



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

March 1, 2000

Mr. Kenneth S. Wood, President
Barringer Technologies Inc.
30 Technology Drive
Warren, NJ 07059

SUBJECT: REQUEST FOR WITHHOLDING OF INFORMATION FROM PUBLIC
DISCLOSURE, BARRINGER TECHNOLOGIES, INC.
IONSCAN MODEL SABRE 2000.

Dear Mr. Wood:

By Barringer's application dated September 23, 1999, and subsequent submissions dated December 21, 1999, and January 20, 2000, a letter and a notarized affidavit dated February 28, 2000, Barringer Technologies has requested the addition of Ionscan Model Sabre 2000 to the SSD Registration Certificate No. NR-163-D-101-G. Barringer Technologies, Inc. has requested that following drawings and document be withheld from public disclosure pursuant to 10 CFR 2.790:

Barringer Drawing Number	Description
1811375	Source Holder
3811358	IMS Detector (Including Parts List)
4812050	Assembly layout
Operation's Manual	Model Sabre 2000

Barringer Technologies stated that these drawings and the operator's Manual should be considered exempt from mandatory public disclosure for the following reasons:

1. In your letter dated February 28, 2000, you stated that the Sabre 2000 Operatot's Manual does not technically contain proprietary data. However, since Ionscan Model Sabre 2000 is an anti-terrorist instrument, Barrington Technologies requested that in the best interest of USA law enforcement and security agencies that detailed operational data should not be released to the world at large.
2. The disclosure of the information contained in the listed drawings would cause irreparable harm to Barringer Technologies, Inc. In particular, these documents contain information, developed by Barrington Research Limited of Canada with Barringer's resources to develop technologies, design and preparation of these documents which are to be used in the production of the Model Sabre 2000.
3. The information is not available in or from public sources.

NR-163-D-101-G

NMSS-02

Mr. Kenneth S. Wood

Therefore, the listed drawings and document herein will be treated as proprietary, and these drawings and Operator's Manual for the Model Sabre 2000 will be withheld from public disclosure pursuant to 10 CFR 2.790(b)(5) and Section 103(b) of the Atomic Energy Act of 1954, as amended.

Withholding from public inspection of these documents shall not impair the right, if any, of persons properly and directly concerned to inspect the documents. If the need arises, we may send copies of this information to our consultants working in this area. We will, of course, ensure that the consultants have signed the appropriate agreements for handling proprietary information.

If the basis for withholding this information from public inspection should change in the future such that the information could then be made available for public inspection, you should promptly notify the NRC. You also should understand that the NRC may have cause to review this determination in the future, for example, if the scope of a Freedom of Information Act request includes the type of information processed at your request. In all review situations, if the NRC makes a determination averse to the above, you will be notified in advance of any

Sincerely,

Ujagar S. Bhachu, P.Eng., C.Eng., F.I.Mech.E.
Materials Safety and Inspection Branch
Division of Industrial and
Medical Nuclear Safety
Office of Nuclear Material Safety
and Safeguards

Distribution:

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Ujagar S. Bhachu, P.Eng., C.Eng., F.I.Mech.E.
Materials Safety and Inspection Branch
Division of Industrial and
Medical Nuclear Safety
Office of Nuclear Material Safety
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DATE	03/29/2000		03/29/2000		03/29/2000		

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To: *Ujagar Bhachur*

Fax #: *301-415-5369*

From: *Kenneth Wood*

Pages: *3*, including this cover sheet.

Date: *2/28/00*

[Original to be Fed-Exed]
MSZ

If you have trouble receiving all pages noted above, please contact Adrienne Brand at
(908) 222-9100 Ext. 3030

From the desk of...

BARRINGER TECHNOLOGIES, INC.
30 Technology Drive
Warren, NJ 07059
(908) 222-9100
Fax: (908) 222-1550

**BARRINGER INSTRUMENTS INC.**

World Headquarters: 30 Technology Drive, Warren, New Jersey 07059, USA
Tel. (908) 222-9100 • Fax (908) 222-1557 • www.barringer.com

February 28, 2000

United States Nuclear Regulatory Commission
Materials Safety Branch
Division of Industrial and Medical Nuclear Safety
Washington, DC 20555-0001

RE: License Amendment, License No. 29-28620-02G

Dear Mr. Bhachu:

The following Barringer drawings are considered to contain proprietary data in that they contain trade secrets and privileged information:

Drawing No. 1811375	Source Holder
Drawing No. 3811358	IMS Detector
Including parts list and materials listing	
Drawing No. 4812050	Assembly Layout

The following information is NOT considered proprietary:

Labels, Photos of the sealed source IMS assembly, Battery data, and tabular prototype test results.

While the Sabre Operator's Manual does not technically contain proprietary data, Barringer requests that this data not be made publically available for security reasons. Our device is an anti-terrorist instrument, and it is not in the best interests of our law enforcement and security agencies to have detailed operational data published for everyone's eyes.

Barringer's Affidavit of Proprietary Information is attached. It has been notarized.

If you have any questions concerning the above, please call me immediately.

Very truly yours,
BARRINGER INSTRUMENTS, INC.

Kenneth Wood
President

AFFIDAVIT OF PROPRIETARY INFORMATION

The following drawings submitted by Barringer Instruments, Inc., in support of its Safety Review Application are considered proprietary on the ground that they contain trade secrets and privileged information:

Drawing No. 1811375

Source Holder

Drawing No. 3811358

IMS Detector

Including parts list and materials listing

Drawing No. 4812050

Assembly Layout

The following notes support this Affidavit:

a) The engineering drawings have been held in confidence by Barringer and the information contained therein is not available from public sources;

b) The drawings contain details on drift tube and instrument construction, which technology was developed at Barringer expense, and is customarily held in confidence. The entire drift tube design and construction, including material selections, is held in confidence and is considered proprietary. Specific details of the drawings cannot be segregated between proprietary and non-proprietary without rendering the drawings meaningless.

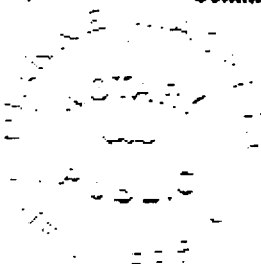
c) Public disclosure could adversely affect Barringer's competitive position with regard to drift tube and instrument technology. Barringer has expended in excess of \$1.0 million and two years of engineering effort in developing this technology. Access to the drawings by another party, and specifically a competitor, would easily enable duplication of our design and product.

The officer of the corporation listed below swears and certifies that the information contained in this Affidavit is accurate and true to the best of his knowledge.

Sworn to and subscribed
before me this
28 day of Feb. 2000

Dianne Magerko
DIANNE MAGERKO
NOTARY PUBLIC OF NEW JERSEY
Commission Expires 12/17/2003

Kenneth Wood
Kenneth Wood
President



From: Mary Pat Siemien
To: Ujagar Bhachu
Date: Wed, Mar 1, 2000 10:42 AM
Subject: Re: Barringer Technologies, Inc. 10 CFR 2.790 Withholding Request

In the sentence beginning with "Also," the word "letters" should be "letter" . You can use my previous concurrence.

Mary Pat

>>> Ujagar Bhachu 02/29 3:36 PM >>>

Hi Mary: The revised response to Barringer request is attached for your review , comments and/or concurrence.

Thank you,
Ujagar.



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Sincerely,

Ujagar S. Bhachu, P.Eng., C.Eng., F.I.Mech.E.
Materials Safety and Inspection Branch
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Office of Nuclear Material Safety
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Distribution:

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Materials Safety and Inspection Branch
Division of Industrial and
Medical Nuclear Safety
Office of Nuclear Material Safety
and Safeguards

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March 1, 2000

Mr. Kenneth S. Wood, President
Barringer Technologies Inc.
30 Technology Drive
Warren, NJ 07059

Dear Mr. Wood:

Based on the information submitted in your letters dated September 23, 1999, December 21, 1999, January 20, 2000, we have amended in its entirety the registration certificate NR-163-D-101-G to include lonscan Model Sabre 2000.

Please be advised that you must manufacture and distribute the product in accordance with the statements and representations contained in the application submitted by Barringer Technologies Inc., with enclosures thereto, and the information set out in the attached registration certificate. As a general rule, you must request and obtain an amendment to the certificate before you make changes or modifications to the information submitted to obtain the registration certificate. You are obligated to notify us promptly in writing should you decide to no longer manufacture or offer service support for the product.

Please be aware that, as a holder of an NRC registration, you may be subject to the NRC's licensing fees in accordance with 10 CFR Part 170, and annual fees in accordance with 10 CFR Part 171. If you have any questions concerning the fee requirements, please contact the License Fee and Debt Collection Branch at (301) 415-6096.

