U.S. Army Corps of Engineers

New England District
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TECHNICAL SUPPORT SERVICES
ST. ALBANS VETERANS ADMINISTRATION EXTENDED CARE CENTER QUEENS, NEW YORK

Contract No. DACA31-96-D-0006

RADIOLOGICAL CHARACTERIZATION SURVEY REPORT
VOLUME I OF II

Task Order No. 19
DCN: VAHOSP-042799-AAAZ

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WESTON
MANAGERS DESIGNERS/CONSULTANTS

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EXECUTIVE SUMMARY

This report describes radiological characterization activities managed by Roy F. Weston, Inc. (WESTON®) at the St. Albans Veterans Administration Extended Care Center (VAECC) in Queens, New York. The characterization was performed for the U.S. Army Corps of Engineers (USACE) North Atlantic Division, New England District (CENAE) under contract DACA31-96-D-0006. Field activities were performed from 15 January – 1 March 1999. Radiological characterization activities included beta-gamma surface contamination surveys, gamma exposure rate surveys, and bulk material sampling in nine survey units previously designated at the VAECC. Characterization activities were performed in two phases, the first of which involved the radiological surveys and sampling of accessible bulk material. The second phase, which was completed 1 March 1999, consisted of concrete core sampling and soil sampling through the concrete penetrations.

One of the highlights of the characterization survey included the application of an innovative contamination survey technology offered by Millenium Services, Inc. The surface contamination monitor – survey information management system (SCM-SIMS) worked efficiently in some of the larger survey areas. Conclusions and observations include:

- Application of the SCM-SIMS survey methodology yielded more data than originally specified, with the data being of high quality and usefulness.
- Surveys of areas contiguous to the restricted survey units 001-004 indicated very little transfer of contamination has taken place, and when it does exist, it is confined and fixed to small floor areas of concrete or terrazzo tile.
- Two small contaminated areas (<75 ft^2 each) and one hot spot were identified in survey unit 005. Maximum contamination levels ranged from 4,800 – 62,000 dpm/100 cm^2.

- Three hot spots were identified in survey unit 007 and one hot spot identified in survey unit 006. Maximum contamination levels ranged from 6,300 – 15,500 dpm/100 cm^2.

- The survey coverage of floor areas in survey units 005 through 007 approached 100%. It is reasonable to conclude that nature and extent of the small contamination areas/hot spots is well defined. No expansion of the survey system or level of coverage in these survey units is necessary. After limited decontamination and re-survey (using hand held instrumentation) of these areas, the SCM-SIMS data may be combined with the release survey data to constitute a final status survey.

- SCM-SIMS data easily meet and exceed the requirements of a final status survey in survey unit 008.

- Substantial strontium-90 contamination is present on walls and floors of survey units 001, 002, and 004. The estimated contaminated surface area is 3,000 ft^2.

- Strontium-90 migration has been identified to a concrete depth of 3-4 inches in portions of survey units 001 and 002. The estimated surface area where migration has occurred is 3,000 ft^2.

- The drain system linking survey unit 001 to 002 is contaminated with strontium-90.

- The drain system linking survey units 003 and 004 to 002 may be contaminated with strontium-90 and tritium.

- Removable tritium contamination was noted in survey units 003 and 009. A level of 25,000 dpm/100 cm^2 was noted in survey unit 003, while the maximum removable level was 2900 dpm/100 cm^2 in survey unit 009.

Complete decontamination is recommended as the preferred remedial alternative so that the NRC license may be terminated. Significant structural and access issues will complicate decontamination efforts. The estimated waste volume (strontium-90 contaminated only) that would be generated from decontamination of survey units 001, 002, and 004 is 4,000 ft^3.

The identification of removable tritium contamination in survey units 003 and 009 is noteworthy in that additional characterization may be warranted in these areas. Survey unit 009 poses the most significant concern in that the contamination was noted on the

upper walls near an incinerator. The potential for large-scale contamination is higher due to the likely throughput of tritium-containing items such as animal carcasses and miscellaneous waste. At a minimum, extended characterization activities should extend to the ceiling and upper walls, as well as all ventilation and discharge systems.

The presence of asbestos-containing material must be considered when planning all decommissioning activities. Transite and suspect floor tile were noted in portions of survey units 001, 005, 006, and 007. In survey unit 009, a material similar to transite was noted behind the incinerator. It is recommended that an asbestos survey be performed in potentially-impacted facility areas in conjunction with preparation of a site decommissioning plan.

SECTION 1
INTRODUCTION

This report describes radiological characterization activities managed by Roy F. Weston, Inc. (WESTON®) at the St. Albans Veterans Administration Extended Care Center (VAECC) in Queens, New York. The characterization was performed for the U.S. Army Corps of Engineers New England District (CENAE) under contract DACA31-96-D-0006. Field activities were performed from 15 January – 1 March 1999. Radiological characterization activities included beta-gamma surface contamination surveys, gamma exposure rate surveys, and bulk material sampling in nine survey units previously designated at the VAECC. Characterization activities were performed in two phases, the first of which involved the radiological surveys and sampling of accessible bulk material. The second phase, which was completed 1 March 1999, consisted of concrete core sampling and soil sampling through the concrete penetrations.

The VAECC has been issued an U.S. Nuclear Regulatory Commission (NRC) "Possession Only" byproduct materials license. This license was issued for residual strontium-90 contamination present as the result of laboratory research in the early 1960s. Under the conditions of the license, CENAE is facilitating this characterization to proceed with schedule commitments to achieve license termination. The data and conclusions in this report may be used to develop management and/or decommissioning strategies.

SECTION 2
GENERAL INFORMATION

2.1 SITE DESCRIPTION

St. Albans Veterans Administration Extended Care Center (VAECC) is located on a 55-acre site at 179th Street and Linden Boulevard in Queens, New York. The site location is shown in Figure 2-1. The St. Albans Extended Care Center consists of 15 separate buildings covering approximately 700,000 ft^2. The Facility employs approximately 500 employees whose work locations are spread throughout the 15 buildings. The activities presently taking place at the facility are extended care services similar to a nursing home; outpatient services; and a consolidated laundry service for this facility and additional facilities. In the near future, the facility also will provide consolidated commissary service for other VA facilities.

Radiological characterization was performed in portions of Buildings 64, 90, and 91. Building 64 houses an incinerator that is no longer in operation, with the balance of the facility used as a boiler plant. Building 90 consists of two levels, ground and basement, that have historically housed the majority of the nuclear medicine-related operations at St. Albans. The basement level of Building 90 contains a former nuclear medicine laboratory, ejector pit, and bathrooms that are currently under restricted access. The balance of the basement and ground floor of Building 90 are used for file storage. The basement level of Building 91 contains the speech pathology department, audiology department, waiting rooms, and a variety of maintenance shops that are in daily use.

The majority of accessible space in Building 90 (other than the nuclear medicine labs, rest rooms and ejector pit) was used for file storage prior to the radiological characterization activities. The VAECC executed a substantial file relocation program immediately prior to field activities associated with this characterization.

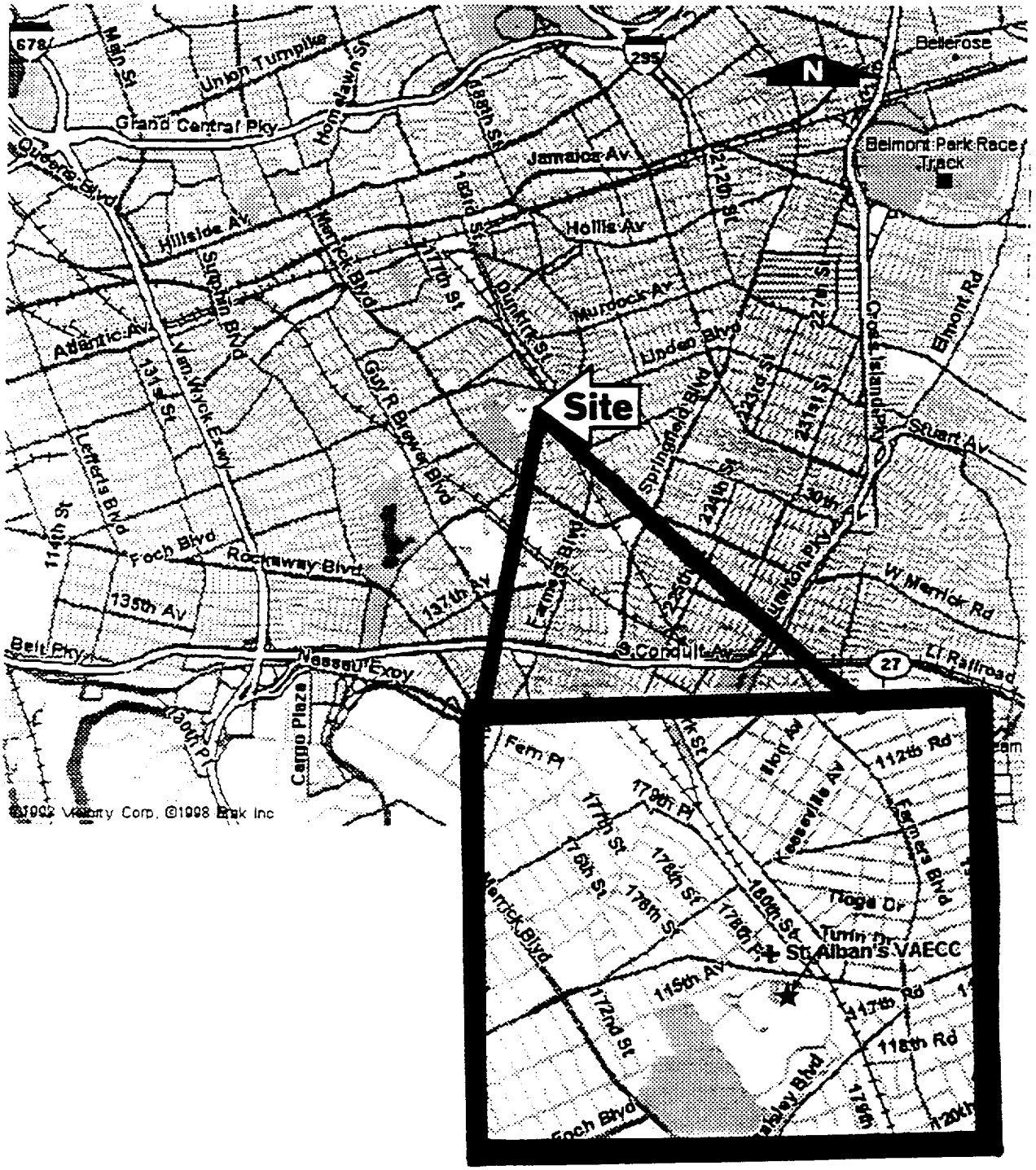

Figure 2-1 VAECC Location

2.2 HISTORICAL REVIEW

The St. Albans Facility was operated as a Naval Hospital prior to its acquisition by the Veterans Administration (VA) in 1976. The Naval Hospital provided nuclear medicine services under several NRC licenses. NRC-licensed activities ended with the termination of NRC license #31-00076-06 on 31 December 1973. In 1976 St. Albans was transferred from the Navy to the VA. The VA did not hold a radioactive materials license at St. Albans. In May 1992, the U.S. Army Corps of Engineers (COE), while performing a review of former Department of Defense (DOD) sites, visited St. Albans and identified areas of elevated radiological contamination. In August 1992, Teledyne Isotopes partially remediated the St. Albans facility and recommended an expanded survey and decontamination of other rooms (Teledyne Isotopes Report - "Radiation Safety Survey for VA medical Center Queens, NY, July 1992"). In September 1997, Ogden Environmental and Energy Services, Inc. (Ogden) surveyed the nuclear labs and ejector pit located adjacent to tunnel 45 and identified radioactive contamination in excess of NRC release criteria (Ogden/NAE 1998). The Ogden report concluded the scope of the survey needed to be expanded.

The primary contaminant of concern is Sr-90 in the form of sporadic surface contamination in restricted areas of Building 90. The Sr-90 contamination resulted from laboratory spill in the early 1960s. Tritium and C-14 solutions also were used in the laboratory and are suspected contaminants. Total beta-gamma surface contamination[1] levels up to 500,000 dpm/100 cm^2 have been noted in the restricted areas of Building 90 (Ogden/NAE, 1998). Removable contamination levels of up to 1,000 dpm/100 cm^2 also were noted. Previous decontamination operations have been executed in areas of Building 90. Some sampling of solutions and soils near drains and holding is discussed in Ogden/NAE (1998). Solid samples ranged from 169 - 21,900 pCi/g gross beta and from 81 – 4,600 pCi/g Sr-90.

2.3 PROJECT DATA MANAGEMENT

For purposes of clarity and transmission, this characterization report references raw data as maintained in the project file structure shown in Appendix A. Radiological characterization

[1] The Ogden/NAE report presents survey results in counts per minute (cpm) as measured with a pancake Geiger-Mueller(GM) detector. To obtain the maximum total surface contamination level in dpm/100 cm^2, an assumed efficiency of 60% and area factor of 8 have been applied to the GM detector.

programs generate a vast array of data that are readily used as a resource only if they are logged systematically. It is not the intent of this report to present all data and records, rather synthesize and present conclusions appropriate to radiological conditions at the St. Albans Facility. Raw data include but are not limited to, equipment calibration records, equipment function check records, raw background survey data, raw survey unit data, log book records, analytical laboratory reports.

SECTION 3
RADIOLOGICAL SURVEY METHODS

3.1 SURVEY UNITS/CLASSIFICATION SCHEME

Based on previous radiological survey information, areas of Buildings 64, 90, and 91 were divided into logical "survey units" and designated as Class I or Class III areas. The classification terminology is applied from the Multi Agency Radiological Survey and Sampling Investigation Manual (MARSSIM, NRC 1997). Class I survey units exhibit surface contamination or bulk material radionuclide concentrations exceeding the derived concentration guidelines (DCGLs). These areas require 100% scanning coverage of floors and lower walls (and 25-100% of upper walls and ceilings) to determine the extent of contamination. Class III survey units are suspected to have elevated levels of contamination or have been identified as having surface contamination or bulk material concentrations above background but less than the DCGLs. These areas require 25-50% scanning coverage of floors and lower walls.

Table 3-1 presents the description and initial classification of the nine survey units investigated as part of the characterization project. A detailed description of the MARSSIM process and DCGLs as applied to the original radiological survey plan is described in detail in S&W (1998).

Table 3-1

Survey Unit Classification for Radiological Characterization

Survey Unit #	Building	Classification	Access Controlled
001- Nuclear Medicine Labs	90	I	Yes
002 – Ejector Pit	90	I	Yes
003 – Women's Rest Room	90	I	Yes
004 – Men's Rest Room	90	I	Yes
005 – Balance of Building 90 Basement	90	I	No
006 – Maintenance Shops and Stairwell	91	III	No
007 – Audiology, Speech Pathology, Maintenance	91	III	No
008 – Ground Level	90	III	No
009 – Incinerator	64	III	No

It should be noted that there is no consistent link to survey classification and level of control placed on a survey unit. Survey units 001-004 are designated as Class I and are under access restrictions per conditions of the St. Albans NRC license. These restrictions are necessary due to large areas of total and removable surface contamination significantly exceeding the DCGLs. Survey unit 005 received a Class I designation because several isolated "hot spots" of fixed contamination were identified on doorway thresholds. These spots pose no significant risk to workers performing routine activities in these areas. Since many of the rooms within survey unit 005 are contiguous to known contaminated survey units, it is prudent to assign a Class I (100%) survey designation.

3.2 NATURE OF CONTAMINATION/REPORTING CONVENTION

The Work Plan (S&W 1998) specifies DCGLs in terms of strontium-90 contribution only. This convention is somewhat unusual in that surface contamination and bulk material criteria are usually derived in terms of total strontium-90/yttrium-90 activity. This combination occurs because strontium-90 is in secular equilibrium with its yttrium-90 daughter. Each radionuclide emits a beta particle (strontium-90: 0.546 MeV, yttrium-90: 2.29 MeV) that may be detected with portable counting systems. To maintain convention with the Work Plan, all surface or bulk material activities presented relative to the strontium-90 activity.

The DCGLs from S&W (1998) are presented in Table 3-2. It should be noted that no solid matrix carbon-14/tritium analyses or total carbon-14/tritium surface contamination measurements were performed as part of this characterization. Removable contamination measurements were collected and submitted for liquid scintillation analysis of carbon-14 and tritium activity.

Table 3-2

Proposed Interim Derived Concentration Guideline Limits (DCGLs)
Acceptable Surface Contamination Levels - (dpm/100 cm^2)

Radionuclide	Fixed Plus Removable		Removable
	Average	Maximum	
Carbon-14	5,000	15,000	1,000
Tritium	--	--	1,000
Strontium-90	1,000	3,000	200

Surface contamination DCGLs are presented in units of disintegrations per minute (dpm) per 100 cm^2. The bulk material strontium-90 DCGL is 5 pCi/g.

3.3 RADIOLOGICAL SURVEY APPROACH

Radiological survey techniques as specified in the Draft Final Work Plan Volume I for the Radiological Characterization Survey of the St. Albans Veterans Administration Extended Care Center Queens, New York (S&W 1998) were traditional in nature, in that a substantial number of health physics technicians would be performing the surveys with hand-held instruments. To streamline the survey process and improve the quantity and quality of data collected, WESTON investigated the application of an innovative technology. It was determined that the Surface Contamination Monitor – Survey Information Management System (SCM-SIMS) operated by Millennium Services Inc. (MSI) under an exclusive arrangement with the electronics patent holder, Shonka Research Associates, Inc., would perform efficiently in the large, uncontrolled areas of some survey units at the VAECC.

Survey units known to be extensively contaminated would be surveyed using the traditional hand-held radiological instrumentation. Where possible, the original number of total and removable contamination survey points would be reduced in highly contaminated areas. The rationale behind this approach was to avoid "over-characterization" of survey units that would require significant decontamination (disturbance). It would likely be necessary to resurvey all building materials and items removed during decontamination, due to the potential for cross-contamination. This approach was discussed between CENAE and WESTON prior to activities in the highly-contaminated survey units. Table 3-3 presents the number of planned (S&W 1998) and actual sample locations per survey unit.

Table 3-3

Discrete Sampling Location Summary

Survey Unit	Hand-Held Survey	SCM-SIMS Survey	Number of Discrete Sample Locations			
			Floor/Lower Wall		Upper Wall/Ceiling	
			Work Plan	Actual	Work Plan	Actual
001	Yes	Partial	90	15	15	15
002	Yes	No	50	10	8	4
003	Yes	No	10	5	1	1
004	Yes	No	15	10	2	2
005	Yes	Yes	15	15	3	3
006	Yes	Yes	20	20	5	5
007	Yes	Yes	50	50	20	20
008	Yes	Yes	20	20	5	5
009	Yes	No	20	20	5	5

The original specifications of S&W (1998) called for 24 soil, liquid or aggregate samples to be collected and analyzed for strontium-90 activity. Based on discussions with CENAE, this number was reduced to six samples. Sample locations would be selected during field characterization activities such that information on the nature and extent of contamination would be maximized. As radiological characterization activities proceeded, CENAE and WESTON concluded that supplemental concrete core samples would assist in determining the migration of contamination into slabs that exhibited surface contamination.

A supplemental characterization plan was prepared to collect six concrete cores and divide them into 2-3" sections. The sections would be analyzed at progressively deeper intervals, until the 5 pCi/g strontium-90 DCGL was achieved. Underlying soil would be collected at the 0-6" and 6-12" intervals and analyzed. Using this supplemental characterization approach, the maximum projected number of additional samples to be analyzed was 42.

3.4 RADIOLOGICAL MEASUREMENT SYSTEMS

Radiological characterization surveys were performed with a variety of equipment systems. Large open areas of Class III areas (and the Class I –survey unit 005) were surveyed with the SCM-SIMS. The basic operation of the SCM-SIMS is through gas-flow proportional counting and is described below. The remaining Class I survey units were surveyed with hand-held radiation detection equipment manufactured by Ludlum Instruments, Inc.

All equipment systems were operated according to standard operating procedures (SOPs) containing information on preparation, quality control, use, and data interpretations. Project-specific SOPs may be located in project file code 1.4 as defined in Appendix A.

3.4.1 Hand-Held Systems

Restricted Class I survey units were surveyed by hand using Ludlum Model 44-116/Model 2221 counting systems. The hand-held systems utilized beta scintillation principles, and were used both in scaler and count rate mode. The Ludlum 44-116/2221 system was chosen because its detection efficiency was comparable to gas-flow proportional systems, yet did not require a gas source and associated hardware. Since this system is most efficient for beta energies greater than 200 KeV, smear results were assumed to be indicative of removable strontium-90 activity.

Two types of removable contamination smears were collected in the survey units. A standard smear was analyzed on-site using a Ludlum Model 44-10-1/Model 2929 system. This dual-channel phoswhich counting system exhibited excellent applicability in that smears could be simultaneously be analyzed for both alpha and beta activity. The presence of alpha activity was taken to be an indicator of radon/radon daughter activity. A collocated smear was collected and placed into a scintillation vial for subsequent laboratory analyses as described in Subsection 3.4.3.

To assess the gamma exposure rates in each survey unit, Ludlum Model 19 "uR-meter" survey meters were utilized. Field personnel walked traverses in the associated rooms and corridors, recording the range of detector responses at a distance of one meter from building surfaces.

3.4.2 SCM-SIMS

MSI utilized the SCM-SIMS, a large-area radiological surface contamination monitor capable of rapidly performing surveys of potentially contaminated surfaces in nuclear facilities. Due to its large size and configuration, it lends itself to rapid traverses of potentially contaminated surface areas. The detector location is electronically logged using an inertial positioning system, thus reducing the need for site grid application traditionally required with hand-held radiation survey

equipment. The system offers a significant improvement in the quantity and quality of radiological survey data collected. Survey measurements are performed by individual 2" by 2" detector elements, with a total measurement capacity of about 400 measurements per square meter. The large number of measurements allows for statistical analyses of contamination levels, whereas traditional methods incorporate "spot" sampling and measurements. All data are logged electronically and rapidly converted to report format.

The SCM-SIMS provided higher quality than the proposed survey methods using discrete hand-held and floor monitoring systems. Automatic electronic transfer reduced the potential for hand entry and record keeping errors associated with traditional survey methods.

3.5 SOLID MATRIX SAMPLES/LABORATORY SMEAR ANALYSIS

A variety of solid matrix samples were submitted for laboratory analyses. The solid matrices included tank scale, sludge, concrete, and soil. Strontium-90 activity was determined using EIChroM Method SRW01 Modified. Sample detection limits were a function of the mass of the sample submitted, and in all cases were below 2 pCi/g.

Per sampling requirements, removable contamination smears were collected and placed into scintillation vials containing a set volume of deionized water. The vials were then logged and shipped for liquid scintillation analyses of carbon-14 and tritium content. Analyses were performed using EPA Method 906.0 Modified. Carbon-14 and tritium sample detection limits ranged from approximately 20 to 80 dpm/100 cm^2.

ThermoNUtech of Oak Ridge, Tennessee provided all analytical services. As part of their internal quality assurance program, ThermoNUtech ran matrix spikes and blank samples. The results of these analyses were presented with final laboratory results. All samples were transmitted to ThermoNUtech using chain of custody procedures.

3.6 DRAIN SYSTEM DESCRIPTION

Based upon review of the original blueprints for the nuclear medicine facilities at St. Albans, two potentially impacted drain systems were identified. During nuclear medicine operations, all of these systems were routed to the ejector pit so that liquid effluent could be sampled prior to discharge to the sanitary sewer system. The primary line of concern serviced the floor clean-outs and sinks in the nuclear medicine labs. The second line of concern serviced the men's and women's rest rooms. The relative location of these drain systems is shown in Figure 3-1.

As a result of previous radiological control activities, many of the clean-out access points have been filled with an epoxy-like substance. Where possible, WESTON personnel performed total and removable contamination surveys on clean-outs in an effort to determine if contaminated solutions had been introduced to a particular section of the drain system.

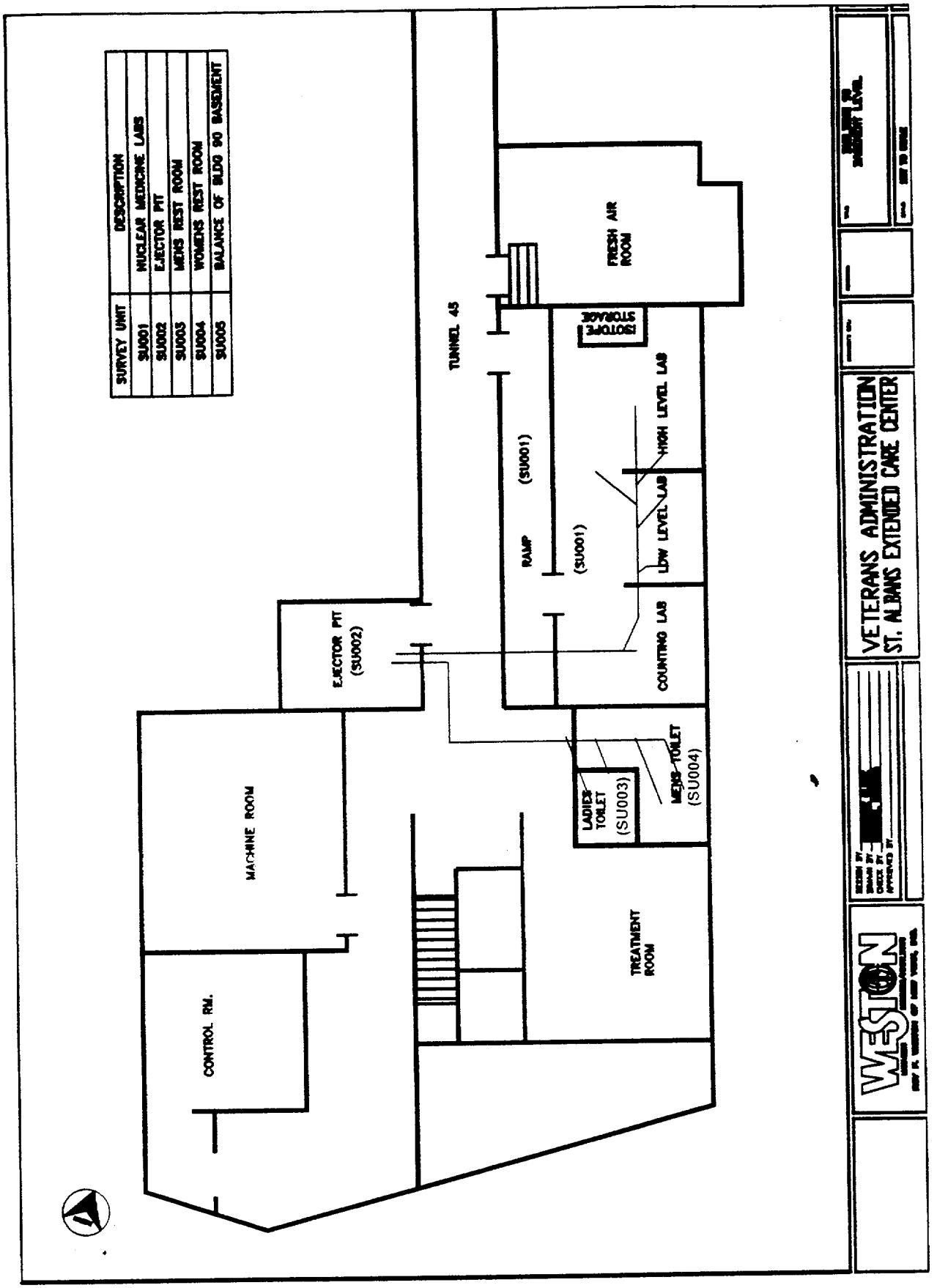

Figure 3-1 Survey Units 001 - 005

SECTION 4
BACKGROUND RADIOLOGICAL SURVEY RESULTS

The original specifications of the S&W (1998), required an extensive identification of building materials and their relative background response to common radiation detection instrumentation. Naturally occurring radionuclides such as uranium, thorium and radium in these building materials are a constant source of counting interference to portable radiation detectors. The interference is caused by alpha, beta or gamma emissions from the radionuclides. Using traditional survey methods for a limited, finite number of survey locations, it is necessary to develop a representative background detector count rate for each type of material surveyed. This population may be compared to a surveyed population using statistical techniques to identify meaningful differences. WESTON developed background response ranges (count rates) for the hand-held radiation detectors used for large-area surface contamination surveys.

The advantage of the SCM-SIMS in this situation is that, due to the large number of measurements performed over a the survey area, statistical analyses may be performed on individual m^2 grid blocks or entire survey units. Using stripping algorithms, it is possible to identify individual pixels (25 cm^2 areas) that exceed the background distribution in the designated survey unit. This saturation allows analyses that theoretically do away with the representative sampling requirements developed using the techniques of NRC (1997).

4.1 TYPES OF MATERIAL PRESENT

A variety of building materials was encountered at the VAECC. Common materials included, concrete slabs, vinyl floor tile, composite (asbestos-containing) floor tile ceramic floor and wall tile, plaster walls, painted wall board, and terrazzo floor tile.

4.2 LIMITATIONS

It should be noted that building materials whose physical appearances are similar may have distinctly different background radionuclide concentrations, and subsequent count rates as measured in the field. Building materials such as concrete and tile may have had variable

mixtures of production components. These production components have characteristic naturally-occurring background radionuclide concentrations. A typical example is concrete slab pours that have been placed at different times. The aggregate used in the concrete mix almost constantly varies as do the associated uranium and thorium concentrations. This variation can affect background count rates, such that applying a high background result to a lower activity aggregate may result in a calculated surface activity less than zero. Conversely, applying a background count rate that is lower than the true background of a higher-activity aggregate may result in a false interpretation that a surface is contaminated.

4.3 HAND-HELD SYSTEMS

As previously mentioned, the primary surface contamination monitoring instrumentation consisted of the Ludlum Model 44-116/Model 2221 system. This system also was used to determine the relative background response of building materials encountered at the VAECC. The typical instrument background (shielded from surfaces/open to air) ranged from 200-250 cpm. As the instrument was passed over uncontaminated building surfaces, the relative count rate changed. Table 4-1 presents the range of count rates encountered for different building materials at the VAECC. Survey units known to contain these building materials are also designated in the table. Count rates are presented in counts per minute (cpm). To reduce the potential for misinterpretation of the background count data, no conversion is made to dpm/100 cm^2.

Table 4-1

Background Surface Count Rates from VAECC Building Materials

Description of Material	Location by Survey Unit	Count Rate Range (cpm)	Median Count Rate (cpm)
Vinyl tile	005, 006, 007, 008	250-450	350
Small green ceramic tile (restrooms)	002, 003, 006, 007, 008	850-1000	925
9x9 green tile	001, 005, 006, 007	300-400	350
Red floor tile	006, 007	300-400	350
Bare or painted concrete floors	001, 004, 005	450-700	575
Plaster walls	005, 006, 007, 008	280-320	300
Cinder block walls	001, 002, 003, 004, 005, 006, 007, 008	400-550	475
Glazed beige ceramic wall tile	005, 006, 007	850-1000	925
Glazed gray ceramic wall tile	005	650-800	725
Poured concrete wall	004, 005	350-450	400
Transite walls	009	300-360	330
Plywood walls	001, 006, 007	300-400	350

The highest background building materials encountered at the VAECC included the beige and gray ceramic wall tiles, as well as the smaller green ceramic tile found in some of the older rest rooms and janitor closets. Total count rates from these materials ranged from 3-4 times some of the lower activity materials such as plaster, wood and transite walls. The higher activity associated with the glazed tiles is not unexpected as uranium and thorium are frequently added to improve the application or color quality of the glaze.

4.4 SCM-SIMS

As previously mentioned, no background analysis of discrete parcels (outside of the survey units) was performed using the SCM-SIMS system. MSI developed background surface activity levels using statistical analyses of the large number of data points collected over the building surfaces. Data were reviewed for lognormal or normal distribution after extracting high values that were indicative of contamination that had been introduced to the surface. It could be argued that some of the excluded values could really be high-end components of the background count distribution. If this is the case, the net effect is conservative, since calculated statistical measures (mean, median, mode) are lower than the true values. Accordingly, calculated net surface activities end up higher due to the subtraction of lower background count rates.

MSI reported background activities for nine materials. Several of the materials had similar characteristics and were grouped into five material categories. The derived background activities for these five categories ranged from 4-2208 disintegrations per area (dpa). The dpa convention is specific to the SCM-SIMS, due to the processing of count data from individual detector locations (pixels). In the survey reports, average dpa is used to report the square meter average disintegrations per minute per 100 cm^2, while maximum dpa is used to report the maximum measured value of disintegrations per minute per 100 cm^2. Details of the SCM-SIMS background assessment may be found in Appendix B.

4.5 DISCUSSION OF VARIATION

It is important to note that the background count rates discussed in Subsection 4.3 are specific to the Ludlum Model 44-116/Model 2221. The background count rates will be specific to the type

of detection system (e.g., gas-flow proportional, scintillation, Geiger-Mueller), manufacturer (e.g., Ludlum, Eberline, Bicron), and to a lesser extent the variances of manufacturing for identical equipment models. The tabulated count rates in Table 4-1 are best used in a relative sense.

4.6 SOLID MATRIX SAMPLES

Strontium-90 is a radionuclide that may occur in the environment in trace quantities due to fallout from atmospheric nuclear testing or nuclear accidents such as Chernobyl. It is conservatively assumed that the bulk materials sampled as part of this characterization have a background strontium-90 concentration of 0 pCi/g.

SECTION 5
RADIOLOGICAL SURVEY RESULTS

5.1 SUMMARY OF ALL SURVEY UNITS

Subsections 5.2 through 5.10 describe the surface contamination survey, bulk material sample results, and field observations for each of the nine survey units. Features such as floor penetrations, ventilation systems, drain clean-outs, and unusual equipment are described. The SCM-SIMS system was used in survey units 005-008 and a portion of survey unit 001. Hand-held equipment "scanning" surveys were performed by WESTON in survey units 001-004 and 009. Per Table 3-3 specifications, WESTON performed discrete measurements of total and removable beta-gamma contamination in all survey units. Table 5-1 presents the discrete measurement (total and removable) surface contamination results. The levels are presented in dpm/100 cm^2 and may be compared directly to the DCGLs of Subsection 3.2. The relationship of these measurements to features within respective survey units is described in the following subsections.

For survey units 005 and 006, the range and average surface contamination levels as measured with the SCM-SIMS also are presented in Table 5-1. It should be noted that the SCM-SIMS measurements are indicative of the "true" condition of the surface contamination levels over the majority of the survey unit surface area. As evidenced by the reported survey results, the majority of surfaces have little or no activity varying from background. The associated Weston discrete measurement results in survey units 005 and 006 should be considered "biased" in that they are the result of closer investigation of anomalies identified with the SCM-SIMS system. It should be noted that most of the WESTON measurements were taken on very small, isolated hot spots. These hot spots did, in some cases, exceed the DCGLs for total and maximum contamination levels. More importantly, no removable contamination was noted with any hot spot. These spots pose little risk to site workers, however must be addressed to maintain consistency with the principle of ALARA and meet the requirements of the Work Plan.

Table 5-1

Surface Contamination Survey Results

Survey Unit	Description	Total Beta-Gamma		Removable Beta-Gamma	
		Range	Average	Range	Average
		(dpm/100cm^2)		(dpm/100cm^2)	
001	Nuclear Medicine Lab	-250 to 2,898,917	107,231	-4 to 2746	271
002	Ejector Pits	67 to 7517	3144	11 to 76	336
003	Ladies Toilet	283 to 867	675	-44 to 22	-13
004	Men's Toilet and Entry Area	-67 to 145,500	30,494	-4 to 83	36
005	Tunnel and Adj. Rooms (SCM-SIMS)	-979 to 6286	93	Not applicable[1]	
005	Tunnel and Adj. Rooms (Weston)	-103 to 73,657	Not applicable[2]	0 to 54.3	30
006	West Basement Area	-458 to 477	63	Not applicable[1]	
006	West Basement Area (Weston)	-117 to 20,417	Not applicable[2]	-22 to 98	23
007	Main Hall and Adj. Rooms	-629 to 10,004	551	-22 to 76	9
008	Ground Floor Machine Rm.	-611 to 482	-104	-24 to 76	14
009	Incinerator	-339 to 893	275	-22 to 43	14

[1] The SCM-SIMS system was used for total and maximum surface contamination measurements only.
[2] Average surface contamination levels are not calculated due to an upward bias in selecting the measurement locations.

Gamma exposure rates and alpha contamination surveys showed little or no significant variance and are described on a site-wide basis. Survey units 003 and 009 were identified as having removable tritium contamination exceeding the DCGL. The interpretation of liquid scintillation analyses (of smears) is described on a site-wide basis and with respect to applicable survey units.

Appendix C contains a summary of analytical laboratory results, while Appendix D presents survey results for drain cleanouts identified in the survey areas. Discrete survey point measurements and miscellaneous survey data are included in Appendix E.

5.1.1 Gamma Exposure Survey Results

Gamma exposure rate surveys were performed in all survey units and demonstrated very limited variation. It can be concluded that there is no significant contribution of gamma-emitting

radionuclides (background or otherwise) in the survey units at the VAECC. Through all survey units, gamma exposure rates ranged from 5-15 uR/hr. This limited range is noteworthy in that the DCGL for gamma exposure rates is 20 uR/hr above background. Assuming the mean background exposure rate is 10 uR/hr in all survey units, a total exposure rate of 30 uR/hr must be exceeded to warrant further concern. No locations exceeding 15 uR/hr were noted at the VAECC. Specific gamma exposure rate results are not discussed further in the following sections.

5.1.2 Removable Alpha Contamination Survey Results

Use of the dual-channel phoswhich smear counter was valuable in that all smears were also counted for removable alpha activity which could be taken as an indicator of high radon/radon daughter contributions. No smear sample alpha count rate exceeded 3 cpm, which at typical alpha efficiencies of 30% equates to approximately 10 dpm/100 cm^2. It can be concluded that no significant removable alpha activity is present in the survey units at the VAECC.

It should be noted that particulate air samples collected for health and safety purposes were also counted on the dual-channel phoswhich counter. Initial counts of these samples occasionally exhibited very high alpha count rates that decayed to background after approximately three days. This response is indicative of radon daughter decay.

