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Job Analysis of Nuclear Power Reactor Health Physics Technicians

Prepared by L.T. Davis, T.J. Mazour, P.V. Clark, R.C. Todd/Analysis & Technology, Inc.
F.J. Marotta/BNL

Brookhaven National Laboratory
Upton, Long Island, New York 11973

Prepared for
U.S. Nuclear Regulatory Commission

It is our hope that the results of this job analysis for nuclear power plant health physics technicians will be used in several ways by the nuclear power industry. The study was performed in a manner to ensure that the collected data would be compatible with the computer programs developed by the Institute of Nuclear Power Operations (INPO). All of the data were provided to INPO and provide an adequate basis for a planned task analysis.

The detailed list of tasks validated by the more than 800 job incumbent questionnaires completed can and should be used for designing highly focused training programs, qualifying technicians for job levels, improving performance appraisals and writing job performance aids. I believe extensive use of these results can lead to improved performance by the health physics technicians.

R E Alexander

Robert E. Alexander, Chief
Occupational Radiation Protection Branch
Office of Nuclear Regulatory Research

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Prepared by
L.T. Davis, T.J. Mazour, P.V. Clark, R.C. Todd/Analysis & Technology, Inc.
BNL Project Manager — F.J. Marotta

NRC Project Manager — A.K. Roecklein

Prepared for
Division of Facility Operations
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
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ABSTRACT

This report describes a project, an industry-wide Job Analysis of Nuclear Power Reactor Health Physics Technicians (HPTs), conducted by Brookhaven National Laboratory and Analysis & Technology, Inc. to provide the industry with job-performance data that can be used in systematically defining training programs in terms of required job functions, responsibilities, and performance standards. The job-analysis methodology is consistent with that used by the Institute of Nuclear Power Operations (INPO) in similar industry-wide projects and includes administration of over 850 job task questionnaires to utility and contractor Health Physics Technicians throughout the country. Data collected includes task performance (difficulty, importance, and frequency) and industry-wide demographics (job levels, experience, education, and training). The results of this project discussed herein include model job descriptions for HPT positions, summaries of HPT experience, education, and training, industry-wide task listings with task-performance characteristics, and recommendations of selected tasks as a basis for HPT training development. Finally, potential future applications of the data base by utility and contractor organizations in training program development and evaluation and personnel qualifications are discussed.

CONTENTS

VOLUME I

ILLUSTRATIONS

TABLES

JOB ANALYSIS OF NUCLEAR POWER REACTOR HEALTH PHYSICS TECHNICIANS

EXECUTIVE SUMMARY

This report describes the methodology and results of an industry-wide nuclear power reactor Health Physics Technician (HPT) job analysis project. The purpose of this project was to provide the industry with HPT task-performance data that can be used in systematically defining training programs. This data includes model job descriptions for HPT positions at operating commercial nuclear power plants, HPT task inventories and task-performance characteristics (difficulty, importance, frequency), and selections of tasks recommended for detailed analysis to identify the knowledge, skills, and abilities that would serve as a basis for training development.

The job analysis methodology was consistent with that used by the Institute of Nuclear Power Operations (INPO) in similar industry-wide projects and consisted of eleven fundamental steps. The first three steps were performed in parallel. First, a front-end needs analysis was conducted to demonstrate the need for job and task analysis of Health Physics Technicians and subsequent development of performance-based selection, training, and qualification programs. A report detailing the findings of this analysis was prepared. Second, a Target Population Report was prepared to identify the characteristics of the target population from which job-analysis data was to be obtained and to specify the considerations and sampling needs that would be applied to using a job analysis questionnaire. Third, as an initial step for developing a job-analysis questionnaire, initial task inventories and tool/equipment/reference lists were prepared based on available job-related information.

In the fourth step, interviews with job incumbents at five nuclear power plants were conducted to refine the initial task and tool/equipment/reference listings. The results of these job incumbent reviews were aggregated and presented to a Subject Matter Expert (SME) Consensus Group convened by BNL. This group provided a quality control and steering function and met at periodic intervals throughout the project. The results of the initial meeting were factored into the development of a pilot questionnaire.

The next four steps (five through eight) involved preparing, field testing, administering, and analyzing responses of a national job-analysis survey of plant and vendor HPT job incumbents. The principal objectives of this survey were to obtain complete and validated listings of tools, equipment, and references used and tasks performed by HPTs (Foremen/Supervisors through Trainee job levels) and to collect task-performance data to support selection of tasks for detailed analysis.

Pilot questionnaires containing instructions, a demographic data sheet, tool/equipment and reference lists, and an inventory of tasks grouped by functional duty areas were field tested at six nuclear power plants and two vendor HPT companies. The results of this field testing were reviewed by the SME Consensus Group and a final survey questionnaire was developed. Final survey questionnaires were administered by mail to 880 utility and vendor HPTs at 39 plants and 6 vendor companies. Utility and vendor company project

coordinators provided invaluable assistance in administering these questionnaires. As questionnaires were returned, they were reviewed by Analysis & Technology personnel to identify problems that might invalidate responses and to record "write-in" tools, references, and tasks. Over 96 percent (851) of the returned questionnaires were usable and their responses were entered onto magnetic tape for computer processing.

Survey respondents were asked to rate each task on five-point, Likert-type scales according to frequency of performing the task, task importance, and task difficulty. Questionnaire response data was tabulated by computer to accomplish the following objectives:

1. Describe the education, training, and experience of respondents. This information has value to the training program designer because it can help serve as a basis for assumptions regarding entry-level trainee skills, knowledge, and abilities.

2. Identify relative usage of tools, equipment, and references. Listings showing the percent of incumbents using them were generated to help identify items to be included in job descriptions.

3. Identify relevance of individual tasks to the entire population. The percent of incumbents performing the task, calculated from questionnaire responses, points to the need for training tasks that are most germane to the job. This information provided input to the process used to recommend tasks for detailed analysis. These results also provide a basis for identifying tasks appropriate for job-description task inventories.

4. Identify criticality of tasks. Tasks were ranked in order of average survey rating of importance (in terms of consequences created by inadequate task performance). Task importance addresses the need to select for analysis and training those tasks that are essential to job performance.

5. Identify performance difficulty of tasks. The average rating of task performance difficulty was used as a measure of the need for formal training to ensure competent task performance.

6. Identify frequency of task performance. Average frequency ratings provide a measure of how much of the job a particular task represents and are useful in training development since task performance frequency is a key consideration in determining the need for periodic retraining of tasks or the need for "as required" training of tasks performed very infrequently.

