THE I 123 Imperative

Sodium Iodide I 123

for Thyroid Studies

1 Radioiodine is trapped by the thyroid and *organified* in the synthesis of thyroxine. $^{99m}TcO_4^-$ is also trapped by the thyroid but is not organified. Consequently, Tc99m activity does not always indicate the physiologic condition of the thyroid.[1]

2 Radioiodine clearly demonstrates the "cold," non-functioning nodules that may be associated with malignant thyroid tumors. Such nonfunctioning nodules have appeared "hot" or "cold" on images obtained with Tc99m, necessitating a confirmatory radioiodine scan.[2,3]

3 Radioiodine thyroid imaging is preferred to Tc99m in such instances as investigation of patients with possible retrosternal thyroid tissue or with unsatisfactory Tc99m images due to poor radionuclide concentration.[3]

---

[1] Steinbach, HL, Kundy, D, Moss, M, et al: A comparison of three agents in thyroid uptake and scintigraphy. Scientific Exhibit, Society of Nuclear Medicine, Philadelphia, June 16-20, 1975.

[2] "Information for Physicians—Irradiation-Related Thyroid Cancer" prepared by the Division of Cancer Control and Rehabilitation, National Cancer Institute, DHEW Publication No. (NIH) 77-1120, p.13.

[3] Arnold, JE, Pinsky, S: Comparison of ^{99m}Tc and ^{123}I for Thyroid Imaging. *J. Nucl. Med.*, 17:261,1976.

Organification is Imperative to Thyroid Studies

A palpable nodule in the left lower lobe present for at least six years considered to be "functioning" on the $^{99m}TcO_4^-$ image.

The ^{123}I image demonstrated that this nodule was "non-functioning."

Medi-Physics Sodium Iodide I 123 is important for informative thyroid studies. The principle gamma emission of I 123 is 159 keV which is well suited for gamma camera imaging. The 13.2 hours half-life and lack of non-penetrating radiations minimize the absorbed radiation dose. Thyroid uptake studies may be performed at 2, 4, 6, and 24 hours. If desired, a thyroid scan and a quantitative radioiodine uptake measurement may be performed simultaneously. Sodium Iodide I 123 is available in capsules or solution for next day delivery almost anywhere in the United States. Call Toll Free (in Calif.) (800) 772-2446; (outside Calif.) (800) 227-0483 for further information.

medi+physics™

For complete prescribing information consult package insert, a summary of which follows:

SODIUM IODIDE I 123
CAPSULES AND SOLUTION FOR ORAL ADMINISTRATION

DESCRIPTION: Sodium iodide I 123 for diagnostic use is supplied as capsules and in vials as an aqueous solution for oral administration. At calibration time each capsule has an activity of 100 microcuries and each vial contains solution with a total specific concentration of two millicuries per ml.

INDICATIONS: Sodium iodide I 123 is indicated for use in the diagnosis of thyroid function and imaging.

CONTRAINDICATIONS: None known.

WARNINGS: This radiopharmaceutical should not be administered to children or to patients who are pregnant or to nursing mothers unless the information to be gained outweighs the potential hazards. Ideally, examinations using radiopharmaceuticals, especially those elective in nature, in women of childbearing capability should be performed during the first few (approximately 10) days following the onset of menses. However, when studies of thyroid function are clinically indicated for members of these special population groups, use of I 123 would be preferable to the use of I 131 in order to minimize radiation dosage.

PRECAUTIONS: Sodium iodide I 123 as well as other radioactive drugs must be handled with care. Appropriate safety measures should be used to minimize radiation exposure to clinical personnel. Care should also be taken to minimize radiation exposure to the patient consistent with proper patient management. The prescribed Sodium Iodide I 123 dose should be administered as soon as practicable in order to minimize the fraction of radiation exposure due to relative increase of radionuclidic contaminants with time. The uptake of I 123 may be decreased by recent administration of iodinated contrast materials, by intake of stable iodine in any form, or by thyroid, antithyroid and certain other drugs. Accordingly, the patient should be questioned carefully regarding diet, previous medication, and procedures involving radiographic contrast media.

ADVERSE REACTIONS: There were nine adverse reactions reported in a series of 1,393 administrations. None of these were attributed to I 123. Five adverse reactions, consisting of gastric upset and vomiting, were attributed to a filler in the capsule. Two cases of headache and one case of nausea and weakness were attributed to the fasting state. One case of garlic odor on the breath was presumed to be attributable to the presence of tellurium.

DOSAGE AND ADMINISTRATION: The recommended oral dose range for diagnostic studies of thyroid function in the average adult patient (70 kg) is from 100 to 400 microcuries. The patient dose should be measured by a suitable radioactivity calibration system immediately prior to administration. Concentration of I 123 in the thyroid gland should be measured in accordance with standardized procedures.

SPECIAL CONSIDERATION: Radiopharmaceuticals should be used only by physicians who are qualified by training and experience in the safe use and handling of radionuclides and whose experience and training have been approved by the appropriate government agency authorized to license the use of radionuclides.

HOW SUPPLIED: Sodium iodide I 123 for oral administration is supplied in aqueous solution in glass vials and in capsules.

THE STABLE SOLUTION TO YOUR BONE IMAGING NEEDS

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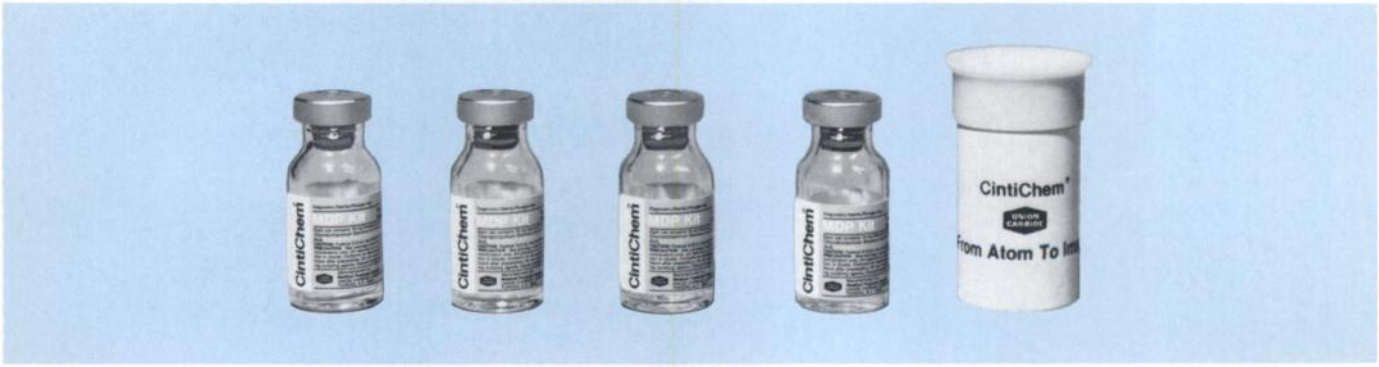

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CintiChem® MDP KIT

Technetium Tc 99m Medronate Kit

BRIEF SUMMARY OF PRESCRIBING INFORMATION

indications and usage

Technetium Tc 99m Medronate may be used as a bone imaging agent to delineate areas of altered osteogenesis.

contraindications

None known.

warnings

This class of compound is known to complex cations such as calcium. Particular caution should be used with patients who have, or who may be predisposed to, hypocalcemia (i.e., alkalosis).

This radiopharmaceutical drug product should not be administered to children, to pregnant women, or to nursing mothers, unless the expected benefit to be gained outweighs the potential risk.

Ideally, examinations using radiopharmaceuticals, especially those elective in nature, of a woman of childbearing capability should be performed during the first few (approximately 10) days following the onset of menses.

precautions

general

Technetium Tc 99m Medronate as well as other radioactive drugs, must be handled with care and appropriate safety measures should be used to minimize radiation exposure to clinical personnel. Also, care should be taken to minimize radiation exposure to the patients consistent with proper patient management.

To minimize radiation dose to the bladder, the patient should be encouraged to void when the examination is completed and as often thereafter as possible for the next 4-6 hours.

This preparation contains no bacteriostatic preservative.

Technetium Tc 99m Medronate should be formulated within six (6) hours prior to clinical use.

pregnancy category C

Adequate reproductive studies have not been performed in animals to determine whether this drug affects fertility in males or females, has teratogenic potential, or has other adverse effects on the fetus. Technetium Tc 99m Medronate should be used in pregnant women only when clearly needed.

nursing mothers

It is not known whether this drug is excreted in human milk. As a general rule nursing should not be undertaken while a patient is on the drug since many drugs are excreted in human milk.

pediatric use

Safety and effectiveness in children have not been established .

adverse reactions

No adverse reactions specifically attributable to the use of Technetium Tc 99m Medronate have been reported.

how supplied

Union Carbide's Technetium Tc 99m Medronate Kit is supplied as a sterile, pyrogen-free kit containing 5 vials.

Each 10 ml vial contains 10 mg medronic acid, 0.17 mg (minimum) stannous chloride (maximum stannous and stannic chloride 0.29 mg), and 2 mg ascorbic acid. The pH has been adjusted to 4-8 with either HCl or NaOH prior to lyophilization. Following lyophilization, the vials are sealed under a nitrogen atmosphere.

Product #17500502 Multidose vial shield with cap and retainer ring available separately.

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Simple-to-perform procedure. Isotope energy independent and can be used for the analysis of any radioisotope or radiopharmaceutical.

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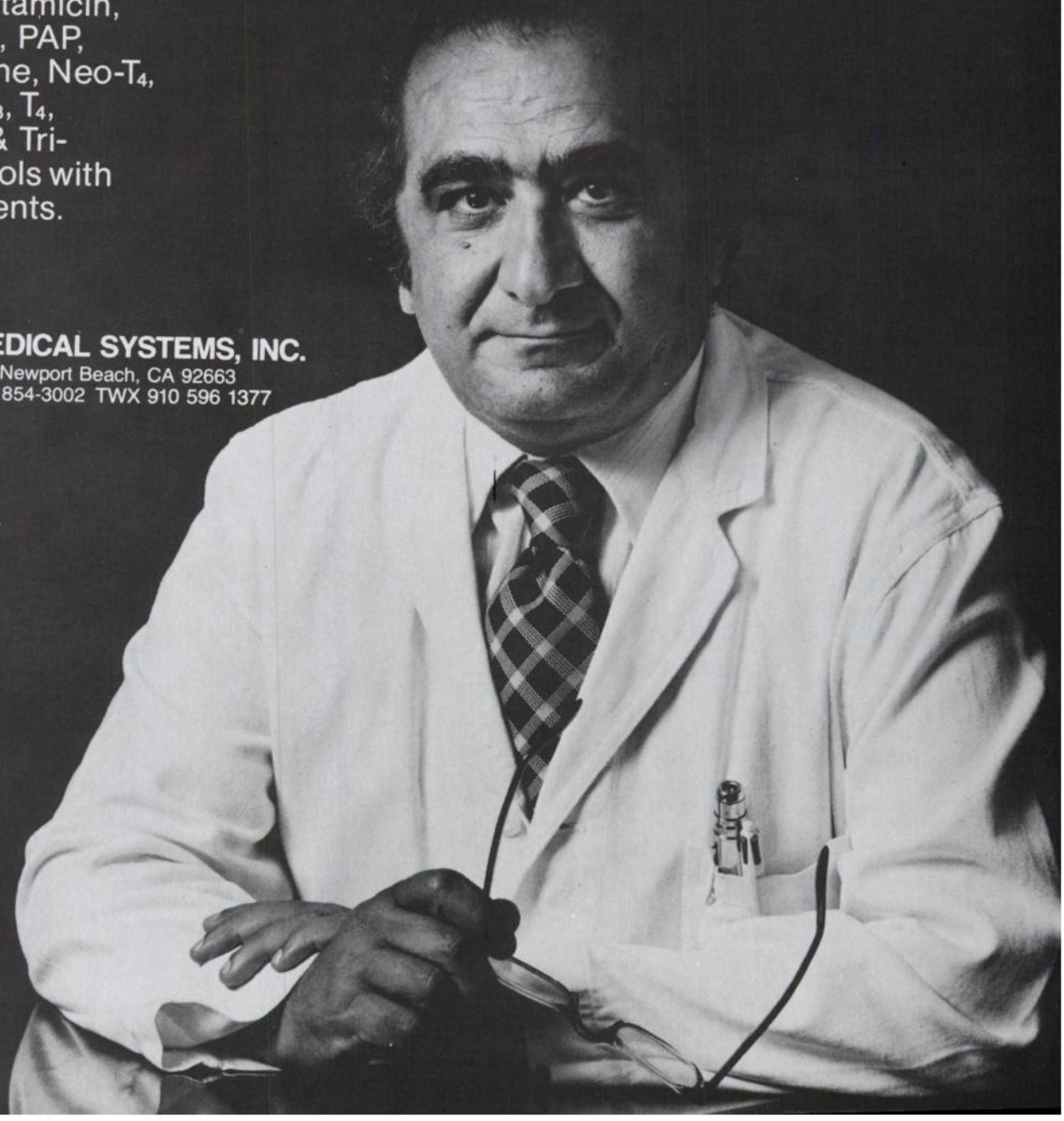

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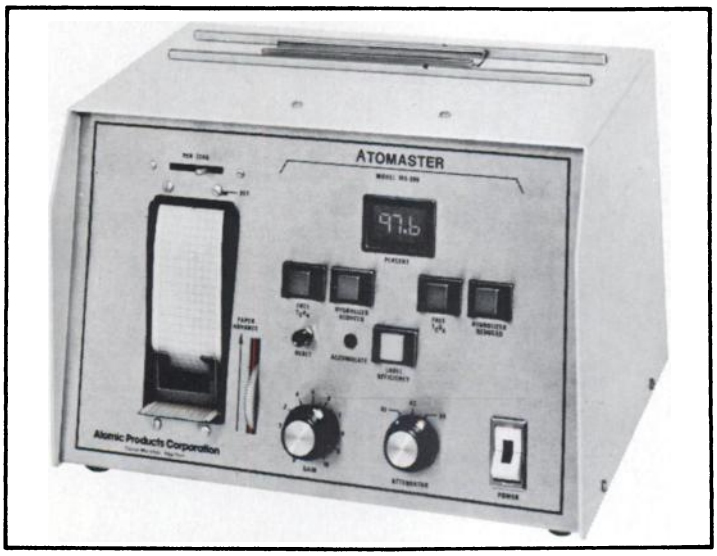
Radiopharmaceutical Quality Control System



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- Simple to use...all components are color-coded. (Spot a red-coded strip, develop in the red-coded solvent, press the red Atomaster button, etc.).
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- Determines the label/tag efficiency.

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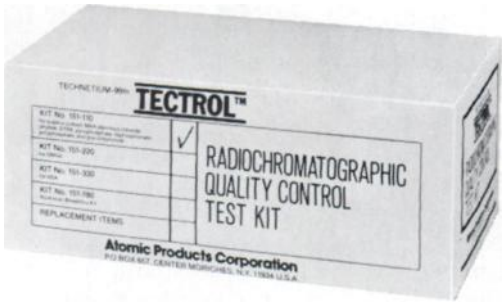

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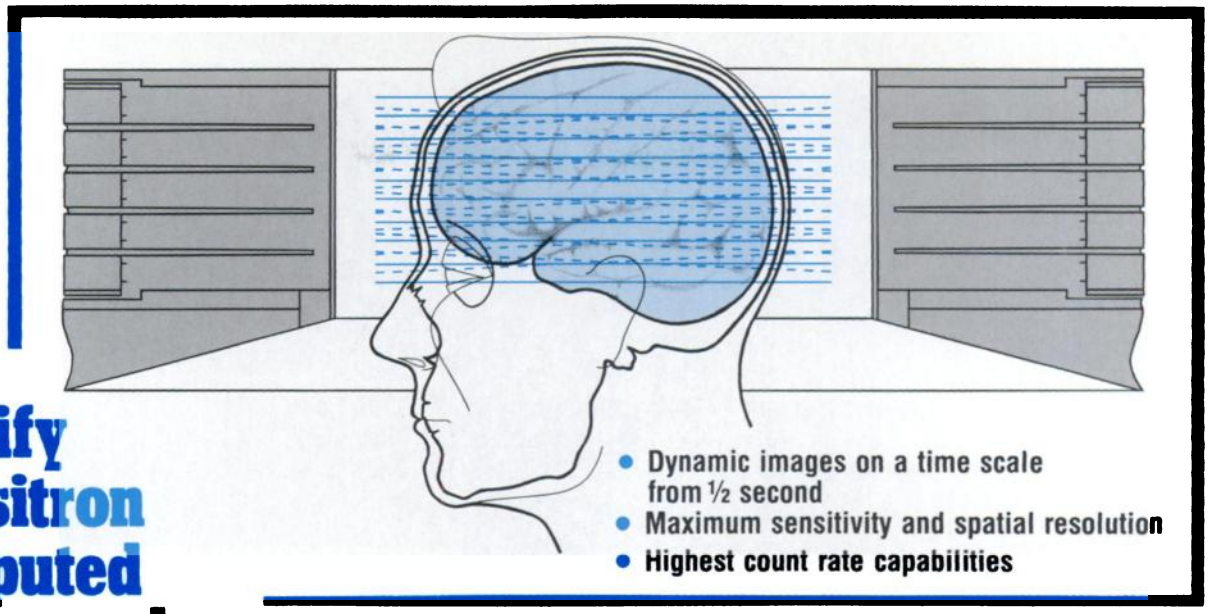

- Dynamic images on a time scale from ½ second
- Maximum sensitivity and spatial resolution
- Highest count rate capabilities

Specify a Positron Computed Tomography System *to meet your unique research requirements.*

Until recently, the intact human cardiovascular and central nervous systems were not accessible to research scientists for precise quantitative study. The lack of adequate technology to measure "in-vivo" perfusion and metabolism has severely limited the study of these and other dynamic systems. With the introduction of *Multi-slice Positron Tomography* by The Cyclotron Corporation of Berkeley, California, technology in this currently evolving field of research takes a big step forward.

Multi-slice Positron Tomography

Cyclotron's unique Positron Tomograph System represents a promising research tool for non-invasive evaluation of human cerebral and cardiovascular function: Short-lived, positron emitting isotopes (e.g., O^{15}, C^{11}, F^{18}, N^{13}) incorporated into metabolically-active compounds provide a safe "in-vivo" method for monitoring dynamic processes such as perfusion, flow, and metabolism in the human body.

A system to fit the application

One major area of concern among researchers has been finding adequate instrumentation to fulfill particular, and perhaps unique, requirements. Instrumentation requirements are dictated by the research application — any tradeoff between sensitivity, resolution, count rate capability and field of view must be carefully weighed in relation to the application at hand. Accordingly, The Cyclotron Corporation has developed its Multi-slice Positron Tomograph systems in varying configurations to fill a growing number of critical needs. Consider, for example, the Model 4600 (one of the three possible systems indicated in the chart below) in which high resolution and count rate capabilities are paramount system parameters. The Cyclotron Corporation welcomes the opportunity to discuss the research physician's unique interests and to configure a system to meet exacting requirements.

Model Number	Application	Number of Simultaneous Image Planes	Geometric Resolution (x, y, z) (mm FWHM)	Average Sensitivity Per Image Plane*	Maximum Useable System Count Rate**
4500	Body	7	10.0	16000	10^6
4600	Neuro	9	8.5	29000	5×10^5
4650	Neuro	7	5.5	16000	3.8×10^5

*Sensitivity expressed as counts/sec per $\mu Ci/cm^3$ for activity uniformly dispersed in 20 cm diameter, water-filled vessel.

**Defined as the "Trues" rate (counts/sec) at which true counts and random counts are equally abundant in the raw data prior to correction and image reconstruction. Tests conducted with 20 cm diameter water-filled phantom extending well beyond detector shield.

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If you work with radioactive Xenon,

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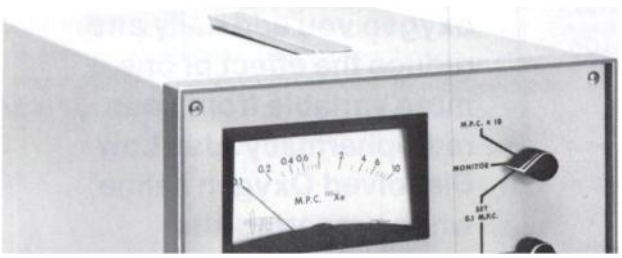
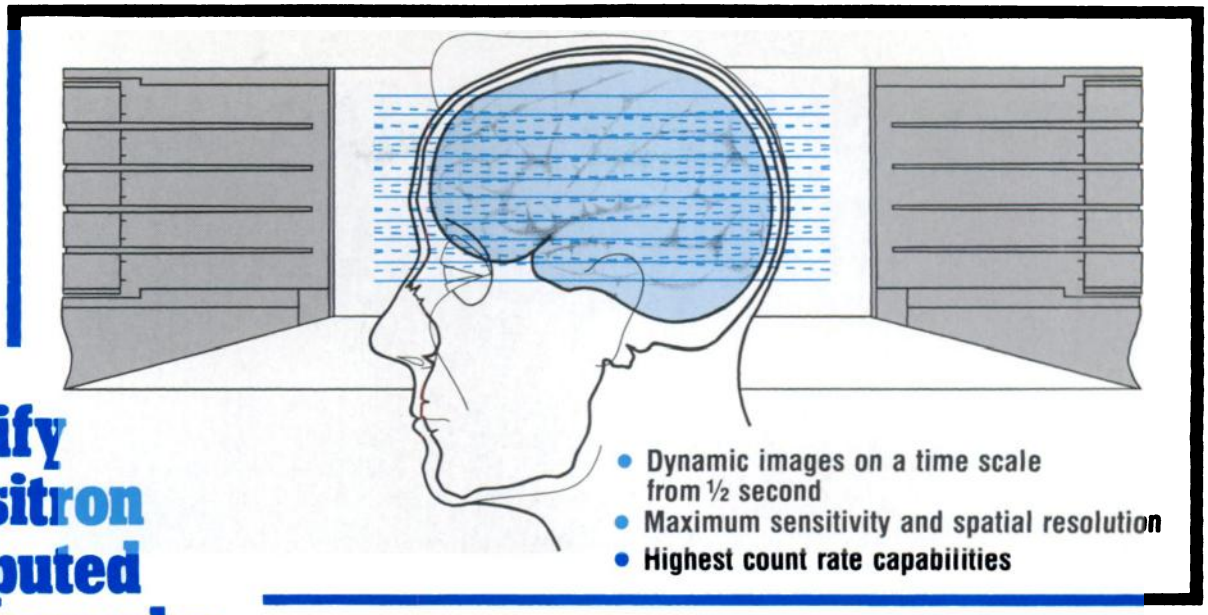


The only way to be sure that radioactive Xenon is not leaking into your room air is to monitor the air continuously. Use the dependable Johnston Lab Model 133 Xenon-133 gas monitor.

It easily detects Xenon-133 levels in room air, or trap output, as low as 20% of the maximum 40-hour airborne concentration (10μCi/M^3) specified by the U.S. Nuclear Regulatory Commission (100 CFR 20.103).

This reliable low cost monitor reads 0.1 to 100 MPC of Xenon-133. It features a large, easy-to-read panel meter, visual and audible alarm, and a recorder.



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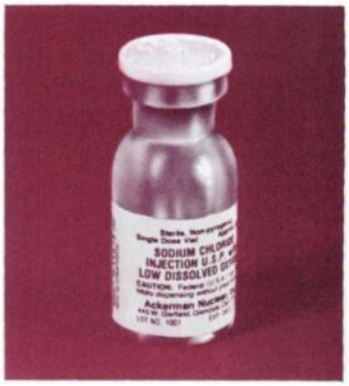

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pH 4.5 to 7.0

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WARNING:
Excessive amounts of sodium chloride by any route may cause hypopotassemia and acidosis. Excessive amounts by the parental route may precipitate congestive heart failure and acute pulmonary edema, especially in patients with cardiovasular disease, and in patients receiving corticosteroids or corticotropin drugs that may give rise to sodium retention. No antimicrobial agent has been added.

PRECAUTIONS:
Unused amounts should be discarded immediately following withdrawal of any portion of the contents.

HOW SUPPLIED:

Catalog No.	Product	Packaging
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Each 10 ml single dose vial contains approximately 6 ml. Each ml contains 9 mg sodium chloride providing 0.154 mEq each of sodium and chloride ions. Total osmolarity 300 mOsm/1; pH between 4.5 and 7.0. Dissolved oxygen content less than 5 ppm. Contains no preservatives.

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*less than 5 ppm

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It easily detects Xenon-133 levels in room air, or trap output, as low as 20% of the maximum 40-hour airborne concentration ($10\mu Ci/M^3$) specified by the U.S. Nuclear Regulatory Commission (100 CFR 20.103).

This reliable low cost monitor reads 0.1 to 100 MPC of Xenon-133. It features a large, easy-to-read panel meter, visual and audible alarm, and a recorder.

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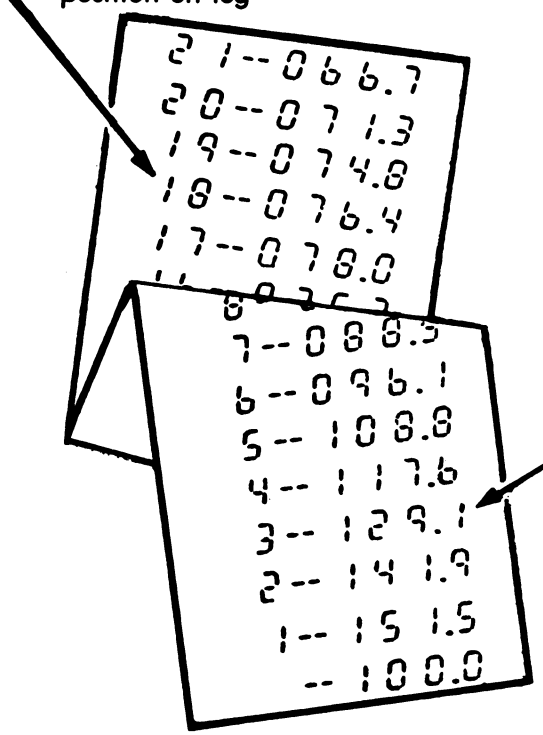

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1¾ inch wide

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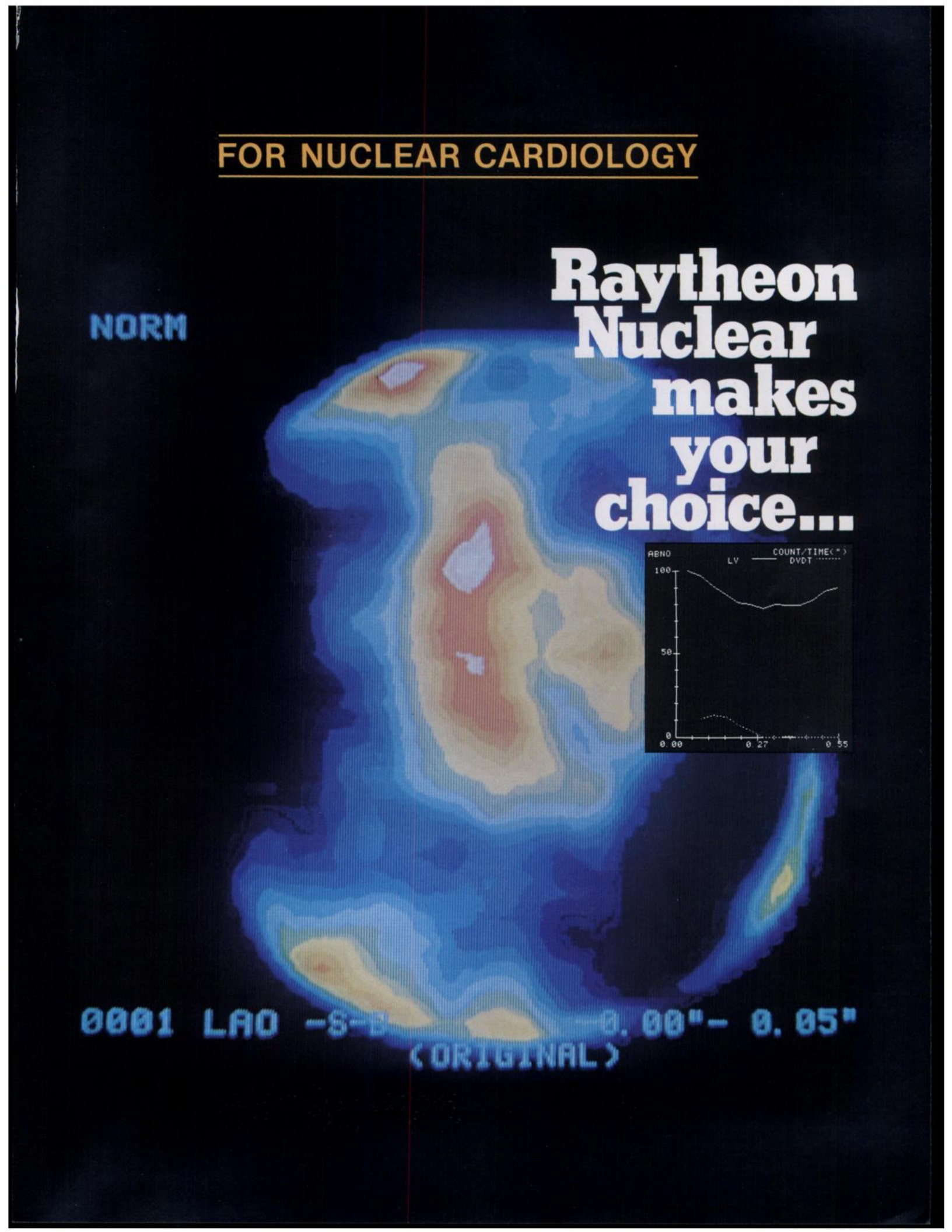
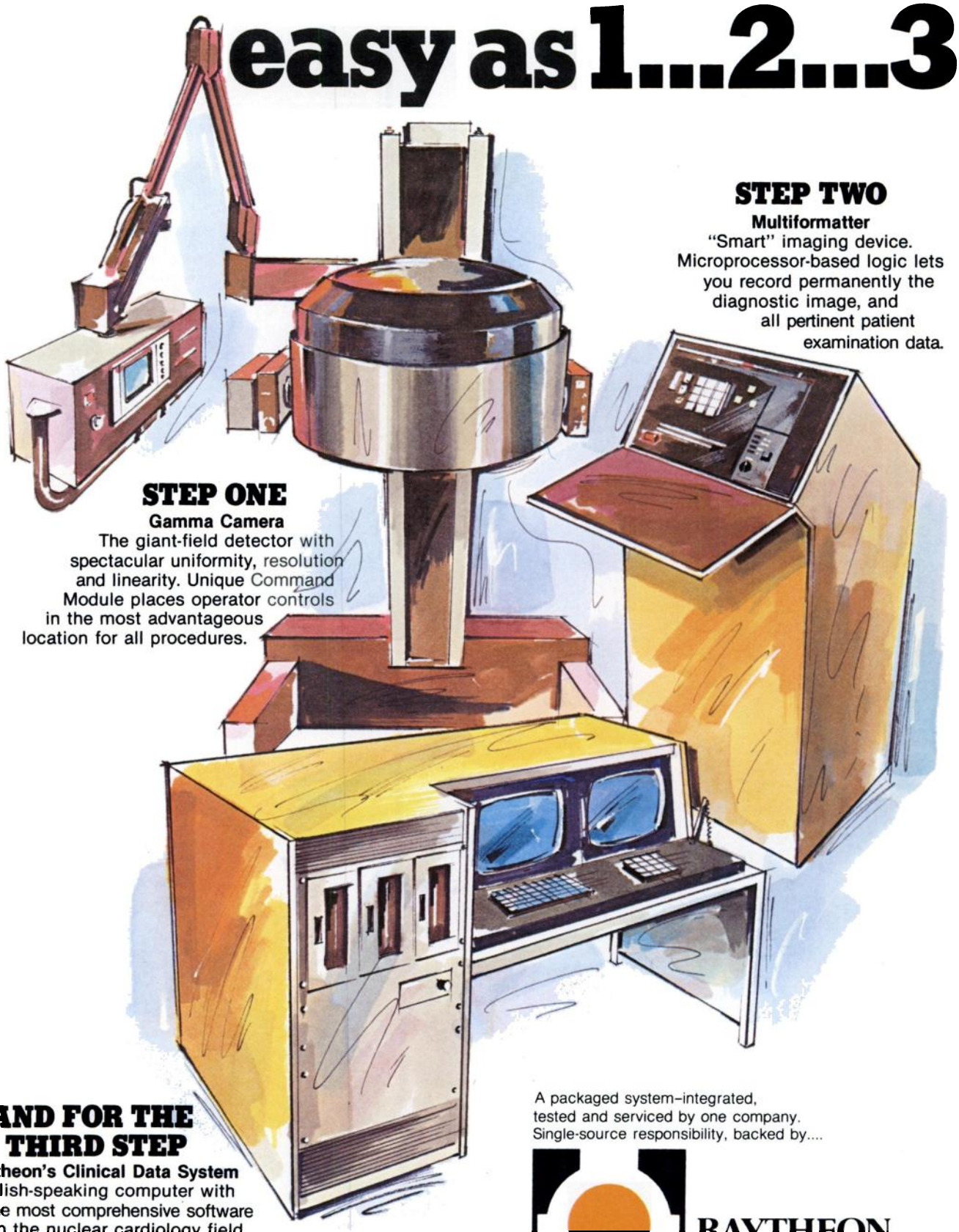


easy as 1...2...3



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The UNION CARBIDE Large Field Gamma Camera . . . Stands Alone.

