DL-090498_02

IIT RESEARCH INSTITUTE

8510 Cinderbed Road
Suite 300
P.O. Box 899
Newington Virginia 22122-0899
703-550-0460 Fax 703-550-0497

September 4, 1998

Mr. Jay L. Henson
Region II, Division of Nuclear Materials Safety
Nuclear Regulatory Commission
61 Forsyth Street, Suite 23T85
Atlanta, GA 30303

Dear Mr. Henson:

In accordance with 10 C.F.R. § 30.36(k), IIT Research Institute (IITRI) requests that the U.S. Nuclear Regulatory Commission terminate IITRI's Materials License No. 45-25057-01 for the licensed facility located at 8510 Cinderbed Road, Suite 300, Newington, Virginia. Enclosed with this letter are: (1) a completed NRC Form 314 certifying the disposition of all licensed material; and (2) a complete radiation survey report, prepared by RSO, Inc., demonstrating that the facility is free of radioactive contamination and suitable for unrestricted use. As indicated in the report, IITRI has removed all radioactive materials from the facility and performed all survey and/or decontamination activities as required by 10 C.F.R. part 20, subpart E

To the extent possible, IITRI requests that you please expedite your review of our decommissioning activities and effect termination of the Materials License as soon as is practicable. Contractual changes beyond our control have forced us to cease operations at this facility with very little time to complete the decommissioning. This facility will close on September 30, 1998, but we must continue to pay rent ($28,000/month) until NRC formally terminates the Materials License. Your assistance in quickly finalizing the decommissioning is greatly appreciated

If you have any questions, require additional information, or would like to arrange for a facility inspection, please telephone Mr Patrick Dussia, our Radiation Safety Officer, or myself. We both can be reached at (703)550-0460

Sincerely,

Richard C. Doyle

Richard C. Doyle, Ph.D.
Associate Director of Research

258069

NRC FORM 314 (6-86)
10 CFR 30.35(d)(1)(iv)
10 CFR 40.42(d)(1)(iv)
10 CFR 70.38(d)(1)(iv)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0028 EXPIRES: [illegible]

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 30 MINUTES. THIS DOCUMENT IS USED BY NRC AS PART OF THE BASIS FOR ITS DETERMINATION THAT THE FACILITY HAS BEEN CLEANED OF RADIOACTIVE MATERIAL SO THAT THE FACILITY IS RELEASED FOR UNRESTRICTED USE. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0028), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503. AN AGENCY MAY NOT CONDUCT OR SPONSOR, AND A PERSON IS NOT REQUIRED TO RESPOND TO, A COLLECTION OF INFORMATION UNLESS IT DISPLAYS A CURRENTLY VALID OMB CONTROL NUMBER.

CERTIFICATE OF DISPOSITION OF MATERIALS

INSTRUCTIONS: ALL ITEMS MUST BE COMPLETED -- PRINT OR TYPE
SEND THE COMPLETED CERTIFICATE TO THE NRC OFFICE SPECIFIED ON THE REVERSE

LICENSEE NAME AND ADDRESS	LICENSE NUMBER
IIT Research Institute 8510 Cinderbed Road, Suite 300 Newington, VA 22122	45-25057-01
	LICENSE EXPIRATION DATE December 31, 2004

A. MATERIALS DATA *(Check one and complete as necessary)*

THE LICENSEE OR ANY INDIVIDUAL EXECUTING THIS CERTIFICATE ON BEHALF OF THE LICENSEE CERTIFIES THAT:
(Check and/or complete the appropriate item(s) below.)

[ ] 1. NO MATERIALS HAVE EVER BEEN PROCURED OR POSSESSED BY THE LICENSEE UNDER THIS LICENSE.

OR

[X] 2. ALL ACTIVITIES AUTHORIZED BY THE LICENSE HAVE CEASED AND ALL MATERIALS PROCURED AND/OR POSSESSED BY THE LICENSEE UNDER THE LICENSE NUMBER CITED ABOVE HAVE BEEN DISPOSED OF IN THE FOLLOWING MANNER. *(If additional space is needed, use the reverse side or provide attachments.)*

Describe specific material transfer actions and, if there were radioactive wastes generated in terminating this license, the disposal actions including the disposition of low-level radioactive waste, mixed waste, Greater-than-Class-C waste, and sealed sources, if applicable.

See Attachment - 1

For transfers, specify the date of the transfer, the name of the licensed recipient, and the recipient's NRC license number or Agreement State name and license number.

See Attachment - 1

If materials were disposed of directly by the licensee rather than transferred to another licensee, licensed disposal site or waste contractor, describe the specific disposal procedures *(e.g., decay in storage)*.

Not Applicable

B. OTHER DATA

[X] 1. OUR LICENSE HAS NOT YET EXPIRED; PLEASE TERMINATE IT.

2. A RADIATION SURVEY WAS CONDUCTED BY THE LICENSEE TO CONFIRM THE ABSENCE OF LICENSED RADIOACTIVE MATERIALS AND TO DETERMINE WHETHER ANY CONTAMINATION REMAINS ON THE PREMISES COVERED BY THE LICENSE. *(Check one)*

[ ] NO *(Attach explanation)*
[X] YES, THE RESULTS *(Check one)*
  [X] ARE ATTACHED, or
  [ ] WERE FORWARDED TO NRC ON *(Date)*

3. THE PERSON TO BE CONTACTED REGARDING THE INFORMATION PROVIDED ON THIS FORM	NAME	TELEPHONE NUMBER (Include Area Code)
	Dr. Richard C. Doyle	703-550-0460

4. MAIL ALL FUTURE CORRESPONDENCE REGARDING THIS LICENSE TO

IITRI, P.O. Box 899
8510 Cinderbed Road, Suite 300, Newington, VA 22122

CERTIFYING OFFICIAL

I CERTIFY UNDER PENALTY OF PERJURY THAT THE FOREGOING IS TRUE AND CORRECT

PRINTED NAME AND TITLE	SIGNATURE	DATE
Dr. Richard C. Doyle Associate Director	Richard C. Doyle	8/26/98

WARNING: FALSE STATEMENTS IN THIS CERTIFICATE MAY BE SUBJECT TO CIVIL AND/OR CRIMINAL PENALTIES. NRC REGULATIONS REQUIRE THAT SUBMISSIONS TO THE NRC BE COMPLETE AND ACCURATE IN ALL MATERIAL RESPECTS. 18 U.S.C. SECTION 1001 MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTIONS.

PRINTED ON RECYCLED PAPER

Attachment 1
Certificate of Disposition of Materials
NRC Form 314
Section A.2. (Continued)

IIT Research Institute, Newington VA
License Number 45-25057-01
Docket No. 030-31193

Material Transfer Actions

IITRI provided notification to the NRC on April 28, 1998 of intention to permanently cease operations. The radioactive materials that remained at the IIT Research Institute (IITRI) licensed facility on that date, have been removed from the premises. The information concerning the transfer of the materials is listed below.

Radioactive Waste materials

Waste materials on hand and waste materials generated during the decommissioning procedures were all low specific activity materials and were packaged and removed from our facility by a waste contractor, Radiation Service Organization (RSO), Inc., 5204 Minnick Road, Laurel, MD 20725. Their Maryland State radioactive materials license number is MD-33-021-02. The waste materials were all were transferred from IITRI to RSO on two dates.

1. On 07/30/98, dry solid wastes, EPA-hazardous scintillation vials, mixed waste, liquid wastes, a chemical lab pack, contaminated oil, and a contaminated vacuum tank and were transferred to RSO on manifest # 14604. The dry solid wastes were transferred to the RSO facility at Laurel, MD. then are destined for supercompaction at GTS Duratek, Oak Ridge, TN (Tennessee License # R-73008-H94) and burial at Barnwell, SC (South Carolina License # 097). The hazardous scintillation vials, mixed waste, liquid wastes, and the chemical lab pack were shipped by RSO on an exclusive use shipment to Perma-Fix of Florida, Inc., 1940 NW 67th Place, Gainesville, FL 32606, (Florida License # 2598-1). The shipment was received by Perma-Fix on 08/10/98 for eventual incineration. The contaminated oil was shipped to GTS Duratek, Oak Ridge, TN (Tennessee License # R-73013-F91) for incineration, and the contaminated tank was also shipped to GTS Duratek (Tennessee License # R-73008-H94) for metal melt.

2. On 08/21/98, the second transfer to RSO took place and was documented on the RSO manifest # 14625. The shipment included dry solid wastes that were transferred to the RSO facility at Laurel, MD. then are destined for supercompaction at GTS Duratek , Oak Ridge, TN (Tennessee License # R-73008-H94) and burial at Barnwell, SC (South Carolina License # 097). The second transfer to RSO also included non-hazardous scintillation vials that were shipped to the RSO facility at Laurel, MD for eventual shipment to Perma-Fix of Florida (Florida License # 2598-1) for incineration.

Radioactive Sealed Sources

The IITRI facility possessed two sealed sources as listed on the IITRI Materials License, Ni-63 (10mCi) and Ba-133 (18.8μCi). The Ni-63 sealed source was used in an electron capture detector of a Model 14 Shimazu gas chromatograph. The Ba-133 sealed source was used as an external standard in a Model 2200 CA Packard Tri-Carb Liquid Scintillation Analyzer

1. On 06/29/98 the Ni-63 source was removed by a Shimadzu Scientific Instruments, Inc. technician for transfer to the Shimadzu facility at 7100 Riverwood Dr , Columbia MD 19046, (Maryland License # MD-27-011-01). It is being held there for eventual transfer to our IITRI

facility at 10 West 35th Street, Chicago, IL 60616, (Illinois License # IL-01563-01) for re-installation into the gas chromatograph when it arrives there.

2. On 08/25/98 the Ba-133 source was removed by a Packard Instrument Co. technician for transfer to the Packard facility at 2200 Warrenville Road, Downers Grove, IL 60615. (Illinois License # IL-01741-01). It will be transferred to the IITRI facility at 10 West 35th Street, Chicago, IL 60616, (Illinois License # IL-01563-01) when the liquid scintillation analyzer arrives at that facility.

Other Radioactive Materials

IITRI also transferred various other radioactive materials to sponsors. The materials had previously been held in the IITRI Newington, VA radioactive material archives

1. On 08/12/98, radioactive test and reference materials were transferred to Novartis Crop Protection, Inc., 410 Swing Road, Greensboro, NC 27409, (North Carolina License # 041-0450-1).

2. On 08/14/98, radioactive test material was transferred to Uniroyal Chemical Co., Inc., World Headquarters Middlebury, CT 06749, (NRC License # 06-00221-08).

3. On 08/19/98, radioactive test material was transferred to WIL Research Laboratories, Inc., 1407 George Rd., Ashland, OH 44805, (NRC License # 34-20070-01).

058063

FINAL SURVEY
and
FINAL RADIOLOGICAL STATUS REPORT

IIT Research Institute
Virginia Technology Center

8510 Cinderbed Rd.. Suite 300
Newington, VA 22122

NRC License # 45-25057-01 **Docket # 030-31193**

August 1998

Prepared for:

IIT Research Institute
Newington, Va.

Prepared by:

RSO, Inc.
Laurel, Md.

FINAL SURVEY
and
FINAL RADIOLOGICAL STATUS REPORT

IIT Research Institute
Virginia Technology Center
8510 Cinderbed Rd., Suite 300
Newington, VA 22122

Prepared by: _____ Date 9/4/98
Gregory D. Smith, CHP
General Manager

Reviewed by: _____ Date 9/4/98
David Bisson
Health Physicist

RSO, Inc.
Laurel, Maryland

August 1998

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1.0 INTRODUCTION AND BACKGROUND

1.1 Introduction

IIT Research Institute (IITRI) used radioactive material at a facility known as the Virginia Technology Center at 8510 Cinderbed Rd., Suite 300, Newington, Va. under a NRC issued byproduct materials license. This was the only authorized place of use under this license. The operations for the use/storage of radioactive materials at this facility have ended. To accomplish the termination of the license, scoping surveys and minor decontamination actions were performed, all radioactive/mixed waste was shipped for disposal, and a final survey of the facility was performed for submission to the NRC.

This report presents the results of the Final Radiological Survey performed by RSO, Inc. during July and August 1998 and a summary of the final radiological status of the facility to support IITRI's request for license termination and unrestricted release of the facility. The report includes a review of the use of radioactive material at this facility, decommissioning actions, the final radiological survey results, and an evaluation of the final radiological conditions of the facility.

1.2 Background

The facility was located in a large industrial park complex with other light industry/"high tech" business in the nearby buildings. The area occupied by IITRI was the northern half (about 30,000 ft² footprint) of a free standing building primarily used as office/laboratory space for research, testing and analysis (including sample analysis, characterization and sample archiving). The area included 25 rooms/areas (including the greenhouse) authorized for use of radioactive material, offices, reception area, employee break room, employee lunch room, kitchen, restrooms, and a storage room. The building was of slab-on-grade construction with cinder block walls and drop ceilings in most office and lab areas. See Attachment B for building drawings. The building was constructed as 2 floors in the front portion of the building. The first floor in this area was primarily used for administrative offices, while the 2nd floor (mezzanine) was a mix of offices and laboratories. Behind this 2-story area the space was divided into 2 large areas built with special construction as a secure classified information facility (designated SCIF #1 and #2) to meet information security requirements. Work with radioactive material was conducted inside only one of these areas, SCIF #1. The large open areas on top of the two SCIFs (2nd floor level, accessible from the 2nd floor mezzanine) were used for storage and utility purposes. A limited amount of storage of radioactive material occurred in a small area on top of SCIF #1.

Chemical fume hoods in labs where radioactive materials were used were typically connected by short sections of duct work to roof mounted blowers. Each hood was served by a dedicated blower. Sinks and sink drain lines served most of the laboratories. Construction was standard design with PVC pipe leading to the main sanitary sewer. Disposal of liquid radioactive waste via the sanitary sewer was not a permitted by IITRI, although glassware rinse water was

allowed to be released in sinks.

The greenhouse, located behind the building, was authorized for use for radioactive material (however no use of radioactive material occurred).

1.3 Summary of History of Use

IITRI began work with radioactive materials at the Virginia Technology Center in 1989 after receipt of a newly issued NRC license. The use was authorized for greenhouse and laboratory tracer studies using primarily beta emitting radionuclides. Most laboratory rooms authorized for use were listed in the original application however several additional rooms were added in later amendments.

Radionuclides that were authorized for use since the license inception included 14C, 3H, 32P, 35S, 36Cl, 45Ca, Cu67, 63Ni, 135Cs, and 133Ba; however, only 14C and 32P had more than limited use.

Carbon-14 was used from December 1989 through April 28, 1998. Use of 3H was limited to use of a sealed vial standard for calibration of the liquid scintillation counter (LSC). Phosphorus-32 was used from July 1990 through approximately August 1993. The sole use of 32P was as a tracer on DNA probes. Both 36Cl and 45Ca were used from January 1993 to April 1993 to determine the LSC counting characteristics but no other laboratory experiments were performed with these radionuclides. Sulfur-35, 135Cs, and 67Cu were never used or procured. Barium-133 was authorized as a sealed source for use in liquid scintillation counter. Nickel-63 was limited to use in the electron capture detector used in the gas chromatograph.

The radionuclides as used were all bound as chemical compounds. Limited organic syntheses were conducted using a maximum of 1 millicuries of 14C per reaction. No operations releasing airborne radionuclides were performed.

There were 4 spills of radioactive material documented. These spills occurred in rooms 202, 203, and 219. All involved 14C with an activity between 0.05 uCi and 400 uCi.

Attachment A contains additional information provided by IITRI that describes the use of radioactive material and includes;

- Authorized Byproduct Materials
- Authorized Rooms and Description
- Radioactive Material Actually Used
- Work and Operations Performed
- Significant Events

1.4 Summary of Decommissioning Effort

The IITRI facility was leased space and was required by the lease to be left in a condition with all laboratory bench work, chemical fume hoods, sinks, and any other tenant installed furniture removed. Sink drain lines were to be cut off behind walls and hood duct work left but terminated above the drop ceiling and hood blowers left in place.

To accomplish this, contamination surveys were conducted on these items in each laboratory room authorized for use of radioactive material. Items that

passed the criteria established for "free release" were removed from the labs for transfer to other IITRI facilities for sale/donation.

Over 400 linear feet of benchwork, 9 chemical fume hoods, 3 biological containment hoods, and over 100 other items were surveyed and released. Only minor amounts of contamination (14C only) were discovered during these surveys. These items were decontaminated, resurveyed and released.

Also, each sink drain trap or drain line was surveyed. One sink drain trap was found to have very low levels of contamination and was removed and disposed of as radioactive waste.

A release survey of the chemical fume hood ducting and roof mounted blowers was performed. Wipe tests and surface scans showed only minor amounts of residual contamination in some of the fume hoods. These hoods were decontaminated to meet release criteria, resurveyed, removed and "free released". No contamination was found at the roof mounted bowers or in the duct work at the fume hood.

A release survey of the outdoor greenhouse was performed. No residual contamination was discovered during this survey.

Also the house vacuum system was surveyed. Swabs of vacuum lines showed contamination (14C) inside some of the vacuum lines ranging from a few hundred dpm per swab to 2,000 dpm per swab. Also, surveys of the vacuum pump and the vacuum pump tank showed contamination at low levels. The vacuum system (over 200 ft. of plastic/copper pipe pump, tank, and fittings) was removed and surveyed. Some portions of the system were not contaminated and were "free released". The majority of the system was disposed of as radioactive waste. The pump exhaust line was not contaminated and was left in place.

During the decommissioning, all radioactive material in inventory was transferred to authorized recipients or packaged for disposal as radioactive waste (See Attachment D). This included transfer of biochemical compounds to other licensed facilities, the return of an electron capture detector (63Ni sealed source) used in a gas chromatograph to the manufacturer, and the return of the sealed source used in the liquid scintillation counter to the manufacturer. Also, contaminated floor tiles, concrete debris, and secondary waste generated from remediation of contamination found during surveys was disposed of as radioactive waste before the Final Survey was completed.

2.0 FINAL SURVEY APPROACH

2.1 Decommissioning Criteria

The review of the history of use and the potential radionuclides (authorized by the license) indicated 14C as the primary radionuclide of concern for the survey. Surveys designed for 14C would detect the presence of any other radionuclide. IITRI's standard operation procedures submitted with the license application required that decontamination procedures be implemented when wipe test results were greater than "2 times background".

These criteria were sufficient for normal operations; however, they were not

sufficiently descriptive for use during the final survey as decommissioning criteria. However, these action levels, if converted to activity units per unit area, were lower than the values found in Nuclear Regulatory Commission Regulatory Guide 1.86 " Termination of Operation Licenses for Nuclear Reactors" and in NRC's "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material" that have historically been used for license terminations. This can be shown by translating the license action limits into activity concentration units (activity per unit area) and comparing to the guideline value of 1,000 dpm/ 100 cm^2.

Assume a wipe test analyzed on a liquid scintillation counter with a background of 25 cpm, therefore 2X background is 50 cpm and the net count rate is 25 cpm. Assuming an efficiency of 90% for 14C means a wipe test action limit of 27 dpm for an area of 100 cm^2.

No criteria were established for monitoring with a survey meter (Geiger counter with "pancake" GM detector). However, if the action limit was also 2X background the following values would be derived: Assume background at 40 cpm, therefore 2X background is 80 cpm so that the net count-rate is 40 cpm. Assuming an efficiency of 5% for 14C, and a probe area of 15 cm^2 means a monitoring action limit of about 5,000 dpm/100 cm^2. This value is the same as the value for the average surface contamination guideline of RG 1.86.

Recognizing the action limits used for operations, the preceding comparison to the facility action limits, the NRC's use of RG 1.86 values for other license terminations, and the low radiotoxicity for 14C, the decommissioning criteria of Reg. Guide 1.86 were adopted.

The ALARA goal adopted was to use the facility limits of 27 dpm of removable contamination and that any residual contamination that remained after reasonable attempts at decontamination shall not exceed the guideline values of Reg. Guide 1.86.

Table 1. Surface contamination guidelines for unrestricted release and license termination used by IITRI for the Final Survey.

Radionuclide	Average (avg. over 1 m^2)	Maximum (max. per 100 cm^2)	Removable (dry wipe method)
Beta-gamma	5,000 dpm/100 cm^2	15,000 dpm/100 cm^2	1,000 dpm/100 cm^2

Any discrete sources of radioactive material were to be transferred to authorized recipients or disposed of as radioactive waste.

The adoption of the contamination guideline levels of the NRC and initiation of the decommissioning before August 20, 1998 would meet the requirements of 10 CFR 20.1401 and 1402.

The final survey was designed and conducted using guidance provided in NUREG/CR-5849 titled "Manual for Conducting Radiological Surveys in Support of License Termination".

2.2 Organization and Responsibilities

Overall management of the License Decommissioning Project was provided by IITRI. Mr. Patrick Dussia, the IITRI Radiation Safety Officer, provided project management and had management responsibility for both IITRI and contracter personnel implementing the decommissioning.

Mr. Gregory D. Smith, General Manager/Certified Health Physicist, RSO, Inc. supported the survey team from RSO's main office in Laurel, MD.

Mr. David Bisson, Health Physicist, RSO, Inc. managed the decommissioning Survey activities conducted by RSO and its technicians. Mr. Bisson (RSO project manager) had the authority to make changes to the survey plan (subject to the established procedural change system with IITRI), as deemed necessary as the survey progressed.

The Radiological Scoping and Final Surveys were performed by qualified personnel employed by RSO under the direction of IITRI. The personnel operated under the supervision of the RSO project manager.

Field measurements of radiological parameters and wipe/smear collection was conducted under the direction of the RSO project manager

Personnel Qualifications

All personnel had levels of training and experience commensurate with their assigned tasks. For those individuals involved in taking radiological measurements and samples, special instruction was provided when necessary on equipment, special techniques, and practices relating to survey activities.

Laboratory Services

Wipes or swabs were analyzed for gross beta/gamma activity. All wipes for the final survey were analyzed at RSO's laboratory.

2.3 Survey Approach

The Final Survey included scans of floors and wall surfaces, wipe tests for removable contamination, gamma scans for elevated radiation levels and exposure rate measurements. All benches, chemical fume hoods, sinks, and other laboratory furniture/items had been removed. The areas were "broom clean".

The approach to the final survey identified 14C as the primary radionuclide of concern. Carbon-14 emits beta radiation (100% of decays) with maximum energy of 156 keV. Beta sensitive survey meters were chosen (large area gas flow proportional detectors with nominal efficiency of ~12% cpm per dpm) to provide the greatest sensitivity to this low-energy beta emitter for the surface scans and direct measurements. Also, this type of detector would have high sensitivity to any other licensed material (all were beta emitting radionuclides) except 3H. Gamma scans were employed for searching for any gamma emitting radioactive material. Exposure rates were measured using survey meters that display in uR/h (microroentgen per hour) to provide results in conventional units.

Wipe tests were used for evaluation of removable contamination and to support

the assumption that there was no 3H contamination. Loose contamination on the floor or other surfaces would be transferred to the wipe and analyzed using liquid scintillation counting techniques.

Surveys were performed as follows:

- Assessment of beta/gamma contamination on floor surfaces was accomplished by performing scans using a survey meter with an analog display (and audio) and capable of direct measurements by integrating counts over a selected count time. The detectors coupled to the survey meters were large area gas flow proportional detectors (See Section 3 for instrumentation details). This type of detector responds to both alpha and beta radiation but is relatively gamma insensitive.
- The evaluation of removable surface contamination was accomplished using wipe samples at the locations indicated on the enclosed drawings (See Attachment C). These wipe samples were first analyzed for gross gamma activity using a gamma counter then they were analyzed for gross beta activity by using a liquid scintillation counter.
- Scans for elevated gamma radiation levels were conducted using a survey meter coupled to a 2" x 2" sodium iodide NaI(Tl) detector (See section 3 for instrumentation details). This survey meter would be sensitive to low levels of gamma/x-ray radiation including bremstralung from high energy beta emitters.
- Exposure rate measurements were made using a μR survey meter.

2.4 Survey Units and Classification:

For the purpose of establishing the sampling and measurement frequency the facility was divided into survey units. These were

1. radioactive material use/storage laboratory rooms/areas

112	152	201	218
143	170	202	219
144	176	203	220
147	177	204	221
148		215	222
150		216	223
151		217	

2. Area on top of SCIF#1, Rm 174 and Rm 105A (vacuum pump room)
3. sink drain lines
4. roof (chemical fume hood blowers and immediate area)
5. greenhouse (concrete pad)
6. non-use areas (corridors including front lobby area)

Each survey unit was categorized according to the probability of contamination and assigned a level of survey (survey type).

TYPE I SURVEYS: Areas/labs authorized for use of radioactive material that had the highest potential for radioactive contamination (based on facility operating history) or known radioactive contamination (based on past surveys). This included areas where records indicated spills or other unusual occurrences that would have resulted in contamination.

TYPE II SURVEYS: Areas/labs authorized for use or storage of radioactive material that had some potential for radioactive contamination (based on facility operating history).

TYPE III SURVEYS: These areas were not expected to have any contamination.

Table 2. Survey types and measurement frequencies.

Survey Type	Grid Interval	Survey Points	Scan Area Floor	Scan Area Walls
I	1 m	1 per cell	100%	25%
II	2 m	1 per cell	100%	—
III	Informal	Selected	> 10%	—

2.5 Background Radiation Level Determination

Background exposure rates were collected from offices and labs in the same building, at locations near the use laboratories, with the same construction but with no indication of radioactive material contamination.

Daily backgrounds were performed and recorded for each instrument before starting survey work each day.

2.6 Survey Method

Survey Grids

Grids were established for floor and wall surfaces for the purpose of referencing locations of wipes, direct radiation measurements and other survey activities. The grid coordinates indicate the grid cell (not the intersection of grid lines). The grid intervals were based on the potential for residual contamination. Type I surveys used a 1 m grid, Type II surveys used a 2 m grid. Type III surveys used informal grids.

Removable Contamination

The amount of removable radioactive material was determined by wiping 100 cm^2 of the surface with a dry paper, using moderate pressure and assessing the amount of radioactive material on the wipe area with an appropriate instrument of known efficiency (e.g.: liquid scintillation counter).

Scan Survey

Surface scanning speeds were 1 detector width per second for beta detection

instruments and 0.5 m per second for gamma instruments. To optimize detection of elevated radiation levels (1.5 to 3 times background) during scanning, audible indicators were used in addition to noting the fluctuations in the analog meter reading.

Direct Measurements

Direct radiation measurements for beta, and or beta/gamma surface activity were performed at select locations using a portable gas flow proportional counter. Measurements were conducted by integrating counts over a 0.5 minute period.

Exposure Rate Measurements

Gamma exposure rates were measured, at 1 m above floor surfaces, using a Ludlum Model 19, "microR" survey (NaI gamma scintillation detector).

Quality Assurance

Survey meters used to perform the Final Survey had been calibrated within 6 months of their use using radioactive standards traceable to NIST. Also, performance checks were completed on each survey meter at the beginning of each day of use.

The laboratory instruments used by RSO, Inc. to analyze the wipe tests were maintained under RSO's laboratory quality assurance program which includes a service agreement with the manufacturer, daily quality control performance charts and background and standard samples counted with every sample batch.

Sample results provided by the laboratory were matched to the data collection sheets which served as chain of custody forms for the sample.

3.0 SURVEY INSTRUMENTATION

3.1 Description of Instrumentation

Table 3. Survey meters used to conduct the Final Survey

Survey Meter	Probe Model	Probe Type	Probe Area/Size	Description
Floor Monitor Ludlum Model 2221 Scaler/Ratemeter	Ludlum 43-37	Gas Flow Proportional Detector	425 cm²	Scans and Direct Measurement of Floors
Ludlum Model 2200 Scaler/Ratemeter	Ludlum 43-20 (-68) or equivalent	Gas Flow Proportional Detector	100 cm²	Direct Measurement of Floors and Surfaces
Ludlum Model 12 Ratemeter	Ludlum Model 44-10 or equivalent	NaI	2" x 2"	Gamma Scintillator
Ludlum Model 19 microR	N/A	Internal NaI	1" x 1"	Assessment of Low Level Gamma Exposure Rates

The survey instruments that were used to perform the Final Survey are shown in Table 3 above.

3.2 Instrument Calibration and Efficiency Data

The calibration and efficiency data for the survey meters that were used during the Final Survey are summarized in Table 4. See Attachment D for copies of the calibration certificate.

Table 4. Survey meter calibration information.

Meter w/ Probe	Serial Number	Calibration Date	Radionuclide	Efficiency/Sensitivity
Ludlum Model 2221 Scaler/Ratemeter	108857	4/21/98	C-14	10% cpm per dpm
Ludlum 2200 Scaler/Ratemeter	43045	4/24/98	C-14	14% cpm per dpm
Model 12 w/ 2" x 2" NaI detector	102824	3/2/98	Cs-137	17% cpm per dpm for point source at contact and about 2,000 cpm in a 5 uR/h field
Model 19	32881	3/2/98	Cs-137 Beam	Reads Directly in Exposure Rate

3.3 Minimum Detectable Concentration for Scanning Technique

The minimum detectable concentration for 14C for the scan techniques was estimated using the suggested method in MARSSIM (NUREG -1575 Final December 1997).

Equation 1

$$Scan\ MDC = \frac{MDCR}{\sqrt{p} \cdot E_i \cdot E_s \cdot \left(\frac{probe\ area}{100\ cm^2}\right)}$$

Where:

MDCR = minimum detectable count-rate,

E_i = instrument efficiency (c/d),

E_s = surface efficiency, and

p = surveyor efficiency.

The sensitivity for the survey meters and techniques used during the Final

058069

Survey are summarized in Table 5.

Assumed values for the scan technique with the Ludlum Floor Monitor (Model 2221) with the 43-37 detector.

E_i = 0.10
E_s = 0.75 (smooth concrete floor)
p = 0.5

Assumed values for the scan technique with the Ludlum 12.

E_i = 500 cpm per uR/h
E_s = Not Applicable
p = 0.5

Assumed values for the scan technique with the Ludlum 19.

E_i = Not Applicable (displays in comparable units)
E_s = Not Applicable
p = 0.5

Table 5. Survey meter minimum detectable concentration for scanning.

Survey Meter	Technique	MDCR	Scan MDC
Ludlum Model 2221 Scaler/Ratemeter	Scan	500 cpm	2,200 dpm/100 cm²
Model 19	Scan	~6 uR/h	8 uR/h
Model 12	Scan	1,500 cpm	5 uR/h

3.4 Wipe Test Sample Analysis

Determinations of the removable surface activity were based on analyses of wipe samples collected over areas of approximately 100 cm². The wipe tests were analyzed using liquid scintillation counting techniques. Gross counts were determined from the sum of all counts in all channels, background subtracted and dpm calculated using the efficiency of a 14C standard. Gross counts were converted into net activity per unit area using the following equation:

Equation 2

$$A = \frac{\left(\frac{C}{t}\right) - R_b}{E \cdot \left(\frac{a}{100}\right)}$$

Where:

A	=	net removable activity (dpm/100 cm²),
C	=	integrated gross counts (counts),
t	=	sample counting time (min),
R_b	=	instrument background count rate (cpm),
E	=	efficiency (c/d), and
a	=	wipe collection area.

Using the equation shown below the minimum detectable activity on a wipe test was estimated to be less than 30 dpm for 1.5 minute count times.

Equation 3

$$WipeTest\ MDC = \frac{4.65\sqrt{R_b * t} + 2.71}{E * \left(\frac{wipe\ area}{100cm^2}\right) * t}$$

4.0 SURVEY RESULTS

4.1 Results

The results for the surveys conducted at the facility are reported by survey method and survey unit. Attachment C contains a survey diagram and a survey data sheet for each area surveyed.

Room diagrams are on a grid of 1 m x 1 m for Type I surveys and a grid of 2 m x 2 m for Type II surveys. The floor is shown in the lower left hand portion of the sheet so that the first cell of each floor is A1. Walls are shown in the diagram and in most cases marked A, B, C and D. Wall A for most diagrams was the wall at the bottom of the page with Wall B the left side wall, Wall C opposite Wall A, and Wall D the right side wall. See the example for a Type II survey in Attachment C.

Each data sheet includes instrument data, survey meter background response, and the minimum detectable concentration for beta scanning and direct measurement techniques. Survey results for the scanning results are shown in the data row followed by the first survey location wipe test and direct measurement result.

4.2 Background Levels

During the survey, background levels in some areas were slightly increased because of natural activity in different building materials. This was evident in the higher background count-rate on bare concrete surfaces as compared to tiled or carpeted floors for the proportional detector based survey meters used for the beta scans and direct measurements.

4.3 Gamma Scans and Exposure Rates

The exposure rates measured indoors in various areas of the facility were consistent with normal background, and the gamma scan showed no areas that varied from normal background.

Representative of this are the measurements that were made in several areas as shown in the following table:

Table 6. Representative exposure rates of indoor areas at IITRI.

Location Description	Gamma Scan (kcpm)	Exposure Rate (uR/h)
First Floor Corridors (Offices)	3 to 5	12
Corridor Between SCIF 1 & 2	6	15
Inside First Floor Use Areas	3 to 5	9 to 17
Second Floor Office/Lab Corridors	3 to 5	9 to 10
Second Floor Laboratories	3 to 5	9 to 10
On The Roof	3 to 5	6
Outdoor Parking Lot Front	3 to 5	10

The typical background exposure rates in and near the facility were 10 μR/h as measured in the corridors, lobby and the parking lot. Exposure rates inside of the building ranged from 7 to 17 μR/h which is typical of background exposure rates. The exposure rates increased with the amount of concrete in the immediate area of the survey. This was probably due to the naturally occurring radionuclides in the concrete. All exposure rates were within typical guideline levels of 5 μR/h above background.

4.4 Beta Scans

Five small areas of elevated residual activity were found during the beta scan. These areas were limited to surface contamination on the floor in 5 laboratory rooms. Two of the areas, Rm 203 and Rm 219, were known by IITRI as locations of previously documented spills. The location, scan results, action taken and final results are shown in Table 7

Table 7. Summary of contamination found and action take.

Lab/Area	Description of Contamination	Action Taken	Result
201	Tile and concrete floor contaminated	Contaminated tile removed and concrete scabbled	Surface contamination levels reduced to levels indistinguishable from background
203	Tile and concrete floor contaminated	Contaminated tile removed and concrete scabbled	Surface contamination levels reduced to less than 2,000 dpm/100 cm^2 averaged over 1 m^2 with a maximum of 6,000 dpm/100 cm^2
216	Tile contaminated	Contaminated tile removed	Surface contamination levels reduced to levels indistinguishable from background
219	Tile contaminated	Contaminated tile removed	Surface contamination levels reduced to levels indistunguishable from background
220	Tile contaminated	Contaminated tile removed	Surface contamination levels reduced to levels indistinguishable from background

4.5 Removable Contamination

Attachment C includes results of the removable surface activity from the wipe surveys. No removable contamination was detected during the final survey.

4.6 Summary

- All licensed material had been removed prior to the completion of the survey.
- Final beta scans showed no residual contamination on floor surfaces in excess of the guideline values
- Direct measurements showed no residual contamination in excess of the guideline values.
- Wipe tests for removable contamination were all less than 100 dpm/100 cm^2
- Gamma exposure rates in all areas were consistent with normal natural background level.

5.0 CONCLUSIONS

IITRI used radioactive material at the Virginia Technology Center in Newington, Va from 1989 until April of 1998. The use of radioactive material was primarily with 14C and 32P labeled compounds using standard biotechnology laboratory techniques. All radioactive waste, including liquid radioactive waste was disposed of off site using authorized processing and disposal facilities. Routine

periodic surveys performed since the initiation of licensed activities showed no or only minor amounts of contamination.

Decommissioning activities included the return of "sponsors" samples and packaging for disposal any unwanted radioactive material. Free release surveys were conducted to demonstrate that items, furniture and laboratory fixtures removed from the authorized use areas were free from contamination. Final surveys were performed following removal of all items from the laboratory areas.

The release criteria chosen were the values from Regulatory Guide 1.86. These values are considered conservative for 14C and also considered to meet the requirements of 10 CFR 20.1402.

During the final survey some residual contamination was found on floor areas revealed after removal of laboratory benches. These areas were remediated and now meet the decommissioning criteria. During the decommissioning 2 shipments of radioactive waste were made to dispose of radioactive waste on hand at the beginning of the decommissio additional items designated as radioactive waste, and decontamination wastes from the discovery of contamination on floor areas. Two sealed source devices were returned to their manufacturers.

Following decontamination, the Final Survey results showed that no residual radioactivity above the guideline levels was found in any of the areas surveyed, and there was no licensed radioactive material remaining at this facility. The IITRI Virginia Technology Center has met the criteria for free release of the facility and termination of it's NRC byproduct materials license.

6.0 REFERENCES

6.1 USNRC, gulatory Guide 1.86., Termination of Operating Licenses for Nuclear Reactors, June 1974.

6.2 USNRC, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unaffected Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material", May 1987

6.3 USNRC NUREG/CR-5849, Manual for Conducting Radiological Surveys in Support of License Termination: NRC Staff's Draft Report for Comment, June 92.

6.4 NUREG-1575, EPA 402-R-97-016, Multi Agency Radiation Survey and Site Investigation Manual (MARSSIM) Final, December 1997

7.0 ATTACHMENTS

Attachment A	History of Use of Radioactive Material at the Va. Technology Center
Attachment B	Facility Drawings
Attachment C	Survey Diagrams and Survey Results
Attachment D	Survey Meter Calibration Reports
Attachment E	NRC Form 314 and Attachment

Attachment A

History of Use of Radioactive Material at the Virginia Technology Center

Attachment A

History of Radioactive Material Use
IIT Research Institute, Newington, Virginia

Licensing

The Materials License was approved by NRC on July 5, 1989. The radioactive materials and amounts approved are given in Table 1. Ni-63 was limited to use in gas chromatographs; Ba-133 was limited to use as a standard in liquid scintillation counters. All other materials were approved for use in greenhouse and laboratory tracer studies. Areas of approved use, handling and/or storage, include the greenhouse, the loading dock area (including the walk-in cooler and freezer in the loading dock area), and rooms 144, 147, 150, 151, 152, 201, 202, 203, and 204.

Table 1. Approved radioactive compounds and their amounts.

Byproduct, Source, and/or Special Nuclear Materials	Chemical and/or Physical Form	Maximum Amount That Licensee May Possess at any One Time Under This License
Carbon 14	Any	80 millicuries
Hydrogen 3	Any	5 millicuries
Phosphorus 32	Any	10 millicuries
Sulfur 35	Any	10 millicuries
Chlorine 36	Any	10 millicuries
Copper 67	Any	10 millicuries
Nickel 63	Foils contained in Shimadzu model ECD-14 detector cell	Not to exceed 10 millicuries per foil
Barium 133	Sealed source	Not to exceed 20 millicuries per source

Amendment No. 1

The license was amended effective January 31, 1991 to:

- Increase the maximum amount of C-14 from 80 to 99 millicuries
- Decrease the maximum amount of Cl-36 from 10 to 5 millicuries
- Add Ca-45 (0.9 millicuries) and Cesium - 135 (1 millicurie) to the permitted materials for use in greenhouse and laboratory tracer studies
- Rooms 215-219, 143, and 176 were added as areas approved for use, handling and/or storage of licensed materials.

Amendment No. 2

The license was renewed effective December 13, 1994. Changes incorporated into the renewal were:

- Copper-67 and Barium-133 were removed from the license.
- Rooms 220-223, 170, and 177 were added as areas approved for use, handling, and/or storage of licensed materials.

Amendment No. 3

The third amendment (April 24, 1998) to the license involved procedural changes only.

Amendment No. 4

The fourth amendment (May 29, 1998) was a notification of intent to permanently cease operation.

Radioactive Materials Used

Phosphorus-32 was used from July 1990 through approximately August 1993. The sole usage of P-32 was as a tracer on DNA probes, used to type DNA. Carbon 14 was used from December 1989 through April 28, 1998. Initial use involved evaluating methodologies for detecting relatively low levels of C-14. C-14 tracer studies were conducted between December 1989 and approximately August 1994 to determine the breakdown and behavior of pesticides and hazardous wastes in the defined environment. Use of C-14 after approximately December 1994 was limited to calibrating the liquid scintillation counter (LSC) as required by the material license. The tritium usage was limited to calibrating and checking the operation of the LSC. The only H-3 obtained was a sealed source standard for the LSC. Both Cl-36 and Ca- 45 were used from January 1993 to April 1993 to determine the LSC counting characteristics of these isotopes. No experimentation was conducted other than to determine detection/quantification capabilities. Sulfur-35, Cesium-135 and Copper-67 were not used nor obtained. Nickel-63 use was limited to the foil in the electron capture detector of the gas chromatograph from October 1989 through July 1998. Barium usage was limited to the external standard in the LSC (10/89-7/98).

Facilities

Room 170 was used to package and store radioactive waste and the south loading dock was used as a staging area for radioactive waste awaiting shipment to disposal or reprocessing sites from December 1994 through July 1998. Room 176 was used for storing radioactive waste from January 1991 through November 1994. The north loading dock was used to receive samples containing radioactive materials from approximately

11/91 to 8/93. The Walk-in cooler and freezer located on the loading dock were used to store samples containing radioactive materials from approximately 1/90 to 7/98.

Room 143 housed a gas chromatograph-mass spectrometer and a TLC radiochem scanner. Radioactive samples were analyzed in this room from approximately 12/89 to 12/94.

Radioactive materials may have been used in room 144 between December, 1989 and January 1990. If so, use was infrequent and work was probably limited to spotting TLC plates with C-14 or other similar, relatively clean activities using C-14.

Room 147 was a darkroom used for autoradiography, for both C-14 and P-32 between July 1990 and approximately August, 1994. No radioactive materials have been used in this room since approximately 8/94.

Room 147 and 146 were connected in approximately October 1994. No use or very little use of radioactive materials occurred in room 146. Any use of radioactive materials would have been limited to autoradiography using ^{14}C.

Room 148 housed an ultra freezer for several years in which P-32 was stored. Other activities involving radioactive materials can not accurately be documented, although is believed to have been relatively light.

Room 150 was used both as a microbiology laboratory and as a general-purpose chemistry laboratory. Radioactive materials including C-14, Ca-45, Cl-36, and possibly P-32 were stored in this room. Usage of radioactive materials can not be accurately documented, but usage was light.

Activities using C-14 occurred in room 151 between 12/89 and 6/90 The level if activity was low to moderate. P-32 was heavily used for one to two years.

Room 152 was a general-purpose laboratory. C-14, P-32, Ca-45, and Cl-36 were used in this space intermittently. No usage has occurred for the past 3-4 years.

Room 176 was not used to conduct research or analysis involving radioactive materials. However, the entrance to room 177 is through room 176. Thus radioactive materials were transported through room 176.

Room 201 was a constant temperature room. Operations were generally limited to sampling and monitoring temperature-controlled studies. C-14 labeled materials were used in this room from approximately June 1990 through January 1992.

Room 202 initially housed the Ni-63 source (10/89-1-91). From October 1989 through August 1994 this was the general-purpose laboratory for C-14 labeled materials. Activities included synthesis, combustion, and extraction.

Room 203 housed the Ba-133 source from 1/90-7/98. This room saw the heaviest usage of C-14. Activities included sample storage, sample preparation, extraction and concentration, dilution of source materials, and liquid scintillation counting. Room 204, within room 203, was originally set up as a photolysis lab where C-14 materials were tested. After approximately 12/94 this room was converted into a storage closet and use of radioactive materials in this area ceased.

Room 215 was used for DNA analysis using P-32 for approximately 2 years (8/91-8/93). Room 216 was originally used for a C-14 synthesis and for conducting a single composting study using C-14 labeled explosives. Then, this room was used for DNA analysis using P-32 labeled probes.

Room 217 was a balance room. Any radioactive materials may have been weighed in this room. Operations were limited to weighing to keep the room uncontaminated.

Room 218 was an archive room. C-14 labeled test substances were stored in a refrigerator in this room. No other handling of radioactive materials was permitted.

Room 219 was an analytical laboratory from approximately January 1991 through July 1998. Radioactive samples were stored and analyzed (gas chromatography, thin layer chromatography, ion chromatography, high performance liquid chromatography, gas chromatography-mass spectrometry, and UV-VIS spectroscopy) in this room. Operations included preparation of standards, limited sample clean up, and fraction collection. A large number of C-14 labeled samples were analyzed in this room.

