

QUALITY IMPROVEMENT IMPLEMENTATION GUIDE FOR DIGITAL RODIOGRAPHIC  
IMAGING -- EXERCISE 26

**SUBJECT:** DIGITAL RADIOLOGY POLICY AND PROCEDURES MANUAL

**PURPOSE:** The Coast Guard Medical Manual (COMDTINST M6000.1C) requires that each clinic radiology department maintain a radiology policy and procedures manual. The radiology policy and procedures manual is a guide to the daily operation of the radiology department. It provides a concise reference for orientation of new personnel to the radiology department and a source of information to answer questions in the absence of the regular radiology staff. This reference should be developed and maintained by the individual designated as responsible for the radiology department. Normally, this would be a "C" school trained radiology technician.

**DISCUSSION:** Enclosure (1) provides a sample of a radiology department policy and procedures manual. Sections required include cover page, table of contents, introduction, personnel responsibilities, and hours of operation, test ordering policies, operating procedures, emergencies, quality control, and radiographic technique. Using this sample in developing the manual will ensure that the manual meets clinic needs while covering required topics. It will also ensure a standardized format among USCG radiology policy and procedures manuals. Specific policies and procedures themselves will necessarily vary by clinic and will need a more extensive explanation than used in this sample. Factors affecting local policies include clinic mission, makeup of beneficiary population, budget constraints, and proximity of military and other radiology services. The manual must be updated annually or more frequently if necessary. Annual revisions shall be dated and signed on the cover page.

**ACTION:** Clinics will have a Radiology policy and procedures manual which will be updated at least annually. Enclosure (1) provided in hard copy and by electronic mail, may be used as a sample for the content of this document.

**ENCLOSURE (1):** Sample Radiology Policy and Procedures Manual

CLINIC NAME  
**Clinic location**

**RADIOLOGY POLICY AND PROCEDURE MANUAL**

\_\_\_\_\_  
CHIEF, HEALTH SERVICES DIVISION

\_\_\_\_\_  
RADIATION HEALTH  
REPRESENTATIVE

DATE

REVIEWED/REVISED: \_\_\_\_\_  
DATE

\_\_\_\_\_  
SIGNATURE

\_\_\_\_\_  
DATE

\_\_\_\_\_  
SIGNATURE

## Table of Contents

<u>Chapters</u>	<u>Page</u>
I Introduction	3
II Personnel Responsibilities	4-5
III Hours of Operation	6
IV Radiology Test Ordering Procedures	7
V Operating Procedures	8-11
VI Emergencies	12
VII Quality Control	13-18
VIII Radiation Safety	19-20
IX Radiographic Techniques	21-26
Enclosures	27-28

## **I. Introduction**

### **A. Designation of Responsibilities for Radiology**

This manual will facilitate the training of new personnel in the Radiology Department operations and serve as an information source when regular radiology staff members are unavailable. The individuals designated as responsible for the Radiology Department will review and update this manual at least annually. Questions regarding this manual or the Radiology Department policies should be directed to the Radiation Safety Representative \_\_\_\_\_ (name).

### **B. Radiology Department Responsibilities**

1. Proper storage of all radiology equipment and supplies in the clinic.
2. Maintain radiology department cleanliness (clean all equipment and counter spaces with appropriate germicidal disinfectant)
3. Inspection of all radiology supplies for date expiration.
4. All record keeping associated with the Radiology Department, such as patient log, repeat analysis, and radiology reports.
5. Performance of daily startup and shutdown of all radiology equipment.
6. Performance of all quality control for the radiology equipment.
7. Ensuring preventative maintenance is completed on all radiology equipment.
8. Inspection of all cassettes, lead shields, and aprons for defects.
9. Training of clinic staff in radiology procedures.
10. Maintain a Civilian radiology results notification log.

