Position Classification Standard for Diagnostic Radiologic Technologist Series, GS-0647

Table of Contents

SERIES DEFINITION

This series includes positions requiring the performance or supervision of technical work in the field of diagnostic radiologic examinations, performed under the direction of a physician. The work involves the operation of radiologic equipment in a hospital or clinic environment as part of the diagnostic plan for patients.

Some positions, usually in small hospitals or clinics, may include the performance of other medical auxiliary services, such as operation of electrocardiographic equipment. These duties usually occupy a minor portion of time and usually do not affect the grade or series of the position. If significant, such duties should be evaluated in accordance with the standards for the occupation of which they are characteristic.

Positions classifiable to this series but not directly covered by the grade level portions of the standard are:

1. Supervisory positions -- Supervisory positions should be evaluated by use of the General Schedule Supervisory Guide.

2. Training or teaching positions -- Training or teaching programs are carried out in some hospitals. There are relatively few positions concerned entirely with training or teaching. Such positions should be evaluated by reference to the standards for positions in the field of Education and Training, GS-1710/1712, and the application of general classification principles.

This standard supersedes and is to be substituted for parts I, II, and III of the standard for the Medical Radiology Technician Series, GS-0647, published in April 1966. The revision is the result of a complete restudy of this occupational field.

EXCLUSIONS

Positions involving the following types of work are excluded from this series:

1. Positions requiring the application of professional knowledges and skills in radiology, or other professional occupations are classifiable in the Medical Officer Series, GS-0602.

2. Positions involving as the primary duty performance of work requiring knowledge, judgment, and skills of dental assistants including dental X-ray, are classifiable in the Dental Assistant Series, GS-0681.

3. Positions involving as the primary duty performance of technical work which is subordinate to the work of radiologists, or other professional or scientific personnel and which involves the operation of ionizing radiation equipment and sealed radiation sources for

radiation therapy are classifiable in the Therapeutic Radiologic Technologist Series, GS-0648.

4. Positions involving as the primary duty performance of technical work using radionuclides (exclusive of sealed radiation sources) for diagnostic, therapeutic, and investigative purposes under the direction of a physician are classifiable in the Nuclear Medicine Technician Series, GS-0642.

5. Positions involving as the primary duty the performance of work limited to automated processing (including X-ray film and motion picture film), splicing and assembling film strips, and mixing development solutions are classifiable in the Equipment Operator Series, GS-0350.

6. Positions involving as the primary duty the manufacture, maintenance, or repair of diagnostic radiation equipment are graded under the Federal Wage System.

TITLES

Titles for positions in this occupation are:

- Diagnostic Radiologic Technologist - for positions at GS-6 and above

- Diagnostic Radiologic Technician - for positions below GS-6

The term "Supervisory" should be prefixed to the titles established above when positions involve supervisory duties and responsibilities as defined in the General Schedule Supervisory Guide.

OCCUPATIONAL INFORMATION

Diagnostic radiologic technologists and technicians perform procedures and examinations in hospitals or clinics under the direction of radiologists and other medical officers. The objective of the examinations and procedures is to produce radiographic studies which are used in medical diagnosis and interpreted by medical officers to locate injuries, foreign bodies, pathological conditions or lesions within the body.

Diagnostic radiologic technologists and technicians follow a general pattern of work. The steps in this general pattern are:

a. Receiving requests and/or instructions for radiologic procedures.

b. Interpreting requests and/or instructions of physicians for procedures.

c. Securing confidence and cooperation of patients during examination procedures.

d. Positioning or placing the body of the patient in the positions to obtain the views requested. (Positioning may include immobilizing the patient with straps, sandbags or cushions and shielding the patient from excess radiation with protective devices such as lead shields.)

e. Determining the technical factors, setting the controls and operating radiographic equipment in order that the portion of the body specified receives the correct calculated exposure. ("Determining the technical factors" includes referring to guidelines and calculating the correct exposure factors of time, distance, kilovoltage, and milliamperage.)

f. Protecting the patient from direct or secondary radiation by using proper exposures, films, filters, screens, etc., and by restricting the X-ray beam through use of cones, cylinders or diaphragms in order to expose only the designated area.

g. Recognizing and reporting the malfunctioning of equipment to the supervisor.

h. Performing clerical duties such as recording radiographic exposures on the patient's chart, compiling daily work reports showing number and identification of patients, identifying X-ray films with the names of patients, and recording technical factors and materials used in studies where no guidelines are available.

i. Keeping abreast of current technical literature.

Technicians perform these duties with both stationary and mobile equipment. They operate the equipment in radiology departments of clinics and hospitals, in operating rooms, and at patients' bedsides.

Technicians and technologists also may assist radiologists during fluoroscopic examinations. They mix contrast media, prepare syringes for radiologists or other medical officers to administer, and adjust controls on equipment such as image intensifiers, magnetic tape recorders, cineradiography cameras, kinescopic equipment, and television monitors to sharpen the images. They remove and insert spot film cassettes exposed for permanent record during the fluoroscopic examination.

GRADING OF POSITIONS

Positions should be evaluated on a factor-by-factor basis, using one or more of the Office of Personnel Management Benchmark Descriptions for Diagnostic Radiologic Technician or Technologist, GS-4-8 as appropriate. The fact that a benchmark description is not provided at a certain grade level does not prevent placing a position at that grade. In situations where the benchmark descriptions are not adequate, refer to the Factor Level Descriptions for Diagnostic Radiologic Technologist and/or the Primary Standard.

The grade levels described in this standard are those commonly found in the occupation. Research oriented positions, bridge positions for upward mobility assignments, or other less usual assignments may occur. Such positions may be classified above or below these grade levels based on the application of sound position classification methods.

GRADE CONVERSION TABLE

Total points on all evaluation factors are converted to GS grade as follows:

GS Grade	Point Range
3	455-650
4	655-850
5	855-1100
6	1105-1350
7	1355-1600
8	1605-1850

FACTOR LEVEL DESCRIPTIONS

Positions should be evaluated to the extent possible by use of one or more of the Office of Personnel Management Benchmark Descriptions described starting on page 11. In the event that factor descriptions in the benchmarks do not provide a good match with the positions to be classified, classifiers may use the following factor level descriptions to determine the appropriate point values.

Factor Levels for Diagnostic Radiologic Technologist Series, GS-0647

These factor level descriptions show the application of the Primary Standard to the Diagnostic Radiologic Technologist Series. They describe degrees of factors and point values typically found in the diagnostic radiology occupation. There may be some positions, however, which do not fall within the typical patterns. In such cases, point values are extrapolated by reference to these factor level descriptions and the additional levels described in the Primary Standard. Note: (1) Each higher level factor includes all the conditions described at the lower levels. (2) The point values assigned to each factor can only be those given for the factor levels. Point values must not be interpolated between these levels.

FACTOR 1, KNOWLEDGE REQUIRED BY THE POSITION

Factor 1, Knowledge Required by the Position measures the extent of information or facts which the technician must understand to do acceptable work (e.g., procedures, practices, rules, theories, and principles) and the nature and extent of skills necessary to apply these knowledges.

Level 1-3 -- 350 points

Knowledge of radiation protection standards and basic techniques for minimum radiographic exposure; knowledge of the function of the major divisions of the skeletal system and major organs; knowledge of the physical concept of energy and the property of X-rays, electric power and electric circuits, and the theory of X-ray tubes; knowledge of basic radiographic procedures and technical factors (control settings); knowledge of positioning of patients for radiographic examination including knowledge of customary alternate positions for patients with common deformities or injuries; knowledge of basic medical terminology covering gross structures of the body and major organs; and knowledge of first aid, including artificial respiration. Skill to apply such knowledge to perform routine diagnostic procedures, i.e., X-raying chest, joints, extremities; to understand and comply with X-ray requests; and to assist as a team member in radiologic examinations.