Room 220 was used for a very short period to perform chemical operations with C-14 labeled materials (synthesis and purification). Some use of P-32 may have occurred.

Room 221, 222, and 223 were interconnected laboratories. Room 223 housed an autoclave. Radioactive materials were not used in room 223. Room 221 was a photolysis laboratory where tracer labeled materials were exposed to simulated sunlight to characterize Photodegradation. Operations were limited to experimental setup, monitoring, and sampling. C-14 was the only radioactive material used in room 221. Room 222 was used for two functions. P-32 autoradiographs were developed on a routine basis for a 1-2 year period. This room was also intermittently used to set up and assemble photolysis chambers containing aqueous solutions of C-14 labeled substances.

No radioactive materials were used or stored in the greenhouse area.

Containment Practices

The IITRI Materials License Application included a section (Item 10) that detailed the facility Radiation Safety Program. The goal of the program was to minimize the exposure of personnel to radiation which is consistent with the NRC policy of maintaining exposures "as low as reasonably achievable" (ALARA). The well-documented training program includes a detailed description of the safety practices that were established for the protection of the workers, the public and the environment from exposure to radioactive materials.

The facility procedures used for handling of radioactive materials were based on maintaining attention to detail, using engineering controls where possible, controlling access to materials, and monitoring of employees and the facility. The exposures were limited through use of proper shielding (such as 0.5" of acrylic for P-32), use of personal protective equipment and use of effective spill control procedures. As a result, previous maximum exposures have been measured at less than 290 mrem/yr shallow dose, and 100 mrem/yr measurable deep dose equivalents (using TLD rings and whole body badges). Typical exposures were less than 50 mrem/yr for the facility radiation workers.

Waste Disposal Practices

The radiation safety-training program also included training of personnel on the proper identification, segregation, handling, accounting, packaging, and disposal of radioactive wastes. Log sheets were utilized to identify and track the type of wastes; i.e.

solid compactable/non-compactable, liquid, mixed, scintillation wastes, or wastes held for decay. The specific activity and description were identified for proper accounting and disposal purposes.

Periodically, the Radiation Safety Officer (RSO) would arrange and supervise the packaging and removal of the radioactive wastes from the facility by a permitted waste hauler (Radiation Service Organization (RSO, Inc.), in Laurel, MD). The RSO assured that the waste contractor was properly licensed, and that the wastes were properly identified, documented and arrived at the final licensed destinations.

Accidents/Spills

A vial of C-14 labeled pesticide containing approximately 400 μCi was dropped on the floor in room 203 on 11/19/91. The vial broke on the floor in the corner to the left of the hood. One worker's boots were slightly contaminated. The floor, cove base, and adjacent metal cabinets were contaminated in the immediate area of the spill. Minor contamination was tracked across the room on the workers boots. No loss of C-14 from the room occurred. The contaminated floor tile and cove base (in the immediate spill area) were removed and disposed of as radioactive waste. The adhesive under the floor tile was scraped up. Other contaminated surfaces were worked with solvent until no C-14 residues were detected. The worker's boots were decontaminated with solvent.

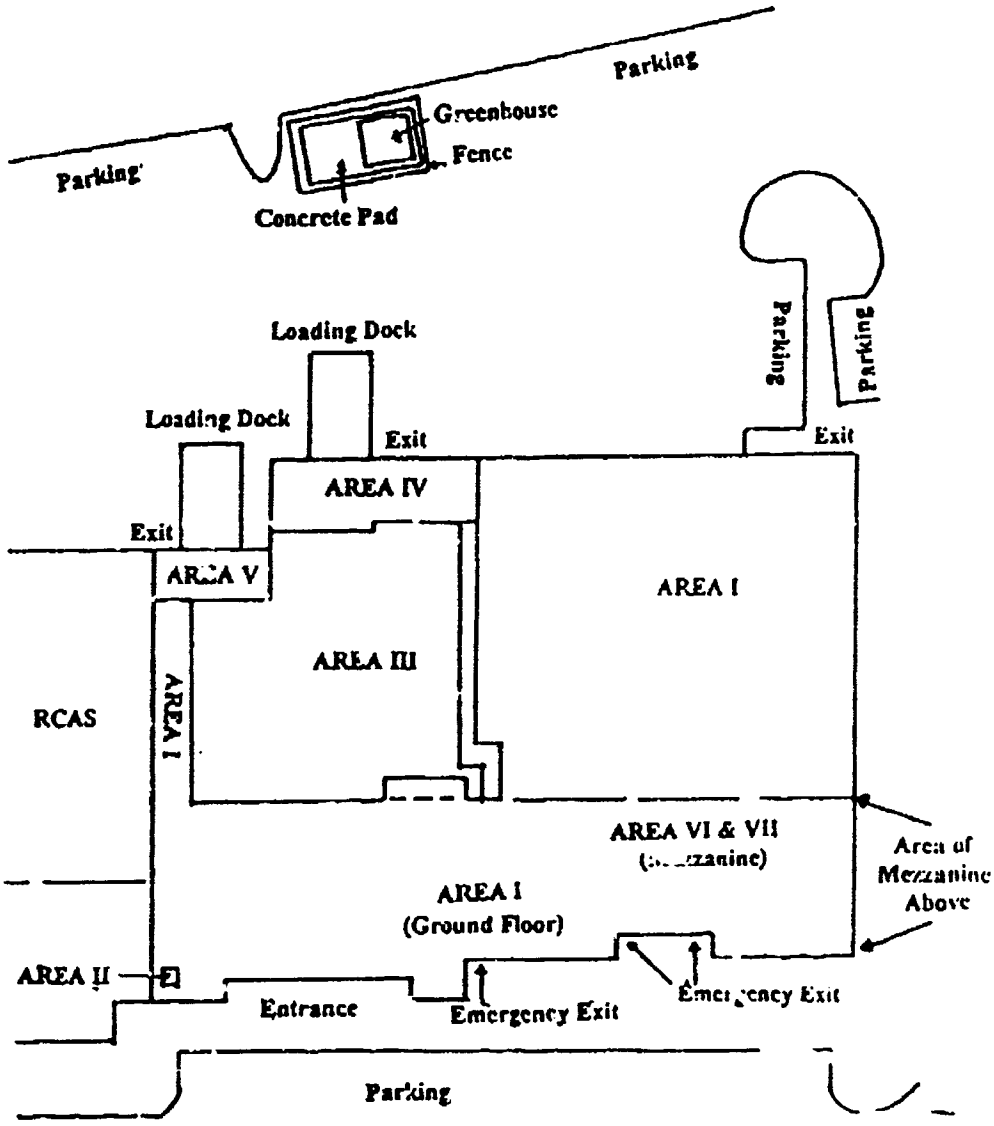
On 5/18/92 during a pressure filtering operation in room 219 a worker was sprayed in the face with a 50:50 water:acetonitrile solution containing C-14 labeled materials. The worker was wearing a lab coat and safety glasses. She immediately removed her glasses and washed her face. Then she showered and washed her hair. The bench in the immediate area was also sprayed. The bench and adjacent floor were cleaned until no C-14 could be detected. The total volume of fluid in this incident was 2 ml. The total C-14 activity was 105,000 to110,000 DPM. The worker was not injured.

On 6/10/92 during the transfer of a C-14 liquid in the hood in room 202, a quantity of approximately 180 μ curies was spilled. Most of the liquid was held by absorbent paper. Some liquid ran down the front of the hood contaminating the underside of the bench, cabinets under the hood, and the floor immediately in the front of the hood. Contaminated floor tiles were moved and disposed of as C-14 waste. The contaminated hood, bench, and cabinets were cleaned until no C-14 could be detected. Seams between the base cabinets and hood base could not be accessed and were possibly contaminated. Therefore, the hood was clearly labeled with a warning to alert personnel when the hood was disassembled. All C-14 was contained and no injuries were incurred.

On 2/17/93 carbon used to absorb C-14 labeled materials was dispersed in room 202 during a pressured nitrogen column drying operation. Approximately 9 μCi of C-14 were released. The room was cleaned with a vacuum cleaner equipped with a HEPA filter. Swipes of the room did not show any C-14 activity remaining. No C-14 was lost and no personnel injury occurred.

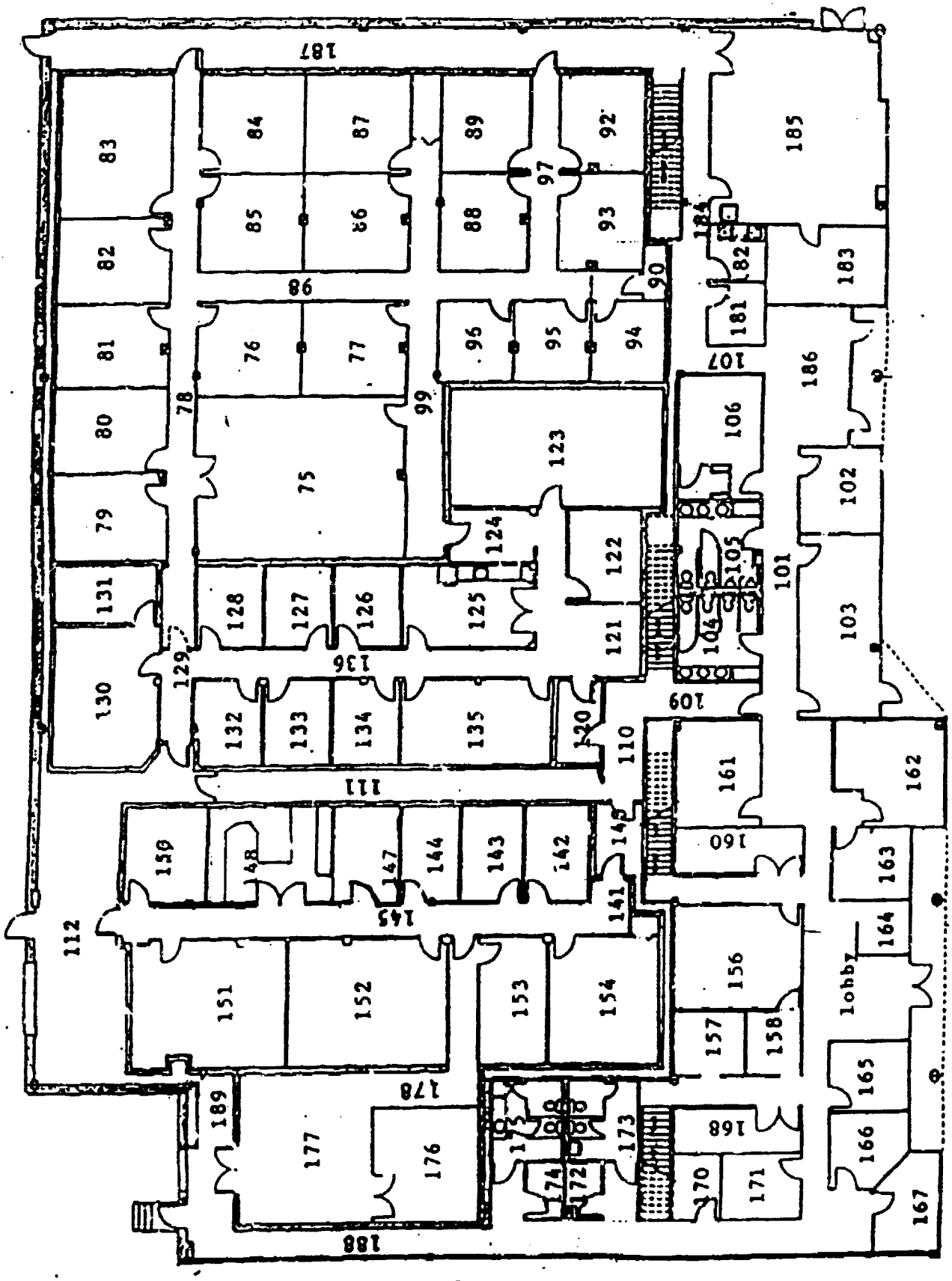
Attachment B

Facility Drawings



Partial outline of the building at 8510 Cinderbed Road, the areas of the building occupied by IITRI, and the location of the greenhouse.

Diagram 1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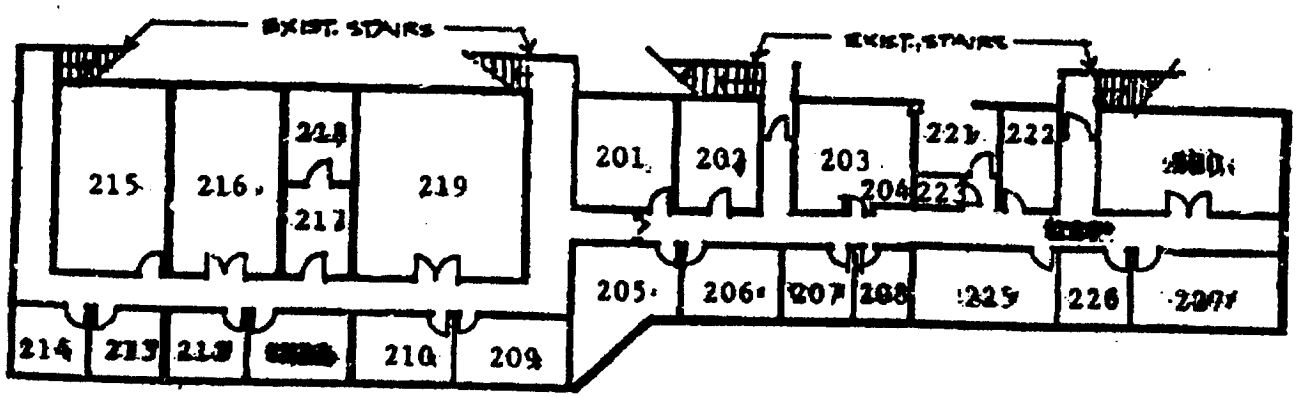
FIRST FLOOR



IIT Research Institute
Virginia Technology Center
Floor Plan (Second Floor)
7/16/91

Attachment C

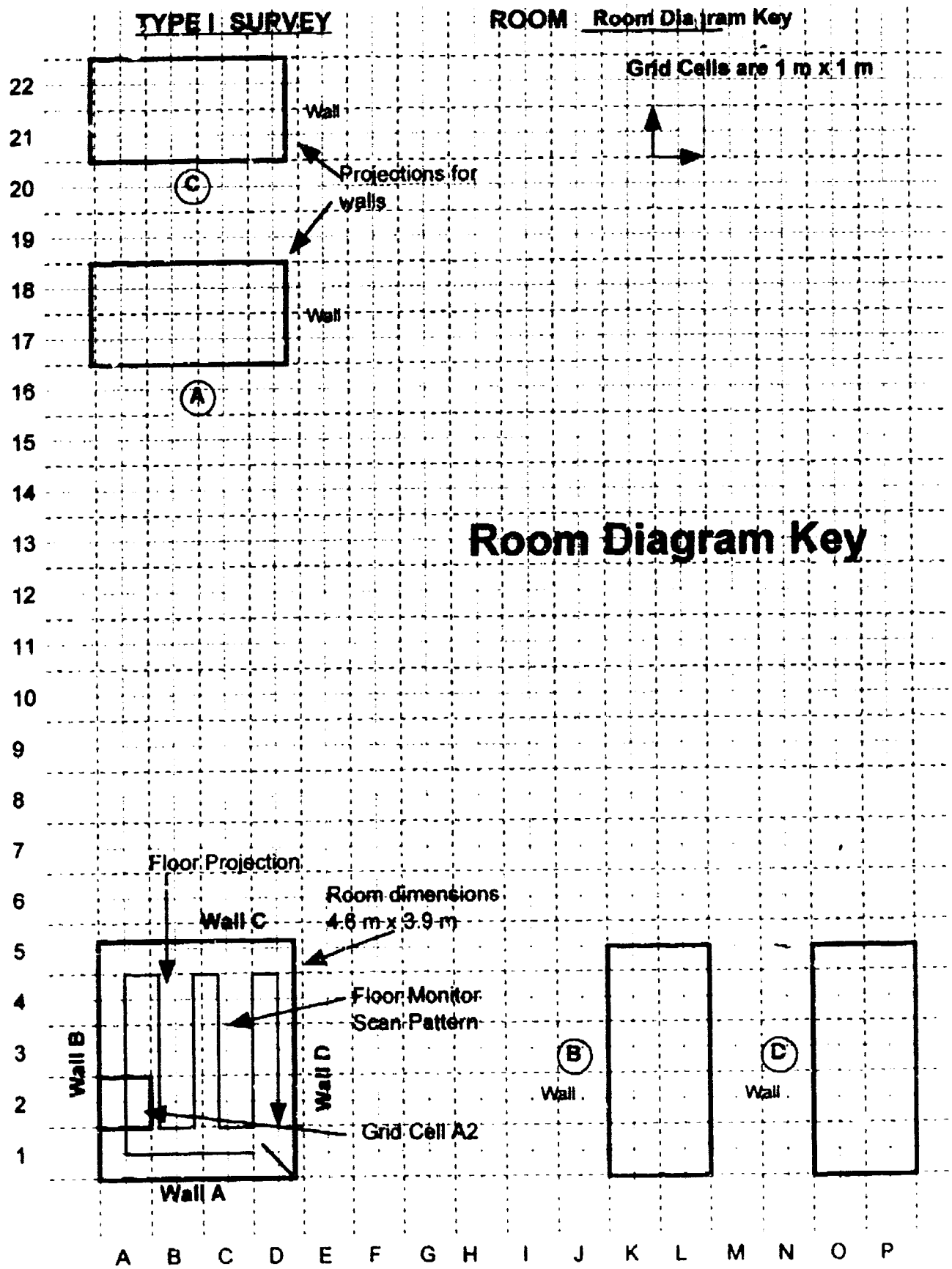
Survey Diagrams, Removable Contamination, Scan, and Direct Measurement Results

Contents

1. radioactive material use/storage laboratory rooms/areas

112	152	201	218
143	170	202	219
144	176	203	220
147	177	204	221
148		215	222
150		216	223
151		217	

2. area on top of SCIF#1, Rm 174 and Rm 105A
3. sink drain lines
4. roof (chemical fume hood blowers and immediate area)
5. greenhouse (concrete pad)
6. non-use areas (corridors, lobby, 105A vacuum pump room)


TYPE I SURVEY
ROOM Room Diagram Key
Grid Cells are 1 m x 1 m
Wall
Projections for walls
Wall
C
A
Room Diagram Key
Floor Projection
Room dimensions 4.6 m x 3.9 m
Wall C
Floor Monitor Scan Pattern
Wall B
Wall D
Grid Cell A2
Wall A
B
Wall
C
Wall
22
21
20
19
18
17
16
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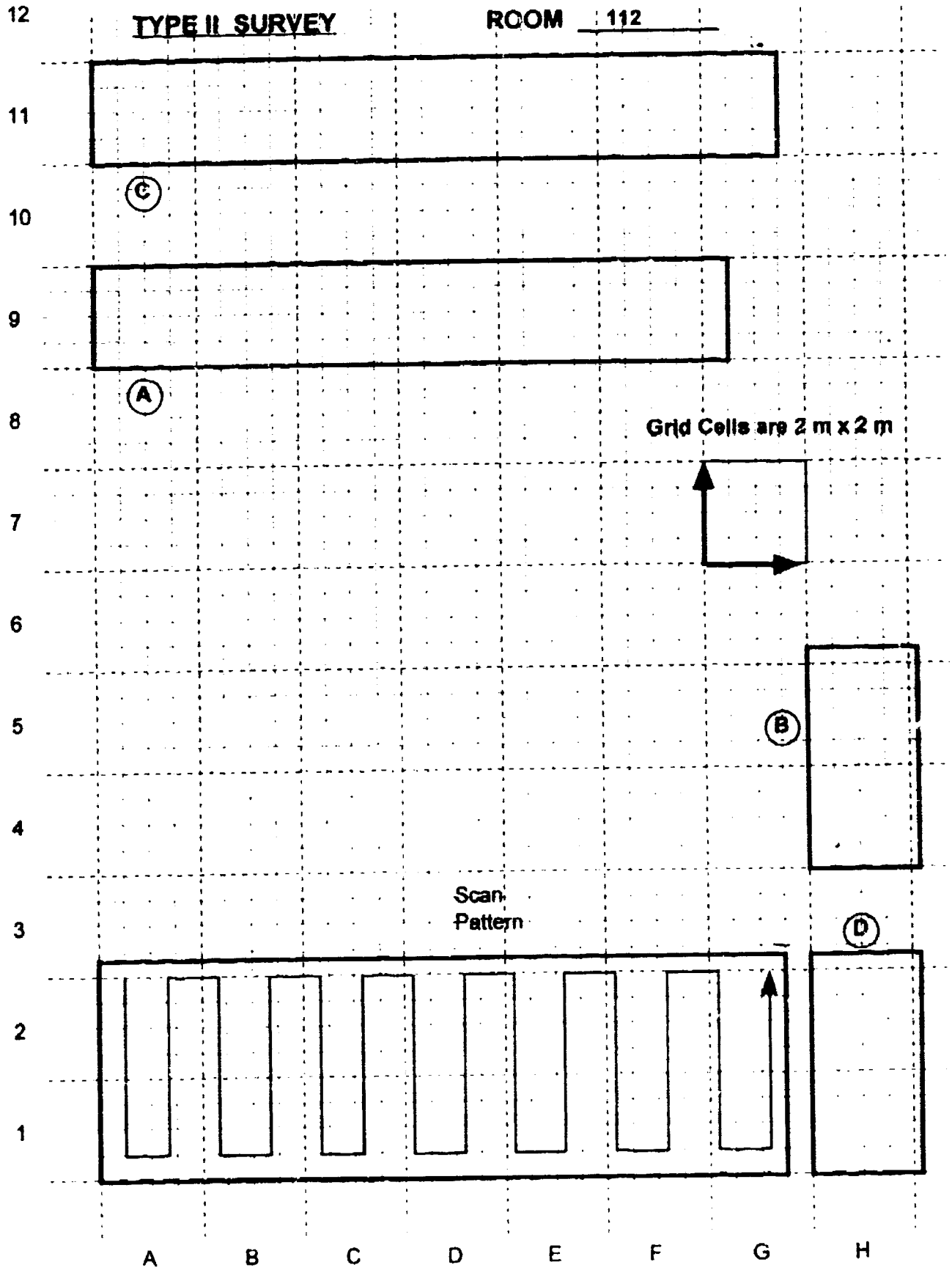
TYPE II SURVEY
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Pattern
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F
G
H

JSO, Inc (SP-30) ITRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Room 1'2 . Date - 11-Aug-98

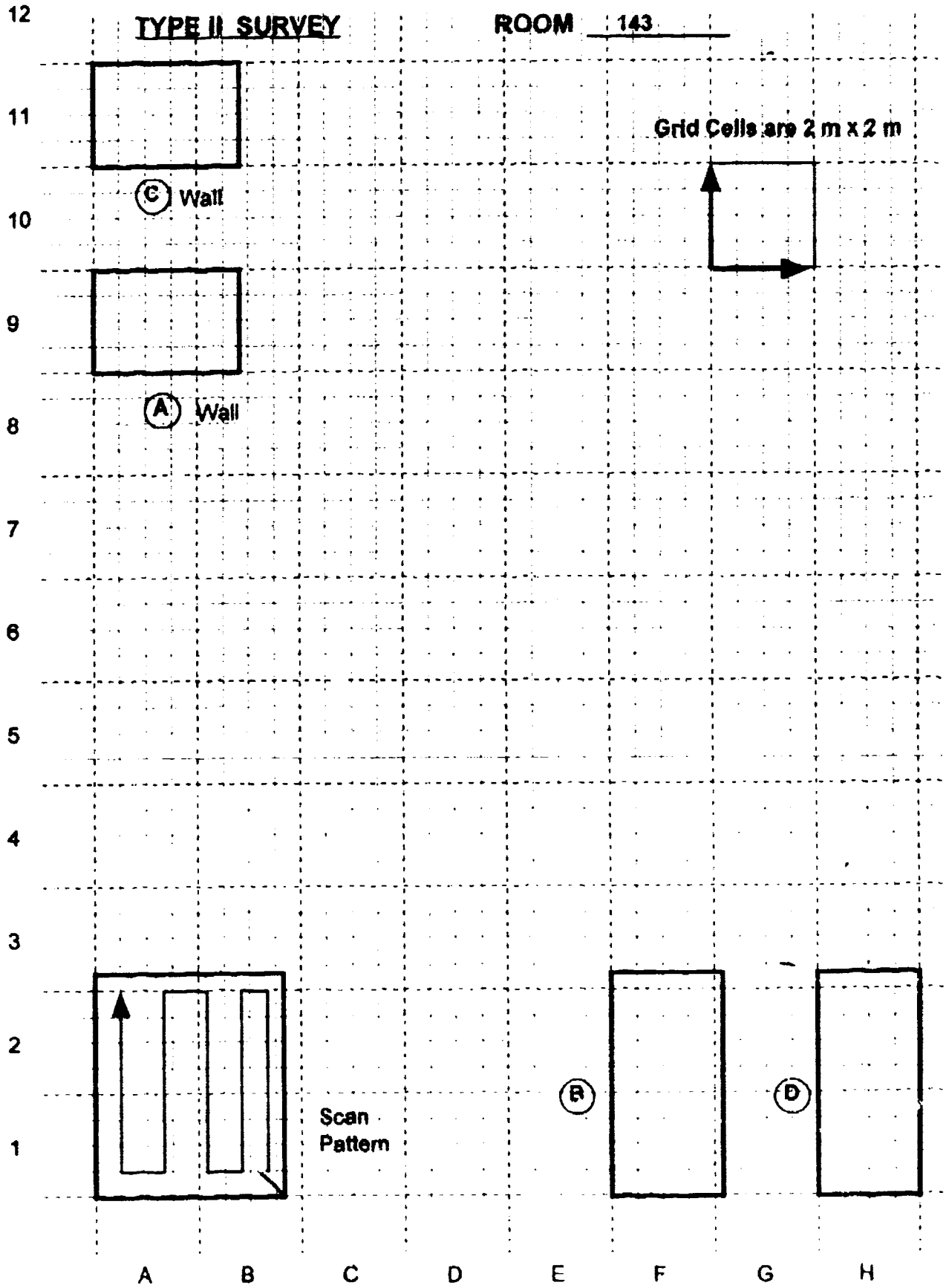
Location Radioisotope Laboratory TYPE II Survey Surveyor - Beason D., Sink D., Smith G.

(1) Floor Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 1057 cpm
Integrated Count MDA - 641 dpm/100 cm2
Scanning MDA - 2200 dpm/100 cm2

(2) L 700 w/ 100 cm2
(2) Gas Flow 100 cm2 - 610 cpm
Integrated Cov # MDA - 1 21 dpm/100 cm2

(3) 2.19 microR 10.0 (uR/h)
(4) L12 w/ 2x2 NaI 4 kcpm
(5) LSC - 36 cpm

Grid		* 95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Scan /100 cm2				(2) Beta Direct Meas 100 cm2			(3) Gamma Contact	(4) Gamma Contact	Action Level	Acceptable
		Wipe	Gross	Beta	Unsurt *	Lowest Meas		Highest Meas		Gross	Beta	Unsurt *				
Cell	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	> 2*Bgd >MDA	Y/N
						1,375	748	1,950	2,061				11	5.0	Pass	Yes
A1	Floor	767	31	-08	27					676	471	302			Pass	Yes
A2	Floor	768	28	-13	26					614	39	344			Pass	Yes
B1	Floor	769	22	-23	25					610	[illegible]	363			Pass	Yes
B2	Floor	770	21	-24	25					322	-2,037	274			Pass	Yes
C1	Floor	771	39	06	28					518	-657	337			Pass	Yes
C2	Floor	772	19	-27	24					660	357	376			Pass	Yes
D1	Floor	773	27	-15	26					536	-100	359			Pass	Yes
D2	Floor	774	25	-17	25					592	-125	358			Pass	Yes
E1	Floor	775	34	-03	27					700	643	386			Pass	Yes
E2	Floor	776	21	-24	25					644	243	372			Pass	Yes
F1	Floor	777	28	-12	26					602	-57	360			Pass	Yes
F2	Floor	778	29	-10	26					538	-514	343			Pass	Yes
G1	Floor	779	31	-07	27					580	-214	354			Pass	Yes
G2	Floor	780	21	-25	24					566	-314	351			Pass	Yes
H4	Wall	781	28	-13	26					548	-443	345			Pass	Yes
H5	Wall	782	27	-15	26					518	-657	337			Pass	Yes
A11	Wall	783	41	10	29					576	-579	342			Pass	Yes
B11	Wall	784	23	-21	25					354	-1,829	285			Pass	Yes
C11	Wall		27	-15	26					524	-614	339			Pass	Yes
D11	Wall		27	-14	26					356	-1,814	286			Pass	Yes
E11	Wall	787	27	-15	26					560	-357	349			Pass	Yes
F11	Wall	788	23	-21	25					536	-529	342			Pass	Yes
G11	Wall	789	28	-13	26					586	-171	356			Pass	Yes
H2	Wall	791	23	-21	25					404	1,471	302			Pass	Yes
H1	Wall	792	27	-14	26					386	-1,643	294			Pass	Yes
A9	Wall	793	23	-21	25					444	-1,186	315			Pass	Yes
B9	Wall	794	25	-18	25					430	-1,286	310			Pass	Yes
C9	Wall	795	22	-23	25					358	-1,800	287			Pass	Yes
D9	Wall	796	21	-25	24					464	-1,043	321			Pass	Yes
E9	Wall	797	27	-15	26					406	-1,417	303			Pass	Yes
F9	Wall	798	31	-07	27					366	-1,743	289			Pass	Yes
G9	Wall	799	25	-18	25					374	-1,686	292			Pass	Yes


TYPE II SURVEY
ROOM 143
Grid Cells are 2 m x 2 m
C Wall
A Wall
Scan Pattern
B
D
12
11
10
9
8
7
6
5
4
3
2
1
A
B
C
D
E
F
G
H

RSO, Inc (RF-30) IITRI

Radiological Survey Results

Site - IITRI Va. Technology Center Survey Results of Room 143 Date - 11-Aug-98

Location Radioisotope Laboratory TYPE II Survey Surveyor - Bisson D., Smith G., Sirk D

(1) Floor Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 1067 cpm
Integrated Count MDA - 642 dpm/100 cm2
Scanning MDA - 2200 dpm/100 cm2

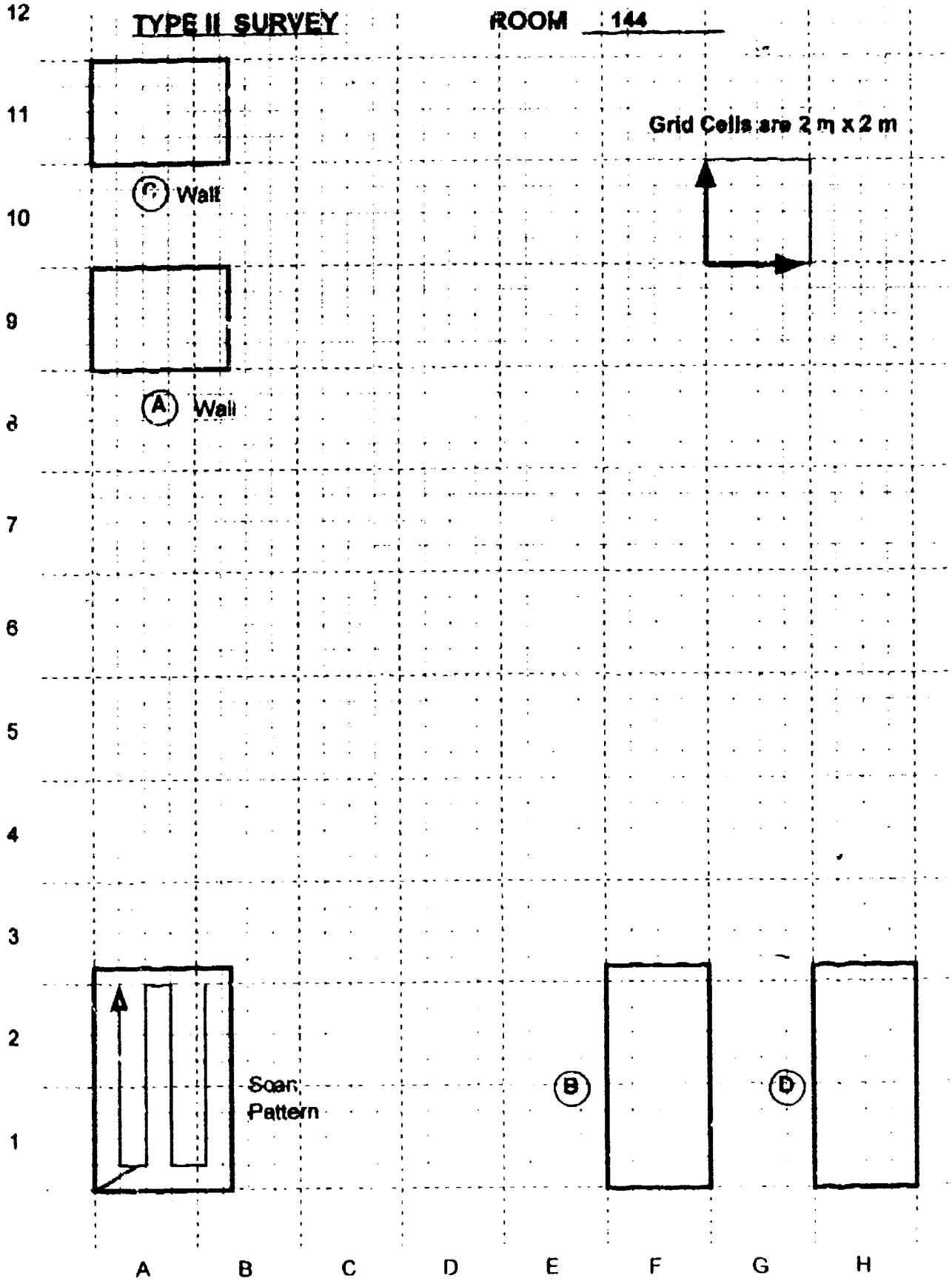
(2) LZ200 w/ 100 cm2
(2) Gas Flow 100 cm2 395 cpm
Integrated Count MDA - 1500 dpm/100 cm2

(3) L19 ionrol
10.0
(uR/h)

(4) L12 w/ 2x2 NaI
4
kcpm

(5) LSC - 36 cpm

Grid		* 99% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Scan /100 cm2				(2) Beta Direct Meas 100 cm2			(3) Gamma Contact	(4) Gamma Contact	Action Level	Released Yes/No
		Wipe	Gross	Beta	Uncert *	Lowest Meas		Highest Meas		Gross	Beta	Uncert *				
Cell	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	> 2*Bgd >MDA	
						800	-605	1,500	1,042				15	5.0	Pass	Yes
A1	Floor	596	25	-17	25					390	-36	298			Pass	Yes
A2	Floor	597	27	-14	26					444	350	308			Pass	Yes
A3	Floor	598	25	-17	25					382	-93	287			Pass	Yes
B1	Floor	599	21	-25	24					380	-107	287			Pass	Yes
B2	Floor	600	27	-15	26					404	64	295			Pass	Yes
B3	Floor	601	29	-11	26					406	79	295			Pass	Yes
F1	Wall	602	35	00	27					356	-279	278			Pass	Yes
F2	Wall	603	30	-09	26					358	-264	279			Pass	Yes
B9	Wall	604	30	-09	26					358	-264	279			Pass	Yes
A9	Wall	605	25	-17	25					352	-307	277			Pass	Yes
H2	Wall	606	28	-13	26					364	-221	281			Pass	Yes
H1	Wall	607	31	-08	27					384	-79	288			Pass	Yes
A11	Wall	608	40	08	28					362	-236	281			Pass	Yes
B11	Wall	609	25	-18	25					396	7	292			Pass	Yes


TYPE II SURVEY
ROOM 144
Grid Cells are 2 m x 2 m
C Wall
A Wall
Scan Pattern
B
D
12
11
10
9
8
7
6
5
4
3
2
1
A
B
C
D
E
F
G
H

RSO, Inc (SP 20) ITTRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Room 144 Date - 11-Aug-98

Location Radioisotope Laboratory TYPE II Survey Surveyor - Bisson D, Smith G, Sink D.

(1) Flow Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 1857 cpm
Integrated Count MDA 647 dpm/100 cm2
Scanning MDA - 2700 dpm/100 cm2

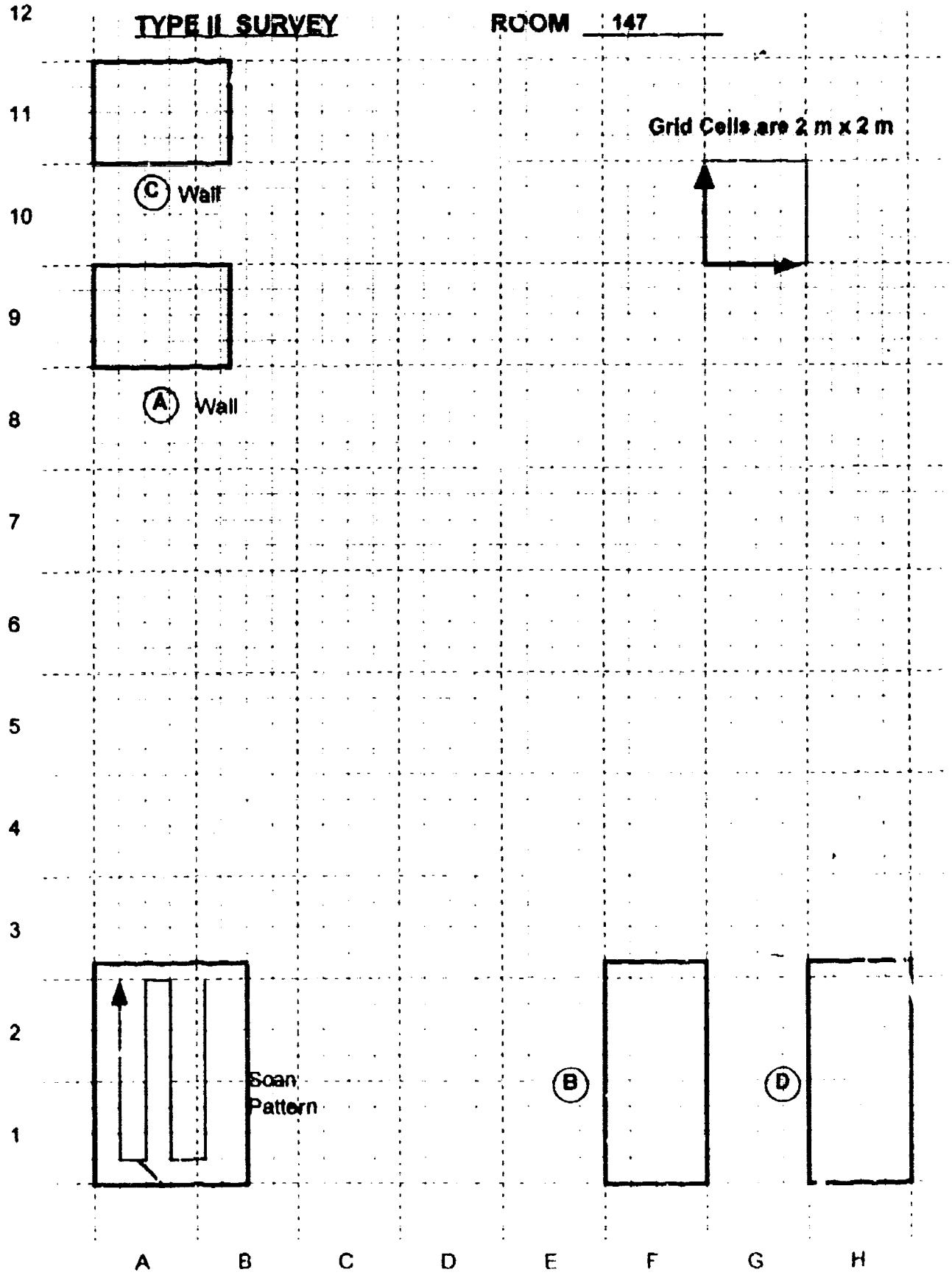
(2) L2200 w/ 100 cm2
(2) Gas Flow 100 cm2 395 cpm
Integrated Count MDA - 1500 dpm/100 cm2

(3) 2.19 microR
10.0
(uR/h)

(4) 1.17 w/ 2x2 NaI
6
kcpm

(5) LSC - 36 cpm

Grid		* 95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Scan /100 cm2				(2) Beta Direct Meas 100 cm2			(3) Gamma	(4) Gamma	Action	Released
		Wipe	Gross	Beta	Uncert *	Lowest Meas		Highest Meas		Gross	Beta	Uncert *	Contact	Contact	Level	Yes/No
Cell	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	* 2*Bgd >MDA	
						900	-369	1,450	925				15	5.0	Pass	Yes
A1	Floor	610	35	00	27					388	-50	289			Pass	Yes
A2	Floor	611	22	-23	25					384	-79	288			Pass	Yes
B1	Floor	612	33	-05	27					454	421	311			Pass	Yes
B2	Floor	613	33	-05	27					422	193	301			Pass	Yes
F1	Wall	614	24	-19	25					340	-393	271			Pass	Yes
F2	Wall	615	26	-16	26					326	-493	268			Pass	Yes
A11	Wall	616	33	-05	27					394	-7	291			Pass	Yes
B11	Wall	617	27	-15	26					414	136	298			Pass	Yes
H2	Wall	618	34	-03	27					404	64	295			Pass	Yes
H1	Wall	619	21	-24	25					384	-79	288			Pass	Yes
A9	Wall	620	30	-09	26					346	-350	275			Pass	Yes
B9	Wall	621	27	-14	26					326	-493	268			Pass	Yes


TYPE II SURVEY
ROOM 147
Grid Cells are 2 m x 2 m
C Wall
A Wall
Scan Pattern
B
D
12
11
10
9
8
7
6
5
4
3
2
1
A
B
C
D
E
F
G
H

RSO, Lic. [illegible] (ITTRI)

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Room 147 Date - 11-Aug-98

Location - Radioisotope Laboratory TYPE II Survey Surveyor - Hinson D., Smith G., Sink D.