## II. Personnel Responsibilities

### A. Radiology Department personnel responsibilities:

1. Follow all procedures for Infection Control as outlined in COMDTINST M6000.1 (Chapter 13 Medical Manual).
2. Familiarize themselves with Chapter 7 of the Safety and Environmental Health Manual COMDTINST M5100.47, including Enclosures 11 and 12.
3. Read the Fuji Operator's Manual, Fuji Medical Systems CR Users Guide, the Fuji Medical Dry Imager DRYPIX 3000 Operator's Manual and the FujiFilm Medical Systems FCR Quality Assurance Program Manual.
4. Maintain cleanliness throughout the Radiology Department. Cleaning all equipment and counter spaces with appropriate germicidal disinfectant. Daily dusting of the Dell monitor, Fuji imaging plate processor, and DryPix 3000 laser printer.
5. Perform all administrative duties of the Radiology Department, including but, not limited to:
  - a. Proper entry of patient exam into the CHCS system.
  - b. Proper completion of the SF 519-A Radiologic Consultation Request/Report.
  - c. Ensuring completed radiology reports are processed properly.
  - d. Proper labeling of patient x-ray jackets.
  - e. Maintaining the Radiology Daily Exam Log, this is to be printed at the end of each workday that radiographs were taken.
  - f. Maintaining a log of all radiographs checked out by patients or medical facilities.
  - g. Prepare and submit the BPA (Blanket purchase agreement) form for the radiologist interpretation charges to MLCLANT for payment.
6. Perform daily start-up and shut down of all radiology equipment.
7. Perform monthly QCs.
8. Maintaining radiographic technique charts.
9. Ensuring preventative maintenance on the radiology equipment is completed on time and proper documentation is kept on file.
10. Act as a liaison with other radiology facilities and radiology ordering medical facilities outside this clinic, e.g.,

11. Conduct mandatory annual training for all clinic personnel in radiation safety procedures.
12. Assume other duties as directed by the Clinic Supervisor.

### **III. Hours Of Operation**

#### **A. Normal Hours of Operation**

- 1. Monday through Friday: \_\_\_\_Insert your Radiology hours here\_\_**
2. Clinics may provide appointment for special radiographic procedures.

#### **B. After Hours Service (Evenings, Weekends, and Holidays)**

- a. The clinic will not normally perform radiology procedures.
- b. Radiology procedures may be performed only if a radiographer is on duty or available. If one is not available, patients are to be referred to a facility that has a radiological technologist.

## **IV. Radiology Test Ordering Policies**

### **A. Authorized to Prescribe**

1. The following health care providers may order radiological tests for eligible beneficiaries at this facility.

- a. Uniformed service physicians, nurse practitioners, physician assistants and dentists.
- b. (Optional) Civilian physicians, Nurse Practitioners, Physician Assistants and dentists.

2. Radiology Consultation/Report Request SF 519-A required information.

- a. Patient's name (last, first, middle initial).
- b. Sponsors' social security number.
- c. Patient's beneficiary code.
- d. Patient's age and date of birth.
- e. Duty station and telephone number if active duty, home phone number if non-active duty.
- f. Test being ordered.
- g. Date test ordered.
- h. Prescriber's name (legible signature along with typed, stamped or printed name.)
- i. All pertinent clinical history, surgical procedures, physical findings, and provisional diagnosis must be recorded in appropriate space. This information is needed for the radiologist to render a proper interpretation of the film.

3. Outside Civilian Providers Requests

- a. Radiology requests for eligible beneficiaries by civilian providers will normally be honored if:
  1. The test is offered by this clinic.
  2. There are no personnel or budgetary constraints that make it necessary to suspend or limit this service.
  3. The request has been transcribed onto a SF-519A (radiographic report chit) and signed by an authorized prescriber.

4. Beneficiary Priority

- a. Radiology services may be reserved for active duty members when, in the opinion of the Chief, of Health Services Division, testing of

non-active duty beneficiaries would leave the Radiology Department unable to serve the needs of the active duty population.

## V. Operating Procedures

### A. Daily Preparation

- a. Turn on all necessary radiology equipment.
- b. If cassettes have not been used within the last forty-eight hours complete a secondary erasure.
- c. Dust Fuji equipment.
- d. Stock sheets and pillow cases and other supplies.

### B. Processing of Radiology Patients

- a. Greet and introduce yourself to the patient.
- b. Ensure radiology request form is completed properly.
- c. If the patient is a female twelve years of age or older you must ask them, in private, if there is any chance they may be pregnant. This must be documented on the radiology request form (SF 519-A). **(Note: You may have to explain to parents that this is necessary and is required to be documented by LAW).**

1. Use either the pregnancy stamp or check the appropriate box regarding pregnancy on the SF-519A. Documentation is to include patients' last menstrual cycle (LMP:), method of birth control (BC:), and have patient sign next to this information. Be sure information and signature is on all copies of the SF-519A.
2. If the patient is pregnant or possibly pregnant, refer patient to the prescribing physician to determine if the radiology exam shall be conducted. Notify a Medical Officer for final radiographic approval. If the exam is approved, Document number of weeks pregnant, double Shielding used. The Patient must sign that she agrees the exam is medically necessary.