Level 1-4 -- 550 points

Knowledge and skill such as described at the lower level and, in addition, knowledge of radiation protection standards including the effects of radiation on living organisms such as genetic damage and accumulated dosage, protective devices and methods for equipment used, and effects of operator techniques on patient and operator exposure; basic anatomic and physiologic knowledge including the location, and function of the various major organs and systems; knowledge of a variety of X-ray machines and accessory equipment including basic physical principles, functioning, operating limitations and operator adjustments; knowledge of radiographic exposure techniques such as equipment set up and operation of intensifying screens, buckys, collimators and other auxiliary equipment, use of contrast materials needed for common noninvasive examination procedures, formulae for determining technical factors, and how to control photographic factors such as density, contrast, detail and distortion. Skill to apply such knowledge to perform moderately complex radiographic procedures such as G. I. series and cholangiograms in accordance with established practice.

Level 1-5 -- 750 points

Knowledge and skill such as described at the lower levels and, in addition, knowledge of anatomy and physiology including location, appearance, and functioning of the major and minor systems susceptible to radiologic illumination, and knowledge of changes to systems and organs caused by common medical and surgical diseases; knowledge of complex radiographic exposure techniques such as determination of technical factors and machine geometry of linear tomographic X-ray machines or equipment of similar complexity, calculation of critical technical

factors needed to show the difference between organs, glands, etc. of similar density when contrast material cannot be used such as adapting for age, structure and patient size when performing mammographies, or use of contrast materials in invasive examinations; knowledge of radiographic positioning required in complex procedures such as lumbar myelography including sequences of positioning, alignment of X-ray beams and localizing of contrast medium; knowledge of first aid and nursing practices such as emergency cardiac arrest procedures and monitoring of vital signs during examinations. Skill to apply such knowledge to perform complex radiographic procedures such as bronchography, lymphangiography, or xerographic mammography.

FACTOR 2, SUPERVISORY CONTROLS

Factor 2, Supervisory Controls covers the nature and extent of direct or indirect controls exercised by the supervisor, the technologist's responsibility, and the review of completed work. Controls are exercised by the supervisor in the way assignments are made, instructions given, priorities and deadlines set, and objectives defined. Responsibility of the technologist depends on the extent to which the technologist is expected to modify or recommend modification of instructions and to participate in establishing priorities. The degree of review of work depends on the nature and extent of review, e.g., close and detailed review of work in process and upon completion or general review of completed work for accuracy.

Level 2-1 -- 25 points

The supervisor or a higher grade technologist provides specific detailed instruction on each procedure to be performed. The technician consults with the supervisor on all problems not specifically covered by instructions. Assignments are controlled to limit the complexity and variety of X-ray procedures to be performed. Work is reviewed through close analysis of X-ray quality and frequent spot-checks of work in progress.

Level 2-2 -- 125 points

The supervisor or a higher grade technologist provides supervision over continuing assignments by indicating generally what is to be done, limitations, and scheduling expected. When assigned to new procedures or to assist radiologists with more difficult procedures, duties and work methods are assigned specifically and in detail.

The technician/technologist carries out recurring assignments independently but recognizes unusual or difficult cases which are not covered by instructions and refers them to the supervisor or a higher grade technologist for help.

Work is observed in progress and by review of completed X-rays to assure that finished work and methods used are technically accurate and in compliance with established procedures.

Level 2-3 -- 275 points

Assignments made by the supervisor cover operating policies, priorities and work schedules. When working as a team member with a radiologist, the technologist's knowledge of complex procedures is accepted. Instructions are limited to such things as medical abnormalities to be expected or discussion of the suitability of available equipment for particular special techniques.

The technologist plans, lays out, and performs the work in accordance with previous training and accepted practices in the occupation.
Work is reviewed on the basis of accomplishing work schedules and overall acceptability of films produced.

FACTOR 3, GUIDELINES

Factor 3, Guidelines covers the nature of the guidelines available to the Diagnostic Radiologic Technologist and the judgment needed to apply these guidelines. This factor is not to be confused with the knowledges described under Factor 1. Guidelines tell the technologist how to use the knowledges.

Level 3-1 -- 25 points

Standard operating procedures specify the number and sequence of exposures and positioning of the patient for each exposure. Tables list the typical settings of kilovoltage, milliamperage, and time for each exposure. Conditions which might require deviation from standard procedures are referred to the supervisor for direction.

Level 3-2 -- 125 points

Standard operating procedures cover the number and sequence of exposures, the normal positioning of the patient and the typical settings of voltage, current, distance, and time. Text books and technical manuals are available for guidance if needed. The Diagnostic Radiologic Technician/Technologist uses judgment in selecting and adapting the appropriate settings and positions in accordance with established precedents.

Level 3-3 -- 275 points

Standard operating procedures cover the number and sequence of exposures and typical settings of voltage, current, distance, and time for the exposures. Text books, trade publications, and technical manuals are consulted for additional guidance. Guidelines often are not directly applicable due to rapidly evolving technology or the complexity of the patient's illness and physical condition. The technologist must use judgment to modify standard procedures and settings to compensate for the patient's illness, injuries, or physical disabilities or to adopt new developments or unusual approaches. The technologist uses initiative to learn of new developments in the field and recommend adoption to improve standard procedures.

FACTOR 4, COMPLEXITY

Factor 4, Complexity covers the nature and variety of tasks, steps, processes, and methods of radiographic examination; and the degree to which the technician/technologist must vary procedures, discern interrelationships and deviations, or develop new techniques.

Level 4-1 -- 25 points

The work consists of duties that involve specific, clear-cut, related tasks for each of several types of routine radiographic examinations. Technical factors and positioning are explained in detail and can be directly applied. The actions taken to position patients or adjust controls are in direct response to instructions.

Level 4-2 -- 75 points

The work consists of duties involving a number of related sequential steps, processes, or methods, e.g., independent performance of a variety of examinations of limited difficulty such as general studies of the chest, spine, or extremities which fall within the range of technical factors and positioning covered in detail by standard operating procedures. The technician/technologist must consider factors that are apparent, comparable, and readily verified in order to make small changes such as devising nonstandard positioning to avoid causing further pain or injury to an injured patient.

Level 4-3 -- 150 points

The work consists of complex radiographic examinations such as bronchograms, mammograms, and G. I. series which are performed under the direction of a radiologist. The examinations consist of various duties and involve a number of different processes and methods. They require the technologist to coordinate the positioning of patients with the operation of the basic X-ray or fluoroscopic equipment and usually the operation of auxiliary equipment such as rapid film changers, power injectors, and cinecameras. The factors of positioning, type of equipment, and phasing of operation differ depending on the examination to be performed. Examination of injured or seriously ill patients requires the technologist to analyze the examination requirements and devise positioning and equipment setup to minimize further pain and injury to the patient.

Level 4-4 -- 225 points

The work consists of performing as the principle or lead technologist of a medical team in the conduct of highly complex radiologic examinations. Factors to be considered involve the assessment of unusual circumstances such as seriousness of illness or injury or mental or physical incapacity of the patient which prevent the patient from cooperating in the procedure and prohibit the use of standard procedures and normal alternatives. These require the technologist to devise variations of positioning, equipment setup, or technical factors to

accommodate to the patient's condition. This requires interpretation of a broad range of information on medical conditions and requirements, equipment capabilities, and examination processes.

FACTOR 5, SCOPE AND EFFECT

Factor 5, Scope and Effect covers the purpose of the assignment and the effect of work products within and outside the organization.

Level 5-2 -- 75 points

The purpose of the work is to provide X-ray studies for doctors to use in diagnosis and treatment of various accident trauma and a wide variety of defects and diseases. Accuracy and clarity of the studies directly effects the accuracy and reliability of the physician's diagnosis and treatment.

FACTOR 6, PERSONAL CONTACTS

Factor 6, Personal Contacts includes face-to-face and telephone contacts with persons not in the supervisory chain. Under this factor, consider only whom the contacts are with. The purpose of the contacts is evaluated under Factor 7. Personal contacts with the supervisor are covered under Factor 2, Supervisory Controls.