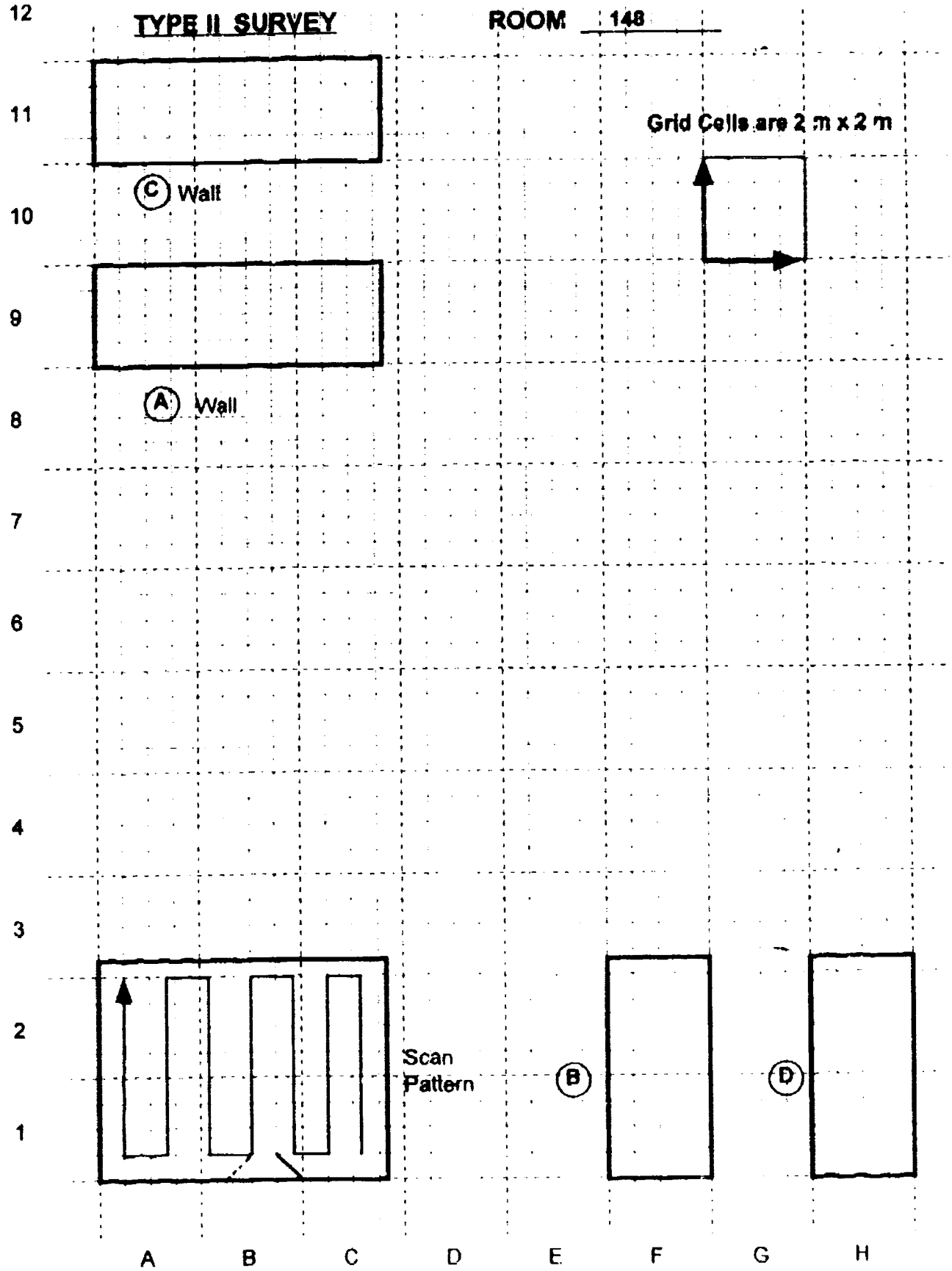
(1) Floor Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 1857 cpm
Integrated Count MDA - 642 dpm/100 cm2
Surveying MDA - 7700 dpm/100 cm2

(2) LZ200 w/ 100 cm2
(2) Gas Flow 100 cm2 - 39.7 cpm
Integrated Count MDA - 1500 dpm/100 cm2

(3) 1.19 microR
10.0
(uR/h)

(4) 1.12 w/ 2x2 NaI
4
kcpm
(5) LSC - 36 cpm

Grid		* 95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Scan /100 cm2				(2) Beta Direct Meas 100 cm2			(3) Gamma	(4) Gamma	Action	Released
						Lowest Meas		Highest Meas								
		Wipe	Gross	Beta	Uncert *	Gross		Gross		Gross	Net	Uncert *	Contact	Contact	Level	Yes/No
Cell	Description	No	cpm	dpm	dpm	cpm	dpm	cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	>2*Bgd >MDA	
						950	352	1,890	1,748				15	5.0	Pass	Yes
A1	Floor	622	2	-17	25					418	164	299			Pass	Yes
A2	Floor	623	28	-13	26					444	350	308			Pass	Yes
B1	Floor	624	29	-10	26					417	164	299			Pass	Yes
B2	Floor	625	33	-04	27					478	593	318			Pass	Yes
F1	Wall	626	21	-25	24					394	-7	291			Pass	Yes
F2	Wall	627	33	-04	27					360	-250	280			Pass	Yes
A11	Wall	628	26	-16	26					358	264	279			Pass	Yes
B11	Wall	629	38	04	28					378	121	286			Pass	Yes
H2	Wall	630	23	-20	25					402	50	294			Pass	Yes
H1	Wall	631	21	-25	24					338	-407	272			Pass	Yes
A9	Wall	632	26	-16	26					362	-236	281			Pass	Yes
B9	Wall	633	36	01	28					366	-217	287			Pass	Yes


TYPE II SURVEY
ROOM 148
Grid Cells are 2 m x 2 m
C Wall
A Wall
Scan Pattern
B
D
12
11
10
9
8
7
6
5
4
3
2
1
A
B
C
D
E
F
G
H

RSO, Inc (SF-20) ITRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Room 148 Date - 11-Aug-98

Location - Radioisotope Laboratory TYPE II Survey Surveyor - Hinson D., Smith G., Sink D

(1) Floor Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 1857 cpm
Integrated Count MDA - 642 dpm/100 cm2
Scanning MDA 2260 dpm/100 cm2

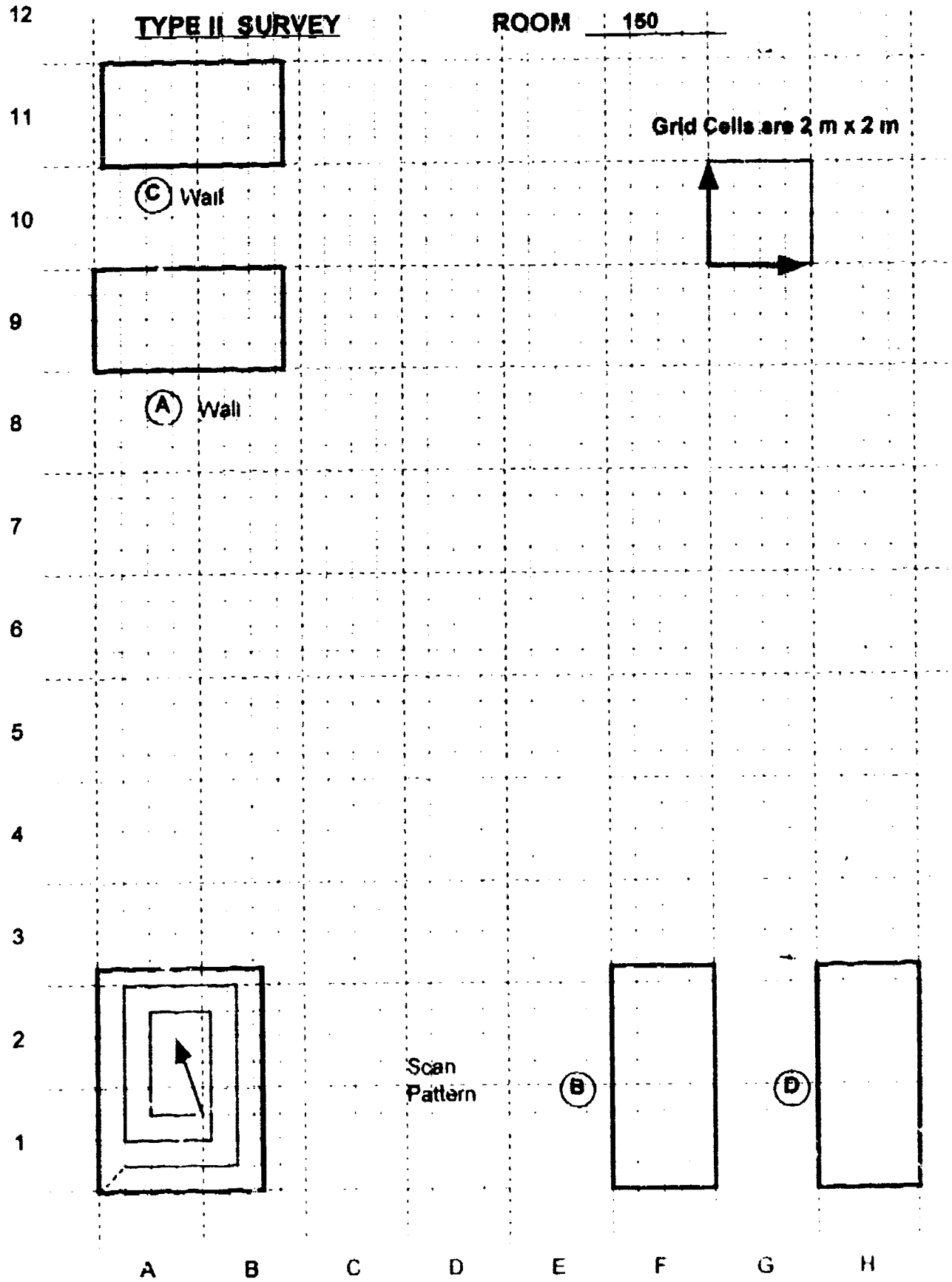
(2) L2200 w/ 100 cm2
(2) Gas Flow 100 cm2 395 cpm
Integrated Count MDA - 1500 dpm/100 cm2

(3) L19 mr/mR 10.0 (uR/h)

(4) L12 w/ 2x2 NaI 4 kcpm

(5) LSC - 36 cpm

Grid		* 95% Confidence Level (*) Wipe Results				Survey Data Results (1) Beta Scan /100 cm2				(2) Beta Direct Meas 100 cm2			(3) Gamma Contact	(4) Gamma Contact	Action Level	Released Yes/No
		Wipe	Gross	Beta	Uncert *	Lowest Meas		Highest Meas		Gross	Beta	Uncert *			> 2*Bgd >MDA	
Cell	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm		
						900	-369	1,550	1,160				12	5.0	Pass	Yes
A1	Floor	634	25	.18	25					480	607	319			Pass	Yes
A2	Floor	635	27	14	26					418	164	299			Pass	Yes
B1	Floor	636	37	02	28					456	436	312			Pass	Yes
B2	Floor	637	30	.09	26					430	250	303			Pass	Yes
C1	Floor	638	25	-17	25					438	307	306			Pass	Yes
C2	Floor	639	29	-11	26					458	450	312			Pass	Yes
F1	Floor	640	27	-15	26					388	-50	289			Pass	Yes
F2	Floor	641	27	-15	26					388	-50	289			Pass	Yes
A11	Wall	642	36	.02	28					404	64	295			Pass	Yes
B11	Wall	643	26	-16	26					430	250	303			Pass	Yes
C11	Wall	644	26	-16	26					398	71	293			Pass	Yes
H2	Wall	645	27	-14	26					370	-179	283			Pass	Yes
H1	Wall	646	39	.06	28					326	-493	268			Pass	Yes
C9	Wall	647	33	-04	27					404	64	295			Pass	Yes
B9	Wall	648	31	-07	27					422	193	301			Pass	Yes
A9	Wall	649	31	-08	27					376	-64	289			Pass	Yes


TYPE II SURVEY
ROOM 150
Grid Cells are 2 m x 2 m
C Wall
A Wall
Scan Pattern
B
D
12
11
10
9
8
7
6
5
4
3
2
1
A
B
C
D
E
F
G
H

RSO, Inst (09-90) ITTRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Room 150 Date - 11-Aug-98

Location Radioisotope Laboratory TYPE II Survey Surveyor Bunon D., Smith G., Sink D

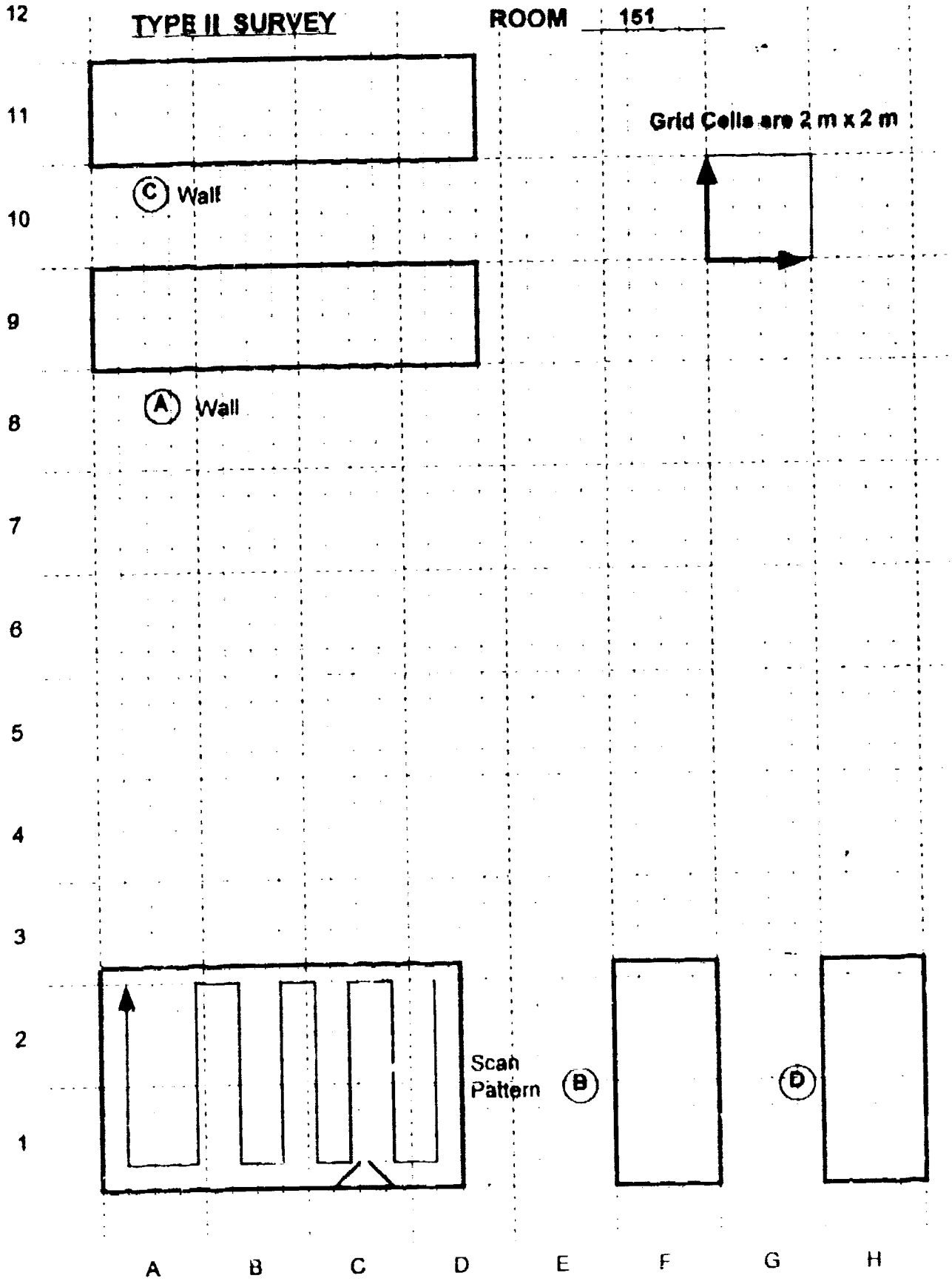
(1) Floor Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 1007 cpm
Integrated Count MDA 647 dpm/100 cm2
Removing MDA 2200 dpm/100 cm2

(2) LZ200 w/ 100 cm2
(2) Gas Flow 100 cm2 395 cpm
Integrated Count MDA 1500 dpm/100 cm2

(3) L19 meter
18.0
(uR/h)
(5) LSC - 36 cpm

(4) L12 w/ 2x2 NaI
4
kcpm

Grid		* 95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Scan /100 cm2 Lowest Meas		Highest Meas		(2) Beta Direct Meas 100 cm2			(3) Gamma Contact	(4) Gamma Contact	Action Level	Referred Yes/No
		Wipe#	Gross	Beta	Unsort *	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	cpm	uR/h	kcpm	>2*Bgd >MDA	
Cell	Datagram	No	cpm	dpm	dpm											
						900	-369	1,600	1,278				17	4.0	Pass	Yes
A1	Floor	650	31	-07	27					510	821	328			Pass	Yes
A2	Floor	651	31	-08	27					518	870	331			Pass	Yes
B1	Floor	652	27	-14	26					472	550	317			Pass	Yes
B2	Floor	653	27	-14	26					450	393	310			Pass	Yes
F1	Wall	654	24	19	25					478	593	318			Pass	Yes
F2	Wall	655	29	-10	26					390	-36	290			Pass	Yes
A11	Wall	656	30	-09	26					416	150	299			Pass	Yes
B11	Wall	657	27	-14	26					402	50	293			Pass	Yes
H2	Wall	658	25	-18	25					414	136	298			Pass	Yes
H1	Wall	659	27	-15	26					404	64	295			Pass	Yes
H9	Wall	660	27	-14	26					394	-7	291			Pass	Yes
A9	Wall	661	33	-04	27					396	7	292			Pass	Yes


TYPE II SURVEY
ROOM 151
Grid Cells are 2 m x 2 m
C Wall
A Wall
Scan Pattern
B
D
12
11
10
9
8
7
6
5
4
3
2
1
A
B
C
D
E
F
G
H

S.S.(c), Inc (SP-20) HT21

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Room 151 Date - 11-Aug-92

Location Radioisotope Laboratory TYPE II Survey Surveyor - Hanson D., Smith G., Sink D.

(1) Plant Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 1057 cpm
Integrated Count MDA - 643 dpm/100 cm2
Scanning MDA 2300 dpm/100 cm2

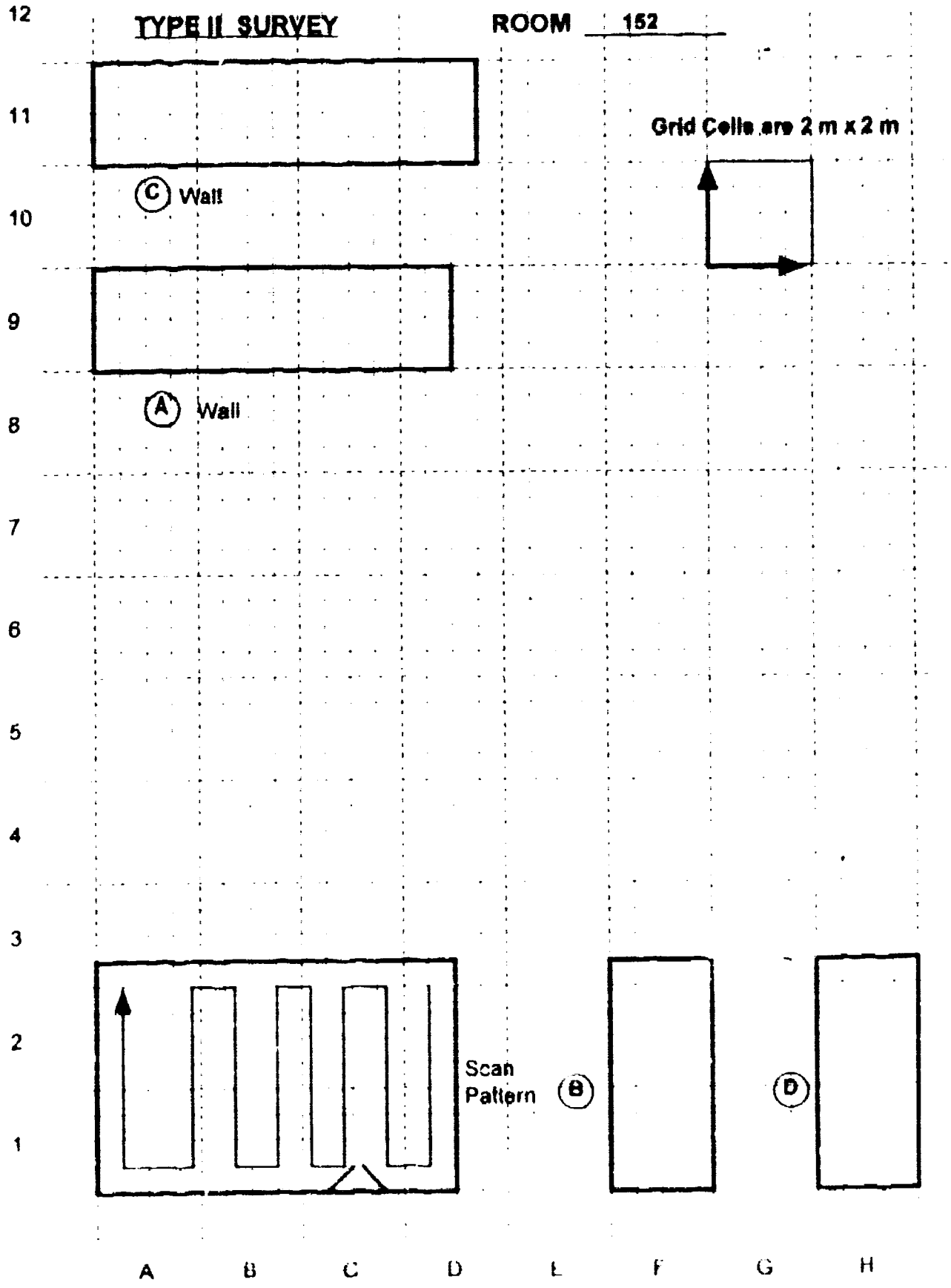
(2) L2200 w/ 100 cm2
(2) Gas Flow 100 cm2 395 cpm
Integrated Count MDA - 1500 dpm/100 cm2

(3) L19 micro-R
10.0
(uR/h)

(4) L17 w/ 2x2 NaI
4
kcpm

(5) L8C - 36 cpm

Grid		~ 95% Confidence Level (5) Wipe Range				Survey Data Results (1) Beta Scan (100 cm2) Lowest Meas.		Highest Meas.		(2) Beta Direct Meas. 100 cm2			(3) Gamma Contact	(4) Gamma Contact	Action Level	Released Yes/No
		Wipe	Gross	Beta	Unsort *	Gross		Gross		Gross	Beta	Unsort *			> 2*Bgd +MDA	
Cell	Description	#o	cpm	dpm	dpm	cpm	dpm	cpm	dpm	cpm	dpm	dpm	uR/h	kcpm		
						975	-193	1,550	1,160				15	5.0	Pass	Yes
A1	Floor	662	23	-21	25					460	464	913			Pass	Yes
A2	Floor	663	25	-17	25					452	407	310			Pass	Yes
A3	Floor	664	33	04	27					434	279	305			Pass	Yes
B1	Floor	665	29	-10	26					456	436	312			Pass	Yes
B2	Floor	666	33	-04	27					466	507	313			Pass	Yes
B3	Floor	667	35	01	27					504	779	320			Pass	Yes
C1	Floor	668	25	-18	25					456	436	312			Pass	Yes
C2	Floor	669	26	-16	26					446	364	308			Pass	Yes
C3	Floor	670	35	-01	27					458	456	312			Pass	Yes
D1	Floor	671	27	15	26					422	191	301			Pass	Yes
D2	Floor	672	31	-07	27					420	179	300			Pass	Yes
D3	Floor	673	29	-10	26					508	807	320			Pass	Yes
F1	Wall	674	27	15	26					416	150	299			Pass	Yes
F2	Wall	675	30	-09	26					376	136	285			Pass	Yes
F3	Wall	676	29	11	26					386	64	289			Pass	Yes
A11	Wall	677	26	-16	26					408	91	290			Pass	Yes
B11	Wall	678	29	11	26					388	50	289			Pass	Yes
C11	Wall	679	23	20	25					428	236	301			Pass	Yes
D11	Wall	680	17	03	28					444	150	308			Pass	Yes
H3	Wall	681	32	-06	27					472	550	317			Pass	Yes
H2	Wall	682	27	15	26					400	16	291			Pass	Yes
H1	Wall	683	17	02	28					450	450	312			Pass	Yes
I19	Wall	684	31	07	27					370	179	283			Pass	Yes
C9	Wall	685	33	04	27					340	193	275			Pass	Yes
B9	Wall	686	17	02	28					318	407	272			Pass	Yes
A9	Wall	687	33	04	27					380	107	287			Pass	Yes


TYPE II SURVEY
ROOM 152
Grid Cells are 2 m x 2 m
C Wall
A Wall
Scan Pattern
B
D
12
11
10
9
8
7
6
5
4
3
2
1
A
B
C
D
E
F
G
H

(8.54) Inc (SF 26) (ITRI)

Radiological Survey Results

Site: ITRI Va Technology Center Survey Results of: Room 152 Date: 11-Aug-98

Location: Radioisotope Laboratory TYPE II Survey Surveyor: Dixson D, Smith G, Sink D

(1) Pistol Monitor or 425 cm2
(1) Gas Flow 425 cm2: 1857 cpm
Integrated Count MDA: 641 dpm/100 cm2
Scanning MDA: 2300 dpm/100 cm2

(2) L2200 w/ 100 cm2
(2) Gas Flow 100 cm2: 391 cpm
Integrated Count MDA: 1500 dpm/100 cm2

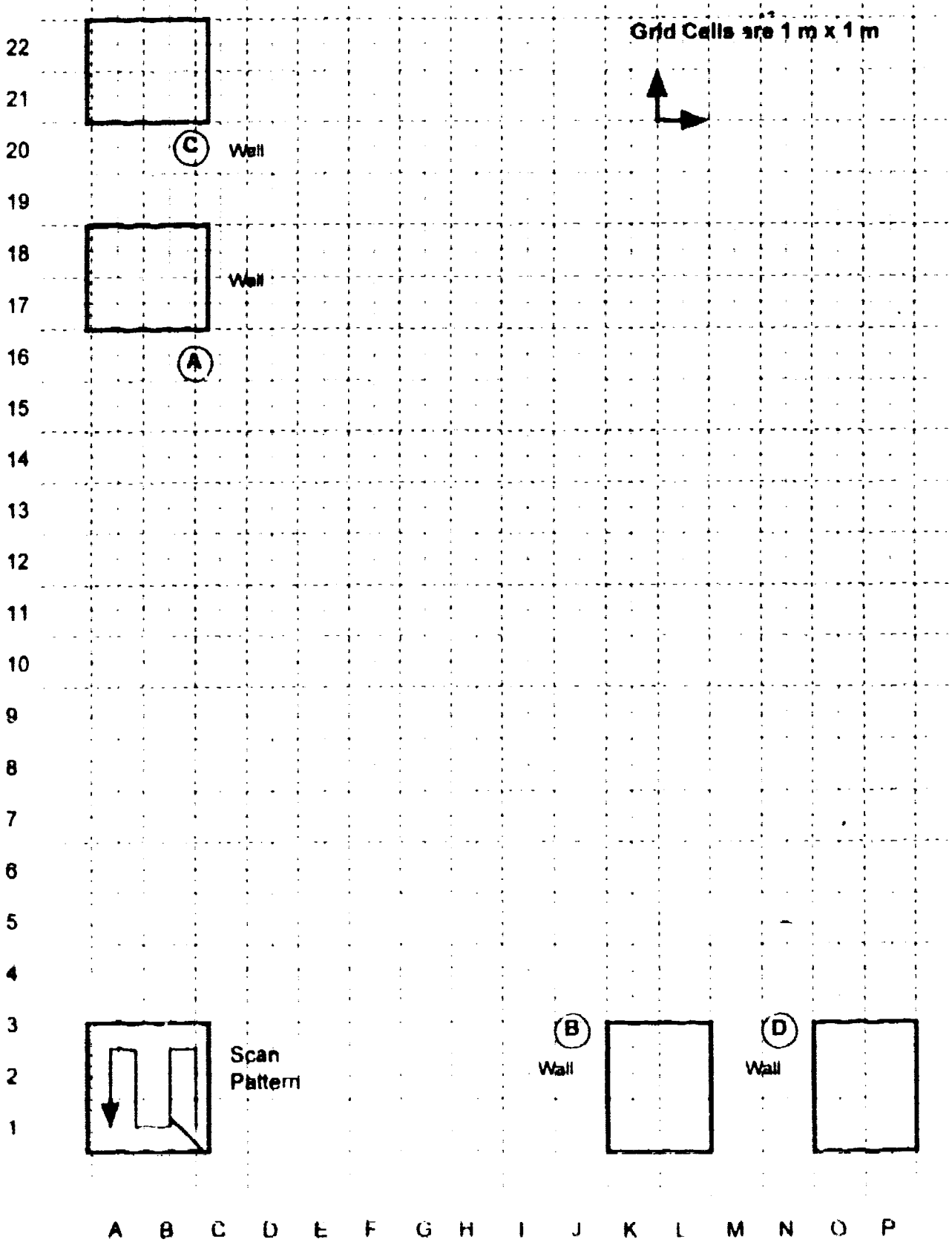
(3) L19 mrem/h
10.0 (uR/h)

(4) L17 w/ 2x2 NaI
4 kcpm

(5) L60: 36 cpm

Grid		* 95% Confidence Level				Survey Data Results										
		(3) Wipe Results				(1) Beta Scan 100 cm2				(2) Beta Direct Meas 100 cm2			(3) Gamma	(4) Gamma	Action	Exceeded
		Wipe	Gross	Beta	Direct *	Lowest Meas		Highest Meas		Gross	Beta	Direct *	Gross	Gross	Level	Yes/No
Cell	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	* 2*Std +MDA	
						980	-366	1,500	1,042				12	30	Pass	Yes
A1	Floor	688	32	-06	27					458	450	312			Pass	Yes
A2	Floor	689	25	-17	25					440	121	307			Pass	Yes
A3	Floor	690	25	-18	25					396	7	292			Pass	Yes
B1	Floor	691	21	-25	24					412	264	304			Pass	Yes
B2	Floor	692	23	21	25					458	450	312			Pass	Yes
B3	Floor	693	29	-10	26					422	173	301			Pass	Yes
C1	Floor	694	24	19	25					472	693	323			Pass	Yes
C2	Floor	695	27	-15	26					480	16	294			Pass	Yes
C3	Floor	696	27	-15	26					456	436	312			Pass	Yes
D1	Floor	697	26	16	26					496	721	324			Pass	Yes
D2	Floor	698	31	05	27					430	250	303			Pass	Yes
D3	Floor	699	26	26	24					478	503	318			Pass	Yes
E1	Wall	700	29	10	26					446	350	275			Pass	Yes
E2	Wall	701	25	17	25					356	279	278			Pass	Yes
E3	Wall	702	27	14	26					366	267	282			Pass	Yes
F11	Wall	703	31	07	27					410	107	297			Pass	Yes
G11	Wall	704	29	10	25					362	250	281			Pass	Yes
H11	Wall	705	29	10	26					376	136	285			Pass	Yes
I11	Wall	706	31	04	27					384	7	286			Pass	Yes
H3	Wall	707	29	11	27					412	173	29			Pass	Yes
H2	Wall	708	27	14	29					372	21	291			Pass	Yes
H1	Wall	709	24	17	25					358	7	271			Pass	Yes
I29	Wall	710	36	06	26					362	250	281			Pass	Yes
I39	Wall	711	38	04	27					392	21	293			Pass	Yes
I99	Wall	712	32	08	27					372	164	284			Pass	Yes
X	Wall	713	32	8	27					372	7	286			Pass	Yes

TYPE I SURVEY ROOM 170



RMO, Inc (RP-20) ITTRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Room 170 Date - 11-Aug-98

Location Radioisotope Laboratory TYPE I Survey Surveyor - Hisson D., Smith G., Sink D.

(1) Flow Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 1857 cpm
Integrated Count MDA - 642 dpm/100 cm2
Scanning MDA - 2200 dpm/100 cm2

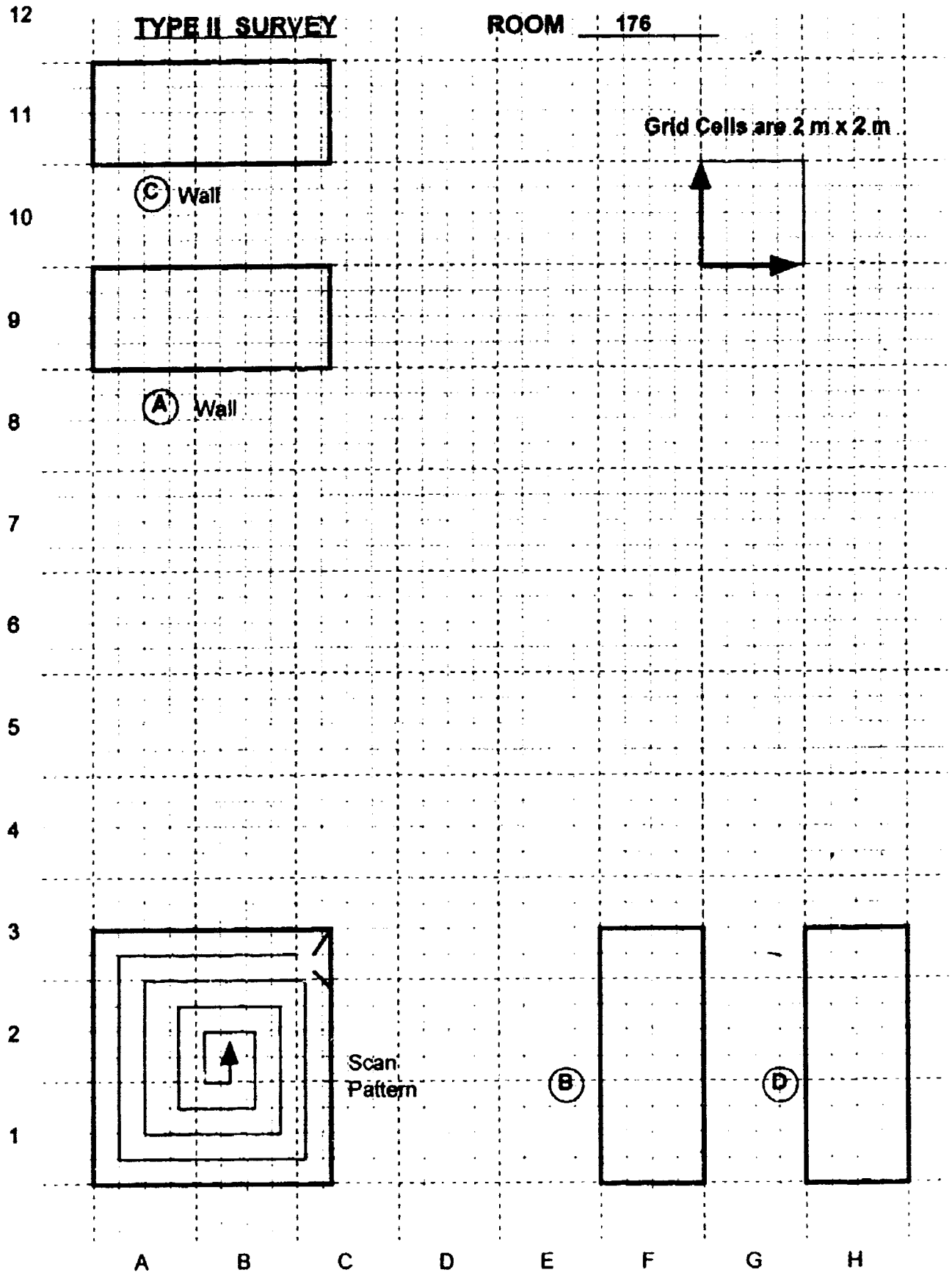
(2) L2700 w/ 100 cm2
(2) Gas Flow 100 cm2 - 395 cpm
Integrated Count MDA - 1500 dpm/100 cm2

(3) L19 microR
10.0
(uR/h)

(4) L12 w/ 2x2 NaI
4
kcpm

(5) LSC - 36 cpm

Grid		* 95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Scan /100 cm2				(2) Beta Direct Meas 100 cm2			(3) Gamma Contact	(4) Gamma Contact	Action Level	Remained Yes/No
		Wipe	Gross	Beta	Uncert *	Lowest Meas		Highest Meas		Gross	Beta	Uncert *				
Cell	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	> 2*Bgd >MDA	
						933	-292	1,352	694				9	4.0	Pass	Yes
A1	Floor	729	26	-16	26					430	250	303			Pass	Yes
A2	Floor	730	35	-01	27					374	-150	285			Pass	Yes
A3	Floor	731	27	-15	26					396	7	292			Pass	Yes
B1	Floor	732	27	-15	26					398	21	293			Pass	Yes
B2	Floor	733	33	-05	27					468	521	315			Pass	Yes
B3	Floor	734	31	-07	27					466	507	315			Pass	Yes
KL12	Wall	735	27	-14	26					320	-536	265			Pass	Yes
AB2122	Wall	736	29	-10	26					370	-179	283			Pass	Yes
OP12	Wall	737	27	-15	26					330	-464	269			Pass	Yes
AB1718	Wall	738	32	-06	27					324	-507	267			Pass	Yes


TYPE II SURVEY
ROOM 176
Grid Cells are 2 m x 2 m
C Wall
A Wall
Scan Pattern
B
D
12
11
10
9
8
7
6
5
4
3
2
1
A
B
C
D
E
F
G
H

RBO, Inc. (EF-20) ITTRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Room 176 Date - 11-Aug-98 / 24-Aug-98

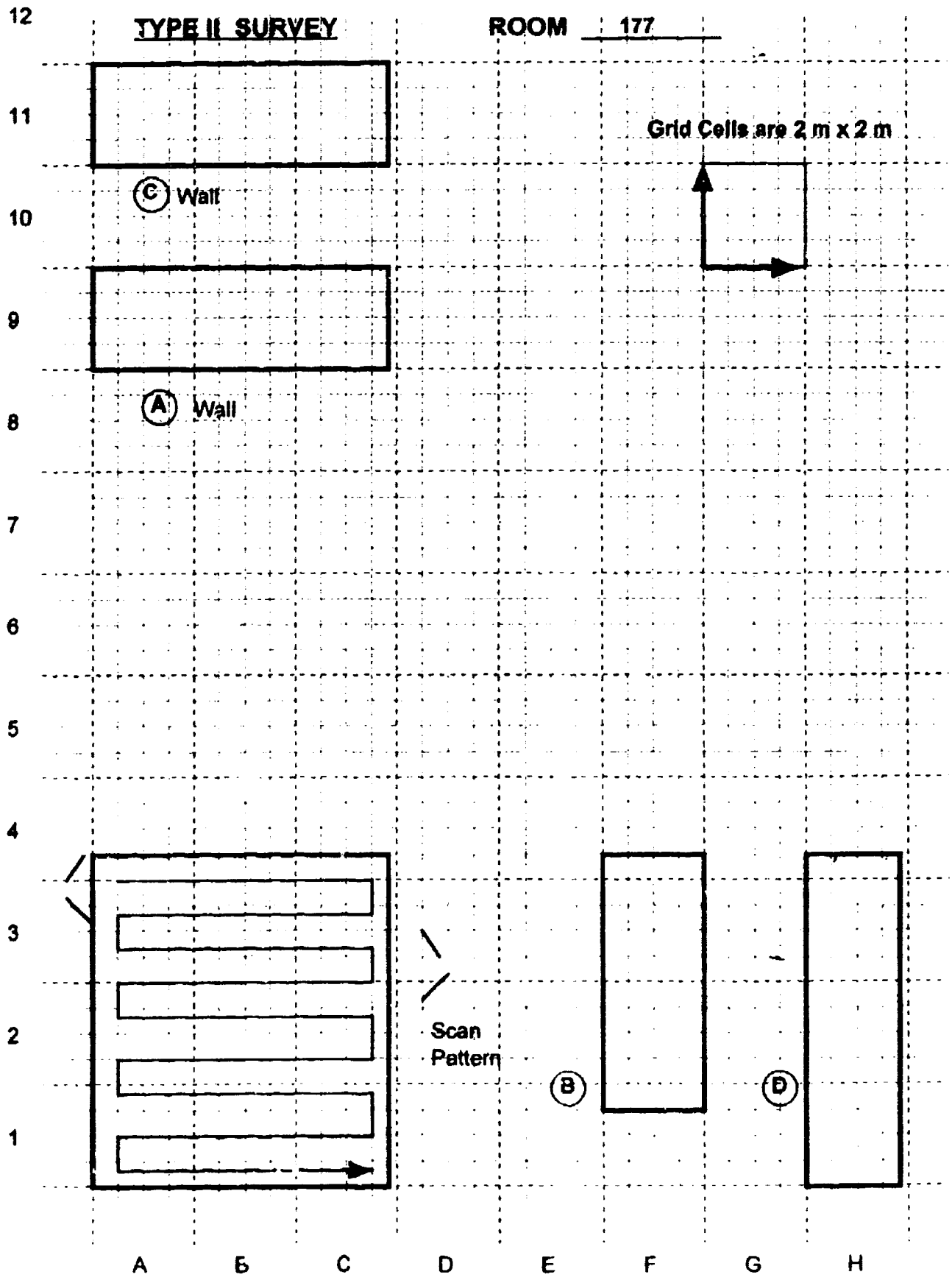
Location Radioisotope Laboratory TYPE II Survey Surveyor - Bisson D., Smith G.

(1) Floor Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 1132 cpm
Integrated Count MDA - 660 dpm/100 cm2
Scanning MDA - 2200 dpm/100 cm2

(2) L2200 w/ 100 cm2
(2) Gas Flow 100 cm2 - 618 cpm
Integrated Count MDA - 1821 dpm/100 cm2

(3) L19 microR 13.0 (uR/h)
(4) L12 w/ 2x2 NaI 5 kcpm
(5) LSC - 42 cpm

Grid		* 95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Scan 100 cm2				(2) Beta Direct Meas. 100 cm2			(3) Gamma	(4) Gamma	Action	Released
		Wipe	Gross	Beta	Unsort.*	Lowest Meas.		Highest Meas.		Gross	Beta	Unsort.*	Contact	Contact	Level	Yes/No
Cell	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	> 2*Bgd. >MDA	
						1,300	419	1,800	1,595				13	42	Pass	Yes
A1	Floor	872	31	-17	28					658	343	375			Pass	Yes
A2	Floor	873	31	-18	28					722	800	392			Pass	Yes
A3	Floor	874	29	-21	28					650	357	376			Pass	Yes
B1	Floor	875	32	-16	28					692	586	384			Pass	Yes
B2	Floor	876	37	-08	29					624	100	366			Pass	Yes
B3	Floor	877	35	-12	29					598	-86	359			Pass	Yes
A9	Wall	878	28	-23	27					428	-1,300	310			Pass	Yes
B9	Wall	879	26	-26	27					428	-1,300	310			Pass	Yes
F1	Wall	88[illegible]	42	01	30					320	-2,071	273			Pass	Yes
F2	Wall	881	33	-14	28					356	-1,814	286			Pass	Yes
F3	Wall	882	38	-06	29					332	-1,986	278			Pass	Yes
A11	Wall	883	29	-22	27					351	-1,800	287			Pass	Yes
B11	Wall	884	26	-26	27					360	-1,786	287			Pass	Yes
H1	Wall	885	29	-22	27					394	-1,543	299			Pass	Yes
H2	Wall	886	30	-19	28					444	-1,186	315			Pass	Yes
H3	Wall	887	31	-17	28					376	-1,671	293			Pass	Yes


TYPE II SURVEY
ROOM 177
Grid Cells are 2 m x 2 m
C Wall
A Wall
Scan Pattern
B
D
12
11
10
9
8
7
6
5
4
3
2
1
A
B
C
D
E
F
G
H

RSO, Inc. (RF-20) ITRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Room 177 Date - 11-Aug-98, 24-Aug-98

Location Radioisotope Laboratory TYPE II Survey Surveyor - Bimon D., Smith G.