- d. Process the radiology request information into the CHCS system.

1. EP – Exam Processing
2. AP - Patient Arrival

- e. Exam information

### C. Pull or make patient's radiograph jacket.

- a. If patient has previous studies of the same exam send those along with the new study to the doctor, if in-house, and to the radiologist for a comparison reading.

- b. In preparing a new radiology jacket use the last four numbers of the sponsor's social security number to determine the jacket color. Refer to **Enclosure (1) Radiographic Filing System**. Use black tape on side of the radiograph jacket to cover the last number of the sponsor's social security number. Use the proper year color tape on the bottom right side of the jacket. Use of this tape will facilitate in disposal of old radiograph jackets. However, if the patient has chest radiographs from an occupational medical surveillance physical do not put the year color tape on the radiograph jacket. According to the Medical Manual, M6000.1B, the chest films will remain on file for thirty years. Write OMSEP in large letters down the right side of the jacket.
  - c. If the patient is under the age of 21, write **minor** along with the patients' birth date on a white label and affix to the radiograph jacket just above the color tape that indicates the year. **Radiograph jackets cannot be purged if the patient is under the age of twenty-one.**
- D. Ask the patient to have a seat while you prepare things. If the patient must disrobe, you may have them do so at this time. Follow the clinic's Chaperone policy.
- E. Explain the exam procedure to the patient. Keep in mind that if the patient is a child they may be afraid. Try to make them feel at ease by talking to them. Some children will not behave properly if the parents are in the room so if possible, have the parents wait outside the room while taking the radiograph. However, in some instances you cannot avoid having the parents in the room. If the mother stays in the room while the radiographs are being taken be sure there is no chance of her being pregnant. If there is a possibility that she may be pregnant do not under any circumstances have her in the room while taking the radiograph.
- F. Take the necessary radiographs. The radiographer taking the images must use their own identification right/left markers to correctly mark the images.
- G. Process radiographs.
- H. Place finished radiographs, along with any pertinent previous studies, and the request chit in the blue radiograph jacket. Escort patient with the radiographs to the appropriate exam room for follow up with the medical officer.
- I. Processing Radiology Results
- a. Distribute the radiologist's transcribed reports to the ordering physician for review and signature.

- b. Once a physician has returned the reading, with their acknowledgment signature, to the radiology department check off the patients' name in the daily log. This denotes that the physician has seen the results.
- c. Place the original copy in the patients' medical record. Place the other copy in the patients' radiograph jacket.
- d. If the radiology request was from an outside provider fax the results to that physicians' office. On the results, document the date and time the results were faxed and the initials of the person that faxed it. The fax cover sheet must have the HIPPA statement at the bottom. Place the original report in the patients' radiograph jacket.
- e. On occasion a provider may request, from the radiology department, a reminder regarding a patient's follow-up care. The provider will make a note for the need of a reminder on the radiology report. Make an extra copy of the report and place it in the front of the daily logbook in the requesting provider's section. Every two weeks ensure the provider has reviewed any follow-ups they may have pending. Once the provider no longer requires the reminder remove the report from the logbook and shred.

#### J. End of Workday

- a. Make sure all areas are clean.
- b. Turn off all equipment properly.
- c. Print out daily log entry.
- d. Ensure all filing is complete.
- 5. Make sure the duty section is aware of any problems in the Dept.

#### K. General Regulations

- a. Use universal precautions by washing hands before and after each patient. Wear gloves when performing any test that may result in direct contact with body fluids.
- b. Radiology counters and equipment shall be decontaminated with an approved germicidal disinfectant.
- c. Practice radiation safety. Keep the dose as low as reasonably acceptable. Use gonad lead shielding for the patient whenever possible.
- d. Never expose a patient to unnecessary radiation.

- e. Never have the collimation larger than the image receptor. If possible, further collimate to the area of clinical interest.
- f. Ensure all radiographic technique charts are up to date.
- g. Never get into a dispute with a patient. Refer dissatisfied patients to the Clinic Supervisor.

L. Purging Radiographs

- a. Radiographs can be purged after five years of inactivity. There are two exceptions to purging.
  - 1. **OMSEP** radiographs are to be retained for thirty years. COMDTINST M6000.1 (Chapter 12 section A.3.a 2).
  - 2. Radiographs of patients that are still minor are not to be purged. These radiographs are to be held until the patient reaches the age of twenty-one and is no longer a minor.
- b. Refer to **Enclosure (1)** Radiographic Filing System disposal code to determine which radiographs are to be purged.

