1. Keywords

DA AUTHORIZATION RADIOISOTOPE
DENTAL X-RAY EQUIPMENT
DOSIMETRY RECORD
FILM BADGE
MEDICAL USE, UNSEALED RADIOACTIVE SOURCE
MEDICAL X-RAY EQUIPMENT
NRC LICENSED RADIOISOTOPE
RADIATION AREA
SEALED RADIOACTIVE SOURCE
TECTRAIN
X-RAY EQUIPMENT

2. Start Date: FY 87 Quarter 2
End Date: FY 87 Quarter 3

3. HQ Division: 43 - HEALTH PHYSICS DIVISION

4. Phase:

5. Program NO: 28

6. Survey Type: RS - INDUSTRIAL RADIATION SURVEY

7. INSTALLATION OR SOURCE OF INFORMATION (CITY & STATE OR COUNTY ARE ESSENTIAL)
HS - USA HEALTH SERVICES COMMAND

8. Authors:

9. ARLOC/Activity: 11933 005 - MEDDAC
Location: WALTER REED
State: DC

10. Project Control Number: 43-0701-87

11. Title: HLTH HZDS IONIZING RADIATION SOURCES

12. DSA: 61

AEHA

UNITED STATES ARMY ENVIRONMENTAL HYGIENE AGENCY

ABERDEEN PROVING GROUND, MD 21010-5422

RADIATION PROTECTION SURVEY NO. 28-43-0701-87
WALTER REED ARMY MEDICAL CENTER/DENTAL ACTIVITY
WASHINGTON, DC
9-20 MARCH 1987

DEPARTMENT OF THE ARMY
U. S. ARMY ENVIRONMENTAL HYGIENE AGENCY
ABERDEEN PROVING GROUND, MARYLAND 21010-5422

REPLY TO
ATTENTION OF

HSHB-MR-H

5 June 1987

MEMORANDUM FOR: Commander, US Army Health Services Command, ATTN: HSCL-P, Fort Sam Houston, TX 78234-6000

SUBJECT: Radiation Protection Survey No. 28-43-0701-87, Walter Reed Army Medical Center/Dental Activity, Washington, DC, 9-20 March 1987

Three copies of report with Executive Summary are enclosed.

FOR THE COMMANDER:

Encl

RALPH R. CARESTIA
Colonel, MS
Director, Radiation and
Environmental Sciences

CF:
HQDA(DASG-PSP) (wo/encl)
Cdr, HSC, ATTN: HSDS (w/encl)
Comdt, AHS, ATTN: HSHA-IPM (w/encl)
Cdr, WRAMC (2 cy) (w/encl)
Cdr, WRAMC, ATTN: PVNTMED Svc (2 cy) (w/encl)
Cdr, DENTAC, Wash DC (2 cy) (w/encl)
Cdr, USAEHA Fld Spt Actv, Ft Meade (w/encl)

DEPARTMENT OF THE ARMY
U. S. ARMY ENVIRONMENTAL HYGIENE AGENCY
ABERDEEN PROVING GROUND, MARYLAND 21010-5422

REPLY TO
ATTENTION OF

HSHB-MR-H

EXECUTIVE SUMMARY
RADIATION PROTECTION SURVEY NO. 28-43-0701-87
WALTER REED ARMY MEDICAL CENTER/DENTAL ACTIVITY
WASHINGTON, DC
9-20 MARCH 1987

1. PURPOSE. This survey was performed to determine the presence and extent of any health hazards resulting from the use of ionizing radiation sources at Walter Reed Army Medical Center/Dental Activity, Washington, DC. Further, it was performed to evaluate the overall radiation protection program for conformance with current regulatory requirements for radiation protection.

2. RECOMMENDATIONS.

a. To ensure regulatory compliance, the following recommendations are made.

(1) Walter Reed Army Medical Center. Store film badges in areas approved by the Radiation Protection Officer (RPO) when not being worn. Document required semiannual leak tests on sealed Beta-Gamma sources. Conduct quarterly inventories of all radioactive sources. Provide training in radiation safety to all personnel routinely entering areas where radioactive materials are used and stored. Inform Military Police personnel as to the location of all radioactive sources and materials. Monitor vials containing radioactive material for removable contamination prior to their use. Provide proper devices for the storage of protective lead aprons for the orthopedic x-ray room. Ensure that interlocks are checked semiannually. Evaluate the incident skin exposure for all automatic exposure controlled chest x-ray systems. Ensure that area surveys of use areas include measurements utilizing exposure rate meters.

