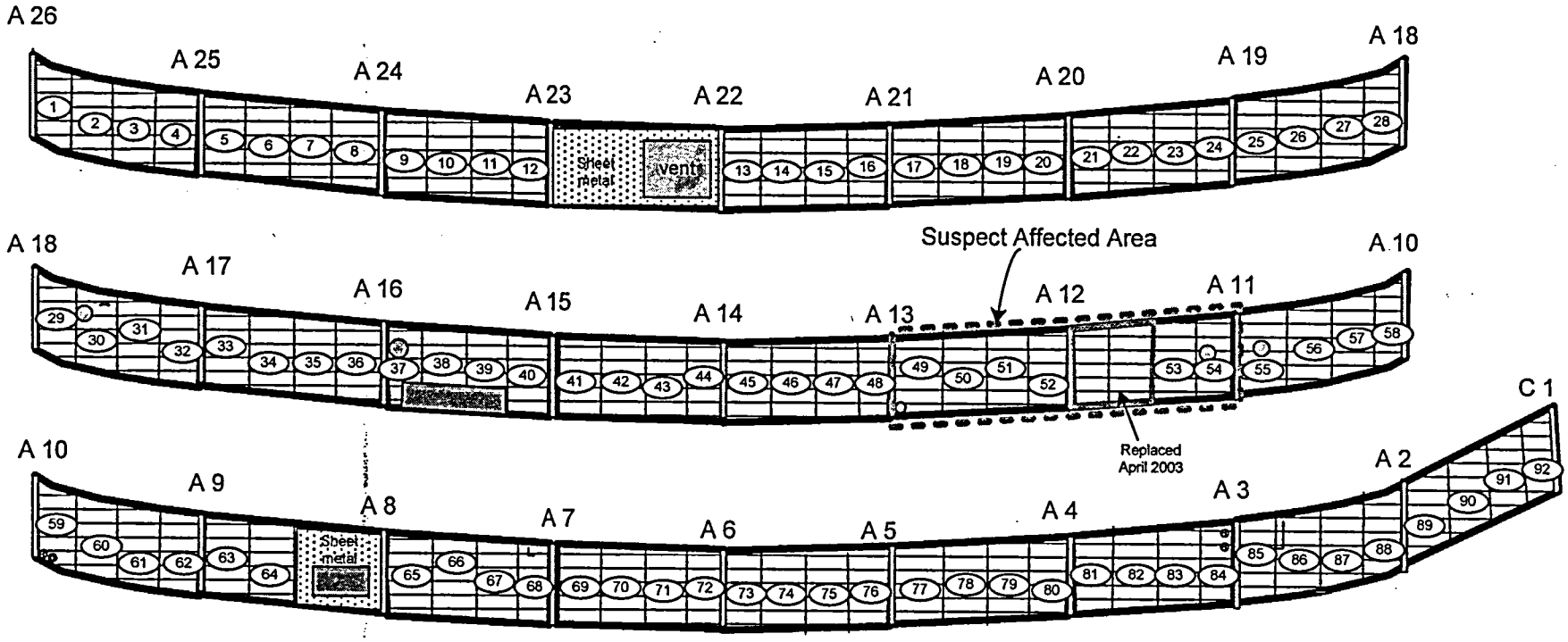
1. ← #-## → Denotes exposure rate surface scans in µR/hr. 100% of accessible surface scanned.
2. ~O~ Denotes large area wipe. 100% of accessible surface wiped.
3. No alpha or beta activity above background detected on large area (Masslinn) wipes.

Instruments			
Model	Ludlum 3	Ludlum 12	Ludlum 3
Serial #	153551	138801	138880
Cal Due Date	11-17-03	03-11-04	03-11-04
Probe	2" X 2" NaI	50 cm^2 α	15 cm^2 β–γ
Probe #	155109	145696	117851
Efficiency	NA	22.52%	26.14%
Background	9-13 µR/hr	<20 cpm	20-60 cpm

Survey Conducted by: G Sayer & W. Schuck
Dates: 10-28-03 to 10-29-03

Figure 87

Figure 88: Building 2 Service Corridor Section A Overhead Crawl Space Vent Louvers External Surface Wipe Survey Locations



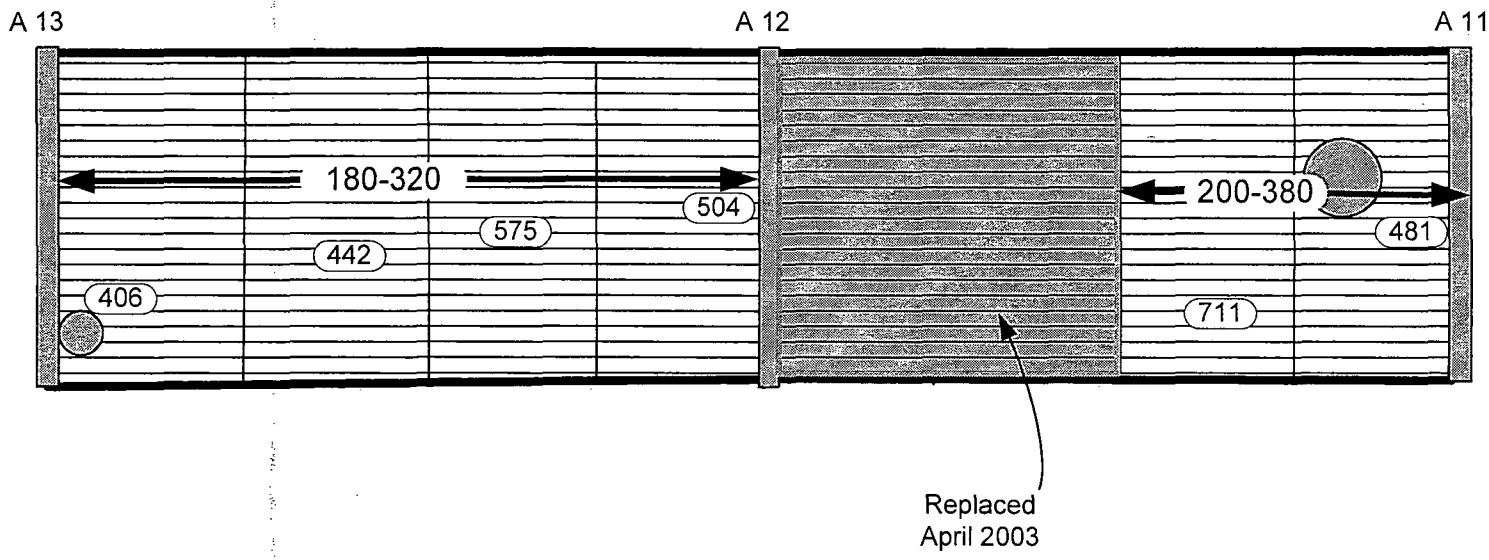
Notes:

1. (##) Denotes 100 cm² wipe number and location.
2. Wipe results are provided in Table 5.

Survey Conducted by: W. Schuck
Date:10/29/03

Figure 88

Figure 89: Building 2 Service Corridor Section A Overhead Crawl Space Vent Louvers External Surface Column A 11 to A 13
Suspect Affected Area Beta Fixed and Scan Measurement Locations and Results



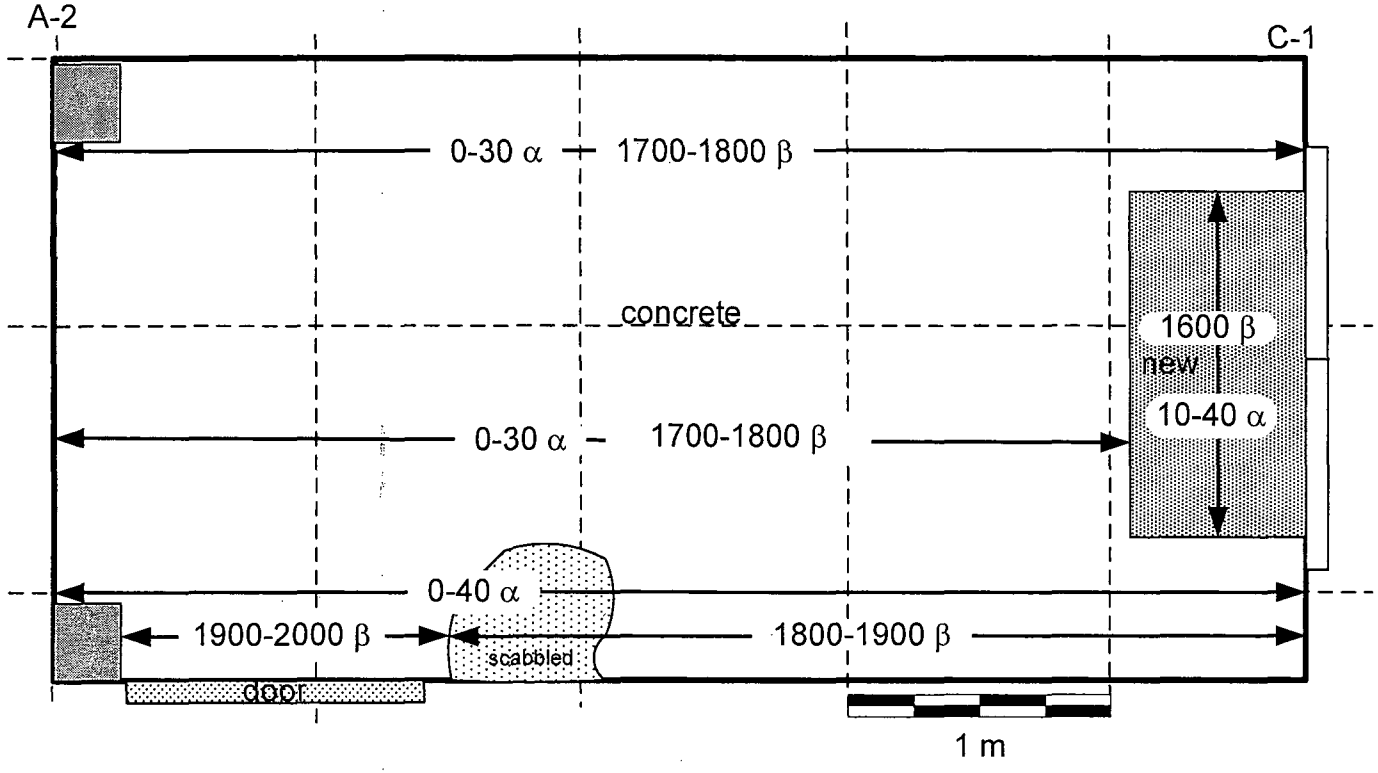
Notes:

1. (###) Denotes 2 minute fixed beta measurement in cp2m.
   Maximum result was 711 cp2m, 442 dpm/100 cm².
2. ◄— ###-### —► Denotes Scan range in cpm.
3. 100% of accessible surface scanned except the recently replaced louvers.

Instrument	
Model	Ludlum 2221
Serial Number	86302
Cal Due Date	05-04-04
Probe	100 cm² β
Probe Serial #	142547
Efficiency	31.20%
Bkgd fixed	435+/-170 cp2m
MDA	160 dpm/100 cm²
Bkgd scan	180-280 cpm

Survey Conducted by: R. Stowell
Date: 11-04-03

Figure 90: Building 2 Service Corridor First (Lowest) Level Floor Column C-1 to A-2
Alpha and Beta Scan Measurement Locations and Results



Notes:

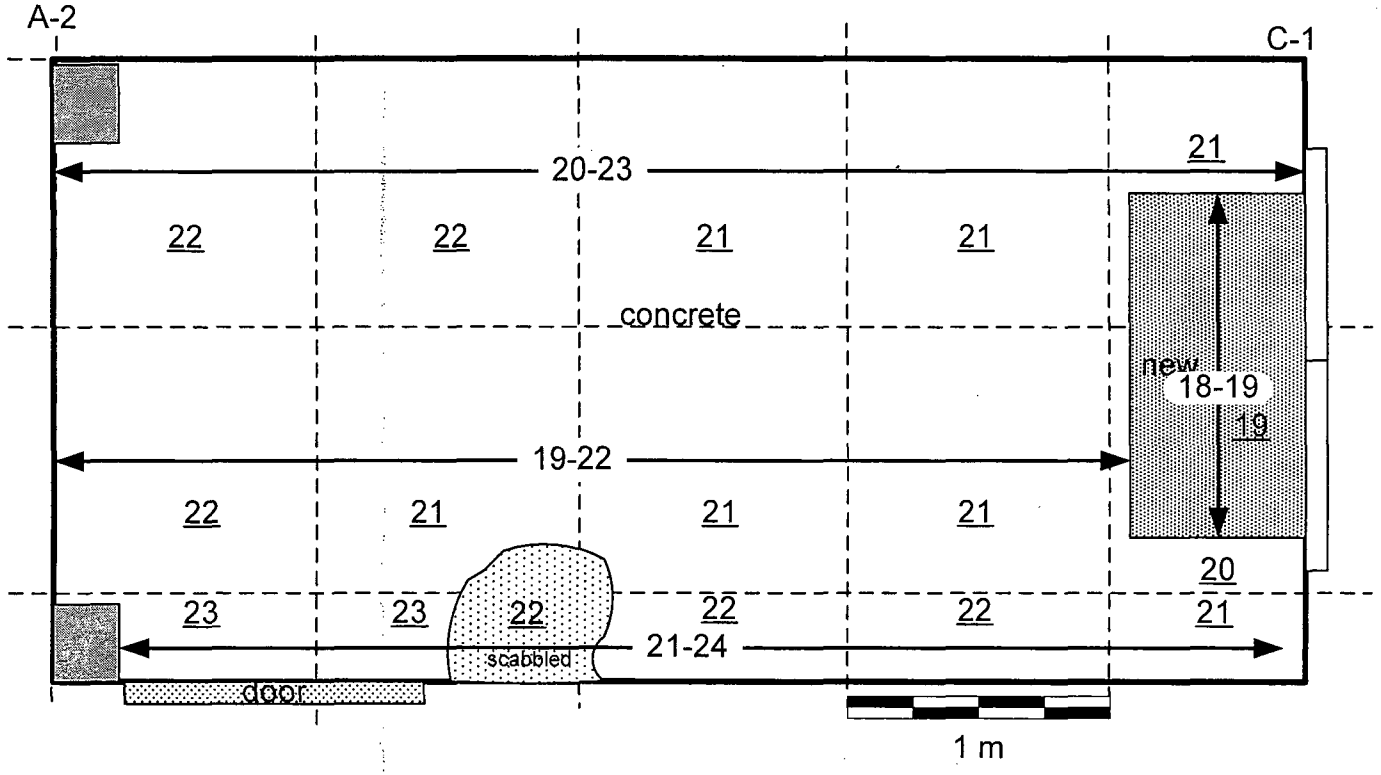
1. 100% of accessible surfaced scanned.
2. ##-## α Denotes alpha scan measurement in cpm.
3. ####-#### β Denotes beta scan measurement in cpm.

	Instruments	
Model	Ludlum 2221	Ludlum 2221
Serial Number	97287	154202
Probe	434 cm^2 α	434 cm^2 β
Probe Serial #	083293	149017
Cal Due Date	10-28-03	09-26-03
Efficiency %	20.98	30.17
Bkgd Concrete	0-30 cpm	1400-2000 cpm

Surveys Conducted by: R. Stowell
Date: 06-03-03

Figure 90

Figure 91: Building 2 Service Corridor First (Lowest) Level Floor Column C-1 to A-2
Fixed Exposure Rate and Exposure Rate Scan Measurement Locations and Results



Notes:

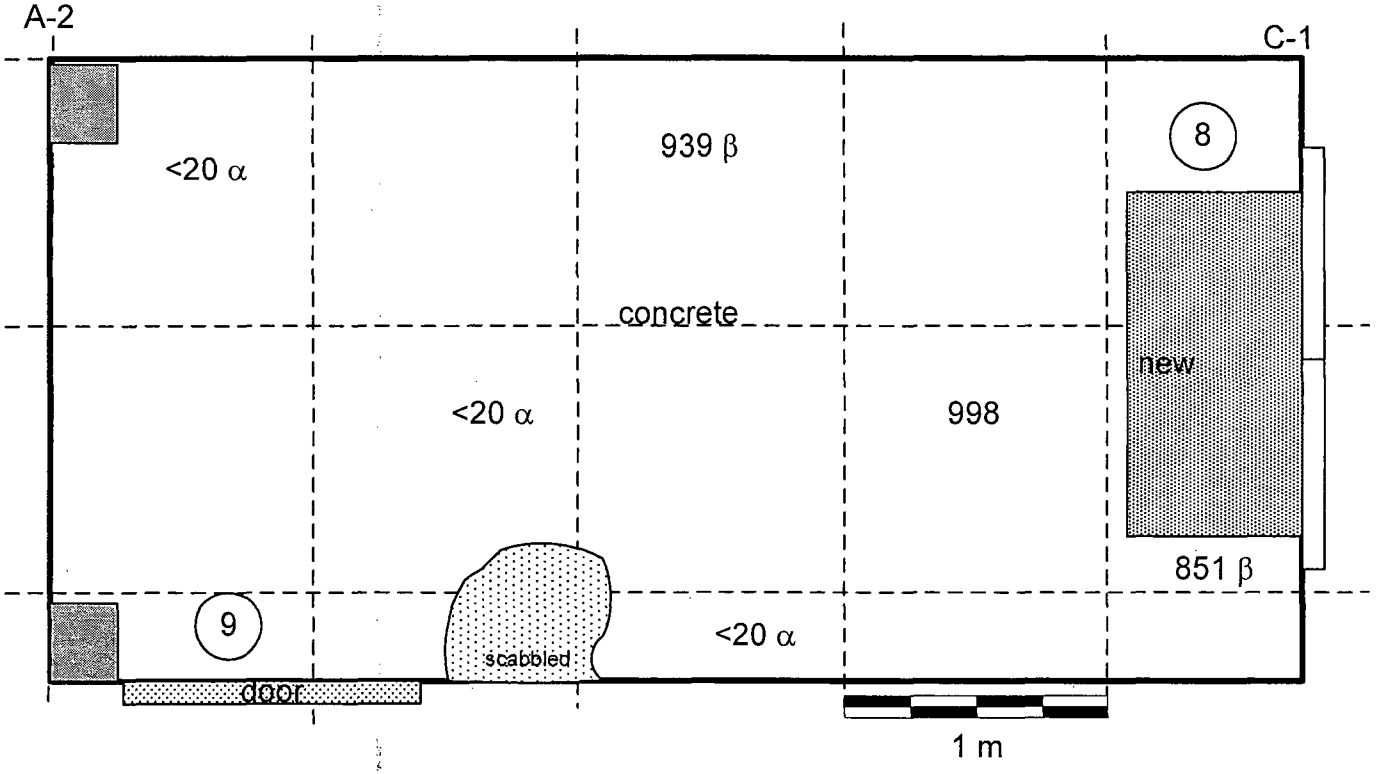
1. All values are μR/hr.
2. 100% of accessible surfaced scanned.
3. ## Denotes fixed exposure rate measurement taken at ~ 1 meter from the surface.
4. ←## - ##→ Denotes exposure rate scan measurement..

Instrument		
Model	Ludlum 3	
Serial #	153551	
Probe	2X2 NaI γ	
Probe Ser. #	155109	
Cal Due Date	08-18-03	
Background	contact	@ 1m
concrete	15-21 μR/hr	15-21 μR/hr

Survey Conducted by: Greg Sayer
Dates: 06-03-03 & 06-04-03

Figure 91

Figure 92: Building 2 Service Corridor First (Lowest) Level Floor Column C-1 to A-2
Alpha and Beta Fixed Measurement Locations and Results and Wipe Survey Locations



Notes:

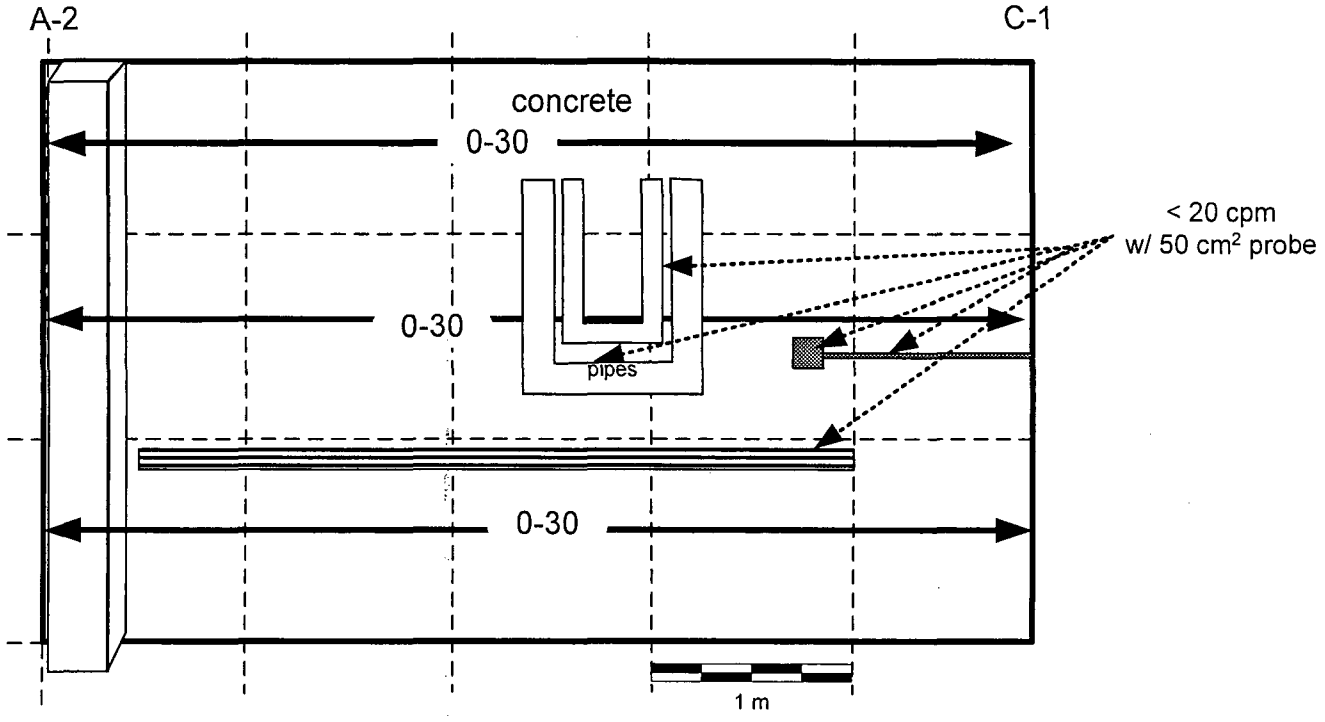
1. ## α Denotes fixed alpha measurement in cpm.
2. #### β Denotes fixed beta measurement in cp2m.
3. (##) Denotes wipe location. Wipe results are provided in Table 5.

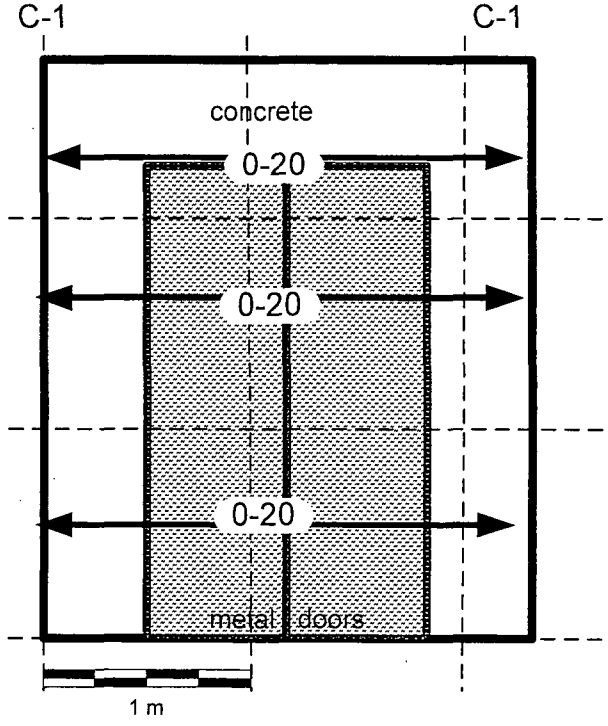
Instruments		
Model	Ludlum 2221	Ludlum 12
Serial Number	86302	138801
Probe	100 cm^2 β	50 cm^2 α
Probe Serial #	142547	145696
Cal Due Date	07-24-03	10-20-03
Efficiency %	31.20	22.52
Bkgd Concrete	822+/- 344 cp2m	<20 cpm
MDA	218 dpm/100 cm^2	209 dpm/100 cm^2

Survey conducted by: R. Stowell & Greg Sayer
Date: 06-04-03

Figure 92

Figure 93: Building 2 Service Corridor First (Lowest) Level Inner Wall & Doors Column C-1 to A-2
Alpha Scan Measurement Locations and Results





Notes:

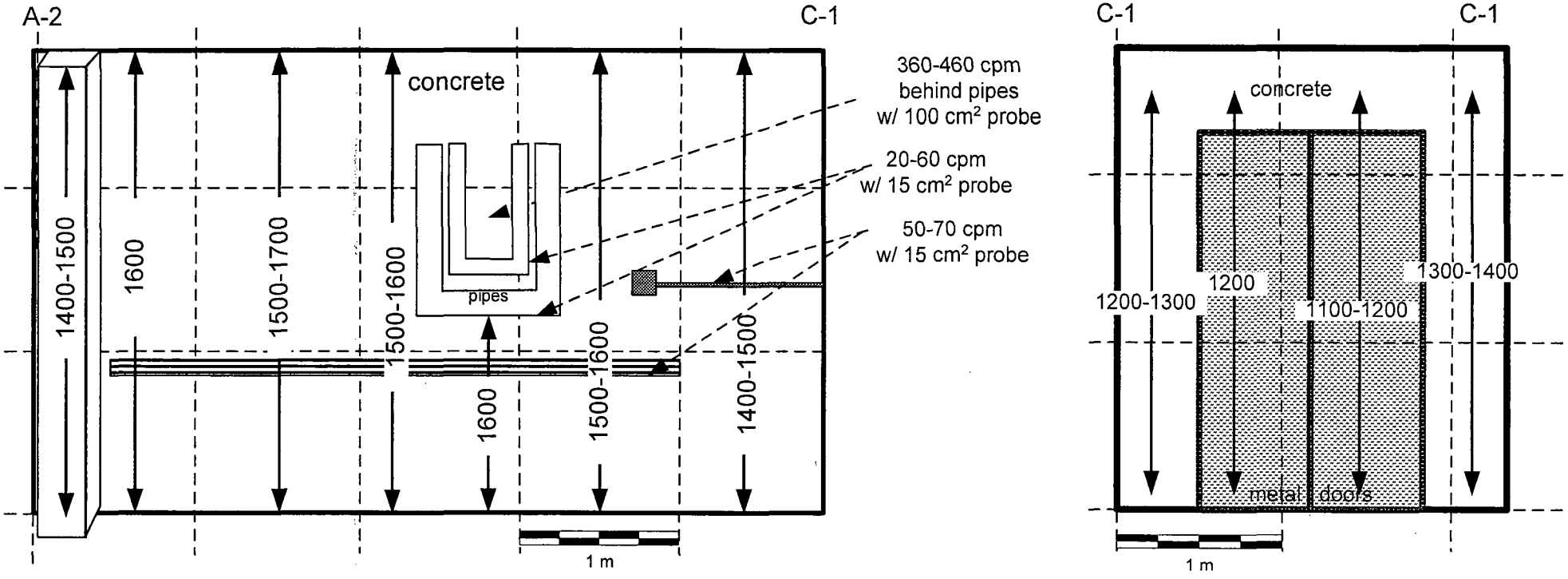
1. All values are cpm alpha.
2. 100% of accessible surfaced scanned 2 meters and below, 10% scanned above 2 meters.
3. ← #-## → Denotes alpha scan with 434 cm^2 probe.
4. 50 cm^2 probe used to scan where indicated.

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial Number	97287	138801
Probe	434 cm^2 α	50 cm^2 α
Probe Serial #	83293	145696
Cal Due Date	10-28-03	10-20-03
Efficiency %	20.98	22.52
Bkgd Concrete	0-30 cpm	<20 cpm
Bkgd Metal	0-20 cpm	<20 cpm

Survey Conducted by: R. Stowell
Date: 06-04-03

Figure 93

Figure 94: Building 2 Service Corridor First (Lowest) Level Inner Wall & Doors Column C-1 to A-2
Beta Scan Measurement Locations and Results



Notes:

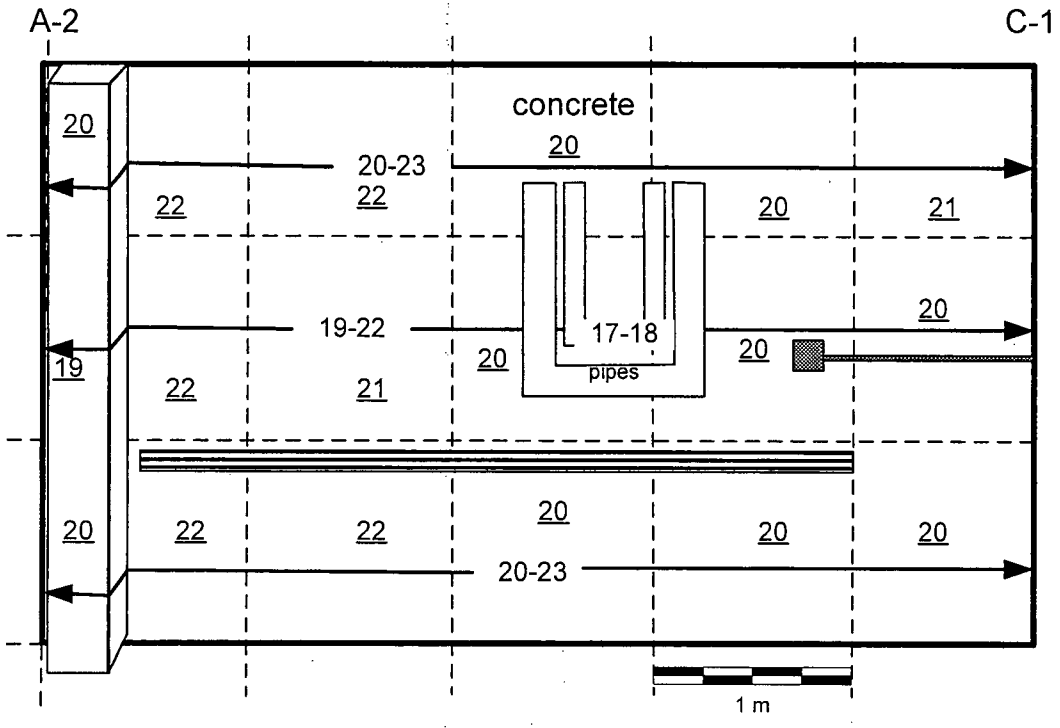
1. All values are cpm beta.
2. 100% of accessible surfaced scanned 2 meters and below, 10% scanned above 2 meters.
3. ◄ ####-#### ► Denotes beta scan with 434 cm² probe.
4. 15 cm² and 100 cm² probes used as noted.

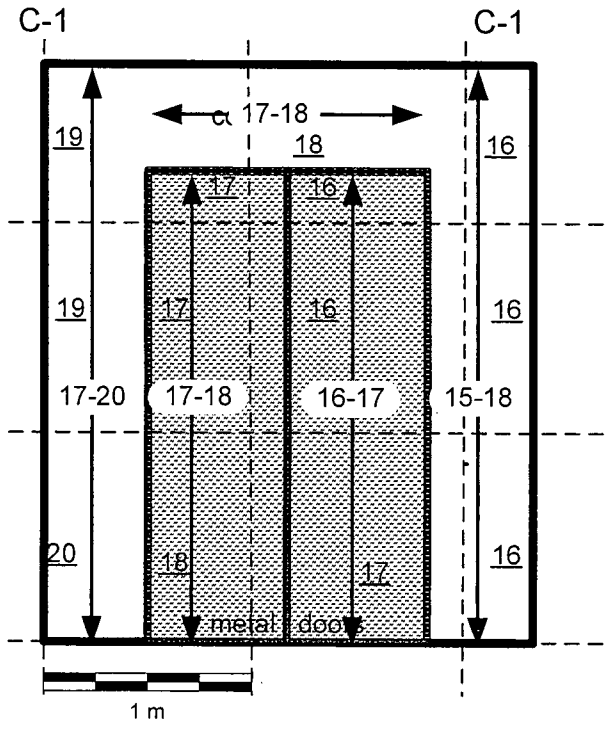
Instruments			
Model	Ludlum 2221	Ludlum 2221	Ludlum 3
Serial Number	154202	86302	138880
Probe	434 cm² β	100 cm² β	15 cm² β–γ
Probe Serial Number	149017	142517	145963
Efficiency %	30.17	31.20	24.64
Cal Due Date	09-26-03	07-24-03	07-18-03
Bkgd. Concrete	1400-2000 cpm	320-420 cpm	--------
Bkgd. Metal	900-1300 cpm	180-280 cpm	40-70 cpm

Survey conducted by: R Stowell
Dates: 06-03-03 & 06-04-03

Figure 94

Figure 95: Building 2 Service Corridor First (Lowest) Level Inner Wall & Doors Column C-1 to A-2
Fixed Exposure Rate and Exposure Rate Scan Measurement Locations and Results





Notes:

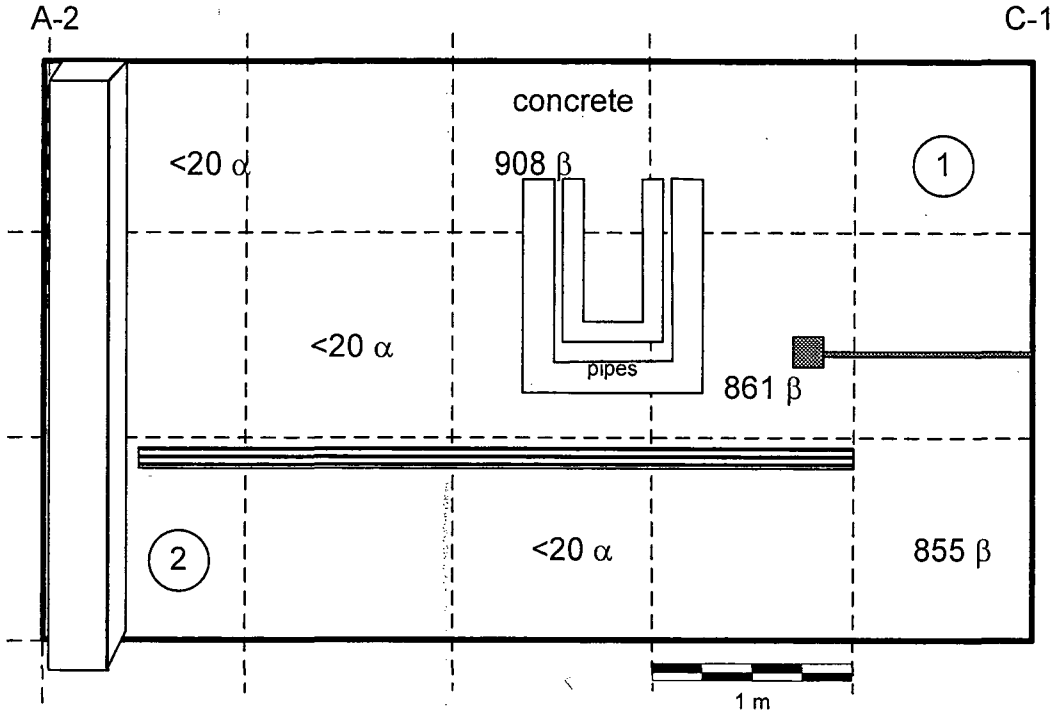
1. All values are μR/hr.
2. 100% of accessible surfaced scanned 2 meters and below, 10 % above 2 meters.
3. ## Denotes fixed exposure rate measurement taken at ~ 1 meter from the surface.
4. ←## -##→ Denotes exposure rate scan.

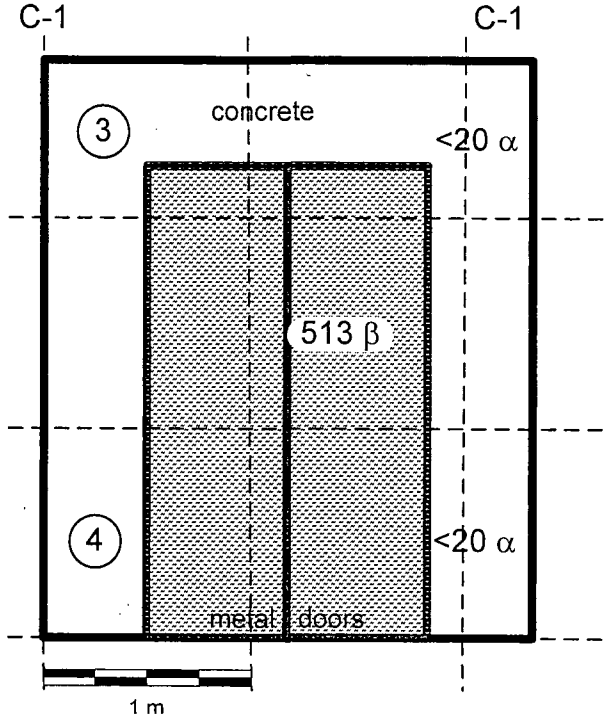
Instrument		
Model	Ludlum 3	
Serial #	153551	
Probe	2X2 NaI γ	
Probe Ser. #	155109	
Cal Due Date	08-18-03	
Background	contact	@ 1m
concrete	15-21 μR/hr	15-21 μR/hr
metal	9-13 μR/hr	10-13 μR/hr

Survey conducted by: Greg Sayer
Dates: 06-03-03 to 06-04-03

Figure 95

Figure 96: Building 2 Service Corridor First (Lowest) Level Inner Wall & Doors Column C-1 to A-2
Fixed Alpha and Beta Measurement Locations and Results and Wipe Survey Locations





Notes:

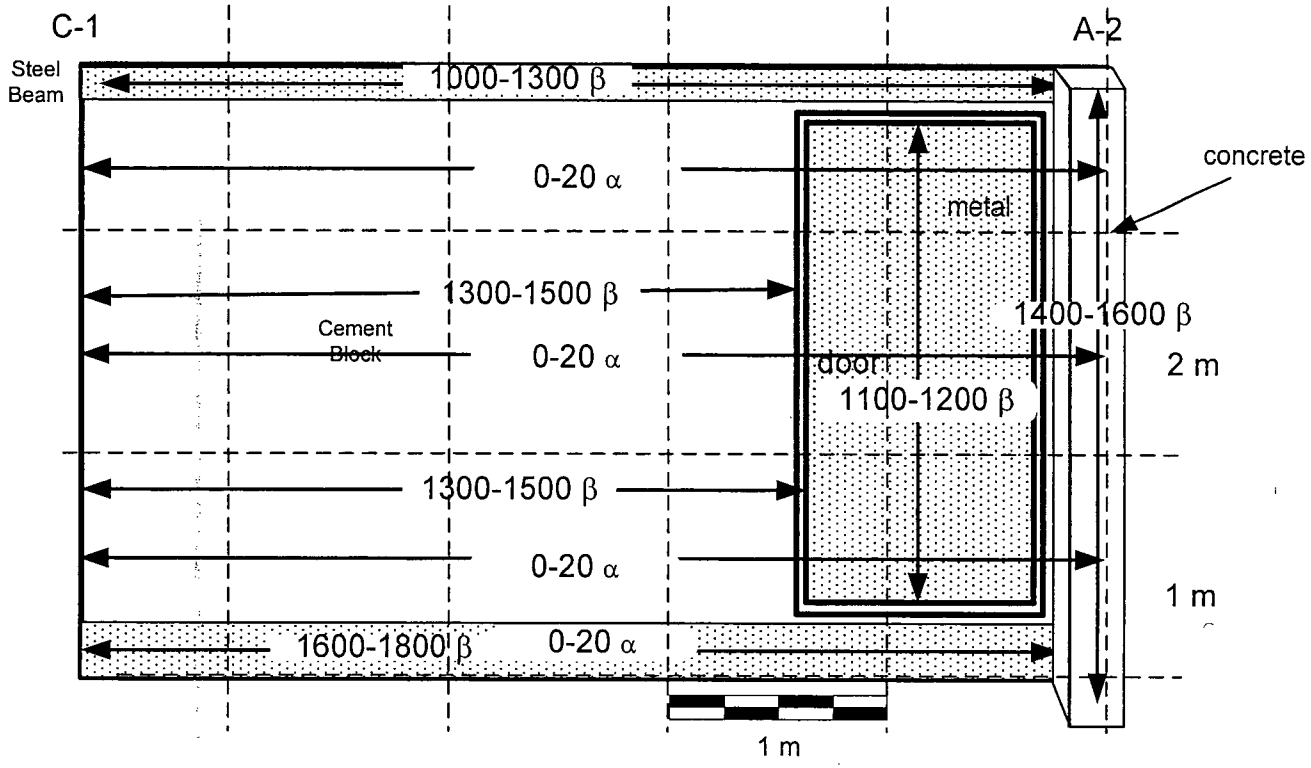
1. ## α Denotes fixed alpha measurement in cpm.
2. #### β Denotes fixed beta measurement in cp2m.
3. (##) Denotes wipe location. Wipe results are provided in Table 5.

	Instruments	
Model	Ludlum 2221	Ludlum 12
SerialNumber	86302	138801
Probe	100 cm^2 β	50 cm^2 α
Probe Serial #	142547	145696
Cal Due Date	07-24-03	10-20-03
Efficiency %	31.20	22.52
Bkgd Concrete	822+/-344 cp2m	<20 cpm
MDA	218 dpm/100 cm^2	209 dpm/100 cm^2
Bkgd Metal	435+/-170 cp2m	<20 cpm
MDA	160 dpm/100 cm^2	209 dpm/100 cm^2

Survey conducted by: R. Stowell & Greg Sayer
Date : 06-04-03

Figure 96

Figure 97: Building 2 Service Corridor First (Lowest) Level Outer Wall Column C-1 to A-2
Alpha and Beta Scan Measurement Locations and Results



Notes:

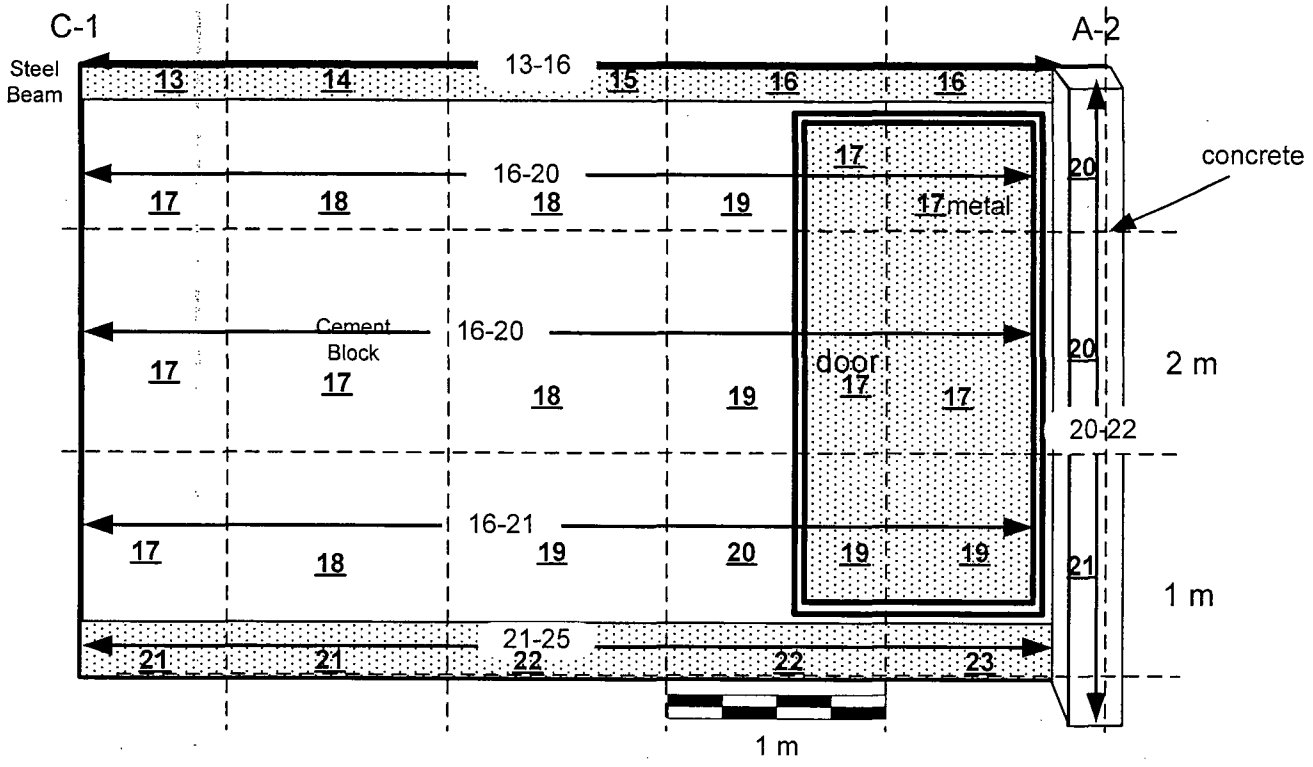
1. 100% of accessible surfaced scanned 2 meters and below, 10% scanned above 2 meters.
2. #-## α Denotes alpha scan measurement in cpm.
3. ####-#### β Denotes beta scan measurement in cpm.

Instruments		
Model	Ludlum 2221	Ludlum 2221
Serial Number	97287	154202
Probe	434 cm^2 α	434 cm^2 β
Probe Serial #	83293	149017
Cal Due Date	10-28-03	09-26-03
Efficiency %	20.98	30.17
Bkgd Cement Blk	0-20 cpm	1400-2000 cpm
Bkgd Metal	0-20 cpm	900-1300 cpm
Bkgd Concrete	0-30 cpm	1100-1600 cpm

Survey Conducted by: G Sayer
Date(s): 06-03-03

Figure 97

Figure 98: Building 2 Service Corridor First (Lowest) Level Outer Wall Column C-1 to A-2
Fixed Exposure Rate and Exposure Rate Scan Measurement Locations and Results



Notes:

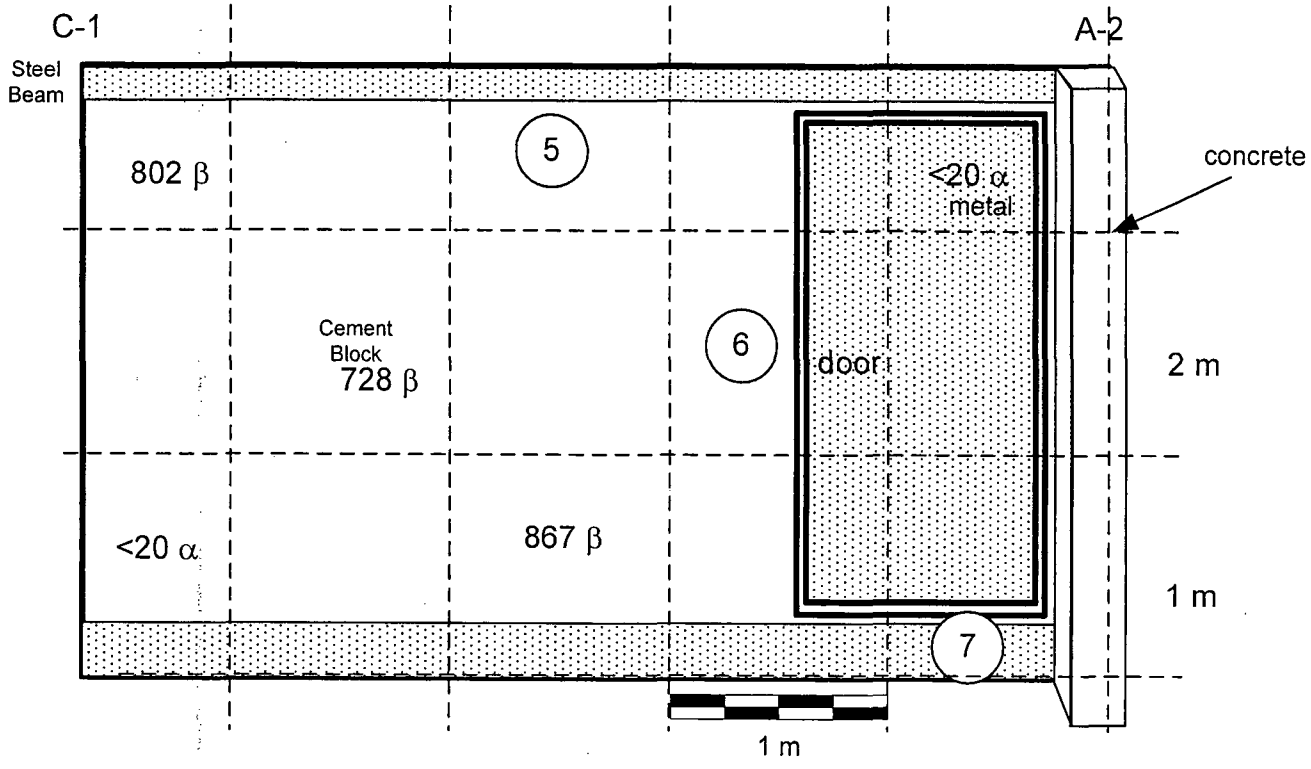
1. All values are μR/hr.
2. 100% of accessible surfaced scanned 2 meters and below, 10% scanned above 2 meters.
3. ## Denotes exposure rate fixed measurement taken at ~ 1 meter from the surface.
4. ←## Denotes exposure rate scan measurement.

Instrument		
Model	Ludlum 3	
Serial #	153551	
Cal Due Date	08-18-03	
Probe	2X2 NaI	
Probe Ser. #	155109	
Background	contact	@ 1m
Concrete	15-21	15-21
Metal	9-13	10-13
Cement Blk	14-19	14-18

Survey Conducted by: Greg Sayer
Date(s): 06-03-03

Figure 98

Figure 99: Building 2 Service Corridor First (Lowest) Level Outer Wall Column C-1 to A-2
Fixed Alpha and Beta Measurement Locations and Results and Wipe Survey Locations



Notes:

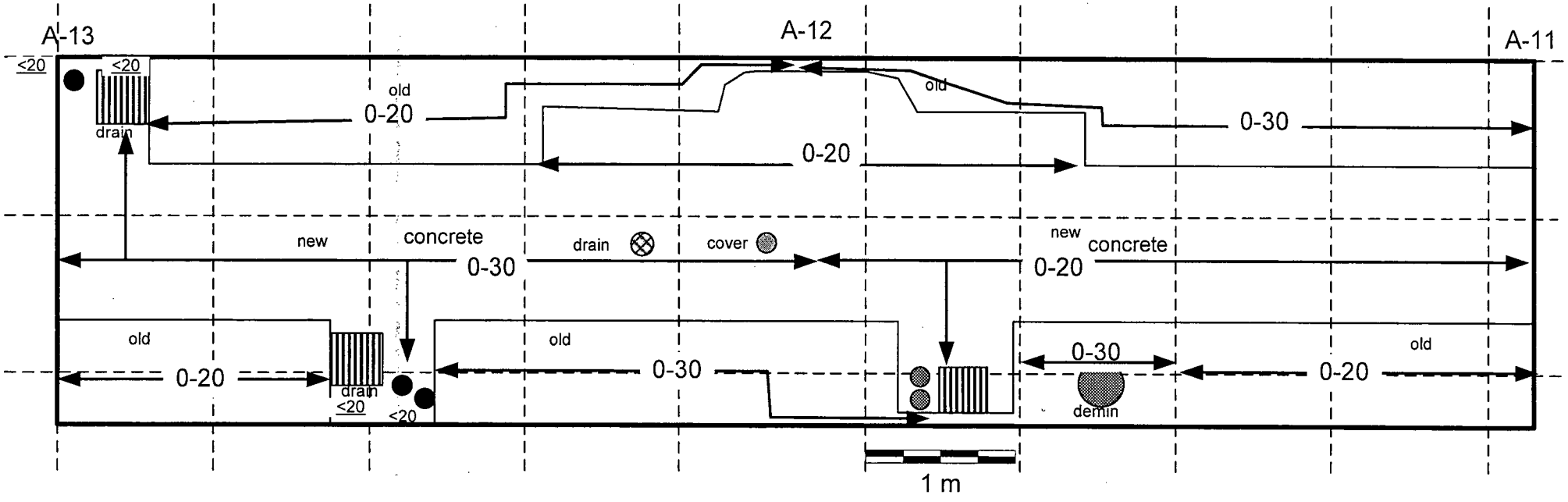
1. ## α Denotes fixed alpha measurement in cpm.
2. #### β Denotes fixed beta measurement in cp2m.
3. (##) Denotes wipe location. Wipe results are provided in Table 5.