5.1.3 Liquid Scintillation Counting Laboratory Results

As a variety of radionuclides including carbon-14 and tritium had been handled under license at the VAECC, there was initial concern for the presence of these radionuclides. Liquid scintillation samples taken to assess the presence of these radionuclides did not yield evidence of these radionuclides. A problem was encountered with some of the "hot" smears known to contain significant strontium-90 activity. Due to the high energy beta activity associated with strontium-90 and yttrium-90, ThermoNUtech reported some suspected "crosstalk" in the carbon-14 and tritium beta channels of the liquid scintillation counter. Crosstalk is the contribution of the lower-energy portion or the beta spectrum (for high-energy beta emitters) to channels assigned to lower

energy beta emitting radionuclides. If the presence of strontium-90 was not certain, this crosstalk could be interpreted as real carbon-14 and tritium activity. This effect may be qualitatively identified through the presence of positive, yet decreasing activity in the carbon-14 and tritium channels, successively. ThermoNUtech reported this effect on final laboratory results. The range of liquid scintillation results are presented by survey unit in Table 5-2.

Table 5-2

Liquid Scintillation Analyses Results

Survey Unit	Description	Smears Laboratory Results Carbon-14		Smears Laboratory Results Tritium	
		Range	Average	Range	Average
		(dpm/100cm^2)		(dpm/100cm^2)	
001	Nuclear Medicine Lab	-17 to 5000	320	-22 to 1734	98
002	Ejector Pits	-11 to 42	3	-7 to 59	10
003	Ladies Toilet	-10 to 174	32	-43 to 25413	3500
004	Men's Toilet and Entry Area	-11 to 37	13	-25 to 746	95
005	Tunnel and Adj. Rooms	-29 to 15	-5	-45 to 267	17
006	West Basement Area	-33 to 3	-22	-22 to 246	13
007	Main Hall and Adj. Rooms	-39 to 14	-7	-6to 166	16
008	Ground Floor Machine Rm.	-39 to 10	-15.51	-33 to 191	9
009	Incinerator	-56 to 2	-21	-362 to 2916	-54

Several smear results from survey units 003 and 009 exhibited positive removable tritium surface activity above the DCGL. These results were reviewed to determine if there was high-energy strontium-90 interference. No interference was identified. No carbon-14 analyses of smears from any survey unit exceeded the DCGL.

5.2 SURVEY UNIT 001 DISCUSSION

Survey unit 001 included the three nuclear medicine laboratories and adjoining ramp as shown in Figure 3-1. At the time of characterization survey, the laboratory tiles had been removed and were stored in three 55-gallon drums. The floor of the laboratories was bare concrete that had been penetrated in several locations. At one of the penetrations exposed soil was accessible. A section of drain line had been broken away below the opening in the floor. A second disturbed area was noted in the low-level laboratory. This area was covered with unsealed plastic and had

been scarified to approximately 1 to 2 inches in depth. Loose concrete debris and a pipe penetration through the floor were noted. Floor clean-out drain openings had been filled with an epoxy-like material. The ramp to the laboratories was tiled and in good condition.

The walls in the survey unit were plywood, cinderblock and plaster. Many of the wood walls were in poor condition and partially broken away. Many laboratory cabinets, counter tops and sinks were still in place. One fume hood had been removed from the low-level laboratory, while a second was still in place in the high-level laboratory. The ductwork connecting the fume hoods and the exit exhaust system had been removed up to the interface with the men's restroom. It should be noted that laboratory ventilation was channeled through the restrooms (survey units 003 and 004) into the waiting area of survey unit 005. From this point, the exhaust system was routed upward to the ground level and through survey unit 008 to the roof. The ductwork has been removed during previous decontamination operations. Surveys of exit points on the roof of survey unit 008 indicated background levels of surface activity.

The ramp to the nuclear medicine laboratories was surveyed with the SCM-SIMS system, while the laboratories were surveyed with hand-held equipment.

5.2.1 Floors

Upon initial entry to the nuclear medicine laboratories, it was evident that the majority of the floor surfaces exceeded the total DCGL for strontium-90. A gradient was evident in that the counting room was less than the low-level laboratory, which in turn exhibited lower total contamination levels than the high-level laboratory. Several floor areas in the former isotope storage room exhibited total contamination levels exceeding 500,000 dpm/100 cm^2. Removable contamination was noted at most locations sampled on the floor, ranging from 0-2,700 dpm/100 cm^2. The ramp to the nuclear medicine laboratories exhibited sporadic hot spots and small areas exceeding the total DCGL. Some removable contamination in the 50-200 dpm/100 cm^2 range was noted during characterization activities, but is attributable to minor transfer from entry to the laboratories. These areas were cleaned as part of the radiological control/ALARA program implemented during characterization activities.

Vertical profile (core) samples (concrete slabs) taken in the nuclear medicine laboratories indicate that in most areas, the contamination is limited to the first inch of the concrete. The damaged area in the low-level counting laboratory (approximately 40 ft^2) exhibited bulk strontium-90 concentrations exceeding the DCGL to a depth of 2-4 inches. Concrete core and soil sample results are presented in Appendix F.

5.2.2 Walls and Ceilings

Sporadic total surface contamination was noted on the lower walls, ranging from 250 –3500 dpm/100 cm^2. Lower walls (wood) near the fume hoods typically exhibited the highest total surface contamination levels. Upper walls and ceilings were, for the most part were within background levels. An exception was identified at the base of the former ventilation system penetration to the wall of the men's room.

5.2.3 Other Features

Underlying soil was sampled at two locations in survey unit 001. The first sample was taken through the penetration in the low-level counting laboratory. The sample result was 2,200 pCi/g for strontium-90 yttrium-90, but may have been impacted by the breached drain line directly below. Two samples were collected through a borehole placed in the counting room. Both 0-6" and 6-12" interval samples exhibited strontium-90 concentrations less than 5 pCi/g.

5.2.4 Conclusions

The quantity and nature of strontium-90 present in survey unit 001 poses significant problems when considering decontamination approaches. The migration into the concrete slabs has likely been accelerated by the use of water and liquid cleaners on the floor over time. Apparent attempts at decontamination in the area have resulted in substantial quantities of transferable strontium-90 contamination. Characterization results of "non-contaminated" portions of survey unit 001 (such as the upper walls and some cabinets) are arbitrary in that all material removed during decommissioning will require release surveys and sampling prior to unrestricted release.

Waste volume estimates for survey unit 001 are prepared under the assumption that the entire slab must be removed and handled as radioactive waste for disposal. Likewise the underlying drain system is assumed to be contaminated and will require removal and disposal. The estimated waste volume for survey unit 001 is 2,800 ft^3. This volume includes stored waste, concrete slabs, soil, drain lines, and miscellaneous building material.

5.3 SURVEY UNIT 002 DISCUSSION

Survey unit 002 included the ejector pit and associated internals. The internals included and ejector system, hold-up tank, and piping. Input flow was received from the waste lines of the nuclear medicine laboratories, rest rooms, and hallway main drain lines. The pit was monolithic in structure, given that its floors and walls were concrete in excess of 10 inches thick. The pit is approximately 6 feet below the Tunnel 45 grade at the basement level. A metal diamond-plate platform rises above the pit, and contains the controls to operate the ejector system. Due to staining visible on the pit walls, it is evident that the pit had filled with overflow on at least several occasions. A dark brown stain pattern is noted from the floor of the pit to a height of 18-20". A second, lighter-colored stain pattern is noted from 20-36". Exposed piping and other pit internals are covered with corrosion and scale.

5.3.1 Floor/Wall Surface Contamination

Total beta-gamma surface contamination levels are relatively consistent in the two stain layers. The dark stain layer exhibits a range of 10,000 to 20,000 dpm/100 cm^2, while the lighter stain layer ranges from 4,000 to 8,000 dpm/100 cm^2. Contrary to first impression, the ejector pit surfaces had no removable beta-gamma contamination exceeding the DCGL. No surface contamination above DCGLs was noted on the platform located above the pit.

5.3.2 Concrete Profile Sampling

Two concrete core profile samples were collected in the ejector pit. One core was taken in the floor of the pit and a second from the wall. Based on the results of these core samples,

strontium-90 concentrations exceed 5 pCi/g to a depth of 3-4" in the floor and walls of the ejector pit.

5.3.3 Conclusions

While not highly contaminated, the ejector pit will pose decontamination problems due to its location, configuration, and depth of contamination. The estimated waste volume generated from operations in survey unit 004 is 1,000 ft^3. This estimate includes concrete, piping, and miscellaneous building materials.

5.4 SURVEY UNIT 003 DISCUSSION

Survey unit 003 includes the women's rest room adjoining the former waiting area of survey unit 005. The toilets and sinks have been removed from the men's room. The majority of the floor is covered with a small (1" by 1") ceramic floor tile. The women's rest room is significantly smaller than the men's rest room, covering an approximate floor area of 75 ft^2.

5.4.1 Floor/Wall Surface Contamination

Total beta-gamma contamination measurements on the floors and walls of survey unit 004 did not exceed the strontium-90 DCGL. Likewise, field smears from these locations were analyzed onsite and determined not to exceed the strontium-90 DCGL for removable contamination. However, several removable contamination smears exhibited tritium activities exceeding the removable contamination DCGL or 1,000 dpm/100 cm^2. These values were 1,900 and 25,000 dpm/100 cm^2, respectively. Three other smears exhibited positive activity above the laboratory detection limit but less than the DCGL. These results are meaningful because the laboratory reported no high-energy strontium-90 interference in the survey unit 003 smear samples. This observation was confirmed through the on-site strontium-90 analyses of smear samples.

5.4.2 Conclusions

The identification of removable tritium contamination is significant and will likely require further investigation. It is conceivable that the disposal of bioassay samples (urine associated with tracer administration) may be the cause of the contamination. This source is questionable however, if the area was subject to routine custodial care. Based on field surveys, little or no significant strontium-90 activity is present in the women's rest room. It is likely that the drain system fed by the toilet and sink contain some tritium activity, in addition to any strontium-90 contamination introduced from the men's room. No solid matrix samples were collected in this survey unit.

5.5 SURVEY UNIT 004 DISCUSSION

Survey unit 004 includes the men's rest room adjoining the former waiting area of survey unit 005. The toilets and sinks have been removed from the men's room. The majority of the floor is covered with a small (1" by 1") ceramic floor tile. Some exposed concrete was noted beneath a stationary bench. A section of ventilation ductwork contiguous to the nuclear medicine laboratories (survey unit 001) has been removed. No solid matrix samples were collected in this survey unit.

5.5.1 Floors

The majority of the surface contamination in survey unit 004 was located on the tile floors. Contamination typically covered smaller areas ranging from a few square centimeters to 200 cm^2. Sporadic contamination was noted on the concrete beneath the changing bench. This location was likely used for shoe storage. Total surface contamination levels ranged from background to 145,000 dpm/100 cm^2, while removable contamination levels were below the applicable DCGL.

5.5.2 Walls and Ceilings

All surface contamination surveys performed on walls and ceilings were within background levels for the associated building material.

5.5.3 Conclusions

It is likely that survey unit can be effectively remediated through tile removal and scabbling of contaminated concrete. The total volume of tile and concrete waste generated from this unit would be approximately 25 ft^3. It is likely that the drainage system fed by the men's and women's restrooms has some limited contamination that is substantially less than that present in the drainage system linked to the nuclear medicine laboratories. No solid matrix samples were collected in this survey unit.

Physical removal of the drain line fed by the men's and women's restrooms is recommended to ensure complete decontamination. The use of drain cleaning techniques is technically feasible, but likely not cost-effective due to high mobilization and set-up costs for a relatively short length of line to be cleaned.

5.6 SURVEY UNIT 005 DISCUSSION

Survey unit 005 contained multiple rooms and areas adjacent to survey units 001-004. These rooms included a fresh air room, tunnel 45, waiting area, several treatment rooms, machine room, and storage room. The relatively large area of this survey unit was ideal for application of the SCM-SIMS.

5.6.1 Floors and Walls

SCM-SIMS floor surveys identified two areas of contamination and one hot spot that exceeded the DCGLs. One area was located in the back hallway of survey unit 005 (MSI survey unit SA0505F), while the other was located in the fresh air room (MSI survey unit SA0504F). The surface area of the contaminated area in the fresh air room was approximately 25 ft^2 with total

beta-gamma contamination levels as high as 10,600 dpm/100 cm^2. The surface area of the back hallway area was approximately 80 ft^2, with total beta gamma surface contamination levels as high as 62,000 dpm/100 cm^2. One hot spot was identified in the terrazzo tile threshold of Tunnel 45 (MSI survey unit SA0503F-2). The hot spot was 4800 dpm/100 cm^2. No removable beta-gamma contamination measurements in these areas were noted to exceed the DCGL. MSI survey details are included in Appendix B.

No total or removable contamination levels exceeding the DCGLs were noted on the lower or upper walls.

5.6.2 Solid Matrix/Concrete Core Sampling

Three discrete solid matrix samples were collected in survey unit 005. Sampling locations included the sump rim in the fresh air room, soil near a sump in the machine room, and drain line residue (also in the machine room). The range of strontium-90 concentrations in these samples was –0.43 to 2.9 pCi/g, with all results below the bulk material DCGL of 5 pCi/g.

Two concrete core profile samples were collected in survey unit 005. These samples were placed in the aforementioned surface contamination areas to determine if there had been migration into the concrete slab. The strontium-90 concentrations in the two samples were 1.20 and 1.60 pCi/g, respectively. The underlying soil was sampled at depth intervals of 0-6" and 6-12", with soil concentrations less than 0.27 pCi/g.

5.6.3 Conclusions

The two contaminated areas and lone hot spot may likely be remediated quickly using scabbling and/or other physical removal techniques. The anticipated waste volume from decontamination in these areas is 20 ft^3. Upon controlled decontamination and final survey of the relatively small areas, the surface contamination survey results may be combined with the MSI survey data to fulfill the requirements of a final status survey.

5.7 SURVEY UNIT 006 DISCUSSION

Survey unit 006 covers several offices and storage areas in the west end of the Building 91 basement. Surface contamination surveys performed by WESTON and MSI identified no total or removable levels exceeding the DCGLs. One exception was noted in the terrazzo tile threshold to the back stairwell (MSI survey unit SA0601F), where a hot spot of 15,500 dpm/100 cm^2 was located.

The lone hot spot may readily be remediated using physical removal techniques. The anticipated waste volume from decontamination in these areas is 3 ft^3. Upon controlled decontamination and final survey of the relatively small areas, the surface contamination survey results may be combined with the MSI survey data to fulfill the requirements of a final status survey. No solid matrix samples were collected in this survey unit.

5.8 SURVEY UNIT 007 DISCUSSION

Survey unit 007 covered a large portion of the east end of the Building 91 basement. As previously mentioned, this area is in daily use by audiometry, speech pathology, and maintenance personnel. Surface contamination surveys performed by WESTON and MSI identified three hot spots (floors) where the maximum surface contamination readings exceeded the DCGL. Two spots are located in the doorway to Room E51 (MSI survey unit SA0714F), while another is located in the doorway to the carpentry shop (MSI survey unit SA0716F). A spot located in the doorway of the electrical shop is very close to the maximum surface contamination DCGL and should be considered for decontamination when this survey unit is addressed. The highest reported activity for these hot spots is 6,300 dpm/100 cm^2. These hot spots were constrained to terrazzo tile interfaces located in doorways. No surface contamination levels exceeding the DCGLs were noted on any walls. No removable contamination exceeding the DCGL was noted in the survey unit.

The isolated hot spots may readily be remediated using physical removal techniques. The anticipated waste volume from decontamination in these areas is 20 ft^3. Upon controlled decontamination and final survey of the relatively small areas, the surface contamination survey

results may be combined with the MSI survey data to fulfill the requirements of a final status survey. No solid matrix samples were collected in this survey unit.

5.9 SURVEY UNIT 008 DISCUSSION

Survey unit 008 includes the ground level of Building 90. The ground level contains two major rooms, one of which was used to control the 1000 kVp x-ray unit, and the second which was used for storage. The control room is a bare concrete floor, while the storage room had recently undergone a tile removal. At the time of survey, the storage room at the west end of the survey unit contained a large number of files. Spot hand-held surveys were performed between files. Surface contamination surveys performed by WESTON and MSI identified no total or removable levels exceeding the DCGLs.

The WESTON and MSI survey data fulfill the requirements of a final status survey. No solid matrix samples were collected in this survey unit. No further investigation is necessary.

5.10 SURVEY UNIT 009 DISCUSSION

Survey unit 009 included the incinerator and surrounding area within Building 64. The majority of floor space in Building 64 was used for miscellaneous storage. The incinerator was accessible and a sample of ash residue collected from the ash hopper underneath the incinerator. The incinerator and surrounding area were surveyed using hand-held instruments due to the lack of available large surface area.

The ash residue was analyzed for strontium-90 activity, with a result of 0.48 pCi/g. Of the 25 smears taken in survey unit 009, one result of 2,916 dpm/100cm^2 significantly exceeded the DCGL. The location of the smear was a wall (level-7') directly behind the incinerator. All other tritium results in survey unit 009 are less than detection limits. This result could be spurious or result from laboratory cross-contamination. Given its location relative to the incinerator and the nature of material incinerated, some supplemental investigation is recommended.

SECTION 6
EVALUATION OF REMEDIAL ALTERNATIVES

Several remedial action alternatives may be evaluated for the VAECC site. It is important to note that the most contaminated areas of the facility are isolated, secure and not important to daily operations at the facility. Remedial alternatives evaluated include no action, limited decontamination, and complete decontamination. The no action and limited decontamination options would require the NRC byproduct materials license to be maintained until the contamination levels had to decayed to levels lower than the DCGLs. This maintenance would likely require a routine monitoring program to be implemented, with reports and license fees submitted to the NRC accordingly. Given this level of involvement the recommended alternative is complete decontamination.

6.1 RE-EVALUATION OF DCGLS TO ASSESS EXTENT OF DECONTAMINATION

It should be noted that the original surface contamination DCGLs were adopted from NRC Regulatory Guide 1.86 (NRC 1976), and that the bulk material criteria for strontium-90 was adopted from an unreferenced source. Prior to initiating decommissioning operations, it is recommended that the DCGLs specified in S&W 1998 be subject to a basic pathway analysis dose assessment to determine compliance with the dose limits specified in 10 CFR 20 Subpart E. Given the current use of the contaminated areas of the VAECC (which is very limited), it is conceivable that calculated surface contamination and bulk material DCGLs could be higher than those presented in the Work Plan. Higher DCGLs could result in some reduction of the volume of contaminated waste generated and shipped during decommissioning.

6.2 NO ACTION

Under a proposed no action alternative, contaminated areas in survey units 001, 002, 003, and 004 at the VAECC would continue to be secured from unrestricted access. Small contamination areas and hot spots within survey units 005, 006 and 007 would pose some small potential for exposure to workers as a result of inadvertent intrusion associated with routine maintenance activities. Since the surface contamination in survey units 005, 006, and 007 is fixed and

isolated, the exposure potential from non-intrusive activities such as walking over, placing and removing files, and transfer of other stored materials is negligible.

Since the total activity of the licensed byproduct material would remain on-site in the survey units 001 through 007, it would be necessary for the VAECC to maintain an NRC license and associated radiological monitoring program. Given the current DCGLs and 28 year half-life of strontium-90, maximum surface contamination as measured in survey unit 001 would decay to unrestricted release levels in 300-400 years. Due to the much lower surface contamination levels in the other survey units, DCGLs could be achieved in a much shorter decay time period.

6.3 LIMITED DECONTAMINATION

A limited decontamination alternative would involve removal of all contamination exceeding the DCGLs and located outside of the secured survey units (survey units 001, 002, 003, 004). Given that the nature of contamination outside of these survey units is sporadic, limited decontamination activities would be relatively straightforward to perform. Survey units 005, 006 and 007 contain several small areas of surface contamination and hot spots that appear to be isolated and relatively easy to remove. By performing the limited decontamination, the potential for inadvertent exposure to non-radiation workers would be mitigated. Currently, some small potential exists for inadvertent disturbance of the fixed contamination due to maintenance activities such as tile removal, concrete resurfacing, etc.

Since the majority of the licensed byproduct material would remain on-site in the secured survey units, it would be necessary for the VAECC to maintain the NRC license and an associated radiological monitoring program. As with the no action alternative, a significant period would be necessary for the strontium-90 to decay to levels less than the DCGLs.

6.4 COMPLETE DECONTAMINATION

Complete decontamination would require removal of all strontium-90 contamination exceeding DCGLs in any of the survey units. As mentioned in the previous section, decontamination in survey units 005, 006 and 007 would be relatively straightforward, with only small amounts of

radioactive waste generated. Decontamination of the women's and men's (survey units 003 and 004) restrooms would require the removal of a significant amount of floor tile and scabbling of concrete surfaces. Survey units 001 and 002 are extensively contaminated and would require removal of significant quantities of building materials. Contaminated building materials include concrete floor slabs/sections, wooden and cinder block walls, contaminated laboratory cabinets and fixtures, and contaminated subsoils and drain lines.

Given the nature of the St. Albans NRC license, complete decontamination is the most desirable option. Under no action and limited decontamination there is still some level of institutional control that must be maintained by the licensee. It should be noted that this is the most costly alternative, given the anticipated complexity of accessing the contaminated areas with heavy equipment and the cost of transport and disposal of radioactive waste. Since the majority of the contaminated survey units were originally constructed to shield patients and staff from radiation treatments, there are areas where building materials are substantially thicker and heavier than normal. Examples include the leaded doors located in the nuclear medicine laboratory and various treatment rooms.

Perhaps the two most significant issues influencing the decision to perform complete decontamination are access to the highly-contaminated areas and transport of contaminated building material and debris from these areas. These issues are discussed below.

6.4.1 Future Use of Facility

Perhaps the most critical step in determining the technical approach for decommissioning (and ultimately cost), is to identify the future use of the impacted survey units. Intuitively, complete restoration of the nuclear medicine labs and ejector pit to their original condition would be very costly versus removing the contaminated structures and backfilling the area. It is reasonable to assume that the contamination in survey units 005-007 would be removed with relatively little damage to the facility. The areas previously used for file storage could be placed back into service as necessary. VAECC input in this process is essential.

6.4.2 Access Issues

Survey units 001-004 are located in the basement of Building 90. The survey units cover rooms that are in an underground "tunnel" between Building 91 and the balance of Building 90. Fortunately, there are no structures above these survey units in the outdoor courtyard between buildings 90 and 91. It appears that the most logical approach to large-scale decommissioning is to access the contaminated survey units from above. This approach will be relatively complex in that a strict sequence of structure dismantlement will be required. The sequence is important because heavy equipment operating above and near the subsurface rooms may put unanticipated stress loading on support elements. Likewise, a geotechnical review of the engineering sequence is recommended.

6.4.3 Radioactive Material Transport Issues

The removal of radioactive material from the contaminated survey units should be relatively straightforward if access occurs from above the rooms. Should it be determined that decontamination will proceed from the "inside-out", it will be extremely difficult to move large quantities of debris and waste from the subsurface work areas. No elevator or other means of transport to the ground level is readily available in the work area.

SECTION 7
HAZARDOUS MATERIAL DATA

There was no evidence of significant quantities of hazardous materials in any survey areas. In some locations, jugs of what appeared to be cleaning fluids were observed (e.g. Radiac wash was observed in the laboratory). Any material remaining in storage tanks in the laboratory and the ejector pit should be considered hazardous. Fluids used by maintenance workers were observed at some locations in small quantities. What appears to be a small metal canister with contents unidentified was observed in the High Level Laboratory. Any waste materials produced during the characterization are considered radioactive waste. These materials are presently stored in the ramp to the laboratory in labeled trash bags. The materials observed are described in Table 7-1.

Vinyl asbestos floor tiles and potentially asbestos-containing floor tile mastic were observed at several locations. The asbestos-containing materials removed from the laboratory area appear to be stored in the laboratory in bags and drums, however mastic, which may contain asbestos, remains on the floor. It should also be noted that many of the rooms have plaster walls and some have dropped ceilings with suspended ceiling tiles. Wall and ceiling plasters may be asbestos-containing materials, as may ceiling tiles and fireproofing materials (if present) above dropped ceilings. Incinerator ash and scrubber wastes may be hazardous.

Table 7-1

Hazardous Material Assessment

Survey Unit #	Area Description	Hazardous/Potentially Hazardous Materials Observed
SU001	Building No. 90 - Nuclear Medicine Laboratory,(Ramp to Nuclear Medicine Laboratory, Water Distillation Alcove, Counting Laboratory, Low Level Laboratory, High Level Laboratory, Isotope Storage Area)	Six to eight bags of apparent asbestos waste (from abatement of floor tiles). Three to four jugs of apparent cleaning solutions. Two to three drums of apparent asbestos waste (likely floor tiles). Five to six bags of rad waste materials. Mastic from r
SU002	Building 90 – Ejector Pits	Any possible materials remaining in the tank. Drum containing unidentified materials. 1 bag of rad waste materials (tyveks, boots, etc.)
SU003	Building 90 – Ladies Toilet	Floors are ceramic tile/concrete block - no potentially hazardous materials.
SU004	Building 90 Men's Toilet and Entry Area	Floors are ceramic tile/concrete block - no potentially hazardous materials.
SU005	Building 90 – Basement area of Building 90 not covered by other survey units and Building 91 corridor area adjacent to Tunnel 45 Entrance	Approx. 500 SF of vinyl asbestos tile (VAT) and potentially asbestos containing mastic in the Treatment Room. Two small observation rooms between stairs and Treatment Room are likely to also contain VAT and asbestos-containing mastic, however these areas
SU006	Building 91 – Basement area west of the corridor double door to Tunnel 45	Small quantities of maintenance fluids stored in work room (E45). Possible VAT and asbestos containing mastic in two small closets.
SU007	Building 91 – Basement area east of the corridor double door to Tunnel 45	Most of the rooms used by Maintenance personnel which are located off of the main corridor contained VAT and possible asbestos containing mastic. The audiology rooms were carpeted. The tile under the carpeting was not observed. Toilets have ceramic tile.
SU008	Building 90 – Ground Level	Tiles have been removed from the "unassigned space" leaving potentially asbestos-containing mastic.
SU009	Building 64 – Incinerator Internals	Incinerator ash and scrubber waste may be hazardous.

SECTION 8

SUMMARY OF QUALITY ASSURANCE PROGRAM RESULTS

Quality assurance and quality control measures were applied to the use of all radiation monitoring equipment and samples submitted for laboratory analyses.

8.1 RADIOLOGICAL EQUIPMENT

QA/QC measures for radiological monitoring included:

1. Use of standard operating procedures and data forms to record raw surveys.
2. Review of all equipment calibration forms for proper application.
3. Daily background checks for all portable equipment.
4. Daily function checks for all equipment using an NIST-traceable check source.
5. Charting of function check results for agreement with Poisson distribution.

All equipment-related records are maintained in the project files – codes 1.4, 2.1 and 2.2. During standard checkout of the portable equipment, a Ludlum Model 2929 dual channel scaler was noted to have an electronic fluctuation. This instrument was replaced the following day. All other radiological equipment used at the site operated within acceptable tolerances.

Similar QA/QC procedures were implemented by MSI while using the SCM-SIMS system. To ensure consistent survey speed and detector response, MSI performed function and distance checks several times each day. These procedures are described in detail in Appendix B.

8.2 SAMPLE COLLECTION/ANALYTICAL LABORATORY

Per the requirements of S&W (1998), duplicate samples were submitted for laboratory analysis. The document specified 60 duplicate samples to be collected at the discrete survey points. Due to the reduction of total discrete measurement locations, the number of QC locations was reduced proportionally. Prior to shipment, all samples were labeled and recorded on chain of custody forms, which are filed under code 3.2.1.

Forty-eight duplicate smears and four duplicate solid matrix samples (two soils, one concrete, one miscellaneous) were collected during characterization and submitted for laboratory analyses. The paired sample results are presented in Appendix F. Given the variable nature of removable contamination, the variance of liquid scintillation results has little significance. All reported solid matrix sample results are below the strontium-90 detection limit, thus comparisons have little significance other than no spurious high readings were reported.

In the process of analyzing smears via liquid scintillation analysis, ThermoNUtech prepared and analyzed spikes and blanks that were analyzed for carbon-14 and tritium, respectively. Spike and blank analyses are presented on individual laboratory reports as filed under code 3.2.2. All spike and blank results were within acceptable laboratory protocol. ThermoNUtech also reviewed each data set for the potential influence of high-energy beta-emitting radionuclides (strontium-90) and noted this potential on applicable laboratory reports. Laboratory reports presented sample-specific minimum detectable activity, which ranged from 20-80 dpm/100 cm^2 for both carbon-14 and tritium.

Similar QC measures were implemented in the analysis of solid matrix samples. ThermoNUtech analyzed spike and blank solids for strontium-90 content. All results were within acceptable laboratory protocol. Laboratory reports presented sample-specific minimum detectable activity, which ranged from 0.5 to 1.9 pCi/g for strontium-90.

8.3 MISCELLANEOUS

Prior to all field activities, workers received site-specific training. Copies of this training and attendee lists are filed under code 1.3. All worker training certifications per 40 CFR 1910.120, respirator fit test certificates and supporting documentation are also maintained under this file code.

SECTION 9
CONCLUSIONS

Characterization activities performed at the VAECC yielded useful information to assist in the evaluation of decommissioning alternatives. Activities were performed safely and within the requirements of the Site-Specific Health and Safety Plan (SSHASP, WESTON 1999). The combination of traditional surface contamination survey methods, SCM-SIMS surveys, and laboratory analysis of smear and solid samples proved to be a powerful means to support the following conclusions.

The application of the SCM-SIMS survey methodology yielded more data than originally specified, with the data being of high quality and usefulness. Conclusions regarding use of the SCM-SIMS include:

- "Saturation" surveys of areas contiguous to the restricted survey units 001-004 indicated very little transfer of contamination has taken place, and when it does exist, it is confined and fixed to small floor areas of concrete or terrazzo tile.
- Data easily meet and exceed the requirements of a final status survey in survey unit 008.

The survey coverage of floor areas in survey units 005 through 007 approached 100%. It is reasonable to conclude that nature and extent of the small contamination areas/hot spots is well defined. No expansion of the survey system or level of coverage in these survey units is necessary. After limited decontamination and re-survey (using hand held instrumentation) of these areas, the SCM-SIMS data may be combined with the release survey data to constitute a final status survey.

Areas of survey units 001, 002, and 004 exhibit levels of fixed and/or removable strontium-90 contamination that exceed the surface contamination DCGLs. Most contamination has been noted on the floors, however the lower walls of survey unit 001 are also sporadically contaminated. Concrete core samples in survey units 001 and 002 have indicated strontium-90 contamination to maximum depths of 3-4 inches in some areas. The drain system that serviced survey unit 001 (and fed to survey unit 002) is known to be contaminated and its integrity

suspect. Some minor soil contamination is present in the soil around this drain system. A drain system that serviced survey units 003 and 004 (and fed to survey unit 002) should be assumed to be contaminated, although not to the levels of the nuclear medicine laboratory line. Should complete decontamination be selected as the preferred remedial alternative, significant structural and access issues will complicate removal efforts. The estimated waste volume (strontium-90 contaminated only) that would be generated from decontamination of survey units 001, 002, and 004 is 4000 ft^2.

The identification of removable tritium contamination in survey units 003 and 009 is noteworthy in that additional characterization may be warranted in these areas. Survey unit 009 poses the most significant concern in that the contamination was noted on the upper walls near an incinerator. The potential for large-scale contamination is higher due to the likely throughput of tritium-containing items such as animal carcasses and miscellaneous waste. At a minimum, extended characterization activities should extend to the ceiling and upper walls, as well as all ventilation and discharge systems.

The presence of asbestos-containing material must be considered when planning all decommissioning activities. Transite and suspect floor tile were noted in survey units 001, 005, 006 and 007. In survey unit 009, a material similar to transite was noted behind the incinerator. It is recommended that an asbestos survey be performed in potentially-impacted facility areas in conjunction with the preparation of a site decommissioning plan.

SECTION 10

REFERENCES

NRC 1976. Unrestricted Release Criteria for Termination of Nuclear Power Reactor Licenses. U.S. Nuclear Regulatory Commission Guide 1.8.6. 1976.

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separates

documents.

U.S. Army Corps of Engineers

New England District
Concord, Massachusetts

TECHNICAL SUPPORT SERVICES
ST. ALBANS VETERANS ADMINISTRATION EXTENDED CARE CENTER QUEENS, NEW YORK

Contract No. DACA31-96-D-0006

RADIOLOGICAL CHARACTERIZATION SURVEY REPORT
VOLUME II OF II – APPENDICES A-G

Task Order No. 19
DCN: VAHOSP-042799-AAAZ

27 April 1999

98P-0892

WESTON
MANAGERS DESIGNERS/CONSULTANTS

Executive Summary of Radiation Surveys Performed at the St.Albans Veterans Administration Extended Care Center Queens, New York

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February 6, 1999

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1. Summary of Work

St. Albans Veterans Administration Extended Care Center is located on approximately a 10 acre site at 179th Street and Linden Boulevard in Queens, New York. The facility operated as a Naval Hospital prior to its acquisition by the VA. The Naval hospital provided nuclear medicine services under several NRC licenses. NRC licensed activities ended with the termination of NRC license #31-00076-06 on December 31, 1973. Surveys performed in recent years have identified radioactive contamination in excess of the NRC release criteria. Historical assessment of the operation of the nuclear medicine laboratory identified the possibility of a spill of liquid $^{90}Sr/^{90}Y$ occurring in late 1962. Surveys performed have indicated elevated readings in the laboratories and several areas adjacent to the labs and in the ejector pit that received liquids from the laboratory drain system. Survey reports presented as recently as 1997 indicate the need for a more extensive survey of the area.

Roy F. Weston, Inc., as prime contractor to the USACE North Atlantic Division, New England District (CENAE) contracted Millennium Services, Inc. to perform a more detailed survey of the areas potentially affected. Areas requiring surveys were classified as Class 1 and Class 3 areas. The objectives of the survey were:

- Survey the Class 3 areas to meet the final status survey criteria of MARSSIM to determine if the Class 3 areas meet the free release criteria: and
- Survey the Class 1 areas for characterization to support development of a remediation plan and decommissioning cost estimate

During the period January 18, 1999 through January 25, 1999, Millennium Services, Inc. (MSI) and its teaming partner Shonka Research Associates, Inc. (SRA) performed surface contamination surveys at the St. Albans VAECC using the patented Surface Contamination Monitor/Survey Information Management System (SCM/SIMS developed by SRA. This report details the areas surveyed, the methodologies employed and the results including background measurements and quality control processes.

Highlights of the survey include:

- Survey of greater than 480 square meters of Class 1 Areas, involving more than 19,000 individual measurements;
- Identification of 20 areas in excess of the maximum 100 cm2 acceptance criteria and 8 square meters in excess of the average square meter criteria:
- Survey of greater than 800 square meters of Class 3 Areas, involving more than 30,000 individual measurements;
- Identification of 3 areas in excess of the maximum 100 cm2 acceptance criteria; and
- Completion of the survey in 7 working days.

1.1 Survey Area

Areas that are the focus of this survey have been categorized as Class 1 and Class 3 areas. The Class 1 areas are those areas that have been known to be contaminated or for which there is evidence of contamination in excess of free release activity values. The Class 1 areas include the hot labs and the isotope storage area, the ramp leading to those labs, tunnel 45, the clean air room, the inductor room, the former treatment rooms an adjoining hallways, the

machine room, and the men's and women's room. . The class 3 areas are those areas adjacent to the class 1 areas that have the potential for contamination, but for which there is no evidence, from either historical records or recent surveys that indicates that radioactive contamination exists. The areas designated Class 3 areas include the hallways, workshops and offices immediately adjacent to the building 45 tunnel. The Class 3 area extends to the east end hallway, adjacent to the stairs and elevator and includes the area presently occupied by the audiometry department.

The areas surveyed are presented in Appendix A. The survey unit identification numbers established in the Work Plan for these areas are identified in Appendix A.

1.2 Survey Team

The survey team consisted of Mr. Richard W. Dubiel, CHP, and Mr. Jeffrey T. Chete of Millennium Services, Inc. and Mr. Don DeBord of Shonka Research Associates.

2. Scope and methodology

2.1 Data Acquisition

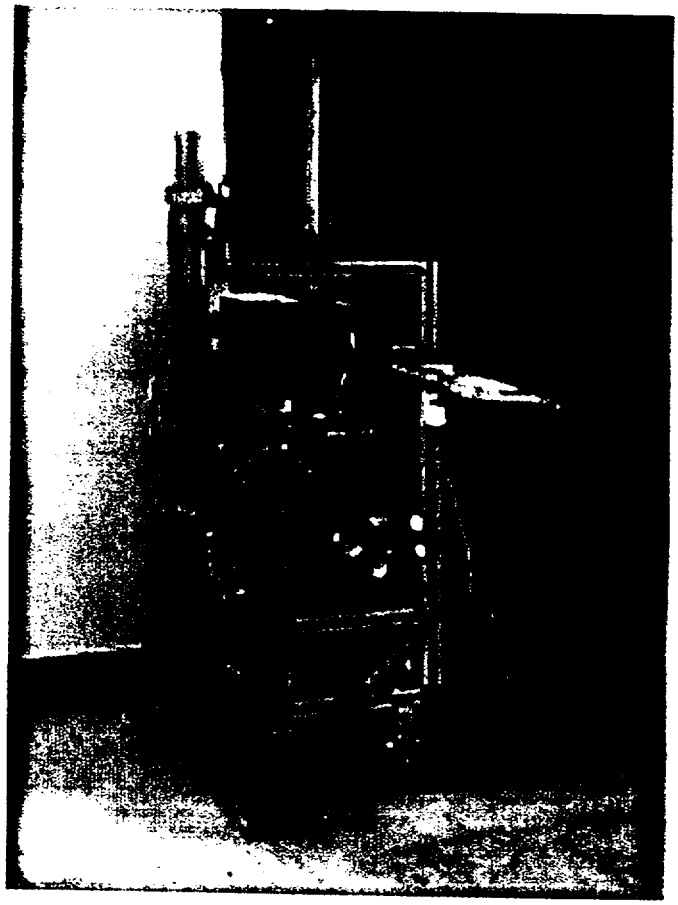
Surveys were performed to determine surface activity levels. The isotope of concern is 90SR. based on the historical assessment and evidence of a spill involving that isotope. Surveys were conducted using the Surface Contamination Monitor/Survey Information Management System (SCM/SIMS) developed by SRA. The system consists of a position sensitive proportional counter (PSPC) coupled to a computerized data acquisition system. The PSPC is a long detector that acts as an array of many small radiation detectors. This allows the

SCM Floor Monitor 1

instrument to measure more area per unit time than a smaller detector and still separate out localized areas of contamination. The PSPC is mounted to a motor driven cart. The drive motor provides speed control for the unit, and a precision wheel encoder, affixed to the cart.

provides travel distance input to the computer. Counts are accumulated in each 2" channel every 2" travel by the system. The result is data retained in 2" x 2" pixels, available for analysis and presentation via the SIMS software.