Questionnaires completed by vendor HPTs who indicated they were on long-term assignment to a plant, filling what otherwise might be a permanent utility position, were grouped with the plant HPT questionnaires for purposes of consistency in data analysis. Hence, survey return data for vendor companies applied only to the questionnaires received from vendor HPTs filling short-term, outage-support type assignments at plants. By differentiating between vendor HPTs on long-term and short-term assignments in this manner, the resulting data would better support comparisons between vendor HPTs on short-term assignments and plant HPTs.

Education and training received by both plant and vendor HPTs were very similar, with a high percentage of job incumbents from both groups having attended college for some period of time (78 percent of plant HPTs and 66 percent of vendor HPTs). Of the plant HPTs, 48 percent held an A.A./A.S. or higher degree, and 35 percent of the vendor HPTs held at least an Associates Degree. The majority of plant and vendor HPTs had received some utility classroom/laboratory and on-the-job training and, for both groups, this was the primary source of health physics training. Military schools were the next most common source of health physics training.

Tasks listed in the questionnaire task inventory were grouped into 15 duty areas. Because of the specific nature of the tasks included in the inventory and the variability imposed by differences attributed to job levels, job specialization, plant designs, equipment, and utility organizations, it was anticipated that the task percent-performing statistic would be more variable across some duty areas than others. This was, in fact, the case. In duty areas that are most germane to all HPTs, such as "Surveys" and "Radiation/Contamination Work Area Support," the majority of the tasks were performed by more than 50 percent of the respondents; however, other duty areas, such as "Effluent Control," "Process Monitoring," and "Environmental Sampling," had mostly low percent-performing ratings, indicating the likelihood that many of these tasks are performed at a number of plants by personnel other than Health Physics Technicians.

To investigate potential differences in the tasks performed by plant HPTs and vendor HPTs on short-term assignments, a comparison of the task percent-performing results for the plant and vendor Senior/Lead Health Physics Technicians was made. This review led to the following findings:

1. Task performance responsibilities for plant HPTs and vendor HPTs on short-term assignment at plants are, for the most part, quite similar (the percent-performing results for these two HPT groups were within 20 percentage points for 366 of the 389 tasks included in the survey questionnaire).

2. Of the 23 tasks whose percent-performing results varied by greater than 20 percentage points between plant and vendor HPTs, all were performed by a higher percentage of plant HPTs than vendor HPTs. This result implies that there are <u>no</u> tasks in the inventory for which vendor HPTs on short-term assignment have a significantly greater responsibility for performing than plant HPTs.

3. The responsibility for task performance in some duty areas focuses more on plant HPTs than vendor HPTs. These duty areas include:

   Duty area #2 - Radioactive Sources,
   Duty area #3 - Effluent Control (Liquid and Gaseous), and
   Duty area #13 - Emergency/Abnormal Tasks.

4. Task percent-performing results for plant and vendor HPTs within some duty areas were extremely close in comparison. Of the 56 tasks included in duty areas #7 (Surveys) and #8 (Radiation/Contamination Work Area Suport), 54 had plant and vendor percent-performing results within 10 percentage points.

Step nine involved identifying tasks for detailed analysis. Data gathered during the survey provided the basis for identifying these tasks. Recommendations for task analysis were developed by the SME Consensus Group by applying a combination of the four criteria of percent performing, frequency, importance, and difficulty. Tasks were initially sorted into groups according to similar combinations of average frequency, difficulty, and importance. Then each task was evaluated individually considering its difficulty and importance ratings, percent-performing results, and the nature of the task. Tasks that do not require training or would not best utilize training resources (based on five deletion criteria developed) were not recommended for analysis. The remaining tasks were selected for detailed analysis. Survey "write-in" tasks were evaluated in a similar manner. Of the 400 tasks (389 questionnaire tasks plus 11 write-in tasks) included in the final HPT task inventory, 278 tasks (69.5 percent) are recommended for detailed analysis.

Steps 10 and 11 included developing model job descriptions and preparation of this final report. Job descriptions for the positions of HPT Foreman/Supervisor, Senior/Lead Technician, Junior Technician, and Assistant Technician/Trainee are provided in this report. These four job descriptions are intended to provide a model from which plant-specific job descriptions may be developed. Each model job description includes the following components:

- o Job title,
- o Required qualifications,
- o General description of job requirements,
- o Description of job incumbent's position within the organization,
- o Description of major job areas (functional duties),
- o Description of work environment,
- o Tools and equipment,
- o Resource documents and references,
- o Description of target population, and
- o Task inventory.

These model job descriptions are intended to be "industry-complete"; that is, the information included in most components should be germane to almost all nuclear power plants, but some revision to account for plant-specific or utility differences will be required. As an example, the task inventories contain a complete listing of tasks identified during the job analysis. Although most of these tasks can be expected to apply to incumbents at a specific plant, it is also expected that some tasks should be deleted from the plant-specific job description.

These model job descriptions and job analysis survey task-performance data provide inputs to the next logical step of task analysis. A completed task analysis of the tasks selected during this project will provide a basis for developing performance-based Health Physics Technician training for the industry. Although the central focus of this project was training, several other useful applications of job analysis results also exist. These include evaluation of qualifications, performance appraisal, screening and selection, and job-performance aids, all of which are discussed in Chapter 4 of this report.

1. INTRODUCTION

1.1 BACKGROUND

The need to implement efficient performance-based training programs derived from job and task analyses has been a major topic of discussion in the nuclear industry in recent years, and represents a major objective for nuclear trainers in the 1980s. A number of related projects are underway [most notably those sponsored by the Institute of Nuclear Power Operations (INPO), the Nuclear Regulatory Commission (NRC), and the Department of Energy] that are based on a systems approach to instructional development and are intended to provide job performance data to the industry that can be used in systematically defining training programs in terms of required job functions, responsibilities, and performance standards. In support of these industry-wide efforts, Brookhaven National Laboratory (BNL) contracted with Analysis & Technology, Inc., (A&T) in April 1983 to perform a job analysis of nuclear power reactor Health Physics Technicians (HPTs). This project, sponsored by the Division of Facility Operations, Office of Nuclear Regulatory Research, of the NRC and jointly managed by BNL and the NRC, was endorsed by the Health Physics Society and INPO.