(1) Floor Monitor w/ 425 cm2
Proportional Detector 1122 cpm
Integrated Count MDA - 660 dpm/100 cm2
Scanning MDA - 2200 dpm/100 cm2

(2) L2200 w/ 100 cm2
(2) Gas Flow 100 cm2 - 610 cpm
Integrated Count MDA - 1821 dpm/100 cm2

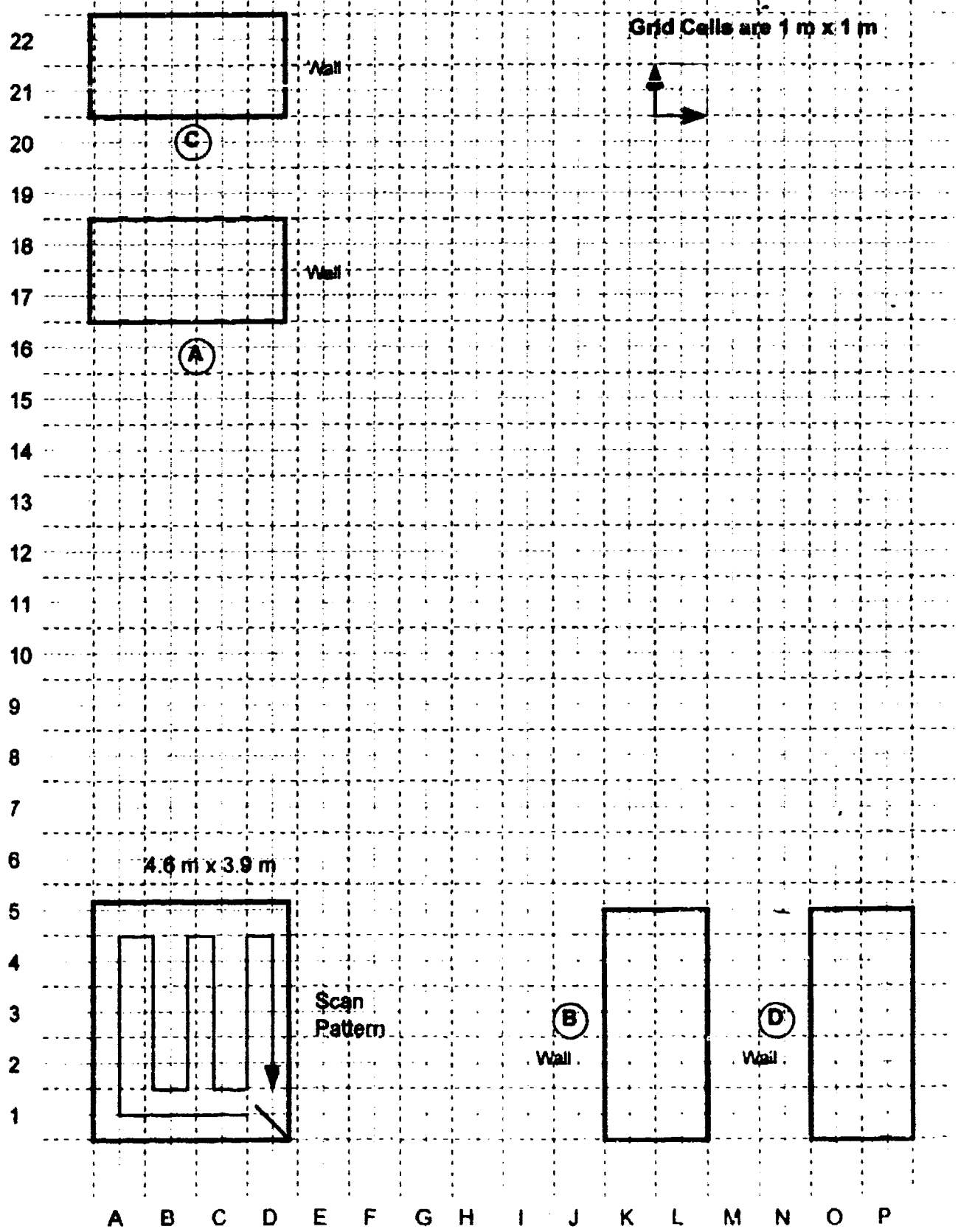
(3) L19 ratemeter
13.0
(uR/h)

(4) L12 w/ 2x2 NaI
5
kcpm

(5) LSC - 42 cpm

Grid		* 95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Scan /100 cm2				(2) Beta Direct Meas 100 cm2			(3) Gamma Contact	(4) Gamma Contact	Action Level	Released Yes/No
		Wipe	Gross	Beta	Unsurt *	Lowest Meas.		Highest Meas.		Gross	Beta	Unsurt. *				
Cell	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	> 2*Bgd >MDA	
						1,300	419	1,800	1,595				12	4.4	Pass	Yes
A1	Floor	888	26	-26	27					638	200	370			Pass	Yes
A2	Floor	889	30	-19	28					630	143	368			Pass	Yes
A3	Floor	890	31	-18	28					614	29	364			Pass	Yes
A4	Floor	891	32	-16	28					606	-29	362			Pass	Yes
B1	Floor	892	25	-28	27					616	43	364			Pass	Yes
B2	Floor	893	37	-08	29					634	171	369			Pass	Yes
B3	Floor	894	35	-12	29					576	-243	353			Pass	Yes
B4	Floor	895	29	-22	27					544	-471	344			Pass	Yes
C1	Floor	896	35	-11	29					622	86	366			Pass	Yes
C2	Floor	897	28	-23	27					672	443	379			Pass	Yes
C3	Floor	898	30	-19	28					622	86	366			Pass	Yes
C4	Floor	899	24	-29	26					54	-457	345			Pass	Yes
A9	Wall	900	38	-06	29					404	-1,471	302			Pass	Yes
B9	Wall	901	27	-24	27					448	-1,157	316			Pass	Yes
C9	Wall	902	31	-17	28					484	-900	327			Pass	Yes
F2	Wall	903	31	-18	28					386	-1,600	296			Pass	Yes
F3	Wall	904	37	-08	29					326	-2,029	275			Pass	Yes
F4	Wall	905	28	-23	27					320	-2,071	273			Pass	Yes
A11	Wall	906	24	-29	26					314	-2,114	271			Pass	Yes
B11	Wall	907	32	-16	28					302	-2,200	267			Pass	Yes
C11	Wall	908	23	-32	26					344	-1,900	282			Pass	Yes
H1	Wall	909	31	-18	28					306	-2,171	268			Pass	Yes
H2	Wall	910	23	-31	26					374	-1,686	292			Pass	Yes
H3	Wall	911	34	-13	28					336	-1,957	279			Pass	Yes
H4	Wall	912	23	-32	26					300	-2,214	266			Pass	Yes

TYPE I SURVEY **ROOM** 201



RSO, Inc. (SF-20) ITTRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Room 201 Date - 15 Jul-98

Location Radioisotope Laboratory TYPE I Survey Surveyor - Bisson D., Dean J.

(1) Floor Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 1093 cpm
Integrated Count MDA - 652 dpm/100 cm2
Scanning MDA - 2200 dpm/100 cm2

(2) L2200 w/ 100 cm2
(2) Gas Flow 100 cm2 - 395 cpm
Integrated Count MDA - 1500 dpm/100 cm2

(3) L19 microR 18.0 (uR/h)
(4) L12 w/ 2x2 NaI 4 kcpm
(5) LSC - 36 cpm

Grid		* 95% Confidence Level				Survey Data Results										
		(5) Wipe Results				(1) Beta Scan /100 cm2				(2) Beta Direct Meas 100 cm2			(3) Gamma	(4) Gamma	Action	Released
		Wipe	Gross	Beta	Uncert *	Lowest Meas		Highest Meas		Gross	Beta	Uncert *	Contact	Contact	Level	Yes/No
Cell	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	> 2*Bgd. >MDA	
						800	-689	1,500	958				10	36	Pass	Yes
D1	Floor	276	30	-09	26					368	-193	283			Pass	Yes
C1	Floor	277	30	-09	26					440	321	307			Pass	Yes
B1	Floor	278	29	-11	26					386	-64	289			Pass	Yes
A1	Floor	279	22	-23	25					528	950	334			Pass	Yes
A2	Floor	280	27	-15	26					426	221	302			Pass	Yes
B2	Floor	281	29	-11	26					468	521	315			Pass	Yes
C2	Floor	282	25	-17	25					286	-64	289			Pass	Yes
D2	Floor	283	31	-07	27					322	-521	266			Pass	Yes
D3	Floor	284	31	-08	27					368	-193	283			Pass	Yes
C3	Floor	285	31	-08	27					502	764	326			Pass	Yes
B3	Floor	286	31	-07	27					566	1,221	344			Pass	Yes
A3	Floor	287	33	-04	27					448	379	309			Pass	Yes
A4	Floor	288	35	00	27					440	321	307			Pass	Yes
B4	Floor	289	27	-15	26	903	-454	5,900	11,311	610	1,536	357			Fail	No
C4	Floor	290	35	00	27					416	150	299			Pass	Yes
D4	Floor	291	32	-06	27					352	-307	277			Pass	Yes
D5	Floor	292	30	-09	26					412	121	297			Pass	Yes
C5	Floor	293	49	22	30					402	50	294			Pass	Yes
B5	Floor	294	27	-14	26	900	-454	5,900	11,311	5,496	36,436	1,042			Fail	No
A5	Floor	295	25	-17	25					388	-50	289			Pass	Yes
AB1718	Wall	296	25	-18	25					310	-607	262			Pass	Yes
CD1718	Wall	297	32	-06	27					298	-693	257			Pass	Yes
KL65	Wall	298	25	-17	25					312	-593	262			Pass	Yes
KL34	Wall	299	29	-10	26					330	-464	269			Pass	Yes
KL12	Wall	300	29	-11	26					282	-807	251			Pass	Yes
AB2122	Wall	301	41	09	29					312	-593	262			Pass	Yes
CD2122	Wall	302	35	00	27					256	-993	241			Pass	Yes
OP56	Wall	303	35	00	27					254	1,007	240			Pass	Yes
OP34	Wall	304	25	-17	25					292	-736	255			Pass	Yes
OP12	Wall	305	36	01	28					282	807	251			Pass	Yes

RBO, Inc (EF-20) HT91

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Room 201 Post Decontamination Date - 4-Aug-98

Location Radioisotope Laboratory TYPE I Survey Surveyor - Bisson D, Smith O.

(1) Floor Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 1457 cpm
Integrated Count MDA - 745 dpm/100 cm2
Scanning MDA - 7200 dpm/100 cm2

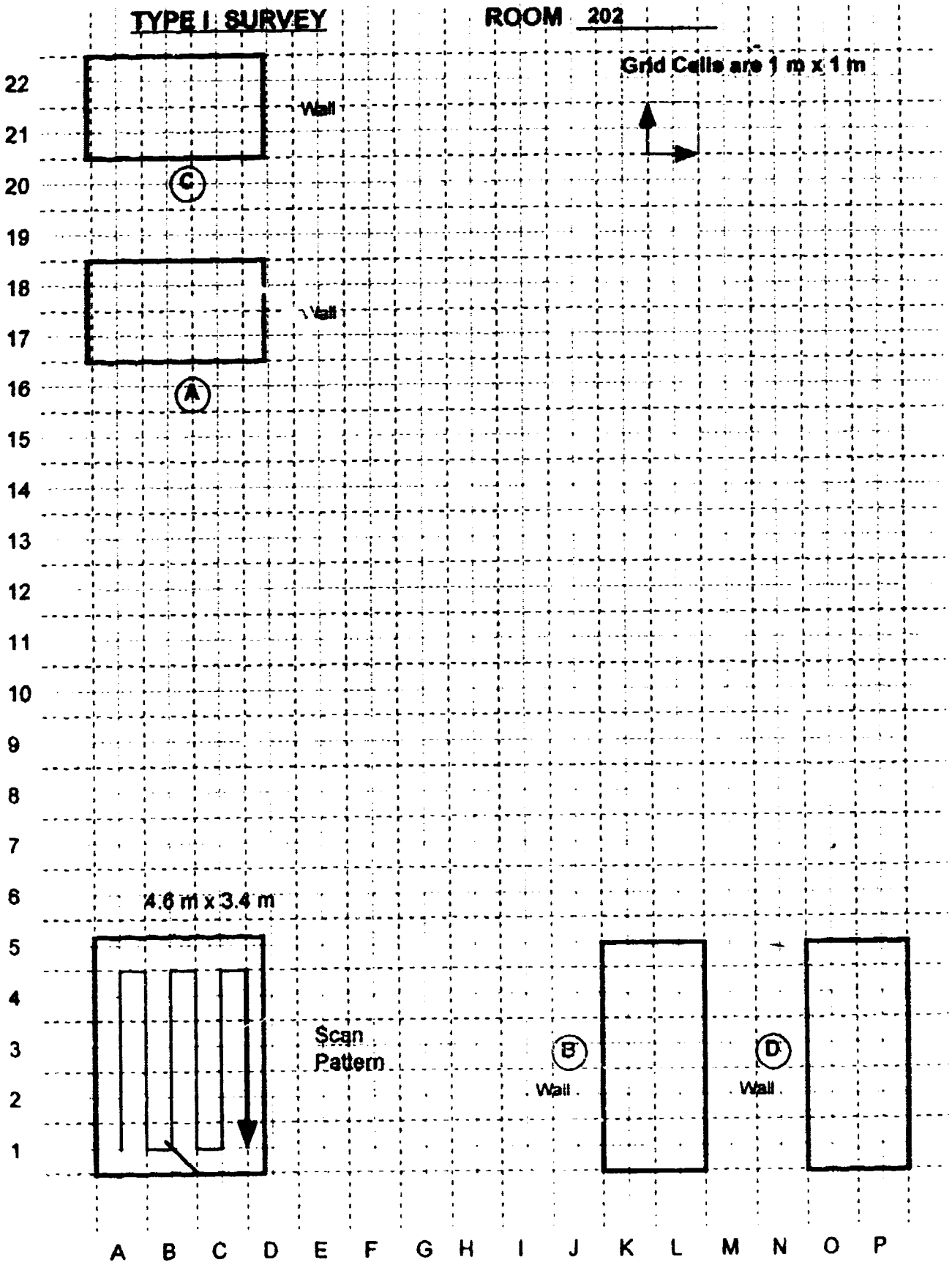
(2) L2200 w/ 100 cm2
(2) Gas Flow 100 cm2 574 cpm
Integrated Count MDA - 1773 dpm/100 cm2

(3) L19 microR
9.0
(uR/h)

(4) L12 w/ 2x2 NaI
3
bkgm

(5) LSC - 39 cpm

Grid		* 95% Confidence Level				Survey Data Results										
		(5) Wipe Results				(1) Beta Scan /100 cm2				(2) Beta Direct Meas 100 cm2			(3) Gamma	(4) Gamma	Action	Released
		Wipe	Gross	Beta	Uncert *	Lowest Meas		Highest Meas		Gross	Beta	Uncert *	Contact	Contact	Level	Yes/No
Cell	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	bkgm	> 2*Bgd >MDA	
						700	-1,781	1,100	-840				8	3.6	Pass	Yes
B5	Loc 57	589	27	-19	27					534	-286	340			Pass	Yes
B5	Loc 58	590	27	-21	26					526	-343	338			Pass	Yes
B5	Loc 59	591	27	-19	27					502	-514	331			Pass	Yes
B4	Loc 60	592	30	-15	27					558	-114	347			Pass	Yes
B4	Loc 61	593	33	-09	28					618	314	364			Pass	Yes
B4	Loc 62	594	33	-09	28					742	1,200	396			Pass	Yes
B4	Loc 63	595	30	-15	27					648	529	372			Pass	Yes


TYPE I SURVEY
ROOM 202
Grid Cells are 1 m x 1 m
Wall
C
Wall
A
4.6 m x 3.4 m
Scan
Pattern
B
Wall
D
Wall
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
A B C D E F G H I J K L M N O P

RSO, Inc (RF-20) ITTRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Room 202 Date - 15-Jul-98

Location Radioisotope Laboratory TYPE I Survey Surveyor - Bisson D.,Dean J.

(1) Floor Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 1093 cpm
Integrated Count MDA - 652 dpm/100 cm2
Scanning MDA - 2200 dpm/100 cm2

(2) L2200 w/ 100 cm2
(2) Gas Flow 100 cm2 - 395 cpm
Integrated Count MDA - 1500 dpm/100 cm2

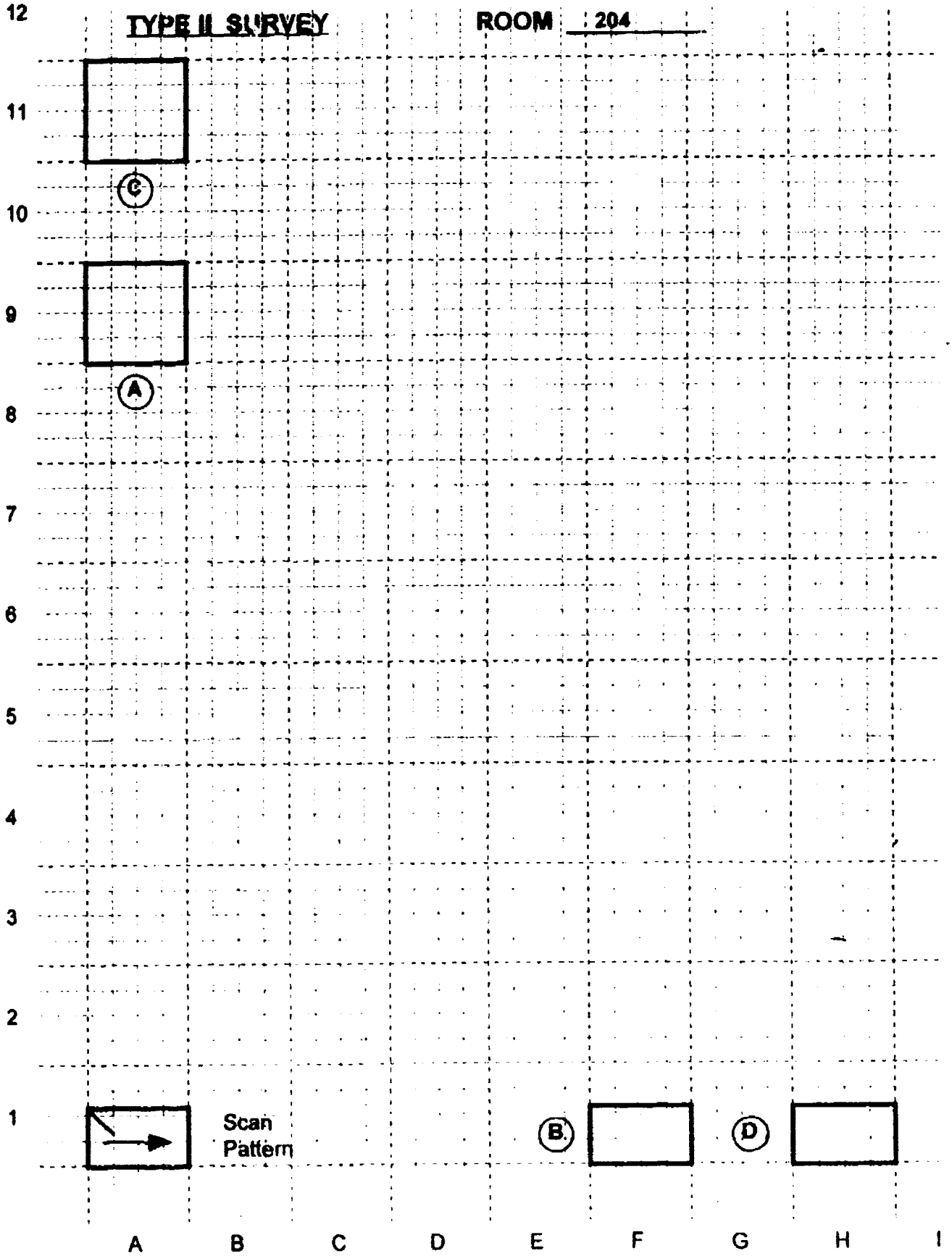
(3) L19 microR 10.0 (uR/h)

(4) 1.12 w/ 2x2 NaI 4 kcpm

(5) LSC - 36 cpm

Grid		* 95% Confidence Level				Survey Data Results										
		(5) Wipe Results				(1) Beta Scan /100 cm2				(2) Beta Direct Meas /100 cm2			(3) Gamma	(4) Gamma	Action	Released
		Wipe	Gross	Beta	Uncert *	Lowest Meas		Highest Meas		Gross	Beta	Uncert *	Contact	Contact	Level	Yes/No
Cell	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	> 2*Bgr >MDA	
						700	-925	1,600	1,193				10	3.6	Pass	Yes
A1	Floor	201	19	-27	24					372	-164	284			Pass	Yes
A2	Floor	202	29	-10	26					388	-50	289			Pass	Yes
A3	Floor	203	30	-09	26					388	-50	289			Pass	Yes
A4	Floor	204	28	-12	26					401	43	294			Pass	Yes
A5	Floor	205	31	-07	27					566	1,221	344			Pass	Yes
B5	Floor	206	40	08	28					496	721	324			Pass	Yes
B4	Floor	207	39	05	28					404	64	295			Pass	Yes
B3	Floor	208	30	-09	26					346	-350	275			Pass	Yes
B2	Floor	209	36	01	28					368	-193	283			Pass	Yes
B1	Floor	210	23	-21	25					353	-36	280			Pass	Yes
C1	Floor	211	25	-18	25					366	-207	287			Pass	Yes
C2	Floor	212	33	-05	27					382	-93	287			Pass	Yes
C3	Floor	213	27	-14	26					372	-164	284			Pass	Yes
C4	Floor	214	27	-15	26					330	-464	269			Pass	Yes
C5	Floor	215	33	-04	27					306	-636	260			Pass	Yes
D5	Floor	216	20	-26	24					334	-436	271			Pass	Yes
D4	Floor	217	27	-14	26					304	-650	259			Pass	Yes
D3	Floor	218	27	-14	26					440	321	307			Pass	Yes
D2	Floor	219	31	-07	27					588	1,379	351			Pass	Yes
D1	Floor	220	23	-20	25					538	1,021	336			Pass	Yes
AB1718	Wall	221	33	-05	27					302	-664	259			Pass	Yes
CD1718	Wall	222	26	-16	26					278	-836	249			Pass	Yes
KL56	Wall	223	29	-10	26					268	-907	245			Pass	Yes
KL34	Wall	224	33	-05	27					266	-921	245			Pass	Yes
KL12	Wall	225	33	-05	27					256	-993	241			Pass	Yes
AB2122	Wall	226	31	-07	27					252	-1,021	239			Pass	Yes
CD2122	Wall	227	23	-21	25					282	-807	251			Pass	Yes
OP56	Wall	228	18	-29	24					292	-736	255			Pass	Yes
OP34	Wall	229	30	-09	26					320	-536	265			Pass	Yes
OP12	Wall	230	23	-21	25					250	1,036	238			Pass	Yes

TYPE II SURVEY ROOM 204



RSO, Inc (SF-20) ITTRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Room 204 Date - 15-Mil-98

Location Radioisotope Laboratory TYPE II Survey Surveyor - Bisson D, Dean J.

(1) Floor Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 1093 cpm
Integrated Count MDA - 652 dpm/100 cm2
Scanning MDA - 2200 dpm/100 cm2

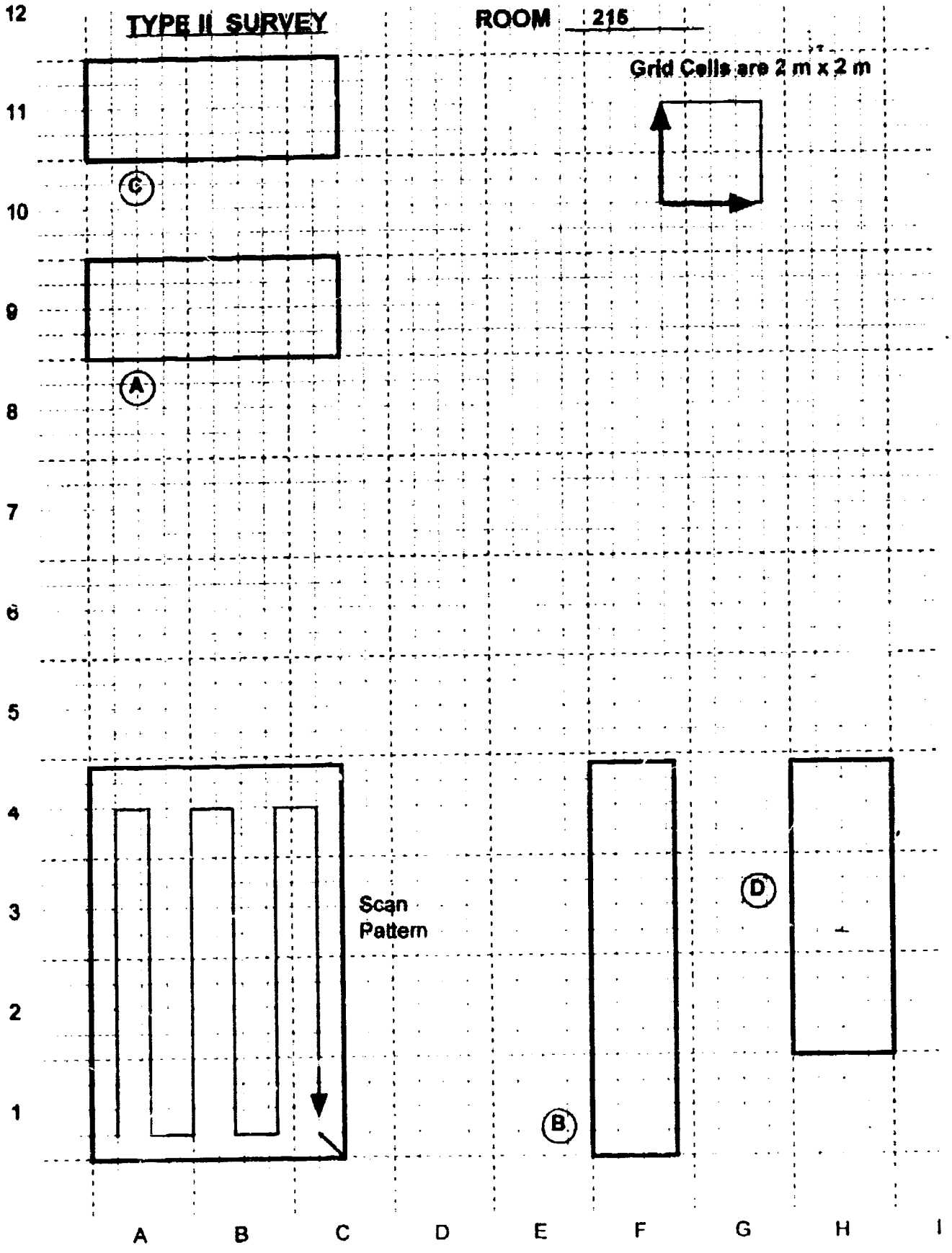
(2) L2200 w/ 100 cm2
(2) Gas Flow 100 cm2 - 395 cpm
Integrated Count MDA - 1500 dpm/100 cm2

(3) L19 microR
18.8
(uR/h)

(4) L12 w/ 2x2 NaI
4
kcpm

(5) LSC - 36 cpm

Grid		* 95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Smear /100 cm2				(1) Beta Direct Meas /100 cm2			(3) Gamma	(4) Gamma	Action	Released
		Wipe	Gross	Beta	Uncert.*	Lowest Meas		Highest Meas		Gross	Beta	Uncert.*	Contact	Contact	Level	Yes/No
Cell	Designation	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	> 2*Bgd. >MDA	
						885	-489	1,062	-73				10	3.6	Pass	Yes
A1	Floor	271	25	-18	25					947	-344	159			Pass	Yes
A9	Wall	272	27	-14	26										Pass	Yes
A11	Wall	273	27	-15	26										Pass	Yes
F1	Wall	274	28	-13	26										Pass	Yes
H1	Wall	275	27	-15	26										Pass	Yes


TYPE II SURVEY
ROOM 215
Grid Cells are 2 m x 2 m
Scan Pattern
A
B
C
D
12
11
10
9
8
7
6
5
4
3
2
1
A
B
C
D
E
F
G
H
I

RSO, Inc (RF-20) ITTRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Room 215 Date - 14-Jul-98

Location Radioisotope Laboratory TYPE II Survey Surveyor - Bisson D, Sunk D.

(1) Floor Monitor w/ 475 cm2
(1) Gas Flow 475 cm2 1128 cpm
Integrated Count MDA - 662 dpm/100 cm2
Scanning MDA - 2200 dpm/100 cm2

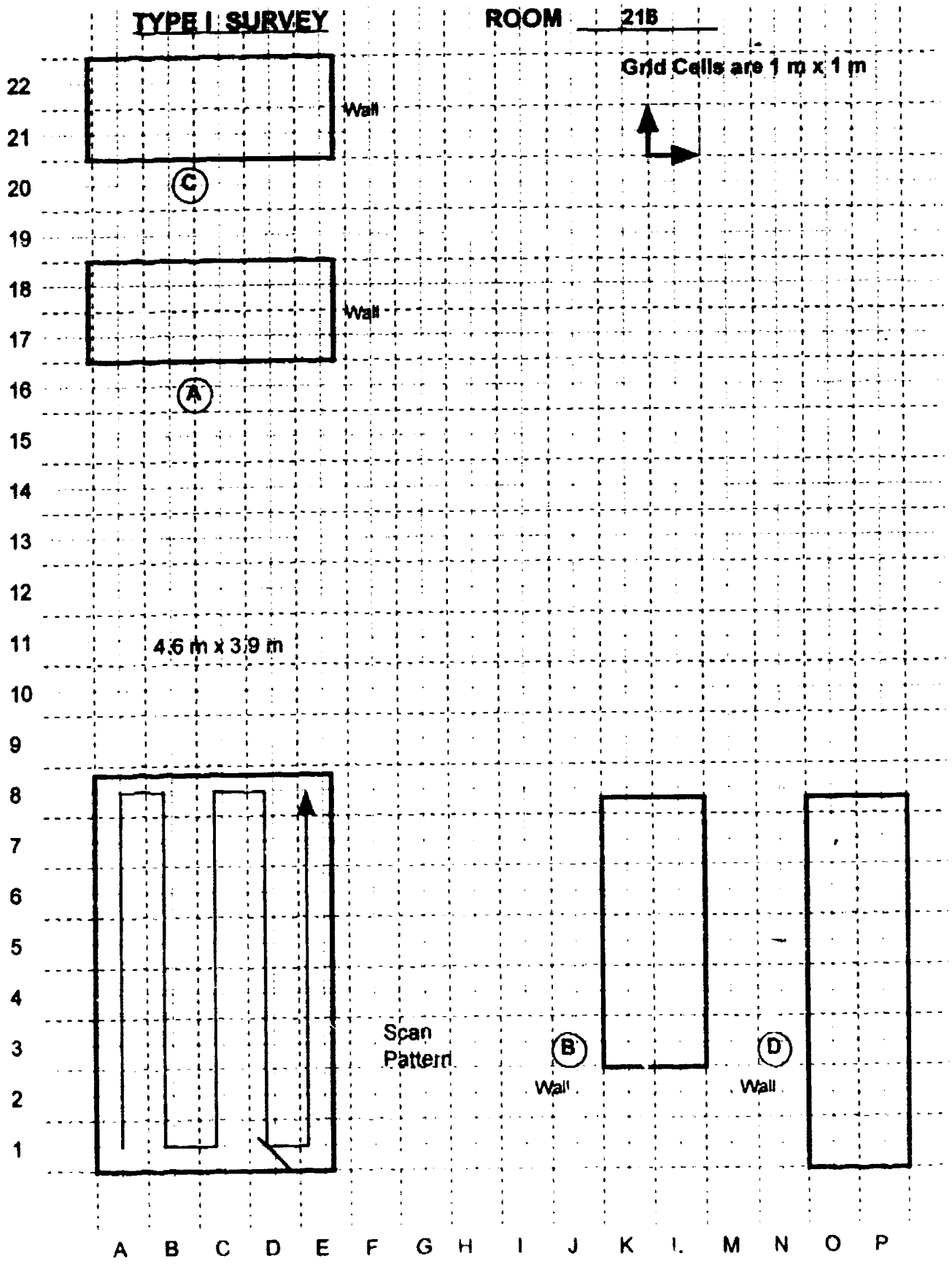
(2) L2200 w/ 100 cm2
(2) Gas Flow 100 cm2 - 683 cpm
Integrated Count MDA - 1514 dpm/100 cm2

(3) L19 microR
9.0 (uR/h)

(4) L12 w/ 2x2 NaI
3 kcpm

(5) LSC - 36 cpm

Grid		* 95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Scan /100 cm2				(1) Beta Direct Meas /100 cm2			(3) Gamma	(4) Gamma	Action	Released
		Wipe	Gross	Beta	Uncert *	Lowest Meas		Highest Meas		Gross	Beta	Uncert *	Contact	Contact	Level	Yes/No
Cell	Description	No.	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	> 2*Bgd >MDA	
						878	-588	1,282	362				9	3.4	Pass	Yes
A1	Floor	1	32	-06	27					962	-391	151			Pass	Yes
A2	Floor	2	31	-08	27					1,036	-216	156			Pass	Yes
A3	Floor	3	31	-08	27					1,044	-198	157			Pass	Yes
A4	Floor	4	29	-10	26					1,016	-264	155			Pass	Yes
B1	Floor	5	29	-11	26					904	-527	147			Pass	Yes
B2	Floor	6	27	-14	26					943	-435	150			Pass	Yes
B3	Floor	7	29	-10	26					994	-315	153			Pass	Yes
B4	Floor	8	22	-23	25					1,032	-226	156			Pass	Yes
C1	Floor	9	28	-12	26					1,010	-278	155			Pass	Yes
C2	Floor	10	34	-03	27					962	-391	151			Pass	Yes
C3	Floor	11	33	-04	27					1,028	-235	156			Pass	Yes
C4	Floor	12	43	12	29					984	-339	153			Pass	Yes
F1	Wall	13	32	-06	27										Pass	Yes
F2	Wall	14	25	-18	25										Pass	Yes
F3	Wall	15	19	-27	24										Pass	Yes
F4	Wall	16	31	-07	27										Pass	Yes
H2	Wall	17	30	-09	26										Pass	Yes
H3	Wall	18	33	-04	27										Pass	Yes
H4	Wall	19	30	-09	26										Pass	Yes
A11	Wall	20	37	02	28										Pass	Yes
B11	Wall	21	31	-07	27										Pass	Yes
C11	Wall	22	27	-14	26										Pass	Yes
A9	Wall	23	24	-19	25										Pass	Yes
B9	Wall	24	38	04	28										Pass	Yes
C9	Wall	25	21	-24	25										Pass	Yes


TYPE I SURVEY
ROOM 21B
Grid Cells are 1 m x 1 m
Wall
C
Wall
A
4.6 m x 3.9 m
Scan Pattern
B
Wall
D
Wall
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
A B C D E F G H I J K L M N O P

ESO, Inc (RP-20) IITRI

Radiological Survey Results

Site - IITRI Va. Technology Center Survey Results of Room 216 Date - 14-Jul-98, 11-Aug-98

Location Radioisotope Laboratory TYPE I Survey Surveyor - Bisson D., Sink D.

(1) Floor Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 1138 cpm
Integrated Count MDA - 642 dpm/100 cm2
Scanning MDA - 2206 dpm/100 cm2

(2) LZ200 w/ 100 cm2
(2) Gas Flow 190 cm2 - 483 cpm
Integrated Count MDA - 1514 dpm/100 cm2

(3) L19 mr ion
9.8 (uR/h)

(4) L12 w/ 2x2 NaI
3 cpm

(5) LSC - 36 cpm

Grid		* 95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Smear /100 cm2				(2) Beta Direct Meas 100 cm2			(3) Gamma Contact	(4) Gamma Contact	Action Level	Released
		Wipe	Gross	Beta	Unsort *	Lowest Meas		Highest Meas		Gross	Beta	Unsort *			> 2*Bgd >MDA	Yes/No
Cell	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm		
						894	-551	1,506	889				9	24	Pass	Yes
A1	Floor	26	31	-08	27					430	193	304			Pass	Yes
A2	Floor	27	21	-25	24					370	-236	284			Pass	Yes
A3	Floor	28	34	-03	27					590	1,336	351			Pass	Yes
A4	Floor	29	34	-03	27					340	-450	273			Pass	Yes
A5	Floor	30	29	-10	26					430	193	304			Pass	Yes
A6	Floor	31	31	-08	27					400	-21	294			Pass	Yes
A7	Floor	32	30	-09	26					749	2,471	393			Fail	Yes
A8	Floor	33	35	-01	27					510	764	328			Pass	Yes
B1	Floor	34	33	-04	27					440	264	307			Pass	Yes
B2	Floor	35	33	-04	27					550	1,050	340			Pass	Yes
B3	Floor	36	33	-05	27			2,500	3,228	410	50	297			Fail	No
B4	Floor	37	36	01	28			2,500	3,228	510	764	328			Fail	No
B5	Floor	38	25	-17	25			2,000	2,052	573	1,214	347			Pass	Yes
B6	Floor	39	30	-09	26			2,000	2,052	421	129	301			Pass	Yes
B7	Floor	40	25	-17	25					520	836	331			Pass	Yes
B8	Floor	41	33	-04	27					1,893	10,643	616			Fail	No
C1	Floor	42	37	03	28					530	907	334			Pass	Yes
C2	Floor	43	30	-09	26					460	407	313			Pass	Yes
C3	Floor	44	25	-18	25			2,500	3,228	510	764	328			Fail	No
C4	Floor	45	31	-08	27			3,000	4,405	400	-21	294			Fail	No
C5	Floor	46	35	-01	27			2,000	2,052	680	1,979	376			Fail	No
C6	Floor	47	37	03	28			2,000	2,052	410	50	297			Pass	Yes
C7	Floor	48	31	-08	27					400	-21	294			Pass	Yes
C8	Floor	49	31	-08	27					410	50	297			Pass	Yes
D1	Floor	50	27	-14	26					421	129	301			Pass	Yes
D2	Floor	51	29	-11	26					444	293	308			Pass	Yes
D3	Floor	52	39	05	28					542	993	338			Pass	Yes
D4	Floor	53	39	05	28					430	193	304			Pass	Yes
D5	Floor	54	27	-15	26					443	286	308			Pass	Yes
D6	Floor	55	30	-09	26					410	50	297			Pass	Yes
D7	Floor	56	30	-09	26					470	479	316			Pass	Yes
D8	Floor	57	38	01	28					440	264	307			Pass	Yes
E1	Floor	58	28	-16	26					392	79	291			Pass	Yes
E2	Floor	59	35	-01	27					381	157	287			Pass	Yes
E3	Floor	60	34	-03	27					345	414	275			Pass	Yes
E4	Floor	61	28	16	26					369	243	283			Pass	Yes
E5	Floor	62	24	-19	25					365	271	282			Pass	Yes
E6	Floor	63	28	16	26					410	50	297			Pass	Yes
E7	Floor	64	38	01	28					427	171	303			Pass	Yes

RSO, Inc (RP-30) ITTRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey of Room 216 Date - 14-Jul-98 / 11-Aug-98

Location Radioisotope Laboratory TYPE I Survey Surveyor - Benson D./Sink D.

(1) Floor Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 1188 cpm
Integrated Count MDA - 662 dpm/100 cm2
Scanning MDA - 2200 dpm/100 cm2

(2) L2200 w/ 100 cm2
(2) Gas Flow 100 cm2 - 483 cpm
Integrated Count MDA - 1514 dpm/100 cm2

(3) L19 microR 9.8 uR/h

(4) L12 w/ 2x2 NaI 3 kcpm

(5) LSC - 36 cpm

Grid		* 95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Scan /100 cm2				(2) Beta Direct Meas 100 cm2			(3) Gamma	(4) Gamma	Action	Released
		Wipe	Gross	Beta	Unsurf *	Lowest Meas		Highest Meas		Gross	Beta	Unsurf. *	Contact	Contact	Level	Yes/No
Cell	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	> 2*Bgd >MDA	
E8	Floor	65	31	-08	27					407	29	798			Pass	Yes
KL34	Wall	66	41	09	29					258	-1,036	242			Pass	Yes
KL56	Wall	67	29	-11	26					360	-307	280			Pass	Yes
KL78	Wall	68	38	04	28					220	-1,307	226			Pass	Yes
OP12	Wall	69	32	-06	27					340	-450	273			Pass	Yes
OP34	Wall	70	33	-05	27					260	-1,021	243			Pass	Yes
OP56	Wall	71	31	-07	27					250	-1,093	239			Pass	Yes
OP78	Wall	72	24	-19	25					240	-1,164	234			Pass	Yes
AB2122	Wall	73	26	-16	26					420	121	300			Pass	Yes
CD2122	Wall	74	30	-09	26					280	-879	251			Pass	Yes
EF2122	Wall	75	34	-03	27					270	-950	247			Pass	Yes
AB1718	Wall	76	29	-10	26					280	-879	251			Pass	Yes
CD1718	Wall	77	32	-06	27					360	-307	280			Pass	Yes
EF1718	Wall	78	33	-05	27					250	-1,093	239			Pass	Yes

RSO, Inc (rev.30 \ ITRI)

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Room 216 Post Decontamination Date - 11-Aug-98

Location Radioisotope Laboratory TY' . I Survey Surveyor - Bisson D.,Smith O

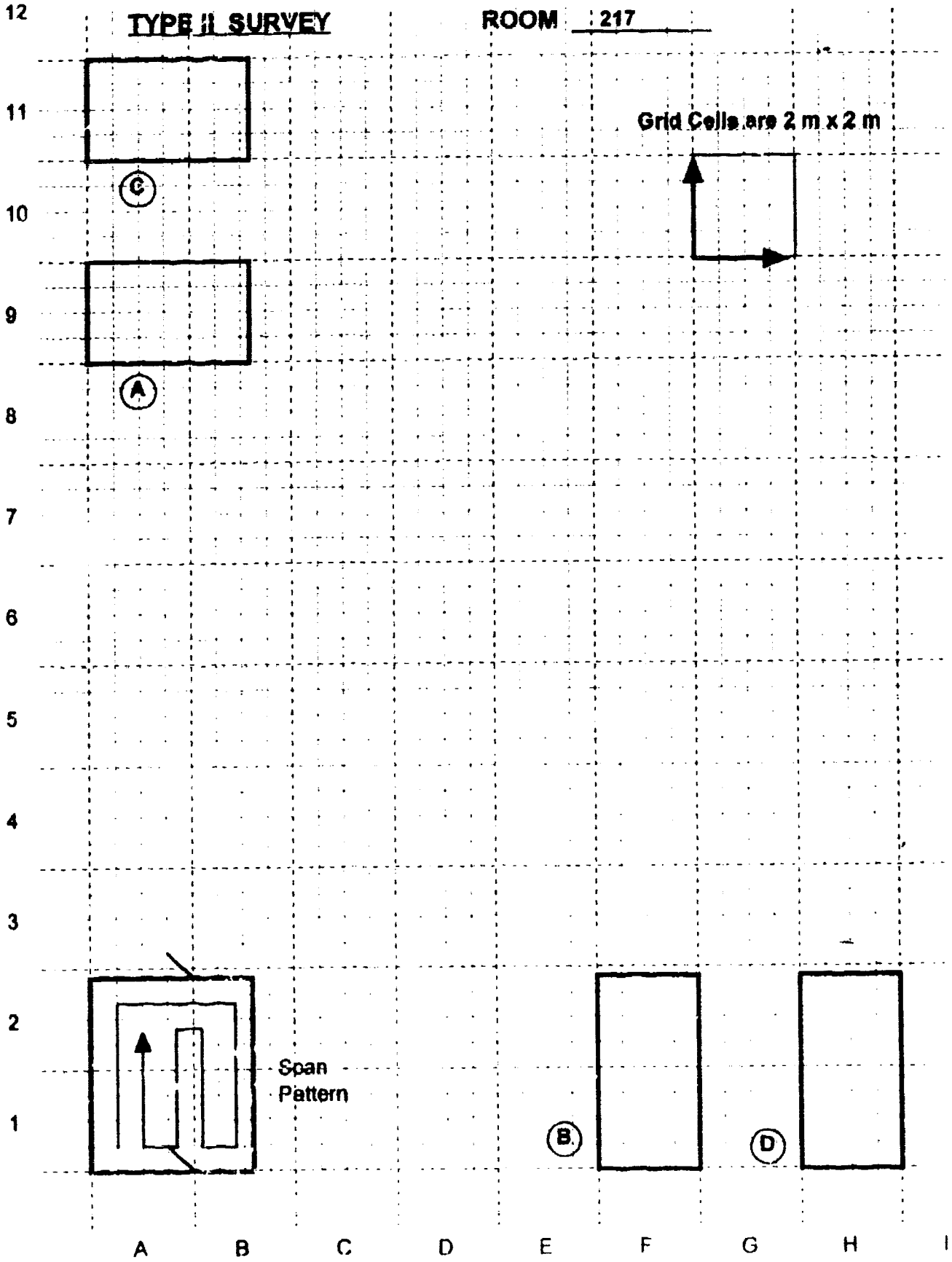
(1) Flow Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 1087 cpm
Integrated Count MDA - 642 dpm/100 cm2
Scanning MDA - 2200 dpm/100 cm2

(2) L2200 w/ 100 cm
(2) Gas Flow 100 cm2 534 cpm
Integrated Count MDA - 1715 dpm/100 cm2

(3) L10 microR 7.0 (uR/h)
(4) L12 w/ 2x2 NaI 3 kcpm
(5) L&C - 39 cpm

Grid		* * % Confidence Level (5) Wipe Results				Survey Data Result (1) Beta Scan /100 cm2				(2) Beta Direct Meas 100 cm2			(3) Gamma Contact	(4) Gamma Contact	Action Level	Release/ Yes/No
		Wipe	Gross	Beta	Uncert *	Lowest Meas		Highest Meas		Gross	Beta	Uncert *				
Cell	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	> 2*Bgd >MDA	
						900	-369	1,503	1,042				10	3.6	Pass	Yes
B8	Loc 7	555	29	-16	27					42[illegible]	-706	310			Pass	Yes
B8	Loc 8	556	33	-11	28					528	-43	338			Pass	Yes
B8	Loc 9	557	33	-11	28					512	157	333			Pass	Yes
B8	Loc 10	558	26	-22	26					374	286	351			Pass	Yes
B8	Loc 11	559	29	-17	27					382	1,086	292			Pass	Yes
B8	Loc 12	560	28	-18	27					460	-529	317			Pass	Yes
BC56	Loc 13	561	28	-18	27					578	314	352			Pass	Yes
BC56	Loc 14	562	17	-36	25					492	-300	327			Pass	Yes
BC56	Loc 15	563	30	-15	27					528	-43	338			Pass	Yes
BC56	Loc 16	564	30	-15	27					490	-314	329			Pass	Yes
BC56	Loc 17	565	30	-15	27					500	-243	329			Pass	Yes
BC56	Loc 18	566	31	-13	27					462	-514	318			Pass	Yes
BC34	Loc 19	567	29	-16	27					514	-143	333			Pass	Yes
BC34	Loc 20	568	27	-19	27					524	-71	336			Pass	Yes
BC34	Loc 21	569	26	-22	26					510	-171	332			Pass	Yes
BC34	Loc 22	570	31	-13	27					520	-100	335			Pass	Yes
BC34	Loc 23	571	31	-13	27					520	-100	335			Pass	Yes
BC34	Loc 24	572	27	-21	26					536	14	340			Pass	Yes

TYPE II SURVEY ROOM 217



RJO, Inc (RF-20) ITTRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Room 217 Date - 24-Jul-98

Location Radioisotope Laboratory TYPE II Survey Surveyor - Bisson D, Smith G., Dean J.