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	86302	138801
Cal Due Date	07-24-03	10-20-03
Probe	100 cm^2 β	50 cm^2 α
Probe Serial #	142547	145696
Efficiency %	31.20	22.52
Bkgd cement block	671±126 cp2m	<20 cpm
MDA	197 dpm/100 cm^2	209 dpm/100 cm^2
Bkgd metal	435±170 cp2m	<20 cpm
MDA	160 dpm/100 cm^2	209 dpm/100 cm^2

Survey Conducted by: R. Stowell & Greg Sayer
Date: 06-04-03

Figure 99

Figure 100: Building 2 Service Corridor First (Lowest) Level Floor Column A-11 to A-13
Alpha Scan Measurement Locations and Results



Notes:

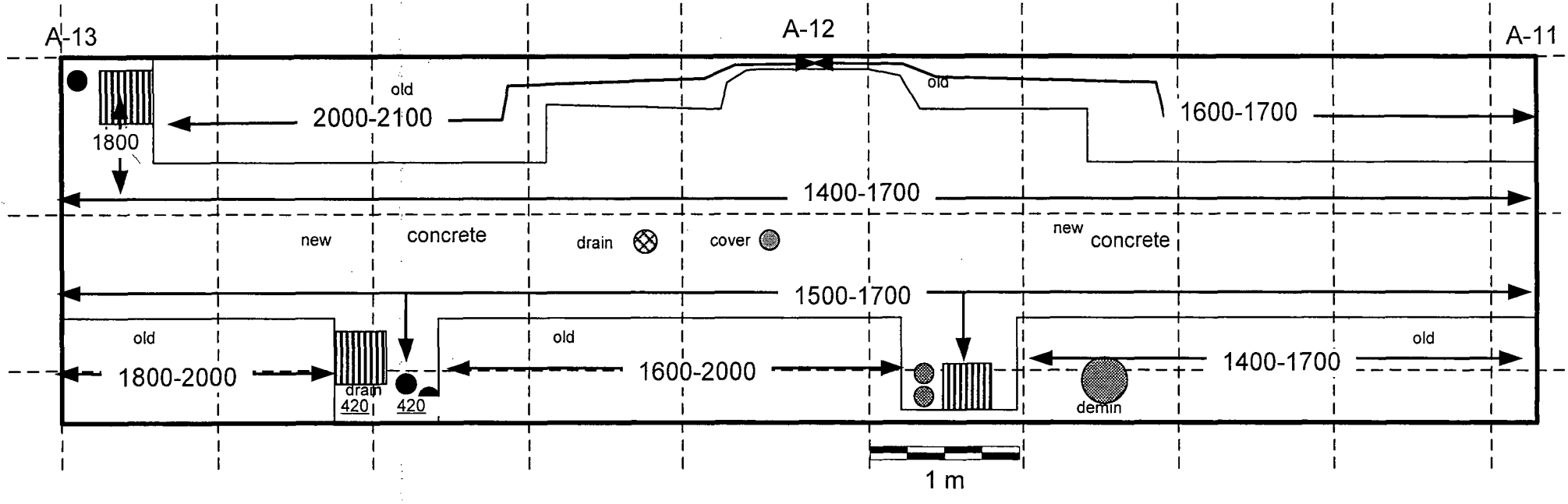
1. All values are cpm alpha.
2. 100% of accessible surface scanned.
3. ## Denotes scans using 50 cm^2 probe.

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial Number	97287	138801
Probe	434 cm^2 α	50 cm^2 α
Probe Ser. #	083293	145696
Cal Due Date	11-05-03	10-20-03
Efficiency %	20.98	22.52
Bkgd Concrete	0-30 cpm	<20 cpm

Survey Conducted by: Greg Sayer
Dates: 06-05-03 to 06-06-03

Figure 100

Figure 101: Building 2 Service Corridor First (Lowest) Level Floor Column A-11 to A-13
Beta Scan Measurement Locations and Results



Notes:

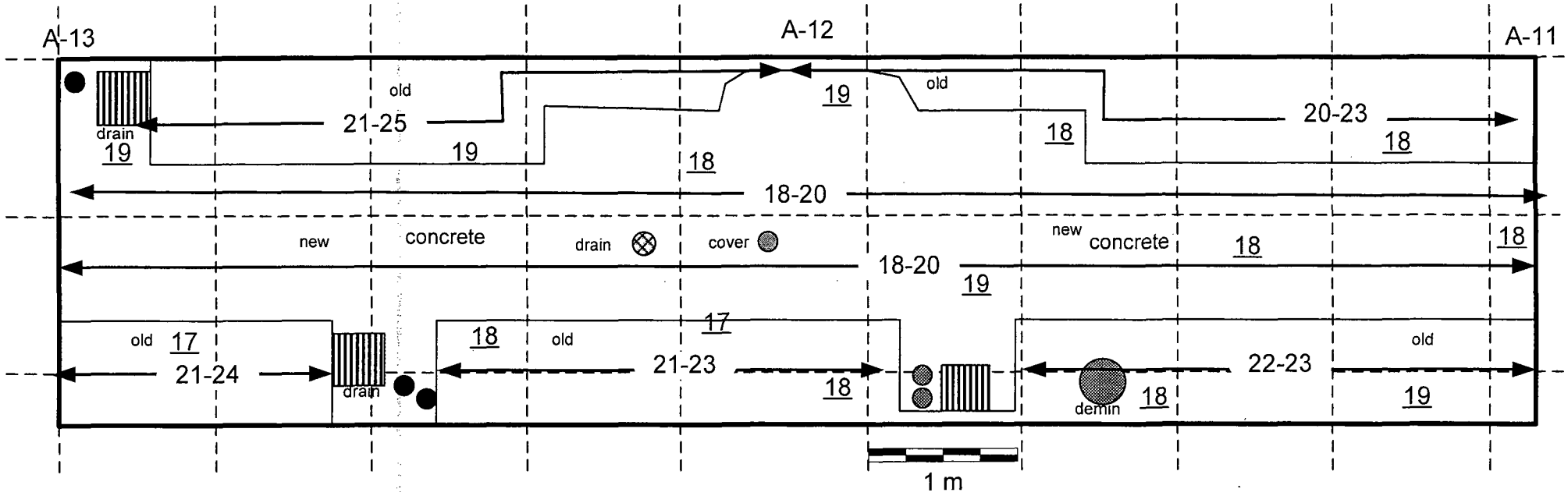
1. All readings are in cpm beta.
2. 100% of accessible surface scanned.
3. ← ###-### → Denotes beta scan measurement with 434 cm2 probe.
3. ### Denotes berta scan measurements using 100 cm^2 probe

Instruments		
Model	Ludlum 2221	Ludlum 2221
Serial Number	154202	86302
Probe	434 cm^2 β	100 cm^2 β
Probe Serial #	149017	142547
Cal Due Date	09-26-03	07-24-03
Efficiency %	30.17	31.20
Bkgd concrete	1400-2000 cpm	320-420 cpm

Survey Conducted by: Greg Sayer
Dates: 06-05-03 and 06-10-03

Figure 101

Figure 102: Building 2 Service Corridor First (Lowest) Level Floor Column A-11 to A-13
Fixed Exposure Rate and Exposure Rate Scan Measurement Locations and Results



Notes:

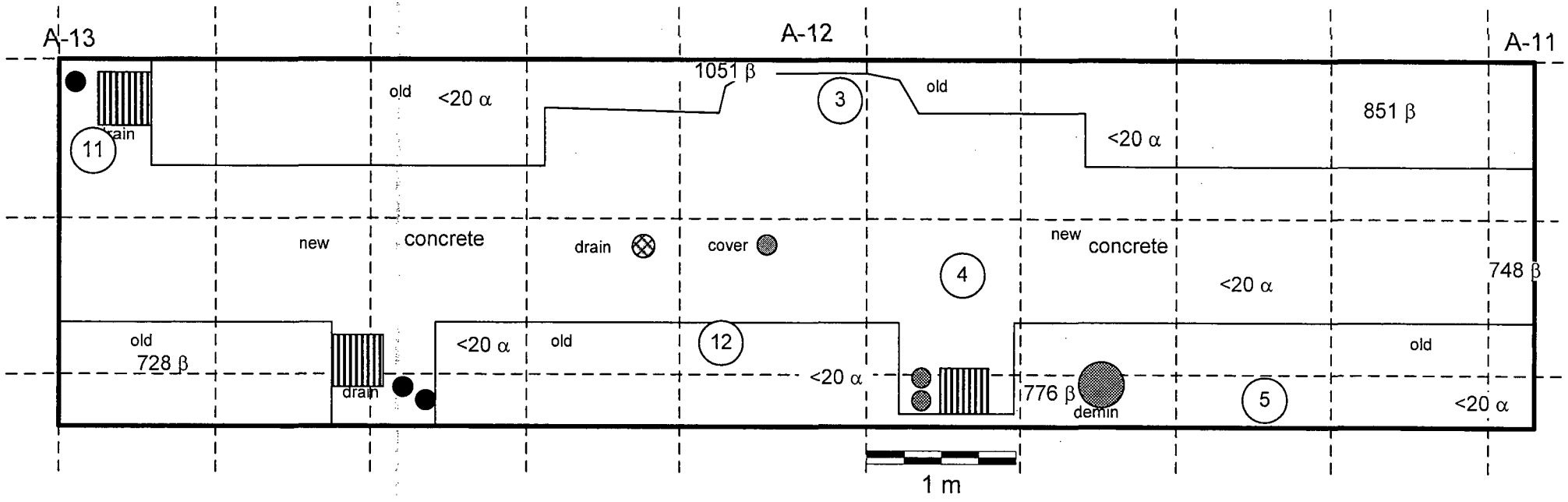
1. All values are μR/hr.
2. 100% of accessible surface scanned.
3. ## Denotes exposure rate fixed measurement taken at ~ 1 meter from the surface.
4. ←## - ##→ Denotes exposure rate scan.

Instrument		
Model	Ludlum 3	
Serial #	153551	
Cal Due Date	08-18-03	
Probe	2X2 NaI	
Probe Serial #	155109	
Background	contact	@ 1 m
concrete	15-21 μR/hr	15-21 μR/h
metal	9-13 μR/h	10-13 μR/h

Surveys conducted by: R. Stowell
Dates: 06-05-03 to 06-06-03

Figure 102

Figure 103: Building 2 Service Corridor First (Lowest) Level Floor Column A-11 to A-13
Fixed Alpha and Beta Measurement Locations and Results and Wipe Survey Locations



Notes:

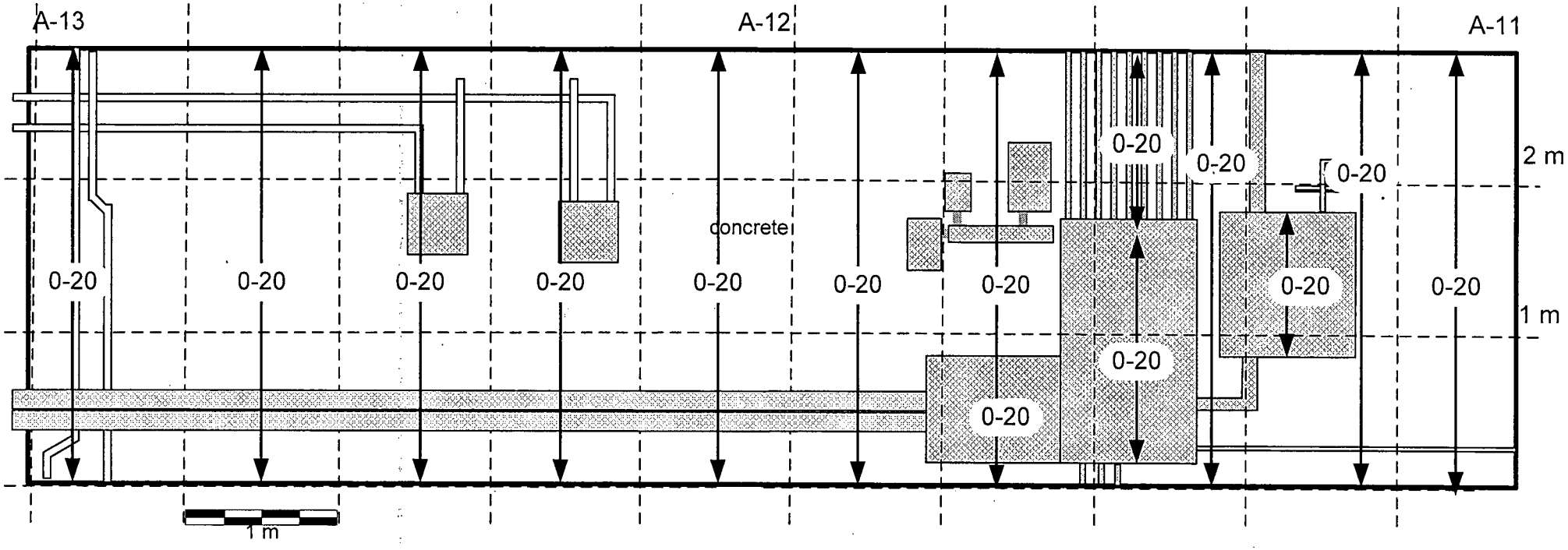
1. ## α Denotes alpha fixed measurement in cpm
2. ### β Denotes beta fixed measurement in cp2m.
3. (##) Denotes wipe location. Wipe results are provided in Table 5.

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial Number	86302	138801
Probe	100 cm^2 β	50 cm^2 α
Probe Ser. #	142547	145696
Cal Due Date	07-24-03	10-20-03
Efficiency %	31.20	22.52
Bkgd Concrete	822+/- 344 cp2m	<20 cpm
	218 dpm/100 cm^2	209 dpm/100 cm^2

Survey Conducted by: R. Stowell and Greg Sayer
Date: 06-05-03 to 06-06-03

Figure 103

Figure 104: Building 2 Service Corridor First (Lowest) Level Inner Wall Column A-11 to A-13
Alpha Scan Measurement Locations and Results



Instrument	
Model	Ludlum 2221
Serial Number	97287
Probe	434 cm² α
Probe Ser. #	83293
Cal Due Date	10-28-03
Efficiency %	20.98
Bkgd Concrete	0-30 cpm
Bkgd Metal	0-20 cpm

Notes:

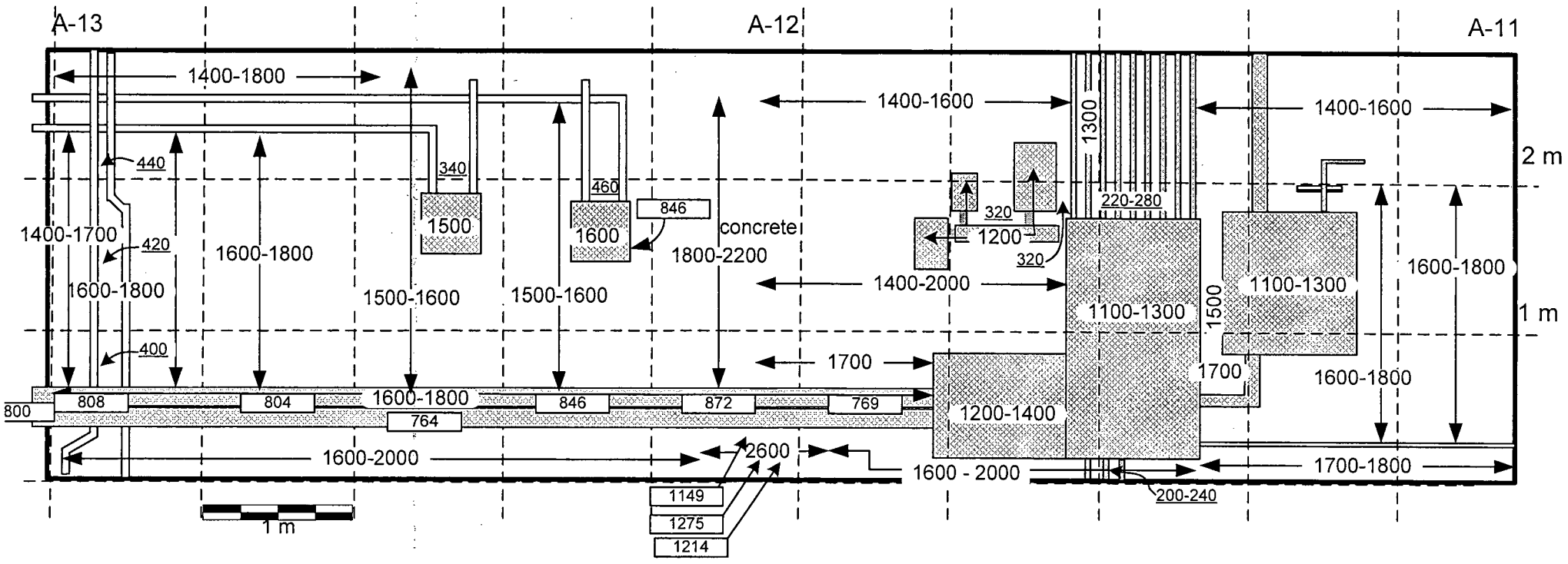
1. ← #-## → Denotes alpha scan in cpm .

2. 100% of accessible surfaced scanned 2 meters and below, 10% scanned above 2 meters.

Survey conducted by: Greg Sayer
Dates: 06-05-03 to 06-06-03

Figure 104

Figure 105: Building 2 Service Corridor First (Lowest) Level Inner Wall Column A-11 to A-13
Beta Scan Measurement and Fixed 2 Minute Beta Measurement Locations and Results



Notes:

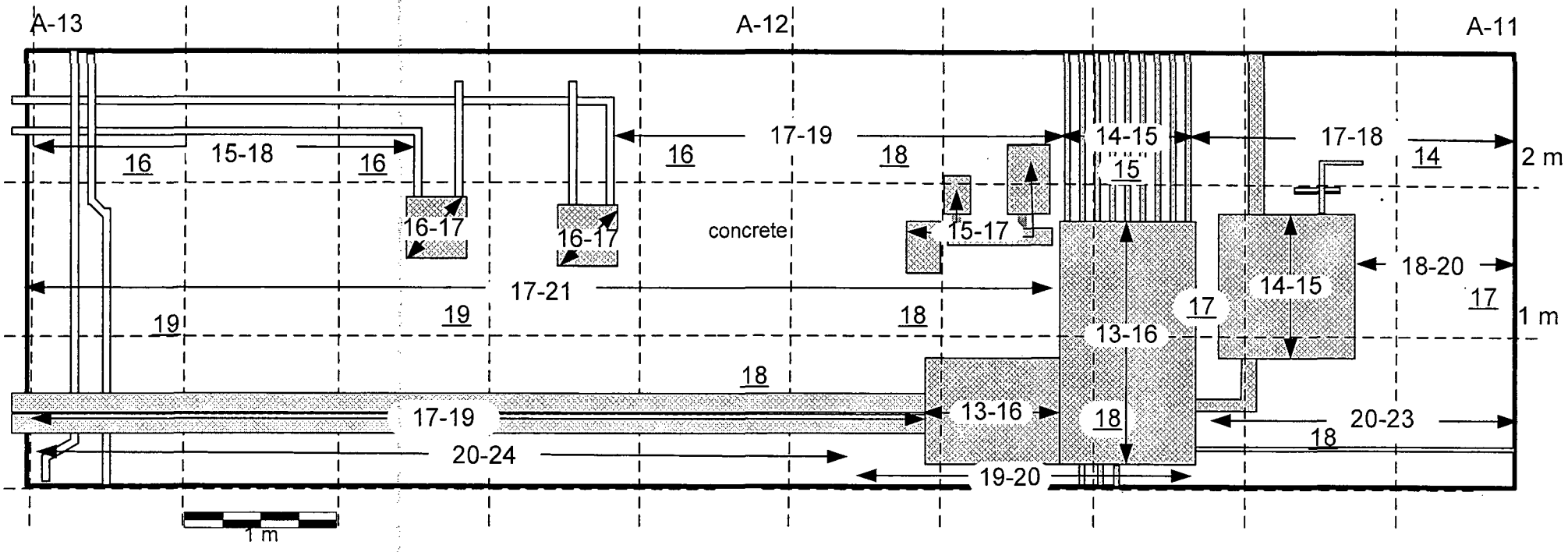
1. 100% of accessible surfaced scanned 2 meters and below, 10% scanned above 2 meters.
2. ◄ ####-#### ► Denotes beta scan measurement with 434 cm² probe in cpm.
3. ###-### Denotes beta scan measurement with the 100 cm² probe n cpm.
4. [####] Denotes fixed beta measurement in cp2m taken at elevated scan locations. Maximum fixed beta result was 1275 cp2m, 726 dpm/100 cm².

Instruments				
Model	Ludlum 2221	Ludlum 2221	Ludlum 2221	
Serial Number	154202	86302	86302	
Probe	434 cm² β	100 cm² β	100 cm² β	
Probe Ser. #	149017	142547	142547	
Cal Due Date	09-26-03	07-24-03	07-24-03	
Efficiency %	30.17	31.20	31.20	MDA
Bkgd Concrete	1400-2000 cpm	320-420 cpm	822+/- 344 cp2m	218 dpm/100 cm²
Bkgd Metal	900-1300 cpm	180-280 cpm	435+/-170 cp2m	160 dpm/100 cm²

Survey Conducted by: Greg Sayer
Dates: 06-05-03 , 6-10-03 and 7-28-03

Figure 105

Figure 106: Building 2 Service Corridor First (Lowest) Level Inner Wall Column A-11 to A-13
Fixed Exposure Rate and Exposure Rate Scan Measurement Locations and Results



Notes:

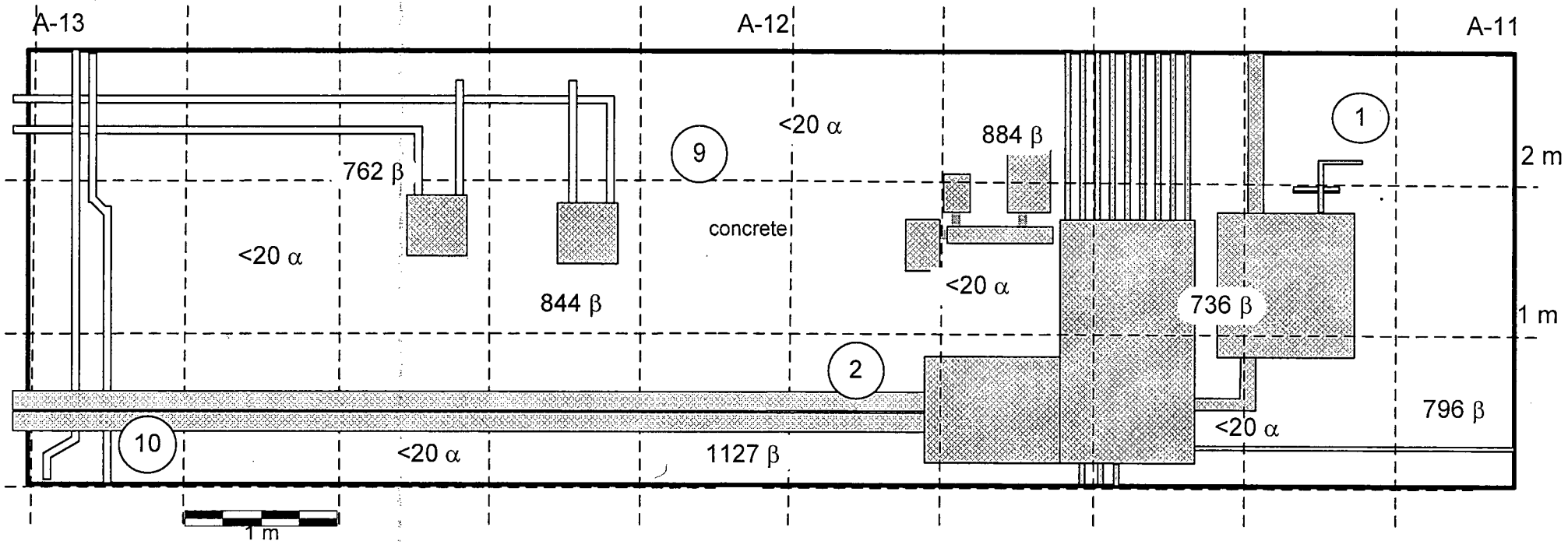
1. All values are μR/hr.
2. 100% of accessible surface scanned 2 meter and below, 10% scanned above 2 meters.
3. ## Denotes fixed exposure rate measurement taken at ~ 1 meter from the surface
4. ←## Denotes exposure rate scan measurement.

Instrument		
Model	Ludlum 3	
Serial #	153551	
Cal Due Date	08-18-03	
Probe	2X2 NaI	
Probe Serial #	155109	
Background	contact	@ 1 m
concrete	15-21 μR/hr	15-21 μR/hr
metal	9-13 μR/hr	10-13 μR/hr

Surveys conducted by: R. Stowell
Dates: 06-05-03 & 06-06-03

Figure 106

Figure 107: Building 2 Service Corridor First (Lowest) Level Inner Wall Column A-11 to A-13
Fixed Alpha and Beta Measurement Locations and Results and Wipe Survey Locations



Notes:

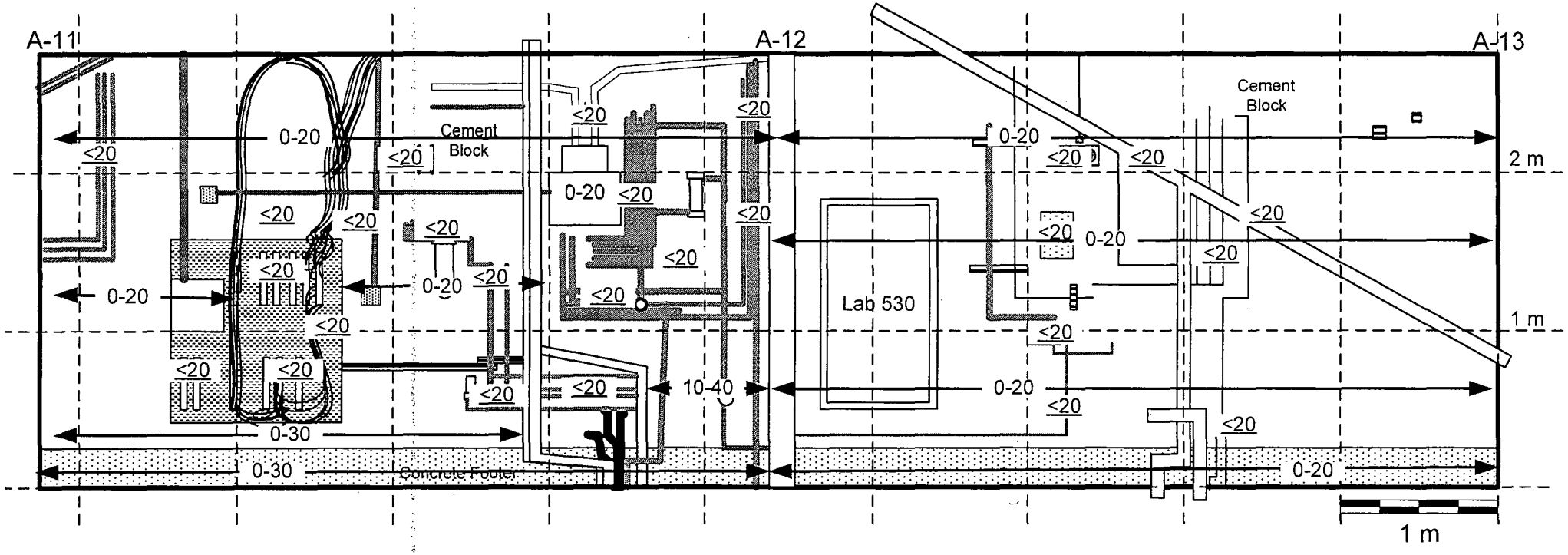
1. ## α Denotes fixed alpha measurement in cpm.
2. #### β Denotes fixed beta measurement in cp2m.
3. (##) Denotes wipe location. Wipe results are provided in Table 5.

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial Number	86302	138801
Probe	100 cm^2 β	50 cm^2 α
Probe Serial #	142547	145696
Cal Due Date	07-24-03	10-20-03
Efficiency %	31.20	22.52
Bkgd Concrete	822+/-344 cp2m	<20 cpm
MDA	218 dpm/100 cm^2	209 dpm/100 cm^2

Surveys conducted by: R. Stowell & Greg Sayer
Dates: 06-05-03 to 06-06-03

Figure 107

Figure 108: Building 2 Service Corridor First (Lowest) Level Outer Wall Column A-11 to A-13
Alpha Scan Measurement Locations and Results



Notes:

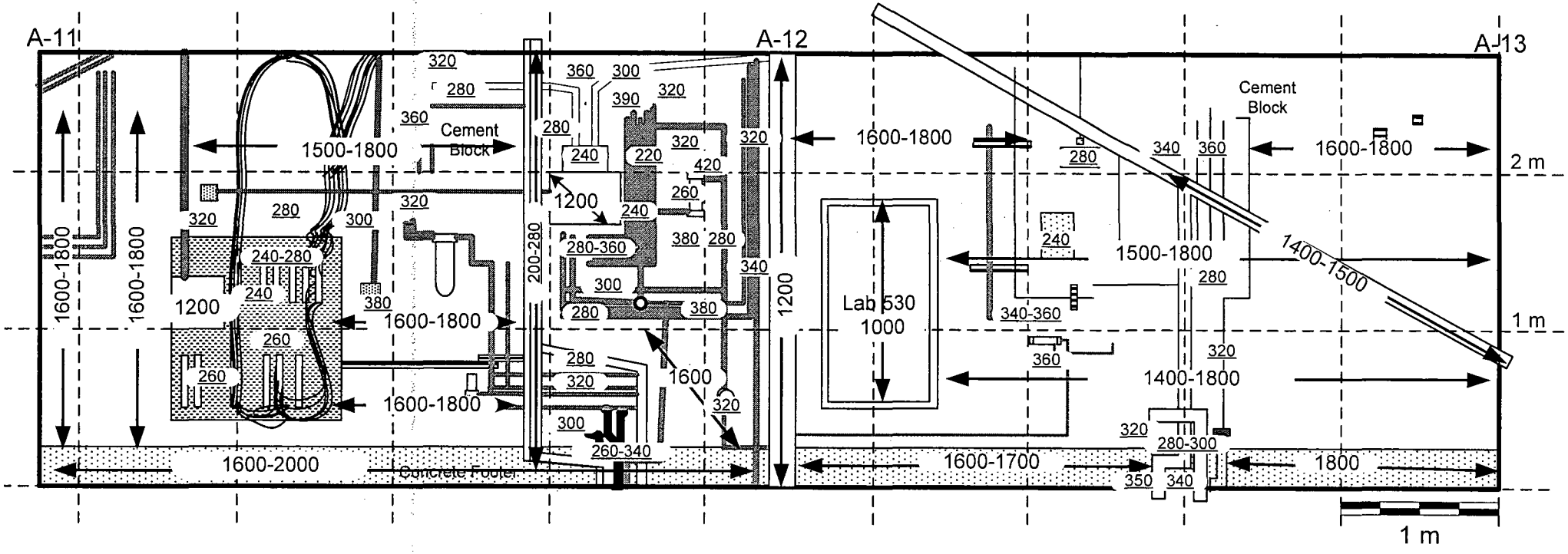
1. All values are in cpm alpha.
2. 100 % of accessible surface scanned 2 meters and below, 10 % scanned above 2 meters.
3. ← #-## → Denotes scans with 434 cm^2 probe.
4 ## Denotes scans with 50 cm^2 probe.

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	97287	138801
Probe	434 cm^2 α	50 cm^2 α
Probe Serial #	083293	145696
Cal Due Date	11-05-03	10-20-03
Efficiency %	20.98	22.52
Bkgd. cement block	0-20 cpm	<20 cpm
Bkgd. metal	0-20 cpm	<20 cpm
Bkgd. concrete	0-30 cpm	<20 cpm

Survey conducted by: R Stowell and Greg Sayer
Dates: 06-05-03 to 06-06-03

Figure 108

Figure 109: Building 2 Service Corridor First (Lowest) Level Outer Wall Column A-11 to A-13
Beta Scan Measurement Locations and Results



Notes:

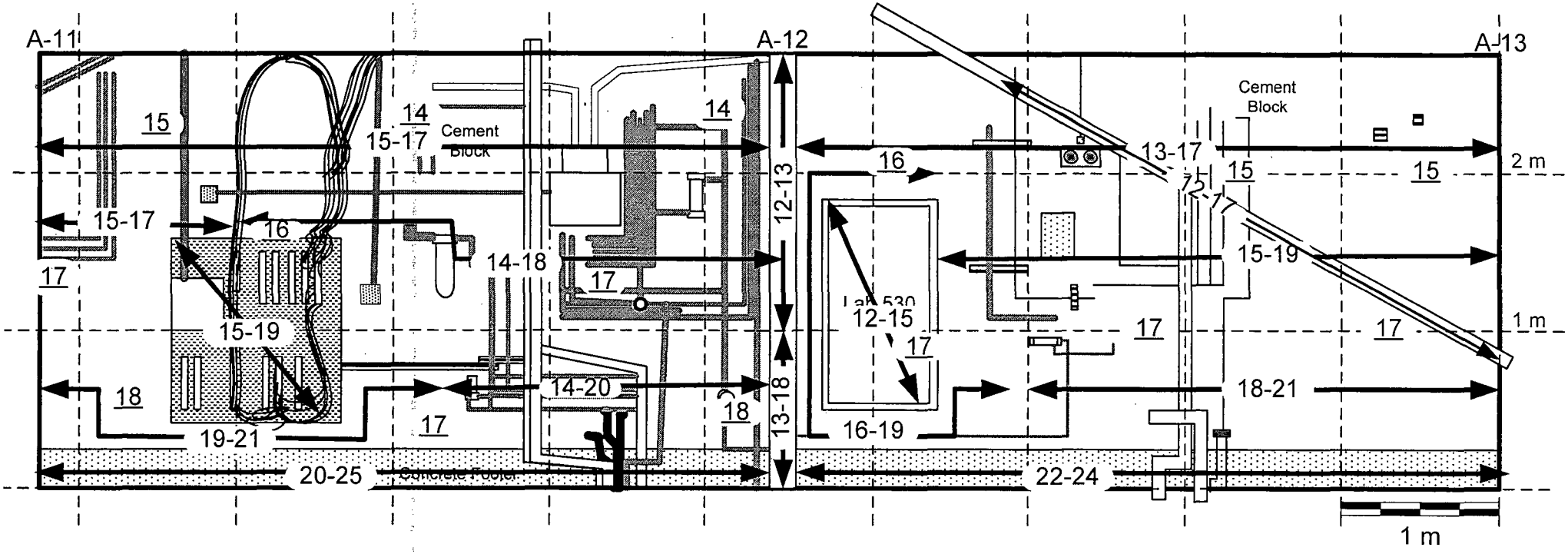
1. All values are in cpm beta.
2. !00% of accessible surfaces scanned 2 meters and below, 10% above 2 meters.
3. ← ####-#### → Denotes scan with 434 cm² probe.
4. ### Denotes scan with 100 cm² probe.

Instruments		
Model	Ludlum 2221	Ludlum 2221
Serial Number	154202	86302
Probe	434 cm² β	100 cm² β
Probe Ser. #	149017	142517
Cal Due Date	09-26-03	07-24-03
Efficiency %	30.17	31.20
Bkgd concrete	1400-2000 cpm	320-420 cpm
Bkgd metal	900-1300 cpm	180-280 cpm
Bkgd cement block	1100-1600 cpm	220-340 cp2m

Survey Conducted by: Greg Sayer
Dates: 06-05-03 to 06-06-03

Figure 109

Figure 110: Building 2 Service Corridor First (Lowest) Level Outer Wall Column A-11 to A-13
Fixed Exposure Rate and Exposure Rate Scan Measurement Locations and Results



Notes:

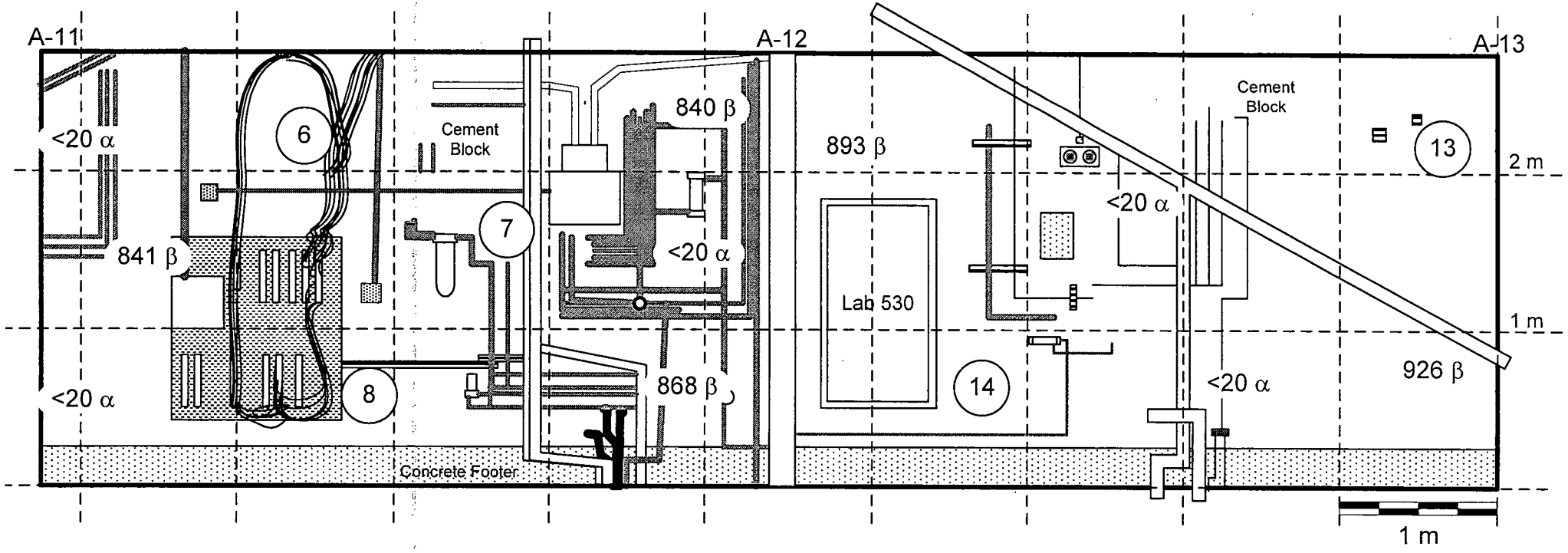
1. All values are μR/hr.
2. 100% of accessible surface scanned 2 meters and below, 10% scanned above 2 meters.
3. ## Denotes fixed exposure rate measurement taken at ~ 1 meter from the surface.
4. ←## Denotes exposure rate scan.

Instrument		
Model	Ludlum 3	
Serial Number	153551	
Probe	2X2 NaI	
Probe Serial #	155109	
Cal Due Date	08-18-03	
Background	contact	@ 1 m
concrete	15-21 μR/hr	15-21 μR/hr
metal	9-13 μR/hr	10-13 μR/hr
cement block	14-19 μR/hr	14-18 μR/hr

Survey conducted by: R. Stowell
Dates: 06-05-03 to 06-06-03

Figure 110

Figure 111: Building 2 Service Corridor First (Lowest) Level Outer Wall Column A-11 to A-13
Fixed Alpha and Beta Measurement Locations and Results and Wipe Survey Locations



Notes:

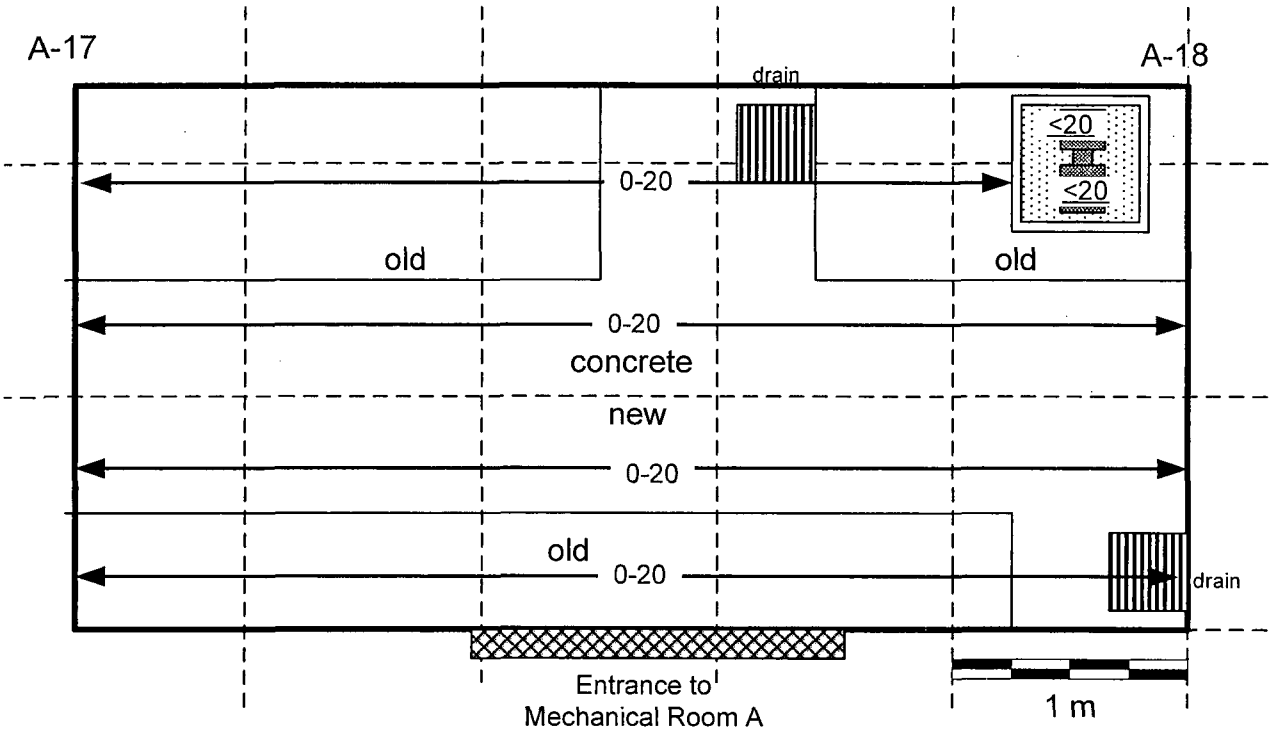
1. ## α — Denotes fixed alpha measurement in cpm.
2. #### β — Denotes fixed beta measurement in cp2m.
3. (##) — Denotes wipe location. Wipe results are provided in Table 5.

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	86302	138801
Probe	100 cm^2 β	50 cm^2 α
Probe Ser. #	142547	145696
Cal Due Date	07-24-03	10-20-03
Efficiency %	31.20	22.52
Bkgd Cement Block	671 +/-126 cp2m	<20 cpm
MDA	197 dpm/100 cm^2	209 dpm/100 cm^2

Survey conducted by: R. Stowell & Greg Sayer
Date: 06-05-03 to 06-06-03

Figure 111

Figure 112: Building 2 Service Corridor First (Lowest) Level Floor Column A-17 to A-18
Alpha Surface Scan Measurement Locations and Results



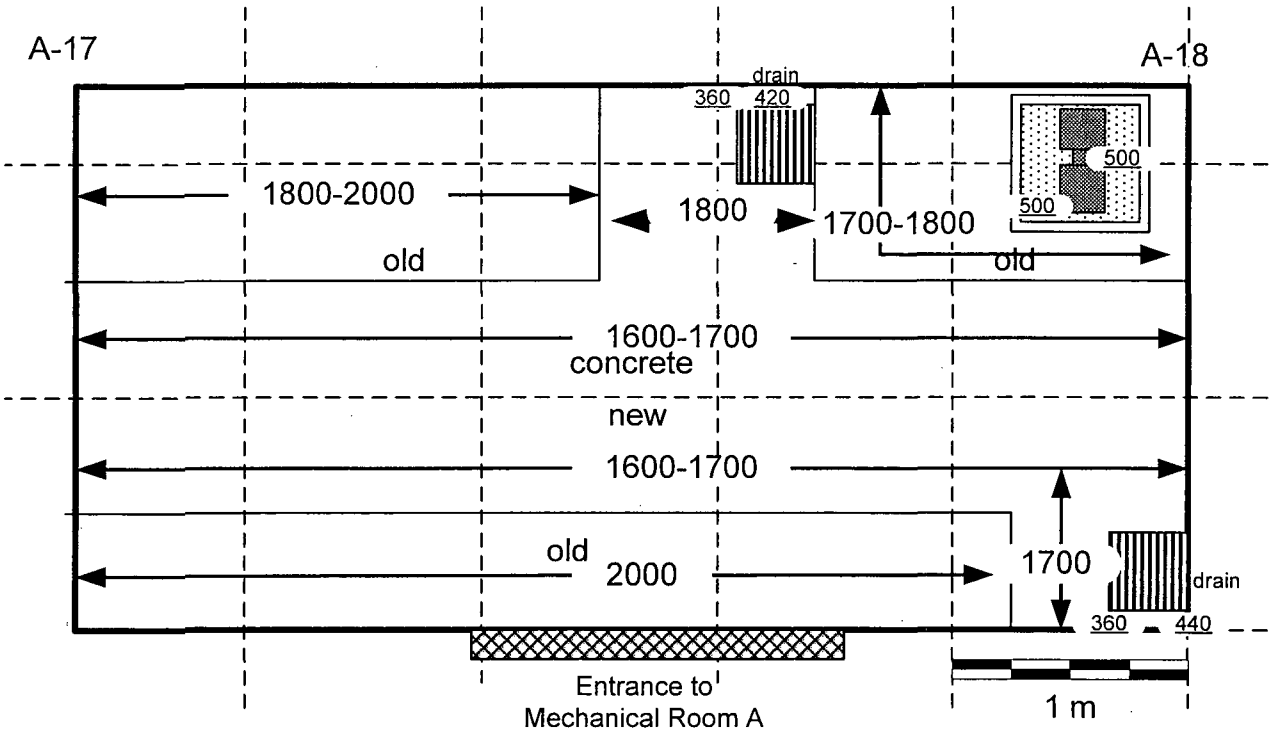
Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	97287	138801
Cal Due Date	11-05-03	10-20-03
Probe	434 cm^2 α	50 cm^2 α
Probe Serial #	083293	145696
Efficiency %	20.98	22.52
Bkgd.concrete	0-30 cpm	<20 cpm
Bkgd. metal	0-20 cpm	<20 cpm

Notes:

1. All values are in cpm alpha.
2. 100 % of accessible surface scanned.
3. ◄—— #-## ——► Denotes scans with 434 cm^2 probe.
4 ## Denotes scans with 50 cm^2 probe.

Survey Conducted by: Greg Sayer
Date: 06-09-03

Figure 113: Building 2 Service Corridor First (Lowest) Level Floor Column A-17 to A-18
Beta Scan Measurement Locations and Results



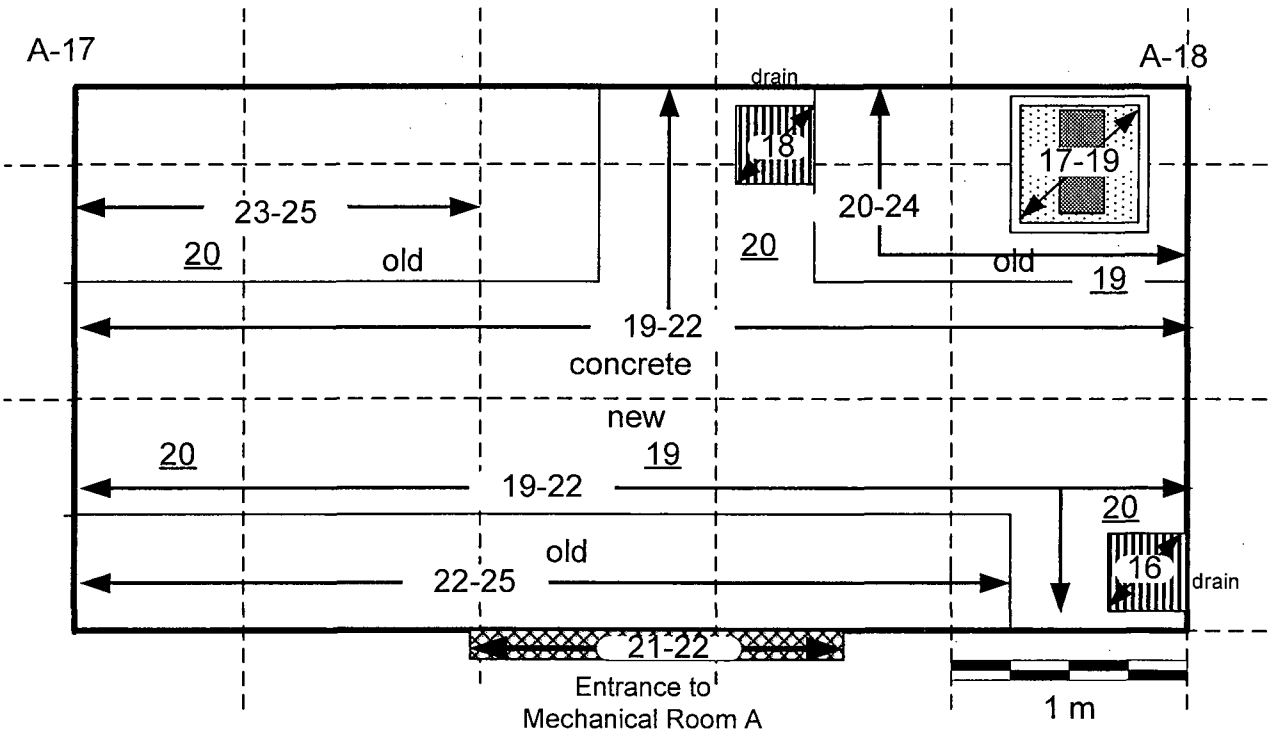
Instruments		
Model	Ludlum 2221	Ludlum 2221
Serial #	154202	86302
Cal Due Date	12-08-03	07-24-03
Probe	434 cm^2 β	100 cm^2 β
Probe Ser #	149017	142547
Efficiency %	30.39	31.20
Bkgd concrete	1300-2000 cpm	320-420 cpm

Notes:

1. All values are in cpm beta.
2. !00% of accessible surfaces scanned.
3. ← ####-#### → Denotes scan with 434 cm^2 probe.
4. ### Denotes scan with 100 cm^2 probe.