Level 6-2 -- 25 points

Personal contacts are with patients, with fellow employees, and with physicians and staff radiologists. These contacts are within the structured setting of the radiology department.

FACTOR 7, PURPOSE OF CONTACTS

Factor 7, Purpose of Contacts covers the reason for the personal contacts and may include other considerations which might affect the nature of the contacts, e.g., dealing with people who are skeptical, uncooperative, unreceptive, or hostile.

Level 7-1 -- 20 points

Personal contacts are for the purpose of exchanging information on procedures, scheduling, or operating problems. Patients usually are aware of the purpose of the procedures and are able to cooperate in positioning.

Level 7-2 -- 50 points

Contacts with fellow workers are to resolve problems and exchange information concerning equipment, procedures, and scheduling of patients. Contacts with patients are to explain procedures to be performed when patients are unfamiliar with examination procedures, to obtain information pertinent to performance of the study, and to direct them to achieve correct positioning. Contacts with physicians or radiologists are to coordinate work efforts or resolve operating problems.

FACTOR 8, PHYSICAL DEMANDS

Factor 8, Physical Demands covers the physical characteristics and abilities, the physical exertion involved, and to some extent, the frequency or intensity of physical exertion.

Level 8-2 -- 20 points

The work requires long periods of standing and walking. There is some bending and carrying of moderately heavy articles such as film cassettes for rapid film changers. Patients sometimes are assisted to achieve proper positioning which may require reaching or work in strained positions.

FACTOR 9, WORK ENVIRONMENT

Factor 9, Work Environment considers the everyday risks or discomforts, that may be imposed on the technologist by the physical surroundings or job situations.

Level 9-2 -- 20 points

The work area is well lighted, heated, and ventilated. Special safety precautions are required to reduce exposure to X-rays. These include using minimum current settings in the X-ray machine and never operating the machine except from behind a protective screen or when wearing protective clothing such as a lead apron.

OPM BENCHMARK DESCRIPTIONS

DIAGNOSTIC RADIOLOGIC TECHNICIAN, GS-0647-03, BMK# 1

Duties

Under close supervision, gains experience in the operation of radiographic equipment by performing diagnostic radiographic examinations which are routine and require no deviation from standard positioning and technical factors (control settings).

- Operates radiographic equipment to produce X-ray films of chest, joints, feet, hands, long bones of arms and legs, and other routine views (posterior and anterior) of other parts of the body. Working with outpatients or ambulatory patients, positions patients and determines and sets technical factors in accordance with standardized procedures and techniques.

- Operates automatic film processing machines to develop X-ray film and prepares film processing chemicals.

- Performs related clerical duties such as identifying film and recording pertinent data on charts, work requests, and records.

Factor 1, Knowledge Required by the Position - 350 points

- Knowledge of radiation protection standards including basic knowledge of the radiation sensitive areas of the body and standard methods and devices used for protection, in order to assure that adequate safeguards are maintained for patients and self.

- Knowledge of basic anatomy covering such areas as the location of the various major organs, and the main divisions of the skeletal system, in order to understand and comply with X-ray requests.

- Knowledge of areas of basic physics including the physical concept of energy, the functioning of typical X-ray tubes, and the properties of X-rays in order to understand the operation of X-ray equipment and adapt to operation of specific machines.

- Knowledge of darkroom techniques in order to hand develop films, operate automatic film processing machines, and load film cassettes and magazines.

- Knowledge of basic radiographic exposure techniques including use of intensifying screens, and formulas for determining technical factors (control settings).

- Knowledge of basic radiographic positioning including routine positioning of patients for X-rays of extremities, upper body, and hip joints in order to complete X-rays of fractures and dislocations, perform chest X-rays for food handler or flight physicals, or similar noncritical applications.

Factor 2, Supervisory Controls - 25 points

Works under the supervision of a higher grade technologist or floor supervisor. Assignments are closely controlled to limit the complexity of work performed. New assignments are explained in detail. Work is frequently observed in progress and by review of completed X-rays to assure adequacy of radiographs, accuracy in determining technical factors and positioning of patients, and effectiveness of approach to patients. Work is performed in accordance with detailed instructions and questions and problems not covered by instructions are referred to the supervisor.

Factor 3, Guidelines - 25 points

Standard operating procedures cover all work assignments and specify the number and sequence of exposures, the positioning of the patient for each exposure and the settings of kilovoltage, milliamperage and time. Technician may use some judgment in determining when conditions might require deviation from standard settings and should be referred to the supervisor for further instructions.

Factor 4, Complexity - 25 points

The work involves predetermined tasks which are performed repetitively for each of several types of radiographic examination. Variations in the technical factors to be used or in positioning the patient are seldom required since standard operating procedures cover in detail what needs to be done and patients are ambulatory and able to cooperate with the technician's directions.

Factor 5, Scope and Effect - 75 points

The purpose of the work is to provide X-ray studies of injuries such as dislocations or fractures or for routine physicals such as for food handlers or preinduction or discharge physicals for the armed services. The X-ray studies affect the accuracy and reliability of physicians' diagnoses and treatments.

Factor 6, Personal Contacts - 25 points

Personal contacts are with patients in an ambulatory or outpatient setting and with fellow employees.

Factor 7, Purpose of Contacts - 20 points

These contacts are for the purpose of taking routine X-rays. The patients usually are aware of the purpose of the X-ray procedures and are able to cooperate in positioning.

Factor 8, Physical Demands - 20 points

The work requires long periods of standing and walking. There is some bending and carrying of light items such as single exposure film cassettes. There is occasional lifting of moderately heavy items such as one or two gallon containers of film processing chemicals.

Factor 9, Work Environment - 20 points

The work area is well lighted, heated and ventilated. Special safety precautions are used to reduce exposure to X-rays. These include using minimum possible current setting in the X-ray machine and never operating the machine except from behind a protective screen.

TOTAL POINTS --585

DIAGNOSTIC RADIOLOGIC TECHNICIAN, GS-0647-04, BMK# 1

Duties

- Performs most routine diagnostic radiographic procedures under general supervision and gains experience in the performance of more difficult techniques and procedures by assisting higher grade technologists.

- Operates radiographic equipment to produce X-ray films of chest, joints, feet, hands, long bones of arms and legs and other routine views of other parts of the body. Working with outpatients or ambulatory patients, positions patients and sets technical factors in accordance with standardized procedures and techniques.

- Assists higher grade technologists to position patients, determine and set technical factors, deal with patient's questions, administer contrast materials and take fluoroscopic and film exposures in procedures such as gastrointestinal series, barium enema examinations, cholangiograms and pyelograms. Procedures involve contrast materials which are administered orally or by enema.

- Assists higher grade technologists to perform radiologic examinations which are routine but require deviation from standard guidelines for positioning and setting technical factors due to patient's disability, i.e., unconscious, paraplegic, acutely ill, etc.

Factor 1, Knowledge Required by the Position - 550 points

- Knowledge of radiation protection standards including basic radiation sensitive areas of the body and all protective devices and methods appropriate to the equipment and procedures used, in order to assure that adequate safeguards are maintained for patients and self and to reassure patients who maybe unfamiliar with X-ray safety procedures.

- Knowledge of basic anatomy and physiology covering such areas as the composition of cells and tissues and their reaction to X-radiation, the location and functions of the various major organs, the parts and functioning of the digestive and urinary systems, and the purpose and main divisions of the skeletal system, in order to understand the need for and better use radiation protection and to evaluate and comply with X-ray requests.

- Knowledge of areas of basic physics including the physical concept of energy, electric power and types of electrical circuits, the construction and function of typical X-ray tubes, and the properties of X-rays, in order to understand the operation of X-ray equipment, why and how to deviate from standard settings, and how to adapt to operation of specific machines.

- Knowledge of radiographic exposure techniques including care and use of buckys, intensifying screens, and fluoroscopic screens, formulas for determining technical factors (control settings), how to control photographic factors such as density, contrast, detail, and distortion, and the use of filters, grids, and collimators, in order to accurately perform assigned tasks.