(2) US Army Dental Activity, Washington, DC. Review retake logs on a weekly basis. Ensure that standard films are taken daily and reviewed by the responsible dentist. Ensure that reviews of the DD Forms 1141, Record of Occupational Exposure to Ionizing Radiation, are performed by the RPO at intervals not exceeding a calendar quarter. Ensure that the RPO reviews completed records and that such reviews are properly dated. Ensure that previous exposure records are obtained for inprocessing personnel. Ensure that administrative doses are administered, documented, and properly reported. Ensure that the DD Forms 1141 accompany or follow individuals to new duty assignments. Ensure that when the DD Form 1141 is maintained separately from the health record, a charge out record (OF 23) is placed in each record. Ensure that abbreviations made on the DD Forms 1141 are explained in the remarks section of these records.

b. To ensure good Health Physics practices, the following recommendations are made for Walter Reed Army Medical Center. Calculate dose equivalents for all positive thyroid burdens of radioiodine. Report all misadministrations involving radiopharmaceuticals to the Radiation Control Committee. Ensure that CO_2 absorber for the BACTEC Analyzer is processed the same as other BACTEC produced radioactive waste. Install dimmer switches in all fluoroscopic examination rooms. Ensure that documentation of acceptance surveys of linear accelerators is maintained on file for inspection purposes.

DEPARTMENT OF THE ARMY
U. S. ARMY ENVIRONMENTAL HYGIENE AGENCY
ABERDEEN PROVING GROUND, MARYLAND 21010-5422

REPLY TO ATTENTION OF

HSHB-MR-H

RADIATION PROTECTION SURVEY NO. 28-43-0701-87
WALTER REED ARMY MEDICAL CENTER/DENTAL ACTIVITY
WASHINGTON, DC
9-20 MARCH 1987

1. AUTHORITY. Letter, HQ HSC, HSCL-P, 2 July 1986, subject: US Army Environmental Hygiene Agency Field Services Requirements - FY 87.

2. PURPOSE. This survey was performed to determine the presence and extent of any health hazards resulting from the use of ionizing radiation sources at WRAMC/DENTAC, Washington, DC. Further, it was performed to evaluate the overall radiation protection program for conformance with current regulatory requirements for radiation protection.

3. GENERAL.

a. This survey was performed concurrently with the HSC-IG General Inspection. This report does not include HSC-IG findings which are included in the HSC-IG Report marked "For Official Use Only" and on file in the HSC-IG Office.

b. An entrance interview and exit briefing for WRAMC, to include a discussion of the findings and recommendations, were held with MG Louis A. Mologne, MC, Commanding General, and selected members of his staff. A comprehensive exit briefing was held with MAJ Gerald M. Connock, MS, RPO.

c. An entrance interview and exit briefing for the DENTAC, to include a discussion of the findings and recommendations, were held with Mr. Wilbur W. McCottry, DAC, DENTAC RPO.

d. The most recent survey of the overall radiation protection program at WRAMC/DENTAC, by this Agency, was conducted during the period 9-19 April 1985 (Radiation Protection Survey No. 28-43-0800-85).

e. Abbreviations are given in Appendix A.

4. FINDINGS AND DISCUSSION.

a. General.

(1) MAJ Connock and CPT David E. Hintenlang, MS, were designated, in writing, as the WRAMC RPO and ARPO, respectively.

(2) Mr. McCottry and COL David C. Keller, DC, were designated, in writing, as DENTAC RPO and ARPO, respectively.

(3) A written radiation protection program was available for review and appeared adequate for its intended purpose.

(4) Documentation of a radiographic quality assurance program was available for review and appeared adequate, with the following exceptions:

(a) Retake logs were being reviewed quarterly instead of weekly at the Fort Myer Dental Clinic.

(b) No daily standard films were being taken and reviewed by the responsible dentist at the Pentagon Dental Clinic.

b. Personnel Dosimetry Program.

(1) All personnel observed to be occupationally exposed to ionizing radiation used the Army film badge service.

(2) The following individuals were designated, in writing, as responsible for preparing and maintaining the DD Forms 1141, Record of Occupational Exposure to Ionizing Radiation, and the DD Forms 1952, Dosimeter Application and Record of Occupational Radiation Exposure, for their respective organizations.

(a) SSG Darrell T. Simmons, USA, was appointed, on orders, for WRAMC and the WRAMC Dental CLinic.

(b) SSG Javier Lopez, USA, was appointed, on orders, for the Pentagon Dental Clinic.

(c) SSG Patricia O. Perkins, USA, was appointed, on orders, for the Fort McNair Dental Clinic.

