

February 8, 2011

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Ms. Sandra Gabriel
Senior Health Physicist
Medical Branch
Division of Nuclear Materials Safety
United States Nuclear Regulatory Commission, Region I
475 Allendale Road
King of Prussia, PA 19406-1415

03001246

2011 FEB 17 AM 10:45
RECEIVED
REGION 1

RE: NRC Radioactive Materials License Amendment - #06-00854-03

Dear Ms. Gabriel:

This letter serves to request that our radioactive materials license be amended to incorporate Dr. Robert Zamenhof as Radiation Safety Officer (RSO). The anticipated date for Dr. Zamenhof to assume the duties of RSO is February 16, 2011. The following attachments are enclosed to support Dr. Zamenhof in this position:

Dr. Zamenhof's CV

Attestation letter from Ms. Rosemary Kennedy, RSO at Harvard's Beth Israel Deaconess Medical Ctr.
E-mail correspondence to Dr. Zamenhof by Ms. Kennedy commenting on further demonstration of RSO training.

Letter of support from Dr. Wu, Director, Tufts Gamma Knife Center

Letter of support from Dr. Sarno, Vice Chairman, Tufts Medical Center

Letter of support from Dr. Clouse, Director of Research, Harvard's Beth Israel Deaconess Medical Ctr.

Letter of support from Dr. Fitzek, Indiana University Medical School (formerly of Tufts Medical Center).

Letter from Indiana Department of Public Health authorizing Dr. Zamenhof as a medical and health physicist.

Letter from Indiana Department of Public Health confirming Dr. Zamenhof's RSO status at MPRI
Completed NRC Form 133A (RSO) attesting to Dr. Zamenhof's training and suitability to be an RSO in Connecticut.

ABR Certificate showing Dr. Zamenhof's board certification in Radiological Physics

Dr. Zamenhof's bio sketch

Copy of Distinguished Service Award from the American Board of Radiology (ABR)

574455

NMSS/RGN1 MATERIALS-002

I have reviewed Dr. Zamenhof's credentials, training and experience records and discussed his potential appointment as RSO for St. Francis Hospital and Medical Center with senior administration officials. We are all completely satisfied with Dr. Zamenhof's clinical experience, training and experience in health physics and other areas of radiological and therapeutic physics. Pending his approval by your agency, we fully support him as St. Francis Hospital and Medical Center's new RSO.

Dr. Zamenhof will work closely with the Radiation Safety Assistant, Mr. Robert Varsanik, who is also the Nuclear Medicine Supervisor. He has daily hands-on responsibility for much of the daily use and handling of licensed materials at St. Francis Hospital, and works closely with the RSO on a weekly basis. Mr. Varsanik serves as the point of contact on radiation safety issues in the absence of the RSO, and has done so for more than 5 years.

Please contact my office should you require clarification or have any questions regarding this request.

If you have any questions, please call me at **860-714-5925**

Sincerely,



Greg Hisel, CHP
Radiation Safety Officer
Saint Francis Hospital and Medical Center
114 Woodland Street
Hartford, CT 06105

Tel 860-714-5925
Fax 860-714-8019
Email: ghisel@yahoo.com



Robert Falaguerra
System Vice President Facilities, Support
Services and Construction
Saint Francis Hospital and Medical Center
114 Woodland Street
Hartford, CT 06105



In acknowledgement and appreciation of
ongoing exceptional service in
fulfilling the ABR mission

DR. ROBERT ZAMENHOF

Is awarded this

DISTINGUISHED SERVICE AWARD

March 1, 2010

U. Reed Jennicks, MD

President

Harry Bederman, MD

Executive Director

The American Board of Radiology

Dear Sir/Madame

I am pleased to inform you that at its last meeting The American Board of Radiology voted to grant you its certificate in RADIOLOGICAL PHYS.

With personal congratulations, I am

Sincerely yours,



F938 PH
ROBERT G ZAMENHOF PH.D.



Beth Israel Deaconess
Medical Center



A teaching hospital of
Harvard Medical School

U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

1/14/2011

To Whom It May Concern

At Beth Israel Deaconess Medical Center (BIDMC) in Boston, MA for the period 1996-2003 Robert G. Zamenhof PhD was

1. Chief, Radiological Physics Section for Radiology at BIDMC and
2. An Authorized User BNCT Medical Physicist for the Boron- Neutron Capture Therapy clinical protocol (joint project between MIT reactor and BIDMC) under license 60-0432.

In those capacities he was a very active member of the BIDMC Radiation Safety Committee which oversaw the broad scope medical license 60-0432. Regular monthly agenda items for the committee were that appropriate of a broad scope medical license included authorized user approval for the therapeutic use of I-131 as well as other radioactive materials used clinically in Radiation Therapy and Nuclear Medicine, and usage in research laboratories.

During his tenure here, and at the request of BIDMC senior administration and the Radiation Safety Committee, he conducted an in-depth review of our Radiation Safety Committee.

Please feel free to contact me at the number below if you have further questions

A handwritten signature in black ink, appearing to read "MKennedy".

Rosemary Kennedy
Radiation Safety Officer
Director of Radiation Safety
Beth Israel Deaconess Medical Center
330 Brookline Avenue
BOSTON, MA 02215
617 667 2038 phone
617 667 4320 fax



Dr. Zamenhof received his undergraduate degree in Electronics and Communications in 1969 from the Polytechnic of North London, U.K., his M.Sc. in Bioengineering in 1971 from the University of Strathclyde, Glasgow, Scotland, and his Ph.D. in Nuclear Engineering & Applied Radiation Physics in 1977 from the Massachusetts Institute of Technology. From 1977 to 1978, Dr. Zamenhof was a Fellow in Radiological Physics at the Harvard Medical School in the Physics Research Laboratory of the Massachusetts General Hospital, Boston. In 1978 he joined the faculty of the Tufts University School of Medicine and was appointed to the Special and Scientific Staff in the New England Medical Center's Department of Radiation Oncology. In 1981 Dr. Zamenhof became the Director of the Radiological Sciences Section at the New England Medical Center, and in 1989 was promoted to Full Professor of Radiation Oncology & Radiology. In 1987 he became the Principal Investigator of the US DOE sponsored program in Neutron Capture Therapy, a position he held until 2003. In 1994 Dr. Zamenhof was appointed to the rank of Visiting Scientist in the Nuclear Engineering Department at MIT. In 1996 he founded and was appointed to the Directorship of the Radiological Physics Division in the Department of Radiology, Beth Israel Deaconess Medical Center, Harvard Medical School, and in July, 1996 was appointed to the rank of Associate Professor of Radiology, Harvard Medical School. In 2003, Dr. Zamenhof was recruited back to Tufts New England Medical Center, where he was appointed Director of Radiological Physics and in 2004 Vice Chairman of Radiation Oncology. In 2007, Dr. Zamenhof left Tufts New England Medical Center and took on a position as Interim Director of Medical Physics, at the Midwest Proton Radiotherapy Institute, Bloomington, Indiana. Dr. Zamenhof has authored or co-authored 129 book chapters, papers, and technical reports in the areas of boron neutron capture therapy, bone density measurement, CT, digital subtraction angiography, mammography, neutron activation analysis, and radiation dosimetry. He is the author of 3 patents in the fields of radiation microdosimetry and computational treatment planning and is the author of a commercial software product for the evaluation of x-ray exposure to patients undergoing diagnostic procedures. Dr. Zamenhof has been the recipient of over \$18,000,000 in Federal and private foundation research grants. Dr. Zamenhof has been in the past and is currently a member of 20 institutional, national, and international committees. He was the instructor-in-residence in the New England Roentgen Ray Society annual radiological physics course for radiology residents. He is a diplomate of the American Board of Radiology in Radiological Physics (1985), is triply-certified in the physics of radiation therapy physics, diagnostic physics, and nuclear medicine physics, and is an approved radiotherapy, diagnostic, and radiation safety physicist with the State of Indiana's Department of Health. Dr. Zamenhof is a past oral examiner for the American Board of Radiology as well as past Diagnostic Physics Panel Chairman and oral examiner for the American Board of Medical Physics. Dr. Zamenhof was Associate Editor of the Journal Medical Physics from 1997-1999. He is a Fellow of the AAPM and a member of its Board of Chancellors and is a past President of the International Society of Neutron Capture Therapy.

