



Quadrex HPS Inc.

1940 N W 67th Place, Gainesville, Florida 32606-1649
904-373-6066 TWX 910-590-2438 TELEX 35-2031 TELECOPY 904-373-0040

November 11, 1986

Ms. Pat Vocherlon²
US NRC
Region III
Office of Inspection and Enforcement
799 Roosevelt Road
Glen Ellyn, IL 61037

Dear Ms. Vocherlon:

In response to our telephone conversation on 11/10/86, the following are submitted to your office for review in association with Dr. Suman K. Mishr's Radioactive Materials license application control no. 82106.

1. A copy of the training program conducted by Quadrex HPS Inc.
2. A copy of Quadrex HPS's license amended in its entirety which authorizes myself as a qualified user and describes the leak testing procedure followed by Quadrex.
3. Clarification as to whom will exchange the source holder device when the source is depleted as well as the type of personnel monitoring worn during the exchange is as follows:

The licensed user or an authorized representative of NOVO Diagnostics Systems will exchange the depleted source holder device and return it to the manufacturers. This procedure is reviewed with the license and is described in section 10.1 of the NOVO BMC-LAB-22a User Manual (see attached). Whole body dosimeters (film badge or TLD type) will be worn by all appropriate personnel. These dosimeters will be serviced by R.S. Landauer (or an equivalent) on a quarterly frequency.

If you should have any further questions, please do not hesitate to contact me at 904-373-6066. Thank you for your assistance.

Sincerely,

Susan E. McDonough

Susan E. McDonough
Health Physicist

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REG3 LIC30
34-24799-01 PDR

SEM/kdgl3

Enclosures

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REGION III

TRAINING FOR BONE MINERAL ANALYZER DIAGNOSTIC DEVICES
AS RECOMMENDED BY THE USNRC

Group A - Basic Radiation Physics and Instrumentation (3 hours)

1. Atomic Structure
2. Decay Process and Types of Emissions (especially gamma radiation)
3. Radioactivity - Definitions and Units (curies, rems, and sub-units)
4. Interactions of Radiation with Matter
5. Half-Life, Inverse Square Law and Half-Value Layers (time, distance, and shielding)
6. Decay Constant Formula and Use of Decay Tables
7. Inverse Square Law Formula and Examples
8. Calculation of Radiation Dose in Air, Tissue and Bone
9. Radiation Dose - Dose Rate, Time and Average Dose
10. Characteristics of Sealed Sources (compared to radioactive liquids and other physical forms)

Group B - Radiation Biology (3 hours)

1. Acute and Chronic Exposures
2. Somatic and Genetic Effects
3. Basis of Maximum Permissible Dose
4. Typical Somatic Effects at Various Dose Levels
5. Genetic Effects and Genetically Significant Dose
6. Factors Affecting Biological Damage (dose, dose rate, type of radiation, type of tissue, amount of tissue, biological variation and chemical modifiers).

Group C - Radiation Protection (2 hours)

1. Principles of Radiation Safety and ALARA Management Program
2. "Standards for Radiation Protection" 10 CFR Part 20 and "Instructions to Radiation Workers" 10 CFR Part 19,
3. License Conditions for Radiation Safety Program
4. Radioactive Shipment Receiving, Opening, Handling, Storage and Security Procedures
5. Radiation Labels and Required Posting and Documents
6. Routine Proper Use, Inventory and Accountability Procedures for Sealed Sources, or Devices Containing Sealed Sources
7. Leak Test of Sealed Sources and Contamination Control
8. Shipment Returns, DOT Regulations and Supplier Instructions and Forms
9. Radiation Detection Instrumentation
10. NRC Draft Regulatory Guide "Instruction Concerning Radiation Exposure" Dated May, 1980 and NRC Regulatory Guide 8.13 "Instructions Concerning Prenatal Radiation Exposure" Dated November, 1975
11. Title 10 CFR Part 35 "Medical Use of Radionuclides" and NRC Regulatory Guide 10.8 Procedures and License Applications
12. Radiation Safety References, NCRP and ICRP Publications
13. Review and Discussion of the Sealed Source "Device Specific" Manufacturer Literature and Instructions



STATE OF FLORIDA
DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES

1317 Winewood Boulevard

Tallahassee, Florida 32301

RADIATION CONTROL
RADIOACTIVE MATERIALS LICENSE

Page 1 of 5 Pages

Pursuant to Chapter 404, Florida Statutes, and Chapter 10D-91, Florida Administrative Code, Control of Radiation Hazards and in reliance on statements and representations heretofore made by the licensee designated below, a license is hereby issued authorizing such licensee to transfer, receive, possess and use the radioactive material(s) designated below and to use such radioactive material(s) for the purpose(s) and at the place(s) designated below. This license is subject to all applicable rules, regulations and orders of the State of Florida, Department of Health and Rehabilitative Services now or hereafter in effect to any conditions specified below.

Licensee

1. Name **QUADREX HPS, INC.**3. License number **1354-4**2. Address **1940 N.W. 67th Place
Gainesville, FL 32606**4. Expiration date **March 30, 1986**5. Reference number
Category: 3P6. Radioactive material
(element and mass number)A. **Gadolinium 153**B. **Gadolinium 153**C. **Cesium 137**D. **Cobalt 60**

7. Chemical and/or physical form

A. **See Item 9A**B. **Sealed source (New
England Nuclear Model
NES-9103)**C. **Sealed source (Isotope
Products Lab Model
Number 290D or New
England Nuclear Model
NES-1015)**D. **Sealed source (Isotope
Products Lab Model
Number 290D or New
England Nuclear Model
NES-1015)**8. Maximum quantity licensee
may possess at any one timeA. **See Item 9A**B. **One source not to exceed
100 microcuries**C. **One source not to exceed
100 microcuries**D. **One source not to exceed
100 microcuries**

(See Page 2)

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**STATE OF FLORIDA
DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES**

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RADIATION CONTROL
RADIOACTIVE MATERIALS LICENSE
SUPPLEMENTARY SHEET

Page 2 of 5 Pages

License Number 1354-4
(3P)

- | | | |
|--|--|---|
| 6. Radioactive material
(element and mass number) | 7. Chemical and/or physical
form | 8. Maximum quantity licensee
may possess at any one time |
| E. Cobalt 57 | E. Sealed source (Isotope
Products Lab Model
Number 290D or New
England Nuclear Model
NES-1015) | E. One source not to exceed
100 microcuries |
| F. Sodium 22 | F. Sealed source (Isotope
Products Lab Model
Number 290D or New
England Nuclear Model
NES-1015) | F. One source not to exceed
100 microcuries |
| G. Gadolinium 153 | G. Sealed source (New
England Nuclear Model
Numbers NER-430, NER-431,
Amersham Corporation
Model Number GDC.CY1,
Gulf Nuclear, Inc. Model
Number GD-1) | G. Six sources not to exceed
1500 millicuries each |

9. Authorized Use.

- A. For possession incident to the performance of leak testing of bone mineral analyzers which contain gadolinium 153 as a sealed source.
- B. through F. To be used for calibration of instruments.
- G. For storage incident to transfer to authorized licensees.

(See Page 3)

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License Number 1354-4
(3P)

CONDITIONS

10. A. Tests for leakage and/or contamination shall be performed only at the customer's sites as designated by customers authority for possession and use of radioactive material.
- B. Analysis of wipes, calibration of instruments and storage of radioactive material shall be performed at the licensee's facility located at the address in Item 2, above.
- C. This condition does not prohibit use in other Agreement States and States under the jurisdiction of the U.S. Nuclear Regulatory Commission under reciprocity which has been approved by an Agreement State or the U.S. Nuclear Regulatory Commission.
11. Failure to comply with the provisions of this license is a felony of the third degree pursuant to Section 404.161, Florida Statutes. Also, violations may warrant an administrative fine of up to \$1,000.00 per violation, per day, pursuant to Section 404.162, Florida Statutes.
12. Licensed material shall be used by James McVey, Ben Warren or Ray Thomas.
13. Sealed sources containing licensed material shall not be opened.
14. Sealed sources contained in devices shall not be removed from their source holders for the purpose of accomplishing the tests authorized in Item 9A, above.
15. A. (1) Each sealed source containing licensed material, other than Hydrogen 3, with a half-life greater than thirty days and in any form other than gas shall be tested for leakage and/or contamination at intervals not to exceed six months. In the absence of a certificate from a transferor, indicating that a test has been made within six months prior to the transfer, a sealed source received from another person shall not be put into use until tested.