- The only true stand-alone gamma camera available anywhere; all essential controls are built in.
- Unique hand control replaces conventional operator console.
- 61 PM tube array provides 41 cm field of view without edge packing.
- Built-in microprocessor-based uniformity correction provides flat-field uniformity to within ±4%.
- Fast counting system: 125,000 CPS with 20% window (Tc^{99m}) with no loss of resolution.
- Triple pulse height analyzer improves photon collection efficiency for multi-peak isotopes.
- Interfaces directly to commercially available computer systems or UNION CARBIDE Image Processor.
- Base specially designed to accommodate wheelchairs, hospital beds and stretchers.

Above *– The UNION CARBIDE Hand-held Console.*

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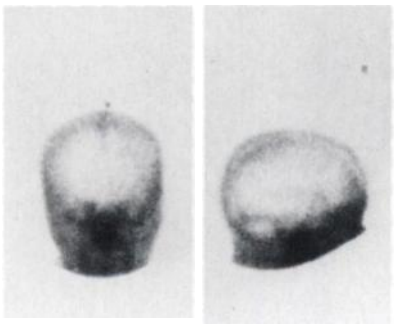
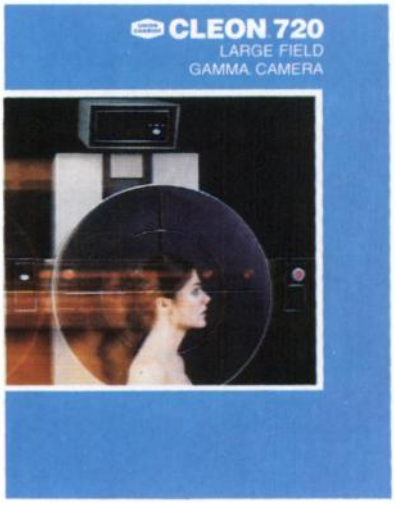


Top *– Subdural hematoma on left, seen in 76-year-old male with 20 mCi D.T.P.A.*

Bottom *– Anterior chest of a 76-year-old male with 15 mCi Tc^{99m} P.Y.P.; slight rotation gives a three dimensional effect.*



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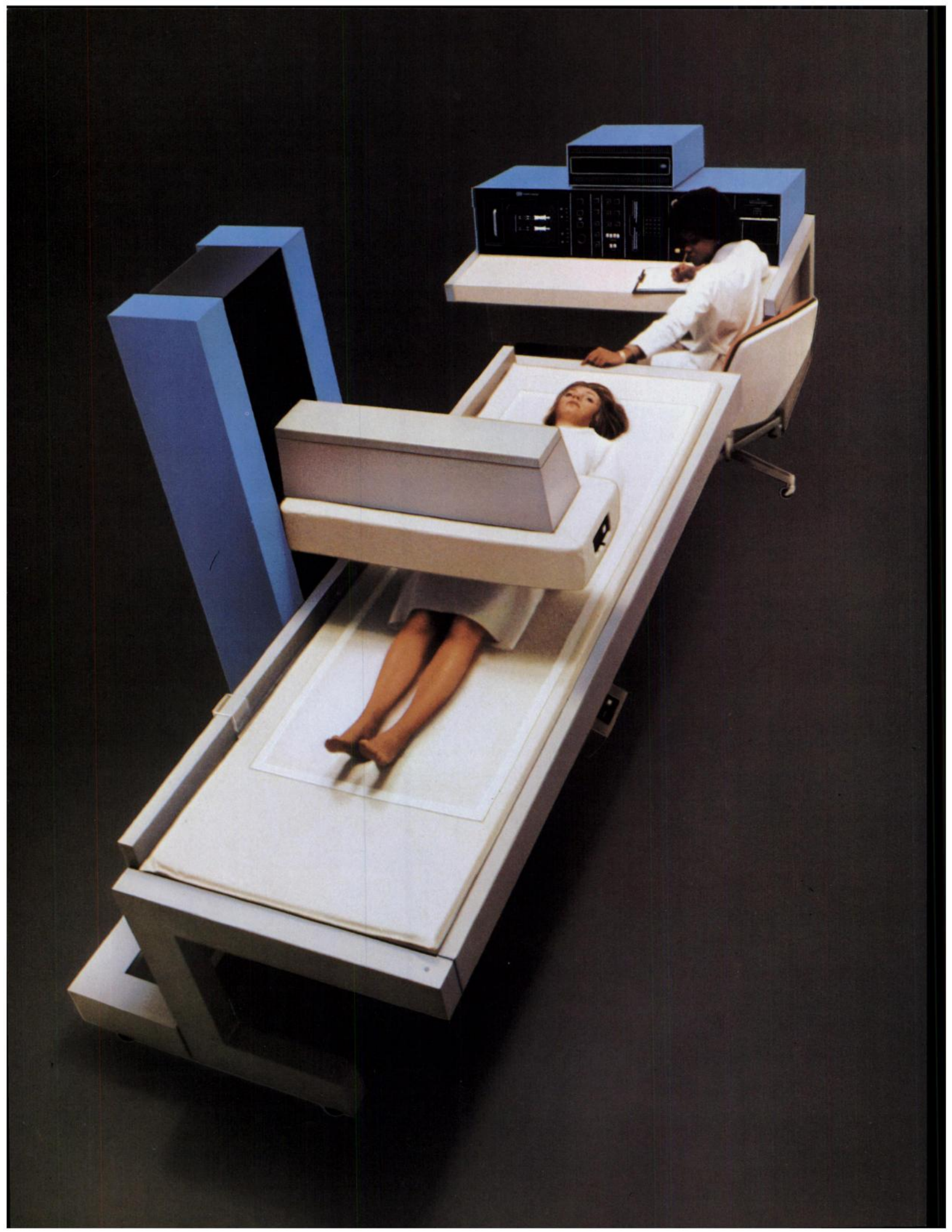

The UNION CARBIDE Whole Body Imager . . . Faster Patient Throughput.

- Capable of performing more than 18 whole body scans per 8 hour day; maximum scan speed is 20cm/minute.
- Dual detector heads provide simultaneous anterior/posterior focal tomographic views with no patient repositioning.
- Parabolic focus collimators allow superior resolution at depth without sacrificing sensitivity.
- Thick NaI crystals (.86″) and dual pulse height analyzers make the system ideal for Gallium imaging.
- Built-in floppy diskette stores raw data.
- Image enhancement controls and 2x magnification are standard.
- Organ mode allows high-resolution static organ studies, two views at a time.
- Priced below comparable gamma camera systems.

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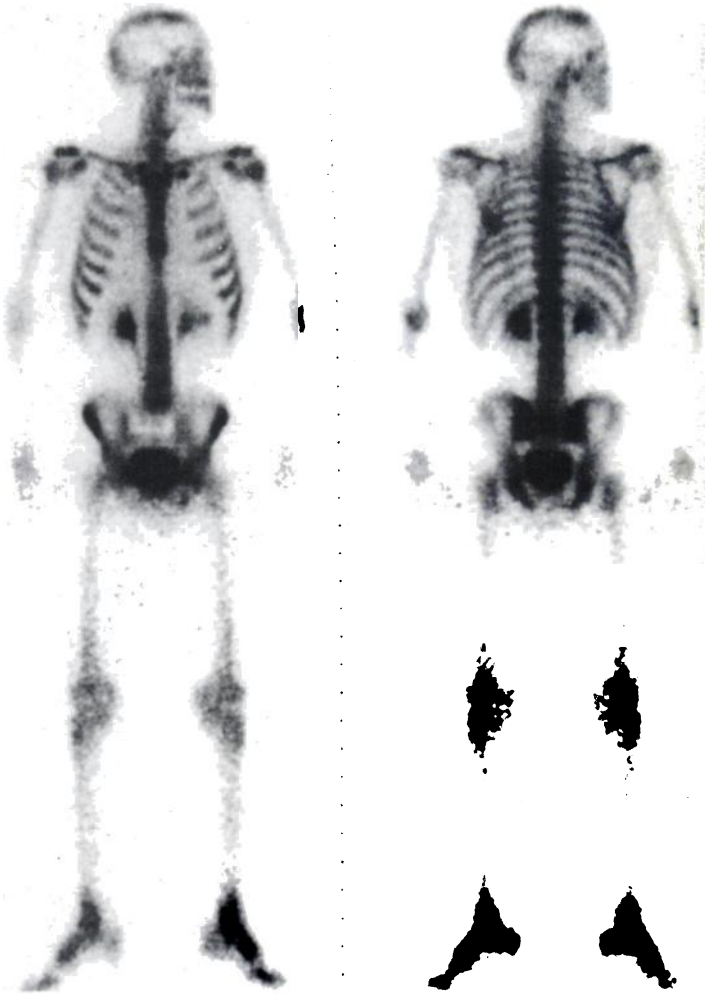
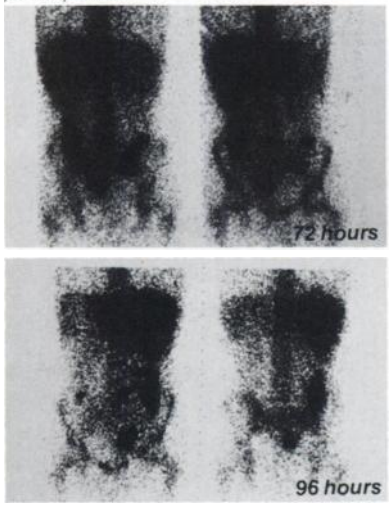
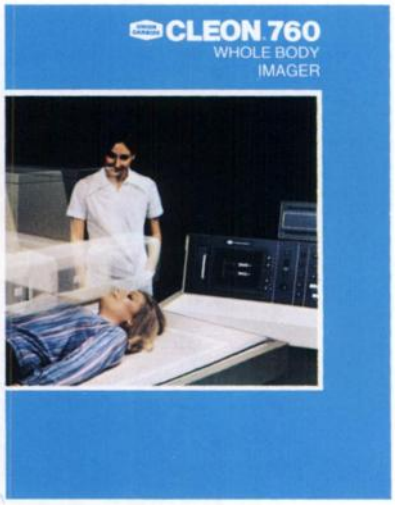


Above *– Actual 13.5 to 1 minification of posterior and anterior whole body bone scan of a 45 year old male two hours post-injection with 20 mCi Technetium Tc^{99m} MDP. Diagnosis: normal.*

Below *– Organ mode Gallium scans of a 30 year old male 72 hours post-injection (posterior and anterior views) and 96 hours post-injection with 5 mCi of Ga-67. Abnormal activity in the lower abdomen is seen clearly with two photo peaks.*





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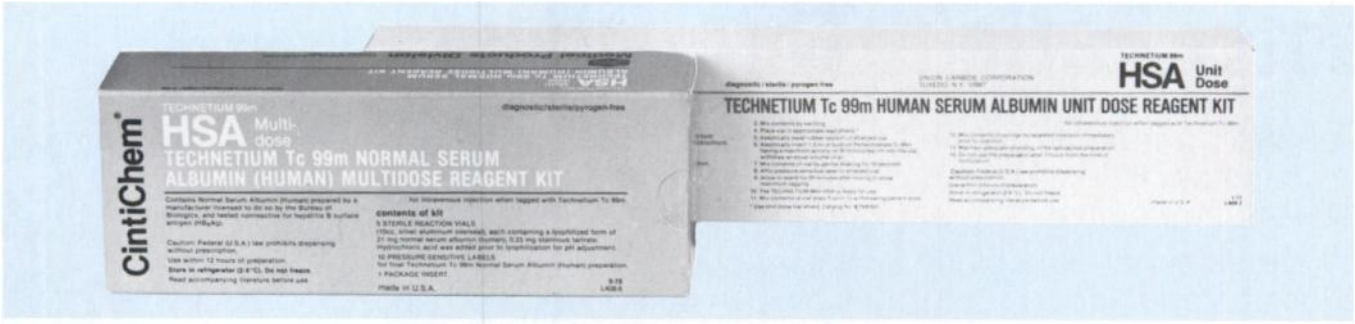

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- **EXCELLENT BINDING EFFICIENCY[2]**
- **STABLE FORMULATION[2]**
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CitiChem®
TECHNETIUM 99m

Technetium Tc 99m Normal Serum Albumin (Human) Reagent Kit HSA
DIAGNOSTIC-FOR INTRAVENOUS USE

BRIEF SUMMARY OF PRESCRIBING INFORMATION

Indications and usage

Technetium Tc 99m Human Serum Albumin is used as an agent for imaging the heart blood pool and to assist in the detection of pericardial effusion and ventricular aneurysm.

contraindications

The use of Technetium Tc 99m Human Serum Albumin is contraindicated in persons with a history of hypersensitivity reactions to products containing human serum albumin.

warnings

The contents of the kit are not radioactive. However, after the Sodium Pertechnetate Tc 99m is added, adequate shielding of the final preparation must be maintained.

This radiopharmaceutical preparation should not be administered to children or to patients who are pregnant or to nursing mothers unless the expected benefits to be gained outweigh the potential hazards.

Ideally, examinations using radiopharmaceuticals, especially those elective in nature, of women of childbearing capability should be performed during the first few (approximately 10) days following the onset of menses.

precautions

The components of the kit are sterile and pyrogen-free. It is essential that the user follows the directions carefully and adheres to strict aseptic procedures during preparation of the radiodiagnostic.

Technetium Tc 99m Human Serum Albumin must not be used after three hours from the time of formulation.

Adequate reproduction studies have not been performed in animals to determine whether this drug affects fertility in males or females, has teratogenic potential, or has other adverse effects on the fetus. Technetium Tc 99m Human Serum Albumin should be used in pregnant women only when clearly needed.

It is not known whether this drug is excreted in human milk. As a general rule, nursing should not be undertaken while a patient is on a drug since many drugs are excreted in human milk.

Safety and effectiveness in children have not been established.

Technetium Tc 99m Human Serum Albumin, as well as other radioactive drugs, must be handled with care and appropriate safety measures should be used to minimize external radiation exposure to clinical personnel. Also, care should be taken to minimize radiation exposure to patients, consistent with proper patient management.

The labeling reactions involved in preparing the agent depend on maintaining the tin in the reduced state. Any oxidant present in the Sodium Pertechnetate Tc 99m supply may thus adversely affect the quality of the prepared agent. Hence, Sodium Pertechnetate Tc 99m containing oxidants, or other additives, should not be employed without first demonstrating that it is without adverse effect on the properties of the resulting agent.

adverse reactions

Hypersensitivity reactions are possible whenever protein-containing materials such as Technetium Tc 99m labeled human serum albumin are used in man. Epinephrine, antihistamines and corticosteroid agents should be available for use.

how supplied

unit dose kit

The kit consists of 10 unit dose reaction vials each containing a lyophilized mixture of 7 mg human serum albumin and 0.08 mg stannous tartrate. Hydrochloric acid was added prior to lyophilization for pH adjustment.

multidose kit

The kit consists of 5 multidose reaction vials each containing a lyophilized mixture of 21 mg human serum albumin and 0.23 mg stannous tartrate. Hydrochloric acid was added prior to lyophilization for pH adjustment.

FOR FULL PREPARATION AND PRESCRIBING INFORMATION, SEE PACKAGE INSERTS.

Notes: [1]Refer to package insert for full preparation and prescribing information. [2]Data on file at Union Carbide Corporation, Tuxedo, New York

UNION CARBIDE FROM ATOM TO IMAGE

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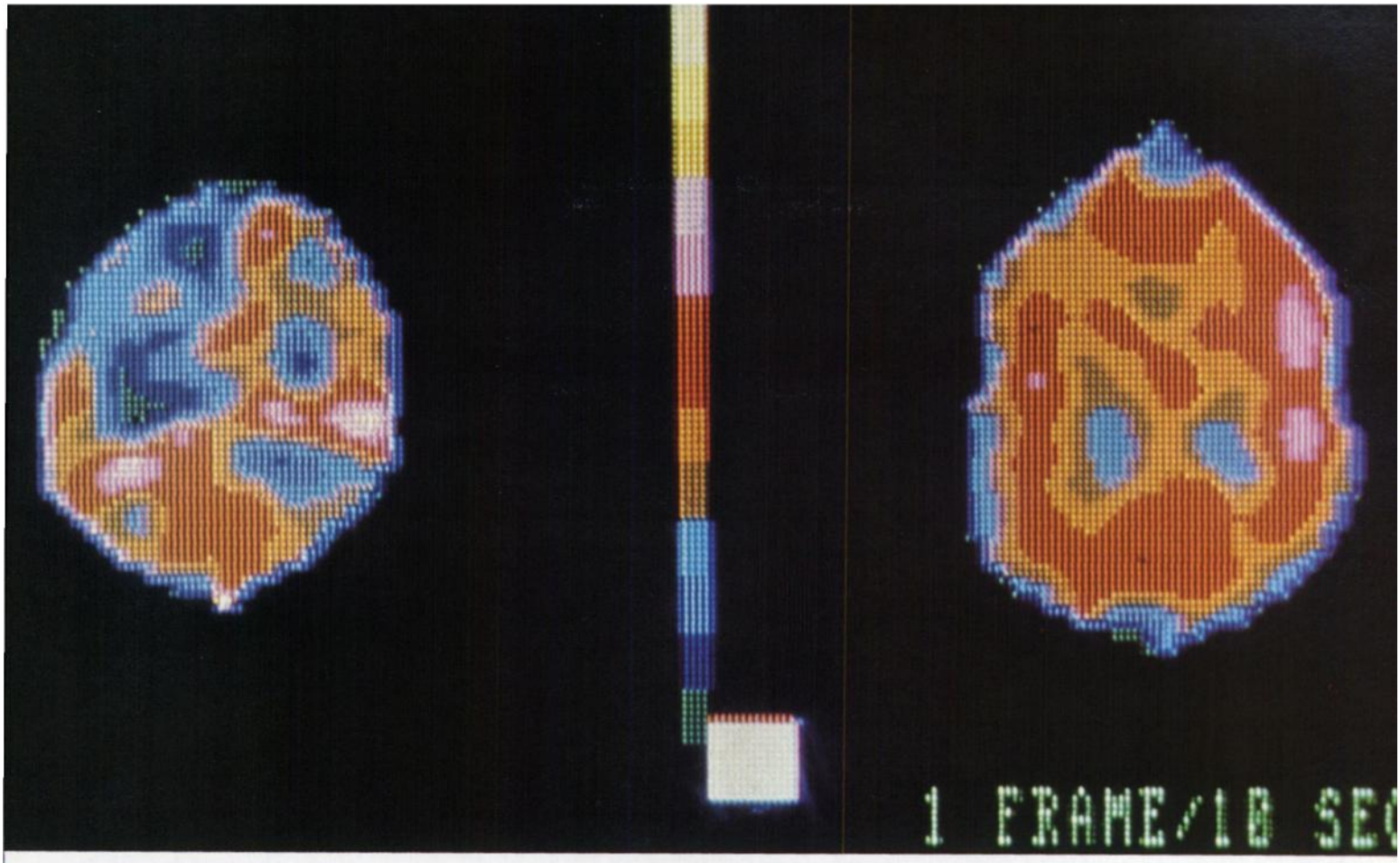
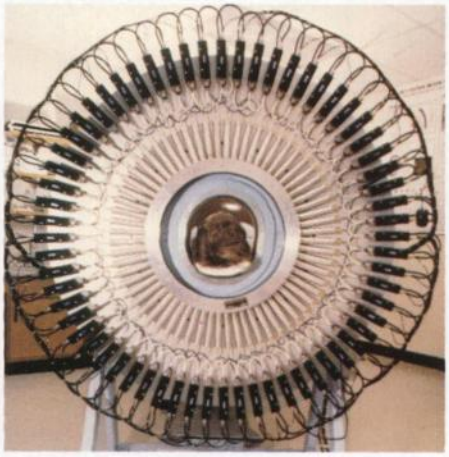


High speed, high resolution, high efficiency.

Therascan 3128 Positron Emission Tomograph from AECL.



Therascan 3128 from Atomic Energy of Canada Limited is the first bismuth germanate ring system in routine clinical use for both outpatient and inpatient studies. A state-of-the-art emission tomograph, it establishes new frontiers in neurological diagnosis and research investigations. Versatile and simple to operate, requiring little computer expertise, the Therascan 3128 method provides a safe, rapid, three-dimensional measurement of brain blood flow as well as biochemical mapping of the brain. Its role is especially significant for patients suffering from strokes, epilepsy, brain tumour, dementia, or other metabolic disorder.

The clinical example shown above demonstrates the unique ability of Therascan to perform dynamic studies of regional cerebral blood flow for diagnosis and treatment evaluation. Pictured is a comparison of pre-op and post-op rCBF studies. The patient had experienced dysphasia with mild paralysis in the right extremities. Clinical signs indicated ischemia in the left fronto-parietal area. An angiogram showed complete occlusion of the left internal carotid artery and a 30% stenosis of the right internal carotid artery, while a CT scan showed no abnormality. However, Therascan 3128, using the isotope ^{77}Kr, showed a marked reduction of cerebral blood flow in a large portion of the left fronto-central area, the right parietal area, and the right anterior frontal area. The patient subsequently underwent extra-intracranial arterial anastomosis (bypass surgery), and the general improvement at the three month follow-up is shown very clearly in the scan on the right.

The extraordinary efficiency of the detector array allows Therascan to image three slices simultaneously in as little as one second, creating many new possibilities for investigations of rapidly changing phenomena. Therascan achieves superior quality scans for both dynamic and static studies, using generator produced isotopes like ^{68}Ga, and the shortlived isotopes ^{11}C, ^{13}N, ^{15}O and ^{18}F, as produced by the JSW Mini Cyclotron (also from AECL.)

Therascan 3128 is truly a radical departure, a major advance, in nuclear medicine. To discover its exceptional versatility and unparalleled detection efficiency firsthand, contact AECL.

Atomic Energy of Canada Limited
Medical Products

P.O. Box 6300, Ottawa, Canada K2A 3W3. Tel.: (613) 592-2790. Cable Nemota. Telex: 053-4162.
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Small black spheres number one for the table.

Small brown spheres number one for diagnosis.

Human Albumin Millimicrospheres labelled with Tc-99m appears to be an excellent agent for visualization of the Reticulo-Endothelial System and imaging of airways potency.

The answer lies in the particle size of the Millimicrospheres which reflects the strict quality control by Sorin Biomedica.

This ensures a reproducible particle size distribution where not less than 90% of the particles have a diameter between 0.3 and 0.8 μ.

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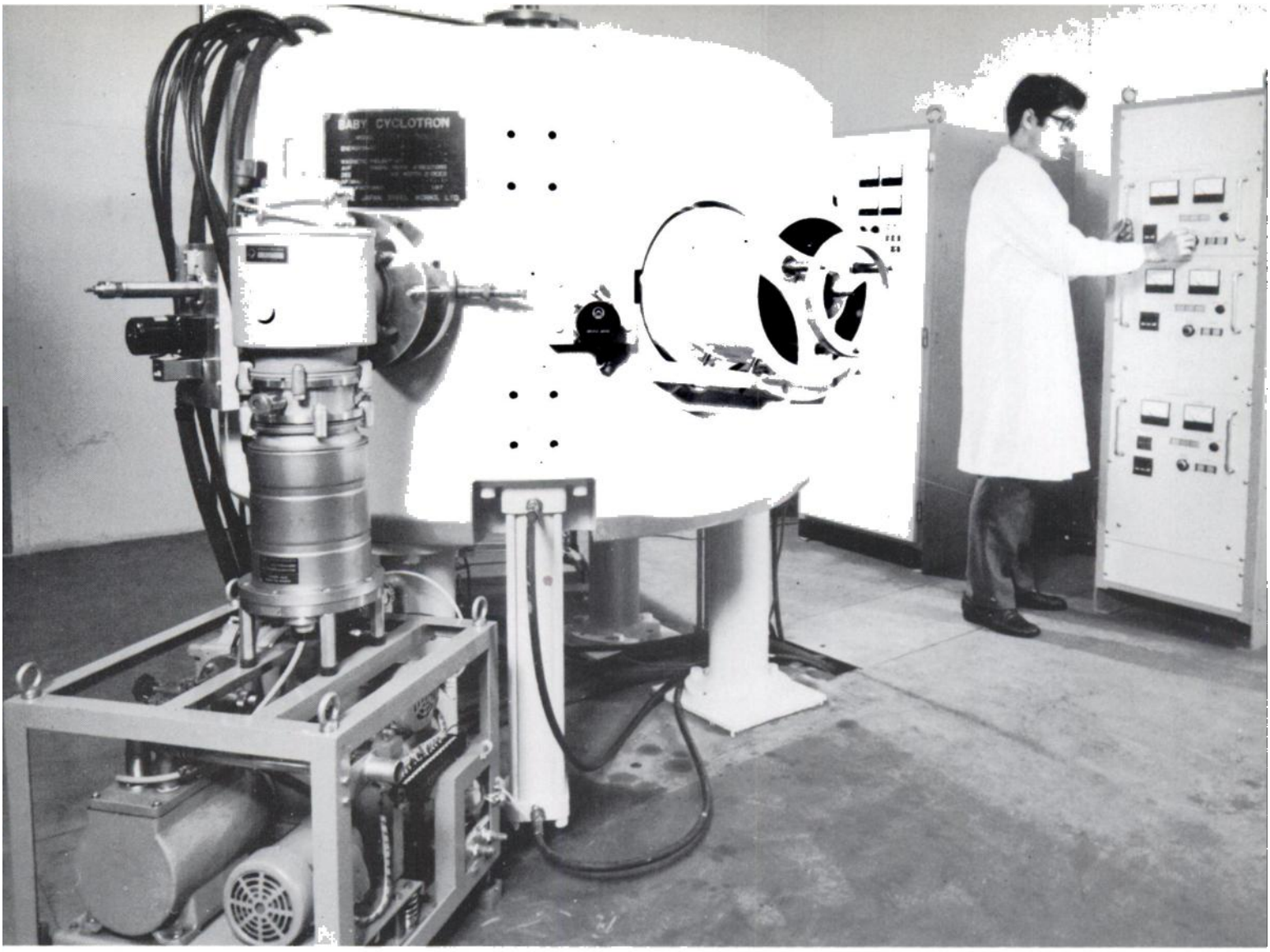
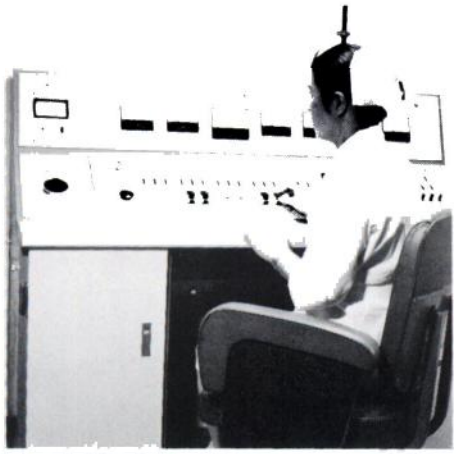


Space efficient, cost efficient, operation efficient.
The JSW Mini Cyclotron, available now, from AECL.



The JSW Mini Cyclotron from Atomic Energy of Canada Limited dramatically expands the capabilities of diagnostic nuclear medicine. A radical departure from traditional accelerator technology, it is the first cyclotron available dedicated to the clinical environment, offering hospitals and research institutions a variety of immediate advantages. Its role significance is especially evident when viewed in the light of recent major developments in new imaging systems – specifically, positron emission cameras such as AECL's Therascan 3128. The Mini Cyclotron allows these new physiological tomography systems to achieve full operation potential by making the crucial, short half-life radioisotopes ^{11}C, ^{13}N, ^{15}O, and ^{18}F immediately available within the nuclear medicine department.

Compact, the Mini Cyclotron can be installed in an area of only 20 square meters. Economic, it features both proton and deuteron acceleration, eliminating the need for expensive, enriched target gases. Safe, simple, reliable, little training is required for its operation, while an innovative two-part design ensures swift, easy servicing. Nuclear medicine comes of age with the JSW Mini Cyclotron. And it's available now! For complete information, contact AECL.

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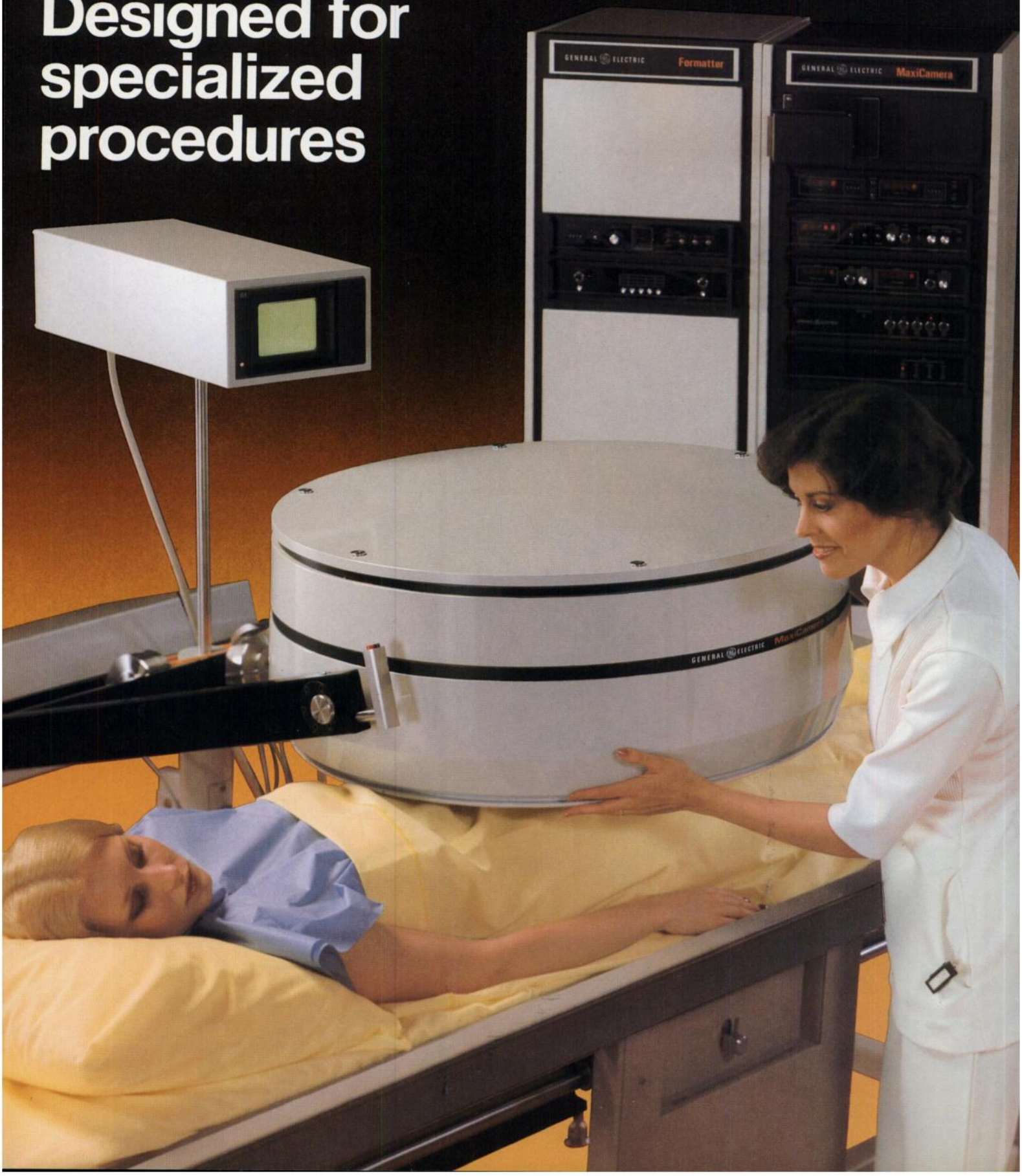
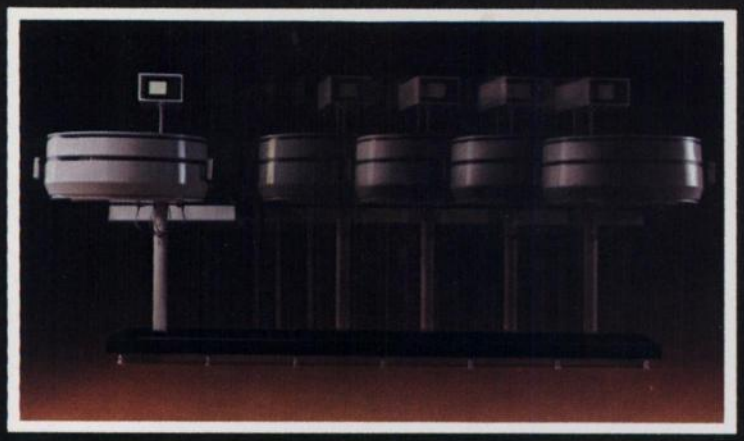
MaxiCamera 535

Designed for specialized procedures

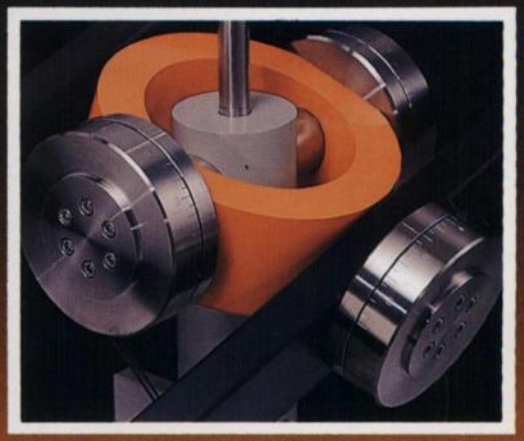




Selectascan system allows whole-body, one-pass scanning for bone or Gallium images and faster throughput.