The principal objectives of this project were to:

1. Develop model job descriptions for utility and vendor HPT positions at operating commercial nuclear power plants,

2. Develop industry-wide HPT task listings and collect data describing task performance characteristics (difficulty, importance, frequency), and

3. Provide recommendations for selecting tasks for detailed analysis to serve as a basis for training development.

The direction of this project was based on the "systems approach to training." This systems approach is the deliberate, orderly process of analysis, design, and development of training programs and their systematic operation, evaluation, and maintenance to ensure continued effectiveness. The process is summarized in the following five steps:

1. Systematic analysis of the job to determine what the performer must be able to do (job and task analysis);

2. Derivation of performance-based learning objectives from that analysis;

3. Implementation of training that has been derived from the learning objectives;

4. Trainee evaluation in training according to the performance standards stated in the learning objectives; and

5. Training program evaluation and revision based on the trainee's ability to perform in the actual job setting.

1.2 PROJECT DESCRIPTION

The project consisted for the following major parts:

1. Front-end analysis to document the need for a HPT job and task analysis,

2. Job analysis survey questionnaire preparation,

3. Job analysis survey administration, and

4. Data analysis (including selecting tasks for detailed analysis and model job description development).

The front-end needs analysis consisted of a review of existing documentation that has demonstrated the need for job and task analysis of HPTs and subsequent development of performance-based selection, training, and qualification programs. These reviews included the many studies conducted since the Three Mile Island accident to determine actions that should be taken by the utilities and regulatory agencies to ensure the safety of the public during the operation of power generating stations.

Preparation of the job analysis survey questionnaires included developing an initial task inventory and tool/equipment and reference listings, preparing a Target Population Report to define the job incumbent population for a national survey of HPTs and to identify sampling considerations, interviewing job incumbents and utilizing a Subject Matter Expert (SME) Consensus Group to revise initial task inventories and tool/equipment/reference listings, pilot testing a job analysis survey questionnaire at nuclear power plant sites, and submitting the final questionnaire to the SME Consensus Group for approval.

The job analysis survey questionnaires were administered to utility and vendor HPT job incumbents at operating nuclear power plants throughout the country. Following review of completed questionnaires, responses were entered into a computer data base to permit compilation and analysis of the survey data for model job description development and the selection of tasks for task analysis recommendations.

1.3 FINAL REPORT FORMAT

Chapter 2 provides an overview of the job analysis approach used.

Chapter 3 describes in more detail a major portion of the job analysis, the survey administered to a national sample of utility and vendor Health Physics Technicians. The principal objectives of this survey were to obtain completed and validated listings of tools, equipment, and references used and tasks performed by job incumbents, and to collect task performance data to support selection of tasks for detailed analysis. The survey, data analysis, and task selection methodology used are described in detail. Data analysis results are discussed and tasks recommended for detailed analysis are indicated.

Chapter 4 discusses the application of the job analysis results in the development of job descriptions and presents an overview of how the job analysis results can be used in training program development and other applications (for example, evaluating qualifications, performance appraisal, screening and selection, job performance aids/procedures).

The model job descriptions developed during this project are provided in Appendices A through D. Individual job descriptions were prepared for the following HPT positions:

- o Health Physics Technician Foreman/Supervisor,
- o Senior/Lead Health Physics Technician,
- o Health Physics Technician (Junior), and
- o Assistant Health Physics Technician/Trainee.

2. JOB ANALYSIS

2.1 INTRODUCTION

This chapter presents the industry-wide Health Physics Technician job analysis in two parts:

1. Definitions of key job analysis terminology and
2. Description of the methodology used.

A major component of the project, the job analysis survey, is discussed in detail in Chapter 3.

2.2 JOB ANALYSIS TERMINOLOGY

To understand clearly the various procedures described in this and subsequent sections, it is necessary to understand the hierarchical structure of the job in terms of its principal components. These are categorized as duties, tasks, or task elements. Figure 2-1 illustrates the relationship between these layers of a job breakdown. The categories are defined as follows:

> The job comprises all the duty areas and tasks performed by a single worker. It is a group of positions that are identical with respect to their major or significant tasks and sufficiently alike to justify their being covered by a single analysis. Health Physics Technician, for example, is a job and has duty areas and tasks as exemplified in Figure 2-2.
>
> A duty is one of the major subdivisions of work performed by one individual. Duty areas are often used in job analysis to categorize groups of tasks in organizing task lists. In the Health Physics Technician example of Figure 2-2, "radiation/contamination work area support" is a duty area. It includes tasks associated with establishing, maintaining, and monitoring radiation/contamination work areas.
>
> The task is the lowest level of behavior in a job that describes the performance of a meaningful function in the job under consideration. Examination of the job at the task level allows the job to be described in sufficient detail to serve as the basis for a complete instructional system. An example task from Figure 2-2 under the duty area of "radiation/contamination work area support" is "set up a control point." Because tasks statements are intended to assure that the job analysis yields usable job-performance data, a task should be characterized as follows:
>
> - Be a highly specific action,
> - Have a definite beginning and end,
> - Be performed in relatively short periods of time, that is, seconds, minutes, or hours,
> - Be observable so that a determination can be made that the task has been performed,

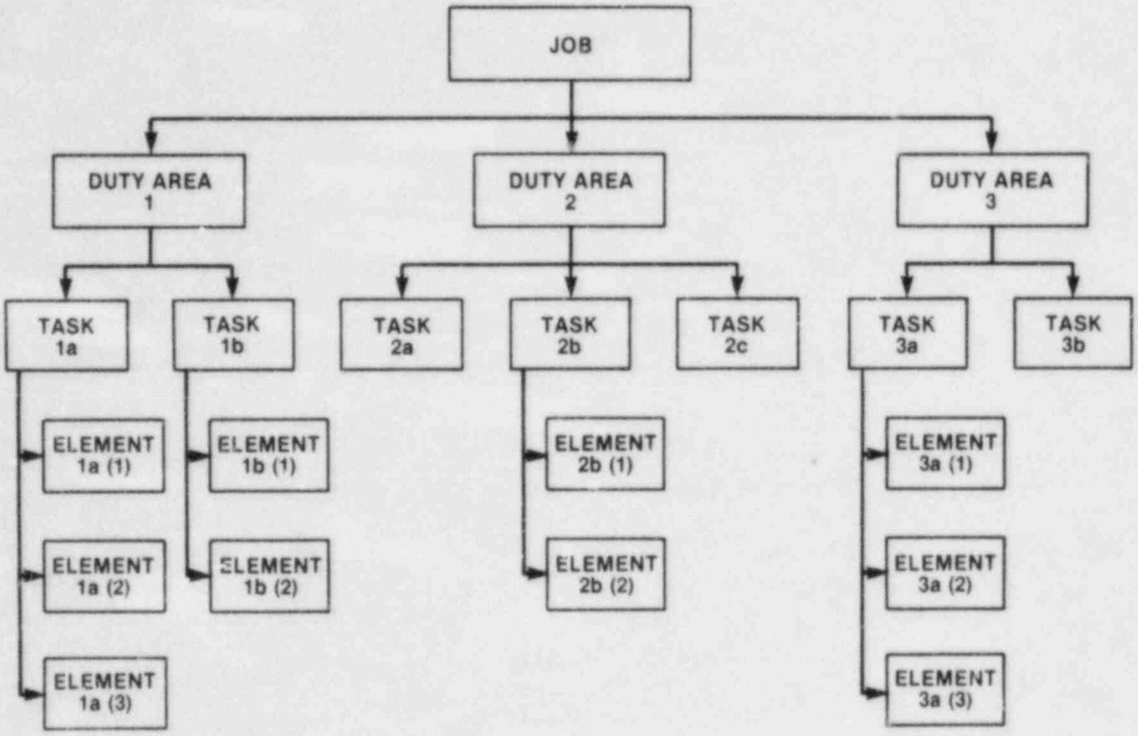


Figure 2-1. Interrelationships of Job, Duties, Tasks, and Elements

- Be measurable in terms of performance, and

- Be independent of other actions.