(See Page 4)

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RADIOACTIVE MATERIALS LICENSE
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License Number 1354-4
(3P)

15. A. (2) Notwithstanding the periodic leak test required by this condition, any licensed sealed source is exempt from such leak tests when the source contains 100 microcuries or less of beta and/or gamma emitting material or 10 microcuries.
- B. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surfaces of the device in which the sealed source is permanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Department of Health and Rehabilitative Services.
- C. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Department of Health and Rehabilitative Services regulations. A report shall be filed within five (5) days of the test with the Office of Radiation Control, Department of Health and Rehabilitative Services, 1317 Winewood Boulevard, Tallahassee, Florida 32301, describing the equipment involved, the test method used, the test results and the corrective action taken.
- D. The test sample (smear) shall be taken by the licensee using leak test kit described in correspondence dated January 30, 1986 leak test kit. Analysis of the test sample for leakage and/or contamination shall be performed by licensee using procedures described in correspondence dated January 30, 1986 or by other persons specifically authorized by the U.S. Nuclear Regulatory Commission or an Agreement State to perform such services.
16. The licensee is authorized to transfer licensed material described in Items 6, 7, 8 and 9, Subitem G pursuant to Chapter 10D-91.319, F.A.C. The records of such transfers must be maintained for inspection by the Department.

(See Page 5)

STATE OF FLORIDA
DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES
1317 Winewood Boulevard
Tallahassee, Florida 32301
RADIATION CONTROL
RADIOACTIVE MATERIALS LICENSE
SUPPLEMENTARY SHEET

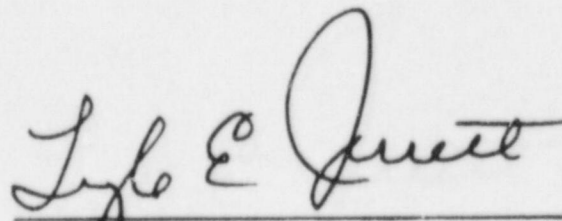
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License Number 1354-4
(3P)

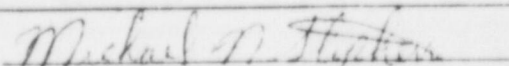
17. The licensee shall not transfer possession and/or control of radioactive material, or products containing radioactive material as a contaminant except:
- A. By transfer to a specifically licensed recipient; or
 - B. As provided otherwise by specific provision of this license pursuant to the requirements of the "Florida Control of Radiation Hazard Regulations", Chapter 10D-91, Florida Administrative Code.
18. A. Except as specifically provided otherwise by this license, the licensee shall possess and use licensed material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in the licensee's application dated December 11, 1985, signed by James T. McVey, Corporate Radiation Safety Officer, and correspondence dated January 30, 1986, signed by James T. McVey, Corporate Radiation Safety Officer.
- B. The licensee shall comply with all applicable requirements of the "Florida Control of Radiation Hazard Regulations", Chapter 10D-91, Florida Administrative Code, and these Regulations shall supersede the licensee's statements in applications or correspondence, unless the statements are more restrictive than the Regulations.

Date February 28, 1986

Licensee - White
Central Files - Canary
USNRC - Pink
Office - Canary
Field Files - Pink



Lyle E. Jerrett, Ph.D.
Director
Radiation Control

by 
Radiation Control

STATE OF FLORIDA
DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES
RADIATION CONTROL
APPLICATION FOR RADIOACTIVE MATERIALS LICENSE

INSTRUCTIONS—Complete items 1 through 15 if this is an initial application or if application is for renewal of a license. Use supplemental sheets where necessary. Item 16 must be completed on all applications. Your copies to: Department of HRS, 1317 Winwood Blvd., Tallahassee, FL 32301. Upon approval of an application, the applicant will receive a "Radioactive Materials License" issued pursuant to statutory and governing regulatory authority and subject to all applicable rules, regulations and orders of all appropriate regulatory agencies now or hereafter in effect and to any conditions specified in the license.

1. (a) NAME AND STREET ADDRESS OF APPLICANT. <small>(Institution, firm, company, person, etc.)</small> Quadrex HPS Inc. 1940 N.W. 67th Place Gainesville, FL 32606 904-373-6066	(b) STREET ADDRESS(ES) AT WHICH RADIOACTIVE MATERIALS WILL BE USED. (If different from 1 (a)) Same Phone No. _____
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2. FEE ENCLOSED FOR: <input checked="" type="checkbox"/> New License application <input type="checkbox"/> Amendment request	OFFICE USE ONLY: Fee category: <u>3P</u> Amount paid: _____
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3. (a) PREVIOUS LICENSE NUMBER(S) — (If this is an application for renewal of a license, please give number.) <u>1354-1; 1354-3</u> (b) HAVE YOU EVER BEEN DENIED A LICENSE No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (c) HAS YOUR LICENSE EVER BEEN SUSPENDED OR REVOKED No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>		If yes, describe details on additional sheet.
4. INDIVIDUAL USER(S). (Name and title of individual(s) who will use or directly supervise use of radioactive materials. State training and experience in items 6 & 7 or documentation attached) James McVey, Ben Warren, Ray Thomas	5. RADIOLOGICAL SAFETY OFFICER (Name of person designated radiation safety officer. If other than individual user, attach resume of training and experience as in items 6 & 7) James McVey	

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 (Use supplemental sheets if necessary)

6. TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle Answer)		FORMAL COURSE (Circle Answer)	
			Yes	No	Yes	No
a. Principles and practices of radiation protection	See Attached		Yes	No	Yes	No
b. Radioactivity measurement standardization and monitoring techniques and instruments			Yes	No	Yes	No
c. Mathematics and calculations basic to the use and measurement of radioactivity			Yes	No	Yes	No
d. Biological effects of radiation			Yes	No	Yes	No

7. EXPERIENCE WITH RADIATION. (Actual use of radioactive materials or equivalent experience.)				
RADIOACTIVE MATERIALS	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
		See Attached		

8. (a) RADIOACTIVE MATERIALS. <small>(Element and mass number of each.)</small>	(b) CHEMICAL AND/OR PHYSICAL FORM See Attached	(c) MAXIMUM AMOUNT YOU WILL POSSESS AT ANY ONE TIME (If sealed source(s), also state number of sources and maximum activity per source.)
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DESCRIBE PURPOSE FOR WHICH RADIOACTIVE MATERIALS WILL BE USED. (If radioactive material is in the form of a sealed source, include the make and model number of the storage container and/or device in which the source will be stored and/or used.)

10. RADIATION DETECTION INSTRUMENTS. (Use supplemental sheets if necessary.)

TYPE OF INSTRUMENTS (Include make and model number of each)	NUMBER AVAILABLE	RADIATION DETECTED	SENSITIVITY RANGE (mr/hr)	WINDOW THICKNESS (mg/cm ²)	USE (Monitoring, surveying, measuring)
See Attached					

11. METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED ABOVE.

All instruments used for measuring purposes are calibrated by the H.P. on a six month frequency with NBS traceable standards. All monitoring instruments are calibrated by an independent lab on a six month frequency (Southeast Atomic Labs or equivalent).