61 hexagonal "teacup" photomultiplier tubes produce superior resolution and linearity.

The largest field-of-view available, 530 mm (21 inches) covers more anatomy than 400 mm cameras.



Gimbal suspension allows precise, swift and secure manual positioning of detector.

MaxiCamera™ 535 system, the newest GE nuclear diagnostic system, answers the need for greater throughput and improved anatomical detail. It's the first nuclear camera system designed for specialized procedures: whole-body bone imaging, Gallium studies, simultaneous lung/liver imaging, and venography.

You can pursue new directions in clinical diagnostics with the innovative GE technology available in MaxiCamera 535.

The extra-large crystal provides the largest field-of-view available today...530 mm (21 inches). Fewer views accomplish more. Sensitivity and resolution are enhanced. Imaging time is reduced. Especially well-suited for bone studies.

The optional Selectascan™ system normally allows whole body scans in just one pass. Even with very large patients, this single pass capability captures all of the anatomy.

61 hexagonal "teacup" photomultiplier tubes are selected and matched for high sensitivity and uniformity. Preamplifiers are integral to the tube assembly. Combined with a unique light coupling system, tubes produce superior resolution and linearity. MaxiCamera 535 system offers the proven performance features of the MaxiCamera series...counter-balanced positioning, modular electronics and human-engineered components.

MaxiCamera 535 tops off the most complete line of nuclear systems available. Others include:

- MaxiCamera II,the 400 mm field-of-view scintillation camera system.
- Med™ IV data acquisition and analysis system.
- DataCamera,™ the first power-driven nuclear camera system with optional on-board data analysis capability, Med III.
- PortaCamera IIC, the portable nuclear camera of choice for mobile van service.

All of these systems are in keeping with the GE concept of continual commitment to nuclear imaging. Let us put that commitment to work for you. Contact your GE representative.

General Electric Medical Systems

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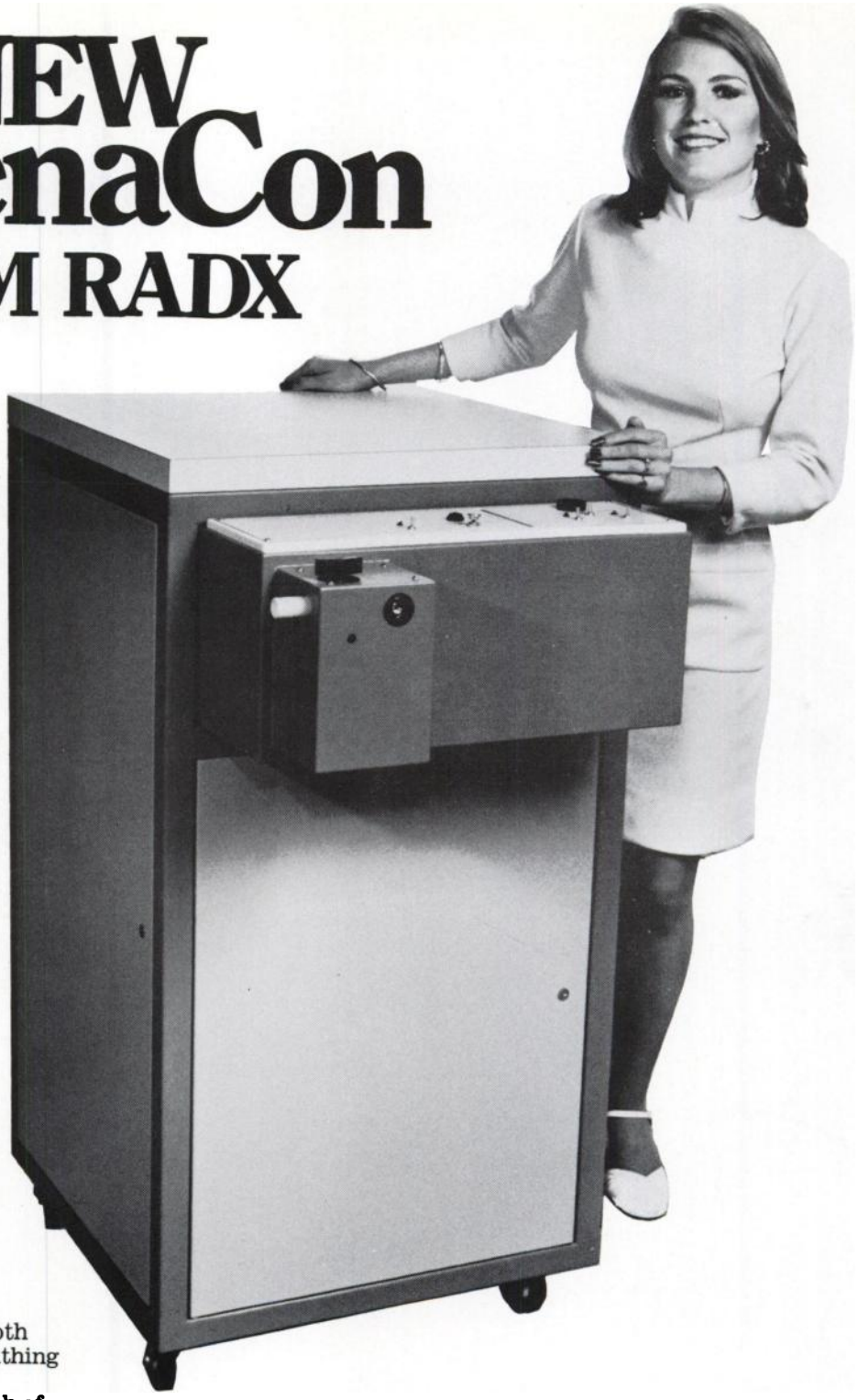
NEW THE XenaCon FROM RADX



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XenaCon II spirometer unit with built-in Xenon Trap

XenaCon III spirometer unit with Xenon Trap and Xenon Trap Exhaust Port Monitor detector/alarm system

PERTINENT SPECIFICATIONS

Mobility: all units are highly mobile, making bedside studies practical

Unit dead space: less than 25 ml in both washout and rebreathing

Spirometer volume: 0-10 liters

Breathing resistance: less than 0.1 inch of water to normal breathing

Shielding: spirometer area — ⅛ inch lead
trap area — ¼ inch lead

Oxygen replenishment: manual pushbutton valve

Xenon injection port: located in head valve for either direct bolus or homogeneous mixture patient administration

Bacteriological filter: inline autoclavable bacteriological filter

CO_2 trap: high capacity, easy access CO_2 trap

Xenon trap cartridge pack: New vertical activated Charcoal cartridge pack eliminates channeling

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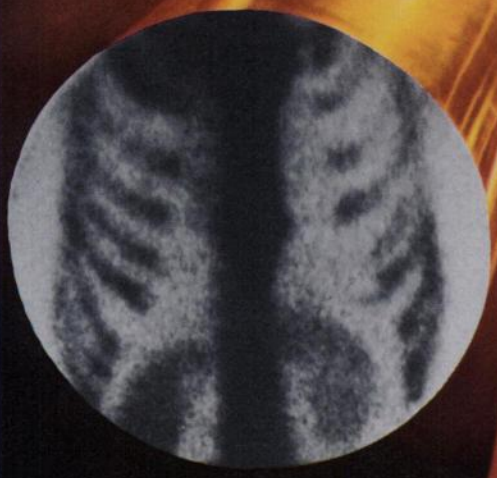
There are three good reasons you should specify

TechneScan® MDP Kit

(Technetium Tc99m Medronate Sodium)

from Mallinckrodt/Nuclear



1 Latest advance in bone imaging capability.

After nearly a year of use, MDP was observed to have "...a 5%-10% greater deposition in bone and a more rapid blood clearance rate than HEDP. Furthermore, its use . . . has been accompanied by a noticeable improvement in the quality and consistency of the scans compared to the previously used HEDP."[1]

"The MDP complex produced images of superior quality as early as two hours after administration, attributable to its more rapid clearance from the blood and soft tissues. On the contrary, a longer interval of 3-4 hours after injection was usually needed for ^{99m}Tc-EHDP; pyrophosphate and polyphosphate complexes regularly required a waiting period of four hours."[2]

2 The TechneScan® Image: Consistent Quality—Reliable Performance.

Many clinicians have come to rely on—and prefer—the benefits associated with TechneScan kits. The Mallinckrodt *MDP Kit* is no exception; it offers users traditional TechneScan quality and convenience, with the added benefit of room temperature storage and long shelf life.

3 The Mallinckrodt commitment to customer service.

Your purchase of any imaging material from Mallinckrodt/Nuclear buys more than just the product. We back up our products with the best customer service/distribution system in the industry. This means fast, dependable delivery and personal attention to your individual needs and requirements.

Mallinckrodt® NUCLEAR

The IMAGE MAKER

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Please refer to brief summary on next page

Introducing Mallinckrodt
TechneScan® MDP Kit
(Technetium Tc99m Medronate Sodium)
The latest advance in skeletal imaging.

References:
1. Davis MA, Jones AG: Comparison of ^{99m}Tc-Labeled Phosphate and Phosphonate Agents for Skeletal Imaging. *Sem. Nucl. Med. 6*:19, 1976.
2. Subramanian G, McAfee JG, Blair RJ, et al: Technetium-99m-methylene Diphosphonate—A Superior Agent for Skeletal Imaging: Comparison with Other Technetium Complexes. *J. Nucl. Med. 16*:744, 1975.

INDICATIONS AND USAGE
Technetium Tc 99m Medronate Sodium is a skeletal imaging agent used to demonstrate areas of altered osteogenesis as seen for example in metastatic bone disease, Paget's disease, arthritic disease and osteomyelitis.

CONTRAINDICATIONS
None known at present.

WARNINGS
This radiopharmaceutical should not be administered to children or to patients who are pregnant or to nursing mothers unless the benefits to be gained outweigh the potential hazards.

Ideally, examinations using radiopharmaceuticals, especially those elective in nature, in women of childbearing capability should be performed during the first few (approximately 10) days following the onset of menses.

This class of compound is known to complex cations such as calcium. Particular caution should be used with patients who have, or who may be predisposed to, hypocalcemia (i.e., alkalosis).

PRECAUTIONS
General
The finding of an abnormal concentration of radioactivity implies the existence of underlying pathology, but further study is required to distinguish benign from malignant lesions.

Technetium Tc 99m Medronate Sodium as well as other radioactive drugs must be handled with care and appropriate safety measures should be used to minimize external radiation exposure to clinical personnel. Also, care should be taken to minimize radiation exposure to patients consistent with proper patient management.

To minimize the radiation dose to the bladder, the patient should be encouraged to void before the examination and as often thereafter as possible for the next 4-6 hours.

The preparation contains no bacteriostatic preservative. Therefore, after labeling with Technetium Tc 99m the solution should be stored at 2°-8°C and discarded after 6 hours.

The image quality may be adversely affected by obesity, old age and impaired renal function.

Carcinogenesis
No long term animal studies have been performed to evaluate carcinogenic potential.

Pregnancy
Adequate reproductive studies have not been performed in animals to determine whether this drug affects fertility in males or females, has teratogenic potential, or has other adverse effects on the fetus. There have been no studies in pregnant women. *Technetium Tc 99m Medronate Sodium* should be used in pregnant women only when clearly needed.

Nursing Mothers
It is not known whether this drug is excreted in human milk. As a general rule nursing should not be undertaken while a patient is on the drug since many drugs are excreted in human milk.

Pediatric Use
Safety and effectiveness in children have not been established.

ADVERSE REACTIONS
At present adverse reactions have not been reported that are specifically attributable to the use of *Technetium Tc 99m Medronate Sodium.*

DOSAGE AND ADMINISTRATION
The recommended adult dose is 10 to 20 mCi (200 uCi/kg) by slow intravenous injection over a period of 30 seconds. Optimum scanning time is 1 to 4 hours post-injection.

The patient should be encouraged to drink fluids before and after the examination and to void immediately before imaging is started. This is to minimize the contribution of the bladder content to the image.

The patient dose should be measured by a suitable radioactivity calibration system immediately prior to administration.

Radiopharmaceuticals should be used only by physicians who are qualified by training and experience in the safe use and handling of radionuclides and whose experience and training have been approved by the appropriate government agency authorized to license the use of radionuclides.

HOW SUPPLIED
TechneScan MDP Kit-Technetium Tc 99m Medronate Sodium Kit

Product No. 088

Each kit consists of 5 reaction vials, each vial containing, in lyophilized form, sterile and non-pyrogenic:

Medronic Acid	10 mg
Stannous Chloride	1 mg

The pH is adjusted to 6.5 to 7.5 with HCl or NaOH prior to lyophilization. The vials are sealed under an atmosphere of nitrogen.

Labels with radiation warning symbols and directions are supplied with each kit.

Manufactured for:
MALLINCKRODT, INC., St. Louis, Missouri 63134

By: MERCK FROSST LABORATORIES Kirkland (Montreal), Canada

Mallinckrodt® NUCLEAR

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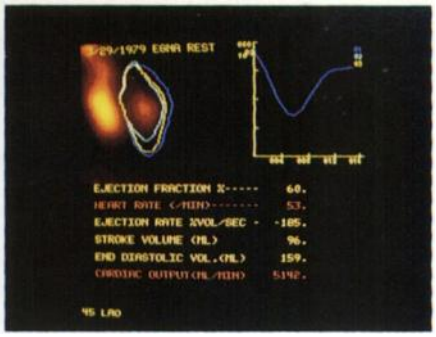
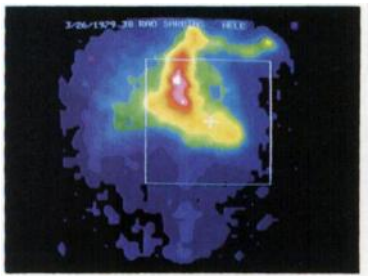


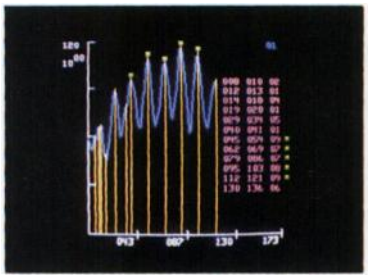
Summarized Cardiac Data.

First Pass Studies.



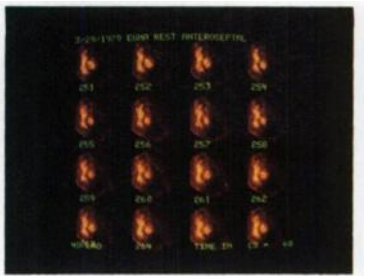
Composite of cycle with ROI for magnification.

Analysis of left or right ventricular performance, and shunt detection are available using clinically tested MACRO programs requiring a minimum of operator effort.



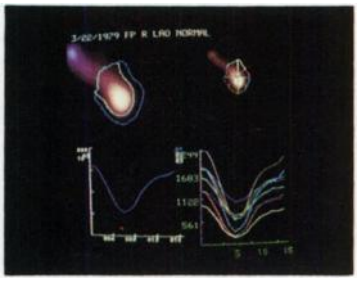
Counts per cycle.

Multiple Gated blood pool imaging



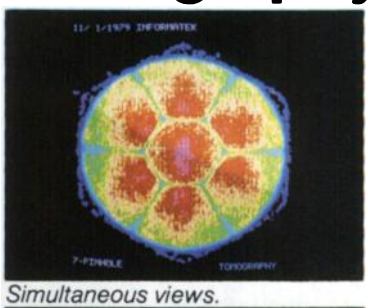
Cardiac cycle.

Ventricular volume, ejection fraction, cine angiography. Informatek makes it easy to do, and reproducible with user approved programs.

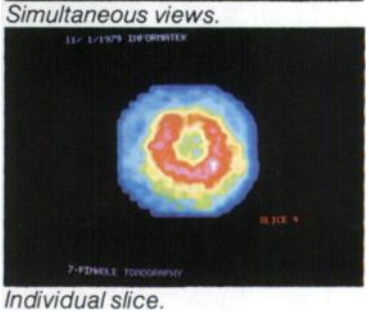


Wall tracings and volume curves.

Tomography



Simultaneous views.



Individual slice.

The multiple pinhole collimator option makes perfusion tomography possible. The Tomography MACRO program automates the extraction of separate longitudinal myocardial slices from a single study in which multiple views have been simultaneously acquired.

Whatever the camera, whatever the procedure,

SIMIS™ nuclear image processing computers still lead the field in proven versatility, ease of operation, and high resolution display.

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Informatek's clinical data processing systems are noninvasive instruments for use in clinical research and diagnosis which do not come into direct contact with the patient and cannot cause direct injury. For directions on proper use, refer to Informatek's instruction manual, as well as the instructions for use accompanying any products used in concert. Informatek clinical data processing systems were engineered solely for use under the direction of, and using methods approved by, a qualified physician.

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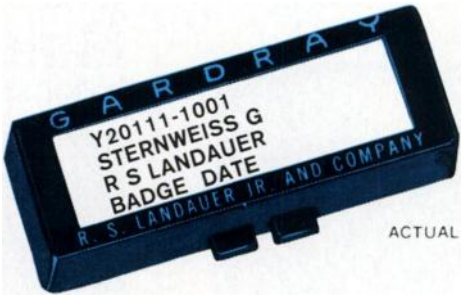

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We agree that all things considered the Landauer Gardray 8 film badge system is the best available personnel dosimeter. And, although we are always looking for the ultimate, we have continued to work hard and invest money and time to make it better.

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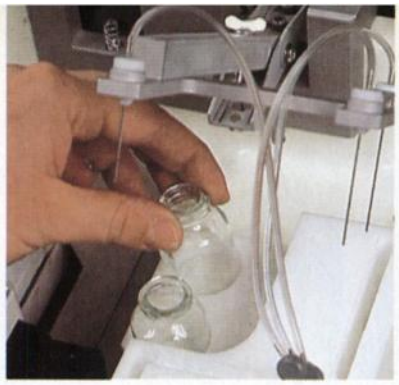
So automated it makes other RIA systems seem downright manual



1 **No operator intervention** from time samples and standards are loaded until tabulated results are collected.

2 **High sample capacity, rapid throughput.** Accepts 175 samples (no pretreatment necessary); processes at a rate of up to one per minute after initial sample run.

3 **Entire procedure under advanced computer control.** Automatically performs all the diverse and time-consuming steps of RIA…in a matter of minutes.

4 **Floppy disk programming** controls all assay parameters; has self-diagnostic capability. Dual drive disk carries over a half-million bytes of information.

5 **Complete data reduction** from sample identification to printing of standard curve.

6 **Modular construction** with minimum number of moving parts. Simplifies trouble-shooting, maintenance and servicing.

7 **Versatile operation.** Extensive instrument software allows quick changeover to other assay modalities, permits adaptability to other reagent sources.

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Gammaflo™ totally automates RIA

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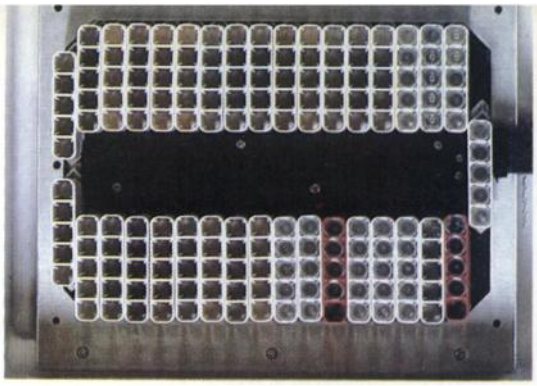

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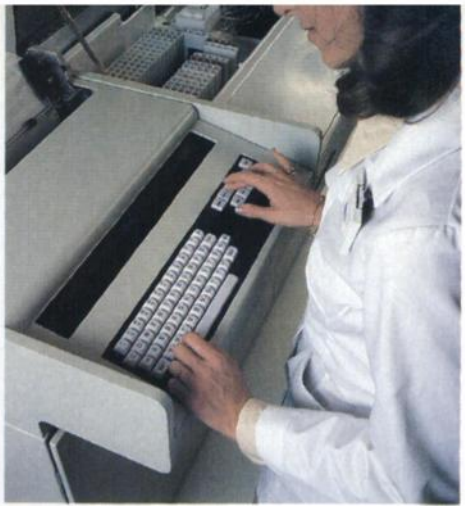

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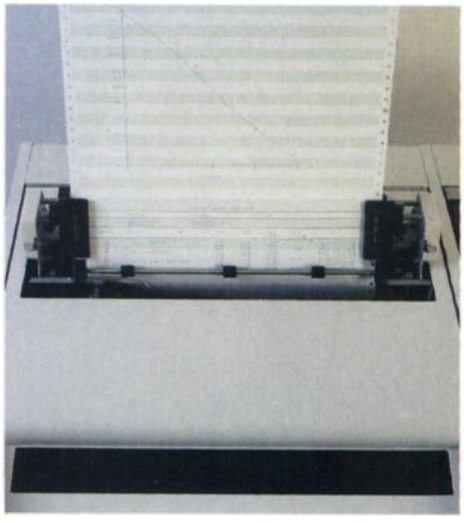

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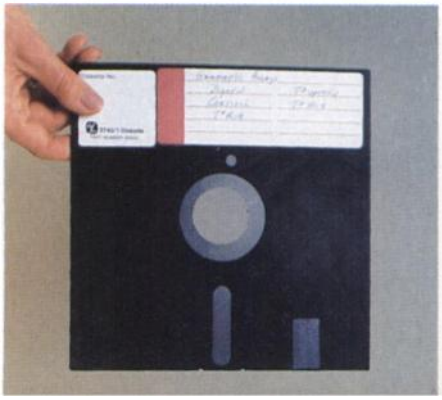

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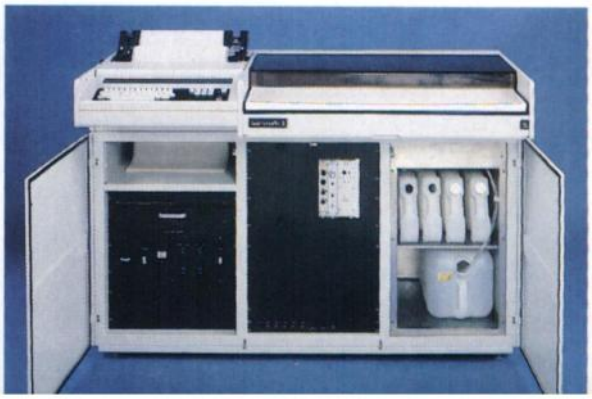

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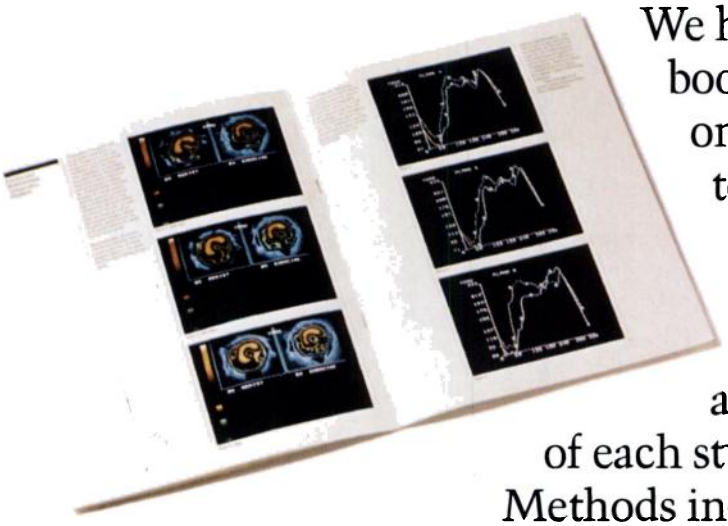

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OSTEOLITE bone imaging in orthopedics

The superior technique:

"The bone scan may be the only technique capable of locating sites of suspected or unsuspected (bone) trauma."[1]

1. *Sem Nucl Med* 6:107, 1976

The superior agent:

OSTEOLITE™

Technetium Tc 99m Medronate Sodium Kit (MDP)

NEN New England Nuclear®

In bone trauma...when the X-ray is inconclusive.

Most rapid blood clearance[2]

- At 90 minutes postinjection, blood clearance of MDP pharmacologically identical to OSTEOLITE was approximately equal to that of tested pyrophosphate agents at 6 hours postinjection.
- At 3 hours, MDP blood levels were considerably less than those of tested EHDP and pyrophosphate.

Result: low-background studies, whether you must scan early to meet patient-flow demands, or at 3 hours for more optimal image detail.

Lowest soft tissue activity[2,3]

The "difference in soft tissue activity (highest with polyphosphate and lowest with MDP) is discernible in clinical images."[2] A University of Minnesota study found that only 4% of 175 MDP images showed moderate to marked soft tissue activity, compared to 17% of EHDP images.[3]

Result: highest assurance of visualizing all skeletal structures.

Highest target-to-background differential[4]

OSTEOLITE's rapid blood clearance and lower soft tissue uptake usually enable current gamma cameras to resolve peripheral skeletal structures and phalanges.

Result: confidence of detecting resolution-challenging alterations in osteogenesis...even roentgenographically "invisible" fractures and small metastases.

Convenient storage and preparation

Available in 5-vial or 30-vial "Convenience Packs," OSTEOLITE can be stored and used at room temperature (15–30 C).

REFERENCES:

1. Marty R et al: Bone trauma and related benign disease: Assessment by bone scanning. *Sem Nucl Med* 6:107, 1976
2. Subramanian G et al: Technetium-99m-methylene diphosphonate—a superior agent for skeletal imaging: Comparison with other technetium complexes. *J Nucl Med* 16:744, 1975
3. Forstrom L et al: Data on file at New England Nuclear, Medical Diagnostics Division, North Billerica, MA
4. Davis MA, Jones AG: Comparison of ^{99m}Tc-labeled phosphate and phosphonate agents for skeletal imaging. *Sem Nucl Med* 6:19, 1976

OSTEOLITE™

Technetium Tc 99m Medronate Sodium Kit (MDP)

RL, right knee

LL, right knee

Post

Ant

A 23-year-old graduate student actively engaged in amateur soccer complained of pain in both knees. X-rays of both knees suggested the possibility of a stress fracture only at the right proximal tibia. OSTEOLITE images of the right knee displayed focal uptake in the proximal tibia, consistent with the diagnosis of a stress fracture. A routine anterior view of both knees disclosed a roentgenographically occult stress fracture of the left proximal tibia as well.

Images produced with 19.6 mCi technetium-99m labeled OSTEOLITE; recorded at 500 K counts, Searle LFOV™ camera with Micro Dot™ Imager.

Please see following page for full prescribing information.

OSTEOLITE™

Technetium Tc 99m Medronate Sodium Kit (Formerly Known as MDP)

October 1977

DESCRIPTION: New England Nuclear's OSTEOLITE™ Technetium Tc 99m Medronate Sodium Kit (formerly known as MDP), is supplied sterile and non-pyrogenic in lyophilized kit form suitable for reconstitution with sodium pertechnetate Tc 99m to form a diagnostic skeletal imaging agent for intravenous administration. Each vial contains 10mg medronate disodium and 0.85mg stannous chloride dihydrate; pH is adjusted to between 7.0–7.5 with hydrochloric acid and/or sodium hydroxide solution. The contents of the vial are lyophilized and stored under nitrogen.

PHYSICAL CHARACTERISTICS

Technetium Tc 99m decays by isomeric transition with a physical half-life of 6.02 hours. (SOURCE: Martin, M. J. Nuclear Data Project, Oak Ridge National Laboratory, March, 1976.) Photons that are useful for imaging studies are listed in Table 1.

Table 1. Principal Radiation Emission Data—Technetium Tc 99m

Radiation	Mean %/ Disintegration	Mean Energy (keV)
Gamma-2	88.96	140.5

To facilitate correction for physical decay of Technetium Tc 99m, the fractions of initial activity that remain at selected intervals after the time of calibration are shown in Table 2.

Table 2. Physical Decay Chart: Technetium Tc 99m Half-Life 6.02 Hours

Hours	Fraction Remaining	Hours	Fraction Remaining
0*	1.000	8	.398
1	.891	9	.355
2	.794	10	.316
3	.708	11	.282
4	.631	12	.251
5	.562	18	.126
6	.501	24	.063
7	.447		

*Calibration Time

EXTERNAL RADIATION

The specific gamma ray constant for Technetium Tc 99m is 0.8R/mCi-hr. at 1cm. The half value layer is 0.2mm of Pb. To facilitate control of radiation exposure from millicurie amounts of Technetium Tc 99m, the use of a 6.35mm thick standard radiation elution lead shield will attenuate the radiation emitted by a factor greater than 10^{-4}.

Table 3. Radiation Attenuation By Lead Shielding

Shield Thickness (Pb)mm	Coefficient of Attenuation
0.2	0.5
0.95	10^{-1}
1.8	10^{-2}
2.7	10^{-3}
3.6	10^{-4}
4.5	10^{-5}
5.4	10^{-6}
6.3	10^{-7}

CLINICAL PHARMACOLOGY: Upon intravenous injection, Technetium Tc 99m OSTEOLITE exhibits a specific affinity for areas of altered osteogenesis. In humans, blood levels fall to 4-10% of the injected dose by two hours post-injection and to 3-5% by three hours. During the first 24 hours following its administration in patients with normal renal function, 50-75% of the radioactivity is excreted into the urine and less than 2% of the injected dose remains in the vascular system.

Uptake of the Technetium Tc 99m in bone appears to be related to osteogenic activity and to skeletal blood perfusion. The deposition in the skeleton is bilaterally symmetrical, with increased accumulation in the axial structure as compared to the appendicular skeleton. There is increased activity in the distal aspect of long bones as compared to the diaphyses. In pediatric patients, in whom the epiphyseal centers are still open, there is more marked accumulation of the radiopharmaceutical in the distal aspects of long bones than is seen in adults in whom the epiphyseal centers are closed. Localized areas of abnormal accumulation of the radiopharmaceutical may be seen in primary skeletal malignancies, metastatic malignancies to bone, acute or chronic osteomyelitis, arthritides, recent fractures, areas of ectopic calcification, Paget's disease, regional migratory osteoporosis, areas of aseptic necrosis and, in general, any pathological situation involving bone in which there is increased osteogenic activity or localized increased osseous blood perfusion. Since increased osteogenic activity and localized increased osseous blood perfusion are not usually present in chronic bone diseases, bone imaging agents, in general, are not effective in detecting such diseases. Localized areas of decreased accumulation of the radiopharmaceutical may be noted in areas of bone which have received localized fields of external radiation or to which blood flow has been interrupted. OSTEOLITE has also been noted to accumulate in areas of acute myocardial infarction from one to fourteen days after the pathologic event.

INDICATIONS AND USAGE: Technetium Tc 99m OSTEOLITE may be used as a bone imaging agent to delineate areas of altered osteogenesis.

CONTRAINDICATIONS: None known.

WARNINGS: The contents of the OSTEOLITE vial are intended only for use in the preparation of Technetium Tc 99m medronate sodium and are NOT to be directly administered to the patient.