(1) Floor Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 951 cpm
Integrated Count MDA - 617 dpm/100 cm2
Scanning MDA - 2200 dpm/100 cm2

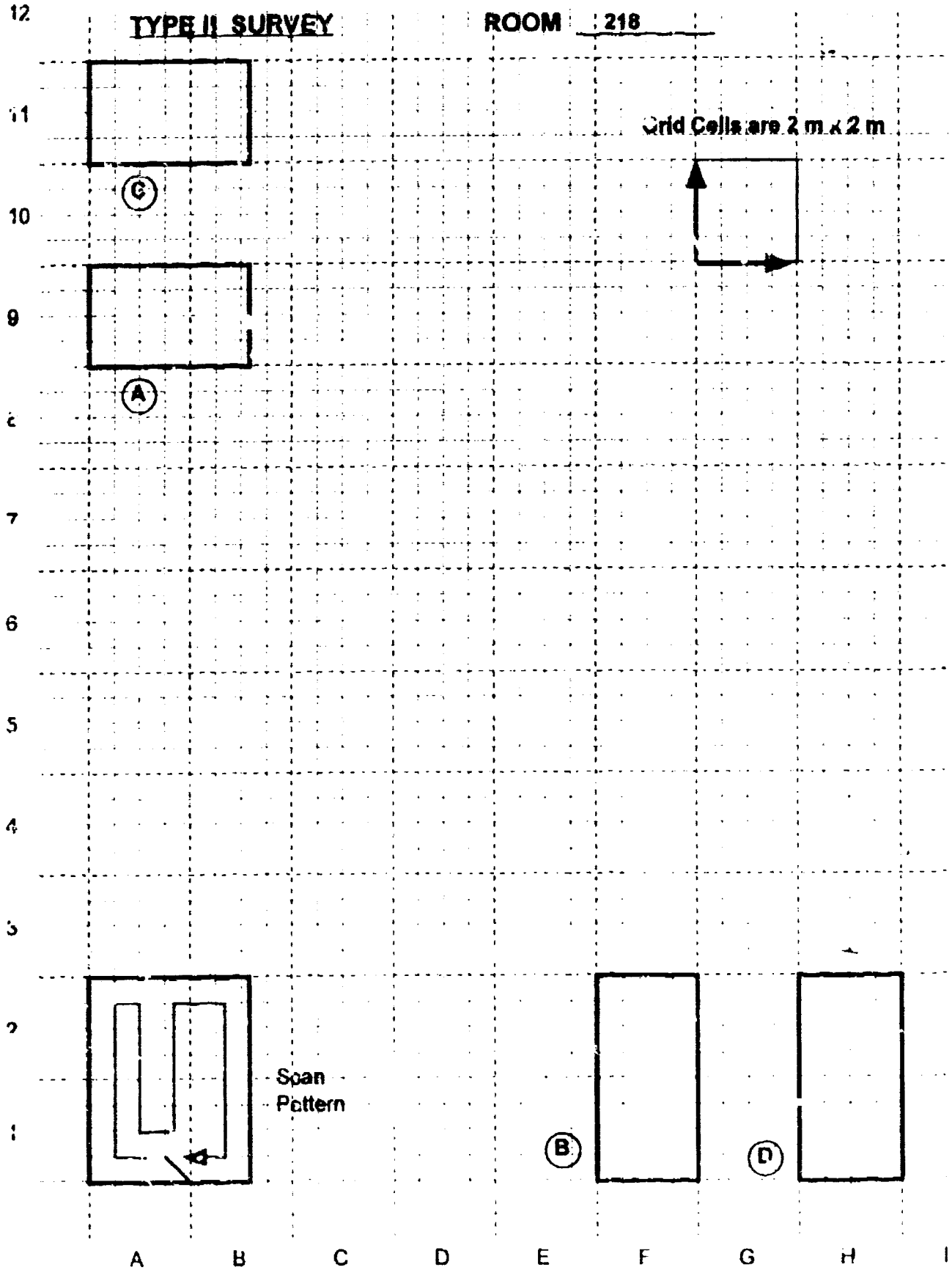
(2) LP100 w/ 100 cm2
(2) Gas Flow 100 cm2 317.6 cpm
Integrated Count MDA - 1363 dpm/100 cm2

(3) L19 microR 7.0 (uR/h)

(4) L12 w/ 2x2 NaI 3 kcpm

(5) LSC - 39 cpm

Grid		* 95% Confidence Level				Survey Data Results										
		(5) Wipe Results				(1) Beta Scan /100 cm2				(2) Beta Direct Meas 100 cm2			(3) Gamma	(4) Gamma	Action	Released
		Wipe	Gross	Beta	Uncert *	Lowest Meas		Highest Meas		Gross	Beta	Uncert *	Contact	Contact	Level	Yes/No
Cell	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	* 2* Bgd >MDA	
						740	-496	1,140	445				9	3.6	Pass	Yes
A1	Floor	482	23	-27	26					372	390	281			Pass	Yes
A2	Floor	483	28	-18	27					390	519	788			Pass	Yes
B2	Floor	484	26	-22	26					368	361	280			Pass	Yes
B1	Floor	485	33	-09	28					408	647	294			Pass	Yes
A9	Wall	486	38	-02	29										Pass	Yes
B9	Wall	487	29	-17	27										Pass	Yes
F2	Wall	488	27	-19	27										Pass	Yes
F1	Wall	489	33	-09	28										Pass	Yes
A11	Wall	490	27	-19	27										Pass	Yes
B11	Wall	491	32	-12	28										Pass	Yes
H2	Wall	492	39	01	29										Pass	Yes
H1	Wall	493	35	-07	28										Pass	Yes


TYPE II SURVEY
ROOM 218
Grid Cells are 2 m x 2 m
Scan Pattern
A
B
C
D
12
11
10
9
8
7
6
5
4
3
2
1
A
B
C
D
E
F
G
H
I

RSO, Inc (EF-20) (ITRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Room 218 Date - 24-Jul-98

Location Radioisotope Laboratory TYPE II Survey Surveyor - Benson D, Smith G, Dean J.

(1) Pancake Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 991 cpm
Integrated Count MDA - 612 dpm/100 cm2
Scanning MDA - 2200 dpm/100 cm2

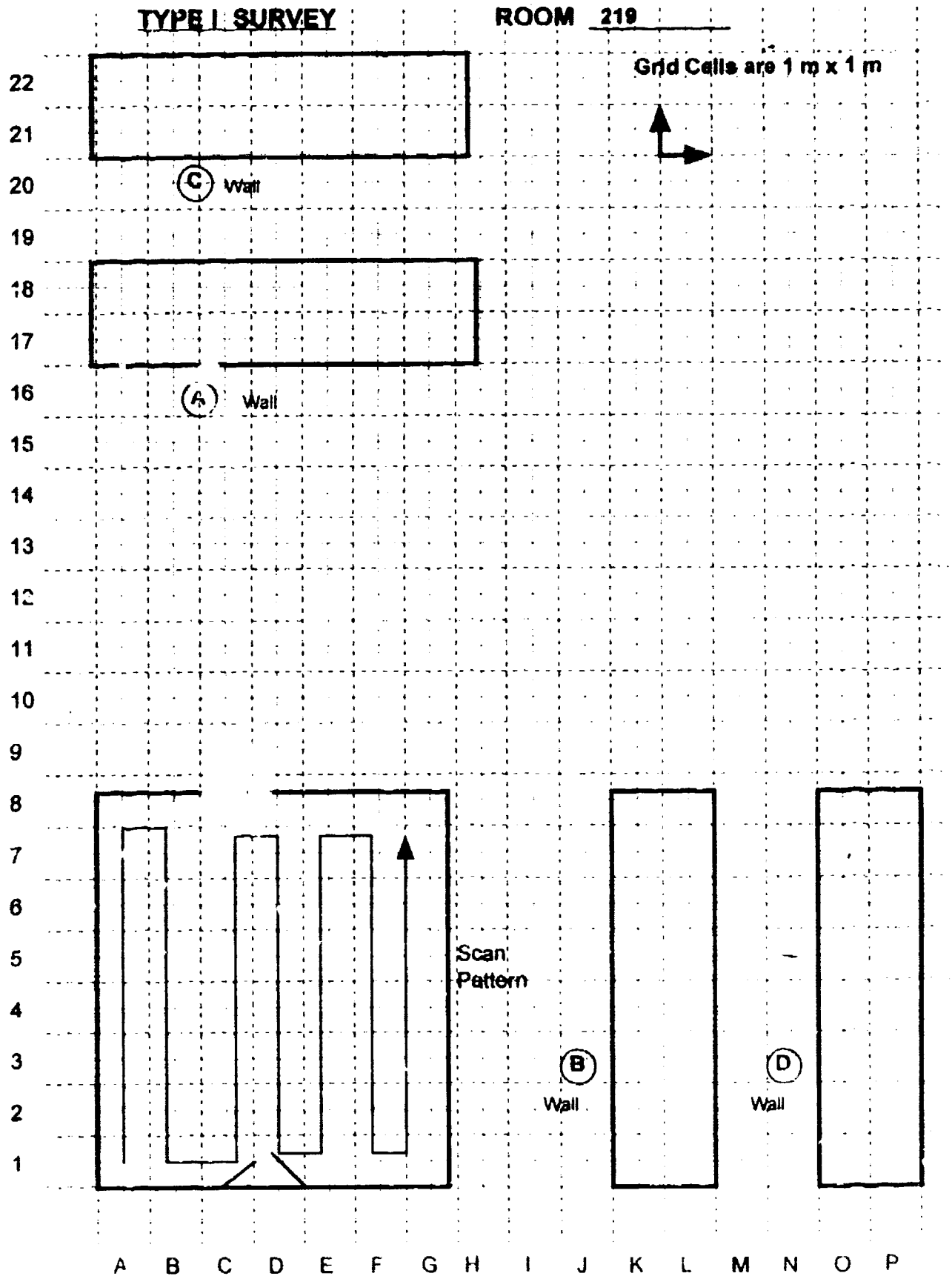
(2) L2200 w/ 100 cm2
(2) Gas Flow 100 cm2 317 cpm
Integrated Count MDA - 1363 dpm/100 cm2

(3) L19 microR
7.0
(uR/h)

(4) L12 w/ 1x1 NaI
3
kcpm

(5) [illegible] 39 cpm

Grid		* 95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Scan /100 cm2				(2) Beta Direct Meas /100 cm2			(3) Gamma Contact	(4) Gamma Contact	Action Level	Released
		Wipe	Gross	Beta	Unsort *	Lowest Meas		Highest Meas		Gross	Beta	Unsort *				
Cell	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	> 2*Bgd >MDA	Yes/No
						850	-238	1,100	351				9	3.6	Pass	Yes
A1	Floor	494	29	-17	27					386	493	286			Pass	Yes
A2	Floor	495	35	-07	28					412	675	295			Pass	Yes
B2	Floor	496	30	-15	27					390	521	287			Pass	Yes
B1	Floor	497	27	-21	26					370	379	281			Pass	Yes
A9	Wall	498	23	-26	26										Pass	Yes
B9	Wall	499	25	-24	26										Pass	Yes
F2	Wall	500	23	-27	26										Pass	Yes
F1	Wall	501	29	-17	27										Pass	Yes
A11	Wall	502	41	03	29										Pass	Yes
B11	Wall	503	32	-12	28										Pass	Yes
H2	Wall	504	25	-23	26										Pass	Yes
H1	Wall	505	27	-21	26										Pass	Yes


TYPE I SURVEY
ROOM 219
Grid Cells are 1 m x 1 m
C Wall
A Wall
Scan Pattern
B Wall
D Wall
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
A B C D E F G H I J K L M N O P

RSO, * w INF 39 | HTRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Room 219 Date - 14-Jul-98

Location Radioisotope Laboratory TYPE I Survey Surveyor - Burton D. Sink D

(1) Flow Monitor w/ 475 cm2
(1) Gas Flow 475 cm2 1120 cpm
Integrated Count MDA 662 dpm/100 cm2
Scanning MDA 1200 dpm/100 cm2

(2) L7200 w/ 100 cm2
(2) Gas Flow 100 cm2 603 cpm
Integrated Count MDA 1,114 dpm/100 cm2

(3) L19 meter/R
0.0
(uR/h)

(4) L12 w/ 2x2 NaI
3
kcpm

(5) LSC - 36 cpm

Grid		* 95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Scan 100 cm2				(2) Beta Direct Meas. 100 cm2			(3) Gamma Contact	(4) Gamma Contact	Action Level	Released Yes/No
		Wipe	Gross	Beta	Uncert *	Lowest Meas		Highest Meas		Gross	Beta	Uncert *				
Cell	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	>2*Bgd >MDA	
						700	-1,017	1,200	1669				10	3.6	Pass	Yes
A1	Floor	79	33	-05	27					1,287	6,314	510			Fail	No
A2	Floor	80	32	-06	27					399	-29	293			Pass	Yes
A3	Floor	81	30	-09	26					408	16	290			Pass	Yes
A4	Floor	82	31	-07	27					434	221	305			Pass	Yes
A5	Floor	83	27	14	26					361	286	281			Pass	Yes
A6	Floor	84	27	14	26					355	341	278			Pass	Yes
A7	Floor	85	26	-16	26					348	-393	276			Pass	Yes
A8	Floor	86	22	-23	25					329	-529	269			Pass	Yes
B1	Floor	87	32	-06	27			3,200	4,875	387	114	289			Fail	No
B2	Floor	88	30	09	26			2,200	2,522	764	2,579	997			Fail	No
B3	Floor	89	28	-13	26					385	-129	289			Pass	Yes
B4	Floor	90	23	-21	25					392	-79	291			Pass	Yes
B5	Floor	91	31	-07	27					372	221	284			Pass	Yes
B6	Floor	92	25	-18	25					363	-286	281			Pass	Yes
B7	Floor	93	31	-07	27					374	-203	285			Pass	Yes
B8	Floor	94	25	-17	25					372	-221	284			Pass	Yes
C1	Floor	95	36	01	28					376	121	289			Pass	Yes
C2	Floor	96	28	13	26					378	179	286			Pass	Yes
C3	Floor	97	32	06	27					402	7	294			Pass	Yes
C4	Floor	98	35	01	27					382	150	288			Pass	Yes
C5	Floor	99	38	04	28					404	7	295			Pass	Yes
C6	Floor	100	28	13	26					396	50	292			Pass	Yes
C7	Floor	101	31	-08	27					403	14	295			Pass	Yes
C8	Floor	102	34	05	27					391	86	291			Pass	Yes
D1	Floor	103	35	00	27					397	43	293			Pass	Yes
D2	Floor	104	22	-23	25					372	-221	284			Pass	Yes
D3	Floor	105	29	11	26					387	114	289			Pass	Yes
D4	Floor	106	30	09	26					418	307	300			Pass	Yes
D5	Floor	107	27	14	26					387	114	289			Pass	Yes
D6	Floor	108	28	11	26					339	-457	273			Pass	Yes
D7	Floor	109	25	17	25					413	71	298			Pass	Yes
D8	Floor	110	33	04	27					387	114	289			Pass	Yes
E1	Floor	111	27	14	26					367	257	283			Pass	Yes
E2	Floor	112	33	05	27					433	214	303			Pass	Yes
E3	Floor	113	25	17	25					379	171	287			Pass	Yes
E4	Floor	114	27	14	26					413	71	298			Pass	Yes
E5	Floor	115	30	08	26					400	29	295			Pass	Yes
E6	Floor	116	33	05	27					413	57	297			Pass	Yes
E7	Floor	117	27	15	26					416	43	296			Pass	Yes

R.H.I. Inc. (RF-30) ITRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Room 219 Date - 14-MI-98

Location Radioisotope Laboratory TYPE I Survey Surveyor - Burton D. Sink D.

(1) Floor Monitor w/ 425 cm2 — (1) Gas Flow 425 cm2: 1120 cpm; Integrated Count MDA - 442 dpm/100 cm2; Scanning MDA - 3200 dpm/100 cm2

(2) L7200 w/ 100 cm2 — (7) Gas Flow 100 cm2: 683 cpm; Integrated Count MDA - 1514 dpm/100 cm2

(3) L19 meter/B — 9.0 (mR/h)

(4) L11 w/ 2x2 NaI — 3 kcpm

(5) Lab - 36 cpm

Grid		* 95% Confidence Level				Survey Data Results										
		(9) Wipe Results				(1) Beta Scan /100 cm2				(7) Beta Direct Meas. 100 cm2			(3) Gamma	(4) Gamma	Action	Released
		Wipe	Gross	Beta	Unsoft *	Lowest Meas		Highest Meas		Gross	Beta	Unsoft *	Contact	Contact	Level	Yes/No
Cell	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	mR/h	kcpm	> 2*Bgd >MDA	
R0	Floor	118	29	-10	26					367	257	283			Pass	Yes
F1	Floor	119	37	03	28					429	186	303			Pass	Yes
F2	Floor	120	26	-18	25					366	-264	282			Pass	Yes
F3	Floor	121	23	-20	25					361	286	281			Pass	Yes
F4	Floor	122	30	-09	26					368	250	283			Pass	Yes
F5	Floor	123	30	-09	26					341	441	273			Pass	Yes
F6	Floor	124	30	-09	26					368	-250	283			Pass	Yes
F7	Floor	125	29	-10	26					363	-286	281			Pass	Yes
F8	Floor	126	27	14	26					377	-186	286			Pass	Yes
G1	Floor	127	28	-13	26					334	-493	271			Pass	Yes
G2	Floor	128	25	-17	25					376	193	284			Pass	Yes
G3	Floor	129	27	-14	26					392	79	291			Pass	Yes
G4	Floor	130	33	-04	27					376	-193	286			Pass	Yes
G5	Floor	131	38	00	27					391	86	291			Pass	Yes
G6	Floor	132	22	-23	25					365	271	282			Pass	Yes
G7	Floor	133	27	-14	26					398	36	293			Pass	Yes
G8	Floor	134	27	-15	26					382	-150	288			Pass	Yes
AB1718	Wall	135	25	-18	25					244	-1,107	236			Pass	Yes
CD1718	Wall	136	31	-07	27					298	750	258			Pass	Yes
EF1718	Wall	137	31	-07	27					280	-879	251			Pass	Yes
GH1718	Wall	138	29	11	26					244	1,136	236			Pass	Yes
KL12	Wall	139	25	-18	25					260	1,021	243			Pass	Yes
KL34	Wall	140	29	10	26					252	1,093	239			Pass	Yes
KL56	Wall	141	23	-20	25					220	-1,309	226			Pass	Yes
KL78	Wall	142	34	02	27					230	-1,236	230			Pass	Yes
AB2122	Wall	143	25	-17	25					250	1,093	239			Pass	Yes
CD2122	Wall	144	36	18	27					364	279	282			Pass	Yes
EF2122	Wall	145	24	19	25					276	807	269			Pass	Yes
GH2122	Wall	146	35	00	27					256	1,050	241			Pass	Yes
OP12	Wall	147	33	05	27					278	493	250			Pass	Yes
OP34	Wall	148	16	29	24					274	921	248			Pass	Yes
OP56	Wall	149	34	02	27					272	950	24			Pass	Yes
OP78	Wall	150	29	11	26					266	979	245			Pass	Yes

RSO, Inc (RP-30) ITRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Room 219 Post Decontamination Date 11 Aug-91

Location Radiometrics Laboratory TYPE I Survey Surveyor - Hasan D. Smith (1)

(1) Flow Meter w/ 613 cm2
(1) Gas Flow 475 cm2 1057 cpm
Integrated Count MDA - 643 dpm/100 cm2
Scaler MDA - 2300 dpm/100 cm2

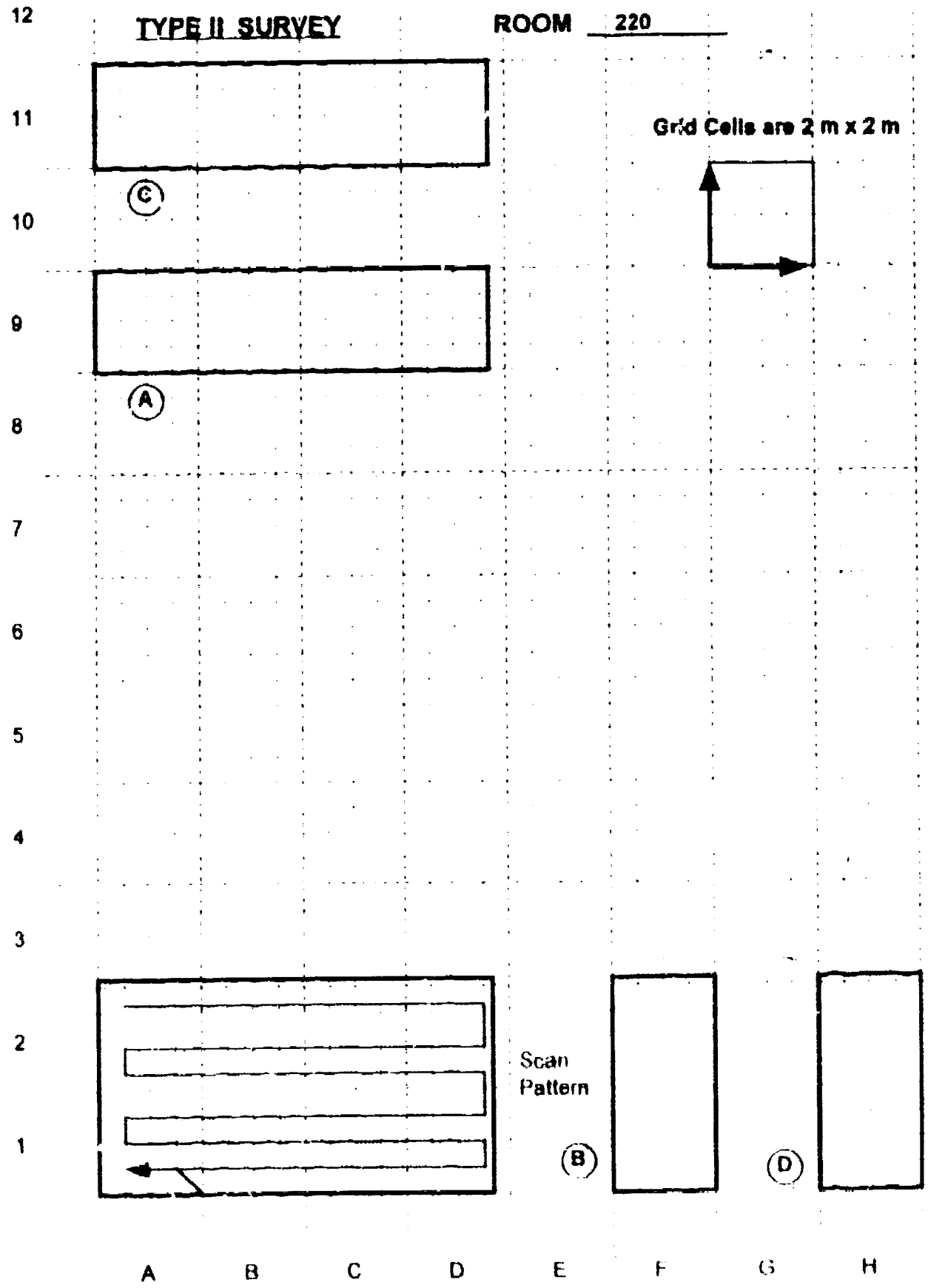
(2) L2300 w/ 100 cm2
(2) Gas Flow 100 cm2 536 cpm
Integrated Count MDA 1715 dpm/100 cm2

(3) L19 mrem/h
2.8
(mR/h)

(4) L12 w/ 2x2 NaI
1
kcpm

(5) L30 30 cpm

Grid		* 95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Scan /100 cm2				(2) Beta Direct Meas /100 cm2			(3) Gamma Constant	(4) Gamma Constant	Active Level	Released Yes/No
		Wipe	Gross	Beta	Unsort *	Lowest Meas		Highest Meas		Gross	Beta	Unsort *				
Cell	Designation	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	mR/h	kcpm	>2*Bgd >MDA	
						800	-605	1,100	161				1.0	3.6	Pass	Yes
AB1-2	Loc 1	549	31	-13	27					538	457	357			Pass	Yes
AB1-2	Loc 2	550	31	13	27					630	686	386			Pass	Yes
AB1-2	Loc 3	551	31	14	27					610	543	361			Pass	Yes
AB1-2	Loc 4	552	31	-14	27					582	543	333			Pass	Yes
AB1-2	Loc 5	553	27	19	27					594	629	336			Pass	Yes
AB1-2	Loc 6	554	36	-05	28					610	543	361			Pass	Yes


TYPE II SURVEY
ROOM 220
Grid Cells are 2 m x 2 m
Scan Pattern
A
B
C
D
12
11
10
9
8
7
6
5
4
3
2
1
A
B
C
D
E
F
G
H

Radiological Survey Results

Site: TTTRI Va Technology Center Survey Results of Room 220 Date: 15-Jul-98

Location: Radioisotope Laboratory TYTF II Survey Surveyor: Bisson D, Dean J

(1) Floor Monitor w/ 45 cm2: (1) Gas Flow 45 cm2: 1093 cpm; Integrated Count MDA: 652 dpm/100 cm2; Reasoning MDA: 1300 dpm/100 cm2

(2) L2000 w/ 100 cm2: (2) Gas Flow 100 cm2: 395 cpm; Background Count MDA: 1900 dpm/100 cm2

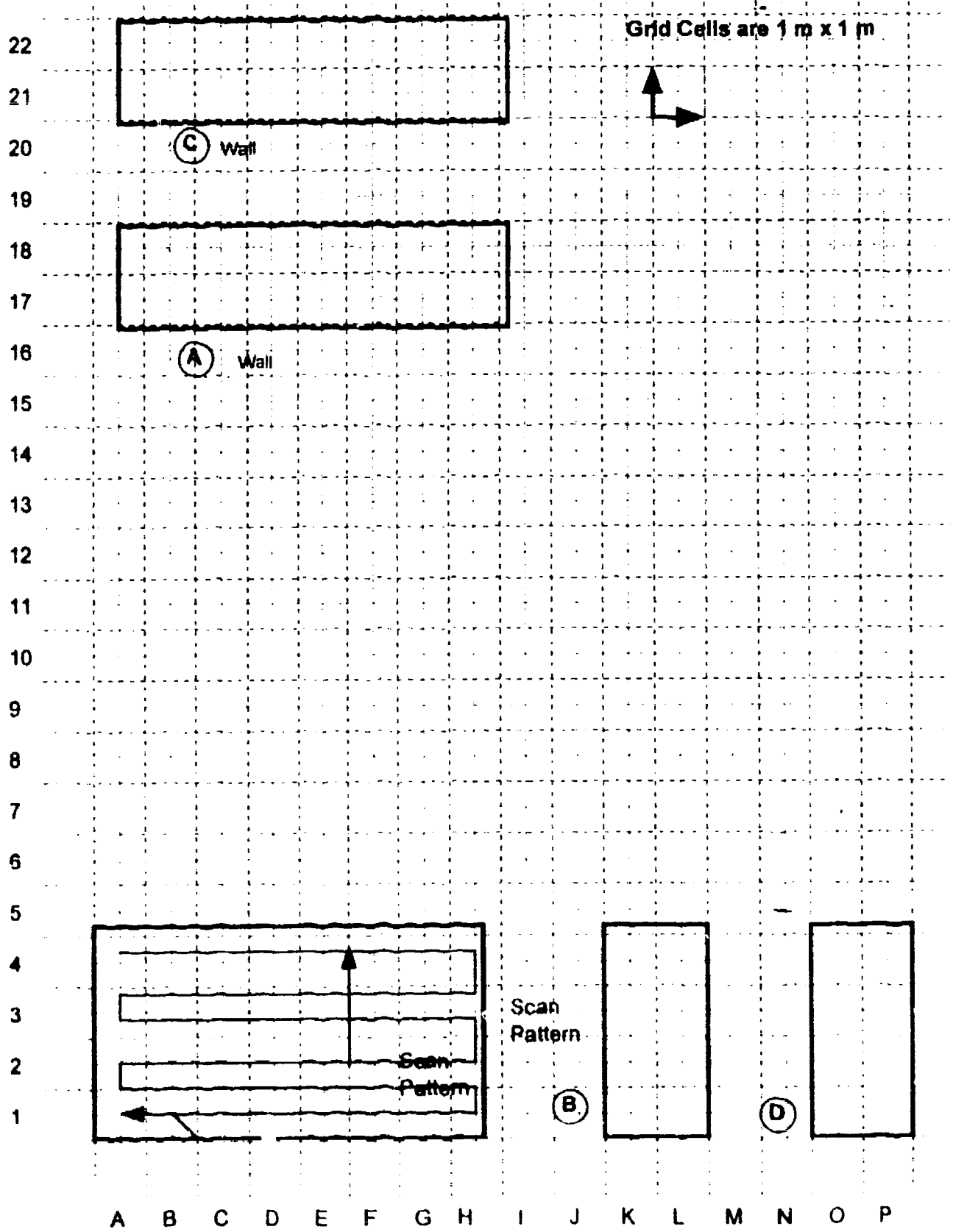
(3) L19 microR: 19.0 (uR/h)

(4) L12 w/ 2x2 NaI: 4 kcpm

(5) LBc: 36 cpm

Grid		* 95% Confidence Level				Survey Data Results										
		(3) Wipe Results				(2) Beta Scan /100 cm2				(1) Beta Direct Meas /160 cm2			(3) Gamma	(4) Gamma	Action	Released
		Wipe	Gross	Beta	Uncert *	Lowest Meas		Highest Meas		Gross	Beta	Uncert *	Contact	Contact	Level	Yes/No
Cell	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	* 1*Bgd -MDA	
						700	-923	1,300	487				10	36	Pass	Yes
A1	Floor	181	25	17	25					1,024	162	155			Pass	Yes
A2	Floor	182	32	.06	27	2,000	2,134	4,000	6,840	3,693	6,118	284			Fail	No
B2	Floor	183	25	18	25					999	224	153			Pass	Yes
B1	Floor	184	31	.04	27					946	146	150			Pass	Yes
C1	Floor	185	3[illegible]	.08	27					930	-184	147			Pass	Yes
C2	Floor	186	35	-01	27					904	-445	147			Pass	Yes
D2	Floor	187	28	-13	26					1,140	111	163			Fail	Yes
D1	Floor	188	31	.07	27					916	-416	148			Pass	Yes
A9	Wall	189	26	16	26										Pass	Yes
B9	Wall	190	38	04	28										Pass	Yes
C9	Wall	191	26	16	26										Pass	Yes
D9	Wall	192	31	.08	27										Pass	Yes
E2	Wall	193	37	02	28										Pass	Yes
E1	Wall	194	31	.07	27										Pass	Yes
A11	Wall	195	41	.05	27										Pass	Yes
B11	Wall	196	28	13	26										Pass	Yes
C11	Wall	197	28	12	26										Pass	Yes
D11	Wall	198	36	01	28										Pass	Yes
H2	Wall	199	30	[illegible]	26										Pass	Yes
H1	Wall	200	29	11	26										Pass	Yes

TYPE I SURVEY ROOM 220



RBO, Inc (RP-30) ITTRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Room 220 Resurvey Date - 24-Jul-98 / 4-Aug-98

Location Radioisotope Laboratory TYPE I Survey Surveyor - Binson D., Smith G., Dean J.

(1) Floor Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 951 cpm
Integrated Count MDA - 411 dpm/100 cm2
Resurvey MDA - 2290 dpm/100 cm2

(2) L2200 w/ 100 cm2
(2) Gas Flow 100 cm2 - 317.4 cpm
Integrated Count MDA - 1363 dpm/100 cm2

(3) L19 microR
7.0
(uR/h)

(4) L12 w/ 2x2 NaI
3
kcpm

(5) LSC - 39 cpm

Grid		* 95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Scan /100 cm2				(2) Beta Direct Meas 100 cm2			(3) Gamma	(4) Gamma	Action	Released
		Wipe	Gross	Beta	Uncert *	Lowest Meas		Highest Meas		Gross	Beta	Uncert *	Contact	Contact	Level	Yes/No
Cell	Description	No.	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	> 2*Bgd >MDA	
						700	-591	1,307	838				8	3.8	Pass	Yes
A1	Floor	445	29	-17	27					504	1,333	324			Pass	Yes
B1	Floor	446	25	-24	26					406	633	293			Pass	Yes
C1	Floor	447	35	-06	28					436	847	303			Pass	Yes
D1	Floor	448	31	-13	27					394	547	289			Pass	Yes
E1	Floor	449	31	-14	27					340	161	270			Pass	Yes
F1	Floor	450	29	-17	27					374	404	282			Pass	Yes
G1	Floor	451	32	-12	28					454	976	309			Pass	Yes
H1	Floor	452	28	-18	27					368	361	280			Pass	Yes
H2	Floor	453	31	-14	27					430	804	301			Pass	Yes
G1	Floor	454	31	-13	27					280	-267	247			Pass	Yes
F2	Floor	455	27	-19	27					368	361	280			Pass	Yes
E2	Floor	456	35	-06	28					428	790	300			Pass	Yes
D2	Floor	457	27	-21	26					402	604	292			Pass	Yes
C2	Floor	458	29	-16	27					428	790	300			Pass	Yes
B2	Floor	459	22	-28	26					410	661	294			Pass	Yes
A2	Floor	460	28	-18	27					364	333	279			Pass	Yes
A3	Floor	461	23	-26	26					460	1,019	310			Pass	Yes
B3	Floor	462	25	-23	26					560	1,733	341			Fail	No
C3	Floor	463	29	-17	27					500	1,304	323			Pass	Yes
D3	Floor	464	27	-21	26					343	183	271			Pass	Yes
E3	Floor	465	25	-23	26					414	690	296			Pass	Yes
F3	Floor	466	34	-08	28					340	161	270			Pass	Yes
G3	Floor	467	29	-17	27					342	176	271			Pass	Yes
H3	Floor	468	29	-16	27					450	947	307			Pass	Yes
H4	Floor	469	25	-23	26					390	519	288			Pass	Yes
G4	Floor	470	31	-13	27					426	776	300			Pass	Yes
F4	Floor	471	31	-13	27					356	276	276			Pass	Yes
E4	Floor	472	33	-09	28					428	790	300			Pass	Yes
D4	Floor	473	31	-14	27					416	704	296			Pass	Yes
C4	Floor	474	18	-35	25					506	1,347	325			Pass	Yes
B4	Floor	475	34	-08	28					672	2,533	371			Fail	No
A4	Floor	476	37	-04	28					632	2,247	361			Fail	No

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Room 220 Post Decontamination Date - 4-Aug-98

Location Radioisotope Laboratory TYPE I Survey Surveyor - Simon D. Smith G.

(1) Floor Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 3460 cpm
Integrated Count MDA - 748 dpm/100 cm2
Scanning MDA - 2560 dpm/100 cm2

(2) L2200 w/ 100 cm2
(2) Gas Flow 100 cm2 - 987 cpm
Integrated Count MDA - 1700 dpm/100 cm2

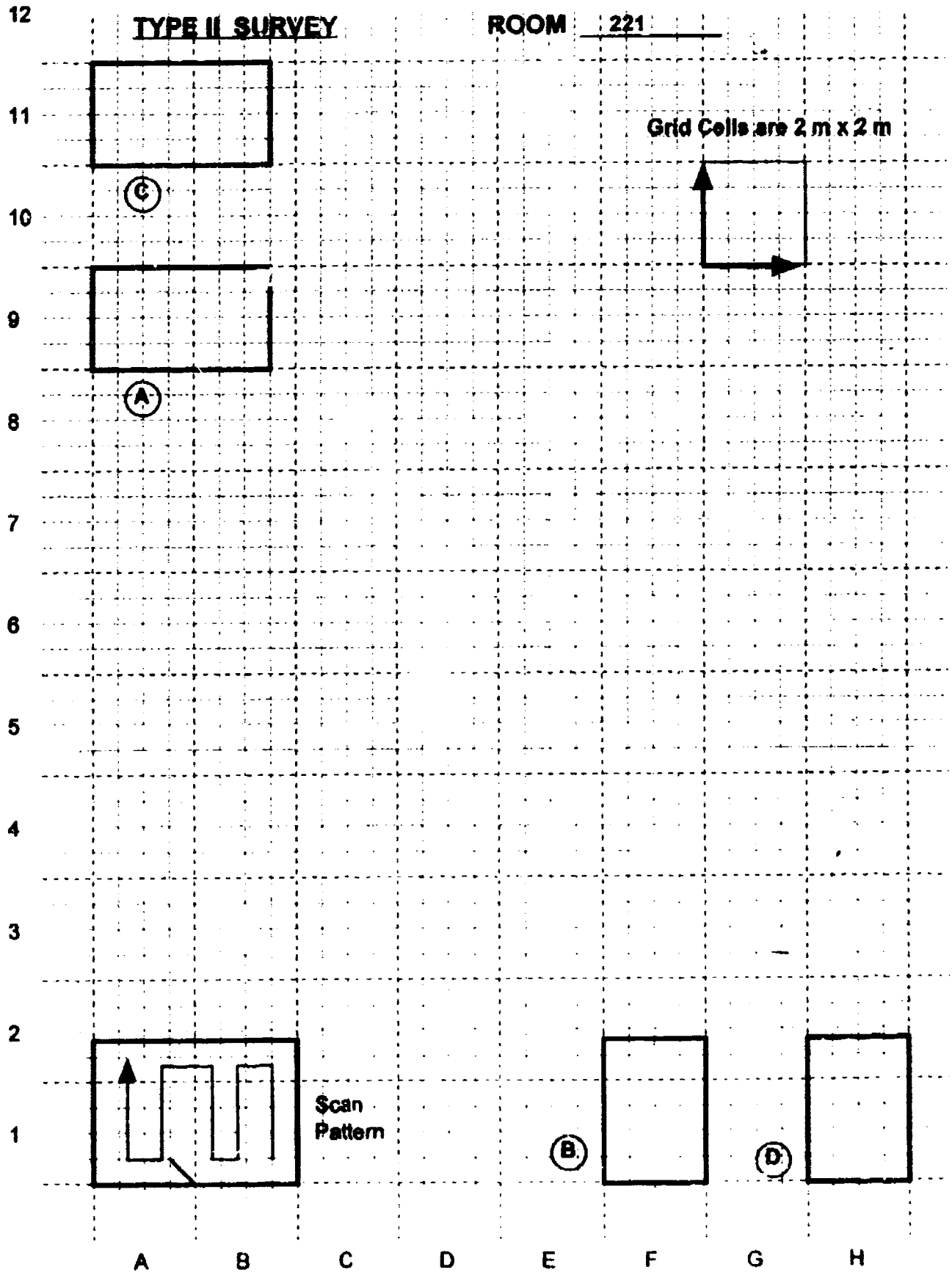
(3) L19 mmR
7.8
(mR/h)

(4) L12 w/ 2x2 NaI
3
kcpm

(5) LBC - 39 cpm

Grid		* 95% Confidence Level				Survey Data Results										
		(5) Wipe Results				(1) Beta Scan /100 cm2				(2) Beta Direct Meas. 100 cm2			(3) Gamma	(4) Gamma	Action	Released
		Wipe	Gross	Beta	Unsort.*	Lowest Meas.		Highest Meas.		Gross	Beta	Unsort. *	Contact	Contact	Level	Yes/No
Cell	Downgrade	No.	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	mR/h	kcpm	> 2*Bgd. >MDA	
						700	-1,807	1,307	-379				8	3.8	Pass	Yes
A3	Loc 41	573	19	-34	25					508	-564	333			Pass	Yes
A4	Loc 42	574	34	-08	28					552	-250	346			Pass	Yes
B3	Loc 43	575	37	-03	29					544	-307	344			Pass	Yes
B4	Loc 44	576	35	-07	28					544	-307	344			Pass	Yes
C3	Loc 45	577	31	-13	27					596	64	358			Pass	Yes
C4	Loc 46	578	30	-15	27					520	-479	337			Pass	Yes

TYPE II SURVEY ROOM 221



RSO, Inc (SF-20) ITTRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Room 221 Date - 15-Nll-98

Location Radioisotope Laboratory TYPE II Survey Surveyor - Bisson D., Dean J.