Please read over the registration certificate in its entirety and notify us immediately of any errors or omissions. If you have any questions, please contact me at (301) 415-7894 or John Jankovich on (301) 415-7904.

Sincerely,

/s/

Ujagar S. Bhachu, Mechanical Engineer
Materials Safety and Inspection Branch
Division of Industrial and
Medical Nuclear Safety
Office of Nuclear Material Safety
and Safeguards

Enclosure: As stated
cc w/encl: SKimberley, LFDCB

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REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE
(AMENDED IN ITS ENTIRETY)

NO.: NR-163-D-101-G

DATE: March 1, 2000

PAGE 1 OF 10

DEVICE TYPE: Ion Mobility Spectrometer

MODEL: IONSCAN Models 100, 200, 250, 350, 400, **Sabre 2000**

DISTRIBUTOR:

**Barringer Instruments, Inc.
30 Technology Drive
Warren, NJ 07959**

MANUFACTURER:

**Barringer Research Limited
1730 Aimco Blvd.
Mississauga, Ontario
Canada, L4W1V1**

SEALED SOURCE MODEL DESIGNATION: Amersham Corp. Model NBC
**Nuclear Radiation Development
(NRD) Source Model, N1001**

ISOTOPE:

Nickel-63

MAXIMUM ACTIVITY:

15 mCi (0.56 GBq)

LEAK TEST FREQUENCY: (6) six months

PRINCIPAL USE: (N) Ion Generators, Chromatography

CUSTOM DEVICE: _____ YES NO

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE
(AMENDED IN ITS ENTIRETY)

NO.: NR-163-D-101-G

DATE: March 1, 2000

PAGE: 2 OF 10

DEVICE TYPE: Ion Mobility Spectrometer

DESCRIPTION:

The IONSCAN devices use ion mobility spectrometry (IMS) to detect and identify trace quantities of a wide variety of chemical substances. Air containing microscopic particles of various chemical substances are drawn into a sample collector. The sample is heated in order to vaporize the particulate matter. The vapor is drawn into the detector, ionized by the Nickel-63 source and passed into a drift region. The ionized particles are focused and accelerated by an electric field along the drift-region towards a collector electrode. Ionized particles in the vapor form are accelerated at different rates and arrive at the collector electrode at different times. The amount of time the particles take to reach the collector electrode can be directly related to the ionized chemical substances present in the vapor. Therefore, specific substances can be detected according to the time required to reach the collector.

The Ni-63 source is encapsulated in a hollow brass cylinder which is, in turn, sealed in a ceramic shield. The ceramic shield is connected to the drift region which consists of a brass tube surrounded by brass discs equally spaced along its length. These discs create the electric field which focuses and accelerates the ionized particles. The entire assembly (the drift tube assembly) is contained in a brass source housing assembly. Graphite gaskets are used to provide a seal between the flanges of the housing assembly. A Pyrex glass inlet tube is connected to the drift tube assembly. Samples are drawn into the ion chamber through this inlet. The source housing assembly, with drift tube assembly and inlet tube installed, is contained within a stainless steel housing. Void spaces between the stainless steel housing and drift tube assembly are filled with insulation in order to protect and immobilize the drift tube assembly. The entire assembly (detector cell) is mounted inside the IONSCAN device. All brass components are plated with a 1.31×10^{-3} inch (400 microns) layer of nickel, and all internal surfaces are also plated with a 0.66×10^{-3} inch (200 microns) layer of gold.

The Model 250 devices are identical to the Model 200 except that the Model 250 devices contain a Model 100 style keypads. The Models 350 and 400 are identical to the Model 250 except that the

SAFETY EVALUATION OF DEVICE
(AMENDED IN ITS ENTIRETY)

NO.: NR-163-D-101-G

DATE: March 1, 2000

PAGE: 3 OF 10

DEVICE TYPE: Ion Mobility Spectrometer

DESCRIPTION: (Contd.)

Model 350 contains an alternate power/pump unit, adding a thermoelectric cooler to remove moisture from the air flow and an optional DC battery pack, and the Model 400 uses a modified keypad and an alternate, a smaller power/pump unit without mass flow controllers.

The Ionscan Sabre 2000 is a hand-held portable chemical detection device which can identify trace residues of, and vapors emitted from, a wide variety of chemicals and, therefore, will be in contact with the operator. The metals used in the construction of the detector are gold and gold plated metals, stainless steel, nickel and Hastelloy. The manufacturer has stated that these metals will not be oxidized by air under anticipated operating and storage conditions. The source is contained in a source holder constructed from gold plated Naval Brass Rod.

A maximum 15 mCi (0.56 GBq) foil source consisting of nickel metal, electroless, 99.9% pure gold plating on a backing foil of 0.006-0.008 inches (0.152-0.203 mm) in thickness (Registration Certificate No. NY502S103U) is inserted into the holder so that it conforms to the interior radius of the brass holder. The source sits against a machined ridge on one side of the holder, and rests against a gold-plated nickel mesh (repelling mesh) on the other side of the holder. The source is physically wedged in place. Sabre 2000 device mounting of the sealed sources is such that it cannot come loose from the source holder, or be dislodged from the device under normal operating and likely accident conditions. The manufacturer stated that for shipping and transportation no additional mechanism is required for shielding the radioactive source. The source is shielded within the detector. No adhesive is used to hold the source in place.

The repelling mesh contacts the source holder on one side while a ceramic spacer contacts the source holder on the other side. The source holder, as well as other pieces of the drift tube assembly, are held together by a 10 lbs. (44.48 N) force provided by a compressed spring.

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE
(AMENDED IN ITS ENTIRETY)

NO.: NR-163-D-101-G

DATE: March 1, 2000

PAGE: 4 OF 10

DEVICE TYPE: Ion Mobility Spectrometer

DESCRIPTION: (Contd.)

Radial ceramic shielding surrounds the source holder, and the drift tube casing surrounds the ceramic shielding. The drift tube shell casing is constructed of 0.032 inches (0.813 mm) thick Hastelloy. While the Ionscan Sabre 2000 is connected to an electrical power supply and rests in a cradle on the Base Station, the battery pack, consisting of 10 Metal Hydride batteries, is continuously charged and system offers full operational capability.

The charger checks the battery pack before charging and does not start charging a faulty pack or if the pack temperature is outside the safety range of 0°C to 40°C, (32°F to 104°F). When the battery is fully charged, the Model Sabre 2000 can operate for one and half hours. Model Sabre 2000 may be connected to a compatible computer for data viewing and programing.

An air flow through the assembly is used to induce chemical particulate and vapors samples through the inlet and into the drift tube. A thermoelectric cooler is connected to the device to remove moisture from the air flow. The air purification cartridge removes moisture from the airflow. The tube is filled with colored and white beads of molecular sieves. The colored beads are blue when dry and turn pink as they are used.

LABELING:

IONSCAN devices distributed prior to February 17, 1994, were erroneously labeled. Barringer has committed that all devices distributed on or after February 17, 1994, will contain a label on the outer surface of the IONSCAN devices which meets the requirements of 10 CFR 32.51. In addition, Barringer has committed to sending additional labels to all users of devices distributed prior to February 17, 1994, with instructions for applying these labels. When properly applied, these past distributed devices will contain labels which meet the requirements of 10 CFR 32.51. All labels are made of Mylar and are secured in place with an adhesive.

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(AMENDED IN ITS ENTIRETY)

NO.: NR-163-D-101-G

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DEVICE TYPE: Ion Mobility Spectrometer

LABELING: (Contd.)

Model Saber 2000 drift tube assembly has two labels permanently affixed to the device. The first label is shown in Attachment No. 5. This label designates the isotope, activity level, wipe test date and has the trefoil symbol included. Additionally, the drift tube assembly carries the label shown on Attachment No. 4. This label is to alert anyone who has removed the Ionscan cover that disassembly of the IMS detector cell is prohibited. The device outside carries Trefoil Symbol and a WARNING RADIATION HAZARD label. This label advises of the Ni-63 source, the requirements for 6 months leak testing, and the general license regulations.

DIAGRAM:

See Attachments 1 to 5.

CONDITIONS OF NORMAL USE:

IONSCAN devices will be used for detecting various chemical compounds, including drugs and explosives. Typical uses of these devices will be in controlled surroundings or in outdoor ambient conditions. The equipment is specified for operation in temperatures ranging from 0°C to 500°C, (320F to 1220F). The device is not expected to operate under any significant vibration conditions. The optional DC power pack is intended to make the IONSCAN device portable in a limited scope. It allows for movement of the device to a temporary site where AC power is not available.