Ideally, examinations using radiopharmaceuticals—especially those elective in nature—of women of childbearing capability should be performed during the first ten days following the onset of menses.

PRECAUTIONS: A thorough knowledge of the normal distribution of intravenously administered Technetium Tc 99m medronate sodium is essential in order to accurately interpret pathologic studies.

Technetium Tc 99m medronate sodium, as well as any radioactive agent, must be handled with care. Once sodium pertechnetate Tc 99m is added to the kit, appropriate safety measures should be used to minimize external radiation exposure to clinical personnel. Care should also be taken to minimize radiation exposure to patients in a manner consistent with proper patient management.

The Technetium Tc 99m labeling reaction involved in preparing Technetium Tc 99m medronate sodium depends on the maintenance of tin in the divalent state. Any oxidant present in the sodium pertechnetate Tc 99m employed may adversely affect the quality of the prepared agent. Thus, sodium pertechnetate Tc 99m containing oxidants should not be used without first demonstrating that it is without adverse effect on the properties of the resulting agent.

The use of bacteriostatic sodium chloride as a diluent for sodium pertechnetate Tc 99m may adversely affect the biologic distribution of the prepared agent, and its use is not recommended.

Adequate reproduction studies have not been performed in animals to determine whether this drug affects fertility in males or females, has teratogenic potential, or has other adverse effects on the fetus. Technetium Tc 99m medronate sodium should be used in pregnant women only when clearly needed.

It is not known whether this drug is excreted in human milk. As a general rule nursing should not be undertaken when a patient is administered radioactive material.

Safety and effectiveness in children have not been established.

ADVERSE REACTIONS: None reported.

DOSAGE AND ADMINISTRATION: The recommended dose for the average 70kg adult patient is 15mCi with a range of 10-20mCi. The patient dose should be measured by a suitable radioactivity calibration system immediately prior to administration.

Optimal imaging results are obtained within one to four hours after administration.

OSTEOLITE should be used within six hours after aseptic reconstitution with sodium pertechnetate Tc 99m. For optimum results this time should be minimized.

The vial contains no bacteriostat.

Radiopharmaceuticals should be used by persons who are qualified by specific training in the safe use and handling of radionuclides produced by nuclear reactor or particle accelerator and whose experience and training have been approved by the appropriate governmental agencies authorized to license the use of radionuclides.

RADIATION DOSIMETRY

The estimated absorbed radiation dose to an average patient (70kg) from an intravenous injection of a maximum dose of 20 millicuries of Technetium Tc 99m OSTEOLITE is shown in Table 4.

Table 4. Absorbed Radiation Dose

Organ		Technetium Tc 99m Medronate Sodium (rads/20mCi)
Total Body		0.13
Bone Total		0.70
Red Marrow		0.56
Kidneys		0.62
Liver		0.16
Bladder Wall	2 hr void	2.60
	4.8 hr void	6.20
Ovaries	2 hr void	0.24
	4.8 hr void	0.34
Testes	2 hr void	0.16
	4.8 hr void	0.22

Method of calculation: A Schema for Absorbed-Dose Calculations For Biologically Distributed Radionuclides, Supplement No. 1, MIRD Pamphlet No. 1, p. 7, 1968.

HOW SUPPLIED: NEN's OSTEOLITE™ Technetium Tc 99m Medronate Sodium Kit is supplied as a set of five or thirty vials, sterile and non-pyrogenic. Each nitrogen-flushed vial contains in lyophilized form:

Medronate Disodium—10mg
Stannous Chloride Dihydrate—0.85mg

The pH is adjusted to between 7.0–7.5 with hydrochloric acid and/or sodium hydroxide solution. The contents of the vial were lyophilized under nitrogen. Store at room temperature (15°-30° C). Included in each five (5) vial kit is one (1) package insert and six (6) radiation labels. Included in each thirty (30) vial kit is one (1) package insert and thirty-six (36) radiation labels.

INSTRUCTIONS FOR PREPARATION OF TECHNETIUM Tc 99m OSTEOLITE: Aseptically inject 2 to 8ml of sodium pertechnetate Tc 99m (pertechnetate in isotonic saline without a bacteriostat) into the supplied vial of OSTEOLITE enclosed by a radiation shield. Swirl for at least ten seconds to dissolve completely. Label appropriately. Suitable labels have been supplied with each OSTEOLITE Kit. Use within six hours after reconstitution. For optimum results, this time should be minimized.

Using proper shielding, the vial containing the reconstituted solution should be visually inspected to insure that it is clear and free of particulate matter.

The contents of the kit vials are not radioactive; however, **after reconstitution with sodium pertechnetate Tc 99m the contents are radioactive and adequate shielding and handling precautions must be maintained.**

Do not use if there is a vacuum in the immediate drug container or if air is injected into the container when the dose is withdrawn.

Catalog Number NRP-420 (5 vial kit)
Catalog Number NRP-420C (30 vial kit)

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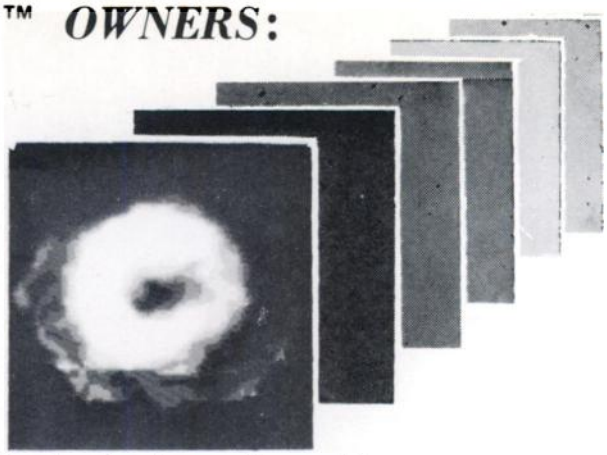
Your computer can now produce high-quality, 3-dimensional, 7-pinhole emission tomography in 60 seconds!

We call it the **GAMMECAT™ Package.**



One plane through myocardium parallel to collimator.

You only need our GAMMECAT system, your computer and most Anger cameras.

The GAMMECAT Package was developed by the pioneers of 7-pinhole tomography. It features the fastest and most accurate software available today. We combined the technology of 7-pinhole tomography with the advances of GAMMECAT software.

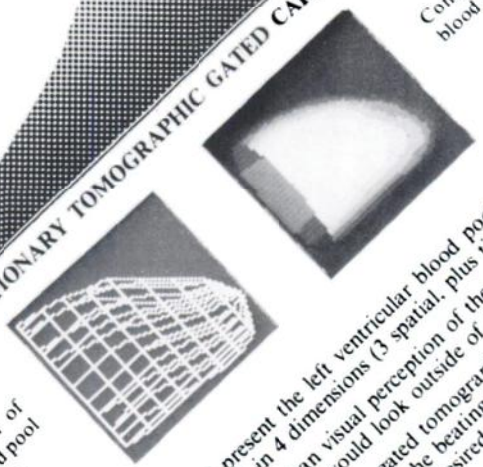
Consider the following:

7-pinhole tomography
- increases sensitivity without any loss of specificity in thallium myocardial perfusion studies.[1,2]
- images the heart in true-to-life 3 dimensions.
- saves valuable camera time by shooting multiple views simultaneously.

GAMMECAT offers
- speed, by reconstructing multiple images into 10 planes in 60 seconds.
- accuracy, through state of the art linear reconstructions, with minimal artifacts.
- constant plane thicknesses with automatic correction for pinhole magnification.
- a complete system, including a collimator, and everything needed for 7-pinhole tomography.
- economy and simplicity, by utilizing your existing camera and computer system.

. . . . . In a word, 7-pinhole tomography is a breakthrough; GAMMECAT is its most advanced application available.

WATCH FOR OUR REVOLUTIONARY TOMOGRAPHIC GATED CARDIAC ANALYSIS PACKAGE*



Computer simulation of blood pool.

Birdcage representation of the surface of the blood pool inside the left ventricle.

This package will present the left ventricular blood pool as it actually appears, in 4 dimensions (3 spatial, plus time). It will simulate human visual perception of the LV blood pool surface as it would look outside of the body. Only one LAO gated tomographic study is needed to view the beating blood pool from any desired angle.

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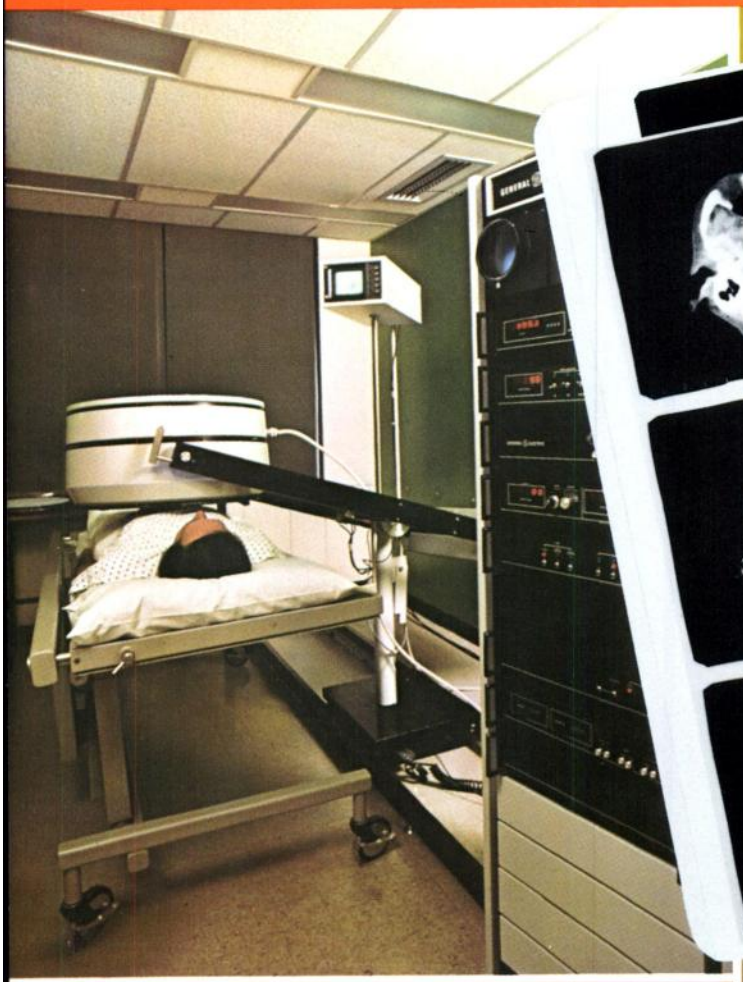
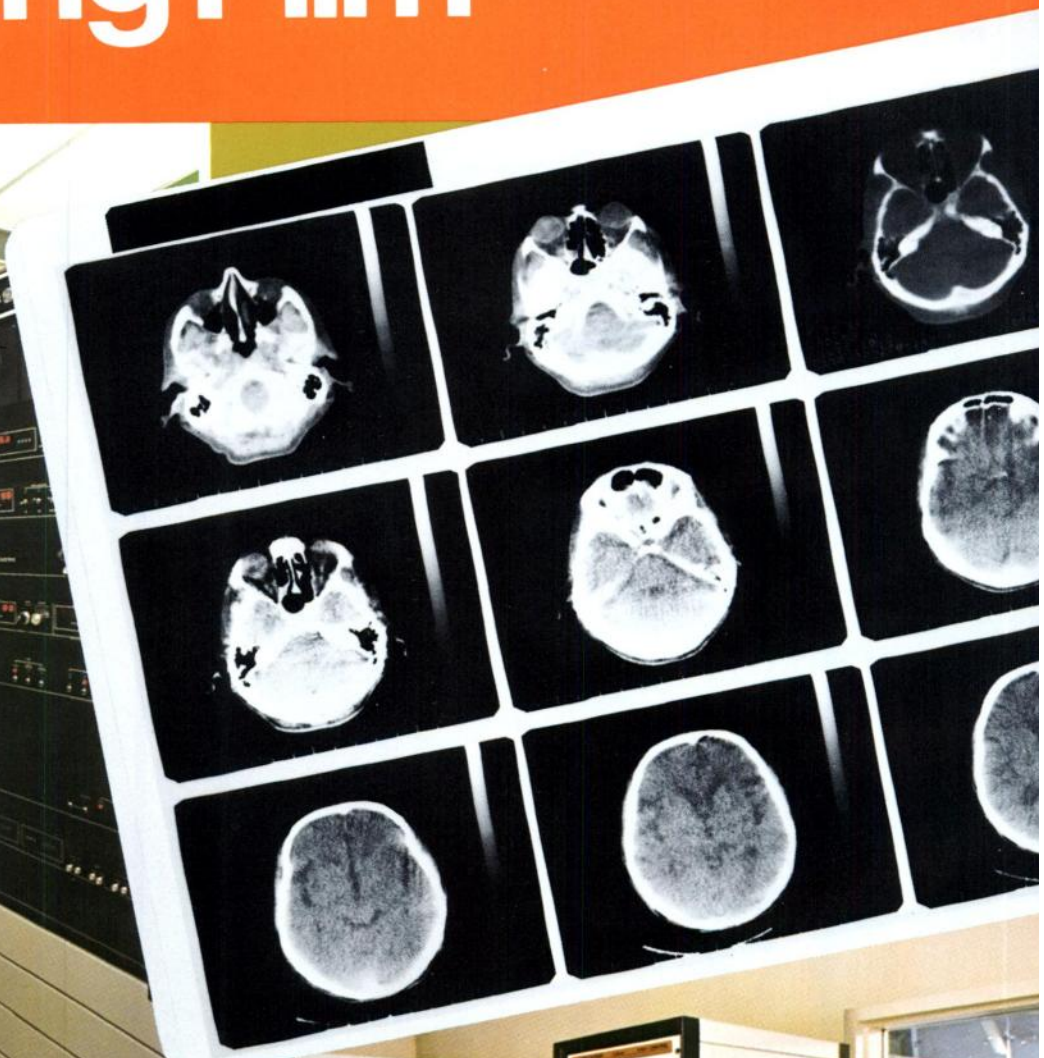
[1]Vogel RA, Kirch DL, Lefree MT, Rainwater JO, Steele PP: Thallium-201 myocardial perfusion scintigraphy: Results of standard and multi-pinhole tomographic techniques. *The American Journal of Cardiology* 43:787-793, 1979

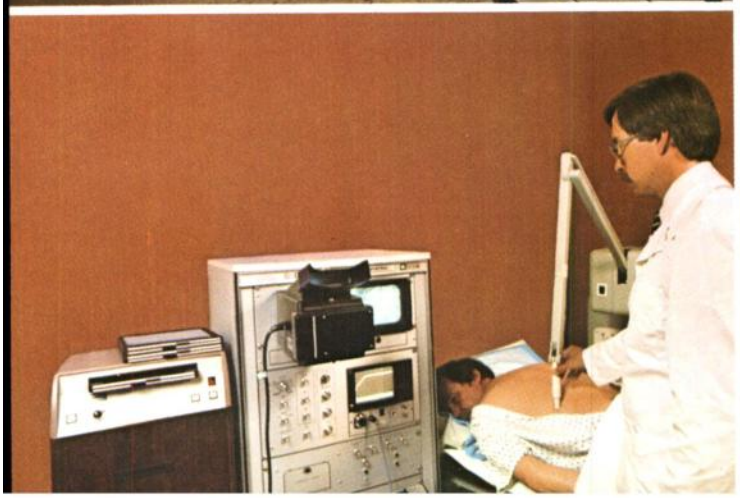
[2]Francisco D, Raymundo G, Van Kirk O, Erhardt J, Marcus M: Tomographic thallium-201 perfusion scintigrams following maximal coronary vasodilation with dipyridamole: Circulation (in press)

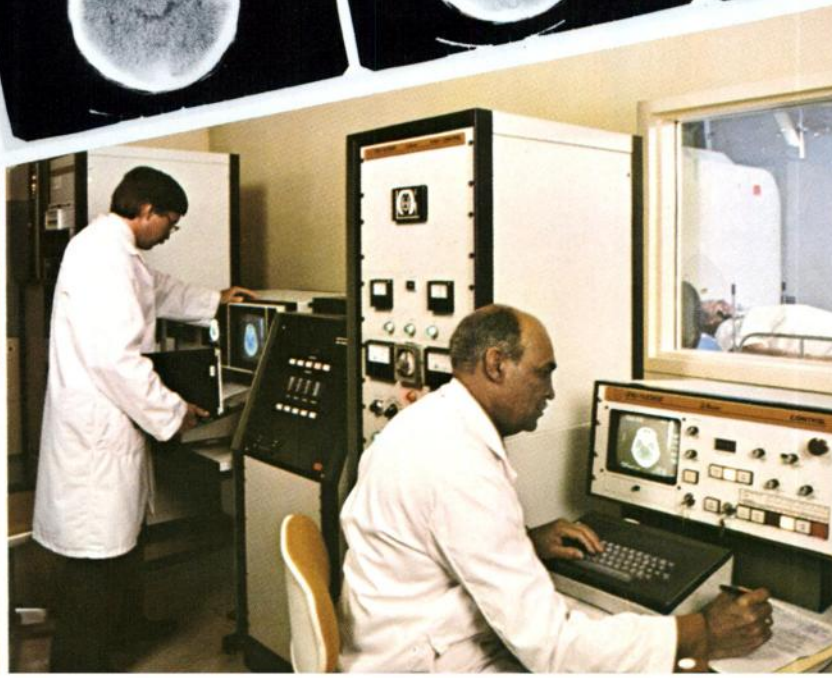
*DEC Gamma 11 is a trademark of Digital Equipment Corporation

SCOPIX® CR3 Universal CRT Imaging Film









The one film for all your computed tomography, ultra-sound and nuclear medicine imaging needs...

Up to now, if you wanted good CRT image recording from computed tomography, ultra-sound and nuclear medicine equipment, you may have used several different "special purpose" imaging films.

We started with a conviction that a more convenient universal emulsion film was desirable and possible. The result is Agfa-Gevaert's new SCOPIX CR3 Universal CRT Imaging Film . . . the *one* film that does it *all!*

It is a film matched to the spectral emission of white, blue and green phosphors used for CRT displays and video monitors.

Matched Response To All CRT Displays.

The broad spectral sensitivity of SCOPIX CR3 Film ensures accurate and detailed recording from greyscale CRT and video monitors which use white, blue or green phosphors in their display tubes. It is the "blindness" to green phosphors which causes other films to exhibit higher grain and less definition.

SCOPIX CR3 Film is a single-coated, orthochromatic, medium speed film of relatively high contrast, which gives outstanding recording of CT scan, ultra-sound and nuclear video images.

Sharper Image

Its higher speed allows CRT monitor intensity to be decreased, thus reducing the "halo" effect on the video screen and improving image definition.

SCOPIX CR3 Film is single-coated on GEVAR polyester base, with anti-halation layer. This combination enhances image detail and definition by preventing image parallax. It is suitable for all RP and manual film processing.

With SCOPIX CR3 film . . . you purchase *fewer* film types and *simplify* film inventory; get improved and consistent *quality* and *economy* because *one film does it all!*

For additional information, contact your nearest Agfa-Gevaert Rex Representative or call 914-682-5650.

Image Quality and Support Second to None.

Agfa-Gevaert Rex offers a complete line of superior, sensitometrically dependable X-ray films. All have the finest definition and image quality to help make precise diagnoses. And all offer appropriate speed for the desired technique. Whether it's general purpose radiology, or special procedures such as cinefluorography, angiography or mammography, Agfa-Gevaert has the film to meet your diagnostic needs.

SCOPIX CR3 Film
The *one* film that does it *all*!

Photos courtesy Mt. Sinai Hospital, N.Y.

AGFA-GEVAERT REX, INC.

A Subsidiary of the Agfa-Gevaert Group, the second largest photo products manufacturer in the world.
Headquarters: White Plains, NY 10604/Tel. 914-682-5650 ■ In Canada contact: Photo Importing Agencies, Ltd./Exclusive Distributor

A² Innovation In Image Processing

The new A²* Single Terminal Systems contribute significant benefits to image processing and display, and a few surprises to our competition.

1. Simplicity
You hardly need an instruction manual. Interactive menus guide you step by step — in English — through patient files, data acquisition, and image processing functions. And, it performs conveniently in your office, camera room, CCU, stress laboratory and conference room — either mobile or stationary.

2. Image Quality
Each A² System offers a 512 X 512 image display matrix with 256 gray shades. In direct comparison of images with competiton, new A² images are superior.

3. Price
Our prices are lower and our systems more deliverable. And, single terminal systems can be upgraded to accommodate multiple users and multiple cameras.

Technical innovations, software excellence, comprehensive user education, and strong customer service have made MDS the leader in image processing technology.

After nine years of continuous leadership, we've renewed our dedication to each of these vital activities.

Please write or call for more information on A² Image Processing Systems.

*A² is a trademark of MDS

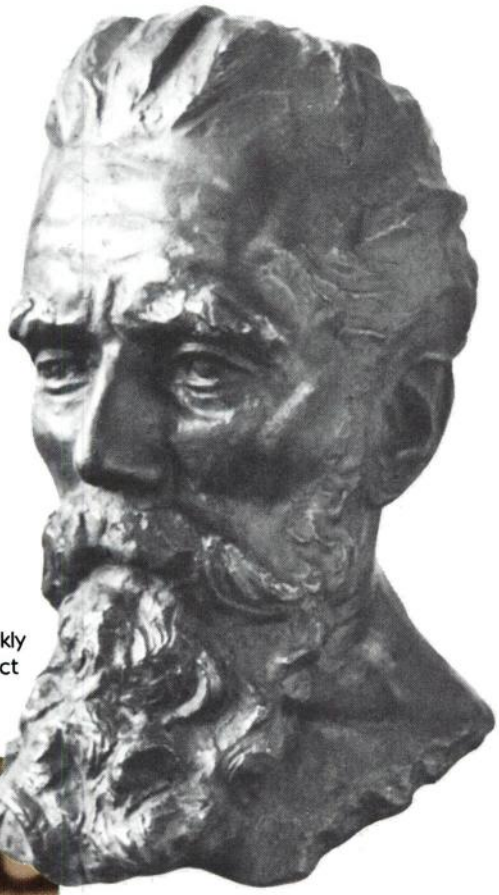
MDS products, hardware and software, are tools for diagnosis and research which do not come in contact with, and cannot cause direct injury to the patient. Refer to the operation manual and instructions accompanying the gamma camera and injectable imaging agent for further information on their use. To ensure proper clinical results, an MDS product must be used under the direction of, and using procedures verified by a qualified physician.

mds
Medical Data Systems

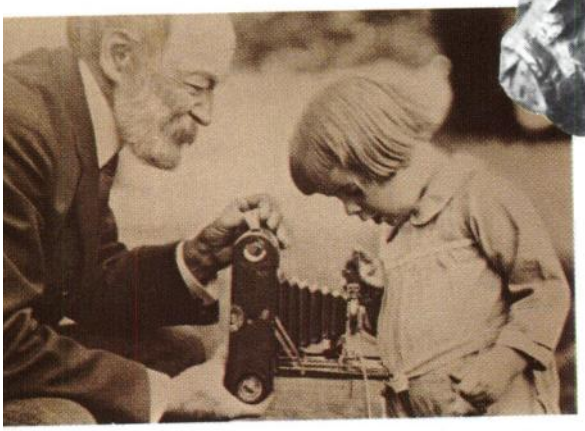
division of Medtronic, Inc.
2311 Green Road
Ann Arbor, Michigan 48105
313 769 9353
Telex 235794

WHEN YOU DO SOMETHING

November 8, 1895.
Wilhelm Roentgen discovered a "new kind of light" that he called x-rays, and quickly made the first radiograph of a human subject —his wife's hand.



(1845-1923)
Wilhelm Konrad Roentgen

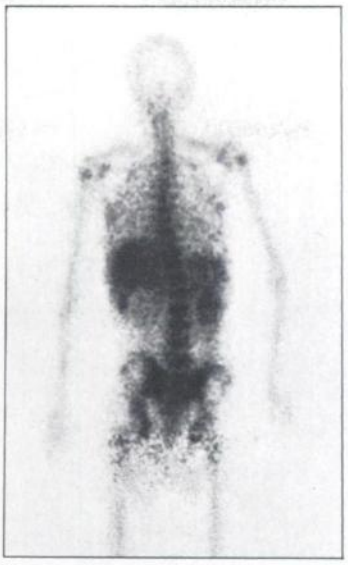


Physicians discovered photography early, and used photos for teaching and record keeping. They were among Kodak's first customers.

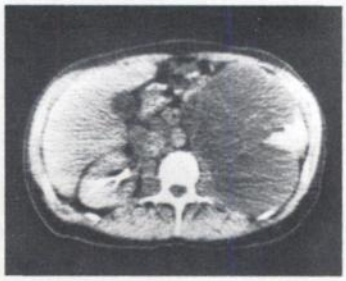
An early Kodak darkroom lamp was a candle in a red fabric box. Today's Kodak safelight filter type GBX is "universal" and safe with all blue- and most green-sensitive x-ray films.

The first Kodak "demonstrator" was hired in 1884. Today, technical sales representatives call on the medical profession to provide imaging expertise and backup.

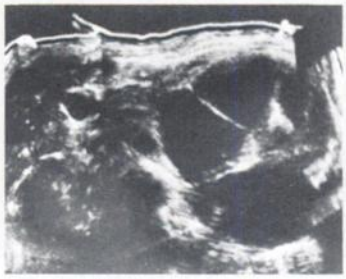
FOR A VERY LONG TIME...



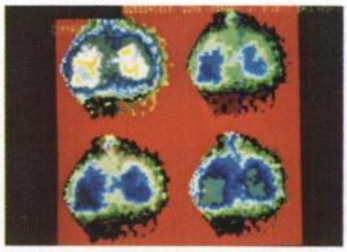
Nuclear medicine



Computed tomography



Ultrasound

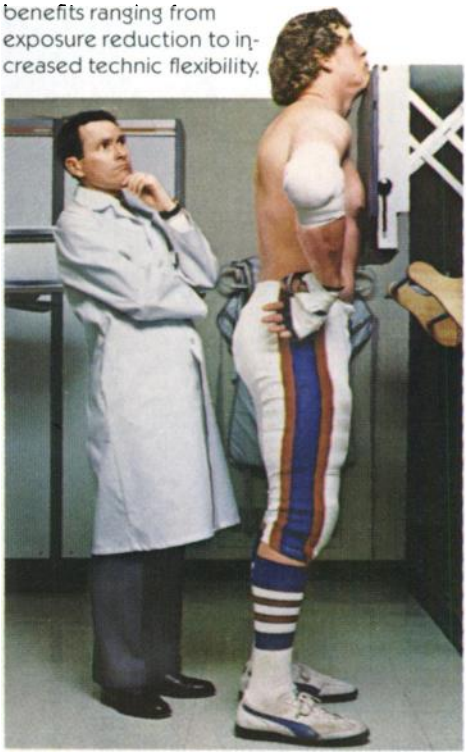


CRT color photography

As the new imaging modalities required new products, Kodak responded. If there is an image to be recorded, there is a Kodak film on which to record it.

Eastman Kodak Company, founded in 1880, occupied this plant in Rochester, New York. Kodak headquarters now occupy the site.

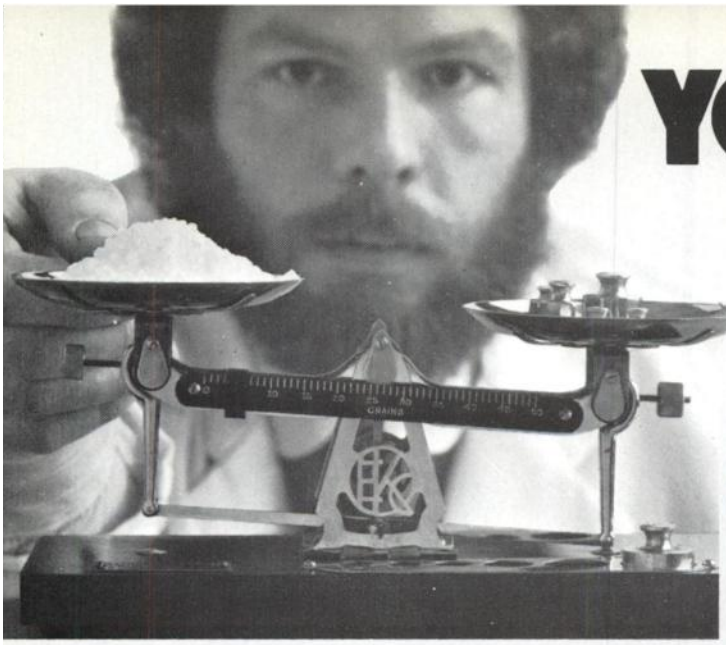
Kodak Lanex screens and Kodak ortho films provide quality images with benefits ranging from exposure reduction to increased technic flexibility.



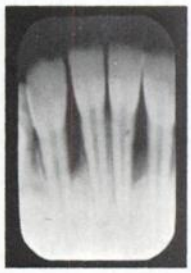
Traditionally a symbol of quality products.

Kodak
TRADEMARK

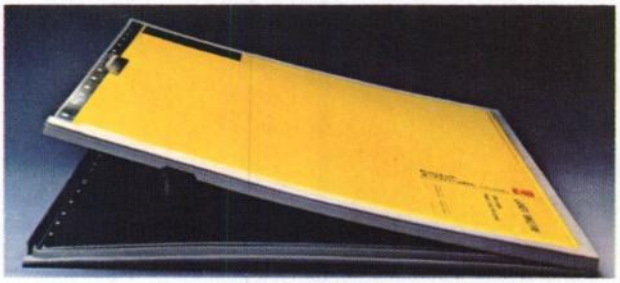
YOU GET TO BE



From the beginning, Kodak provided chemicals for processing, and even sold the balances for measuring them. Today, the Kodak automixer delivers fresh chemicals to processors, relieving department personnel of a time-consuming chore.



Kodak
first prepackaged dental x-ray film in 1913.

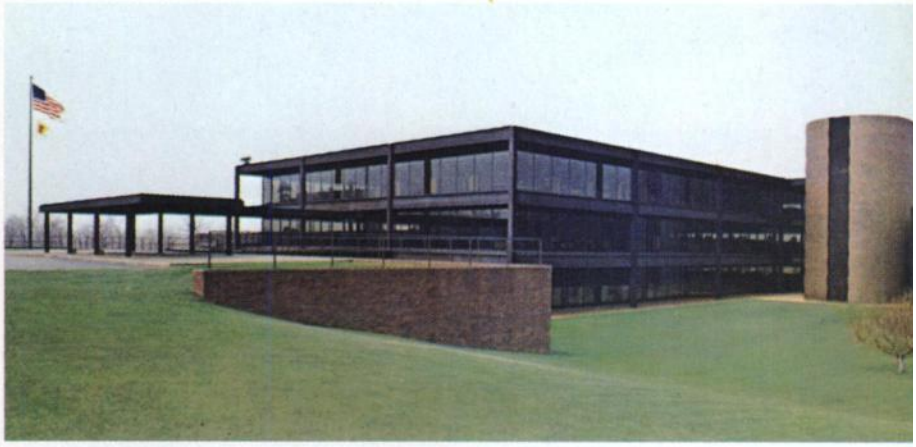


Kodak X-Omatic cassette, introduced in 1971. Curved panel design forces out trapped air and provides intimate screen/film contact.

Kodak had film before Roentgen had the ray, establishing a tradition of meeting the needs of medical imaging. No other company catalogs as many films as Kodak.

VERY GOOD AT IT.

Imaging is not complete without proper processing. An early Kodak advertisement showed a Kodak film processor that operated by the turn of a crank. Today, the Kodak RP X-Omat processor, model M8, processes x-ray film in 90 seconds and monitors its own performance automatically.

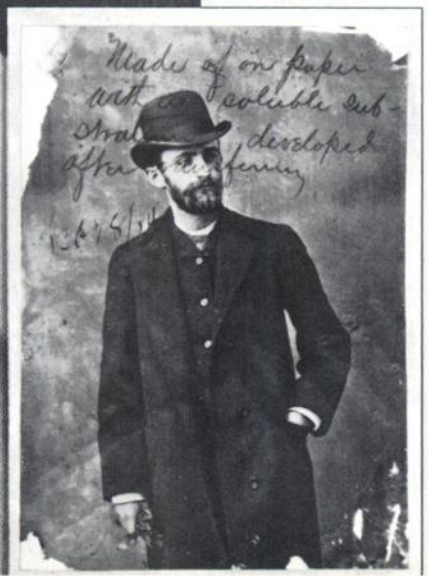


Kodak's 100-year commitment to its customers has always included instruction on the use of its products. Many courses are conducted at the Kodak Marketing Education Center.