## **VI. Emergencies**

### **A. Fire**

1. Follow clinic fire and safety procedures.

### **B. Management of medical emergencies**

1. If 2 HSs are present, 1 summons help while the other treats the patient.
2. If 1 HS is present, he/she summons help ASAP and returns to the patient ASAP.

## VII. Quality Control

### A. Fuji Smart CR Quality Control

1. This is a simplified version of the QC program, **Enclosure 2**, to be performed once a month. The following information was taken from the Fuji FCR Quality Assurance Program manual and approved by the Senior Medical Physicist at Naval Medical Center Portsmouth. For a more in depth version refer to the FUJIFILM Medical Systems FCR Quality Assurance Program.
  - a. First, establish a baseline phantom image. This image is used to compare with the monthly QC phantom images. A new baseline image should be taken anytime the Fuji service engineer has made 'S' number adjustments. Also, a new baseline image should be taken after adjustments made to the Philips x-ray machine may alter output, such as a tube head change.
  - b. Equipment needed for baseline phantom image:
    - a. FCR QA Phantom
    - b. Lead Apron
    - c. Control 14x17 IP cassette; perform a secondary erasure before using. (same control cassette in the monthly phantom QC test)
    - d. Densitometer
    - e. Primary Exposure Room Baseline Exposure Factors Form
  - c. Test Procedure for Baseline Phantom Image:
    1. Complete a secondary erasure cycle on the control IP cassette.
    2. If the x-ray machine has not been used within 90 minutes, warm up the tube by making an exposure.
    3. Move the x-ray tube away from the table so the beam will strike the floor.
    4. Turn on the field light. Place lead apron on the floor and in the field.
    5. Place the designated CR IP cassette on the apron with the green stripe at the anode end (positive side) of the x-ray tube. Place the FCR 1 Shot Phantom directly on the cassette with its stripe at the green stripe end of the cassette.

- f. Position the x-ray tube to an SID of no less than 60 inches. Collimate the x-ray beam to a size 1" larger than the outside frame of the cassette.
  - g. Use a manual exposure of 80kVp with time of 0.10 second. The mA station used will be 100mA or less. Establish an exposure with an "S" number close to 200 (150-250). Remember as exposure decreases "S" number increases. Keep the time at 0.10 second and adjust the mA to get the 200 "S" number. It may take a couple of adjustments to get the proper "S" number. Steps *a* through *k* will need to be completed to ensure the proper "S" number is attained.
  - h. Do not process immediately! Wait 10 minutes before processing.
  - i. Input test image demographics for proper identification.
  - j. Use the "test" selection from the anatomical region section of the IDT **Imaging Data Terminal**. Under "test" select "contrast" which should select an EDR **Exposure Data Recognizer** of "semi", SS of "1.0", and CS of "1.0". Store the image on the CR reader and print out a film.
  - k. Process the IP (**Imaging Plate**)
    - l. Record the baseline image in the CR reader.
    - m. Print the film.
    - n. Record the baseline settings on the primary Exposure Room Baseline Exposure Factor form.
    - o. The density reading should be taken within the center measurement circle (EC on the phantom diagram).
- d. Monthly QC (**Quality Control**) Phantom Tests. Exposure of the phantom image for the monthly QC is similar to the baseline image with only a few changes. If a QC test fails, repeat the test. If it fails again, expose another phantom image and re-run the tests. If the phantom tests fail again call the service engineer.
- e. Equipment needed for Monthly QC Phantom Tests:
- 1. FCR QA Phantom
  - 2. Lead Apron
  - 3. Control 14x17 IP cassette; perform a secondary erasure before using. Use the same 14x17 that was used to set up the baseline phantom image.
  - 4. Densitometer
  - 5. FCR 1 Shot Phantom Monthly Report Form
- f. Test Procedure for Monthly QC Phantom Tests:

1. Complete the secondary exposure cycle on the control IP cassette.
  2. X-ray tube may need a warm up if it has not been used in 90 min.
  3. On the floor position the phantom on the lead apron. Place the control 14x17 directly on top of the phantom matching the orientation strip at the established distance of no less than 60 inches. Collimate the beam one-inch outside the frame of the cassette.
  4. The orientation strip must always be at the anode end of the x-ray tube.
  5. Expose the phantom at 80 kVp and the pre-established mA and time settings to produce the QA image.
  6. Do not process immediately! Wait 10 minutes before proceeding.
  7. Input the test image demographics for identification. Example; AUGUST 2003 QC PHANTOM.
  8. Select test from the anatomical region of the IDT. Under test select contrast. Verify that the contrast menu is set for 1:1 format and the EDR option is semi mode. Also confirm that there has been no change in SS (i.e. **1.0**/1.0) from baselines.
  9. Process the IP and print the film.
  10. Complete the FCR 1 Shot Phantom Monthly Report Form.
- g. Relative Sensitivity Test: Using the workstation note the “S” number. It should not deviate from the baseline “S” number by more than +/-20%. Using a densitometer measure the density of the film this should not deviate from the original film by more than +/- 0.15DU (Density Units). The density reading should be taken within the center measurement circle (EC on the phantom diagram).
- h. Shading: Measure the film density of the center circle (EC), left circle (EL), and right circle (ER) on the film. These should be similar to prior readings and “EL” and “ER” should not differ from “EC” by more than +/-10%.
- i. Contrast Evaluation: Using the contrast patches visually compare (do not measure) that the inner and outer circles are distinctly different in density and that the apparent difference is similar for each of the contrast patches. This test is to be performed both on the printed phantom and the workstation monitor.
- j. Sharpness Test: Observe the resolution test object in the middle of the phantom on the film noted the level of resolution and compare to

the original film. They should be similar (within 0.5 lp/mm). This test is to be done on the printed phantom and the workstation monitor. When testing at the workstation make sure that the lighting in the room is the same as previously used, magnify the image, and ensure the window/level is the same as used previously.

- k. Laser Jitter Test: Observe the edges of the “T” shaped object at the top of the phantom image. With the unaided eye there should be no jagged edges seen. Compare to the original using 2x magnification to verify they are the same.
- l. Image Noise and Artifact: Observe the image (film and/or softcopy) for graininess. If seen ensure that the “S” number is the same as originally obtained. Observe the image for artifacts such as white areas of variable shape or lines that run parallel to IP read direction. If any are seen, clean the IP and repeat.
- m. Primary Erasure Test: This test does not require documentation on the monthly report form. Without exposing the control imaging plate rerun it through the reader and observe on the monitor that there is no residual image of the phantom.

## 2. Cleaning of the imaging plates

- a. Review images on a routine bases for white spots (minus density artifacts) that may be caused by dust or dirt particles. Do not clean or remove the IPs from the cassettes unless necessary. Unnecessary removal from the cassettes increases the chance of damage to the IPs also, exposure to the air may cause dust particles to adhere to the IP.
- b. Equipment needed for cleaning Imaging Plates:
  - 1. Anhydrous ethanol: Ethyl alcohol (completely denatured) is the only cleaning solution used for cleaning IP’s. Do not use water, screen cleaner or isopropyl alcohol to clean IP’s.
  - 2. Lint-free cloth
  - 3. Lint-free cotton glove
- c. Procedure for cleaning imaging plates
  - 1. While wearing lint free cotton gloves, remove the IP from the cassette and inspect for artifacts and physical damage. Use lint free cloth to gently remove the artifact. If the artifact remains use a small amount of the solution and wipe the IP surface in a zigzag pattern

to remove the artifact. If the artifact cannot be removed the plate should be removed from service.

d. Inspection of cassettes

1. Inspect cassettes for physical damage. The insertion of a broken cassette into the CR reader can result in mechanical failure and system shutdown. Check cassette hinges, hinge rivets and clasps. Inspect lead backing for peeling or other physical damage.

e. Cassette cleaning

1. The CR cassettes can be cleaned with any of the cleaning solutions used for cleaning the exterior screen/film radiographic cassettes. Do not immerse the cassette when cleaning. Do not insert a moist cassette into the CR reader.

3. Repeat/Reject Analysis

- a. Reject analysis is used to determine the causes of repeated images. The information obtained can be used to identify problems areas and therefore help reduce patient exposure and improve image quality.
- b. This is an ongoing process with calculations done at the end of each month.
- c. Equipment needed for Repeat/Reject Analysis:
  1. Repeat/Reject Analysis Form
  2. Repeat/Reject Monthly Report Form.(found in Fuji film Medical systems TCR Quality Assurance program)
  3. Total number of images produced during test period
  4. All repeated images during the month
- d. The repeat/reject analysis form should be hung behind the control panel. During the month if it is necessary to repeat an exposure mark on the form the reason for the repeat. At the end of the month add the number of images taken. This can be done at the CR monitor. Select *all* and *study date*. This will arrange the studies chronologically. The number of images taken per study will be displayed in *number of images column*. Calculate the total images taken for the month. Use the following formula for reject rate calculations.