(d) SFC Nancy K. Love, USA, was appointed, on orders, for the Fort Myer Dental Clinic.

(3) A review of the DD Forms 1141 indicated that, at the time of the survey, 422 individuals at WRAMC, 15 individuals at the Pentagon Dental Clinic, 7 individuals at the Fort McNair Dental Clinic, and 13 individuals at the Fort Myer Dental Clinic, were identified as radiation workers by their inclusion in the Army film badge program. All had received exposures in the preceding year of less than 10 percent of the applicable whole-body dose equivalent limits (AR 40-14). In the opinion of the survey officers, personnel dosimetry results indicated that occupational exposure to ionizing radiation at WRAMC/DENTAC were being maintained ALARA.

(4) Forty-eight individuals were included in the bioassay monitoring program. Of those results available for review, all had received internal exposures in the preceding year of less than 10 percent of the annual radiation exposure standards for a specific radionuclide as established by the ICRP and NCRP.

(5) The DD Forms 1141 and the DD Forms 1952 were being properly maintained, with the following noted exceptions:

(a) Quarterly review of DD Forms 1141 by DENTAC RPO's were done incorrectly. Rather than reviewing the records at periods not exceeding a calendar quarter, the reviews were conducted when a quarter's worth of results were obtained from USAIRDC. In some instances, such as the Pentagon Dental Clinic, this resulted in a lapse of 6 months between quarterly RPO reviews.

(b) The DENTAC RPO's were documenting their quarterly reviews of the DD Forms 1141 IAW AR 40-14, Figure 2. This resulted in the dating of quarterly reviews the day following the close of the quarter to be reviewed. Due to the normal delay in obtaining results from USAIRDC, this indicates that either the RPO's were reviewing incomplete results that were later filled in above their signature or they were not dating the records with the actual date of the review.

(c) Efforts to obtain previous occupational exposure histories at the Fort McNair and Fort Myer Dental Clinics were not being accomplished.

(d) Administrative doses were not being calculated, documented on the appropriate DD Forms 1141, and forwarded to the CDRR, for radiation workers assigned to the Fort Myer Dental Clinic.

(e) At the Pentagon Dental Clinic, DD Forms 1141 did not accompany radiation workers when they outprocessed nor were they forwarded to the individual's gaining unit.

(f) At the Pentagon Dental Clinic, OF 23's were not placed in radiation workers' medical records.

(g) The abbreviations "NR" and "NU" were not defined in the remarks section of the DD Forms 1141 at the Fort McNair Dental Clinic.

(h) Film badges for cardiologists attached to the Cardiac Catheterization Laboratory were not stored in the approved storage area designated by the WRAMC RPO.

(6) Dose equivalents for positive thyroid burdens of radioiodine were only calculated for burdens in excess of the action levels proposed by the NRC.

c. Radioactive Materials.

(1) The use of radioactive materials for diagnosis, therapy, medical research and development, and instrument check and calibration was authorized by NRC License No. 08-01738-02 (expiration date 31 July 1987)

at the following locations: WRAMC, Washington, DC; WRAMC, Forest Glen Section and Annex, Silver Spring, Maryland; USAMRIID, Fort Detrick, Maryland; Andrew Rader US Army Health Clinic, Fort Myer, Virginia; WRAIR Animal Holding Facility, Fort Meade, Maryland; US Army Medical Laboratory, WRAMC Department of Pathology, Fort Meade, Maryland; and US Army Institute of Dental Research Facility, Fort Meade, Maryland.

(2) The use of radioactive materials for animal irradiators at WRAIR and USAMRIID was authorized by NRC License No. 08-01738-03, Amendment 17 (expiration date 31 May 1991).

(3) The use of small quantities of radioactive byproduct material for Invitro Clinical and Laboratory Tests at WRAMC, Forest Glen Section and Annex, and US Army Medical Laboratory, WRAMC, was authorized by NRC Registration Certificate - Invitro Testing, Registration No. 6158 (dated 27 November 1981).

(4) The use of radioactive materials which are not controlled by the NRC for human use, research and development, and instrument check and calibration was authorized by DA Radiation Authorization No. A08-07-01 (expiration date 31 July 1987) under the conditions of NRC License No. 08-01738-02 at the following locations: WRAMC, Forest Glen Section and Annex, Fort Detrick, Fort Myer, Fort Meade, and the Pentagon.

(5) A review of records and interviews with staff members of Nuclear Medicine Services, Radiation Therapy, and the Health Physics Office revealed that human use activities were being performed IAW AR 40-37, NRC License Conditions, DA Radiation Authorizations, and applicable JCAH Standards, except for the following:

(a) The semiannual leak test in October 1986 of a one curie gadolinium - 153 source (CH 533) was not documented.