X-Ray Bulletin

Kodak publications.
X-ray Bulletin began in 1925; became Medical Radiography and Photography in 1947.

Veterinarians also find Kodak products useful in their practices.



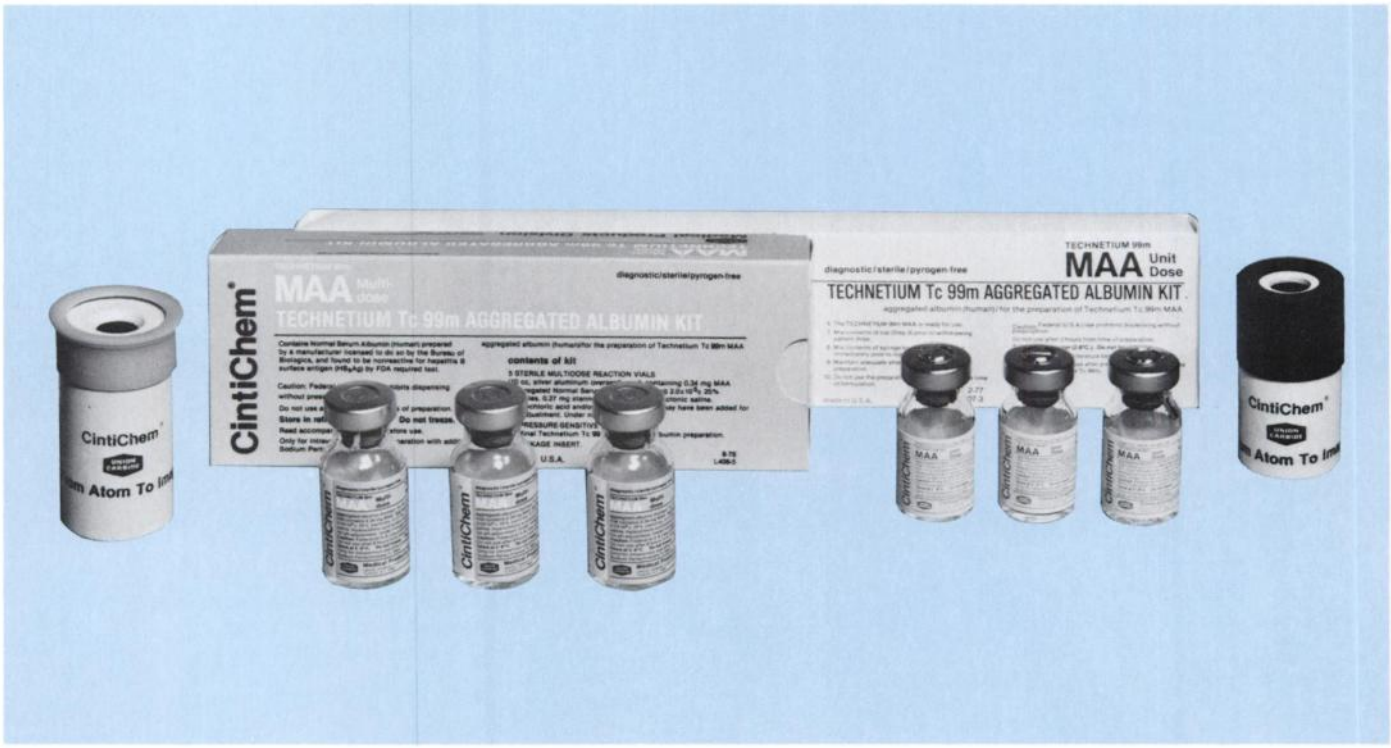
George Eastman,
1854-1932.
He started it all.

1880 Kodak *1980*

100 YEARS OF TURNING ENERGY INTO IMAGES

REDUCE YOUR

WITH THE ECONOMIC ALTERNATIVES



THE ECONOMIC ALTERNATIVES, available only from UNION CARBIDE NUCLEAR PRODUCTS, consist of diagnostic kits such as **CINTICHEM® TECHNETIUM 99m MAA** in **UNIT DOSE** and **MULTIDOSE** vial sizes, designed for the full range of dose preparation needs required to meet today's practice of Nuclear Medicine in an environment of cost containment.

CINTICHEM® TECHNETIUM 99m MAA UNIT DOSE and **MULTIDOSE** both offer the following advantages:

- **EASY TO PREPARE**[1]
- **STABLE FORMULATION**—Prepared with Stannous Tartrate[2], which is more resistant to oxidation than Stannous Chloride.
- **LOWEST DOSE RATE TO THE LUNGS OF ANY COMMERCIALLY AVAILABLE KIT**[3]

IMAGING COSTS

AVAILABLE ONLY FROM UNION CARBIDE

CINTICHEM® TECHNETIUM 99m MAA UNIT DOSE can reduce the cost of operating any size patient volume department:

UNIT DOSE kits each contain 10 vials

UNIT DOSE kits are competitively priced with 5 vial multidose kits

UNIT DOSE can reduce the cost of operating any department when maintained in inventory and substituted for a multidose vial on a single unexpected special, late afternoon, or weekend study, when a prepared multidose vial is not available

UNIT DOSE kits can reduce your average cost per dose if an average of one perfusion study is routinely performed per day; ideal for low volume departments

CINTICHEM® TECHNETIUM 99m MAA MULTIDOSE, for use with up to 90 mCi per vial, can provide moderate to high patient volume departments with the optimum economical dosage availability from a single vial.

[1] See Union Carbide CintiChem® Technetium 99m MAA Unit Dose or Multidose package insert for full preparation instructions.

[2] Union Carbide Reg. U.S. Patent Office # 3987157

[3] Refer to Union Carbide and competitive package inserts for full lung dosimetry information.

TO ORDER OR FOR ADDITIONAL INFORMATION

CALL TOLL FREE **800-431-1146**

IN N.Y.S. CALL (914) 351-2131 EXT 227

You can also take advantage of the other **CINTICHEM® ECONOMIC ALTERNATIVES** by ordering today Unit Dose and/or Multidose **Technetium 99m DTPA** (DTPA Tin Kit For Use In The Preparation of Technetium Tc 99m DTPA Tin Chelate) and **Technetium 99m HSA** (Technetium Tc 99m Serum Albumin (Human) Reagent Kit).

THE ECONOMIC ALTERNATIVES such as **CINTICHEM® TECHNETIUM 99m MAA UNIT DOSE** and **MULTIDOSE** (Technetium Tc 99m Aggregated Albumin Kit), can be utilized to maximum economic advantage by preparation of the vial size that best meets your daily scheduling and immediate dosage needs.

With a **CINTICHEM® STANDING ORDER** (the original "convenience packaging") you can mix your purchase and delivery of CintiChem®10 vial UNIT DOSE and 5 vial MULTI DOSE kits at the same competitive price.

Compared to competitive "convenience packaging", a CintiChem® Standing Order allows you to optimize your kit purchases and delivery schedule to meet your individual dosage needs; reduces your shelf space requirements; and continuously assures you of product with the longest expiration date available.

CINTICHEM®

TECHNETIUM 99M

MAA Technetium Tc 99m Aggregated Albumin Kit

UNION CARBIDE **FROM ATOM TO IMAGE**

Union Carbide Corporation • Medical Products Division • Nuclear Products • P.O. Box 324 • Tuxedo, New York 10987

CintiChem is a registered trademark of Union Carbide Corporation

Xenon Found in Room Air By 80% of ^{133}Xe Users

80% of a sample of XenAlert™ owners reported finding xenon gas releases of which they were previously unaware. Discovery of varying xenon concentrations during "routine" ventilation studies had been virtually impossible to detect prior to using the "XenAlert" Xenon-133 Monitor.

XenAlert™

Xenon-133 Room Air & Trap Monitor*

The ONLY instrument that integrates the xenon-133 concentration (MPC · HRS) for a full week, as required by NRC and Agreement States.[1]

- Audible and visual indicators alert you BEFORE a hazardous xenon concentration is reached.
- Ideal for workers in restricted areas.
- Monitors and displays ^{133}Xe concentration exiting from gas trap to indicate when filter cartridge needs replacement.
- Recorder output for keeping permanent records.

SATISFACTION GUARANTEED OR MONEY REFUNDED.
Demonstrations available.

Send for full details.
Ask for Bulletin 266-B

[1]The Code of Federal Regulations† clearly limits the permissible ^{133}Xe exposure to 1 MPC for 40 hours per week for 13 weeks. The data is continuously updated and displayed by the "XenAlert."

† *10 CFR, Part 20, Sec. 20.103 and Appendix B, Table 1.*

VICTOREEN

NUCLEAR ASSOCIATES
Division of VICTOREEN, INC.

100 Voice Road • Carle Place, N.Y. 11514 • (516) 741-6360

™Victoreen, Inc. *Patent Pending

Now there's an economical agent
AN-MDP™ Technetium Tc 99m Medronate Kit

If you've been waiting for an economical way to produce high-quality, low-background medronate (MDP) bone images, wait no more. AN-MDP™, from Ackerman Nuclear, Inc., gives you all of the advantages of medronate—and a lot of medronate for your money.

Superior images

Medronate produces high-target-to-background scans that readily demonstrate altered osteogenesis.[1]

- 90–94% blood clearance by two hours after administration
- Lowest soft-tissue uptake of all of the phosphonate bone agents in current use.[2]

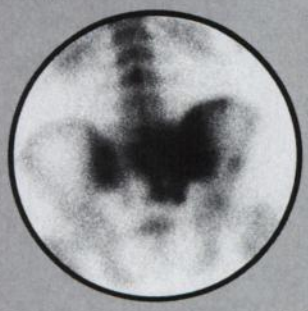
Convenience

- When necessary, imaging may begin an hour after injection (optimal imaging time is 1 to 4 hours).
- AN-MDP is stored and used at room temperature (15–30°C).

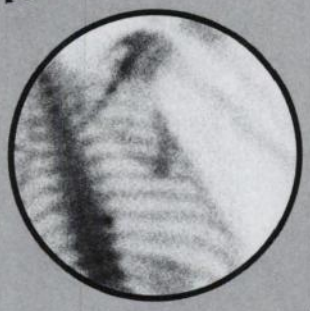
Economy

- You get 6 vials of reagent with each AN-MDP kit, instead of the usual 5.

Posterior pelvis



Posterior right side



A 54-year-old male with metastatic CA of the prostate was administered 15 mCi technetium Tc 99m-labeled AN-MDP. The images were recorded at 500K counts. Courtesy of Century City Hospital, Los Angeles.

For complete prescribing information, consult the package insert, a summary of which follows.

AN-MDP™ Technetium Tc 99m Medronate Kit

Indications and usage. Technetium Tc 99m Medronate may be used as a bone imaging agent to delineate areas of altered osteogenesis.

Contraindications. None known.

Warnings. This class of compounds is known to complex cations such as calcium. Particular caution should be used with patients who have or who may be predisposed to hypocalcemia (i.e., alkalosis)

Precautions. Contents of the vial are intended only for use in the preparation of Technetium Tc 99m Medronate and are *NOT* to be administered directly to the patient. Technetium Tc 99m Medronate, as well as other radioactive drugs, must be handled with care and appropriate safety measures should be used to minimize radiation exposure to patients consistent with proper patient management.

To minimize radiation dose to the bladder, patients should be encouraged to drink fluids and to void immediately before the examination and as often thereafter as possible for the next 4–6 hours.

Technetium Tc 99m Medronate should be formulated within six (6) hours prior to clinical use. Optimal imaging results are obtained 1–4 hours after administration.

Carcinogenesis, mutagenesis, impairment of fertility: No long-term animal studies have been performed to evaluate carcinogenic potential or whether Technetium Tc 99m Medronate affects fertility in males or females.

Pregnancy category C: Animal reproductive studies have not been conducted with Technetium Tc 99m Medronate. It is also not known whether Technetium Tc 99m Medronate can cause fetal harm when administered to a pregnant woman or can affect reproduction capacity. Technetium Tc 99m should be given to a pregnant woman only if clearly needed. Ideally, examinations using radiopharmaceuticals, especially those elective in nature, of a woman of childbearing capability should be performed during the first few (approximately 10) days following the onset of menses.

Nursing mothers: Technetium Tc 99m is excreted in human milk during lactation, therefore formula feedings should be substituted for breast feedings.

for those famous "MDP" scans.

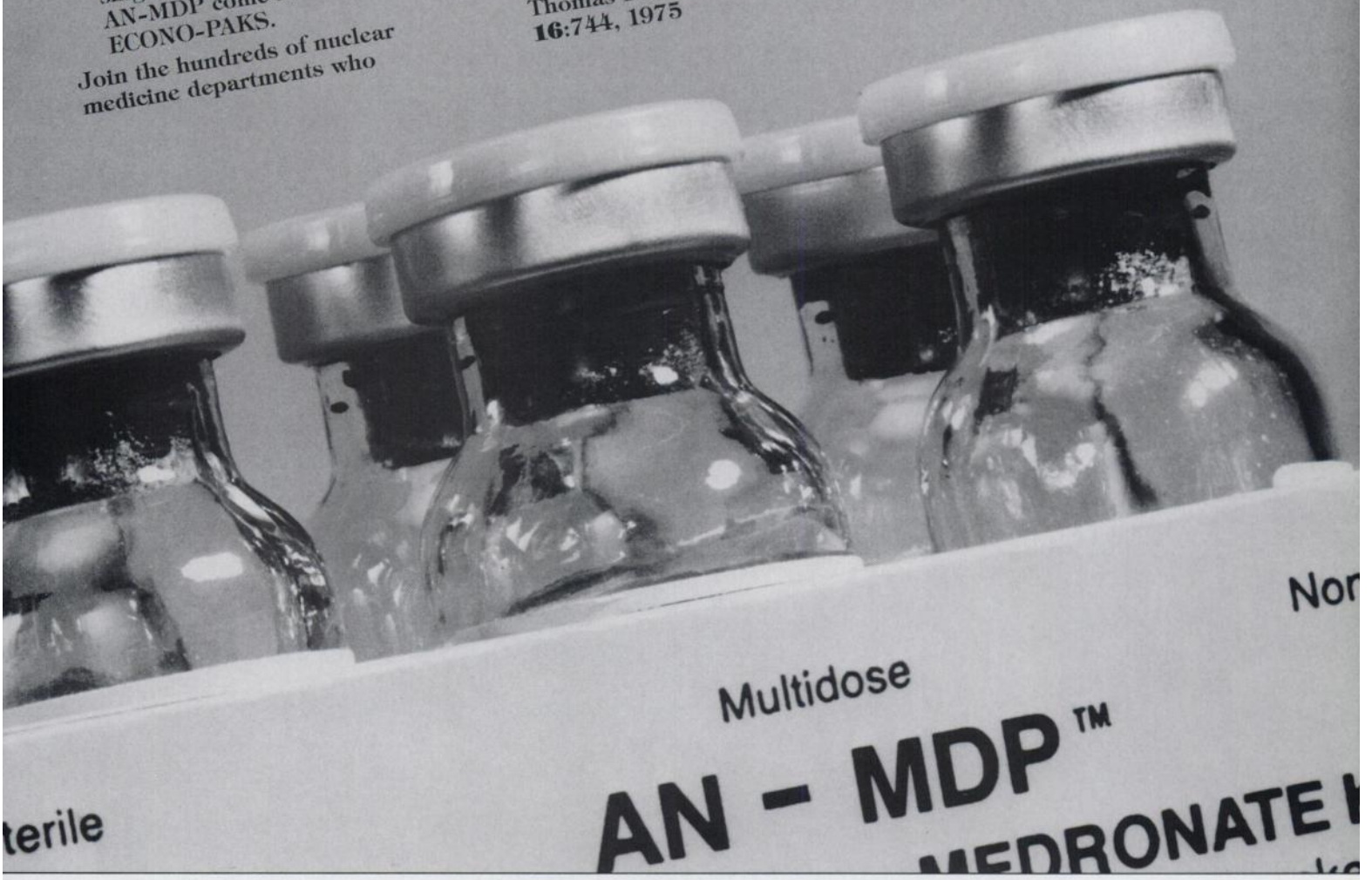
- CUT WASTE. You can choose either single-dose or multi-dose vials to match your department's volume.
- For greater savings, both single-dose and multidose AN-MDP come in 30-vial ECONO-PAKS.

Join the hundreds of nuclear medicine departments who already enjoy the benefits of "MDP" scans. To place your order today, just call us collect: (213) 240-8555.

1. Davis MA, and Jones AG: **Sem Nucl Med 6**:19, 1976
2. Subramanian G, McAfee JG, Blair RJ, Kallfelz FA, and Thomas FD: **J Nucl Med 16**:744, 1975

Ackerman Nuclear, Inc.
445 West Garfield Avenue
Glendale, CA 91204
(213) 240-8555

ACKERMAN NUCLEAR, INC.



Pediatric use: Safety and effectiveness in children have not been established.

Radiopharmaceuticals should be used only by physicians who are qualified by training and experience in the safe use and handling of radionuclides and whose experience and training have been approved by the appropriate government agency authorized to license the use of radionuclides.

Adverse reactions. No adverse reactions specifically attributable to the use of Technetium Tc 99m Medronate have been reported.

Dosage and administration. The suggested dose range for i.v. administration, after reconstitution with oxidant-free sodium pertechnetate Tc 99m Injection, to be employed in the average patient (70 kg) is:

Bone imaging: 10–20 mCi Technetium Tc 99m Medronate

Scanning is optimal at about 1–4 hours post-injection. The patient dose should be measured by a suitable radioactivity calibration system immediately prior to administration.

How supplied. AN-MDP™ is supplied both in the single-dose and multidose form. Both are available in sets of 6 or 30 sterile and nonpyrogenic vials. Each nitrogen-flushed vial contains, in lyophilized form:

	Single dose	Multidose
Medronic acid	5.0 mg	10.0 mg
Stannous chloride (minimum)	0.25 mg	0.51 mg
Maximum total stannous and stannic chloride	0.51 mg	1.01 mg

The pH is adjusted to 5.0–5.5 with HCl and NaOH prior to lyophilization. Included in each 6-vial kit is one package insert and 12 radiation labels. In each 30-vial kit is one package insert and 60 radiation labels. Refrigeration is not necessary.

Description	Catalog Number
Single dose 6-vial kit	K-401-S
Single dose 30-vial ECONO-PAK	K-402-S
Multidose 6-vial kit	K-401
Multidose 30-vial ECONO-PAK	K-402

AN-MDP™ is a trademark of Ackerman Nuclear, Inc.

First-Pass Radionuclide Angiocardiography

In 8 to 10 heartbeats...

- Ejection fraction, global and regional.
- Ventricular wall motion.
- Right and left ventriculograms in any view.
- End-diastolic volume in milliliters.
- Cardiac output in liters per minute.
- Pulmonary transit time and blood volume.
- Detection of aneurysms in RAO and LAO.

The Cordis-Baird System Seventy-Seven® Gamma Camera

Telephone, toll-free 1-800-327-7820, ext 2711
or write, Cordis Nuclear Medical Systems
P.O. Box 370428, Miami, Florida 33137

cordis®

Puzzled...?

Sometimes the detection and evaluation of heart disease can indeed be a puzzle...you have to put all of the pieces of information together in order to make an accurate diagnosis.

And that information is often elusive... sometimes impossible to obtain without resorting to expensive and time-consuming invasive procedures.

But, now with the advent of radionuclide scanning techniques, many invasive procedures have been eliminated...or at least the absolute need for the procedure can now be determined.

The difference is decisive.

Many claims are being made for new radionuclide techniques...patient comfort...low medical costs... convenience...speed...noninvasive.

And they all operate on the same principle.

All except one.

The Cordis-Baird System Seventy-Seven• and First-Pass Technology.

System Seventy-Seven has all of the advantages mentioned...the big difference is in data accumulation potential. The type of data that helps you make your diagnosis complete.

Write today for information and compare the data accumulation potential with all of the other systems.

You won't have to be puzzled anymore.

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Nuclear Medical Systems Division
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System Seventy-Seven.
It's all you need to know.

A reference is only as good as its source

Our sources have an excellent reputation for safety and convenience; they offer you references you can trust.

Sealed flood sources

Supplied as ^{57}Co (2 and 3mCi) and ^{133}Ba (0.5 and 1.0mCi) in two sizes, to check the uniformity and resolution of conventional and wide field-of-view gamma cameras, and for transmission imaging. The maximum acceptable variation in activity over the entire active area, is ±1% of the mean value. Each uniformly active plastic component is surrounded by inactive plastic and enclosed in an anodized aluminium casing. A shielded storage case is supplied with each source.

Anatomical marker sources

Spot sources are available as a 1mm bead of ^{57}Co or ^{133}Ba (10 and 100μCi). Features include a welded plastic capsule, point source geometry with a visible active bead, and colour coding for quick identification of nuclide and activity. They are packed in sets of three in shielded boxes; replacements are available separately.

Pen point tracers have a 1mm diameter bead of ^{57}Co (100μCi) sealed in the tip of a ball-point pen shaped holder with a brass shield for the active end.

Flexible sources are 50cm x 4mm diameter; ^{57}Co (100μCi) is dispersed in an inner core of active plastic, sealed in an inactive PVC tube, and closed by aluminium caps.

^{129}I rod sources for γ counters

^{129}I (0.1μCi) gamma/X-ray spectrum is virtually identical to ^{125}I, and has a half-life of 1.57×10^7 years. Calibration in terms of ^{125}I is available. The length is 100mm, maximum diameter 15mm—suitable for most manual and automatic counters. Active material is sealed in a plastic capsule attached to a handling rod. Other nuclides ^{241}Am, ^{133}Ba, ^{57}Co, ^{60}Co, ^{137}Cs, ^{54}Mn, ^{22}Na, ^{75}Se, ^{123m}Te, ^{88}Y and mock ^{131}I.

The Radiochemical Centre Amersham

For further information please write or phone
The Radiochemical Centre Limited, Amersham, England. Telephone: 024-04-4444
In the Americas: Amersham Corporation, Illinois 60005. Telephone: 312-593-6300
In W. Germany: Amersham Buchler GmbH & Co KG, Braunschweig. Telephone: 05307-4693-97

0353

Medi-Ray *announces . . .*

SURVEY METER

CALIBRATION and REPAIR SERVICE

The Medi-Ray Survey Meter Calibration and Repair Service is designed to provide reliable, competent calibration and repair for the areas of Nuclear Medicine, Radiology, Research and Industry. Our service incorporates the latest techniques and facilities, as well as a staff of highly qualified personnel functioning in the latest and most modern of environments. The result is the highest quality service at a reasonable cost to the customer.

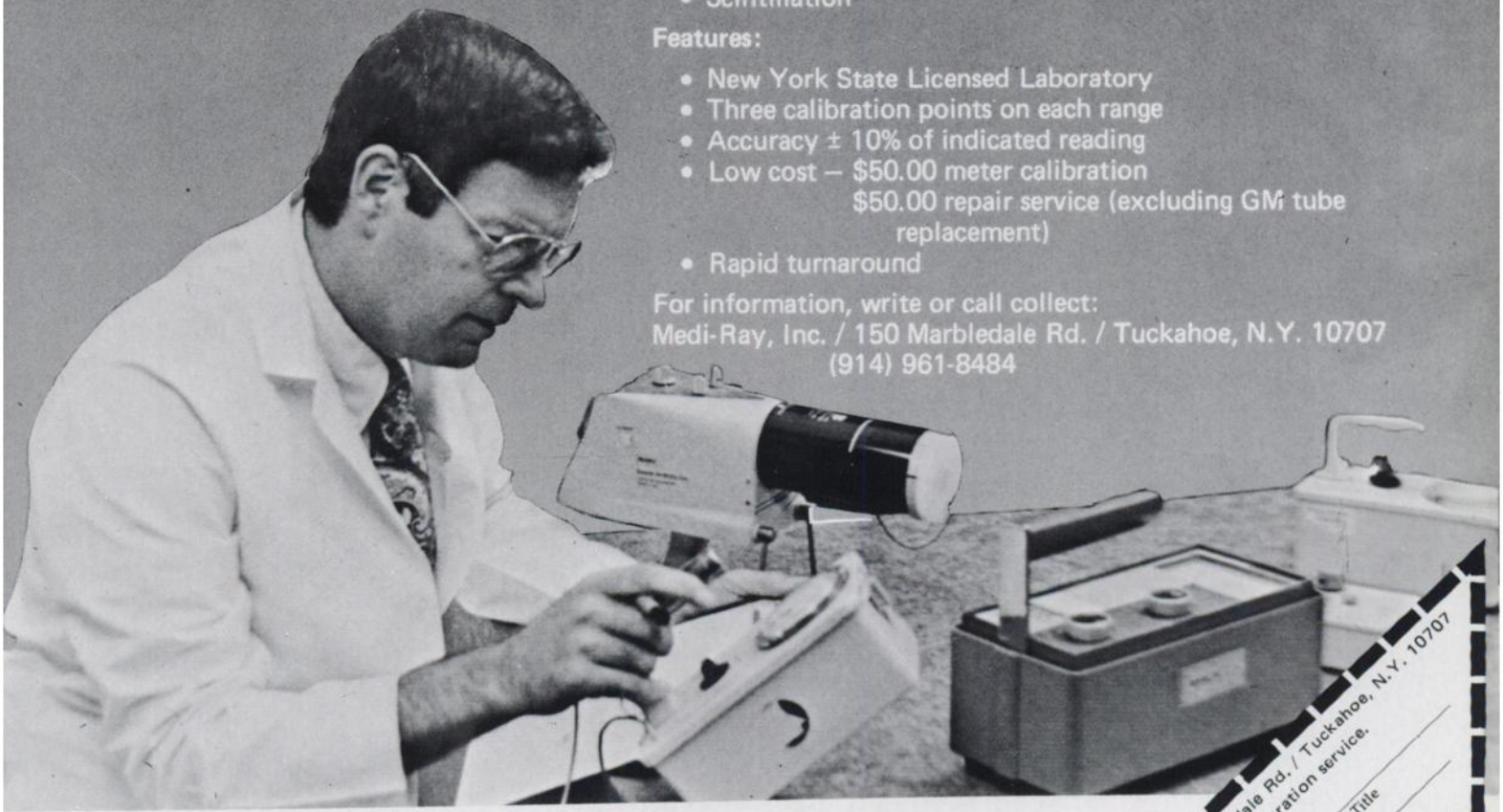
Types of Meters:

- Ionization Chamber
- Geiger – Mueller
- Scintillation

Features:

- New York State Licensed Laboratory
- Three calibration points on each range
- Accuracy ± 10% of indicated reading
- Low cost – $50.00 meter calibration
  $50.00 repair service (excluding GM tube replacement)
- Rapid turnaround

For information, write or call collect:
Medi-Ray, Inc. / 150 Marbledale Rd. / Tuckahoe, N.Y. 10707
(914) 961-8484



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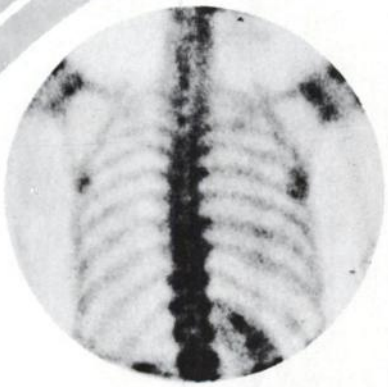
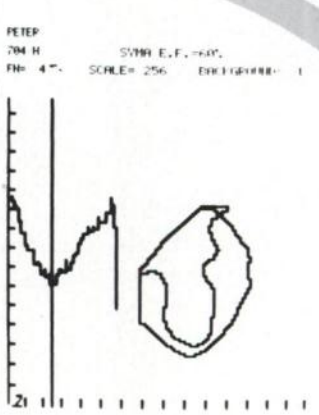
Medi-Ray, Inc. / 150 Marbledale Rd. / Tuckahoe, N.Y. 10707
Please send information on calibration service.

Name _____ Title _____
Hospital _____ Dept. _____
Address _____ City _____
State _____ Zip _____
Phone _____

LARGE FIELD OR MOBILE ?





BOTH!
with elscint's DYMAX-MBLF
the first large field mobile gamma camera

It was tough for nuclear medical specialists to choose between a stationary LF gamma camera with its wide viewing area and a mobile unit with its maneuverability.

Until today.

Elscint has now developed the first large field mobile gamma camera, DYMAX-MBLF, which combines the benefits of both systems. Large field of view and mobility.

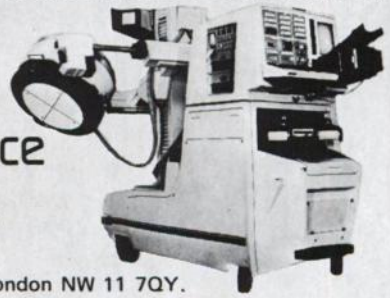
The DYMAX-MBLF has an effective detection area 250% larger than any mobile camera now available. It also has an on-board computerized clinical processor.. And all at a surprisingly low price!

The DYMAX-MBLF can be used for all routine work in your nuclear medicine lab and to perform patient bedside procedures requiring a large field of view in the ICCU or emergency room, such as:

- Lung studies in suspected pulmonary emboli cases
- Myocardial perfusion emission tomography studies
- Gated blood pool studies using 7-Pinhole or Biplane collimators

Check these outstanding peformance highlights:

- Field of view: 400 mm
- Intrinsic resolution (with Tc^{99m} at 20% window)
  Bar separation: 2.8 mm at 20Kc/s
  Bar separation: 4.0 mm at 110Kc/s
- Uniformity (with Tc^{99m} at 20% window)
  3% corrected
- Linearity: ± 1% of FOV diameter
- Maximum imaging count rate: 120Kc/s with 20% window



the elscint commitment to excellence

U.S.A.: ELSCINT INC. 138-160 Johnson Avenue, Hackensack, New Jersey 07602, Tel.: 201-487-5885; Telex: 135382

Elscint International Sales Division, Annandale, North End Road, Golders Green, London NW 11 7QY. Tel.: (01)-458-7323.

TO MONITOR
The Chemotherapy Of The Cancer Patient

Diagnostic Biochemistry Inc.

Presents

Doxorubicin [^{125}I] (Adriamycin)* Radioimmunoassay Kit

For Investigational Use Only.

High circulating levels of Adriamycin* may result in irreversible myocardial damage, bone marrow depression, and gastrointestinal trauma.[1,2,3] Knowledge of circulating Adriamycin* concentrations therefore, is important.

Our ^{125}I Doxorubicin (Adriamycin) Radioimmunoassay Kit features a rapid, simple procedure with 100 picogram sensitivity in serum, plasma or urine. Six precalibrated standards as well as a control serum are supplied. The stable ^{125}I tracer and one hour incubation time makes this kit a unique tool in cancer management.

1. Bonadonna, G. et al: Phase I and preliminary Phase II evaluation of adriamycin (NSC 123127), Cancer Res. *30*, 2572, 1970
2. Middleman, E. et al: Clinical trials with adriamycin. Cancer, *28*, 844, 1971
3. Wang, J. et al: Therapeutic effect and toxicity of adriamycin in patients with neoplastic diseases. Cancer, *28*, 837, 1971

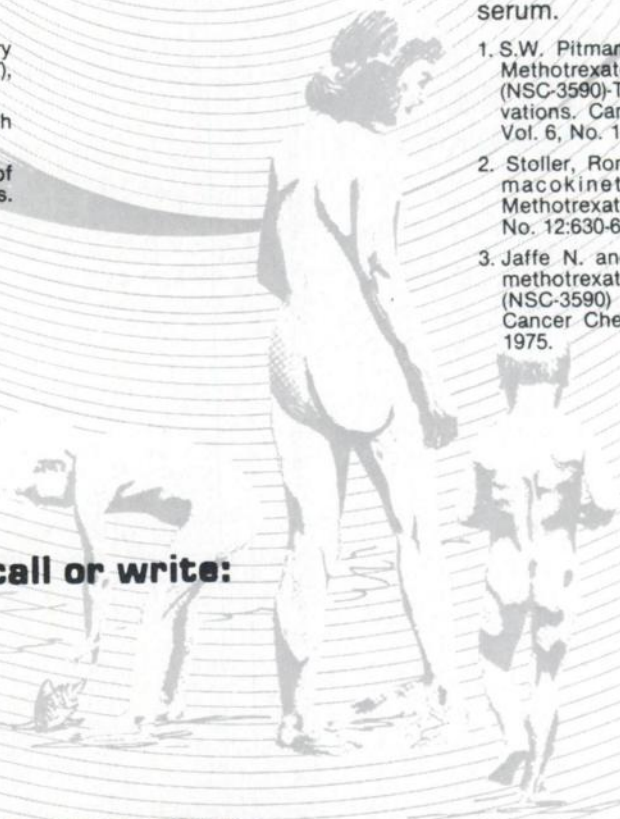
*Tradename Adria Labs.