Survey Conducted by: Greg Sayer
Date: 06-10-03

Figure114 : Building 2 Service Corridor First (Lowest) Level Floor Column A-17 to A-18
Fixed Exposure Rate and Exposure Rate Scan Measurement Locations and Results



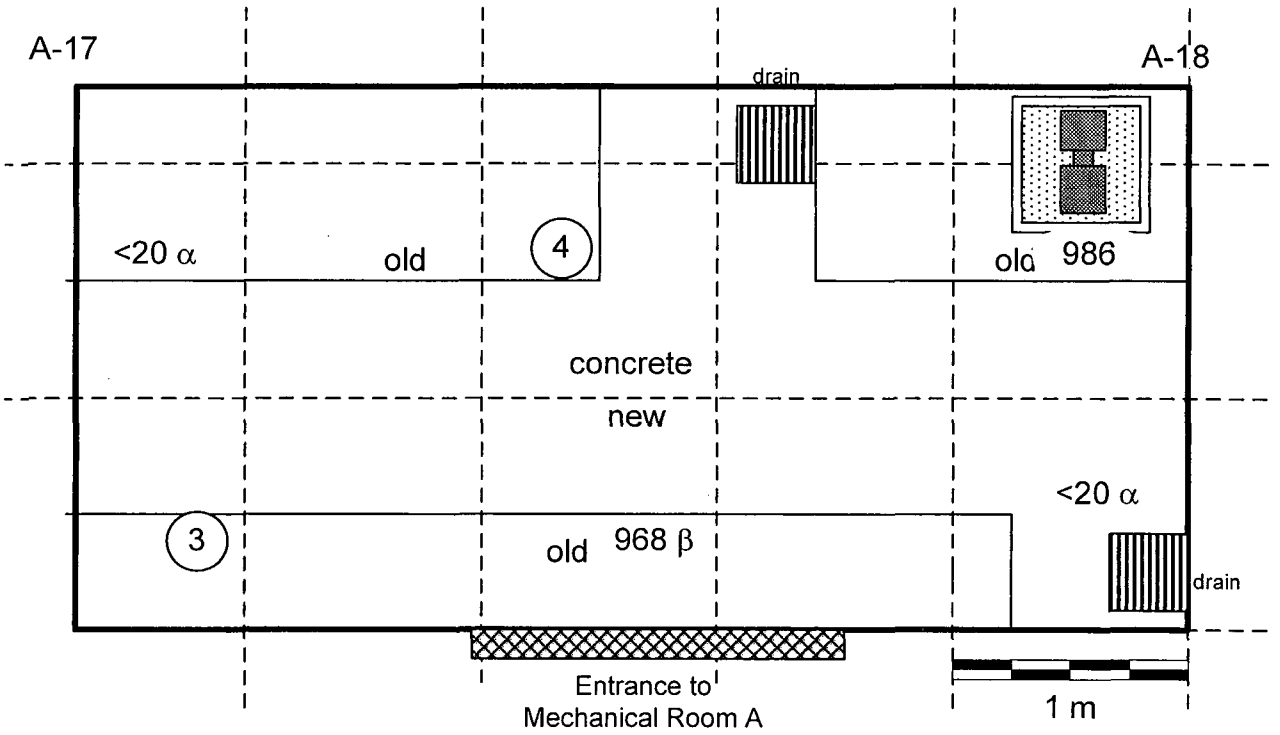
Instrument		
Model	Ludlum 3	
Serial #	153551	
Cal Due Date	08-18-03	
Probe	2" X 2" NaI γ	
Probe Serial #	155109	
Background	contact	@ 1 m
concrete	15-21 μR/hr	15-21 μR/hr
metal	9-13 μR/hr	10-13 μR/hr

Notes:

1. All values are μR/hr.
2. 100% of accessible surface scanned .
3. ## Denotes exposure rate fixed measurement taken at ~ 1 meter from the surface.
4. ← ##-## → Denotes exposure rate scan measurement.

Survey Conducted by: R. Stowell
Date: 06-09-03

Figure 115: Building 2 Service Corridor First (Lowest) Level Floor Column A-17 to A-18 Fixed Alpha and Beta Measurement Locations and Results and Wipe Survey Locations



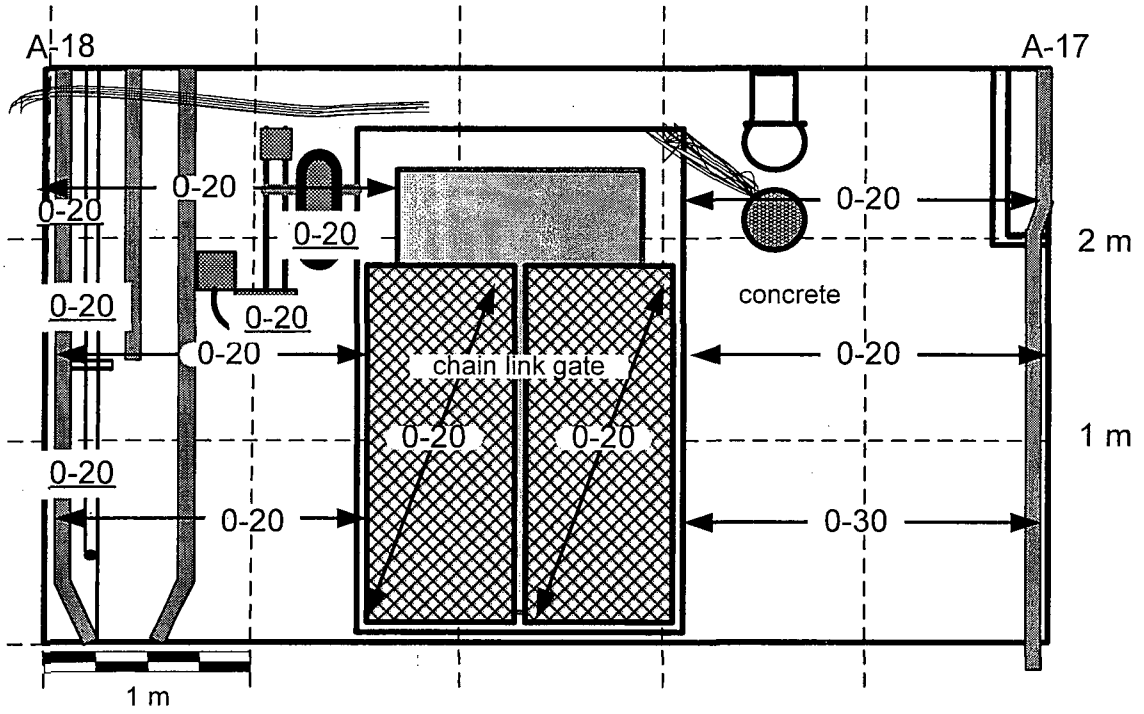
Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	86302	138801
Cal Due Date	07-24-03	10-20-03
Probe	100 cm^2 β	50 cm^2 α
Probe Ser. #	142547	145696
Efficiency %	31.20	22.52
Bkgd Concrete	822+/-344 cp2m	<20 cpm
MDA	218 dpm/100 cm^2	209 dpm/100 cm^2

Notes:

1. ## α Denotes fixed alpha measurement in cpm.
2. ### β Denotes fixed beta measurement in cp2m.
3. (#) Denotes wipe location. Wipe results are provided in Table 5.

Survey Conducted by: Greg Sayer
Date: 06-09-03

Figure 116:Building 2 Service Corridor First (Lowest) Level Inner Wall Column A-17 to A-18
Alpha Scan Measurement Locations and Results



	Instruments	
Model	Ludlum 2221	Ludlum 12
Serial #	97287	138801
Cal Due Date	11-05-03	10-20-03
Probe	434 cm^2 α	50 cm^2 α
Probe Serial #	083293	145696
Efficiency %	20.98	22.52
Bkgd. metal	0-20 cpm	<20 cpm
Bkgd. concrete	0-30 cpm	<20 cpm

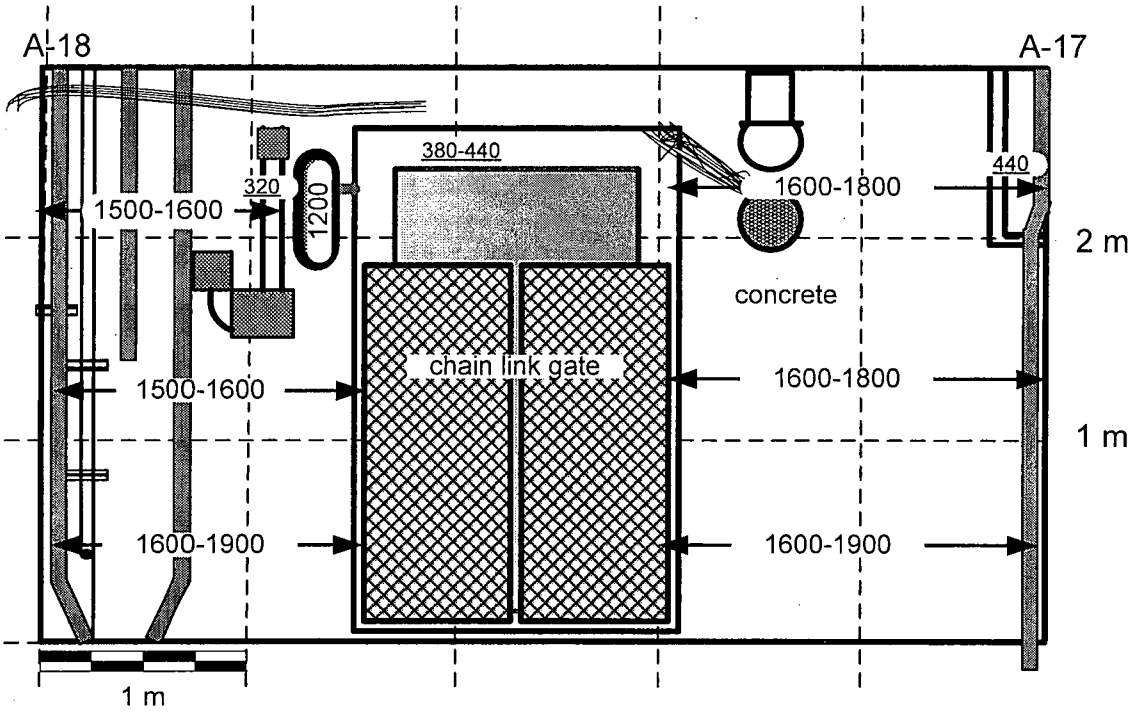
Notes:

1. All values are in cpm alpha.
2. 100 % of accessible surface scanned 2 meters and below, 10 % scanned above 2 meters.
3. ◄— #-## —► Denotes scans with 434 cm^2 probe.
4. ## Denotes scans with 50 cm^2 probe.

Survey Conducted by: G. Sayer
Date: 06-09-03

Figure 116

Figure 117: Building 2 Service Corridor First (Lowest) Level Inner Wall Column A-17 to A-18
Beta Scan Measurement Locations and Results



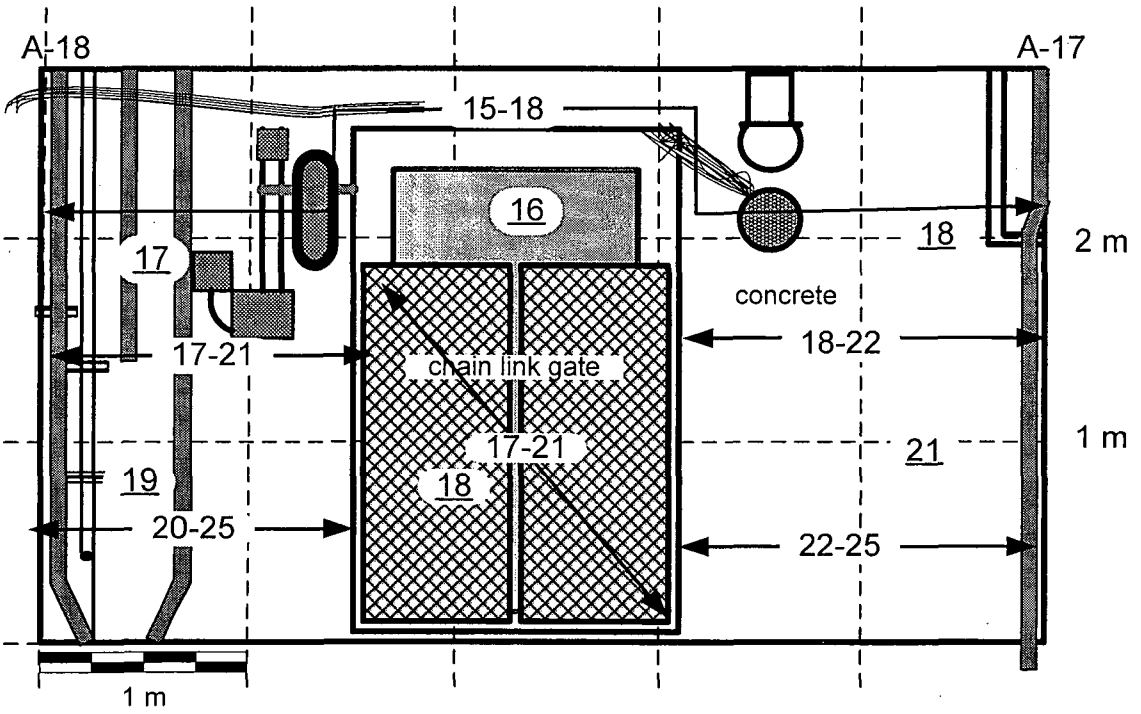
Instruments		
Model	Ludlum 2221	Ludlum 2221
Serial #	154202	86302
Cal Due Date	12-08-03	07-24-03
Probe	434 cm^2 β	100 cm^2 β
Probe Ser. #	149017	142547
Efficiency %	30.39	31.20
Bkgd concrete	1300-2000 cpm	320-420 cpm
Bkgd metal	700-1300 cpm	180-280 cpm

Notes:

1. All values are in cpm beta.
2. !00% of accessible surfaces scanned 2 meters and below, 10% above 2 meters.
3. ← ####-#### → Denotes scan with 434 cm^2 probe.
4. ### Denotes scan with 100 cm^2 probe.

Survey Conducted by: Greg Sayer
Date: 06-10-03

Figure 118: Building 2 Service Corridor First (Lowest) Level Inner Wall Column A-17 to A-18
Fixed Exposure Rate and Exposure Rate Scan Measurement Locations and Results



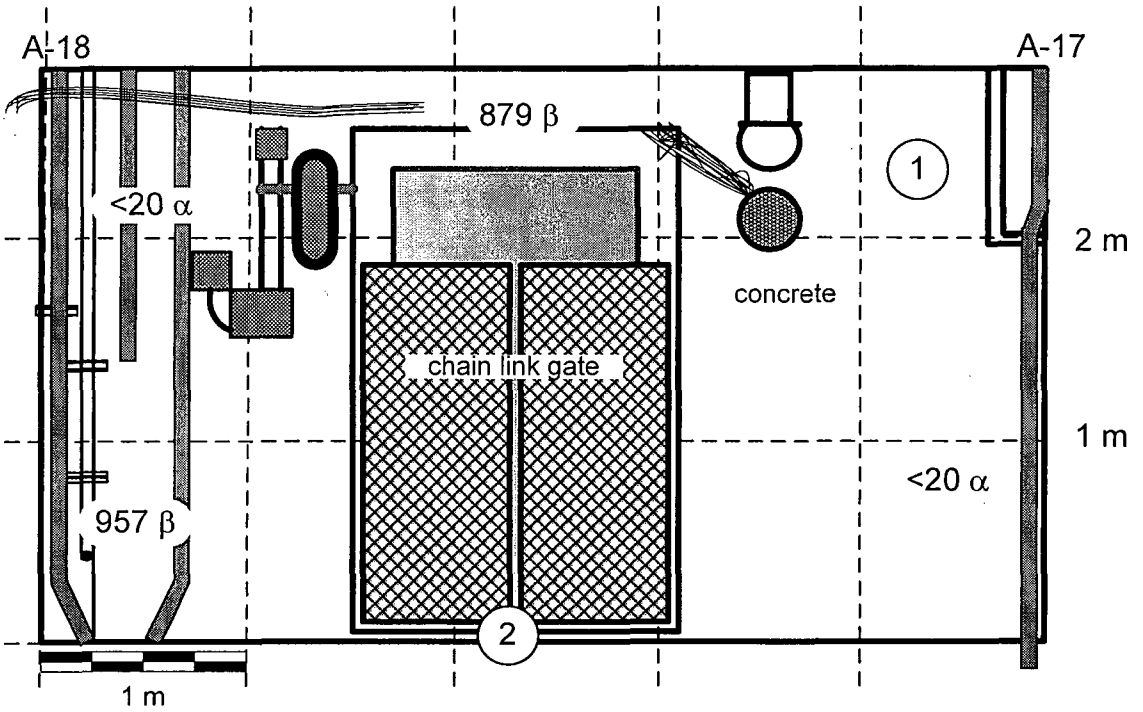
Instrument		
Model	Ludlum 3	
Serial Number	153551	
Cal Due Date	08-18-03	
Probe	2" X 2" NaI γ	
Probe Serial #	155109	
Background	contact	@ 1 m
concrete	15-21 μR/hr	15-21 μR/hr
metal	9-13 μR/hr	10-13 μR/hr

Notes:

1. All values are μR/hr.
2. 100% of accessible surface scanned 2 meters and below, 10% scanned above 2 meters.
3. ## Denotes fixed exposure rate measurement taken at ~ 1 meter from the surface
4. ◄— ##-## —► Denotes exposure rate scan measurement.

Survey Conducted by: R. Stowell
Date: 06-09-03

Figure 119: Building 2 Service Corridor First (Lowest) Level Inner Wall Column A-17 to A-18
Fixed Alpha and Beta Measurement Locations and Results and Wipe Survey Locations



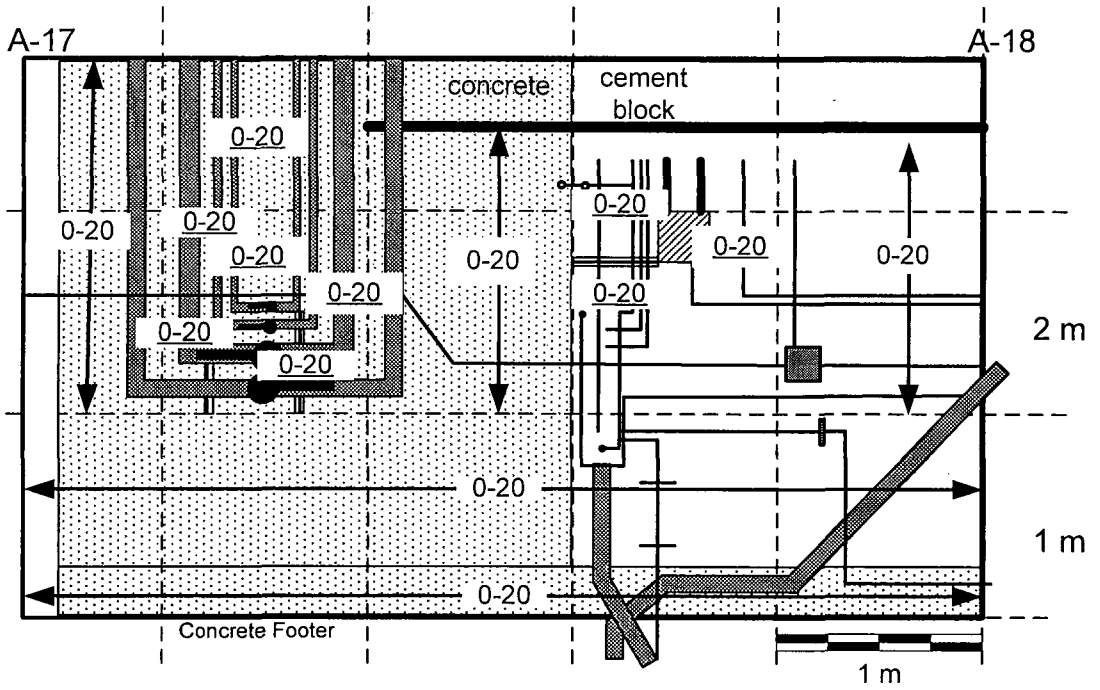
Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	86302	138801
Cal Due Date	07-24-03	10-20-03
Probe	100 cm^2 β	50 cm^2 α
Probe Serial #	142547	145696
Efficiency %	31.20	22.52
Bkgd. Concrete	822+/- 344 cp2m	<20 cpm
MDA	218 dpm/100 cm^2	209 dpm/100 cm^2
Bkgd. Metal	435+/-170 cp2m	<20 cpm
MDA	160 dpm/100 cm^2	209 dpm/100 cm^2

Notes:

1. ## α Denotes fixed alpha measurement in cpm.
2. #### β Denotes fixed beta measurement in cp2m.
3. (##) Denotes wipe location. Wipe results are provided in Table 5.

Survey Conducted by: Greg Sayer
Date: 06-09-03

Figure 120: Building 2 Service Corridor First (Lowest) Level Outer Wall Column A-17 to A-18
Alpha Scan Measurement Locations and Results



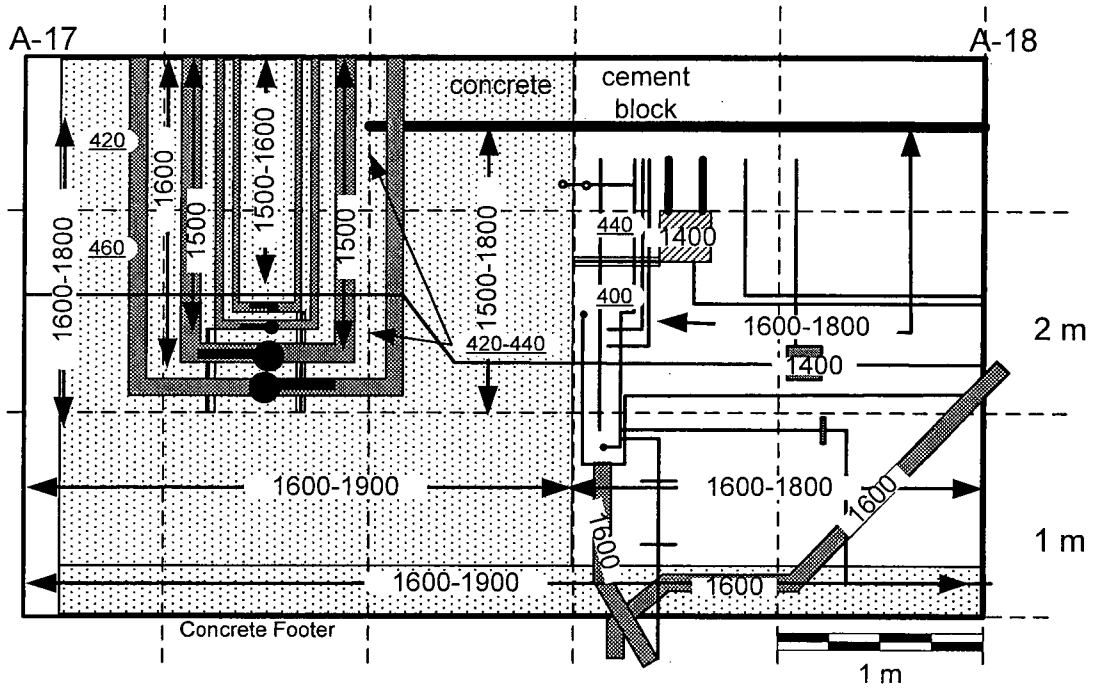
Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	97287	138801
Cal Due Date	11-05-03	10-20-03
Probe	434 cm^2 α	50 cm^2 α
Probe Serial #	083293	145696
Efficiency %	20.98	22.52
Bkgd. cement block	0-20 cpm	<20 cpm
Bkgd. metal	0-20 cpm	<20 cpm
Bkgd. concrete	0-30 cpm	<20 cpm

Notes:

1. All values are in cpm alpha.
2. 100 % of accessible surface scanned 2 meters and below, 10 % scanned above 2 meters.
3. ◄— #-## —► Denotes scans with 434 cm^2 probe.
4. #-## Denotes scans with 50 cm^2 probe.

Survey conducted by: G. Sayer
Date: 06-09-03

Figure 121: Building 2 Service Corridor First (Lowest) Level Outer Wall Column A-17 to A-18
Beta Scan Measurement Locations and Results



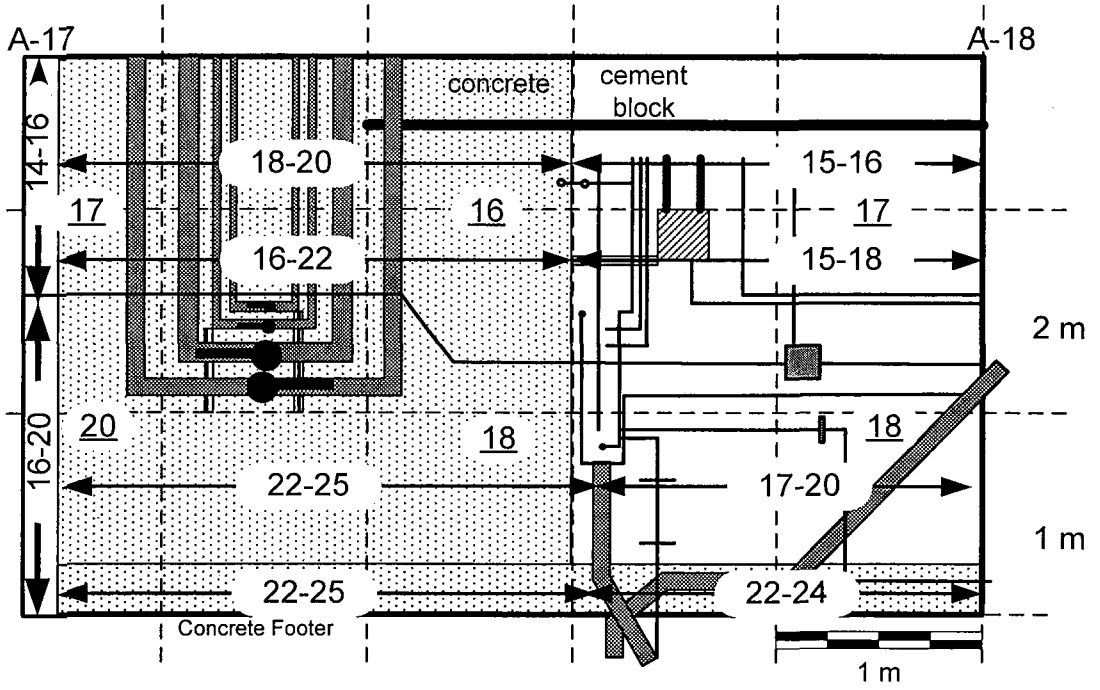
Instruments		
Model	Ludlum 2221	Ludlum 2221
Serial #	154202	86302
Cal Due Date	12-08-03	07-24-03
Probe	434 cm^2 β	100 cm^2 β
Probe Ser. #	149017	142517
Efficiency %	30.39	31.20
Bkgd concrete	1300-2000 cpm	320-420 cpm
Bkgd metal	700-1300 cpm	180-280 cpm
Bkgd cement block	1300-1500 cpm	220-340 cp2m

Notes:

1. All values are in cpm beta.
2. !00% of accessible surfaces scanned 2 meters and below, 10% above 2 meters.
3. ← ####-#### → Denotes scan with 434 cm^2 probe.
4. ### Denotes scan with 100 cm^2 probe.

Survey Conducted by: Greg Sayer
Date: 06-10-03

Figure 122: Building 2 Service Corridor First (Lowest) Level Outer Wall Column A-17 to A-18
Fixed Exposure Rate and Exposure Rate Scan Measurement Locations and Results



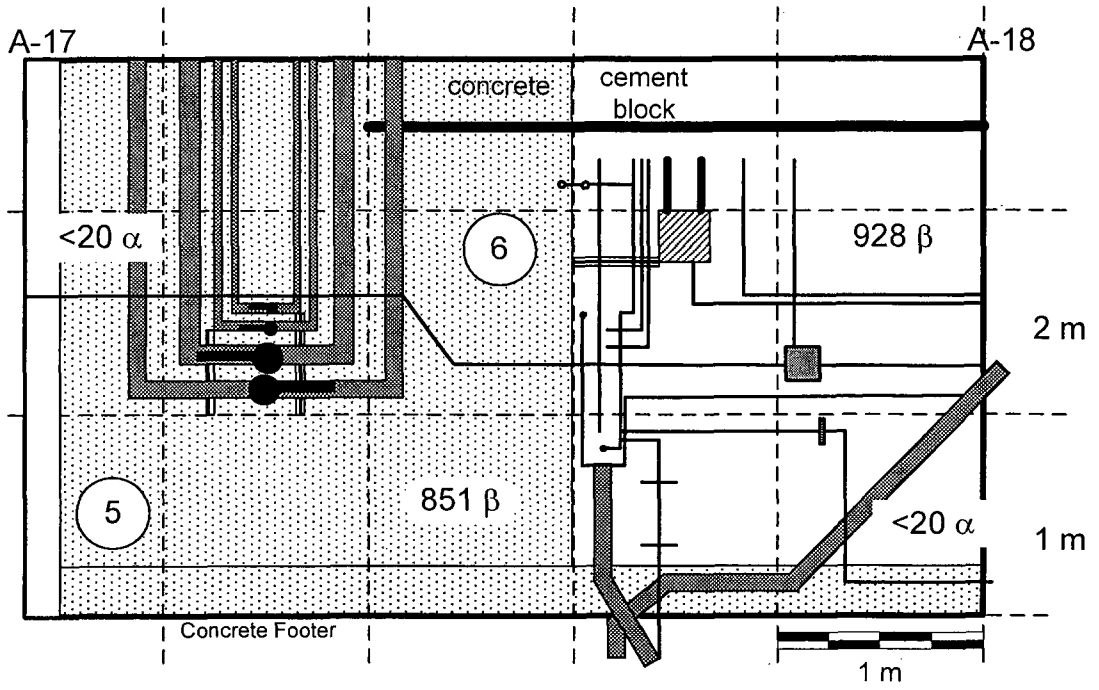
Instrument		
Model	Ludlum 3	
Serial #	153551	
Cal Due Date	08-18-03	
Probe	2" X 2" NaI γ	
Probe Serial #	155109	
Background	contact	@ 1 m
concrete	15-21 μR/hr	15-21 μR/hr
metal	9-13 μR/hr	10-13 μR/hr
cem blk	14-19 μR/hr	14-18 μR/hr

Notes:

1. All values are μR/hr.
2. 100% of accessible surface scanned 2 meters and below, 10% scanned above 2 meters.
3. ## Denotes Fixed measurement taken at ~ 1 meter from the surface
4. ← ##-## → Denotes scan range at the surface.

Survey Conducted by: R. Stowell
Date: 06-09-03

Figure 123: Building 2 Service Corridor First (Lowest) Level Outer Wall Column A-17 to A-18 Alpha and Beta Fixed Measurement Locations and Results and Wipe Survey Locations



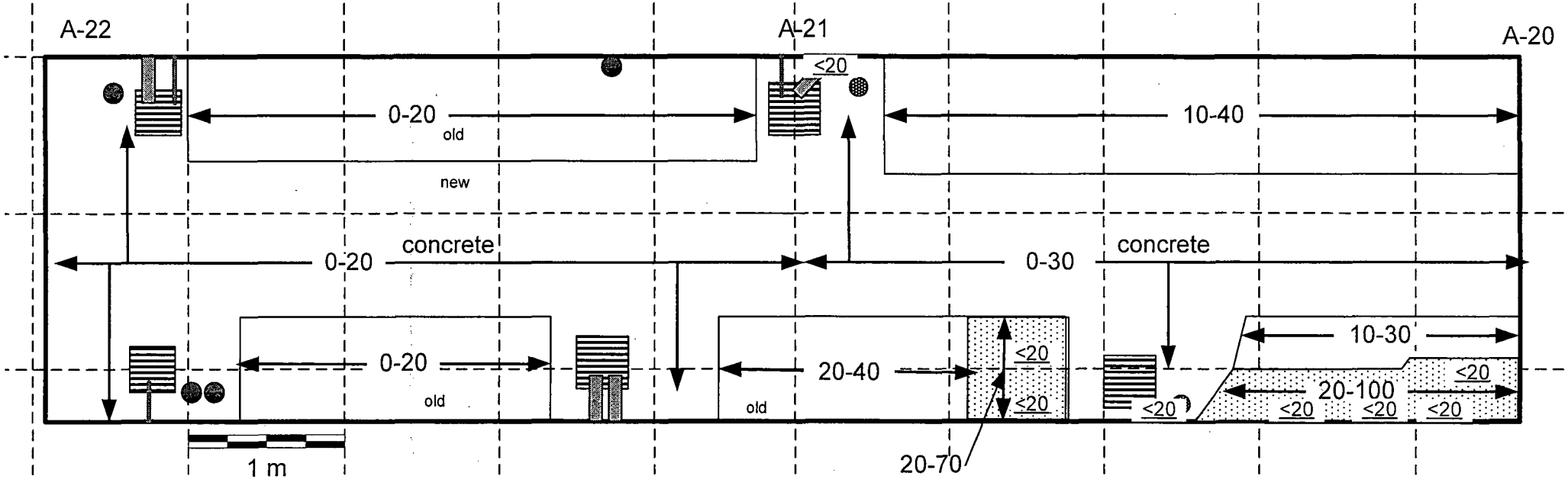
Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	86302	138801
Cal Due Date	07-24-03	10-20-03
Probe	100 cm^2 β	50 cm^2 α
Probe Serial #	142547	145696
Efficiency %	31.20	22.52
Bkgd. Concrete	822+/- 344 cp2m	<20 cpm
MDA	218 dpm/100 cm^2	209 dpm/100 cm^2
Bkgd. Metal	435+/-170 cp2m	<20 cpm
MDA	160 dpm/100 cm^2	209 dpm/100 cm^2
Bkgd. Cem. Blk.	671+/-126 cp2m	<20 cpm
MDA	197 dpm/100 cm^2	209 dpm/100 cm^2

Notes:

1. ## α Denotes fixed alpha measurement in cpm.
2. #### β Denotes fixed beta measurement in cp2m.
3. (##) Denotes wipe location. Wipe results are provided in Table 5.

Survey Conducted by: G. Sayer
Date: 06-09-03

Figure 124: Building 2 Service Corridor First (Lowest) Level Floor Column A-20 to A-22
Alpha Scan Measurement Locations and Results



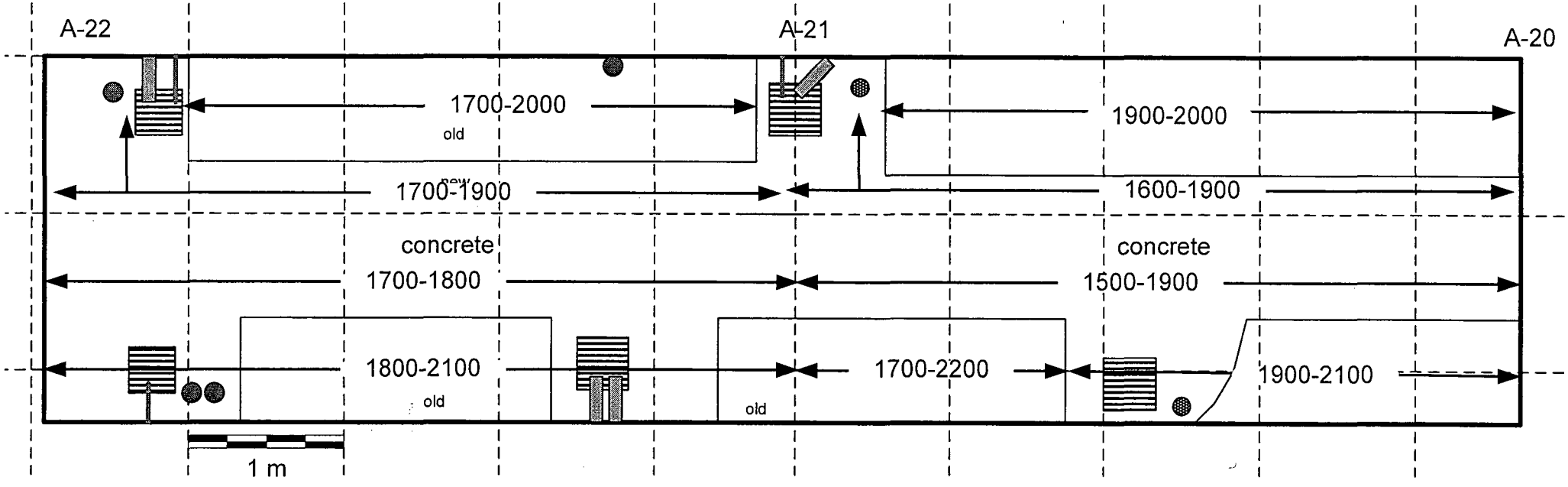
Notes:

1. All values are in cpm alpha.
2. 100 % of accessible surface.
3. ← #-## → Denotes scans with 434 cm² probe.
4. ## Denotes scans with 50 cm² probe.
5. Denotes area of elevated scans checked with 50 cm² probe.

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	97287	138801
Cal Due Date	11-05-03	10-20-03
Probe	434 cm² α	50 cm² α
Probe Serial #	083293	145696
Efficiency %	20.98	22.52
Bkgd. concrete	0-30 cpm	<20 cpm

Survey Conducted by: R. Stowell and G. Sayer
Date(s): 06-10-03 and 06-12-03

Figure 125: Building 2 Service Corridor First (Lowest) Level Floor Column A-20 to A-22
Beta Scan Measurement Locations and Results



Notes:

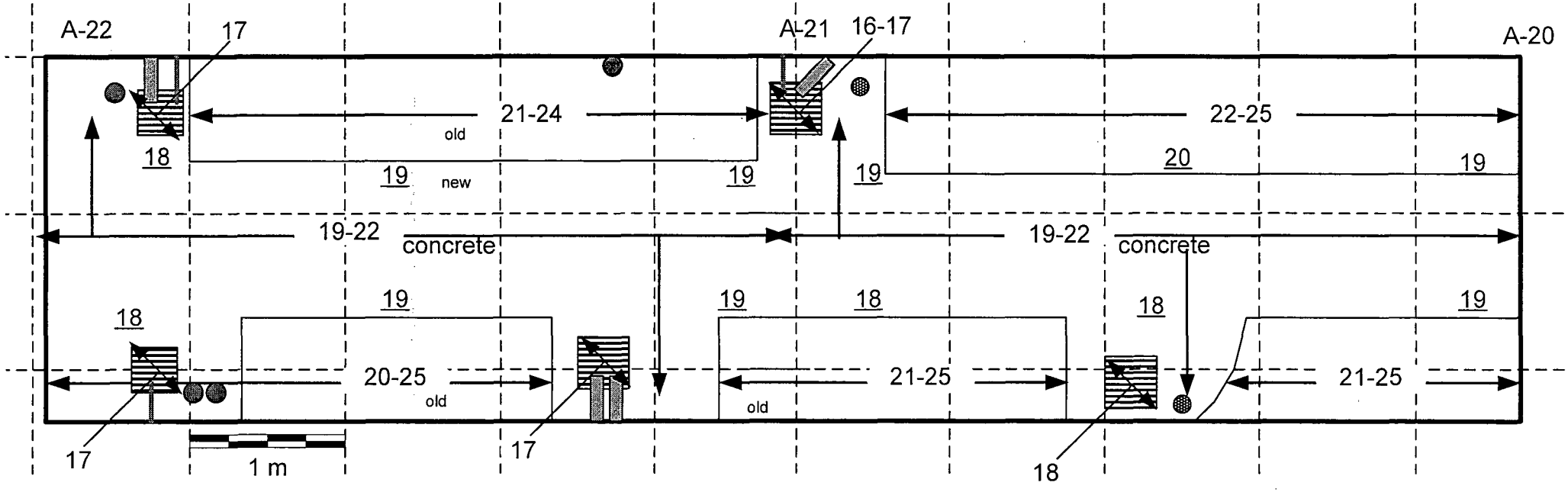
1. All values are in cpm beta.
2. 100% of accessible surfaces scanned.
3. ←— ####-#### —→ Denotes scan with 434 cm^2 probe.

Instrument	
Model	Ludlum 2221
Serial #	154202
Cal Due Date	12-08-03
Probe	434 cm^2 β
Probe Ser. #	149017
Efficiency %	30.39
Bkgd concrete	1300-2000 cpm

Survey Conducted by: Greg Sayer
Dates: 06-10-03 to 06-11-03

Figure 125

Figure 126: Building 2 Service Corridor First (Lowest) Floor Column A-20 to A-22
Fixed Exposure Rate and Exposure Rate Scan Measurement Locations and Results



Notes:

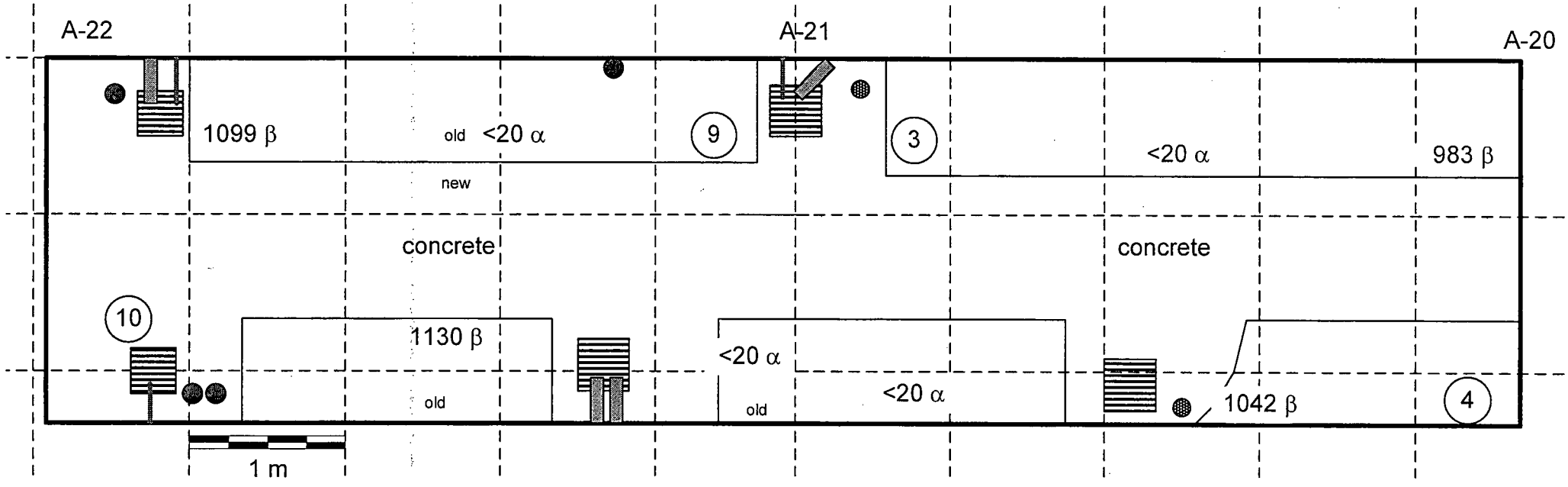
1. All values are μR/hr.
2. 100% of accessible surface scanned .
3. ## Denotes fixed measurement taken at ~ 1 meter from the surface.
4. ←## - ##→ Denotes scan range at the surface.

Instrument		
Model	Ludlum 3	
Serial #	153551	
Cal Due Date	08-18-03	
Probe	2" X 2" Nal γ	
Probe Serial #	155109	
Background	contact	@ 1 m
concrete	15-21 μR/hr	15-21 μR/hr
metal	9-13 μR/hr	10-13 μR/hr

Survey Conducted by: R. Stowell
Dates: 06-10-03 and 06-12-03

Figure 126

Figure 127: Building 2 Service Corridor First (Lowest) Level Floor Column A-20 to A-22
Alpha and Beta Fixed Measurement Locations and Results and Wipe Survey Locations



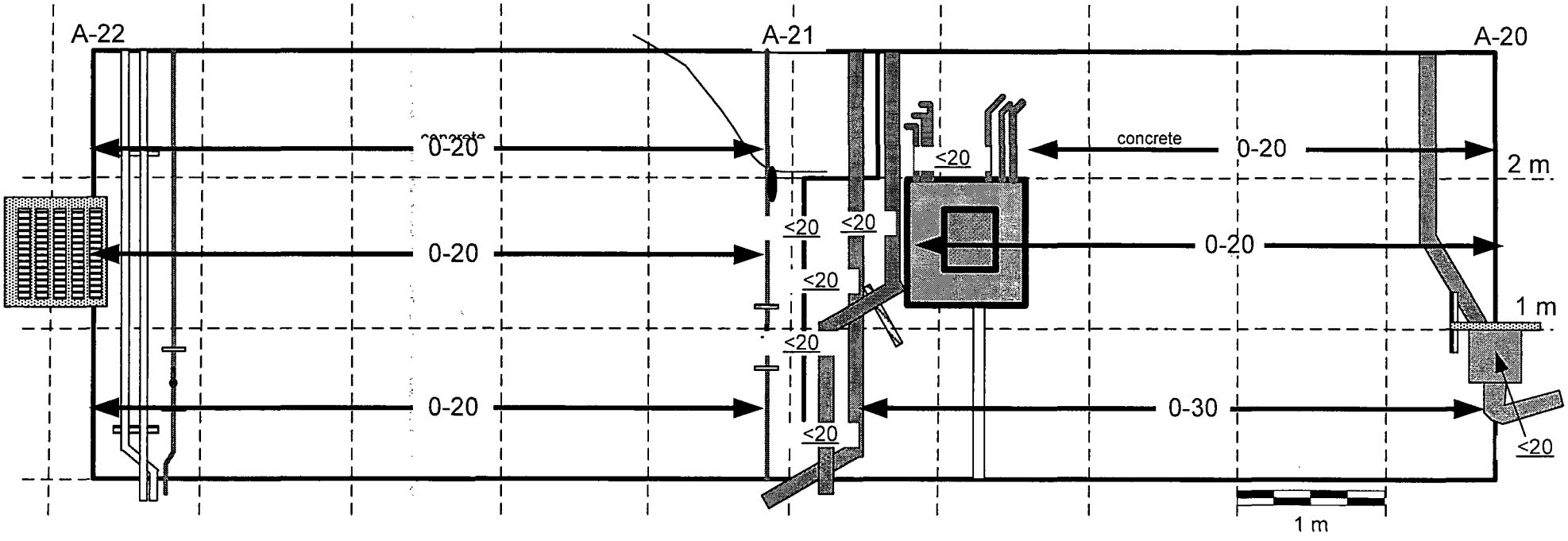
Notes:

1. ## α — Denotes fixed alpha measurement in cpm.
2. #### β — Denotes fixed beta measurement in cp2m.
3. (##) — Denotes wipe location. Wipe results are provided in Table 5.

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	86302	138801
Cal Due Date	07-24-03	10-20-03
Probe	100 cm^2 β	50 cm^2 α
Probe Serial #	142547	145696
Efficiency %	31.20	22.52
Bkgd. Concrete	822+/- 344 cp2m	<20 cpm
MDA	218 dpm/100 cm^2	209 dpm/100 cm^2

Survey Conducted by: R. Stowell and G.Sayer
Dates: 06-11-03 to 06-12-03

Figure 128: Building 2 Service Corridor First (Lowest) Level Inner Wall Column A-20 to A-22
Alpha Scan Measurement Locations and Results



Notes:

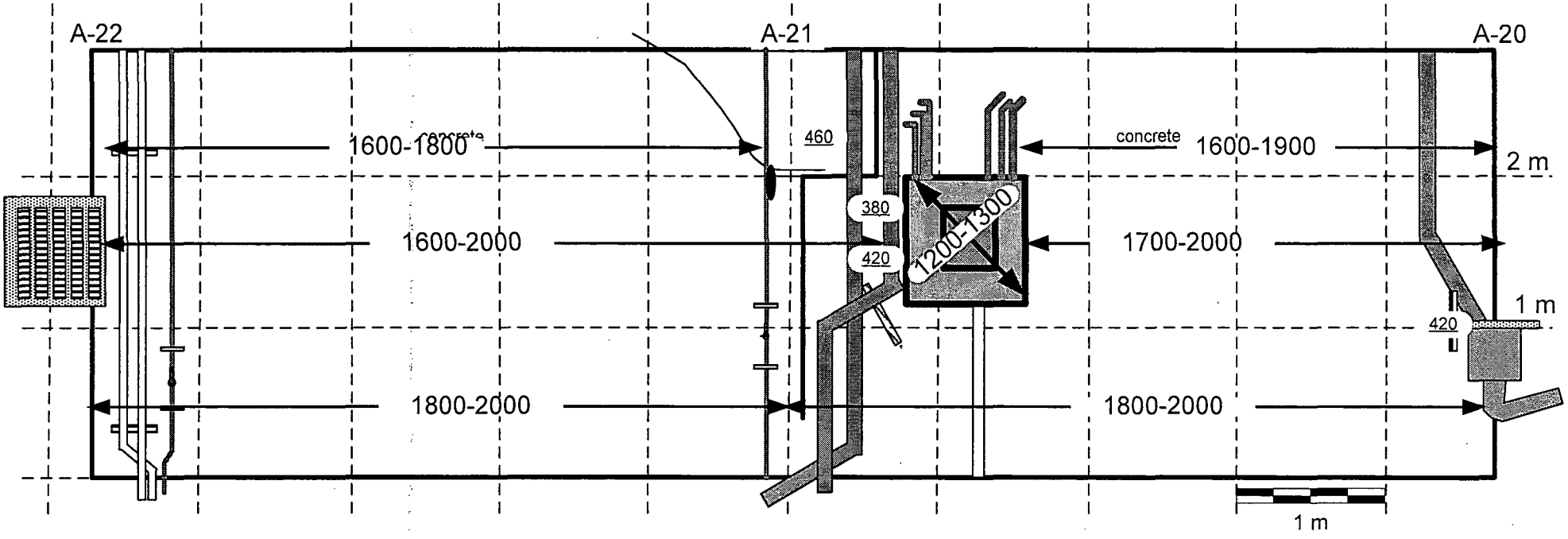
1. All values are in cpm alpha.
2. 100 % of accessible surface scanned 2 meters and below, 10 % scanned above 2 meters.
3. ← #-## → Denotes scans with 434 cm^2 probe.
4. ## Denotes scans with 50 cm^2 probe.

