Thomas Jefferson University Hospital
Jefferson Health System

Department of Radiation Oncology
Bodine Center for Cancer Treatment
111 South 11th Street
Philadelphia, PA 19107-5097

Fax

To	PENNY LANZISERA	Date	3-13-08
Re	VARIAN CLINAC		
Department	NRC	Fax No.	
Fax #	~~610-339-5262~~ 610-337-5269 ~~610-337-5393~~	Number of Pages Including Cover Sheet	2
From	ESTER SAN DIEGO (SECRETARY)	Phone #	(215)955-8855

Comments ☐ Urgent ☐ For Review ☐ Reply ASAP ☐ Please Comment

PER YOUR REQUEST, HERE'S THE COPY OF THE LETTER RE: CLINAC 4

Public

989 Jericho Turnpike, Smithtown, New York 11787 631 864-5600

Richard T. Byrnes MD
Maged M. Ghaly MD
Heather D. Zinkin MD
David L. Benninghoff MD

September 28, 2006

Nuclear Systems
728 Shady Pond Path
Franklin Lakes, NJ 07417

North Shore Medical Accelerator, PC purchased from Nuclear Systems, Inc. a Varian Clinac 4, serial #99. The date of sale was around 1989.

Sincerely,

Norma Marriott
Administrator

C & C NUCLEAR SYSTEMS, INC.
26 DANIEL COURT
WOODCLIFF LAKE, NJ 07675

May 20, 1986

Nagalingam Suntharalingam, Ph.D.
Chief of Medical Physics
Thomas Jefferson University
Radiation Therapy Department
11th & Walnut Street
Philadelphia, PA 19107

Dear Dr. Suntharalingam:

Please accept this letter as a firm offer to purchase the Varian Clinac-4 accelerator from Jefferson Medical Center for the sum of $135,000 with the following terms:

1) $10,000 deposit with a signed agreement from both parties

2) the balance of the purchase price of $125,000 will be paid in full prior to removal of the accelerator

3) the Clinac-4 shall be purchased on an as is basis

4) the Clinac-4 shall be removed by C & C Nuclear Systems, Inc. at no cost to the hospital

5) the Clinac-4 shall be removed in a timely manner on or about November 1986 with proper notification from the hospital

If the above proposal is acceptable to the hospital, I shall then prepare a more formal contract.

Thank you for your attention to this matter.

Sincerely yours,

Bun Chan

Bun Chan
President

Public

JEFFERSON MEDICAL COLLEGE
of
THOMAS JEFFERSON UNIVERSITY

Department of Radiology
Stein Research Center
Division of Medical Physics

Philadelphia, 19107
(215) 829-7811
(215) 829-7813

27 February 1974

Office of Radiological Health
Pennsylvania Dept. of Health
P.O. Box 90
Harrisburg, PA 17120

ADDENDUM TO RADIATION PROTECTION SURVEY REPORT

Gentlemen:

A Varian Clinac-4 accelerator was installed in the Radiation Therapy Department at Thomas Jefferson University Hospital during July of 1973. A complete survey report was submitted to your office on 19 November 1973. It was noted in that report that additional shielding was required in the gantry to bring the leakage radiation to a small area below 0.1% of the useful beam. Due to the direction, area, and intensity of the leakage radiation, there was no hazard to patients or personnel, and, therefore, radiation therapy treatments could continue.

On 12 February 1974, two small pieces of lead shielding were retrofitted around the Vaclon pump leading to the accelerator waveguide by Varian personnel. This reduced the exposure rate at one meter below the stated limits. Position 13 on the diagram of the head leakage measurements (see 11/19/73 report) now measures 6 R/hr. The unit now meets all pertinent radiation safety requirements.