Methotrexate [^{125}I] Radioimmunoassay Kit

High dose Methotrexate therapy in combination with leucovorin "rescue" treatment creates a vital need for close monitoring of circulating Methotrexate plasma levels. Methotrexate overdose has been shown to be associated with severe myelosuppression, renal damage[1,2] and hepatotoxicity.[3]

Our ^{125}I Methotrexate Radioimmunoassay Kit provides a rapid simple method, with sensitivity of 10 picograms in serum, plasma, cerebrospinal fluid or urine. Results can be reported in less than 1½ hours. Precalibrated human serum standards and control serum are provided as well as a stable ^{125}I tracer and antiserum.

1. S.W. Pitman et al: Clinical Trial of High-Dose Methotrexate (NSC-740). With Citrovorum Factor (NSC-3590)-Toxicologic and Therapeutic Observations. Cancer Chemotherapy Reports Part 3 Vol. 6, No. 1, July 1975.
2. Stoller, Ronald G. et al: Use of Plasma Pharmacokinetics to Predict and Prevent Methotrexate Toxicity. N.E. Jr. of Med. Vol. 297 No. 12:630-634, Sept. 22, 1977.
3. Jaffe N. and Traggis D. Toxicity of high-dose methotrexate (NSC- 740) and citrovorum factor (NSC-3590) rescue in osteogenic sarcoma. Cancer Chemother. Rep. Part 3, Vol.6(1):31-36, 1975.



For further information call or write:

Diagnostic Biochemistry Inc.

(714) 452-0950

10457-H ROSELLE STREET • SAN DIEGO, CA 92121

DIAGNOSTIC ISOTOPES
MDP KIT
TECHNETIUM Tc 99m MEDRONATE KIT

INDICATIONS AND USAGE
Technetium Tc 99m Medronate may be used as a bone imaging agent to delineate areas of altered osteogenesis.

CONTRAINDICATIONS
None known.

WARNINGS
This class of compound is known to complex cations such as calcium. Particular caution should be used with patients who have, or who may be predisposed to, hypocalcemia (i.e., alkalosis).

This radiopharmaceutical drug product should not be administered to children, to pregnant women, or to nursing mothers, unless the expected benefit to be gained outweighs the potential risk.

Ideally, examinations using radiopharmaceuticals, especially those elective in nature, of a woman of childbearing capability should be performed during the first few (approximately 10) days following the onset of menses.

PRECAUTIONS

General

Technetium Tc 99m Medronate as well as other radioactive drugs, must be handled with care and appropriate safety measures should be used to minimize radiation exposure to clinical personnel. Also, care should be taken to minimize radiation exposure to the patients consistent with proper patient management.

To minimze radiation dose to the bladder, the patient should be encouraged to void when the examination is completed and as often thereafter as possible for the next 4-6 hours.

This preparation contains no bacteriostatic preservative.

Technetium Tc 99m Medronate should be formulated within six (6) hours prior to clinical use.

Pregnancy Category C

Adequate reproductive studies have not been performed in animals to determine whether this drug affects fertility in males or females, has teratogenic potential, or has other adverse effects on the fetus. Technetium Tc 99m Medronate should be used in pregnant women only when clearly needed.

Nursing Mothers

It is not known whether this drug is excreted in human milk. As a general rule nursing should not be undertaken while a patient is on the drug since many drugs are excreted in human milk.

Pedriatic Use

Safety and effectiveness in children have not been established.

ADVERSE REACTIONS
No adverse reactions specifically attributable to the use of Technetium Tc 99m Medronate have been reported.

DOSAGE AND ADMINISTRATION
The suggested dose range for i.v. administration, after reconstitution with oxidant-free sodium pertechnetate Tc 99m Injection, to be employed in the average patient (70 kg) is:

Bone imaging: 10-20 mCi Technetium Tc 99m Medronate

Scanning post-injection is optimal at about 1-4 hours.

Slow administration of the drug over a period of 30 seconds is recommended.

The patient dose should be measured by a suitable radioactivity calibration system immediately prior to administration.

Radiopharmaceuticals should be used only by physicians who are qualified by training and experience in the safe use and handling of radionuclides and whose experience and training have been approved by the appropriate government agency authorized to license the use of radionuclides.

HOW SUPPLIED
Diagnostic Isotopes' Technetium Tc 99m Medronate Kit is supplied as a sterile, pyrogen-free kit containing 10 vials.

Each 10 ml vial contains 10 mg medronic acid, 0.17 mg (minimum) stannous chloride (maximum stannous stannic chloride 0.29 mg), and 2 mg ascorbic acid. THe pH has been adjusted to 4-8 with either HCl or NaOH prior to lyophilization. Following lyophilization, the vials are sealed under a nitrogen atmosphere.

Dicopac®

Oral Cyanocobalamin Co 58, Oral Cyanocobalamin Co 57 Bound to Human Gastric Juice, Cyanocobalamin I.M. Injection

INDICATIONS

Dicopac Kit consisting of cyanocobalamin Co 58 and cyanocobalamin Co 57 combined with human intrinsic factor is used to assess vitamin B_{12} absorption in the diagnosis of malabsorption due to the lack of intrinsic factor, e.g. Addisonian (pernicious) anemia, and as a diagnostic adjunct in other defects of intestinal absorption.

CONTRAINDICATIONS - None.

WARNINGS

This radiopharmaceutical should not be administered to patients who are pregnant or during lactation unless the information to be gained outweighs the potential hazards.

Ideally, examinations using radiopharmaceuticals, especially those elective in nature, on a woman of childbearing capability should be performed during the first few (approximately 10) days following onset of menses.

Radiopharmaceuticals should be used only by physicians who are qualified by specific training in the safe use and handling of radionuclides produced by nuclear reactor or particle accelerator and whose experience and training have been approved by the appropriate government agency authorized to license the use of radionuclides.

PRECAUTIONS

As in the use of any other radioactive material, care should be taken to insure minimum radiation exposure to the patient, consistent with proper patient management, and to insure minimum radiation exposure to occupational workers.

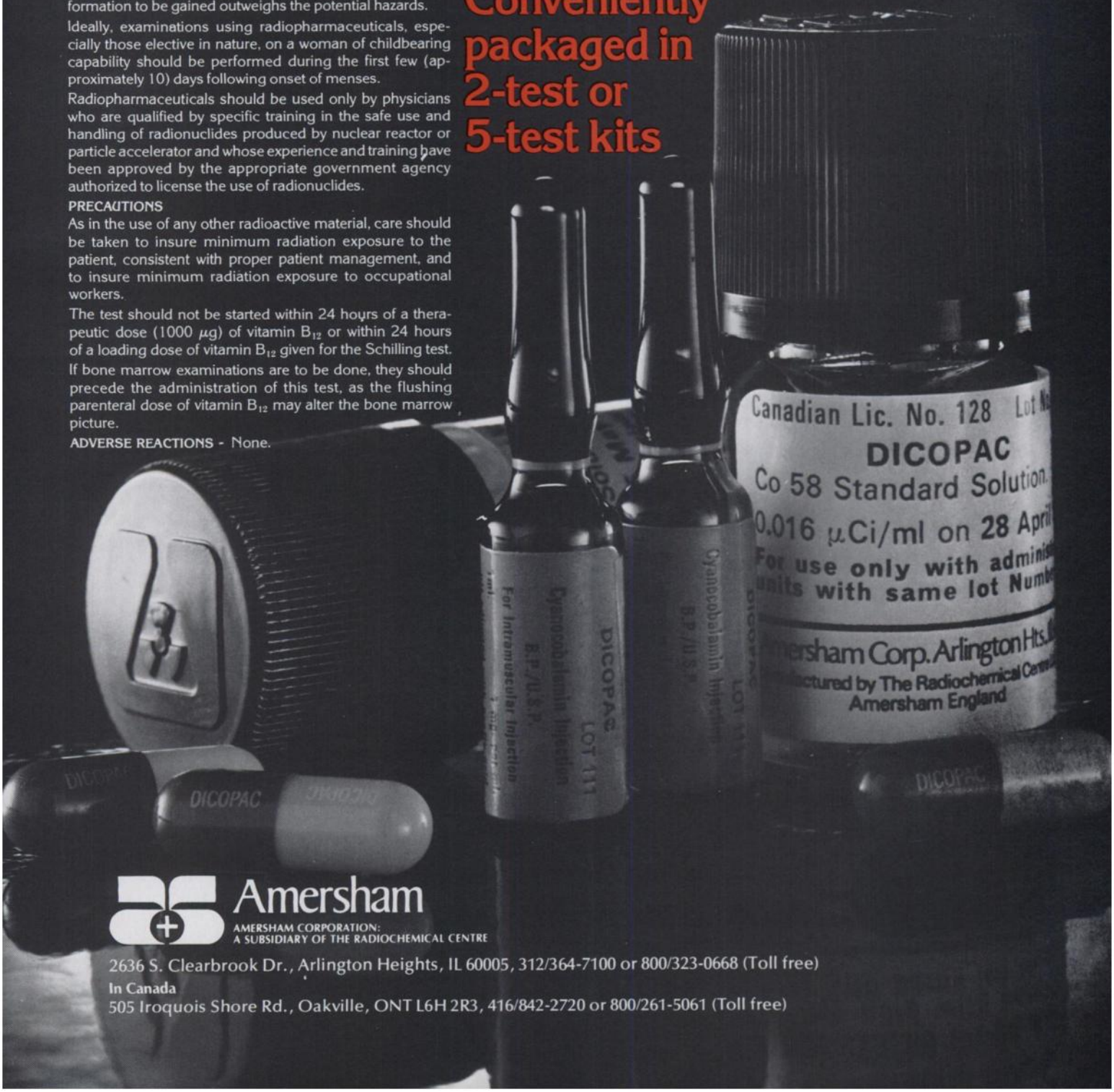
The test should not be started within 24 hours of a therapeutic dose (1000 μg) of vitamin B_{12} or within 24 hours of a loading dose of vitamin B_{12} given for the Schilling test.

If bone marrow examinations are to be done, they should precede the administration of this test, as the flushing parenteral dose of vitamin B_{12} may alter the bone marrow picture.

ADVERSE REACTIONS - None.

One day test for Vitamin B_{12} malabsorption

Conveniently packaged in 2-test or 5-test kits



Amersham

AMERSHAM CORPORATION:
A SUBSIDIARY OF THE RADIOCHEMICAL CENTRE

2636 S. Clearbrook Dr., Arlington Heights, IL 60005, 312/364-7100 or 800/323-0668 (Toll free)

In Canada

505 Iroquois Shore Rd., Oakville, ONT L6H 2R3, 416/842-2720 or 800/261-5061 (Toll free)

Do something else with your lab's boiling water.

The No-Boil Folate

New GammaDab® [^{125}I] Folate Radioassay Kit

- ☐ Room temperature denaturation eliminates boiling
- ☐ New technology combines binder and separator into one reagent
- ☐ No charcoal
- ☐ Single tube assay—less than 30 minutes technician time
- ☐ Human serum N^5-MTHFA standards
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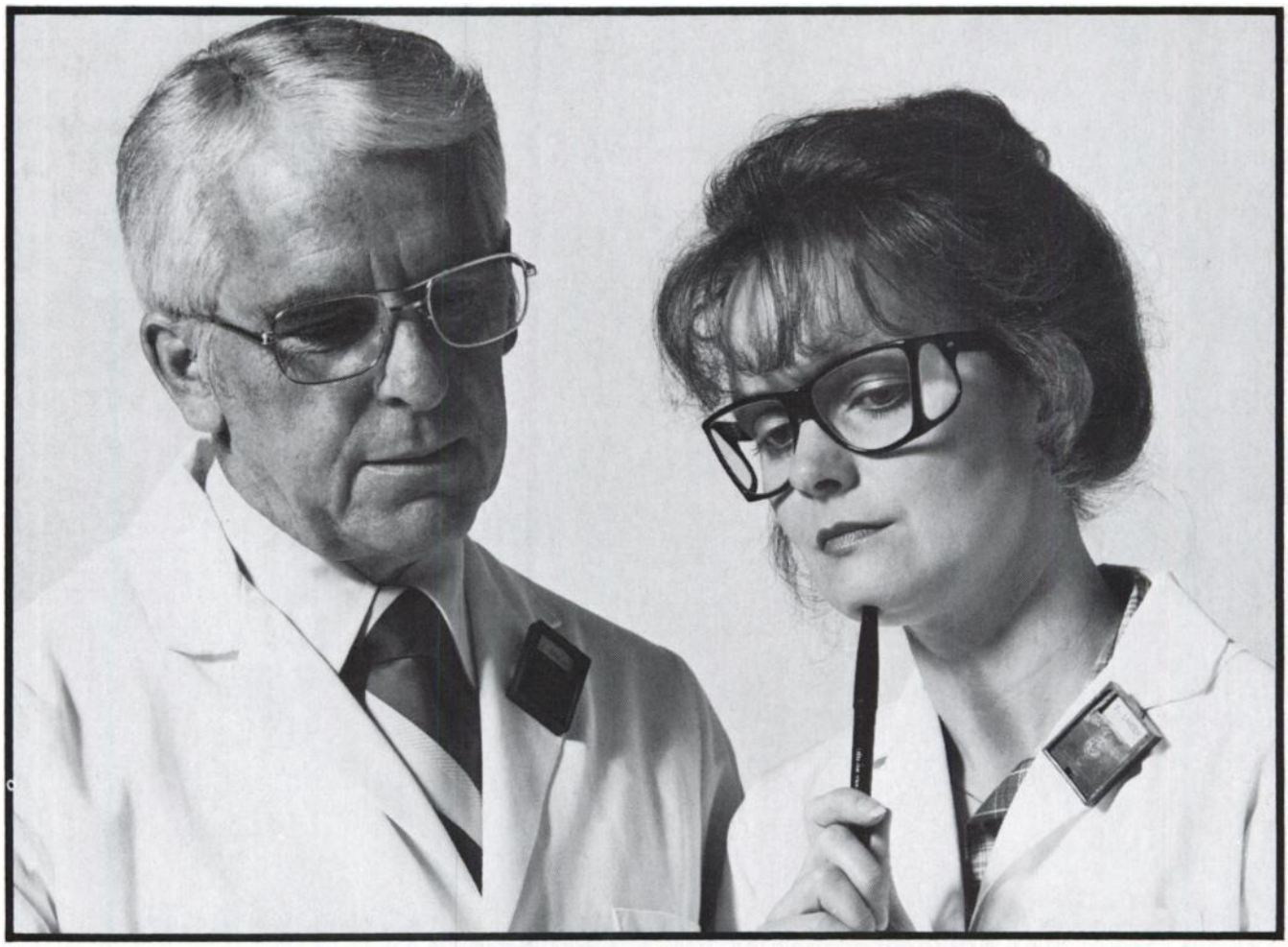
For other worldwide locations, please contact your local Clinical Assays/Travenol representative or the International Sales Department, Clinical Assays, Cambridge, MA 02139 U.S.A.

Complete directions are provided with each product. These directions should be read and understood before use. Particular attention should be paid to all warnings and precautions. Additional performance data are available. Should you have any questions, contact your Clinical Assays/Travenol representative

Patent pending

Keep your eyes safe from radiation... comfortably and confidently.

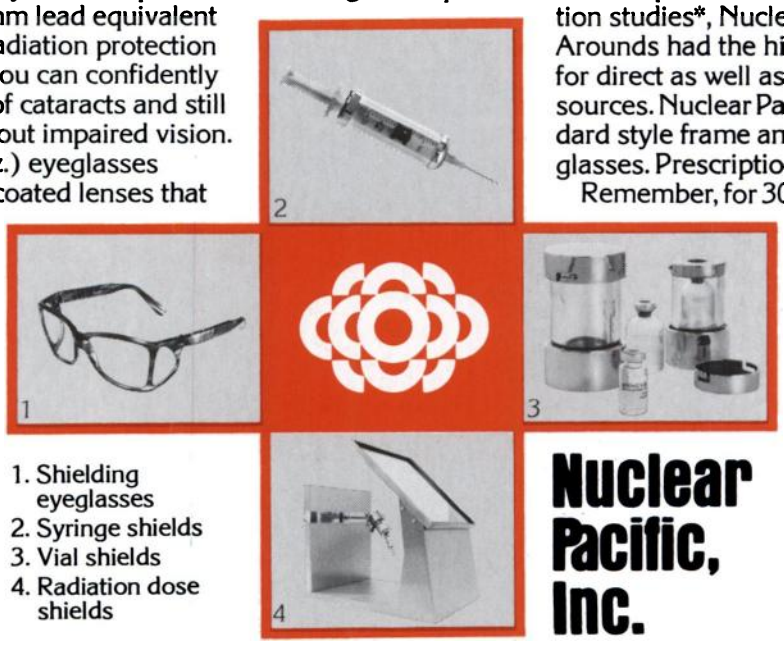


Nuclear Pacific's optically clear Wrap Around shielding glasses provide 0.60 mm lead equivalent protection—as much radiation protection as a lead apron. Now you can confidently reduce the possibility of cataracts and still work comfortably without impaired vision. The lightweight (2.8 oz.) eyeglasses feature anti-reflection coated lenses that provide light transmission higher than standard optical glass.

Quality constructed for long life, every lens is tested to assure strict conformance to FDA impact resistance requirements. In recent Dose Reduction studies*, Nuclear Pacific's Wrap Arounds had the highest dose reduction for direct as well as peripheral radiation sources. Nuclear Pacific also offers a standard style frame and clip-ons for regular glasses. Prescription lenses are available.

Remember, for 30 years Nuclear Pacific has set the standard for visibility and protection in the radiation shielding industry.

Standard style and clip-ons: $155. Wrap Around: $197.



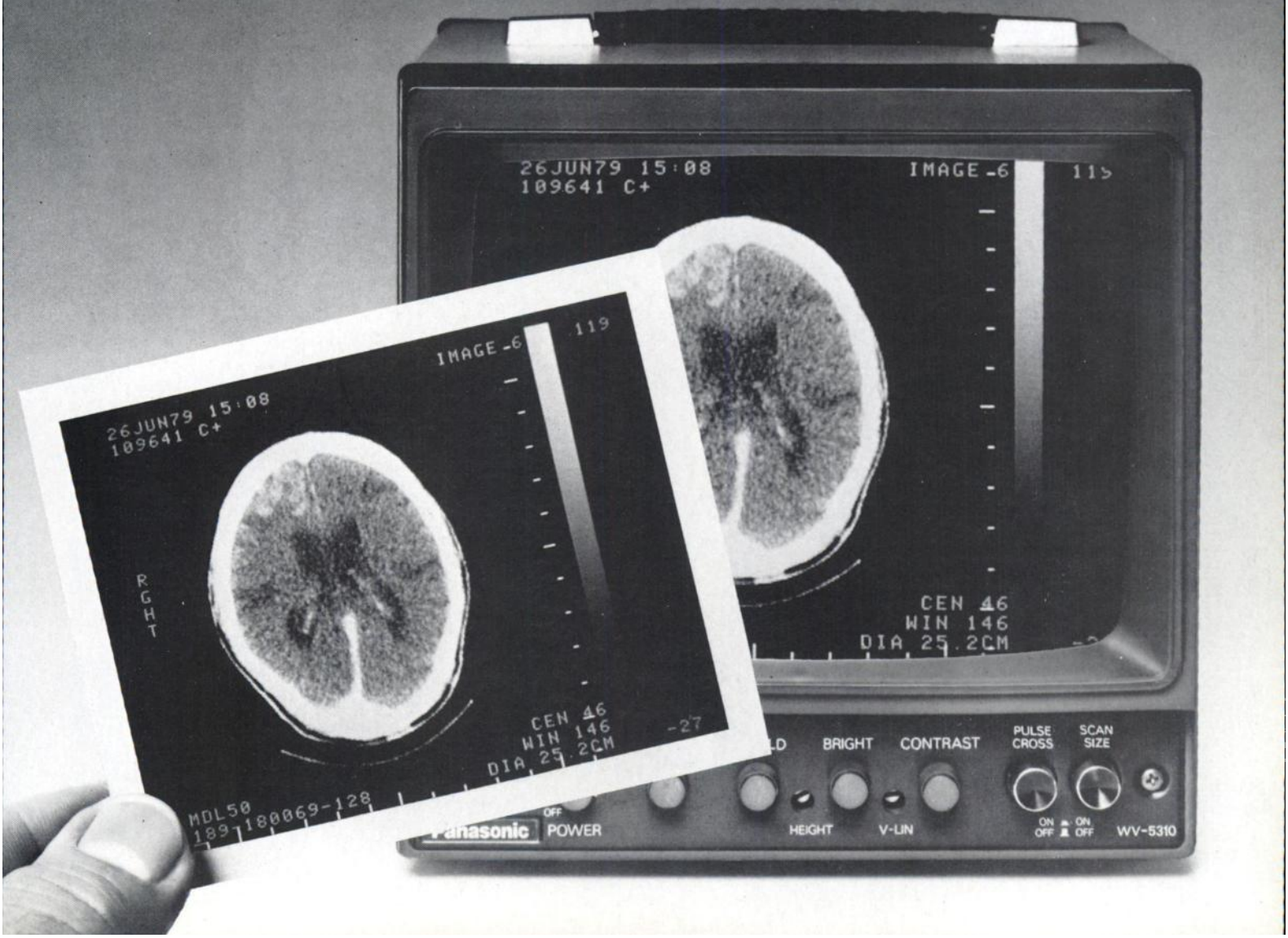
1. Shielding eyeglasses
2. Syringe shields
3. Vial shields
4. Radiation dose shields

*Study available upon request.

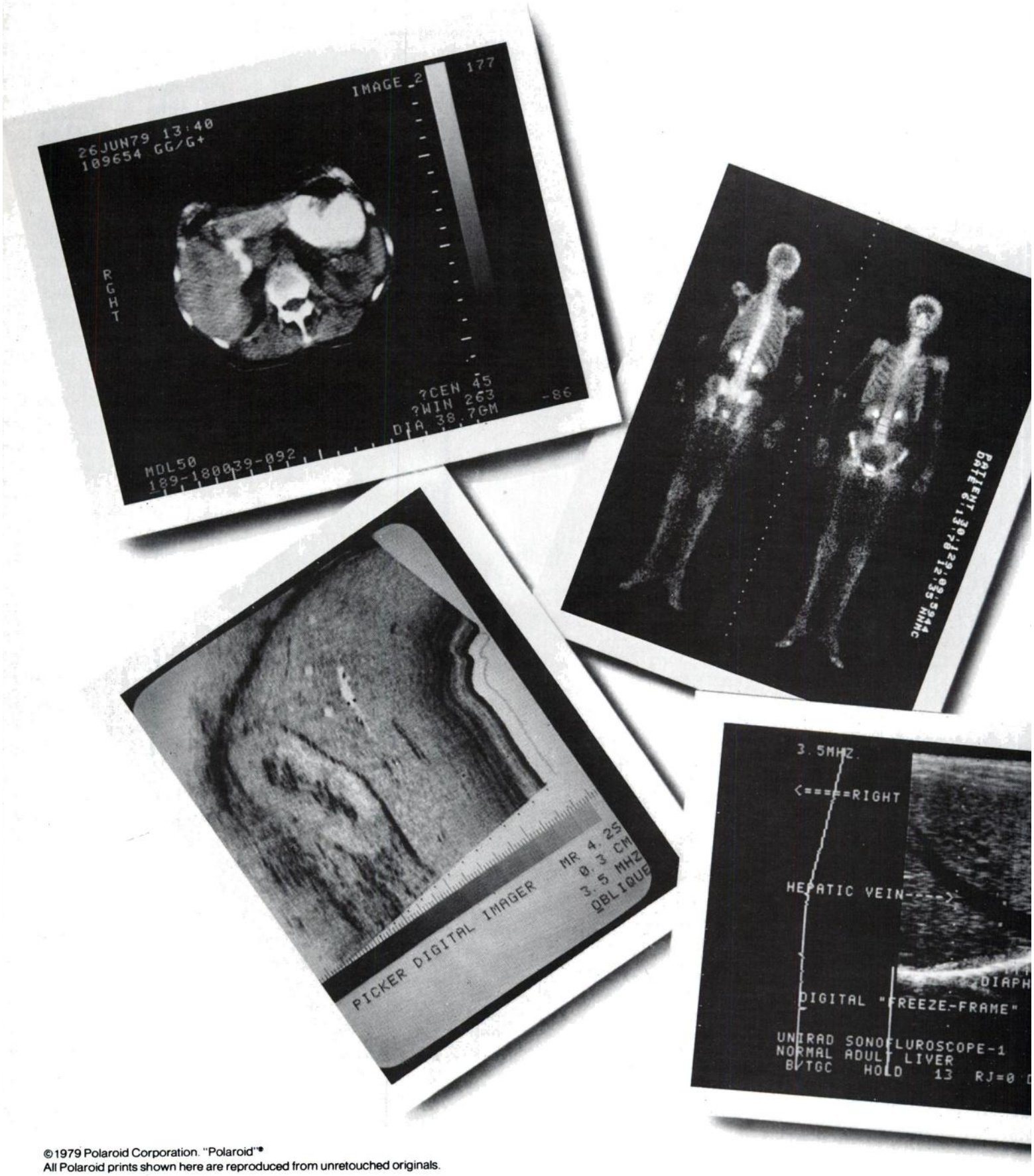
Nuclear Pacific, Inc.

6701 Sixth Ave. S., Seattle, WA 98108
(206) 763-2170

Polaroid introduces the first instant recording film to record exactly what you see on your video monitor.



Polaroid's new Type 611 Vi



deo Image Recording film.

Designed specifically for medical diagnostic video recording—with extended dynamic range and exposure latitude.

Now, for the first time, you can get positive prints of the "best visual image" on your video monitor. Instantly. And on-the-spot.

Without loss of detail or information. And without continual adjustments to your equipment.

With Polaroid's new Type 611 Video Image Recording film.

This new, low contrast, medium-speed film has been designed specifically for video recording. It has nearly twice the dynamic range of other Polaroid films.

Which means a wider exposure latitude (for improved recording of the brightness scale and ease of use) and a greatly expanded gray scale (for increased information).

As a result, Type 611 can give you information from video displays fully equivalent to that of the best transparency films. But without the expense, delay or inconvenience of darkrooms and wet-film processors. Because all its operations—from loading to developing—take place in the light. And the prints don't need coating after development.

Type 611, which has a 3¼x4¼ inch format, can be used in the same camera backs and with the same imaging equipment that accept other Polaroid self-developing pack films.

What's more, Type 611 prints can be left to develop up to 3 minutes without any noticeable change in image quality.

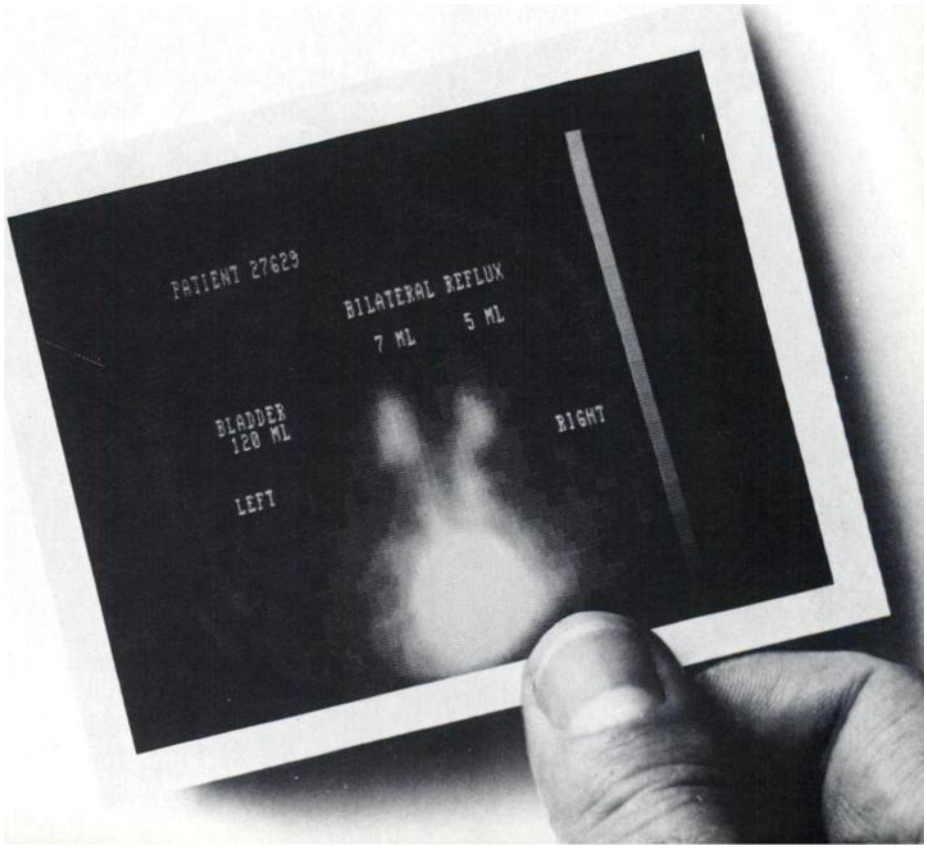
So, if you're making a whole series of pictures over a short period of time, you don't have to worry about accurate development timing.

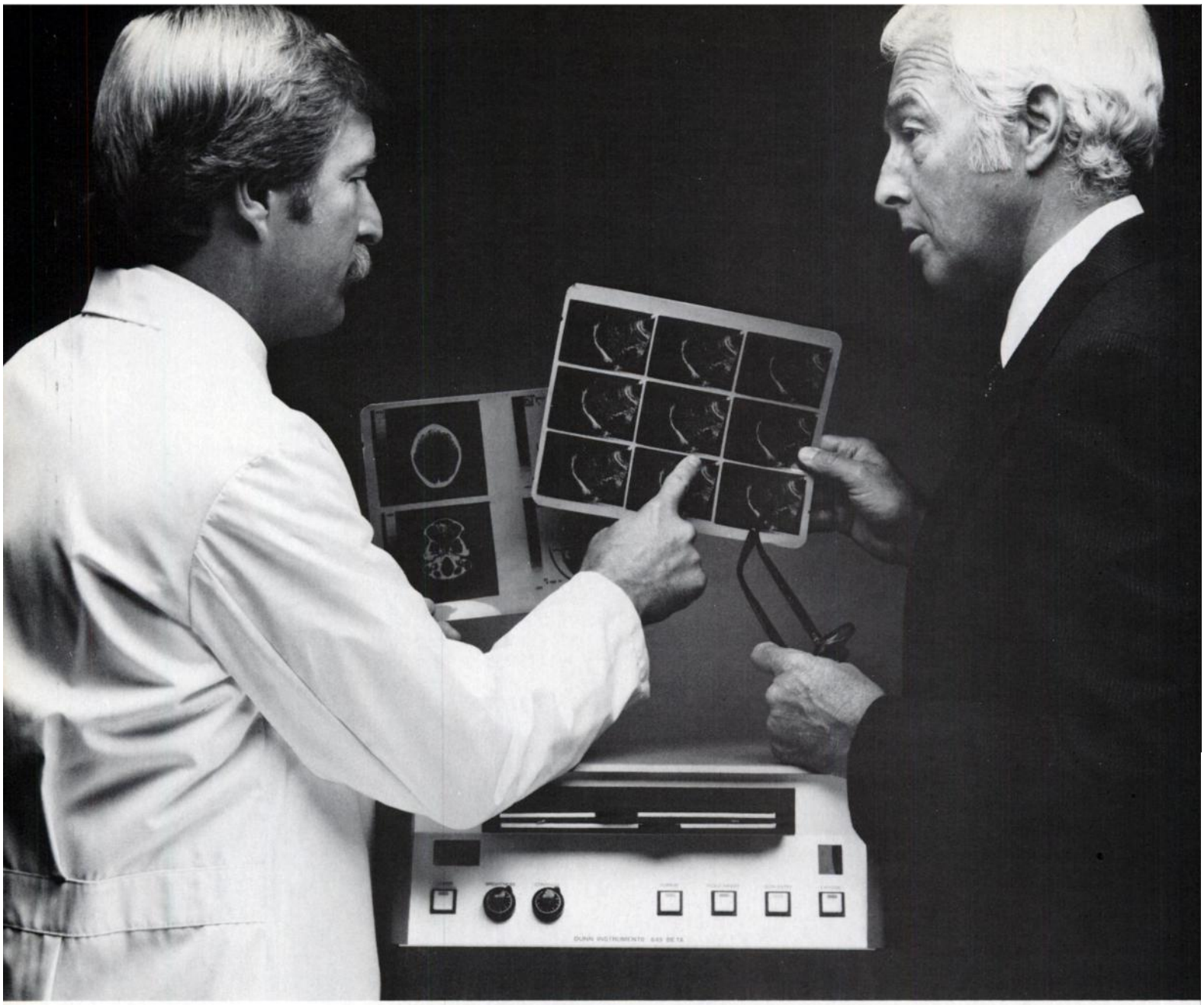
Polaroid's new Type 611 Video Image Recording film. For positive prints of exactly what you see on your video monitor. In just 45 seconds.