	Instruments	
Model	Ludlum 2221	Ludlum 12
Serial #	97287	138801
Cal Due Date	11-05-03	10-20-03
Probe	434 cm^2 α	50 cm^2 α
Probe Serial #	083293	145696
Efficiency %	20.98	22.52
Bkgd. cement block	0-20 cpm	<20 cpm
Bkgd. metal	0-20 cpm	<20 cpm
Bkgd. concrete	0-30 cpm	<20 cpm

Survey Conducted by: R. Stowell and G. Sayer
Dates: 06-10-03 and 06-12-03

Figure 128

Figure 129: Building 2 Service Corridor First (Lowest) Level Inner Wall Column A-20 to A-22
Beta Scan Measurement Locations and Results



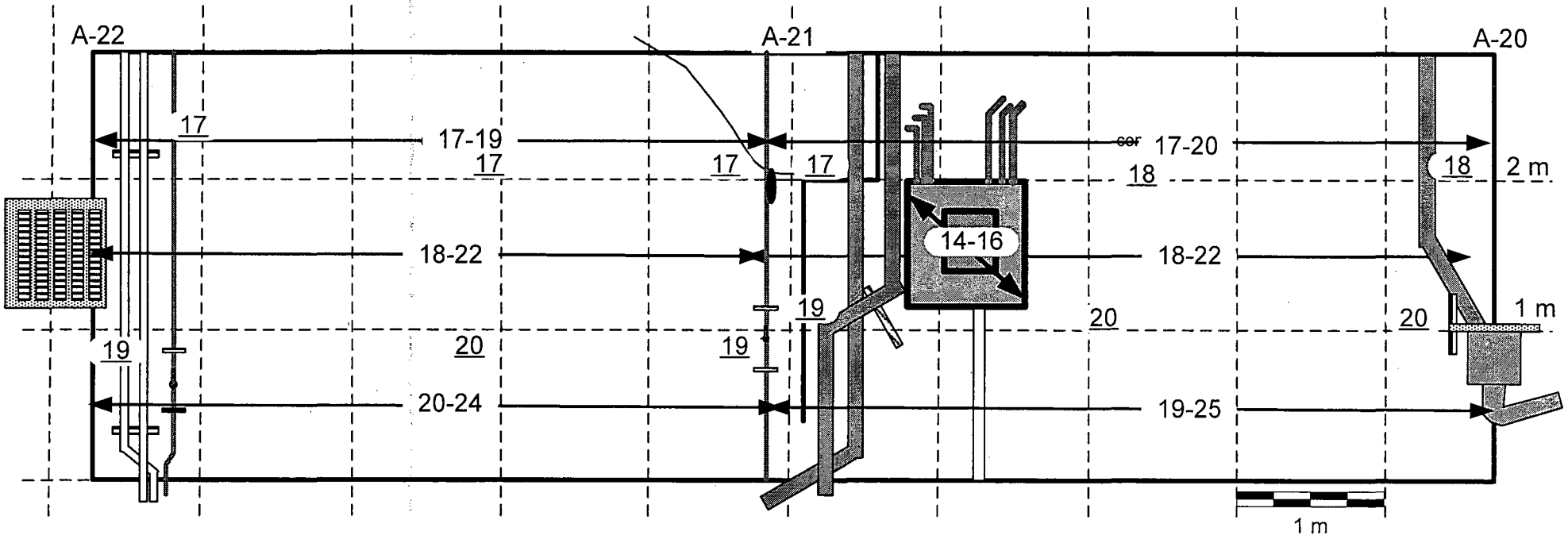
Notes:

1. All values are in cpm beta.
2. !00% of accessible surfaces scanned 2 meters and below, 10% above 2 meters.
3. ← ###-### → Denotes scan with 434 cm^2 probe.
4. ### Denotes scan with 100 cm^2 probe.

Instruments		
Model	Ludlum 2221	Ludlum 2221
Serial #	154202	86302
Cal Due Date	12-08-03	07-24-03
Probe	434 cm^2 β	100 cm^2 β
Probe Ser. #	149017	142517
Efficiency %	30.39	31.20
Bkgd concrete	1300-2000 cpm	320-420 cpm
Bkgd metal	700-1300 cpm	180-280 cpm

Survey Conducted by: Greg Sayer
Dates: 06-10-03 to 06-11-03

Figure 130: Building 2 Service Corridor First (Lowest) Level Inner Wall Column A-20 to A-22
Fixed Exposure Rate and Exposure Rate Scan Measurement Locations and Results



Notes:

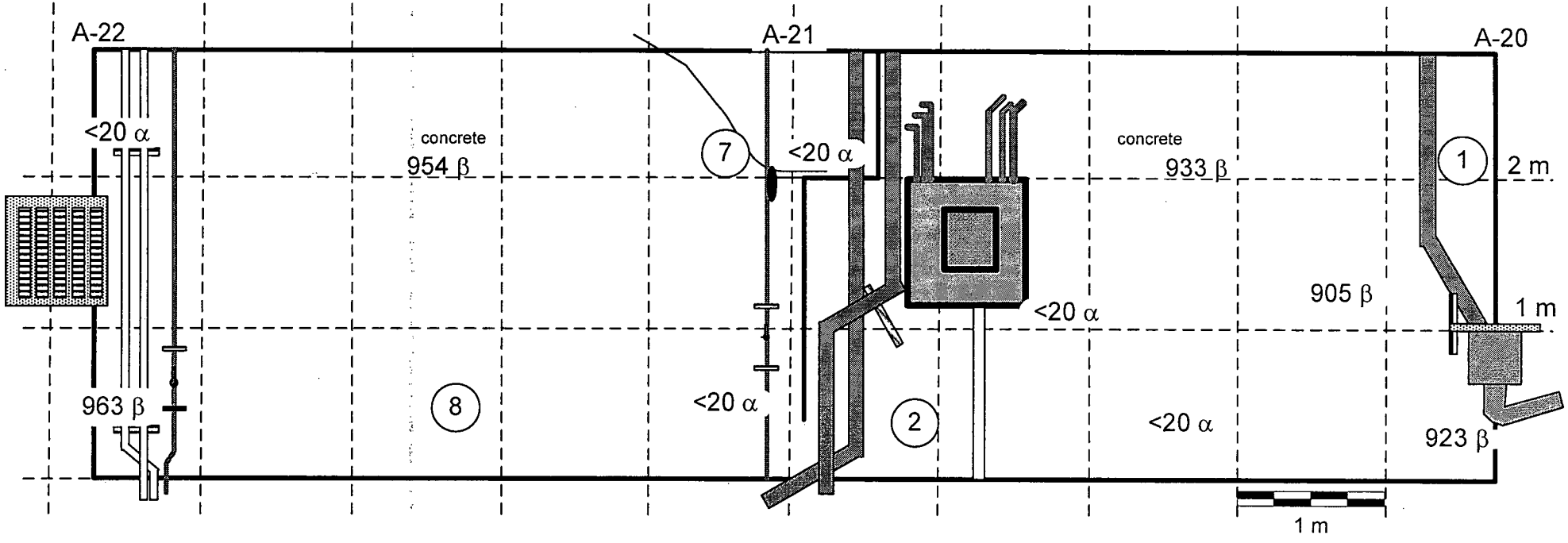
1. All values are μR/hr.
2. 100% of accessible surface scanned 2 meters and below, 10% scanned above 2 meters.
3. ## Denotes exposure rate fixed measurement taken at ~ 1 meter from the surface.
4. ◄— ##-## —► Denotes exposure rate scan measurement.

Instrument		
Model	Ludlum 3	
Serial #	153551	
Cal Due Date	08-18-03	
Probe	2" X 2" Nal γ	
Probe Serial #	155109	
Background	contact	@ 1 m
concrete	15-21 μR/hr	15-21 μR/hr
metal	9-13 μR/hr	10-13 μR/hr

Survey Conducted by: R. Stowell
Dates: 06-10-03 to 06-11-03

Figure 130

Figure 131: Building 2 Service Corridor First (Lowest) Level Inner Wall Column A-20 to A-22
Alpha and Beta Fixed Measurement Locations and Results and Wipe Survey Locations



Notes:

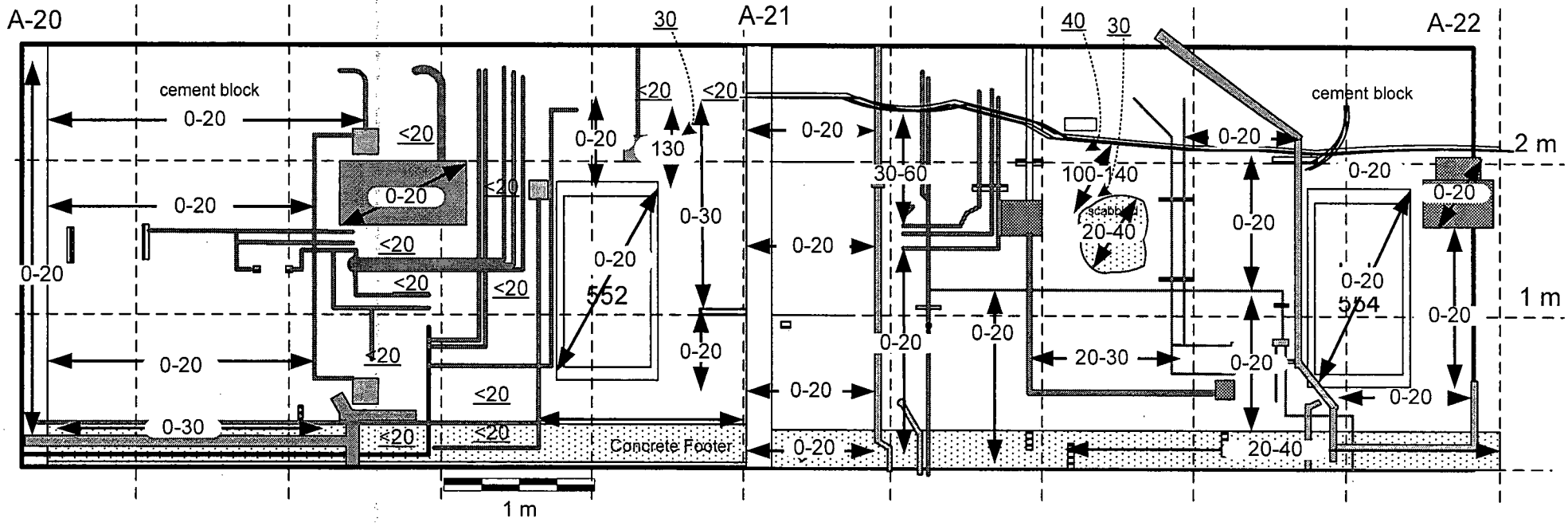
1. ## α Denotes fixed alpha measurement in cpm.
2. #### β Denotes fixed beta measurement in cp2m.
3. (##) Denotes wipe location. Wipe results are provided in Table 5.

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	86302	138801
Cal Due Date	07-24-03	10-20-03
Probe	100 cm^2 β	50 cm^2 α
Probe Serial #	142547	145696
Efficiency %	31.20	22.52
Bkgd. Concrete	822+/- 344 cp2m	<20 cpm
MDA	218 dpm/100 cm^2	209 dpm/100 cm^2
Bkgd. Metal	435+/-170 cp2m	<20 cpm
MDA	160 dpm/100 cm^2	209 dpm/100 cm^2

Survey Conducted by: R. Stowell and G. Sayer
Dates: 06-11-03 to 06-12-03

Figure 131

Figure 132: Building 2 Service Corridor First (Lowest) Level Outer Wall Column A-20 to A-22
Alpha Scan Measurement Locations and Results



Notes:

1. All values are in cpm alpha.

2. 100 % of accessible surface scanned 2 meters and below, 10 % scanned above 2 meters.

3. ← #-## → Denotes scans with 434 cm^2 probe.

4 ## Denotes scans with 50 cm^2 probe.

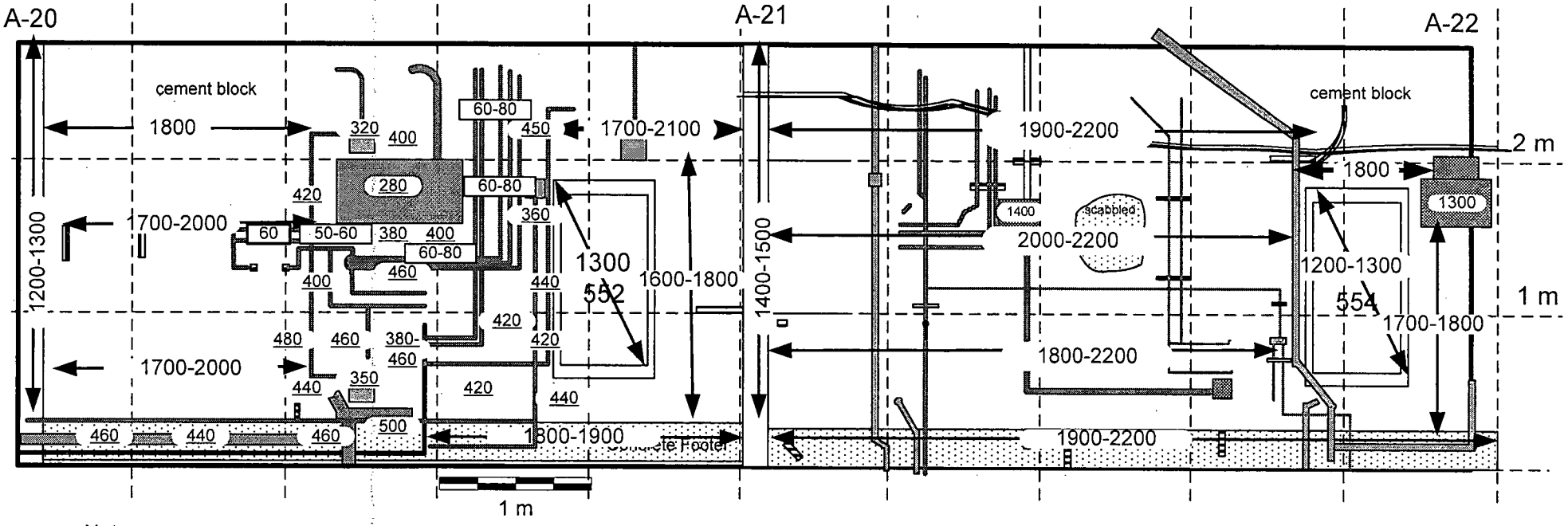
5. Elevated 434 cm^2 probe readings, >100 cpm, were checked with 50 cm^2 probe. Maximum reading was 40 cpm,<MDA (209 dpm/ 100 cm^2).

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	97287	138801
Cal Due Date	11-05-03	10-20-03
Probe	434 cm^2 α	50 cm^2 α
Probe Serial #	083293	145696
Efficiency %	20.98	22.52
Bkgd. cement block	0-20 cpm	<20 cpm
Bkgd. metal	0-20 cpm	<20 cpm
Bkgd. concrete	0-30 cpm	<20 cpm

Survey conducted by: R. Stowell & G. Sayer
Dates: 06-10-03 & 06-12-03

Figure 132

Figure 133: Building 2 Service Corridor First (Lowest) Level Outer Wall Column A-20 to A-22
Beta Scan Measurement Locations and Results



Notes:

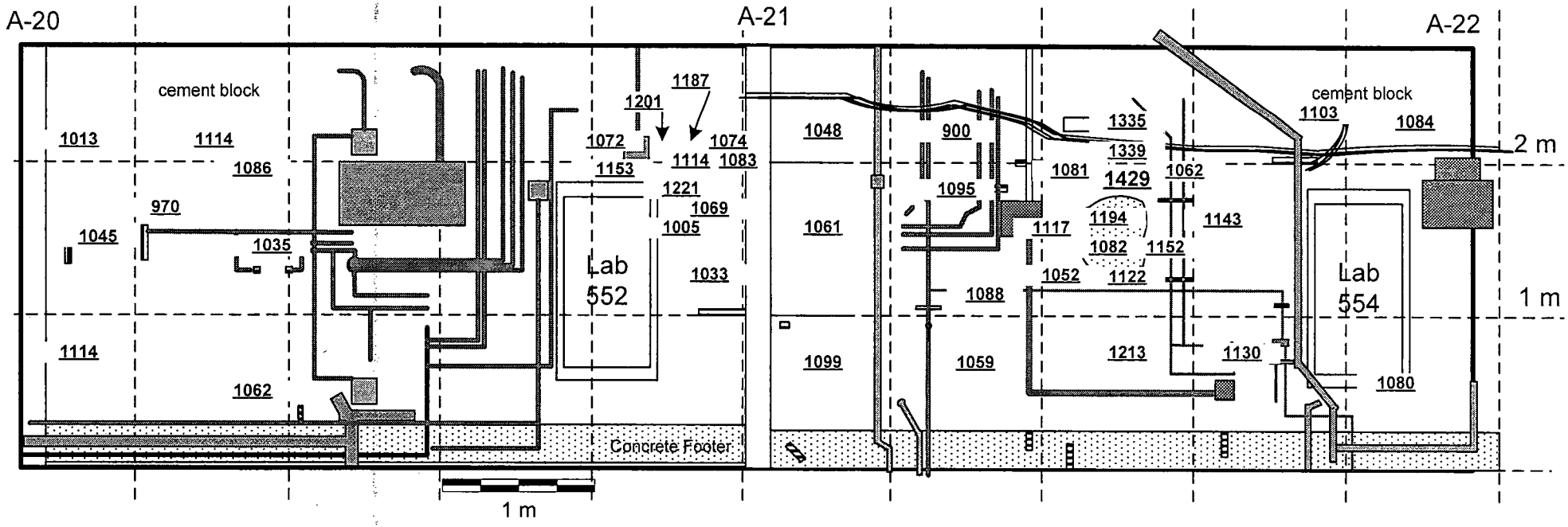
1. All values are in cpm beta.
2. 100% of accessible surfaces scanned.
3. ← ####-#### → Denotes scan with 434 cm^2 probe.
4. ### Denotes scan with 100 cm^2 probe.
5. ##-## Denotes scan with 15 cm^2 probe.
6. Results of additional investigation of areas with elevated scan results are provided on Figure 134.

Instruments			
Model	Ludlum 2221	Ludlum 2221	Ludlum 3
Serial #	154202	86302	138880
Cal Due Date	12-08-03	07-24-03	07-18-03
Probe	434 cm^2 β	100 cm^2 β	15 cm^2 β–γ
Probe Ser. #	149017	142547	145693
Efficiency %	30.39	31.20	24.62
Bkgd. concrete	1300-2000 cpm	320-420 cpm	60-80 cpm
Bkgd. cem blk	1300-1500 cpm	220-340 cpm	50-80 cpm
Bkgd. metal	700-1300 cpm	180-280 cpm	40-70 cpm

Survey Conducted by: Greg Sayer
Dates: 06-10-03 to 06-12-03

Figure 133

Figure 134: Building 2 Service Corridor First (Lowest) Level Outer Wall Column A-20 to A-22
Elevated Beta Scan Measurement Area Investigation



Notes:

1 #### Denotes two minute fixed beta measurement in cp2m.

2. Measurements taken at the highest reading in elevated, > 1850 cpm, beta scan areas.

3. The maximum fixed beta measurement was 1429 cp2m, 1215 dpm/ 100 cm^2.

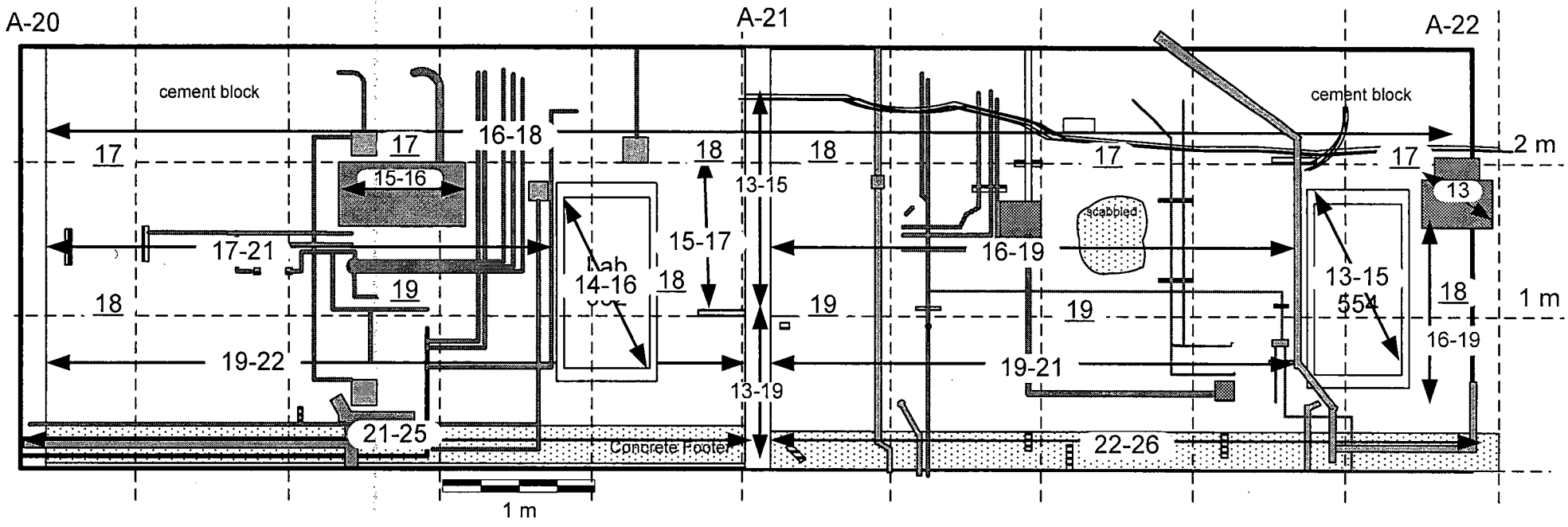
4. The average of 43 fixed beta measurements was 1110 cp2m, 704 dpm/ 100 cm^2.

Instrument	
Model	Ludlum 2221
Serial #	86302
Cal Due Dates	07-24-03 01-14-04
Probe	100 cm^2 β
Probe Ser. #	142547
Efficiency %	31.20
Bkgd. Cem. Blk	671 +/- 126 cp2m
MDA	197 dpm/100 cm^2

Survey Conducted by: Greg Sayer
Dates: 06-11-03 to 08-01-03

Figure 134

Figure 135: Building 2 Service Corridor First (Lowest) Level Outer Wall Column A-20 to A-22
Fixed Exposure Rate and Exposure Rate Scan Measurement Locations and Results



Notes:

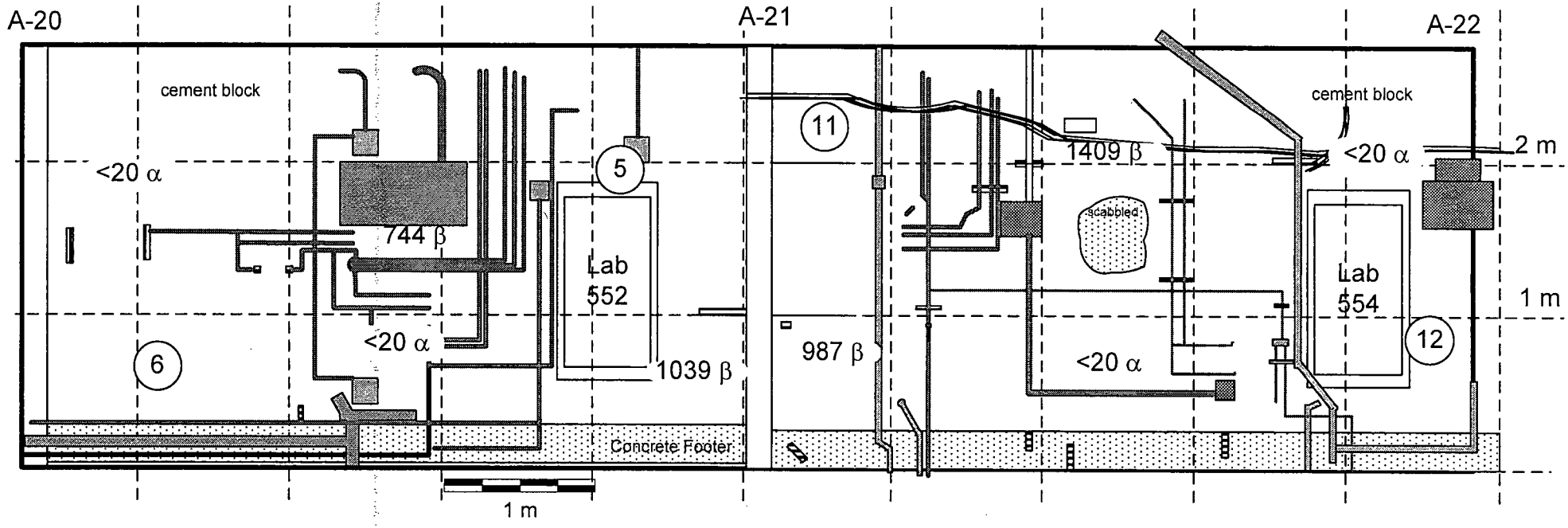
1. All values are μR/hr.
2. 100% of accessible surface scanned 2 meters and below, 10% scanned above 2 meters.
3. ## Denotes fixed exposure rate measurement taken at ~ 1 meter from the surface.
4. ← ##-## → Denotes exposure rate scan measurement.

Instrument		
Model	Ludlum 3	
Serial #	153551	
Cal Due Date	08-18-03	
Probe	2" X 2" NaI γ	
Probe Serial #	155109	
Background	contact	@ 1 m
concrete	15-21 μR/hr	15-21 μR/hr
metal	9-13 μR/hr	10-13 μR/hr
cem blk	14-19 μR/hr	14-18 μR/hr

Survey Conducted by: R. Stowell
Dates: 06-10-03 to 06-11-03

Figure 135

Figure 136: Building 2 Service Corridor First (Lowest) Level Outer Wall Column A-20 to A-22
Alpha and Beta Fixed Measurement Locations and Results and Wipe Survey Locations



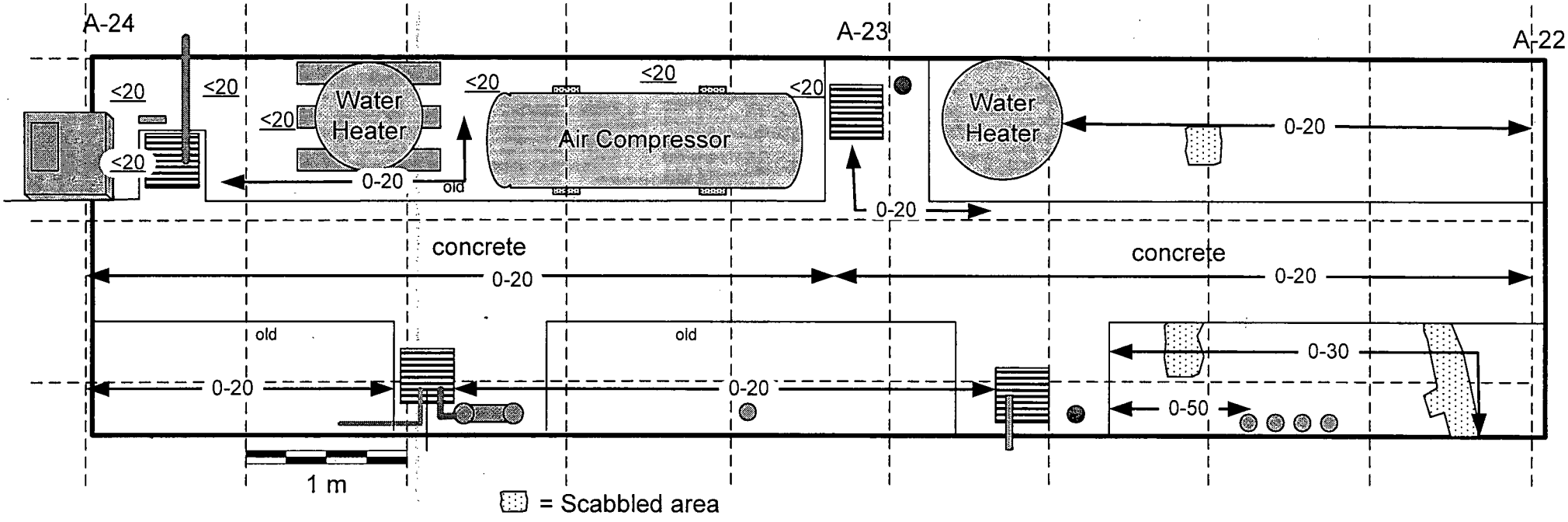
Notes:

1. ## α Denotes fixed alpha measurement in cpm.
2. #### β Denotes fixed beta measurement in cp2m.
3. (##) Denotes wipe location. Wipe results are provided in Table 5.
4. Maximum fixed beta measurement was 1409 cp2m, 1183 dpm/100 cm².
5. Additional fixed beta measurements are provide on Figure 134.

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	86302	138801
Cal Due Date	07-24-03	10-20-03
Probe	100 cm² β	50 cm² α
Probe Serial #	142547	145696
Efficiency %	31.20	22.52
Bkgd. Cement blk	671+/-126 cp2m	<20 cpm
MDA	197 dpm/100 cm²	209 dpm/100 cm²
Bkgd. Metal	435+/-170 cp2m	<20 cpm
MDA	160 dpm/100 cm²	209 dpm/100 cm²

Survey Conducted by: R. Stowell and Greg Sayer
Dates: 06-11-03 to 06-12-03

Figure 137: Building 2 Service Corridor First (Lowest) Level Floor Column A-22 to A-24
Alpha Scan Measurement Locations and Results



Notes:

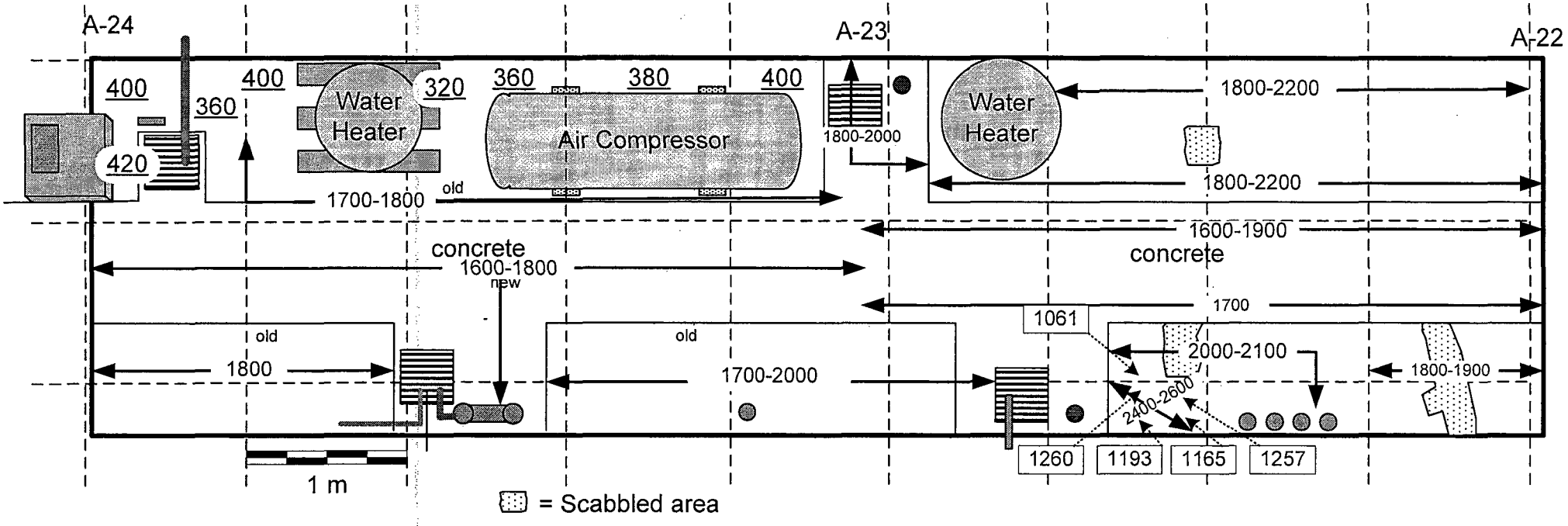
1. All values are in cpm alpha.
2. 100 % of accessible surface scanned.
3. ◄— #-## —► Denotes scans with 434 cm^2 probe.
4. ## Denotes scans with 50 cm^2 probe.

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	97287	138801
Cal Due Date	11-05-03	10-20-03
Probe	434 cm^2 α	50 cm^2 α
Probe Serial #	083293	145696
Efficiency %	20.98	22.52
Bkgd. concrete	0-30 cpm	<20 cpm

Survey conducted by: G. Sayer
Dates: 06-12-03 & 06-16-03

Figure 137

Figure 138: Building 2 Service Corridor First (Lowest) Level Floor Column A-22 to A-24
Beta Scan Measurement and Fixed 2 Minute Beta Measurement Locations and Results



Notes:

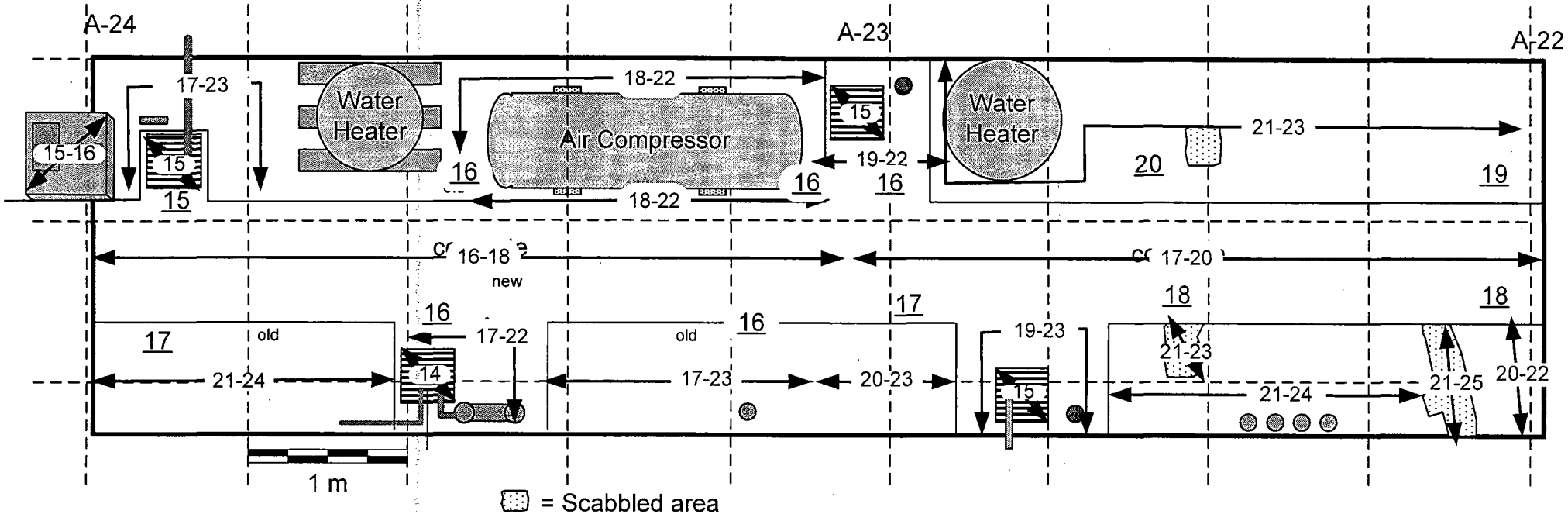
1. All scan values are in cpm beta.
2. !00% of accessible surfaces scanned.
3. ←— ####-#### —→ Denotes beta scan with 434 cm² probe.
4. ### Denotes beta scan with 100 cm² probe.
5. [####] Denotes fixed beta measurement in cp2m taken at elevated scan locations. Maximum result was 1260 cp2m, 702 dpm/100 cm².

Instruments			
Model	Ludlum 2221	Ludlum 2221	
Serial #	154202	86302	
Cal Due Date	12-08-03	07-24-03	
Probe	434 cm² β	100 cm² β	
Probe Ser. #	149017	142517	
Efficiency %	30.39	31.20	
Bkgd concrete	1300-2000 cpm	320-420 cpm (scan)	822+/-344 cp2m (fixed)
			MDA 218 dpm/100 cm²

Survey conducted by: G. Sayer
Dates: 06-13-03 & 06-16-03

Figure 138

Figure 139: Building 2 Service Corridor First (Lowest) Level Floor Column A-22 to A-24
Fixed Exposure Rate and Exposure Rate Scan Measurement Locations and Results



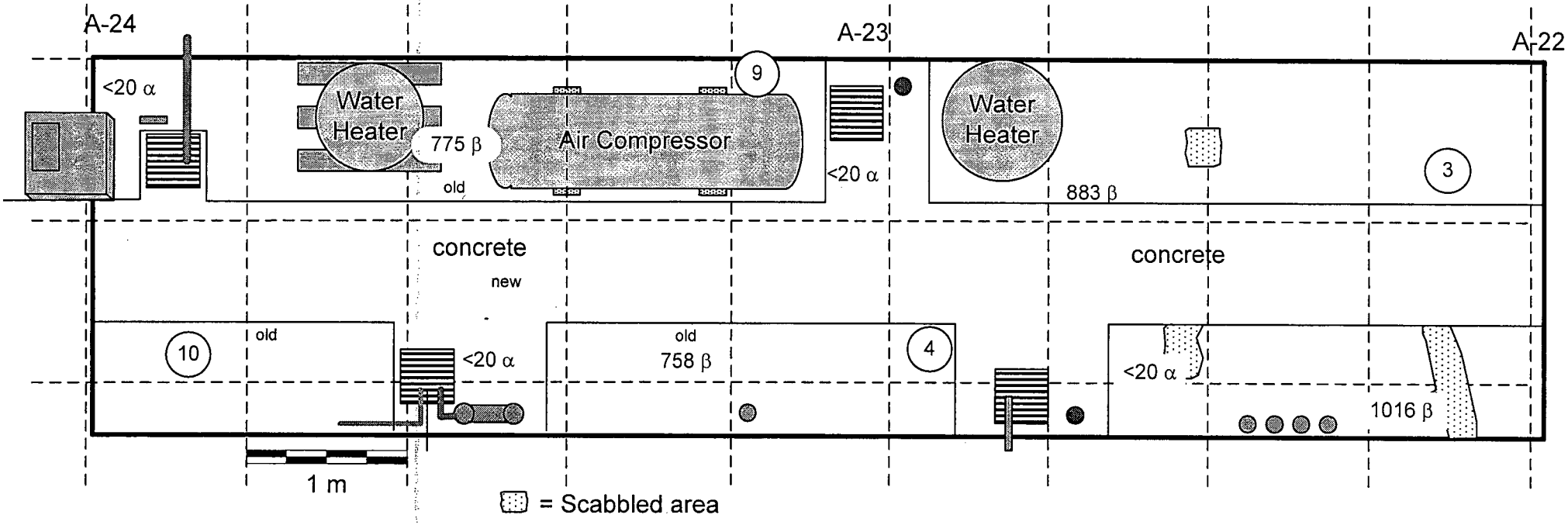
Notes:

1. All values are μR/hr.
2. 100% of accessible surface scanned.
3. ## Denotes fixed exposure rate measurement taken at ~ 1 meter from the surface.
4. ←## ##→ Denotes exposure rate scan measurement.

Instrument		
Model	Ludlum 3	
Serial #	153551	
Cal Due Date	08-18-03	
Probe	2" X 2" NaI γ	
Probe Serial #	155109	
Background	contact	@ 1 m
concrete	15-21 μR/hr	15-21 μR/hr
metal	9-13 μR/hr	10-13 μR/hr

Figure 139

Figure 140: Building 2 Service Corridor First (Lowest) Level Floor Column A-22 to A-24
Alpha and Beta Fixed Measurement Locations and Results and Wipe Survey Locations



Notes:

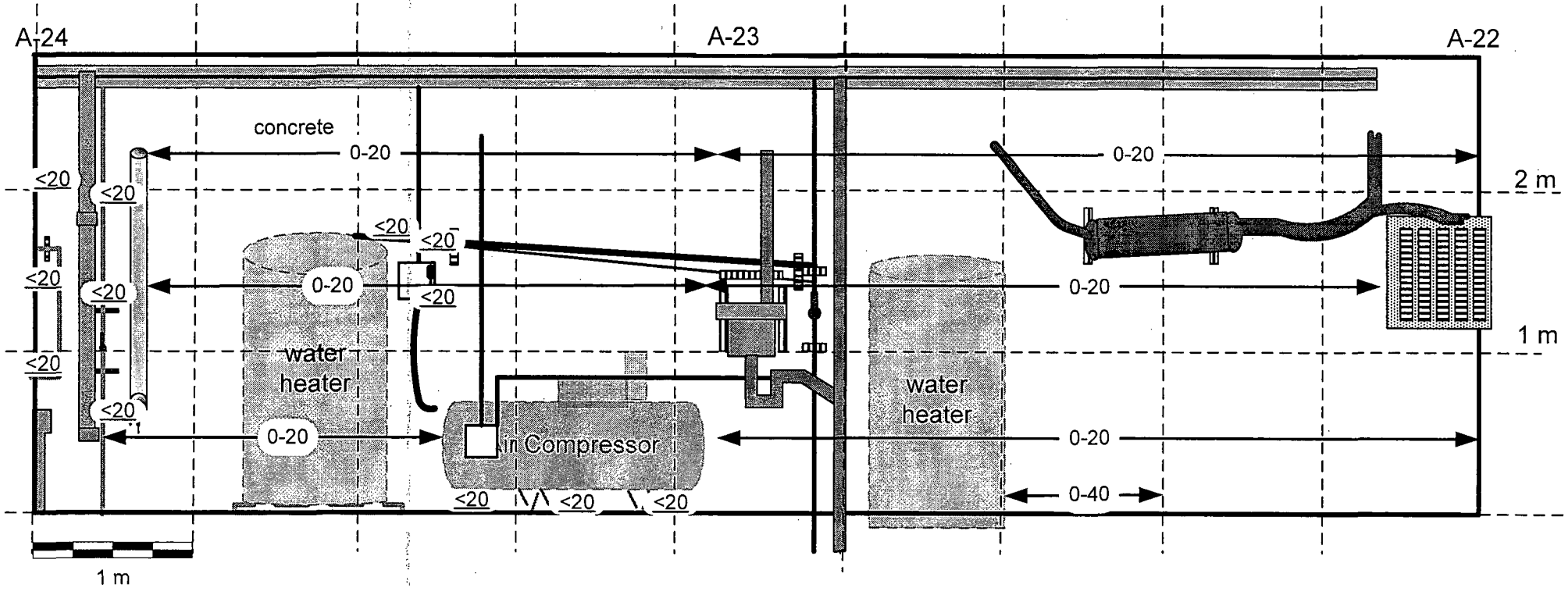
1. ## α Denotes fixed alpha measurement in cpm.
2. #### β Denotes fixed beta measurement in cp2m.
3. (##) Denotes wipe location. Wipe results are provided in Table 5.

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	86302	138801
Cal Due Date	07-24-03	10-20-03
Probe	100 cm^2 β	50 cm^2 α
Probe Serial #	142547	145696
Efficiency %	31.20	22.52
Bkgd. Concrete	822+/- 344 cp2m	<20 cpm
MDA	218 dpm/100 cm^2	209 dpm/100 cm^2
Bkgd. Metal	435+/-170 cp2m	<20 cpm
MDA	160 dpm/100 cm^2	209 dpm/100 cm^2

Survey conducted by: R. Stowell
Dates: 06-13-03 & 06-16-03

Figure 140

Figure 141: Building 2 Service Corridor First (Lowest) Level Inner Wall Column A-22 to A-24
Alpha Scan Measurement Locations and Results



Notes:

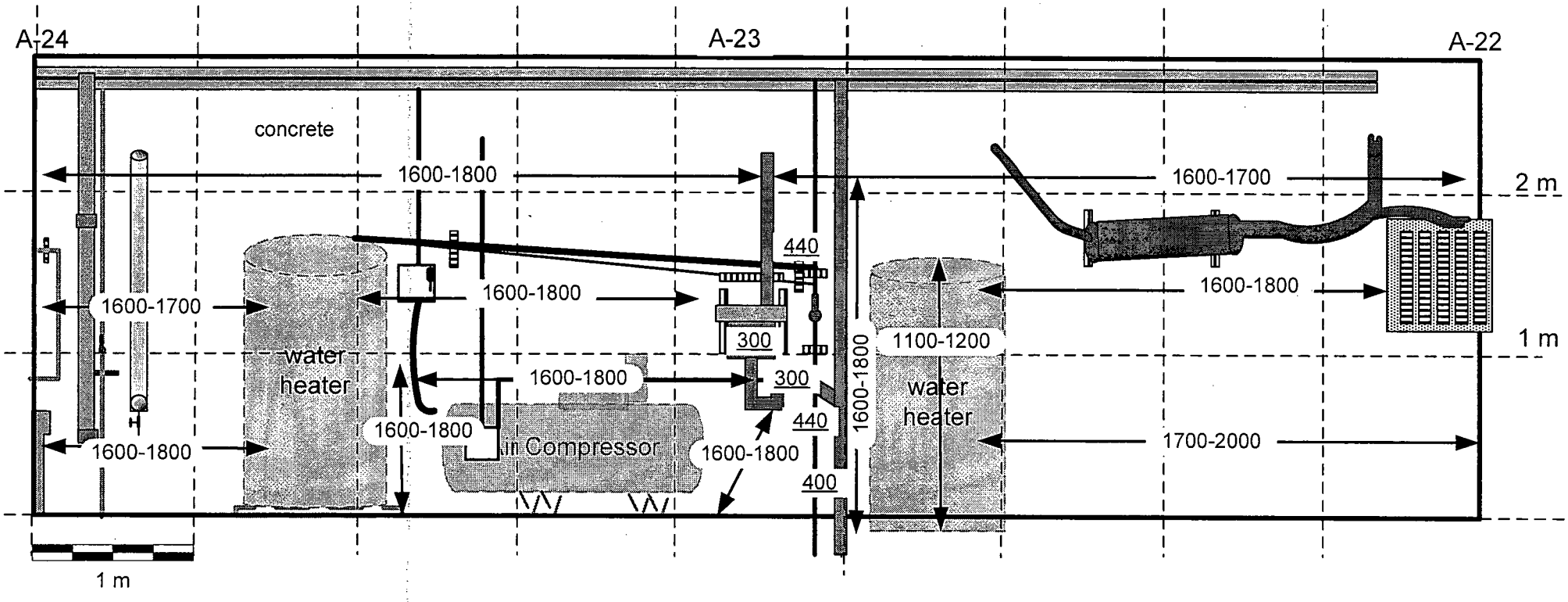
1. All values are in cpm alpha.
2. 100 % of accessible surface scanned 2 meters and below, 10 % scanned above 2 meters.
3. ⟵ #-## ⟶ Denotes scans with 434 cm^2 probe.
4. #-## Denotes scans with 50 cm^2 probe.

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	97287	138801
Cal Due Date	11-05-03	10-20-03
Probe	434 cm^2 α	50 cm^2 α
Probe Serial #	083293	145696
Efficiency %	20.98	22.52
Bkgd. cement block	0-20 cpm	<20 cpm
Bkgd. metal	0-20 cpm	<20 cpm
Bkgd. concrete	0-30 cpm	<20 cpm

Survey Conducted by: G. Sayer
Date: 06-12-03 & 06-16-03

Figure 141

Figure 142: Building 2 Service Corridor First (Lowest) Level Inner Wall Column A-22 to A-24
Beta Scan Measurement Locations and Results



Notes:

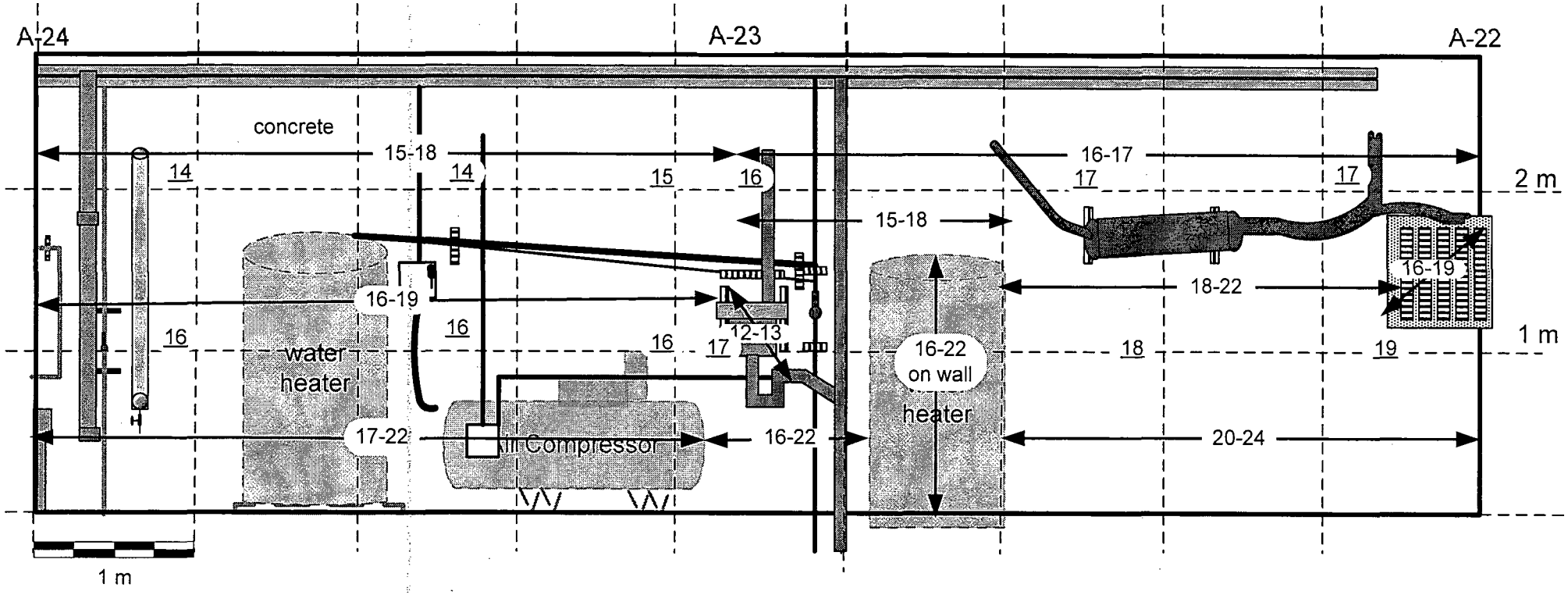
1. All values are in cpm beta.
2. !00% of accessible surfaces scanned 2 meters and below, 10% above 2 meters.
3. ← ####-#### → Denotes beta scan measurement with 434 cm^2 probe.
4. ### Denotes beta scan measurement with 100 cm^2 probe.