Model Sabre 2000 can be used for the detection of both the trace particles and vapor. It can be used for detecting and identifying explosives and narcotics. The armed forces, law enforcement authorities, customs, correctional institutions, local police and fire departments, public and private security surveillance organizations may be the primary users of this device. The device is not expected to be used in a wet (rain, snow, under water etc.) or vibrational environment.

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SAFETY EVALUATION OF DEVICE
(AMENDED IN ITS ENTIRETY)

NO.: NR-163-D-101-G

DATE: March 1, 2000

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DEVICE TYPE: Ion Mobility Spectrometer

CONDIOTIONS OF NORMAL USE: (Contd.)

The expected working life of the Model Sabre 2000 is anticipated to be 10 years or more. The Ni-63 nor radiological safety aspects limit the expected working life.

PROTOTYPE TESTING:

The manufacturer claims that the IMS detector assembly, with sealed source installed, was tested to ANSI N542-1977 and received a classification of 77C32211 which is the minimal requirement for ion generators used as chromatograph. Following each test air was flown through the device and the drift tube assembly was tested for removable contamination. No removable contamination above 0.005 micro curies (185 Becquerel) was noted.

The structural integrity of the Model Sabre 2000 detecting device design was tested under the following expected extreme temperatures, pressure and impact conditions:

- Pressure test to 25 kPa, (3.63 lbs/in²)
- Drop test from 1.5 m, (59.06 inches) ten times onto a steel plate
- Temperature test -40°C to 220°C, (-40°F to 428°F)
- Impact 50 g, from 1 m, (39.37 inches)

The manufacturer reported that prototype tests were conducted on the sealed source drift tube assembly, with the sealed source installed, in accordance with the minimum classification of 77C32211 for Ion Generator of Chromatography Type (ECD), per ANSI N542-1977. The source material was not affected by the tests and there was no loss of shielding or containment integrity. No removable contamination above 0.005 micro curies (185 Becquerel) was noted.

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE
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DEVICE TYPE: Ion Mobility Spectrometer

EXTERNAL RADIATION LEVELS:

Due to the shielding of the beta-radiation by the brass, ceramic and stainless steel components of the IMS detector cell, Barringer reports no detectable radiation on any accessible surface of the detector cell or the external surface of the IONSCAN device.

Since the walls of the Model Sabre 2000 detectors are far in excess of the range of the maximum energy beta particles emitted from the contained source, surface readings on the Model Sabre 2000 did not exceed ambient background levels. Furthermore, any beta radiation emitted is thermalized within a distance of 1 cm.

Leak tests are to be performed on each sealed source as a part of factory acceptance testing, and a copy of the leak test results is to be delivered to each customer along with a copy of the General License.

QUALITY ASSURANCE AND CONTROL:

Barringer performs an incoming inspection to ensure that each source assembly received is undamaged, properly labeled, that all radiation protection features are in accordance with drawings and specifications and that leak test results are provided by the manufacturer. Once the IMS is installed in the IONSCAN, an operational test will be performed on the entire unit. Each completed device, prior to installation, is tested for leakage. The quality control program involving the IMS is on file with NRC.

Barringer Research Limited is a certified ISO 9001 Organization. Barringer Research is committed to design, manufacture and distribute the Model Sabre 2000 devices in accordance with the current ISO-9000 approved program. Current ISO-9000 Certificate No. 006556 is on file with NRC.

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE
(AMENDED IN ITS ENTIRETY)

NO.: NR-163-D-101-G

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DEVICE TYPE: Ion Mobility Spectrometer

LIMITATIONS AND/OR OTHER CONSIDERATIONS OF USE:

- The devices may be distributed to persons generally licensed pursuant to Section 31.5, 10 CFR Part 32.5, and must be initially transferred in accordance with the requirements of Section 32.51, and 10 CFR Part 32.5.
- These devices shall be leak tested at intervals not to exceed 6 months by persons specifically or generally licensed by the NRC or an Agreement State, using techniques capable of detecting 0.005 microcuries (185 Bq) of removable contamination. **Allow the units to cool down prior to taking swab samples. For Sabre 2000 model two samples, one from IMS inlet and another from the exhaust port, must be taken for leak testing.**
- This registration sheet and the information contained within the references shall not be changed without the written consent of the NRC.
- **REVIEWER NOTE: Barringer Instruments Inc. understands and has confirmed that the final disposal of the devices and sources will be performed by their parent company, Barringer Research Limited located in Ontario, Canada. In case of an emergency, USA Federal, State or Local authorities may isolate and dispose of chemically contaminated devices and sources in accordance with the applicable regulations.**

SAFETY ANALYSIS SUMMARY:.

Barringer Instruments, Inc., provided adequate IONSCAN units safety characteristics to ensure that individuals will not receive radiation exposures in excess of applicable regulatory limits. Unauthorized access to the source is discouraged by instructions, labeling and the fact that the source in the drift tube is buried deep within the self contained IMS detector housing providing three levels of protection, and is itself contained inside the IONSCAN device.

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
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DEVICE TYPE: Ion Mobility Spectrometer

SAFETY ANALYSIS-SUMMARY: (Contd.)

Barringer has submitted sufficient information to provide reasonable assurance that:

- The device can be safely operated by persons not having training in radiological protection.
- Under ordinary conditions of handling, storage, and use of the device, the byproduct material contained in the device will not be released or inadvertently removed from the source housing, and it is unlikely that any person will receive in any period of one year a dose in excess of 10 percent of the limits specified in Section 20.1201(a), 10 CFR Part 20.
- Under accident conditions associated with handling, storage and use, it is unlikely that any person would receive an external radiation dose or dose commitment in excess of the dose to the appropriate organ as specified in the following chart:

PART OF BODY

	rem.	Sv
Whole body; head and trunk; active blood-forming organs; gonads; or lens of eye	15	150
Hands and forearms; feet and ankles; localized areas of skin averaged over areas no larger than 1 square centimeter	200	2000
Other organs	50	500

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DEVICE TYPE: Ion Mobility Spectrometer

SAFETY ANALYSIS SUMMARY: (Contd.)

Based on review of the IONSCAN spectrometer design and the information and test data cited below, we continue to conclude that the devices are acceptable for licensing purposes. Furthermore, we continue to conclude that the devices would be expected to maintain their containment integrity for normal conditions of use and accidental conditions which might occur during uses specified in this certificate.

REFERENCES:

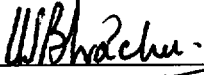
The following supporting documents for the IONSCAN spectrometer devices are hereby incorporated by reference and are made a part of this registry document.

- Barringer's letters dated August 31, 1995, March 30, 1995, February 17, 1994, February 15, 1994, February 2, 1994, September 8, 1993, January 17, 1992, December 3, 1991, and August 20, 1990, **July 26, 1999, September 23, 1999, December 21, 1999, January 20, 2000, February 28, 2000, February 29, 2000, with enclosures thereto.**

ISSUING AGENCY:

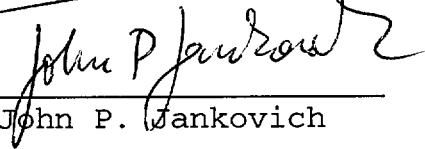
U.S. Nuclear Regulatory Commission

Date: March 1, 2000

Reviewer: 

Ujagar S. Bhachu

Date: March 1, 2000

Concurrence: 