- Knowledge of radiographic positioning including routine positioning of patients for X-rays of extremities, upper body, hip joints, and abdomen in order to complete X-rays of fractures and dislocations and routine chest X-rays and assist with gastrointestinal and similar procedures.

Factor 2, Supervisory Controls - 25 points

Works under the supervision of a higher grade technologist or floor supervisor. Independent assignments to perform routine procedures and controlled to limit the complexity of work performed. The technician refers all questions and problems not covered by instructions to the supervisor or a higher grade technologist. Work is frequently observed to assure adequacy of radiographs, accuracy in determining technical factors and positioning of patients, and effectiveness of approach to patients.

Developmental assignments are closely directed by supervisors and higher grade technologists. Specific instruction is provided on radiographic techniques and procedures. Assignments are closely reviewed in progress and on completion for accuracy, compliance with instructions, and progress in mastering the new techniques.

Factor 3, Guidelines - 25 points

Standard operating procedures cover all work assignments and specify the number and sequence of exposures and normal positioning of the patient for each exposure. Technical factors are determined from tables of typical settings of kilovoltage, milliamperage, and time for each procedure and for differences in size and physique of patient. The technician uses some judgment in determining from the tables which settings to use for the patient. However, conditions which might require deviation from standard settings are referred to the supervisor for approval. Printed guidelines are supplemented by oral explanations when undertaking new assignments or changed methods.

Factor 4, Complexity - 25 points

The work involves predetermined tasks which often are performed repetitively. Variations in the techniques or technical factors to be used or in positioning the patients, when required, are done

in accordance with instructions. Patients are usually able to cooperate with the technician's directions.

Factor 5, Scope and Effect - 75 points

The purpose of the work is to provide: (1) X-ray studies for diagnosis and treatment of patients for such things as dislocations and fractures and for routine physicals such as food handlers or military preinduction or discharge physicals; and (2) experience in more advanced radiologic procedures including nonstandard positioning and technical factors on routine X-rays and noninvasive studies using contrast media. The X-ray studies taken affect the accuracy and reliability of physicians' diagnoses and treatment.

Factor 6, Personal Contacts - 25 points

Personal contacts are with ambulatory patients and with fellow employees in an X-ray department.

Factor 7, Purpose of Contacts - 20 points

These contacts are for the purpose of taking X-ray studies. The technician directs patients who usually are aware of the procedures used and are able to cooperate in positioning. Contact with fellow employees is to exchange information such as scheduling problems or need for materials.

Factor 8, Physical Demands - 20 points

The work requires long periods of standing and walking. There is some bending and carrying of light items such as single exposure film cassettes. There is occasional moderate exertion such as lifting multi-exposure film cassettes or assisting other technicians in lifting and positioning patients.

Factor 9, Work Environment - 20 points

The work area is well lighted, heated, and ventilated. Special safety precautions are required to reduce exposure to X-rays. These include using minimum possible settings in the X-ray machine and never operating the machine except from behind a protective screen or when wearing a protective apron.

TOTAL POINTS -- 785

DIAGNOSTIC RADIOLOGIC TECHNICIAN, GS-0647-05, BMK# 1

Duties

- Working at a dispensary, technician independently performs a variety of diagnostic radiographic examinations.

- Follows standard operating procedures to perform X-rays of skull, chest, pelvis, extremities, spine, and abdomen for purposes such as routine industrial health examinations, preemployment physicals, and diagnosis of injuries and illnesses reported on the job. Occasionally deviates from standard procedures to adapt for deformities of body, injuries, and other variable considerations such as age and weight of patient.

- Performs darkroom duties such as loading and unloading cassettes, operating automatic film processing machines, and mixing and replenishing processing chemicals.

- Maintains records such as daily log of patients, statistical reports, films on loan from the department, and X-ray files.

Factor 1, Knowledge Required by the Position - 550 points

- Knowledge of radiation protection standards including radiation sensitive areas of the body and all protective devices and methods appropriate to the equipment and procedures used, in order to assure that adequate safeguards are maintained for patients and self and to reassure patients who may be unfamiliar X-ray safety procedures.

- Knowledge of basic anatomy and physiology such as the structure, location and function of major organs and the skeletal system in order to locate areas of study by using anatomical landmarks, to identify organs appearing on the film in order to judge the acceptability of the radiograph for diagnostic use, and to determine if standard positioning techniques might cause further pain or injury to accident victims.

- Knowledge of basic physics including the concepts of energy, electric power and types of electrical circuits, the construction and function of typical X-ray tubes, and the properties of X-rays, in order to understand the operation of X-ray equipment, monitor the equipment for proper operation, make minor changes to standard procedures to compensate for equipment aging, and determine when maintenance or repair is needed.

- Knowledge of darkroom chemistry and techniques in order to hand develop films and operate automatic film processing machines.

- Knowledge of radiographic exposure techniques including use of intensifying screens, buckys and collimators, formulas for determining technical factors, how to control detail,

density, contrast and distortion, and the use of filters and grids to produce high quality radiographs with a minimum of retakes.

- Knowledge of radiographic positioning of patients for X-rays of extremities, skull, chest, pelvis, spine, and abdomen including skill in selecting alternate positions or modifying standard positions to adapt to the patient's condition, i.e., deformities of body, injuries, or other significant variations from the normal.

- Knowledge of basic medical terminology including names of bones and gross structures of the body, radiographic abbreviations, and some medical terms for organs and functions, in order to interpret X-ray requests, discuss need for X-ray exposures with doctors, and keep records of patients and exposures.

- Knowledge of first aid in handling injured or seriously ill patients, including method of artificial respiration.

Factor 2, Supervisory Controls - 125 points

Receives general administrative supervision from higher grade medical personnel at the dispensary who do not have technical knowledge of diagnostic radiation work. The mission of the dispensary limits most assignments to those for which clear precedents exist. Technical assistance is available on request from radiologists or higher grade technologists at a facility located several miles away whenever an unusual or difficult case arises. Employee occasionally repositions patient for an additional exposure which would provide a better view of an apparent abnormality. Work is reviewed technically by spot checks of records and films during occasional visits of a radiologist or higher grade technologist and on the overall acceptability of radiographs submitted for medical interpretation.

Factor 3, Guidelines - 125 points

Standard operating procedures cover the number and sequence of steps and normal positioning of the patient for each exposure. Basic formulae for calculation of technical factors supplement the tables of typical settings of kilovoltage, milliamperage, distance and time for each procedure. Textbooks and technical manuals on radiography are available for additional guidance. The technician uses judgment to deviate from standard positioning and adjust technical factors in accordance with established precedent and methods of calculation, e.g., to provide a more comfortable position for a patient while X-raying a leg injury.

Factor 4, Complexity - 75 points

The work involves a variety of radiographic examinations of limited difficulty. Most fall within the range of technical factors and positioning covered by the standard operating procedures. The employee occasionally must use basic formulae to calculate technical factors, for example, for patients who are substantially more robust or frail than the norm. X-rays taken after industrial

accidents occasionally require that the employee devise nonstandard positioning and equipment setups to avoid causing further injury to the patient

Factor 5, Scope and Effect - 75 points

The purpose of the work is operation of the diagnostic radiation section of a dispensary to provide X-ray studies for diagnosis and treatment of patients for such things as dislocations, fractures, and other injuries and for routine physicals such as food handlers or preemployment physicals. The X-ray studies affect the accuracy and reliability of physicians' diagnoses and treatment.

Factor 6, Personal Contacts - 25 points

Personal contacts are with patients and with fellow employees in an outpatient clinic.

Factor 7, Purpose of Contacts - 50 points

Contacts with patients are to explain procedures and direct positioning. Patients frequently are familiar with the examination routine but in cases of accident or illness they may require particularly firm and sympathetic control. Contacts with fellow employees are to resolve operating and scheduling problems and exchange information on procedures.