Instruments		
Model	Ludlum 2221	Ludlum 2221
Serial #	154202	86302
Cal Due Date	12-08-03	07-24-03
Probe	434 cm^2 β	100 cm^2 β
Probe Ser #	149017	142517
Efficiency %	30.39	31.20
Bkgd concrete	1300-2000 cpm	320-420 cpm
Bkgd metal	700-1300 cpm	180-280 cpm

Survey Conducted by: G. Sayer
Date: 06-13-03 & 06-16-03

Figure 142

Figure 143: Building 2 Service Corridor First (Lowest) Level Inner Wall Column A-22 to A-24
Fixed Exposure Rate and Exposure Rate Scan Measurement Locations and Results



Notes:

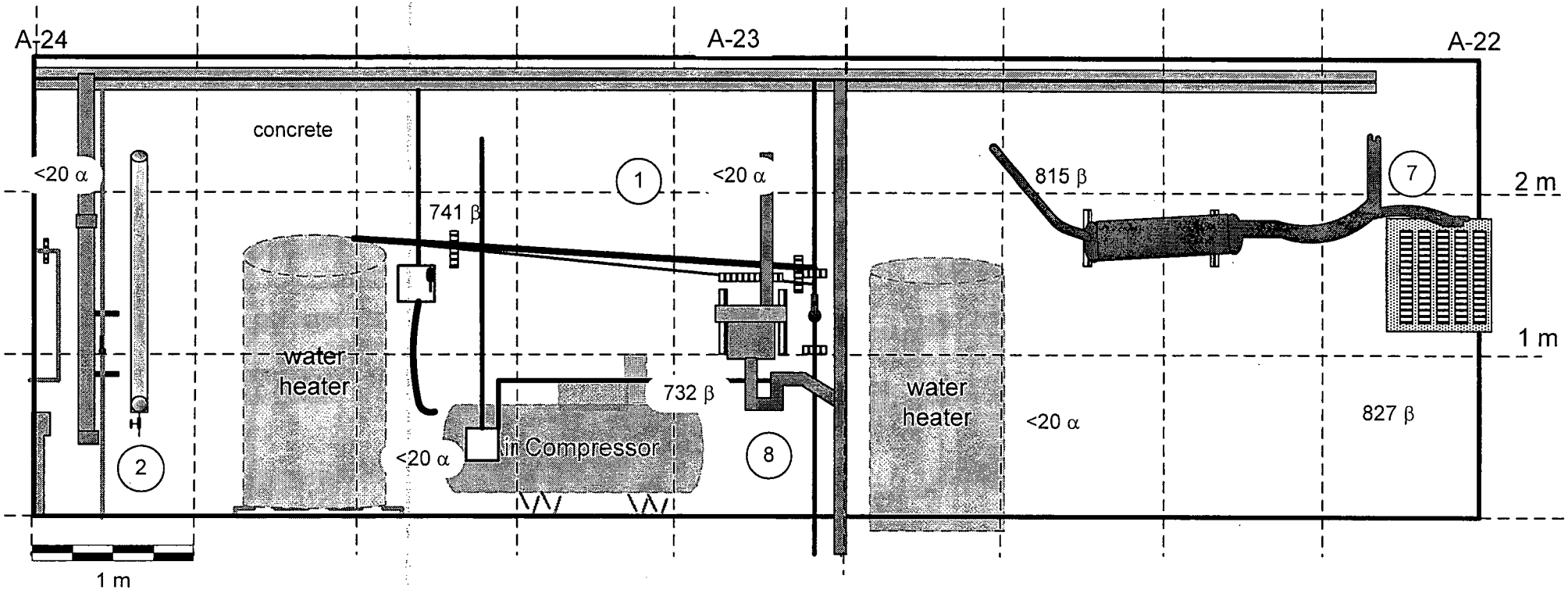
1. All values are μR/hr.
2. 100% of accessible surface scanned 2 meters and below, 10% scanned above 2 meters.
3. ## Denotes fixed exposure rate measurement taken at ~ 1 meter from the surface.
4. ← ##-## → Denotes exposure rate scan.

Instrument		
Model	Ludlum 3	
Serial #	153551	
Cal Due Date	08-18-03	
Probe	2" X 2" NaI γ	
Probe Serial #	155109	
Background	contact	@ 1 m
concrete	15-21 μR/hr	15-21 μR/hr
metal	9-13 μR/hr	10-13 μR/hr

Survey Conducted by: R. Stowell
Dates: 06-12-03 & 06-16-03

Figure 143

Figure 144: Building 2 Service Corridor First (Lowest) Level Inner Wall Column A-22 to A-24
Alpha and Beta Fixed Measurement Locations and Results and Wipe Survey Locations



Notes:

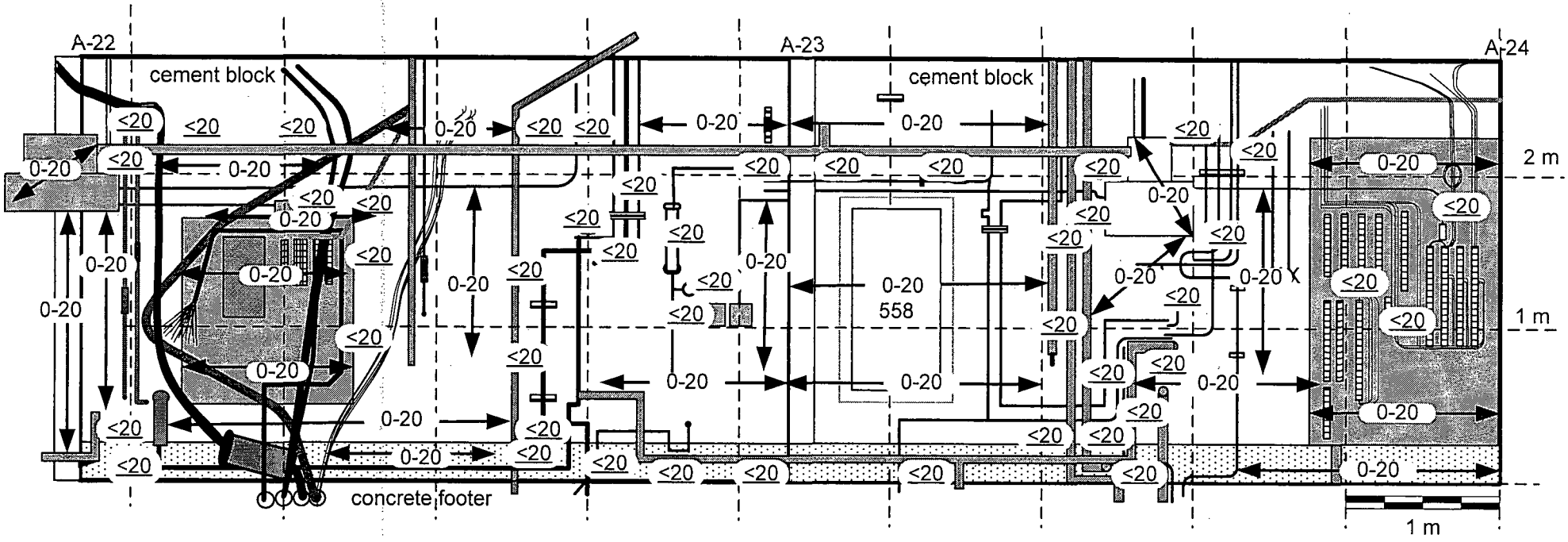
1. ## α Denotes fixed alpha measurement in cpm.
2. #### β Denotes fixed beta measurement in cp2m.
3. (##) Denotes wipe location. Wipe results are provided in Table 5.

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	86302	138801
Cal Due Date	07-24-03	10-20-03
Probe	100 cm^2 β	50 cm^2 α
Probe Serial #	142547	145696
Efficiency %	31.20	22.52
Bkgd. Concrete	822+/- 344 cp2m	<20 cpm
MDA	218 dpm/100 cm^2	209 dpm/100 cm^2
Bkgd. Metal	435+/-170 cp2m	<20 cpm
MDA	160 dpm/100 cm^2	209 dpm/100 cm^2

Survey Conducted by: R. Stowell
Dates: 06-13-03 & 06-16-03

Figure 144

Figure 145: Building 2 Service Corridor First (Lowest) Level Outer Wall Column A-22 to A-24
Alpha Scan Measurement Locations and Results



Notes:

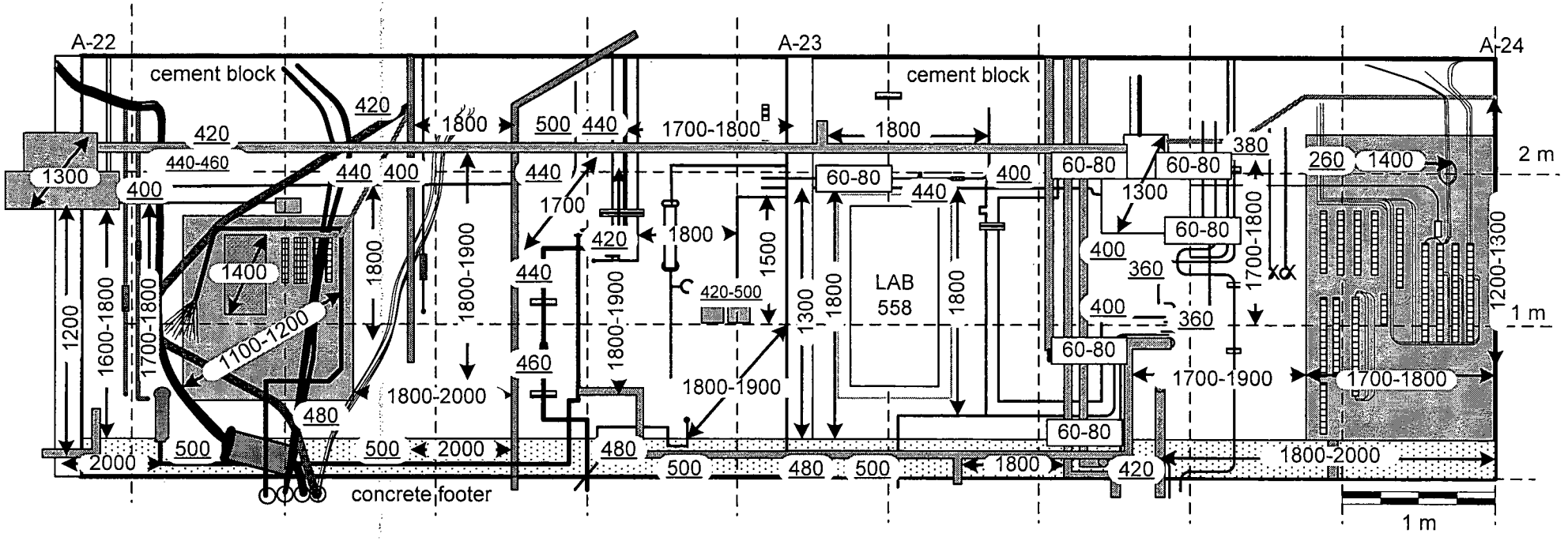
1. All values are in cpm alpha.
2. 100 % of accessible surface scanned 2 meters and below, 10 % scanned above 2 meters.
3. ← #-## → Denotes scans with 434 cm^2 probe.
4. ## Denotes scans with 50 cm^2 probe.

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	97287	138801
Cal Due Date	11-05-03	10-20-03
Probe	434 cm^2 α	50 cm^2 α
Probe Serial #	083293	145696
Efficiency %	20.98	22.52
Bkgd. cement block	0-20 cpm	<20 cpm
Bkgd. metal	0-20 cpm	<20 cpm
Bkgd. concrete	0-30 cpm	<20 cpm

Survey Conducted by:G. Sayer
Dates: 06-12-03 & 06-13-03

Figure 145

Figure 146: Building 2 Service Corridor First (Lowest) Level Outer Wall Column A-22 to A-24
Beta Scan Measurement Locations and Results



Notes:

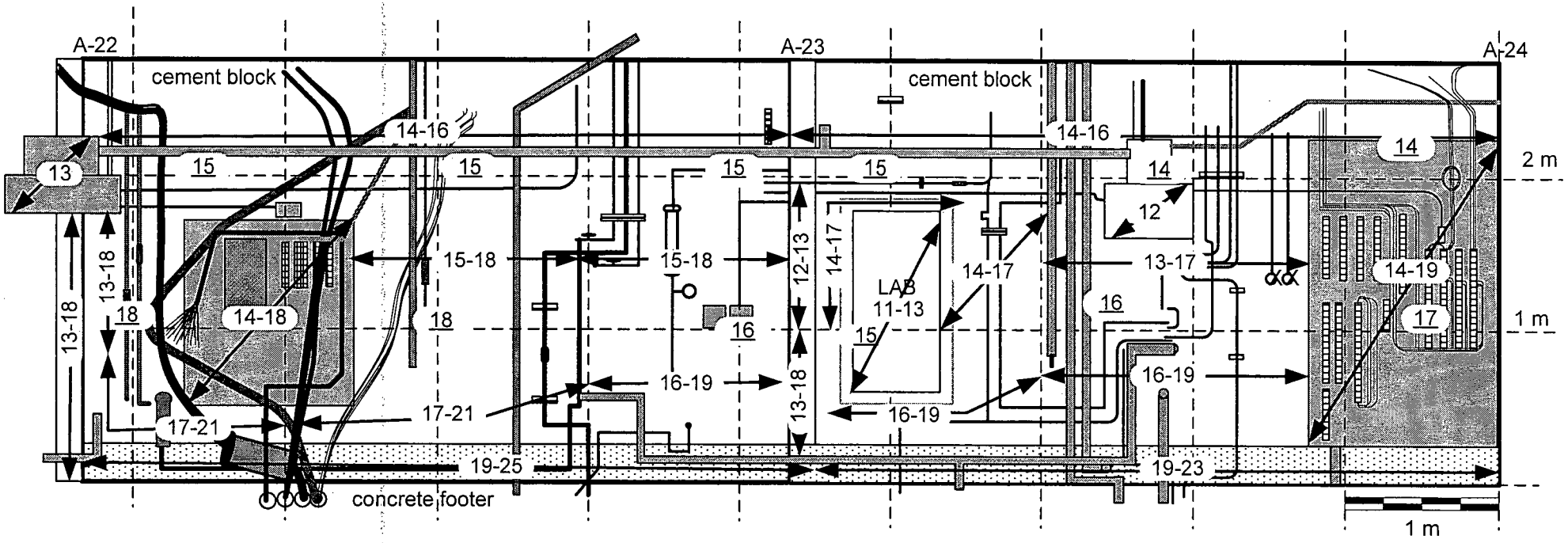
1. All values are in cpm beta.
2. !00% of accessible surfaces scanned 2 meters and below, 10% above 2 meters.
3. ← ####-#### → Denotes scan with 434 cm² probe.
4. ### Denotes scan with 100 cm² probe.
5. ## Denotes scan with 15 cm² probe.

Instruments			
Model	Ludlum 2221	Ludlum 2221	Ludlum 3
Serial #	154202	86302	138880
Cal Due Date	12-08-03	07-24-03	07-18-03
Probe	434 cm² β	100 cm² β	15 cm² β–γ
Probe Ser. #	149017	142517	145963
Efficiency %	30.39	31.20	24.64
Bkgd concrete	1300-2000 cpm	320-420 cpm	60-80 cpm
Bkgd metal	700-1300 cpm	180-280 cpm	40-70 cpm
Bkgd cement block	1300-1500 cpm	220-340 cpm	50-80 cpm

Survey Conducted by: G. Sayer
Dates: 06-13-03 & 06-16-03

Figure 146

Figure 147: Building 2 Service Corridor First (Lowest) Level Outer Wall Column A-22 to A-24
Fixed Exposure Rate and Exposure Rate Scan Measurement Locations and Results



Notes:

1. All values are μR/hr.

2. 100% of accessible surface scanned 2 meters and below, 10% scanned above 2 meters.

3. ## Denotes fixed exposure rate measurement taken at ~ 1 meter from the surface

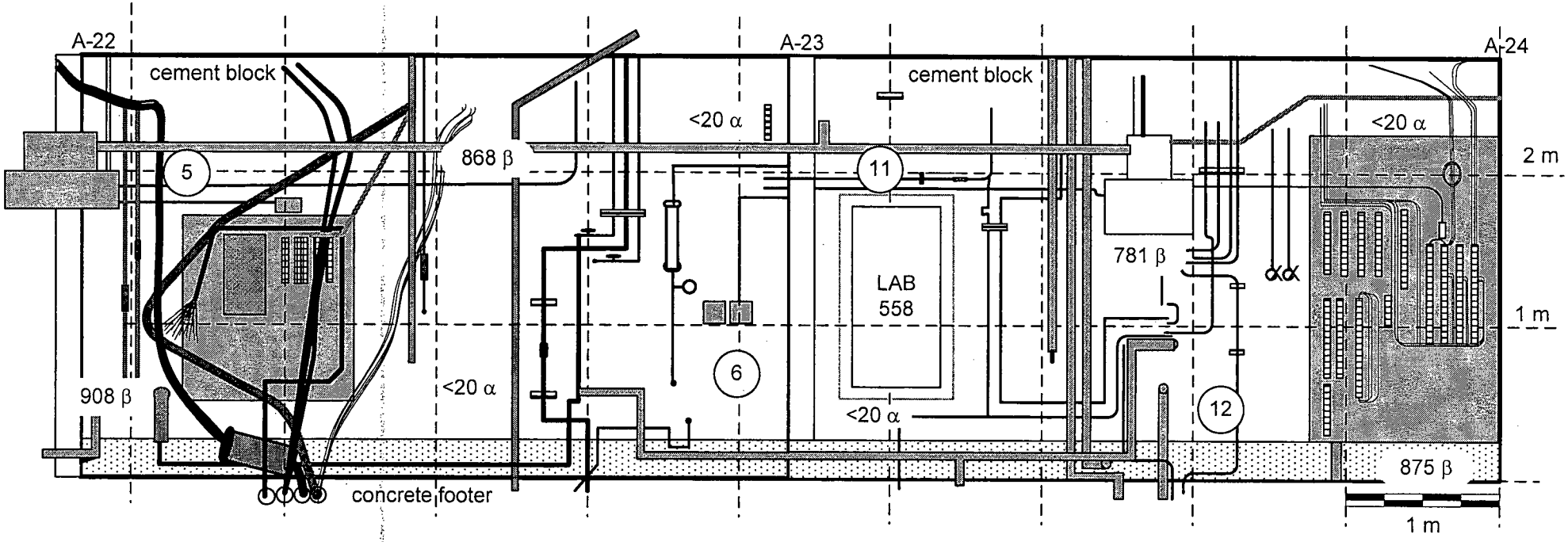
4. ←##-##→ Denotes exposure rate scan measurement.

Instrument		
Model	Ludlum 3	
Serial #	153551	
Cal Due Date	08-18-03	
Probe	2" X 2" NaI γ	
Probe Serial #	155109	
Background	contact	@ 1 m
concrete	15-21 μR/hr	15-21 μR/hr
metal	9-13 μR/hr	10-13 μR/hr
cem blk	14-19 μR/hr	14-18 μR/hr

Survey Conducted by: R. Stowell
Dates: 06-13-03 & 06-16-03

Figure 147

Figure 148: Building 2 Service Corridor First (Lowest) Level Outer Wall Column A-22 to A-24
Alpha and Beta Fixed Measurement Locations and Results and Wipe Survey Locations



Notes:

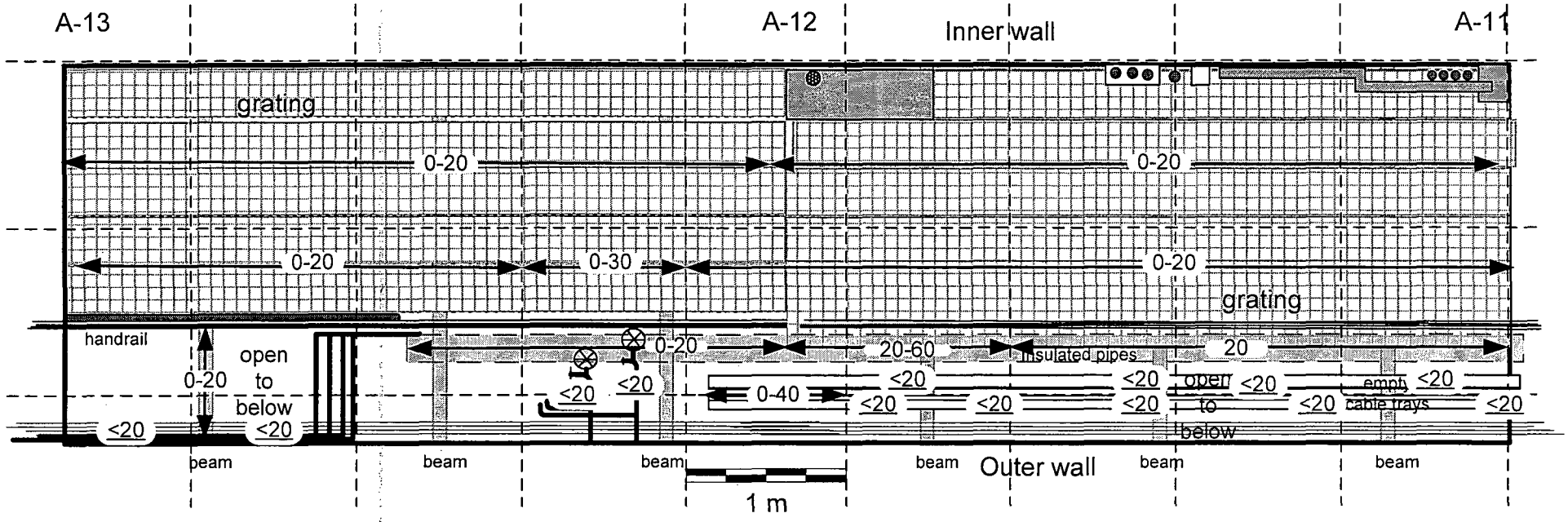
1. ## α Denotes fixed alpha measurement in cpm.
2. #### β Denotes fixed beta measurement in cp2m.
3. (##) Denotes wipe location. Wipe results are provided in Table 5.

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	86302	138801
Cal Due Date	07-24-03	10-20-03
Probe	100 cm^2 β	50 cm^2 α
Probe Serial #	142547	145696
Efficiency %	31.20	22.52
Bkgd. Concrete	822+/- 344 cp2m	<20 cpm
MDA	218 dpm/100 cm^2	209 dpm/100 cm^2
Bkgd. Metal	435+/-170 cp2m	<20 cpm
MDA	160 dpm/100 cm^2	209 dpm/100 cm^2
Bkgd. Cem Block	671+/- 126 cp2m	<20 cpm
MDA	197 dpm/100 cm	209 dpm/100 cm

Survey Conducted by: R. Stowell
Dates: 06-13-03 & 06-16-03

Figure 148

Figure 149: Building 2 Service Corridor Second (Middle) Level Floor Column A-11 to A-13
Alpha Scan Measurement Locations and Results



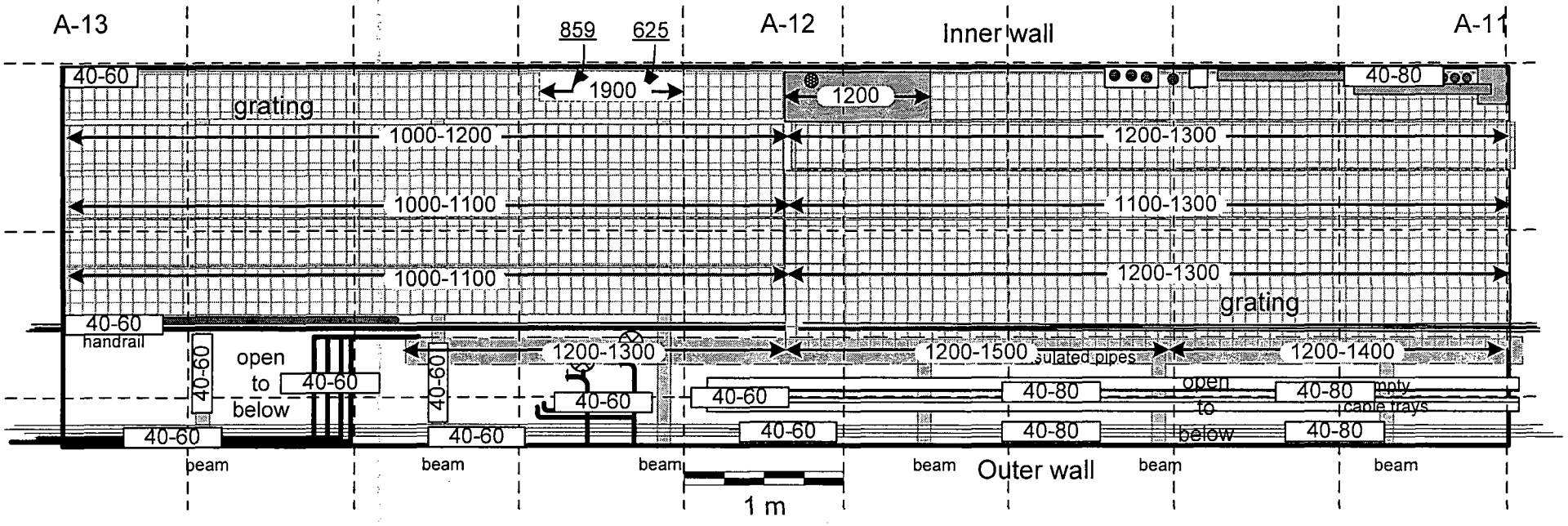
Notes:

1. All values are in cpm alpha.
2. 100 % of accessible surface scanned.
3. ◄— #-## —► Denotes scans with 434 cm^2 probe.
4 ## Denotes scans with 50 cm^2 probe.

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	97287	138801
Cal Due Date	11-05-03	10-20-03
Probe	434 cm^2 α	50 cm^2 α
Probe Serial #	083293	145696
Efficiency %	20.98	22.52
Bkgd. metal	0-20 cpm	<20 cpm

Survey conducted by: G. Sayer
Dates: 06-17-03 to 06-19-03

Figure 150: Building 2 Service Corridor Second (Middle) Level Floor Column A-11 to A-13
Beta Scan Measurement and Fixed 2 Minute Beta Measurement Locations and Results



Notes:

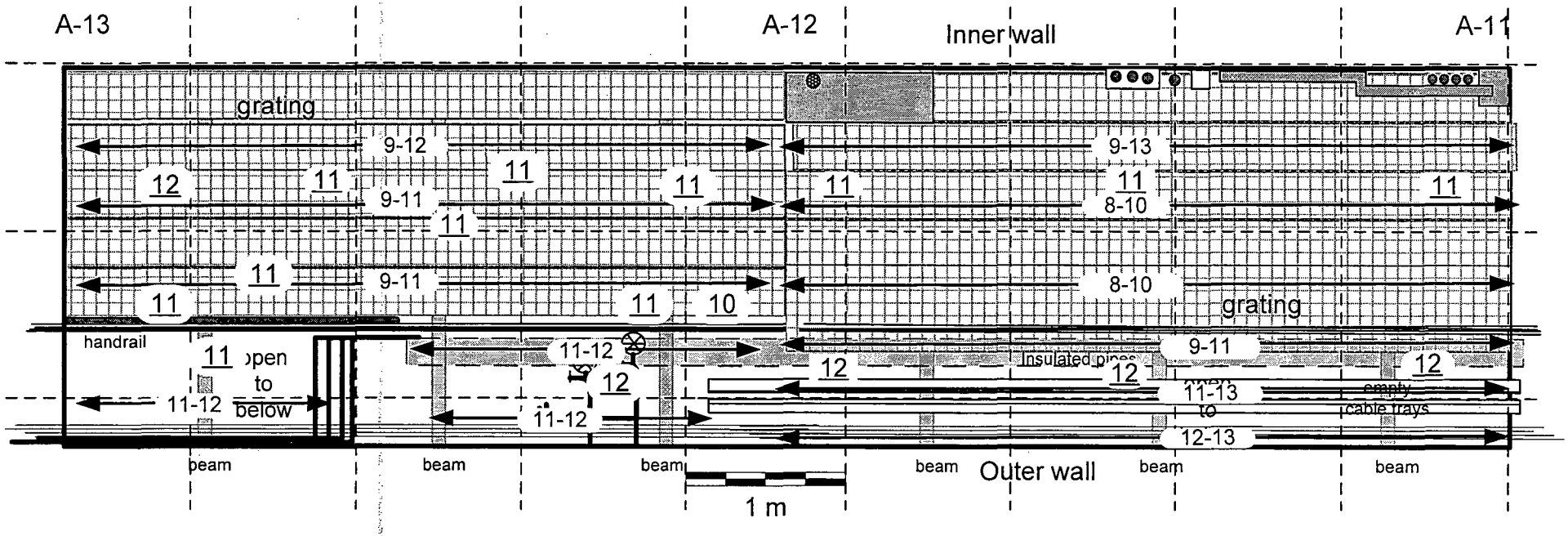
1. All values are in cpm beta.
2. !00% of accessible surfaces scanned 2 meters and below, 10% above 2 meters.
3. ← ####-#### → Denotes beta scan measurement with 434 cm^2 probe.
4. ##-## Denotes beta scan measurement with 15 cm^2 probe.
5. ### Denotes fixed beta measurement, in cp2m, taken at elevated scan location, 1900 cpm. Maximum result was 859 cp2m, 434 dpm/100 cm^2.

Instruments			
Model	Ludlum 2221	Ludlum 2221	Ludlum 3
Serial #	154202	86302	138880
Cal Due Date	12-08-03	07-24-03	07-18-03
Probe	434 cm^2 β	100 cm^2 β	15 cm^2 β–γ
Probe Ser #	149017	142517	145963
Efficiency %	30.39	31.20	24.62
Bkgd metal	900-1300 cpm	588+/-141 cp2m	40-70 cpm
		185 dpm/100 cm^2	

Survey conducted by: R. Stowell
Dates: 06-17-03 to 06-19-03

Figure 150

Figure 151: Building 2 Service Corridor Second (Middle) Level Floor Column A-11 to A-13
Fixed Exposure Rate and Exposure Rate Scan Measurement Locations and Results



Notes:

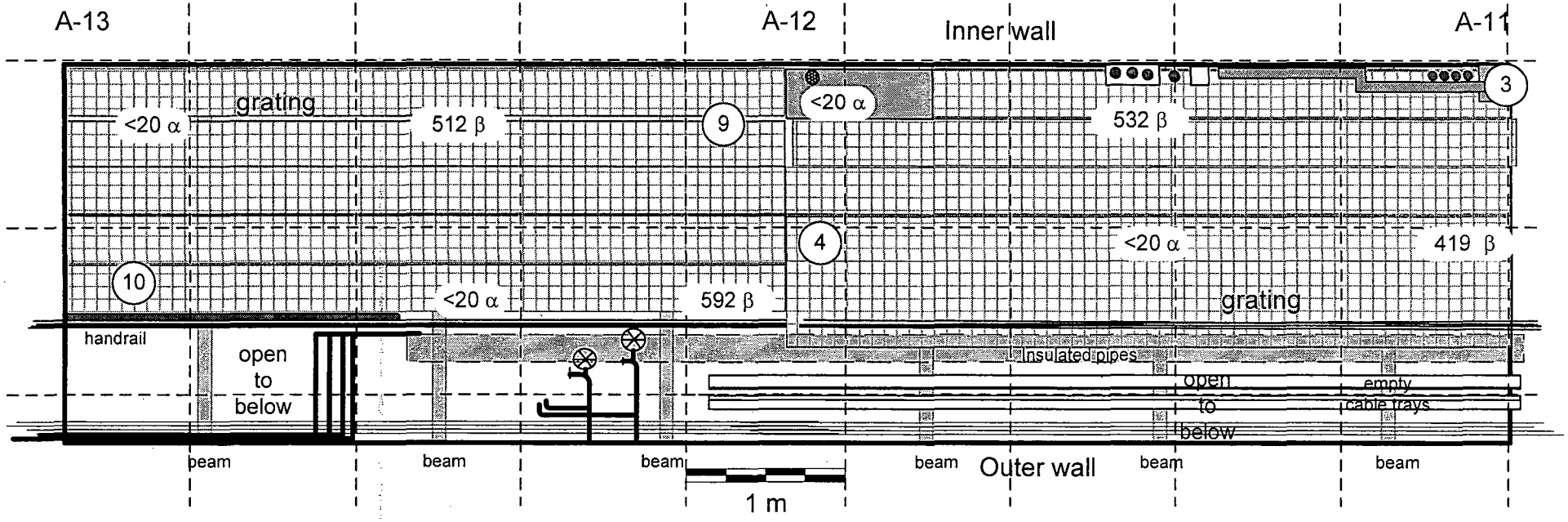
1. All values are μR/hr.
2. 100% of accessible surface scanned.
3. ## Denotes fixed exposure rate measurement taken at ~ 1 meter from the surface.
4. ←## - ##→ Denotes exposure rate scan measurement.

Instrument		
Model	Ludlum 3	
Serial #	153551	
Cal Due Date	08-18-03	
Probe	2" X 2" NaI γ	
Probe Serial #	155109	
Background	contact	@ 1 m
metal	9-13 μR/hr	10-13 μR/hr

Surveys Conducted by: G. Sayer & R. Stowell
Dates: 06-18-03 & 06-20-03

Figure 151

Figure 152: Building 2 Service Corridor Second (Middle) Level Floor Column A-11 to A-13
Alpha and Beta Fixed Measurement Locations and Results and Wipe Survey Locations



Notes:

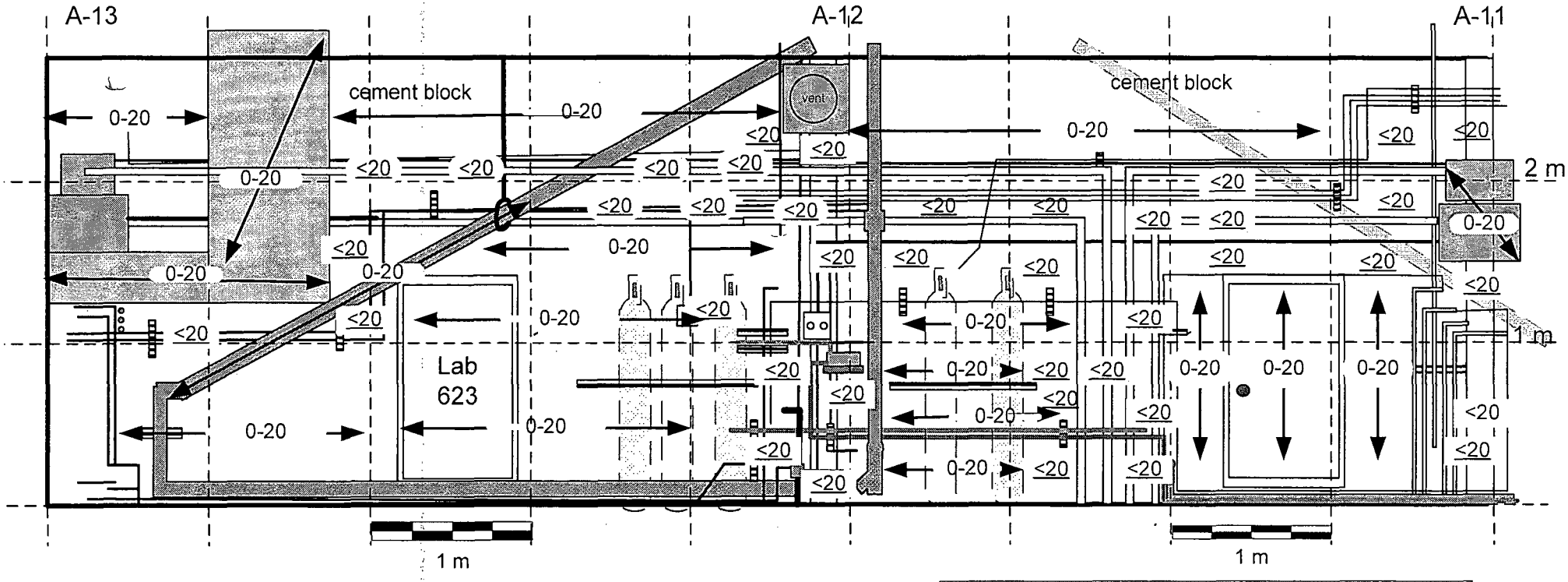
1. ## α Denotes fixed alpha measurement in cpm.
2. #### β Denotes fixed beta measurement in cp2m.
3. (##) Denotes wipe location. Wipe results are provided in Table 5.

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	86302	138801
Cal Due Date	07-24-03	10-20-03
Probe	100 cm^2 β	50 cm^2 α
Probe Serial #	142547	145696
Efficiency %	31.20	22.52
Bkgd. metal grating	588+/-141 cp2m	<20 cpm
MDA	185 dpm/100 cm^2	209 dpm/100 cm^2

Surveys conducted by: G. Sayer
Dates: 06-19-03 & 06-21-03

Figure 152

Figure 153: Building 2 Service Corridor Second (Middle) Level Inner Wall Column A-11 to A-13
Alpha Scan Measurement Locations and Results



Notes:

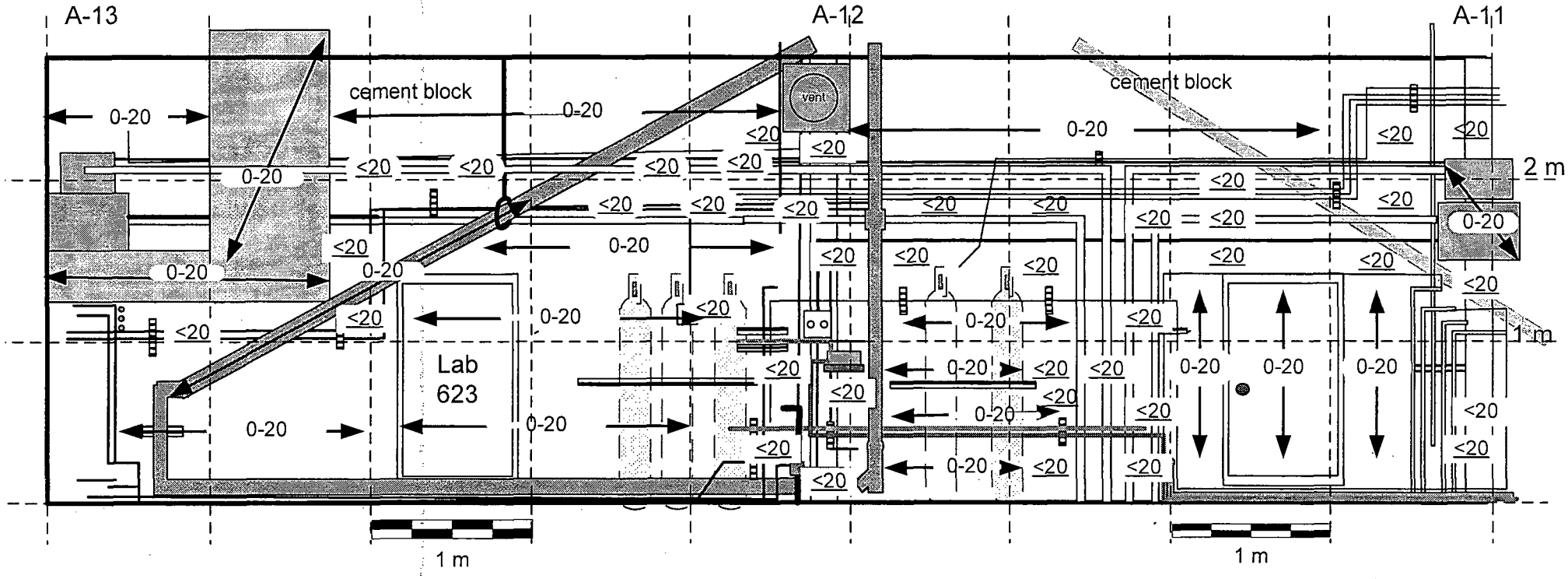
1. All values are cpm alpha.
2. 100% of accessible surfaced scanned 2 meters and below, 10% scanned above 2 meters.
3. ← #-## → denotes scan using 434 cm^2 probe.
4. ## denotes scan using 50 cm^2 probe.

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	97287	138801
Cal Due Date	11-05-03	10-20-03
Probe	434 cm^2 α	50 cm^2 α
Probe Serial #	083293	145696
Efficiency %	20.98	22.52
Bkgd. cement block	0-20 cpm	<20 cpm
Bkgd. metal	0-20 cpm	<20 cpm

Survey Conducted by: Greg Sayer
Dates: 06-18-03 & 06-19-03

Figure 153

Figure 153: Building 2 Service Corridor Second (Middle) Level Inner Wall Column A-11 to A-13
Alpha Scan Measurement Locations and Results



Notes:

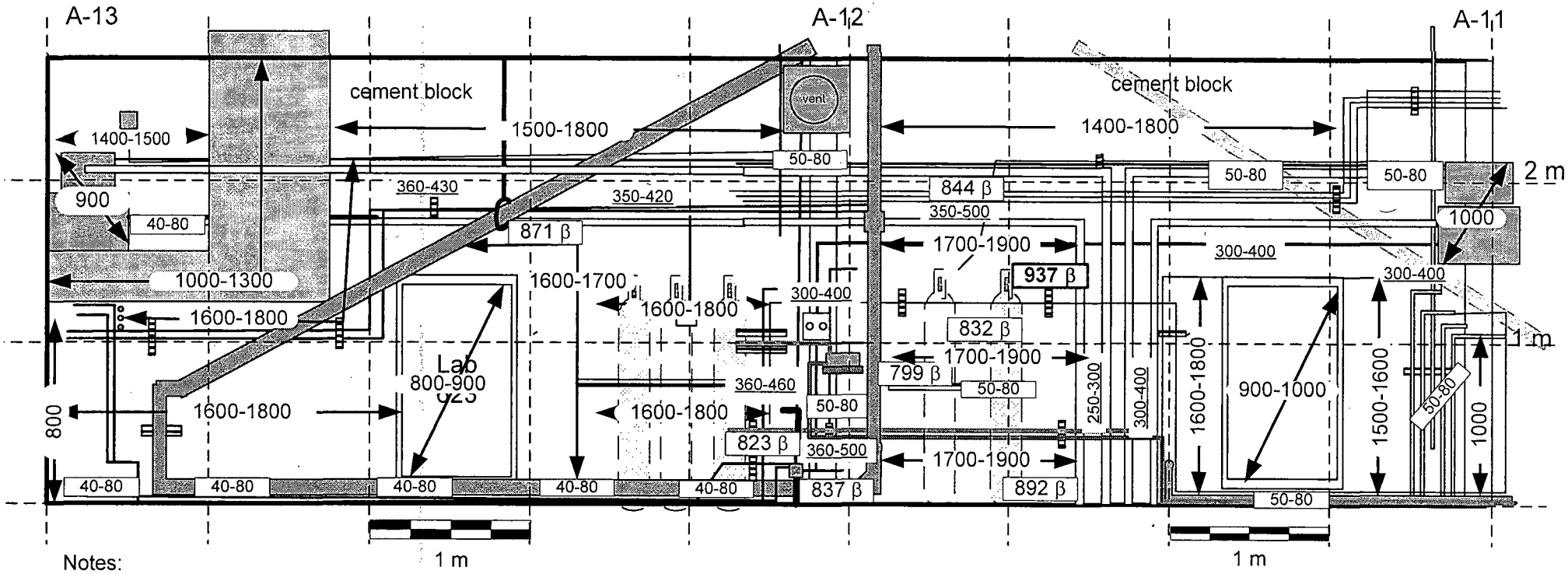
1. All values are cpm alpha.
2. 100% of accessible surfaced scanned 2 meters and below, 10% scanned above 2 meters.
3. ← #-## → denotes scan using 434 cm^2 probe.
4. ## denotes scan using 50 cm^2 probe.

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	97287	138801
Cal Due Date	11-05-03	10-20-03
Probe	434 cm^2 α	50 cm^2 α
Probe Serial #	083293	145696
Efficiency %	20.98	22.52
Bkgd. cement block	0-20 cpm	<20 cpm
Bkgd. metal	0-20 cpm	<20 cpm

Survey Conducted by: Greg Sayer
Dates: 06-18-03 & 06-19-03

Figure 153

Figure 154: Building 2 Service Corridor Second (Middle) Level Inner Wall Column A-11 to A-13
Beta Scan Measurement and Fixed 2 Minute Beta Measurement Locations and Results



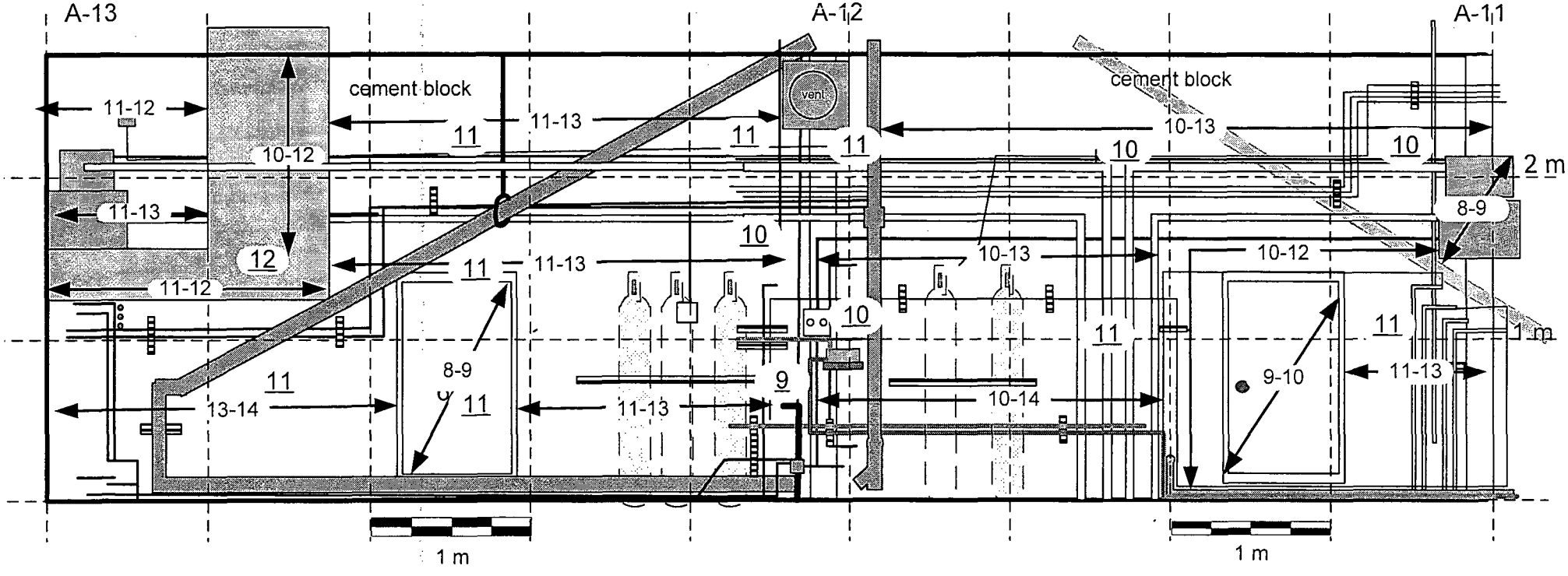
Notes:

1. All values are cpm beta unless otherwise noted.
2. 100% of accessible surface scanned 2 meters and below, 10% scanned above 2 meters.
3. ◄ ####-#### ► Denotes scan with 434 cm² probe.
4. ####-### Denotes scan with 100 cm² probe.
5. [##-##] Denotes scan with 15 cm² probe.
6. [### β] Denotes fixed beta measurements, in cp2m, taken in elevated scan areas. Maximum fixed beta measurement was 937 cp2m, 426 dpm/100 cm².

Instruments			
Model	Ludlum 2221	Ludlum 2221	Ludlum 3
Serial #	154202	86302	138880
Cal Due Date	12-08-03	07-24-03	07-18-03
Probe	434 cm² β	100 cm² β	15 cm² β–γ
Probe Ser. #	149017	142517	145936
Efficiency %	30.39	31.20	24.64
Bkgd. cem block	1300-1500 cpm	220-340 cpm	50-80 cpm
Bkgd. metal	700-1300 cpm	180-280 cpm	40-70 cpm
	cem block	671+/- 126 cp2m	
		MDA 197dpm/100 cm²	

Survey conducted by: R. Stowell
Dates: 06-18-03 to 06-20-03

Figure 155: Building 2 Service Corridor Second (Middle) Level Inner Wall Column A-11 to A-13
Fixed Exposure Rate and Exposure Rate Scan Measurement Locations and Results



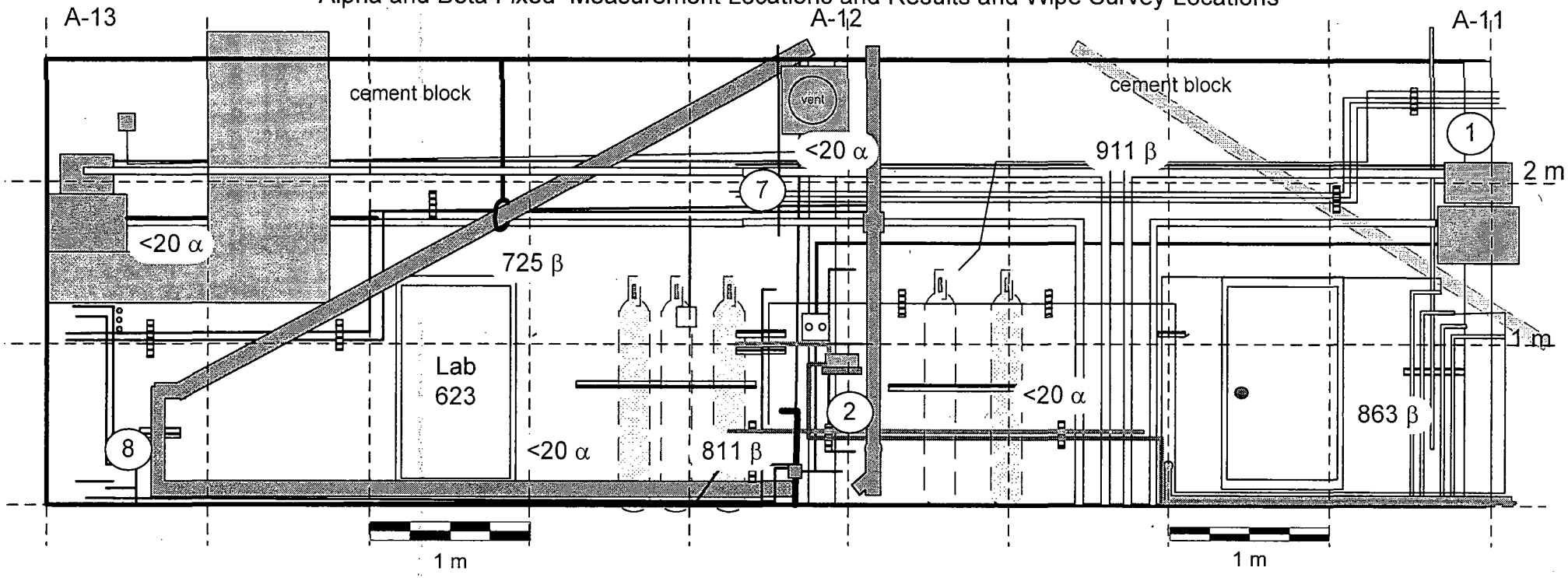
Notes:

1. All values are μR/hr.
2. 100% of accessible surface scanned 2 meters and below, 10% scanned above 2 meters.
3. ## Denotes fixed exposure rate measurement taken at ~ 1 meter from the surface.
4. ← ##-## → Denotes exposure rate scan measurement.