For a sample two-pack (16 exposures) or application information, write: Polaroid Corporation, Dept. A413, 575 Technology Square, Cambridge, MA 02139. Or, call toll-free from anywhere in the continental U.S.: 800-225-1618 (in Massachusetts, call collect: 617-547-5177).

Polaroid

Instant Diagnostic Films





New Faithful

The multi-format 649 camera joins the Beta Series.

Faithful rendition of the medical image. And faithful operation at the touch of a button. Dunn's Model 649 has been around long enough to prove its worth. But now it's new again. Why? Because it has been thoroughly re-designed and re-engineered to take its place in the Beta Series. Now the finest series of fixed-format multi-image cameras also offers the advantages of multiple formats where they're needed.

Beta design means effortless and error-proof operation, thanks to programmable microprocessor electronics. It means a service record to envy. And most important, the superb optical and video components mean perfect pictures every time, in any format.

Whatever your imaging needs, in CT, ultrasound or fluoroscopy, you will want to check out the Beta Series, including the new 649. Find out why the inventors of the multi-image camera still make the best. Call or write for full information and sample films. Dunn Instruments, Inc., 544 Second Street, P.O. Box 77172, San Francisco, CA 94107. Tel. 415/957-1600.

DUNN INSTRUMENTS

The precision image

THE RIGHT PATIENT, THE RIGHT ACTIVITY, THE RIGHT DOSE. THAT'S THE TICKET.

Wherever your mobile camera goes — ICU, CCU, Cath Lab, Surgery, Orthopedics — throughout the hospital — our CRC®-30's data ticket goes right along.

The CRC-30 Radioisotope Calibrator/Computer/Printer/Radiochemical Purity Analyzer System provides for patient ID, dose information, activity data, and more. All to keep you in compliance with Federal Regulations.

Best of all, the CRC-30 prints these tickets in triplicate, one for Nuclear Medicine, one accompanies the dose and one for accountability.

If you're on the move with mobile imaging, get the ticket (and calibrator system) that lets you go first class.

The CRC-30 from Capintec.

Capintec Inc., 136 Summit Ave., Montvale, New Jersey 07645. Call toll free 800-631-2557. In New Jersey Tel.: 201-391-3930.

CAPINTEC

YOUR CRC-30 TICKET... DON'T LEAVE NUCLEAR MEDICINE WITHOUT IT.

RADIONUCLIDE DOSE COMPUTATION AND MEASUREMENT RECORD ©

PATIENT'S NAME: John Doe

I.D.: 049-267-8412

STUDIES: MI

NUCLIDE: THALLIUM-201

FORM: Thallous Chloride SAMPLE NO. 12

LOT NO. T029496 KIT NO.

DATE: 4 APRIL 79 14:10

CONCENTRATION: 970 uCi/ml

DOSE DESIRED: 1.5 mCi

VOLUME REQUIRED: 1.54 ml

ACTIVITY MEAS'D: 1.49 mCi

TIME OF ADMINISTRATION: 2:30 AM (PM)

SIGNATURE(S): Jane Smith

CAPINTEC, INC.

136 SUMMIT AVENUE • MONTVALE, NEW JERSEY 07645
(201) 391-3930

memo

Joe-

When measuring radiopharmaceuticals, the CRC-17 will do the work for you accurately, quickly, easily - and economically.

Dave

- Connector provided to interface the calibrator to CRC-U Computer/Printer system
- Push-button operation . . . instant digital readout of total activity of eight most frequently used radionuclides
- Manual radioisotope selection for over 200 radionuclides
- Deep ionization chamber well allows convenient measurements of virtually any radioisotope in clinical use and accommodates sample sizes up to 200 ml vial
- Ion collection potential supply easily displayed by pushing TEST button
- High sensitivity (0.1 μCi resolution)
- Moly-assay capability
- Pressurized argon detector

SQUIBB CRC® -17 Radioisotope Dose Calibrator

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☐ Send CRC-17 information.
☐ Have representative call.

NAME

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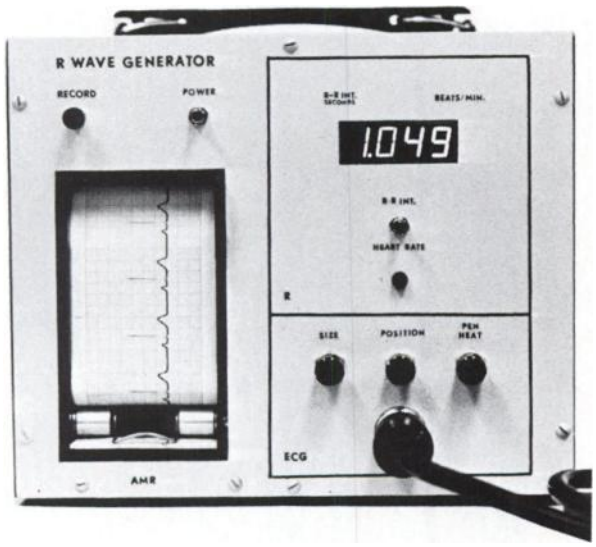
R WAVE GENERATOR

FOR

NUCLEAR CARDIOLOGY



BEHIND EVERY SQUARE WAVE THERE IS AN R WAVE

If all you need is a square wave to trigger the computer every time an R wave occurs then talk to us before you make a decision. We can provide you with a reliable system and save you money. Why buy unnecessary features that cost you extra? Our R wave generator provides only the features that you need.

INSTRUMENT HIGHLIGHTS

- Compact and inexpensive unit which records ECG on strip chart for permanent record.
- Four digit LED display to indicate R-R interval in seconds or heart rate in beats per minute. The R-R interval display is used to decide the gate tolerance. The heart rate display is helpful during stress testing.
- Produces sharp square wave output for R wave which can be used as a trigger for nuclear cardiology applications.

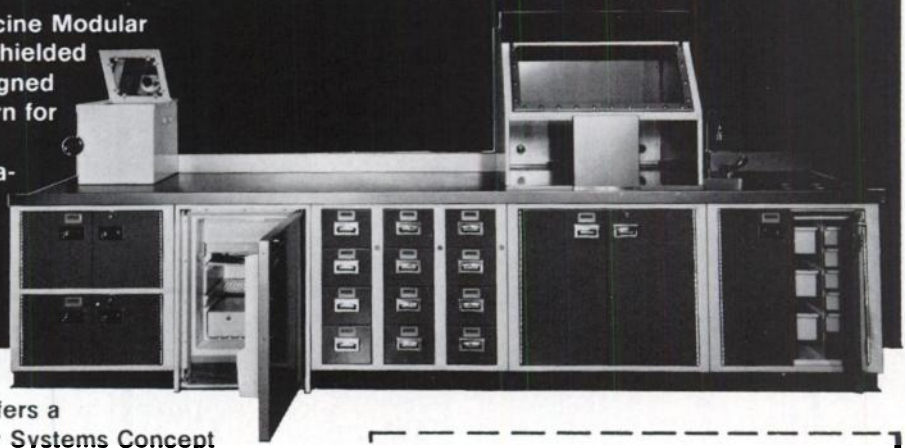
Delivery is 90 Days or less depending upon stock.

For price information call: (203) 877-1610 or write to:

Customer Service, AMR CORP., P. O. Box 3094 PPS, Milford, Conn. 06460

Nuclear Medicine Modular Systems

Kewaunee Nuclear Medicine Modular Systems consist of lead shielded modules specifically designed with a "Work-Flow" pattern for Receiving, Holding and Storage, Reagent Preparation, Inventory and Dispensing of Radiopharmaceuticals and Decay Storage.



The Kewaunee design offers a complete Radiopharmacy Systems Concept **for Nuclear Medicine Departments. Lead shielding within the system provides for personnel safety from radiation. Maximum efficiency is obtained through the "Work-Flow" pattern concept.**

kewaunee

KEWAUNEE SCIENTIFIC EQUIPMENT CORP.
Special Products Division
Lockhart, Texas 78644
Phone: 512/398-5294

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☐ Please have representative call

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Organization _____

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PLACEMENT

POSITIONS OPEN

NUCLEAR MEDICINE PHYSICIAN. THE Division of Nuclear Medicine at the Hospital of the Univ. of Pennsylvania has an opening at the Asst. Prof. level. Strong background in both clinical and research nuclear medicine desirable. Well equipped Division with modern imaging instruments, computers and a cardiovascular Nuclear Medicine facility in ICU area. PETT scanner will be installed shortly. Excellent research opportunities. Contact Abass Alavi, MD, Chief, Division of Nuclear Medicine, Hospital of the University of Pennsylvania, 3400 Spruce Street, Philadelphia, PA 19104.

UNIVERSITY OF MIAMI SCHOOL OF Medicine. Full-time Academic position involving all aspects of Nuclear Imaging, Radioassay, Echocardiography and Doppler Ultrasound. Experience in Cardiovascular procedures preferred but not essential. Contact Aldo N. Serafini, MD, Director of Nuclear Medicine, University of Miami School of Medicine, P.O. Box 016960, Miami, Florida 33101.

NUCLEAR CARDIOLOGY TECHNOLOgist, applications are now being accepted for this position in our new Nuclear Cardiology Unit. Training and experience in computer applications preferred but registry eligible applicants may apply. Attractive salary and fringe benefits offered. Contact Personnel Director, Quain & Ramstad Clinic, Box 1818, Bismarck, North Dakota 58501. (701) 222-5412. An Equal Opportunity Employer.

NUCLEAR MEDICINE RESIDENCY Available. July, 1980. Two year accredited affiliated program including 700 bed VA General Hospital, 500 bed County Hospital and 1,000 bed Air Force Medical Center; and equal opportunity employer. Comprehensive training in basic sciences, laboratory sciences, computer technology, patient care services, and research. Contact: Martin L. Nusynowitz, MD, Division of Nuclear Medicine, University of Texas Health Science Center, San Antonio, Texas, 78284 (512) 691-7265.

NUCLEAR MEDICINE TECHNOLOGIST. Exceptional opportunity for registered or eligible nuclear medicine med tach to work in imaging. We are a full service department within a 500 bed general acute care hospital. Salary commensurate with experience. Excellent fringe benefits. Qualified applicants submit resume to: Mercy Hospital Center, Personnel Dept., 6th and University, Des Moines, Iowa 50314.

NUCLEAR MEDICINE TECHNOLIGISTS Chief Imaging Division as well as Staff technologist. 490 active beds community hospital affiliated with CMDNJ (Rutgers Medical School). Performing entire array of imaging procedures including Nuclear Cardiology procedures. Salary negotiable. Submit resume: Dr. L. Zeiger, Chief Nuclear Medicine, Cooper Medical Center, 1 Cooper Plaza, Camden, NJ 08103 (609) 432-2370.

NUCLEAR MEDICINE TECHNOLOGIST Registered staff position available for Nuclear Medicine Technologist in 320 bed Hospital in Roanoke Valley, Va. Good geographic location. Excellent salary and benefits. Contact Personnel Dept., Lewis-Gale Hospital, Inc., 703-989-4261, ext. 138. EOE

RADIOLOGIST, BOARD CERTIFIED IN Nuclear Medicine, to join large multi-specialty pre-paid medical group. Opportunity to expand department and plan department for new hospital in 1982. Salary negotiable. Liberal Fringe Benefits. Contact: Hawaii Permanente Medical Group, Inc., 1697 Ala Moana Boulevard, Honolulu, Hawaii 98615. An Equal Opportunity Employer.

NUCLEAR MEDICINE PHYSICIAN. THE Department of Nuclear Medicine at the University of Tennessee Center for the Health Sciences has opening at Instructor or Assistant Professor level, depending upon qualifications. The department serves City of Memphis Hospital, LeBonheur Children's Hospital, and University of Tennessee Hospital. Proven ability in teaching and research and knowledge and practical experience in all major categories of Clinical Nuclear Medicine are necessary. ABNM certification or eligibility required. Send C.V. and references to Martha McDonald, MD, Acting Chairman; Department of Nuclear Medicine; Univeristy of Tennessee; 865 Jefferson, Room 150C, Chandler Building; Memphis, Tennessee 38163. The Univeristy of Tennessee is an Equal Opportunity/Affirmative Action employer.

MONTEFIORE HOSPITAL, UNIVERSIty of Pittsburgh School of Medicine is seeking a full-time faculty member to direct the Nuclear Medicine Unit of the Department of Medicine. Applicants should have experience in advanced nuclear medicine and ultrasound techniques and be prepared to develop a program involving teaching, patient care and clinical research. Replies and curriculum vitae should be sent to: Philip Troen, M.D., Physician-in-Chief, Montefiore Hospital, Professor and Vice-Chairman, Department of Medicine, University of Pittsburgh School of Medicine, 3459 Fifth Avenue, Pittsburgh, PA. 15213. University of Pittsburgh is an equal opportunity/affirmative action employer.

NUCLEAR MEDICINE (2 YR)/NUCLEAR Radiology (1 yr) residencies in combined University Hospital-VA Hospital program. Training available in nuclear imaging and nuclear in vitro procedures. Opportunities for clinical and laboratory research. W.N. Tauxe, Director, Division of Nuclear Medicine, University of Alabama Hospitals, Birmingham, Alabama 35233.

NUCLEAR MEDICINE TECHNOLOGIST Florida Medical Center a 400-bed acute care facility has positions available in its progressive nuclear medicine department. Equipment includes SEARLE, LFOU, LEM, PHOCON, PG-4 CAMERA and a TRANS AXIL SCANNER. Cardiac and computer experience recommended but not essential. Excellent salary and benefits. Inquire to Director of Personnel, Florida Medical Center Hospital, 5000 West Oakland Park Boulevard, Fort Lauderdale, Florida 33313, (305) 735-6000.

NUCLEAR MEDICINE TECHNOLOGIST Immediate opening. Nuclear Medicine Technologist registered or registry eligible, to perform a wide range of Nuclear Medicine procedures, imaging, etc...with particular emphasis on Nuclear Cardiology and the ability to do wide range of RIA and related procedures. All equipment has on line computers or Micro computers. 413 bed community hospital. Department geared to continuing education philosophy. Opportunity to attend seminars, conferences, etc. Excellent starting salary and employee fringe benefit program. Please submit resume or for more information contact: Paul K. Schlesinger, Director of Personnel Department, South Chicago Community Hospital, 2320 East 93rd Street, Chicago, Illinois 60617. Telephone: (312) 978-2000, Ext. 5160.

CHIEF-NUCLEAR MEDICINE SECTION: Physician, Board Certified in Nuclear Medicine (or eligible), wanted to head established Division in major affiliated teaching hospital. Three cameras, computer, stress testing equipment. 4,000 scans per year of which 500 are nuclear cardiology procedures. Immediate opening for progressive person. Contact: Director, Department of Radiology, Shadyside Hospital, Pittsburgh, PA 15232 (412) 622-2083.

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NUCLEAR MEDICINE RESIDENCY, beginning July 1980, an approved two-year program at VA Medical Center integrated with University of California, San Francisco. Training in all aspects of Nuclear Medicine, including basic science, clinical imaging, nuclear cardiology, thyroidology, radioimmunoassay, rotation in CT, ultrasound, and research opportunities. For details contact: Ralph R. Cavalieri, M.D., Chief, Nuclear Medicine Service, VA Medical Center, 4150 Clement Street, San Francisco, California 94121, Telephone: (415) 221-4810, ext. 461. Foreign medical graduates must have passed V.Q.E. or be licensed in U.S. An equal opportunity employer.

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NUCLEAR MEDICINE TECHNOLOGIST. Full time position with a Mobil Nuclear Medicine Service available now. Registry required. Prefer 1 year experience as R.T. Excellent salary plus commission, and fringe benefits. Send resume and salary requirements to R.I.A., Inc. 2500 21st Avenue South, Nashville, Tenn. 37212

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PATHOLOGY-NUCLEAR MEDICINE Physician being sought to join practice in a 400 Bed community hospital. Send Resume to William M. Bridger, MD., Baptist Medical Center, 2105 East South Boulevard, Montgomery, Alabama, 36116.

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BOARD CERTIFIED INTERNIST COMpleting University Residency in Nuclear Medicine July 1980. Age 48. Strong Computer Background. Seeks position where he can be in charge and set his own hours, so that interest in Internal Medicine and Computers can be pursued secondarily. Reply Box 1100, Society of Nuclear Medicine, 475 Park Ave. South, New York, NY 10016

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NUCLEAR GROUP SEEKS RELOCAtion. 3 ABNM certified physicians, 1 nuclear pharmacist, 1 physicist currently working in academic setting wish to relocate as group to academic center dedicated to quality nuclear medicine. Reply to Box 1104, Society of Nuclear Medicine, 475 Park Ave. So., NY, NY 10016.

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Send curriculum vitae to:

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Division of Nuclear Medicine
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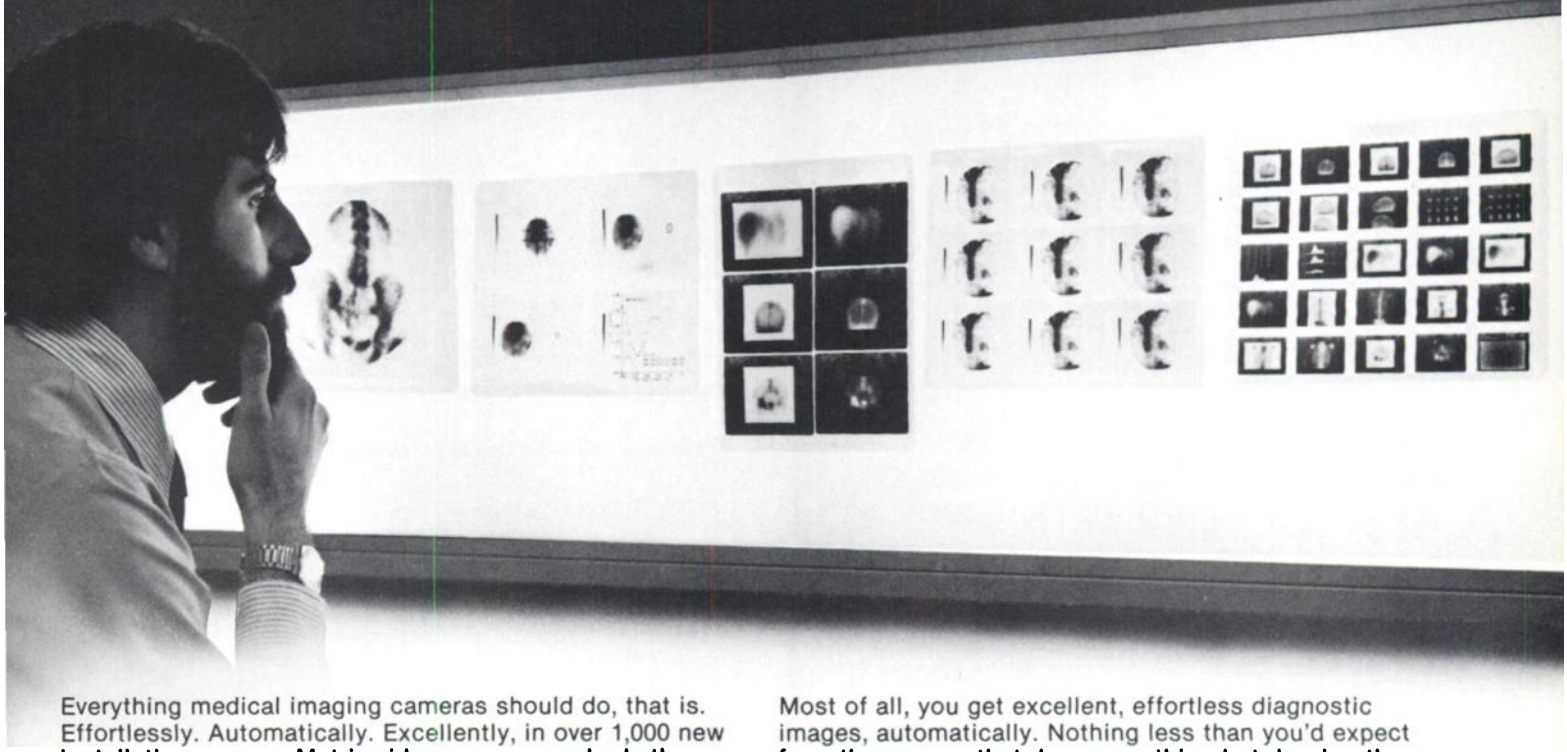

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(4) Medical writer

For information contact John A. Burdine, M.D., Chief, Nuclear Medicine Section, Departments of Internal Medicine and Radiology, 6720 Bertner Avenue, Houston, TX 77030; phone 713/791-2272

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Brief summary of Package Insert. Before using, please consult the full Package Insert included in each kit.

Description: Each vial of OSTEOSCAN contains 5.9 mg etidronate disodium, 0.16 mg stannous chloride and 0.56 mg sodium ascorbate as active ingredients. Upon addition of ADDITIVE-FREE sodium pertechnetate Tc99m the etidronate disodium and stannous chloride combine with Tc99m to form a stable soluble complex.

Clinical pharmacology: When injected intravenously, Tc99m-labeled OSTEOSCAN has a specific affinity for areas of altered osteogenesis. Areas of bone which are undergoing neoplastic invasion often have an unusually high turnover rate which may be imaged with Tc99m-labeled OSTEOSCAN. Three hours after intravenous injection of Tc99m-labeled OSTEOSCAN, an estimated 40-50% of the injected dose has been taken up by the skeleton. At this time approximately 50% has been excreted in the urine and 6% remains in the blood. A small amount is retained by the soft tissue. The level of Tc99m-labeled OSTEOSCAN excreted in the feces is below the level detectable by routine laboratory techniques. Tc99m-labeled OSTEOSCAN is also taken up in areas of necrosis and severely injured myocardial cells. Approximately 1.5 hours following intravenous injection 0.01-0.02 percent of the administered dose per gram of tissue is taken up by an acutely infarcted myocardium.

Indications: OSTEOSCAN is a skeletal imaging agent used to demonstrate areas of altered osteogenesis and a cardiac imaging agent used as an adjunct in the diagnosis of acute myocardial infarction. When used as an adjunct in the diagnosis of myocardial infarction the incidence of false negatives has been found to be approximately 14% and false positives about 16%. False negatives may result from failure to observe temporal requirements for good myocardial imaging; false positives may be related to coronary heart disease, left ventricular aneurysms, trauma, repeated cardioversion following coronary by-pass surgery or old myocardial infarcts.

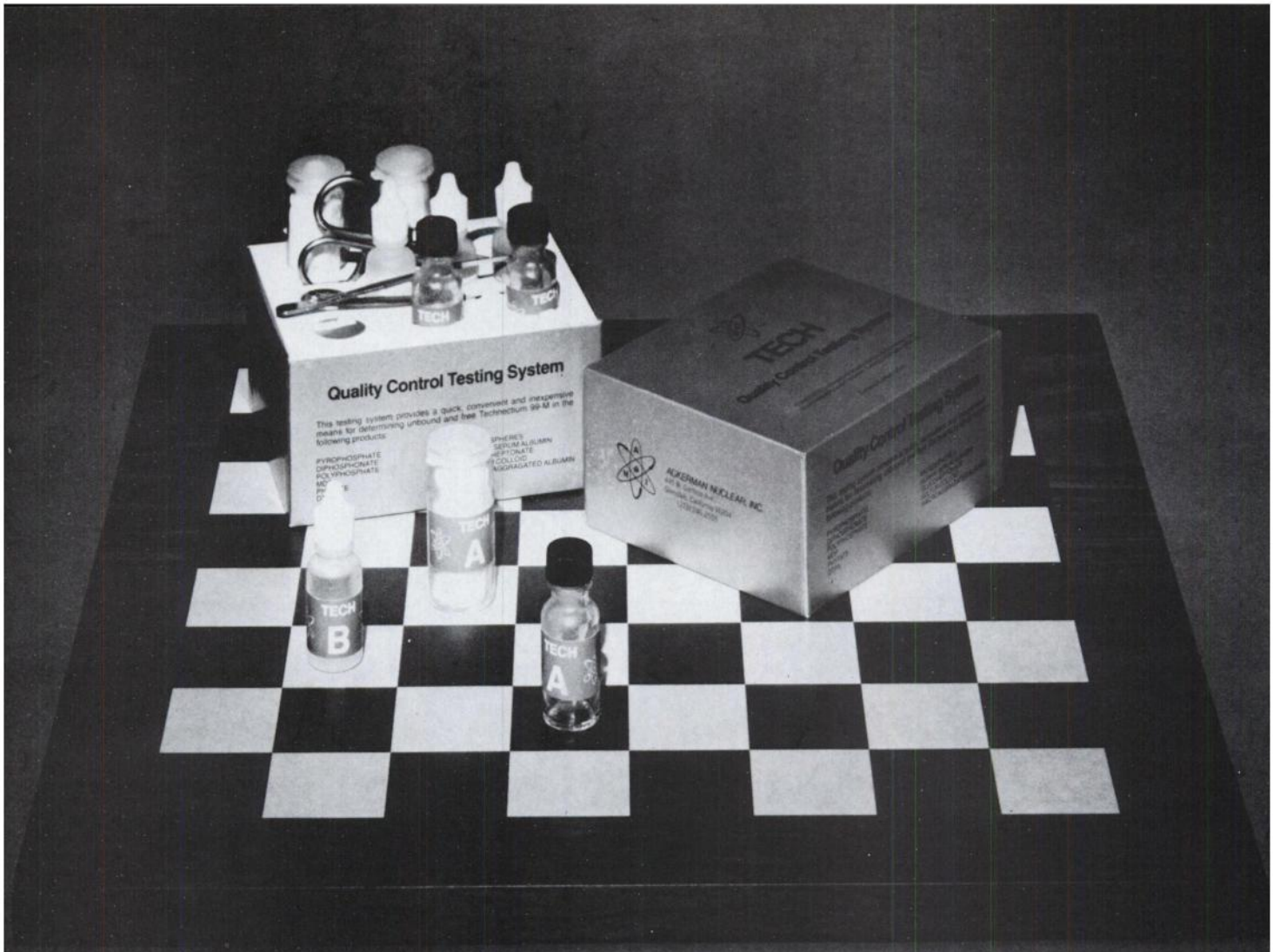
Contraindications: None known.

Warnings: This radiopharmaceutical should not be administered to patients who are pregnant or lactating unless the information to be gained outweighs the potential hazards. Ideally, examinations using radiopharmaceuticals, especially those elective in nature, of a woman of childbearing capability should be performed during the first few (approximately 10) days following the onset of menses. The technetium used to tag the product should be routinely tested for molybdenum and aluminum; if an unacceptable level of either is found, the technetium should not be used. Radiopharmaceuticals should be used only by physicians who are qualified by specific training in the safe use and handling of radionuclides produced by nuclear reactor or particle accelerator and whose experience and training have been approved by the appropriate government agency authorized to license the use of radionuclides.

Precautions: As in the use of any other radioactive material, care should be taken to insure minimum radiation exposure to the patient, consistent with proper patient management, and to insure minimum radiation exposure to occupational workers. Bone Imaging: Both prior to and following Tc99m-labeled OSTEOSCAN administration, patients should be encouraged to drink fluids. Patients should void as often as possible after the Tc99m-labeled OSTEOSCAN injection to minimize background interference from accumulation in the bladder and unnecessary exposure to radiation. Cardiac Imaging: Patient's cardiac condition should be stable before beginning the cardiac imaging procedure. If not contraindicated by the cardiac status, patients should be encouraged to ingest fluids and to void frequently in order to reduce unnecessary radiation exposure. Interference from chest wall lesions such as breast tumors and healing rib fractures can be minimized by employing the three recommended projections.

Adverse reactions: None known.

Dosage and administration: The recommended adult dose of Tc99m-labeled OSTEOSCAN is 10-15 mCi. The activity of each dose should be measured by a suitable radiation calibration system just prior to administration. The dose should be given intravenously by slow injection. For optimal results bone imaging should be done 2-4 hours post injection and cardiac imaging 1-1½ hours post injection. The acute myocardial infarct can be visualized from 1-9 days following onset of symptoms with maximum uptake at 2-3 days. It is recommended that three projections of the heart be made (anterior, left anterior oblique and left lateral).