Factor 8, Physical Demands - 20 points

The work requires long periods of standing and walking. There is some bending and carrying of light items such as single exposure film cassettes. There is occasional lifting of moderately heavy items such as one or two gallon containers of film processing chemicals.

Factor 9, Work Environment - 20 points

The work area is well lighted, heated, and ventilated. Special safety precautions are required to reduce exposure to X-rays. These include using minimum current settings in the X-ray machine and never operating the machine except from behind a protective screen.

TOTAL POINTS -- 1065

DIAGNOSTIC RADIOLOGIC TECHNICIAN, GS-0647-05, BMK# 2

Duties

Performs a variety of routine to moderately complex radiographic procedures. Positions patient, explains procedures, selects and sets voltage, time, and other technical factors, and makes exposures necessary for the requested procedure.

- Performs routine X-rays of skull, chest, pelvis, spine, abdomen, and extremities for diagnosis of injuries and illness such as broken bones, sprains, and tuberculosis when unusual deviations from standard positioning and technical factors are often required to adapt to physical considerations such as deformities of body, injuries, or serious illness of patient.

- Assists radiologist in the less complex fluoroscopic and spot film examinations which require administration of contrast material. Typical examples are gastrointestinal series, barium enemas, pyelograms and cholangiograms. Prepares contrast media. Administers contrast media orally or by enema

- Performs darkroom operations, loading and unloading cassettes, operating automatic film processors or hand developing film, and mixing processing chemicals.

- Maintains records of patients examined, examinations performed, views taken, and technical factors used.

Factor 1, Knowledge Required by the Position - 550 points

- Knowledge of radiation protection standards including concepts of accumulated dosage and genetic changes, effects of radiation on living organisms, and the effects of X-ray techniques on patient and operator exposure in order to assure that adequate safeguards are maintained and reassure patients who may be unfamiliar with X-ray safety procedures

- Knowledge of basic anatomy and physiology such as the structure, location, and function of major organs and the skeletal system in order to locate areas of study by using anatomical landmarks, to identify organs appearing on the film in order to determine the acceptability of the radiograph for diagnostic use, and to determine if standard positioning techniques might cause further pain or injury to patients.

- Knowledge of aspects of basic physics including the concepts of energy, electric power and types of electrical circuits, the construction and function of typical X-ray tubes, and the properties of X-rays, in order to understand the operation of X-ray equipment, monitor the equipment for proper operation, recommend minor changes to standard procedures to compensate for equipment aging, and determine when maintenance or repair is needed.

- Knowledge of darkroom procedures in order to load and unload film cassettes, operate automatic film processing machines, hand develop films, and perform preventive maintenance on processing machines.

- Knowledge of radiographic exposure techniques including use of formulae for determining technical factors, how to control density, contrast and distortion, and use of intensifying screens, buckys, collimators, filters, grids, etc., in order to produce high diagnostic quality radiographs with a minimum of retakes.

- Knowledge and skill in radiographic positioning of patients for X-rays of extremities, skull, chest, pelvis, spine, and abdomen, selecting alternate positions or modifying standard

positions to adapt to unusual clinical condition of patient. Basic knowledge of positions required and skill in following directions of higher grade personnel to perform fluoroscopic and spot film examinations such as barium enemas, gastrointestinal series or cholangiograms. Knowledge and skill in mixing and administering contrast material orally or rectally. Skill in repositioning patients and/or realigning X-ray equipment to follow sequences of the examinations.

- Knowledge of first aid in handling injured or seriously ill patients, including methods of artificial respiration.

Factor 2, Supervisory Controls - 125 points

Receives instructions covering new or revised policies, work procedures, and radiographic techniques from supervisor. Radiologists and higher grade technologists are available for consultation or advice when needed on unusual or difficult cases. Fluoroscopic or similar specialized examinations are performed as directed by a radiologist. Work is reviewed by the supervisor by spot-checks of work in progress, records, radiographs, and X-ray techniques and on the overall acceptability of radiographs submitted for medical interpretation.

Factor 3, Guidelines - 125 points

Standard operating procedures cover the number and sequence of exposures and normal positioning of the patient for each exposure. Basic formulae for calculation of technical factors supplement tables typical settings for kilovoltage, milliamperage, distance, and time for each exposure. Textbooks and technical manuals in radiology are available for additional guidance. Employee uses judgment to adapt positioning or adjust technical factors in accordance with established precedent and methods of calculation.

Factor 4, Complexity - 75 points

The work involves independent performance of a variety of radiographic examinations of limited difficulty and performance of radiographic examinations of moderate difficulty under the direction of a radiologist. Most examinations fall within the range of technical factors and positioning covered by the standard operating procedures. The employee occasionally must use basic formulae to calculate technical factors, for example, for patients who are substantially more robust or frail than the norm. X-rays taken after accidents or of seriously ill patients occasionally require that the employee devise nonstandard positioning and equipment setup to avoid causing further injury or pain to the patient.

Factor 5, Scope and Effect - 75 point

The purpose of the work is to provide X-ray studies for diagnosis and treatment of patients for such things as dislocations, fractures, gall stones, and obstruction of the bowels. The X-ray studies taken affect the accuracy and reliability of physicians' diagnoses and treatment.

Factor 6, Personal Contacts - 25 points

Personal contacts are with patients, fellow employees, and professionals in a hospital radiology department. Contacts are sometimes made with employees in other hospital departments.

Factor 7, Purpose of Contacts - 20 points

These contacts are for the purpose of taking routine X-rays. The patients usually are aware of the purpose of the X-ray procedures and are able to cooperate in positioning. Occasionally patients are ill, apprehensive, or seriously injured which requires the employee to provide reassurance and comfort. Contacts with fellow employees and professional personnel are to exchange information on procedures or operating problems.

Factor 8, Physical Demands - 20 points

The work requires long periods of standing and walking. There is some bending and lifting and carrying of light items such as single exposure film cassettes. There is occasional lifting of moderately heavy items such as one or two gallon containers of film processing chemicals and lifting or positioning patients. Heavy lifting of totally incapacitated patients is done only with the help of other employees.

Factor 9, Work Environment - 20 points

The work area is well lighted, heated, and ventilated. Special safety precautions are used to reduce exposure to X-rays. These include using minimum current settings in the X-ray machine and never operating the machine except from behind a protective screen or when wearing protective clothing such as a lead apron.

TOTAL POINTS – 1035

DIAGNOSTIC RADIOLOGIC TECHNOLOGIST, GS-0647-06, BMK# 1

Duties

Performs a variety of difficult radiographic examinations. Receives patient, explains method of procedure, positions patient, selects and sets technical factors, sets up and adjusts accessory equipment required, and makes exposures necessary for the requested procedure.

- Performs procedures such as cholangiography, linear tomography, xerographic mammography, lumbar and thoracic myelography, bronchography, lymphangiography, or femoral arteriography. Sets up the X-ray room. Assures that sterile supplies, contrast materials, catheters, or other required equipment are present and laid out. Prepares and administers contrast material orally, by enema, or, under close control of radiologist, intravenously. As required by procedure or patient's condition, monitors vital signs such as heart beat and blood pressure and notifies radiologist of significant changes.

- Performs examinations of head, trunk, and extremities for routine physical examinations and for diagnosis of illness or of injuries of accident victims.

- Processes exposed radiographs and prepares film processing chemicals.

- Maintains records of patients examined, examinations performed, views taken, and technical factors used.

- Assists radiologists and higher grade technologists to perform more complex procedures such as carotid arteriograms.

Factor 1, Knowledge Required by the Position - 750 points

- Thorough knowledge of radiation protection standards devices and techniques including concepts of accumulated dosage and genetic changes, effects of radiation on living organisms, and the effects of X-ray technique on patient and operator exposure in order to assure that adequate safeguards are maintained, recognize when changes of equipment or procedures might result in increased exposures, and recommend methods to prevent such exposure.