12. FILM BADGES, DOSIMETERS, AND BIO-ASSAY PROCEDURES USED. (For film badges, specify method of calibrating and processing, or name of supplier. State frequency of exchange.)

Whole body dosimeters (TLD type) will be worn by all appropriate personnel. These dosimeters will be serviced by R.S. Landauer (or an equivalent) on a quarterly frequency.

13. FACILITIES AND EQUIPMENT. Describe laboratory facilities and remote handling equipment, storage containers, shielding, fume hoods, etc. Explanatory sketch of facility is attached.
(Circle answer)

Yes

No

See Attached

14. RADIATION PROTECTION PROGRAM.

See Attached

15. WASTE DISPOSAL

See Attached

CERTIFICATE (This item must be completed by applicant)

THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATE ON BEHALF OF THE APPLICANT NAMED IN ITEM 1, CERTIFY THAT ALL INFORMATION CONTAINED IN THIS APPLICATION, INCLUDING ANY SUPPLEMENTS ATTACHED HERETO, IS TRUE AND CORRECT TO THE BEST OF OUR KNOWLEDGE AND BELIEF.

12/11/85

Quaddrex HPS, Inc
Applicant named in Item 1

by: James T. McVey

James T. McVey
Corp. Radiation + Safety Officer

Item 8:

- | | | |
|--|-------------------|--|
| 8a. a. Gadolinium-153 | 8b. a. Any form | 8c. a. 0.5 Curies |
| b. Gadolinium-153 | b. Sealed sources | b. 1.5 Curies each
with maximum
total of 9
Curies |
| c. Cobalt-60
Cesium-137
Sodium-22
Cobalt-57 | c. Sealed sources | c. Up to 100 μ Ci
each |

Item 9:

- a. Receipt of swipes taken from licensed bone densitometer units utilizing ^{153}Gd sealed sources. Said swipes may contain trace quantities of ^{153}Gd .
- b. Material will be used for storage only and future distribution to licensed recipients only.
- c. Sealed sources will be used as calibration check sources for leak testing of samples obtained for inservice medical bone densitometry systems.

Item 10:

TYPE OF INSTRUMENTS (include make & model number of each)	NUMBER AVAILABLE	RADIATION DETECTED	SENSITIVITY	WINDOW	USE (monitoring, surveying, measuring)
			RANGE (mr/hr)	THICKNESS (mg/cm ²)	
1. Canberra 35 MCA with NaI	1	gamma	N/A	N/A	measuring
2. Ludlum Model 2	2	beta/gamma	-0-		monitoring
3. Ludlum Model 3	2	beta/gamma	-0-		monitoring
4. Ludlum Model 177	1	beta/gamma	-0-		monitoring
5. Ludlum Model 1000 SCA with NaI or Gas Proportional	1	beta/gamma	N/A	-0-	measuring

Item 13:

The facilities associated with this license will include those indicated in diagram 4-1. The instrumentation and calibration sources will be located in the laboratory area. This area will be clearly marked as a radiation controlled area and storage of sealed calibration sources will be in a lockable cabinet when not in use.

The Gadolinium sealed sources will be located in a lockable cabinet located in the area indicated as the R&D area. This cabinet will be kept locked and a security seal will be used to indicate any unauthorized entry.

The waste accumulated for this licensed activity will be packaged into DOT-17H drums for transport and disposal. These drums will be located in the area designated as waste storage on the diagram. The waste will be periodically shipped off as per State of Florida procedures and not accumulated in large quantities.

These facilities are designed of concrete flooring with impermeable covering, permanent walls of metal, concrete or stud wall construction. These facilities are also a contiguous portion of the Quadrex HPS facility of approximately 25,000 ft² of office, lab and production space. No extra shielding will be required for the materials licensed due to their encapsulation within a shielded source holder or their low specific activity (for smears and calibration sources). The laboratory has within its confines additional counterspace, cabinets and a hood to facilitate safe use of radioactive materials. Access to these areas is afforded through controlled points where sign in sheets are utilized by those on the authorized listings. Visitors access is only upon RSO approval and may require escort.

Item 14:

- a. Quadrex HPS will receive up to six (6) Gadolinium sealed sources of up to 1500 mCi each for the sole purpose of storage for future distribution to NRC or Agreement State licensed facilities. These sources shall be maintained in a secure location providing for protection against unauthorized entry and tampering. The sources shall remain in their original shipping containers and shall be sealed with a tamper indicating seal. The exposure to the adjacent areas will be maintained at or below 2 mR/hr. Leak tests will be performed at a frequency of every six (6) months of the external surfaces of the containers. Leak testing will be performed of the actual source, only, prior to its transfer to another licensee to enhance Quadrex's ALARA program by eliminating unnecessary exposures. An inventory of all sources will be maintained to include as a minimum the type source, serial number, date received, curie content, and date/location of transfer.
- b. Quadrex HPS will receive leak test samples from licensed owners of Gadolinium-153 Osteoporosis units. These samples will be provided to the licensed unit owners in the form of a leak test kit. This kit may consist of but not be limited to such materials as filter discs, cotton tipped swabs, location map, identifying labels, instructions for use, and shipping materials. These leak test samples will be received by Quadrex HPS, logged into a receiving record and analyzed. This analysis will be performed on a Canberra Model 35 multichannel analyzer with a 3" x 3" NaI detector. This detection system shall be calibrated at least every six months. Sample analyses will be performed via standard health physics techniques sufficient to detect activity levels per sample of less than 0.005 μ Ci.

The data will be recorded in a form suitable for review by authorized state personnel and copies will be transmitted to the originating licensee for review and filing. In the event that a sample is found to contain radioactivity in excess of the specified limit of 0.005 μCi then one or more of the following will occur:

- a. Immediate notification to the licensee of a potentially leaking source with precautions to be implemented.
- b. Immediate delivery of an additional leak test kit or professional health physics personnel to evaluate.
- c. Notification of State representatives of a potential yet unconfirmed leaking source.

Upon verification of a leaking source, the licensee will be immediately notified to secure the area for additional evaluations and remedial action evaluation and the State representatives will be immediately notified.