CURRICULUM VITAE

Robert G.A. Zamenhof, Ph.D., F.A.A.P.M.

HOME ADDRESS

[REDACTED]
Tel: [REDACTED]
Fax: [REDACTED]
Email: zamenhof@mit.edu

PLACE OF BIRTH

EDUCATION

1966-1970 B.Sc. Polytechnic of North London (U.K.) (Electronics & Communications)
1971-1972 M.Sc. University of Strathclyde (U.K.) (Bioengineering)
1973-1977 Ph.D. Massachusetts Institute of Technology (Applied Radiation Physics)

POSTDOCTORAL TRAINING

1976-1978 Research Fellow in Radiology (Physics) Harvard Medical School, Massachusetts General Hospital, Boston, Massachusetts

BOARD CERTIFICATION

1985 American Board of Radiology Certification in *Radiological Physics*
[triple certification in *therapeutic radiation physics*, *diagnostic radiation physics*, and *physics of nuclear medicine*]

ACADEMIC APPOINTMENTS

1976-1979 Research Fellow in Radiology (Physics) Harvard Medical School, MGH
1978-1982 Clinical Assistant Professor of Radiation Oncology and Diagnostic Radiology, Tufts School of Medicine & New England Medical Center
1982-1989 Associate Professor of Radiation Oncology and Diagnostic Radiology Tufts University School of Medicine & New England Medical Center
1989-1996 Professor of Medical Physics, Tufts University School of Medicine & New England Medical Center
1996-2004 Associate Professor of Radiology, Harvard Medical School
2003-2007 Professor of Radiation Oncology, Tufts University School of Medicine & New England Medical Center

HOSPITAL APPOINTMENTS

1979-1981 Chief, Radiotherapy Treatment Planning Section,
Dept. of Radiation Oncology, New England Medical Center Medical Physics Division,
New England Medical Center, Tufts University School of Medicine
1981-1995 Chief, Radiological Sciences Section, Dept. of Radiation Oncology, New England

- 1996-2003 Medical Center, Tufts University School of Medicine
Chief, Radiological Physics Section, Department of Radiology, Beth Israel Deaconess
Medical Center, Harvard Medical School
- 2003-2007 Director, Division of Radiological Sciences, Department of Radiation Oncology, Tufts-
New England Medical Center, Tufts University School of Medicine
- 2003-2007 Vice Chairman, Department of Radiation Oncology, T-NEMC
- 2007-pres Interim Director of Medical Physics, Midwest Proton Radiotherapy Institute

OTHER PROFESSIONAL POSITIONS & VISITING APPOINTMENTS

- 1977-1980 Adjunct Assistant Professor of Engineering, Boston University
- 1987-pres Research Affiliate, Dept. of Nuclear Engineering, MIT
- 1997 Visiting Professor, Wayne State University, Department of Medical Physics
- 1994-2007 Visiting Scientist, Dept. of Nuclear Engineering, MIT
- 2006 Visiting Professor, Dept. of Physics, University of Buenos Aires
- 2007-2008 Visiting Professor, Indiana University, Department of Physics

AWARDS & HONORS

- 1971-1972 British Science Research Council Scholarship (U.K.)
- 1973-1975 Harvard-MIT Health Science and Technology Fellowship
- 1975-1977 MIT Health Sciences Fund Fellowship
- 1976-2007 Sigma-Xi Research Society of North America
- 1987 Recipient, *Sylvia Sorkin-Greenfield Award* for "Best Paper in Medical Physics in 1986"

COMMITTEE ASSIGNMENTS

REGIONAL, NATIONAL, INTERNATIONAL

- 1979-1982 Member of NCRP Scientific Committee-55 (Experimental Basis for Absorbed Dose
Calculations in Medical Uses of Radionuclides)
- 1980-1981 Member of Advisory Committee on Research, MIT Nuclear Reactor Laboratory
- 1981-1983 Member of American Association of Physicists in Medicine (AAPM) International Affairs
Committee
- 1982-1985 Member of AAPM NMR Committee
- 1982-1985 Member of AAPM Publications Committee
- 1982-1983 Member of International Atomic Energy Agency Advisory Panel on Nuclear
Techniques in Developing Countries
- 1982-1983 Chairman, NE Chapter AAPM Committee on Education (including organization of a
two-day symposium on digital angiography, ACR CME accredited)
- 1982-1985 Editor, *AAPM Newsletter*
- 1983-1984 President, New England Chapter, AAPM
- 1986-1987 Member, ACR Committee on Quality Assurance and Acceptance Testing of Radiology
Equipment
- 1986-1990 Chairman, AAPM Task Group on Bone Density Measurement
- 1993-1994 Member, U.S. DOE Coordinating Committee for Neutron Capture Therapy Research
- 1992-1995 Member of Advisory Committee for NIH Program Project Grant (Dr. Richard Pierson PI)
titled: "Methods for High-Precision In Vivo Neutron Activation Analysis for Body
Composition Analysis"
- 1990-2001 Member, Board of Councilors, International Society for Neutron Capture Therapy
- 1996-2003 Oral Examiner, American Board of Radiology (Radiological Physics)
- 1997-2005 Oral Examiner, American College of Medical Physics (Diagnostic Imaging Physics)
- 1997-1999 Associate Editor, *Journal of Medical Physics*
- 1998-2007 Chairman, Diagnostic Imaging Physics Panel, American Board of Medical Physics

Curriculum Vitae: Robert G. Zamenhof, Ph.D.