Sincerely,

Kenneth Strubler

Kenneth Strubler
Radiological Physicist

KS/mjh

Public

JEFFERSON MEDICAL COLLEGE
of
THOMAS JEFFERSON UNIVERSITY

Department of Radiology
Stein Research Center
Division of Medical Physics

Philadelphia, 19107
(215) 829-7811
(215) 829-7813

19 November 1973

Office of Radiological Health
Pennsylvania Dept. of Health
P.O. Box 90
Harrisburg, Penna. 17120

Gentlemen:

A Varian Clinac-4 linear accelerator was installed in the Radiation Therapy Department at Thomas Jefferson University Hospital during July of this year. A preliminary report was sent to you at an earlier date. The attached radiation safety survey is being submitted in compliance with regulations.

Registration of this unit has been made with your office. If there are any questions regarding this report, please let me know.

Sincerely yours,

Kenneth Strubler

Kenneth Strubler
Radiological Physicist

KS/rrb

REPORT OF A RADIATION PROTECTION SURVEY OF A VARIAN CLINAC 4 MEDICAL LINEAR ACCELERATOR

1. INSTALLATION

A Varian Clinac-4, Model No. 99, was installed in the Department of Radiation Therapy during July, 1973. The Clinac-4 is a self-contained medical linear accelerator designed for radiotherapy. The installation was into a newly constructed subterranean room located in the basement of the main building of Thomas Jefferson University Hospital, Philadelphia, Pennsylvania 19107.

To insure safety, a preliminary radiation survey was conducted during the month of July prior to acceptance tests. A detailed survey and calibration was made during August, 1973 by the undersigned, and the facility was considered ready for clinical use on August 20, 1973.

2. INSTRUMENTATION

The following instruments were used for the protection survey:

A) Victoreen Cutie Pie Survey Meter
Model: 740-F Serial: 317
Range: 0-25 mR/hr Scales: 1X, 100X, 1000X

To avoid possible errors due to the pulsed nature of the beam , this instrument was calibrated with the Clinac-4 itself; low exposure rates were obtained by using lead filters and large distances.

B) Portable Survey Meter with GM Probe
(Eberline Instrument Corp.)
Model: PAC-1SA Serial: 1164
GM Tube #2548 used with electrometer

Calibration of this instrument was with a standard radium source calibrated by N.B.S. and leak tested periodically.

3. DESCRIPTION OF UNIT

The Clinac-4 is an isocentrically mounted unit capable of 360° rotation. It accelerates electrons to an energy of 4 MeV which strike a transmission-type tungsten target to produce X-rays; it can only be used in this X-ray mode. The dose rate in tissue is continuously variable from about 100 to 330 rads/min @80 cm. Field size is variable from 0X0 cm to 32 x 32 cm @80 cm, and the tube housing is of the therapeutic type. A lead flattening filter is permanently mounted in the unit. Wedge filters may be attached to the collimator and are interlocked so that the beam may not be turned on without the appropriate indication on the console and without the proper "beam on" sequence by the operator. No other filter system is used with the unit.

4. LEAKAGE RADIATION

A survey was made of the leakage radiation surrounding the tube housing. Eighteen locations one meter from the target were measured in three mutually perpendicular planes. An area one meter from the target of about 500 cm^2 on top of the gantry and directed backwards (away from the treatment couch) measured from 15 to 50 R/hr. This is greater than 0.1% of the useful beam which is about 13 R/hr (based on a maximum dose rate of 330 rads/min @80 cm). All other locations give an average exposure of about 3R/hr at one meter.

Of principal concern is the protection of the patient during treatment. However, the high leakage radiation measured in one area does not present a hazard to the patient due to its location, area and intensity. Therefore, uni additional shielding is added, treatment of patients may continue.

5. AREA SURVEY OF STRAY RADIATION

A detailed survey was made of stray radiation levels in all accessible areas in the vicinity of the teletherapy room, including the driveway above. The survey was made with a GM Survey Meter calibrated against a radium standard. Measurements were made with the beam collimator jaws opened to their fullest extent with and without a phantom intercepting the beam. For measurements in the driveway above the room and behind primary barriers, the unattenuated beam was used and directed in each instance to the area of concer Representative maximum readings are listed below at selected locations. (see diagram).