(1) Floor Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 1193 cpm
Integrated Count MDA - 692 dpm/100 cm2
Scanning MDA - 2200 dpm/100 cm2

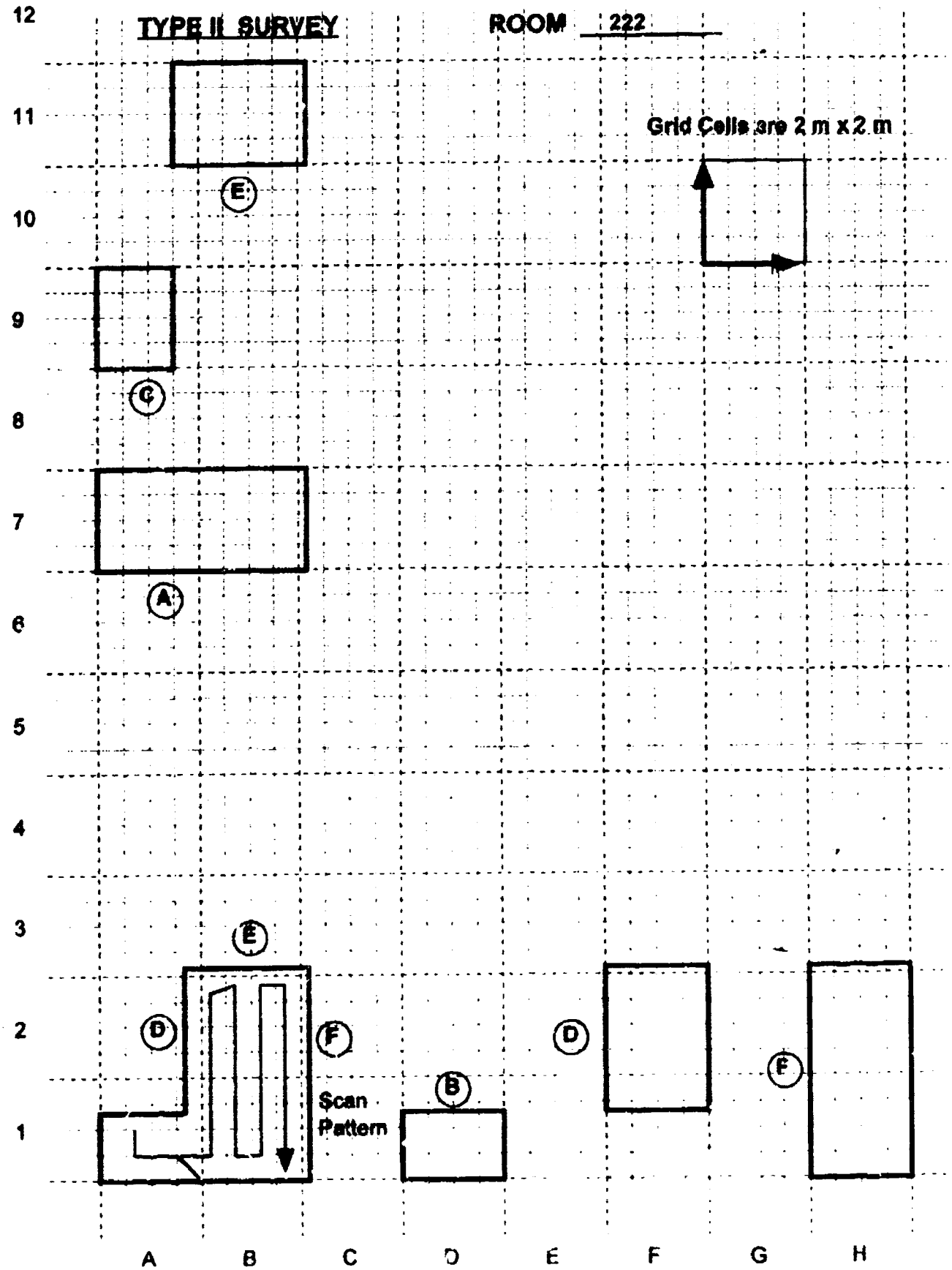
(2) L2000 w/ 100 cm2
(2) Gas Flow 100 cm2 395 cpm
Integrated Count MDA - 1900 dpm/100 cm2

(3) L19 mini-R
10.0
(uR/h)

(4) L12 w/ 2x2 NaI
4
kcpm

(5) LSC - 36 cpm

Grid		* 95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Scan /100 cm2				(1) Beta Direct Meas. /100 cm2			(3) Gamma Contact	(4) Gamma Contact	Action Level	Released Yes/No
		Wipe	Gross	Beta	Unsort.*	Lowest Meas.		Highest Meas		Gross	Beta	Unsort *				
Cell	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	> 2*Bgd. >MDA	
						749	-809	1,048	-106				10	3.6	Pass	Yes
B1	Floor	164	32	-06	27					832	-614	141			Pass	Yes
A1	Floor	165	35	00	27					890	-678	146			Pass	Yes
A2	Floor	166	25	-18	25					842	-591	142			Pass	Yes
B2	Floor	167	28	-13	26					846	-581	143			Pass	Yes
A9	Wall	168	27	-15	26										Pass	Yes
B9	Wall	169	31	-08	27										Pass	Yes
F2	Wall	170	35	-01	27										Pass	Yes
F1	Wall	171	28	-13	26										Pass	Yes
A11	Wall	172	23	-20	25										Pass	Yes
B11	Wall	173	27	-15	26										Pass	Yes
H2	Wall	174	32	-06	27										Pass	Yes
H1	Wall	175	24	-19	25										Pass	Yes


TYPE II SURVEY
ROOM 222
Grid Cells are 2 m x 2 m
Scan Pattern
12
11
10
9
8
7
6
5
4
3
2
1
A
B
C
D
E
F
G
H

RSO, Inc (RF-20) ITRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Room 222 Date - 15-Jul-98

Location Radioisotope Laboratory TYPE II Survey Surveyor - Bisson D., Dean J.

(1) Plastic Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 1003 cpm
Integrated Count MDA - 652 dpm/100 cm2
Scanning MDA - 2200 dpm/100 cm2

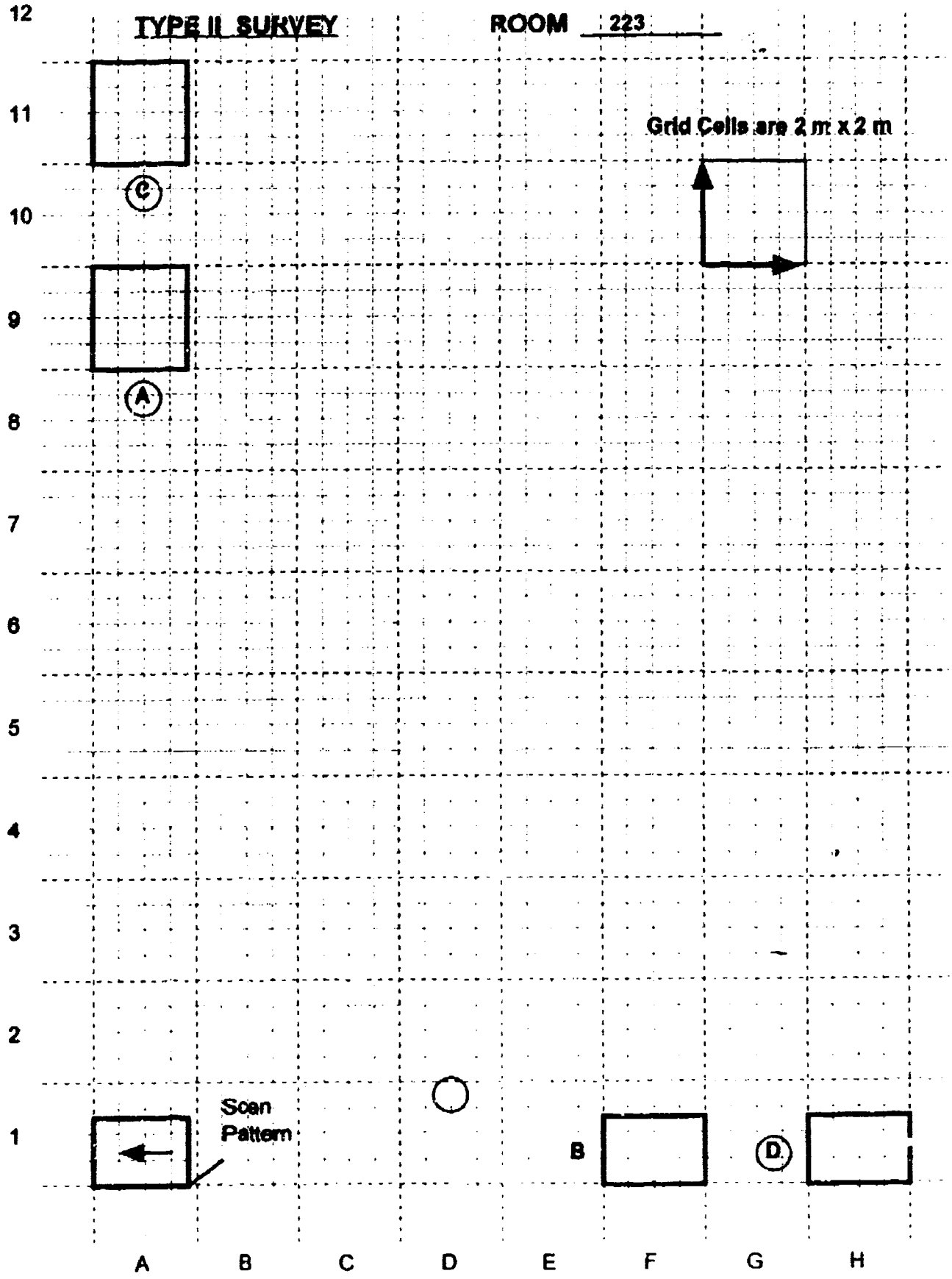
(2) L2200 w/ 100 cm2
(2) Gas Flow 100 cm2 - 395 cpm
Integrated Count MDA - 1500 dpm/100 cm2

(3) L19 microR 10.0 (uR/h)
(5) LBC - 36 cpm

(4) L12 w/ 2x2 NaI 4 kcpm

Grid		* 99% Confidence Level (3) Wipe Results				Survey Data Results (1) Beta Scan 100 cm2				(1) Beta Direct Meas /100 cm2			(3) Gamma Contact	(4) Gamma Contact	Action Level	Released
		Wipe	Gross	Beta	Unsort *	Lowest Meas		Highest Meas		Gross	Beta	Unsort *				
Cell	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	> 2*Bgd >MDA	Yes/No
						840	-525	1,049	-104				10	3.6	Pass	Yes
A1	Floor	151	35	00	27					953	-329	150			Pass	Yes
A2	Floor	152	20	-26	24					888	-482	146			Pass	Yes
B2	Floor	153	28	-15	26					882	-496	145			Pass	Yes
B1	Floor	154	31	-07	27					891	-475	146			Pass	Yes
D1	Wall	155	21	-24	25										Pass	Yes
A9	Wall	156	36	01	28										Pass	Yes
F1	Wall	157	26	-16	26										Pass	Yes
F2	Wall	158	29	-10	26										Pass	Yes
H2	Wall	159	29	-10	26										Pass	Yes
H1	Wall	160	24	-19	25										Pass	Yes
B11	Wall	161	29	-11	26										Pass	Yes
A7	Wall	162	28	-13	26										Pass	Yes
B7	Wall	163	29	-10	26										Pass	Yes

TYPE II SURVEY ROOM 223



RBO, Inc (RF-20) ITRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Room 223 Date - 15-Jul-98

Location Radioisotope Laboratory TYPE II Survey Surveyor - Bisson D., Dean J.

(1) Floor Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 1093 cpm
Integrated Count MDA - 652 dpm/100 cm2
Scanning MDA - 2200 dpm/100 cm2

(2) L2200 w/ 100 cm2
(2) Gas Flow 100 cm2 - 395 cpm
Integrated Count MDA - 1500 dpm/100 cm2

(3) L19 microR 19.0 (uR/h)

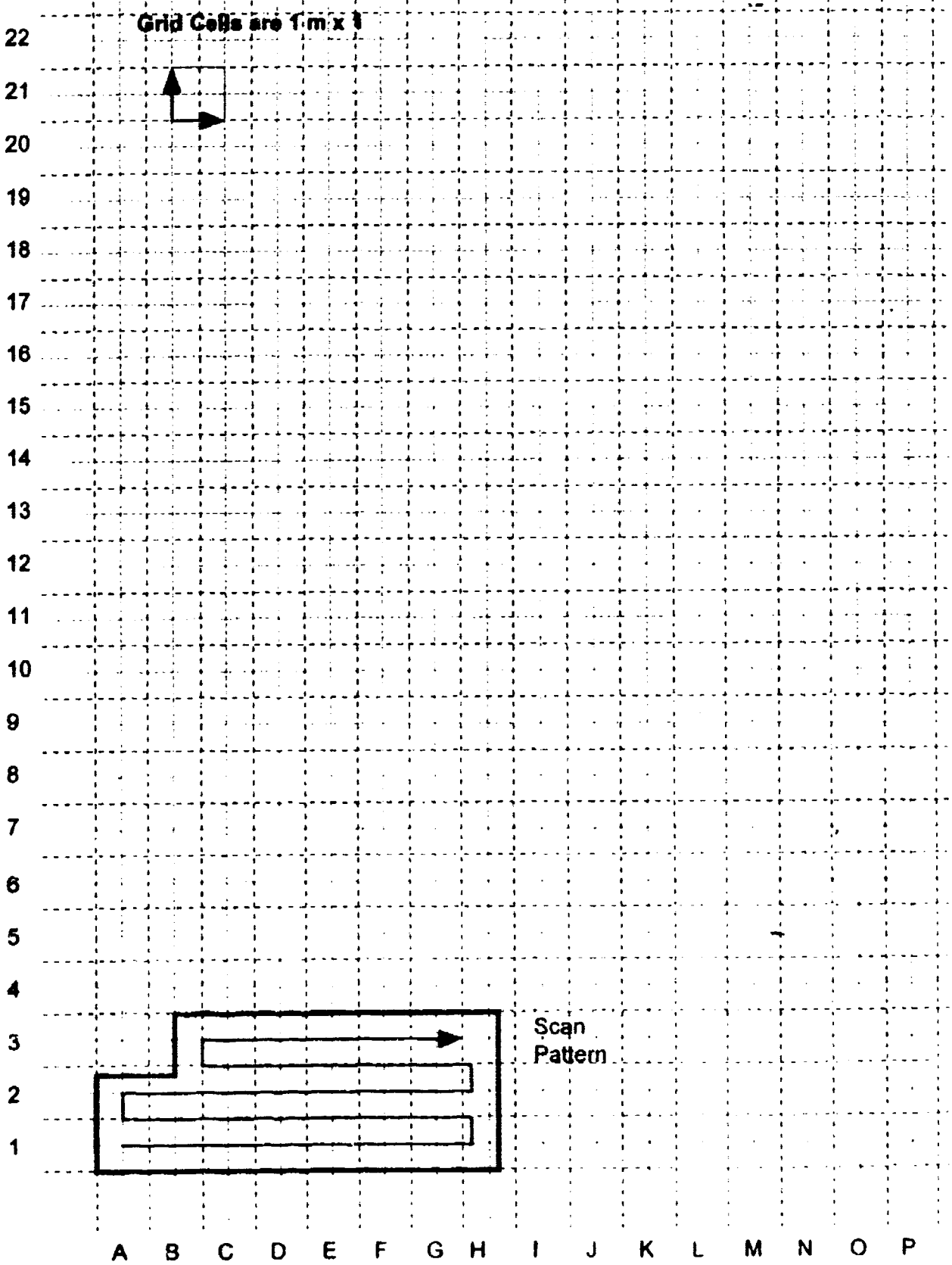
(4) L12 w/ 2x2 NaI 6 kcpm

(5) LSC - 36 cpm

Grid		* 95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Scan /100 cm2				(1) Beta Direct Meas /100 cm2			(3) Gamma	(4) Gamma	Action	Released
		Wipe	Gross	Beta	Unsust.*	Lowest Meas		Highest Meas		Gross	Beta	Unsust.*	Contact	Contact	Level	Yes/No
Cell	Description	No.	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	> 1*Bgd >MDA	
						870	-525	1,015	-184				10	3.6	Pass	Yes
A1	Floor	176	25	-18	25					892	-473	427			Pass	Yes
A9	Wall	177	23	-20	25										Pass	Yes
F1	Wall	178	37	02	28										Pass	Yes
A11	Wall	179	27	-14	26										Pass	Yes
H1	Wall	180	27	-14	26										Pass	Yes

TYPE I SURVEY ROOM On Top of SCIF #1

Grid Cells are 1 m x 1



RSO, Inc (RF-20) ITRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of On Top of SCIF#1 Date - 24-Jul-98

Location On Top of SCIF #1 TYPE I Survey Surveyor - Bisson D., Smith G., Dean J.

(1) Flow Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 991 cpm
Integrated Count MDA - 612 dpm/100 cm2
Scanning MDA - 7200 dpm/100 cm2

(2) L2200 w/ 100 cm2
(2) Gas Flow 100 cm2 - 536 cpm
Integrated Count MDA - 1715 dpm/100 cm2

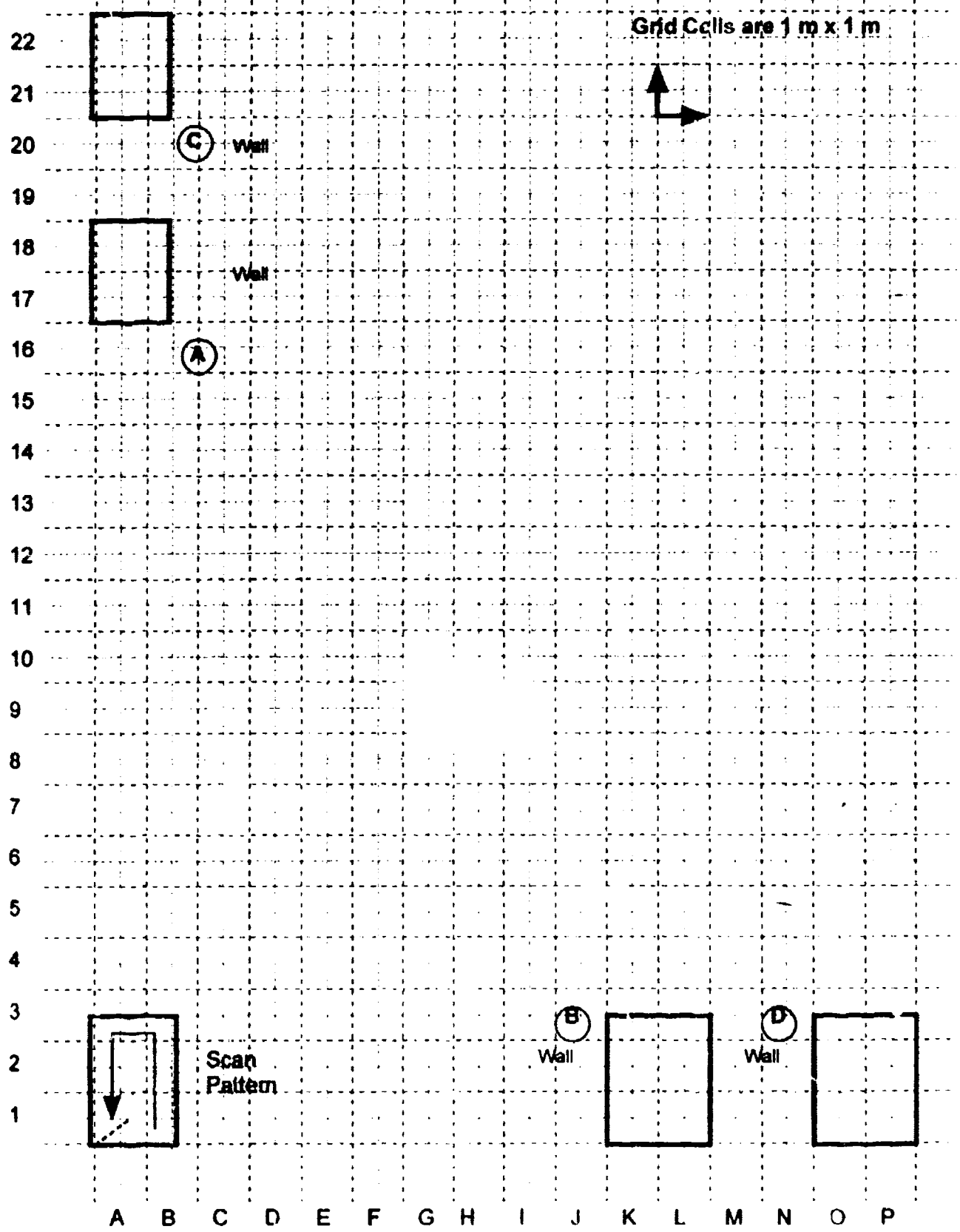
(3) L19 microR
7.8
(uR/h)

(4) L12 w/ 3x2 NaI
3
kcpm

(5) LSC - 39 cpm

Grid		* 95% Confidence Level				Survey Data Results										
		(5) Wipe Results				(1) Beta Scan /100 cm2				(2) Beta Direct Meas 100 cm2			(3) Gamma Contact	(4) Gamma Contact	Action Level	Released Yes/No
		Wipe	Gross	Beta	Unsupt *	Lowest Meas		Highest Meas		Gross	Beta	Unsupt *				
Cell	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	> 2*Bgd >MDA	
						1,150	468	1,650	1,645				10	3.6	Pass	Yes
A1	Floor	526	25	-23	26					512	-157	[illegible]			Pass	Yes
B1	Floor	527	22	-28	26					510	-171	337			Pass	Yes
C1	Floor	528	23	-26	26					502	-229	339			Pass	Yes
D1	Floor	529	25	-24	26					514	-143	333			Pass	Yes
E1	Floor	530	29	-16	27					486	-343	325			Pass	Yes
F1	Floor	531	25	-23	26					496	-271	328			Pass	Yes
G1	Floor	532	29	-17	27					540	43	341			Pass	Yes
H1	Floor	533	37	-03	29					436	-700	310			Pass	Yes
H2	Floor	534	30	-15	27					504	-214	331			Pass	Yes
G2	Floor	535	23	-26	26					534	0	339			Pass	Yes
F2	Floor	536	29	-17	27					470	-457	320			Pass	Yes
E2	Floor	537	28	-18	27					514	-143	333			Pass	Yes
D2	Floor	538	21	-31	25					544	71	342			Pass	Yes
C2	Floor	539	36	-05	28					488	-329	326			Pass	Yes
B2	Floor	540	27	-21	26					506	-200	331			Pass	Yes
A2	Floor	541	27	-21	26					490	-314	329			Pass	Yes
C3	Floor	542	24	-25	26					498	-257	329			Pass	Yes
D3	Floor	543	26	-22	26					648	814	371			Pass	Yes
E3	Floor	544	29	-16	27					500	-243	329			Pass	Yes
F3	Floor	545	28	-18	27					532	-14	339			Pass	Yes
G3	Floor	546	37	-03	29					488	-329	326			Pass	Yes
H3	Floor	547	25	-23	26					516	-129	334			Pass	Yes

TYPE I SURVEY ROOM 174



RSO, Inc (RF-20) ITTRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Room 174 Date - 11-Aug-98

Location Radioisotope Laboratory TYPE I Survey Surveyor - Besson D., Smith O., Sink D.

(1) Floor Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 1057 cpm
Integrated Count MDA - 642 dpm/100 cm2
Scanning MDA - 7200 dpm/100 cm2

(2) L2200 w/ 100 cm2
(2) Gas Flow 100 cm2 395 cpm
Integrated Count MDA - 1500 dpm/100 cm2

(3) L19 microR
10.0
(uR/h)

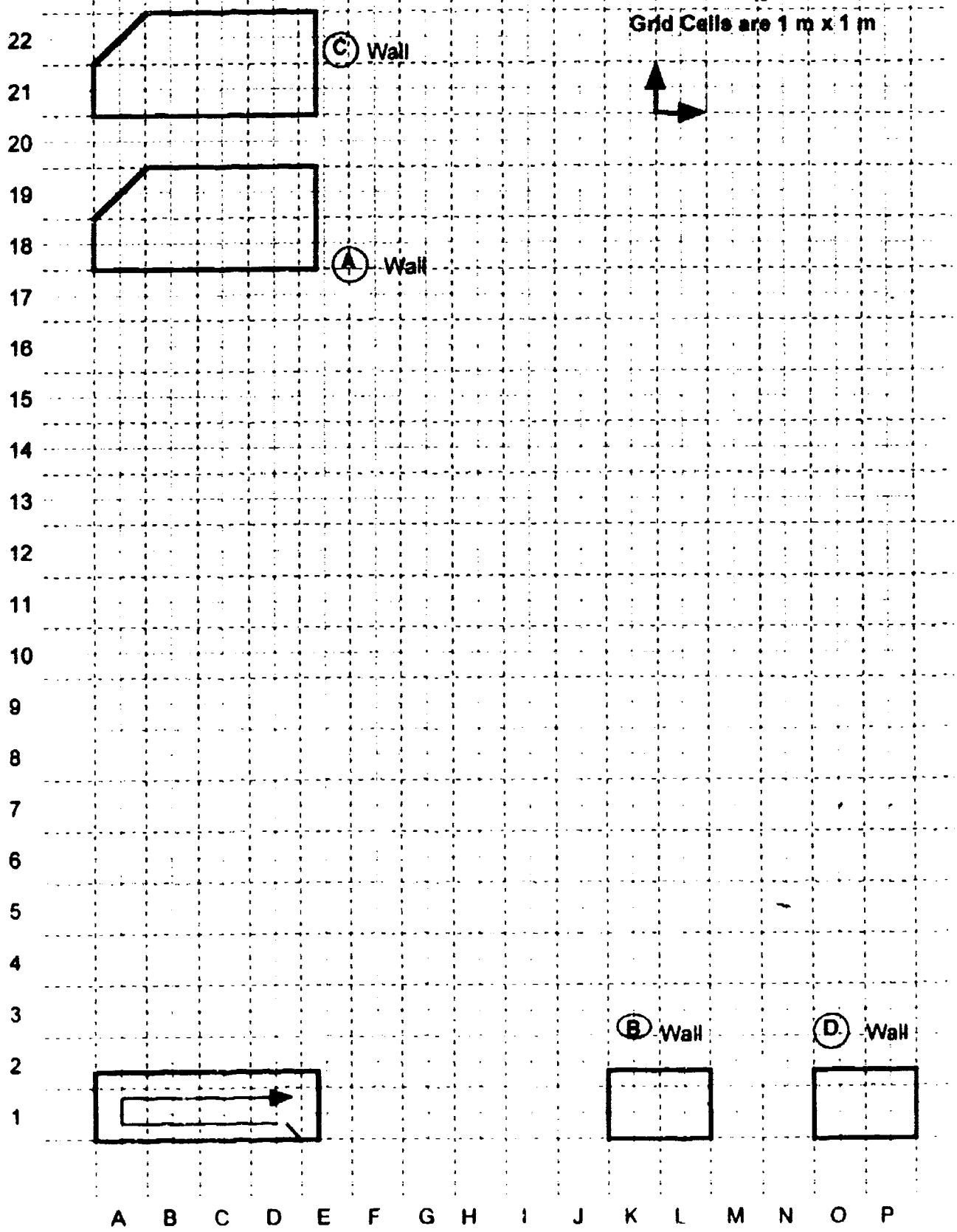
(4) L12 w/ ZnS Nal
6
kcpm

(5) LBC - 36 cpm

Grid		* 95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Scan /100 cm2				(2) Beta Direct Meas 100 cm2			(3) Gamma	(4) Gamma	Action	Released
		Wipe	Gross	Beta	Uncert.*	Lowest Meas		Highest Meas		Gross	Beta	Uncert.*	Contact	Contact	Level	Yes/No
Cell	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	> 2*Bgd. >MDA	
						830	-534	1,175	278				10	4.0	Pass	Yes
A1	Floor	739	28	-13	26					358	-264	279			Pass	Yes
A2	Floor	740	31	-07	27					426	221	302			Pass	Yes
A3	Floor	741	23	-20	25					406	79	295			Pass	Yes
B1	Floor	742	29	-10	26					388	-50	289			Pass	Yes
B2	Floor	743	32	-06	27					412	121	297			Pass	Yes
B3	Floor	744	33	-04	27					380	-107	287			Pass	Yes
KL12	Wall	745	24	-19	25					324	-507	267			Pass	Yes
AB2122	Wall	746	25	-18	25					308	-621	261			Pass	Yes
OP12	Wall	747	31	-08	27					326	-493	268			Pass	Yes
AB1718	Wall	748	27	-15	26					284	-793	252			Pass	Yes

TYPE I SURVEY ROOM 105A

Grid Cells are 1 m x 1 m



RSO No. (SF 20) ITTRI

Radiological Survey Results

Site - ITTRI Va Technology Center | Survey Results of Room 105A | Date 11 Aug-98

Location Radioisotope Laboratory | TYPE I Survey | Surveyor - Bisson D , Smith G , Sink D

(1) Floor Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 1007 cpm
Integrated Count MDA 642 dpm/100 cm2
Scanning MDA 2200 dpm/100 cm2

(2) 2200 w/ 100 cm2
(2) Gas Flow 100 cm2 610 cpm
Integrated Count MDA 1821 dpm/100 cm2

(3) L19 mr/hr
10.0 mR/hr

(4) 1.12 w/ 2x2 NaI
4 kcpm

(5) LSC 36 cpm

Grid		* 95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Scan /100 cm2				(2) Beta Direct Meas /100 cm2			(3) Gamma	(4) Gamma	Action	Released
		Wipe	Gross	Beta	Uncert. *	Lowest Mean		Highest Mean		Gross	Beta	Uncert *	Contact	Contact	Level	Yes/No
Loll	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	> 2*Bgd >MDA	
						1,400	807	2,000	2,219				12	5.0	Pass	Yes
D1	Floor	749	28	12	26					676	471	380			Pass	Yes
C1	Floor	750	29	11	26					674	457	380			Pass	Yes
B1	Floor	751	29	11	26					560	357	349			Pass	Yes
A1	Floor	752	35	01	27					578	229	354			Pass	Yes
D2	Floor	753	28	13	26					690	571	384			Pass	Yes
C2	Floor	754	37	03	28					686	543	383			Pass	Yes
B2	Floor	755	32	06	27					550	429	346			Pass	Yes
A2	Floor	756	23	30	25					486	886	327			Pass	Yes
K1	Wall	757	31	07	27					348	1,871	283			Pass	Yes
D2122	Wall	758	25	17	25					588	157	357			Pass	Yes
C2122	Wall	759	24	19	25					556	186	348			Pass	Yes
B2122	Wall	760	27	15	26					580	214	354			Pass	Yes
A2122	Wall	761	26	16	26					536	529	342			Pass	Yes
OP12	Wall	762	22	23	25					506	743	333			Pass	Yes
D1819	Wall	763	34	03	27					346	1,886	282			Pass	Yes
C1819	Wall	764	29	10	26					362	1,771	288			Pass	Yes
B1819	Wall	765	27	14	26					340	1,929	280			Pass	Yes
A1819	Wall	766	30	09	26					364	1,757	289			Pass	Yes

RBO, Inc (RF-20) ITTRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Sink Drain Pipe Swabs Date - 24-Aug-98

Location Various TYPE III Survey Surveyor - Smith, G.

(1) Floor Monitor w/ 425 cm2
Proportional Detector 1122 cpm
Integrated Count MDA - 660 dpm/100 cm2
Scanning MDA - 2200 dpm/100 cm2

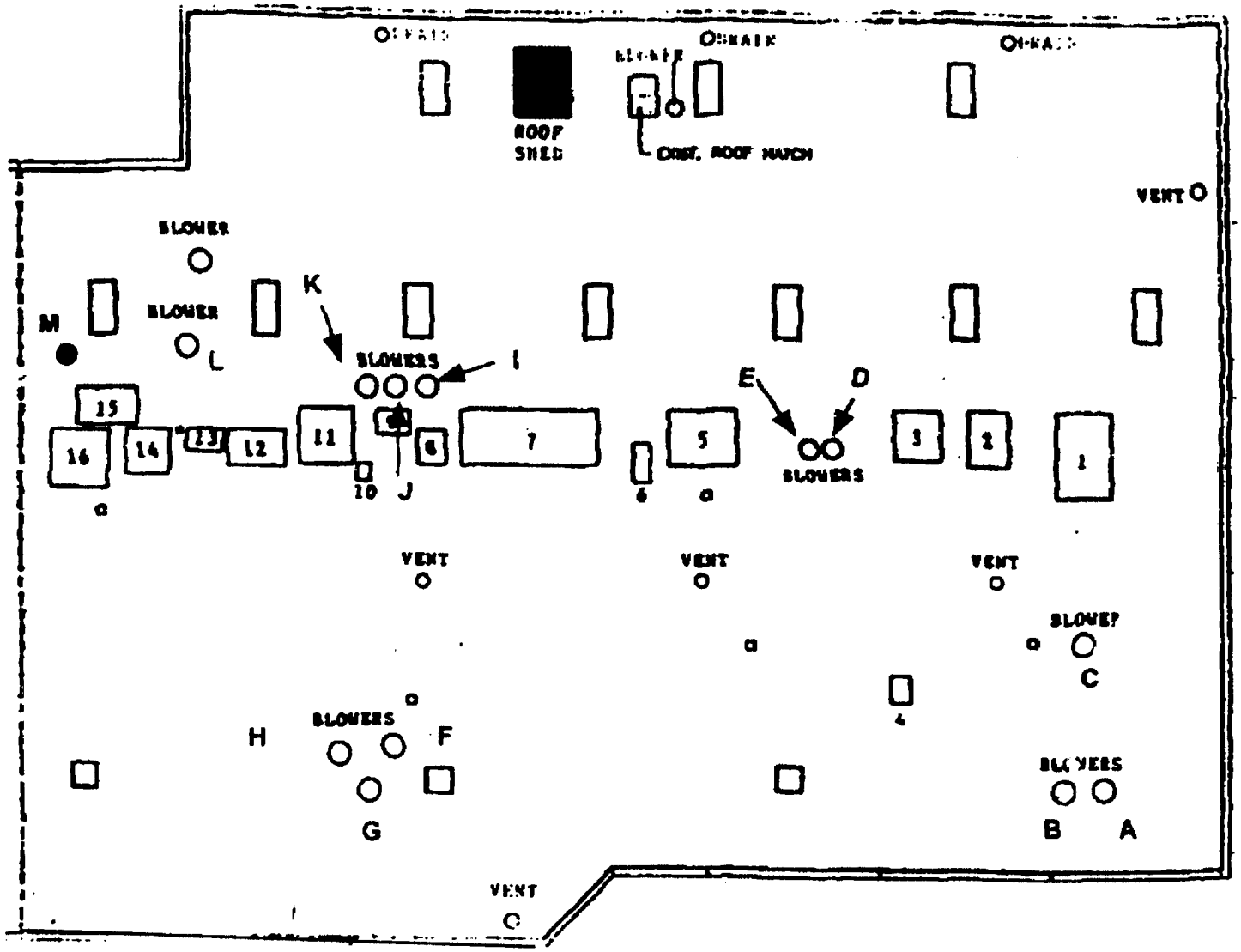
(2) L2200 w/ 100 cm2
Proportional Detector 394 cpm
Integrated Count MDA - 1499 dpm/100 cm2

(3) L19 microR
10.0
(uR/h)

(4) L12 w/ 2x2 NaI
4
kcpm

(5) Beckman LS 6000SC 42 cpm

Grid		* 95% Confidence Level				Survey Data Results										
		(5) Wipe Results				(1) Beta Scan /100 cm2				(2) Beta Direct Meas 100 cm2			(3) Gamma	(4) Gamma	Action	Released
		Wipe	Gross	Beta	Unsort *	Lowest Meas		Highest Meas		Gross	Beta	Unsort *	Contact	Contact	Level	Yes/No
Location	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	> 2*Bgd >MDA	
															Pass	Yes
Rm 215	drain pipe	913	43	03	30										Pass	Yes
Rm 216	drain pipe	914	39	-05	29										Pass	Yes
Rm 216	drain pipe	915	47	08	31										Pass	Yes
Rm 219	drain pipe	916	24	-29	26										Pass	Yes
Rm 219	drain pipe	917	24	-29	26										Pass	Yes
Rm 202	drain pipe	918	27	-24	27										Pass	Yes
Rm 202	drain pipe	919	31	-18	28										Pass	Yes
Rm 203	drain pipe	920	27	-24	27										Pass	Yes
Rm 203	drain pipe	921	31	-17	28										Pass	Yes
Rm 203	drain pipe	922	22	-33	26										Pass	Yes
Rm 203	drain pipe	923	43	02	30										Pass	Yes
Rm 203	drain pipe	924	20	[illegible]	26										Pass	Yes
Rm 222	drain pipe	925	31	-17	28										Pass	Yes
Rm 222	drain pipe	926	32	-16	28										Pass	Yes
Rm 220	drain pipe	927	25	-27	27										Pass	Yes
Rm 220	drain pipe	928	24	-29	26										Pass	Yes
Rm 220	drain pipe	929	33	-15	28										Pass	Yes
Rm 220	drain pipe	930	27	-25	27										Pass	Yes
Rm 220	drain pipe	931	28	-23	27										Pass	Yes
Rm 147	drain pipe	932	38	-06	29										Pass	Yes
Rm 148	drain pipe	933	35	-12	29										Pass	Yes
Rm 148	drain pipe	934	37	-08	29										Pass	Yes
Rm 150	drain pipe	935	28	-23	27										Pass	Yes
Rm 151	drain pipe	936	21	-34	26										Pass	Yes
Rm 151	drain pipe	937	28	-23	27										Pass	Yes
Rm 152	drain pipe	938	29	-22	27										Pass	Yes
Rm 152	drain pipe	939	24	-29	26										Pass	Yes
Rm 152	Flr Drain	940	33	15	28										Pass	Yes
SCIF#1	drain pipe	941	25	-28	27										Pass	Yes
2nd Floor	show drain	942	[illegible]	-04	29										Pass	Yes



Note: Numbered rectangles are HVAC units.

IITRI Va. Tech Center Rooftop.
Fume Hood Blowers Labeled A thru M.

- ☐ Direct Measurements
- ☐ Surface Scan
- ☐ Removable Contamination
- ☐ Other

RADIOLOGICAL SURVEY

RSO, Inc.
P.O. Box 1526
Laurel, MD 20725-1526
301-953-2482

FACILITY	IITRI
CONTACT	Pat Dussia
PHONE NO.	(703) 550-0460

SURVEYOR	Last name, first name		Survey Date
	Bissund, Smith, Dean J.		7/24/98

1			
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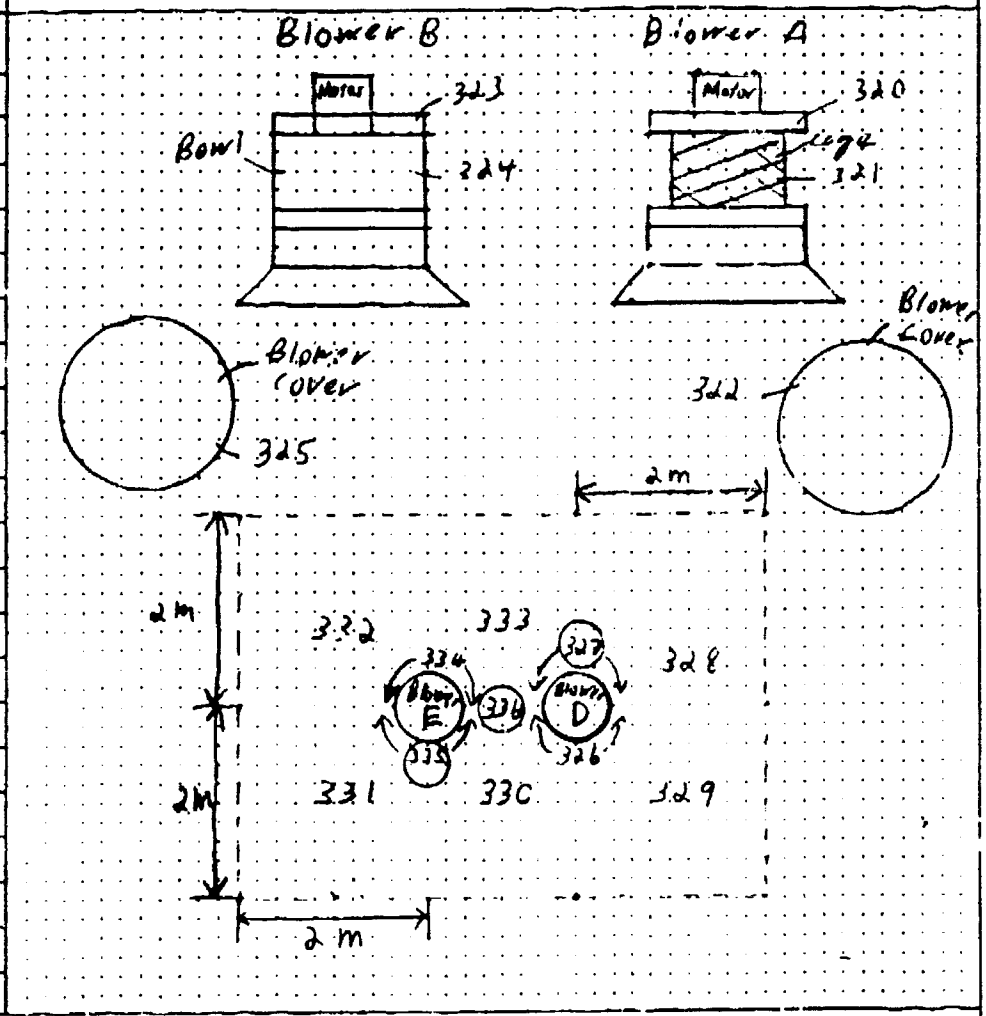
0			

AREA DIAGRAM

Scale _____



REMARKS

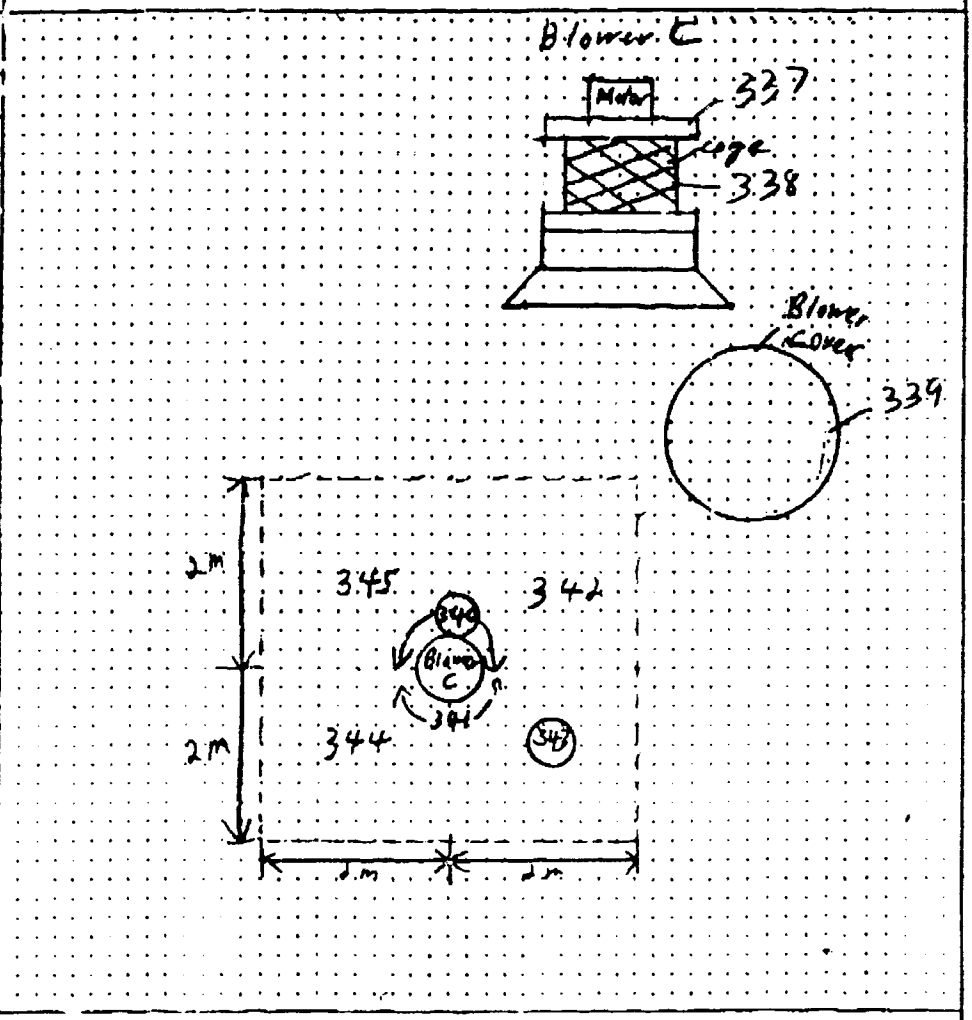
Page ____ of ____

☐ Direct Measurements ☐ Surface Scan ☐ Removable Contamination ☐ Other RADIOLOGICAL SURVEY	**RSO, Inc.** P.O. Box 1526 Laurel, MD 20725-1526 301-953-2482	FACILITY: ITRI CONTACT: PHONE NO.