- 1998-2005 Member, Executive Board, International Society for Neutron Capture Therapy
1998-2007 Member, Executive Board, American College of Medical Physics
President-Elect, International Society for Neutron Capture Therapy
2002-2004 President, International Society for Neutron Capture Therapy
2002-2005 Member, AAPM Board of Chancellors
2002 Elected to Fellowship of the AAPM

TUFTS SCHOOL OF MEDICINE & NEW ENGLAND MEDICAL CENTER

- 1986-1987 Interviewer for Tufts University School of Medicine Admissions Committee
1980-1995 Volunteer Interpreter for New England Medical Center, Social Services Department
1990-1991 Member of President's Task Group on Research Goals of NEMC
1990-1991 Department of Radiation Oncology's representative to Tufts Faculty Senate
1991-1996 Member of Department of Radiation Oncology's Executive Committee
2003-2007 Member of NEMC's Radiation Safety Committee
2004-2007 Member of Department of Radiation Oncology's Executive Committee
2004-2007 Department of Radiation Oncology's representative to Tufts Faculty Senate

HARVARD MEDICAL SCHOOL & BETH ISRAEL DEACONESS MEDICAL CENTER

- 1996-2003 Member of BIDMC Radiation Safety Committee
1996-2003 Member of BIDMC RSC Radiation Dosimetry Subcommittee
1996-2003 Member of BIDMC RDRC Committee
1998-2003 Member of BIDMC Committee on Clinical Investigations
1997-2003 Member of Dept. of Radiology's Grant Review & Faculty Mentorship Committee
2001-2003 Member of Dept. of Radiology's Strategic Research Planning Committee
2004-2007 Member of Tufts-NEMC Radiation Safety Committee

MEMBERSHIPS IN PROFESSIONAL SOCIETIES

- American Association of Physicists in Medicine - Full Member
American College of Medical Physics - Full Member
Biomedical Engineering Society - Senior Member
American College of Radiology - Member
Massachusetts Radiological Society - Member
Institution of Electronic and Radio Engineers (U.K.) - Member
New England Roentgen Ray Society - Member
New England AAPM Chapter - Member (*President*, 1982-1983)
International Society for Neutron Capture Therapy-Founding Member, *President-Elect* (2000-2002),
President (2002-2004)
American Society for Therapeutic Radiology & Oncology - Associate Member
Proton Therapy Combined Oncology Group - Member

PAST & PRESENT RESEARCH INTERESTS

Computational study of deuterons as a proton-complementary particle for treatment of eye tumors

Neutron capture therapy: dosimetry, treatment planning, nuclear assay methods, epithermal beam development, animal & clinical studies, and program management.

Novel bone density measurement techniques: development, implementation, and optimization.

Optimization of radiographic examinations: Special interest in computer-assisted tomography, digital subtraction angiography, digital radiography, and digital mammography.

Development of energy-subtraction digital mammography

RESEARCH GRANTS FUNDED

- 1982-1983 USDA "Measurement of Body Elemental Composition by Photon Activation Analysis". Principal Investigator. \$20,000.
- 1985-1986 Siemens Corporation "Development of Software for the DR3 CT Scanner to Automatically Analyze Bone Density Scans". Principal Investigator. \$20,000.
- 1987-1990 DOE "Preclinical and Clinical Investigations of Neutron Capture Therapy". Principal Investigator & Administrative Program Director. \$600,000 x3.
- 1990-1993 DOE "Renewal Grant for NEMC/MIT Preclinical Program in Neutron Capture Therapy". Principal Investigator & Administrative Program Director. \$1,100,000 x3.
- 1991-1992 DOE "Conference Grant to Support an International Workshop in Macro- and Micro-Dosimetry & Treatment Planning". Principal Investigator. \$40,000.
- 1993-1995 Herbert M. Karol Cancer Foundation. "Microdistribution & Microdosimetry of Boron Compounds for Use in Boron Neutron Capture Therapy of Brain Tumors". Principal Investigator. \$20,000.
- 1993-1996 DOE 1 year Grant Extension for NEMC/MIT Preclinical Program in Neutron Capture Therapy". \$1,100,000. Principal Investigator & Administrative Program Director.
- 1994-1998 DOE "Continuation of Research Program in Neutron Capture Therapy at NEMC & MIT". Principal Investigator & Administrative Program Director. \$1,100,000 x3.
- 1996-1998 DOE. "Acceleration of the MCNP Los Alamos Monte Carlo Code for Use in Treatment Planning for Boron Neutron Capture Therapy". Investigator (Dr. Guy Estes, LANL, Principal Investigator). Subcontract to RGZ: \$40,000/yr x2 years.
- 1996-1997 Deaconess Hospital BSRG Seed Research Grant. Co-Investigator (Dr. Osman Cay, Principal Investigator), "Videomicroscopy of liver lesions." \$10,000.
- 1993-1997 DOE, "Research Program in Neutron Capture Therapy at BIDMC & MIT". Principal Investigator & Administrative Program Director. \$1,550,000/yr x5 yr.
- 1998-2000 Supplemental funding to above grant. \$165,000.
- 1999-2000 IAEA, "Computational Treatment Planning Standards for NCT." Principal Investigator. \$10,000.
- 2001-2002 DOE Extension Grant. "Research Program in Neutron Capture Therapy at BIDMC & MIT," Principal Investigator & Administrative Program Director. \$1,044,616 x2.
- 2000-2001 Harvard Medical School's Center of Excellence in Women's Health, Women's Health Fund, "Proof-of-Principle of Contrast-Enhanced Energy-Subtraction Mammography." Co-investigator (Dr. John Copeland Principal Investigator). \$45,000.
- 2000-2001 BIDMC Radiology Department Seed Grant, "Proof-of-Principle of Contrast-Enhanced Energy Subtraction Mammography." Co-investigator (Dr. John Copeland Principal Investigator). \$10,000.

- 2002-2003 DOE Extension Grant. "Research Program in Neutron Capture Therapy at BIDMC & MIT." Principal Investigator & Administrative Program Director. \$850,000.
- 2001-2002 ACR *ACRIN* Multi-Institutional Grant. "Evaluation of digital mammography". Investigator. (Dr. Janet Baum, PI). \$800,000/year x2 years
- 2001-2003 NIH R21 grant. "BNCT of glioblastoma and intracranial melanoma". Investigator (Dr. Paul Busse, PI). \$500,000/year (direct) x2 years.
- 2002-2005 NIH RO1 grant. "BNCT of cutaneous melanoma". Investigator. (Dr. Paul Busse, PI). \$750,000/year (direct) x3 years.

TEACHING

HARVARD / BIDMC COURSES

- 1982-2003 *Physics of Diagnostic Radiology, Nuclear Medicine, NMR, and Ultrasound.* 48 hr/annum, Beth Israel Hospital, Harvard Medical School. 4-5 3rd. yr. radiology residents
- 1997-2003 Senior teaching faculty for Harvard Medical School Core Clerkship in Radiology.
- 1998-2003 *Introduction to Radiological Techniques, Equipment, & Safety.* 6 hours/annum. 6-8 1st year radiology residents.

CONTINUING EDUCATION COURSES FOR RADIOGRAPHERS

- 1997-2003 Various imaging topics; 6-12 hours/annum, Radiographers' CE requirements.

EXTERNAL COURSES

- 1979-2007 *Physics of Diagnostic Radiology, Nuclear Medicine, NMR, and Ultrasound.* 48 hr/annum. From January 1988 – January 2001, held under the auspices of the *New England Roentgen Ray Society*. 20 radiology residents & cardiology fellows.
- 1980-1995 *Mammography: Physical Principles, Equipment Evaluation, and Quality Assurance.* 8 hr/annum, at Tufts-NEMC, 30-35 outside radiologists.

TUFTS-NEMC COURSES

- 1980-1995 *Physics of Medical Imaging* [for 3rd. yr. medical students]. 12 hr/annum, Tufts-NEMC. 8-10 radiology elective students.
- 2003-2007 *Physics of Radiation Therapy.* 1 hr/week course for radiation oncology 1st – 4th year residents.