(b) Quarterly inventories of radioactive materials did not include an accounting of a radium-226 needle (#006) for the third fiscal quarter of 1986.

(c) Though housekeeping personnel routinely entered areas where radioactive materials were used and stored, they did not receive training in radiation protection and procedures.

(d) Military Police personnel were not notified of the location and type of radioactive material stored within WRAMC, Forest Glen Section, and WRAIR.

(e) Vials containing radiopharmaceuticals were not monitored with swipes for removable contamination prior to their use.

(6) Misadministrations involving the human use of radiopharmaceuticals had not been reported to and addressed at meetings of the WRAMC RCC.

(7) The CO_2 absorber for the BACTEC® analyzer had not been cleaned since its purchase. This absorber is a concentrated source of carbon-14 and a potential source of radioactive waste.

d. Diagnostic X-Ray Facilities.

(1) Medical X-Ray Facilities. A review of records and interviews with staff members revealed that radiology services were being performed IAW JCAH Standards with the following exceptions:

(a) Appropriate devices for the storage of lead aprons were not available in the Orthopedic X-Ray Room.

(b) Interlocks in the hospital x-ray exposure rooms were not being evaluated every 6 months.

(c) A fluoroscopic examination room in Radiology did not have dimmer switches for its overhead lights. These extraneous lights could interfere with the fluoroscopic examinations.

(2) Dental X-Ray Facilities. Dental services were being performed IAW applicable regulations, except for findings and recommendations included in the HSC-IG report.

e. Records, Reports, and Surveys.

(1) A complete inventory of ionizing radiation sealed sources was available for review.

(2) Radiation protection surveys and maintenance procedures for diagnostic x-ray systems were being conducted, but the incident skin exposure from automatic exposure control on chest x-ray systems was not evaluated.

(3) Monthly area surveys of the hot lab and camera rooms in Nuclear Medicine Services consisted of wipe testing only. There were no measurements of exposure levels with an exposure rate meter.

(4) At the time of the survey, recommendations on the acceptance test for the 18 MeV Accelerator were not available for review in the Health Physics Office, Radiation Therapy, or Biomedical Maintenance.

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5. CONCLUSION. A review of the findings indicated that there were no health hazards resulting from the use of ionizing radiation sources at WRAMC/DENTAC, Washington, DC. The overall radiation protection program was being conducted IAW current regulatory requirements for radiation protection, with exceptions for which the following recommendations are provided.

6. RECOMMENDATIONS.

a. The following recommendations are made to ensure regulatory compliance:

(1) General.

(a) Ensure that retake logs are reviewed weekly at the Fort Myer Dental Clinic [TB MED 521, paragraph 2-10f(5)].

(b) Ensure that standard films are taken daily and reviewed by the responsible dentist at the Pentagon Dental Clinic (HQ USAHSC, Commander's Guide, Directorate of Dental Services Interest Area VI, Item 112).

(2) Personnel Dosimetry Program.

(a) Ensure that DENTAC RPO reviews of the DD Forms 1141 are conducted at periods not to exceed a calendar quarter (AR 40-14, paragraph 13).

(b) Ensure that DENTAC RPO reviews of the DD Forms 1141 are dated with the date of the review and do not include incomplete results (AR 40-14, paragraph 11-g).

(c) Ensure that, at the Fort McNair and Fort Myer Dental Clinics, efforts are made to obtain previous exposure records from previous duty assignments from the CDRR (AR 40-14, paragraph 11d).

(d) Ensure that, at the Fort Myer Dental Clinic, administrative doses are properly calculated, documented on the appropriate DD Forms 1141, and reported to the CDRR (AR 40-14, paragraphs 13-h and i).

(e) Ensure that the DD Forms 1141 at the Pentagon Dental Clinic accompany outprocessing personnel (AR 40-14, paragraph 11-d).

(f) Ensure that, at the Pentagon Dental Clinic, an OF 23 with the location of the DD Forms 1141, is in the medical records of radiation workers (AR 40-14, paragraph 11).

(g) Ensure that, at the Fort McNair Dental Clinic, abbreviations entered on the DD Forms 1141 are completely spelled out in the Remarks Section, Item 16 (AR 40-14, paragraph 11-g and Figure 2).

(h) Ensure that Cardiac Catheterization Laboratory film badges are only stored in a location approved by the RPO (AR 40-14, paragraph 10c).

(3) Radioactive Materials.