As deployed, the system used a 2' long detector for the floor areas. Although detectors up to 6' long were available, the small areas surveyed did not make use of the longer detectors practical. To complete surveys in areas that were not accessible with the standard cart mounted detectors, corner detectors were employed. The corner detector is a similar PSPC used in s static count mode with data binned in 2" increments. The output of the corner detector is formatted to allow integration into the SIMS software to complete the survey data for a survey area.



SCM Wall Monitor 1

Wall surveys were performed by mounting the detectors vertically to the side of the SCM cart. All other aspects of the survey are consistent with floor monitoring. Speed control is maintained by the drive wheel. and position sensitivity established through the wheel encoder and the height above grade as identified by the PSPC.

Surveys were conducted in accordance with equipment operation and calibration procedures developed by SRA. Detector efficiencies were determined with a NIST traceable source with a maximum Beta energy of 0.546 MeV for ^{90}Sr and 2.29 Mev for ^{90}Y. Periodic Quality

Control checks were performed for each detector in use, and used to establish the efficiency for the detectors based on data that spanned the use of that detector during the survey (See section 4). Beta surveys were conducted at a speed of 2"/sec. All quality control checks were performed under the same operating and environmental conditions as the survey.

2.2 Data Analysis

To automatically document a survey, four elements are needed: a platform for the computerized measurement system; sensors appropriate for the desired measurement; the reading of the sensors; and the location of the reading. These four elements are integrated into the SCM described above. The longitudinal location is determined by equipping one of the wheels on the cart with a high precision wheel encoder. This device provides 110 pulses per inch of travel. Measurements are obtained for each 2" travel of the SCM, with the data "binned" in 2" increments along the length of the PSPC. Therefore, each 2" x 2" area, referred to as a pixel, has an associated measurement. A building or exterior area is divided into conveniently sized survey blocks. The size of the survey block is typically limited to 15 meters by 15 meters, which results in 90,000 recorded measurements per block. This size of survey, when converted to a large matrix of numbers can be easily manipulated as a digital image using commonly available personal computers. A series of straight lanes is marked on the area to be surveyed using chalk lines or other means. The SCM is aligned with the first lane, and the "start recording" function is invoked. The SCM is motorized, and the operator follows the machine monitoring the data acquisition and steering the system straight down the chalk line. At the end of a strip, the operator presses the "stop recording" function and aligns the SCM with the next strip.

The SRA Survey Information Management System (SIMS) provides a powerful interface for studying and reporting survey information. Although primarily designed to handle the large quantity of data produced by the SCM, SIMS can manage any survey data, including non-radiological measurements. When used with the SCM and for a survey of a rectangular area, no operator intervention is needed to generate a survey report. When the survey is from an irregular area, STITCHER© is used to re-assemble the strips in the manner in which they were taken. The user simply "grabs" strips, pulls them into location, and points them in the direction they were taken. The logged data file has dimensional information such as the length of the strip. The automatically generated survey report includes a narrative that reports time and date of survey, process monitor information from the SCM, and any data entered by the survey technician (building and survey block number, etc.). The report includes a user selectable plot (three-dimensional default) of the data; a two-dimensional color plot of the data with grids (one meter square) superimposed; and a spreadsheet showing data for minimum, maximum, average, and standard deviation (in units of dpm per 100 cm^2) of the activity for each of the meter grids. The values contained in the spreadsheet are printed in bold for any square meter in excess of reporting limits for average contamination above background. A black background grid of the survey area is also generated indicating any 100 cm^2 areas exceeding the local area limit shown in white above background. This survey report is a Microsoft™ Word document, and the technician can edit the report to provide more narrative, show video images, and show the results of further study on the data such as zooming and cropping to localize areas for examining the detail. Images can be shown in two or three-dimensional presentations with a dozen different color maps and with or without contour lines.

SIMS also provides nearly all of the algorithms that have been developed by NASA for treatment of earth imagery from satellites. These include alternate methods for edge detection, smoothing and other data treatments, interpolation, etc. Additionally, the user can call up the square meter data on the screen and display distribution functions of the data on probability scales. SIMS is integrated into Windows® and makes use of either files or the clipboard for transferring data to other applications. Data can be transferred to CAD (via DXF formatted files) or GIS (via ARCINFO formatted files) systems in the form of two dimensional images or contours that can be directly overlaid onto facility CAD drawings, or can be transferred to image treatment software such as CorelDraw to overlay video images captured from the camera with CAD drawings and data.

Survey reports containing three and two dimensional images and square meter grid data, including mean, maximum, minimum and standard deviation for each 100 cm^2 area, for all areas surveyed, are provided as an attachment to this report.

2.3 Reporting Criteria

This data is reported both as digital images and tabular data which provide net disintegrations per minute per 100 cm^2 for average and maximum values measured in each square meter of building floor. This report will use the unit "average dpa" to report the square meter average disintegrations per minute per 100 cm^2, and "maximum dpa" to report the maximum measured value of disintegrations per minute per 100 cm^2 found in a square meter. The data is asserted to be above reporting criteria when the measured values on the detector, less background, exceed the values discussed in this section

The purpose of the survey was to gather radiological data in support of free release of Class 3 areas of the building. Class 1 area information will be utilized in development of the facility decommissioning program Reporting criteria were established based on industry standards and efforts to provide the most useful information at this point in the process. The values listed in Table 2.1 are identified in the Work Plan for the characterization survey for St. Albans VAECC. These values are not inclusive of background, hence the reporting criteria below is stated in terms of net dpm per 100 cm^2.

Table 2.1 Reporting Criteria used for Survey Reports.

Type Radiation	Average net dpm per 100 cm^2	Maximum net dpm per 100 cm^2
Strontium-90	1000	3000

3. Background

The background encountered in an area is an important quantity to establish to correctly assert the net contamination present in a radiation survey. The need for care in establishing the correct background depends on the impact of the choice in backgrounds on any decision. If the site reporting criteria are set at easily measurable levels, and the field survey area is grossly contaminated above the reporting levels, then careful measurements of backgrounds are less important and less study is necessary. Under some conditions, there is no need to establish backgrounds, since the site may not need a precise net dpa value, and a background

of "zero" can be assumed. This is also true if the area is well below easily measured reporting criteria. More careful assertion of backgrounds is needed when you are trying to assert contamination that is present at levels that are extremely close to site reporting levels, or when you are trying to measure the total contamination present (by adding the net dpa per square meter over the entire survey area).

The variations in background from surface materials can be substantial, and in many cases exceed the reporting criteria values. Thus, establishing a single background value can lead to incorrectly identifying acceptable areas as contaminated, or contaminated areas as acceptable for free release. To more accurately reflect the backgrounds for the areas surveyed, data from those areas that exhibit distributions typically found in non-contaminated areas are used to assert the background. With the availability of up to 400 measurements in a square meter, statistical analysis of the data can verify that the data used exhibits properties consistent with non-contaminated areas.

Backgrounds were established in an iterative fashion using the data from the survey grids themselves. Partial meters with less than 400 measurements are not used (or shown). Also, meters with standard deviations substantially above the typical values for the data set were redacted. This was done to remove meter areas in which there was a potential that added man-made contamination was the source of the larger standard deviations. It is important to realize that removal of excessively large values from the distribution is always conservative, in that backgrounds may be understated and contamination overstated if the rejected high value is a valid measurement of background and not contamination. The data was examined in spreadsheet form by successively ranking maximum, standard deviation, and mean in ascending order and viewing the largest values.

Under ideal circumstances, the meter data, when plotted as a cumulative frequency distribution, will smoothly follow either a normal or log-normal distribution. When the data is log-normally distributed (this will often occur with environmental measurements), the mean, mode and median will differ and redacting extreme values will tend to assert an average that is slightly lower than the true average. This will be conservative, and is appropriate unless the conservatively stated background impacts site decisions due to low reporting criteria.

The areas surveyed at the St. Albans VAECC presented significant variations in background. Nine different materials of construction were monitored with the SCM. Identification of each of the nine materials and the backgrounds are presented in table 3.1. The backgrounds in these areas varied by 400%, however within each grouping, the variations were found to be minor. The values presented in the data are based on the efficiencies developed for the detectors with a ^{90}Sr source, and are expressed in terms of ^{90}Sr equivalent.

Table 3.1
Background Values for Various Materials of Construction

Group	Surface Materials	Background (dpa 90Sr Equiv)
1	8" x 12" Wall Tile	2238 dba
2	4" x 4" Wall Tile,	2208 dba
3	1" x 1" Floor Tile	1450 dba
4	9" x 9" Floor Tile	1105 dba
5	Painted Concrete Block Walls	1058 dba
6	Terrazzo Floors	894 dba
7	12" x 12" Floor Tile	653 dba
8	Carpet	642 dba
9	Wallboard	554 dba

A review of the data identified that the areas can be grouped into five distinct levels of background. Within each group, the lowest background value represents the conservative approach to determining if areas exceed the reporting criteria. The background determined from the data obtained during this survey is identified for each of these groups in Table 3.2.

Table 3.2
Background Values Applied to Survey Data

Group	Surface Materials	Applied Background Values
1	8" x 12" Wall Tile, 4" x 4" Wall Tile	2208 dba
2	1" x 1" Floor Tile	1450 dba
3	9' x 9" Floor Tile, Painted Concrete Block	1058 dba
4	Terrazzo Floor	894 dba
5	12" x 12" Floor Tile, Carpet, Wallboard	4 dba

4 Quality Control

The primary isotope of concern for this survey is ^{90}Sr. All quality control measurements were made using 90Sr sources. The source used during the survey was comprised of two ^{90}Sr sources of 47 mm diameter. The first source , source No. FX-679 is a NIST traceable source. The copy of the source certificate is included as Appendix A. The second ^{90}Sr source, source No. B-879 is of similar size. Since the traceability of the source is questionable, a reference to the first source was developed prior to deployment for the survey. Twenty static measurements using two different Beta sensitive radiation monitors were made of each source. The mean values of the measurements were then used to develop a standard for the source No. B-879. The data collected to establish the reference for source No. B-879 is also included in Appendix B.

The sources were placed on a thin paper backing with the center of the sources two inches apart. The positioning created a source approximately four inches in length, approximating one side of a square 100 cm^2 source. The source geometry better approximated the response

of a source distributed over 100 cm^2. Smaller sources will tend to cause an overestimation of the detector response and therefore overstate the system efficiency.

Quality Control checks consisted of rolling the detector over the sources at the speed and detector height used during the survey. Each check consisted of 3 passes over the sources. A check was performed at the beginning and end of each detector use each day and frequently during the surveys. The response of the detector over the duration of its use becomes the basis for the detectors efficiency. Each detector efficiency is calculated against the activity of ^{90}Sr in the sources. The efficiencies are higher than normally encountered for beta radiation due to the second beta from the daughter isotope, ^{90}Y, and the high energy of the betas.

During the performance of the survey, four detectors were used. Initial surveys of the floor areas were performed with a 2' detector (SRA002). All wall surveys were performed with a 6' detector. Following completion of initial floor areas, and during movement of the detector to survey area 08, the floor survey detector was changed to a second 2' detector (SRA001). The fourth detector used was a 6' corner detector. Quality control data for each detector is presented in Appendix C. Figure 4.1 presents the control chart for the 2' floor detector (SRA002).

Prior to commencement of survey activities, the precision wheel encoder calibration was verified in accordance with normal operating procedures. The encoder was checked against a 60' strip, with the measurement repeated three times. The acceptance criteria for acceptable response is that the mean of the three readings must be within 1% of the actual distance, and that each of the three readings must be within 3% of the mean. The results of the wheel encoder calibration verification are presented in table 4.1.

TABLE 4.1

Measurement	Distance (inches)	Dev. From Mean (%)
1	720.4	0.13
2	721.5	0.013
3	722.3	0.12
Mean	721.4	XXXXXXXX

Mean variance from Actual Distance: 0.19 %

5 Survey Results

Survey reports are presented as an attachment to this document. Each area surveyed is presented as a unique document. An example of the survey identification numbers as presented is SA0101F. The SA refers to St. Albans. The first two digits refer to the survey unit identification numbers of the characterization work plan. The next two digits are a sequential number to track the individual areas of the survey units as monitored during this survey. Appendix A provides a reference for each of the areas. The last letter

of the survey name identifies the surface monitored. F indicates that a floor surface was monitored. The letters E, N, S, and W refer to a wall surface in that survey area. Each wall area was monitored to a height of 6 feet. The orientation of the floor surveys is established with the 0,0 reference as the southwest corner of the area. For wall units, the data is presented as one would be looking at the wall. The 0,0 reference is the lower left corner of the wall as one would be facing it.

Each survey is documented with a narrative that provides survey information such as technician, date the monitoring system, the system efficiency and general information regarding the output data. A 3 dimensional graph and a 2 dimension color graphic display of the data is presented on page 2. For areas with poor aspect ratios, e.g. long, narrow halls, the 2 dimensional display typically provides better observation of the results. The graphs are followed by a summary table providing the mean, maximum, and minimum 100 cm^2 value for each meter. The table also provides the standard deviation of all 400 measurements within the meter, and the number of pixels in the meter area. Full meters will have 400 pixels, meters on the edge of the survey area may have less.The reports are divided into the Class 1 area reports representing Survey Units 1 and 5, and the Class 3 areas, representing Survey Units 006, 007, and 008.

5.1 Class 1 Areas

The Class 1 areas consisted of the ramp area leading to the laboratories and the areas extending from tunnel 45 to the southwest, encompassing the former waiting area, treatment rooms, machine room, etc. floors and available wall areas were surveyed in support of the characterization efforts in these area. Areas that are known to be contaminated over much of their surfaces were not surveyed. Examples of these areas are the men's and women's rooms adjacent to the waiting area, and the ejector pits.

Table 5.1
Summary Table
Class 1 Areas

Survey Area	Highest 100 cm2 Area	No. of meters	No. exceeding M2 limit	No. exceeding 100 cm2 limit	PSPC Efficiency
SA0101E	3906	16	0	0	0.6611
SA0101F	96909	16	2	5	0.709
SA0101W	7425	14	0	2	0.6611
SA0501F	9014	54	0	1	0.709
SA0502F	1782	80	0	0	0.709
SA0502W	2755	18	0	0	0.6611
SA0503E	3022	12	0	0	0.6611
SA0503F	5096	35	0	1	0.709
SA0503N	3069	8	0	0	0.6611
SA0503S	2777	8	0	0	0.6611
SA0503W	2972	12	0	0	0.6611
SA0504F	10599	20	1	3	0.709
SA0505E	1627	16	0	0	0.6611

SA0505F	62068	55	5	8	0.6187
SA0505W	1614	16	0	0	0.6611
SA0506E	833	10	0	0	0.6611
SA0506F	1236	25	0	0	0.6187
SA0506N	942	8	0	0	0.6611
SA0506S	806	6	0	0	0.6611
SA0506W	884	10	0	0	0.6611
SA0507E	769	2	0	0	0.6611
SA0507F	929	12	0	0	0.6187
SA0507N	871	4	0	0	0.6611
SA0507S	850	6	0	0	0.6611
SA0507W	964	4	0	0	0.6611
SA0508F	2799	18	0	0	0.6187
SA0509F	1554	2	0	0	0.6187
	Total Area	487	Square Meters		

The ramp leading to the laboratory area, survey area SA0101, shows several areas of contamination both on the floor and on the west wall. In Survey Unit 005, contamination was found in several areas. The highest levels were detected in survey area SA0505, the hallway leading from the former waiting area to the treatment room. Contamination was also found in the fresh air unit room and in the 1000kvp treatment room. All contamination found in these areas were on floor surfaces. There was no evidence of contamination on walls outside of the ramp area leading to the laboratories. Figure 5.1 is the 2 dimensional colorgraphic image for survey area SA0505F. The view from the bottom is toward the former waiting area. The highest levels of contamination were found at the south end of the area, with additional contamination detected toward the middle of the hallway and a small spot near the entrance to the waiting area.

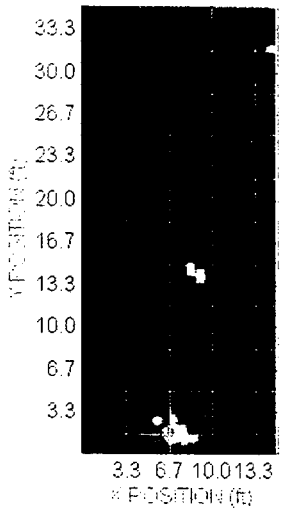


Figure 5.1 Survey Area SA0505F 1

There was no contamination detected in the machine area or in the back treatment area, SA0506, and SA0507.

Total surface area surveyed in the class 1 areas was 487 square meters with over 19,000 individual measurements obtained.

5.2 Class 3 Areas

Class 3 area surveys consisted of floor and wall surveys in Survey Units 006, 007, and 008. These areas consisted of the hallway and adjacent storage rooms and shops outside tunnel 45, and the area above the 1000 kvp treatment room. Wall surveys were performed where accessibility to the walls were reasonable. Many of the areas surveyed are presently in use as offices, test facilities and shop areas. Of the more than 800 square meters surveyed, three areas were found in which the maximum 100 cm^2 criteria of 3000 dpm above background was exceeded. The areas involved survey areas SA0601F, SA0714F, and SA0716F. No distributed contamination was detected and no square meter exceeded the meter average criteria. Each of the three areas in which the maximum 100 cm^2 criteria was exceeded had no other identified contamination. The summary of the findings in Class 3 Areas is presented in Table 5.2. The total area surveyed exceeded 800 square meters, with over 30,000 individual measurements obtained.

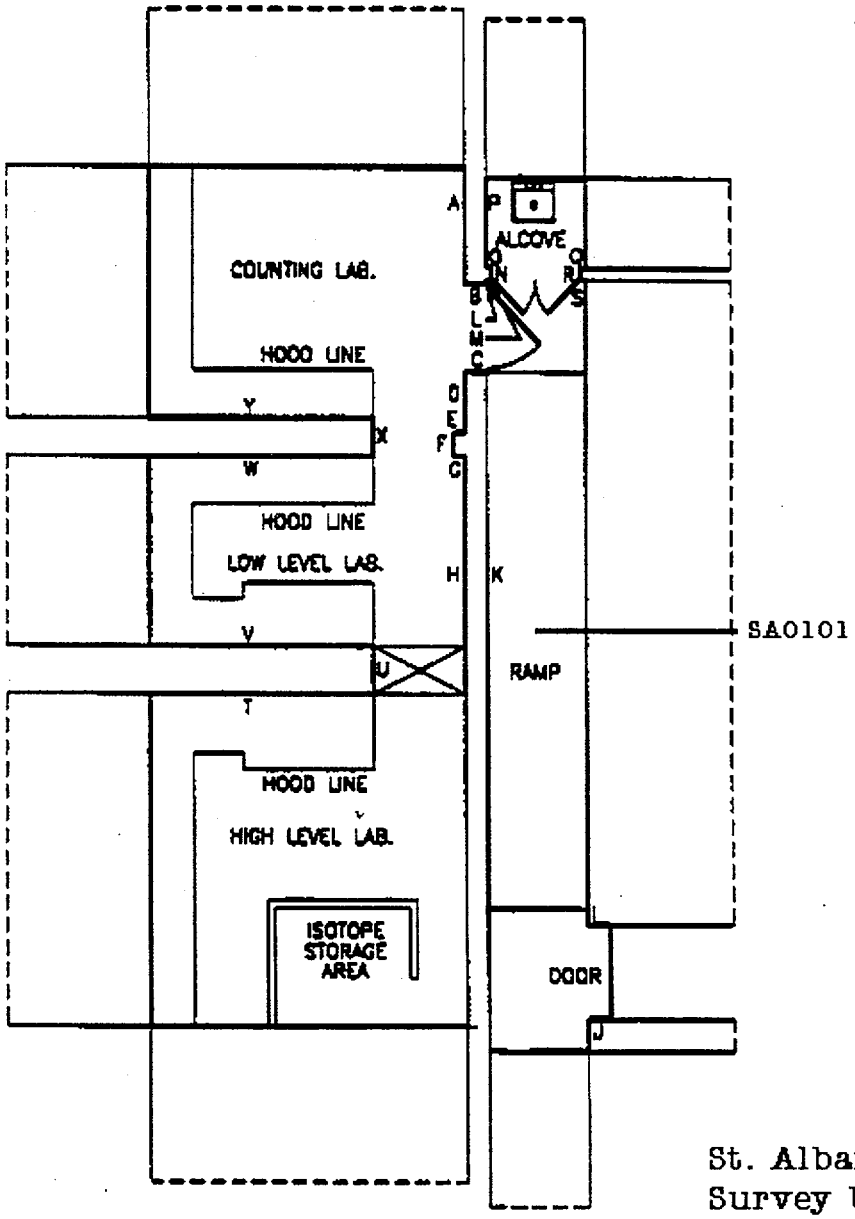
Table 5.2
Summary Table
Class 3 Areas

Survey Area	Highest 100	No. of	No. exceeding	No. exceeding	PSPC
	cm2 Area	meters	m2 limit	100 cm2 limit	Efficiency
SA0601F	15515	60	0	1	0.709
SA0601E	2820	4	0	0	0.6611
SA0601S	2868	6	0	0	0.6611
SA0602F	1740	2	0	0	0.709
SA0603F	1014	20	0	0	0.709
SA0603E	1094	4	0	0	0.6611
SA0603S	1254	6	0	0	0.6611
SA0604F	1439	20	0	0	0.709
SA0604E	2972	2	0	0	0.6611
SA0604S	3120	8	0	0	0.6611
SA0604W	3225	6	0	0	0.6611
SA0605F	1042	20	0	0	0.709
SA0701F	1097	35	0	0	0.709
SA0701N	3357	14	0	0	0.6611
SA0701E	1145	6	0	0	0.6611
SA0701S	1309	6	0	0	0.6611
SA0701W	1596	4	0	0	0.6611
SA0702F	1010	32	0	0	0.709
SA0702N	3186	16	0	0	0.6611
SA0702S	981	8	0	0	0.6611
SA0703F	1407	105	0	0	0.709
SA0704F	1418	45	0	0	0.709
SA0705F	1195	12	0	0	0.709

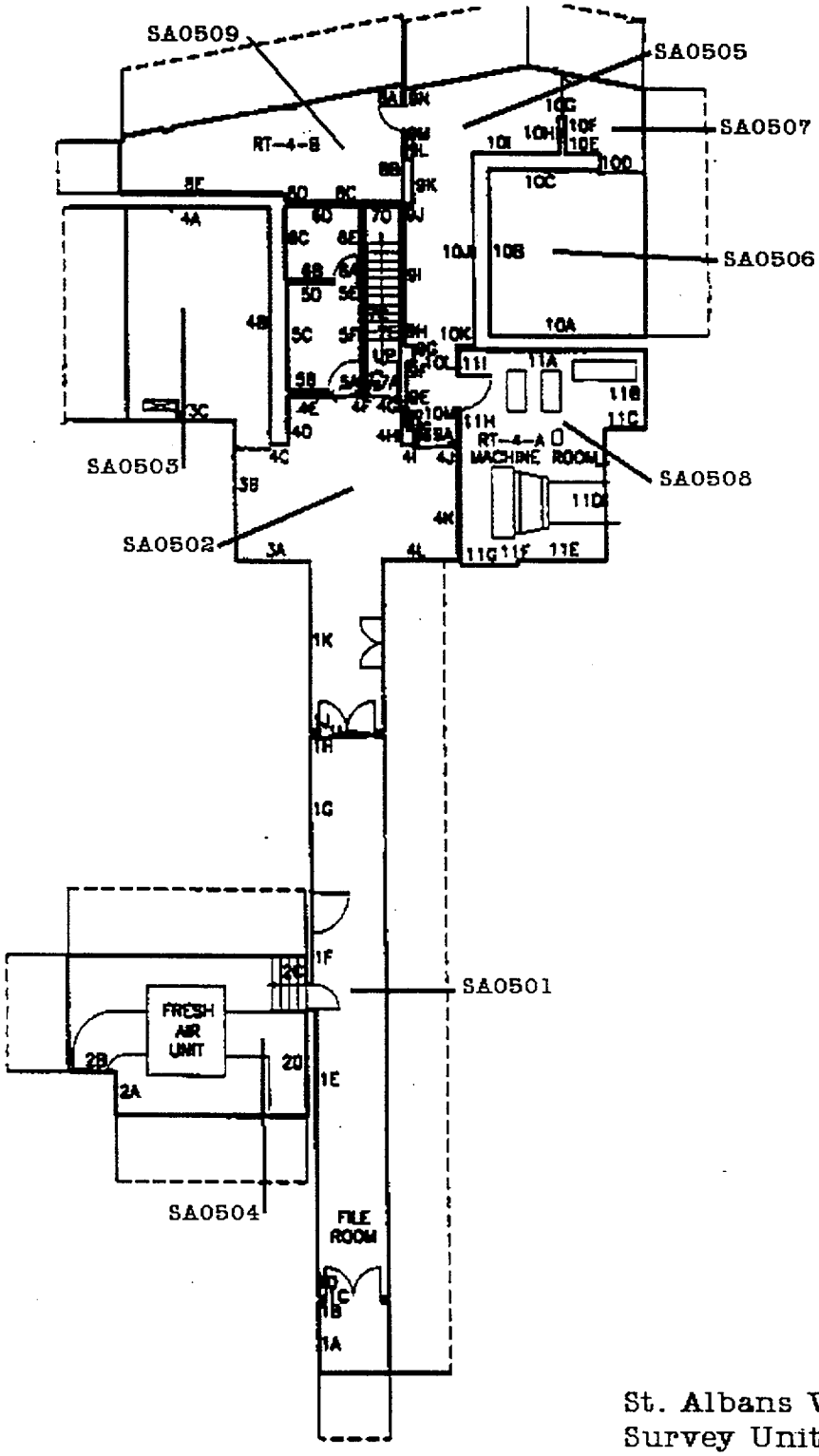
SA0706F	981	4	0	0	0.709
SA0707F	932	9	0	0	0.709
SA0708F	1170	15	0	0	0.709
SA0709F	920	6	0	0	0.709
SA0710F	2249	12	0	0	0.709
SA0711E	2646	2	0	0	0.6611
SA0711F	2091	12	0	0	0.709
SA0711W	2630	2	0	0	0.6611
SA0712F	1442	20	0	0	0.709
SA0713F	3223	69	0	0	0.709
SA0713S	3187	38	0	0	0.6611
SA0714E	2867	2	0	0	0.6611
SA0714F	6310	35	0	1	0.709
SA0715F	1557	12	0	0	0.709
SA0716F	5228	15	0	1	0.709
SA0717F	1605	8	0	0	0.709
SA0718F	2700	6	0	0	0.709
SA0801F	2508	100	0	0	0.6187
	Total Area	808	Square Meters		

APPENDIX A

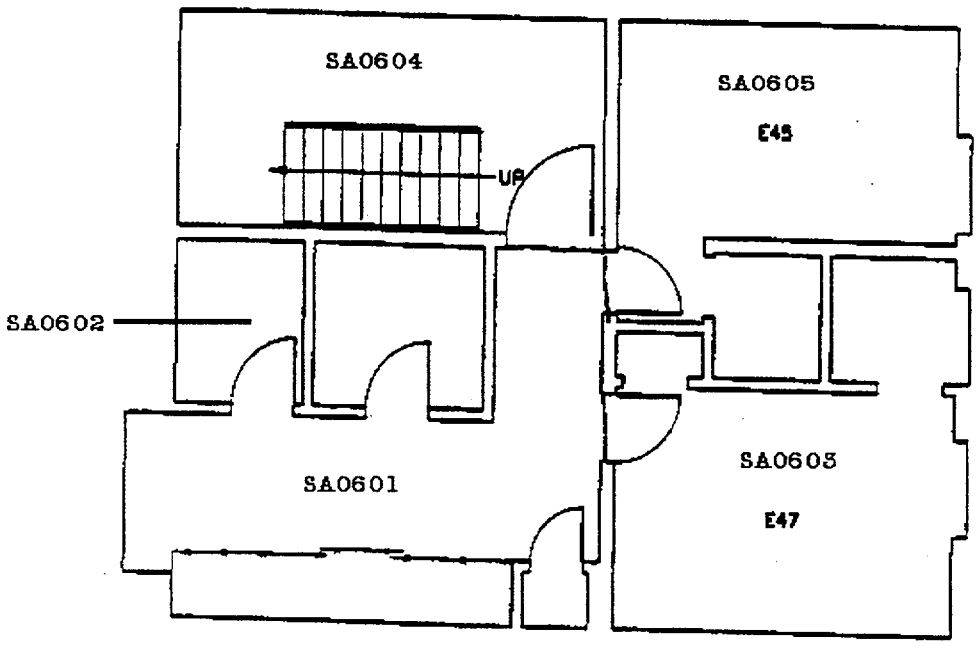
St. Albans Veterans Administration
Extended Care Center
Radiological Survey
Executive summary



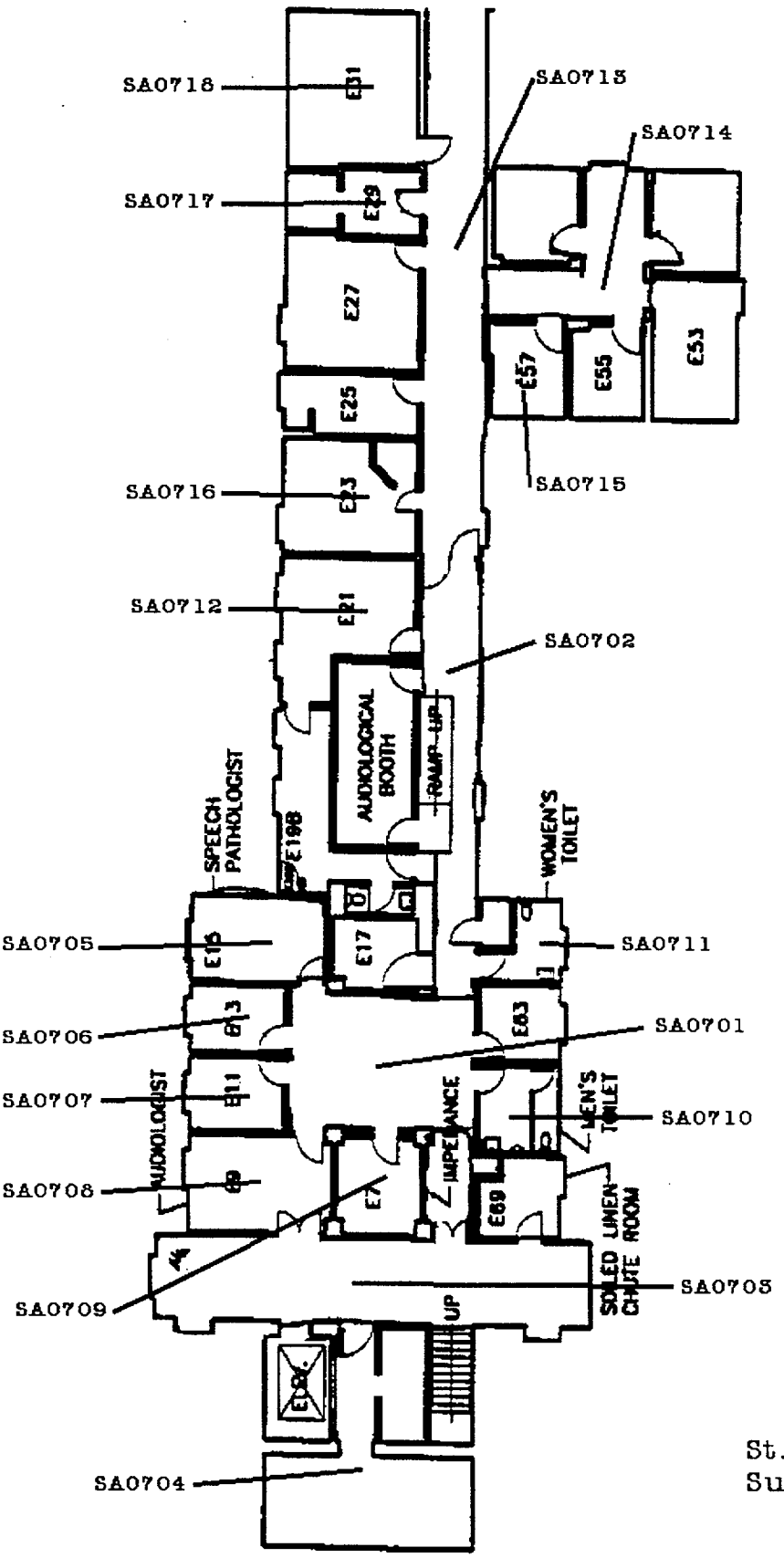
St. Albans VAECC
Survey Unit 001



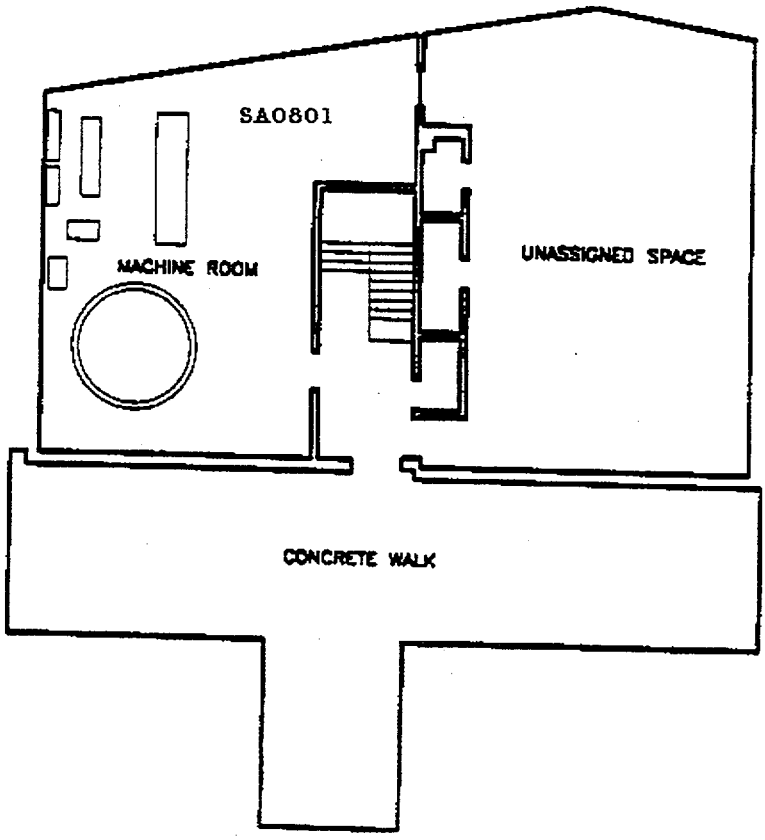
St. Albans VAECC
Survey Unit 005



St. Albans VAECC
Survey Unit 006



St. Albans VAECC
Survey Unit 007



St. Albans VAECC
Survey Unit 008

APPENDIX B

MSI SURVEY RESULTS

APPENDIX B

St. Albans Veterans Administration
Extended Care Center
Radiological Survey
Executive summary

Nycomed Amersham

Amersham Buchler
GmbH & Co KG
Gieselweg 1
D-38110 Braunschweig
Postfach 11 49
D-38001 Braunschweig
Tel. (05307) 930-0
Fax (05307) 930-293
Fax-Zentrale 930-237

CERTIFICATE

No. 439752

for a Sealed Radioactive Source

Source Type: Beta Wide Area Reference Source

Product code	SIRX1803
Drawing	VZ-1688
Dimensions of active surface	Ø 40.6 mm
Overall dimensions	Ø 50 mm x 0.8 mm
Source no.	FX 679
Nuclide	Strontium-90

Measurement Data

Activity	1.38 kBq
Overall uncertainty*	6 %
Beta surface emission rate	1.74E03 s^{-1} in 2 π steradian
Overall uncertainty* of beta surface emission rate	6 %
Reference date	2 March 1998
Traceability*	Defined on page 2

Leakage and Contamination Test/s

Test method/s*	I
Test/s passed on	10 March 1998

Additional Information

ISO classification*	C.11111
Remark	---

* see page 2 for explanation

Amersham Buchler GmbH & Co KG

i. A. Pet—

(Production Manager)

Quality assurance system

The quality assurance system of Amersham Buchler GmbH & Co KG was certified by Lloyd's Register Quality Assurance (LRQA) according to ISO 9001, issue 1994.

Nycomed Amersham

Overall uncertainty

The reported uncertainty is based on standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95 %. (ISO Guide, 1995)

Traceability

This certificate documents the traceability of measurement results to national standards, standard measuring equipment and methods for the realisation of physical units of measurement according to the International System of Units (SI).

Traceability is defined as 'the property of a result of a measurement whereby it can be related to appropriate standards, generally international or national standards, through an unbroken chain of comparisions'.

Amersham Buchler GmbH & Co KG has been accredited as DKD (Deutscher Kalibrierdienst) calibration laboratory by the Physikalisch-Technische Bundesanstalt (PTB) and is authorized to issue reference sources which are traceable to national standards held at the PTB in Germany.

Because of the European Cooperation for Accreditation of Laboratories (EAL) mutual recognition agreement the certificates are also accepted by all EAL-members (e. g. NAMAS, UK).

This product complies with the requirements for traceability to NIST specified in the American National Standard "Traceability of Radioactive Sources to the NIST and Associated Instrument Quality Control (ANSI N42.22-1995)".

As a requirement for the ANSI N42.22-1995 Amersham participates in the NEI/NIST Measurements Assurance Program of the Nuclear Power Industry.

Leakage and contamination tests

Stringent tests for leakage are an essential feature of radioactive sources production. They are based on ISO 9978. Some standard methods used for testing radiation sources are listed below.

Wipe test I

The source is wiped with a swab or tissue, moistened with ethanol or water, the activity removed is measured.
Limit: 185 Bq

Immersion test II

The source is immersed in a suitable liquid at 50 °C for 4 hours and the activity removed is measured.
Limit: 185 Bq

Bubble test III

The source is immersed in water or a suitable liquid and the pressure in the vessel reduced to 13 kPa (100 mm Hg). No bubbles must be observed.
(This test conforms to ISO 9978 except that for some sources, the 100 mm^3 free volume requirement is not met.)

Emanation test IV

The source is placed in a gas tight enclosure with activated carbon as absorber and is left there for at least 3 h. The source is considered leak tight when not more than 185 Bq Radon related to a collection time of 12 h can be measured afterwards.

ISO classification

The International Organization for Standardization (ISO) has proposed a system of classification of sealed radioactive sources based on safety requirements for typical uses (see ISO 2919). This system provides a manufacturer of sealed radioactive sources with a set of tests to evaluate the safety of his products. It also assists a user of such sealed sources to select types which suit the application he has in mind. The tests to which specimen sources are subjected are listed in the following table.