MEDICAL STUDENT MENTORING

- 1983 Carl Winalski (TUSM)
- 1984 Kay Kronberg (TUSM/Hanover Medical School, FRG)
- 1985 Karsden Dreinhoefer (TUSM/Hanover Medical School, FRG)
- 1986 Robin Aaron (TUSM)

MASTER'S, DOCTORAL STUDENT, & RESEARCH FELLOW MENTORING

1980-1983	Kenneth Ulin, Ph.D., Tufts University
1985-1987	Rabia Kabani, M.S., Tufts University
1987-1988	Christiana Lui, M.S., MIT
1987-1988	Nicolas Lizzo, M.S., MIT
1989-1990	Kevin Roberts, M.S., MIT
1988-1991	Guido Solares, Ph.D., MIT
1993-1995	Gopica Yasuda, Ph.D., Tufts University
1993-1995	Chun-Shan Yam, Ph.D., MIT
1995-1995	Daniel Katz, M.S., MIT
1995-1999	Stead Kiger, Ph.D., MIT
1996-1999	Cynthia Chuang, Ph.D., MIT
1998-2001	John Goorley, Ph.D., MIT
1996-1998	John Copeland, Ph.D., Clinical Research Fellow
1996-1981	Mark Rivard, Ph.D., Wayne State University
1998-2006	Gustavo Santa Cruz, University of Buenos Aires; Grad. Student
1998-2002	Ysushi Shibata, M.D., Ph.D., Visiting Research Fellow
2001-2003	Haejin Kang, Ph.D., Clinical Research Fellow
1999-2005	Sara Gonzalez, University of Buenos Aires (6 months); Graduate. Student & IAEA Fellow
2001-2002	Fang Hsu, National University of Taiwan (6 months); Visiting Research Fellow
2004-2005	Jonathan Pioli, Ecole Supérieure d'Ingenieurs de Luminy, Marseille University, France

LEADERSHIP ACTIVITIES

1981-1984 & 1994-95	Co-Director, Medical Physics Residency Training Program, Radiation Oncology Department, Tufts-NEMC (NIH)
1997-2003	Director, Radiological Physics Fellowship/Training Program, Department of Radiology, Beth Israel Deaconess Medical Center, Harvard Medical School
2000-2001	Chairman, RSC Subcommittee for Auditing Operations of Radiation Safety Office
2003-2007	Vice Chairman, Department of Radiation Oncology, Tufts-New England Medical Center
2002-2004	President, International Society for Neutron Capture Therapy; hosted biennial congress in Boston, MA in 2004
2007-2008	Interim Director of Medical Physics at the Midwest Proton Radiotherapy Institute (MPRI), Bloomington, Indiana. Ensured that accurate and legally compliant proton treatments can continue. Restructured the medical physics staff and initiated formal cross-training procedures, fostered an expanded research program, brought salary scales up to AAPM norms, organized a "six-sigma" program at MPRI, actively participated in new recruitments and in the transition of MPRI to Indiana University's Simon Cancer Center

BIBLIOGRAPHY

[Organized as: 1. SCIENTIFIC PAPERS [IN PEER REVIEWED JOURNALS]; 2. SCIENTIFIC PAPERS [IN PEER-REVIEWED PROCEEDINGS]; 3. TECHNICAL/SCIENTIFIC REPORTS & EDUCATIONAL MATERIALS; 4. BOOKS, BOOK CHAPTERS & MONOGRAPHS; 5. In-Press]

1. SCIENTIFIC PAPERS [IN PEER REVIEWED JOURNALS]

1. BW Murray, GL Brownell, JA Correia, RG Zamenhof, J Harvey: "Development of an In Vivo Neutron Activation Analysis Facility at the Massachusetts Institute of Technology," *Trans. Am. Nucl. Soc.* 18:96-98, 1974
2. RG Zamenhof, BW Murray, GL Brownell, GR Wellum, and EI Tolpin: "Boron Neutron Capture Therapy for the Treatment for Cerebral Gliomas: I. An Evaluation of the Efficacy of Different Neutron Beams", *Med. Phys.* 2:47-58, 1975
3. FC Dohan, PL Kornblith, RG Zamenhof, WH Sweet, EI Tolpin, and GR Wellum: "Boron Neutron Capture Therapy for the Treatment of Cerebral Gliomas: II. Utilization of the Blood-Brain Barrier and Tumor Specific Antigens for the Selective Concentration of Boron in Gliomas", *Oncology* 32:223, 1975
4. MS Potsaid, R Irwin, F Castronovo, G Prout, W Harvey, A Tofe, & RG Zamenhof: "P-32 Diphosphonate Dose Determination in Cancer Patients," *JNM* 19:98-104, 1978
5. RG Zamenhof, M Weissberger, S Aronow, & RM Neer: "CT Scanning for the Measurement of Bone Mineral in the Human Spine," *J. Comp. Assisted Tomog.*, 2:253-260, 1978
6. RG Zamenhof, M. Szulc: "A Sensitivity Evaluation of Computerized Tomography for the Measurement of Bone Mineral in Cortical & Vertebral Bone," *J. Comp. Assist. Tomog.*, 3:852-353, 1979
7. RG Zamenhof: "An Interesting Form of Gamma Ray - Detector Interaction & its Significance on Peak Centroid Determination", *Med. Phys.* 6:62-64, 1979
8. RG Zamenhof, OL Deutsch, and BW Murray: "Feasibility Study of Prompt Capture Gamma In Vivo Neutron Activation Analysis", *Med. Phys.* 6:179-188, 1979
9. RG Zamenhof: "The Optimization of Signal Detectability in Digital Fluoroscopy", *Med. Phys.*, 5:688-696, 1982
10. MJ Homer, RG Zamenhof: "Breast Exposures Incurred by Women Undergoing an Upper GI Series," *Radiology*, 145:497-501, 1982
11. RD Zwicker, RG Zamenhof, SM Wolpert: "A Dosimetric Comparison Between CT and Polytomography for Evaluation of the Sella Tursica", *A.J.N.R.*, 3:354-358, 1982
12. GR Wellum, RG Zamenhof, EI Tolpin: "Boron Neutron Capture Therapy for the Treatment of Cerebral Gliomas: III: The Utilization of Tumor Specific Antibodies," *Int. J. Rad. Oncol., Phys. Biol.*, 8:1339-1346, 1982
13. HD Mitcheson, RG Zamenhof, MS Bankoff, EL Prien, "Determination of the Chemical Composition of Urinary Calculi by Computerized Tomography", *J. of Urology*, 130:814-820, 1983
14. K Ulin, RG Zamenhof, "The Measurement of Carbon, Nitrogen, and Oxygen in the Body by Photon Activation Analysis," *Med. Phys.*, 13:887-998, 1986 [recipient of the *Sylvia Sorkin-Greenfield* award for "best paper in *Med. Phys.* in 1986"]