1. Number of films rejected divided by the number of films used x 100 = % rejected.

a. Example: 28 rejects divided by 245 x 100 = 11.4% total rejected.

f. Calculate a reject rate for each category and then an overall reject rate. Enter repeat data onto the Repeat /Reject Analysis Monthly Report Form. Strive to achieve a reject rate of 5% or less. A rate above 10% indicates a need for immediate corrective action. Identifying the common cause of repeats can be used to determine if additional training or review is needed.

## 5. Annual Lead Apron Inspection

a. All medical and dental lead aprons are to be inspected annually, and logged. Testing includes visual and x-ray inspection.

b. Visually examine each apron for obvious tears, cuts, or rips.

c. X-ray inspection is used to verify the shielding integrity of the apron. Fluoroscopy or radiographic unit can do this. If fluoroscopy is the desired method the radiographer must locate a facility willing to perform this test.

d. The radiographic unit may be used to inspect the apron one section at a time.

1. Register the apron by number in the Fuji Smart CR.

Use the “test” selection from the anatomical region section of the IDT. Under “test” select “contrast”.

2. Place a section of the apron on the cassette and using tabletop method make an exposure using large focal spot with an approximate technique of 80kVp @ 6.4 – 10 mas.

3. Process the cassette, but do not print.

4. View the image on the monitor. Look for defects that show up as very dark pinhole areas.

5. Some scattered pinholes are okay, but if the apron is peppered with pinholes it needs to be removed from service.

6. X-ray aprons are to be hung up or draped over a rod. They are **not** to be folded or piled up on a shelf.

## **VIII. Radiation Safety**

### **A. Senior Medical Officer Responsibilities**

1. The Senior Medical Officer or designated supervising medical officer of each health care facility with medical diagnostic radiography capabilities is responsible for:

- a. Compliance with all provisions of COMDTINST M5100.47, Chapter 7, Safety and Environmental Health Manual.

### **B. Clinic Administrator Responsibilities**

- a. Clinic Administrators (CA) shall assume the overall responsibility for the Personnel Dosimetry Program and serve as the point of contact for the U.S. Army Primary Standards Laboratory (APSL). The CA shall designate a Radiation Health Representative (RHR) in writing who will have basic knowledge of radiation safety practices and procedures and oversee the day-to-day operations.

### **C. Radiation Health Representative Responsibilities**

1. Ensure compliance with the personnel dosimeter quality assurance and personnel monitoring programs as per Safety and Environmental Health Manual COMDTINST M5100.47, Chapter 7-E-6, also CG-113 and US ARMY IONIZING RADIATION DOSIMETRY PROGRAM (Customer Handbook resource #1-877-876-3816).

- a. Training of individuals assigned dosimeters. Personnel assigned dosimeters are responsible for proper use, loss, and damage to the dosimeter. Deliberate exposure or other improper use of the dosimeter constitutes falsification of an official record resulting in the need for an investigation and possible disciplinary action.
- b. Ensure all women of child bearing age that are occupationally monitored ( assigned a dosimeter) are advised of the potential hazards of radiation exposure to unborn children as described in COMDTINST M5100.47, enclosure 12, Safety and Environmental Health Manual. Such personnel are required to sign a statement certifying that they have been briefed. Copies of these statements will be attached to fourth quarter calendar year dosimeter reports and retained in the health record.
- c. Maintain all Quality Assurance records, personnel monitoring records, and Dosimetry reports.

- d. Review radiation reports for unusual exposures, investigating to determine the cause, and reporting conclusions to Commandant (G-KSE-3) via MLC Commander (k).
- e. Ensure the evaluation of medical diagnostic radiography equipment by the regional Radiological Health Representative (RRHR) at least every two years.
- f. Ensuring further evaluation whenever:
  - 1. New radiography equipment is installation.
  - 2. Existing radiography equipment is movement to a different location
  - 3. New radiography facilities are constructed.
  - 4. Existing radiography facilities are renovated.
- g. Maintain a file on all equipment in the radiology department.
- h. Ensure that Ionizing Radiation signs are posted in the appropriate areas.
- i. Ensuring the signs, which request possible pregnant patients to notify radiographers, are posted.