Classification of sealed source performance standard according to ISO 2919

Test	Class 1	2	3	4	5	6
Temperature	No test	- 40 °C (20 min) + 80 °C (1 h)	- 40 °C (20 min) + 180 °C (1 h)	- 40 °C (20 min) + 400 °C (1 h) and thermal shock 400 °C to 20 °C	- 40 °C (20 min) + 600 °C (1 h) and thermal shock 600 °C to 20 °C	- 40 °C (20 min) + 800 °C (1 h) and thermal shock 800 °C to 20 °C
External Perssure	No test	25 kPa absolute	25 kPa absolute to 2 MPa absolute	25 kPa absolute to 7 MPa absolute	25 kPa absolute to 70 MPa absolute	25 kPa absolute to 170 MPa absolute
Impact	No test	50 g from 1 m	200 g from 1 m	2 kg from 1 m	5 kg from 1 m	20 kg from 1 m
Vibration	No test	3 x 10 min 25 - 500 Hz at 5 g peak amplitude	3 x 10 min 25 - 50 Hz at 5 g peak amplitude and 50 - 90 Hz at 0.635 mm amplitude peak to peak and 90 - 500 Hz at 10 g peak amplitude	3 x 30 min 25 - 80 Hz at 1.5 mm amplitude peak to peak and 80 - 2000 Hz at 20 g peak amplitude		
Puncture	No test	1 g from 1 m	10 g from 1 m	50 g from 1 m	300 g from 1 m	1 kg from 1 m

Special applications

No test programme can cover all possible combinations of environments to which a source may be exposed.
Users should therefore consult our experts before using sources in potentially adverse environments.

IAEA Special Form

'Special Form' is a test specification for sealed sources given in the IAEA transport regulations (IAEA Safety Series No. 6, 1985 revised edition).
It is used in determining the maximum acceptable activities for various types of transport containers.

NIST Traceable Source
FX679
Strontium - 90

NIST Traceable Source

ID #	FX679	
β Emm. Ra	104400	Beta/min (2π)
Assay Date	3/2/98	
Corrected	102057	Beta/min (2π)

ELECTRA
(S/N 3546/1999)

Background

Counts	Time (min.)	CPM
375	1	375

Efficiency 43.8%

Source Measurements (1 Min. Counts)

#	Gross Counts	Net Counts
1	45200	44825
2	45200	44825
3	45100	44725
4	44900	44525
5	44900	44525
6	45000	44625
7	45000	44625
8	45200	44825
9	45000	44625
10	45600	45225
11	45200	44825
12	45200	44825
13	44800	44425
14	44900	44525
15	45300	44925
16	44800	44425
17	45200	44825
18	45100	44725
19	45200	44825
20	44600	44225
Average		44695.0
Std. Dev.		220.3

LUDLUM 2224/43-89
(S/N 143049/145797)

Background

Counts	Time (min.)	CPM
204	1	204

Efficiency 40.4%

Source Measurements (1 Min. Counts)

#	Gross Counts	Net Counts
1	41024	40820
2	41458	41254
3	41494	41290
4	41648	41444
5	41361	41157
6	41580	41376
7	41517	41313
8	41347	41143
9	41499	41295
10	41208	41004
11	41492	41288
12	41499	41295
13	41447	41243
14	41717	41513
15	41248	41044
16	41428	41224
17	41094	40890
18	41354	41150
19	41544	41340
20	41367	41163
Average		41212.3
Std. Dev.		173.1

Non-NIST Traceable Source
B879
Strontium 90

Non-NIST Traceable Source

ID #	B 879	
Activity	111.9	nCi
β Emm. Ra	248418	Beta/min (2π)
Assay Date	8/1/94	
Corrected	2.23E+05	Beta/min (2π)

"Calibrated" Non-Nist Traceable Source

ID #	B 879	
Electra		
β Emm. Rate	255850	Beta/min (2π)
Ludlum		
β Emm. Rate	246958	Beta/min (2π)
Average		
β Emm. Rate	251404	Beta/min (2π)

ELECTRA
(S/N 3546/1999)

Background

Counts	Time	CPM
353	1	353

Efficiency 50%

Source Measurements (1 Min. Counts)

#	Gross Counts	Net Counts
1	112000	111647
2	113000	112647
3	112000	111647
4	113000	112647
5	112000	111647
6	112000	111647
7	112000	111647
8	112000	111647
9	112000	111647
10	113000	112647
11	113000	112647
12	113000	112647
13	113000	112647
14	112000	111647
15	112000	111647
16	112000	111647
17	113000	112647
18	112000	111647
19	112000	111647
20	113000	112647
Average		112047.0
Std. Dev.		502.6

LUDLUM 2224/43-89
(S/N 143049/145797)

Background

Counts	Time	CPM
216	1	216

Efficiency 44.8%

Source Measurements (1 Min. Counts)

#	Gross Counts	Net Counts
1	99932	99716
2	100055	99839
3	100447	100231
4	100161	99945
5	99708	99492
6	100163	99947
7	100061	99845
8	99422	99206
9	100238	100022
10	99568	99352
11	100058	99842
12	99817	99601
13	100573	100357
14	100109	99893
15	99242	99026
16	99674	99458
17	99763	99547
18	100073	99857
19	100329	100113
20	99439	99223
Average		99725.6
Std. Dev.		355.4

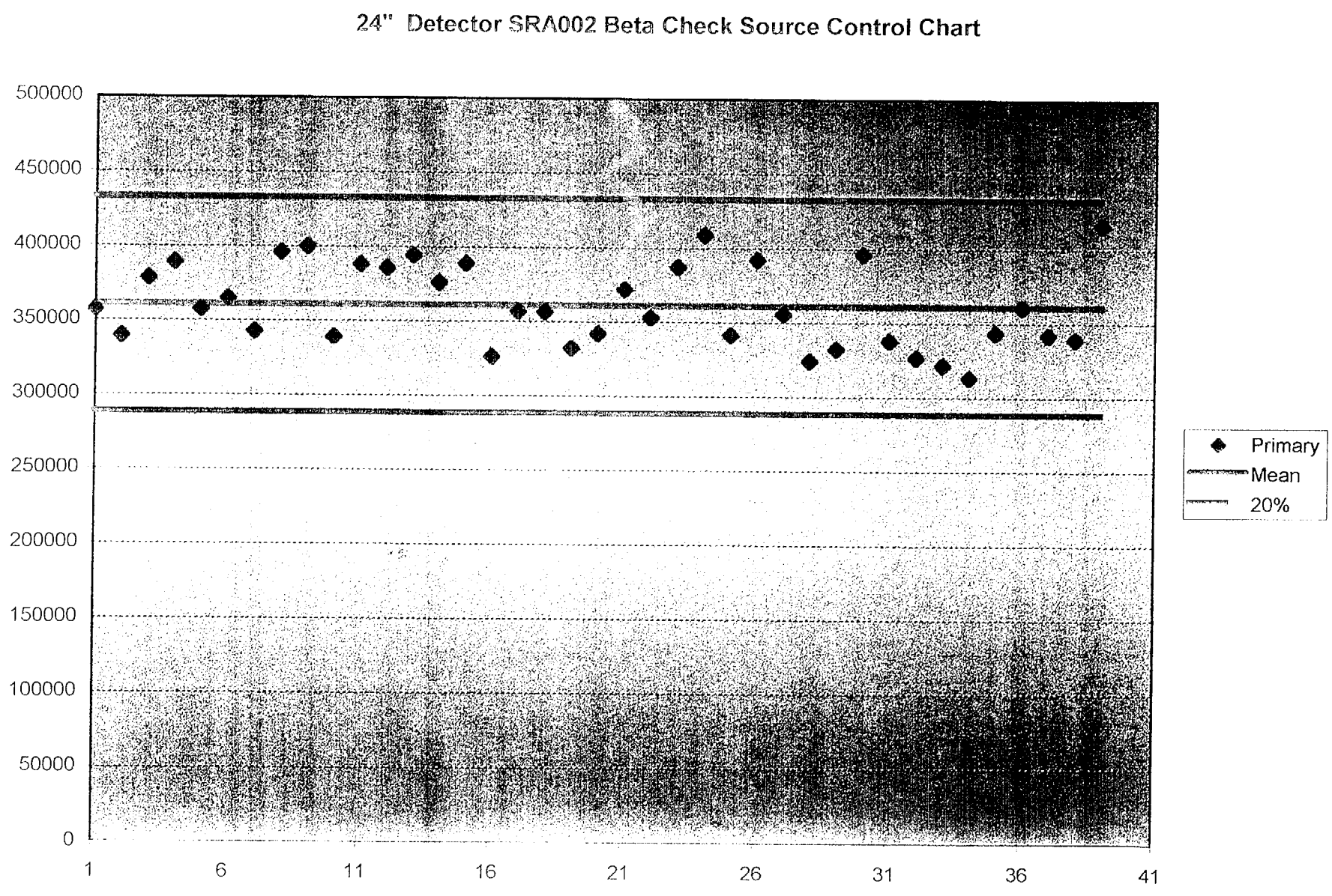
APPENDIX C

St. Albans Veterans Administration
Extended Care Center
Radiological Survey
Executive summary

SYSTEM EFFICIENCY
SCM-2
2' DETECTOR
SRA-002

Reported (Raw) File		Source S/N	Activity
Beta1	248155.9	FX679/B879	353515
Beta1	235956	FX679/B879	353515
Beta1	263076.7	FX679/B879	353515
Beta2	270586.7	FX679/B879	353515
Beta2	248638.1	FX679/B879	353515
Beta2	253574.1	FX679/B879	353515
Beta3	238306.5	FX679/B879	353515
Beta3	275315.4	FX679/B879	353515
Beta3	277877	FX679/B879	353515
Beta4	235855.1	FX679/B879	353515
Beta4	269783.6	FX679/B879	353515
Beta4	267985.2	FX679/B879	353515
Beta5	274087.7	FX679/B879	353515
Beta5	261332.8	FX679/B879	353515
Beta5	270306.3	FX679/B879	353515
Beta6	226803	FX679/B879	353515
Beta6	247937.3	FX679/B879	353515
Beta6	247848.7	FX679/B879	353515
Beta7	231022.2	FX679/B879	353515
Beta7	237651.5	FX679/B879	353515
Beta7	258434.9	FX679/B879	353515
Beta8	245431	FX679/B879	353515
Beta8	268886.1	FX679/B879	353515
Beta8	284169.7	FX679/B879	353515
Beta9	237410.7	FX679/B879	353515
Beta9	272414.6	FX679/B879	353515
Beta9	247217.6	FX679/B879	353515
Beta10	225351	FX679/B879	353515
Beta10	230952.5	FX679/B879	353515
Beta10	275257.8	FX679/B879	353515
Beta11	234940.4	FX679/B879	353515
Beta11	227131.7	FX679/B879	353515
Beta11	223418.9	FX679/B879	353515
Beta12	217744.4	FX679/B879	353515
Beta12	238643.7	FX679/B879	353515
Beta12	250680.1	FX679/B879	353515
Beta13	237664.5	FX679/B879	353515
Beta13	235819.1	FX679/B879	353515
Beta13	289199.6	FX679/B879	353515

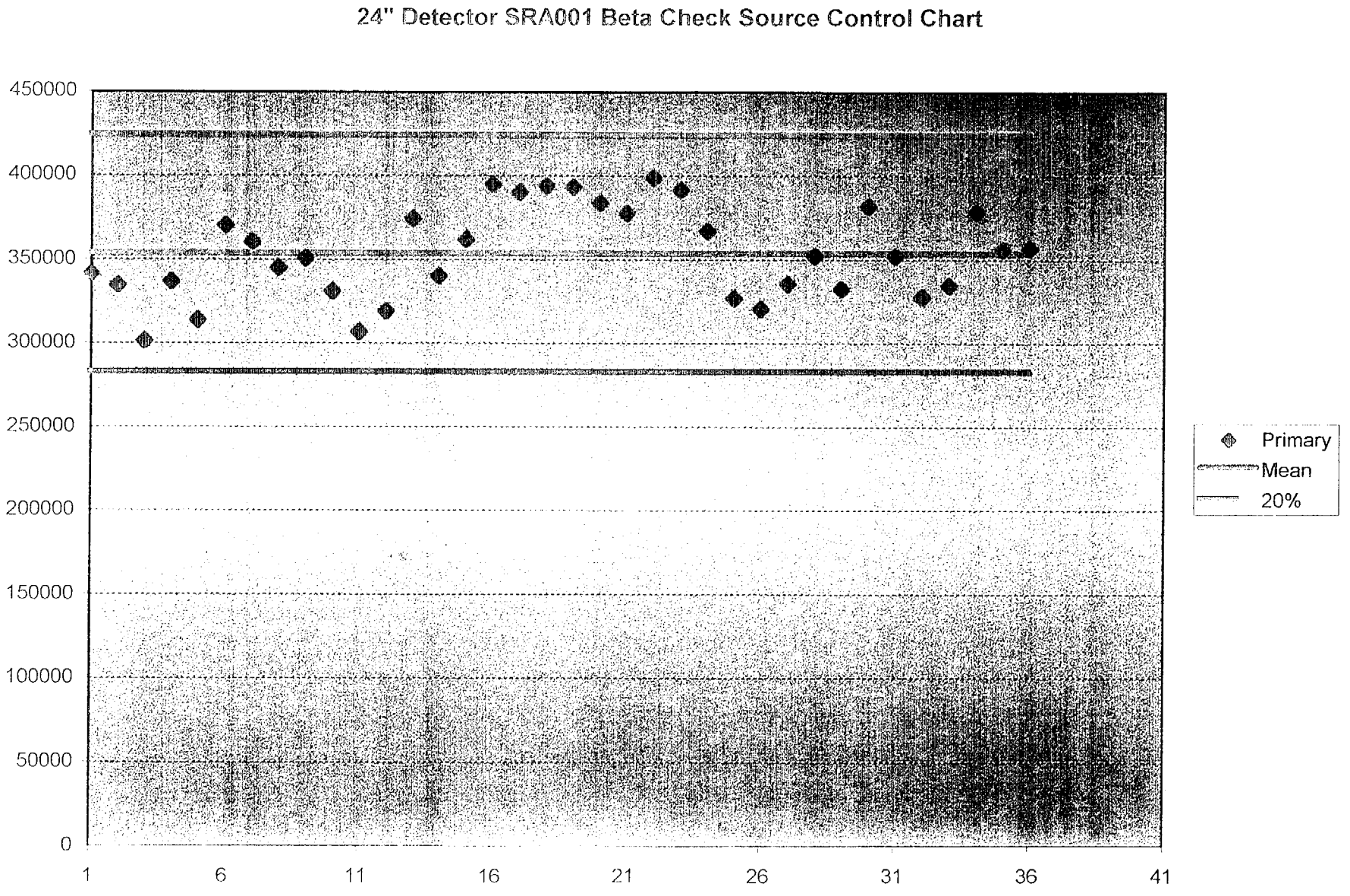
Net Average Count Rate:	250842.8
Average Bkg Count Rate:	267
Net Avg Source Cnt Rate:	250575.8
Efficiency	0.708812


24" Detector SRA002 Beta Check Source Control Chart
500000
450000
400000
350000
300000
250000
200000
150000
100000
50000
0
1
6
11
16
21
26
31
36
41
Primary
Mean
20%

SYSTEM EFFICIENCY
SCM-2
2' DETECTOR
SRA-001

File		Source S/N	Activity
Beta15	211298.5	FX679/B879	353515
Beta15	207083.2	FX679/B879	353515
Beta15	186388.1	FX679/B879	353515
Beta16	208431.8	FX679/B879	353515
Beta16	194182.2	FX679/B879	353515
Beta16	229325.2	FX679/B879	353515
Beta19	223064	FX679/B879	353515
Beta19	213565.9	FX679/B879	353515
Beta19	216955	FX679/B879	353515
Beta20	204816.4	FX679/B879	353515
Beta20	189867.2	FX679/B879	353515
Beta20	197484.6	FX679/B879	353515
Beta21	231678.9	FX679/B879	353515
Beta21	210529.7	FX679/B879	353515
Beta21	224022.5	FX679/B879	353515
Beta22	244364.9	FX679/B879	353515
Beta22	241538	FX679/B879	353515
Beta22	243766.9	FX679/B879	353515
Beta23	243473.6	FX679/B879	353515
Beta23	237499	FX679/B879	353515
Beta23	233730.2	FX679/B879	353515
Beta25	246791.6	FX679/B879	353515
Beta25	242338.9	FX679/B879	353515
Beta25	227276.7	FX679/B879	353515
Beta26	202358.2	FX679/B879	353515
Beta26	198487.2	FX679/B879	353515
Beta26	207650.6	FX679/B879	353515
Beta27	217911	FX679/B879	353515
Beta27	205762.8	FX679/B879	353515
Beta27	236375	FX679/B879	353515
Beta28	217752.2	FX679/B879	353515
Beta28	202784.2	FX679/B879	353515
Beta28	206968.9	FX679/B879	353515
Beta29	234217.7	FX679/B879	353515
Beta29	220234	FX679/B879	353515
Beta29	220687	FX679/B879	353515

Net Average Count Rate:	218907.3
Average Bkg Count Rate:	185.5
Net Avg Source Cnt Rate:	218721.8
Efficiency	0.618706


24" Detector SRA001 Beta Check Source Control Chart
450000
400000
350000
300000
250000
200000
150000
100000
50000
0
1
6
11
16
21
26
31
36
41
Primary
Mean
20%

SYSTEM EFFICIENCY
SCM-2
6' WALL DETECTOR

File		Source S/N	Activity
Beta1	233768	FX679/B879	353515
Beta1	236892.8	FX679/B879	353515
Beta1	254987.2	FX679/B879	353515
Beta2	178486.4	FX679/B879	353515
Beta2	207972.8	FX679/B879	353515
Beta2	208384.6	FX679/B879	353515
Beta3	199761.6	FX679/B879	353515
Beta3	184128	FX679/B879	353515
Beta3	244584	FX679/B879	353515
Beta4	253811.2	FX679/B879	353515
Beta4	258804.8	FX679/B879	353515
Beta4	235188.8	FX679/B879	353515
Beta5	251792	FX679/B879	353515
Beta5	257014.4	FX679/B879	353515
Beta5	260344	FX679/B879	353515
Beta6	261352	FX679/B879	353515
Beta6	241744	FX679/B879	353515
Beta6	249163.2	FX679/B879	353515
Beta7	189304	FX679/B879	353515
Beta7	209648	FX679/B879	353515
Beta7	203289.6	FX679/B879	353515
Beta8	243502.4	FX679/B879	353515
Beta8	245801.6	FX679/B879	353515
Beta8	220524.8	FX679/B879	353515
Beta9	288840	FX679/B879	353515
Beta9	251512	FX679/B879	353515
Beta9	242206.4	FX679/B879	353515

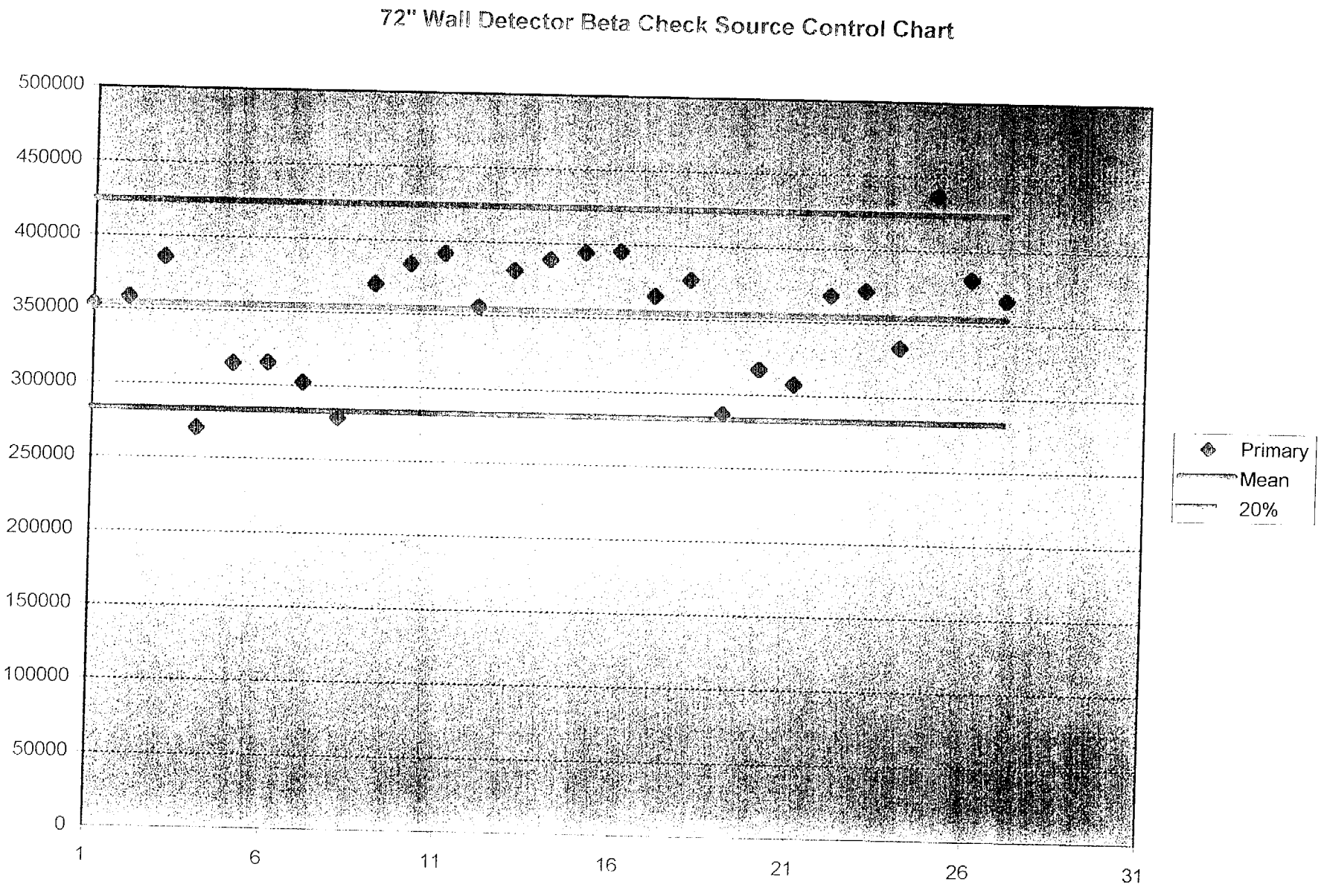
Net Average Count Rate:	233807.7
Average Bkg Count Rate:	159.7
Net Avg Source Cnt Rate:	233648
Efficiency	0.661035

The information gathered during the course of the Radiological Characterization can be grouped into three main headings, as follows:

1.0 Preliminary Data
- 1.1 Personnel Data
  - 1.1.1 Medical Clearance
  - 1.1.2 Training Certificates
  - 1.1.3 Fit Testing
  - 1.1.4 Dosimetry Paperwork
- 1.2 Equipment
  - 1.2.1 Requisitions
- 1.3 Site Awareness Training
- 1.4 Procedures

2.0 Field Data
- 2.1 Instrumentation
  - 2.1.1 Calibration Data
  - 2.1.2 Function Checks
- 2.2 Survey Data Collected
  - 2.2.1 Total/Maximum Beta Contamination Survey Forms and
  - 2.2.2 Total Removable Beta Contamination Survey Forms
  - 2.2.3 Gross Beta Air Particulate Forms
  - 2.2.4 Radiation Work Permits
  - 2.2.5 Access Control Logs
- 2.3 Log Book Copies

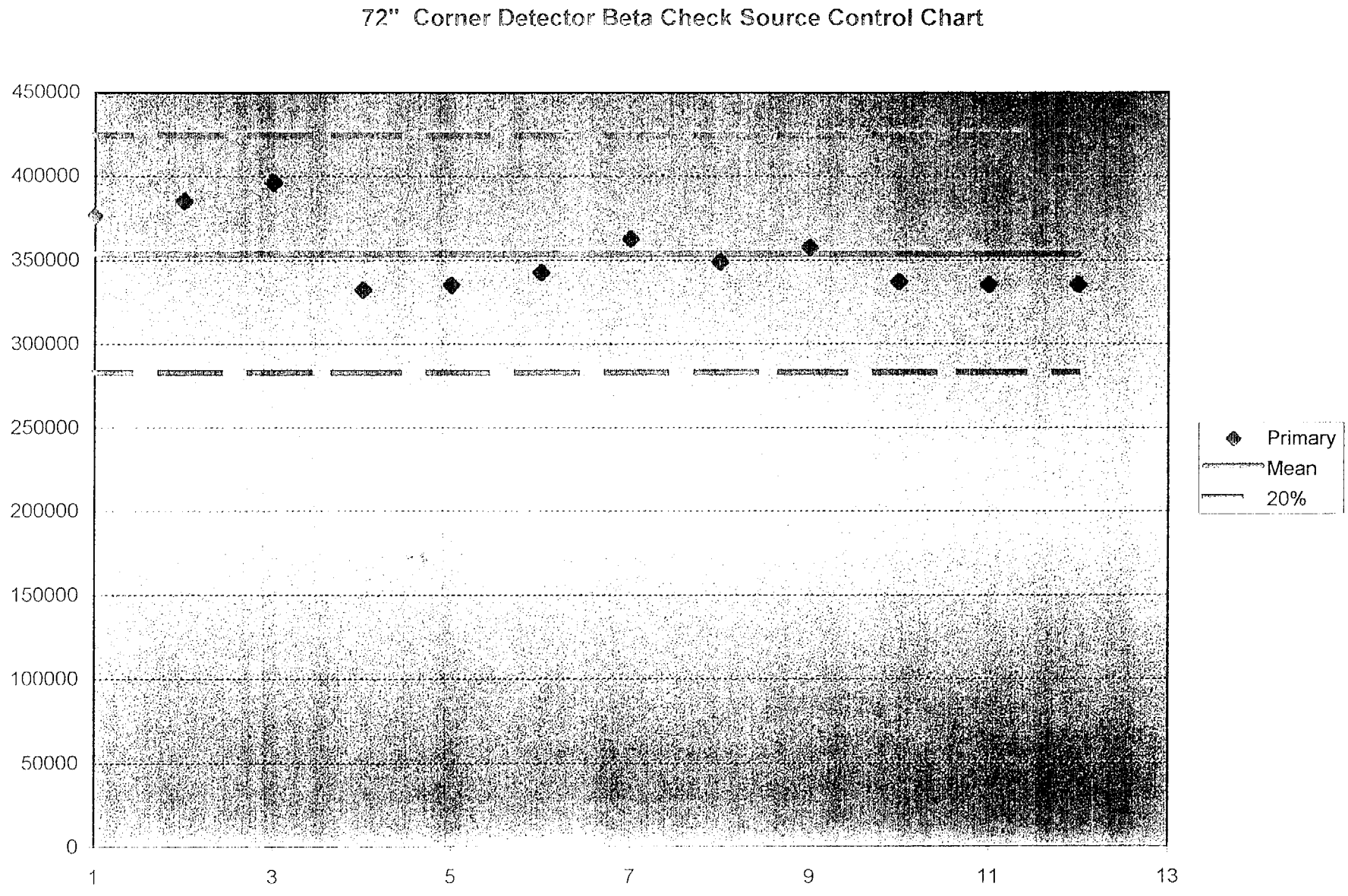
3.0 Results
- 3.1 Millennium Services, Inc. Survey Report
- 3.2 Laboratory
  - 3.2.1 Chain of Custody
  - 3.2.2 Liquid Scintillation Analyses
  - 3.2.3 Solid Matrix, Concrete, Soils
  - 3.2.4 Miscellaneous QA/QC

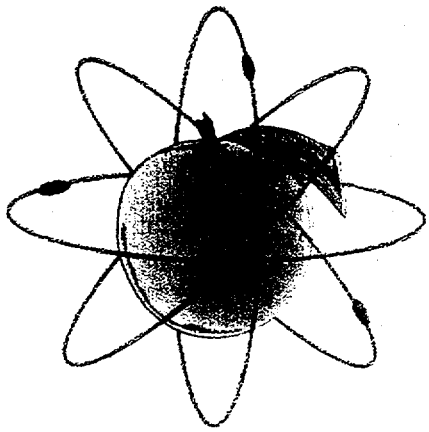

72" Wall Detector Beta Check Source Control Chart
500000
450000
400000
350000
300000
250000
200000
150000
100000
50000
0
1
6
11
16
21
26
31
Primary
Mean
20%

SYSTEM EFFICIENCY
SCM-2
6' CORNER DETECTOR

File	Bkgrnd	Source S/N	Activity
Betac1	283377.6	FX679/B879	353515
Betac1	290220.8	FX679/B879	353515
Betac1	298353.6	FX679/B879	353515
Betac2	250332.8	FX679/B879	353515
Betac2	252400	FX679/B879	353515
Betac2	258126.4	FX679/B879	353515
Betac3	273246.4	FX679/B879	353515
Betac3	262827.2	FX679/B879	353515
Betac3	269220.8	FX679/B879	353515
Betac4	253920	FX679/B879	353515
Betac4	252548.8	FX679/B879	353515
Betac4	252580.8	FX679/B879	353515

Net Average Count Rate:	266429.6
Average Bkg Count Rate:	140
Net Avg Source Cnt Rate:	266289.6
Efficiency	0.753263


72" Corner Detector Beta Check Source Control Chart
450000
400000
350000
300000
250000
200000
150000
100000
50000
0
1
3
5
7
9
11
13
Primary
Mean
20%



Radiological Survey Data Sheets
Radiation Surveys Performed at the
St.Albans Veterans Administration Extended Care Center
Queens, New York

Attachment 1

Prepared by

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February 6, 1999

ST. ALBANS VETERANS ADMINISTRATION
EXTENDED CARE CENTER

CLASS 1 AREAS

RADIOLOGICAL SURVEY AREA REPORTS

SUMMARY TABLE

CLASS 1 AREAS

Survey Area	Highest 100 cm2 Area	No. of meters	No. exceeding m2 limit	No. exceeding 100 cm2 limit	PSPC Efficiency
SA0101E	3906	16	0	0	0.6611
SA0101F	96909	16	2	5	0.709
SA0101W	7425	14	0	2	0.6611
SA0501F	9014	54	0	1	0.709
SA0502F	1782	80	0	0	0.709
SA0502W	2755	18	0	0	0.6611
SA0503E	3022	12	0	0	0.6611
SA0503F	5096	35	0	1	0.709
SA0503N	3069	8	0	0	0.6611
SA0503S	2777	8	0	0	0.6611
SA0503W	2972	12	0	0	0.6611
SA0504F	10599	20	1	3	0.709
SA0505E	1627	16	0	0	0.6611
SA0505F	62068	55	5	8	0.6187
SA0505W	1614	16	0	0	0.6611
SA0506E	833	10	0	0	0.6611
SA0506F	1236	25	0	0	0.6187
SA0506N	942	8	0	0	0.6611
SA0506S	806	6	0	0	0.6611
SA0506W	884	10	0	0	0.6611
SA0507E	769	2	0	0	0.6611
SA0507F	929	12	0	0	0.6187
SA0507N	871	4	0	0	0.6611
SA0507S	850	6	0	0	0.6611
SA0507W	964	4	0	0	0.6611
SA0508F	2799	18	0	0	0.6187
SA0509F	1554	2	0	0	0.6187
Total Area		487	Square Meters		

Introduction

Survey SA0101E was conducted on January 25, 1999 by TODD CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 66%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0101E ranged from 44 to 1,055 dpm/pixel. 100 cm^2 data ranged from 44 to 3,906 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

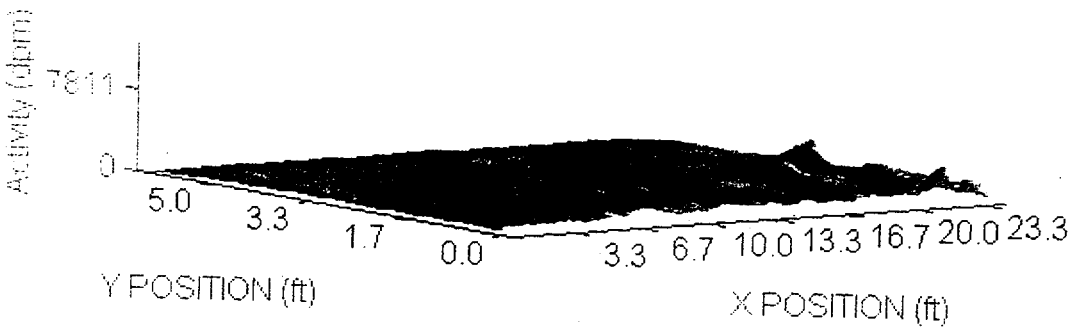

Figure 1 Image plot of surface activity in dpm/25cm^2

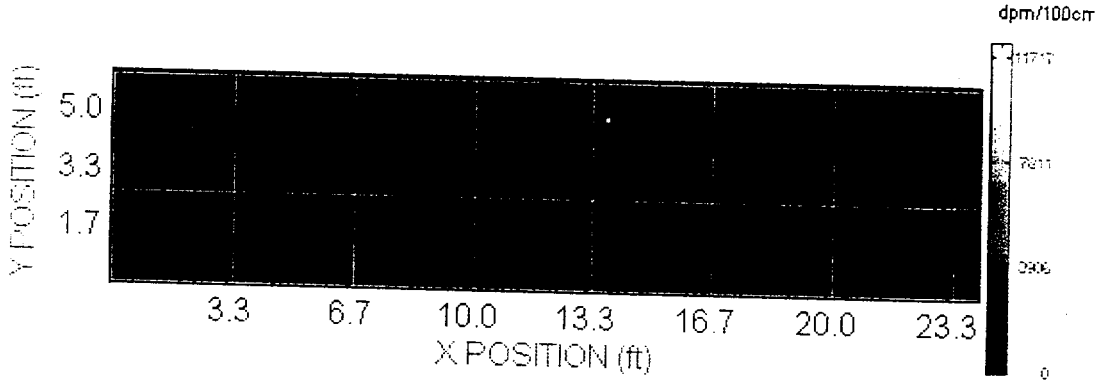

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

X	Y	Mean	Max	Min	STD	Pixels
1	2	759	986	285	133.5	400
2	2	795	915	436	106.8	400
3	2	774	917	448	98.5	400
4	2	821	1,060	485	115.3	400
5	2	777	909	421	96.2	400
6	2	804	1,098	433	129.2	400
7	2	990	3,173	442	385.4	400
8	2	741	1,436	239	230.9	110
1	1	807	1,050	437	106.5	320
2	1	890	1,130	644	76.6	320
3	1	1,009	2,652	712	273.8	320
4	1	1,144	2,199	861	208.1	320
5	1	1,040	1,827	821	170.9	320
6	1	1,094	2,113	809	250.9	320
7	1	1,624	3,905	913	488.7	320
8	1	1,390	2,098	717	365.4	88

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (8,1) and Grids (8,1) - (8,2) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 1058 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

2058 dpm/100 cm^2, averaged over 1m^2
4058 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were below the site-specific guidelines for release.

Introduction

Survey SA0101F was conducted on January 25, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 71%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0101F ranged from 0 to 41,573 dpm/pixel. 100 cm^2 data ranged from 0 to 96,909 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

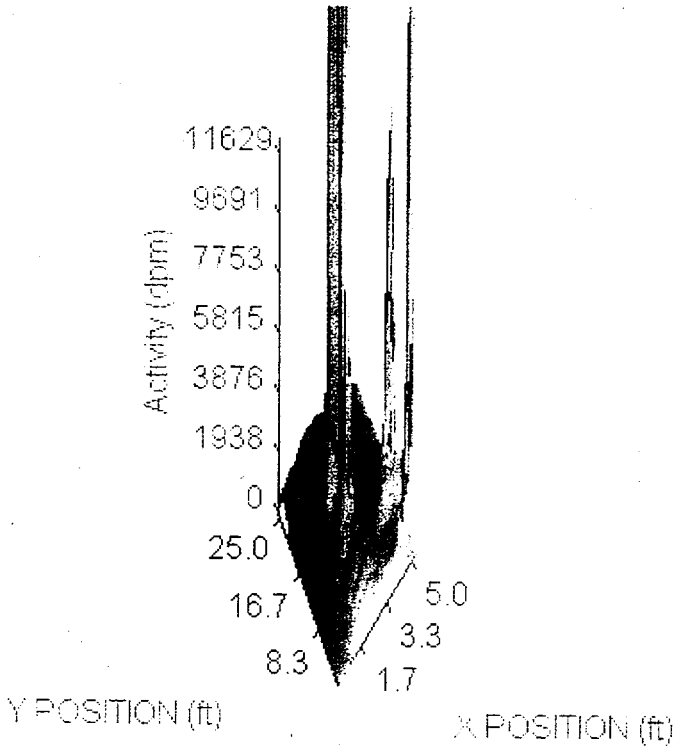

Figure 1 Image plot of surface activity in dpm/25cm^2

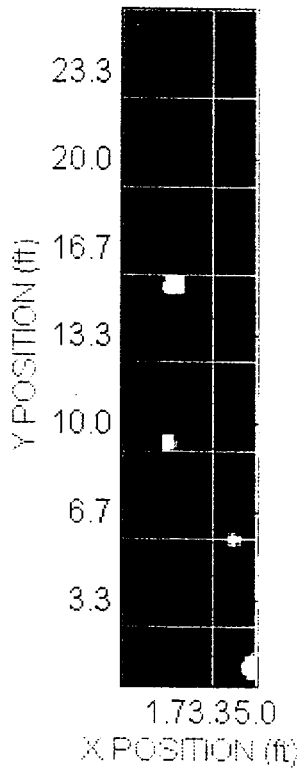

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

X	Y	Mean	Max	Min	STD	Pixels
1	8	852	1,453	357	186.1	400
2	8	674	1,027	37	243.9	220
1	7	666	1,033	0	359.8	304
2	7	843	1,046	499	143.6	220
1	6	785	1,699	0	428.4	280
2	6	944	1,205	602	132.2	220
1	**5**	**3,998**	**96,908**	**0**	**10855.1**	**280**
2	5	1,074	1,392	619	154.6	220
1	**4**	**1,930**	**48,048**	**0**	**4457.0**	**280**
2	4	1,007	1,382	551	184.9	220
1	3	956	3,060	0	553.9	280
2	**3**	**1,270**	**8,365**	**529**	**944.0**	**220**
1	2	1,337	2,537	0	788.0	280
2	**2**	**1,509**	**10,884**	**504**	**1237.4**	**220**
1	1	1,073	2,013	0	565.9	196
2	**1**	**4,113**	**89,913**	**262**	**11434.2**	**154**

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (2,1) and Grids (2,1) - (2,8) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 1058 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

2058 dpm/100 cm^2, averaged over 1m^2
4058 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were above the site-specific guidelines for release in certain grid locations. The following grids are above the release limits: (1,5) (2,1)

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were above the site-specific guidelines for release. Figure 3 details which zones were above release limits:

X	Y	Mean	Max	Min	STD	Pixels
1	2	800	1,037	306	153.2	4000
2	2	720	941	449	98.5	400
3	2	705	907	372	105.3	400
4	2	736	954	388	123.8	400
5	2	784	1,037	385	134.7	400
6	**2**	**1,394**	**4,773**	**369**	**926.2**	**400**
7	2	0	0	0	.0	0
1	**1**	**2,041**	**7,424**	**900**	**1412.5**	**400**
2	1	899	1,134	591	107.0	400
3	1	906	1,199	550	138.5	400
4	1	937	1,567	656	150.2	400
5	1	1,010	1,362	840	104.4	400
6	1	1,039	3,442	556	440.2	400
7	1	0	0	0	.0	0

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (7,1) and Grids (7,1) - (7,2) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 1058 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

2058 dpm/100 cm^2, averaged over 1m^2
4058 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were above the site-specific guidelines for release. Figure 3 details which zones were above release limits:

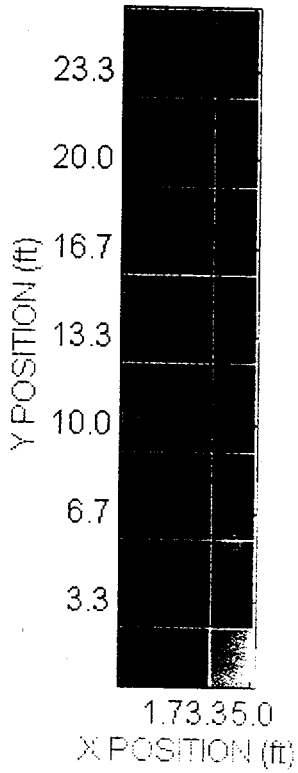

Figure 3 Yellow shading denotes grids in excess of the average limit, while red pixels correspond to the upper left coordinate of a 100cm^2 area exceeding the maximum limit.