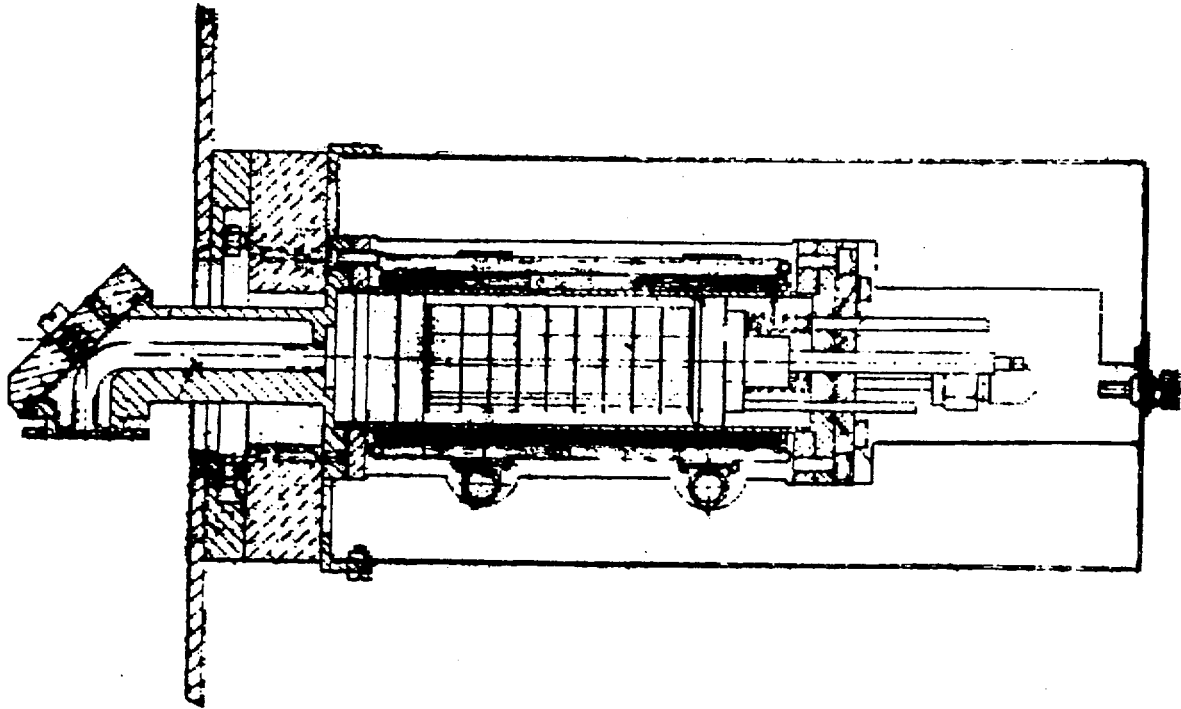
John P. Jankovich

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE
(AMENDED IN ITS ENTIRETY)

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ATTACHMENT 1



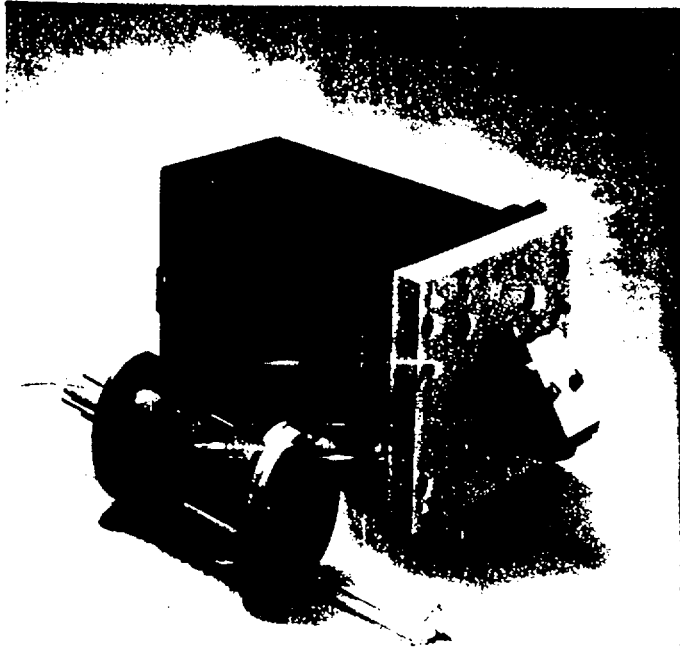
IMS Detector Cell Assembly

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE
(AMENDED IN ITS ENTIRETY)

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ATTACHMENT 2



EXTERNAL IMS HOUSING



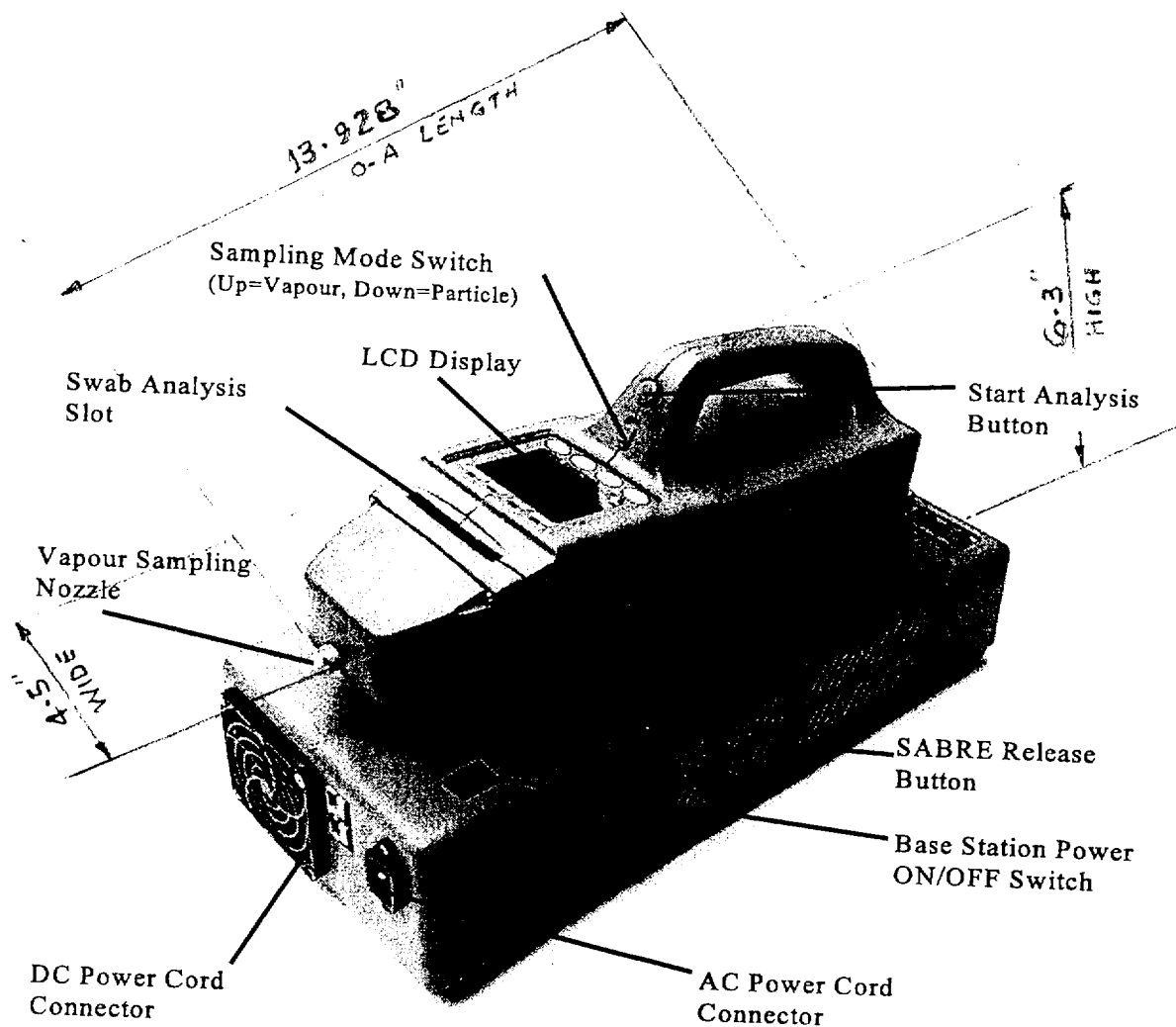
IMS HOUSING INSTALLED IN IONSCAN

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE
(AMENDED IN ITS ENTIRETY)

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ATTACHMENT 3



SABRE 2000 and Base Station Key Components

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE
(AMENDED IN ITS ENTIRETY)

NO.: NR-163-D-101-G

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ATTACHMENT 4

Radiation label used on sealed source assemble

WARNING: RADIATION HAZARD

This IONSCAN contains a sealed radioactive source: Ni63 at 15 Millicuries. There is no direct radiation hazard. This equipment must be handled in accordance with the licensing requirements of the applicable nuclear regulatory agency.

DISASSEMBLY OF THE IMS DETECTOR CELL AND REMOVAL OF THE RADIOACTIVE SOURCE MUST NEVER BE ATTEMPTED EXCEPT BY THE MANUFACTURER.

Radiation warning label used on exterior of instrument

WARNING: RADIATION HAZARD

This IONSCAN contains a sealed radioactive source: Ni63 at 15 Millicuries. Disassembly of the IMS detector and removal of the radioactive source **MUST NEVER** be attempted except by the manufacturer. Six month leak testing of this device is required in accordance with the licensing requirements of the applicable nuclear regulatory agency.

The receipt, possession, use, and transfer of this device Model 400-1161

Serial No. 400-971 are subject to a general license or the equivalent and the regulations of the U.S. NRC or of a State with which the NRC has entered into an agreement for the exercise of regulatory authority. This label shall be maintained on the device in a legible condition. Removal of this label is prohibited.