- Knowledge of anatomy and physiology such as the location, appearance, and function of the various major systems including the muscular, circulatory, lymphatic, respiratory, digestive, and urinary systems in order to interpret the examination request accurately; to understand the functioning and interrelationship of the various organs appearing on the film and the various stages of the examination to judge the acceptability of the radiograph for diagnostic use. Knowledge of the effects of common medical and surgical diseases upon radiographic examinations, for example, the more common abnormalities of veins and arteries, results of respiratory conditions such as emphysema, pneumonia and sinusitis, or peptic ulcer in order to recognize the conditions, assure that the radiographic studies properly illustrate the condition, and adjust positioning, technical factors or other variables to better illustrate them, if necessary.

- Knowledge of aspects of basic physics including the concepts of energy, electric power and types of electrical circuits, the construction, function, and operating limitations of various types of X-ray tubes, and the properties of X-rays, in order to understand the operation of X-ray equipment, monitor the equipment for proper operation, make minor changes to standard procedures to compensate for equipment aging, and determine when maintenance or repair is needed.

- Knowledge of radiographic exposure techniques including use of formulae for determining technical factors, how to control density, contrast, and distortion, and use of intensifying screens, buckys, collimators, filters, grids, and other accessories to produce radiographs of high diagnostic quality with a minimum of retakes.

- Knowledge and skill in positioning of patients for a wide variety of difficult radiographic examinations. For example, in a lumbar myelography, skill in securing the patient firmly to the table so that no movement will take place as the table is tilted, knowledge of the four required posterior and lateral views and skill in accurately positioning the patient to best demonstrate the desired areas of the spine, concentrating the contrast medium where needed.

- Knowledge of basic nursing practices related to radiography including emergency cardiac arrest procedures, principles of hypodermic, subcutaneous, intramuscular and intravenous injections, and sterile operating room practices.

- Knowledge of pediatric radiography including methods of handling children, special restraining equipment available, and protective measures to be applied in order to get satisfactory radiographs without unnecessary radiation exposure.

Factor 2, Supervisory Controls - 125 points

Works under the supervision of a higher grade technologist or supervisor. Repetitive assignments are made with general instructions as to type of work, quality and quantity. The supervisor provides detailed instructions on new procedures and techniques, and advises on technical problems. Work is spot checked for diagnostic value and methods used in conducting the examination. When assisting with difficult procedures such as carotid arteriograms, receives direct instruction as to the duties to be performed.

Factor 3, Guidelines - 125 points

Standard operating procedures cover the number, type, and sequence of exposures for each examination. Basic formulae for calculation of technical factors supplement tables of typical settings of kilovoltage, milliamperage, distance, and time for the exposures. Textbooks and technical manuals on radiography are available for additional guidance in adapting the general requirements of the procedure to the specific condition of the patient. The technologist must use judgment to deviate from standard procedures and tables to compensate for patient's injuries, illness, or physical disabilities in accordance with established precedent and methods of calculation. The standard procedures change occasionally due to new developments in the field and, more frequently, to reflect the standards and experience of new chief radiologists.

Factor 4, Complexity - 150 points

The work involves independent performance of a variety of routine radiographic examinations and performance of more complex examinations under the direction of a radiologist. The radiographic examinations require coordination of operation of auxiliary equipment such as rapid film changers, power injectors, and cinecamera with the positioning of patients and operation of the more basic X-ray equipment. The technician occasionally must use basic formulae to calculate technical factors, for example, to accommodate for patients who are substantially more robust or frail than normal. X-rays taken after accidents or of seriously ill patients require that the technician devise nonstandard positioning and equipment setup to minimize further pain or injury to the patient.

Factor 5, Scope and Effect - 75 points

The purpose of the work is to provide X-ray studies for diagnosis and treatment of patients for such things as localization of foreign bodies, disorders of gastrointestinal system or kidneys, or accident trauma. The studies affect the accuracy and reliability of physicians' diagnoses and treatment.

Factor 6, Personal Contacts - 25 points

Personal contacts are with patients, with fellow employees and with professionals in a hospital radiology department. Contacts are sometimes made with employees in other hospital departments.

Factor 7, Purpose of Contacts - 50 points

Personal contacts are for the purpose of taking X-ray studies. Contacts with fellow workers are to exchange information and resolve problems with equipment, procedures, and scheduling of patients. Contacts with patients are to explain the procedures to be performed to patients who are unfamiliar with X-ray examinations, and direct patients how to move to achieve correct positioning. Occasionally patients are ill, injured or nervous which requires the technician to provide reassurance and comfort.

Factor 8, Physical Demands - 20 points

The work requires long periods of standing and walking. There is some bending, lifting, and carrying of moderately heavy items such as cassettes for fast film changers and jugs of film processing chemicals. Positioning patients who are unconscious or disabled requires considerable effort and working in awkward positions. Heavy lifting of totally incapacitated patients is done only with the help of other employees.

Factor 9, Work Environment - 20 points

The work area is well lighted and temperature controlled. Special safety precautions are required to reduce exposure to X-rays. These include using minimum current settings in the X-ray machine and never operating the machine except from behind a protective screen or when wearing protective clothing such as a lead apron.

TOTAL POINTS -- 1340

DIAGNOSTIC RADIOLOGIC TECHNOLOGIST, GS-0647-07, BMK# 1

Duties

Working in an outpatient clinic as technologist in charge of the radiology section, performs a variety of difficult radiographic examinations. Receives patients, explains methods of procedures, positions patients, selects and sets technical factors, sets up and adjusts accessory equipment and makes exposures necessary for the requested procedure.

- Independently makes routine radiographic examinations of head, trunk, and extremities for diagnosis of illness or injuries.

- Performs procedures as a team member, with a radiologist, such as bronchograms, cholecystograms, cholangiograms, urethrograms, G. I. series, and barium and air contrast barium enemas. Sets up the X-ray room. Assures that sterile supplies, local anesthetics, contract materials, catheters, and other required equipment are present and laid out. Prepares and administers contrast material.

- Schedules patients for examinations. Maintains logs of patients and procedures used. Prepares file jackets on patients X-rays. Requisitions supplies.

- Cleans, oils, makes minor repairs and adjustments to X-ray equipment, accessories, and automatic film processing machine. Operates film processing machines.

- Reviews new developments in the field and recommends to the head of the clinic adoption of those which would improve the operation of the radiology section.

Factor 1, Knowledge Required by the Position - 750 points

- Thorough knowledge of radiation protection standards, devices, and techniques including concepts of accumulated dosage and genetic changes, effects of radiation on living organisms, and the effects of X-ray technique on patient and operator exposure in order to assure that adequate safeguards are maintained, to recognize when changes of equipment or procedures might result in increased exposure, and to adopt methods to prevent such exposure.

- Knowledge of anatomy and physiology, e.g., the location, appearance and function of various major systems, especially the urinary, digestive, and respiratory systems. Skill in using this knowledge to interpret accurately the examination request and understand the functioning and relationship of the various organs of the system; to select the best procedures to emphasize any aspects of particular interest to the doctor; and to identify the organs appearing on the film and the various stages of the examination in order to judge the acceptability of the radiograph for diagnostic use.

- Knowledge of basic physics including the concepts of energy, electric power and types of electric circuits, the construction, function and operating limitations of various types of X-ray tubes, and the properties of X-rays in order to understand the operation of X-ray equipment, monitor the equipment for proper operation, modify standard procedures to accommodate to new equipment or examinations, and determine when maintenance or repair of equipment is needed

- Knowledge of radiographic exposure techniques including how to use formulae for determining technical factors, how to control density, contrast and distortion, and how to use intensifying screens, buckys, collimators, filters, grids, and other accessories to produce radiographs of high diagnostic quality with a minimum of retakes.

- Knowledge and skill in positioning of patients for a number of difficult radiographic examinations. In bronchography, for example, positioning the patient so that the contrast medium properly coats the lung and trachea and the oblique, lateral, and AP views are properly centered for optimum demonstration of the suspect area.

- Knowledge of first aid practices including emergency cardiac arrest procedures in order to assist patients until a medical or nursing team can arrive.