Introduction

Survey SA0101W was conducted on January 25, 1999 by TODD CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 66%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0101W ranged from 52 to 2,269 dpm/pixel. 100 cm^2 data ranged from 52 to 7,425 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

Figure 1 Image plot of surface activity in dpm/25cm^2

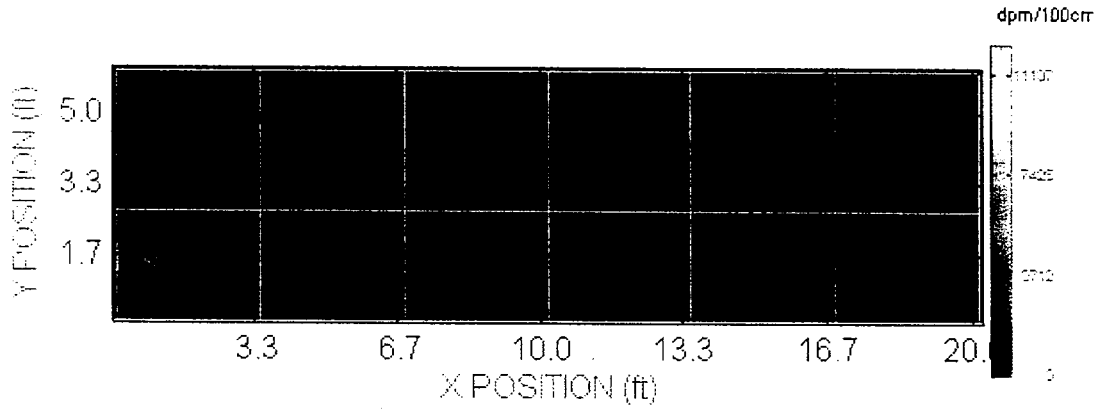

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

(Filtered) (Primary) Date: 02-06-1999 Time: 15:42:38 SA0101W-2

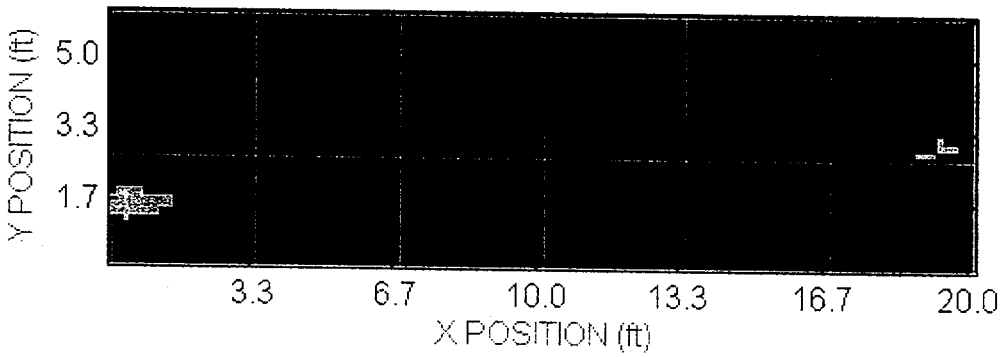

Figure 3 Yellow shading denotes grids in excess of the average limit, while red pixels correspond to the upper left coordinate of a 100cm^2 area exceeding the maximum limit.

Introduction

Survey SA0501E was conducted on January 22, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 66%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0501E ranged from 78 to 1,084 dpm/pixel. 100 cm^2 data ranged from 78 to 3,420 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

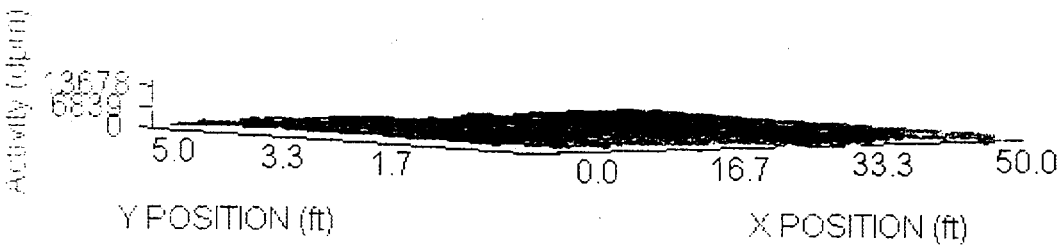

Figure 1 Image plot of surface activity in dpm/25cm^2

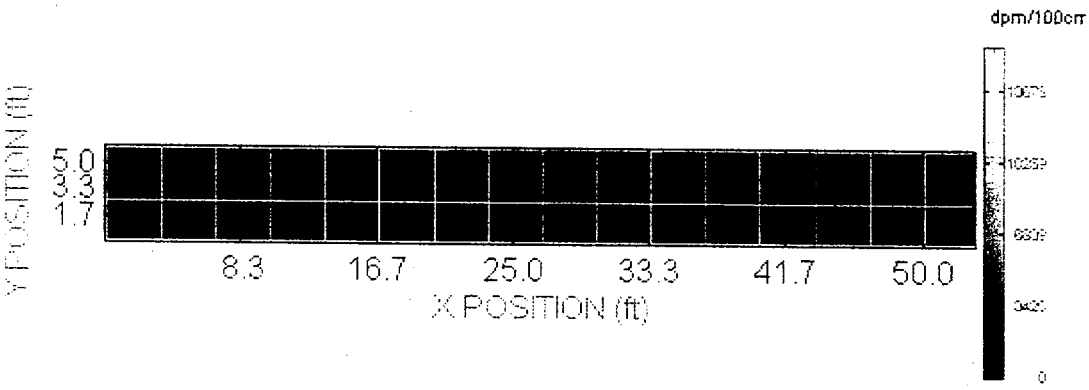

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

X	Y	Mean	Max	Min	STD	Pixels
1	2	2,471	2,926	1,540	288.7	400
2	2	2,449	2,729	1,393	218.3	400
3	2	2,501	3,099	1,239	293.5	400
4	2	2,497	3,419	1,579	230.1	400
5	2	2,460	2,961	1,534	225.3	400
6	2	2,441	2,896	1,378	205.8	400
7	2	2,379	2,937	1,127	297.1	400
8	2	2,242	2,785	1,370	270.2	400
9	2	821	2,006	372	330.3	400
10	2	1,084	2,401	380	604.4	400
11	2	1,258	2,741	351	702.9	400
12	2	1,259	2,264	415	571.3	400
13	2	2,367	2,942	1,477	243.6	400
14	2	2,523	2,802	1,584	198.3	400
15	2	2,463	2,768	1,430	236.6	400
16	2	2,248	3,149	427	561.6	380
1	1	2,388	2,870	1,583	239.9	320
2	1	2,507	3,298	1,691	234.9	320
3	1	2,546	3,086	1,328	351.7	320
4	1	2,583	2,940	1,736	232.0	320
5	1	2,450	2,945	1,186	364.4	320
6	1	2,364	2,757	1,395	256.5	320
7	1	2,281	2,584	1,447	220.3	320
8	1	2,245	2,617	1,405	225.5	320
9	1	761	1,586	386	267.7	320
10	1	1,149	2,465	427	618.6	320
11	1	1,280	2,640	467	616.8	320
12	1	1,327	2,356	462	583.6	320
13	1	2,392	2,885	1,454	211.8	320
14	1	2,355	2,938	1,510	235.0	320
15	1	2,396	2,717	1,254	274.6	320
16	1	2,195	2,711	479	509.5	304

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (16,1) and Grids (16,1) - (16,2) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 2208 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

3208 dpm/100 cm^2, averaged over 1m^2
5208 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were below the site-specific guidelines for release.

Introduction

Survey SA0501F was conducted on January 21, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 71%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0501F ranged from 0 to 3,790 dpm/pixel. 100 cm^2 data ranged from 0 to 8,970 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

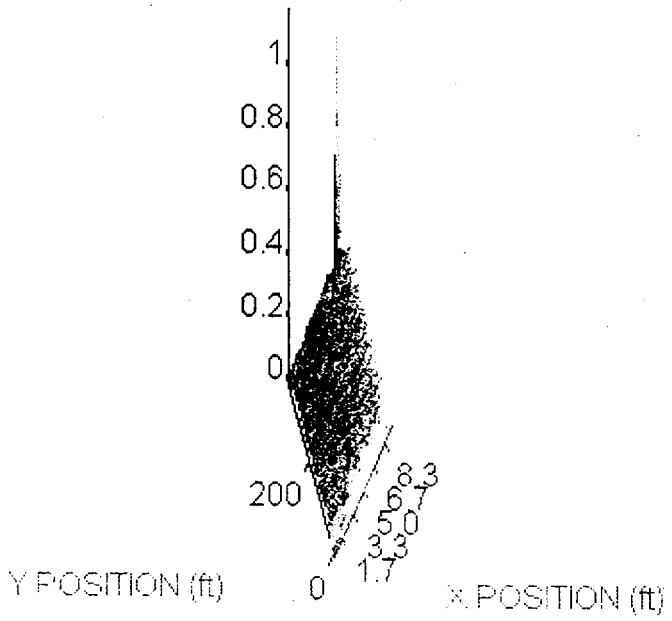

Figure 1 Image plot of surface activity in dpm/25cm^2

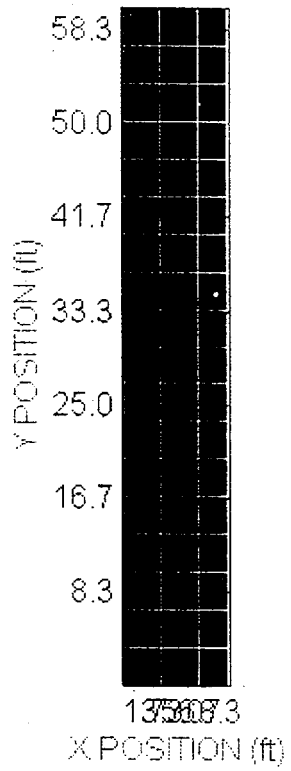

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

X	Y	Mean	Max	Min	STD	Pixels
1	19	475	744	0	236.3	370
2	19	657	877	383	87.0	400
3	19	522	758	0	228.4	328
1	18	671	918	329	76.7	400
2	18	599	764	440	80.5	400
3	18	682	873	276	109.6	340
1	17	659	973	406	72.3	400
2	17	634	1,548	254	146.5	400
3	**17**	**881**	**8,970**	**326**	**713.0**	**340**
1	16	678	837	452	59.4	400
2	16	615	815	410	93.3	400
3	16	654	884	287	105.3	340
1	15	629	725	428	55.4	400
2	15	636	790	374	89.0	400
3	15	695	1,174	291	120.5	340
1	14	640	854	412	79.4	400
2	14	625	830	391	98.3	400
3	14	638	934	299	90.4	340
1	13	609	817	360	65.6	400
2	13	589	806	379	84.7	400
3	13	647	922	277	97.8	340
1	12	615	713	408	58.2	400
2	12	591	707	414	76.5	400
3	12	620	827	276	95.0	340
1	11	641	797	416	77.0	400
2	11	594	768	391	84.4	400
3	11	631	766	315	74.7	340
1	10	646	784	397	75.4	400
2	10	613	792	380	90.4	400
3	10	574	732	251	105.4	340
1	9	641	1,137	381	88.8	400
2	9	576	732	399	89.8	400
3	9	576	728	281	100.1	340
1	8	695	3,552	458	267.6	400
2	8	539	709	395	77.2	400
3	8	577	875	242	107.3	340
1	7	652	866	430	70.9	400
2	7	597	755	388	89.8	400
3	7	654	841	271	103.1	340
1	6	688	963	450	72.2	400
2	6	583	734	385	80.7	400
3	6	658	798	296	97.5	340
1	5	648	999	477	70.5	400
2	5	592	754	394	84.4	400
3	5	660	826	315	103.6	340

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1	4	687	988	447	67.8	400
2	4	606	820	411	103.0	400
3	4	637	813	287	107.7	340
1	3	608	876	421	60.5	400
2	3	600	809	416	98.1	400
3	3	667	819	311	97.6	340
1	2	553	2,679	0	461.5	249
2	2	681	1,252	205	239.7	400
3	2	590	1,172	0	299.7	292
1	1	0	0	0	.0	0
2	1	0	0	0	.0	8
3	1	0	0	0	.0	13

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (3,1) and Grids (3,1) - (3,19) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 554 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

1554 dpm/100 cm^2, averaged over 1m^2
3554 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were above the site-specific guidelines for release. Figure 3 details which zones were above release limits:

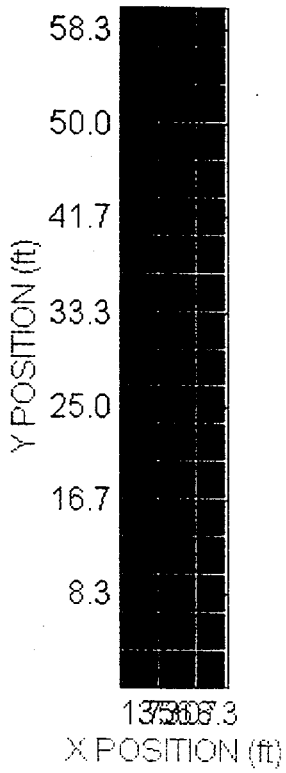

Figure 3 Yellow shading denotes grids in excess of the average limit, while red pixels correspond to the upper left coordinate of a 100cm^2 area exceeding the maximum limit.

Introduction

Survey SA0501W was conducted on January 22, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 66%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0501W ranged from 204 to 1,135 dpm/pixel. 100 cm^2 data ranged from 227 to 3,665 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

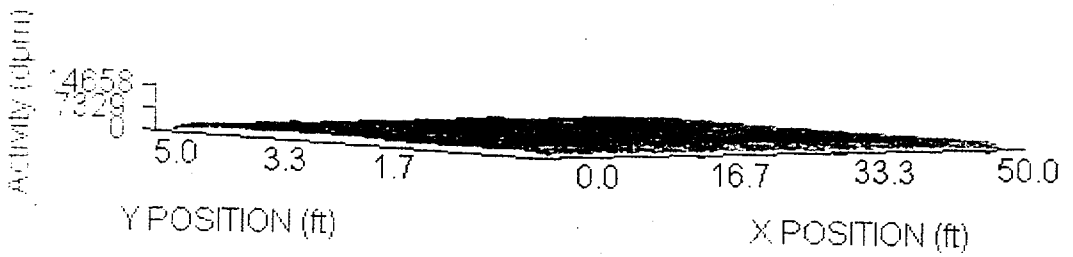

Figure 1 Image plot of surface activity in dpm/25cm^2

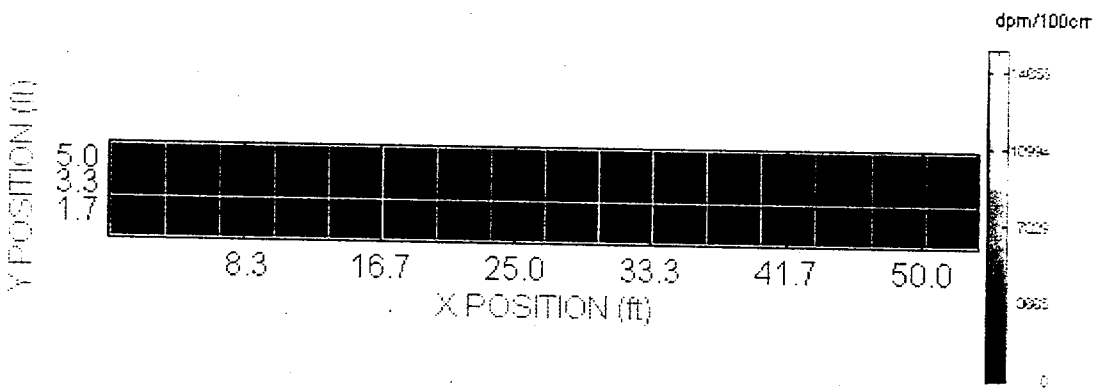

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

(Filtered) (Primary) Date: 02-06-1999 Time: 15:53:32 SA0501W-2

X	Y	Mean	Max	Min	STD	Pixels
1	2	2,474	2,810	1,436	221.4	0
2	2	2,505	3,006	1,502	235.5	0
3	2	2,491	3,079	1,453	282.0	0
4	2	2,464	3,664	1,315	299.4	0
5	2	2,455	2,762	1,372	251.1	0
6	2	2,379	2,612	1,458	174.9	0
7	2	2,418	2,792	1,593	178.1	0
8	2	2,384	2,707	1,296	280.8	0
9	2	2,386	2,830	1,461	193.8	0
10	2	2,410	2,725	1,519	197.5	0
11	2	2,562	3,139	1,533	232.3	0
12	2	2,468	2,778	1,336	269.1	0
13	2	2,547	2,930	1,528	257.5	0
14	2	2,575	3,097	1,686	232.2	0
15	2	2,567	3,015	1,580	202.0	0
16	2	2,378	2,740	1,338	256.4	0
1	1	2,295	2,523	1,397	229.7	0
2	1	2,370	2,970	1,467	226.6	0
3	1	2,385	2,942	1,534	195.5	0
4	1	2,415	2,715	1,352	249.9	0
5	1	2,403	2,657	1,419	238.7	0
6	1	2,346	2,655	1,372	294.2	0
7	1	2,373	2,625	1,581	215.3	0
8	1	2,375	2,780	1,531	229.7	0
9	1	2,408	2,750	1,696	187.0	0
10	1	2,358	2,610	1,338	262.5	0
11	1	2,404	2,669	1,462	208.7	0
12	1	2,409	2,726	1,408	251.3	0
13	1	2,482	3,132	1,555	263.5	0
14	1	2,490	2,753	1,596	187.4	0
15	1	2,427	2,691	1,606	212.7	0
16	1	2,321	2,799	1,319	285.3	0

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (16,1) and Grids (16,1) - (16,2) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 2208 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

3208 dpm/100 cm^2, averaged over 1m^2
5208 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were below the site-specific guidelines for release.

Introduction

Survey SA0502F was conducted on January 21, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 71%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0502F ranged from 0 to 686 dpm/pixel. 100 cm^2 data ranged from 0 to 1,782 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

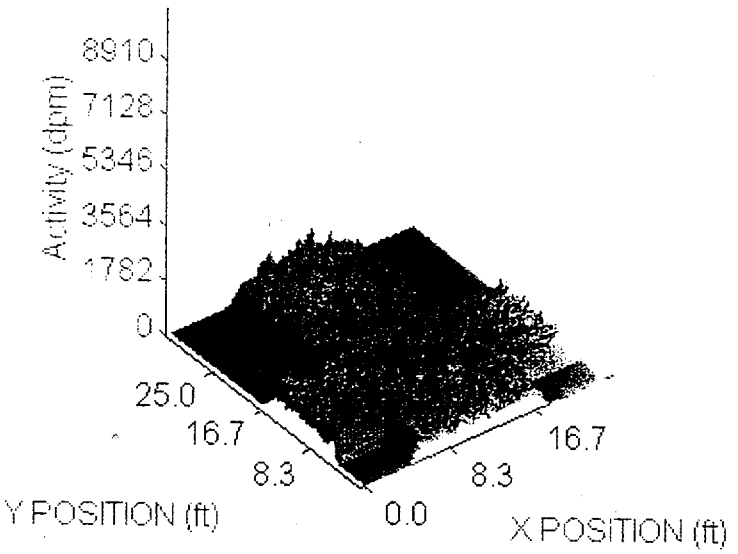

Figure 1 Image plot of surface activity in dpm/25cm^2

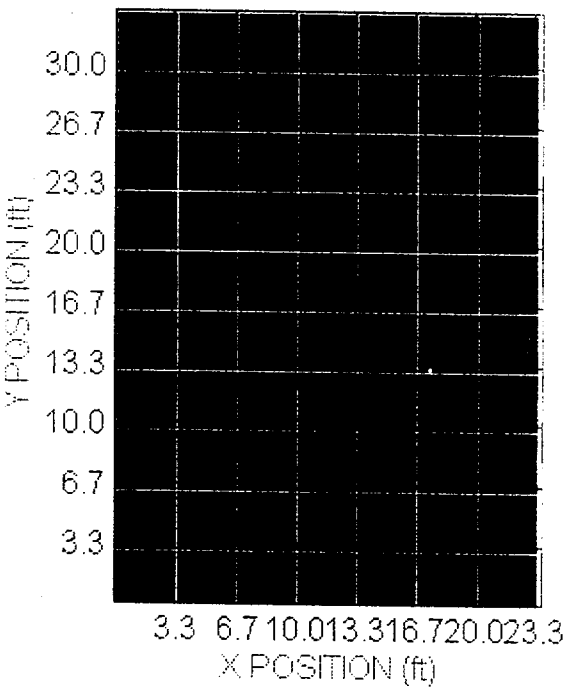

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

X	Y	Mean	Max	Min	STD	Pixels
1	10	0	0	0	.0	0
2	10	329	887	0	203.1	140
3	10	715	1,383	391	156.0	400
4	10	716	1,522	416	194.5	400
5	10	631	1,467	259	161.2	400
6	10	347	882	0	212.1	140
7	10	0	0	0	.0	0
8	10	0	0	0	.0	0
1	9	0	0	0	.0	0
2	9	324	924	0	203.9	140
3	9	661	1,037	404	117.6	400
4	9	621	1,250	342	124.2	400
5	9	622	975	362	111.2	400
6	9	394	1,037	0	253.9	133
7	9	0	0	0	.0	0
8	9	0	0	0	.0	0
1	8	0	0	0	.0	0
2	8	307	929	0	194.3	140
3	8	601	1,037	412	98.9	400
4	8	585	933	405	87.0	400
5	8	663	1,191	382	123.8	400
6	8	402	1,008	0	247.5	120
7	8	0	0	0	.0	0
8	8	0	0	0	.0	0
1	7	0	0	0	.0	0
2	7	320	921	0	198.9	140
3	7	608	1,115	419	80.5	400
4	7	656	1,017	394	81.0	400
5	7	629	920	386	92.0	400
6	7	297	728	0	170.1	120
7	7	0	0	0	.0	0
8	7	0	0	0	.0	0
1	6	287	941	0	210.5	160
2	6	311	858	0	220.4	244
3	6	625	1,034	415	80.6	400
4	6	574	795	404	72.6	400
5	6	605	1,326	357	127.8	400
6	6	322	939	0	240.9	218
7	6	303	914	0	212.9	140
8	6	148	0	0	99.1	14
1	5	678	885	407	82.6	400
2	5	658	987	480	60.3	400
3	5	639	1,131	355	93.4	400
4	5	594	844	397	84.9	400
5	5	515	794	376	82.4	400

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6	5	674	1,045	400	111.5	400
7	5	640	1,016	323	107.0	400
8	5	389	0	0	110.2	40
1	4	657	914	396	99.6	400
2	4	649	1,020	368	97.3	400
3	4	590	752	427	66.4	400
4	4	615	1,002	382	88.5	400
5	4	533	837	407	51.4	400
6	4	554	788	421	57.5	400
7	4	590	904	404	77.3	400
8	4	472	0	0	169.0	40
1	3	612	1,038	329	125.0	400
2	3	647	1,046	342	105.4	400
3	3	629	906	464	83.4	400
4	3	574	915	413	71.7	400
5	3	556	794	343	64.3	400
6	3	608	776	448	50.6	400
7	3	608	874	393	77.4	400
8	3	414	0	0	123.7	40
1	2	563	1,781	0	358.3	160
2	2	504	857	0	263.9	316
3	2	586	852	396	75.4	400
4	2	584	1,016	345	104.9	400
5	2	585	1,242	359	101.8	400
6	2	467	879	0	261.2	290
7	2	432	891	0	245.9	180
8	2	303	0	0	161.7	18
1	1	0	0	0	.0	0
2	1	452	727	0	266.6	234
3	1	607	1,156	314	126.2	360
4	1	599	1,055	368	103.2	360
5	1	567	797	356	73.5	360
6	1	350	630	0	213.8	165
7	1	0	0	0	.0	0
8	1	0	0	0	.0	0

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (8,1) and Grids (8,1) - (8,10) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 554 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

1554 dpm/100 cm^2, averaged over 1m^2
3554 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were below the site-specific guidelines for release.

Introduction

Survey SA0502N was conducted on January 22, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 66%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0502N ranged from 0 to 1,101 dpm/pixel. 100 cm^2 data ranged from 0 to 3,031 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

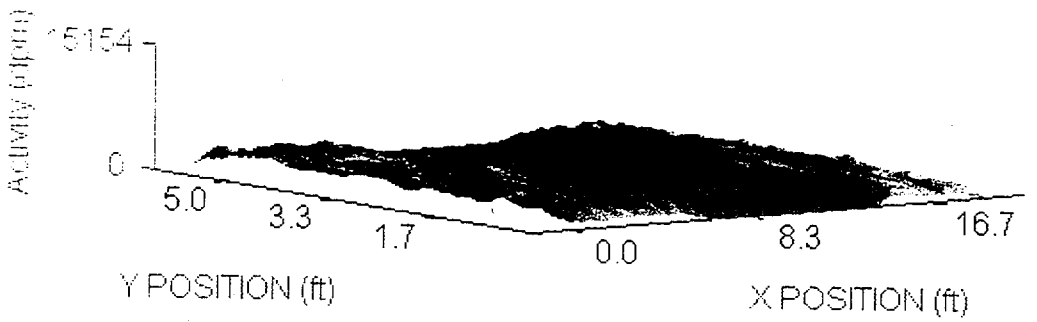

Figure 1 Image plot of surface activity in dpm/25cm^2

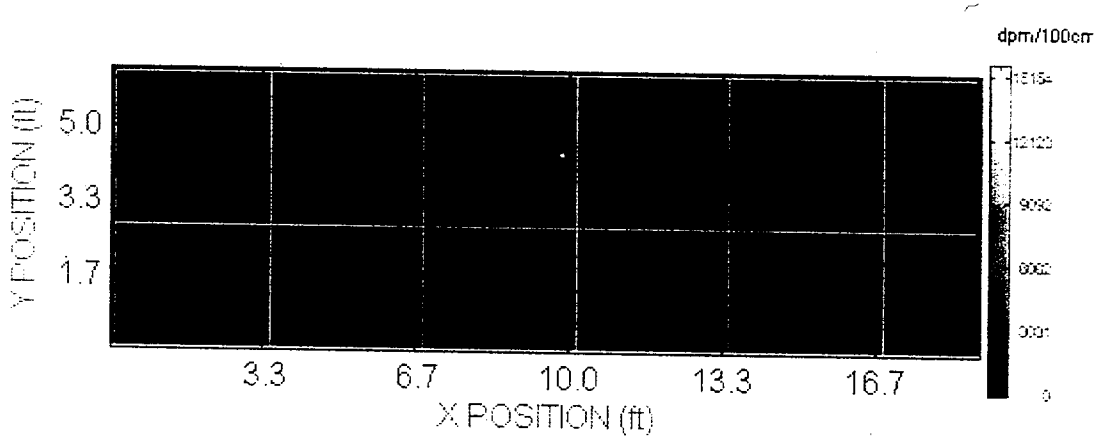

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

(Filtered) (Primary) Date: 02-06-1999 Time: 15:29:43 SA0502N-2

X	Y	Mean	Max	Min	STD	Pixels
1	2	2,259	2,993	1,290	258.5	400
2	2	1,908	2,739	263	571.6	400
3	2	97	101	0	21.0	20
4	2	0	0	0	.0	0
5	2	1,414	2,281	0	706.7	360
6	2	2,081	2,597	1,145	246.1	260
1	1	2,131	3,030	846	438.2	340
2	1	1,765	2,597	273	570.8	340
3	1	88	94	0	19.1	17
4	1	0	0	0	.0	0
5	1	1,626	2,624	0	806.3	306
6	1	1,991	2,843	653	414.9	221

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (6,1) and Grids (6,1) - (6,2) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 2208 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

3208 dpm/100 cm^2, averaged over 1m^2
5208 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were below the site-specific guidelines for release.

Introduction

Survey SA0502S was conducted on January 22, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 66%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0502S ranged from 50 to 774 dpm/pixel. 100 cm^2 data ranged from 82 to 2,664 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

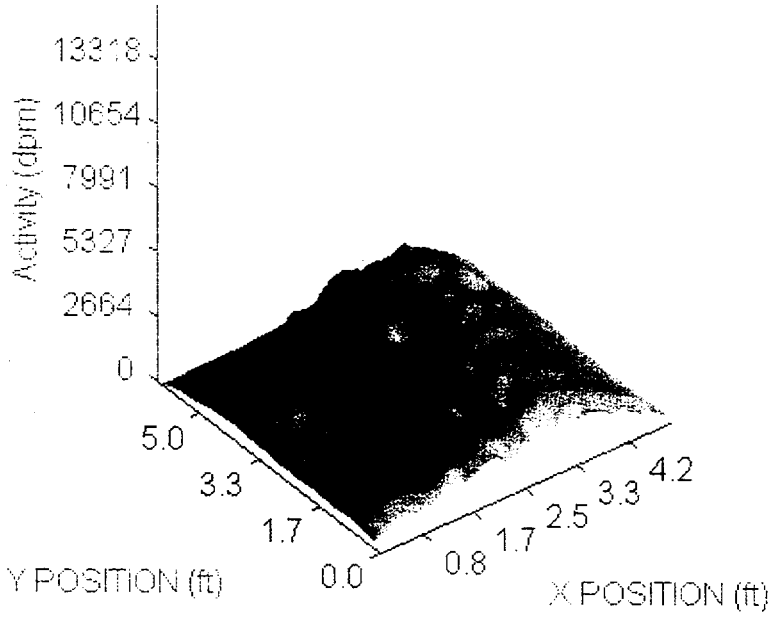

Figure 1 Image plot of surface activity in dpm/25cm^2

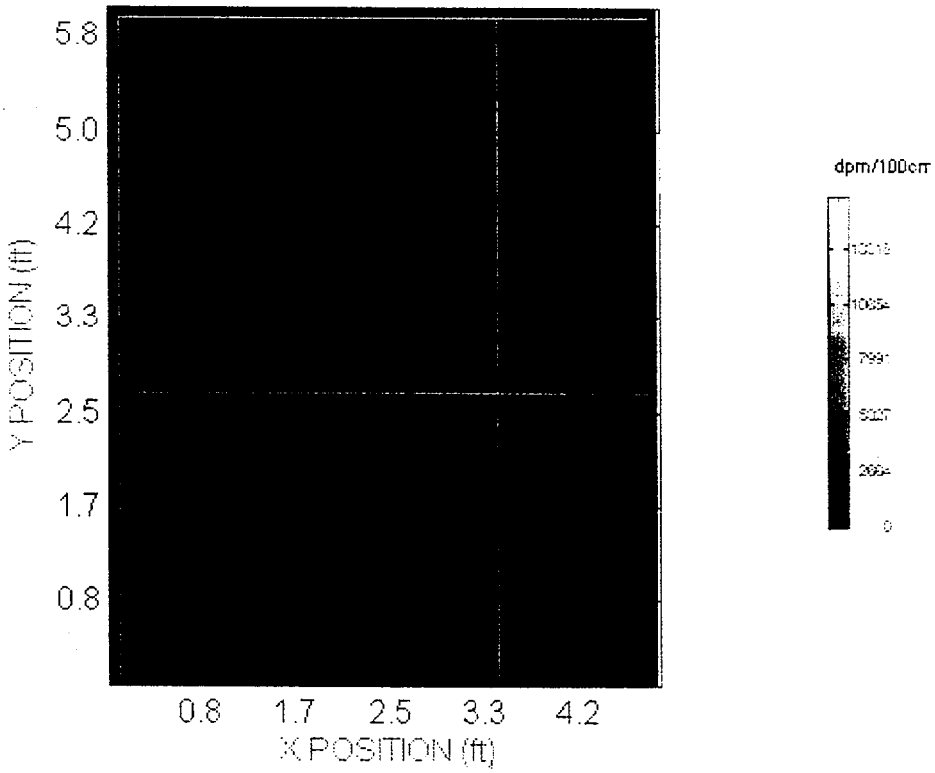

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

X	Y	Mean	Max	Min	STD	Pixels
1	2	1,120	2,386	240	542.8	400
2	2	1,632	2,663	442	522.1	180
1	1	1,145	2,329	300	560.5	320
2	1	1,414	2,133	440	491.0	144

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (2,1) and Grids (2,1) - (2,2) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2. was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 2208 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over $1m^2$
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

3208 dpm/100 cm^2, averaged over $1m^2$
5208 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were below the site-specific guidelines for release.

Introduction

Survey SA0502W was conducted on January 22, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 66%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria. consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0502W ranged from 58 to 861 dpm/pixel. 100 cm^2 data ranged from 93 to 2,755 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

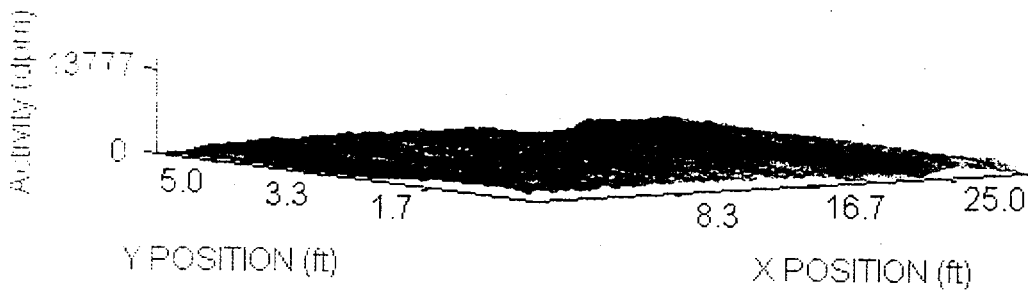

Figure 1 Image plot of surface activity in dpm/25cm^2

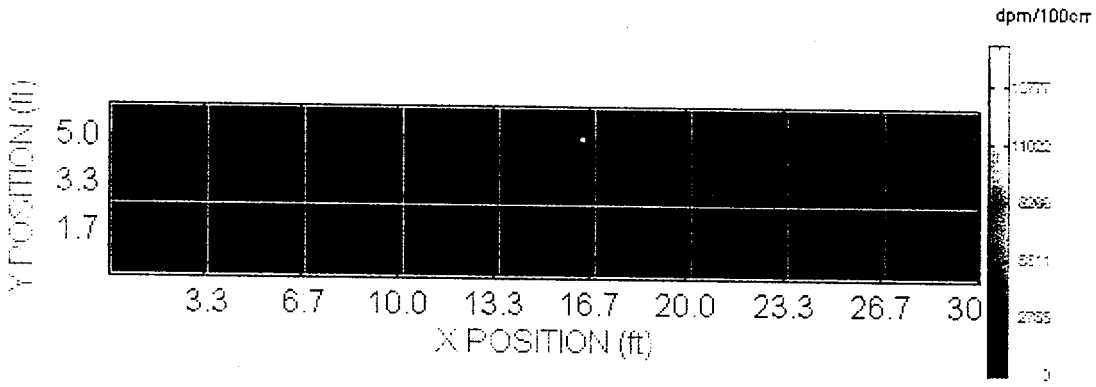

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

(Filtered) (Primary) Date: 02-05-1999 Time: 17:37:02 SA0502W-2

X	Y	Mean	Max	Min	STD	Pixels
1	2	1,294	2,456	372	681.8	400
2	2	2,159	2,545	1,089	257.5	400
3	2	2,250	2,755	1,120	258.5	400
4	2	2,221	2,605	1,193	221.7	400
5	2	2,067	2,454	1,116	221.0	400
6	2	1,838	2,342	386	478.0	400
7	2	575	736	275	82.4	400
8	2	1,576	2,560	318	692.5	400
9	2	2,062	2,730	756	350.6	400
1	1	1,809	2,648	727	342.6	320
2	1	2,156	2,713	1,139	280.8	320
3	1	2,269	2,618	1,495	247.6	320
4	1	2,214	2,462	1,474	170.3	320
5	1	2,164	2,710	1,342	214.0	320
6	1	1,777	2,396	480	508.7	320
7	1	569	738	376	66.2	320
8	1	1,543	2,501	419	631.3	320
9	1	1,952	2,679	804	343.9	320

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (9,1) and Grids (9.1) - (9,2) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 2208 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

3208 dpm/100 cm^2, averaged over 1m^2
5208 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were below the site-specific guidelines for release.