BARRINGER INSTRUMENTS, INC.

Trefoil symbol used on exterior of instrument

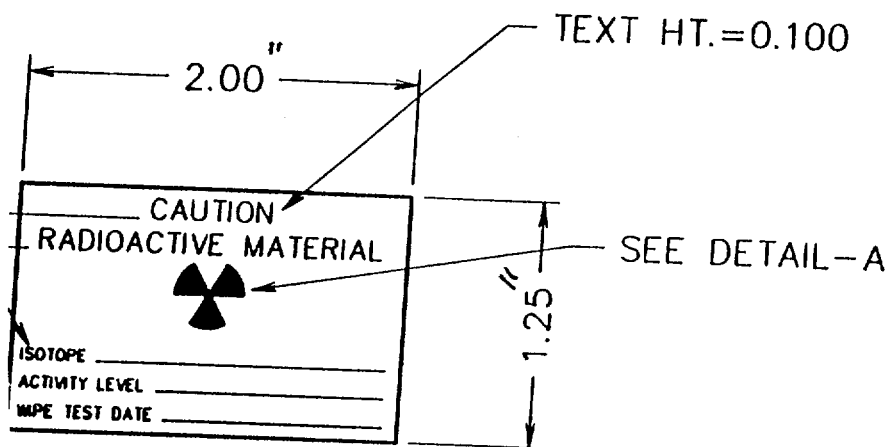


REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE
(AMENDED IN ITS ENTIRETY)

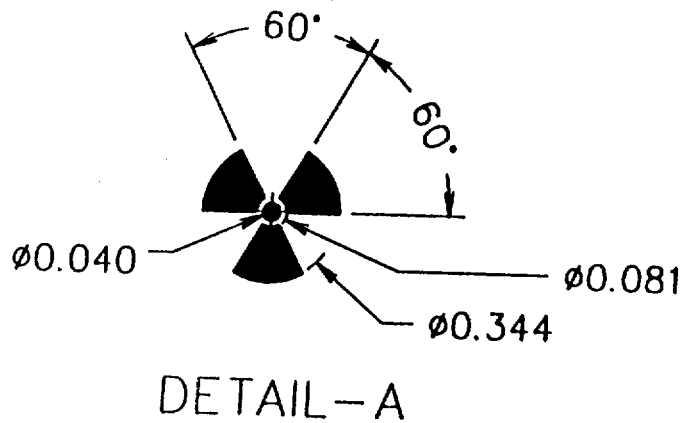
NO.: NR-163-D-101-G

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ATTACHMENT 5



MATL: SELF-ADHESIVE
PAPER LABEL (YELLOW)



RADIOACTIVE SOURCE IDENTIFICATION

March 1, 2000

Mr. Kenneth S. Wood, President
Barringer Technologies Inc.
30 Technology Drive
Warren, NJ 07059

Dear Mr. Wood:

Based on the information submitted in your letters dated September 23, 1999, December 21, 1999, January 20, 2000, we have amended in it's entirety the registration certificate NR-163-D-101-G to include Ionscan Model Sabre 2000.

Please be advised that you must manufacture and distribute the product in accordance with the statements and representations contained in the application submitted by Barringer Technologies Inc., with enclosures thereto, and the information set out in the attached registration certificate. As a general rule, you must request and obtain an amendment to the certificate before you make changes or modifications to the information submitted to obtain the registration certificate. You are obligated to notify us promptly in writing should you decide to no longer manufacture or offer service support for the product.

Please be aware that, as a holder of an NRC registration, you may be subject to the NRC's licensing fees in accordance with 10 CFR Part 170, and annual fees in accordance with 10 CFR Part 171. If you have any questions concerning the fee requirements, please contact the License Fee and Debt Collection Branch at (301) 415-6096.

Please read over the registration certificate in its entirety and notify us immediately of any errors or omissions. If you have any questions, please contact me at (301) 415-7894 or John Jankovich on (301) 415-7904.

Sincerely,

/s/

Ujagar S. Bhachu, Mechanical Engineer
Materials Safety and Inspection Branch
Division of Industrial and
Medical Nuclear Safety
Office of Nuclear Material Safety
and Safeguards

Enclosure: As stated
cc w/encl: SKimberley, LFDCB

Distribution:
IMNS r/f SSD 99-54 NMSS-02 PUBLIC

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DATE	03/01/2000		03/1/2000						

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REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE
(AMENDED IN ITS ENTIRETY)

NO.: NR-163-D-101-G

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PAGE 1 OF 10

DEVICE TYPE: Ion Mobility Spectrometer

MODEL: IONSCAN Models 100, 200, 250, 350, 400, **Sabre 2000**

DISTRIBUTOR:

**Barringer Instruments, Inc.
30 Technology Drive
Warren, NJ 07959**

MANUFACTURER:

**Barringer Research Limited
1730 Aimco Blvd.
Mississauga, Ontario
Canada, L4W1V1**

SEALED SOURCE MODEL DESIGNATION: Amersham Corp. Model NBC
**Nuclear Radiation Development
(NRD) Source Model, N1001**

ISOTOPE:

Nickel-63

MAXIMUM ACTIVITY:

15 mCi (0.56 GBq)

LEAK TEST FREQUENCY: (6) six months

PRINCIPAL USE: (N) Ion Generators, Chromatography

CUSTOM DEVICE: _____ YES NO

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE
(AMENDED IN ITS ENTIRETY)

NO.: NR-163-D-101-G

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DEVICE TYPE: Ion Mobility Spectrometer

DESCRIPTION:

The IONSCAN devices use ion mobility spectrometry (IMS) to detect and identify trace quantities of a wide variety of chemical substances. Air containing microscopic particles of various chemical substances are drawn into a sample collector. The sample is heated in order to vaporize the particulate matter. The vapor is drawn into the detector, ionized by the Nickel-63 source and passed into a drift region. The ionized particles are focused and accelerated by an electric field along the drift-region towards a collector electrode. Ionized particles in the vapor form are accelerated at different rates and arrive at the collector electrode at different times. The amount of time the particles take to reach the collector electrode can be directly related to the ionized chemical substances present in the vapor. Therefore, specific substances can be detected according to the time required to reach the collector.

The Ni-63 source is encapsulated in a hollow brass cylinder which is, in turn, sealed in a ceramic shield. The ceramic shield is connected to the drift region which consists of a brass tube surrounded by brass discs equally spaced along its length. These discs create the electric field which focuses and accelerates the ionized particles. The entire assembly (the drift tube assembly) is contained in a brass source housing assembly. Graphite gaskets are used to provide a seal between the flanges of the housing assembly. A Pyrex glass inlet tube is connected to the drift tube assembly. Samples are drawn into the ion chamber through this inlet. The source housing assembly, with drift tube assembly and inlet tube installed, is contained within a stainless steel housing. Void spaces between the stainless steel housing and drift tube assembly are filled with insulation in order to protect and immobilize the drift tube assembly. The entire assembly (detector cell) is mounted inside the IONSCAN device. All brass components are plated with a 1.31×10^{-3} inch (400 microns) layer of nickel, and all internal surfaces are also plated with a 0.66×10^{-3} inch (200 microns) layer of gold.

The Model 250 devices are identical to the Model 200 except that the Model 250 devices contain a Model 100 style keypads. The Models 350 and 400 are identical to the Model 250 except that the

SAFETY EVALUATION OF DEVICE
(AMENDED IN ITS ENTIRETY)

NO.: NR-163-D-101-G

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DEVICE TYPE: Ion Mobility Spectrometer

DESCRIPTION: (Contd.)

Model 350 contains an alternate power/pump unit, adding a thermoelectric cooler to remove moisture from the air flow and an optional DC battery pack, and the Model 400 uses a modified keypad and an alternate, a smaller power/pump unit without mass flow controllers.

The Ionscan Sabre 2000 is a hand-held portable chemical detection device which can identify trace residues of, and vapors emitted from, a wide variety of chemicals and, therefore, will be in contact with the operator. The metals used in the construction of the detector are gold and gold plated metals, stainless steel, nickel and Hastelloy. The manufacturer has stated that these metals will not be oxidized by air under anticipated operating and storage conditions. The source is contained in a source holder constructed from gold plated Naval Brass Rod.