Factor 2, Supervisory Controls - 275 points

Works under the supervision of the director of the clinic who advises on matters such as general operation of the radiology section and patient relationships and occasionally spot checks radiographs for diagnostic quality. The technologist plans and schedules the day-to-day work of the radiology section. When working as a team member on difficult radiologic procedures, employee receives direction from a radiologist who indicates which actions should be performed. The technologist is responsible for the technical procedures to accomplish these directions. Technical assistance is only available when the part-time radiologist is present at the clinic.

Factor 3, Guidelines - 125 points

Standard operating procedures cover the number, type, and sequence of exposures for each kind of examination. Basic formulae for calculation of technical factors supplement tables of typical settings of kilovoltage, milliamperage, distance, and time for the exposures. Textbooks and technical manuals on radiography are available for additional guidance in adapting the general requirements of the procedure to the specific condition of the patient. The technologist must use

judgment to deviate from standard procedures and tables to compensate for patient's injuries, illness, or physical disabilities in accordance with established precedent and methods of calculation. The technologist maintains up-to-date knowledge of new developments in the field and exercises judgment to evaluate their usefulness and recommend adoption by the clinic.

Factor 4, Complexity - 150 points

The work involves operation of the radiographic section of the clinic, including independent performance of a variety of routine radiographic examinations and performance of a number of more complex examinations under the direction of a radiologist. The examinations require coordination of the positioning of patients and the operation X-ray equipment. The technologist occasionally must use basic formulae to set up standard operating procedures or to accommodate to patients who are substantially more robust or frail than normal. The employee occasionally devises nonstandard positioning and equipment setup to accommodate patients who are suffering from illnesses, deformities, or injuries.

Factor 5, Scope and Effect - 75 points

The purpose of the work is to operate the radiology section of an outpatient clinic to provide X-ray studies for doctors to use in diagnosis and treatment of patients for such things as localization of foreign bodies, disorder of gastrointestinal system or kidneys, or accident trauma. The X-ray studies taken affect the accuracy and reliability of physicians' diagnoses and treatment.

Factor 6, Personal Contacts - 25 points

Personal contacts are with patients, with doctors, and with fellow employees in an out-patient clinic.

Factor 7, Purpose of Contacts - 50 points

These contacts are for the purpose of making X-ray studies. Contacts with doctors are to resolve problems concerning scheduling of patients and requested procedures. Those with fellow workers are to resolve problems concerning maintenance of equipment and spaces, or ordering supplies. Contacts with patients are to explain the procedures to be accomplished, often to patients who are unfamiliar with X-ray examinations, and to direct patients how to move to achieve correct positioning. Some patients are ill, injured, or nervous which requires the technician to provide reassurance and comfort.

Factor 8, Physical Demands - 20 points

The work requires long periods of standing and walking. There is some bending and carrying of moderately heavy items such as cassettes, film, and containers of film processing chemicals.

Factor 9, Work Environment - 20 points

The work area is well lighted, and temperature controlled. Special safety precautions are used to reduce exposure to X-rays. These include using minimum current settings in the X-ray machine and never operating the machine except from behind a protective screen or when wearing protective clothing such as a lead apron.

TOTAL POINTS -- 1490

DIAGNOSTIC RADIOLOGIC TECHNOLOGIST, GS-0647-07, BMK# 2

Duties

Primarily performs very difficult radiographic examinations. Receives patients, explains method of procedure, positions patients, selects and sets technical factors, sets up and adjusts accessory equipment required, and makes exposures necessary for the requested procedures.

- Performs procedures such as multiaxial tomography, selective cerebral venography, carotid arteriograms, or pneumoencephalograms. Sets up the X-ray room. Assures that sterile supplies, contrast materials, catheters, and other required equipment are present and laid out. May prepare and administer contrast material and limited number of anesthetic or antispasmodic drugs such as Lidocaine and Demerol under close control.

- As work load dictates, performs procedures such as bronchography, cholangiography, mammography, and routine examinations of chest, joints, and extremities.

- Maintains records of patients treated, examinations performed, views taken and settings used.

- Coordinates work of one or two lower graded technicians or technologists when procedures require more than one person.

Factor 1, Knowledge Required by the Position - 750 points

- Thorough knowledge of radiation protection standards, devices, and techniques including concepts of accumulated dosage and genetic changes, effects of radiation on living organisms, and the affects of X-ray technique on patient and operator exposure in order to assure that adequate safeguards are maintained, to recognize when changes of equipment or procedures might result in increased exposure, and to recommend methods to prevent such exposure.

- Knowledge of anatomy and physiology such as the location, appearance, and function of the various major and minor systems susceptible to radiologic illumination in order to interpret the examination request accurately; to understand the functioning and interrelationship of the various organs in the system in order to use the methods and techniques which will emphasize aspects of particular interest to the doctor, and to identify the organs appearing on

the screen or film and the various stages of the examination in order to judge the acceptability of the image for diagnostic use.

- Knowledge of aspects of basic physics including the concepts of energy, electric power and types of electrical circuits, construction and use of X-ray tubes and the properties of X-rays, in order to understand the operation of X-ray equipment, monitor the equipment for proper operation, make changes to standard procedures to compensate for equipment aging, and determine when maintenance or repair is needed.

- Knowledge of radiographic exposure techniques including use of formulae for determining technical factors, how to control density, contrast and distortion, theory and use of the most complex special equipment such as multiaxial tomography machines as well as use of intensifying screens, buckys, collimators, filters, grids, and other accessories to produce high diagnostic quality X-rays with a minimum of retakes. Knowledge of and skill to produce the various sizes and shapes of catheters, wires and adapters needed for each type of examination.

- Knowledge and skill in positioning patients for a wide variety of difficult radiographic examinations. For example, in a lumbar myelography, skill in securing the patient firmly to the table so that no movement will take place as the table is tilted, knowledge of the required posterior and lateral views, and skill in accurately positioning the patient to best show the desired areas of the spine, concentrating the contrast medium where needed.

- Knowledge of first aid procedures for such occurrences as seizures and cardiac arrest, including operation of defibrillators, and artificial respiration.

Factor 2, Supervisory Controls - 125 points

Works under the supervision of a higher grade technologist or supervisor. Repetitive assignments are made with general instructions as to type of work, quality and quantity. The supervisor provides detailed instructions on new procedures and techniques, and advises on technical problems. Work is spot checked for diagnostic value and for methods used in conducting the examination.

Factor 3, Guidelines - 125 points

Standard operating procedures cover the number, type, and sequence of exposures for each examination. Basic formulae for calculating of technical factors supplement tables of typical settings of kilovoltage, milliamperage, distance and time for the exposures. Textbooks and technical manuals on radiography are available for additional guidance. The technologist must use judgment to deviate from standard procedures and tables to compensate for patient's injuries, illness, or physical disabilities in accordance with established precedent and methods of calculation. The technologist must maintain up-to-date knowledge of developments in the field to recommend new methods and guidelines to improve standard procedures. Procedures change

occasionally due to new developments in the field and, more frequently, to reflect the standards and experience of new chief radiologists.

Factor 4, Complexity - 225 points

The work involves performance of many complex and highly complex examinations as part of a medical team, under the general direction of a radiologist. The radiographic examinations require coordination of operation of auxiliary equipment such as rapid film changers, power injectors, and cinecameras with the positioning of patients and operation of the basic X-ray equipment. The technologist frequently must use basic formulae to calculate technical factors, for example, to accommodate patients who are heavily bandaged as a result of injuries or patients whose bone structure is not of normal capacity as a result of radiation therapy treatments. Examination procedures are frequently made additionally complex due to serious illness or injury, mental or physical incapacity of the patient or similar conditions which require the technician to devise nonstandard positioning or equipment setups or make it difficult or impossible to communicate with the patient.