(a) Ensure that semiannual leak tests are documented for all sealed beta-gamma sources (AR 40-37, Appendix B-3m).

(b) Ensure that quarterly inventories are conducted for all radioactive sources (AR 40-37, Appendix B-3l).

(c) Ensure that housekeeping personnel receive training in radiation protection and procedures to be followed in areas where radioactive materials are used [AR 40-5, paragraph 9-9a(2)(b) and 10 CFR 19.12)].

(d) Notify Military Police personnel of the location of radioactive materials utilized by WRAMC [AR 40-5, paragraph 9-9b(5)].

(e) Ensure that vials containing unsealed radionuclides are properly monitored for contamination prior to their use [AR 40-37, Appendix C-1n(11)(e)].

(4) Diagnostic X-Ray Facilities.

(a) Ensure that appropriate devices are available for the storage of protective lead aprons in the Orthopedic X-Ray Room (TB MED 521, paragraph 2-9f).

(b) Conduct and document semiannual checks of all interlocks to x-ray exposure rooms (TB MED 521, paragraph 2-4g).

(5) Records, Reports, and Surveys.

(a) Evaluate the incident skin exposure for automatic exposure controlled chest x-ray systems [TB MED 521, paragraph 5-3b(11)].

(b) Conduct monthly area surveys utilizing both exposure rate meters and swipe tests [AR 40-37, Appendix C-1n(12)].

b. The following recommendations are provided as good health physics practices and, if implemented, will enhance the quality of the radiation protection program.

(1) General. None.

(2) Personnel Dosimetry Program. Positive thyroid burdens of radioiodine should be converted into dose equivalents regardless of the quantity. This would enable the RPO to better monitor total exposure levels of radiation workers, both internal and external, and support an effective ALARA program.

(3) Radioactive Materials.

(a) Misadministrations involving radiopharmaceuticals in nuclear medicine should be reported to the responsible RCC. This would greatly assist the RCC in ensuring that the uses of radioactive materials are in consonance with sound clinical and experimental procedures [AR 40-37, paragraph 4-f(10) and 4-f(11)].

(b) Procedures for replacement of the CO_2 absorber for the BACTEC analyzer should be included in the pathology radiation protection SOP to ensure the absorber is disposed of in the same manner as other BACTEC waste.

(4) Diagnostic X-Ray Facilities. Dimmer switches in fluoroscopic examination rooms should be installed to ensure that extraneous lights do not interfere with fluoroscopic examinations [TB MED 521, paragraphs 2-16(f) and 4-4f].

(5) Records, Reports, and Surveys. Ensure that records involving acceptance testing of accelerators are kept on hand to document the lack of health hazard [ANSI No. 13.6-1966 (R1972), paragraph 7.1].

7. REFERENCES. See Appendix B for a list of references.

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APPENDIX A
ABBREVIATIONS

ALARA	- as low as is reasonably achievable
ANSI	- American National Standards Institute
ARPO	- Alternate Radiation Protection Officer
CFR	- Code of Federal Regulations
CDRR	- Central Dosimetry Record Repository
DAC	- Department of the Army Civilian
IAW	- in accordance with
ICRP	- International Council on Radiation Protection and Measurements
JCAH	- Joint Commission on Accreditation of Hospitals
NCRP	- National Council on Radiation Protection and Measurements
NRC	- Nuclear Regulatory Commission
RCC	- Radiation Control Committee
RPO	- Radiation Protection Officer
USAIRDC	- US Army Ionizing Radiation Dosimetry Center
USAMRIID	- US Army Medical Research Institute for Infectious Disease
WRAIR	- Walter Reed Army Institute of Research
WRAMC/DENTAC	- Walter Reed Army Medical Center/US Army Dental Activity

APPENDIX B
REFERENCES

1. AR 40-5, 30 August 1986, Preventive Medicine.

2. AR 40-14, 15 March 1982, Control and Recording Procedures for Exposure to Ionizing Radiation and Radioactive Materials.

3. AR 40-37, 7 January 1977, Licensing and Control of Radioactive Materials for Medical Purposes.

4. TB MED 521, 15 June 1981, Management and Control of Diagnostic X-Ray, Therapeutic X-Ray, and Gamma-Beam Equipment.

5. Title 10, CFR, 1986 rev., Chapter I, Nuclear Regulatory Commission.

6. Accreditation Manual for Hospitals, Joint Commission on Accreditation of Hospitals, 1986 edition.

7. ANSI No. N13.6-1966 (R1972), Practice for Occupational Radiation Exposure Records Systems.

8. HQ HSC Directorate of Dental Services Commanders Guide, January 1986.