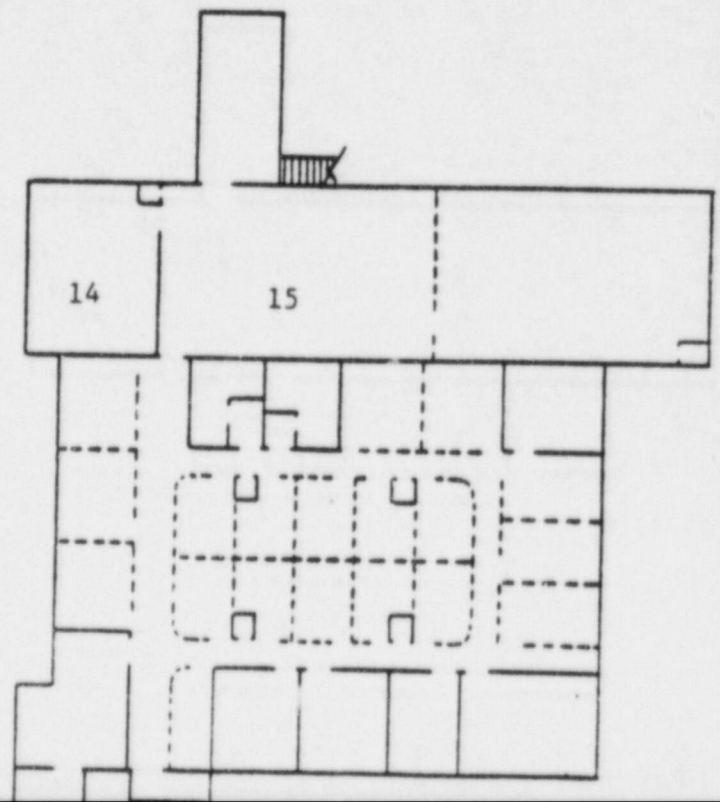
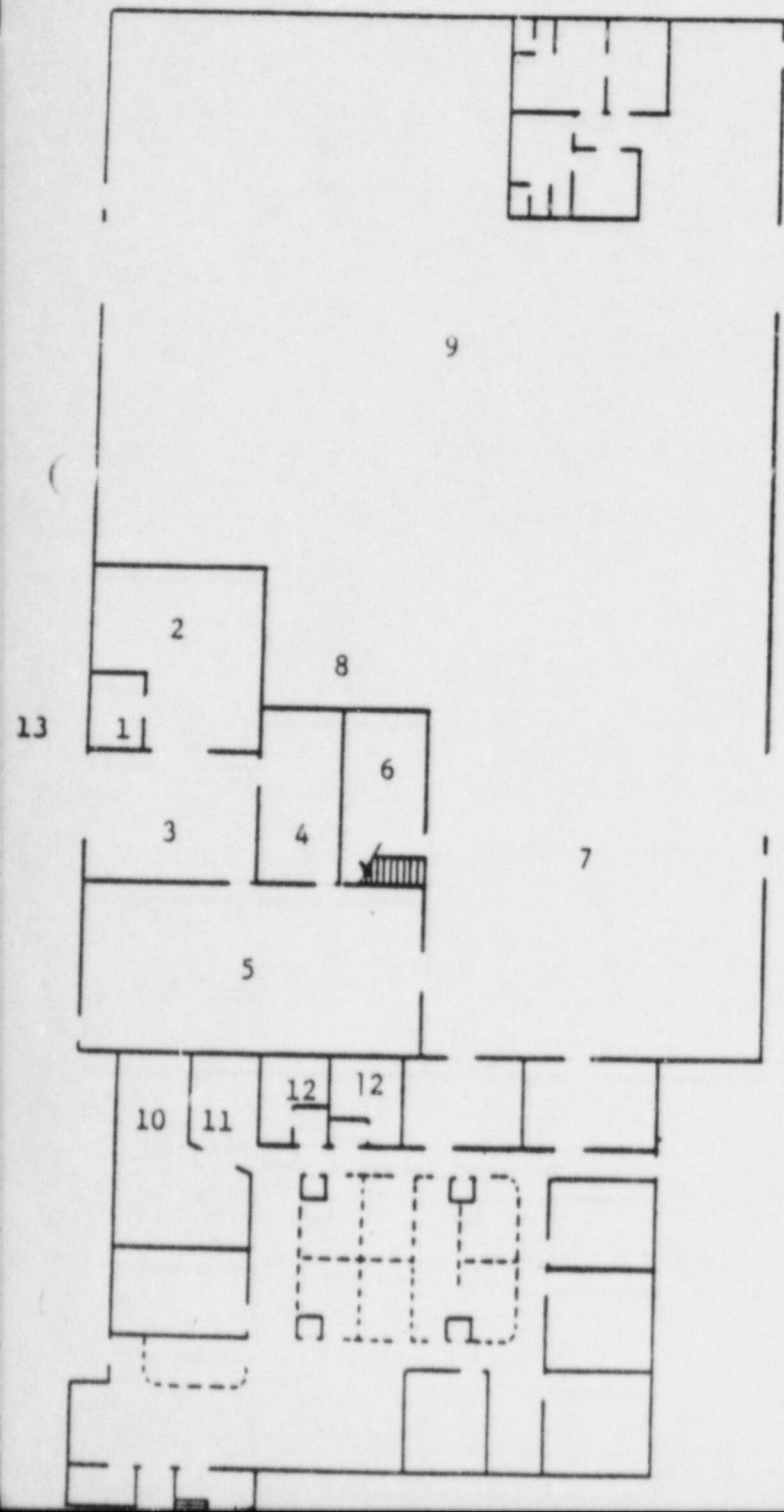
Item 15: Waste Disposal

All waste accumulated as a result of activities associated with this license shall be prepared for transport and disposal in accordance with the provisions of 49CFR173, 10CFR20 and burial site criteria. Said wastes shall be offered to NRC approved burial sites only. No environmental releases will occur as a result of this licensed activity.

Occupancy

RESTRICTED = Rooms 1-5

1. Radwaste Storage
2. Decon Room
3. Access Room
4. Laboratory
5. R&D Room
6. Shop Office
7. Shop
8. Shop Equipment Storage
9. Shop
10. President's Office
11. President's Secretary
12. Restrooms
13. Outside
14. Breakroom
15. Back-up Conference Room



Area of Training	Where Trained	Duration of Training	On-the-Job		Overall Eval	
			Yes	No	Yes	No
Principles and practices of radiation protection	University of Florida V.A. Hospital, Gainesville ERM Corp. NCTR	1967-1973 1971-1973 1973-1976 4/77-Present	X X X X		X X X X	
Radioactivity measurement standardization and monitoring techniques and instruments	Same	Same	X		X	
Chemistries and calculations basic to the use and measurements of radioactivity	Same	Same	X		X	
Biological effects of radiation	Same	Same	X		X	
Experience with radiation (Actual use of radioisotopes or equivalent experience)						

Isotope	Maximum amount	Where experience was gained	Duration of exp.	Type of use
P-14	750 mCi	U of F, V.A., NCTR	3 years	1) Biological inco and tracer anal
P-32	1 Ci	U of F, NCTR	3 years	2) Same as 1)
Co-60	460 Ci	U of F	2 years	3) Irradiation with lethal
S-137	.5 mCi	U of F	6 months	4) Whole Body Count & Phantom Analy
I-125 & 131	20 mCi	U of F	6 Mo	5) Thyroid uptake & phantom analy
Ce-99	30 mCi	U of F, V.A.	1 year	6) Patient imaging malignancies &
Na-24	750 mCi	U of F, V.A.	2 years	7) Evaluation of protective comp
P-32	1 mCi	U of F	3 Mo.	8) Instrument Eval
Kr-133	20 mCi	U of F	3 Mo.	9) Lung Function
Ar-41	10 uCi	U of F	1 Mo.	10) Analysis from effluent
Cr-51	50 uCi	U of F	2 Mo.	11) Blood evaluation

05	10 mCi	NCTR	6 Mo.	12)	Microsphere incorp
06	10 mCi	NCTR	6 Mo	13)	pharmacokinetic st
Ray	Diagnostic & Ortho-	U of F, ERM	3 years	14)	Same as 12)
achines	voltage	ERM	1 1/2 years	15)	Patient treatment
linear	20 MeV	U of F	3 Mo.	16)	imaging
elerator		U of F	3 Mo.	17)	Facility design &
users		U of F, V.A.	6 years	18)	evaluation
microwave					Instrument evaluat
electron					Leakage assesment
oscope					Biological evaluat

HEALTH PHYSICS SYSTEMS, INC.
James T. McVey

ENGINEERING/SENIOR HEALTH PHYSICIST

Experience Highlights

- Over ten years in the health physics field
- Familiar with all aspects of safe handling of radioactive materials and devices
- Proficiency in theoretical health physics
 - Competency in the function, design, adaptation and operations of radiation detection systems and procedures
- Extensive experience in dosimetry, waste control, decontamination procedures, and transportation of radioactive material
- Designed and supervised therapeutic and diagnostic shielding installations; health physics programs; and performed internal and external dosimetry evaluations

Professional Experience

Present

Health Physics Systems, Inc., Gainesville, Florida.
Health Physicist. Responsible for radiological services pertaining to radioactive materials licensing and safe handling; radioactive materials transportation; equipment and contract site ALARA compliance; quality assurance and quality control programs for instrumentation, equipment and procedures; and health physics support to all documents, programs and procedures as necessary. Responsible for research and development programs involving decontamination technologies applicable to the nuclear, industrial and research fields, including equipment development; data acquisition; evaluation and technical writing.