15. K Ulin, M Meydani, RG Zamenhof, J. Blumberg, "The Effect of Protein Malnutrition on the Carbon and Nitrogen Balance in Rats Measured by Photon Activation Analysis," *Am. J. Clin. Nutr.*, 44:963-970, 1986
16. RG Zamenhof, S Shahabi, HT Morgan, "The Estimation of Exposure from Diagnostic X-ray Exams Using Standardized Exposure Functions", *Am. J. Roentgenol.*, 149:631-638, 1987
17. RH Behrman, RG Zamenhof, and KM Blazo, "Evaluation of a Mammography Image Enhancement System," *Journal of Digital Imaging*, 2:163-170, 1989
18. RG Zamenhof, H Madoc-Jones, OK Harling, JA Bernard, "A Multidisciplinary Program Leading to a Clinical Trial of Neutron Capture Therapy at Tufts-New England Medical Center & the Massachusetts Institute of Technology," *Strahlentherapie und Onkologie*, 165: 254-256, 1989
19. RG Zamenhof, S Clement, K Lin, C Lui, D Ziegelmler, OK Harling, "Monte Carlo Treatment Planning and High-Resolution Alpha-Track Autoradiography for Neutron Capture Therapy," *Strahlentherapie und Onkologie*, 165: 188-191, 1989
20. OK Harling, SD Clement, JR Choi, JA Bernard, RG Zamenhof, "Neutron Beams for Neutron Capture Therapy at the MIT Research Reactor," *Strahlentherapie und Onkologie*, 165-169: 90, 1989
21. RG Zamenhof, "The Design of Neutron Beams for Neutron Capture Therapy," *Nucl. Sci. Appl.*, 4:303-315, 1991
22. SC Saris, GR Solares, DE Wazer, G Cano, SE Kerley, M Joyce, LS Adelman, OK Harling, H Madoc-Jones, RG Zamenhof, "Boron Neutron Capture Therapy of Murine Brain Tumors," *Cancer Research*, 52:4672-4677, 1992
23. OK Harling, RG Zamenhof, JC Yanch, R Choi, GR Solares, RD Rogus, DJ Moulin, L Scott-Johnson, Ilhan Olmez, S Wirdzek, JA Bernard, CI Nwanguma, DE Wazer, S Saris, H Madoc-Jones, CB Sledge, S Shortkroff, "Boron Neutron Capture and Radiation Synovectomy Research at the MIT Research Reactor," *Nucl. Sci. & Eng.*, 110:330-342, 1992
24. GR Solares, RG Zamenhof, "A New Approach to the Microdosimetry of Neutron Capture Therapy," *Trans. Am. Nucl. Soc.*, 65:153-157, 1992
25. J Yanch, R Zamenhof, "Dosimetry of Cf-252 Sources for Neutron Radiotherapy with and without Augmentation by Boron Neutron Capture Therapy," *Radiation Research*, 131:249-255, 1992
26. D Stern, R Zamenhof, B Dawson-Hughes, "Spurious Dual-Energy X-Ray Absorptiometry Images in a Patient Exposed to the Contrast Agent Thorotrast," *Osteoporosis Int.*, 3:283-286, 1993
27. CS Yam, GR Solares, RG Zamenhof "Validation of the HRQAR Approach to BNCT Microdosimetry". *Trans. Am. Nucl. Soc.* 71:142-144, 1994
28. OK Harling, RG Zamenhof, GR Solares, JC Yanch, DE Wazer, RD Rogus, J-M Chabeuf, SC Yam, JA Bernard, G Cano, T DiPetrillo, H Madoc-Jones, "Preparation for Phase-I Clinical Trials of Boron Neutron Capture Therapy at the MIT Reactor and the New England Medical Center," *Rad. Onc. Inv.*, 2:109-118, 1994

29. GR Solares, RG Zamenhof, "A Novel Approach to the Microdosimetry of Neutron Capture Therapy: Part I. High -Resolution Quantitative Autoradiography Applied to the Microdosimetry of Neutron Capture Therapy," *Radiation Research*, 144:50-58, 1995
30. WG Cano, RG Zamenhof, GR Solares, TA DiPetrillo, SAG Meylaerts, SC Lin, SC Saris, JF Duker, E Goad, H Madoc-Jones, DE Wazer, "Toxicity Associated with Boronophenylalanine and Cranial Neutron Irradiation." *Rad. Onc. Inv.* 3:108-118, 1995
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Harvard Medical School

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*Emeritus Chairman of Radiology and
Director, Radiology Research*

*Deaconess Professor of Radiology
Harvard Medical School*

January 4, 2011

Radiation Safety Division Nuclear Regulatory Commission

To Whom It May Concern:

I am writing this letter in support of Dr. Robert Zamenhof's application to the NRC to be approved as an RSO.

Dr. Zamenhof was in my department for 6 years, from 1997 to 2003. While at BIDMC, he was the medical physicist representative of the radiology department to the radiation safety committee and sat on the research committee as their "radiation" and "radiation risk" expert. He worked extensively with the hospital's RSO on reviewing application for human studies, in particular those that involved radionuclide use. In this capacity, he became very knowledgeable about the handling of various routinely administered radionuclides, from the safety and regulatory standpoints. In 2002, the human studies research committee requested Dr. Zamenhof to carry out a detailed audit of the Radiation Safety office. In pursuing this task, he investigated in detail which radionuclides were in use, matched them to the corresponding licensed amounts and storage requirements, reviewed the methodology by which wipe tests and radiation surveys were done in the research labs, and spot-checked some dose and activity calculations. Dr. Zamenhof also taught a course in radiation safety to nuclear medicine and cardiology fellows, and developed the on-line fluoroscopic credentialing exam which I believe is still in use.

In the diagnostic radiology area, Dr. Zamenhof also worked extensively with the radiation safety office at BIDMC. His activities included measuring and calculating radiation exposures for all the x-ray imaging devices in the department and in our suburban facilities, developing methodologies to reduce radiation exposures in CT (long before the CT over-doses at Cedars Sinai Hospital in California were discovered), developing dosimetry charts for the 5th generation cardiac scanner we have in our department, calculating doses for sentinel node procedures, and helping to reduce plain x-ray doses to infants through the use of experimental heavy-metal k-edge filters.

One Deaconess Road
West Campus Clinical Center
Boston, MA 02215

telephone (617)754-2529
fax 617-754-2525
mclouse@bidmc.harvard.edu

In summary, I believe that Dr. Zamenhof would be an excellent and committed RSO, highly knowledgeable in the areas of diagnostic radiology and nuclear medicine safety, and an excellent choice for your position for this and many other reasons.

Sincerely,



Melvin E. Clouse, MD, FACR, FAHA, FSIR, FSCCT
Deaconess Professor of Radiology, Harvard Medical School
Emeritus Chairman and Director of Radiology Research
Beth Israel Deaconess Hospital, WCC 308A
One Deaconess Road, Boston, MA 02215
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INDIANA UNIVERSITY
DEPARTMENT OF RADIATION ONCOLOGY
School of Medicine

Nuclear Regulatory Commission
Office of Radiation Safety

Markus M. Fitzek, MD, MSc
Associate Professor of Radiation Oncology
Indiana University School of Medicine

To the Nuclear Regulatory Commission, Office of Radiation Safety

Regarding: Application of Dr. Robert Zamenhof to the NRC as RSO.

Bloomington, Dec. 30th 2010

I am writing this letter in strong support of Dr. Robert Zamenhof's application to the NRC to be approved as a Radiation Safety Officer.

I may concentrate in this letter on Dr. Zamenhof's experience in Radiation Safety rather than his entire experience in the field of Medical Physics. It should be noted that there is hardly an individual with such a pristine record and such extensive expertise in all fields of Medical Physics (Therapy, Diagnostic, Nuclear Medicine, including even fundamental Nuclear Physics) as Dr. Zamenhof, and a complete description could fill a small novel.

I have known Dr. Zamenhof since 2004, and have worked with him from 2004-2007 at Tufts New England Medical Center in Boston and from 2007-2008 at the Midwest Proton Radiotherapy Institute in Bloomington, Indiana. Dr. Zamenhof was Vice-Chair of the Department of Radiation Oncology at Tufts during my time as Attending Physician and Assistant Professor of Radiation Oncology from 2004 until 2007. When I moved to Indiana in 2007 to become Director of Research and Development at the Midwest Proton Radiotherapy Institute (MPRI) and Associate Professor of Radiation Oncology at Indiana University, we were in need of a Director of Medical Physics at MPRI. We have been fortunate to be able to recruit Dr. Zamenhof for the position of interim Director of Medical Physics for 1 year, during which time he provided us with invaluable services.