Introduction

Survey SA0503E was conducted on January 22, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 66%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0503E ranged from 141 to 1,073 dpm/pixel. 100 cm^2 data ranged from 169 to 3,022 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

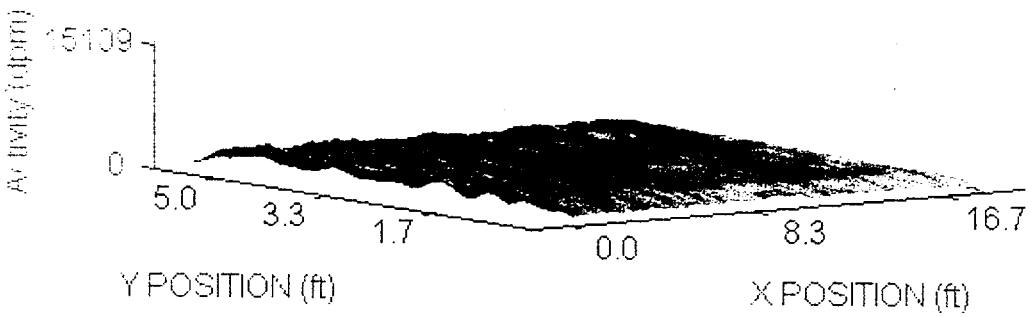

Figure 1 Image plot of surface activity in dpm/25cm^2

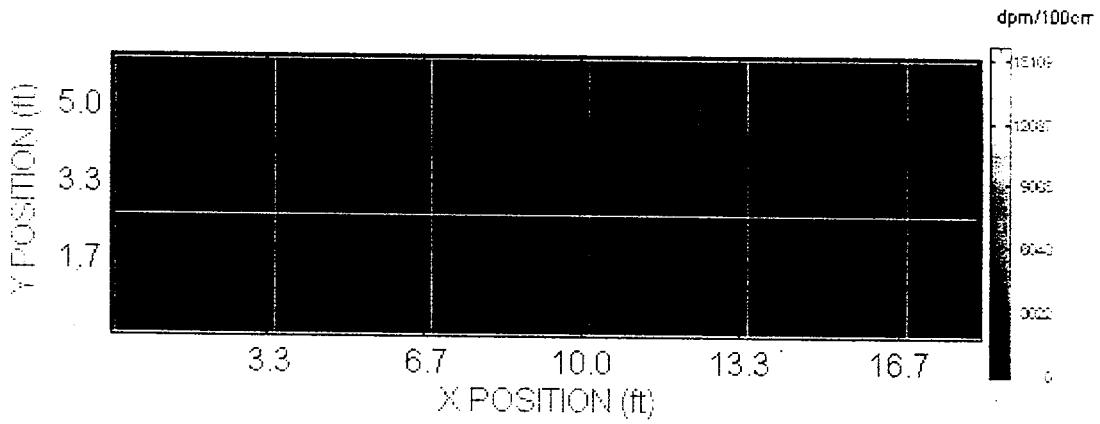

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

(Filtered) (Primary) Date: 02-05-1999 Time: 17:35:59 SA0503E-2

X	Y	Mean	Max	Min	STD	Pixels
1	2	2,218	2,856	997	253.3	0
2	2	2,164	2,816	1,292	201.5	0
3	2	2,095	2,374	1,192	235.8	0
4	2	2,030	2,367	1,062	250.1	0
5	2	2,164	2,670	1,136	232.6	0
6	2	2,120	2,520	944	387.4	0
1	1	2,185	3,021	1,182	325.3	0
2	1	2,042	2,555	1,188	229.6	0
3	1	2,209	2,466	1,181	209.4	0
4	1	2,004	2,418	1,160	223.3	0
5	1	2,042	2,310	1,209	225.1	0
6	1	1,902	2,368	906	321.2	0

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (6,1) and Grids (6,1) - (6,2) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 2208 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

3208 dpm/100 cm^2, averaged over 1m^2
5208 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were below the site-specific guidelines for release.

Introduction

Survey SA0503F was conducted on January 21, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 71%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0503F ranged from 0 to 2,029 dpm/pixel. 100 cm^2 data ranged from 0 to 5.096 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

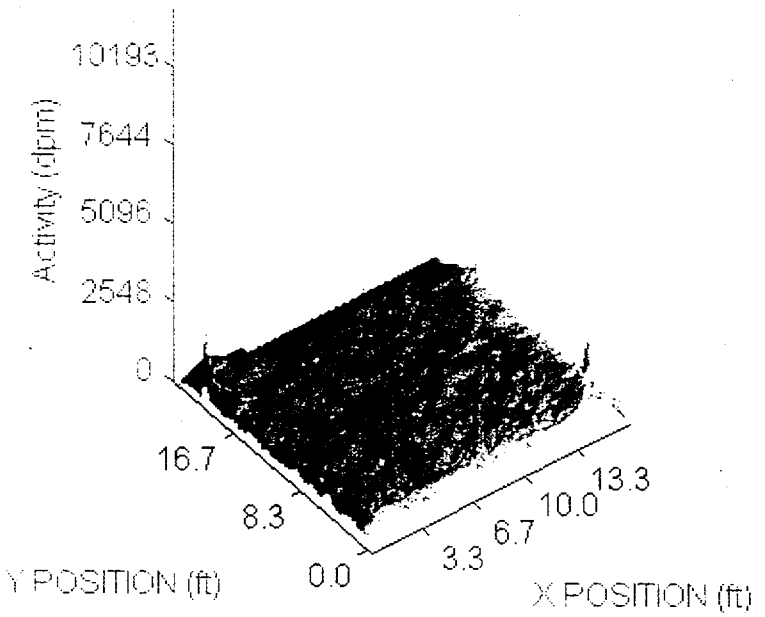

Figure 1 Image plot of surface activity in dpm/25cm^2

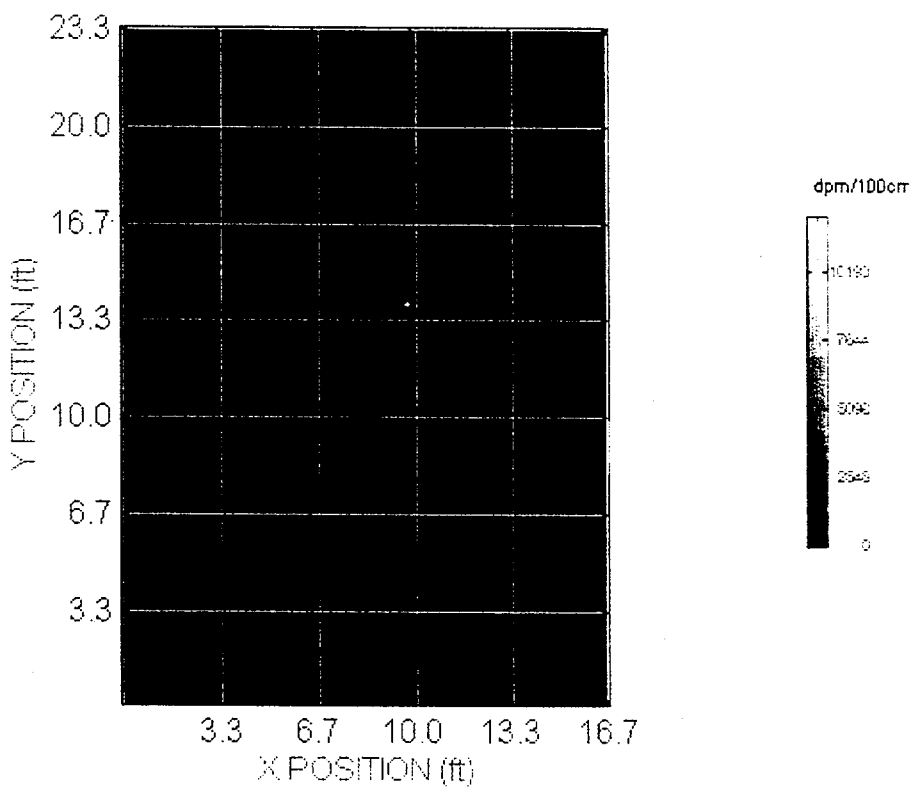

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

X	Y	Mean	Max	Min	STD	Pixels
1	7	621	2,361	103	211.9	400
2	7	355	771	0	243.2	268
3	7	349	794	0	231.5	180
4	7	384	827	0	260.9	180
5	7	334	765	0	223.2	180
1	6	629	1,207	319	95.8	400
2	6	730	911	590	74.5	400
3	6	733	892	589	43.1	400
4	6	804	1,004	601	76.0	400
5	6	779	1,135	383	96.5	400
1	5	636	806	320	84.0	400
2	5	786	2,276	571	201.5	400
3	5	747	1,034	597	74.0	400
4	5	717	945	556	68.4	400
5	5	723	1,473	358	138.0	400
1	4	622	908	369	86.5	400
2	4	699	837	614	39.0	400
3	4	683	870	563	47.3	400
4	4	761	1,392	673	73.9	400
5	4	702	956	324	121.8	400
1	3	727	913	430	78.1	400
2	3	751	914	642	46.1	400
3	3	788	1,147	597	94.2	400
4	3	721	994	517	73.3	400
5	3	758	1,018	326	109.1	400
1	2	713	1,144	387	89.1	400
2	2	775	1,098	645	53.9	400
3	2	787	1,033	604	71.3	400
4	2	808	1,186	637	64.9	400
5	2	789	1,340	328	135.4	400
1	**1**	**810**	**4,795**	**350**	**319.2**	**400**
2	1	813	1,411	434	99.7	400
3	1	910	3,013	471	272.1	400
4	1	800	984	483	99.6	400
5	1	893	2,017	355	249.2	400

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (5,1) and Grids (5,1) - (5,7) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 1058 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

2058 dpm/100 cm^2, averaged over 1m^2
4058 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were above the site-specific guidelines for release. Figure 3 details which zones were above release limits:

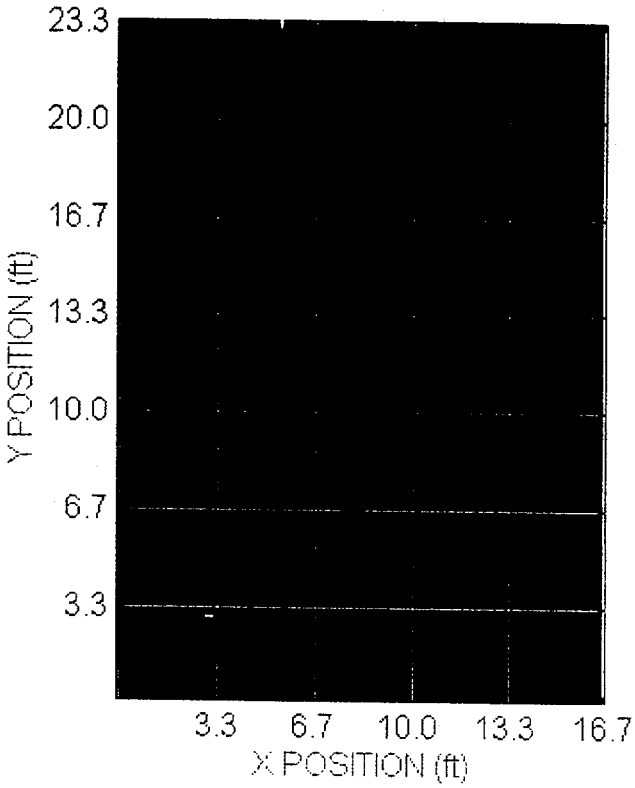

Figure 3 Yellow shading denotes grids in excess of the average limit, while red pixels correspond to the upper left coordinate of a 100cm^2 area exceeding the maximum limit.

Introduction

Survey SA0503N was conducted on January 22, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 66%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0503N ranged from 178 to 990 dpm/pixel. 100 cm^2 data ranged from 251 to 3,069 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

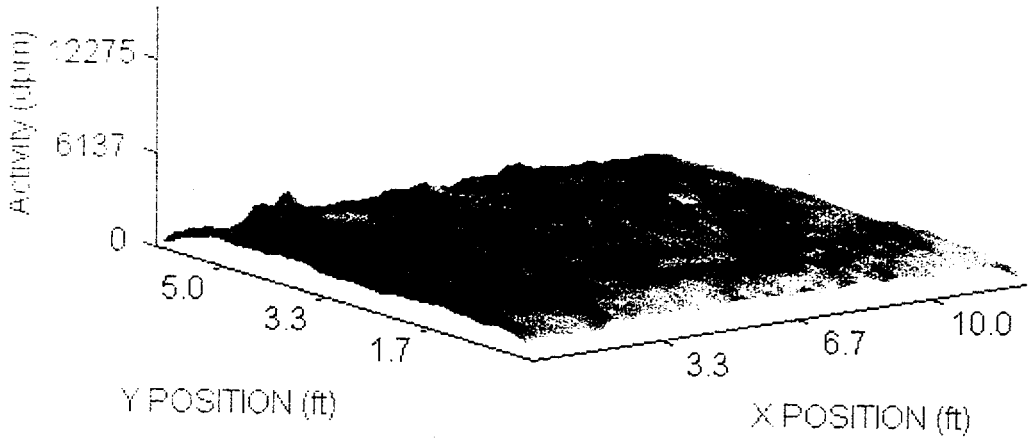

Figure 1 Image plot of surface activity in dpm/25cm^2

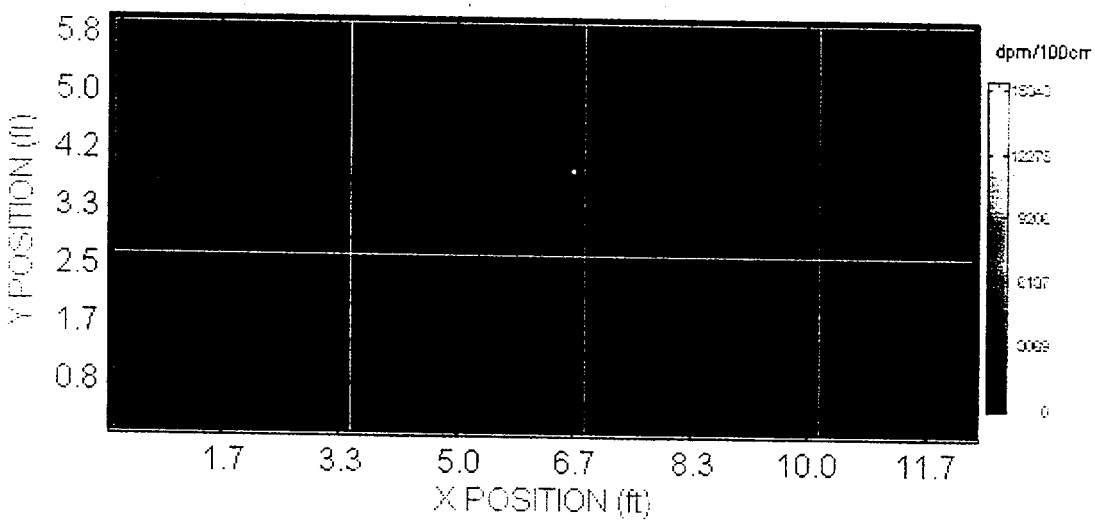

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

(Filtered) (Primary) Date: 02-05-1999 Time: 17:34:57 SA0503N-2

X	Y	Mean	Max	Min	STD	Pixels
1	2	1,909	3,068	886	305.2	400
2	2	2,138	2,657	1,422	191.0	400
3	2	2,286	2,788	1,348	240.0	400
4	2	2,130	2,451	1,328	287.6	280
1	1	1,858	2,322	1,030	272.5	320
2	1	2,115	2,373	1,313	215.1	320
3	1	2,058	2,473	1,325	225.5	320
4	1	1,959	2,415	1,057	313.7	224

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (4,1) and Grids (4,1) - (4,2) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 2208 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

3208 dpm/100 cm^2, averaged over 1m^2
5208 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were below the site-specific guidelines for release.

Introduction

Survey SA0503S was conducted on January 22, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 66%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0503S ranged from 125 to 907 dpm/pixel. 100 cm^2 data ranged from 125 to 2,777 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

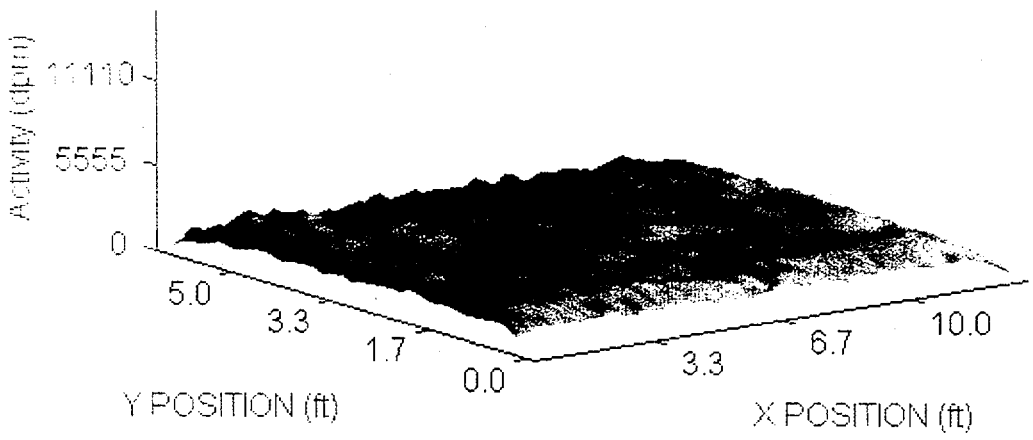

Figure 1 Image plot of surface activity in dpm/25cm^2

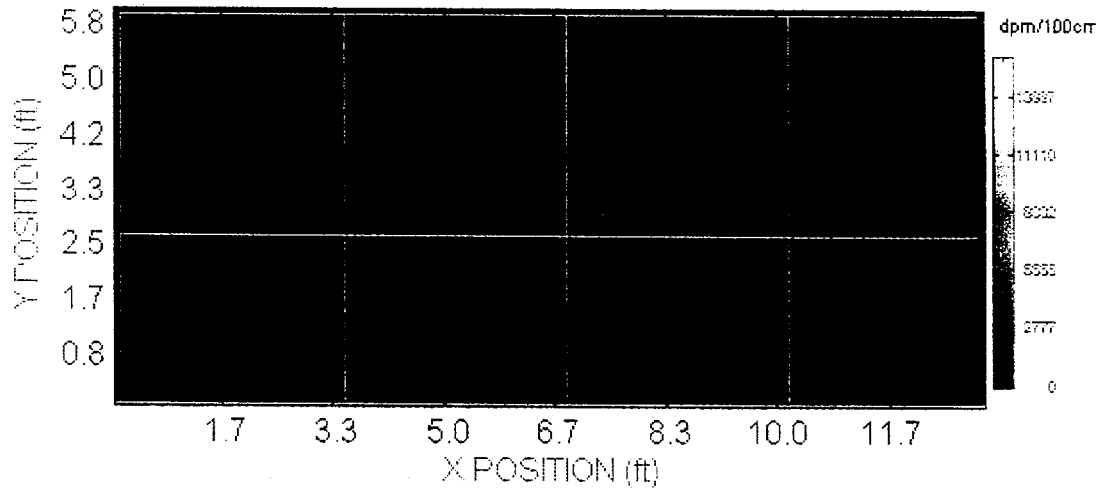

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

(Filtered) (Primary) Date: 02-05-1999 Time: 17:33:58 SA0503S-2

X	Y	Mean	Max	Min	STD	Pixels
1	2	2,205	2,777	1,380	214.7	400
2	2	2,188	2,568	1,256	216.8	400
3	2	2,179	2,434	1,312	196.6	400
4	2	2,107	2,477	623	347.0	360
1	1	2,162	2,474	1,219	226.7	320
2	1	2,101	2,409	1,223	244.3	320
3	1	2,128	2,405	1,285	199.1	320
4	1	1,966	2,356	740	333.7	288

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (4,1) and Grids (4,1) - (4,2) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 2208 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

3208 dpm/100 cm^2, averaged over 1m^2
5208 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were below the site-specific guidelines for release.

Introduction

Survey SA0503W was conducted on January 22, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 66%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0503W ranged from 0 to 1,038 dpm/pixel. 100 cm^2 data ranged from 0 to 2,972 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

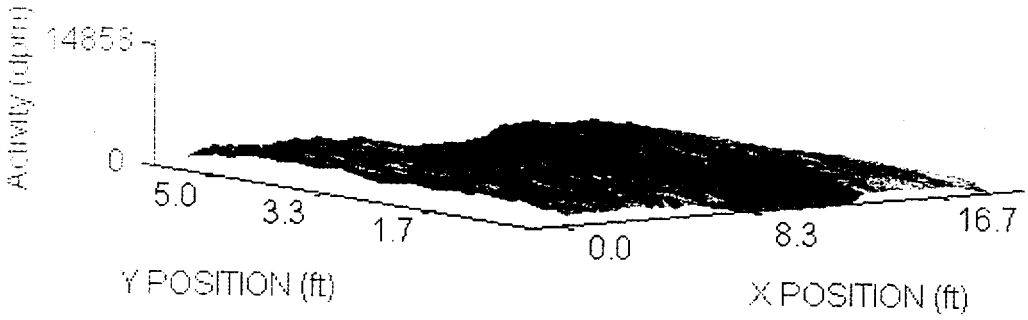

Figure 1 Image plot of surface activity in dpm/25cm^2

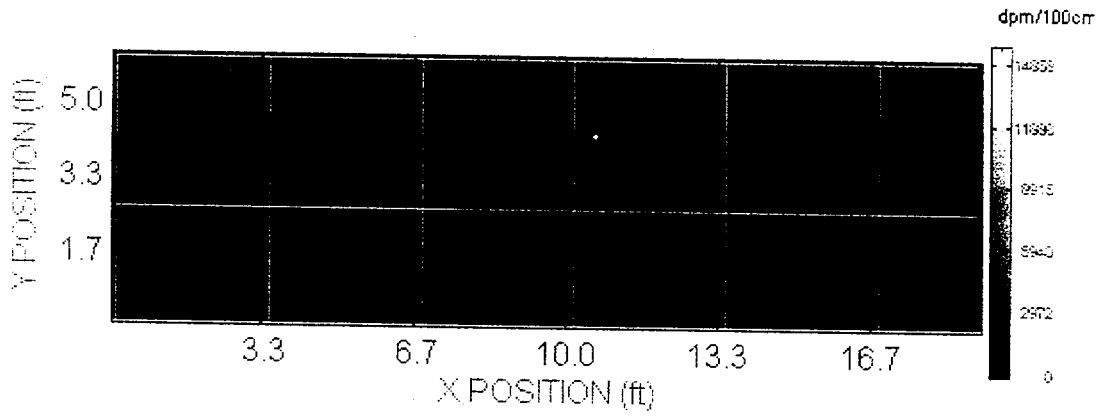

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

(Filtered) (Primary) Date: 02-06-1999 Time: 11:56:58 SA0503W-2

X	Y	Mean	Max	Min	STD	Pixels
1	2	2,243	2,971	1,277	278.2	400
2	2	2,153	2,663	1,438	177.3	400
3	2	1,325	2,350	0	818.7	180
4	2	502	1,394	0	265.9	100
5	2	2,050	2,860	1,251	230.1	400
6	2	1,798	2,412	744	389.5	280
1	1	2,109	2,530	1,204	238.2	320
2	1	2,166	2,728	1,160	245.7	320
3	1	1,364	2,512	0	853.8	144
4	1	521	1,568	0	284.1	80
5	1	1,964	2,511	1,249	239.0	320
6	1	1,913	2,271	729	360.6	224

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (6,1) and Grids (6,1) - (6,2) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 2208 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

3208 dpm/100 cm^2, averaged over 1m^2
5208 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were below the site-specific guidelines for release.

Introduction

Survey SA0504F was conducted on January 21, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 71%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0504F ranged from 0 to 3,107 dpm/pixel. 100 cm^2 data ranged from 0 to 10,599 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

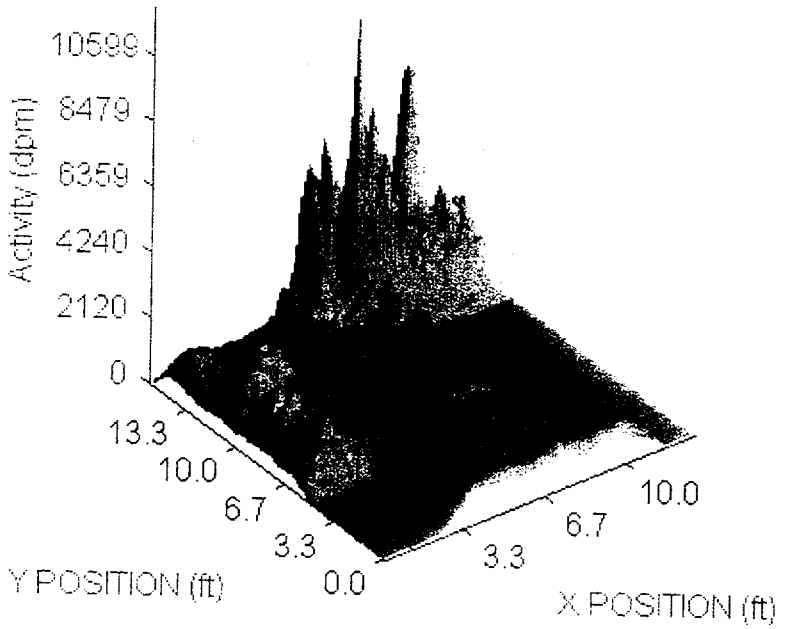

Figure 1 Image plot of surface activity in dpm/25cm^2

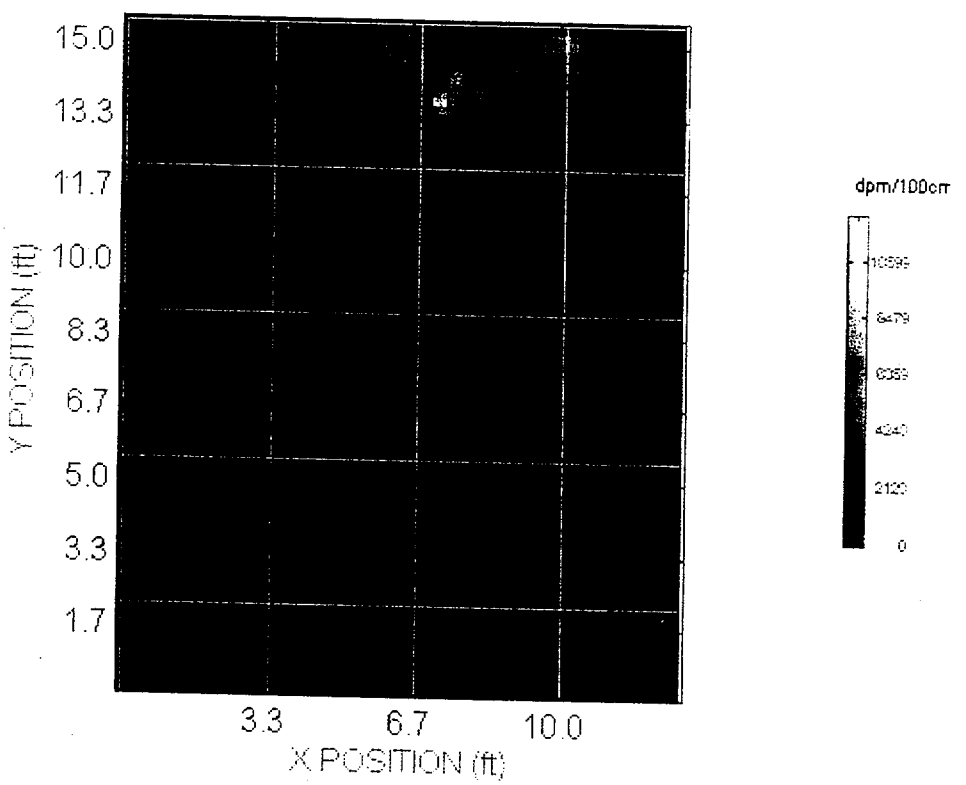

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

(Filtered) (Primary) Date: 02-06-1999 Time: 12:10:10 SA0504F-2

X	Y	Mean	Max	Min	STD	Pixels
1	5	948	1,524	287	248.4	400
2	**5**	**1,662**	**6,299**	**414**	**1089.2**	**400**
3	**5**	**2,871**	**10,599**	**54**	**1826.8**	**390**
4	**5**	**1,889**	**7,285**	**28**	**1313.8**	**306**
1	4	1,177	1,937	471	342.5	400
2	4	1,162	1,367	963	76.0	400
3	4	1,046	1,907	0	590.3	300
4	4	0	0	0	.0	0
1	3	913	2,171	320	253.9	400
2	3	1,021	1,287	754	111.6	400
3	3	745	1,156	0	430.8	300
4	3	0	0	0	.0	0
1	2	239	553	0	121.8	112
2	2	885	1,055	568	89.9	400
3	2	648	1,052	0	355.7	329
4	2	178	618	0	108.7	74
1	1	221	412	0	104.9	52
2	1	887	1,073	446	124.3	260
3	1	887	1,176	555	119.5	260
4	1	622	1,058	0	371.6	130

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (4,1) and Grids (4,1) - (4,5) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 1058 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

2058 dpm/100 cm^2, averaged over 1m^2
4058 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were above the site-specific guidelines for release in certain grid locations. The following grids are above the release limits: (3,5)

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were above the site-specific guidelines for release. Figure 3 details which zones were above release limits:

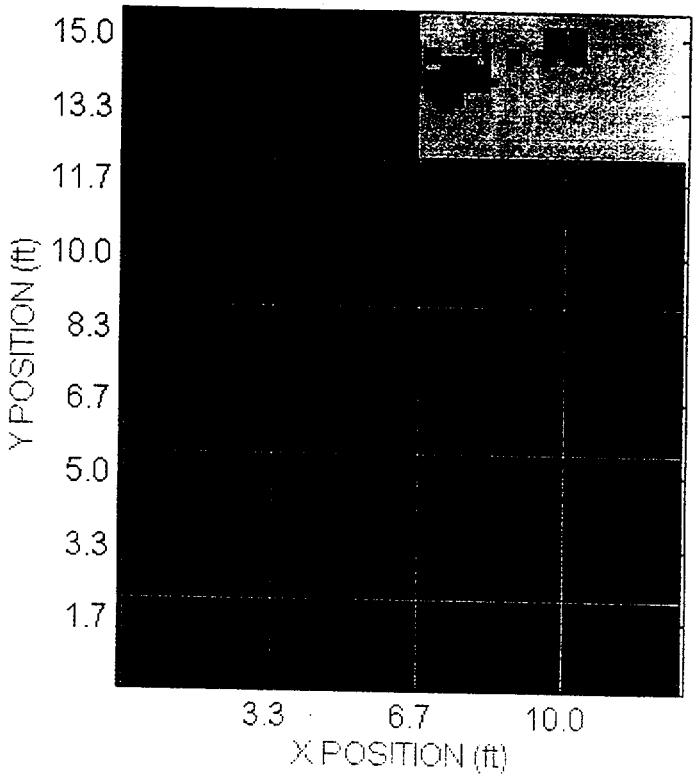

Figure 3 Yellow shading denotes grids in excess of the average limit, while red pixels correspond to the upper left coordinate of a 100cm^2 area exceeding the maximum limit.

Introduction

Survey SA0505E was conducted on January 23, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 66%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0505E ranged from 0 to 663 dpm/pixel. 100 cm^2 data ranged from 0 to 1,627 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

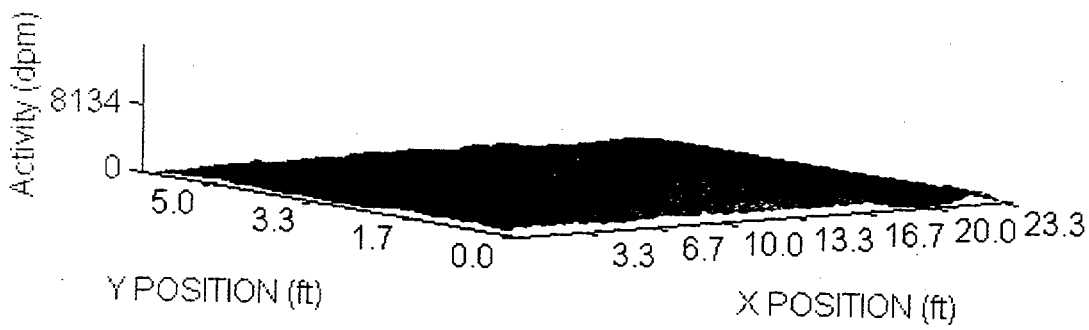

Figure 1 Image plot of surface activity in dpm/25cm^2

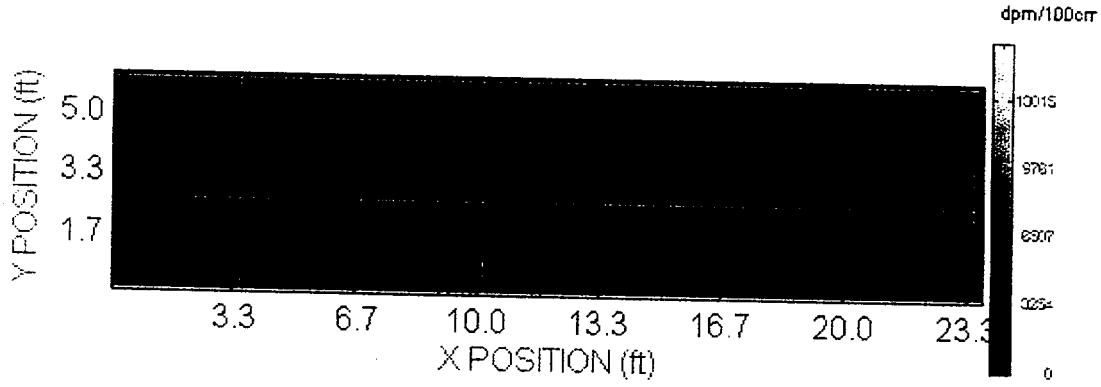

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

(Filtered) (Primary) Date: 02-05-1999 Time: 17:32:39 SA0505E-2

X	Y	Mean	Max	Min	STD	Pixels
1	2	893	1,507	341	214.7	400
2	2	903	1,315	412	166.9	400
3	2	1,117	1,419	572	147.1	400
4	2	1,110	1,582	655	145.8	400
5	2	1,151	1,623	549	182.8	400
6	2	699	1,243	0	414.0	340
7	2	547	938	0	313.2	320
8	2	370	0	0	59.2	40
1	1	1,069	1,577	565	154.3	320
2	1	952	1,304	617	147.4	320
3	1	1,202	1,525	688	112.7	320
4	1	1,165	1,626	673	164.5	320
5	1	1,119	1,535	700	141.7	320
6	1	752	1,239	0	426.1	272
7	1	696	1,251	0	397.2	256
8	1	436	0	0	31.9	32

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (8,1) and Grids (8,1) - (8,2) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 2208 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

3208 dpm/100 cm^2, averaged over 1m^2
5208 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were below the site-specific guidelines for release.

Introduction

Survey SA0505F was conducted on January 25, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 62%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0505F ranged from 0 to 26,775 dpm/pixel. 100 cm^2 data ranged from 0 to 62,069 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

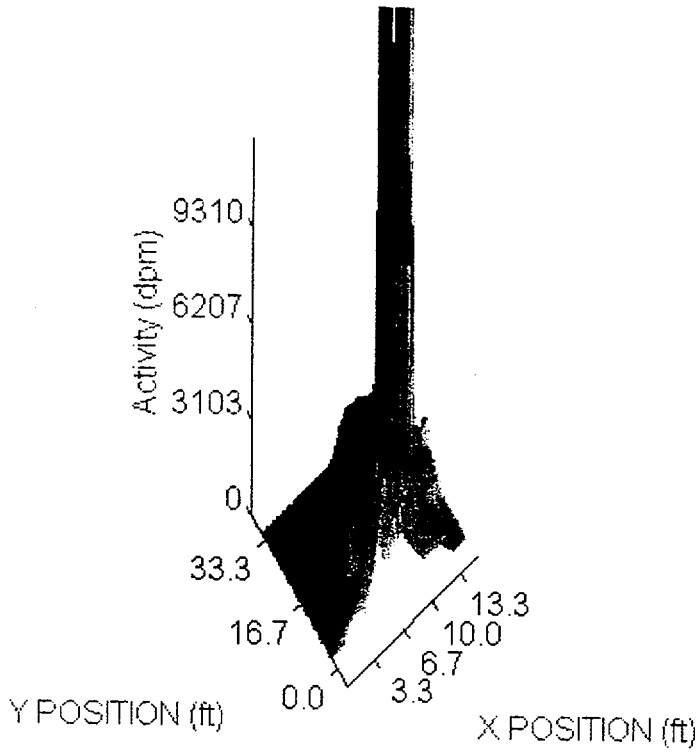

Figure 1 Image plot of surface activity in dpm/25cm^2

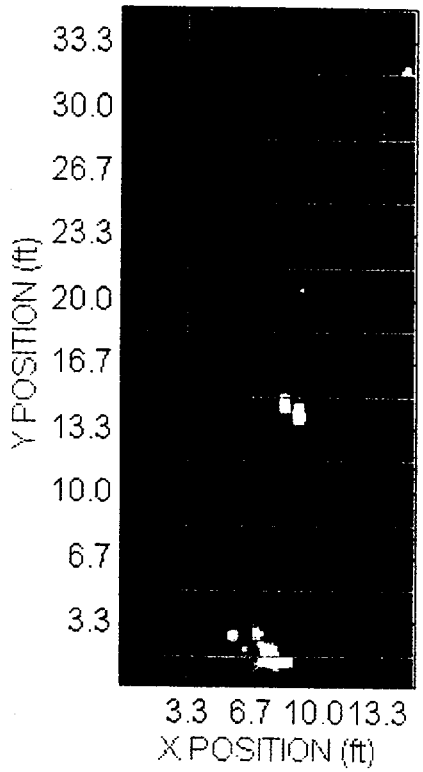

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

(Filtered) (Primary) Date: 02-06-1999 Time: 12:01:23 SA0505F-2

X	Y	Mean	Max	Min	STD	Pixels
1	11	0	0	0	.0	0
2	11	0	0	0	.0	0
3	11	905	1,691	0	577.9	240
4	11	1,160	1,825	0	434.0	389
5	**11**	**1,482**	**15,629**	**0**	**2094.6**	**169**
1	10	0	0	0	.0	0
2	10	0	0	0	.0	0
3	10	878	1,652	0	553.5	240
4	10	1,515	1,912	1,146	170.6	400
5	10	1,232	3,346	618	356.2	220
1	9	0	0	0	.0	0
2	9	116	429	0	51.5	42
3	9	869	1,939	0	589.4	297
4	9	1,505	2,322	413	383.1	400
5	9	895	2,050	0	639.8	190
1	8	0	0	0	.0	0
2	8	491	1,003	0	269.0	120
3	8	1,472	1,874	863	194.9	400
4	8	1,497	1,965	1,098	203.3	400
5	8	1,047	1,400	557	215.8	220
1	7	0	0	0	.0	0
2	7	530	978	0	286.8	120
3	7	1,432	1,684	1,150	107.3	400
4	7	1,709	2,440	1,277	301.4	400
5	7	1,230	2,044	643	327.8	220
1	6	0	0	0	.0	0
2	6	519	1,095	0	286.8	120
3	**6**	**1,822**	**12,429**	**1,143**	**821.9**	**400**
4	6	1,746	2,962	1,211	470.4	400
5	6	1,403	2,194	537	413.5	220
1	5	0	0	0	.0	0
2	5	727	1,529	0	399.5	120
3	**5**	**4,807**	**62,068**	**1,344**	**8131.4**	**400**
4	**5**	**1,891**	**7,653**	**1,002**	**839.6**	**400**
5	5	985	1,457	439	247.7	220
1	4	0	0	0	.0	0
2	4	710	2,765	0	408.9	120
3	4	1,511	2,245	1,064	168.2	400
4	4	1,026	1,646	311	282.0	400
5	4	284	637	0	137.3	50
1	3	1,204	3,559	0	895.2	168
2	3	1,254	2,682	0	793.5	316
3	3	1,978	3,203	1,305	475.6	400
4	3	1,065	1,505	300	308.7	400
5	3	79	89	0	21.9	20

(Filtered) (Primary) Date: 02-06-1999 Time: 12:01:23 SA0505F-3

1	2	950	1,981	0	638.9	294
2	**2**	**3,488**	**27,422**	**1,364**	**2943.0**	**400**
3	**2**	**5,063**	**50,607**	**1,961**	**6136.7**	**400**
4	2	1,672	2,549	435	534.5	400
5	2	140	164	0	39.0	20
1	1	1,116	1,790	441	287.5	200
2	**1**	**3,142**	**8,179**	**847**	**1635.2**	**200**
3	**1**	**7,344**	**50,359**	**846**	**9637.8**	**200**
4	1	1,012	1,855	168	378.9	200
5	1	98	116	0	27.9	10

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (5,1) and Grids (5,1) - (5,11) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 1058 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

2058 dpm/100 cm^2, averaged over 1m^2
4058 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were above the site-specific guidelines for release in certain grid locations. The following grids are above the release limits: (3,5) (2,2) (3,2) (2,1) (3,1)

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were above the site-specific guidelines for release. Figure 3 details which zones were above release limits:

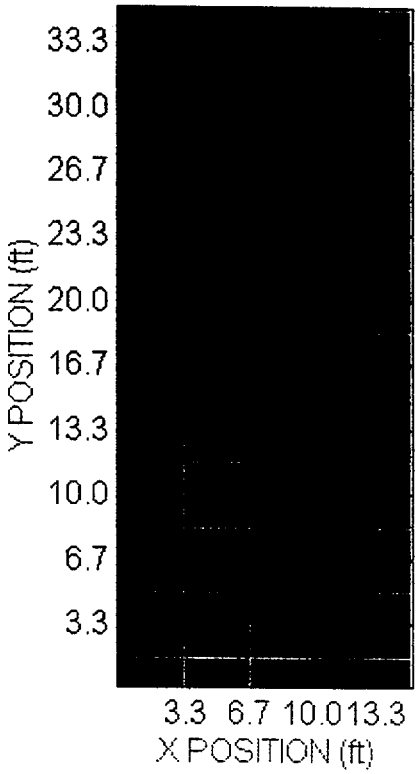

Figure 3 Yellow shading denotes grids in excess of the average limit, while red pixels correspond to the upper left coordinate of a 100cm^2 area exceeding the maximum limit.