1977-1980

National Center for Toxicological Research, DHHS/FDA,
Jefferson, Arkansas.
Health Physicist. Responsible for large research facility radiation program with high volume radionuclide use. Duties included protocol review and approval; personnel monitoring and training; equipment training, repair, and calibration; system and program design; environmental surveillance; waste disposal; decontamination; transportation of hazardous materials; center-wide quality assurance program; research activities; and technical writing and presentation. Additional involvement included, shielding calculations, facility design, equipment design, supervision of the Radiation Control Office and all records and representation on various FDA/NCTR committees.

James T. McVey
Professional Experience (continued)

1975-1976

Pulcir, Inc., Oak Ridge, Tennessee. Southeastern representative and radiation biophysicist involved in radiation equipment review, sales, installation, and maintenance for nuclear medicine, diagnostic, therapeutic and clinical installations.

1973-1977

Environmental Radiation Management Corporation, Gainesville, Florida. President of consulting and services firm involved in licensing, surveillance, program design for medical installations, sample analysis, facility design, shielding determination and health physics responsibilities.

1967-1969
and
1971-1974

University of Florida, Gainesville, Florida. Research Electron Microscopist involved in orthopedic research of bio-glass ceramic prosthetic implants, utilizing radiotracers, autoradiography, tissue culture and electron microscopic evaluation.

Education

- M.S., Radiation Biophysics/Health Physics, University of Florida, Gainesville, 1972
- B.S., Psychology, University of Florida, Gainesville, Florida, 1970
- A.A., Zoology, Santa Fe Community College, Gainesville, Florida, 1968

College Training Includes:

- Health Physics
- Radiological Physics
- Radioisotope Theory and Techniques
- Radiation Protection
- Radiation Effects on Humans
- Instrumentation and Dosimetry in Radiology
- Nuclear Radiation Detection and Instruments
- Radioactive Tracer Instrumentation and Methodology
- Radiological Health Administration
- Nuclear Medicine Techniques and Instrumentation

James T. McVey
College Training (continued)

- Radiation Epidemiology
- Computer Programming and Medical Application
- Diagnostic and Radiation Therapy Procedures
- Nuclear Power Plant Operation
- Industrial Radiology
- Environmental Surveillance
- Inorganic and Organic Chemistry
- Zoology
- Psychology
- Calculus
- Physics
- Statistics

Certification

- Health Physics Certification - Pending

Training

- Hazardous Chemical Safety Course, Buffalo, NY
- H.P. Certification Review, Lowell, Mass., June 1981

Workshops

- Robotics Workshop to Delineate the Economic, Technical and Policy Issues for Remote Maintenance in Energy Systems. Sponsored by U.S.D.O.E., March, 1981, Gainesville, Florida.
- FED Remote Maintenance Equipment Workshop. Sponsored by U.S.D.O.E., March, 1981, Oak Ridge, Tennessee.

Publications

1. McVey, J.T.: High Resolution Autoradiographic Study of Parathyroid Hormone as a Radioprotectant. Thesis published by the University of Florida Graduate School, 1972.
2. Hench, L.L., Paschall, H.A., Puchall, N., and McVey, J.: Histological Responses at Bioglass and Bioglass-Ceramic Interfaces, 75th Annual Meeting, The American Ceramic Society, American Ceramic Society Bulletin, Vol. 52, pp. 432, 1973.

James T. McVey
Publications (continued)

3. Paschall, H.A., Rodebush, M., and McVey, J.T.: A Comparison of Soft Tissue Reaction to Metallic Screws and a Biodegradable Ceramic Implant, *Journal of Biomaterials Engineering*, 1972.
4. Paschall, H.A., Rodebush, M., and McVey, J.T.: Response of Cancellous Bone to Glass-Ceramic Implants, *Annual Report DADA 17-70-0000*, September, 1972.
5. Paschall, H.A., Rodebush, M., and McVey, J.T.: Soft Tissue Reaction to Non-Porous Bioglass-Ceramic Materials.
6. Tilden, R.L., Jackson, J. Jr., Enneking, W.F., Deland, F.W., and McVey, J.T.: Technetium-99m Polyphosphate: Histological Localization in Human Femurs by Autoradiography, *Journal of Nuclear Medicine*, 1973.
7. McVey, J.T., Hunziker, J., Holson, J.F., and Young, J.F.: Small Animal Traversing Gamma Counter, *J. of Pharmacological Methods*, Vol. 5, pp 1-13, 1981.
8. McVey, J.T., Hunziker, J., Holson, J.F., and Young, J.F.: Small Animal Whole Body Gamma Counter-Multiple Adaptations and Evaluations, *Health Physics*, Vol. 37, No. 6, pp. 823, 1979.
9. McVey, J.T., Hunziker, J., Holson, J.F., and Young, J.F.: Small Animal Whole Body Gamma Counter - Multiple Adaptations and Evaluations, *Proceedings, Arkansas Academy of Sciences*, pp. 18, 1979.
10. Contributor to the NCTR Guidelines for Protocol Development, Review and Approval prepared by the NCTR Research Scientist Group, Department of Health and Human Services, Food and Drug Administration/U.S. Environmental Protection Agency, National Center for Toxicological Research, 1980.
11. Contributor to the Radiation Studies Report: ENE 643-Electronic Product Radiation, Environmental Engineering, University of Florida, 1971.
12. McVey, J., Campuzano, D., and Fowler, D.: From Nuclear Waste to Reusable Items: Tools and Equipment, *Nuclear and Chemical Waste Management*, (accepted).
13. McVey, J., Campuzano, D., and Fowler, D.: From Nuclear Waste to Reusable Items: Tools and Equipment, *Trans. Am. Nucl. Soc.*, Vol. 38, pp 197, 1981.
14. Young, J.F., and McVey, J.T.: Quality Assurance Considerations for a Tissue Oxidizer System, in preparation.

James T. McVey

Presentations

- Three-day seminar at NCTR: Autoradiography Techniques, 1976.
- Arkansas Academy of Sciences, Paper presented: Small Animal Whole Body Gamma Counter, April, 1979.
- Health Physics Society, 24th Annual Meeting. Paper presented: Small Animal Whole Body Gamma Counter Multiple Adaptations and Evaluations, July, 1979.
- Week-long course: Safe Handling of Radionuclides, NCTR, 1977, 1978, and 1979.
- Seminar on Radionuclide Safety in Animal Handling, NCTR, 17 performed during 1978-79.
- American Nuclear Society Meeting, Paper presented: From Nuclear Waste to Reusable Items: Tools and Equipment, June, 1981.

Professional Memberships

American Nuclear Society (Member)
Florida Chapter of the American Nuclear Society (Member)
Health Physics Society (Member)
Florida Chapter of the Health Physics Society (Member)
Hazardous and Nuclear Materials and Waste Ad Hoc Committee (Public Office)
Deep South Health Physics Society (Past Member)
Arkansas Academy of Science (Past Member)
Air Pollution Control Association (Past Member)
Association of NCTR Employees of Little Rock (Past President)
Research Scientist Group (Past Chairman)

Activities

Assisted in Conceptual and managerial set-up of Quadrex Corporation, Nevada Inspection Services which included: Training, Department of Transportation Regulations, and Health Physics Considerations, 1980-81.

QUADREX CORPORATION

Bernhardt C. Warren

HEALTH PHYSICIST

Experience Highlights

- o Over nine years experience in evaluating applications for licensing nuclear operations.
- o Experience in planning emergency response activities.