While at Tufts, Dr. Zamenhof was the Massachusetts State-authorized chief-physicist for the Boston Gammaknife Center at New England Medical Center. He was responsible for all medical physics tasks related to this program, including regular quality

assurance of the Gammaknife itself and of all imaging related procedures used in the process. This included CT scanning protocols as well as MRI protocols. Dr. Zamenhof also conducted the radiation safety measurements around the Gammaknife. He supervised the replacement of the 201 Co-60 sources in 2005 and documented safety procedures during this potentially hazardous period.

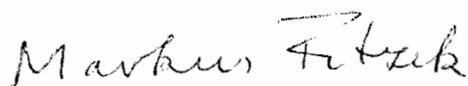
He was also the physicist in charge of analyzing the impact of errors in treatment administration of the Gammaknife and the conventional Linear Accelerators and of the calculation and implementation of appropriate corrections in the treatment delivery.

At the Midwest Proton Radiotherapy Institute (MPRI, 2007-2008), Dr. Zamenhof was in charge of re-organizing the Medical Physics department. He was approved by the state of Indiana as a Diagnostic, Therapy, and Nuclear Medicine Physicist. He was also approved as Radiation Safety Officer for MPRI. I am aware that Indiana is an agreement State, and that criteria are not totally reciprocal with those of the NRC. Dr. Zamenhof also taught a course in radiation safety to MPRI's Medical Physicists and Indiana University's Nuclear Physicists which was highly appreciated by our staff.

In all tasks, Dr. Zamenhof provided exemplary guidance through his knowledge in Nuclear Physics, Radiation Biology, and all forms of Applications of Radiation. I have not encountered an individual in the field of Medical Physics with comparable abilities.

In summary, I believe that Dr. Zamenhof would be an excellent Radiation Safety Officer, highly knowledgeable in all areas of Medical Physics. On a personal note I wish to add that he is a wonderful collaborator of the highest personal integrity, and a very pleasant and humorous person. I believe he would be an excellent choice for your position.

Sincerely,

Handwritten signature of Markus M. Fitzek in black ink.

Markus M. Fitzek, MD, MSc (London)
Associate Professor of Radiation Oncology,
Indiana University School of Medicine

*The principal teaching
hospital for Tufts University
School of Medicine*

Tufts Medical Center

800 Washington Street
Boston, Massachusetts 02111
t 617 636-9000
tuftsmedicalcenter.org

January 10, 2011

The Nuclear Regulatory Commission
Office of Radiation Safety

RE: Robert Zamenhof, Ph.D.

Dear Sir or Madam:

I am delighted to write a letter in support of the application of Robert Zamenhof, Ph.D. for an approval from the Nuclear Regulatory Commission to be a Radiation Safety Officer. I have worked with Dr. Zamenhof since the 1970's. During his early years at Tufts-New England Medical Center (1978-1996), he was the primary Radiation Safety Physicist in Radiology and nuclear medicine. He was responsible for safety procedures in handling nuclear materials, computing thyroid doses for patients undergoing thyroid ablation with I-131 and computing effective doses from various nuclear and non-nuclear imaging procedures. After leaving Tufts in 1997, he was the medical physicist representative of the radiology department to the Radiation Safety Committee at Beth Israel Deaconess Medical Center. Following a six year stay at that institution, he returned to Tufts where he was the medical physics department representative to the Radiation Safety Committee when misadministration's or other errors of radiation delivery occurred. He was the physicist to analyze misadministration's, investigate root causes, document the magnitude of dosage errors and write remedial procedures to reduce the likelihood of future repetitions. He worked extensively in pediatric radiology to minimize radiation dose to infants using various experimental approaches. He was also the Chief Massachusetts-Authorized Physicist for the gammaknife program and was the one who measured radiation dose fields around various positions around the gammaknife. He conducted radiation safety QA measurements every month, supervised the replacement of the 201 Co-60 sources and documented safety procedures during this potentially very hazardous period. He comes to your agency with a vast experience in medical physics. His years of exemplary activities within this field with his multitude of tasks should easily qualify him for approval by the NRC as Radiation Safety Officer. If I could of more help in assessing the qualifications of Dr. Zamenhof, please feel free to contact me here in Boston.

Very truly yours,



Robert C. Sarno, M.D.
Professor of Radiology
Tufts University School of Medicine

The principal teaching
hospital for Tufts University
School of Medicine

Tufts Medical Center

Department of Neurosurgery
800 Washington Street, #178
Boston, Massachusetts 02111
T 617 636-5858
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tuftsmedicalcenter.org

Nuclear Regulatory Commission Office of Operation Safety

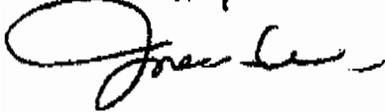
RE: Dr. Robert Zamenhof

Date: 12/23/10

Dear Sir:

It is my pleasure to write this letter of support for Dr. Zamenhof. I have known Dr. Zamenhof for over 5 years. Most recently, between 2005 and 2007 when I was at Tufts Medical Center and worked with him directly. He was a medical physicist here and was the departmental representative to the Radiation Safety Committee to whom all mis-administrations or lesser errors in radiation delivery were reported. He was the physicist who analyzed these occurrences, investigating root causes, documented a magnitude of these dose errors and wrote remedial procedures to reduce the likelihood of future error repetitions. He also worked extensively in the pediatric radiology department to minimize radiation doses to infants utilizing various extremity approaches. He was the chief Massachusetts state authorized physicist for the Gamma knife program for which I worked most closely with him. He was the physicist who measured radiation dose fields around various positions around the Gamma knife, conducted radiation safety quality assurance measurements every month and supervised the replacement of the Cobalt-60 sources in 2005. He documented safety procedures during this hazardous period. He was also the physicist who analyzed the impact of errors in treatment, administration and calculated top up doses when the patients had to interrupt their treatments. Dr. Zamenhof is an exemplary medical physicist. He was the go-to guy when we had any physics questions regarding our Gamma knife treatments. He has my highest confidence in matters of radiation safety.

Sincerely,



Julian K. Wu, MD

Electronically Signed

JULIAN K WU, MD 12/27/2010 18:48

Carl B. Heilman, MD
Chairman, Neurosurgery

James Kryzanski, MD
Minimally Invasive and Microsurgery

Adel Malek, MD, PhD
Chief, Neurovascular Surgery

Ron Riesenburger, MD
Spine Surgery

Simcha J. Weller, MD
Chief, Spinal Surgery

Julian K. Wu, MD
Associate Chief, Neurosurgery

Kevin Yao, MD
Chief, Spinal Oncology & Stereotactic Radiosurgery

Associate Chief, Neuro-Oncology

Alain Charest, PhD
Director, Brain Tumor Research Laboratory

Brain Tumor Clinic
617 636-2694
Gamma Knife
617 636-4266

Christopher Robbins, PA-C
Erin Rebelo, PA-C
Courtney Petersen, PA-C
Tara Haggerty, PA-C
Michelle Russell, PA-C
Marianne Tuohy, ANP, BC
Joyce Pugatch, ANP, BC
Kelly J. Dougherty
Director, Neurosciences

----- Forwarded Message

From: "Nauth, Dave E." <dnauth@isdh.in.gov>

Date: Wed, 12 Jan 2011 09:26:02 -0500

To: Robert Zamenhof <zamenhof@mit.edu>

Subject: Physicist Info.