Instrument		
Model	Ludlum 3	
Serial #	153551	
Cal Due Date	08-18-03	
Probe	2X2 Nal	
Probe Serial #	155109	
Background	contact	@ 1 m
cement block	14-19 μR/hr	14-18 μR/hr
metal	9-13 μR/hr	10-13 μR/hr

Survey Conducted by: R. Stowell & G. Sayer
Dates: 06-18-03 to 06-19-03

Figure 156: Building 2 Service Corridor Second (Middle) Level Inner Wall Column A-11 to A-13
Alpha and Beta Fixed Measurement Locations and Results and Wipe Survey Locations



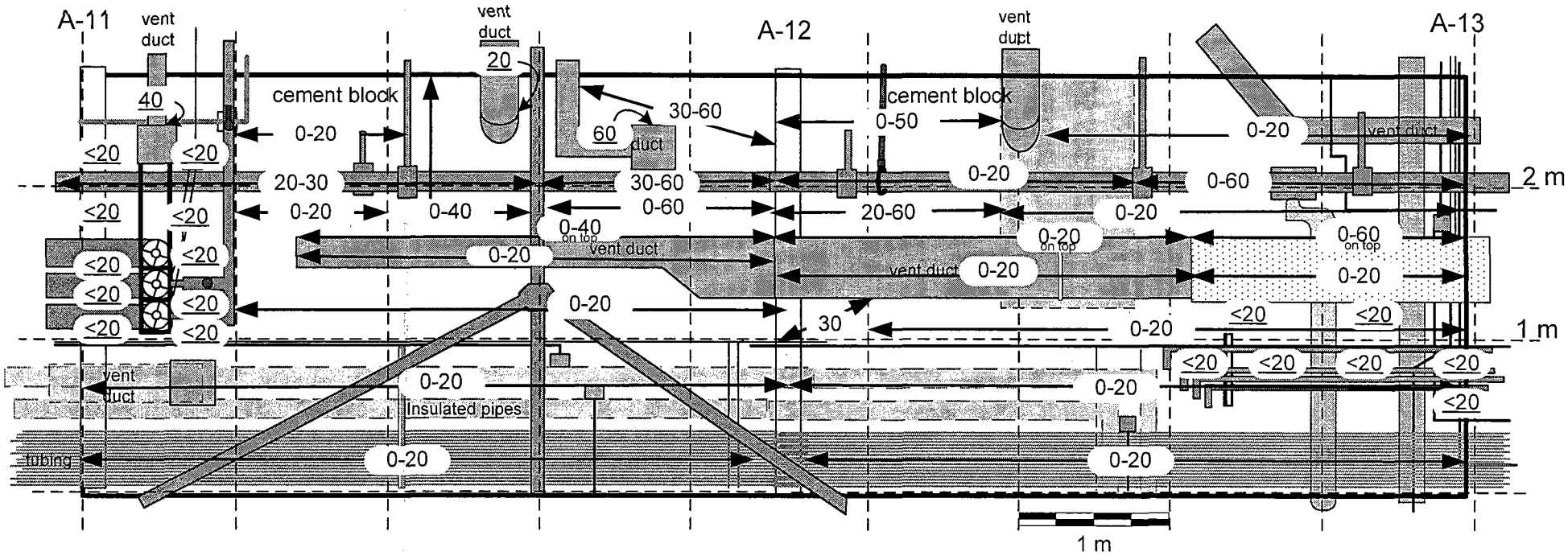
Notes:

1. ## α Denotes fixed alpha measurement in cpm.
2. ### β Denotes fixed beta measurement in cp2m.
3. (##) Denotes wipe location. Wipe results are provided in Table 5.

	Instruments	
Model	Ludlum 2221	Ludlum 12
Serial #	86302	138801
Cal Due Date	07-24-03	10-20-03
Probe	100 cm^2 β	50 cm^2 α
Probe Ser. #	142547	145696
Efficiency %	31.20	22.52
Bkgd metal	435+/-170 cp2m	<20 cpm
MDA	160 dpm/100 cm2	209 dpm/100 cm2
Bkgd cem. block	671+/-126 cp2m	<20 cpm
MDA	197 dpm/100 cm2	209 dpm/100 cm2

Survey Conducted by: Greg Sayer
Dates: 06-19-03 to 06-20-03

Figure 157: Building 2 Service Corridor Second (Middle) Level Outer Wall Column A-11 to A-13
Alpha Scan Measurement Locations and Results



Notes:

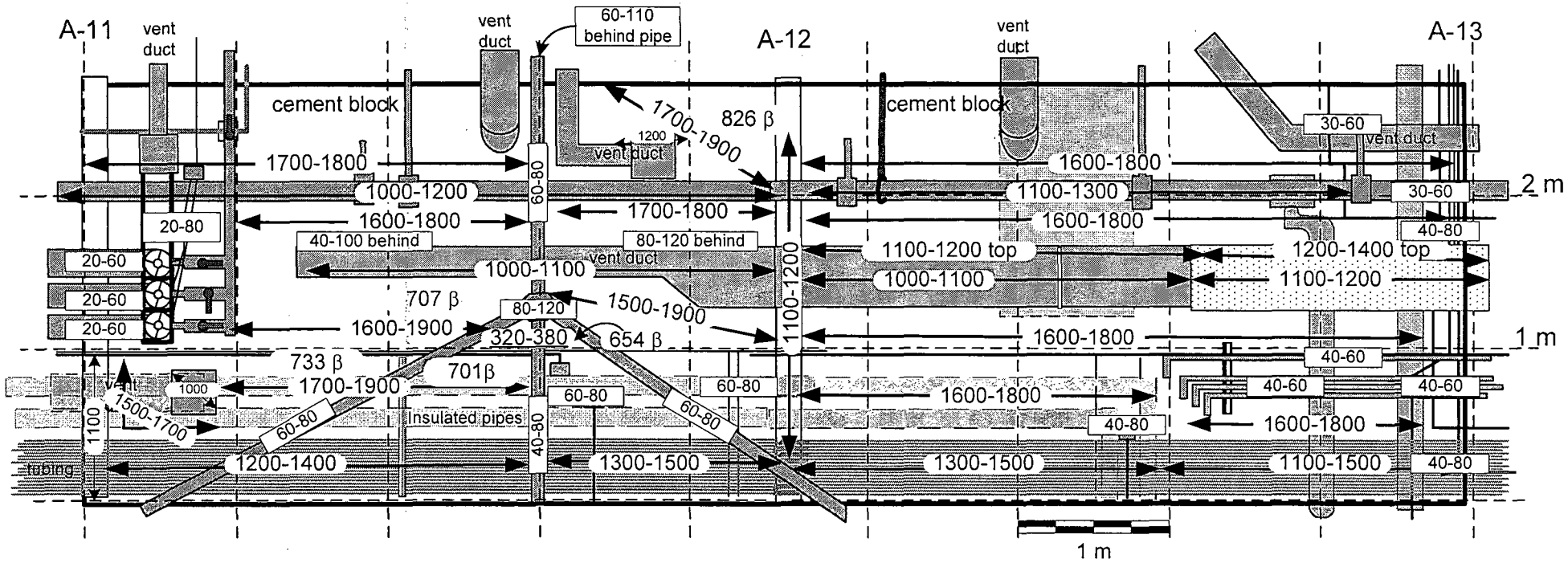
1. All values are cpm alpha.
2. 100% of accessible surfaced scanned 2 meters and below, 10% scanned above 2 meters.
3. ← #-## → Denotes scan using 434 cm^2 probe.
4. ## Denotes scan using 50 cm^2 probe.

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	97287	138801
Cal Due Date	11-05-03	10-20-03
Probe	434 cm^2 α	50 cm^2 α
Probe Serial #	083293	145696
Efficiency %	20.98	22.52
Bkgd. cement block	0-20 cpm	<20 cpm
Bkgd. metal	0-20 cpm	<20 cpm

Survey Conducted by: R. Stowell & G. Sayer
Dates: 06-18-03 to 06-19-03

Figure 157

Figure 158: Building 2 Service Corridor Second (Middle) Level Outer Wall Column A-11 to A-13
Beta Scan Measurement and Fixed 2 Minute Beta Measurement Locations and Results



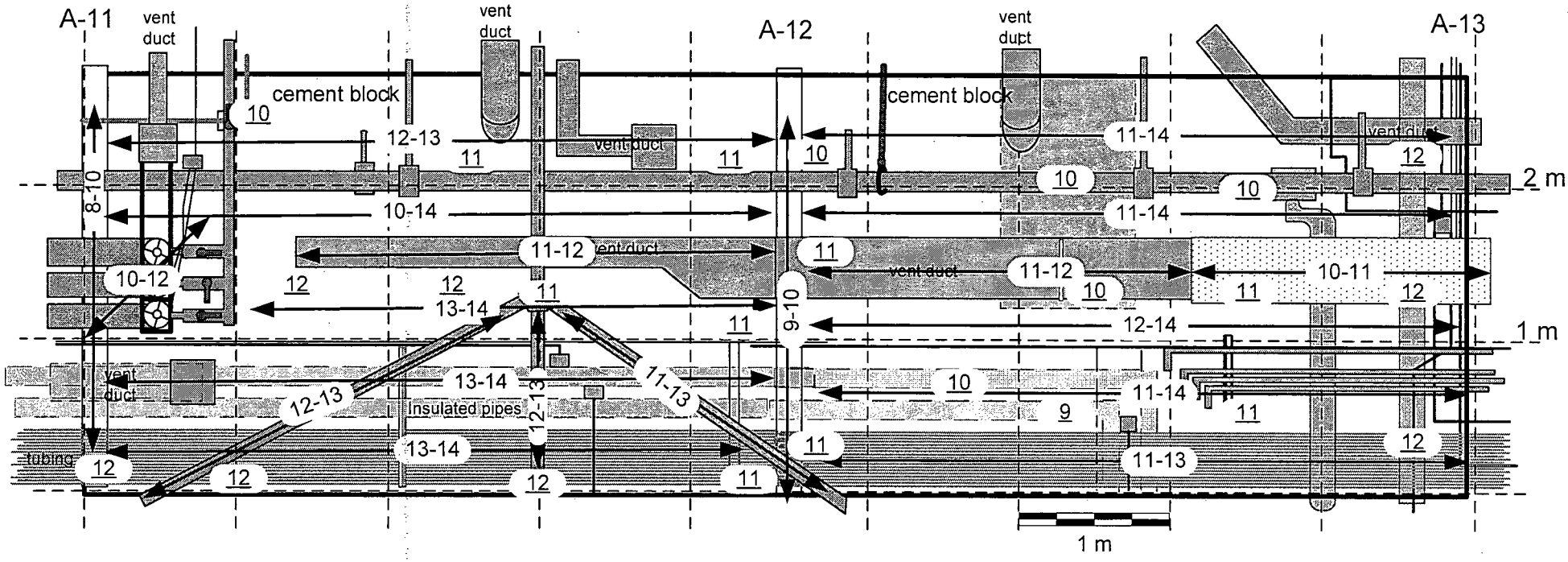
Notes:

1. All values are cpm beta unless otherwise noted.
2. 100% of accessible surface scanned 2 meters and below, 10% scanned above 2 meters.
3. ◄ ####-#### ► Denotes scan with 434 cm² probe.
4. ###-### Denotes scan with 100 cm² probe.
5. ##-## Denotes scan with 15 cm² probe.
6. ### β Denotes fixed beta measurement, in cp2m, taken in elevated (>1900 cpm) scan area. Maximum fixed beta measurement was 826 cp2m, 242 dpm/100 cm².

Instruments			
Model	Ludlum 2221	Ludlum 2221	Ludlum 3
Serial #	154202	86302	138880
Cal Due Date	12-08-03	07-24-03	07-18-03
Probe	434 cm² β	100 cm² β	15 cm² β-γ
Probe Ser. #	149017	142517	145936
Efficiency %	30.39	31.20	24.64
Bkgd. cem block	1300-1500 cpm	220-340 cpm	50-80 cpm
Bkgd. metal	700-1300 cpm	180-280 cpm	40-70 cpm
	cem block	671+/- 126 cp2m	
		MDA 197dpm/100 cm²	

Survey Conducted by: R. Stowell
Dates: 06-18-03 to 06-20-03

Figure 159: Building 2 Service Corridor Second (Middle) Level Outer Wall Column A-11 to A-13
Fixed Exposure Rate and Exposure Rate Scan Measurement Locations and Results



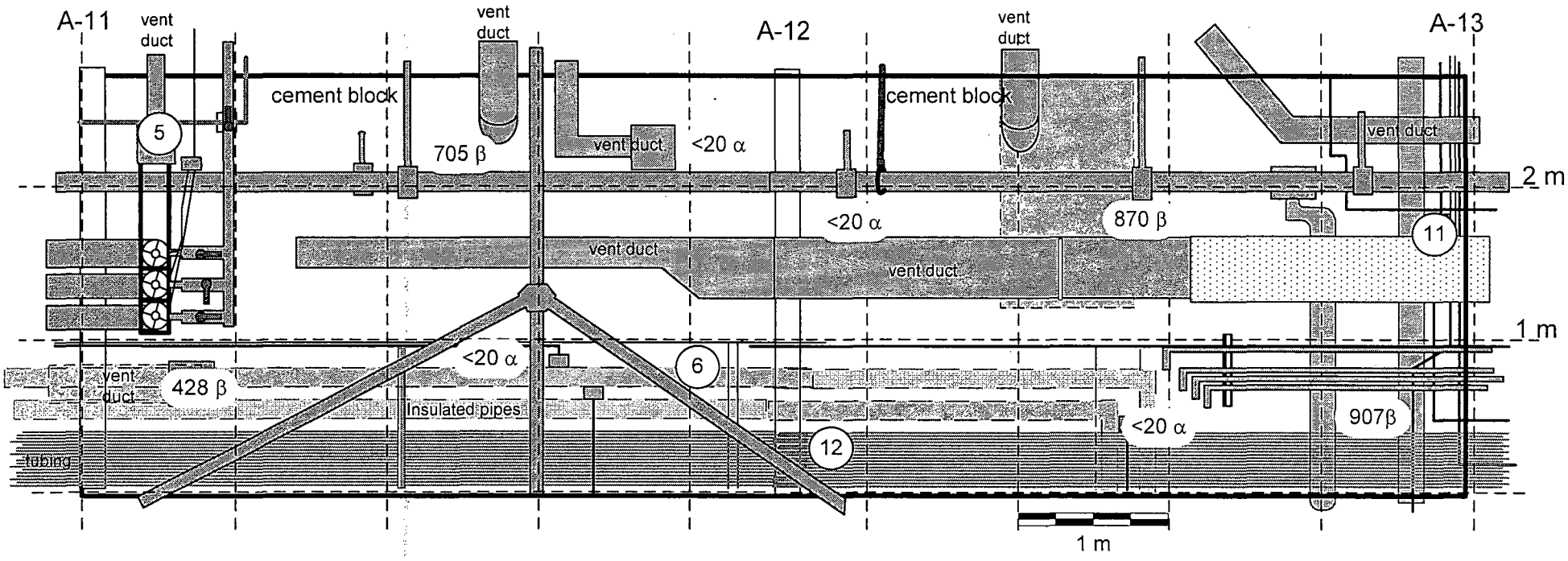
Notes:

1. All values are μR/hr.
2. 100% of accessible surface scanned 2 meters and below, 10% scanned above 2 meters.
3. ## Denotes fixed exposure rate measurement taken at ~ 1 meter from the surface.
4. ◄— ##-## —► Denotes exposure rate scan measurement.

Instrument		
Model	Ludlum 3	
Serial #	153551	
Cal Due Date	08-18-03	
Probe	2X2 NaI	
Probe Serial #	155109	
Background	contact	@ 1 m
cement block	14-19 μR/hr	14-18 μR/hr
metal	9-13 μR/hr	10-13 μR/hr

Survey Conducted by: G. Sayer
Dates: 06-18-03 & 06-20-03

Figure 160: Building 2 Service Corridor Second (Middle) Level Outer Wall Column A-11 to A-13
Alpha and Beta Fixed Measurement Locations and Results and Wipe Survey Locations



Notes:

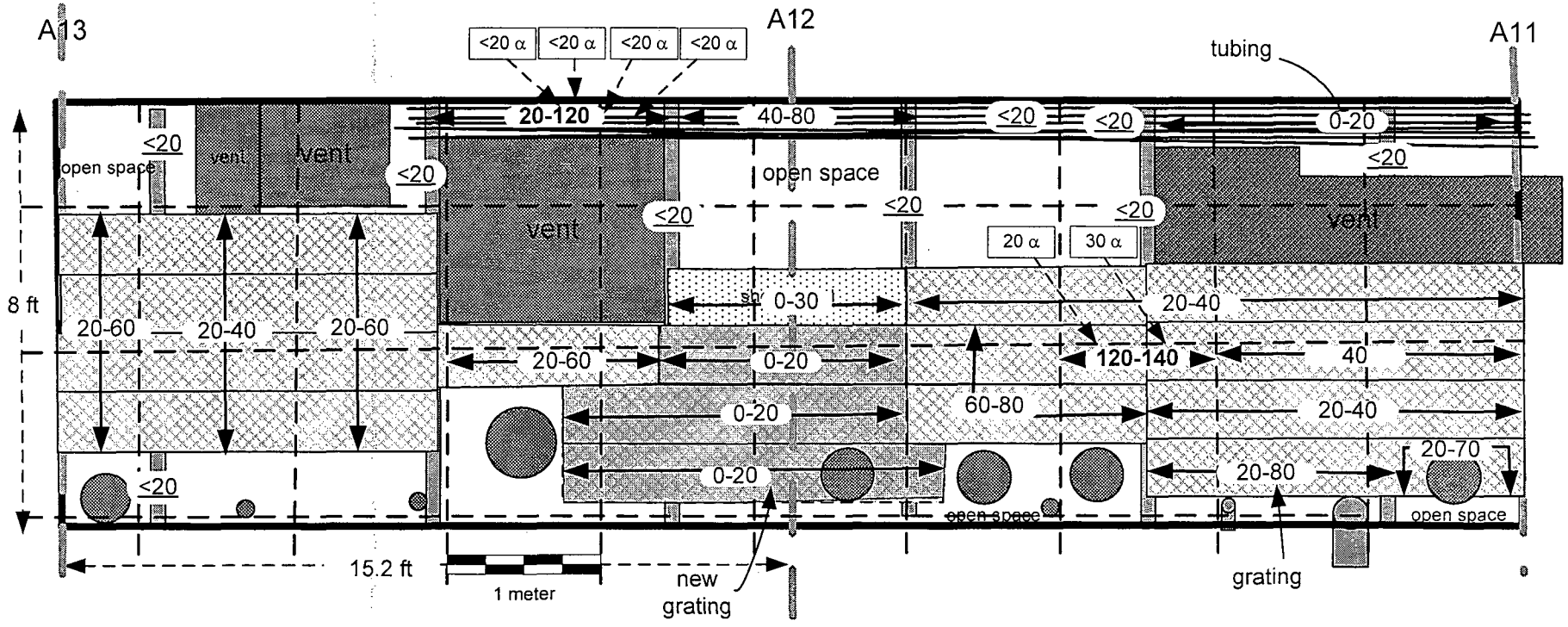
1. ## α — Denotes fixed alpha measurement in cpm.
2. ### β — Denotes fixed beta measurement in cp2m.
3. (##) — Denotes wipe location. Wipe results are provided in Table 5.

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	86302	138801
Cal Due Date	07-24-03	10-20-03
Probe	100 cm^2 β	50 cm^2 α
Probe Ser. #	142547	145696
Efficiency %	31.20	22.52
Bkgd metal	435+/-170 cp2m	<20 cpm
MDA	160 dpm/100 cm2	209 dpm/100 cm2
Bkgd cem. block	671+/-126 cp2m	<20 cpm
MDA	197 dpm/100 cm2	209 dpm/100 cm2

Survey Conducted by: G. Sayer
Dates: 06-19-03 & 06-20-03

Figure 160

Figure 161: Building 2 Service Corridor Overhead Crawl Space Floor Column A-11 to A-13
Alpha Scan and Fixed Measurement Locations and Results



Notes:

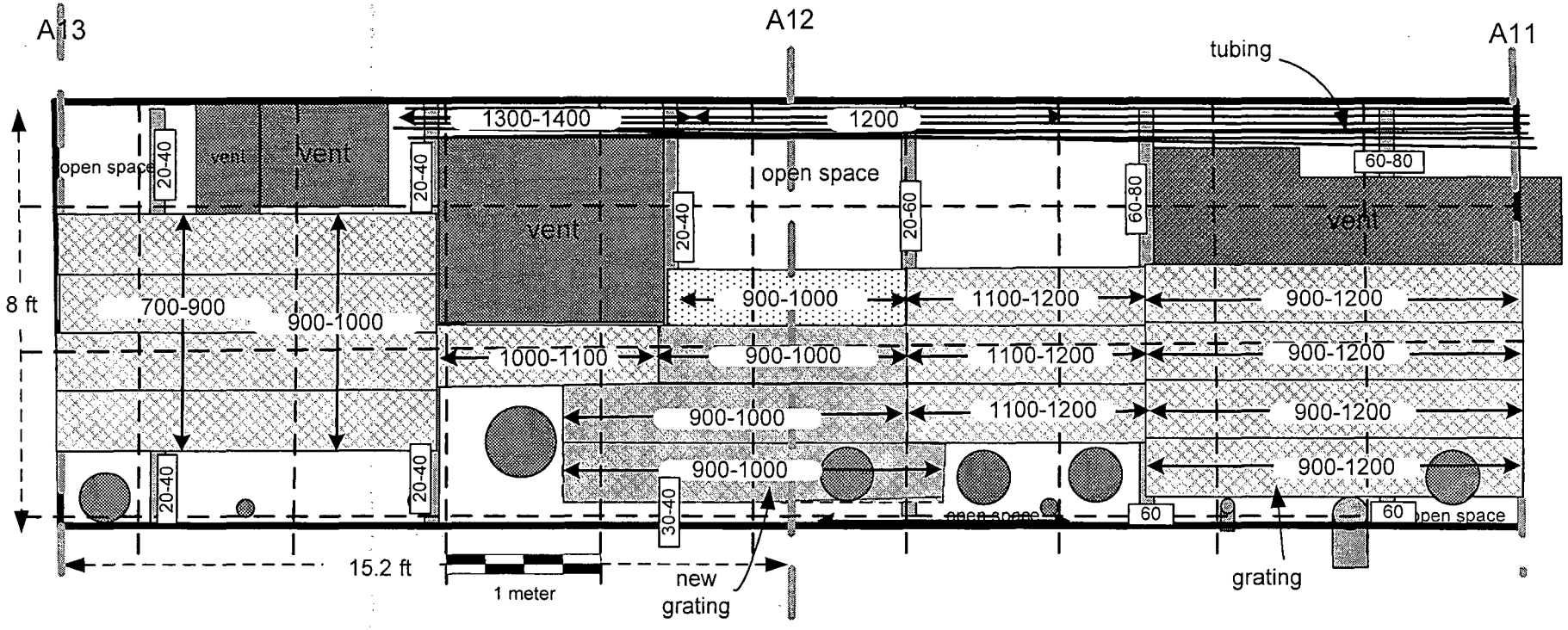
1. All values are in cpm alpha.
2. 100 % of accessible surface scanned.
3. ← #-## → Denotes scans with 434 cm^2 probe.
4. #-# Denotes scans with 50 cm^2 probe.
5. [## α] Denotes fixed alpha measurement taken at an elevated, ≥ 100 cpm, scan site.

Instruments			
Model	Ludlum 2221	Ludlum 12	
Serial #	84734	138801	
Cal Due Date	12-25-03	10-20-03	
Probe	434 cm^2 α	50 cm^2 α	
Probe Serial #	147695	145696	
Efficiency %	21.02	22.52	
Bkgd. metal	0-20 cpm	<20 cpm scan	<20 cpm fixed
		MDA	209 dpm/100 cm^2

Survey conducted by: G. Sayer & R. Stowell
Dates: 06-30-03 & 07-08-03

Figure 161

Figure 162: Building 2 Service Corridor Overhead Crawl Space Floor Column A-11 to A-13
Beta Scan Measurement Locations and Results



Notes:

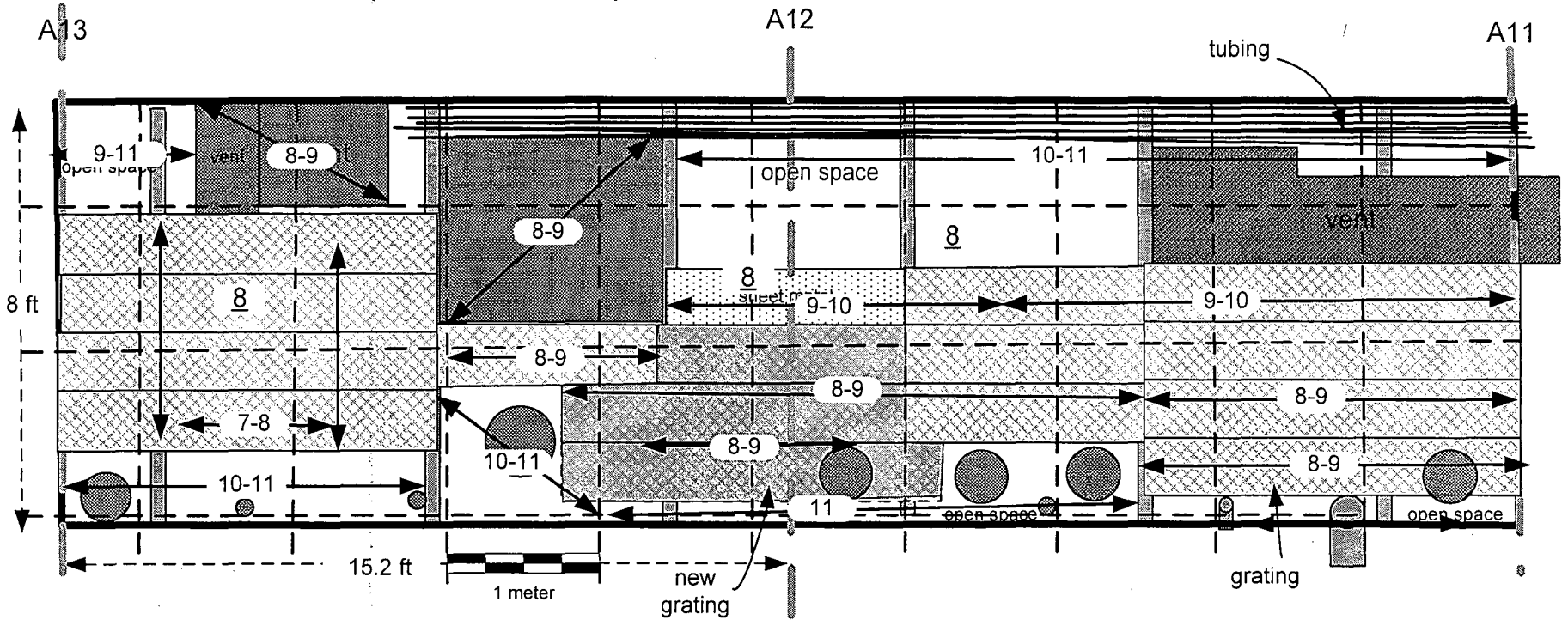
1. All values are in cpm beta.
2. 100% of accessible surfaces scanned.
3. ← ####-#### → Denotes beta scan measurement with 434 cm² probe.
4. ##-## Denotes beta scan measurement with 15 cm² probe.

Instruments		
Model	Ludlum 2221	Ludlum 3
Serial Number	154202	138880
Cal Due Date	12-08-03	07-18-03
Probe	434 cm² β	15 cm² β–γ
Probe Serial #	149017	145963
Efficiency %	30.39	24.64
Bkgd. metal	700-1300 cpm	40-70 cpm

Survey Conducted by: R. Stowell & G. Sayer
Dates: 06-24-03, 06-26-03 & 07-07-03

Figure 162

Figure 163: Building 2 Service Corridor Overhead Crawl Space Floor Column A-11 to A-13
Fixed Exposure Rate and Exposure Rate Scan Measurement Locations and Results .



Notes:

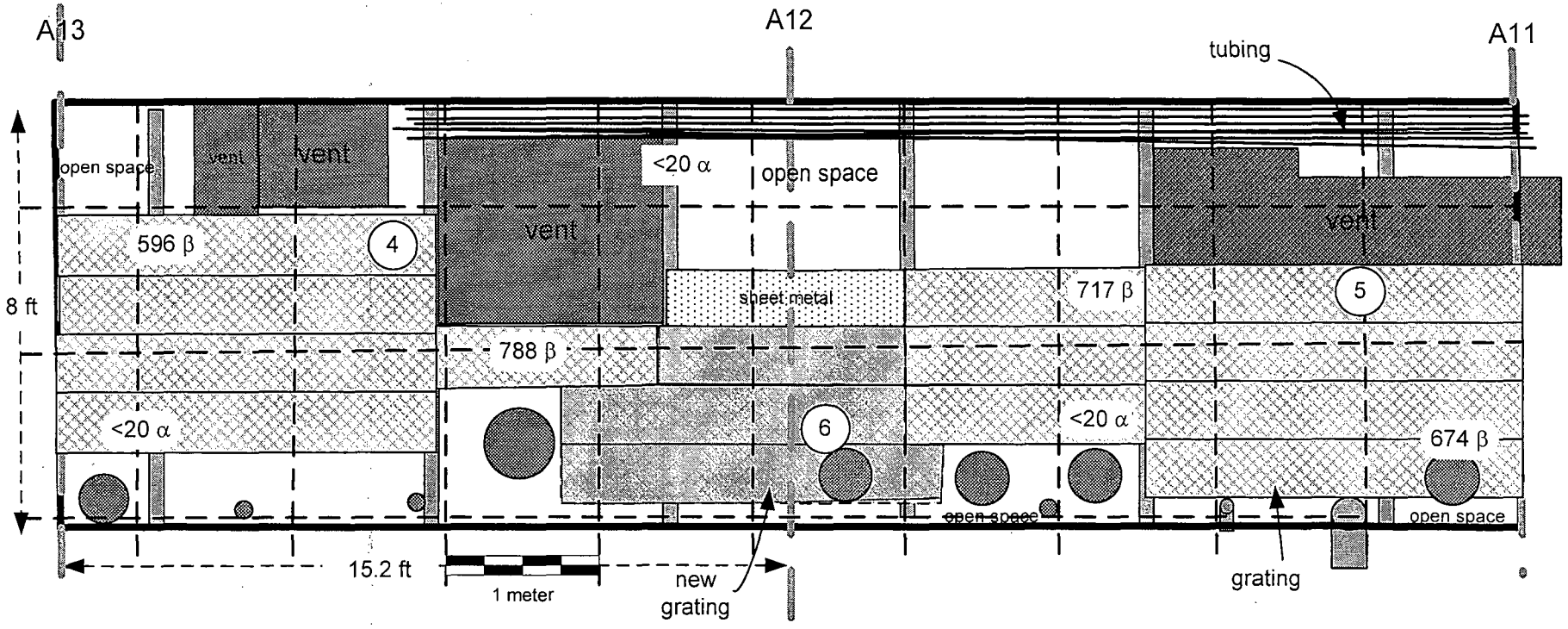
1. All values are μR/hr.
2. 100% of accessible surface scanned.
3. ## Denotes fixed exposure rate measurement taken at ~ 1 meter from the surface.
4. ← ##-## → Denotes exposure rate scan measurement.

Instrument		
Model	Ludlum 3	
Serial #	153551	
Cal Due Date	08-18-03	
Probe	2" X 2" Nal γ	
Probe Serial #	155109	
Background	contact	@ 1 m
metal	9-13 μR/hr	10-13 μR/hr

Surveys Conducted by: G. Sayer
Date: 06-25-03

Figure 163

Figure 164: Building 2 Service Corridor Overhead Crawl Space Floor Column A-11 to A-13
Alpha and Beta Fixed Measurement Locations and Results and Wipe Survey Locations



Notes:

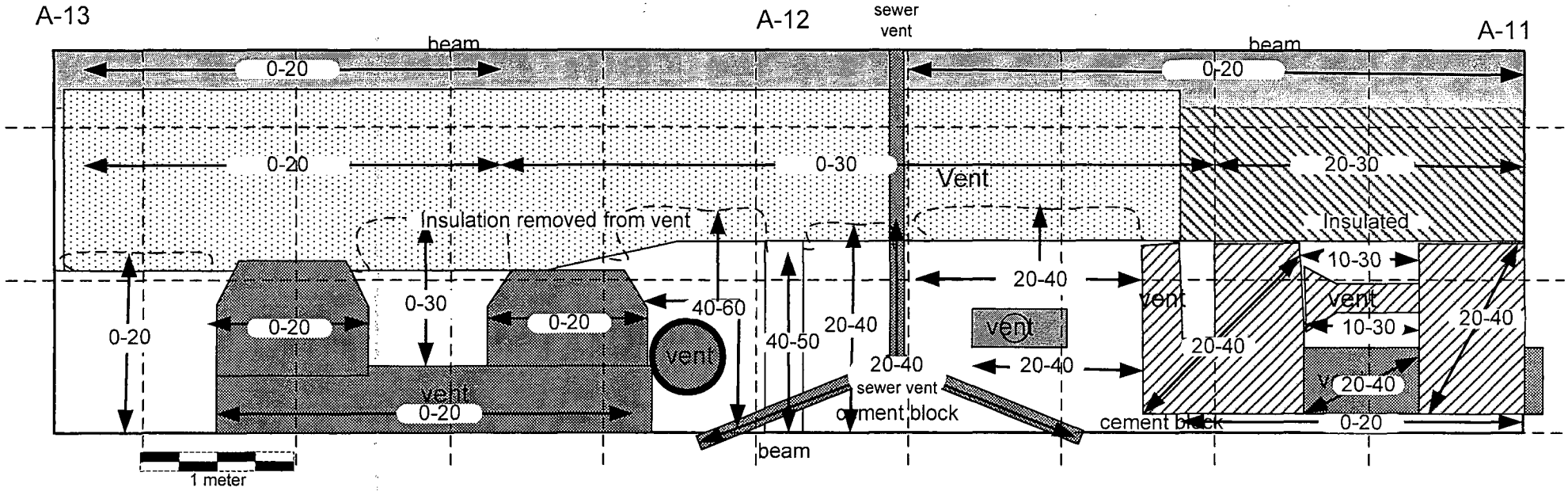
1. ## α — Denotes fixed alpha measurement in cpm.
2. #### β — Denotes fixed beta measurement in cp2m.
3. (##) — Denotes wipe location. Wipe results are provided in Table 5.

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	86302	138801
Cal Due Date	07-24-03	10-20-03
Probe	100 cm^2 β	50 cm^2 α
Probe Serial #	142547	145696
Efficiency %	31.20	22.52
Bkgd. metal grating	588+/-185 cp2m	<20 cpm
MDA	185 dpm/100 cm^2	209 dpm/100 cm^2

Surveys conducted by: G. Sayer & R. Stowell
Date: 07-01-03

Figure 164

Figure 165: Building 2 Service Corridor Overhead Crawl Space Inner Wall Column A-11 to A-13
Alpha Scan Measurement Locations and Results



Notes:

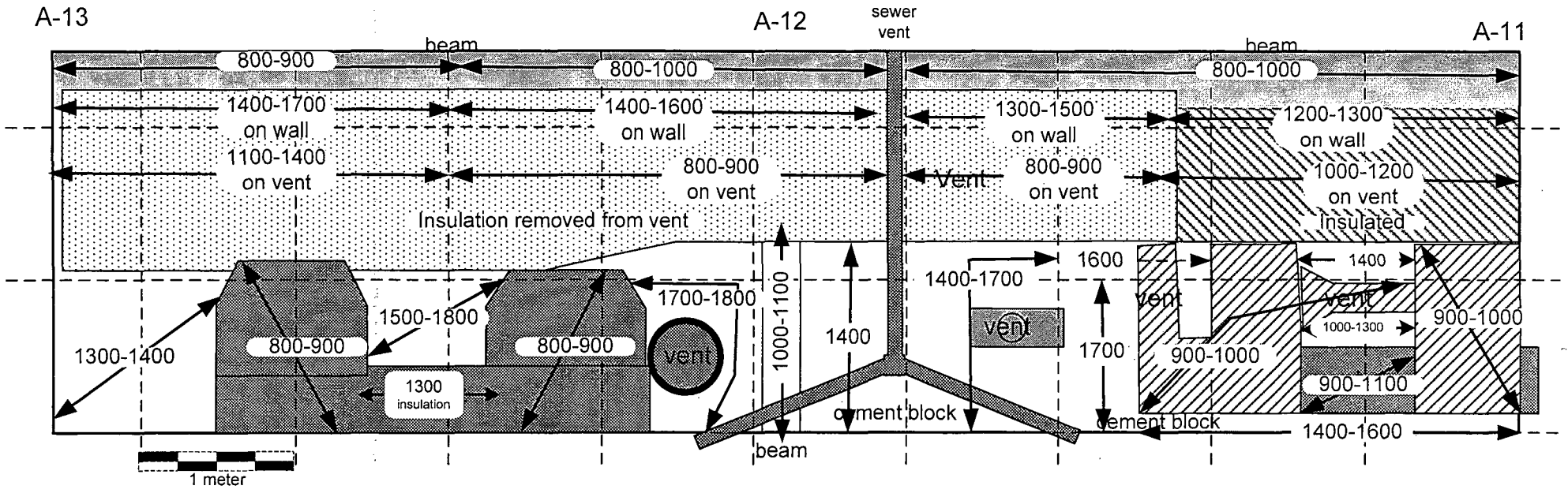
1. All values are cpm alpha.
2. 100% of accessible surfaced scanned 2 meters and below, 10% scanned above 2 meters.
3. ◄— #-## —► denotes scan using 434 cm^2 probe.

Instruments	
Model	Ludlum 2221
Serial #	84734
Cal Due Date	12-25-03
Probe	434 cm^2 α
Probe Serial #	147965
Efficiency %	21.02
Bkgd. cement block	0-20 cpm
Bkgd. metal	0-20 cpm

Survey Conducted by: Greg Sayer & R. Stowell
Dates: 06-30-03 to 07-01-03

Figure 165

Figure 166: Building 2 Service Corridor Overhead Crawl Space Inner Wall Column A-11 to A-13
Beta Scan Measurement Locations and Results



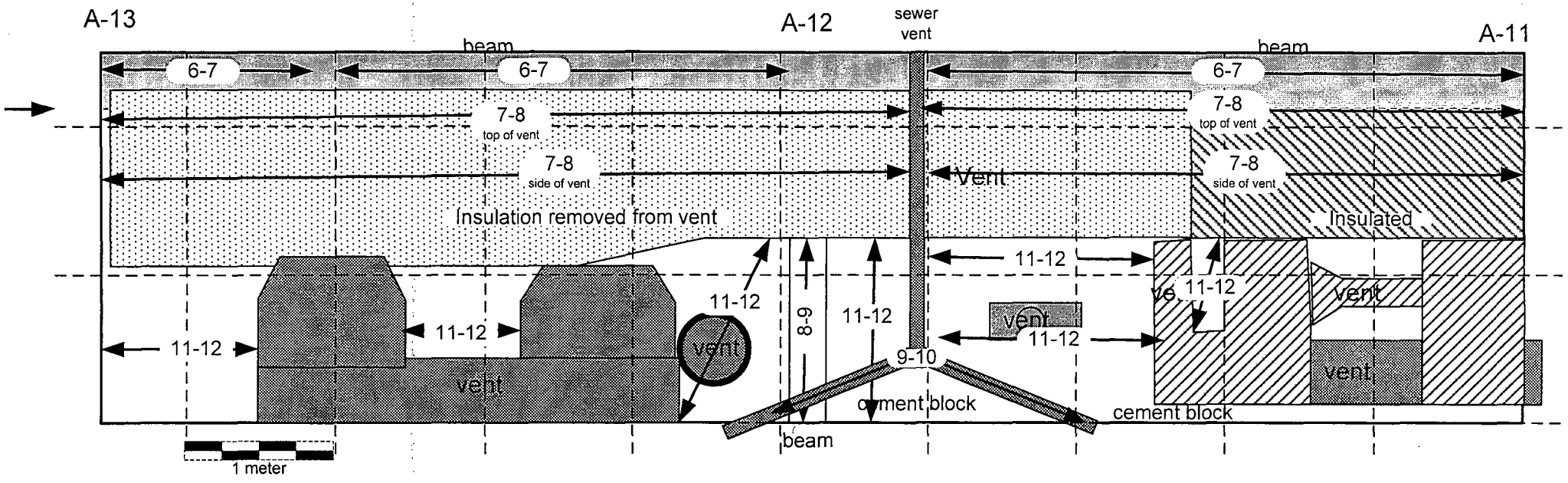
Notes:

1. All values are cpm beta unless otherwise noted.
2. 100% of accessible surface scanned 2 meters and below, 10% scanned above 2 meters.
3. ◄ #### #### ► Denotes scan with 434 cm^2 probe.

Instrument	
Model	Ludlum 2221
Serial #	154202
Cal Due Date	12-08-03
Probe	434 cm^2 β
Probe Ser. #	149017
Efficiency %	30.39
Bkgd. cem block	1300-1500 cpm
Bkgd. metal	700-1300 cpm

Survey Conducted by: R. Stowell & G. Sayer
Dates: 06-24-03 to 07-01-03

Figure 167: Building 2 Service Corridor Overhead Crawl Space Inner Wall Column A-11 to A-13
Exposure Rate Scan Measurement Locations and Results



Notes:

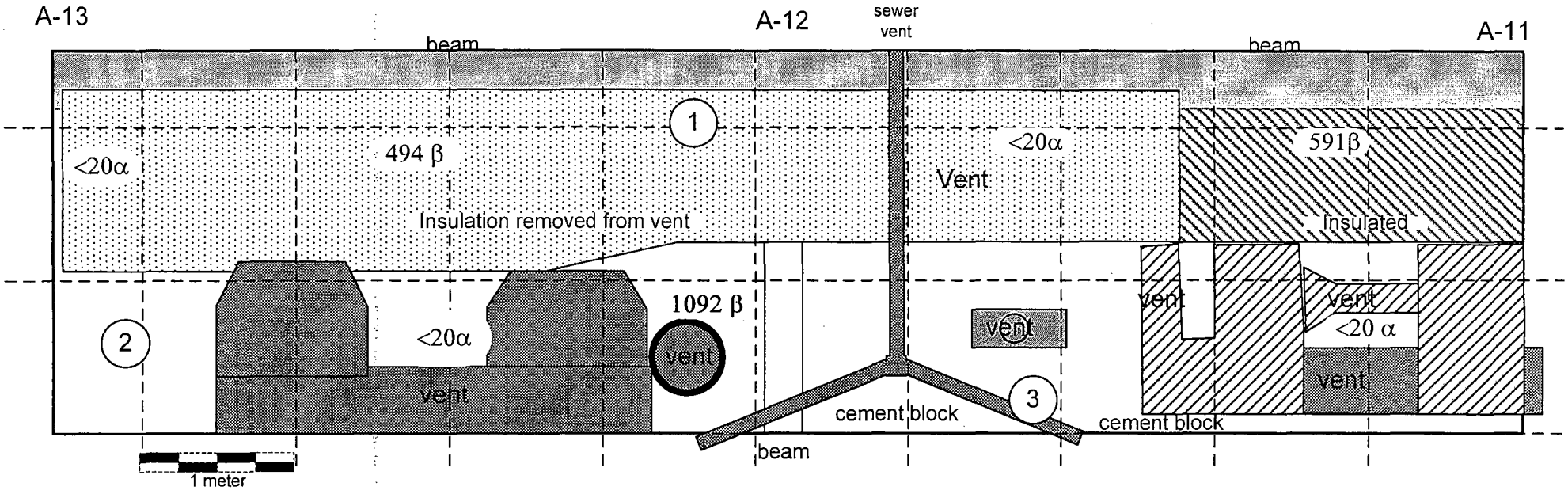
1. All values are μR/hr.
2. 100% of accessible surface scanned 2 meters and below, 10% scanned above 2 meters.
3. ← ##-## → Denotes exposure rate scan measurement.

Instrument	
Model	Ludlum 3
Serial #	153551
Cal Due Date	08-18-03
Probe	2X2 NaI
Probe Serial #	155109
Background	contact
cement block	14-19 μR/hr
metal	9-13 μR/hr

Survey Conducted by: G. Sayer
Date: 06-25-03

Figure 167

Figure 168: Building 2 Service Corridor Overhead Crawl Space Inner Wall Column A-11 to A-13
Alpha and Beta Fixed Measurement Locations and Results and Wipe Survey Locations



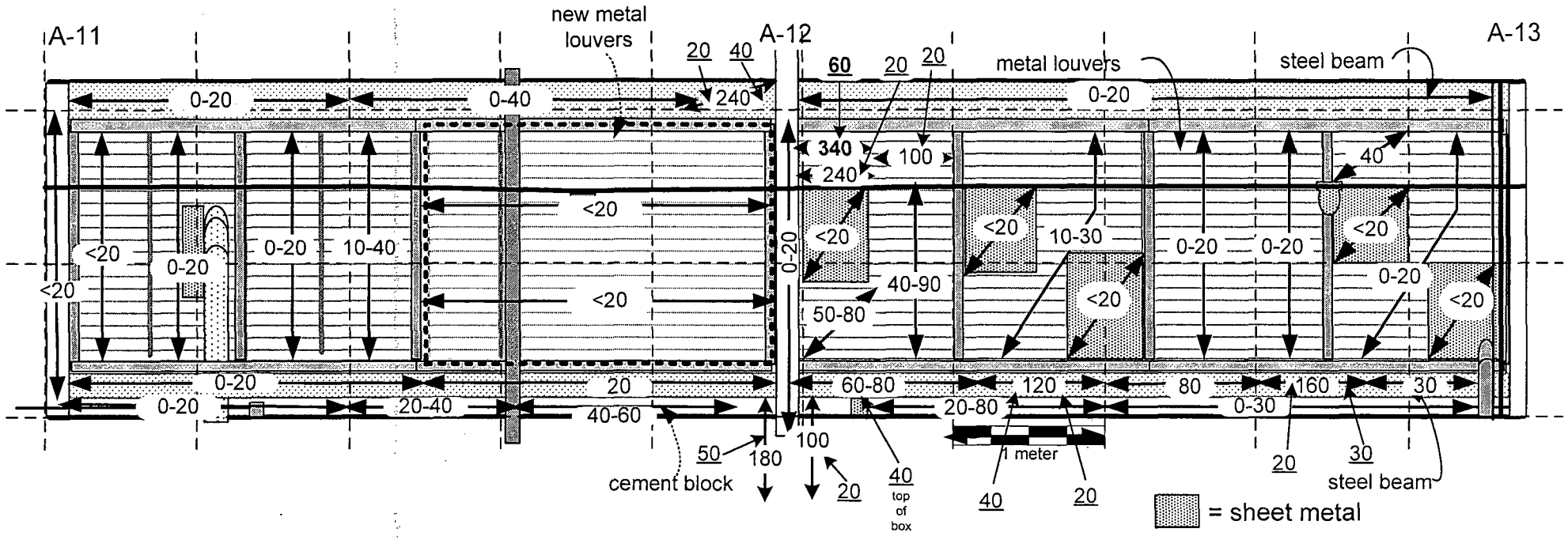
Notes:

1. ## α Denotes fixed alpha measurement in cpm.
2. #### β Denotes fixed beta measurement in cp2m.
3. (##) Denotes wipe location. Wipe results are provided in Table 5.
4. Maximum beta fixed measurement was 1092 cp2m, 675 dpm/100 cm²

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	86302	138801
Cal Due Date	07-24-03	10-20-03
Probe	100 cm² β	50 cm² α
Probe Serial #	142547	145696
Efficiency %	31.20	22.52
Bkgd. Cem. block	671+/-126 cp2m	<20 cpm
MDA	197 dpm/100 cm²	209 dpm/100 cm²
Bkgd. metal	435+/-170 cp2m	<20 cpm
MDA	160 dpm/100 cm²	209 dpm/100 cm²

Survey Conducted by R. Stowell & G. Sayer
Date: 07-01-03

Figure 169: Building 2 Service Corridor Overhead Crawl Space Outer Wall Column A-11 to A-13
Alpha Scan and Fixed Measurement Locations and Results



Notes:

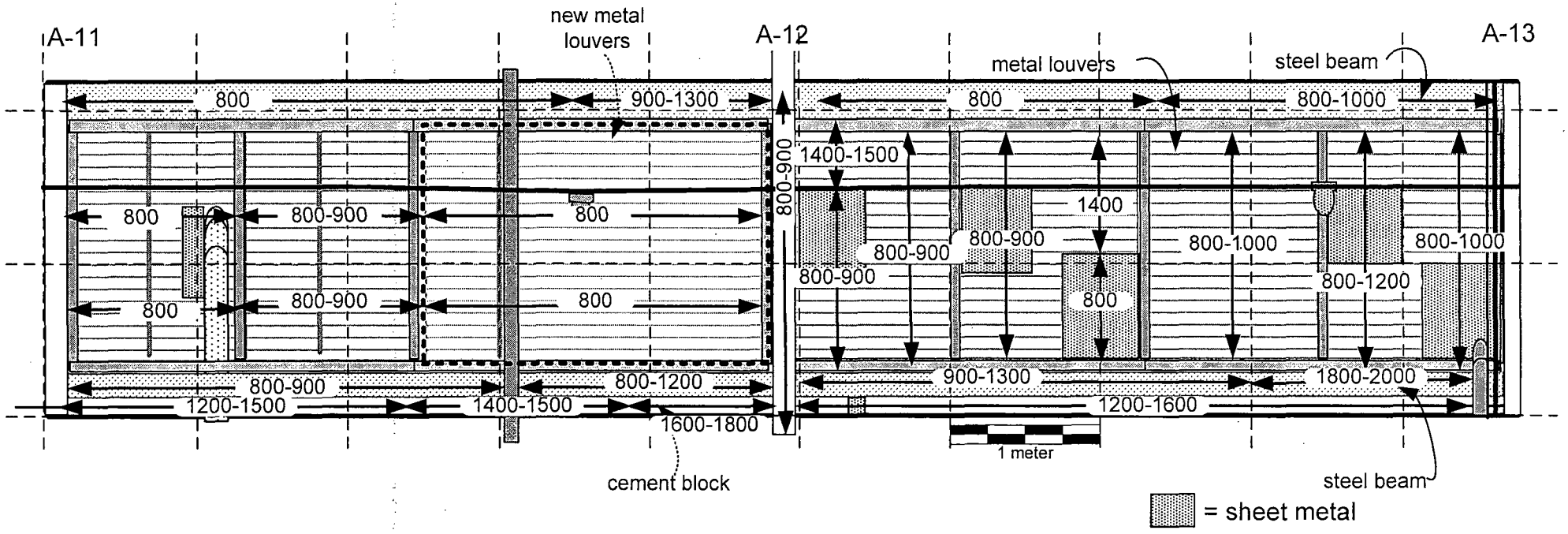
1. All values are cpm alpha.
2. 100% of accessible surfaced scanned 2 meters and below, 10% scanned above 2 meters.
3. ← #-## → Denotes scan using 434 cm² probe.
4. ## Denotes alpha fixed measurement taken with 50 cm² probe at elevated (≥100 cpm) scan sites. Maximum fixed alpha measurement was 60 cpm, 355 dpm/100 cm².