Professional Experience

Present	Quadrex Corporation, Gainesville, Florida. responsibilities include health physics consulting to industry, medical facilities, academic institutions and other users of radioactive materials. Perform duties as radiation safety consultant to the company for licensed activities. Assists in preparation of application documents for submitting to regulatory agencies. Performs liaison duties with federal agencies.
1973-1982	<u>Department of Health and Rehabilitative Services Offices, Radiation Control, Tallahassee, Florida</u> Manager of the section responsible for the licensing of radioactive materials in the State of Florida. Established policies regarding complex licensing actions. Planned and implemented licensing procedures for all classes of licenses. Served as program liaison with federal, state and local agencies that interacted with the radiation control program. Also responsible for preparing budgetary issues, classifications, job descriptions and monitoring internal quality control activities.
1970-1973	<u>U.S. Army, Fort Campbell, Kentucky</u> Commissioned officer in the Medical Service Corps. Performed duties as Nuclear, Biological, Chemical Officer, Hospital Administrator, Unit Commander and Nuclear Medicine Officer.

Education

- o B.S., Biology/Psychology, Florida Southern College
- o M.P.A., Public Administration (Includes training in organizational behavior and development, personnel classification, budget preparation and analysis, policy development, legislative relationships, legal aspects, and statistical analyses.)
- o U.S. Nuclear Regulatory Commission Sponsored Training Programs
 - Applied Health Physics (10 Weeks) (included extensive training in radiation physics, instrumentation, biological effects, and nuclear power plant operations and safety requirements)
 - Nuclear Physics
 - Biological Effects of Ionizing radiation (Harvard Medical School)
 - Protective Action Decision Making for Radiological Emergency Response
 - Uranium Mining and Milling Operations
 - Medical use of Radionuclides
 - Radiation Protection Engineering

12/15/82

HEALTH PHYSICS SYSTEMS, INC.
Ray C. Thomas

Operations

Summary

Ray C. Thomas has an Associate of Science Degree in Radiological Health. His experience includes technical service representative for dry cleaning of protective clothing and small tool decon units, Health Physics Technician, and assisting in dosimetry control and surveillance areas.

Professional Experience

July 1977 - Present

Health Physics Systems, Inc., Gainesville, FL
Assisted in construction of mobile dry cleaning units, supervised the set-up of the dry cleaning units at various job sites, technical representative for dry cleaning of protective clothing and small tool decontamination units, supervisor for construction and repair of the mobile decon units, responsible for coordination of the mobile laundry systems, health physics technician at home office and outside contracts, assist in dosimetry control and surveillance, assisted in the development of the dry cleaning process.

Education

Central Florida Community College, Ocala, Florida.

June 1977-December 1978

A.S. Degree in Radiological Health (GPA 3.5 of 4.0)



Quadrex HPS Inc.

1940 N W 67th Place, Gainesville, Florida 32606-1649
904 373-6066 TWX 910-590-2438 TELEX 35 2031 TELECOPY 904-373-0040

January 30, 1986

Mr. Mike Stevens
Office of Radiation Control
Department of Health &
Rehabilitative Services
1317 Winewood Blvd.
Tallahassee, FL 32301

Dear Mike:

As per our telephone conversation, the following additional information is provided to you concerning our radioactive materials license application (control no. 51223-704).

Attached you will find:

- 1.0 A list of the manufacturers and model numbers of the radioactive sources.
- 2.0 Proposed instructions concerning the use of the leak test kit by the individual physicians. These proposed instructions may, from time to time, be modified as necessary or required by regulatory changes. Significant changes will not be made without prior review by the State.
- 3.0 A copy of the standard procedures to be used in the analysis of the collected leak test wipes.
- 4.0 A copy of the report sheet, to be sent to the individual physician, indicating the results of the leak test.

Should you have any further questions or requests concerning Quadrex's license application, feel free to contact me at (904) 373-6066.

Sincerely,

James T. McVey, CHCM
Corporate Radiation & Safety Officer

JTM/kdgl6

Enclosures

1.0 In reference to items 8 and 9 the following manufacturer and model numbers will apply:

- a. Gd-153 - swipes are obtained from installed units, provided by the individual physicians, mentioned and discussed in this application, therefore no specific manufacturer may be appropriate.
- b. Gd-153 - sealed source may be obtained from Gulf Nuclear (Model GD-1); Amersham Corp. (Model GD-10310); New England Nuclear (Model NER 430) or Biosources (Model OS 213A).
- c. Sealed NBS traceable reference sources such as those listed, including Co-60, Cs-137, Na-22, Co-57, and additionally, Gd-153 calibrated source may be purchased from the following:
 1. Isotope Products Laboratory Model 290D (disc sources)
 2. New England Nuclear Model NES 9103 (Gd-153 disc source) and/or Model number NES-1015, disc source kit.

2.0 Instructions to Physicians

Enclosed you will find a leak test kit. This kit consists of eight (8), prenumbered filter discs and holders, a 100 cm² template, facility diagram with prenumbered sample site locations, a plastic glove and a return sample mailer. In order to complete the necessary test, the following should be performed.

- a. Examine the 100 cm² template; this is the approximate area to be covered by each of the subsequent smears (about 4" x 4").
- b. Referring to the facility diagram, you will find sampling locations marked one (1) through eight (8). These are the approximate locations from which the leak test wipes should be made.
- c. Remove sampling smear number one (1) from the package. While wearing the glove peel the filter disc from the holder, and using moderate pressure wipe the pad (non adhesive side) over an area of approximately 100 cm² which corresponds to location number one (1) on the facility diagram provided.
- d. Wipe pad horizontally over the 4" x 4" area then vertically over the same 4" x 4" area.
- e. Carefully replace the obtained smear in its original holder. Fold the sample holder in half and fill in appropriate data, including date, time, location and the individual taking the sample and insert into sample envelope.
- f. Repeat this procedure for locations two (2) through eight (8) then insert the sample envelopes into the plastic bag and seal. Refer to Note (2) before proceeding.

- g. Insert the plastic bag containing the samples into the enclosed, pre-addressed (UPS, Federal Express, etc.) envelope, for delivery to Quadrex.

NOTE:

1. The enclosed plastic glove should be worn during the sampling procedure.
2. The samples obtained from the actual Gadolinium source cannot obviously conform to the rigid interpretations of a 4" x 4" area. Therefore, the entire prescribed surface is to be smeared.
3. The quantity of radioactive material typically obtained for all of these smears will be less than a regulated amount (exempt quantity). The packaging as prescribed complies with the regulations for shipment.

3.0 Standard procedures to be used in the analysis of the collected leak test wipes.

- a. The instrument to be used will be a Canberra 35 + multi channel analyzer (MCA) with a 3" x 3" NaI detector.
- b. The MCA will be calibrated with NBS traceable standards of sufficient number (at least 3) to permit accurate identification of isotope by respective energies and accurate determination of the quantity of isotope present. Calibration will be performed at least every six (6) months. Reference checks and standards will be run with every batch of samples to assure continued calibration. Any variation greater than 2 sigma from the determined mean count will be cause for recalibration.
- c. Background will be automatically subtracted from sample counts.
- d. Spectrums obtained for each sample will be printed with integrated area of interest indicated for isotope identification. These spectrum analyses will be maintained on file.
- e. One of the standards will include the isotope of interest (Gd-153) for accurate efficiency determination.
- f. Counting Procedure:
 1. Determine that the NaI detection system is within calibrated limits. For example, the reference peaks should fall within +/- 1% of the total number of channels in use (i.e. +/- 20 channels for 2048 or +/- 10 channels for 1024). If the reference peaks are not within these limits, recalibration may be required.

2. Decay correct the calibrated, Gd-153 standard for the subsequent analysis using equation 1 to determine the disintegrations per minute.
3. Count the Gd-153 standard for five (5) minutes and record the data on Form NOV-01 (use the same number of channels for integration purposes on all counts).
4. Count the background for ten (10) minutes and record data on Form NOV-01.
5. Calculate the system efficiency for Gd-153 using equation 2.
6. Remove samples from sample envelope with forceps and place into counter. Count samples for ten (10) minutes and record counts in Form NOV-01.
7. Determine the minimum detectable activity, (MDA), the smallest concentration of radioactive material, that has a 95% probability of being detected, using equation 3.
8. Calculate the true dpm for the collected sample using equation 4 and compare to system MDA.
9. Complete Form NOV-01 and return to RSO for review and report preparation.
10. After review the leak test data will be reported to the client on Form NOV-02.