Dr. Zamenhof,

Following up on our discussion from Monday, your approval letter to be an approved Indiana medical physicist was dated November 29, 2007. You were approved as a Diagnostic Imaging Physicist (which in Indiana includes Nuclear Medicine), Health Physicist and Radiation Oncology Physicist. We do not have specific rules addressing qualifications of Radiation Safety Officers. This would be a designation by the facility based on who they feel is the best person for this position. However, this person would have to be an approved physicist. In review of the MPRI file, I do see that you were officially designated as the facility's RSO. Those records have been discarded consistent with our records retention schedule.

If you have any further questions, please let me know.

Sincerely,

Dave Nauth, Manager
Medical Radiology Services
Indiana State Department of Health
317/233-7563

----- End of Forwarded Message



**Indiana State
Department of Health**
An Equal Opportunity Employer

Mitchell E. Daniels, Jr.
Governor

Judith A. Monroe, M.D.
State Health Commissioner

November 29, 2007

5F 99

Robert G. Zamenhof, Ph.D.

[REDACTED]

Re: Qualified Radiation Physicist Application

Dear Dr. Zamenhof:

You applied to the Indiana State Department of Health (ISDH) Division of Medical Radiology Services to have your name added to the list(s) of Qualified Radiation Physicists. The information provided concerning your training, education, experience and professional references was evaluated by the Physicist Review Committee pursuant to 410 IAC 5-6.1-118.

You are hereby approved by the Indiana State Department of Health as an Diagnostic Imaging Physicist, Health Physicist, and Radiation Oncology Physicist for the purposes of 410 IAC 5-6.1-118. Your name will be added to the appropriate list that is distributed to all persons requesting this information. Your personal physicist number is 404.

Enclosed please find copies of Indiana State Department of Health inspection forms. When you need additional forms, you may e-mail me at mstiker@isdh.in.gov or call 317/233-7563.

If you have a change of address or telephone number, be sure to let us know so we can change it on the physicist list. If you have questions or need help in any way, please call this office at 317/233-7563.

Sincerely,

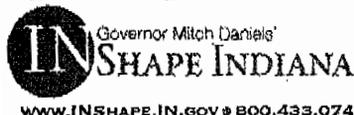
MARY STIKER
MEDICAL RADIOLOGY SERVICES
INDIANA STATE DEPARTMENT OF HEALTH

ENCLOSURES

Epidemiology Resource Center
2525 N. Shadeland Ave. Suite E3, Indianapolis, IN 46219
317.356.7190 ext. 253

Laboratories
550 West 16th Street, Suite B, Indianapolis, IN 46202
317.921.5500

Weights & Measures
2525 N. Shadeland Ave. Suite D3, Indianapolis, IN 46219
317.356.7078 ext. 221



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The Indiana State Department of Health supports Indiana's economic prosperity and quality of life by promoting, protecting and providing for the health of Hoosiers in their communities.

**RADIATION SAFETY OFFICER TRAINING AND EXPERIENCE
AND PRECEPTOR ATTESTATION
[10 CFR 35.50]**

APPROVED BY OMB: NO. 3150-0120
EXPIRES: 3/31/2012

Name of Proposed Radiation Safety Officer

Robert G. Zamenhof, Ph.D.

Requested Authorization(s) *The license authorizes the following medical uses (check all that apply):*

- 35.100 35.200 35.300 35.400 35.500 35.600 (remote afterloader)
 35.600 (teletherapy) 35.600 (gamma stereotactic radiosurgery) 35.1000 ()

PART I -- TRAINING AND EXPERIENCE
(Select one of the four methods below)

*Training and Experience, including board certification, must have been obtained within the 7 years preceding the date of application or the individual must have obtained related continuing education and experience since the required training and experience was completed. Provide dates, duration, and description of continuing education and experience related to the uses checked above.

1. Board Certification

- a. Provide a copy of the board certification. [provided]
- b. Use Table 3.c. to describe training in radiation safety, regulatory issues, and emergency procedures for all types of medical use on the license.
- c. Skip to and complete Part II Preceptor Attestation.

OR

2. Current Radiation Safety Officer Seeking Authorization to Be Recognized as a Radiation Safety Officer for the Additional Medical Uses Checked Above

- a. Use the table in section 3.c. to describe training in radiation safety, regulatory issues, and emergency procedures for the additional types of medical use for which recognition as RSO is sought.
- b. Skip to and complete Part II Preceptor Attestation.

OR

3. Structured Educational Program for Proposed Radiation Safety Officer

- a. Classroom and Laboratory Training

Description of Training	Location of Training	Clock Hours	Dates of Training*
Radiation physics and instrumentation			
Radiation protection			
Mathematics pertaining to the use and measurement of radioactivity			
Radiation biology			
Radiation dosimetry			

Total Hours of Training:

RADIATION SAFETY OFFICER TRAINING AND EXPERIENCE AND PRECEPTOR ATTESTATION (continued)

3. Structured Educational Program for Proposed Radiation Safety Officer (continued)

b. Supervised Radiation Safety Experience **EXPERIENCE OVER 30 YEARS:**
(If more than one supervising individual is necessary to document supervised work experience, provide multiple copies of this section.)

Description of Experience	Location of Training/ License or Permit Number of Facility	Dates of Training*
Shipping, receiving, and performing related radiation surveys	TUFTS MEDICAL CENTER	1978-1996
Using and performing checks for proper operation of instruments used to determine the activity of dosages, survey meters, and instruments used to measure radionuclides	TUFTS MEDICAL CENTER BETH ISRAEL DEACONESS MED CTR MPRI, BLOOMINGTON, IN	1978-1996 1996-2003 2007-2008
Securing and controlling byproduct material	TUFTS MEDICAL CENTER BETH ISRAEL DEACONESS MED CTR MPRI, BLOOMINGTON, IN TUFTS MEDICAL CENTER	1978-1996 1996-2003 2007-2008 2003-2007
Using administrative controls to avoid mistakes in administration of byproduct material	TUFTS MEDICAL CENTER BETH ISRAEL DEACONESS MED CTR MPRI, BLOOMINGTON, IN TUFTS MEDICAL CENTER	1978-1996 1996-2003 2007-2008 2003-2007
Using procedures to prevent or minimize radioactive contamination and using proper decontamination procedures	TUFTS MEDICAL CENTER BETH ISRAEL DEACONESS MED CTR MPRI, BLOOMINGTON, IN TUFTS MEDICAL CENTER	1978-1996 1996-2003 2007-2008 2003-2007
Using emergency procedures to control byproduct material	TUFTS MEDICAL CENTER BETH ISRAEL DEACONESS MED CTR MPRI, BLOOMINGTON, IN TUFTS MEDICAL CENTER	1978-1996 1996-2003 2007-2008 2003-2007
Disposing of byproduct material	TUFTS MEDICAL CENTER MPRI, BLOOMINGTON, IN	1978-1996 2007-2008
Licensed Material Used (e.g., 35.100, 35.200, etc.)+	35.100, 35.200, 35.300, 35.400 35.500, 35.600	

+ Choose all applicable sections of 10 CFR Part 35 to describe radioisotopes and quantities used: 35.100, 35.200, 35.300, 35.400, 35.500, 35.600 remote afterloader units, 35.600 teletherapy units, 35.600 gamma stereotactic radiosurgery units, emerging technologies (provide list of devices).