Position	Description	Maximum Exposure Rate (mR/hr)
A	Control Suite	near background
B	Lead glass window in door	< 0.1
C	At examination rooms	8.0 (at wall) 2.0 in room
D	Waiting area-corridor	2.0
E	Adjacent stairway*	5.3*
F	Driveway above	0.8

* Part of this area may be used for storage purposes in the future. Access to this room is through a door kept locked at all times. The door is interlocked and marked with warning signs and lights. The stairway leads only to a small unoccupied area containing utility conduit. Furthermore, due to the presence of the stairway, the measurement listed above is not within the solid angle of the primary beam; i.e., it is either above or lateral to it.

The entire radiation therapy wing is considered a controlled area. Stray radiation measurements in this area generally range from about background levels to 3.5 mR/hr. Exposure rates above 2 mR/hr were obtained when the unattenuated beam (at maximum dose rate) was directed at primary barriers. These levels are well within permissible levels when use and occupancy factors are

CHEM-NUCLEAR SYSTEMS, LLC
Subsidiary of Duratek
740 Osborn Road • Barnwell, South Carolina 29812

28 June, 2004

John McCormick
Bionomics, Inc.
P.O. Box 817
Kingston, TN 37763

Reference: Radioactive Waste Shipment – Shipment ID Number: 12369

Dear Mr. McCormick,

As required by 10 CFR, Part 20 (Appendix F), South Carolina Title A (3.55.3.4.1), and Barnwell Waste Management Facility Disposal Criteria (S20-AD-010), this letter is notification that the shipment referenced above has been disposed of at the Barnwell Waste Management Facility. This waste meets all the Barnwell Waste Management Facility acceptance requirements and was disposed of in accordance with the Barnwell Site's License.

If you have any questions regarding this letter, please contact the Prior Notification Plan Department at (803) 541-5017.

Sincerely,

James W. Latham
Vice President, Barnwell Operations

FORM 542A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

BARNWELL WASTE MANAGEMENT FACILITY

2 MANIFEST NUMBER: 0604 12360

3 PAGE 2 OF 3 PAGE(S)

MANIFEST INDEX AND REGIONAL COMPACT TABULATION (CONTINUATION)

5 C TRANSPORT PERMIT NUMBER	5 GENERATOR NAME AND TELEPHONE NUMBER	6 GENERATOR FACILITY ADDRESS	6A WASTE DESCRIPTION (NOMENCLATURE)	7 PREPROCESSED WASTE (OR MATERIAL) VOLUME (m^3)	(ft^3)	8 MANIFEST NUMBER(S) UNDER WHICH WASTE (OR MATERIAL) RECEIVED AND DATE OF RECEIPT	9 WASTE CODE (APPROPRIATE ONE CHECKED)	10 ORIGINATING COMPACT REGION OR STATE	11 AS PROCESSED/COLLECTED TOTAL A SOURCE MATERIAL (kg)	(lb)	B SNM (g)	C ACTIVITY (MBq)	(mCi)	D VOLUME (m^3)	(ft^3)	E WEIGHT (lb)	F MAXIMUM PACKAGE RADIATION LEVEL (mrem/hr)
			Sealed Sources	5.6633730	0.20	52004 5/23/2004	C	NC	NP		NP	11255.001367505	305.000037365	5.663370	0.20	31.00	50.00
			Sealed Sources	0.0036811905	0.13	51804A 5/23/2004	C	SD	NP		NP	0.000296	0.000008	0.0036811905	0.13	20.00	50.00
			Sealed Sources	5.0970330	0.18	51704C 5/23/2004	C	IA	NP		NP	3709.265150	100.25095	5.0970330	0.18	28.00	50.00
			Sealed Sources	5.6633730	0.20	52704G 5/28/2004	C	PA	NP		NP	1110.00	30.00	5.663370	0.20	31.00	50.00
1433-37 04 Y	Thomas Jefferson University (215) 955-7813	919 Walnut Ave. Philadelphia, PA 19107	Sealed Sources	0.0283168850	0.10	52704F 5/28/2004	C	PA	NP		NP	1.4800	0.040	0.0283168850	0.10	16.00	50.00
			Sealed Sources	0.0283168850	0.10	52504-B 5/28/2004	C	NY	NP		NP	7881.00	213.00	0.0283168850	0.10	16.00	50.00
			Sealed Sources	0.0505871615	1.79	60304 6/4/2004	C	SC	NP		NP	4421.500	119.500	0.0505871615	1.79	278.00	50.00
			Sealed Sources	0.0280336815	0.99	60204D 6/4/2004	C	SC	NP		NP	1.4800	0.0400	0.0280336815	0.99	155.00	50.00
			Sealed Sources	0.0002831685	0.01	60204A 6/4/2004	C	SC	NP		NP	9.034290	0.244170	0.0002831685	0.01	1.00	50.00