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	84734	138801
Cal Due Date	12-25-03	10-20-03
Probe	434 cm² α	50 cm² α
Probe Serial #	147965	145696
Efficiency %	21.02	22.52
Bkgd. cement block	0-20 cpm	<20 cpm
Bkgd. metal	0-20 cpm	<20 cpm

Survey Conducted by: R. Stowell & G. Sayer
Date: 06-27-03

Figure 169

Figure 170: Building 2 Service Corridor Overhead Crawl Space Outer Wall Column A-11 to A-13
Beta Scan Measurement Locations and Results



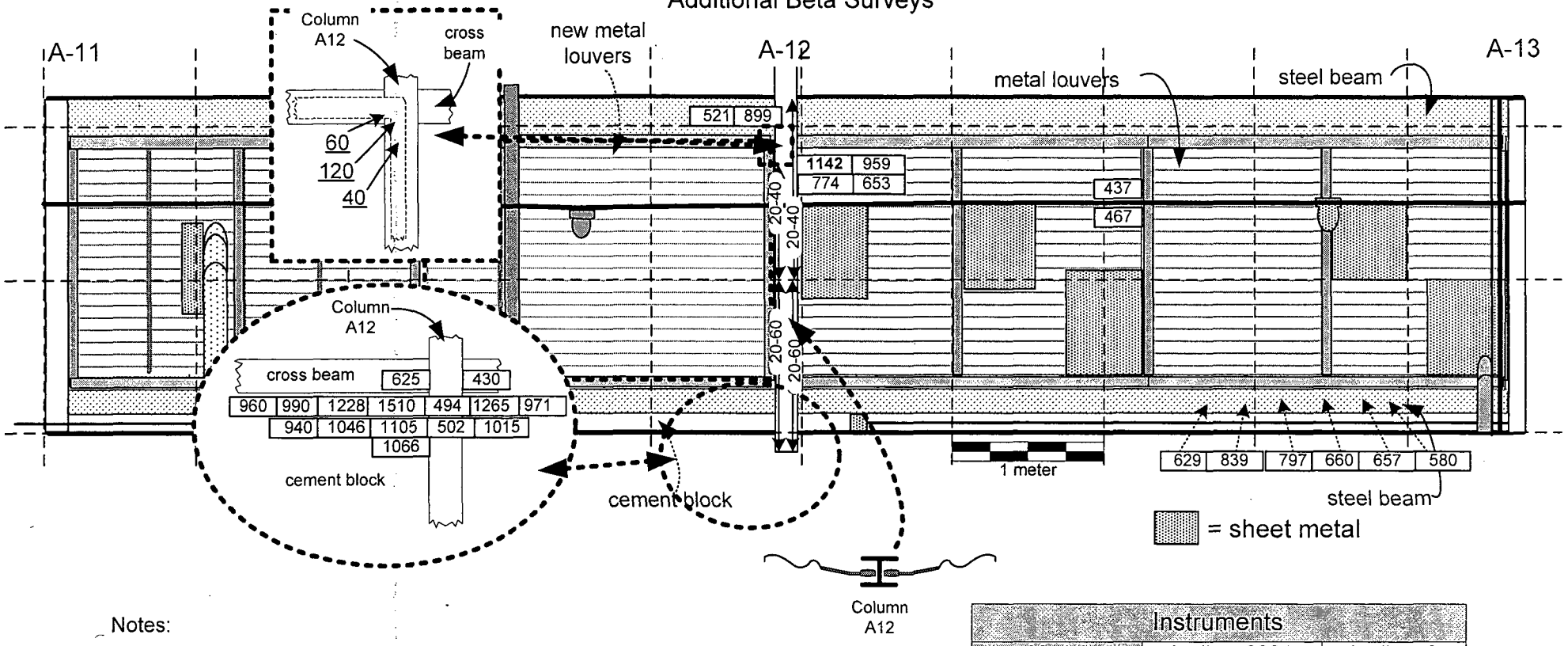
Notes:

1. All values are cpm beta unless otherwise noted.
2. 100% of accessible surface scanned 2 meters and below, 10% scanned above 2 meters.
3. ◄ ####-#### ► Denotes scan with 434 cm^2 probe.
4. Additional beta surveys are provided on Figure 171.

Instruments	
Model	Ludlum 2221
Serial #	154202
Cal Due Date	12-08-03
Probe	434 cm^2 β
Probe Ser. #	149017
Efficiency %	30.39
Bkgd. cem block	1300-1500 cpm
Bkgd. metal	700-1300 cpm

Survey Conducted by: R. Stowell & G. Sayer
Dates: 06-24-03 to 07-03-03

Figure 171: Building 2 Service Corridor Overhead Crawl Space Outer Wall Column A-11 to A-13
Additional Beta Surveys



Notes:

1. Fixed beta measurements were taken in areas of elevated beta scans. The interior surfaces of metal column A-12 were also surveyed with the 15 cm² probe as shown.

2. [###] Denotes beta fixed measurement in cp2m taken with the 100 cm² probe. Maximum reading on metal was 1142 cp2m, 1133 dpm/100 cm. Maximum reading on cement block was 1510 cp2m, 1345 dpm/100 cm² .

3. ◄ ##-## ► Denotes scan using the 15 cm² probe.

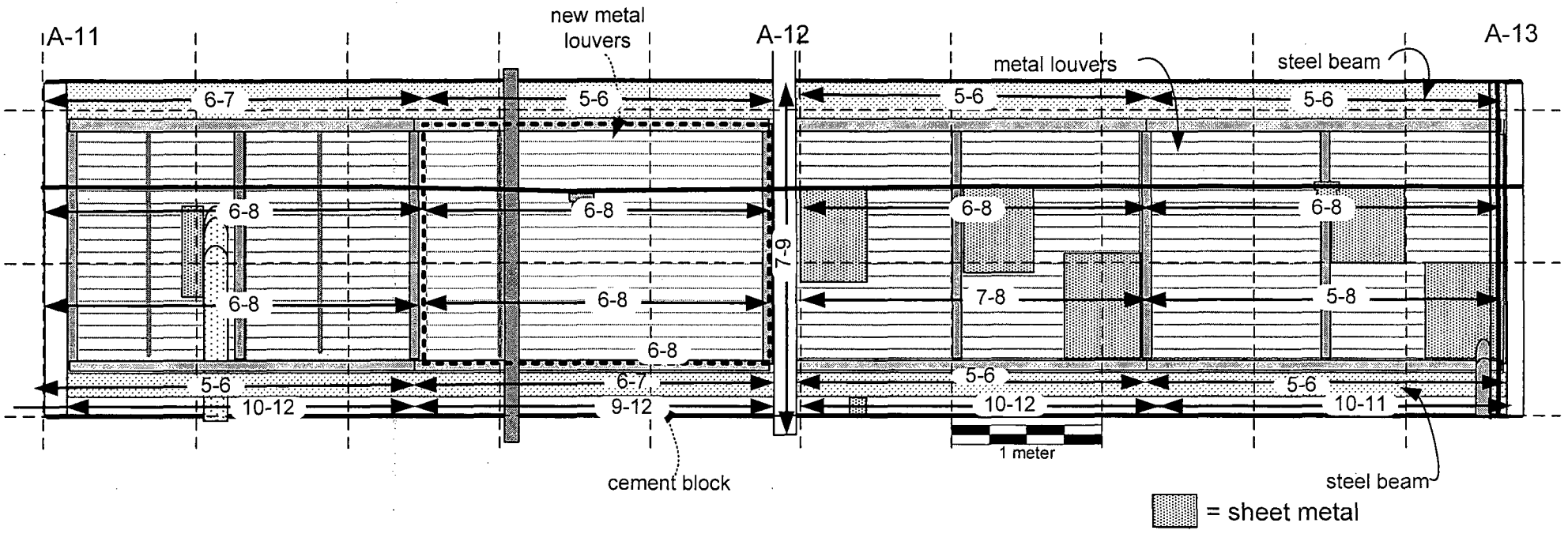
4. ## Denotes fixed measurement using the15 cm² probe.

Instruments		
Model	Ludlum 2221	Ludlum 3
Serial #	86302	138880
Cal Due Date	07-24-03	07-18-03
Probe	100 cm² β	15 cm² β–γ
Probe Ser. #	142547	145963
Efficiency %	31.20	24.64
Bkgd. cem block	671+/- 126 cp2m	50-80 cpm
MDA	197 dpm/100 cm²	---
Bkgd. metal	435+/-170 cp2m	40-70-cpm
MDA	160 dpm/100 cm²	---

Surveys Conducted by: R. Stowell & G. Sayer
Dates: 07-03-03 & 07-07-03

Figure 171

Figure 172: Building 2 Service Corridor Overhead Crawl Space Outer Wall Column A-11 to A-13
Exposure Rate Scan Measurement Locations and Results



Notes:

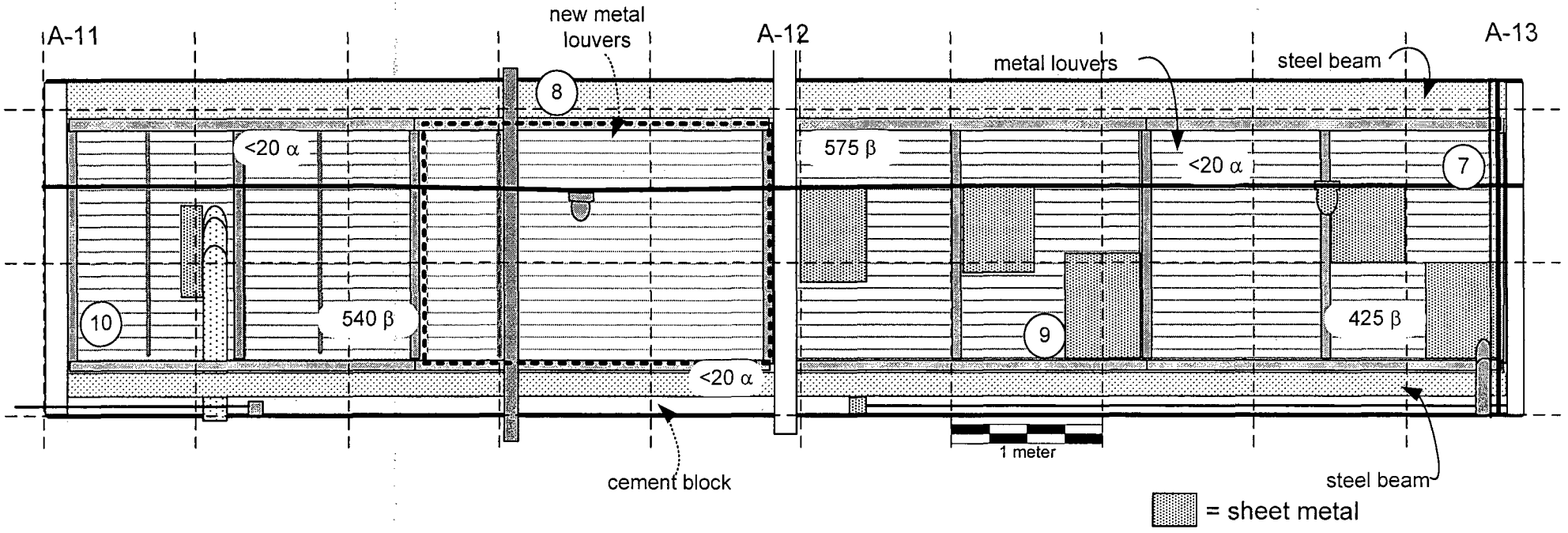
1. All values are μR/hr.
2. 100% of accessible surface scanned 2 meters and below, 10% scanned above 2 meters.
3. ← ##-## → Denotes exposure rate scan measurement.

Instrument	
Model	Ludlum 3
Serial #	153551
Cal Due Date	08-18-03
Probe	2X2 NaI
Probe Serial #	155109
Background	contact
cement block	14-19 μR/hr
metal	9-13 μR/hr

Survey Conducted by: G. Sayer
Date: 06-25-03

Figure 172

Figure 173: Building 2 Service Corridor Overhead Crawl Space Outer Wall Column A-11 to A-13
Alpha and Beta Fixed Measurement Locations and Results and Wipe Survey Locations



Notes:

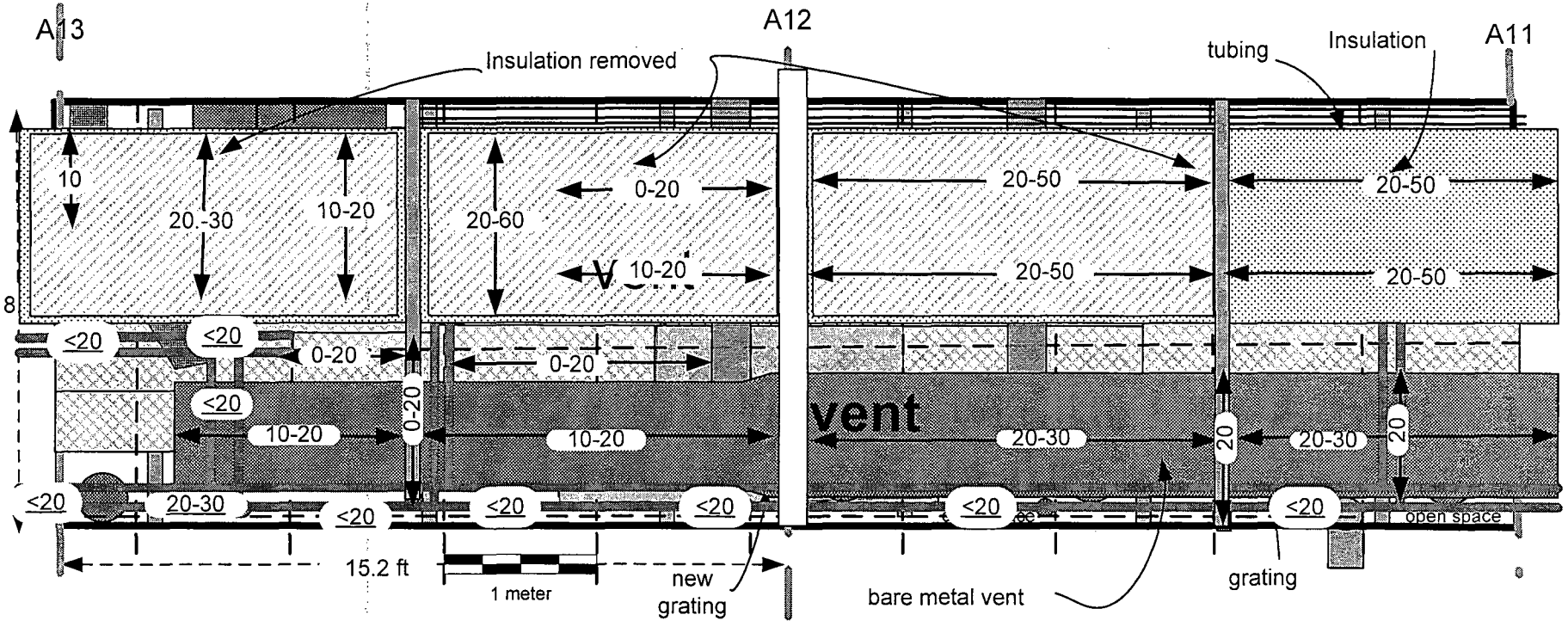
1. ## α Denotes fixed alpha measurement in cpm.
2. #### β Denotes fixed beta measurement in cp2m.
3. (##) Denotes wipe location. Wipe results are provided in Table 5.
4. Maximum beta fixed measurement was 575 cp2m, 224 dpm/100 cm²

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	86302	138801
Cal Due Date	07-24-03	10-20-03
Probe	100 cm² β	50 cm² α
Probe Serial #	142547	145696
Efficiency %	31.20	22.52
Bkgd. metsl	435+/-170 cp2m	<20 cpm
MDA	160 dpm/100 cm²	209 dpm/100 cm²

Survey Conducted by R. Stowell & G. Sayer
Date: 07-01-03

Figure 173

Figure 174: Building 2 Service Corridor Overhead Crawl Space Vents and Pipes Column A-11 to A-13
Alpha Scan Measurement Locations and Results



Notes:

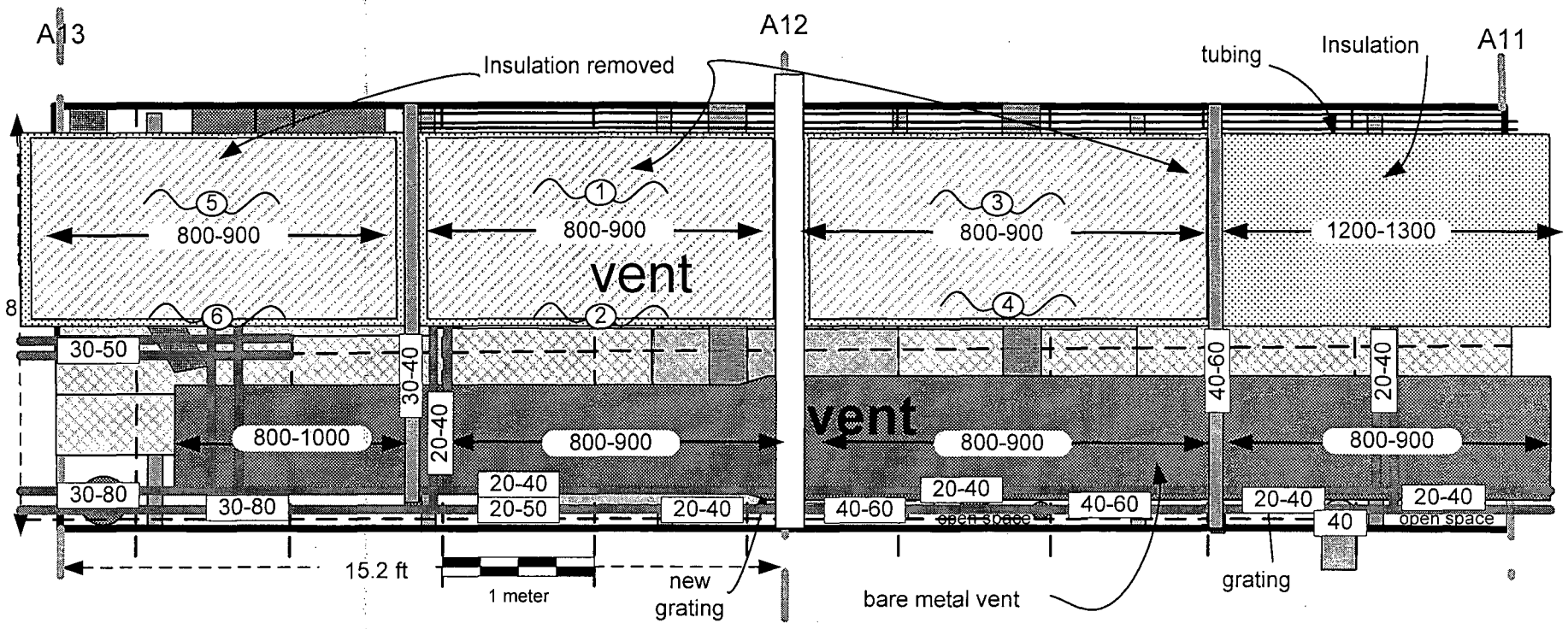
1. All values are in cpm alpha.
2. 100 % of accessible surface scanned.
3. ◄— #-## —► Denotes scans with 434 cm² probe.
4 ## Denotes scans with 50 cm² probe.

Instruments		
Model	Ludlum 2221	Ludlum 12
Serial #	84734	138801
Cal Due Date	12-25-03	10-20-03
Probe	434 cm² α	50 cm² α
Probe Serial #	147695	145696
Efficiency %	21.02	22.52
Bkgd. metal	0-20 cpm	<20 cpm

Survey conducted by: G. Sayer & R. Stowell
Date: 07-01-03

Figure 174

Figure 175: Building 2 Service Corridor Overhead Crawl Space Vents and Pipes Column A-11 to A-13
Beta Scan Measurement and Large Area Wipe Locations and Results



Notes:

1. Additional beta scans performed on vents and pipes following removal of contaminated insulation.
2. All values are cpm beta.
3. ◄ ###-### ► Denotes beta scan with 434 cm^2 probe.
4. [##-##] Denotes beta scan with 15 cm^2 probe.
5. ~(#)~ Denotes large area wipe taken on ventilation duct following insulation removal. 1,3 & 5 on top of vent, 2, 4 & 6 on side. No activity, alpha or beta, above background detected on the wipes.

Instruments			
Model	Ludlum 2221	Ludlum 3	Ludlum 12
Serial Number	154202	138880	72676
Cal Due Date	12-08-03	07-18-03	12-09-03
Probe	434 cm^2 β	15 cm^2 β–γ	50 cm^2 α
Probe Serial #	149017	145963	89920
Efficiency %	30.39	24.64	22.14%
Bkgd. metal	700-1300 cpm	40-70 cpm	<20 cpm

Survey Conducted by: R. Stowell & G. Sayer
Dates: 06-24-03 to 07-02-03

Figure 175

General Atomics'

Final Radiological Survey Report for the Building 2 Service Corridor Section "A"

Appendix A

Final Survey Plans for the Building 2 Service Corridor Section "A"

September 8, 1998
Prepared by: Efraim Ramirez
Approved by: Laura Gonzales

Decontamination/Characterization Survey Plan of Building 2 Service Core

Background

The Service Core was used to provide utility and other services for Building 2 laboratories. Various radioactive isotopes were used by these labs and contaminated equipment was stored in the service core.

The Service Core is comprised of three sections (a, b, and c) with concrete floor and concrete block walls on the lower level and metal grating floor and concrete block walls on the upper level.

During implementation of the Survey Plan dated Dec. 8, 1997, approximately **42** contaminated areas were located. The purpose of this survey is to characterize and, in most cases decontaminate, all areas that exceed alert levels. Decontamination will be accomplished by using a wire brush, needle gun, jack-hammer, or other similar aggressive decontamination methods (including cutting-out grating and disposing it as radioactive waste).

Classification

Areas where contamination was detected were reclassified to "**suspect affected areas**" using I-beam numbers as boundaries. In these areas surveys will be performed according to the Survey Plan issued December 8, 1997.

Characterization Plan

There are ~ 42 elevated areas of contamination (see tables & figures). In some cases several spots are elevated in the same area, indicating same source possibly responsible for contamination. To characterize (determine radionuclides), samples must be collected in **each area** (~30 samples are estimated to be needed in the ~42 elevated locations). In some cases (areas <200 cm^2) collecting the samples will also decontaminate the area.

Decontamination Plan

Decon work will be performed only by qualified individuals (Jerry Cooper & Undree Wells) under a radiation work permit.

The locations where elevated radiation levels were measured are provided in the attached table & corresponding figures.

In contaminated areas < 200 cm^2, decontaminate until levels are at or near background and collect the sample for γ spectroscopy. GM counter background for concrete and concrete block is ~ 120 cpm. Alpha 50 cm^2 counter background is <20 cpm.

In contaminated areas > 200 cm^2, collect a sample first to obtain a γ spectroscopy, then HP Manager will determine if decon is needed and applicable release levels.

Re-Survey

In every decontaminated area, re-survey as follows:

1. Take a 100 cm^2 smear of surface area.
2. Take fixed measurement(s) with 100 cm^2 detector on decontaminated areas every 2 meters. Five and two minute counts on lower level and upper level decontaminated areas, respectively.
3. Check decontaminated areas with hand-held 15 cm^2 GM and 50 cm^2 alpha counters.

Documentation

Every survey conducted must be documented on a drawing showing the approximate locations surveyed. Include the results (include units), the technician's signature, date, instrument(s) used (including model and serial number of both the rate meter and the detector), calibration due date, % efficiency, background readings (if applicable) and any other applicable information.

1. Scan 100% of accessible floor areas for both alpha and beta.
2. Scan 100% of accessible wall surfaces up to 2 meters.
3. Scan 25% of the accessible walls surfaces above 2 meters.
4. Take micro R measurements every 2 meters --- on surface contact and at 1 meter.
5. Take fixed measurements (5 minutes each) every 2 meters. BETA ONLY w/100 cm^2
6. Collect more 100 cm^2 smears in areas that were decontaminated and extra smears in the overhead areas (number should be based on site-specific items in the area).
7. Re-survey after decontamination. Survey 100% of all decontaminated areas for both alpha and beta.

Note : Surveys 1-4 have been completed. Surveys 5-7 are post-decon surveys.

January 17, 2002
Prepared by: Laura Gonzales Laura Gonzales 1/18/02

Final Survey Plan for the Building 2 Service Core

Background

Previous History and Use

The Service Core is used to provide utilities and other services to the Building 2 laboratories. Occasionally, contaminated equipment was stored in the service core. Additionally, 55 gallon drums were located in the service core which were used to store low levels or radioactively contaminated liquid waste. Previous surveys of the service corridor identified areas of contamination which have since been cleaned.

Exhaust Ducts, Motors and Fans

Ventilation ducting in the service core were identified in 1994 as being radioactively contaminated (some of these ducts were labeled with "Caution, Radioactive Materials" labels). In February 1994, removal of all radioactively contaminated ducts began and continued until they were all removed. In addition, a plan to inspect all lab exhausts and vents was formulated and surveys began. By May 1994, the surveys were completed. All contaminated ducts and/or exhausters were removed. As a result, no known contamination exists in the ventilation ducts.

Concrete Floor Surveys

The concrete was removed (after surveys showed it met the release criteria) and placed in GA's Main Site Soil Staging Area (SSA) Bin T-31. The survey results were documented in Figures A-1 through A-10, Figures B-1 through B-10 and Figures C-1 through C-10 of the SSA Bin T-31 release request package. The concrete was removed in order to remove the sewer drain lines.

Sewer Drain Lines

The sewer drain lines within the service corridor were removed and disposed of as radioactive waste. In addition, the sewer drain "lead outs" to 3 concrete storage vaults were also removed and disposed of as radioactive waste. The concrete storage vaults were decontaminated, as needed, and then released to unrestricted use. A Final Radiological Survey Report was submitted to the NRC and the State of CA in April 2001 summarizing the data collected in the resulting trench along with a request to release the trench to unrestricted use as follows: [Keith Asmussen Letter dated April 4, 2001 to Ms. Mary Adams and Dr. Ronald Rogus (696/CAL-3353) "Request to Release a Certain Portion of General Atomics' Site to Unrestricted Use and Delete it From License: Namely, Building 2 Service Corridor Drain Line Trench"]. The NRC had the lead NRC inspection report dated 10/16/01 was received by GA (70-734/01-03) as well as NRC released per NRC SNM-696 license amendment #72 releasing the trench to unrestricted use. A copy of the inspection report and license amendment was sent to the State on November 28, 2001 as follows: [Keith Asmussen Letter dated November 28, 2001 to Ms. Sudana Kwok (CAL-3422) "Transmittal of Copy of NRC SNM-696 License Amendment No. 72 Which Releases the Following to Unrestricted Use: (1) Building 2

Service Corridor Drain Line Trench and (2) LINAC North Land Area; with a copy of NRC Inspection Report 70-734/01-03"].

After NRC release of the trench to unrestricted use, GA obtained NRC and State of CA approval to backfill the trench with clean soil and to pour new concrete on the surface. This was done in December 2001. *Therefore, the majority of the concrete floor (on the lower level laboratories) is new and does not need to be surveyed (only the edges, ~18" from the each wall).*

Prior Decontamination

In addition to the removal of contaminated ventilation ducts and exhausters in 1994, several attempts to survey and decontaminate, as needed, have been made since then.

During implementation of a detailed Survey Plan dated December 8, 1997, approximately 42 contaminated areas were located. Each area was characterized and decontaminated, as needed. Decontamination was accomplished by using a wire brush, needle gun, jack-hammer, or other similar aggressive decontamination methods (including cutting-out grating and disposing it as radioactive waste). Post-decontamination surveys verified that decontamination was successful.

Purpose of Survey

This purpose of this Final Plan is to conduct a detailed survey in the Building 2 service core to ensure that the service core now meets the criteria for unrestricted release.

Objectives and Responsibility

The purpose of performing a final survey is to demonstrate that the radiological conditions in the service core satisfy the NRC and State of CA guidelines for release to unrestricted use. The objectives include (1) to show that the average surface contamination levels for each survey unit are within the authorized value, (2) to show that the maximum residual activity ("hot spot" area) do not exceed three times the average value in an area up to 100 cm^2 and (3) that a reasonable effort has been made to clean removable contamination and fixed contamination and (4) that the exposure rates in occupiable locations are less than 10 μR/hr above background measured at 1 meter above the surface. Samples will be counted in GA's Health Physics laboratory. Surveys will be taken only by qualified Health Physics Technicians having a minimum of 3 years Health Physics Technician experience following approved Health Physics procedures and this Plan. The survey and final report documenting the survey will be performed by GA's Health Physics group.

Classification

Based on the fact that decontamination was previously performed, no additional radioactive contamination is expected to be found. Therefore, the service corridor is now classified as a **"non-suspect affected" area.**

Release Criteria (per GA Site Decommissioning Plan)

Concrete Surface

The applicable guidelines for residual contamination on concrete surfaces is based on the contaminant. At the current time, there is no known radiologically contaminated area within the service corridor. If elevated levels are found above normal background levels, samples will be collected and analyzed in order to determine what the contaminant(s) are and limits applied accordingly as follows:

Uranium

5,000 dpm α/100 cm^2, averaged over a 1 m^2 area
15,000 dpm α/100 cm^2, total, maximum in a 100 cm^2 area
1,000 α dpm/100 cm^2, removable activity

Gamma Emitters

5,000 dpm/100 cm^2, averaged over a 1 m^2 area
15,000 dpm/100 cm^2, total, maximum in a 100 cm^2 area
1,000 dpm/100 cm^2, removable activity

Sr-90

1,000 dpm α/100 cm^2, averaged over a 1 m^2 area
3,000 dpm α/100 cm^2, total, maximum in a 100 cm^2 area
200 α dpm/100 cm^2, removable activity

Thorium

1000 dpm/100cm^2, averaged over a 1 m^2 area
3000 dpm/100cm^2, maximum in a 100 cm^2 area if the average over 1 m^2 is met
200 dpm/100cm^2, removable activity

As interpreted by the NRC, the average 1000 dpm/100cm^2 and the maximum 3000 dpm/100cm^2 should apply to both alpha and beta measurements, independently, for surface contamination involving natural thorium. ("Interpretation of Thorium Surface Decontamination Limits," U.S. Nuclear Regulatory Commission, February 9, 1992). Thorium emits alpha radiation and beta radiation in a 1:0.67 ratio; therefore, *if beta radiation measurements are used to demonstrate compliance with the release criteria,* the corresponding average and maximum beta activity guidelines are 670 dpm/100cm^2 and 2000 dpm/100cm^2, respectively.

Exposure Rate Measurements

The guideline value for exposure rates measured at 1 m above the surface, is 10 μR/hr above background.

Final Survey Plan

1. **Grid** as needed to properly identify the area and location of measurements.

2. **Exposure Rate Scanning** - Using a microR meter, scan 100% of the *old* floor concrete & 100% of the lower walls. Also, on the second floor, scan 100% of the grating and 100% of the lower walls (if possible).

3. **Conduct a 100% beta survey on the *old* concrete floor and lower walls (<u>below</u> 2 m) using a 434 cm2 detector (wherever possible)**. Check elevated areas using a hand held frisker (15 cm^2 pancake detector) and use the frisker in areas where the 434 cm^2 probe cannot be used. Review past data to determine if contaminants have already been identified. If no data found, collect a sample and gamma scan.

4. **Conduct a 100% alpha survey on the *old* concrete floor using and lower walls (<u>below</u> 2 m) using a 434 cm2 detector (wherever possible)**. Check elevated areas using a hand held 50 cm^2 alpha probe and/or use hand held probe in areas where the 434 cm^2 probe cannot be used. Review past data to determine if contaminants have already been identified. If no data found, collect a sample and gamma scan.

5. **Conduct a 10% beta scan on all accessible walls <u>above</u> 2 m using a 434 cm2 detector (where ever possible)**. Check elevated areas using a hand held frisker (15 cm^2 pancake detector) and use the frisker in areas where the 434 cm^2 probe cannot be used. Review past data to determine if contaminants have already been identified. If no data found, collect a sample and gamma scan.

6. **Conduct a 10% alpha scan on all accessible walls <u>above</u> 2 m using a 434 cm2 detector (where ever possible)**. Check elevated areas using a hand held 50 cm^2 alpha probe and/or use hand held probe in areas where the 434 cm^2 probe cannot be used. Review past data to determine if contaminants have already been identified. If no data found, collect a sample and gamma scan.

7.* **Conduct measurements on the floor & on the lower walls (at 1 m from the floor) – 1 every 4 m**

   ***For Measurements:**
   a. Alternate between an alpha fixed measurement, a beta fixed measurement and a smear.
   b. Use a 50 cm^2 alpha probe for the alpha fixed measurements (~6 sec each).
   c. Use the 100 cm^2 beta gas flow proportional counter - 2 min each measurement for beta.
   d. For smears, take a 100 cm^2 wipe.

8.* **Conduct fixed measurement(s)** using the 100 cm^2 beta detector on any location which appears to have been remediated or any similar suspect area (i.e., different color concrete or stained concrete).

9. **Surveys of the Overhead Fixtures** - Do about a 10% survey.
   ✓ Ventilation Ducts – Conduct scans, fixed beta and alpha measurements and smears
   ✓ Lights - Conduct scans, fixed beta and alpha measurements and smears
   ✓ Other Overhead Fixtures and Other Structures – Survey as needed and document.

10. **Exposure Rate Surveys at 1 m from the surface** - every 2 m. On lower and upper level.

11. **Floor Drains** - scan and smear all floor drains. Collect sample if possible.

12. **Grating on Second Floor**
    - ✓ Conduct 100% gamma scan using microR meter,
    - ✓ Conduct exposure rate measurements every 2 m at 1 m from the surface, and
    - ✓ Conduct a measurement (alternate from alpha fixed, beta fixed and smear) 1 every 4 m.

13. **Lower Walls on Second Floor** (unaffected)
    - ▸ Conduct 10% gamma scan using microR meter (if accessible)
    - ▸ Conduct a measurement (alternate from alpha fixed, beta fixed and smear) 1 every 4 m.

Alert Levels

Alpha Alert Levels

If the following "alert levels" are exceeded, notify HP Management so an evaluation can be performed and to evaluate if decontamination is required.

> 100 cpm alpha using the large area (434 cm^2) probe (check area with a hand-held alpha meter).
> 60 cpm using a 50 cm^2 hand-held alpha probe (~ 600 dpm/100 cm^2)

Beta Monitoring

>300 cpm above the appropriate background using the 434 cm^2 probe.
>200 cpm above the appropriate background using the 100 cm^2 probe.
>150 cpm above background using a portable GM detector.

Exposure Rate Measurements

> 25 μR/hr at surface
> 20 μR/hr at 1 m

Beta Alert Levels

If the following "alert levels" are exceeded, notify HP Management so an evaluation can be performed to determine if increased survey coverage is required or to evaluate if decontamination is required.

Documentation

Every survey conducted must be documented on a drawing showing the approximate locations surveyed. Include the results (include units), the technician's signature, date, instrument(s) used (including model and serial number of both the rate meter and the detector), calibration due date, % efficiency, background readings (if applicable) and any other applicable information.

On a weekly basis (on Fridays), provide the surveys to Laura Gonzales for review.

January 17, 2002
Revised February 12, 2002 Laura Gonzales
Prepared by: Laura Gonzales

Final Survey Plan for the Building 2 Service Core

Background

Previous History and Use

The Service Core is used to provide utilities and other services to the Building 2 laboratories. Occasionally, contaminated equipment was stored in the service core. Additionally, 55 gallon drums were located in the service core which were used to store low levels or radioactively contaminated liquid waste. Previous surveys of the service corridor identified areas of contamination which have since been cleaned.

Exhaust Ducts, Motors and Fans

Ventilation ducting in the service core were identified in 1994 as being radioactively contaminated (some of these ducts were labeled with "Caution, Radioactive Materials" labels). In February 1994, removal of all radioactively contaminated ducts began and continued until they were all removed. In addition, a plan to inspect all lab exhausts and vents was formulated and surveys began. By May 1994, the surveys were completed. All contaminated ducts and/or exhausters were removed. As a result, no known contamination exists in the ventilation ducts.

Concrete Floor Surveys

The concrete was removed (after surveys showed it met the release criteria) and placed in GA's Main Site Soil Staging Area (SSA) Bin T-31. The survey results were documented in Figures A-1 through A-10, Figures B-1 through B-10 and Figures C-1 through C-10 of the SSA Bin T-31 release request package. The concrete was removed in order to remove the sewer drain lines.

Sewer Drain Lines

The sewer drain lines within the service corridor were removed and disposed of as radioactive waste. In addition, the sewer drain "lead outs" to 3 concrete storage vaults were also removed and disposed of as radioactive waste. The concrete storage vaults were decontaminated, as needed, and then released to unrestricted use. A Final Radiological Survey Report was submitted to the NRC and the State of CA in April 2001 summarizing the data collected in the resulting trench along with a request to release the trench to unrestricted use as follows: [Keith Asmussen Letter dated April 4, 2001 to Ms. Mary Adams and Dr. Ronald Rogus (696/CAL-3353) "Request to Release a Certain Portion of General Atomics' Site to Unrestricted Use and Delete it From License: Namely, Building 2 Service Corridor Drain Line Trench"]. The NRC had the lead NRC inspection report dated 10/16/01 was received by GA (70-734/01-03) as well as NRC released per NRC SNM-696 license amendment #72 releasing the trench to unrestricted use. A copy of the inspection report and license amendment was sent to the State on November 28, 2001 as follows: [Keith Asmussen Letter dated November 28, 2001 to Ms. Sudana Kwok (CAL-3422) "Transmittal of Copy of NRC SNM-696 License Amendment No. 72 Which Releases the Following to Unrestricted Use: (1) Building 2

Service Corridor Drain Line Trench and (2) LINAC North Land Area; with a copy of NRC Inspection Report 70-734/01-03"].

After NRC release of the trench to unrestricted use, GA obtained NRC and State of CA approval to backfill the trench with clean soil and to pour new concrete on the surface. This was done in December 2001. *Therefore, the majority of the concrete floor (on the lower level laboratories) is new and does not need to be surveyed (only the edges, ~18" from the each wall).*

Prior Decontamination
In addition to the removal of contaminated ventilation ducts and exhausters in 1994, several attempts to survey and decontaminate, as needed, have been made since then.

During implementation of a detailed Survey Plan dated December 8, 1997, approximately 42 contaminated areas were located. Each area was characterized and decontaminated, as needed. Decontamination was accomplished by using a wire brush, needle gun, jack-hammer, or other similar aggressive decontamination methods (including cutting-out grating and disposing it as radioactive waste). Post-decontamination surveys verified that decontamination was successful.

Purpose of Survey

This purpose of this Final Plan is to conduct a detailed survey in the Building 2 service core to ensure that the service core now meets the criteria for unrestricted release.

Objectives and Responsibility

The purpose of performing a final survey is to demonstrate that the radiological conditions in the service core satisfy the NRC and State of CA guidelines for release to unrestricted use. The objectives include (1) to show that the average surface contamination levels for each survey unit are within the authorized value, (2) to show that the maximum residual activity ("hot spot" area) do not exceed three times the average value in an area up to 100 cm^2 and (3) that a reasonable effort has been made to clean removable contamination and fixed contamination and (4) that the exposure rates in occupiable locations are less than 10 μR/hr above background measured at 1 meter above the surface. Samples will be counted in GA's Health Physics laboratory. Surveys will be taken only by qualified Health Physics Technicians having a minimum of 3 years Health Physics Technician experience following approved Health Physics procedures and this Plan. The survey and final report documenting the survey will be performed by GA's Health Physics group.

Classification

Based on the fact that decontamination was previously performed, no additional radioactive contamination is expected to be found. Therefore, the service corridor is now classified as a **"non-suspect affected" area (both the lower and the upper levels).**

Release Criteria (per GA Site Decommissioning Plan)

Concrete Surface

The applicable guidelines for residual contamination on concrete surfaces is based on the contaminant. At the current time, there is no known radiologically contaminated area within the service corridor. If elevated levels are found above normal background levels, samples will be collected and analyzed in order to determine what the contaminant(s) are and limits applied accordingly as follows:

Uranium

5,000 dpm α/100 cm^2, averaged over a 1 m^2 area
15,000 dpm α/100 cm^2, total, maximum in a 100 cm^2 area
1,000 α dpm/100 cm^2, removable activity

Gamma Emitters

5,000 dpm/100 cm^2, averaged over a 1 m^2 area
15,000 dpm/100 cm^2, total, maximum in a 100 cm^2 area
1,000 dpm/100 cm^2, removable activity

Sr-90

1,000 dpm /100 cm^2, averaged over a 1 m^2 area
3,000 dpm /100 cm^2, total, maximum in a 100 cm^2 area
200 dpm/100 cm^2, removable activity

Thorium

1000 dpm/100cm^2, averaged over a 1 m^2 area
3000 dpm/100cm^2, maximum in a 100 cm^2 area if the average over 1 m^2 is met
200 dpm/100cm^2, removable activity

As interpreted by the NRC, the average 1000 dpm/100cm^2 and the maximum 3000 dpm/100cm^2 should apply to both alpha and beta measurements, independently, for surface contamination involving natural thorium. ("Interpretation of Thorium Surface Decontamination Limits," U.S. Nuclear Regulatory Commission, February 9, 1992). Thorium emits alpha radiation and beta radiation in a 1:0.67 ratio; therefore, *if beta radiation measurements are used to demonstrate compliance with the release criteria,* the corresponding average and maximum beta activity guidelines are 670 dpm/100cm^2 and 2000 dpm/100cm^2, respectively.

Exposure Rate Measurements

The guideline value for exposure rates measured at 1 m above the surface, is 10 μR/hr above background.

Final Survey Plan

1. **Grid** as needed to properly identify the area and location of measurements.

2. **Exposure Rate Scanning** - Using a microR meter, scan 100% of the *old* floor concrete & 100% of the lower walls (lower level only).

3. **Conduct a 100% beta survey on the *old* concrete floor and lower walls (<u>below</u> 2 m) using a 434 cm^2 detector (wherever possible).** Check elevated areas using a hand held frisker (15 cm^2 pancake detector) and use the frisker in areas where the 434 cm^2 probe cannot be used. Review past data to determine if contaminants have already been identified. If no data found, collect a sample and gamma scan.

4. **Conduct a 100% alpha survey on the *old* concrete floor and lower walls (<u>below</u> 2 m) using a 434 cm2 detector (wherever possible).** Check elevated areas using a hand held 50 cm^2 alpha probe and/or use hand held probe in areas where the 434 cm^2 probe cannot be used. Review past data to determine if contaminants have already been identified. If no data found, collect a sample and gamma scan.

5. **Conduct a 10% beta scan on all accessible walls <u>above</u> 2 m using a 434 cm2 detector (where ever possible).** Check elevated areas using a hand held frisker (15 cm^2 pancake detector) and use the frisker in areas where the 434 cm^2 probe cannot be used. Review past data to determine if contaminants have already been identified. If no data found, collect a sample and gamma scan.

6. **Conduct a 10% alpha scan on all accessible walls <u>above</u> 2 m using a 434 cm2 detector (where ever possible).** Check elevated areas using a hand held 50 cm^2 alpha probe and/or use hand held probe in areas where the 434 cm^2 probe cannot be used. Review past data to determine if contaminants have already been identified. If no data found, collect a sample and gamma scan.

7.* **Conduct measurements on the floor & on the lower walls (at 1 m from the floor) – 1 every 4 m**

***For Measurements:**

a. Alternate between an alpha fixed measurement, a beta fixed measurement and a smear.
b. Use a 50 cm^2 alpha probe for the alpha fixed measurements (~6 sec each).
c. Use the 100 cm^2 beta gas flow proportional counter - 2 min each measurement for beta.
d. For smears, take a 100 cm^2 wipe.

8.* **Conduct fixed measurement(s)** using the 100 cm^2 beta detector on any location which appears to have been remediated or any similar suspect area (i.e., different color concrete or stained concrete).

9. **Surveys of the Overhead Fixtures** - Do about a 10% survey.
   - ✓ Ventilation Ducts – Conduct scans, fixed beta and alpha measurements and smears
   - ✓ Lights - Conduct scans, fixed beta and alpha measurements and smears
   - ✓ Other Overhead Fixtures and Other Structures – Survey as needed and document.

10. **Exposure Rate Surveys at 1 m from the surface** - every 2 m. On lower and upper level.

11. **Floor Drains** - scan and smear all floor drains. Collect sample if possible.

12. **Grating on Second Floor**
    - ✓ Conduct 100% gamma scan using microR meter,
    - ✓ Conduct 100% beta scan with the 434 cm^2
    - ✓ Conduct 100% alpha scan with the 434 cm^2
    - ✓ Conduct a measurement 1 every 4 m (alternate from alpha fixed, beta fixed and smear), and
    - ✓ Conduct exposure rate measurements every 2 m at 1 m from the surface

13. **Lower Walls (< 2m) on Second Floor**
    1. Conduct 10% beta scan with the 434 cm^2 probe (or 100 cm^2 probe)
    2. Conduct 10% alpha scan with the 434 cm^2 probe
       Note: Where contamination potential exists; e.g., decontaminated walls, discolored wall, conduct additional scans of the area.
    3. Conduct a measurement (alternate from alpha fixed, beta fixed and smear) 1 every 4 m.

14. **Upper Walls (> 2 m) on Second Floor**
    1. Conduct 10% beta scan with the 434 cm^2 probe (or 100 cm^2 probe)
    2. Conduct 10% alpha scan with the 434 cm^2 probe

Note: Check elevated areas using a hand held frisker (15 cm^2 pancake detector) and use the frisker in areas where the 434 cm^2 probe cannot be used.

Alert Levels

Alpha Alert Levels

If the following "alert levels" are exceeded, notify HP Management so an evaluation can be performed and to evaluate if decontamination is required.

> 100 cpm alpha using the large area (434 cm^2) probe (check area with a hand-held alpha meter).
> 60 cpm using a 50 cm^2 hand-held alpha probe (~ 600 dpm/100 cm^2)

Beta Monitoring

>300 cpm above the appropriate background using the 434 cm^2 probe.
>200 cpm above the appropriate background using the 100 cm^2 probe.
>150 cpm above background using a portable GM detector.

Exposure Rate Measurements
> 25 µR/hr at surface
> 20 µR/hr at 1 m

Beta Alert Levels
If the following "alert levels" are exceeded, notify HP Management so an evaluation can be performed to determine if increased survey coverage is required or to evaluate if decontamination is required.

Documentation

Every survey conducted must be documented on a drawing showing the approximate locations surveyed. Include the results (include units), the technician's signature, date, instrument(s) used (including model and serial number of both the rate meter and the detector), calibration due date, % efficiency, background readings (if applicable) and any other applicable information.

On a weekly basis (on Fridays), provide the surveys to Laura Gonzales for review.

Prepared By: W. T. LaBonte Date: March 17, 2003

Approved By: Laura Gonzales 3/17/03

Building 2 Service Corridor Final Survey Plan Supplement

The purpose of this Final Survey Plan Supplement is to provide survey requirements for the "side rooms" adjacent to the service corridor that were not surveyed during the Final Survey, and instructions for the taking of samples in Sections "A", "B", and "C" to determine the isotopic content of residual contamination.

Background

The Service Corridor is used to provide utilities and other services to the Building 2 laboratories. Occasionally, contaminated equipment was stored in the service corridor. Additionally, 55 gallon drums were located in the service corridor to store low levels of radioactive waste. A final survey for this service corridor was completed in accordance with a Survey Plan issued on January 17, 2002. This plan did not address the side rooms adjacent to the service corridor or the crawl space in the overhead. This supplement to the Final Survey Plan provides the minimum survey requirements for these areas and provides instruction for the sampling of sections "A", "B", and "C" to determine the isotopic content of the residual activity.

Classification

The service corridor is classified as a **"Non-Suspect Affected"** area. The "side rooms" and over head have no history of radioactive material use or contamination, therefore, are classified as an **"Unaffected"** area.

Survey Objectives and Responsibility

The purpose of performing a final survey is to demonstrate that the radiological conditions within the Service Corridor satisfy the NRC and State of CA guidelines for release to unrestricted use. The objectives include (1) to show that the average surface contamination levels for each survey unit are within the authorized value, (2) to show that the maximum residual activity ("hot spot" area) do not exceed three times the average value in an area up to 100 cm^2 and (3) that a reasonable effort has been made to clean removable contamination and fixed contamination and (4) that the exposure rates in occupiable locations are less than 10 μR/hr above background measured at 1 meter above the surface. Samples will be counted in the Health Physics laboratory (onsite). Surveys will be taken only by qualified Health Physics Technicians having a minimum of 3 years Health Physics Technician experience. The survey and final report documenting the survey will be performed by GA's Health Physics group.

Release Criteria (per GA Site Decommissioning Plan)

Concrete/Asphalt Surface Release Criteria
The NRC release criteria for Sr-90 and Thorium-232, which is conservatively selected for beta measurements , is:

1,000 dpm /100 cm^2, averaged over a 1 m^2 area
3,000 dpm /100 cm^2, total, maximum in a 100 cm^2 area
200 dpm/100 cm^2, removable activity

The NRC release criteria for most beta, gamma and Alpha activity (Sr-90 is not an alpha emitter) is:

5,000 dpm /100 cm^2, averaged over a 1 m^2 area
15,000 dpm /100 cm^2, total, maximum in a 100 cm^2 area
1,000 dpm/100 cm^2, removable activity

Exposure Rate Measurements
The guideline value for exposure rates measured at 1 m above the surface, is 10 μR/hr above background.

Alert Levels

Alpha Alert Values
If the following "alert levels" are exceeded, notify HP Management so an evaluation can be performed and to evaluate if decontamination is required.

> 100 cpm alpha using the large area (434 cm^2) probe (check area with a hand-held alpha meter).
> 60 cpm using a 50 cm^2 hand-held alpha probe (~ 600 dpm/100 cm^2)

Beta Monitoring
>250 cpm above the appropriate background using the 434 cm^2 probe.
>100 cpm above the appropriate background using the 100 cm^2 probe.
>40 cpm above background using a portable GM detector. **(Note: this meter should ONLY be used in areas the 434cm^2 or 100 cm^2 probes will not fit).**

Exposure Rate Measurements
> 25 μR/hr at surface
> 20 μR/hr at 1 m

Isotopic Determination Sampling

In each of the areas in section "A", "B", and "C" that were marked for additional surveying, remove the markings and enough additional material to fill ½ of a 100 ml container. Record the section and specific area (level and beam number) on the container and transport it to the HP Laboratory for gamma spectroscopy analysis.

Minimum Survey Requirements

Type of Survey/Activity	Non-Impacted Area
Crawl Space (Overhead)	
Gridding Required?	No
Minimum number of Measurements (2) (3)	Perform a Large Area wipe of accessible surfaces every 4m. Analyze for α and β activity.
μR/hr Readings (Scan Survey)	10% scan on all accessible surfaces with detector held ~1" from surface.
μR/hr Readings (Fixed Measurements @ 1m from surface)	1 every 4m on accessible surfaces.
Side Rooms	
Gridding Required?	No
Concrete Surfaces (1) (Scan w/ 434 cm^2 alpha probe).	10 % on floor and up to 2m on walls.
Concrete Surfaces (1) (Scan w/ 434 cm^2 beta probe).	10 % on floor and up to 2m on walls.
Minimum number of Measurements (2) (3)	1 measurement per 50 m^2, or, every 7m on floor and walls up to 2m. Alternate between (1) a wipe, (2) an alpha fixed measurement and (3) a beta fixed measurement on **concrete surfaces.**
μR/hr Readings (Scan Survey)	10% scan on all surfaces below 2m with detector held ~1" from surface.
μR/hr Readings (Fixed Measurements @ 1m from surface)	1 every 7m on floor and walls up to 2m.