SURVEYOR	Last name, first name		Survey Date
	Bissun B, Smith G, Dean J		7/24/98

AREA DIAGRAM

Scale _____



REMARKS

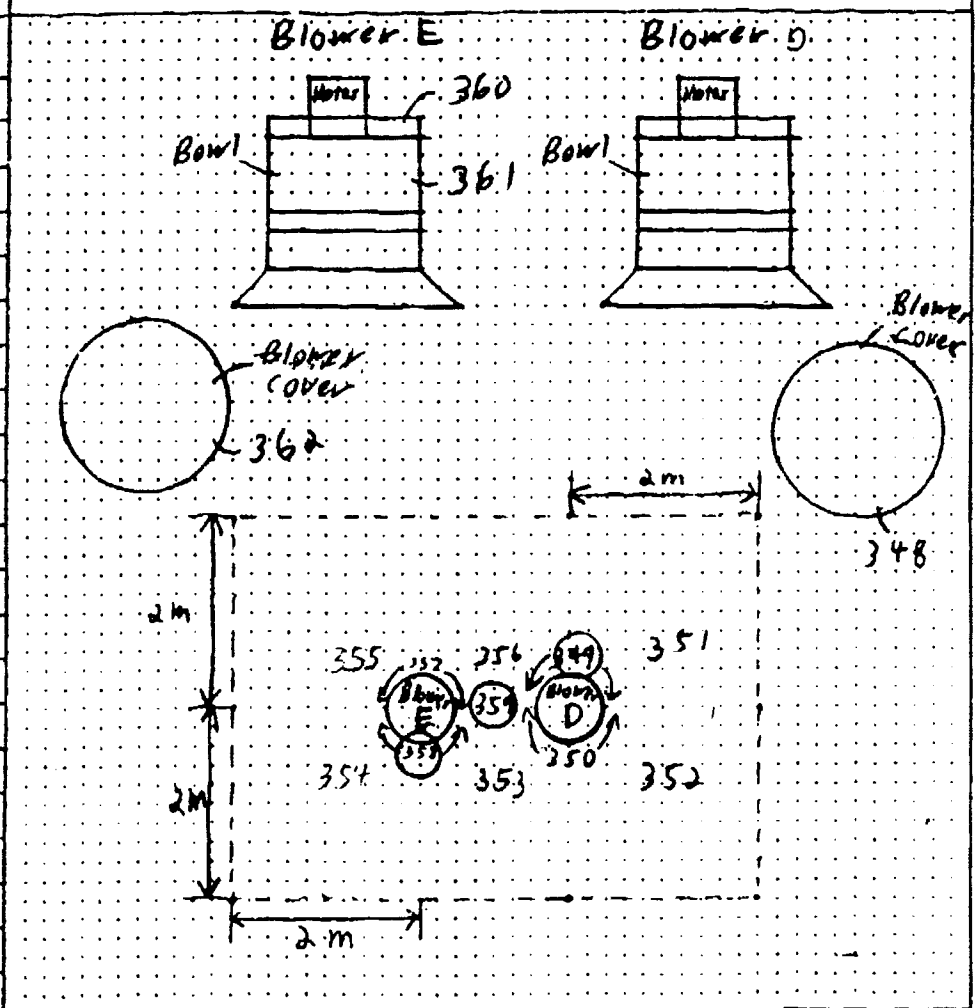
Page ____ of ____

☐ Direct Measurements ☐ Surface Scan ☐ Removable Contamination ☐ Other RADIOLOGICAL SURVEY	**RSO, Inc.** P.O. Box 1526 Laurel, MD 20725-1526 301-953-2482	FACILITY: IITRI CONTACT: Pat Dussia PHONE NO.: (703) 550-0460

SURVEYOR	Last name, first name		Survey Date
	Bisson, D Smith b, Dean, J		7/24/98

AREA DIAGRAM

Scale _____



REMARKS

☐ Direct Measurements
☐ Surface Scan
☐ Removable Contamination
☐ Other

RADIOLOGICAL SURVEY

RSO, Inc.
P.O. Box 1526
Laurel, MD 20725-1526
301-953-2482

FACILITY: IITRI

CONTACT:

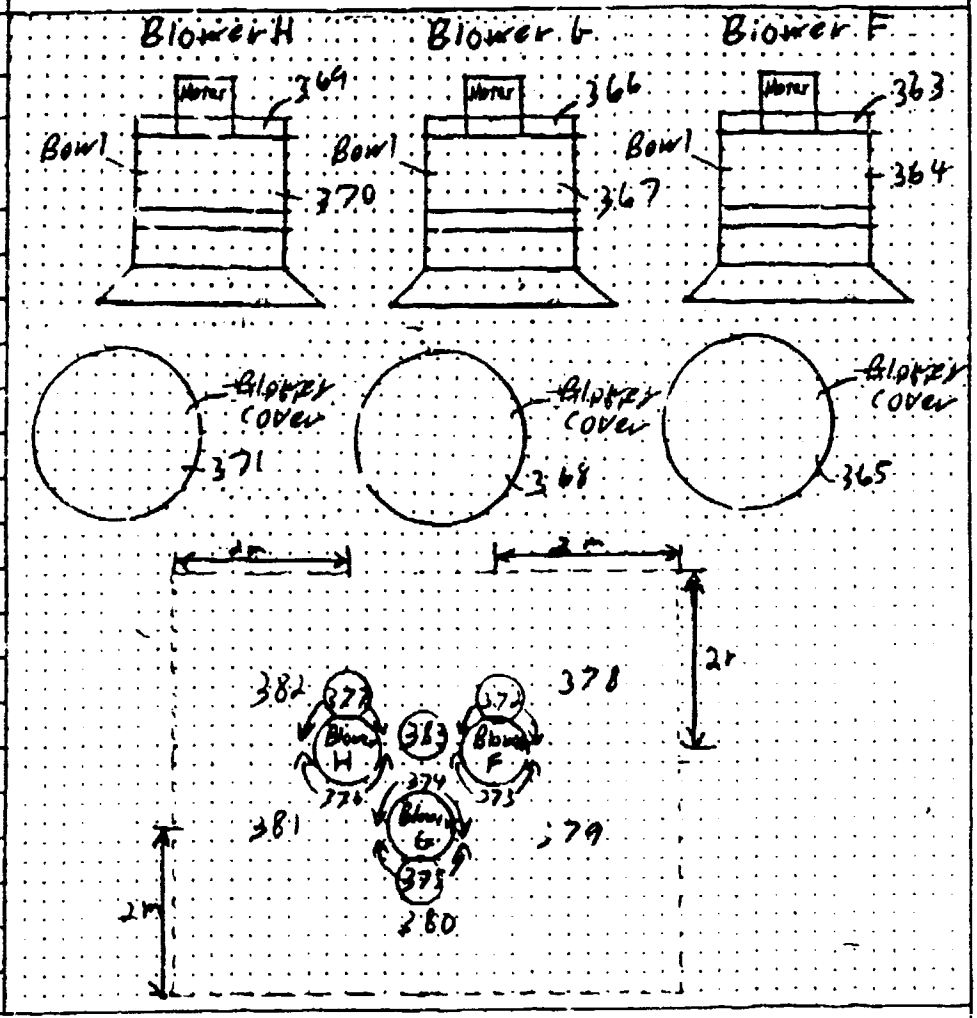
PHONE NO.:

SURVEYOR: Last name, first name: Bisson D., Smith G.

Survey Date: 7/24/98

AREA DIAGRAM

Scale _____



REMARKS

- ☐ Direct Measurements
- ☐ Surface Scan
- ☐ Removable Contamination
- ☐ Other

RADIOLOGICAL SURVEY

RSO, Inc.
P.O. Box 1526
Laurel, MD 20725-1526
301-953-2482

FACILITY: ITRI

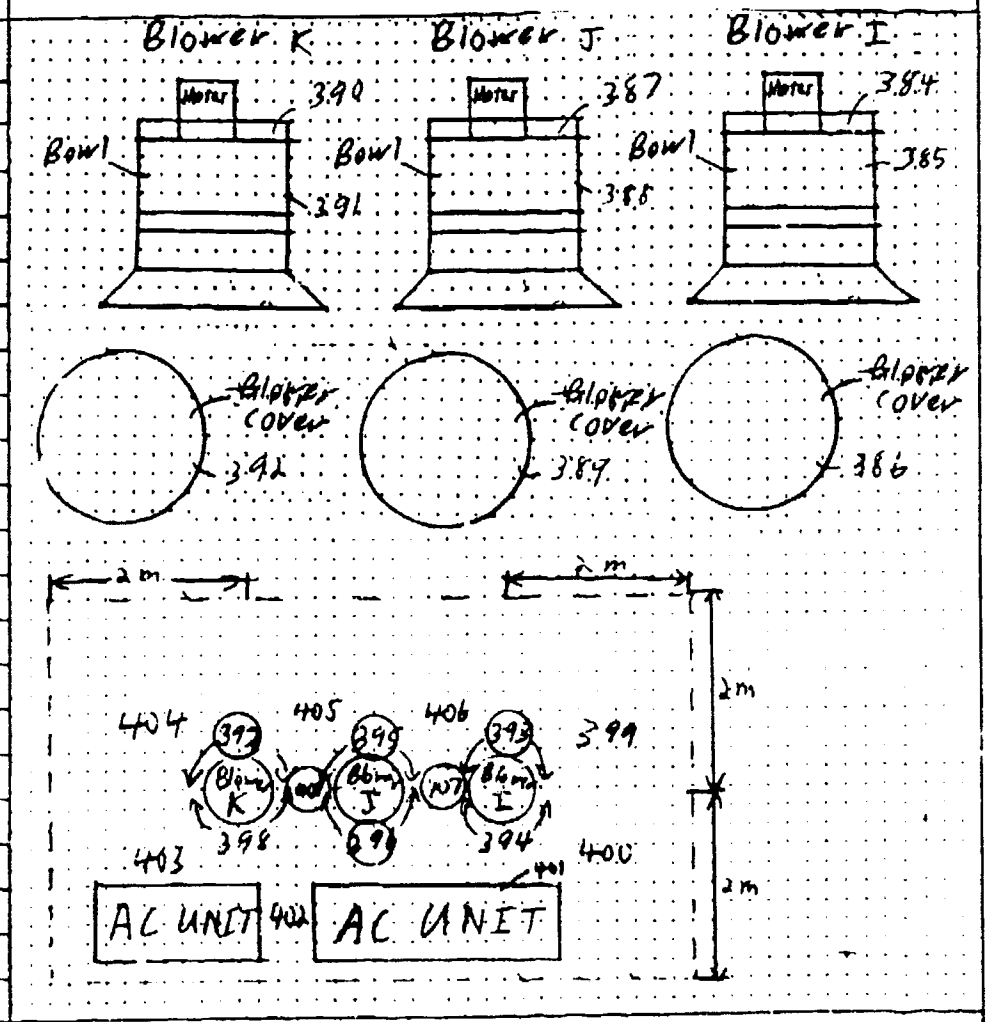
CONTACT:

PHONE NO.:

SURVEYOR	Last name, first name: Bisson D, Smith K, Dennis		Survey Date: 11/24/98

AREA DIAGRAM

Scale _____



REMARKS

☐ Direct Measurements
☐ Surface Scan
☐ Removable Contamination
☐ Other

RADIOLOGICAL SURVEY

RSO, Inc.
P.O. Box 1526
Laurel, MD 20725-1526
301-953-2482

FACILITY: ITRI

CONTACT:

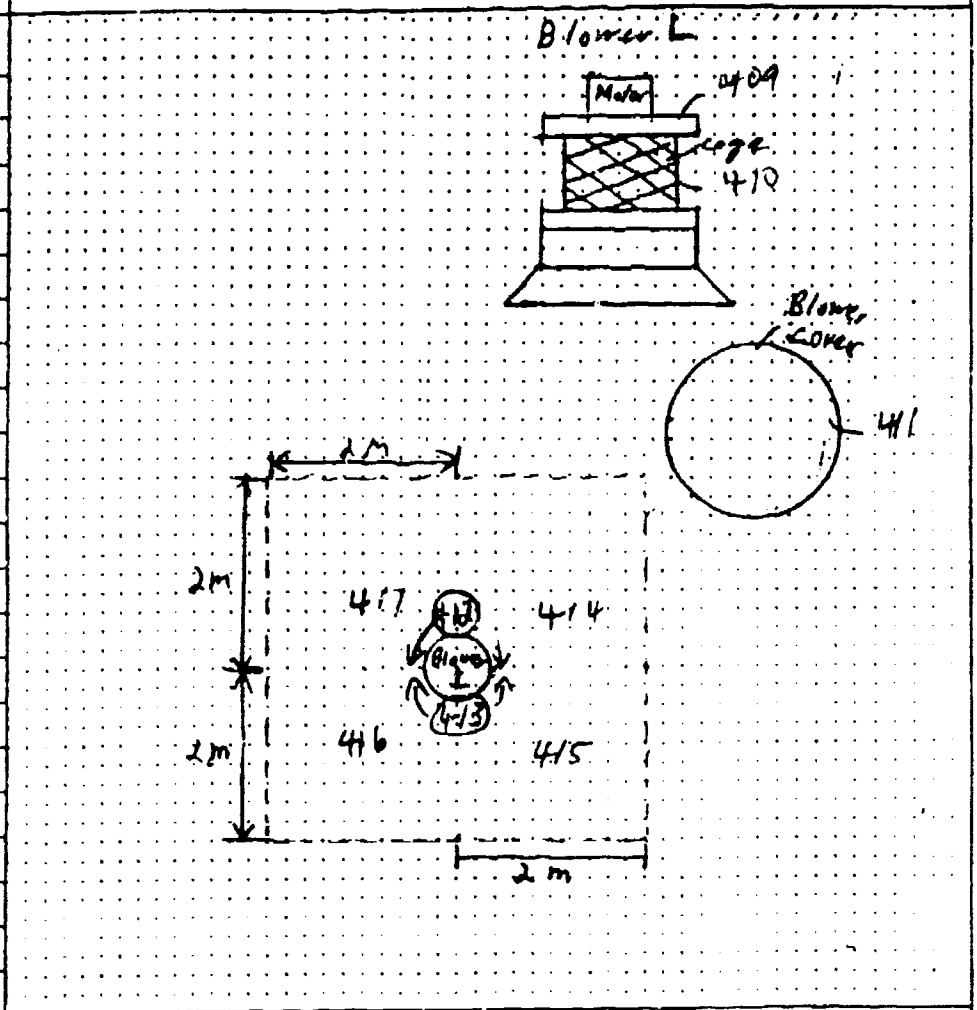
PHONE NO.:

SURVEYOR: Last name, first name: Bisson D., Smith Osmo

Survey Date: 7/24/92

AREA DIAGRAM

Scale _____



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9			
0			

REMARKS

☐ Direct Measurements
☐ Surface Scan
☐ Removable Contamination
☐ Other

RADIOLOGICAL SURVEY

RSO, Inc.
P.O. Box 1526
Laurel, MD 20725-1526
301-953-2482

FACILITY: IITRI

CONTACT:

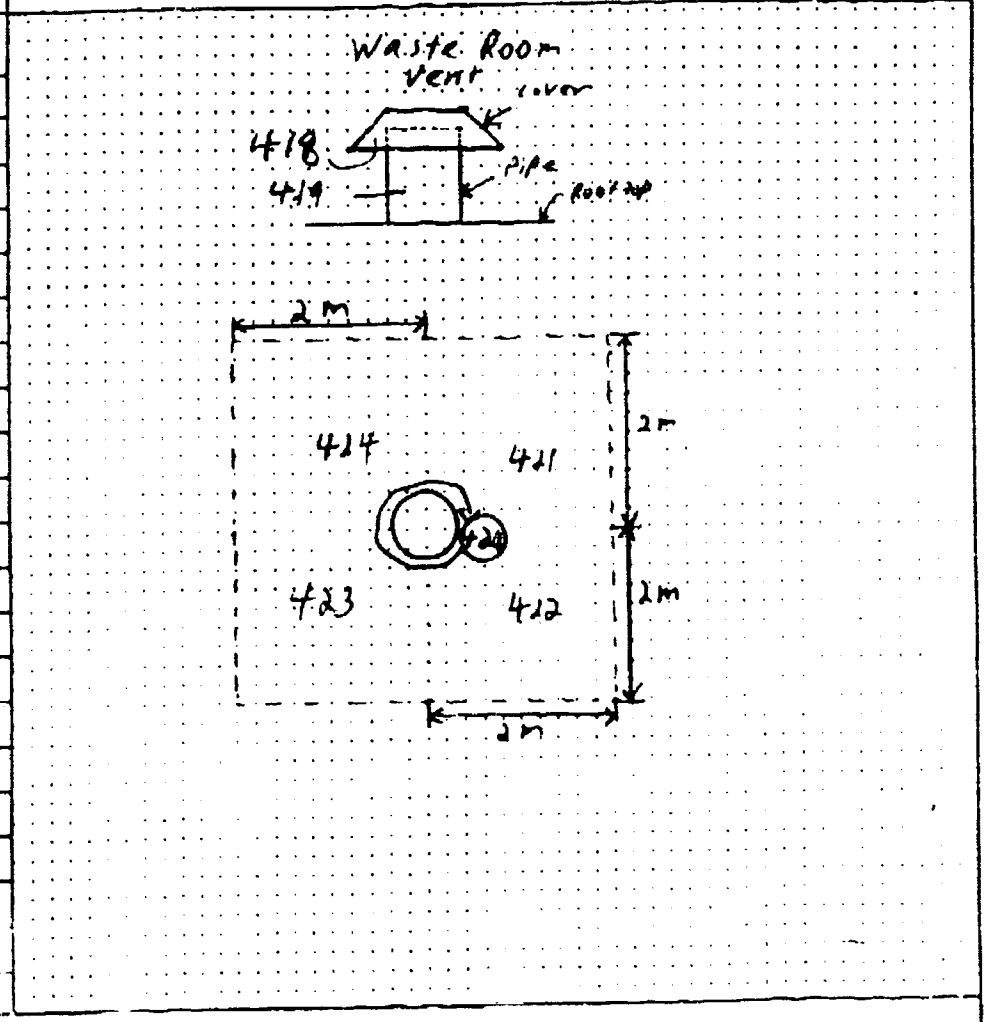
PHONE NO.:

SURVEYOR: Last name, first name: Bisson D., Smith, Brand

Survey Date: 7/24/98

AREA DIAGRAM

Scale _____



REMARKS

Radiological Survey Results

Site: ITTRI Va. Technology Center Survey Results of: Rooftop-Blowers Date: 24-Jul-98

Location: Rooftop TYPE III Survey Surveyor: Hanon D, Smith O., Dean J

(1) Flow Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 ____ cpm
Integrated Count MDA: ____ dpm/100 cm2
Removing MDA: 2200 dpm/100 cm2

(2) LZ200 w/ 100 cm2
(2) Gas Flow 100 cm2: 317.4 cpm
Integrated Count MDA: 1363 dpm/100 cm2

(3) L19 mmeR: 6.8 (uR/h)
(9) LBC: 39 cpm

(4) L12 w/ 2x2 NaI: 1 kcpm

Grid		* 95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Scan /100 cm2				(2) Beta Dosimt Meas 100 cm2			(3) Gamma Contact	(4) Gamma Contact	Action Level	Referred Yes/No
		Wipe	Gross	Beta	Unsort	Lowest Meas		Highest Meas		Gross	Beta	Unsort *				
Location	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	> 2*Bgd MDA	
Blower A,B		320	27	-21	26								6.0	2	Pass	Yes
Blower A,B		321	31	-13	27								6.0	2	Pass	Yes
Blower A,B		322	30	-15	27								6.0	2	Pass	Yes
Blower A,B		323	28	-18	27								6.0	2	Pass	Yes
Blower A,B		324	31	-13	27								6.0	2	Pass	Yes
Blower A,B		325	39	01	29								6.0	2	Pass	Yes
Blower A,B		326	35	-06	28								6.0	2	Pass	Yes
Blower A,B		327	33	-11	28					326	61	365	6.0	2	Pass	Yes
Blower A,B		328	39	-01	29								6.0	2	Pass	Yes
Blower A,B		329	25	24	26								6.0	2	Pass	Yes
Blower A,B		330	21	-29	25								6.0	2	Pass	Yes
Blower A,B		331	33	-11	28								6.0	2	Pass	Yes
Blower A,B		332	35	-06	28								6.0	2	Pass	Yes
Blower A,B		333	26	-22	26								6.0	2	Pass	Yes
Blower A,B		334	35	-07	28								6.0	2	Pass	Yes
Blower A,B		335	27	-21	26					410	061	294	6.0	2	Pass	Yes
Blower A,B		336	34	-08	28					358	261	275	6.0	2	Pass	Yes
Blower C		337	35	-06	28								6.0	2	Pass	Yes
Blower C		338	30	-15	27								6.0	2	Pass	Yes
Blower C		339	31	-13	27								6.0	2	Pass	Yes
Blower C		340	33	-11	28					144	504	267	6.0	2	Pass	Yes
Blower C		341	33	-11	28								6.0	2	Pass	Yes
Blower C		342	23	-27	26								6.0	2	Pass	Yes
Blower C		343	31	-13	27					268	-153	242	6.0		Pass	Yes
Blower C		344	29	-17	27								6.0	2	Pass	Yes
Blower C		345	31	-14	27								6.0	2	Pass	Yes
Blower D,E		346	35	-05	28								6.0	2	Pass	Yes
Blower D,E		347	24	-25	26								6.0	2	Pass	Yes
Blower D,E		348	33	-11	28								6.0	2	Pass	Yes
Blower D,E		349	26	-22	26					342	126	271	6.0	2	Pass	Yes
Blower D,E		350	31	-13	27								6.0	2	Pass	Yes
Blower D,E		351	26	-23	26								6.0	2	Pass	Yes
Blower D,E		352	34	-08	28								6.0	2	Pass	Yes
Blower D,E		353	41	03	29								6.0	2	Pass	Yes
Blower D,E		354	31	-14	27								6.0	2	Pass	Yes
Blower D,E		355	36	-07	28								6.0	2	Pass	Yes
Blower D,E		356	31	-13	27								6.0	2	Pass	Yes
Blower D,E		357	23	-31	25								6.0	2	Pass	Yes
Blower D,E		358	34	-08	28					404	619	292	6.0	2	Pass	Yes

[illegible] Inc (SF 20) HTRI

Radiological Survey Results

Site: HTRI Va. Technology Center Survey Results of: Rooftop-Blowers Date: 24-Jul-98

Location: Rooftop TYPE III Survey Surveyor: Hinson D, Smith G, Dean J

(1) Plate Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 _____ cpm
Integrated Count MDA _____ dpm/100 cm2
Scanning MDA 2700 dpm/100 cm2

(2) 2700 w/ 100 cm2
(2) Gas Flow 107 cm2 317.4 cpm
Integrated Count MDA 1363 dpm/100 cm2

(3) 119 mrem/h
6.0
(uR/h)

(4) 11 w/ 282 Nal
2
kcpm

(5) LM 30 cpm

Grid		* 95% Confidence Level				Survey Data Results										
		(5) Wipe Results				(1) Beta Scan 100 cm2				(2) Beta Direct Meas 100 cm2			(3) Gamma	(4) Gamma	Action	Release
		Wipe	Gross	Beta	Uncorr *	Lowest Meas		Highest Meas		Gross	Beta	Uncorr *	Gamma	Gamma	Level	Yes/No
Location	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	2*Bgd +MDA	
Blower D,E		159	23	-27	20					424	361	290	5.0	2	Pass	Yes
Blower D,E		160	31	14	27								5.0	2	Pass	Yes
Blower D,E		161	34	-08	28								5.0	2	Pass	Yes
Blower D,E		162	34	-08	28								5.0	2	Pass	Yes
Blower F,G,H		163	30	15	27								6.0	2	Pass	Yes
Blower F,G,H		164	32	-12	28								6.0	2	Pass	Yes
Blower F,G,H		165	23	-26	26								6.0	2	Pass	Yes
Blower F,G,H		166	34	08	28								6.0	2	Pass	Yes
Blower F,G,H		167	28	18	27								6.0	2	Pass	Yes
Blower F,G,H		168	31	14	27								6.0	2	Pass	Yes
Blower F,G,H		169	43	06	30								6.0	2	Pass	Yes
Blower F,G,H		170	31	14	27								6.0	2	Pass	Yes
Blower F,G,H		171	30	-15	27								6.0	2	Pass	Yes
Blower F,G,H		172	27	19	27					426	276	600	6.0	2	Pass	Yes
Blower F,G,H		173	39	01	29								6.0	2	Pass	Yes
Blower F,G,H		174	35	07	28								6.0	2	Pass	Yes
Blower F,G,H		175	25	24	27					429	311	298	6.0	2	Pass	Yes
Blower F,G,H		176	29	-17	27								6.0	2	Pass	Yes
Blower F,G,H		177	31	14	27					426	276	600	6.0	2	Pass	Yes
Blower F,G,H		178	32	12	28								6.0	2	Pass	Yes
Blower F,G,H		179	27	19	27								6.0	2	Pass	Yes
Blower F,G,H		180	32	1	28								6.0	2	Pass	Yes
Blower F,G,H		181	29	1	27								6.0	2	Pass	Yes
Blower F,G,H		182	23	27	26								6.0	2	Pass	Yes
Blower F,G,H		183	28	22	27					444	436	803	6.0	2	Pass	Yes
Blower I,J,K		184	30	01	27								5.0	2	Pass	Yes
Blower I,J,K		185	31	14	27								5.0	2	Pass	Yes
Blower I,J,K		186	23	27	26								5.0	2	Pass	Yes
Blower I,J,K		187	38	05	28								5.0	2	Pass	Yes
Blower I,J,K		188	28	18	27								5.0		Pass	Yes
Blower I,J,K		189	27	19	27								5.0		Pass	Yes
Blower I,J,K		190	23	27	26								5.0	2	Pass	Yes
Blower I,J,K		191	27	19	27								5.0	2	Pass	Yes
Blower I,J,K		192	25	24	27								5.0	2	Pass	Yes
Blower I,J,K		193	28	1	27					43	14	2	5.0	2	Pass	Yes
Blower I,J,K		194	33	1	28								5.0	2	Pass	Yes
Blower I,J,K		195	23	27	26					42	1	298	5.0	2	Pass	Yes
Blower I,J,K		196	28	22	27								5.0	2	Pass	Yes
Blower I,J,K		197	34	14	28					178	1	1	5.0	2	Pass	Yes
Blower I,J,K		198	30	15	27								5.0	2	Pass	Yes

Radiological Survey Results

Site - ITTRI Va Technology Center Survey Results of Rooftop-Blowers Date - 24-Jul-98

Location Rooftop TYPE III Survey Surveyor Hutson D, Smith G, Dean J

(1) Plate Measured = 425 cm2
(1) Gas Plate 425 cm2 ____ cpm
Integrated Count MDA ____ dpm/100 cm2
Scanning MDA 2200 dpm/100 cm2

(2) 2200 = 100 cm2
(2) Gas Plate 100 cm2 317.0 cpm
Integrated Count MDA 1363 dpm/100 cm2

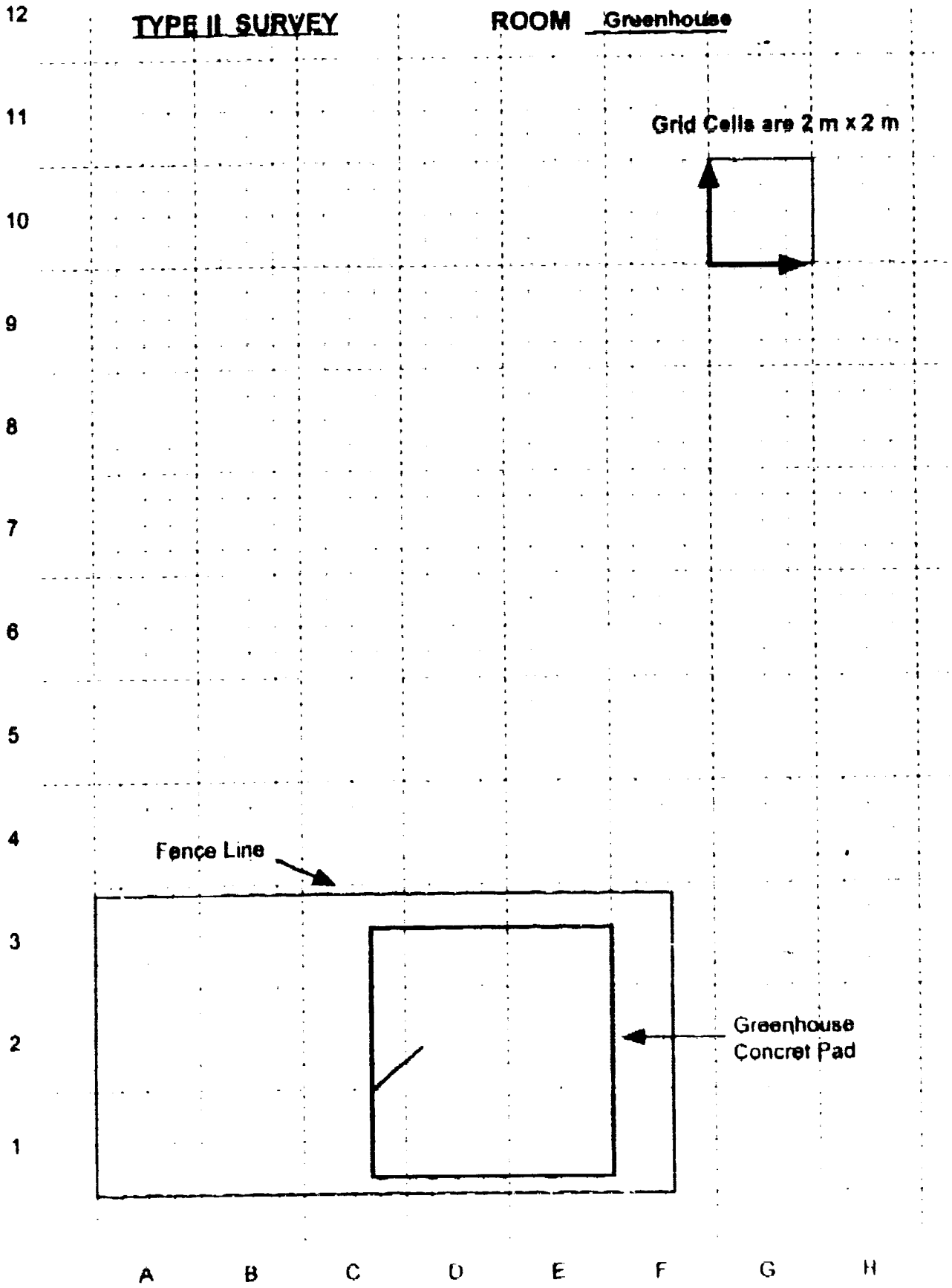
(3) 1.19 mrad/R
0.0 (mR/h)

(4) 1.12 = 2x2 Nal
1 kcpm

(5) LSC 39 cpm

Grid		* 95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Scan 100 cm2 Lowest Mean		Highest Mean		(2) Beta Direct Mean 100 cm2			(3) Gamma Constant	(4) Gamma Constant	Action Level	R Swipe Yes/No
		Wipe	Gross	Beta	Unwipe *	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm		kcpm	> 1*Bgd -MDA	
Location	Description	No	cpm	dpm	dpm											
Blower LJK		399	33	-11	28									2	Pass	Yes
Blower LJK		400	21	29	25									2	Pass	Yes
Blower LJK		401	20	16	27									2	Pass	Yes
Blower LJK		402	20	-16	27									2	Pass	Yes
Blower LJK		403	34	48	28									2	Pass	Yes
Blower LJK		404	27	21	26									2	Pass	Yes
Blower LJK		405	35	48	28									2	Pass	Yes
Blower LJK		406	37	44	29									2	Pass	Yes
Blower LJK		407	32	12	28									2	Pass	Yes
Blower LJK		408	26	22	26					172	464	263		2	Pass	Yes
Blower I		409	41	-15	27									2	Pass	Yes
Blower I		410	37	44	28									2	Pass	Yes
Blower I		411	27	19	27									2	Pass	Yes
Blower I		412	31	-14	27					474	1044	294		2	Pass	Yes
Blower I		413	30	15	27					464	577	273		2	Pass	Yes
Blower I		414	21	-29	25									2	Pass	Yes
Blower I		415	27	21	26									2	Pass	Yes
Blower I		416	29	15	27									2	Pass	Yes
Blower I		417	37	43	29									2	Pass	Yes
Waste Rm Vent		418	27	19	27									2	Pass	Yes
Waste Rm Vent		419	23	27	26									2	Pass	Yes
Waste Rm Vent		420	5	67	28					441	817	264		2	Pass	Yes
Waste Rm Vent		421	11	14	27									2	Pass	Yes
Waste Rm Vent		422	27	19	27									2	Pass	Yes
Waste Rm Vent		423	25	26	26									2	Pass	Yes
Waste Rm Vent		424	33	48	28									2	Pass	Yes

TYPE II SURVEY ROOM Greenhouse



RMI, Inc (SP 70) ITRI

Radiological Survey Results

Site - ITTP Va Technology Center Survey Results of Greenhouse Date - 24-Aug-98

Location Parking Lot Behind Suite 300 TYPE II Survey Surveyor - Smith G

(1) Floor Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 1113 c/m
Integrated Count MDA - 668 dpm/100 cm2
Scanning MDA 2200 dpm/100 cm2

(2) LE200 w/ 100 cm2
(2) Gas Flow 100 cm2 735 c/m
Integrated Count MDA - 1081 dpm/100 cm2

(3) L10 microR 12.0 (uR/h)
(4) I 12 w/ 2x2 NaI 5 kcpm
(5) LSC - 42 cpm

Grid		* 95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Scan (100 cm2) Lowest Meas		Highest Meas		(2) Beta Direct Meas 100 cm2			(3) Gamma Contact	(4) Gamma Contact	Action Level	Released Yes/No
		Wipe	Gross	Beta	Uncert *	Gross cpm	dpm	Gross cpm	dpm	Gross cpm	Beta dpm	Uncert * dpm	uR/h	kcpm	> 2*Bgd -MDA	
Cell	Description	No	cpm	dpm	dpm											
													13	42	Pass	Yes
D1	Floor	866	29	22	27					664	507	[illegible]			Pass	Yes
D2	Floor	867	27	-25	27					696	-279	368			Pass	Yes
D3	Floor	868	23	-32	26					650	-617	377			Pass	Yes
E1	Floor	869	33	-14	28					690	-321	387			Pass	Yes
E2	Floor	870	29	-22	27					576	-1,136	337			Pass	Yes
E3	Floor	871	25	-27	27					672	-450	382			Pass	Yes

☐ Direct Measurements
☐ Surface Scan
☐ Removable Contamination
☐ Other

RADIOLOGICAL SURVEY

RSO, Inc.
P.O. Box 1526
Laurel, MD 20725-1526
301-953-2482

FACILITY IITPI

CONTACT

PHONE NO

SURVEYOR

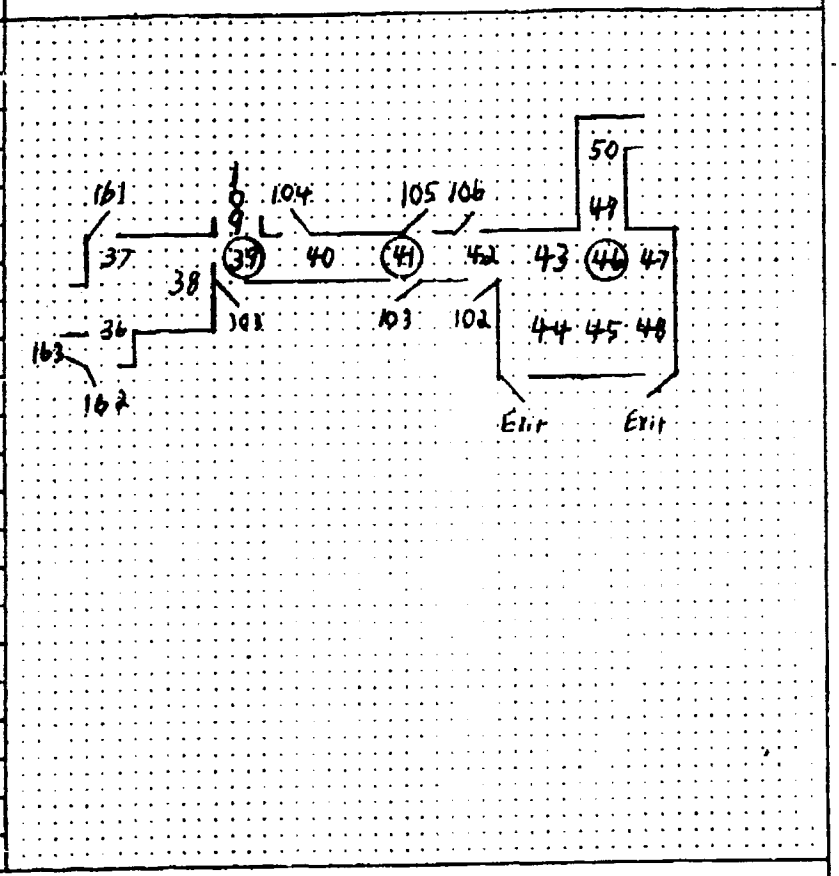
Last name, first name: Bisson D., Smith K.

Survey Date 8/21/98

TYPE III Survey

AREA DIAGRAM

Scale _____



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REMARKS Corridor 102-163

RSO, INC. Rev 4 3/97

RIO, Inc (RP-20) ITRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Corr 102-163 Date - 21-Aug-98

Location Corridor (Carpeted) TYPE III Survey Surveyor - Bisson D., Smith O.

(1) Float Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 1132 cpm
Integrated Count MDA - 660 dpm/100 cm2
Scanning MDA - 2200 dpm/100 cm2

(2) L2200 w/ 100 cm2
(2) Gas Flow 100 cm2 - 394 cpm
Integrated Count MDA - 1499 dpm/100 cm2

(3) L19 microR 10.0 (uR/h)

(4) L12 w/ 2x2 NaI 4 kcpm

(5) LSC - 42 cpm

Grid		95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Scan /100 cm2				(2) Beta Direct Meas. 100 cm2			(3) Gamma Contact	(4) Gamma Contact	Action Level	Released Yes/No
		Wipe	Gross	Beta	Unsort.*	Lowest Meas.		Highest Meas.		Gross	Beta	Unsort.*				
Location	Description	No.	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	> 2*Bgd. >MDA	
						750	-875	1,250	301				12	4.0	Pass	Yes
36	Floor	836	21	-35	26										Pass	Yes
37	Floor	837	39	-04	29										Pass	Yes
38	Floor	838	25	-27	27										Pass	Yes
39	Floor	839	27	-24	27					402	57	294			Pass	Yes
40	Floor	840	30	-19	28										Pass	Yes
41	Floor	841	29	-22	27					472	200	301			Pass	Yes
42	Floor	842	31	-18	28										Pass	Yes
43	Floor	843	33	-14	28										Pass	Yes
44	Floor	844	34	-13	28										Pass	Yes
45	Floor	845	36	-09	29										Pass	Yes
46	Floor	846	28	-23	27					[illegible]	229	302			Pass	Yes
47	Floor	847	33	15	28										Pass	Yes
48	Floor	848	33	-15	28										Pass	Yes
49	Floor	849	29	-21	28										Pass	Yes
50	Floor	850	33	-14	28										Pass	Yes

☐ Direct Measurements
☐ Surface Scan
☐ Removable Contamination
☐ Other

RADIOLOGICAL SURVEY

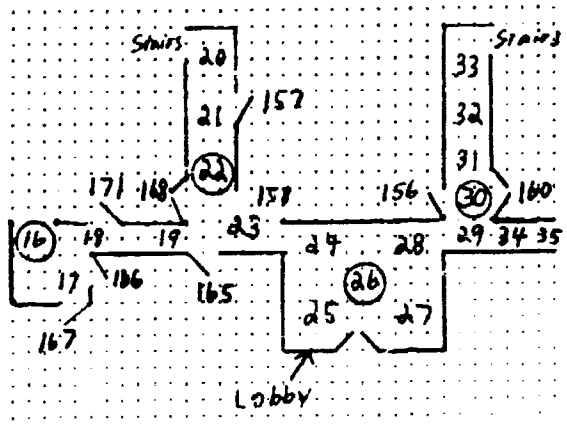
RSO, Inc.
P.O. Box 1526
Laurel, MD 20725-1526
301-953-2482

FACILITY: IITRI
CONTACT:
PHONE NO.:

SURVEYOR: Last name, first name: Bisson D Smith
Survey Date: 8/21/98

TYPE III Survey

AREA DIAGRAM
Scale _____



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REMARKS: Corridor 157-171

RSO, INC. Rev 4 3/97

BJSO, Inc (BF-20) ITRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Corr 157-171 Date - 21-Aug-98

Location Corridor (Carpeted) TYPE III Survey Surveyor - Bisson D., Smith G.

(1) Flow Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 1133 cpm
Integrated Count MDA - 660 dpm/100 cm2
Scanning MDA - 2200 dpm/100 cm2

(2) L2200 w/ 100 cm2
(2) Gas Flow 100 cm2 - 394 cpm
Integrated Count MDA - 1499 dpm/100 cm2

(3) L19 Admin/R
3.0
(uR/h)

(4) L12 w/ 2x2 NaI
4
kcpm

(5) LSC - 43 cpm

Grid		* 95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Scan /100 cm2				(2) Beta Direct Meas. 100 cm2			(3) Gamma Contact	(4) Gamma Contact	Action Level	Released Yes/No
		Wipe	Jmax	Beta	Uncert.*	Lowest Meas		Highest Meas		Gross	Beta	Uncert.*				
Location	Description	No.	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	> 2*Bgd. >MDA	
						750	-875	1,250	301				12	4.0	Pass	Yes
16	Floor	816	27	-25	27					416	157	299			Pass	Yes
17	Floor	817	37	-08	29										Pass	Yes
18	Floor	818	39	-05	29										Pass	Yes
19	Floor	819	43	02	30										Pass	Yes
20	Floor	820	37	-08	29										Pass	Yes
21	Floor	821	29	-22	27										Pass	Yes
22	Floor	822	35	-12	29					378	-114	286			Pass	Yes
23	Floor	823	32	-16	28										Pass	Yes
24	Floor	824	34	-13	28										Pass	Yes
25	Floor	825	39	-05	29										Pass	Yes
26	Floor	826	44	06	30					424	214	301			Pass	Yes
27	Floor	827	28	-23	27										Pass	Yes
28	Floor	828	29	-22	27										Pass	Yes
29	Floor	829	33	-14	28										Pass	Yes
30	Floor	830	35	-11	29					418	171	299			Pass	Yes
31	Floor	831	25	-27	27										Pass	Yes
32	Floor	832	35	-11	29										Pass	Yes
33	Floor	833	28	-23	27										Pass	Yes
34	Floor	834	33	-15	28										Pass	Yes
35	Floor	835	29	-21	28										Pass	Yes

☐ Direct Measurements
☐ Surface Scan
☐ Removable Contamination
☐ Other

RADIOLOGICAL SURVEY

RSO, Inc.
P.O. Box 1526
Laurel, MD 20725-1526
301-953-2487

FACILITY IITRI

CONTACT

PHONE NO.

SURVEYOR

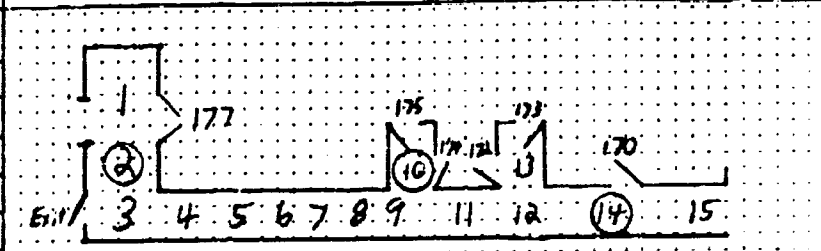
Last name, first name: Bisson D, Smith G

Survey Date: 8/21/98

TYPE III Survey

AREA DIAGRAM

Scale _____



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REMARKS Corridor 170-177

RSO, INC. Rev 4 3/97

RSO, Inc (RP-29) ITRI

Radiological Survey Results

Site - ITRI Va. Technology Center Survey Results of Corr 170-177 Date - 21-Aug-98

Location Corridor (Carpeted) TYPE III Survey Surveyor - Bimon D., Smith G.