Equations:

$$1: A = A_0 e$$

$$2: \% \text{ Efficiency} = \frac{\text{standard cpm} - \text{background dpm}}{\text{dpm (of standard)}} \times 100$$

$$3: \text{MDA}_{.95} = 4.66 \sqrt{\frac{\text{background cpm}}{T_{\text{min}}}}$$

$$4: \text{True dpm}_{.95} = \frac{\text{sample (dpm)} - \text{background dpm}}{\% \text{ efficiency}}$$

LEAK TEST DATA SHEET

Sample Site _____

Source Serial No. _____

Date Obtained _____

License No. _____

Operator _____

Date Analyzed* _____

Std. Ser. # _____

Current dpm _____

Calc. % Eff. _____

Decay Corrected dpm _____

Background cpm _____

Sample	Counting Time	Total Counts	cpm	dpm	Decay Correction	Meets Regulatory Criteria of <0.005 uCi (Y/N)
Std.						
Bkg.						
S-1						
S-2						
S-3						
S-4						
S-5						
S-6						
S-7						
S-8						

MDA is _____

Reviewed by: _____

Equations:

1: $A = A_0 e^{-\lambda t}$

2: $\% \text{ Efficiency} = \frac{\text{standard cpm} - \text{background dpm}}{\text{dpm (of standard)}} \times 100$

3: $\text{MDA}_{.95} = 4.66 \sqrt{\frac{\text{background cpm}}{T_{\min}}}$

4: $\text{True dpm}_{.95} = \frac{\text{sample (dpm)} - \text{background dpm}}{\% \text{ efficiency}}$

* If the time from date obtained to date analyzed is greater than two (2) days for Gadolinium samples, a decay correction is required (equation 1).

LEAK TEST ANALYSIS REPORT

Site: _____ Source Serial No. _____
 _____ License No. _____

This report is provided to you as an indication of the radiological analyses performed on leak survey samples on and around your sealed source. This report should be retained in your files for review by authorized regulatory agencies.

Samples Obtained by: Client _____ Quadrex _____

Date Obtained _____ Date Analyzed _____

Detection System

a. Type _____ b. % Efficiency _____
 c. MDA _____ d. Background _____
 e. Operator _____ f. Counting Time _____

NBS Standard Used _____

Sample Site	uCi	Meets Regulatory Limits (Y/N)
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		

Remedial Action Required

a. None _____ b. Resample _____
 c. H.P. Investigation Suggested _____
 d. Discontinue Use and Notify the State _____

Reviewed by: _____

STATE OF FLORIDA
DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES
1317 Winewood Boulevard
Tallahassee, Florida 32301
RADIATION CONTROL
RADIOACTIVE MATERIALS LICENSE
SUPPLEMENTARY SHEET

Page 1 of 1 Pages

License Number 1354-4

AMENDMENT NO. 1
(B91) (3P)

Quadrex HPS Inc.
1940 N.W. 67th Place
Gainesville, FL 32606

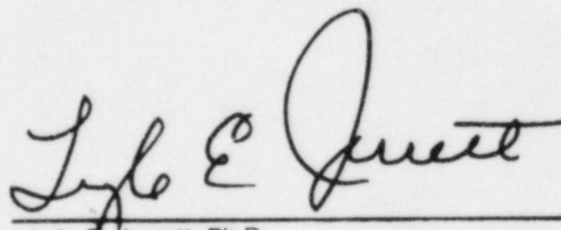
Pursuant to Annual Fee received March 11, 1986, State of Florida Radioactive Materials License number 1354-4 is hereby amended as follows:.

TO CHANGE ITEM #4 TO READ:

4. Expiration Date: February 28, 1991

Date March 21, 1986

Licensee - White
Central Files - Canary
U.S.N.R.C. - Pink
Office - Canary
Field Files - Pink



Lyle E. Jerrett, Ph.D.
Director
Radiation Control


by _____
Radiation Control

STATE OF FLORIDA
DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES
1317 Winewood Boulevard
Tallahassee, Florida 32301
RADIATION CONTROL
RADIOACTIVE MATERIALS LICENSE
SUPPLEMENTARY SHEET

Page 1 of 1 PagesLicense Number 1354-4
AMENDMENT NO. 2
(3P) (B91)

QUADREX HPS, INC.
1940 N.W. 67th Place
Gainesville, FL 32606

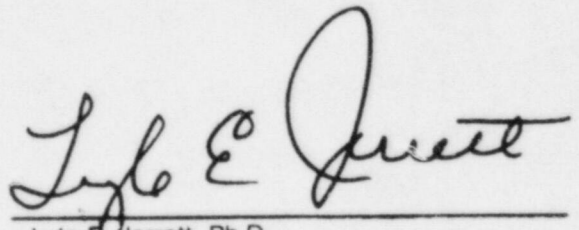
With reference to correspondence dated April 9, 1986, State of Florida Radioactive Materials License number 1354-4 is hereby amended as follows:

TO CHANGE CONDITION 12 TO READ:

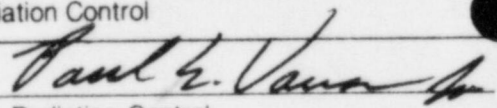
12. Licensed Material shall be used by James McVey, Ben Warren, Ray Thomas, or Susan E. McDonough.

Date May 28, 1986

Licensee - White
Central Files - Canary
U.S.N.R.C. - Pink
Office - Canary
Field Files - Pink



Lyle E. Jerrett, Ph.D.
Director
Radiation Control

by 
Radiation Control

SUSAN E. MCDONOUGH

HEALTH PHYSICIST

Experience Highlights

- | | |
|--|-----------------------------------|
| o Health Physics | o Radiation Detection Systems |
| o Radiation Waste Management | o Personnel Training |
| o Radioactive/Hazardous Materials Shipping | o Procedure Development |
| o Industrial Safety | o Dosimetry |
| o Environmental Surveillance | o Atmospheric Dispersion Modeling |

Professional Experience

- 1986 - Present Quadrex HPS Inc., Gainesville, Florida
Health Physicist responsible for license preparation for radioactive materials; radioactive materials transportation; personnel dosimetry; physician training in safe handling of radioactive materials; health physics/industrial safety support for programs and procedures; equipment calibration; sealed source leak testing, decontamination data acquisition and evaluation; and technical writing.
- 1985 - 1986 CH2M Hill, Gainesville, Florida
Laboratory Technician responsible for Gas Chromatographic analysis of environmental samples. Sample preparation including soil extractions; system setup; and calibration.
- 1985 - 1986 University of Florida, Gainesville, Florida
Graduate Assistant, Assistant Project Manager responsible for administration of the Emergency Thermoluminescence Dosimetry Program for Florida's Nuclear Power Plants; Standard Operating Procedures development; preparation of quarterly and annual reports; instrument calibration; and data management.
- 1985 - 1986 University of Florida, Gainesville, Florida
Graduate Assistant, Crystal River Nuclear Generating Plant Environmental Surveillance Program. ⁹⁰Sr/⁹⁰Y analysis from all waste streams for environmental monitoring program; atmospheric monitoring thermoluminescence dosimeter placement and collection.
- 1983 - 1983 City of Houston, Houston, Texas
Environmental Technician, Wasteload Control responsible for wasteload systems requirements and restrictions project; 1983 City of Houston annexation project; and technical communications.

1982 - 1983

City of Houston, Houston, Texas

Environmental Technician, Air Pollution Control, responsible for enforcement of the Texas Clean Air Act for both stationary and mobile sources; facility inspection sampling and compliance evaluation; atmospheric monitoring; and regulatory technical communication.