## IX. Radiographic Technique

A. These techniques are only estimates; some adjustments may be necessary.

### 1. Anatomical Part: Hand

- a. Views: PA, Oblique, and Lateral
- b. Film size: 10x12
- c. Distance: 40"; screen
- d. Baseline technique for: PA and Oblique: [55kv@1.6mas](#)
- e. Baseline technique for: Lateral: [55kv@2mas](#)

### 2. Wrist

- a. PA, Oblique, and Lateral
- b. 10x12
- c. 40"; screen
- d. [55@3.2](#)

### 3. Forearm

- a. AP and Lateral
- b. 11x14
- c. 40", screen
- d. AP [55@3.2](#), Lateral [56@4](#)

### 4. Elbow

- a. AP, Lateral, Internal Oblique, and External Oblique
- b. 10x12; two views per cassette
- c. 40", screen
- d. [56@3.2](#)

### 5. Humerus

- a. AP and Lateral
- b. 14x17
- c. 40", screen or bucky
- d. Screen [60@5](#); bucky 64kv center cell

6. Shoulder

- a. AP Internal and External
- b. 10x12 crosswise
- c. 40", bucky
- d. 70kv center cell

7. Shoulder Y view

- a. 10x12 lengthwise
- b. 40", bucky
- c. 70kv center cell

8. Clavicle

- a. AP and Tangential (10-15 degree cephalic)
- b. Depending on patient size use either a 14x17, making both exposures on one film, or use two 10x12.
- c. 40", bucky
- d. 66-70kv center cell

9. Foot

- a. AP, Oblique, and Lateral
- b. 10x12
- c. 40", screen
- d. AP, Oblique: [55@3.2](#); Lateral: [58@4](#)

10. Toes

- a. AP, Oblique, and Lateral
- b. 10x12
- c. 40", screen
- d. AP, Oblique: [55@2](#); Lateral: [56@3.2](#)

11. Calcaneus

- a. AP, and Lateral
- b. 8x10 screen
- c. 40"
- d. AP: [55@3.2](#); Lateral: [58@4](#)

12. Ankle

- a. AP, Oblique, and Lateral
- b. 10x12
- c. 40", screen
- d. AP, Oblique, and Lateral: [60@3.2](#)

13. Tibia/Fibula

- a. AP and Lateral (to include both joints)
- b. 14x17
- c. 40", screen
- d. AP: 64@4 and Lateral: [64@5](#)

14. Knee

- a. AP, Oblique, and Lateral
- b. 10x12 Lengthwise
- c. 40", bucky
- d. 62kv

15. Femur

- a. AP Pelvis, AP femur, and Lateral
- b. 14x17
- c. 40", bucky
- d. AP Pelvis; crosswise; 70kv outer cells
- e. AP and lateral Femur; lengthwise; 66kv center cell

16. Hip

- a. AP Pelvis and Frog leg hip
- b. Pelvis: 14x17 crosswise; Frog leg: 10x12 crosswise
- c. 40", bucky
- d. AP Pelvis 70kv outer cells
- e. Frog leg 70kv center cell

17. Pelvis

- a. AP
- b. 14x17 crosswise
- c. 40", bucky
- d. 70kv outer cells

## 18. Abdomen

- a. AP
- b. 14x17 lengthwise; if patient is large do 2 crosswise
- c. 40", bucky
- d. 70kv center cell

## 19. Upright Abdomen

- a. AP
- b. 14x17 lengthwise, if patient is large can do crosswise.
- c. 40", upright bucky
- d. 70kv center cell

## 20. Lumbar Spine

- a. AP, Both Oblique, Lateral, and Spot
- b. AP, Obliques, and Lateral 14x17 lengthwise
- c. Spot 10x12 lengthwise
- d. 40", bucky
- e. AP: 75-80kv center cell
- f. Obliques: 80-85kvcenter cell
- g. Lateral: 90-95kvcenter cell
- h. Spot: 95-100kv center cell

## 21. Thoracic Spine

- a. AP and Lateral
- b. 14x17 lengthwise
- c. 40", bucky
- d. AP: 70kv center cell
- e. Lateral: [66-70kv@50ma@6.4-10seconds](#); use breathing technique

## 22. Swimmers

- a. Lateral; 25-30 degrees caudal
- b. 10x12 lengthwise
- c. 40" bucky
- d. 70kv

### 23. Cervical Spine

- a. AP, both Obliques. Lateral, Odontoid
- b. 10x12 lengthwise, Spot 8x10 crosswise
- c. AP and Odontoid: 40" bucky
- d. 70kv center cell
- e. Lateral and both Obliques: 72" bucky
- f. [73kv@40mas](#)