(1) Floor Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 1133 cpm
Integrated Count MDA - 660 dpm/100 cm2
Scanning MDA - 2200 dpm/100 cm2

(2) L2200 w/ 100 cm2
(2) Gas Flow 100 cm2 - 304 cpm
Integrated Count MDA - 1470 dpm/100 cm2

(3) L19 micro-R
10.0
(uR/h)

(4) L12 w/ 2"-2 NaI
4
kcpm

(5) LBC - 42 cpm

Grid		* 95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Scan /100 cm2				(2) Beta Direct Meas 100 cm2			(3) Gamma Contact	(4) Gamma Contact	Action Level	Released Yes/No
		Wipe	Gross	Beta	Unsort *	Lowest Meas		Highest Meas		Gross	Beta	Unsort *				
Location	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	> 2*Bgd >MDA	
						850	-640	1,350	536				10	3.8	Pass	Yes
1	Floor	801	23	-32	26										Pass	Yes
2	Floor	802	24	-29	26					536	1,014	336			Pass	Yes
3	Floor	803	33	-14	28										Pass	Yes
4	Floor	804	35	-12	29										Pass	Yes
5	Floor	805	31	-18	28										Pass	Yes
6	Floor	806	26	-26	27										Pass	Yes
7	Floor	807	27	-24	27										Pass	Yes
8	Floor	808	30	-19	28										Pass	Yes
9	Floor	809	23	-32	26										Pass	Yes
10	Floor	810	29	-21	28					432	271	304			Pass	Yes
11	Floor	811	35	-11	29										Pass	Yes
12	Floor	812	31	-18	28										Pass	Yes
13	Floor	813	26	-26	27										Pass	Yes
14	Floor	814	26	-26	27					386	-57	289			Pass	Yes
15	Floor	815	31	-18	28										Pass	Yes

Page ____ of ____

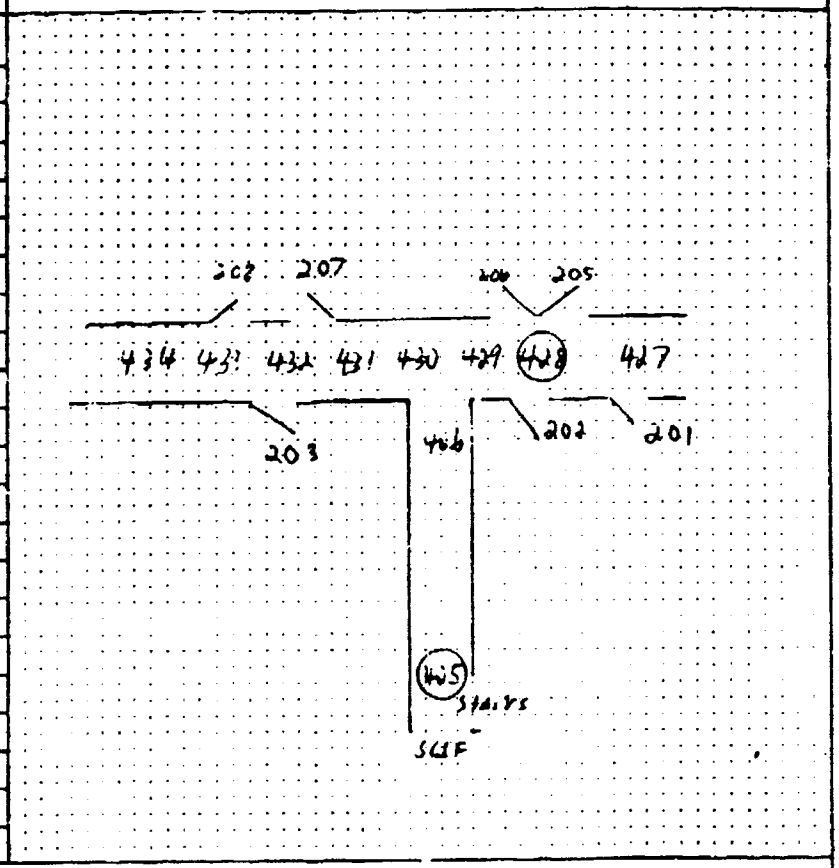
☐ Direct Measurements ☐ Surface Scan ☐ Removable Contamination ☐ Other RADIOLOGICAL SURVEY	**RSO, Inc.** P.O. Box 1526 Laurel, MD 20725-1526 301-953-2482	FACILITY: IITRI CONTACT: PHONE NO.

SURVEYOR	Last name, first name: Bisor[illegible]		Survey Date: 7/24/98

TYPE III survey

AREA DIAGRAM

Scale _____



REMARKS Corridor 201-208

RSO, INC. Rev 4 3/97

BRO, Inc (BF-20) ITRI

Radiological Survey Results

Site - ITRI Va. Technology Center Survey Results of Corr 201-208 Date - 24-Jul-98

Location Corridor TYPE III Survey Surveyor - Bisson D., Smith G., Dean J.

(1) Floor Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 951 cpm
Integrated Count MDA - 612 dpm/100 cm2
Scanning MDA - 2200 dpm/100 cm2

(2) L2200 w/ 100 cm2
(2) Gas Flow 100 cm2 - 387.4 cpm
Integrated Count MDA - 1363 dpm/100 cm2

(3) L19 micro R
7.0
(uR/h)

(4) L12 w/ 2x2 NaI
3
kcpm

(5) LSC - 39 cpm

Grid		* 95% Confidence Level				Survey Data Results										
		(5) Wipe Results				(1) Beta Scan /100 cm2				(2) Beta Direct Meas 100 cm2			(3) Gamma Contact	(4) Gamma Contact	Action Level	Released Yes/No
		Wipe	Gross	Beta	Unsort *	Lowest Meas		Highest Meas		Gross	Beta	Unsort *				
Location	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	> 2*Bgd >MDA	
						740	-496	1,190	562				10	3.6	Pass	Yes
425	Floor	425	27	-21	26					292	-181	252			Pass	Yes
426	Floor	426	32	-12	28										Pass	Yes
427	Floor	427	29	-16	27										Pass	Yes
428	Floor	428	25	-23	26					428	790	300			Pass	Yes
429	Floor	429	28	-18	27										Pass	Yes
430	Floor	430	35	-06	28										Pass	Yes
431	Floor	431	33	-09	28										Pass	Yes
432	Floor	432	34	-08	28										Pass	Yes
433	Floor	433	27	-19	27										Pass	Yes
434	Floor	434	35	-07	28										Pass	Yes

Page ___ of ___

☐ Direct Measurements
☐ Surface Scan
☐ Removable Contamination
☐ Other

RADIOLOGICAL SURVEY

RSO, Inc.
P.O. Box 1526
Laurel, MD 20725-1526
301-953-2482

FACILITY: IITRI

CONTACT:

PHONE NO:

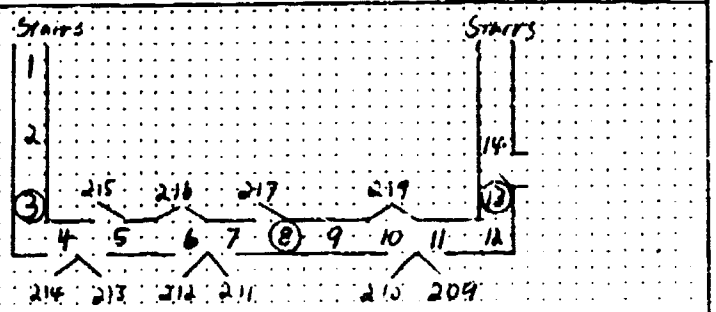
SURVEYOR: Last name, first name: Bisson D., Dean J.

Survey Date: 7/15/98

TYPE III Survey

AREA DIAGRAM

Scale _____



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REMARKS: Corridor 209-219

RSO, INC. Rev 4 3/97

RJRO, Inc. (RP-20) ITTRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Corr 209-219 Date - 15-Jul-98

Location Corridor TYPE III Survey Surveyor - Bisson D., Dean J.

(1) Floor Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 1693 cpm
Integrated Count MDA - 652 dpm/100 cm2
Scanning MDA - 2200 dpm/100 cm2

(2) L2200 w/ 100 cm2
(2) Gas Flow 100 cm2 - 255 cpm
Integrated Count MDA - 1500 dpm/100 cm2

(3) L19 microR 10.0 (uR/h)

(4) L12 w/ 1x2 NaI 4 kcpm

(5) LSC - 36 cpm

Grid		* 95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Scan /100 cm2				(1) Beta Direct Meas /100 cm2			(3) Gamma Contact	(4) Gamma Contact	Action Level	Released Yes/No
		Wipe	Gross	Beta	Unsat *	Lowest Meas		Highest Meas		Gross	Beta	Unsat *				
Location	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	> 2*Bgd >MDA	
						750	-807	1,300	487				10	3.6	Pass	Yes
1	Floor	306	33	-05	27										Pass	Yes
2	Floor	307	25	-17	25										Pass	Yes
3	Floor	308	25	-17	25					889	-480	146			Pass	Yes
4	Floor	309	21	-25	24										Pass	Yes
5	Floor	310	35	00	27										Pass	Yes
6	Floor	311	31	-07	27										Pass	Yes
7	Floor	312	27	-15	26										Pass	Yes
8	Floor	313	24	-19	25					974	-280	152			Pass	Yes
9	Floor	314	24	-19	25										Pass	Yes
10	Floor	315	31	-07	27										Pass	Yes
11	Floor	316	35	-01	27										Pass	Yes
12	Floor	317	32	-06	27										Pass	Yes
13	Floor	318	31	-07	27					938	-365	149			Pass	Yes
14	Floor	319	31	-08	27										Pass	Yes

Page ___ of ___

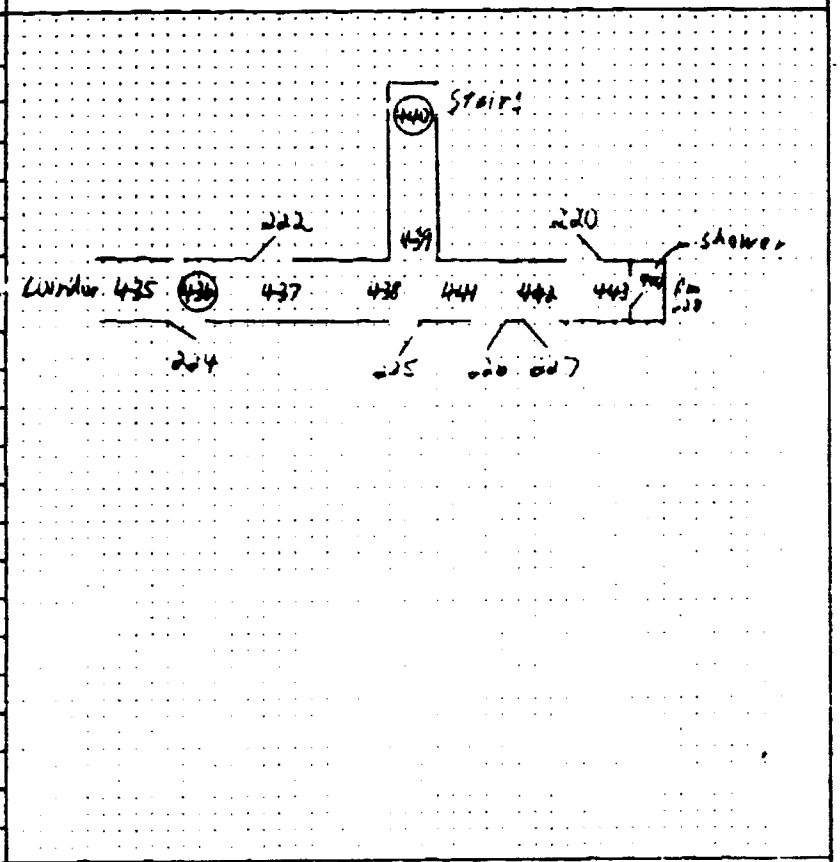
☐ Direct Measurements ☐ Surface Scan ☐ Removable Contamination ☐ Other RADIOLOGICAL SURVEY	**RSO, Inc.** P.O. Box 1526 Laurel, MD 20725-1526 301-953-2482	FACILITY: IITRI CONTACT: PHONE NO.

SURVEYOR	Last name, first name: Bisson D, Smith G, Orand J		Survey Date: 7/24/98

TYPE III Survey

AREA DIAGRAM

Scale _____



REMARKS Corridor 220-227

RSO, INC. Rev 4 3/97

RBO, Inc (SF-30) ITTRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Corr 220-227 Date - 24-Jul-98

Location Corridor TYPE III Survey Surveyor - Bisson D., Smith G., Dean J.

(1) Floor Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 981 cpm
Integrated Count MDA - 612 dpm/100 cm2
Scanning MDA - 2200 dpm/100 cm2

(2) L2200 w/ 100 cm2
(2) Gas Flow 100 cm2 - 317.4 cpm
Integrated Count MDA - 1363 dpm/100 cm2

(3) L19 microR
7.0
(uR/h)

(4) L12 w/ 2x2 NaI
5
kcpm

(5) LSC - 39 cpm

Grid		* 95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Scan /100 cm2				(2) Beta Direct Meas 100 cm2			(3) Gamma Contact	(4) Gamma Contact	Action Level	Released Yes/No
		Wipe	Gross	Beta	Unsurt *	Lowest Meas		Highest Meas		Gross	Beta	Unsurt *				
Location	Description	No	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	> 2*Bgd >MDA	
						790	-379	1,150	468				10	3.6	Pass	Yes
435	Floor	435	29	-17	27										Pass	Yes
436	Floor	436	27	-21	26					324	47	264			Pass	Yes
437	Floor	437	27	-21	26										Pass	Yes
438	Floor	438	33	-11	28										Pass	Yes
439	Floor	439	32	-12	28										Pass	Yes
440	Floor	440	31	-13	27					328	76	266			Pass	Yes
441	Floor	441	30	-15	27										Pass	Yes
442	Floor	442	25	-24	26										Pass	Yes
443	Floor	443	33	-09	28										Pass	Yes
444	Floor	444	26	-22	26										Pass	Yes

Page ____ of ____

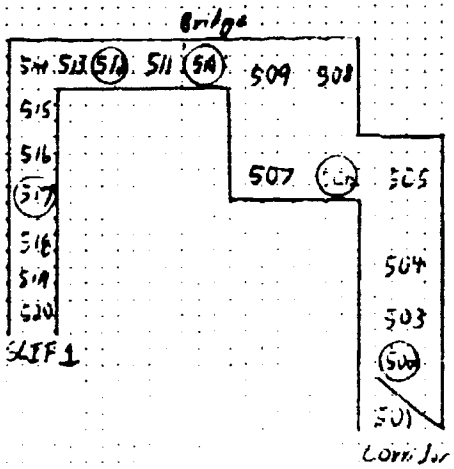
☐ Direct Measurements ☐ Surface Scan ☐ Removable Contamination ☐ Other RADIOLOGICAL SURVEY	**RSO, Inc.** P.O. Box 1526 Laurel, MD 20725-1526 301-953-2482	FACILITY: IITRI CONTACT: PHONE NO.

SURVEYOR	Last name, first name		Survey Date
	Bisson D, Smith G, Brand		7/24/98

TYPE III Survey

AREA DIAGRAM

Scale _____



REMARKS "Corridor" on TOP of SCIF

RSO, INC Rev 4 3/97

RSC, Inc (SP-20) ITTRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of "Corridor" on Top of SCIF Date - 24-Jul-98

Location Corridor TYPE III Survey Surveyor - Bisson D., Smith G., Dean J.

(1) Floor Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 951 cpm
Integrated Count MDA - 612 dpm/100 cm2
Scanning MDA - 2200 dpm/100 cm2

(2) L2200 w/ 100 cm2
(2) Gas Flow 100 cm2 - 534 cpm
Integrated Count MDA - 1715 dpm/100 cm2

(3) L19 mini-R
7.8
(uR/h)

(4) L12 w/ 2x2 NaI
3
kcpm

(5) LSC - 39 cpm

Grid		* 95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Scan /100 cm2				(2) Beta Direct Meas 100 cm2			(3) Gamma Contact	(4) Gamma Contact	Action Level	Released
		Wipe	Gross	Beta	Uncert *	Lowest Meas		Highest Meas		Gross	Beta	Uncert *				Yes/No
Location	Description	No.	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	kcpm	> 2*Bgd >MDA	
						1,000	115	1,560	1,433				9	3.6	Pass	Yes
501	Floor	506	36	-05	28										Pass	Yes
502	Floor	507	24	-25	26					504	-214	331			Pass	Yes
503	Floor	508	29	-16	27										Pass	Yes
504	Floor	509	25	-23	26										Pass	Yes
505	Floor	510	27	-19	27										Pass	Yes
506	Floor	511	27	-21	26					490	-314	326			Pass	Yes
507	Floor	512	26	-22	26										Pass	Yes
508	Floor	513	26	-22	26										Pass	Yes
509	Floor	514	32	-12	28										Pass	Yes
510	Floor	515	26	-22	26					300	-1,671	263			Pass	Yes
511	Floor	516	35	-07	28										Pass	Yes
512	Floor	517	29	-17	27										Pass	Yes
513	Floor	518	29	-17	27										Pass	Yes
514	Floor	519	26	-22	26										Pass	Yes
515	Floor	520	41	-14	27										Pass	Yes
516	Floor	521	29	-17	27										Pass	Yes
517	Floor	522	29	-16	27					514	-143	333			Pass	Yes
518	Floor	523	29	-17	27										Pass	Yes
519	Floor	524	31	-13	27										Pass	Yes
520	Floor	525	26	22	26										Pass	Yes

Attachment D

Survey Meter Calibration Reports

RSO, Inc.
P.O. Box 1526
Laurel, MD 20725
(301) 953-2482

RSO Order No. 14,805
P.O. No.

Certificate of Calibration

Issued To
Customer: RSO INC. SAFETY SERVICES
Address: 5206 MINNICK ROAD
City: LAUREL State: MD Zip: 20707
Contact: Greg Smith Phone: (410) 792-7444

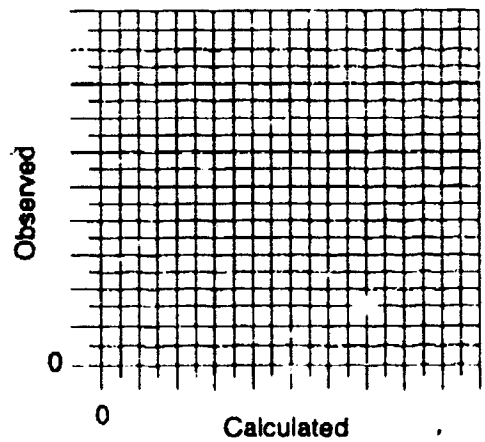
Instrument
Make: Ludlum
Type: Microrem
Model: 19
Serial #: 32881

Detectors

	Make	Type	Model	Serial Number	Voltage (v)	Radionuclide	Efficiency
1.		Int. Scint.					
2.							
3.							
4.							

RSO, Inc. certifies that on 3/2/98 the above described instrument was calibrated in a known radiation field using a 137Cs (662 keV) beam calibrator (J.L. Shepherd Model 28-6A, S/N 10056). The results are tabulated below. Calibration is traceable to NIST.

Scale or Range	Calculated (uR/h)	Observed (uR/h)		C.F.
25	5.000	5.000	*	1.00
	20.000	20.000	*	1.00
50	10.000	10.000	*	1.00
	40.000	40.000	*	1.00
250	50.000	50.000	*	1.00
	200.000	200.000	*	1.00
500	100.00	100.00	*	1.00
	400.00	400.00	*	1.00
5000	1,000.00	1,000.00		1.00
	4,000.00	4,000.00		1.00
			Average correction Factor:	1.00



Calibration Geometry
Orientation To Radiation Beam
Front X Back Parallel Perpendicular
PROBE WINDOW
OPEN CLOSED FIXED X
INSTRUMENT CHECKS
CHECK SOURCE: NA
BATTERY CHECK: BATT
ENVIRONMENTAL CONDITIONS
Temperature: 26 °C
Pressure: 765 mmHg
Humidity: 65 %

COMMENTS: *Pulsed.

This Instrument Should Be Returned For Recalibration No Later Than 8/31/98

Calibrated By: John Sean Jr. Reviewed By: Date: 3/2/98
Maryland License MD 33-021-01

RSO Order No. 14,951

P.O. No.

RSO, Inc.
P.O. Box 1526
Laurel, MD 20725
(301) 953-2482

Certificate of Calibration

Issued To
Customer: RSO, INC.
Address: 8204 MINNICK ROAD
City: LAUREL State: MD Zip: 20707
Contact: JIM DEAN, SR Phone: (301) 953-2482

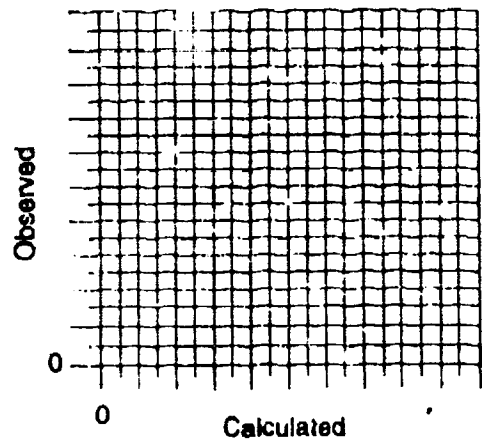
Instrument
Make: Ludlum
Type: Ratemeter
Model: 2200
Serial #: 43045

Detectors

	Make	Type	Model	Serial Number	Voltage (v)	Radionuclide	Efficiency
1.	Ludlum	Gas Flow	43-20	113631	1900	90Sr 14C	32%, 14%
2.						99Tc	30%
3.							
4.							

RSO, Inc. certifies that on 4/24/98 the above described instrument was calibrated using a radioactive source to determine the efficiency for a specific radionuclide(s) and using electronically generated pulses for the linearity. The efficiency is shown above with the linearity data tabulated below. Calibration equipment and sources used are traceable to NIST.

Scale or Range	Calculated (cpm)	Observed (cpm)	C.F.
Digital	100.000	110.000	0.91
	400.000	411.000	0.97
Scale	1,000.000	1,011.000	0.99
	4,000.000	4,100.000	0.98
	10,000.000	10,300.000	0.97
	40,000.000	41,000.000	0.98
	100,000.00	103,000.00	0.97
	400,000.00	404,000.00	0.99
		Average correction Factor:	0.97



Calibration Geometry
Orientation To Radiation Beam
Front Back Parallel Perpendicular
PROBE WINDOW
OPEN CLOSED FIXED

INSTRUMENT CHECKS
CHECK SOURCE: NA :
BATTERY CHECK: BATT/AC
ENVIRONMENTAL CONDITIONS
Temperature: 26 °C
Pressure: 765 mmHg
Humidity: 65 %

COMMENTS

This Instrument Should Be Returned For Recalibration No Later Than 10/23/98

Calibrated By: [signature] Jim Dean Jr. Reviewed By: [signature] Date: 4/24/98
Maryland License MD-33-021-01

RSO Order No. 14.355

P.O. No.

RSO, Inc.
P.O. Box 1526
Laurel, MD 20725
(301) 953-2482

Certificate of Calibration

Issued To
Customer: RSO, INC.

Address: 5204 MINNICK ROAD
City: LAUREL State: MD Zip: 20707

Contact: JIM DEAN, SR Phone: (301) 953-2482

Instrument
Make: Ludlum

Type: Ratemeter

Model: 2221

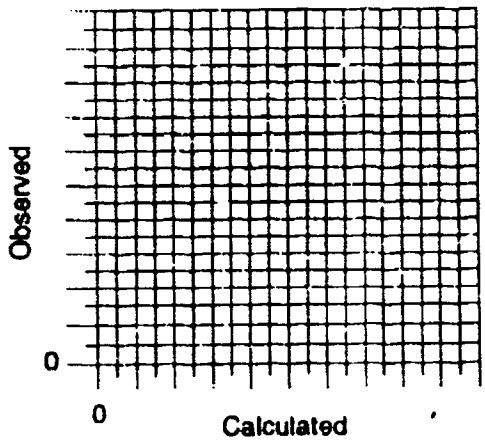
Serial # : 108857

Detectors

	Make	Type	Model	Serial Number	Voltage (v)	Radionuclide	Efficiency
1		Gas Flow		4820	1975	90Sr,14C	35%,10%
2.						99Tc,137Cs	17%,13%
3.							
4.							

RSO, Inc. certifies that on 4/21/98 the above described instrument was calibrated using a radioactive source to determine the efficiency for a specific radionuclide(s) and using electronically generated pulses for the linearity. The efficiency is shown above with the linearity data tabulated below. Calibration equipment and sources used are traceable to NIST.

Scale or Range	Calculated (cpm)	Observed (cpm)	C.F
X1	100.000	100.000	1.00
	400.000	403.000	0.99
X10	1,000.000	1,011.000	0.99
	4,000.000	4,039.000	0.99
X100	10,000.000	10,115.000	0.99
	40,000.000	40,396.000	0.99
X1K	100,000.00	101,157.00	0.99
	400,0[illegible]	403,942.00	0.99
		Average correction Factor:	0.99



Calibration Geometry

Orientation To Radiation Beam

Front Back Parallel Perpendicular

PROBE WINDOW

OPEN CLOSED FIXED

INSTRUMENT CHECKS

CHECK SOURCE: Source Set : 31000 cpm

BATTERY CHECK: BATT

ENVIRONMENTAL CONDITIONS

Temperature: 26 °C

Pressure: 765 mmHg

Humidity: 65 %

COMMENTS

This Instrument Should Be Returned For Recalibration No Later Than 10/20/98

Calibrated By: Jim Dean Jr. Reviewed By: Date: 4/21/98

Maryland License MD-33-021-01

RSO Order No. 14,805

P.O. No.

RSO, Inc.
P.O. Box 1526
Laurel, MD 20725
(301) 953-2482

Certificate of Calibration

Issued To
Customer: RSO INC.
SAFETY SERVICES
Address: 5206 MINNICK ROAD
City: LAUREL State: MD Zip: 20707
Contact: Greg Smith Phone: (410) 792-7444

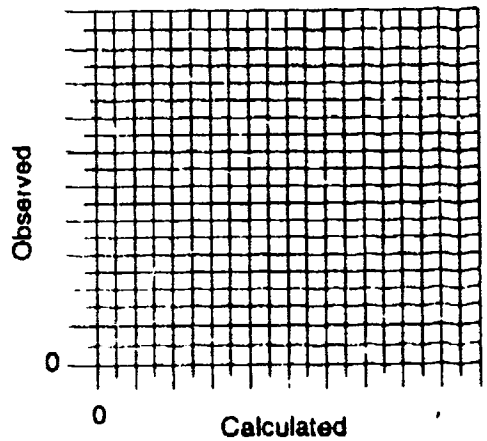
Instrument
Make: Ludlum
Type: Ratemeter
Model: 12
Serial # : 102824

Detectors

	Make	Type	Model	Serial Number	Voltage (v)	Radionuclide	Efficiency
1.	Ludlum	NaI	112	022547	500	137Cs	17%
2.							
3.							
4.							

RSO, Inc. certifies that on 3/2/98 the above described instrument was calibrated using a radioactive source to determine the efficiency for a specific radionuclide(s) and using electronically generated pulses for the linearity. The efficiency is shown above with the linearity data tabulated below. Calibration equipment and sources used are traceable to NIST.

Scale or Range	Calculated (cpm)	Observed (cpm)	C.F.
X1	100.000	100.000	1.00
	400.000	400.000	1.00
X10	1,000.000	1,000.000	1.00
	4,000.000	4,000.000	1.00
X100	10,000.000	10,000.000	1.00
	40,000.000	40,000.000	1.00
X1000	100,000.00	100,000.00	1.00
	400,000.00	400,000.00	1.00
		Average correction Factor:	1.00



Calibration Geometry
Orientation To Radiation Beam
Front Back Parallel Perpendicular
PROBE WINDOW
OPEN CLOSED MIXED

COMMENTS

INSTRUMENT CHECKS
CHECK SOURCE: NA
BATTERY CHECK: BATT
ENVIRONMENTAL CONDITIONS
Temperature: 26 °C
Pressure: 765 mmHg
Humidity: 65 %

This Instrument Should Be Returned For Recalibration No Later Than 6/31/98

Calibrated By: [signature] Reviewed By: [signature] Date: 3/2/98
Maryland License MD-33-021-01

Attachment E

NRC Form 314 and Attachment

NRC FORM 314 (6-98)
10 CFR 30.36(d)(1)(iv)
10 CFR 40.42(d)(1)(iv)
10 CFR 70.38(d)(1)(iv)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0028 EXPIRES: [illegible]

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 30 MINUTES. THIS SUBMITTAL IS USED BY NRC AS PART OF THE BASIS FOR ITS DETERMINATION THAT THE FACILITY HAS BEEN CLEANED OF RADIOACTIVE MATERIAL BEFORE THE FACILITY IS RELEASED FOR UNRESTRICTED USE. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0028), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503. AN AGENCY MAY NOT CONDUCT OR SPONSOR, AND A PERSON IS NOT REQUIRED TO RESPOND TO, A COLLECTION OF INFORMATION UNLESS IT DISPLAYS A CURRENTLY VALID OMB CONTROL NUMBER.

CERTIFICATE OF DISPOSITION OF MATERIALS

INSTRUCTIONS: ALL ITEMS MUST BE COMPLETED -- PRINT OR TYPE
SEND THE COMPLETED CERTIFICATE TO THE NRC OFFICE SPECIFIED ON THE REVERSE

LICENSEE NAME AND ADDRESS	LICENSE NUMBER
IIT Research Institute 8510 Cinderbed Road, Suite 300 Newington, VA 22122	45-25057-01
	LICENSE EXPIRATION DATE December 31, 2004

A. MATERIALS DATA *(Check one and complete as necessary)*

THE LICENSEE OR ANY INDIVIDUAL EXECUTING THIS CERTIFICATE ON BEHALF OF THE LICENSEE CERTIFIES THAT:
(Check and/or complete the appropriate item(s) below.)

[ ] 1. NO MATERIALS HAVE EVER BEEN PROCURED OR POSSESSED BY THE LICENSEE UNDER THIS LICENSE.

OR

[X] 2. ALL ACTIVITIES AUTHORIZED BY THE LICENSE HAVE CEASED AND ALL MATERIALS PROCURED AND/OR POSSESSED BY THE LICENSEE UNDER THE LICENSE NUMBER CITED ABOVE HAVE BEEN DISPOSED OF IN THE FOLLOWING MANNER. *(If additional space is needed, use the reverse side or provide attachments.)*

Describe specific material transfer actions and, if there were radioactive wastes generated in terminating this license, the disposal actions including the disposition of low-level radioactive waste, mixed waste, Greater-than-Class-C waste, and sealed sources, if applicable.

See Attachment - 1

For transfers, specify the date of the transfer, the name of the licensed recipient, and the recipient's NRC license number or Agreement State name and license number.

See Attachment - 1

If materials were disposed of directly by the licensee rather than transferred to another licensee, licensed disposal site or waste contractor, describe the specific disposal procedures *(e.g., decay in storage)*.

Not Applicable

B. OTHER DATA

[X] 1. OUR LICENSE HAS NOT YET EXPIRED; PLEASE TERMINATE IT.

2. A RADIATION SURVEY WAS CONDUCTED BY THE LICENSEE TO CONFIRM THE ABSENCE OF LICENSED RADIOACTIVE MATERIALS AND TO DETERMINE WHETHER ANY CONTAMINATION REMAINS ON THE PREMISES COVERED BY THE LICENSE *(Check one)*

[ ] NO *(Attach explanation)*
[X] YES THE RESULTS *(Check one)*
  [X] ARE ATTACHED, or
  [ ] WERE FORWARDED TO NRC ON *(Date)*

3. THE PERSON TO BE CONTACTED REGARDING THE INFORMATION PROVIDED ON THIS FORM	NAME	TELEPHONE NUMBER (Include Area Code)
	Dr. Richard C. Doyle	703-550-0460

4. MAIL ALL FUTURE CORRESPONDENCE REGARDING THIS LICENSE TO

IITRI, P.O. Box 899
8510 Cinderbed Road, Suite 300, Newington, VA 22122

CERTIFYING OFFICIAL

I CERTIFY UNDER PENALTY OF PERJURY THAT THE FOREGOING IS TRUE AND CORRECT

PRINTED NAME AND TITLE	SIGNATURE	DATE
Dr. Richard C. Doyle Associate Director	Richard C. Doyle	8/26/98

WARNING: FALSE STATEMENTS IN THIS CERTIFICATE MAY BE SUBJECT TO CIVIL AND/OR CRIMINAL PENALTIES. NRC REGULATIONS REQUIRE THAT SUBMISSIONS TO THE NRC BE COMPLETE AND ACCURATE IN ALL MATERIAL RESPECTS. 18 U.S.C. SECTION 1001 MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTIONS.

PRINTED ON RECYCLED PAPER

Attachment 1
Certificate of Disposition of Materials
NRC Form 314
Section A.2. (Continued)

IIT Research Institute, Newington VA
License Number 45-25057-01
Docket No. 030-31193

Material Transfer Actions

IITRI provided notification to the NRC on April 28, 1998 of intention to permanently cease operations. The radioactive materials that remained at the IIT Research Institute (IITRI) licensed facility on that date, have been removed from the premises. The information concerning the transfer of the materials is listed below.

Radioactive Waste materials

Waste materials on hand and waste materials generated during the decommissioning procedures were all low specific activity materials and were packaged and removed from our facility by a waste contractor, Radiation Service Organization (RSO), Inc., 5204 Minnick Road, Laurel, MD 20725. Their Maryland State radioactive materials license number is MD-33-021-02. The waste materials were all were transferred from IITRI to RSO on two dates.

1. On 07/30/98, dry solid wastes, EPA-hazardous scintillation vials, mixed waste, liquid wastes, a chemical lab pack, contaminated oil, and a contaminated vacuum tank and were transferred to RSO on manifest # 14604. The dry solid wastes were transferred to the RSO facility at Laurel, MD. then are destined for supercompaction at GTS Duratek, Oak Ridge, TN (Tennessee License # R-73008-H94) and burial at Barnwell, SC (South Carolina License # 097). The hazardous scintillation vials, mixed waste, liquid wastes, and the chemical lab pack were shipped by RSO on an exclusive use shipment to Perma-Fix of Florida, Inc., 1940 NW 67th Place, Gainesville, FL 32606, (Florida License # 2598-1). The shipment was received by Perma-Fix on 08/10/98 for eventual incineration. The contaminated oil was shipped to GTS Duratek, Oak Ridge, TN (Tennessee License # R-73013-F91) for incineration, and the contaminated tank was also shipped to GTS Duratek (Tennessee License # R-73008-H94) for metal melt.

2. On 08/21/98, the second transfer to RSO took place and was documented on the RSO manifest # 14626. The shipment included dry solid wastes that were transferred to the RSO facility at Laurel, MD. then are destined for supercompaction at GTS Duratek , Oak Ridge, TN (Tennessee License # R-73008-H94) and burial at Barnwell, SC (South Carolina License # 097). The second transfer to RSO also included non-hazardous scintillation vials that were shipped to the RSO facility at Laurel, MD for eventual shipment to Perma-Fix of Florida (Florida License # 2598-1) for incineration.

Radioactive Sealed Sources

The IITRI facility possessed two sealed sources as listed on the IITRI Materials License. Ni-63 (10mCi) and Ba-133 (18 dμCi). The Ni-63 sealed source was used in an electron capture detector of a Model 14 Shimazu gas chromatograph. The Ba-133 sealed source was used as an external standard in a Model 2200 CA Packard Tri-Carb Liquid Scintillation Analyzer.

1. On 06/29/98 the Ni-63 source was removed by a Shimadzu Scientific Instruments, Inc. technician for transfer to the Shimadzu facility at 7100 Riverwood Dr. Columbia, MD 19045. (Maryland License # MD-27-011-01). It is being held there for eventual transfer to our IITRI

Attachment 1
Certificate of Disposition of Materials
NRC Form 314
Section A.2. (Continued)

IIT Research Institute, Newington VA
License Number 45-25057-01
Docket No. 030-31193

facility at 10 West 35th Street, Chicago, IL 60616, (Illinois License # IL-01563-01) for re-installation into the gas chromatograph when it arrives there

2. On 08/25/98 the Ba-133 source was removed by a Packard Instrument Co technician for transfer to the Packard facility at 2200 Warrenville Road, Downers Grove, IL 60615, (Illinois License # IL-01741-01). It will be transferred to the IITRI facility at 10 West 35th Street, Chicago, IL 60616, (Illinois License # IL-01563-01) when the liquid scintillation analyzer arrives at that facility.

Other Radioactive Materials

IITRI also transferred various other radioactive materials to sponsors The materials had previously been held in the IITRI Newington, VA radioactive material archives

1 On 08/12/98, radioactive test and reference materials were transferred to Novartis Crop Protection, Inc., 410 Swing Road, Greensboro, NC 27409, (North Carolina License # 041-0450-1).

2 On 08/14/98, radioactive test material was transferred to Uniroyal Chemical Co., Inc., World Headquarters, Middlebury, CT 06749, (NRC License # 06-00221-08)

3 On 08/19/98, radioactive test material was transferred to WIL Research Laboratories, Inc., 1407 George Rd., Ashland, OH 44805, (NRC License # 34-20070-01)

Page 01

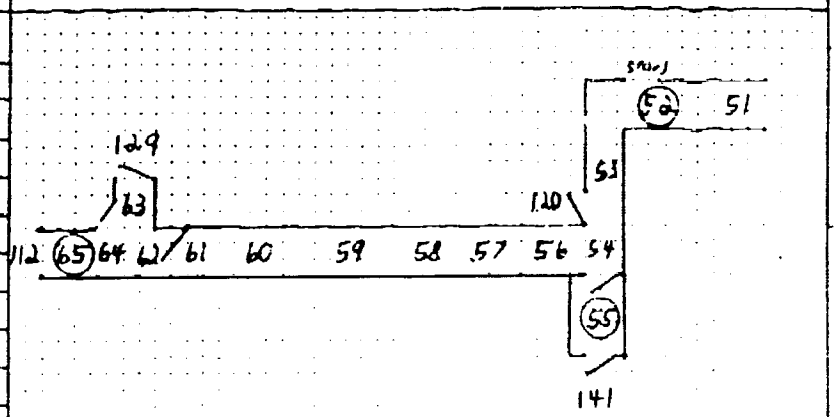
☐ Direct Measurements ☐ Surface Scan ☐ Removable Contamination ☐ Other RADIOLOGICAL SURVEY	**RSO, Inc.** P.O. Box 1526 Laurel, MD 20725-1526 301-953-2482	FACILITY ITRI CONTACT PHONE NO.

SURVEYOR	Last name, first name		Survey Date
	Bisson D, Smith		8/21/98

TYPE III Survey

AREA DIAGRAM

Scale _____



REMARKS Corridor 112-141

RSO, INC Rev 4 3/97

RSO, Inc (RF-20) ITTRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Corr 112-141 Date - 21-Aug-98

Location Corridor (Carpeted) TYPE III Survey Surveyor - Bunon D, Smith G

(1) Floor Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 1122 cpm
Integrated Count MDA - 640 dpm/100 cm2
Scanning MDA - 2200 dpm/100 cm2

(2) L2200 w/ 100 cm2
(2) Gas Flow 100 cm2 394 cpm
Integrated Count MDA - 1496 dpm/100 cm2

(3) L19 mrem/h
10.0
(uR/h)

(4) L12 w/ 2x2 NaI
6
bqm

(5) LSC - 42 cpm

Grid		* 95% Confidence Level				Survey Data Results										
		(5) Wipe Results				(1) Beta Scan /100 cm2				(2) Beta Direct Meas. 100 cm2			(3) Gamma	(4) Gamma	Action	Released
		Wipe	Gross	Beta	Unsust.*	Lowest Meas.		Highest Meas.		Gross	Beta	Unsust.*	Contact	Contact	Level	Yes/No
Location	Description	No.	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	bqm	> 2*Bgd +MDA	
						750	-875	1,750	1,678				15	6.0	Pass	Yes
51	Floor	851	33	-15	28										Pass	Yes
52	Floor	852	28	-23	27					414	143	298			Pass	Yes
53	Floor	853	31	-18	28										Pass	Yes
54	Floor	854	29	-22	27										Pass	Yes
55	Floor	855	27	-24	27					338	-400	272			Pass	Yes
56	Floor	856	27	-25	27										Pass	Yes
57	Floor	857	26	-26	27										Pass	Yes
58	Floor	858	22	-33	26										Pass	Yes
59	Floor	859	25	-28	27										Pass	Yes
60	Floor	860	23	-31	26										Pass	Yes
61	Floor	861	23	-32	26										Pass	Yes
62	Floor	862	39	-04	29										Pass	Yes
63	Floor	863	26	-26	27										Pass	Yes
64	Floor	864	31	-18	28										Pass	Yes
65	Floor	865	25	-27	27					588	1,386	351			Pass	Yes

Page ____ of ____

- ☐ Direct Measurements
- ☐ Surface Scan
- ☐ Removable Contamination
- ☐ Other

RADIOLOGICAL SURVEY

RSO, Inc.
P.O. Box 1526
Laurel, MD 20725-1526
301-953-2482

FACILITY: ITRI

CONTACT:

PHONE NO:

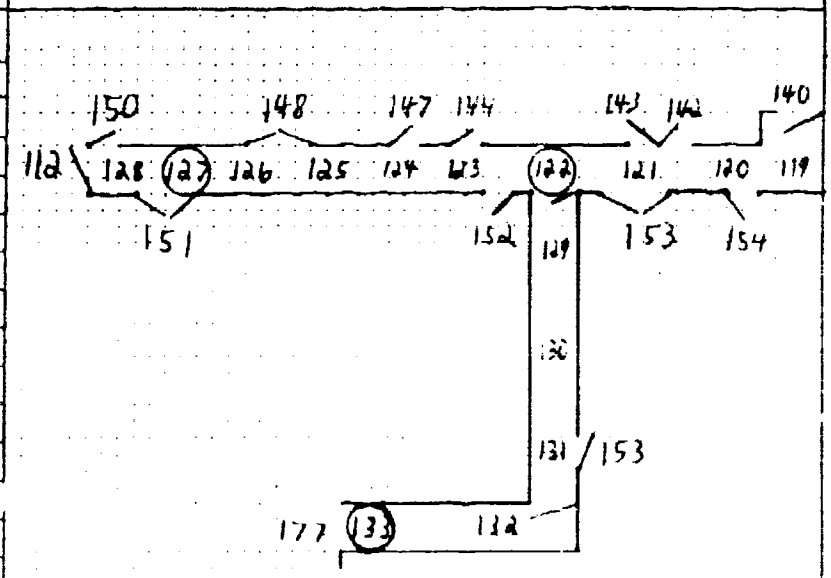
SURVEYOR: Last name, first name: Bisson D. Smith, Carl

Survey Date: 8/11/98

VPE III Survey

AREA DIAGRAM

Scale _____



REMARKS: Corridor 140 - 177

RSO, INC Rev 4 3/97

258069

RSO, Inc. (SF-20) ITTRI

Radiological Survey Results

Site - ITTRI Va. Technology Center Survey Results of Corr 140-177 Date - 11-Aug-98

Location Corridor (Carpeted) TYPE III Survey Surveyor - Hanson D., Smith G., Sink D.

(1) Floor Monitor w/ 425 cm2
(1) Gas Flow 425 cm2 1093 cpm
Integrated Count MDA 652 dpm/100 cm2
Scanning MDA - 2200 dpm/100 cm2

(2) L2200 w/ 100 cm2
(2) Gas Flow 100 cm2- 395 cpm
Integrated Count MDA - 1500 dpm/100 cm2

(3) L19 microR
10.0
(uR/h)

(4) L12 w/ 2x2 NaI
4
bqm

(5) LSC - 36 cpm

Grid		* 95% Confidence Level (5) Wipe Results				Survey Data Results (1) Beta Scan /100 cm2				(1) Beta Direct Meas. /100 cm2			(3) Gamma	(4) Gamma	Action	Released
		Wipe	Gross	Beta	Unsat.*	Lowest Meas.		Highest Meas		Gross	Beta	Unsat. *	Contact	Contact	Level	Yes/No
Location	Description	No.	cpm	dpm	dpm	Gross cpm	dpm	Gross cpm	dpm	cpm	dpm	dpm	uR/h	bqm	> 2*Bgd. >MDA	
						900	-454	1,500	958				13	50	Pass	Yes
119	Floor	714	21	-25	24										Pass	Yes
120	Floor	715	31	-08	27										Pass	Yes
121	Floor	716	22	-23	25										Pass	Yes
122	Floor	717	24	-19	25					1,214	285	168			Pass	Yes
123	Floor	718	29	-11	26										Pass	Yes
124	Floor	719	31	-07	27										Pass	Yes
125	Floor	720	28	-13	26										Pass	Yes
126	Floor	721	25	-17	25										Pass	Yes
127	Floor	722	28	-13	26					1,214	285	168			Pass	Yes
128	Floor	723	21	-24	25										Pass	Yes
129	Floor	724	26	-16	26										Pass	Yes
130	Floor	725	25	-18	25										Pass	Yes
131	Floor	726	24	-19	25										Pass	Yes
132	Floor	727	16	-32	23										Pass	Yes
133	Floor	728	25	-17	25					1,361	631	177			Pass	Yes