Factor 5, Scope and Effect - 75 points

The purpose of the work is to provide X-ray studies for diagnosis and treatment of patients for such problems as hematoma within the brain and similar hard to detect lesions. Clear and accurate studies are essential to enable the doctor to evaluate and treat the patient's condition.

Factor 6, Personal Contacts - 25 points

Personal contacts are with patients, with fellow employees in a hospital radiology department, and with staff radiologists and other professional personnel. Contacts are sometimes made with employees in other hospital departments.

Factor 7, Purpose of Contacts - 50 points

Personal contacts are for the purpose of taking X-ray studies. Contacts with fellow workers are to exchange information and resolve problems with equipment, procedures, and scheduling of patients and to coordinate the work of lower grade technicians when working on procedures which require a team approach. Contacts with patients are to explain the procedures to be performed, to patients who are unfamiliar with X-ray examinations, and direct patients how to move to achieve correct positioning. Some patients are ill, injured, or nervous. This may require the technologist to provide reassurance and comfort. Contacts with professional personnel outside the radiology department are to demonstrate and explain practical problems and procedures in taking X-ray studies. Contacts with radiologists, in addition to receiving instructions, are to coordinate work efforts or resolve operating problems.

Factor 8, Physical Demands - 20 points

The work requires long periods of standing and walking. There is some bending and carrying of moderately heavy articles such as cassettes for rapid film changers. Positioning patients who are unconscious or disabled requires considerable effort and working in awkward positions. Heavy lifting of totally incapacitated patients is done only with the help of other employees.

Factor 9, Work Environment - 20 points

The work area is well lighted, and temperature controlled. Special safety precautions are used to reduce exposure to X-rays. These include using minimum current settings in the X-ray machine and never operating the machine except from behind a protective screen or when wearing protective clothing as lead aprons and gloves.

TOTAL POINTS -- 1415

DIAGNOSTIC RADIOLOGIC TECHNOLOGIST, GS-0647-08, BMK# 1

Duties

Performs computerized axial tomographic scanning of heads and/or bodies. Directs the work of one or two lower grade technologists/ technicians when procedures require assistance.

- Receives patient, explains methods of procedure, positions patient and makes exposures necessary for the requested examination.

- Independently makes standard examinations.

- Confers with radiologists to establish requirements of nonstandard examinations and determines technical factors, positioning, number and thickness cut of scans, etc., to satisfy the requirements.

- Schedules patients for examinations. Evaluates the nature of critical and emergency procedures and rearranges patient priorities to accommodate them. Maintains records of patients treated, examinations performed, scans taken, etc. Maintains permanent record of scans in a tape library.

- Advises radiologist or referring physician of results of examination and provides them with a preliminary diagnostic evaluation. Notifies them of significant scans requiring their immediate attention and visualization while patient is undergoing examination.

- Makes minor adjustments to equipment such as setting up wedges or changing traverse length adjusters. Performs preventive maintenance as required. May operate film processing machines.

- Reviews new developments in the field and recommends to supervisor those which would improve the operation of the section.

Factor 1, Knowledge Required by the Position - 750 points

- Thorough knowledge of radiation protection standards, devices, and techniques including concepts of accumulated dosage and genetic changes, effects of radiation on living organisms, and the affects of X-ray technique on patient and operator exposure in order to assure that adequate safeguards are maintained, to recognize when changes of equipment or procedures might result in increased exposure, and to adopt methods to prevent such exposure.

- Knowledge of physiology and cross sectional anatomy such as the location, appearance, and function of the various major and minor systems susceptible to radiologic exposure and the physical abnormalities associated with most diseases or lesions which are customarily illustrated by computerized scanning in order to interpret examination requests accurately; to recognize scans which illustrate the lesion and develop them through control of contrast, density, etc., to optimize their clarity for diagnostic use; and to recognize when additional scans or different positions are needed to fully illustrate the lesion; for example, recognizing an unsuspected mass lesion on a head scan and taking additional cuts to fully illustrate it, recognizing when hard to visualize organs have not been properly imaged and changing patient's position or taking additional cuts to improve the illustration, or recognizing motion artifacts and repeating needed scans.

- Knowledge of aspects of basic physics including the concepts of energy, electric power, and types of electrical circuits, construction and use of X-ray tubes and the properties of X-rays in order to understand the operation of X-ray equipment, monitor the equipment for proper operation, make changes to standard procedures to compensate for equipment aging, and determine when maintenance or repair is needed.

- Basic understanding of computer operation including operation of teletype keyboard input (typing skill not required); purpose of and when to select the various preset programs, e.g., scan, view, transfer and print, etc.; "bootstrapping" operation to set up equipment for operation; and manual override procedures to finish a series of scans when external conditions would otherwise cause machine to shut off.

- Knowledge of radiographic exposure techniques such as use of formulae for determining technical factors and use of "wedges" to collimate the X-ray beam and "bolus bags" to reduce density discontinuities.

- Knowledge of basic nursing practices related to radiography such as emergency cardiac arrest procedures and use of oxygen to assist with breathing difficulties.

Factor 2, Supervisory Controls - 275 points

Works under the general direction of radiologists and the supervisory technologist. Assignments are made in the form of work schedules and verbal instructions. On the more unusual and complex assignments works closely and confers with radiologists and medical officers on special techniques. On most assignments, technologist handles all problems and deviations. Work is evaluated on a spot-check basis for achievement of objectives.

Factor 3, Guidelines - 275 points

Standard operating procedures cover the section to be illustrated, the interval and number of scans to be taken, use of contrast medium, positioning of the patient, and technical factors to be used. Textbooks, technical manuals and research papers on computerized axial tomography are available for additional guidance. Many guidelines are not specifically applicable to the assignment since C-T scanning is a rapidly evolving part of diagnostic radiology. The technologist must modify these procedures and guidelines to compensate for observed physiological and anatomical conditions peculiar to the patient in order that the lesions existing should be most effectively illustrated. The technologist must maintain up-to-date knowledge of developments in the field of computerized axial tomography to recommend new methods, examinations, and guidelines for adoption. Procedures change frequently due to new developments in the field.

Factor 4, Complexity - 225 points

The work involves independent performance of many types of computerized tomographic scans, under the general direction of a radiologist. The examination process requires the technologist to recognize the lesions, masses, or disease related changes to organs which are the object of the examination in order to adjust the picture or take additional scans to achieve optimum visualization of affected areas.

Factor 5, Scope and Effect - 75 points

The purpose of the work is to provide X-ray studies for diagnosis and treatment of patients for such problems as hematoma within the brain and similar hard to detect lesions in the body. Clear and accurate studies are essential to enable the doctor to evaluate and treat the patient's condition.

Factor 6, Personal Contacts - 25 points

Personal contacts are with patients, with fellow employees in a hospital radiology department, and with interns and staff radiologists and other professional personnel. Contacts are sometimes made with employees in other hospital departments.

Factor 7, Purpose of Contacts - 50 points

Personal contacts are for the purpose of taking X-ray studies. Contacts with fellow workers are to exchange information and resolve problems with equipment, procedures, and scheduling of patients and to coordinate the work of lower grade technologists when working on procedures which require a team effort. Contacts with patients are to explain the procedures to be performed, to patients who are unfamiliar with X-ray examinations, and direct patients how to move to achieve correct positioning. Some patients are seriously ill, injured, or nervous. This may require the technologist to provide reassurance and comfort. Contacts with professionals outside the radiology department are to demonstrate and explain practical problems and procedures in taking computerized scan studies. Contacts with radiologists, in addition to receiving instructions, are to coordinate work efforts or resolve operating problems.

Factor 8, Physical Demands - 20 points

The work requires long periods of standing and walking. Positioning patients who are unconscious or disabled requires considerable effort and working in awkward positions. Heavy lifting of totally incapacitated patients is done only with the help of other employees.

Factor 9, Work Environment - 20 points

The work area is well lighted, and temperature controlled. Special safety precautions are used to reduce exposure to X-rays. These include using minimum current settings in the X-ray machine and never operating the machine except from behind a protective screen.

TOTAL POINTS -- 1715