A maximum 15 mCi (0.56 GBq) foil source consisting of nickel metal, electroless, 99.9% pure gold plating on a backing foil of 0.006-0.008 inches (0.152-0.203 mm) in thickness (Registration Certificate No. NY502S103U) is inserted into the holder so that it conforms to the interior radius of the brass holder. The source sits against a machined ridge on one side of the holder, and rests against a gold-plated nickel mesh (repelling mesh) on the other side of the holder. The source is physically wedged in place. Sabre 2000 device mounting of the sealed sources is such that it cannot come loose from the source holder, or be dislodged from the device under normal operating and likely accident conditions. The manufacturer stated that for shipping and transportation no additional mechanism is required for shielding the radioactive source. The source is shielded within the detector. No adhesive is used to hold the source in place.

The repelling mesh contacts the source holder on one side while a ceramic spacer contacts the source holder on the other side. The source holder, as well as other pieces of the drift tube assembly, are held together by a 10 lbs. (44.48 N) force provided by a compressed spring.

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SAFETY EVALUATION OF DEVICE
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DEVICE TYPE: Ion Mobility Spectrometer

DESCRIPTION: (Contd.)

Radial ceramic shielding surrounds the source holder, and the drift tube casing surrounds the ceramic shielding. The drift tube shell casing is constructed of 0.032 inches (0.813 mm) thick Hastelloy. While the Ionscan Sabre 2000 is connected to an electrical power supply and rests in a cradle on the Base Station, the battery pack, consisting of 10 Metal Hydride batteries, is continuously charged and system offers full operational capability.

The charger checks the battery pack before charging and does not start charging a faulty pack or if the pack temperature is outside the safety range of 0°C to 40°C, (32°F to 104°F). When the battery is fully charged, the Model Sabre 2000 can operate for one and half hours. Model Sabre 2000 may be connected to a compatible computer for data viewing and programing.

An air flow through the assembly is used to induce chemical particulate and vapors samples through the inlet and into the drift tube. A thermoelectric cooler is connected to the device to remove moisture from the air flow. The air purification cartridge removes moisture from the airflow. The tube is filled with colored and white beads of molecular sieves. The colored beads are blue when dry and turn pink as they are used.

LABELING:

IONSCAN devices distributed prior to February 17, 1994, were erroneously labeled. Barringer has committed that all devices distributed on or after February 17, 1994, will contain a label on the outer surface of the IONSCAN devices which meets the requirements of 10 CFR 32.51. In addition, Barringer has committed to sending additional labels to all users of devices distributed prior to February 17, 1994, with instructions for applying these labels. When properly applied, these past distributed devices will contain labels which meet the requirements of 10 CFR 32.51. All labels are made of Mylar and are secured in place with an adhesive.

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DEVICE TYPE: Ion Mobility Spectrometer

LABELING: (Contd.)

Model Saber 2000 drift tube assembly has two labels permanently affixed to the device. The first label is shown in Attachment No. 5. This label designates the isotope, activity level, wipe test date and has the trefoil symbol included. Additionally, the drift tube assembly carries the label shown on Attachment No. 4. This label is to alert anyone who has removed the Ionscan cover that disassembly of the IMS detector cell is prohibited. The device outside carries Trefoil Symbol and a WARNING RADIATION HAZARD label. This label advises of the Ni-63 source, the requirements for 6 months leak testing, and the general license regulations.

DIAGRAM:

See Attachments 1 to 5.

CONDITIONS OF NORMAL USE:

IONSCAN devices will be used for detecting various chemical compounds, including drugs and explosives. Typical uses of these devices will be in controlled surroundings or in outdoor ambient conditions. The equipment is specified for operation in temperatures ranging from 0°C to 500°C, (320F to 1220F). The device is not expected to operate under any significant vibration conditions. The optional DC power pack is intended to make the IONSCAN device portable in a limited scope. It allows for movement of the device to a temporary site where AC power is not available.

Model Sabre 2000 can be used for the detection of both the trace particles and vapor. It can be used for detecting and identifying explosives and narcotics. The armed forces, law enforcement authorities, customs, correctional institutions, local police and fire departments, public and private security surveillance organizations may be the primary users of this device. The device is not expected to be used in a wet (rain, snow, under water etc.) or vibrational environment.

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DEVICE TYPE: Ion Mobility Spectrometer

CONDIOTIONS OF NORMAL USE: (Contd.)

The expected working life of the Model Sabre 2000 is anticipated to be 10 years or more. The Ni-63 nor radiological safety aspects limit the expected working life.

PROTOTYPE TESTING:

The manufacturer claims that the IMS detector assembly, with sealed source installed, was tested to ANSI N542-1977 and received a classification of 77C32211 which is the minimal requirement for ion generators used as chromatograph. Following each test air was flown through the device and the drift tube assembly was tested for removable contamination. No removable contamination above 0.005 micro curies (185 Becquerel) was noted.

The structural integrity of the Model Sabre 2000 detecting device design was tested under the following expected extreme temperatures, pressure and impact conditions:

- Pressure test to 25 kPa, (3.63 lbs/in²)
- Drop test from 1.5 m, (59.06 inches) ten times onto a steel plate
- Temperature test -40°C to 220°C, (-40°F to 428°F)
- Impact 50 g, from 1 m, (39.37 inches)

The manufacturer reported that prototype tests were conducted on the sealed source drift tube assembly, with the sealed source installed, in accordance with the minimum classification of 77C32211 for Ion Generator of Chromatography Type (ECD), per ANSI N542-1977. The source material was not affected by the tests and there was no loss of shielding or containment integrity. No removable contamination above 0.005 micro curies (185 Becquerel) was noted.

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SAFETY EVALUATION OF DEVICE
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NO.: NR-163-D-101-G

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PAGE: 7 OF 10

DEVICE TYPE: Ion Mobility Spectrometer

EXTERNAL RADIATION LEVELS:

Due to the shielding of the beta-radiation by the brass, ceramic and stainless steel components of the IMS detector cell, Barringer reports no detectable radiation on any accessible surface of the detector cell or the external surface of the IONSCAN device.

Since the walls of the Model Sabre 2000 detectors are far in excess of the range of the maximum energy beta particles emitted from the contained source, surface readings on the Model Sabre 2000 did not exceed ambient background levels. Furthermore, any beta radiation emitted is thermalized within a distance of 1 cm.

Leak tests are to be performed on each sealed source as a part of factory acceptance testing, and a copy of the leak test results is to be delivered to each customer along with a copy of the General License.

QUALITY ASSURANCE AND CONTROL:

Barringer performs an incoming inspection to ensure that each source assembly received is undamaged, properly labeled, that all radiation protection features are in accordance with drawings and specifications and that leak test results are provided by the manufacturer. Once the IMS is installed in the IONSCAN, an operational test will be performed on the entire unit. Each completed device, prior to installation, is tested for leakage. The quality control program involving the IMS is on file with NRC.

Barringer Research Limited is a certified ISO 9001 Organization. Barringer Research is committed to design, manufacture and distribute the Model Sabre 2000 devices in accordance with the current ISO-9000 approved program. Current ISO-9000 Certificate No. 006556 is on file with NRC.

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE
(AMENDED IN ITS ENTIRETY)

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DEVICE TYPE: Ion Mobility Spectrometer

LIMITATIONS AND/OR OTHER CONSIDERATIONS OF USE:

- The devices may be distributed to persons generally licensed pursuant to Section 31.5, 10 CFR Part 32.5, and must be initially transferred in accordance with the requirements of Section 32.51, and 10 CFR Part 32.5.
- These devices shall be leak tested at intervals not to exceed 6 months by persons specifically or generally licensed by the NRC or an Agreement State, using techniques capable of detecting 0.005 microcuries (185 Bq) of removable contamination. **Allow the units to cool down prior to taking swab samples. For Sabre 2000 model two samples, one from IMS inlet and another from the exhaust port, must be taken for leak testing.**
- This registration sheet and the information contained within the references shall not be changed without the written consent of the NRC.
- **REVIEWER NOTE: Barringer Instruments Inc. understands and has confirmed that the final disposal of the devices and sources will be performed by their parent company, Barringer Research Limited located in Ontario, Canada. In case of an emergency, USA Federal, State or Local authorities may isolate and dispose of chemically contaminated devices and sources in accordance with the applicable regulations.**

SAFETY ANALYSIS SUMMARY:.

Barringer Instruments, Inc., provided adequate IONSCAN units safety characteristics to ensure that individuals will not receive radiation exposures in excess of applicable regulatory limits. Unauthorized access to the source is discouraged by instructions, labeling and the fact that the source in the drift tube is buried deep within the self contained IMS detector housing providing three levels of protection, and is itself contained inside the IONSCAN device.

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE
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DEVICE TYPE: Ion Mobility Spectrometer

SAFETY ANALYSIS-SUMMARY: (Contd.)