The task elements provide the step-by-step direction and guidance concerning task performance. An element is the smallest division of behavior that has practical meaning to instructional designers. Elements within a task may be:

- Fixed sequence (the elements are done in the same order),

- Alternate path (the specific situation encountered determines the appropriate sequence), or

- A combination of both.

Within the Figure 2-2 example task, "set up a control point," example elements include "post radiation signs," "position radiation rope," and "position step-off pad."

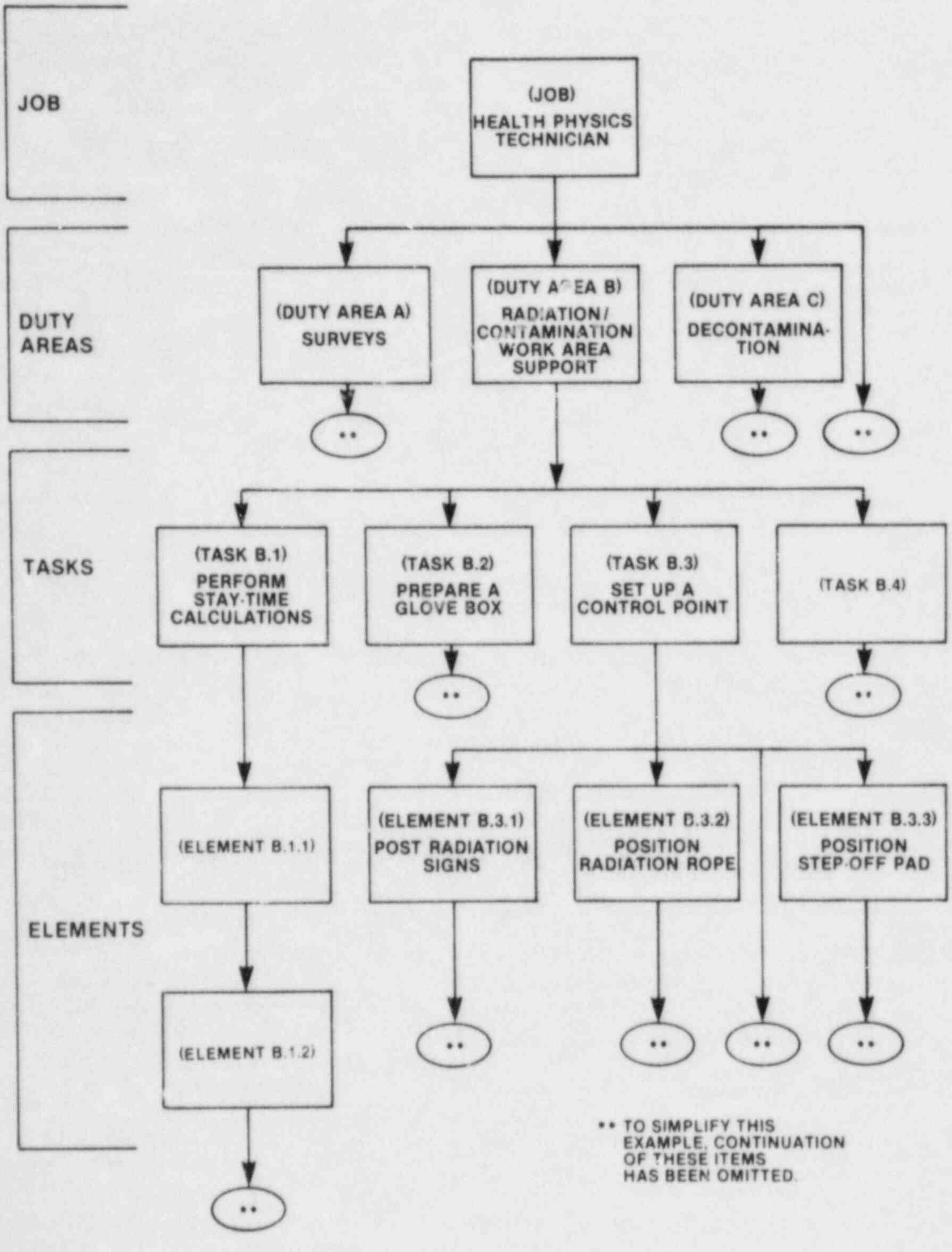


Figure 2-2. Health Physics Technician Job Breakdown

2.3 JOB ANALYSIS METHODOLOGY

Figure 2-3 provides a block diagram of the key job analysis steps used. This methodology is consistent with that used by INPO in performing industry-wide job analysis of other nuclear power plant job positions. These fundamental steps were:

Step 1. Conduct a front-end analysis to document the need for Health Physics Technician (HPT) job and task analysis.

Step 2. Develop initial task inventories and tool/equipment/reference listings.

Step 3. Prepare a Target Population Report.

Step 4. Interview job incumbents at sites and utilize a Subject Matter Expert (SME) Consensus Group to revise initial task inventories and tool/equipment/reference listings.

Step 5. Prepare a pilot job analysis survey questionnaire.

Step 6. Test the pilot questionnaire at nuclear power plants and vendor HPT companies to develop the final survey questionnaire.

Step 7. Submit the final survey questionnaire for SME Consensus Group approval.

Step 8. Administer questionnaires to a national sample of job incumbents and analyze their responses.

Step 9. Identify tasks for detailed task analysis.

Step 10. Develop HPT model job descriptions based upon analysis of the data.

Step 11. Provide a final job analysis report and the survey data to BNL.

Step 1: Conduct front-end needs analysis.

This step consisted of literature search and compilation of existing documentation to demonstrate the need for job and task analysis for Health Physics Technicians and for the subsequent development of performance-based selection, training, and qualification programs. A report detailing the findings of this step was produced.