Education

- o M.S., Environmental Engineering Sciences-Air Pollution and Health Physics, University of Florida, Gainesville, Florida
- o B.S., Environmental Science, Florida Institute of Technology, Melbourne, Florida
- o B.S., Secondary School Science Education, Florida Institute of Technology, Melbourne, Florida

Professional Training

- o Principles and Practices of Radiation Protection, University of Florida, Gainesville, Florida
- o Radioactivity Measurement Standardization and Monitoring Techniques and Instruments, University of Florida, Gainesville, Florida
- o Mathematics and Calculations Basic to the Use and Measurements of Radioactivity, University of Florida, Gainesville, Florida
- o Biological Effects of Radiation, University of Florida, Gainesville, Florida.

Certification

- o Smoke Reader, Air Pollution Control Technology, Houston, Texas

Quaddrex HPS Inc.

QUADREX

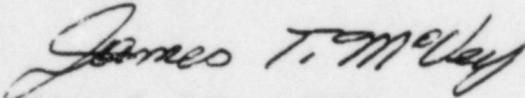
April 9, 1986

Mr. Allen Schubert
Radioactive Materials Section
Office of Radiation Control
Dept. of HRS
1317 Winewood Blvd.
Tallahassee, FL 32301

Dear Mr. Schubert:

This letter is to request amendment to our license number 1354-4 to add an additional user. The qualifications for Ms. Susan E. McDonough are attached for your review.

Sincerely,



James T. McVey, CHCM
Corporate Radiation & Safety Officer

JTM/kdg32

Enclosures

STATE OF FLORIDA
DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES
1317 Winewood Boulevard
Tallahassee, Florida 32301
RADIATION CONTROL
RADIOACTIVE MATERIALS LICENSE
SUPPLEMENTARY SHEET

Page 1 of 1 Pages

License Number 1354-4
AMENDMENT NO. 3
(3P) (B91)

QUADREX HPS, INC.
1940 N.W. 67th Place
Gainesville, FL 32609

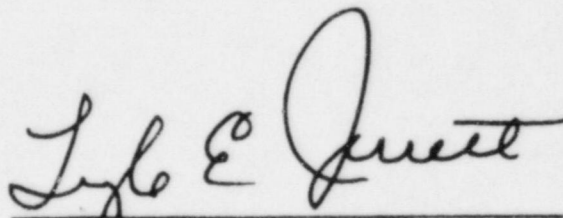
With reference to correspondence dated July 8, 1986, State of Florida Radioactive Materials License Number 1354-4 is hereby amended as follows:

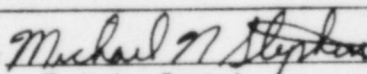
TO CHANGE ITEMS 6, 7 and 8, Subitem B TO READ:

- | | | |
|--|---|---|
| 6. Radioactive material
(element and mass number) | 7. Chemical and/or physical
form | 8. Maximum quantity licensee
may possess at any one time |
| B. Gadolinium 153 | B. Sealed source (New
England Nuclear Model
Number NES-9103 or
Isotope Product Lab Model
Number GSF series) | B. One source; not to exceed
100 microcuries. |

Date August 1, 1986

Licensee - White
Central Files - Canary
U.S.N.R.C. - Pink
Office - Canary
Field Files - Pink


Lyle E. Jerrett, Ph.D.
Director
Radiation Control

by 
Radiation Control



Quadrex HPS Inc.

1940 N W 67th Place, Gainesville, Florida 32606-1649
904-373-6066 TWX 910-590-2438 TELEX 35 2031 TELECOPY 904-373-0040

July 8, 1986

Mr. Allen Schubert
Office of Radiation Control
Department of Health and
Rehabilitative Services
1317 Winewood Blvd.
Tallahassee, FL 32301

Dear Allen:

This letter is a request to amend Quadrex HPS's Radioactive Materials License 1354-4 by the following:

Item 7b: Chemical and/or physical form to include "or Isotope Product Lab Model GF-153D as a potential source".

Item 8b: to remain "not to exceed 100 uCi".

Should you have any questions concerning this request please feel free to contact me at (904) 373-6066.

Sincerely,

Susan E. McDonough
Health Physicist

SEM/kdg35

The procedure is all mechanical and involves the following tools:

Allen wrench
Adjustment Rod
Adjustment Plug

The BMC-LAB is powered down during the adjustment for protection of the radioactive source.

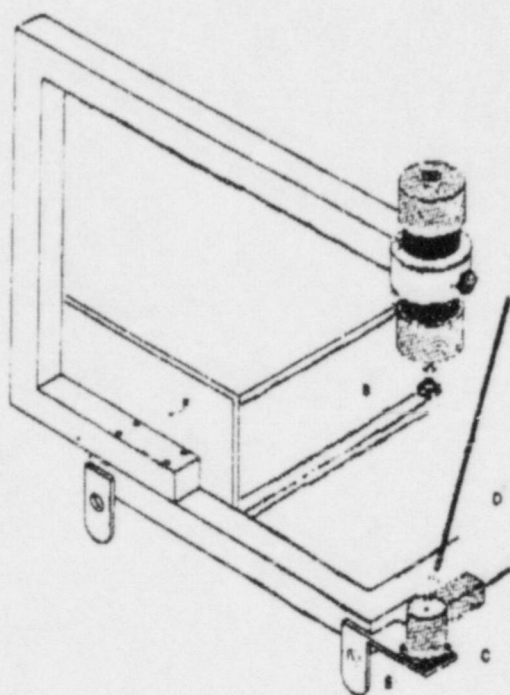


Fig.10.1 Source Holder alignment

1.
Loosen the thumb screw A at the detector holder and elevate the detector to its top position. Remove mattress and top cover.
2.
Insert the adjustment plug B into the detector aperture. This will ensure protection of the sensitive parts of the detector. Furthermore, the adjustment plug tap pointing downwards indicates the precise centerline.
3.
Insert the adjustment rod D into the source holder aperture. Take care not to bend the rod.
4.
Lower the detector as to get approx. 2 mm gap between the rod and the plug tap.

10. EQUIPMENT MAINTENANCE

10.1 REPLACEMENT AND ALIGNMENT OF SOURCE HOLDER

The source holder containing the radioactive source is located under the couch top cover.

The source holder is not rechargeable and must be disposed of with the source. Due to the decay of the radioactive source, the source holder assembly should be replaced every 18-24 month. See Technical Specifications for supplier of sources.

REPLACEMENT PROCEDURE

1.
Turn off the BMC-LAB22a on the analyzer front panel. (under top cover). Lift off mattress and top cover. Loosen the end panel screws in order to protect the paint.
2.
Disconnect the source holder plug.
3.
Unscrew the four screws E shown in fig. 10.1. (next page). Remove the source holder.
3.
Mount the new source holder on the rubber washer C as shown in the figure, source holder arm in parallel with scanner control box. Tighten the four screws E.
(The rubber washer is not included in earlier models. A new washer is supplied with the adjustment kit. (See chapter 11 for NDS order code).
4.
Insert the source holder plug into the scanner frame connector.
5.
Dispose of old source holder assembly in compliance with your local regulations.

Before the new source holder can be put into service, it must be aligned with the detector.

ALIGNING DETECTOR AND SOURCE HOLDER

This adjustment aligns detector and source holder in order to achieve maximum sensitivity.

5.

Align the top on the adjustment plug and the rod emerging from the source holder, by either tighten or loosen the four screws E securing the source holder.

Inspect that the rubber washer is compressed over the entire surface, as to give a firm and steady adjustment.

If it is impossible to align by means of the screws E, then slightly loosen the screws F holding the scanner gantry, for coarse alignment of the gantry. Refasten, and turn to the sourceholder for fine adjustment.

6.

Elevate the detector and remove the adjustment rod. Remove the adjustment plug.

Eventually perform the mechanical maintenance of the scanner before the top cover and mattress are put into place.