RADIATION SAFETY OFFICER TRAINING AND EXPERIENCE AND PRECEPTOR ATTESTATION (continued)

3. Structured Educational Program for Proposed Radiation Safety Officer (continued)

b. Supervised Radiation Safety Experience (continued)

(If more than one supervising individual is necessary to document supervised work experience, provide multiple copies of this section.)

Supervising Individual

License/Permit Number listing supervising individual as a Radiation Safety Officer

This license authorizes the following medical uses:

- | | | | |
|---|--|---|---------------------------------|
| <input type="checkbox"/> 35.100 | <input type="checkbox"/> 35.200 | <input type="checkbox"/> 35.300 | <input type="checkbox"/> 35.400 |
| <input type="checkbox"/> 35.500 | <input type="checkbox"/> 35.600 (remote afterloader) | <input type="checkbox"/> 35.600 (teletherapy) | |
| <input type="checkbox"/> 35.600 (gamma stereotactic radiosurgery) | <input type="checkbox"/> 35.1000 (|) | |

c. Describe training in radiation safety, regulatory issues, and emergency procedures for all types of medical use on the license.

Description of Training	Training Provided By	Dates of Training*
Radiation safety, regulatory issues, and emergency procedures for 35.100, 35.200, and 35.500 uses		
Radiation safety, regulatory issues, and emergency procedures for 35.300 uses		
Radiation safety, regulatory issues, and emergency procedures for 35.400 uses		
Radiation safety, regulatory issues, and emergency procedures for 35.600 - teletherapy uses		
Radiation safety, regulatory issues, and emergency procedures for 35.600 - remote afterloader uses		
Radiation safety, regulatory issues, and emergency procedures for 35.600 - gamma stereotactic radiosurgery uses		
Radiation safety, regulatory issues, and emergency procedures for 35.1000, specify use(s):		

RADIATION SAFETY OFFICER TRAINING AND EXPERIENCE AND PRECEPTOR ATTESTATION (continued)

3. Structured Educational Program for Proposed Radiation Safety Officer (continued)

c. Training in radiation safety, regulatory issues, and emergency procedures for all types of medical use on the license (continued)

Supervising Individual *If training was provided by supervising RSO, AU, AMP, or ANP. (If more than one supervising individual is necessary to document supervised training, provide multiple copies of this page.)* License/Permit Number listing supervising individual

License/Permit lists supervising individual as:

Radiation Safety Officer Authorized User Authorized Nuclear Pharmacist
Authorized Medical Physicist

Authorized as RSO, AU, ANP, or AMP for the following medical uses:

35.100 35.200 35.300 35.400
 35.500 35.600 (remote afterloader) 35.600 (teletherapy)
 35.600 (gamma stereotactic radiosurgery) 35.1000 ()

d. Skip to and complete Part II Preceptor Attestation.

OR

4. Authorized User, Authorized Medical Physicist, or Authorized Nuclear Pharmacist identified on the licensee's license

- a. Provide license number.
- b. Use the table in section 3.c. to describe training in radiation safety, regulatory issues, and emergency procedures for all types of medical use on the license.
- c. Skip to and complete Part II Preceptor Attestation.

PART II – PRECEPTOR ATTESTATION

Note: This part must be completed by the individual's preceptor. The preceptor does not have to be the supervising individual as long as the preceptor provides, directs, or verifies training and experience required. If more than one preceptor is necessary to document experience, obtain a separate preceptor statement from each.

First Section

Check one of the following:

1. Board Certification

I attest that **Dr. Robert Zamenhof** has satisfactorily completed the requirements in
Name of Proposed Radiation Safety Officer

10 CFR 35.50(a)(1)(i) and (a)(1)(ii); or 35.50 (a)(2)(i) and (a)(2)(ii); or 35.50(c)(1).

OR

2. Structured Educational Program for Proposed Radiation Safety Officers

I attest that **N/A** has satisfactorily completed a structural educational
Name of Proposed Radiation Safety Officer

program consisting of both 200 hours of classroom and laboratory training and one year of full-time radiation safety experience as required by 10 CFR 35.50(b)(1).

OR

RADIATION SAFETY OFFICER TRAINING AND EXPERIENCE AND PRECEPTOR ATTESTATION (continued)

Preceptor Attestation (continued)

First Section (continued)

Check one of the following:

x 3. Additional Authorization as Radiation Safety Officer

x I attest that **Dr Robert Zamenhof** is an
Name of Proposed Radiation Safety Officer

x Authorized User Authorized Nuclear Pharmacist

x Authorized Medical Physicist

identified on the Licensees license and has experience with the radiation safety aspects of similar type of use of byproduct material for which the individual has Radiation Safety Officer responsibilities

AND

Second Section

Complete for all (check all that apply):

x I attest that **Dr Robert Zamenhof** has training in the radiation safety, regulatory issues, and
Name of Proposed Radiation Safety Officer

emergency procedures for the following types of use:

x 35.100 Use of unsealed byproduct material for uptake, dilution, and excretion studies

x 35.200 Use of unsealed byproduct material for imaging and localization studies

x 35.300 oral administration of less than or equal to 33 millicuries of sodium iodide I-131, for which a written directive is required

x 35.300 oral administration of greater than 33 millicuries of sodium iodide I-131

35.300 parenteral administration of any beta-emitter, or a photon-emitting radionuclide with a photon energy less than 150 keV for which a written directive is required

35.300 parenteral administration of any other radionuclide for which a written directive is required

35.400

35.500

x 35.600 remote afterloader units

x 35.600 teletherapy units

x 35.600 gamma stereotactic radiosurgery units

x 35.1000 emerging technologies, including:
Neutron Capture Therapy for brain tumors and melanoma; research and clinical

RADIATION SAFETY OFFICER TRAINING AND EXPERIENCE AND PRECEPTOR ATTESTATION (continued)

AND

**Third Section
Complete for ALL**

I attest that **Dr Robert Zamenhof** has achieved a level of radiation safety knowledge
Name of Proposed Radiation Safety Officer
sufficient to function independently as a Radiation Safety Officer for a medical use licensee.

**Fourth Section
Complete the following for Preceptor Attestation and signature**

I am the Radiation Safety Officer for *INDIANA UNIVERSITY HEALTH*
~~University of Indiana~~ Proton Therapy Center
Name of Facility

License/Permit Number: X *13-32785-01*

Name of Preceptor
Dr Mark Wolanski

Signature
Mark Wolanski

Telephone Number
812-349-5120

Date
1/24/2011

This is to acknowledge the receipt of your letter/application dated

2/3/2011, and to inform you that the initial processing which includes an administrative review has been performed.

AMEND. 06-00854-03
There were no administrative omissions. Your application was assigned to a technical reviewer. Please note that the technical review may identify additional omissions or require additional information.

Please provide to this office within 30 days of your receipt of this card

A copy of your action has been forwarded to our License Fee & Accounts Receivable Branch, who will contact you separately if there is a fee issue involved.

Your action has been assigned **Mail Control Number** 574455.
When calling to inquire about this action, please refer to this control number.
You may call us on (610) 337-5398, or 337-5260.