The documents reviewed as a part of this step included the following:

- NUREG 0660, "NRC Action Plan Developed as a Result of the TMI-2 Accident" (1),
- "Report of the President's Commission on the Accident at Three Mile Island" (2),
- ANSI/ANS-3.1-1981, "American National Standard for Selection, Qualification and Training of Personnel for Nuclear Power Plants" (3),

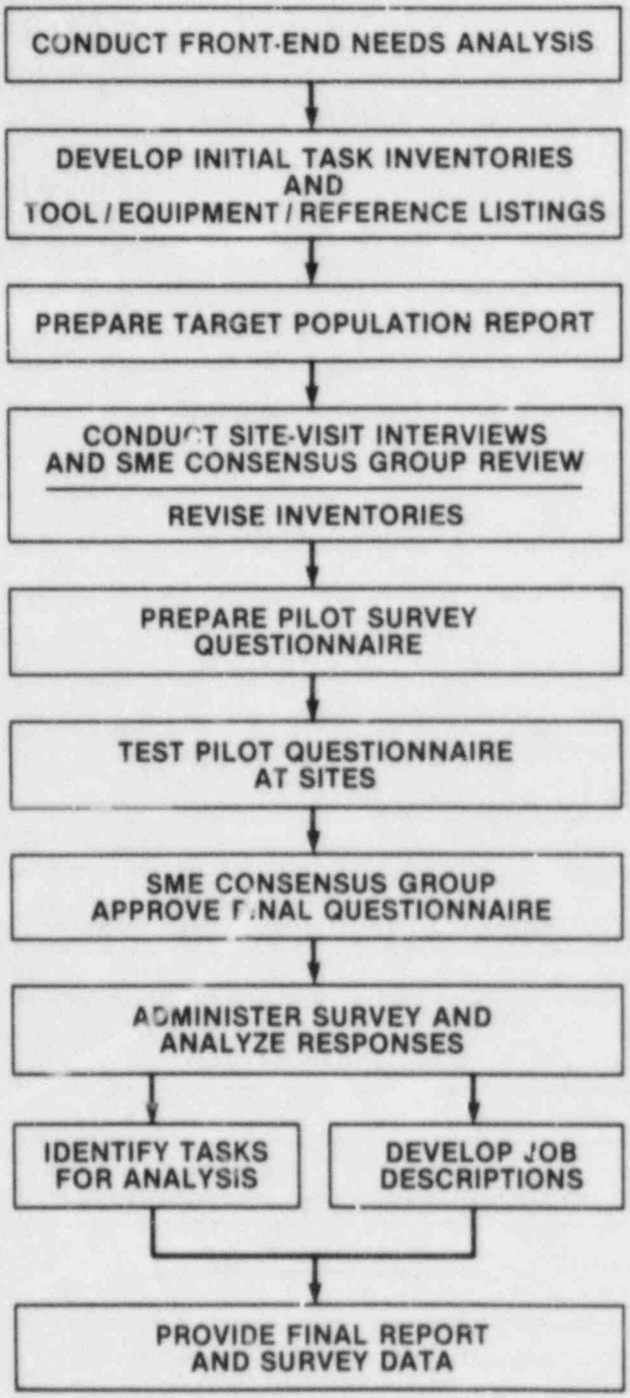


Figure 2-3. Job Analysis Process

- o NUREG/CR-1750, "Analysis, Conclusions, and Recommendations Concerning Operator Licensing" (4),
- o Descriptions of existing HPT Training Programs (demonstrating variability in programs),
- o Nuclear Safety Oversight Committee letter to the President, 17 April 1981 (5),
- o INPO Guidelines 82-006, "Radiological Protection Qualifications" (6), and
- o NUREG-0855, "Health Physics Appraisal Program" (7).

The conclusions generated from the review of this information were that:

- o Performance-based training programs are needed,
- o Job and task analysis should be used as the initial step in developing these programs, and
- o An industry-wide job and task analysis using the INPO program development model is the preferable scheme for accomplishing the training data collection.

Step 2: Develop initial task inventories and tool/equipment/reference listings.

Two options were considered for developing initial task inventories and tool/equipment/reference lists: 1) conduct extensive interviews with job incumbents to develop lists from interview results, and 2) conduct an extensive review of available job-related documentation to develop initial lists, which could later be validated through job incumbent interviews, SME Consensus Group review, and job-analysis survey instruments. The second approach was selected to minimize demands on industry personnel.

Job-related documentation available at A&T and BNL, supplemented by job descriptions and job/task analysis data provided by utilities, was used as the source for developing initial task inventories and tool/equipment/reference lists for HPTs. The end products from this step were initial task inventories organized by duty area (for example, effluent control, process monitoring, personnel monitoring, shipment/receipt of radioactive materials, administration) and a listing of tools/equipment and references with which or on which HPTs work.

Step 3: Prepare a Target Population Report.

The principal objective of this step was to identify the characteristics of the target population for which job-analysis survey data was to be obtained. As developed, the Target Population Report specified the considerations and sampling that would be applied to using the job-analysis questionnaire and quantified the size of the HPT population. This step in the job analysis ensured that the survey results would correctly reflect the characteristics of the entire population of HPT personnel throughout the industry.

Review of the plant-specific job descriptions, organizational diagrams, and industry-wide plant staffing surveys prepared by INPO and the Edison Electric Institute (EEI) indicated that the job duties of Health Physics Technicians are defined under numerous titles and job classifications. The following list of job titles was generalized from this data and was used in the survey questionnaire to permit sorting respondents according to similar levels of experience and job titles:

- o Foreman or Supervisor (first-line manager),
- o Senior/Lead Technician,
- o Technician (Junior),
- o Assistant Technician, and
- o Technician Trainee.

After the generalized job titles were defined, several other characteristics of the job environment were reviewed to assess the potential effect on responses to a survey questionnaire. These characteristics included:

- o Type of reactor (boiling water or pressurized water),
- o Union or non-union jobs,
- o Plant operational status,
- o Job location (on-site or off-site), and
- o Use of vendor HPTs.

As a result of these reviews, the following conclusions were drawn:

1. The type of reactor system [boiling water (BWR) or pressurized water (PWR)] at a plant was expected to make no difference in the manner of task performance; however, the frequency of performance of some tasks may differ due to the presence of more contamination at BWR plants (so that more surveys and radiation work permits are completed than at PWR plants). There may also be a few tasks unique to each type of plant.

2. Survey response and job analysis results should not be affected appreciably by unionization since the duty areas of the HPT job that are performed by only one individual tend to be limited due to organizational considerations at both union and non-union plants.

3. The survey sample should be composed of Health Physics Technicians from operational plants because the scope of HPT responsibilities expands considerably once fuel is loaded and a plant is operational. Hence, the HPT job at a pre-operational plant is a subset of the HPT job at an operational plant. Thus, the results of a survey that inadvertently included pre-operational plants would be skewed away from the tasks that are actually performed at a majority of the plants. Such a bias in the results would then cause task selection for analysis and training to be misguided.