### 24. Chest

- a. PA and Lateral
- b. 14x17 lengthwise or crosswise depending on patients size
- c. 72" wall bucky
- d. 117kv center cell

### 25. Ribs

- a. PA Chest (if provider ordered), AP or PA (depending upon where rib pain is), Oblique (of affected side), AP lower ribs
- b. AP/PA and Oblique 14x17 lengthwise
- c. AP lower ribs 10x12 crosswise
- d. 40" bucky

### 26. Skull

- a. PA, both Laterals, AP Townes
- b. PA and AP Townes: 10x12 lengthwise
- c. Both Laterals: 10x12 crosswise
- d. 40" bucky
- e. 70kv center cell

### 27. Sinus

- a. PA, Caldwell, Waters, Lateral
- b. 10x12 lengthwise
- c. 40" wall bucky
- d. 66-70kv center cell

## 28. Facial Bones

- a. PA, Lateral (affected side closest to film or left lateral), Waters, Submentovertical (SMV) for Zygomatic Arches
- b. PA, Lateral, Waters: 10x12 lengthwise
- c. SMV: 8x10 crosswise
- d. 40" bucky
- e. 60-70kv

## 29. Mandible

- a. PA, bilateral Obliques, Exaggerated Townes, Lateral (affected side closest to film)
- b. 10x12 lengthwise
- c. 40" bucky
- d. 66-70kv center cell

## 30. Nasal Bones

- a. Waters and Facing Laterals
- b. Waters 10x12 lengthwise
- c. Waters: 40" bucky 70kv
- d. Facing Laterals: 40" screen; use a finger technique [55@1.6](#)

## 31. Orbits

- a. AP, Lateral, Waters, Rhese, (chin, cheek, nose)
- b. 10x12 crosswise
- c. 40" bucky

## Radiographic Jacket Filing System

00-09-----ORANGE  
10-19-----GREEN  
20-29-----YELLOW  
30-39-----GRAY  
40-49-----TAN  
50-59-----BLUE  
60-69-----WHITE  
70-79-----BROWN  
80-89-----PINK  
90-99-----RED

## X-ray Disposal Schedule Color Tape Code

1<sup>st</sup> Year – YELLOW  
2<sup>nd</sup> Year – WHITE  
3<sup>rd</sup> Year – BLACK  
4<sup>th</sup> Year – RED  
5<sup>th</sup> Year – BLUE  
6<sup>th</sup> Year – GREEN

REPEAT COLOR TAPE CODE

Enclosure (1)

## CR QC Summary

This is a simplified QC program to be performed once a month.

Clear an IP and place in top of a lead apron at 60 inches SID. Using 80kVp, \_\_\_ mA, .10 sec, expose the IP. Wait for 10 minutes and then read in the CR unit. Use the “test” selection from the anatomical region section of the IDT and under test select “contrast” which should select an EDR of “semi”, SS of “1.0” and CS of “1.0”. Store the image on the CR reader and print out a film.

*Relative S Number Calibration:* Using the workstation note the “S” number. It should not deviate from the originally obtained “S” number by more than +/-20%. Using a densitometer measure the density of the film that should not deviate from the original film by more than +/-0.15 DU.

*Shading:* Measure the film density of the “EC”, “EL”, and “ER” objects on the film. These should be similar to prior readings and “EL” and “ER” should not differ from “EC” by more than +/-10%.

*Contrast:* Using the contrast patches observe that the inner and outer circles are distinctly different in density and that the apparent difference is similar for each of the contrast patches.

*Sharpness:* Observe the resolution test object in the middle of the phantom on the film noted the level of resolution and compare to the original film. They should be similar (within 0.5 lp/mm).

*Laser Jitter:* Observe the edges of the “T” shaped object at the top of the phantom image. With the unaided eye there should be no jagged edges seen. Compare to the original image using 2x mag to verify they are the same.

*Noise/Artifact:* Observe the image (film and/or softcopy) for graininess. If seen ensure that the “S” number is the same as originally obtained. Observe the image for artifacts such as white areas of variable shape or lines that run parallel to IP read direction. If any are seen, clean the IP and repeat.

*Primary Erasure:* Without exposing the plate rerun it through the reader and observe that there is no residual image of the phantom.

*Other Activities:* If an IP is not used for 48 hours it should be secondary erased before being used. All IPs should be cleaned with a lint free cloth monthly or whenever artifacts are seen. If artifacts are not removed by cleaning with a cloth use “anhydrous ethanol” to gently clean the plate.