Barringer has submitted sufficient information to provide reasonable assurance that:

- The device can be safely operated by persons not having training in radiological protection.
- Under ordinary conditions of handling, storage, and use of the device, the byproduct material contained in the device will not be released or inadvertently removed from the source housing, and it is unlikely that any person will receive in any period of one year a dose in excess of 10 percent of the limits specified in Section 20.1201(a), 10 CFR Part 20.
- Under accident conditions associated with handling, storage and use, it is unlikely that any person would receive an external radiation dose or dose commitment in excess of the dose to the appropriate organ as specified in the following chart:

PART OF BODY

	rem	Sv
Whole body; head and trunk; active blood-forming organs; gonads; or lens of eye	15	150
Hands and forearms; feet and ankles; localized areas of skin averaged over areas no larger than 1 square centimeter	200	2000
Other organs	50	500

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE
(AMENDED IN ITS ENTIRETY)

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PAGE 10 OF 10

DEVICE TYPE: Ion Mobility Spectrometer

SAFETY ANALYSIS SUMMARY: (Contd.)

Based on review of the IONSCAN spectrometer design and the information and test data cited below, we continue to conclude that the devices are acceptable for licensing purposes. Furthermore, we continue to conclude that the devices would be expected to maintain their containment integrity for normal conditions of use and accidental conditions which might occur during uses specified in this certificate.

REFERENCES:

The following supporting documents for the IONSCAN spectrometer devices are hereby incorporated by reference and are made a part of this registry document.

- Barringer's letters dated August 31, 1995, March 30, 1995, February 17, 1994, February 15, 1994, February 2, 1994, September 8, 1993, January 17, 1992, December 3, 1991, and August 20, 1990, **July 26, 1999, September 23, 1999, December 21, 1999, January 20, 2000, February 28, 2000, February 29, 2000, with enclosures thereto.**

ISSUING AGENCY:

U.S. Nuclear Regulatory Commission

Date: March 1, 2000

Reviewer:

Ujagar S. Bhachu
Ujagar S. Bhachu

Date: March 1, 2000

Concurrence:

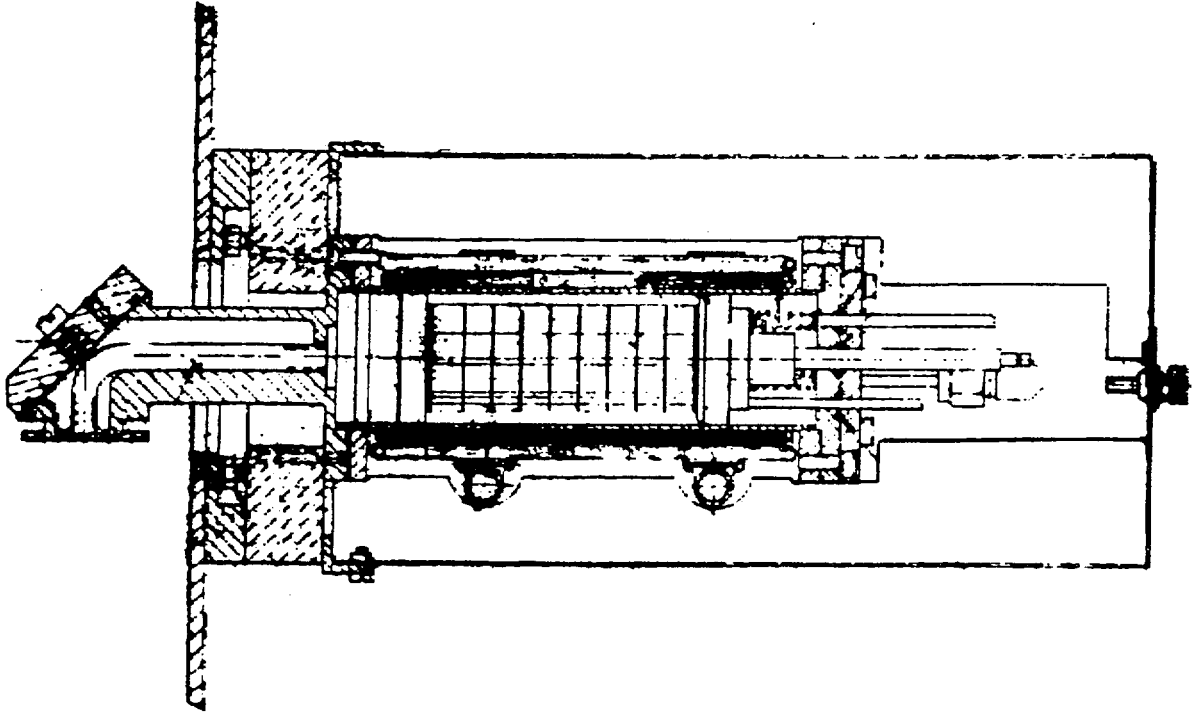
John P. Jankovich
John P. Jankovich

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE
(AMENDED IN ITS ENTIRETY)

NO.: NR-163-D-101-G

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ATTACHMENT 1



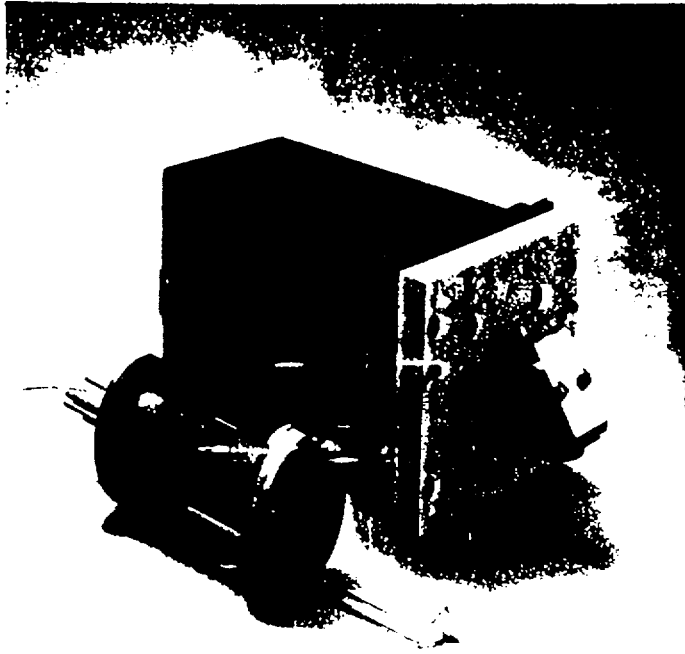
IMS Detector Cell Assembly

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE
(AMENDED IN ITS ENTIRETY)