4. The impact of job location (either on-site or off-site) on the survey results is related to the variety of job titles that can confuse identification of the target population. The survey was aimed at the HPT job that is performed on-site. A limited investigation into the tasks performed by HPTs off-site found that the tasks are few and very specific, such as radiation exposure audits and special-circumstance radiation analyses. The potential for confusion existed because the job titles of HPTs working on-site and off-site are very similar, if

not the same. This problem was resolved by the directions provided to each plant for survey distribution and with a question to the respondent on the questionnaire demographic sheets.

5. It is desirable to also survey the vendor HPTs on short-term, temporary assignment at plants during specific plant modes, such as outages. These personnel, also referred to as "rent-a-techs," are distinguished from the other contractor HPTs who are filling normally permanent utility HPT positions. The rent-a-tech fulfills only a temporary need of the plant; however, because the rent-a-tech is performing tasks that a plant HPT would perform and for whose actions the utility is equally responsible, the inclusion of rent-a-techs in the target population would benefit any study of their training needs and qualifications in comparison to training needed by permanently employed HPTs. In addition, the survey results from rent-a-techs may identify tasks not available from the regular HPT staff on-site because of the special periods and work for which they are recruited.

Three key references were used to determine the size of the plant HPT population (excluding vendor HPTs on short-term, temporary assignment at plants):

- "A Survey of Occupational Employment and Training in the Nuclear Power Industry" (8), which was prepared by INPO and gives the status of utility job positions as of March 1981,
- "1982 Survey of Nuclear-Related Occupational Employment in U.S. Electric Utilities" (9), which was also prepared by INPO and updated the status of job positions to March 1982, and
- "Nuclear Plant Staffing Survey" (10) by the Edison Electric Institute (EEI), which gives the status of job positions for each specific plant as of October 1981 (as compared to the entire industry summary of the INPO surveys).

The EEI study was used to separate the number of HPTs at operational plants from those of all plants (given by the INPO studies). The EEI study was also used to estimate how many first-line HPT supervisors are in the industry. This step was necessary because the INPO surveys include all managers and supervisors at a plant under one category. The results of the review of these studies are shown in Table 2-1. On the basis of these results, a plant HPT population of 1575 was used for determining the sample size. (Section 3.2.1 discusses the survey sampling plan.)

Initially, surveying the population of vendor HPTs used predominantly for short-term outage support was not a project objective; however, as the project progressed, it became apparent that the same survey questionnaires used for plant HPTs could be used to collect data from this vendor technician population. In addition, it was realized that vendor technician data could be helpful in addressing questions related to the training and qualification utilities should require for vendor HPTs, the similarities and differences of the job-experience levels of utility and vendor HPTs, and the extent to which common training and qualification requirements could be applied to utility and vendor HPTs.

TABLE 2-1
SUMMARY OF PLANT HEALTH
PHYSICS TECHNICIAN POPULATION*

JOB CATEGORY	MARCH 1981	MARCH 1982
UTILITY EMPLOYEES		
Technicians	1083	1151
Supervisors	158	168 (estimated)
CONTRACTOR EMPLOYEES		
(Filling normally permanent utility positions)	407	256
TOTAL	1648	1575
VACANCIES		
(Not included in total)	509	258
*On-site personnel at operating plants (excluding vendor HPTs on short-term, temporary assignment at plants)		

To collect the vendor HPT data, the scope of the project was expanded to include surveying vendor HPTs working for firms willing to participate in the survey. Since these vendor HPT firms were not included in the INPO and EEI industry-wide staffing surveys, an approximation of the vendor HPT population was made by conducting a telephone survey of a sample of these firms. That survey indicated that the population of vendor HPTs fluctuates around 1200 technicians depending upon the season (that is, fewer outage during peak electricity demand periods). It was recognized that this estimate of the vendor HPT population is subject to greater error than the estimated plant HPT population since the vendor HPT estimate was not based on any formal industry-wide survey.

Step 4: Interview job incumbents at sites and utilize a Subject Matter Expert Consensus Group to revise initial task inventories and tool/equipment/reference listings.

To improve and verify the accuracy of the initial task and tool/equipment/reference listings, representative HPT job incumbents were interviewed at BWR and PWR plants. These incumbents included 13 supervisors and technicians from the following nuclear power plants:

Plant	Utility
Calvert Cliffs, MD	Baltimore Gas & Electric Co.
Connecticut Yankee, CT	Connecticut Yankee Atomic Power Co.
D. C. Cook, MI	Indiana & Michigan Electric Co.
Millstone, CT	Northeast Utilities
Pilgrim, MA	Boston Edison Co.

The initial task inventories were used to structure these interviews. Job incumbents were asked to comment on each task regarding its applicability, terminology, and correctness and to identify any additional tasks that should be added to the inventory. Similiar reviews of the tool/equipment and reference listings were conducted.

The results of these job incumbent interviews were aggregated and presented to a Subject Matter Expert (SME) Consensus Group convened by BNL. This group provided a quality control and steering function and met at periodic intervals throughout the project. "Subject Matter Expert" in this case was not limited just to in-depth knowledge and experience in HPT job requirements. Since this group was also charged with making training-related recommendations as well as verifying job data, a component of this group included "training and education SMEs," experienced in education and training techniques and the job analysis process. Organizational affiliations of the 10 members of the SME Consensus Group were as follows:

Members	Affiliation
2	Brookhaven National Laboratory - Safety and Environmental Protection Division
1	Nuclear Regulatory Commission - Occupational Radiation Protection Branch, Division of Facility Operations, Office of Nuclear Regulatory Research
2	Institute of Nuclear Power Operations - Radiation Protection and Emergency Preparedness Division - Training and Education Division
2	Institute for Resource Management - Contract HPT services
1	Rutgers University - Department of Environmental Sciences (Radiation Science)
2	Analysis & Technology, Inc.

Resume summaries of SME Consensus Group members are provided in Appendix E.

At the first SME Consensus Group meeting, each task inventory item was reviewed individually, including a discussion of job incumbent interview comments and suggested revisions. All SMEs were asked to identify any of the following possible task inventory deficiencies and reach consensus concerning the statement of each task:

1. Task statements that are duplicates.

2. Tasks that are performed primarily by someone else.

3. Tasks that are clearly not a part of the job. (For example, unique circumstances sometimes require an individual, at least temporarily, to do part of someone else's job. These tasks, however, should not be included in the final task inventory.)

4. Tasks that are incorrectly stated and should be rewritten. (For example, the job-incumbent interview results indicate a general misunderstanding of the task statement, which could cause problems in defining the task during the task analysis phase.)