FORM 542A (3-90) DIO

CONSIGNEE ORIGINAL COPY

APPROVED BY OMB: NO. 3150-0164
EXPIRES: 07/31/2004

Estimated burden per response to comply with this information collection request: 45 minutes. This uniform manifest is required by NRC to meet reporting requirements of Federal and State Agencies for the safe transportation and disposal of low-level waste. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0164), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

NRC FORM 540 (7-2001) U.S. NUCLEAR REGULATORY COMMISSION

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER *(Include Area Code)*: (800) 376-0197

ORGANIZATION: [illegible], INC

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☒ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST =====> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? If "Yes," provide Manifest Number ☐ YES ☒ NO

EPA MANIFEST NUMBER: N/A

5. SHIPPER - NAME AND FACILITY: [illegible]
[illegible]
[illegible] PA [illegible]

SHIPPER I.D. NUMBER:

☐ COLLECTOR
☐ PROCESSOR
☒ GENERATOR TYPE *(Specify)*: A

USER PERMIT NUMBER:
SHIPMENT NUMBER:

CONTACT: Larry [illegible]
TELEPHONE NUMBER *(Include Area Code)*: 215-[illegible]-7813

6. CARRIER - Name and Address: TAG [illegible]
2813 [illegible]
[illegible] TN 37748

EPA I.D. NUMBER: TN[illegible]
SHIPPING DATE: 5/27/04

CONTACT: [illegible]
TELEPHONE NUMBER *(Include Area Code)*: [illegible]

SIGNATURE - Authorized carrier acknowledging waste receipt: [signature]
DATE: 5/27/04

7. NRC FORM 540 AND 540A PAGE 1 OF 1 PAGE(S)
NRC FORM 541 AND 541A — PAGE(S)
NRC FORM 542 AND 542A — PAGE(S)
ADDITIONAL INFORMATION — PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): [illegible]27[illegible]F

9. CONSIGNEE - Name and Facility Address: Chem-Nuclear [illegible]
[illegible] Rd
Barnwell SC 29812

CONTACT: Jimmy [illegible]
TELEPHONE NUMBER *(Include Area Code)*: (803)259-179[illegible]

SIGNATURE - Authorized consignee acknowledging waste receipt:
DATE:

10. CERTIFICATION

This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the applicable requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature]
TITLE: [illegible]
DATE: 5/27/04

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (including proper shipping name, hazard class, UN ID number, and any additional inforation)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES		16. TOTAL PACKAGE ACTIVITY IN SI UNITS	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
Radioactive Material, n.o.s.,	White [illegible]	N/A	[illegible]	~~[illegible]~~ Gd 153		1.48 MBq	N/A	[illegible]	TJB-1
7, UN2982									

FOR CONSIGNEE USE ONLY

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