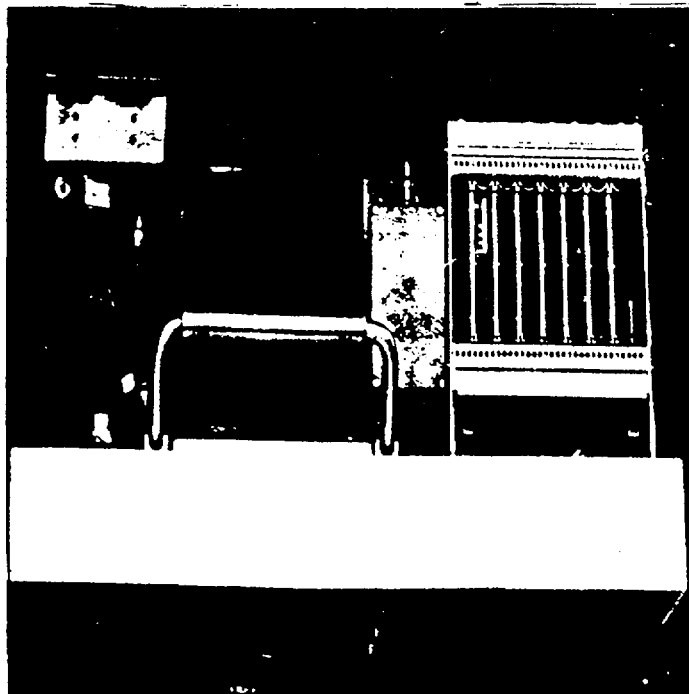
NO.: NR-163-D-101-G

DATE: March 1, 2000

ATTACHMENT 2



EXTERNAL IMS HOUSING



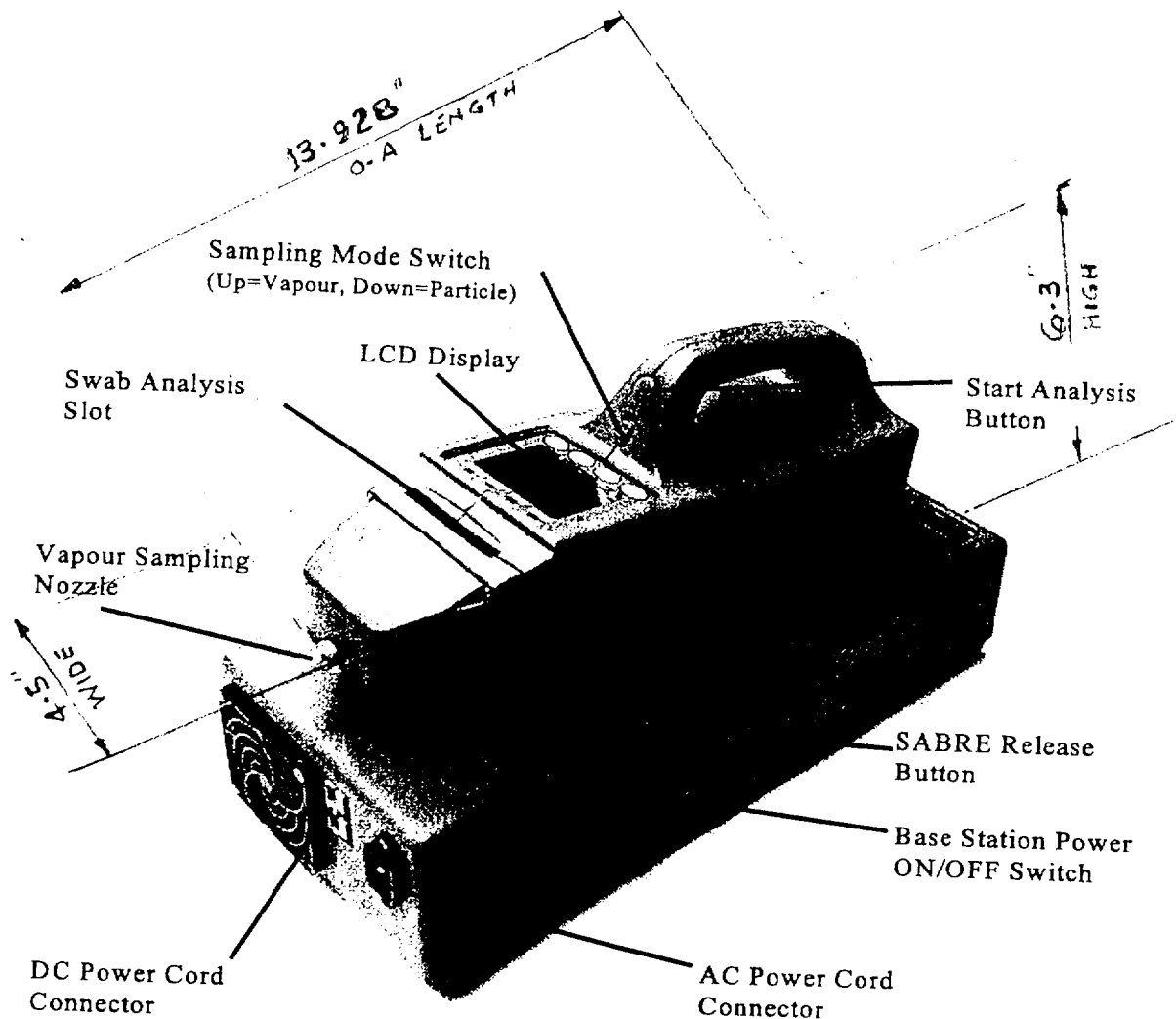
IMS HOUSING INSTALLED IN IONSCAN

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE
(AMENDED IN ITS ENTIRETY)

NO.: NR-163-D-101-G

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ATTACHMENT 3



SABRE 2000 and Base Station Key Components

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE
(AMENDED IN ITS ENTIRETY)

NO.: NR-163-D-101-G

DATE: March 1, 2000

ATTACHMENT 4

Radiation label used on sealed source assemble

WARNING: RADIATION HAZARD
This IONSCAN contains a sealed radioactive source: Ni63 at 15 Millicuries. There is no direct radiation hazard. This equipment must be handled in accordance with the licensing requirements of the applicable nuclear regulatory agency.
DISASSEMBLY OF THE IMS DETECTOR CELL AND REMOVAL OF THE RADIOACTIVE SOURCE MUST NEVER BE ATTEMPTED EXCEPT BY THE MANUFACTURER.

Radiation warning label used on exterior of instrument

WARNING: RADIATION HAZARD

This IONSCAN contains a sealed radioactive source: Ni63 at 15 Millicuries. Disassembly of the IMS detector and removal of the radioactive source MUST NEVER be attempted except by the manufacturer. Six month leak testing of this device is required in accordance with the licensing requirements of the applicable nuclear regulatory agency.

The receipt, possession, use, and transfer of this device Model 400-1161

Serial No. 400-971 are subject to a general license or the equivalent and the regulations of the U.S. NRC or of a State with which the NRC has entered into an agreement for the exercise of regulatory authority. This label shall be maintained on the device in a legible condition. Removal of this label is prohibited.

BARRINGER INSTRUMENTS, INC.

Trefoil symbol used on exterior of instrument

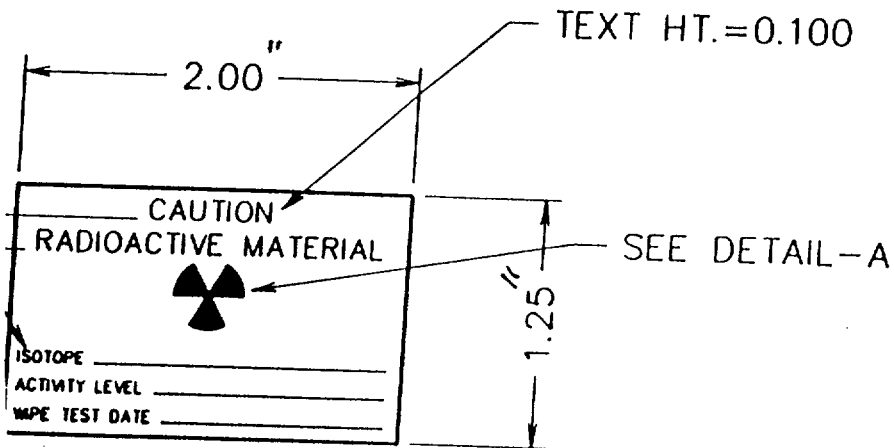


REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE
(AMENDED IN ITS ENTIRETY)

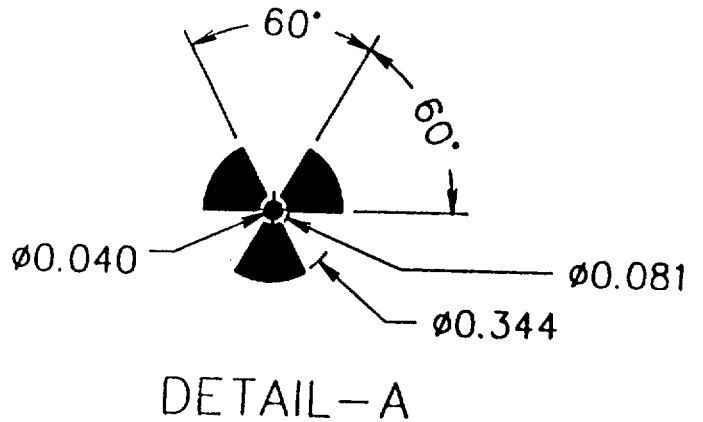
NO.: NR-163-D-101-G

DATE: March 1, 2000

ATTACHMENT 5



MATL: SELF-ADHESIVE
PAPER LABEL (YELLOW)



RADIOACTIVE SOURCE IDENTIFICATION



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

FAXED FROM:

DIVISION OF INDUSTRIAL AND MEDICAL NUCLEAR SAFETY (NMSS)
FAX NO. (301) 415-5369

DATE: Mar. 2, 2000

NAME: <u>Ken Wood</u>	FAX NO: <u>908-222-1556</u>
NAME:	FAX NO:
NAME:	FAX NO:
NAME:	FAX NO:
NAME:	FAX NO:

FROM: <u>Irasi Kine</u>	PHONE NO: (301) 415- <u>8140</u>
NUMBER OF PAGES INCLUDING COVER SHEET: <u>17</u>	
DOCUMENT DESCRIPTION: <u>Reg. Cert. NR-163-D-101-G</u> <u>with letter</u>	
COMMENTS:	

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301 415 5369

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