5. Task statements that were omitted from the inventory.

6. Duty areas that were incorrectly listed and/or tasks that were listed under the wrong duty area.

Similar reviews were conducted for the tool/equipment and reference listings.

The SME Consensus Group also reviewed a draft of the demographic information and task rating scales to be incorporated into a pilot job analysis survey questionnaire. Comments on this material were factored into the development of the pilot questionnaire (Step 5).

Step 5: Prepare pilot job analysis survey questionnaire.

After the job-incumbent interviews were completed, and contributions from subject-matter experts provided, the HPT task inventories were revised. These task inventories, along with tool/equipment lists and reference lists, were included in a national job analysis survey of job incumbents to validate the inventories for accuracy and completeness. Before conducting this national survey, however, pilot survey questionnaires were field tested at representative facilities.

Each questionnaire included a demographic (biographical information) data sheet, a listing of tools and equipment used, a list of references used, and an inventory of tasks appropriately grouped by functional duty areas. All questionnaires were provided with instructions designed to permit the questionnaire to be self-administered.

The demographic data sheets solicited information to allow sorting of data by appropriate dimensions (for example, job level, utility or vendor technician, plant type) as well as to provide an adequate summary of the education and experience of respondents. Two demographic data sheets were provided in the questionnaire to permit collecting data for plant HPTs and vendor HPTs separately. Specific information requested on the demographic data sheets included the following:

1. Personnel identification -- name, plant or vendor company, job title.

2. Permanent job specialty area assignments -- to identify any technicians permanently assigned to particular specialty areas (for example, calibration, dosimetry, decontamination).

3. Job level descriptor -- to identify the respondent's position relative to other HPTs within the organization (for example, Trainee, Assistant Technician, Junior Technician, Senior/Lead Technician, Foreman or Supervisor).

4. Experience -- years of health physics experience in the current job position, at the utility/vendor company and at other commercial power reactors, and experience in other health physics areas.

5. Education and training -- highest level of formal education achieved, total amount of health physics training received at various locations (for example, vocational school, utility, military service, college, short courses/seminars).

Task statements were grouped in the questionnaire according to the following 15 duty areas:

1. Counting Room and Associated Equipment
2. Radioactive Sources
3. Effluent Control (Liquid and Gaseous)
4. Process Monitoring
5. Portable Radiation Monitoring Equipment (Survey Meters and Air Samplers)
6. Personnel Monitoring Equipment (Friskers, Whole-Body Count Equipment)
7. Surveys (Radiation/Contamination/Airborne)
8. Radiation/Contamination Work Area Support
9. Shipping and Receiving Radioactive Materials
10. Decontamination
11. Environmental Sampling
12. Respirators and Self-Contained Breathing Apparatus (SCBA) Equipment
13. Emergency/Abnormal Tasks
14. Administration/Training
15. Miscellaneous Supplies and Equipment.

One of the major purposes of the job analysis survey was to collect task performance criteria data that would subsequently provide a basis for selecting tasks for training/detailed task analysis (the methodology used for recommending tasks for detailed analysis is discussed in Chapter 3). Procedures for applying the systems approach to training provide several options for these criteria. Example criteria include:

1. Percent of job incumbents performing the task,
2. Frequency of performance,
3. Task importance,
4. Task performance difficulty,

5. Task delay tolerance (that is, how much delay can be tolerated between the time the need for task performance becomes evident and the time actual performance must begin),

6. Relative amount of time spent performing the task,

7. Task learning difficulty, and

8. Probability of deficient task performance.

Based upon INPO's experience with other nuclear industry-wide job analyses, criteria 1 through 4 (percent performing, frequency of performance, importance, and difficulty) were selected to be the principal criteria in survey questionnaire design.

The percent of incumbents performing the task, calculated from the responses to the survey questionnaires, was selected as a measure of the relevance of the task to the entire population. This criterion points to the need for training tasks that are most germane to the job.

The second criterion, frequency of performance, was selected as a measure of how much of the job a particular task represents and whether the task is performed frequently enough for a job incumbent to maintain proficiency without additional practice (retraining). This criterion points to the need to provide training to incumbents for tasks on which they spend the most time, and to provide retraining (or practice) for infrequently performed tasks that are selected for training based upon other criteria (importance and difficulty).

The task-importance criterion was selected as a measure of the criticality of the task. Task importance in terms of consequences created by inadequate task performance points to the need for selecting tasks for analysis and training that are essential to job performance regardless of how often the task is performed.

The fourth criterion, task difficulty, was selected as a measure of the need for formal training to ensure competent task performance. Some tasks are complicated and require specific, formal training, whereas other tasks are simple and can be learned easily on the job.

For each task, the job incumbent was asked to rate the task according to five-point Likert-type scales for frequency of task performance, importance, and difficulty (the calculation of percent performing was based on task responses). Table 2-2 provides abbreviated definitions of these criteria scales. Respondents were asked to rate tools/equipment and references used in the job according to the frequency scale listed in Table 2-2.

The listing of tasks for individual duty areas followed a logical sequence to assist job incumbents in identifying any tasks not listed on the questionnaire. In the space provided, respondents were requested to write in additional tasks performed and to rate these tasks according to the frequency, importance, and difficulty criteria scales.

Step 6: Test pilot questionnaire at nuclear power plants and vendor HPT companies to develop final survey questionnaire.

Before the questionnaires were administered to a national sample of HPTs, it was important that BNL and A&T be assured of the comprehensibility of the directions, task

TABLE 2-2
DEFINITIONS OF TASK RATING SCALES

FREQUENCY

0 = Never

1 = Rarely (once a year or less often)

2 = Seldom (about 3 or 4 times a year)

3 = Occasionally (about once a month)

4 = Often (about once a week)

5 = Very Often (daily)

IMPORTANCE

1 = Negligible (Improper task performance results in no unnecessary radiation dose or makes no difference in plant operation and safety consequences)

2 = Undesirable (Improper task performance may result in dose considered inconsistent with ALARA, some undesirable consequences to plant operation, safety consequences, or some moderate corrective action)

3 = Serious (Improper task performance may result in exceeding administrative exposure limits or serious consequences to plant operation, personnel injury, or an unusual occurrence event, or may require considerable corrective actions)

4 = Severe (Improper task performance may result in exceeding federal exposure limits or consequences requiring extensive corrective action or an alert event may result)

5 = Extremely Severe (Improper task performance may result in serious over-exposure implying possible health consequences or consequences that may be enormously time consuming or costly to correct or a site or general emergency may result)

DIFFICULTY

1 = The mental activity required is low and the degree of motor coordination is low.

2 = The mental activity required is low and the degree of motor coordination is high.