1. Clean surfaces, debris or dirt removed.

2) For the fixed measurements:

- For α measurements; use either the hand held alpha counter (*minimum* of ~6 second count). Document all readings in cpm.
- For β measurements; take a 2 minute count using the 100 cm^2 gas flow proportional detector (beta) with the Model 2221 ratemeter. Document all readings and mark on a drawing the locations the readings were taken.
- For wipes, analyze each 100 cm^2 wipe for α and β activity.

3) A "measurement" is either (1) a "fixed" radiation measurement representing total activity or (2) a wipe (removable activity).

Prepared By: W. T. LaBonte/Richard Stowell Date: May 28, 2003

Approved By: Laura Gonzales 6/2/03

Building 2 Service Corridor Final Survey Plan Supplement-2

The purpose of this Final Survey Plan Supplement is to provide survey requirements for the locations in section A that had elevated activity requiring decontamination.

Background

The Service Corridor is used to provide utilities and other services to the Building 2 laboratories. Occasionally, contaminated equipment was stored in the service corridor. Additionally, 55 gallon drums were located in the service corridor to store low levels of radioactive waste. A final survey for this service corridor was completed in accordance with a Survey Plan issued on January 17, 2002. This plan did not address the side rooms adjacent to the service corridor or the crawl space in the overhead. A supplement to the Final Survey Plan, issued in March, 2003, provided the minimum survey requirements for these areas and provides instruction for the sampling of sections "A", "B", and "C" to determine the isotopic content of the residual activity. During the performance of surveys in accordance with the original survey plan and it's supplement, elevated activity levels were discovered in section A of the service corridor that required decontamination. In accordance with the GA Site Decommissioning Plan, if elevated activity is detected in a Non-Suspect Affected Area, the area must re-classified and surveyed accordingly.

Classification

Section A of the Building 2 Service Corridor is Re- classified as a **"Suspect Affected"** area in the following locations:

1. First (lowest) level between column numbers A-20 to A-24, A-17 to A-18, A-11 to A-13, and C-1 to A-2.
2. The second level between column A-11 and A-13.
3. The Crawl Space (highest level) between column numbers A-11 and A-13.

Survey Objectives and Responsibility

The purpose of performing a final survey is to demonstrate that the radiological conditions within the Service Corridor satisfy the NRC and State of CA guidelines for release to unrestricted use.

The objectives include (1) to show that the average surface contamination levels for each survey unit are within the authorized value, (2) to show that the maximum residual activity ("hot spot" area) do not exceed three times the average value in an area up to 100 cm^2 and (3) that a reasonable effort has been made to clean removable contamination and fixed contamination and (4) that the exposure rates in occupiable locations are less than 10 μR/hr above background measured at 1 meter above the surface. Samples will be counted in the Health Physics laboratory (onsite). Surveys will be taken only by qualified Health Physics Technicians having a minimum of 3 years Health Physics Technician experience. The survey and final report documenting the survey will be performed by GA's Health Physics group.

Release Criteria (per GA Site Decommissioning Plan)

Concrete/Asphalt Surface Release Criteria

The NRC release criteria for Sr-90 and Thorium-232, which is conservatively selected for beta measurements , is:

1,000 dpm /100 cm^2, averaged over a 1 m^2 area
3,000 dpm /100 cm^2, total, maximum in a 100 cm^2 area
200 dpm/100 cm^2, removable activity

The NRC release criteria for most beta, gamma and Alpha activity (Sr-90 is not an alpha emitter) is:

5,000 dpm /100 cm^2, averaged over a 1 m^2 area
15,000 dpm /100 cm^2, total, maximum in a 100 cm^2 area
1,000 dpm/100 cm^2, removable activity

Exposure Rate Measurements

The guideline value for exposure rates measured at 1 m above the surface, is 10 μR/hr above background.

Alert Levels

Alpha Alert Values

If the following "alert levels" are exceeded, notify HP Management so an evaluation can be performed and to evaluate if decontamination is required.

> 100 cpm alpha using the large area (434 cm^2) probe (check area with a hand-held alpha meter).
> 60 cpm using a 50 cm^2 hand-held alpha probe (~ 600 dpm/100 cm^2)

Beta Monitoring

>250 cpm above the appropriate background using the 434 cm^2 probe.
>100 cpm above the appropriate background using the 100 cm^2 probe.
>40 cpm above background using a portable GM detector. **(Note: this meter should ONLY be used in areas the 434cm^2 or 100 cm^2 probes will not fit).**

Exposure Rate Measurements
> 25 μR/hr at surface
> 20 μR/hr at 1 m

Minimum Survey Requirements

Type of Survey/Activity	Suspect Affected Area
Gridding Required?	YES **(When Possible)**
Concrete Surfaces (1) (Scan w/ 434 cm^2 alpha probe).	100 % on accessible floor and walls up to 2m high. !0% above 2m.
Concrete Surfaces (1) (Scan w/ 434 cm^2 beta probe).	100 % on accessible floor and walls up to 2m high. !0% above 2m.
Minimum number of Measurements (2) (3)	1 measurement per 4 m^2(1 every 2m). Alternate between (1) a wipe, (2) an alpha fixed measurement and (3) a beta fixed measurement on **concrete surfaces.** Analyze wipes for α and β activity.
μR/hr Readings (Scan Survey)	100% scan on all surfaces below 2m with detector held ~1" from surface, 10% above 2m.
μR/hr Readings (Fixed Measurements @ 1m from surface)	1 measurement per 4 m^2(1 every 2m).

(1) Clean surfaces, debris or dirt removed.

(2) For the fixed measurements:

- For α measurements; use either the hand held alpha counter (*minimum* of ~6 second count). Document all readings in cpm.
- For β measurements; take a 2 minute count using the 100 cm^2 gas flow proportional detector (beta) with the Model 2221 ratemeter. Document all readings and mark on a drawing the locations the readings were taken.
- For wipes, analyze each 100 cm^2 wipe for α and β activity.

(3) A "measurement" is either (1) a "fixed" radiation measurement representing total activity or (2) a wipe (removable activity).

General Atomics'

Final Radiological Survey Report for the

Building 2 Service Corridor Section "A"

Appendix B

Confirmatory Survey Plan and Summary

APPENDIX B

CONFIRMATORY SURVEY PLAN

Prepared By: W. T. LaBonte W T LaBonte Date: July 29, 2003

Approved By: Laura Q Gonzales 7/29/03
L.Q. Gonzales

Building 2 Service Corridor Confirmatory Survey Plan

The purpose of this Confirmatory Survey Plan Supplement is to verify the radiological conditions identified during the performance of radiological surveys in accordance with the Final Survey Plan(s).

Background

The Service Corridor is used to provide utilities and other services to the Building 2 laboratories. Occasionally, contaminated equipment was stored in the service corridor. Additionally, 55 gallon drums were located in the service corridor to store low levels of radioactive waste. A final survey for this service corridor was completed in accordance with a Survey Plan issued on January 17, 2002. This plan did not address the side rooms adjacent to the service corridor or the crawl space in the overhead. A supplement to the Final Survey Plan, issued in March, 2003, provided the minimum survey requirements for these areas and provides instruction for the sampling of sections "A", "B", and "C" to determine the isotopic content of the residual activity. During the performance of surveys in accordance with the original survey plan and it's supplement, elevated activity levels were discovered in section A of the service corridor that required decontamination. In accordance with the GA Site Decommissioning Plan, if elevated activity is detected in a Non-Suspect Affected Area, the area must re-classified and surveyed accordingly. Following decontamination of elevated activity areas, a second supplement to the Final Survey Plan was issued on May 28, 2003.

Classification

Section A of the Building 2 Service Corridor is Re- classified as a **"Suspect Affected"** area in the following locations:

1. First (lowest) level between column numbers A-20 to A-24, A-17 to A-18, A-11 to A-13, and C-1 to A-2.

~~2. The second level between column A-11 and A-13.~~ L Gonzales

3. The Crawl Space (highest level) between column numbers A-11 and A-13.

The remaining Service Corridor is classified as a "**Non-Suspect Affected Area**".

The "Side Rooms" (Heating and Air Conditioning rooms, machine shop, elevator shafts, etc.,) are classified as "**Unaffected Areas**". No activity distinguishable from natural background was discovered in these side rooms, therefore, confirmatory surveys do not have to be performed in these areas.

Survey Objectives and Responsibility

The purpose of performing this confirmatory survey is to demonstrate that the radiological conditions within the Service Corridor satisfy the NRC and State of CA guidelines for release to unrestricted use. The objectives include (1) to show that the average surface contamination levels for each survey unit are within the authorized value, (2) to show that the maximum residual activity ("hot spot" area) do not exceed three times the average value in an area up to 100 cm^2 and (3) that a reasonable effort has been made to clean removable contamination and fixed contamination and (4) that the exposure rates in occupiable locations are less than 10 μR/hr above background measured at 1 meter above the surface. Samples will be counted in the Health Physics laboratory (onsite). Surveys will be taken only by qualified Health Physics Technicians having a minimum of 3 years Health Physics Technician experience.

Release Criteria (per GA Site Decommissioning Plan)

Concrete/Asphalt Surface Release Criteria

The NRC release criteria for Sr-90 and Thorium-232, which is conservatively selected for beta measurements , is:

1,000 dpm /100 cm^2, averaged over a 1 m^2 area
3,000 dpm /100 cm^2, total, maximum in a 100 cm^2 area
200 dpm/100 cm^2, removable activity

The NRC release criteria for most beta, gamma and Alpha activity (Sr-90 is not an alpha emitter) is:

5,000 dpm /100 cm^2, averaged over a 1 m^2 area
15,000 dpm /100 cm^2, total, maximum in a 100 cm^2 area
1,000 dpm/100 cm^2, removable activity

Exposure Rate Measurements

The guideline value for exposure rates measured at 1 m above the surface, is 10 μR/hr above background.

Alert Levels

Alpha Alert Values

If the following "alert levels" are exceeded, notify HP Management so an evaluation can be performed and to evaluate if decontamination is required.

> 100 cpm alpha using the large area (434 cm^2) probe (check area with a hand-held alpha meter).
> 60 cpm using a 50 cm^2 hand-held alpha probe (~ 600 dpm/100 cm^2)

Beta Monitoring

>250 cpm above the appropriate background using the 434 cm^2 probe.
>100 cpm above the appropriate background using the 100 cm^2 probe.
>40 cpm above background using a portable GM detector. **(Note: this meter should ONLY be used in areas the 434cm^2 or 100 cm^2 probes will not fit).**

Exposure Rate Measurements

> 25 μR/hr at surface
> 20 μR/hr at 1 m

Minimum Survey Requirements

Type of Survey/Activity	Non-Suspect Affected Area	Suspect Affected Area
Gridding Required?	Not Required	YES **(as established during final survey)**
Concrete Surfaces (1) (Scan w/ 434 cm^2 alpha probe).	No Survey Required	On the Lower Level ONLY, 10 % on accessible floor (excluding the center of the floor which is new, only survey approximately 6" from each wall) and walls up to 2m high.
Concrete Surfaces (1) (Scan w/ 434 cm^2 beta probe).	No Survey Required	On the Lower Level ONLY, 10 % on accessible floor (excluding the center of the floor which is new, only survey approximately 6" from each wall) and walls up to 2m high.
Minimum number of Measurements (2) (3)	Spot check a minimum of 10 locations for fixed beta activity	Scan each of the remediated areas with a beta instrument. Taken at least one (1) fixed alpha, one (1) fixed beta in the area with the highest scan results in each remediated area. **This applies to all three (3) levels.**
µR/hr Readings (Scan Survey)	No Survey Required	On the Lower Level ONLY, 10% scan on all surfaces below 2m (excluding the center of the floor which is new) with detector held ~1" from surface.
µR/hr Readings (Fixed Measurements @ 1m from surface)	On the Lower Level ONLY, take 1 measurement every 10 m, in the center of the walkway, with the instrument held 1 m from the floor.	

(1) Clean surfaces, debris or dirt removed.

(2) For the fixed measurements:

- For α measurements; use either the hand held alpha counter (*minimum* of ~6 second count). Document all readings in cpm.
- For β measurements; take a 2 minute count using the 100 cm^2 gas flow proportional detector (beta) with the Model 2221 ratemeter. Document all readings and mark on a drawing the locations the readings were taken.
- For wipes, analyze each 100 cm^2 wipe for α and β activity.

(3) A "measurement" is either (1) a "fixed" radiation measurement representing total activity or (2) a wipe (removable activity).

APPENDIX B

CONFIRMATORY SURVEY SUMMARY OF RESULTS

Appendix B

Building 2 Service Corridor "Section A" Confirmatory Survey Summary

Description

In September and October 2003, GA conducted an internal confirmatory survey of the Building 2 Service Corridor, Section "A", in accordance with a written plan (provided in this Appendix). The purpose of this survey was to determine if the final survey results effectively reflect the radiological conditions of Section A of the Building 2 Service Corridor.

This survey consisted of exposure rate measurements, exposure rate scans, alpha and beta scans, and alpha and beta fixed measurements.

Exposure Rate Measurements

Exposure rate measurements were taken at 1 meter from the floor, every 10 meters, in the center of the entire section "A" corridor. The results ranged from 16 to 21 μR/hr, which is natural background. See attached Figures 1, 2, 3, 4, and 5 for locations and results.

Exposure Rate Surface Scans and Results

About 10% of the "old" flooring and 10% of the walls in the Suspect Affected Areas were scanned with a 2"x2" NaI (Tl) detector held within 1" of the surface. The results ranged from 19 to 25 μR/hr on the "old" flooring and 12 to 23 μR/hr on the walls. These results are not distinguishable from natural background measurements in enclosed concrete spaces similar to this corridor. See attached Figures 6 and 7 for locations and results.

Alpha and Beta Scanning

About 10% of the "old" flooring and 10% of the walls in the Suspect Affected Areas were scanned with 434 cm^2 gas flow proportional alpha and beta detectors held within 1" of the surface. The alpha results range from 5 to 39 cpm on the "old" floor and 3 to 47 cpm on the walls. The maximum result (47 cpm) corresponds to 40 dpm/100 cm^2, which is less than the Minimum Detectable Activity (MDA) for the instrument used (43 dpm/100 cm^2). The beta results ranged from 1550 to 2300 cpm on the "old" floors and 1350 to 1950 cpm on the walls. The maximum result (2300 cpm) corresponds to 379 dpm/100 cm^2, which is less than the Minimum Detectable Activity (MDA) for the instrument used (409 dpm/100 cm^2). See attached Figures 6 and 7 for locations and results.

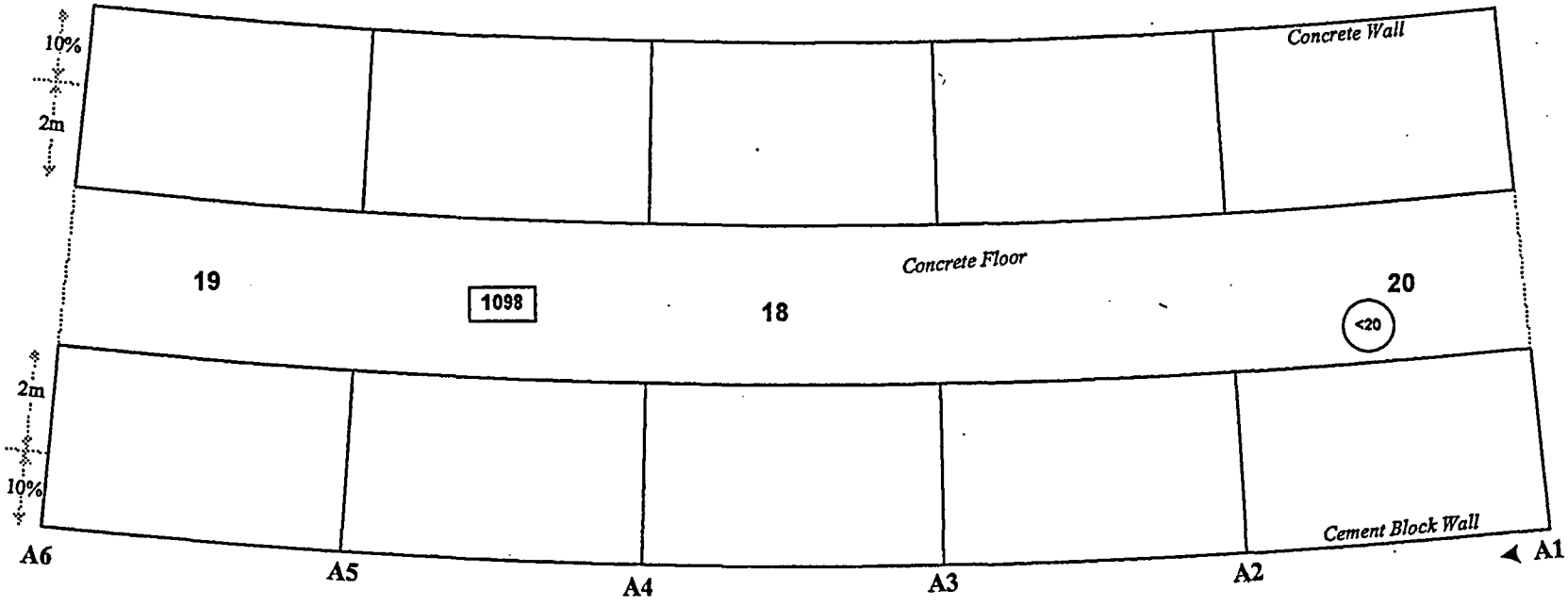
Fixed Alpha and Fixed Beta Measurements and Results

Five (5) fixed alpha and ten (10) fixed beta measurements were taken on the "old" floor surfaces on the lowest level, two (2) fixed alpha and two (2) fixed beta measurements were taken on the floor surfaces of the crawl space between columns A-11 and A-12, ten (10) fixed alpha and ten (10) fixed beta measurements were taken on the outer wall of the crawl space between column A-11 and A-13. The highest alpha result was 120 cpm on the outer wall of the crawl space near column A-12. This result corresponds to 994 dpm/100 cm^2, which is far below the NRC- and State- approved release criteria. The highest beta result was 1155 cp2m which corresponds to 83 dpm/100 cm^2, which is less than the MDA (245 dpm/100 cm^2) for the instrument used. See attached Figures 1, 2, 3, 4, 5, 8 and 9 for locations and results.

Conclusion

The confirmatory survey results indicate that radiation levels within Section A of the Building 2 Service Corridor were well below the NRC- and State- approved release criteria and were in agreement with the results of the Final Survey performed for this area.

Figure 1: Building 2 Service Corridor Section A Confirmatory Survey Fixed Measurement Locations and Results.



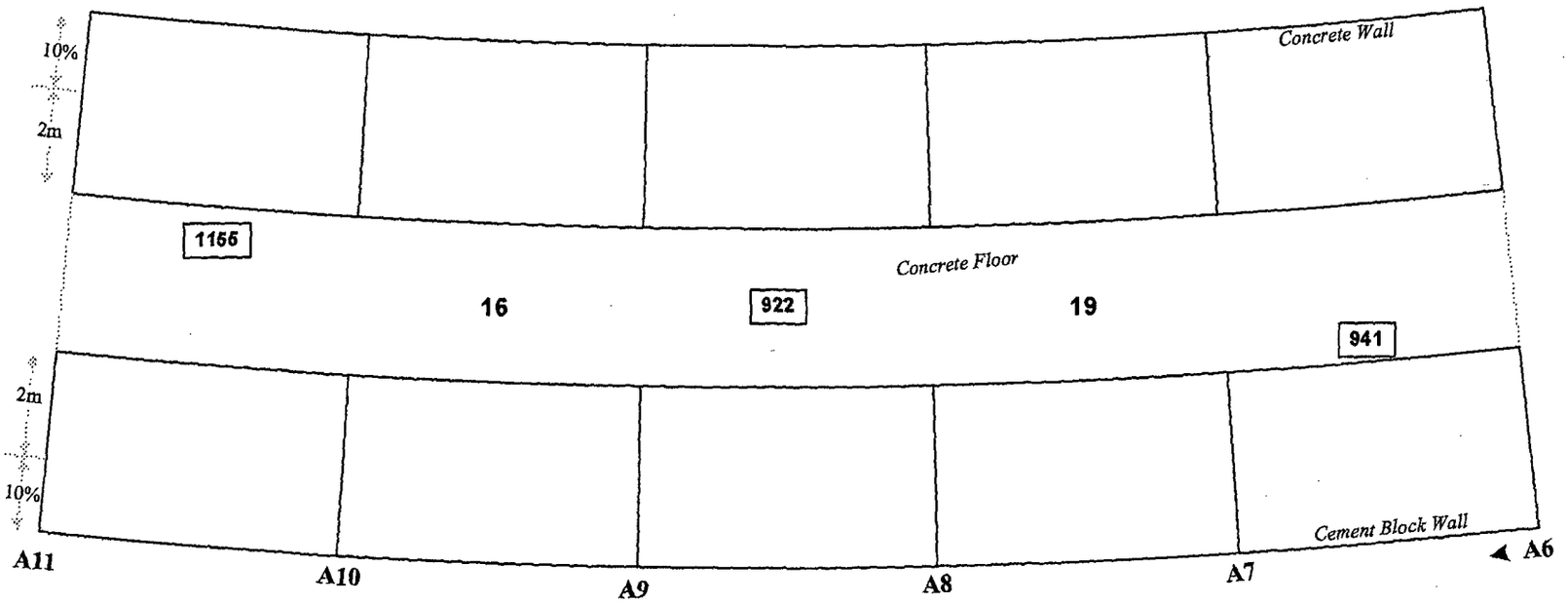
= µR/hr at 1 meter from the floor.

[###] = Fixed Beta result in counts/2 minutes.

(##) = Fixed Alpha result in counts/minute

Location	Building 2 Service Corridor		
Instruments	Model 2221	Model 3	Model 12
Serial Number	86302	153590	72676
Calibration Due	4/06/04	11/17/03	12/09/03
Efficiency	31.2%	N/A	22.14%
α β γ	β	γ	α
Probe Number	142517	155190	089928
Probe Size	100 cm²	2"X2"	50 cm²
Background	1042± 90	20-25 µR/hr	0-20 cpm
MDA in DPM/100 cm²	245	N/A	157
Surveyors: W. Schuck/ D. Koelker Date: 9/24/03-10/07/03			

Figure 2: Building 2 Service Corridor Section A Confirmatory Survey
Fixed Measurement Locations and Results.



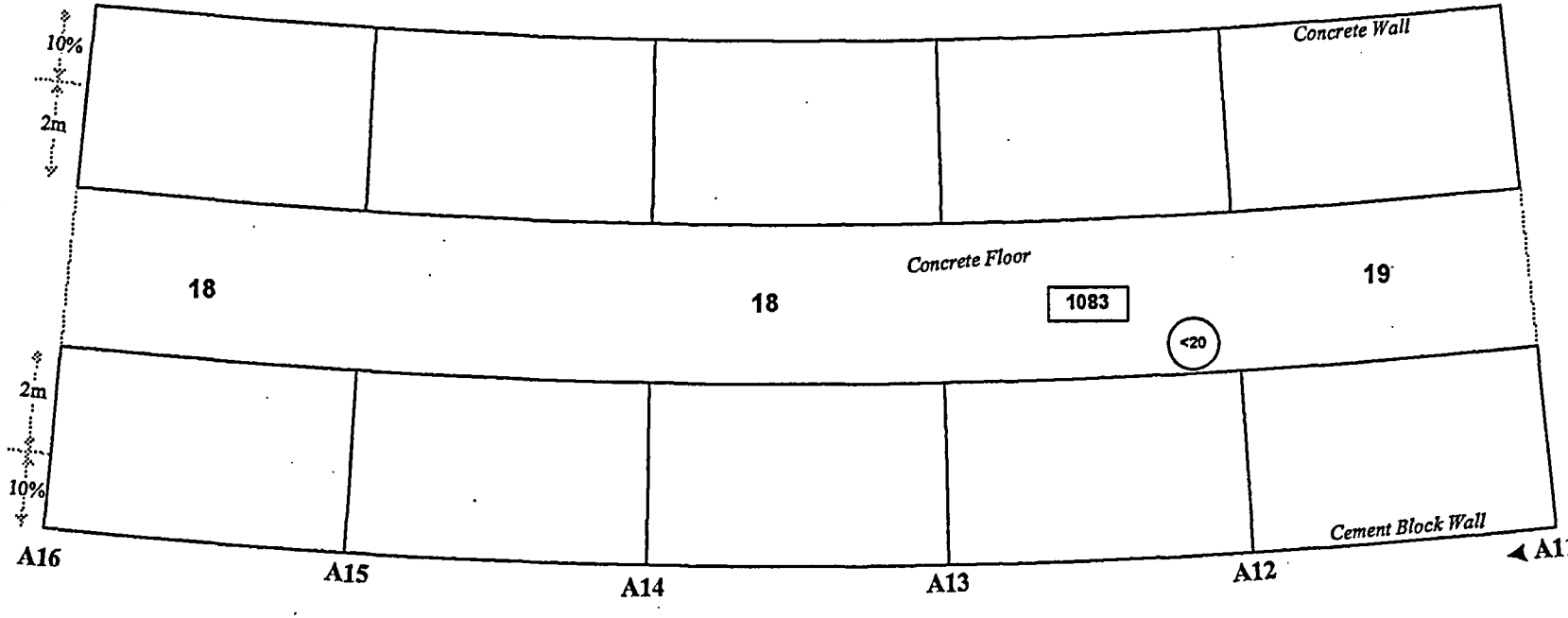
= µR/hr at 1 meter from the floor.

[###] = Fixed Beta result in counts/2 minutes.

(##) = Fixed Alpha result in counts/minute

Location	Building 2 Service Corridor		
Instruments	Model 2221	Model 3	Model 12
Serial Number	86302	153590	72676
Calibration Due	4/06/04	11/17/03	12/09/03
Efficiency	31.2%	N/A	22.14%
α β γ	β	γ	α
Probe Number	142517	155190	089928
Probe Size	100 cm²	2"x2"	50 cm²
Background	1042± 90	20-25 µR/hr	0-20 cpm
MDA in DPM/100 cm²	245	N/A	157
Surveyors: W. Schuck/ D. Koelker Date: 9/24/03-10/07/03			

Figure 3: Building 2 Service Corridor Section A Confirmatory Survey Fixed Measurement Locations and Results.



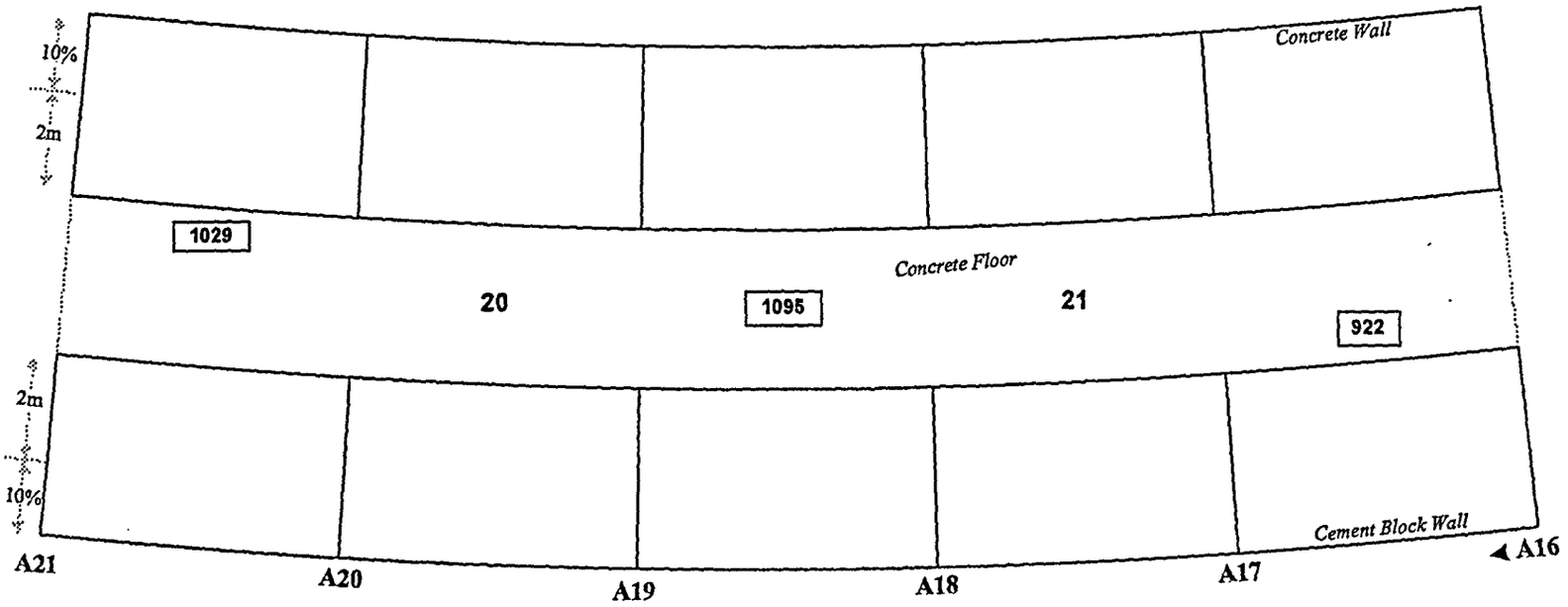
Location	Building 2 Service Corridor		
Instruments	Model 2221	Model 3	Model 12
Serial Number	86302	153590	72676
Calibration Due	4/06/04	11/17/03	12/09/03
Efficiency	31.2%	N/A	22.14%
α β γ	β	γ	α
Probe Number	142517	155190	089928
Probe Size	100 cm^2	2"x2"	50 cm^2
Background	1042± 90	20-25 µR/hr	0-20 cpm
MDA in DPM/100 cm^2	245	N/A	157
Surveyors: W. Schuck/ D. Koelker Date: 9/24/03-10/07/03			

= µR/hr at 1 meter from the floor.

[###] = Fixed Beta result in counts/2 minutes.

(##) = Fixed Alpha result in counts/minute

Figure 4: Building 2 Service Corridor Section A Confirmatory Survey Fixed Measurement Locations and Results.



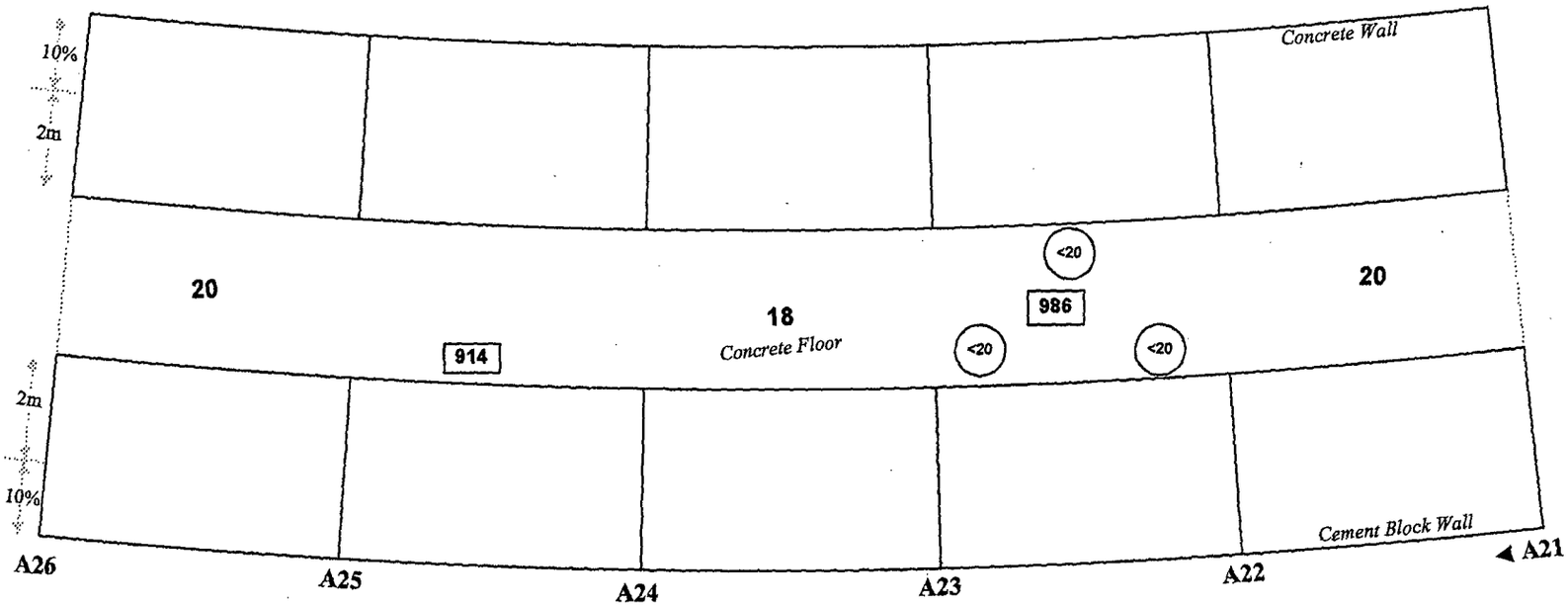
Location	Building 2 Service Corridor		
Instruments	Model 2221	Model 3	Model 12
Serial Number	86302	153590	72676
Calibration Due	4/06/04	11/17/03	12/09/03
Efficiency	31.2%	N/A	22.14%
α β γ	β	γ	α
Probe Number	142517	155190	089928
Probe Size	100 cm²	2"x2"	50 cm²
Background	1042± 90	20-25 µR/hr	0-20 cpm
MDA in DPM/100 cm²	245	N/A	157
Surveyors: W. Schuck/ D. Koelker Date: 9/24/03-10/07/03			

= µR/hr at 1 meter from the floor.

[###] = Fixed Beta result in counts/2 minutes.

(##) = Fixed Alpha result in counts/minute

Figure 5: Building 2 Service Corridor Section A Confirmatory Survey
Fixed Measurement Locations and Results.



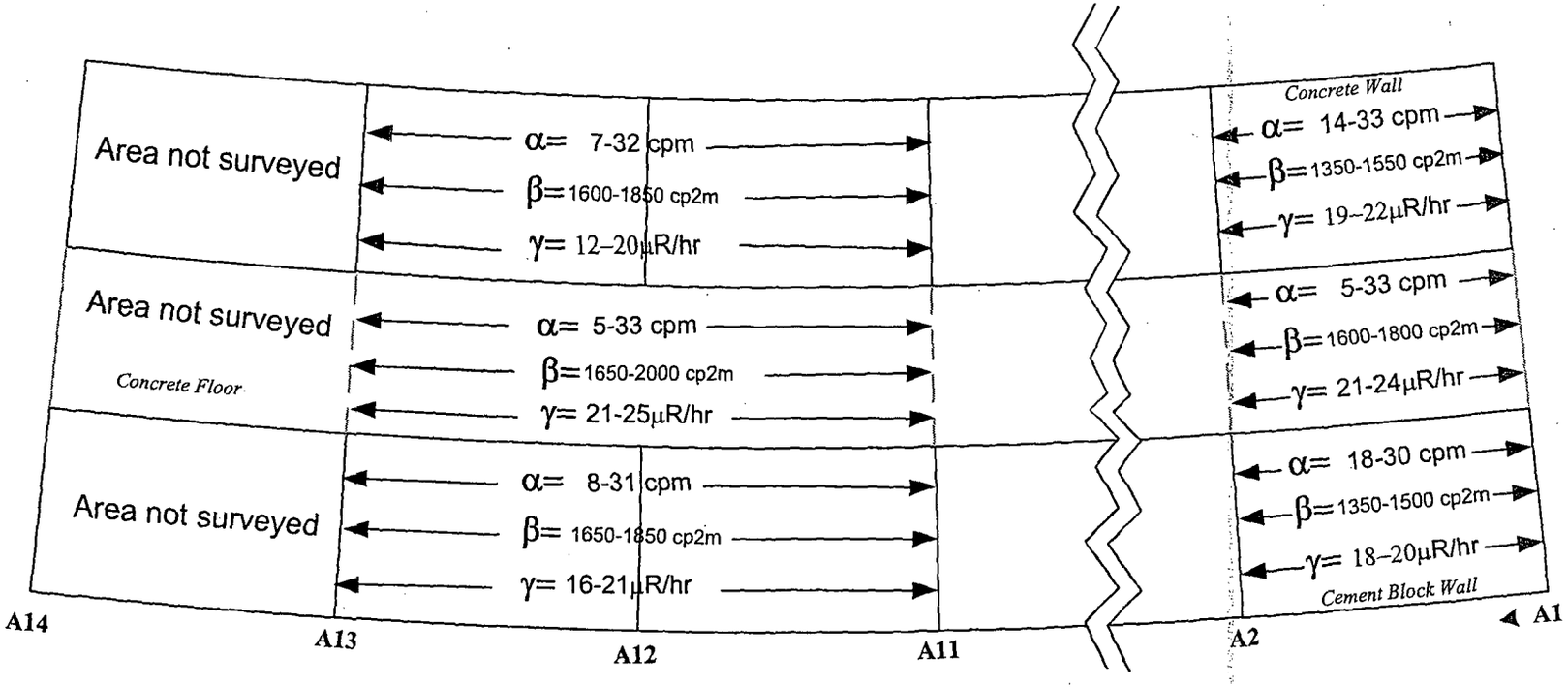
= µR/hr at 1 meter from the floor.

[###] = Fixed Beta result in counts/2 minutes.

(##) = Fixed Alpha result in counts/minute

Location	Building 2 Service Corridor		
Instruments	Model 2221	Model 3	Model 12
Serial Number	86302	153590	72676
Calibration Due	4/06/04	11/17/03	12/09/03
Efficiency	31.2%	N/A	22.14%
α β γ	β	γ	α
Probe Number	142517	155190	089928
Probe Size	100 cm²	2"x2"	50 cm²
Background	1042± 90	20-25 µR/hr	0-20 cpm
MDA in DPM/100 cm²	245	N/A	157
Surveyors: W. Schuck/ D. Koelker Date: 9/24/03-10/07/03			

Figure 6: Building 2 Service Corridor Section A Confirmatory Survey Scan Survey Locations and Results.



10% of Old floors and all wall surfaces below 2m scanned for Alpha activity, Beta activity, and Exposure Rate at contact.

A-# = Column Number

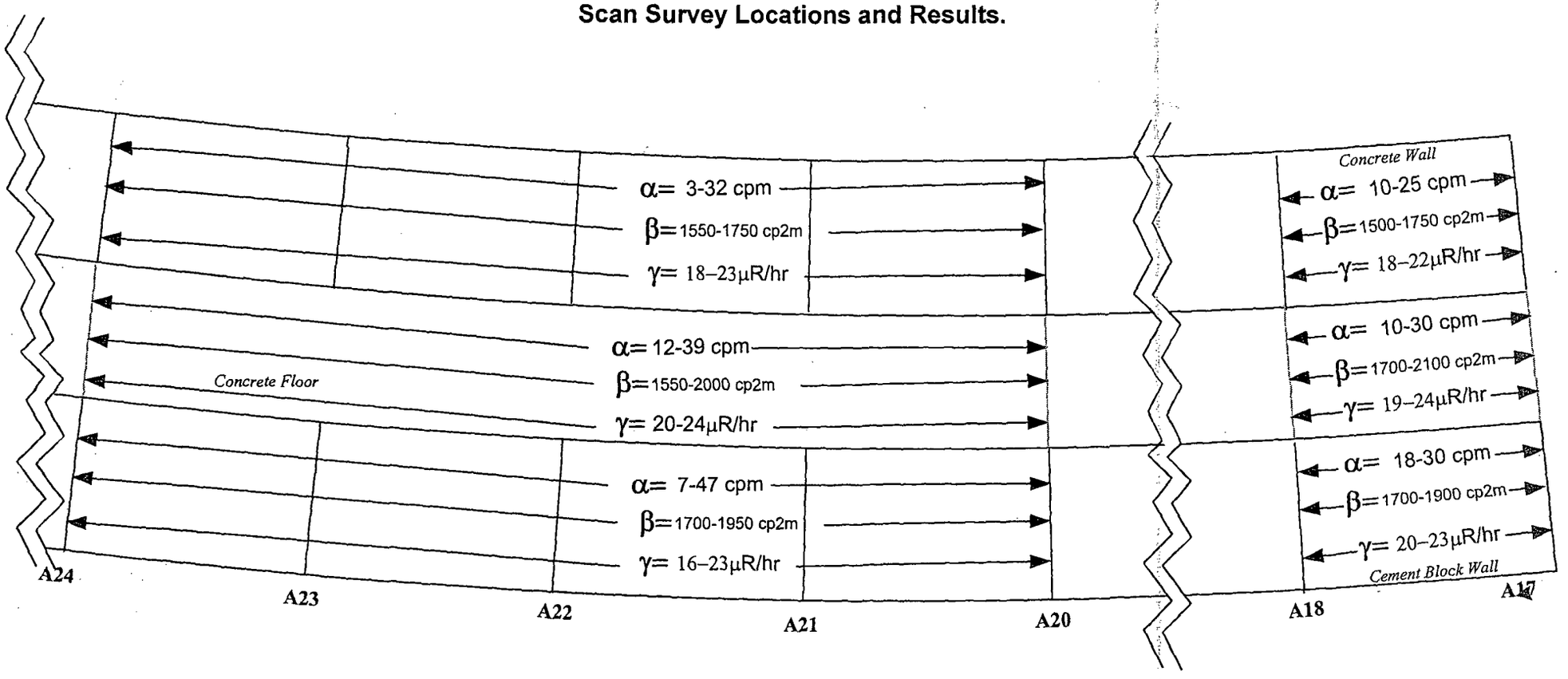
Alpha results are in cpm.

Beta Results are in cpm

Exposure Rates at contact in μR/hr.

Location	Building 2 Service Corridor		
Instruments	Model 2221	Model 3	Model 2221
Serial Number	154202	153590	84459
Calibration Due	03/22/04	11/17/03	02/02/04
Efficiency	30.39%	N/A	21.58%
α β γ	β	γ	α
Probe Number	149017	155190	84459
Probe Size	434 cm^2	2"x2"	434 cm^2
Background	1400-2200 cpm	20-25 μR/hr	0-20 cpm
MDA in DPM/100 cm^2	409	N/A	43
Surveyors: W. Schuck/ D. Koelker Date: 9/24/03-10/07/03			

Figure 7: Building 2 Service Corridor Section A Confirmatory Survey Scan Survey Locations and Results.



10% of Old floors and all wall surfaces below 2m scanned for Alpha activity, Beta activity, and Exposure Rate at contact.

Location	Building 2 Service Corridor		
Instruments	Model 2221	Model 3	Model 2221
Serial Number	154202	153590	84459
Calibration Due	03/22/04	11/17/03	02/02/04
Efficiency	30.39%	N/A	21.58%
α β γ	β	γ	α
Probe Number	149017	155190	84459
Probe Size	434 cm^2	2"x2"	434 cm^2
Background	1400-2200 cpm	20-25 μR/hr	0-20 cpm
MDA in DPM/100 cm^2	409	N/A	43
Surveyors: W. Schuck/ D. Koelker Date: 9/24/03-10/07/03			

A-# = Column Number

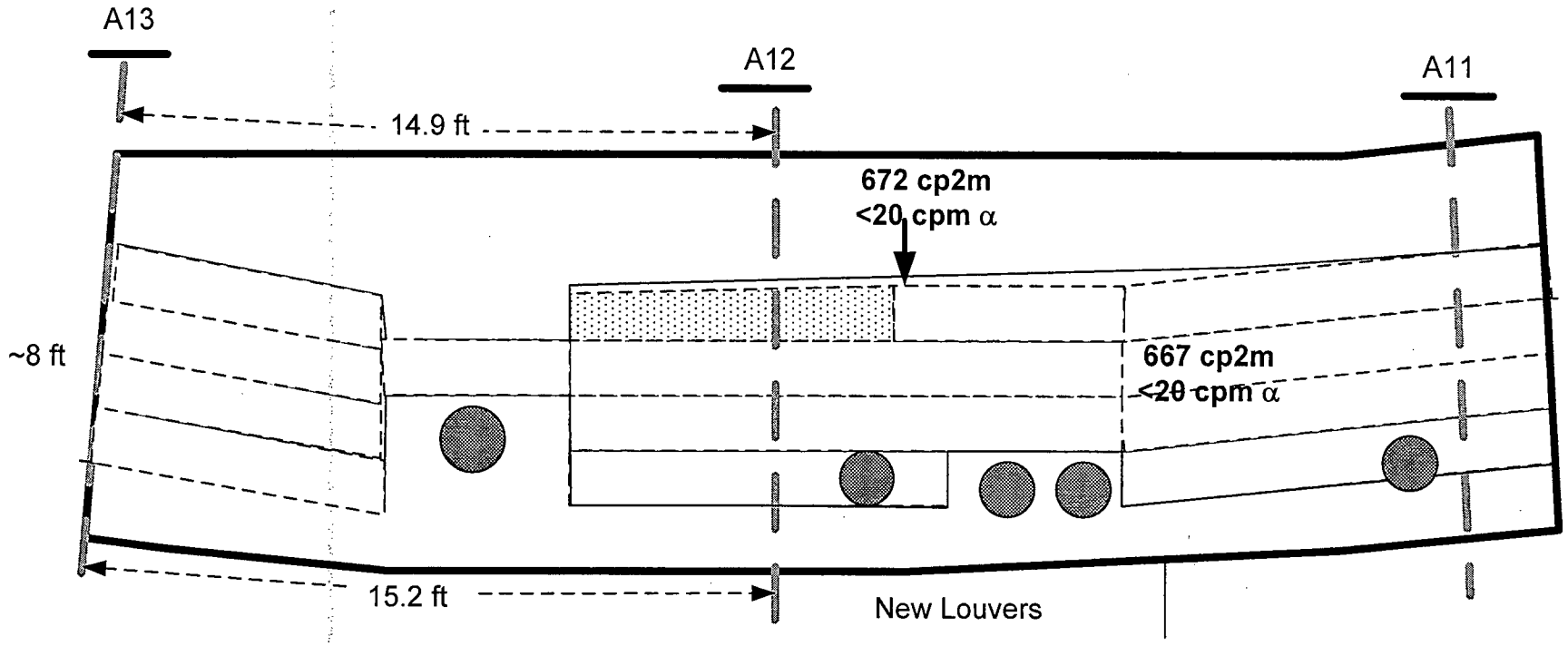
Alpha results are in cpm.

Beta Results are in cpm

Exposure Rates at contact in μR/hr.

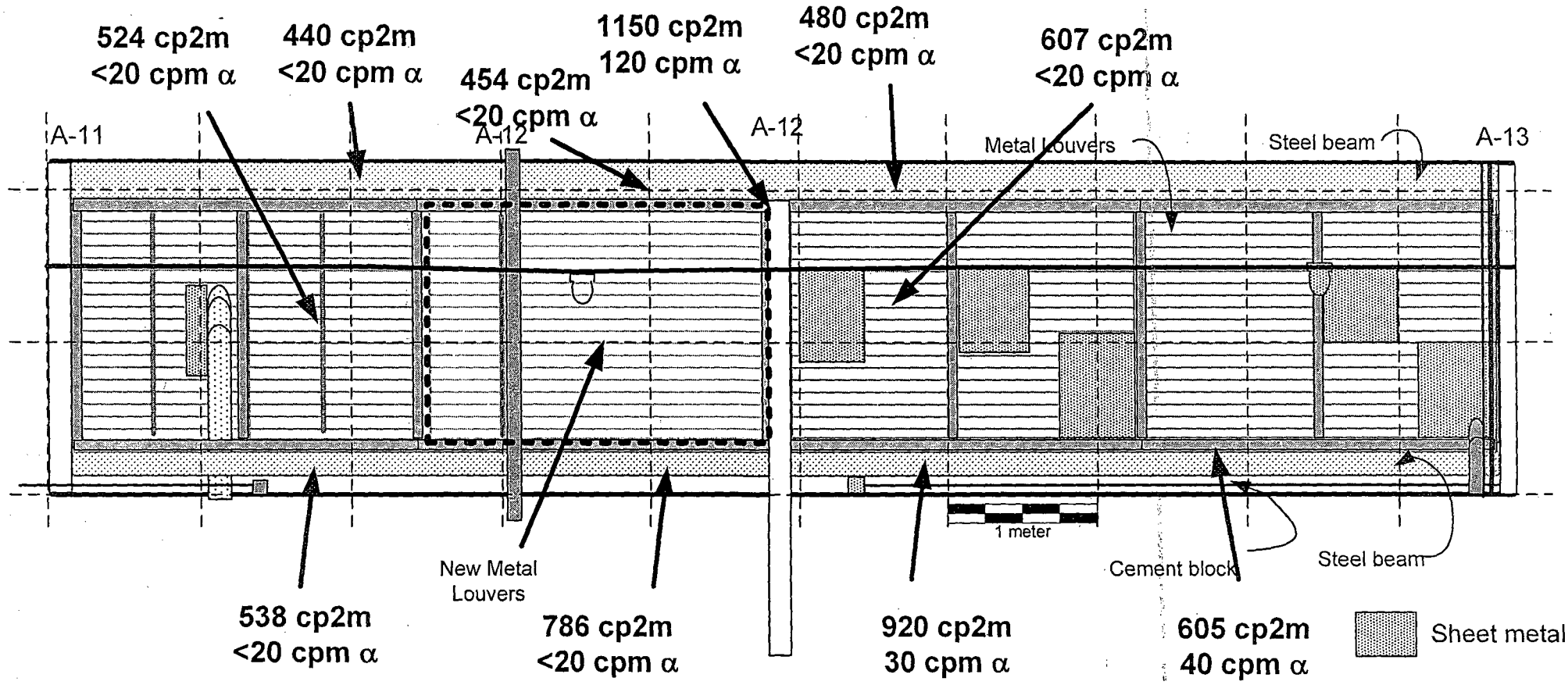
Figure 8: Building 2 Service Core Overhead "Crawl Space" Column A-11 to Column A-13

Survey: Confirmatory Survey, Fixed readings on floor



Location	Bldg 2 Corridor Sec A				
Instruments	Model 12	Model 3	2221		
Serial Number	72676	4652	86302		
Calibration Due	12/09/03	03/11/04	01/14/04		
Efficiency	22.14%	26.44	31.2		
α β γ	α	β	β		
Probe Number	089928	4652	142517		
Probe Size cm	50cm²	15cm²	100cm²		
Comments:					
Signature: William Schuck			Date: 09/24/03		

Figure 9: Building 2 Service Core Crawl Space Outer Wall A-11 to A-13, Fixed Measurement Locations and Results



Location:	Bldg 2 Corridor Sec A				
Instruments	Model 12	Model 3	2221	2221	2221
Serial Number	72676	153590	84459	154202	86302
Calibration Due	12/09/03	11/17/03	02/02/04	03/22/04	01/14/04
Efficiency	22.14%	N/A	21.58	30.39	31.2
α β γ	α	γ	α	β	β
Probe Number	089928	155190	84459	149017	142517
Probe Size cm²	50cm²	2X2	434cm²	434cm²	100cm²
Comments:					
Signature: William Schuck			Date: 09/24/03		

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