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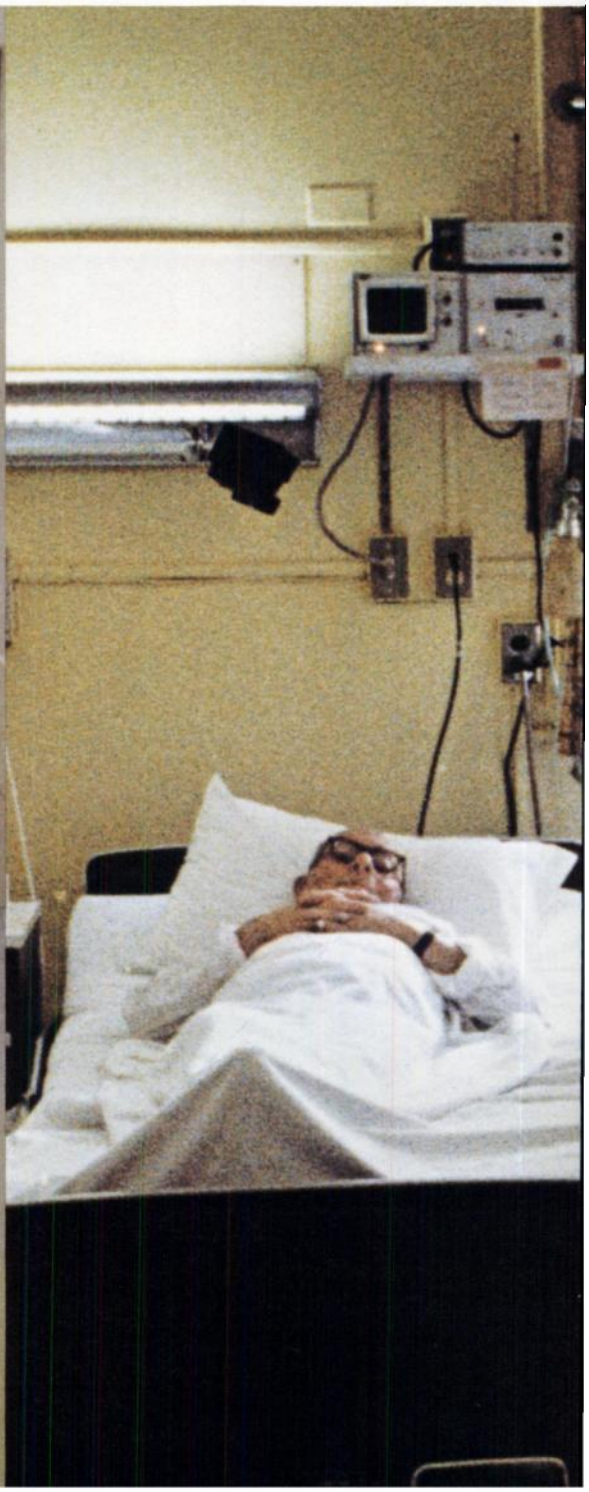

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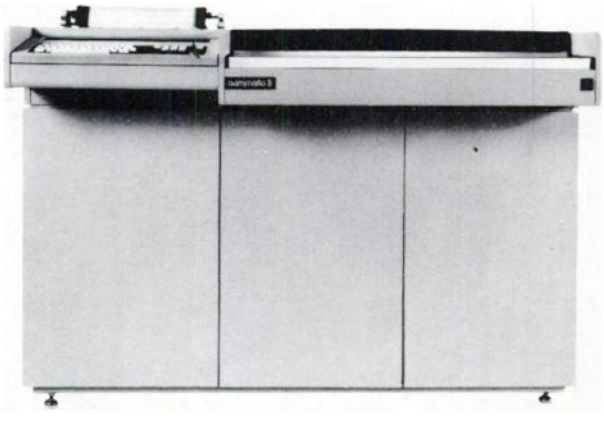

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For futher definitions, see page 36A

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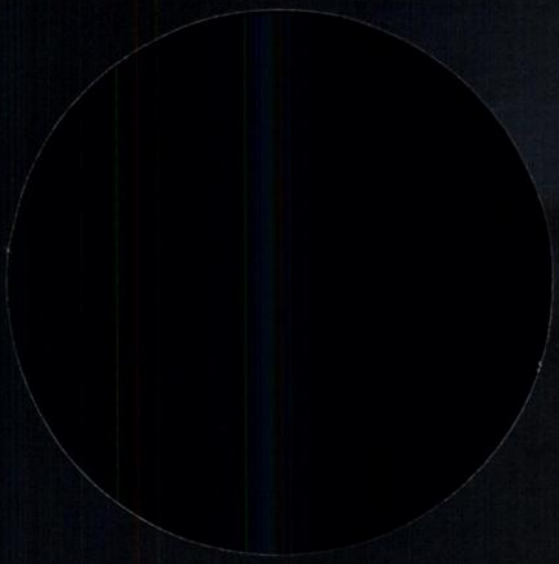
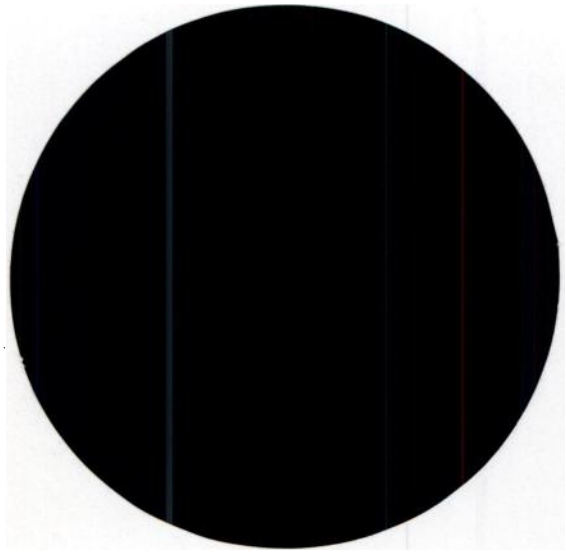
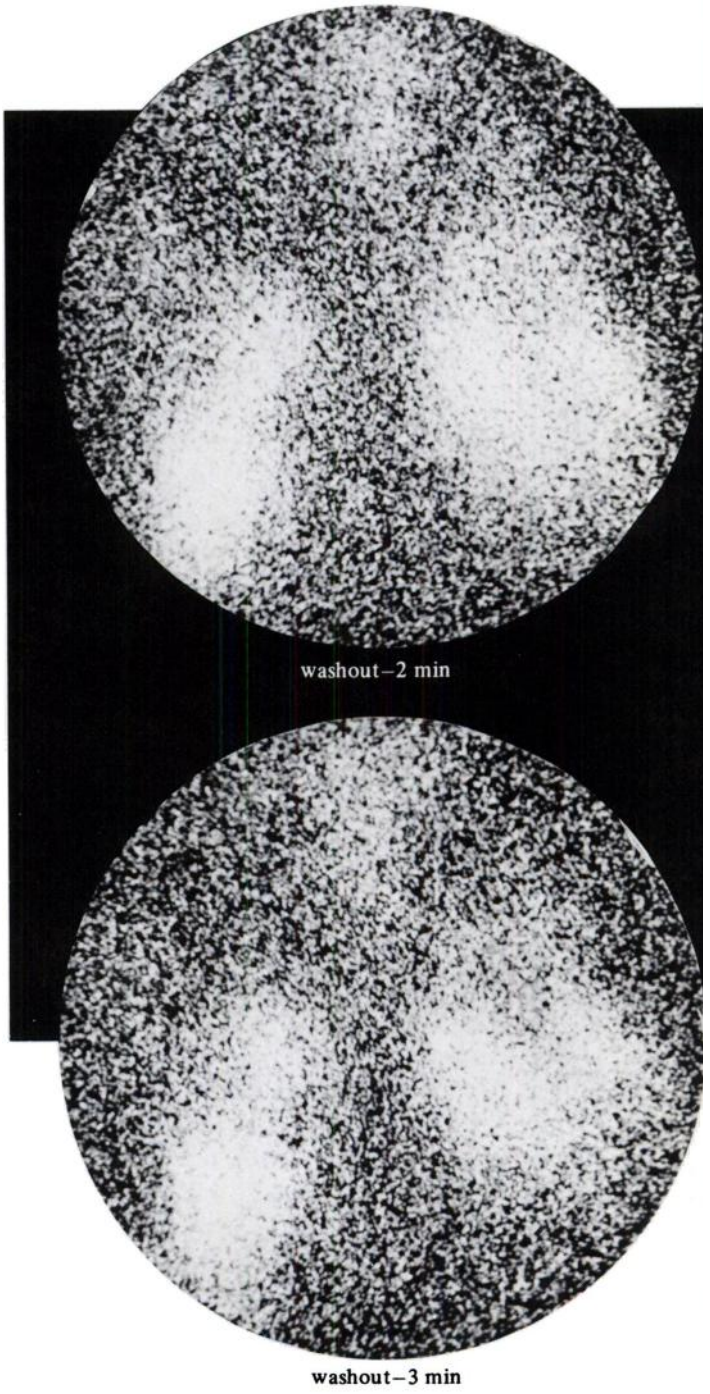


..you could have missed the diagnosis.





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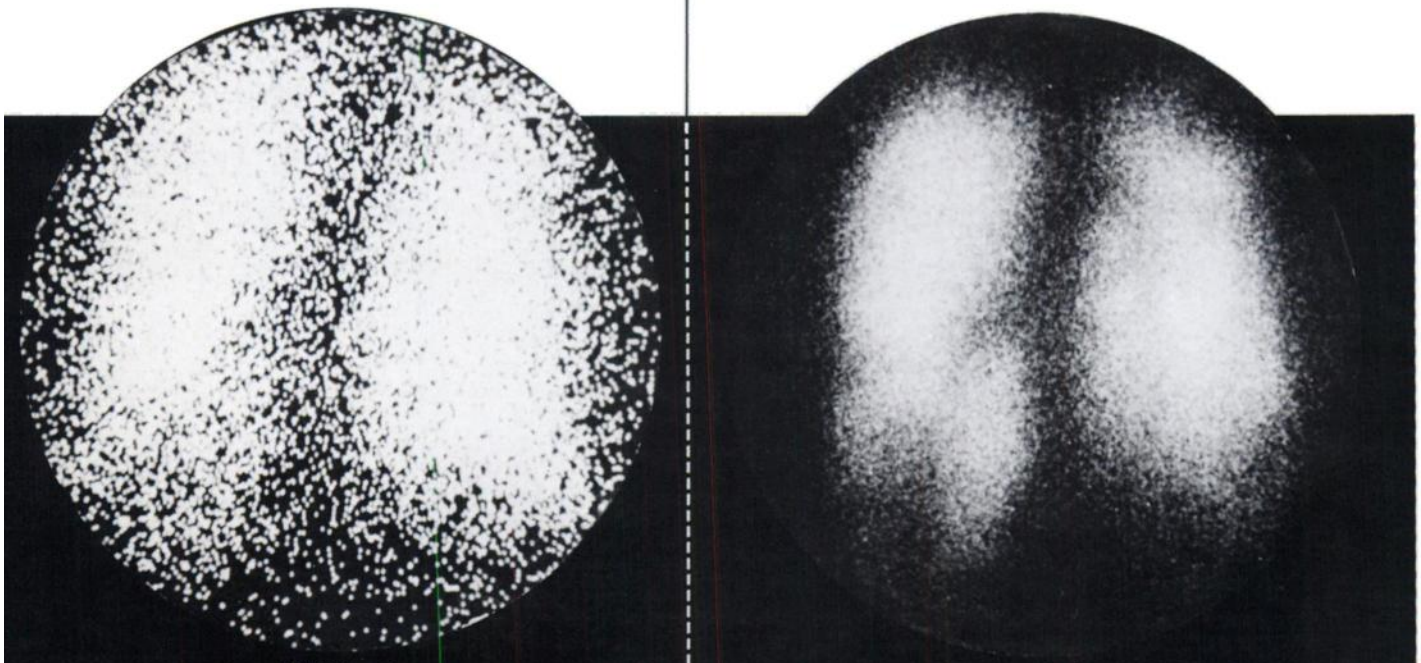
(SENSITIVITY)

Perfusion lung imaging is recognized as the most sensitive noninvasive means of detecting pulmonary embolism (PE). Almost every patient with PE will have an abnormal study—while a normal study virtually rules out PE. But perfusion defects are nonspecific, since both vascular disorders, such as PE, and parenchymal disease or effusion alter pulmonary perfusion.



initial breath

posterior

36-year-old female, 7 years oral contraceptive use, presented with 10-day history of increasing shortness of breath, dyspnea and nonproductive cough. No history of hemoptysis, fever or thrombophlebitis. Bilateral wheezes and rhonchi. Chest X-ray normal. Sent to nuclear medicine with suspected pulmonary embolism. Perfusion lung images showed multiple peripheral defects, many concave and wedge-shaped. The ventilation study showed severe bilateral air trapping, particularly lower lobes, corresponding in distribution to perfusion defects. Studies compatible with alpha-1-antitrypsin deficiency, confirmed by laboratory tests.

For convenient, safe ventilation imaging

Xenon Xe 133 Gas (CALIDOSE) Dispensing System

For high-quality perfusion lung imaging

PULMOLITE™ Technetium Tc 99m Aggregated Albumin Kit

NEN **New England Nuclear®**

Please see following page for full prescribing information.

Xenon Xe 133 Gas†

DESCRIPTION: Xenon Xe 133 for diagnostic use is available as 5% gas in carbon dioxide diluent 95%.

ACTIONS: Xenon Xe 133 is a readily diffusible gas which is neither utilized nor produced by the body. It passes through cell membranes and freely exchanges between blood and tissue. It tends to concentrate more in body fat than in blood, plasma, water or protein solutions. In the concentrations used for diagnostic purposes it is physiologically inactive. Inhaled xenon Xe 133 gas will enter the alveolar wall and enter the pulmonary venous circulation via the capillaries. Most of the xenon Xe 133 that enters the circulation from a single breath is returned to the lungs and exhaled after a single pass through the peripheral circulation.

INDICATIONS: Inhalation of xenon Xe 133 gas has proved valuable for the evaluation of pulmonary function and for imaging the lungs. It may also be applied to assessment of cerebral flow.

CONTRAINDICATIONS: To date, no known contraindications to the use of xenon Xe 133 gas have been reported.

WARNINGS: This radiopharmaceutical should not be administered to pregnant or lactating women unless the benefits to be gained outweigh the potential hazards.

Ideally, examinations using radiopharmaceuticals, especially those elective in nature, of a woman of childbearing capability should be performed during the first few (approximately 10) days following the onset of the menses.

Radiopharmaceuticals should be used only by physicians who are qualified by specific training in the safe use and handling of radionuclides produced by nuclear reactor or particle accelerator, and whose experience and training have been approved by the appropriate governmental agency authorized to license the use of radionuclides.

PRECAUTIONS: As in the use of any other radioactive material care should be taken to insure minimum radiation exposure to the patient, consistent with proper patient management, and to insure minimum radiation exposure to occupational workers. Expired xenon Xe 133 gas should be controlled in a manner that is in compliance with the appropriate governmental agency regulations.

Xenon Xe 133 adheres to some plastics and rubber and should not be allowed to stand in tubing or respirator containers. Such unrecognized loss of radioactivity from the dose for administration may render the study nondiagnostic. Xenon Xe 133 gas delivery systems, ie, respirators or spirometers, and associated tubing assemblies must be leakproof to avoid loss of radioactivity into the laboratory environs not specifically protected by exhaust systems.

ADVERSE REACTIONS: To date, no adverse reactions based on the use of xenon Xe 133 gas have been reported.

DOSAGE AND ADMINISTRATION: Xenon Xe 133 gas is administered by inhalation from closed respirator systems or spirometers.

The suggested activity range employed for inhalation by the average adult patient (70 kg) is:

Pulmonary function including imaging: 2-30 mCi in 3 liters of air.

Cerebral blood flow: 10-30 mCi in 3 liters of air.

The patient dose should be measured by a suitable radioactivity calibration system immediately prior to administration.

PHYSICAL CHARACTERISTICS: Xenon Xe 133 decays by beta and gamma emissions with a physical half-life of 5.27 days (1). Photons that are useful for imaging studies are listed in Table 1.

Table 1. Principal Radiation Emission Data Xenon Xe 133

Radiation	Mean % per Disintegration	Mean Energy (keV)
Beta-2	99.30	100.6
Gamma-2	34.99	81.0
K int. con. electrons,-2	47.24	45.0
L int. con. electrons,-2	7.87	75.7
M int. con. electrons,-2	9.84	80.0
K x-rays	34.70	30.8
K x-rays	7.67	35.2

(1) Dillman, L.T., Radionuclide Decay Schemes and Nuclear Parameters for Use in Radiation-Dose Estimation, Part 2, Supplement No. 4, MIRD pamphlet No. 6, J. Nucl. Med., p. 28, 1970.

The specific gamma ray constant for xenon Xe 133 is 0.44 R/mCi-hr. at 1 cm. The half value layer is 1 mm of Pb.

To correct for physical decay of this radionuclide, the fractions that remain at selected time intervals before and after the date of calibration are shown in Table 2.

Table 2. Xenon Xe 133 Physical Decay Chart (Half-life 5.27 days)

Day	Fraction Remaining	Day	Fraction Remaining
-5	1.930	8	.349
-4	1.893	9	.302
-3	1.483	10	.288
-2	1.300	11	.235
-1	1.140	12	.206
0*	1.000	13	.181
1	.877	14	.159
2	.769	15	.139
3	.674	16	.122
4	.591	17	.107
5	.518	18	.094
6	.454	19	.082
7	.398	20	.072

*Calibration Day

RADIATION DOSIMETRY: The estimated absorbed radiation doses (2) to an average patient (70 kg) for pulmonary perfusion and cerebral blood flow studies from a maximum dose of 30 millicuries of xenon Xe 133 in 3 liters of air are shown in Table 3.

Table 3. Radiation Doses

	Effective Half-time	Lungs*	Brain	Whole Body
		rads/30mCi		
Pulmonary Perfusion	2 min.	0.25	0.0014	0.0027
Cerebral Blood Flow	5 min.	0.83	0.0035	0.0068

*99% of activity is in lungs

(2) Method of Calculation: A Schema for Absorbed-Dose Calculation for Biologically Distributed Radionuclides, Supplement No. 1, MIRD pamphlet No. 1, J. Nucl. Med., p. 7, 1968.

HOW SUPPLIED: The xenon Xe 133 gas is supplied as part of the Calidose® system, consisting of 2 ml unit dose vials and the Calidose dispenser* for shielded dispensing.

Normally vials containing either 10 or 20 mCi/vial, packed up to 5 vials per shield tube, are supplied. Vial sets containing up to 100 mCi/vial are available.

*Patent Pending †JO 127 July 1975, Rev 1

PULMOLITE™

Technetium Tc 99m Aggregated Albumin Kit

August 1976

DIAGNOSTIC—FOR INTRAVENOUS USE

DESCRIPTION: Each vial of PULMOLITE™ Technetium Tc 99m Aggregated Albumin Kit contains a sterile, pyrogen-free, lyophilized mixture of 1.0mg of aggregated albumin (Human), 10mg of normal serum albumin, 10mg of sodium chloride, and 0.07mg (maximum) of stannous chloride dihydrate. PULMOLITE is prepared from albumin that was nonreactive when tested for hepatitis B antigen (HB_sAg) by radioimmunoassay. Each vial contains $3.6\text{-}6.5 \times 10^6$ aggregated albumin particles. The particle size distribution of the aggregated albumin is such that not less than 85% are within the range of 15-90 microns in size. There are no aggregated albumin particles greater than 150 microns in size. Reconstitution of PULMOLITE with sodium pertechnetate Tc 99m provides an aqueous suspension of technetium Tc 99m aggregated albumin, with a labeling efficiency of >90%

PHYSICAL CHARACTERISTICS

Technetium Tc 99m decays by isomeric transition with a physical half life of 6.03 hours (1). Photons that are useful for detection and imaging are listed in Table 1.

Table 1. Principle Radiation Emission Data

Radiation	Mean %/ Disintegration	Mean Energy (keV)
Gamma-2	87.9	140.5

(1) Dillman, L.T. and Van der Lage, F.C. Radionuclide Decay Schemes and Nuclear Parameters for Use in Radiation-Dose Estimation, MIRD Pamphlet No. 10, p. 82. (1975).

EXTERNAL RADIATION

The specific gamma ray constant for Tc 99m is 0.88R/mCi-hr at 1cm. The first half value thickness of lead (Pb) for Tc 99m is 0.2mm. A range of values for the relative attenuation of the radiation emitted by this radionuclide that results from interposition of various thicknesses of Pb is shown in Table 2. For example, the use of 2.7mm of Pb will decrease the external radiation exposure by a factor of about 1,000.

Table 2. Radiation Attenuation by Lead Shielding

Shield Thickness (Pb) mm	Coefficient of Attenuation
0.2	0.5
0.95	10^{-1}
1.8	10^{-2}
2.7	10^{-3}
3.8	10^{-4}
4.5	10^{-5}

To correct for physical decay of this radionuclide, the fractions that remain at selected time intervals after the time of calibration are shown in Table 3.

Table 3. Physical Decay Chart: Tc 99m Half-Life 6.03 Hours

Hours	Fraction Remaining	Hours	Fraction Remaining
0*	1.000	8	.399
1	.891	9	.355
2	.795	10	.317
3	.708	11	.282
4	.631	12	.252
5	.563		
6	.502		
7	.447		

*Calibration Time

CLINICAL PHARMACOLOGY: Within 6-10 minutes of intravenous injection, over 80% of Tc 99m aggregated albumin is trapped in the arterioles and capillaries of the lung.

Organ selectivity is a direct result of particle size. Below 1-10 microns the aggregates are taken up by the reticuloendothelial system. Above 10-15 microns the aggregates become lodged in the lung capillaries by a purely mechanical process. Distribution of particles in the lungs is a function of regional pulmonary blood flow.

Lung to liver ratios of about 19:1 are obtained within the first few minutes. Elimination of the Tc 99m aggregated albumin from the lungs occurs with a half-life of about 5.8 hours. Cumulative urinary excretion studies show an average of 20% elimination of the injected Tc 99m dose 24 hours post administration.

INDICATIONS AND USAGE: Technetium Tc 99m aggregated albumin is indicated as a lung imaging agent to be used as an adjunct in the evaluation of pulmonary perfusion.

CONTRAINDICATIONS: Technetium Tc 99m aggregated albumin should not be administered to patients with severe pulmonary hypertension.

The use of Tc 99m aggregated albumin is contraindicated in persons with a history of hypersensitivity reactions to products containing human serum albumin.

WARNINGS: The possibility of allergic reactions should be considered in patients who receive multiple doses.

Theoretically, the intravenous administration of particulate material such as aggregated albumin imposes a temporary small mechanical impediment to blood flow. While this effect is probably physiologically insignificant in most patients the administration of aggregated albumin is possibly hazardous in acute cor pulmonale and other states of severely impaired pulmonary blood flow.

This radiopharmaceutical preparation should not be administered to children or to pregnant or lactating women unless the expected benefits to be gained outweigh the potential risks.

Ideally, examinations using radiopharmaceuticals, especially those elective in nature, of a woman of childbearing capability should be performed during the first few (approximately 10) days following the onset of menses.

PRECAUTIONS: In cases of right-to-left cardiac shunt, additional risk may exist due to the rapid entry of aggregated albumin into the systemic circulation.

The contents of the kit are not radioactive. However, after the sodium pertechnetate Tc 99m is added, adequate shielding of the final preparation must be maintained.

The labeling reactions involved in preparing the agent depend on maintaining tin in the reduced state. Any oxidant present in the sodium pertechnetate Tc 99m supply may thus adversely affect the quality of the prepared agent. Hence, sodium pertechnetate Tc 99m containing oxidants, or other additives, should not be employed without first demonstrating that it is without adverse effect on the properties of the resulting agent.

The contents of the vial are sterile and non-pyrogenic. It is essential that the user follow the directions carefully and adhere to strict aseptic procedures during preparation of the radiodiagnostic.

Technetium Tc 99m aggregated albumin is physically unstable and as such the particles will settle with time. Failure to mix the vial contents adequately before use may result in non-uniform distribution of radioactivity.

It is also recommended that, because of the increasing probability of agglomeration with aging, a batch of Technetium Tc 99m aggregated albumin not be used after eight hours from the time of reconstitution. Refrigerate at 2° to 8°C after reconstitution. If blood is withdrawn into the syringe, unnecessary delay prior to injection may result in clot formation in situ.

The contents of the vial are under a nitrogen atmosphere and should be protected from air. Do not use if clumping or foaming of the contents is observed.

Adequate reproduction studies have not been performed in animals to determine whether the drug affects fertility in males or females, has teratogenic potential, or has other adverse effects on the fetus. Technetium Tc 99m aggregated albumin should be used in pregnant women only when clearly needed.

It is not known whether this drug is excreted in human milk. As a general rule, nursing should not be undertaken while a patient is on a drug since many drugs are excreted in human milk.

Safety and effectiveness in children have not been established.

As in the use of any radioactive material, care should be taken to minimize radiation exposure to the patient, consistent with proper management, and to insure minimum radiation exposure to the occupational worker.

Radiopharmaceuticals should be used only by physicians who are qualified by training and experience in the safe use and handling of radionuclides and whose experience and training have been approved by the appropriate governmental agency authorized to license the use of radionuclides.

ADVERSE REACTIONS: The literature contains reports of deaths occurring after the administration of aggregated albumin to patients with pre-existing severe pulmonary hypertension. Instances of hemodynamic or idiosyncratic reactions to preparations of Tc 99m-labeled aggregated albumin have been reported.

Hypersensitivity reactions are possible whenever protein-containing materials such as Tc 99m-labeled aggregated albumin are used in man. Epinephrine, antihistamines and corticosteroid agents should be available for use.

DOSAGE AND ADMINISTRATION: The recommended intravenous dose range for the average patient (70kg) is 1 to 4 millicuries. The volume of the dose may vary from 0.2 to 1.3ml.

The recommended number of aggregated albumin particles to be administered per dose is 200,000-700,000 with the suggested number being approximately 350,000.

For ease and accuracy in dispensing the prepared agent, it is recommended that prior to reconstitution, concentrated sodium pertechnetate Tc 99m be further diluted to a volume of 8ml with fresh, preservative-free sodium chloride injection (U.S.P.).

Table 4. Particles/Dose x 10^6* ($\bar{T} = 5 \times 10^6$ particles/vial)

Reconstitution Activity (mCi)	Dose 1mCi	2mCi	3mCi	4mCi
20	0.25	0.50	0.75	1.0
30	0.17	0.33	0.50	0.67
40	0.13	0.25	0.38	0.50
50	0.10	0.20	0.30	0.40

*The particles per millicurie dose will increase in relation to the physical decay of Tc 99m such that at six hours (one half-life) after preparation, the values in the table will increase by a factor of two.

In case of right-to-left cardiac shunt the number of aggregated albumin particles administered per dose should be reduced to the minimum feasible.

The patient dose should be measured by a suitable radioactivity calibration system immediately prior to patient administration. Re-suspend particles by repeated inversion of the syringe immediately prior to injection. (If blood is drawn into syringe, any unnecessary delay prior to injection may lead to clot formation in situ). Do not backflush the syringe, slow injection is recommended, and for optimum results, imaging should begin as soon as possible after injection.

RADIATION DOSIMETRY

The estimated absorbed radiation doses (1) to an average patient (70kg) from an intravenous injection of 4 millicuries of Tc 99m aggregated albumin are shown in Table 5.

Table 5. Radiation Doses

Tissue	Radiation Absorbed Dose (rads/4mCi)
Lungs	1.04
Whole Body	0.06
Liver	0.12
Spleen	0.11
Bladder Wall 2 hour void	0.08
4.8 hour void	0.11
Ovaries	0.06
Testes	0.07

(1) Method of Calculation: A Schema for Absorbed-Dose Calculations for Biologically Distributed Radionuclides, Supplement No. 1, MIRD Pamphlet No. 1, p. 7, (1968).

HOW SUPPLIED: PULMOLITE™ Technetium Tc 99m Aggregated Albumin Kit is supplied in lots of five (5) or thirty (30) vials, sterile and non-pyrogenic, each vial containing in lyophilized form:

Aggregated albumin (human)-1.0mg
Normal human serum albumin-10mg
Sodium chloride-10mg
Stannous chloride dihydrate, maximum-0.07mg

Each vial contains $3.6\text{-}6.5 \times 10^6$ aggregated albumin particles.

PULMOLITE contains no preservative; after reconstitution the shielded vial should be stored at 2° to 8°C.

Included in each five (5) vial kit is one (1) package insert and six (6) radiation labels. Included in each thirty (30) vial kit is one (1) package insert and thirty-six (36) radiation labels.

DIRECTIONS

Aseptically inject approximately 8ml of sodium pertechnetate Tc 99m, containing about 20 to 50 millicuries (pre-diluted with sterile, preservative-free saline as necessary) into a shielded vial of PULMOLITE.

NOTE: Enter the vial septum with the needle at an oblique angle and add the pertechnetate solution in such a way that it first strikes the vial wall. Shake vigorously for at least 30 seconds before use. Complete the Radiation Label provided and apply to shield. Prior to withdrawing an aliquot, re-suspend the particles by repeatedly inverting the shielded vial for 15 seconds. After reconstitution, store at 2° to 8°C and use the preparation within eight hours.

This reagent kit is approved for use by persons licensed by the U.S. Nuclear Regulatory Commission pursuant to Section 35.14 and 35.100 Group III of 10CFR 35 or under licenses of Agreement States.

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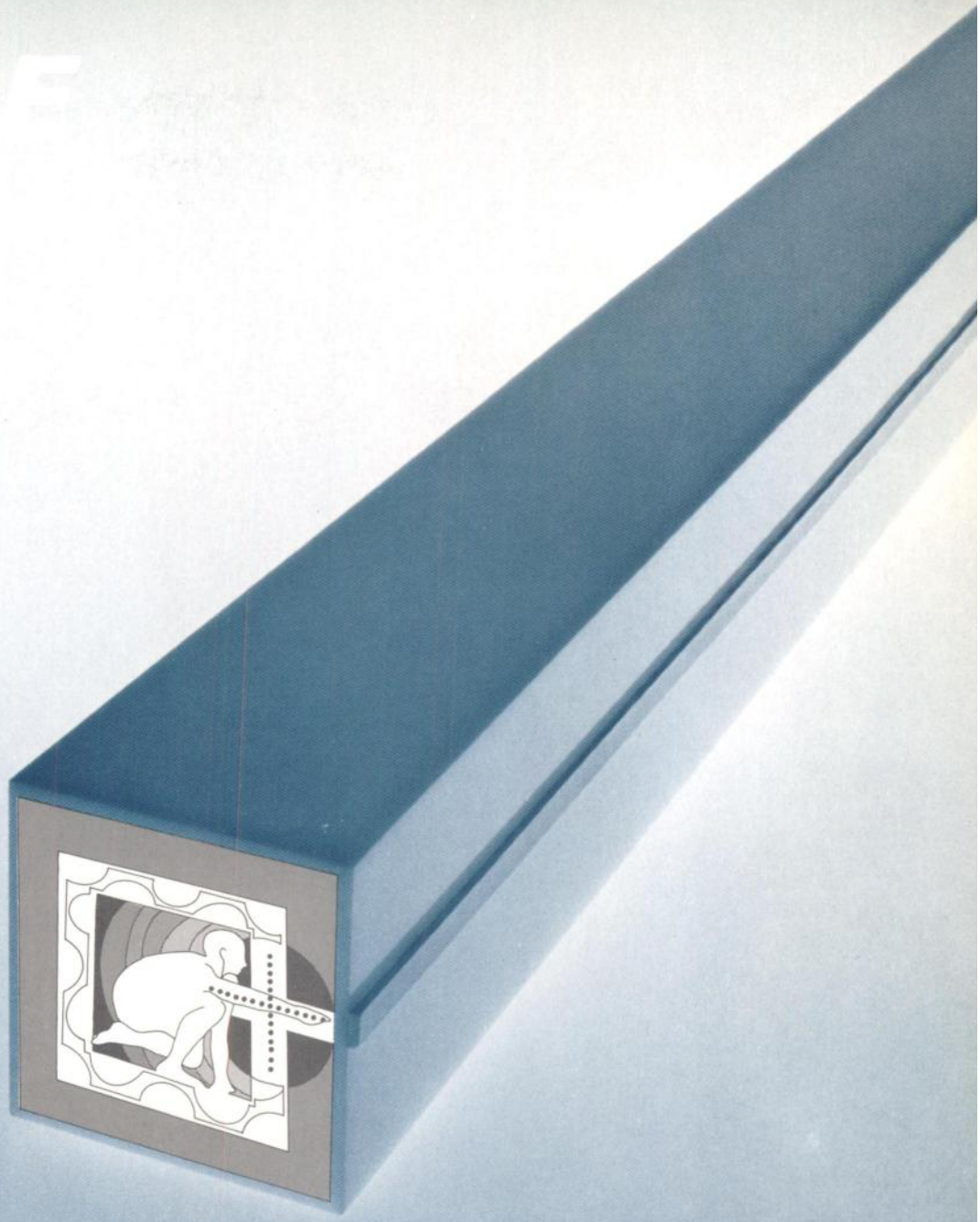

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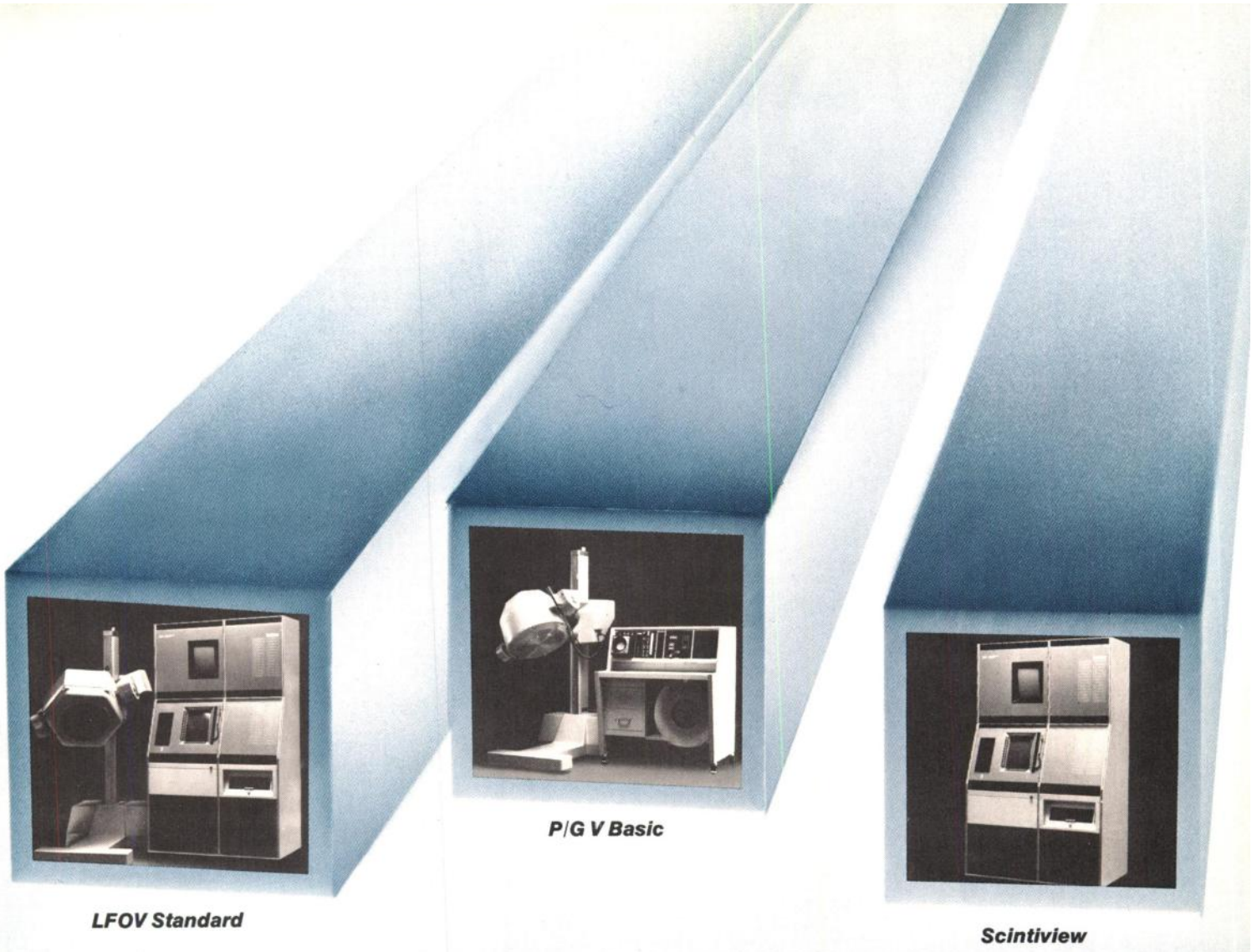

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