Introduction

Survey SA0505W was conducted on January 23, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 66%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0505W ranged from 0 to 582 dpm/pixel. 100 cm^2 data ranged from 0 to 1,614 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

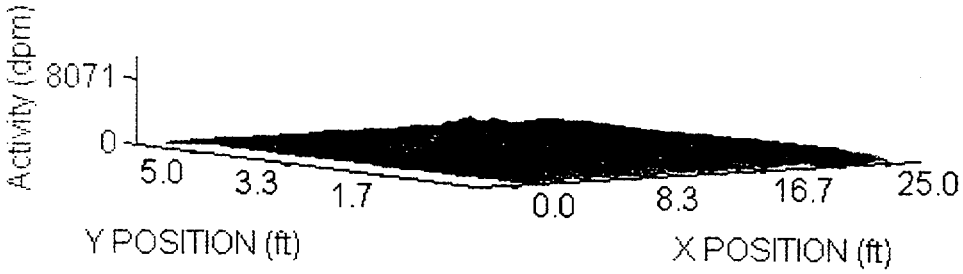

Figure 1 Image plot of surface activity in dpm/25cm^2

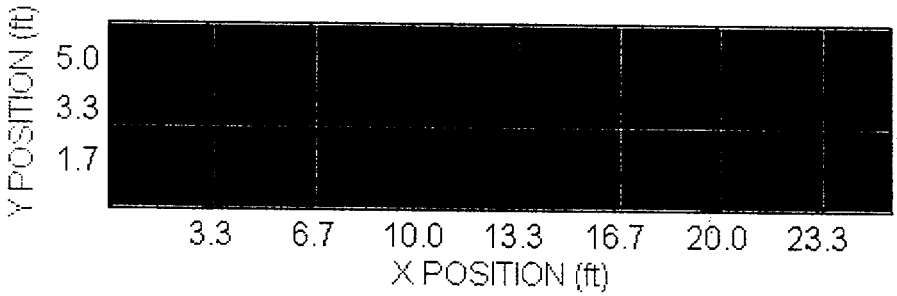

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

X	Y	Mean	Max	Min	STD	Pixels
1	2	509	703	235	74.0	400
2	2	554	704	269	83.7	400
3	2	532	695	264	86.1	400
4	2	639	872	320	104.0	400
5	2	570	812	253	93.6	400
6	2	814	1,614	285	262.8	400
7	2	616	1,213	0	401.8	220
8	2	465	942	0	247.3	240
1	1	570	1,083	253	110.0	340
2	1	561	784	280	97.2	340
3	1	538	726	275	82.2	340
4	1	552	980	272	103.4	340
5	1	543	903	266	85.1	340
6	1	790	1,311	295	212.8	340
7	1	558	1,251	0	366.7	187
8	1	717	1,490	0	418.9	204

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (8,1) and Grids (8,1) - (8,2) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 554 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over $1m^2$
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

1554 dpm/100 cm^2, averaged over $1m^2$
3554 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were below the site-specific guidelines for release.

Introduction

Survey SA0506E was conducted on January 23, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 66%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0506E ranged from 41 to 320 dpm/pixel. 100 cm^2 data ranged from 44 to 833 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

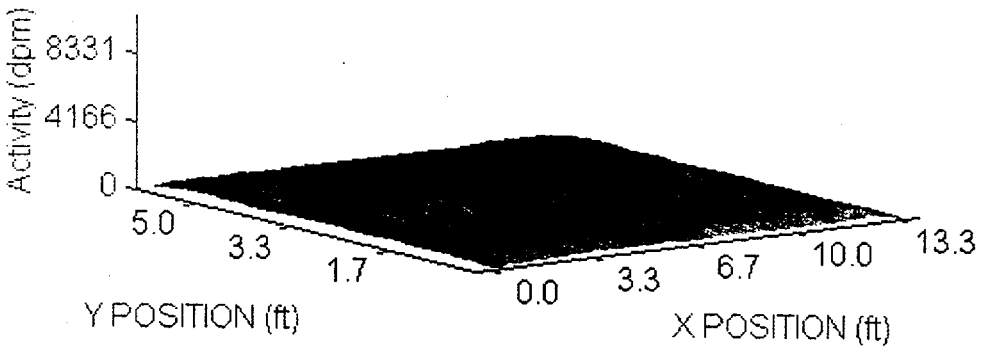

Figure 1 Image plot of surface activity in dpm/25cm^2

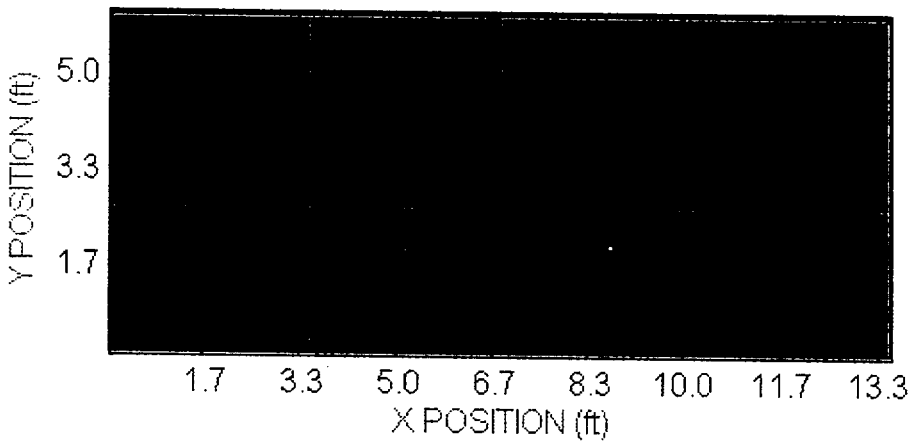

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

X	Y	Mean	Max	Min	STD	Pixels
1	2	540	792	245	97.6	400
2	2	526	706	252	90.9	400
3	2	512	655	222	87.5	400
4	2	512	749	236	82.6	400
5	2	0	0	0	.0	20
1	1	448	644	196	66.4	320
2	1	537	775	362	71.6	320
3	1	470	559	321	53.7	320
4	1	484	668	265	72.5	320
5	1	0	0	0	.0	16

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (5,1) and Grids (5,1) - (5,2) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 554 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

1554 dpm/100 cm^2, averaged over 1m^2
3554 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were below the site-specific guidelines for release.

Introduction

Survey SA0506F was conducted on January 25, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 62%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0506F ranged from 32 to 425 dpm/pixel. 100 cm^2 data ranged from 32 to 1,236 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

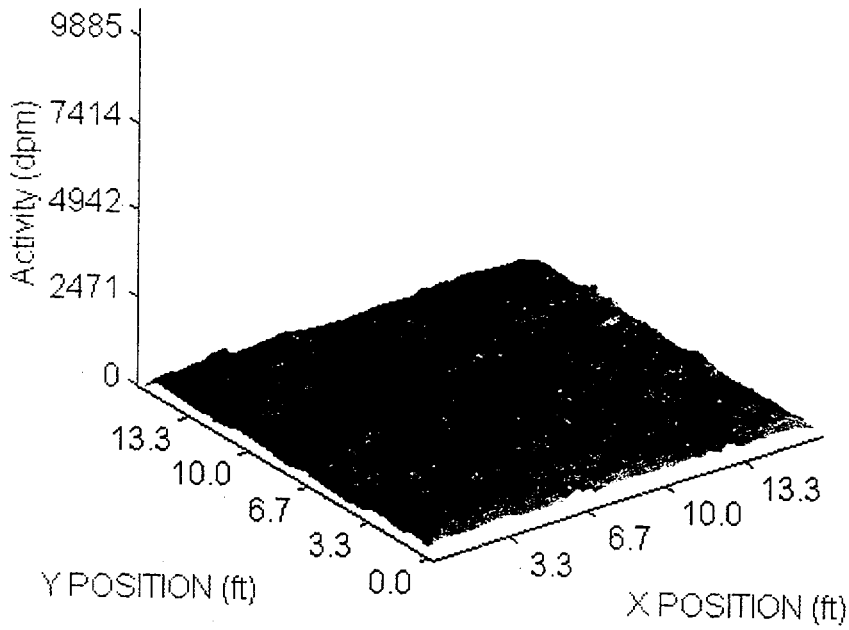

Figure 1 Image plot of surface activity in dpm/25cm^2

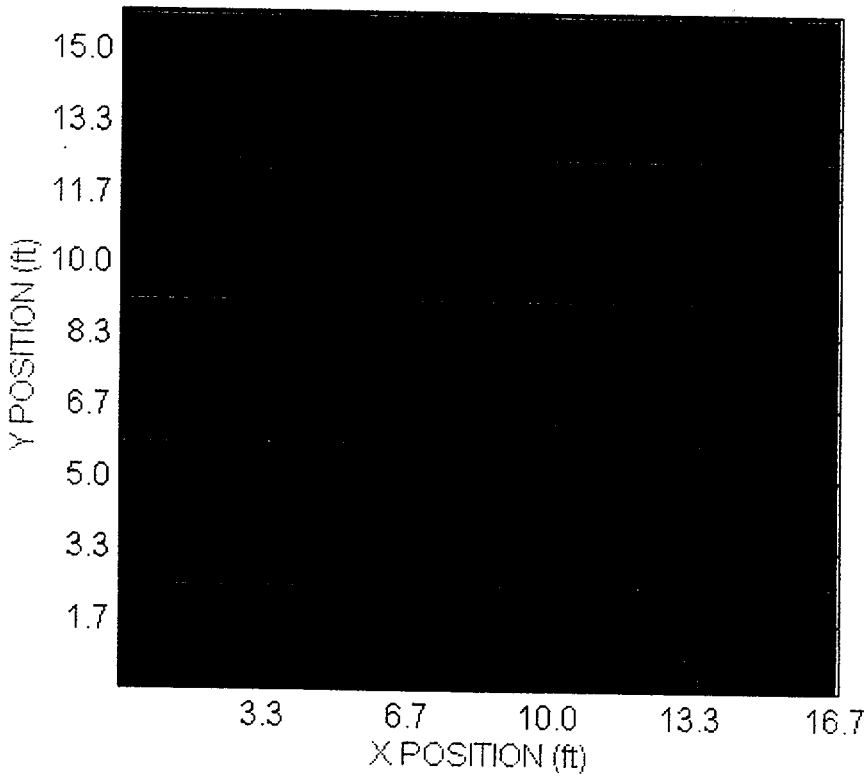

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

(Filtered) (Primary) Date: 02-04-1999 Time: 17:33:27 SA0506F-2

X	Y	Mean	Max	Min	STD	Pixels
1	5	503	664	217	78.3	400
2	5	525	666	287	70.9	400
3	5	528	1,046	216	126.9	400
4	5	563	924	247	111.8	400
5	5	496	759	172	118.6	400
1	4	516	641	293	55.7	400
2	4	543	695	425	48.4	400
3	4	582	1,012	345	96.8	400
4	4	541	783	373	74.1	400
5	4	479	734	263	68.3	400
1	3	515	630	281	68.0	400
2	3	558	846	388	60.0	400
3	3	650	974	471	75.0	400
4	3	579	834	456	63.9	400
5	3	526	1,235	214	129.6	400
1	2	474	605	234	75.5	400
2	2	528	732	417	51.8	400
3	2	542	734	393	58.0	400
4	2	590	982	446	79.5	400
5	2	487	663	192	91.0	400
1	1	525	660	314	81.0	300
2	1	517	657	313	75.3	300
3	1	516	734	312	72.3	300
4	1	522	714	316	75.5	300
5	1	466	679	177	98.6	300

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (5,1) and Grids (5,1) - (5,5) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 554 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

1554 dpm/100 cm^2, averaged over 1m^2
3554 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were below the site-specific guidelines for release.

Introduction

Survey SA0506N was conducted on January 23, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 66%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0506N ranged from 26 to 324 dpm/pixel. 100 cm^2 data ranged from 26 to 942 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

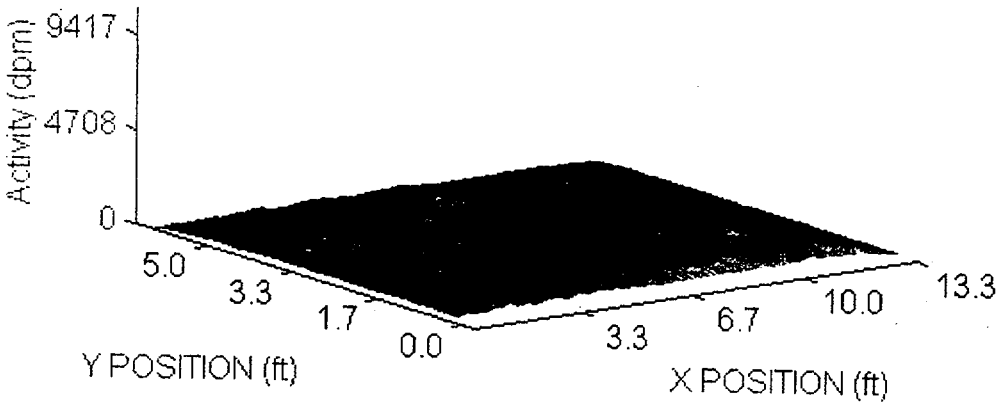

Figure 1 Image plot of surface activity in dpm/25cm^2

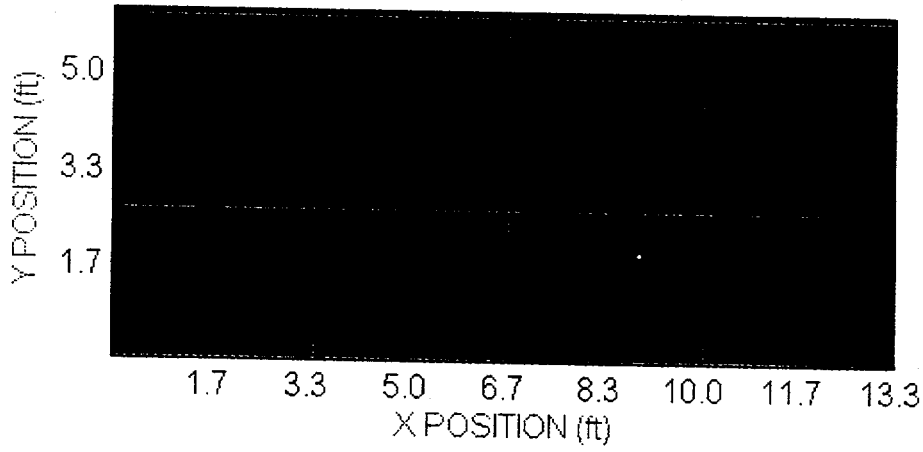

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

(Filtered) (Primary) Date: 02-04-1999 Time: 16:34:25 SA0506N-2

X	Y	Mean	Max	Min	STD	Pixels
1	2	533	941	211	102.9	400
2	2	523	778	277	75.2	400
3	2	488	640	287	62.0	400
4	2	474	720	131	111.3	400
1	1	512	734	244	74.6	320
2	1	550	706	334	64.8	320
3	1	487	665	346	56.1	320
4	1	463	604	177	90.6	320

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (4,1) and Grids (4,1) - (4,2) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 554 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

1554 dpm/100 cm^2, averaged over 1m^2
3554 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were below the site-specific guidelines for release.

Introduction

Survey SA0506S was conducted on January 23, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 66%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0506S ranged from 43 to 299 dpm/pixel. 100 cm^2 data ranged from 92 to 806 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

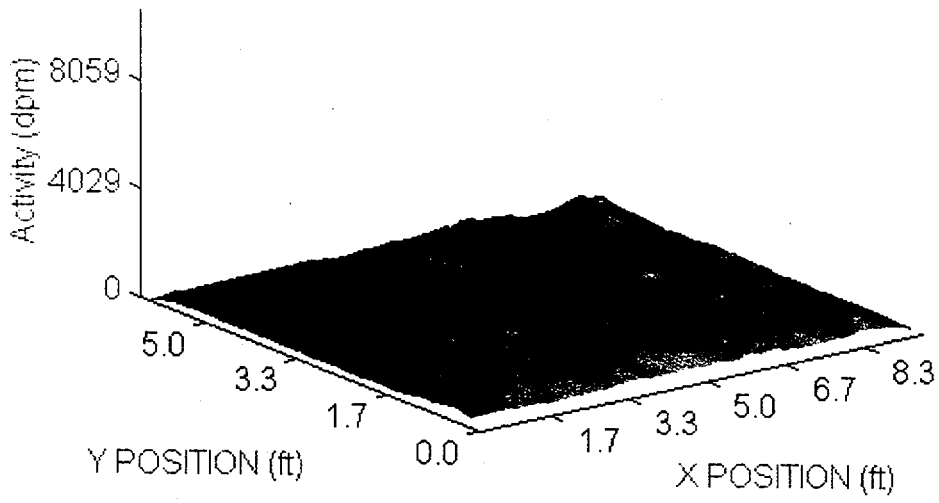

Figure 1 Image plot of surface activity in dpm/25cm^2

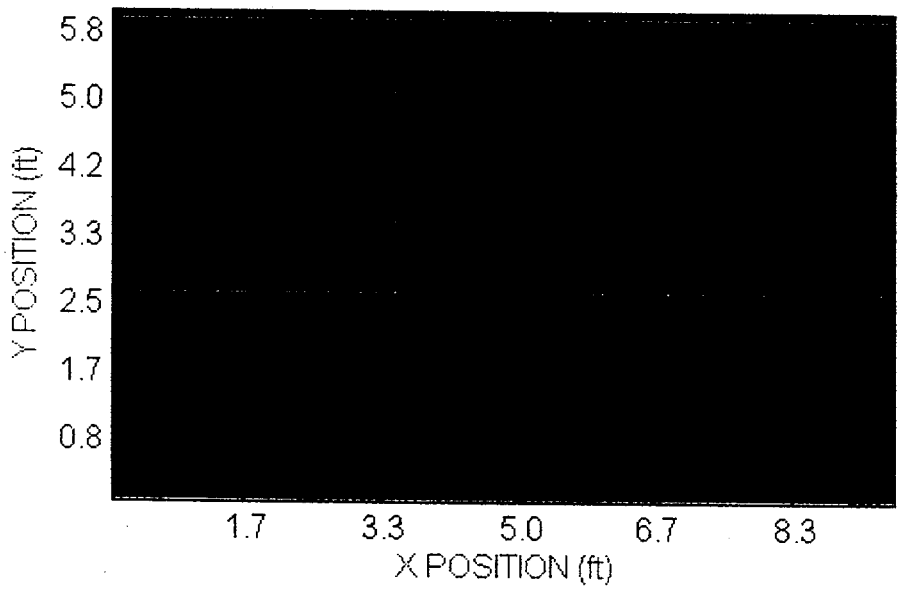

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

X	Y	Mean	Max	Min	STD	Pixels
1	2	535	778	225	115.4	400
2	2	508	775	281	75.3	400
3	2	539	792	305	80.8	340
1	1	495	699	286	93.8	320
2	1	527	805	341	81.0	320
3	1	465	592	224	77.2	272

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (3,1) and Grids (3,1) - (3,2) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 554 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

1554 dpm/100 cm^2, averaged over 1m^2
3554 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were below the site-specific guidelines for release.

Introduction

Survey SA0506W was conducted on January 23, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 66%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0506W ranged from 45 to 343 dpm/pixel. 100 cm^2 data ranged from 48 to 884 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

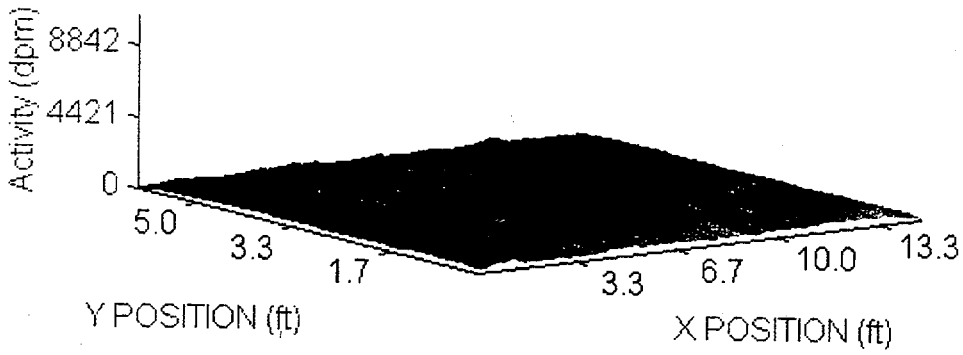

Figure 1 Image plot of surface activity in dpm/25cm^2

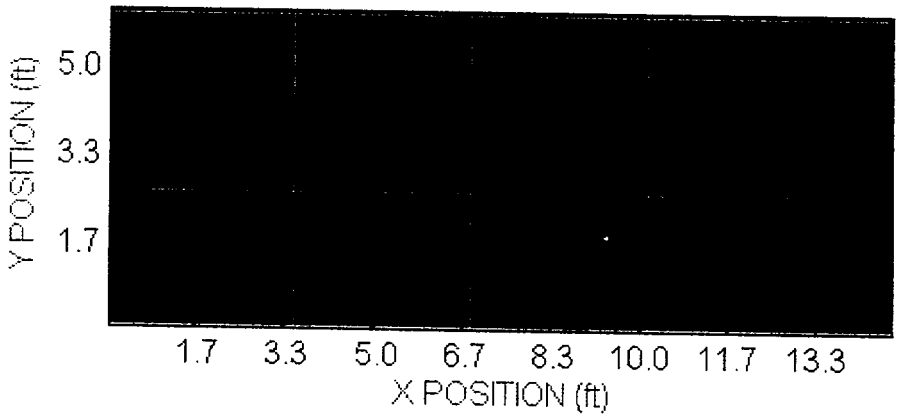

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

X	Y	Mean	Max	Min	STD	Pixels
1	2	557	884	218	97.6	400
2	2	579	858	295	78.2	400
3	2	585	842	327	82.9	400
4	2	551	778	304	73.1	400
5	2	478	633	214	113.9	160
1	1	566	790	317	89.4	320
2	1	598	731	369	61.7	320
3	1	544	825	341	88.7	320
4	1	557	754	389	49.4	320
5	1	480	655	244	107.8	128

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (5,1) and Grids (5,1) - (5,2) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 554 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

1554 dpm/100 cm^2, averaged over 1m^2
3554 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were below the site-specific guidelines for release.

Introduction

Survey SA0507E was conducted on January 23, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 66%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0507E ranged from 38 to 239 dpm/pixel. 100 cm^2 data ranged from 38 to 769 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

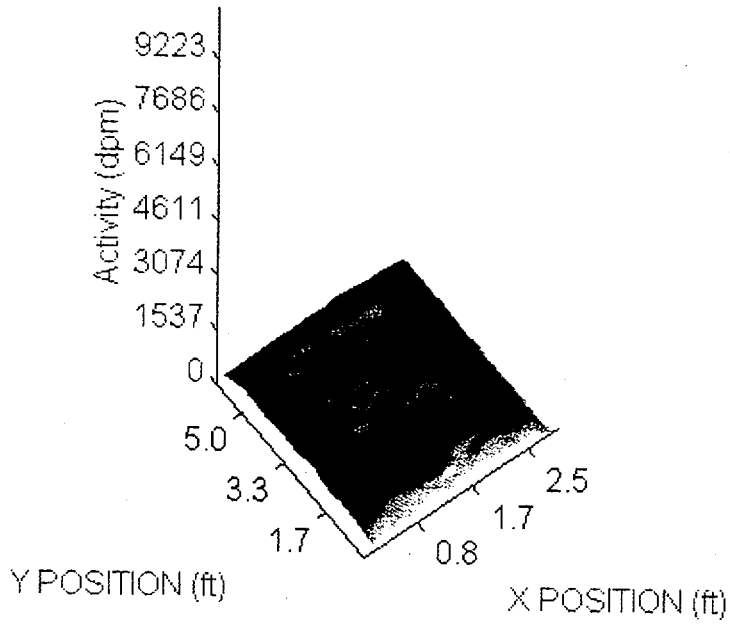

Figure 1 Image plot of surface activity in dpm/25cm^2

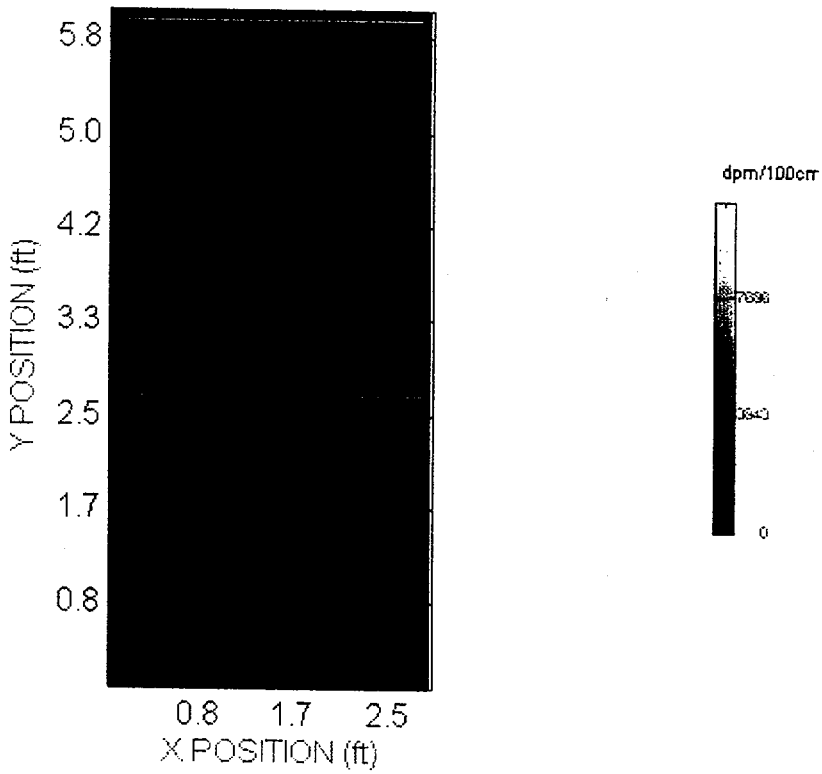

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

(Filtered) (Primary) Date: 02-06-1999 Time: 15:35:04 SA0507E-2

X	Y	Mean	Max	Min	STD	Pixels
1	2	436	768	190	91.3	340
1	1	421	532	197	68.4	272

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (1,1) and Grids (1,1) - (1,2) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 554 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

1554 dpm/100 cm^2, averaged over 1m^2
3554 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were below the site-specific guidelines for release.

Introduction

Survey SA0507F was conducted on January 26, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 62%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0507F ranged from 0 to 337 dpm/pixel. 100 cm^2 data ranged from 0 to 929 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

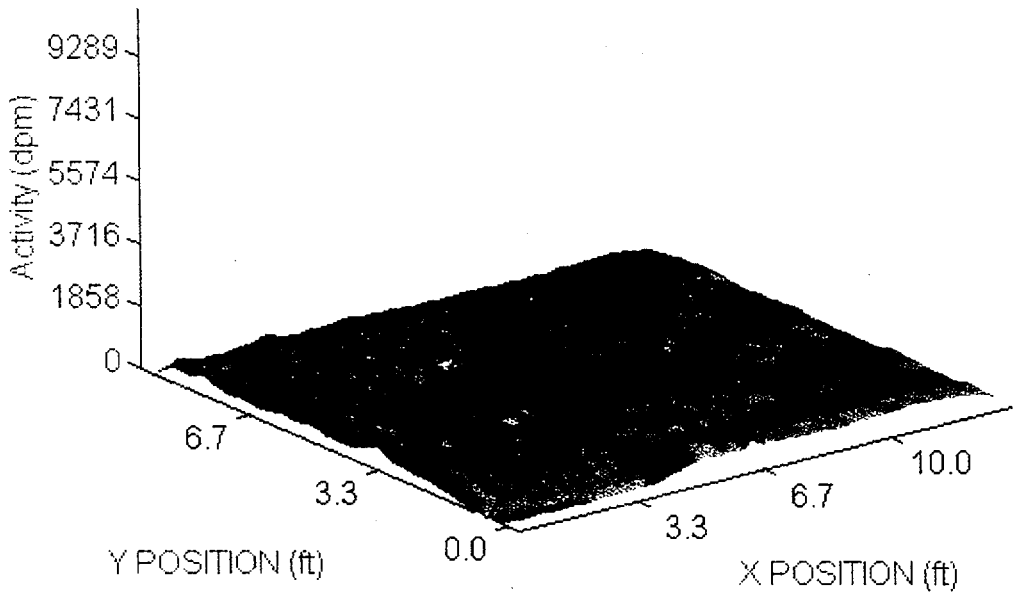

Figure 1 Image plot of surface activity in dpm/25cm^2

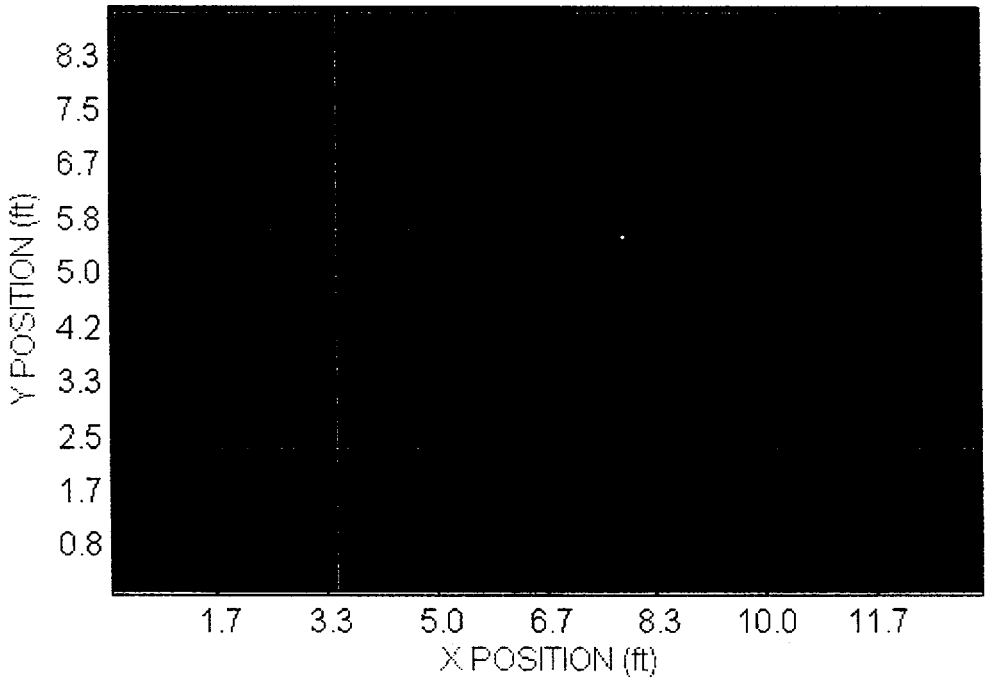

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

(Filtered) (Primary) Date: 02-04-1999 Time: 17:34:15 SA0507F-2

X	Y	Mean	Max	Min	STD	Pixels
1	3	546	813	309	83.5	400
2	3	549	764	300	83.8	400
3	3	554	871	235	119.7	400
4	3	472	832	137	116.9	380
1	2	539	785	356	77.8	400
2	2	564	726	430	65.4	400
3	2	546	744	384	63.1	400
4	2	515	694	239	87.8	380
1	1	412	928	0	242.6	200
2	1	461	679	0	156.5	268
3	1	492	721	304	61.2	280
4	1	456	624	226	82.8	266

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (4,1) and Grids (4,1) - (4,3) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 554 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

1554 dpm/100 cm^2, averaged over 1m^2
3554 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were below the site-specific guidelines for release.

Introduction

Survey SA0507N was conducted on January 23, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 66%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0507N ranged from 34 to 316 dpm/pixel. 100 cm^2 data ranged from 34 to 871 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

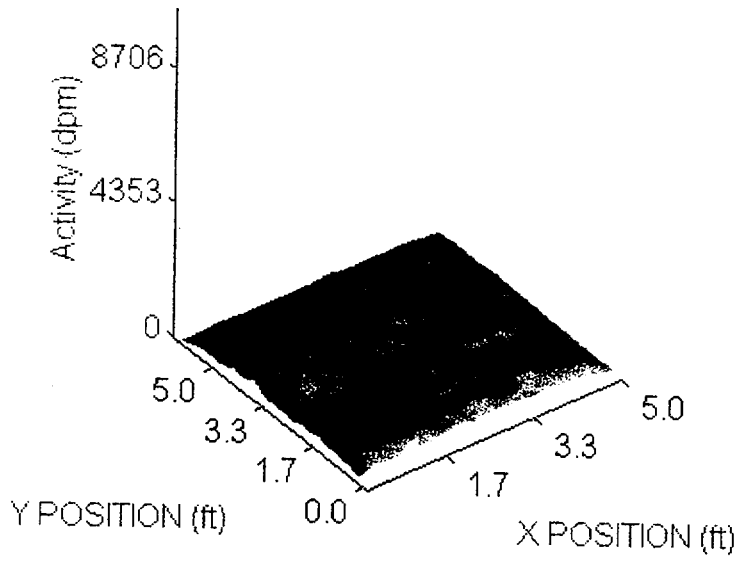

Figure 1 Image plot of surface activity in dpm/25cm^2

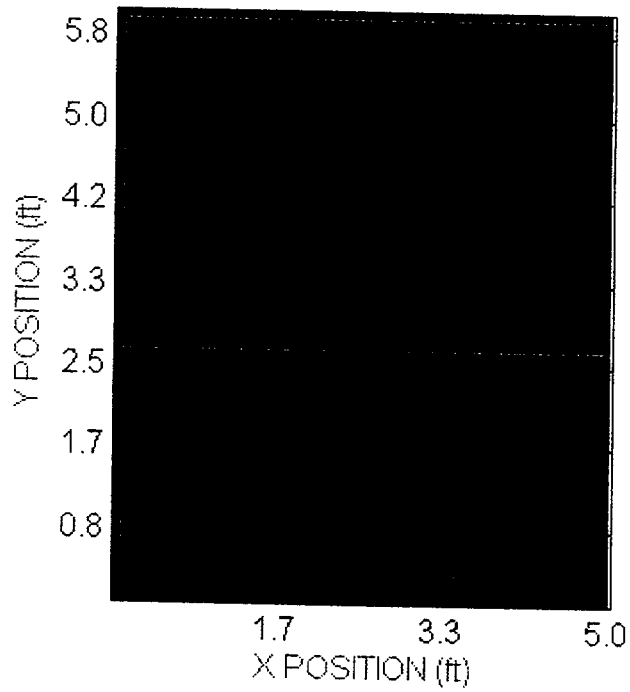

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

X	Y	Mean	Max	Min	STD	Pixels
1	2	543	870	227	105.0	400
2	2	477	639	175	95.6	200
1	1	483	680	257	67.3	320
2	1	440	633	191	97.9	160

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (2,1) and Grids (2,1) - (2,2) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 554 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

1554 dpm/100 cm^2, averaged over 1m^2
3554 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were below the site-specific guidelines for release.

Introduction

Survey SA0507S was conducted on January 23, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 66%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0507S ranged from 45 to 330 dpm/pixel. 100 cm^2 data ranged from 49 to 850 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max. and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

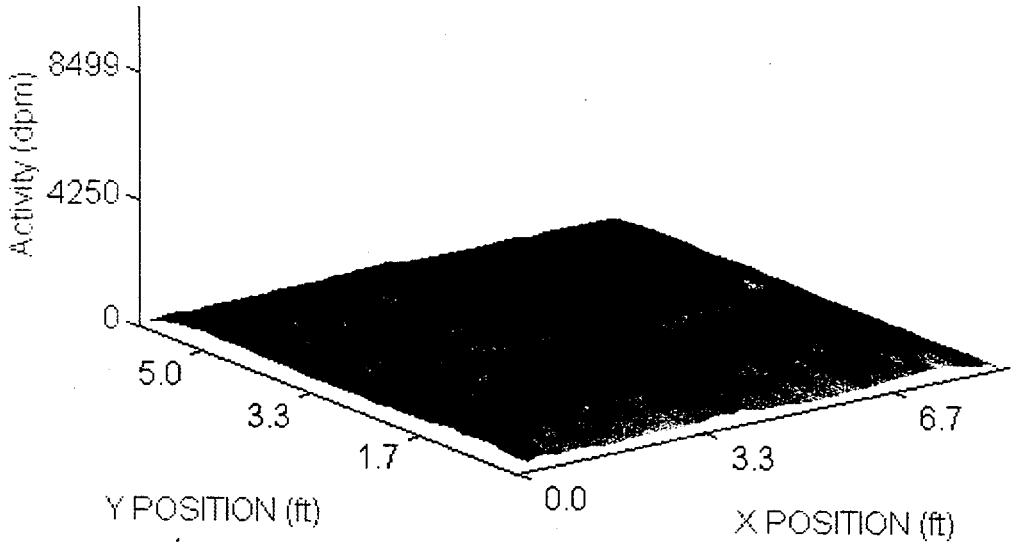

Figure 1 Image plot of surface activity in dpm/25cm^2

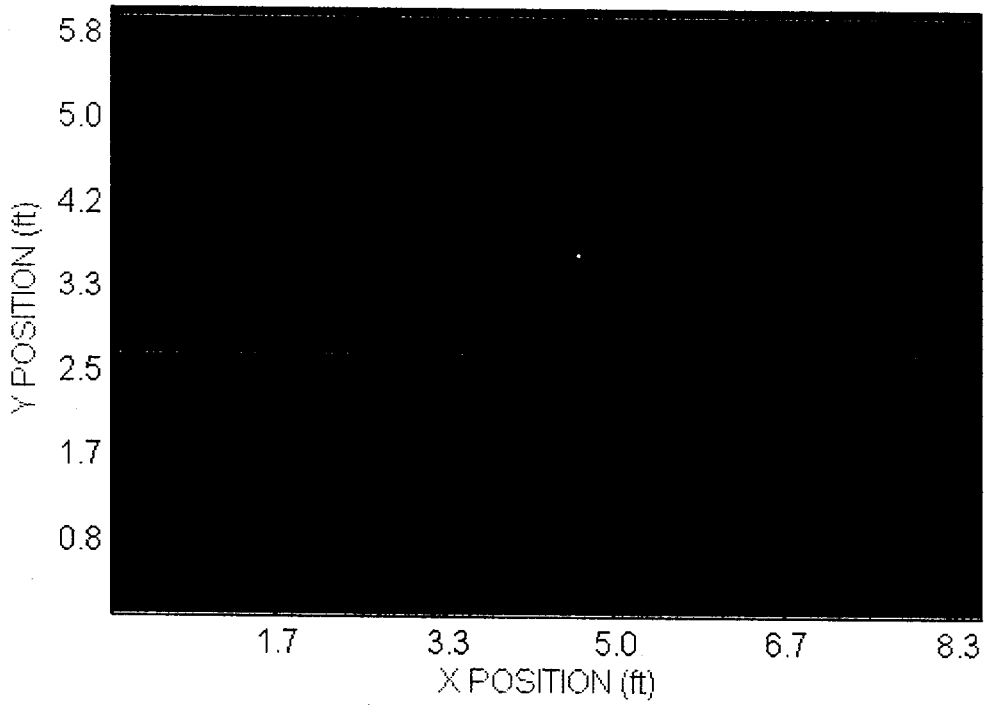

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

(Filtered) (Primary) Date: 02-04-1999 Time: 17:34:52 SA0507S-2

X	Y	Mean	Max	Min	STD	Pixels
1	2	515	725	234	93.8	400
2	2	534	670	316	61.9	400
3	2	491	648	236	91.7	220
1	1	530	849	328	82.3	320
2	1	524	796	274	80.6	320
3	1	504	650	251	105.7	176

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (3,1) and Grids (3,1) - (3,2) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 554 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

1554 dpm/100 cm^2, averaged over 1m^2
3554 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were below the site-specific guidelines for release.

Introduction

Survey SA0507W was conducted on January 23, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 66%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0507W ranged from 27 to 361 dpm/pixel. 100 cm^2 data ranged from 27 to 964 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

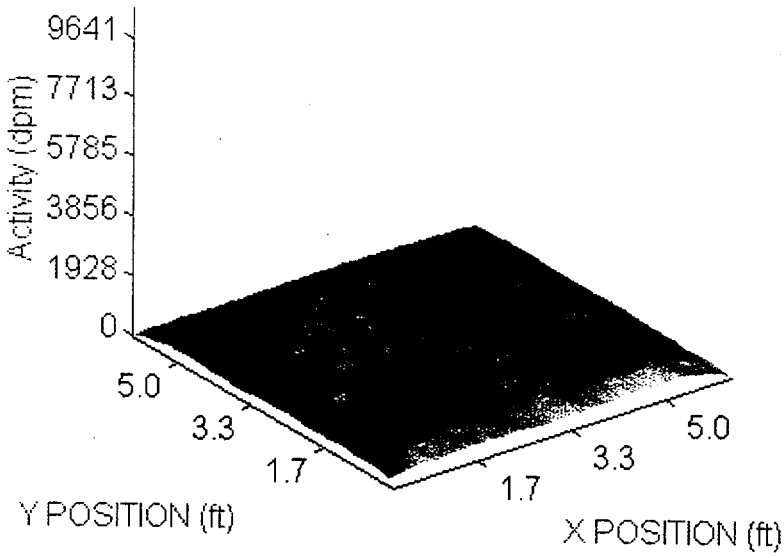

Figure 1 Image plot of surface activity in dpm/25cm^2

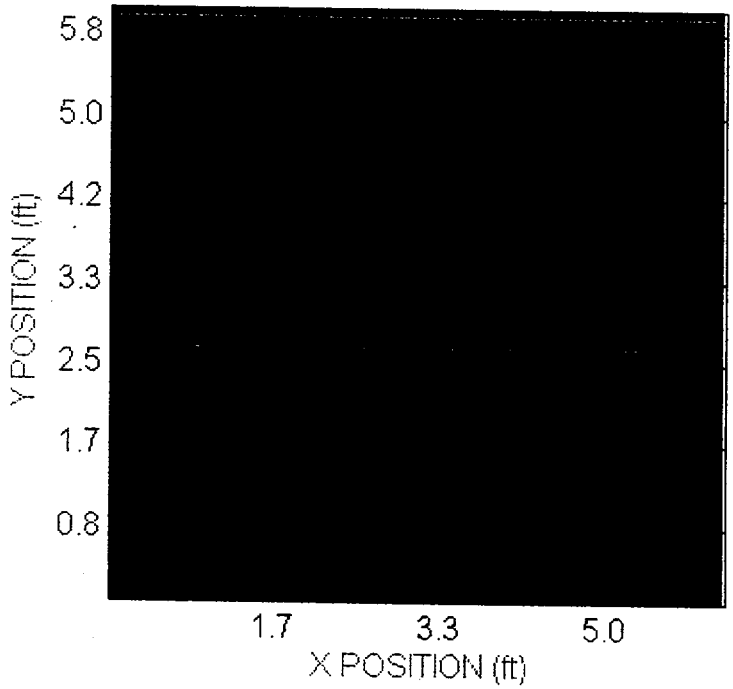

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

X	Y	Mean	Max	Min	STD	Pixels
1	2	570	964	214	128.6	400
2	2	532	704	151	112.3	340
1	1	571	734	287	89.4	320
2	1	532	773	222	92.3	272

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (2,1) and Grids (2,1) - (2,2) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 554 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

1554 dpm/100 cm^2, averaged over 1m^2
3554 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were below the site-specific guidelines for release.

Introduction

Survey SA0508F was conducted on January 25, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 62%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0508F ranged from 0 to 1,071 dpm/pixel. 100 cm^2 data ranged from 0 to 2,799 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

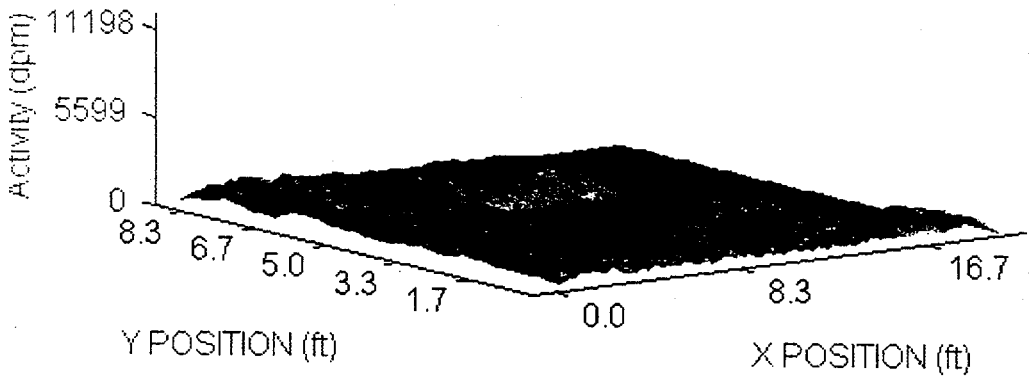

Figure 1 Image plot of surface activity in dpm/25cm^2

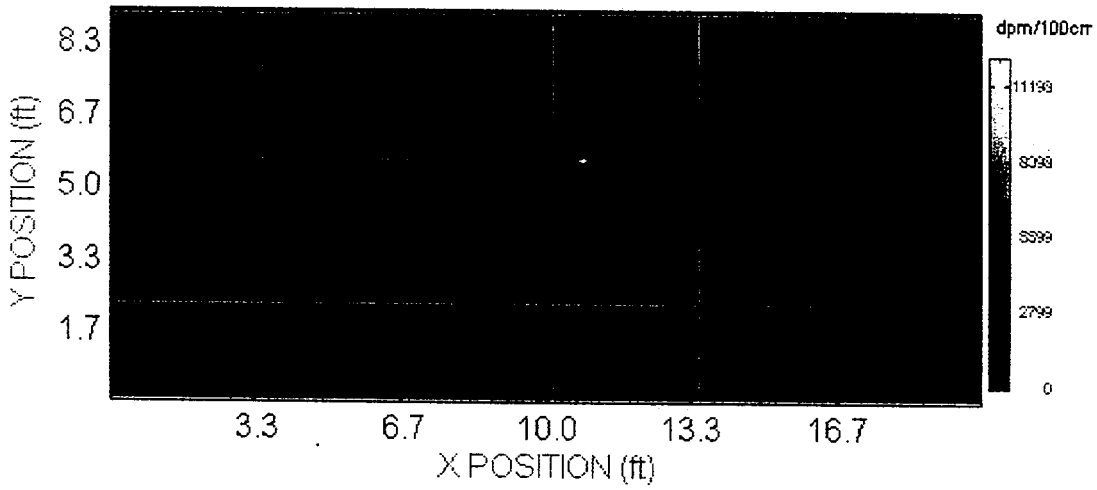

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

(Filtered) (Primary) Date: 02-06-1999 Time: 15:31:38 SA0508F-2

X	Y	Mean	Max	Min	STD	Pixels
1	3	1,047	1,405	327	164.8	400
2	3	965	1,416	465	130.8	400
3	3	721	1,022	58	232.5	376
4	3	758	1,234	52	294.5	360
5	3	466	1,030	0	287.6	180
6	3	0	0	0	.0	0
1	2	930	1,206	568	106.4	400
2	2	890	1,207	707	91.5	400
3	2	755	2,799	0	445.2	364
4	2	675	1,705	0	371.7	340
5	2	589	1,282	0	355.6	340
6	2	101	315	0	61.7	89
1	1	894	1,346	528	122.1	280
2	1	877	1,386	637	95.9	280
3	1	972	1,455	610	133.5	280
4	1	863	1,191	568	101.3	280
5	1	892	1,391	587	129.8	280
6	1	853	1,451	378	205.5	266

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (6,1) and Grids (6,1) - (6,3) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 1058 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

2058 dpm/100 cm^2, averaged over 1m^2
4058 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were below the site-specific guidelines for release.

Introduction

Survey SA0509F was conducted on January 23, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 62%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0509F ranged from 39 to 476 dpm/pixel. 100 cm^2 data ranged from 39 to 1,554 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

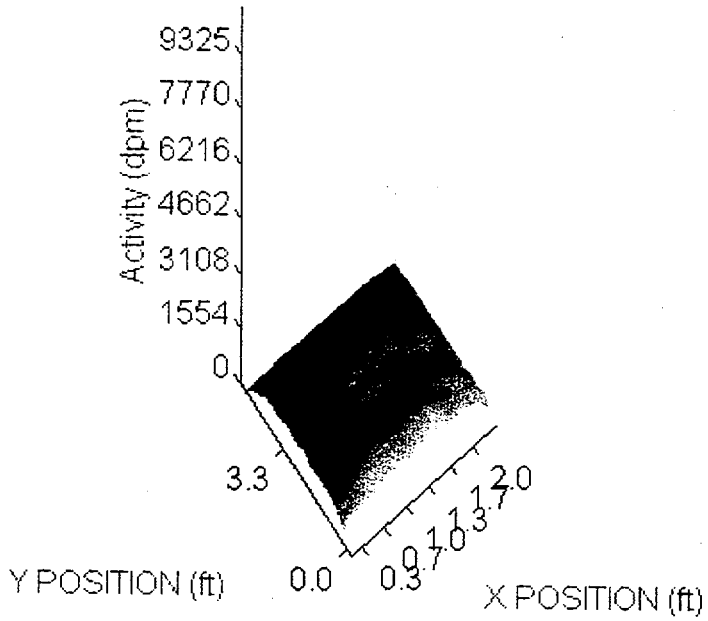

Figure 1 Image plot of surface activity in dpm/25cm^2

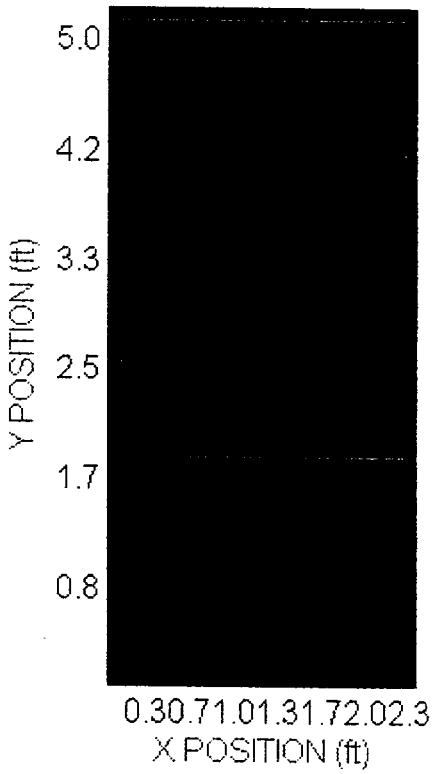

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

X	Y	Mean	Max	Min	STD	Pixels
1	2	874	1,554	222	291.1	280
1	1	935	1,176	471	161.0	154

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (1,1) and Grids (1,1) - (1,2) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 554 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over $1m^2$
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

1554 dpm/100 cm^2, averaged over $1m^2$
3554 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were below the site-specific guidelines for release.

ST. ALBANS VETERANS ADMINISTRATION
EXTENDED CARE CENTER

CLASS 3 AREAS

RADIOLOGICAL SURVEY AREA REPORTS

SUMMARY TABLE

CLASS 3 AREAS

Survey Area	Highest 100 cm2 Area	No. of meters	No. exceeding m2 limit	No. exceeding 100 cm2 limit	PSPC Efficiency
SA0601F	15515	60	0	1	0.709
SA0601E	2820	4	0	0	0.6611
SA0601S	2868	6	0	0	0.6611
SA0602F	1740	2	0	0	0.709
SA0603F	1014	20	0	0	0.709
SA0603E	1094	4	0	0	0.6611
SA0603S	1254	6	0	0	0.6611
SA0604F	1439	20	0	0	0.709
SA0604E	2972	2	0	0	0.6611
SA0604S	3120	8	0	0	0.6611
SA0604W	3225	6	0	0	0.6611
SA0605F	1042	20	0	0	0.709
SA0701F	1097	35	0	0	0.709
SA0701N	3357	14	0	0	0.6611
SA0701E	1145	6	0	0	0.6611
SA0701S	1309	6	0	0	0.6611
SA0701W	1596	4	0	0	0.6611
SA0702F	1010	32	0	0	0.709
SA0702N	3186	16	0	0	0.6611
SA0702S	981	8	0	0	0.6611
SA0703F	1407	105	0	0	0.709
SA0704F	1418	45	0	0	0.709
SA0705F	1195	12	0	0	0.709
SA0706F	981	4	0	0	0.709
SA0707F	932	9	0	0	0.709
SA0708F	1170	15	0	0	0.709
SA0709F	920	6	0	0	0.709
SA0710F	2249	12	0	0	0.709
SA0711E	2646	2	0	0	0.6611
SA0711F	2091	12	0	0	0.709
SA0711W	2630	2	0	0	0.6611
SA0712F	1442	20	0	0	0.709
SA0713F	3223	69	0	0	0.709
SA0713S	3187	38	0	0	0.6611
SA0714E	2867	2	0	0	0.6611
SA0714F	6310	35	0	1	0.709
SA0715F	1557	12	0	0	0.709
SA0716F	5228	15	0	1	0.709
SA0717F	1605	8	0	0	0.709
SA0718F	2700	6	0	0	0.709
SA0801F	2508	100	0	0	0.6187
	Total Area	808	Square Meters		

Introduction

Survey SA0601E was conducted on January 22, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 66%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0601E ranged from 61 to 849 dpm/pixel. 100 cm^2 data ranged from 61 to 2,820 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

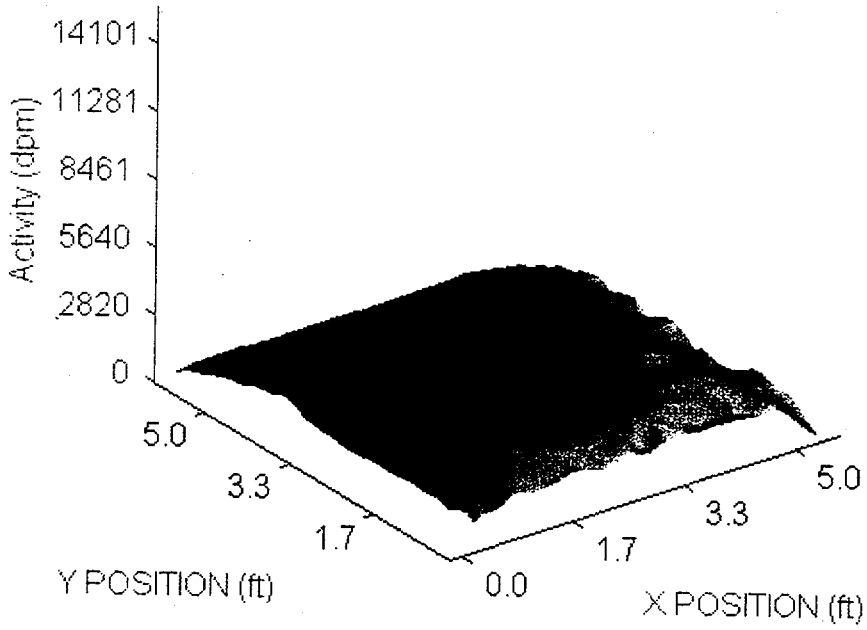

Figure 1 Image plot of surface activity in dpm/25cm^2

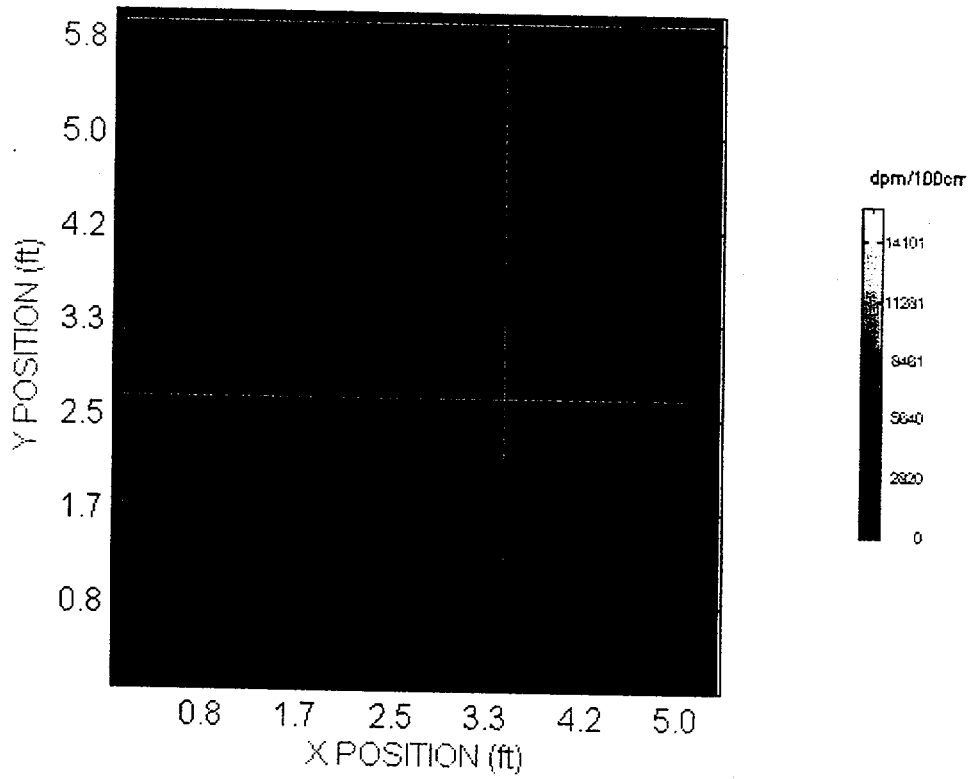

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

(Filtered) (Primary) Date: 02-05-1999 Time: 17:23:57 SA0601E-2

X	Y	Mean	Max	Min	STD	Pixels
1	2	1,896	2,706	427	626.5	400
2	2	1,909	2,698	313	673.1	240
1	1	2,255	2,688	1,196	341.8	320
2	1	2,289	2,820	1,140	425.3	192

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (2,1) and Grids (2,1) - (2,2) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 2208 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

3208 dpm/100 cm^2, averaged over 1m^2
5208 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were below the site-specific guidelines for release.

Introduction

Survey SA0601F was conducted on January 20, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 71%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0601F ranged from 0 to 9,447 dpm/pixel. 100 cm^2 data ranged from 0 to 15,515 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

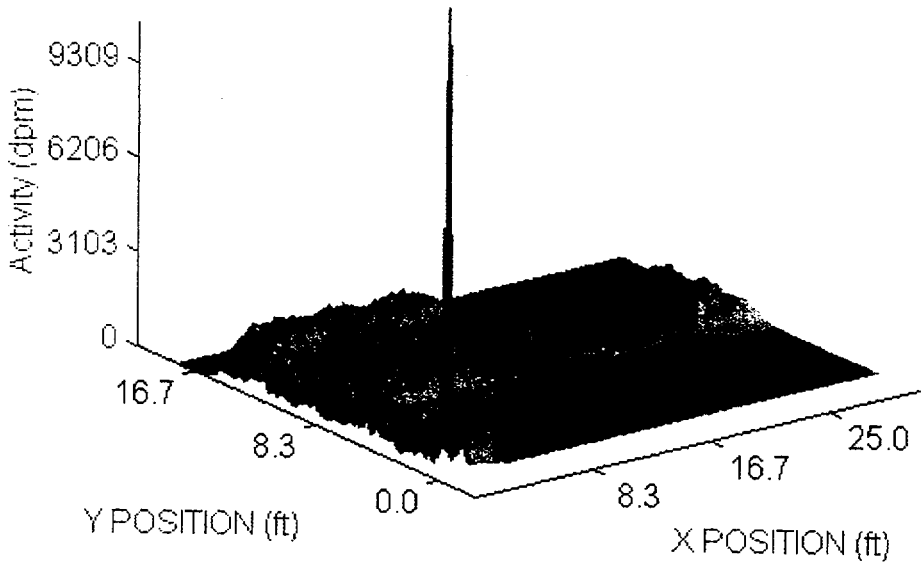

Figure 1 Image plot of surface activity in dpm/25cm^2

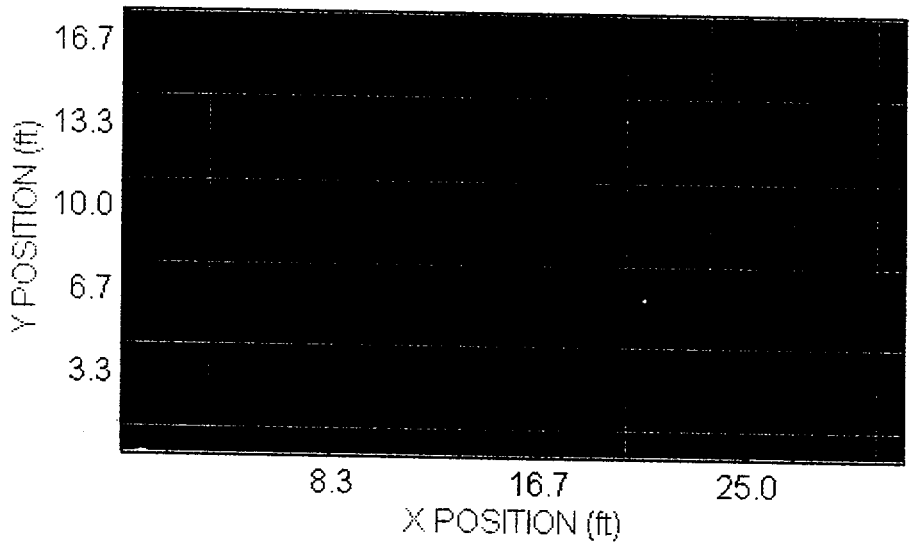

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

X	Y	Mean	Max	Min	STD	Pixels
1	6	403	1,070	0	280.9	200
2	6	496	926	16	223.5	390
3	6	638	976	185	174.9	400
4	6	677	1,047	271	144.5	400
5	6	537	966	195	187.4	400
6	6	145	540	0	102.4	175
7	6	142	607	0	87.6	100
8	6	132	397	0	79.6	100
9	6	124	437	0	75.2	100
10	6	96	322	0	59.1	35
1	5	723	1,136	310	126.4	400
2	5	691	940	387	87.2	400
3	5	726	1,165	481	93.0	400
4	5	655	1,010	547	62.3	400
5	5	659	960	426	83.7	400
6	5	705	1,195	279	147.7	400
7	5	706	1,090	450	106.8	400
8	5	704	1,124	389	107.4	400
9	5	654	848	380	76.7	400
10	5	492	854	189	143.6	140
1	4	683	1,120	266	110.3	400
2	4	699	1,001	479	94.3	400
3	4	673	997	398	87.9	400
4	4	690	1,046	428	90.9	400
5	4	682	1,169	420	104.4	400
6	4	653	974	406	89.2	400
7	4	679	1,050	403	97.9	400
8	4	633	798	385	71.8	400
9	4	685	995	405	101.7	400
10	4	548	912	258	132.1	140
1	3	728	1,050	365	123.6	400
2	3	469	1,001	0	296.6	230
3	3	209	252	0	69.8	60
4	3	218	271	0	70.8	60
5	3	226	287	0	75.8	60
6	3	211	260	0	70.7	60
7	3	205	258	0	67.8	60
8	3	218	270	0	73.0	60
9	3	210	278	0	72.9	60
10	3	162	246	0	57.1	21
1	2	753	1,303	362	121.9	400
2	2	574	1,099	0	354.8	200
3	2	0	0	0	.0	0
4	2	0	0	0	.0	0
5	2	0	0	0	.0	0

(Filtered) (Primary) Date: 02-04-1999 Time: 16:37:26 SA0601F-3

6	2	0	0	0	.0	0
7	2	0	0	0	.0	0
8	2	0	0	0	.0	0
9	2	0	0	0	.0	0
10	2	0	0	0	.0	0
1	**1**	**1,031**	**15,515**	**211**	**1886.7**	**140**
2	1	341	1,032	0	251.7	70
3	1	0	0	0	.0	0
4	1	0	0	0	.0	0
5	1	0	0	0	.0	0
6	1	0	0	0	.0	0
7	1	0	0	0	.0	0
8	1	0	0	0	.0	0
9	1	0	0	0	.0	0
10	1	0	0	0	.0	0

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (10,1) and Grids (10,1) - (10,6) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 554 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

1554 dpm/100 cm^2, averaged over 1m^2
3554 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were above the site-specific guidelines for release. Figure 3 details which zones were above release limits:

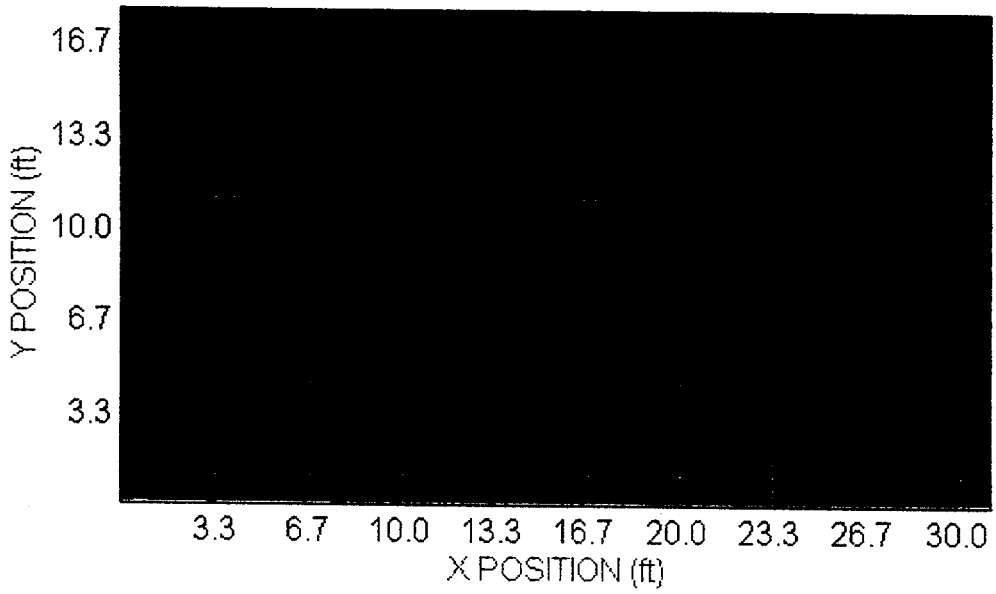

Figure 3 Yellow shading denotes grids in excess of the average limit, while red pixels correspond to the upper left coordinate of a 100cm^2 area exceeding the maximum limit.

Introduction

Survey SA0601S was conducted on January 22, 1999 by TODD_CHETE as part of the STALBANS survey. Data was gathered using SRA Surface Contamination Monitor, SCM2. The Position Sensitive Proportional Counter was operating with an efficiency of 66%. The SRA Survey Information Management System was used to provide visual imaging and analysis of the survey data and to generate this report.

Surface Activity Levels

The SCM measures and records activity in 25 cm^2 areas called pixels. Each square meter contains 400 individual pixels. These pixels can be summed into 100 cm^2 areas for comparison to release criteria. To evaluate the measured activity levels versus release criteria, consecutive 100 cm^2 sums are offset by 25 cm^2 pixels, thus ensuring that all possible 100 cm^2 combinations of the data are considered.

Total measured activity for SA0601S ranged from 0 to 907 dpm/pixel. 100 cm^2 data ranged from 0 to 2,868 dpm/100 cm^2. An interpolated surface plot of the data is provided in Figure 1. A light source is simulated to add definition via shadows to the artifacts in the image.

Square Meter Data

Conventional statistics are provided by SIMS. The survey is divided into meter grids. For each grid the 100 cm^2 data is analyzed for mean, min, max, and standard deviation. The number of pixels containing data is also reported for each grid. Figure 2 shows the grid pattern, while Table 1 details the statistical data for each grid. Bold text denotes grids which exceed release limits.

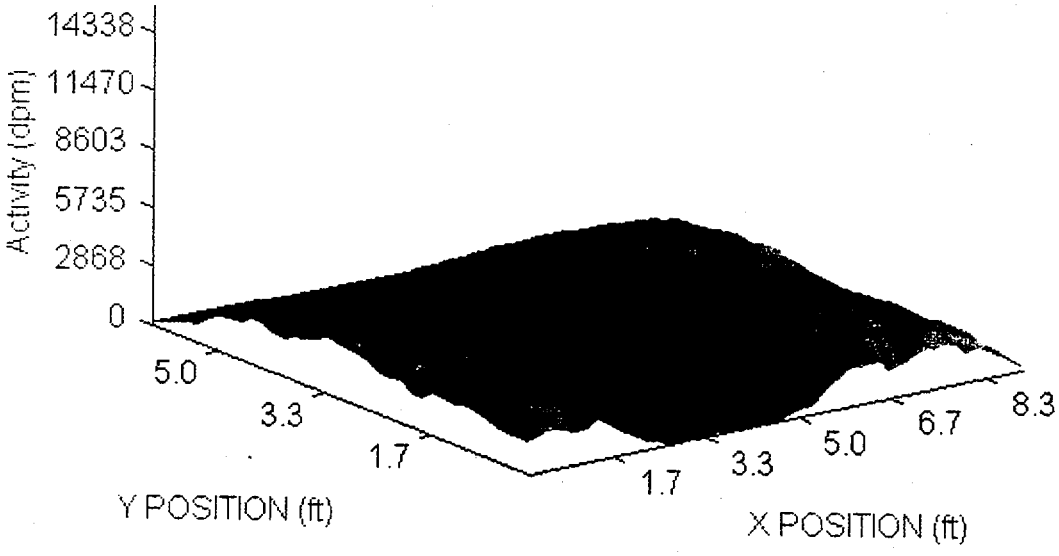

Figure 1 Image plot of surface activity in dpm/25cm^2

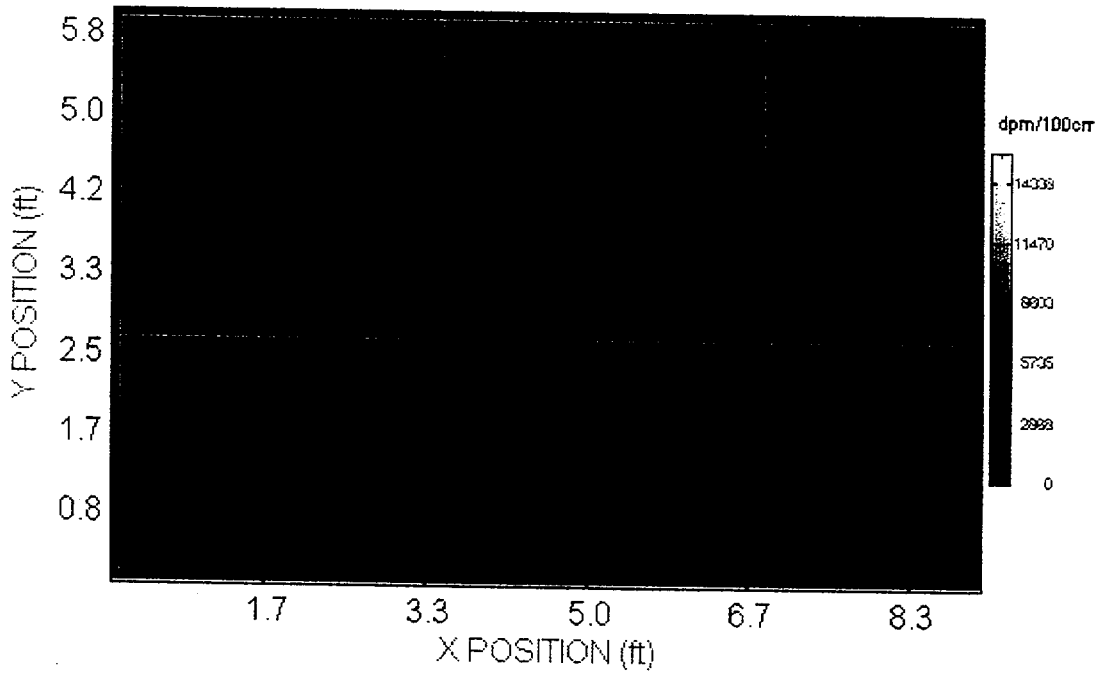

Figure 2 Meter Grid overlaid onto dpm/25cm^2 image plot

(Filtered) (Primary) Date: 02-05-1999 Time: 17:22:53 SA0601S-2

X	Y	Mean	Max	Min	STD	Pixels
1	2	1,530	2,867	0	949.6	320
2	2	1,331	2,702	0	931.0	220
3	2	1,731	2,671	215	658.7	280
1	1	1,804	2,693	0	945.8	256
2	1	1,574	2,827	0	1037.8	176
3	1	2,046	2,844	601	616.8	224

Table 1 dpm/100cm^2 averaged over one square meter. Grids (1,1) - (3,1) and Grids (3,1) - (3,2) are not one square meter. Bold text denotes grids which exceed release limits

COMPARISON OF RESULTS WITH GUIDELINES

The survey data provided by the SRA Surface Contamination Monitor, serial number SCM2, was compared to the following criteria. The limits for total activity were calculated by adding an observed background of 2208 dpm/100 cm^2 to the survey criteria.

Criteria

1000 dpm/100 cm^2, averaged over 1m^2
3000 dpm/100 cm^2, maximum in 100 cm^2

Total Activity Limits

3208 dpm/100 cm^2, averaged over 1m^2
5208 dpm/100 cm^2, maximum in 100 cm^2

The survey results indicate that surface activity levels averaged over one square meter were below the site-specific guidelines for release.

The survey results indicate that the maximum surface activity levels in the 100 square centimeter zones were below the site-specific guidelines for release.