3 = The mental activity required is medium (irrespective of the motor coordination rating).

4 = The mental activity required is high and the degree of motor coordination is low.

5 = The mental activity required is high and the degree of motor coordination is high.

statements, and lists of tools, equipment, and references, as well as the accuracy and completeness of the task inventories. To provide this assurance, the HPT survey instrument was field tested by administering the questionnaires to HPTs at six nuclear power plants and two vendor companies. Table 2-3 lists the organizations that participated in this pilot testing.

During pilot testing, job incumbents were asked to identify potential problems and provide suggestions for improving the questionnaire. At the completion of this testing step, comments and suggestions regarding questionnaire content and all write-in tasks identified were aggregated for presentation to the SME Consensus Group. The responses to all task statements and tool/equipment/reference listings were entered into computer files for processing.

TABLE 2-3
PILOT TESTING PARTICIPANTS

PLANT/COMPANY	NUMBER OF QUESTIONNAIRE RESPONDENTS
Calvert Cliffs, MD	4
Connecticut Yankee, CT	2
FitzPatrick, NY	2
Indian Point 3, NY	3
Maine Yankee, ME	3
Pilgrim, MA	4
Institute for Resource Management, Inc.	4
Nuclear Support Services, Inc.	4
TOTAL	26

Step 7: Submit final survey questionnaire for SME Consensus Group approval.

After developmental testing was completed, the pilot questionnaire responses given by job incumbents to the listing of tools/equipment, references, and tasks were tabulated. These computerized results provided for SME Consensus Group review included:

- o Summary of all demographic data,
- o Number of responses and calculated percent-using statistics for each tool/equipment and reference document,
- o Number of respondents who perform each task,
- o Percent of all respondents performing each task,
- o For each task, a distribution of responses for each of the five points of the rating scales for the criteria (frequency, importance, and difficulty), and

- Average task ratings and associated standard deviation for each of the criteria (frequency, importance, and difficulty).

These data along with composite listings of suggested questionnaire changes and write-in tasks were reviewed individually with the group to reach consensus on changes for the final survey questionnaire. This final questionnaire is provided as Appendix F of this report.

Step 8: Administer questionnaires to a national sample of job incumbents and analyze responses.

Initial preparations for administering the questionnaires included identifying utility and vendor company points of contact for coordinating survey administration, preparing instructions for on-site administration of the questionnaires, and printing the final questionnaires.

The initial list of target plants included all commercial nuclear power plants in operation at that time. Target vendor organizations were selected based on estimates of the number of contract HPTs employed by each company (the intent being to focus survey efforts on vendor companies most likely to respond with significant numbers of questionnaires). The initial point of contact for each plant was selected to be the Radiation Protection Manager in most cases. In some cases, this individual assigned responsibility for on-site administration of the questionnaires to another individual within the organization. Vendor points of contact were identified through communication with appropriate company managers.

Members of the SME Consensus Group from BNL and other organizations provided valuable assistance in developing project interest and support from industry organizations. The project was endorsed by INPO and the Health Physics Society.

Initial letters of notification were sent to all utility and vendor points of contact by BNL. These letters described the project methodology and objectives and requested support for this effort. A&T personnel followed up these letters with telephone calls to each point of contact to identify organizations that intended to participate in the effort and the number of HPTs within each organization.

The final printed questionnaires were mailed to each point of contact under a Health Physics Society cover letter with a set of instructions needed for administering questionnaires to job incumbents properly. If previous telephone conversations indicated that the point of contact indicated a desire to have all HPTs participate, instructions were provided to issue questionnaires to all HPTs (including first-line supervisors). For cases where the point of contact indicated that approximately one half of the HPTs would participate, instructions were provided to select every other person on the facility's organization chart from first-line supervisors and below. This selection procedure was intended to provide a random sample of personnel at all levels of expertise and job areas. If an organization indicated a commitment that would permit only a minimum response to the survey, instructions were provided to distribute questionnaires at different areas of expertise (for example, from each job area or job category).

This selection procedure was intended to ensure that the broadest range of HPT jobs was represented in organizations participating to only a minimum degree. For cases where long-term assistance was being provided at a plant by personnel from other organizations (for example, vendor technicians filling permanent positions in the organizations), the points of contact were instructed to administer questionnaires to these individuals as well.

To coordinate the administration of the survey, A&T communicated with utility and vendor points of contact as necessary to ensure receipt of questionnaires, to answer questions, and to request the return of completed questionnaires.

A&T personnel reviewed each returned questionnaire to identify any problems that might invalidate responses (for example, the personnel information data indicated that the respondent was not a member of the survey target population, no tasks were rated, the same rating was used for the same criteria scale on nearly all tasks, or each task consistently received the same rating on all scales). In addition, this review ensured that responses were sufficiently clear to preclude problems when entering these responses onto magnetic tape for computer processing.

During questionnaire review, a composite list of all write-in tools/equipment, references, and tasks was prepared. This list was screened to eliminate items that duplicated items included in the questionnaires, identify items of a plant-specific nature, and eliminate inappropriate items.

The survey data was transferred from the individual survey books to magnetic tape by having two key punch operators enter the same data independently and utilizing a computer sort routine to identify any differences in data entry. All differences were resolved and the corrected data provided on magnetic tape in a format compatible with existing INPO and A&T job analysis software. In this manner, errors in the job analysis data were minimized.

Upon completion of data entry, the survey data were sorted and basic statistics determined (for example, number of responses, mean values, and standard deviations) for the aggregate ratings for each criteria scale for each task. These statistical results were used as the basis for developing final criteria for recommending tasks for detailed analysis. Chapter 3 describes the analysis of survey data in detail.

Step 9: Identify tasks for detailed task analysis.

This step is not discussed in detail here since Chapter 3 provides a detailed discussion of the methodology used to analyze the survey data and to select tasks for analysis.

Tasks were selected for analysis by the SME Consensus Group based on the results of the survey and a list of subjective criteria used for evaluating the survey data. This selection process was completed in two steps. Preliminary task selections were made by the SME Consensus Group when approximately one half of the survey data had been tabulated. The intent of conducting this preliminary selection was to acquaint SME Consensus Group members with the task selection process used and to provide an opportunity for independent review of preliminary survey data. Final task selections were made by repeating this process when all of the survey data had been tabulated. For each task included in survey questionnaires, task selection recommendations are provided in this report (Chapter 3) based upon:

- o Percentage of incumbents performing the task,
- o Frequency of task performance,
- o Importance of the task in terms of the consequences created by inadequate task performance, and
- o Difficulty of performing the task.

Step 10: Develop HPT model job descriptions based upon analysis of data.

The results of the job analysis survey were used to develop "model" HPT job descriptions. The results of analysis of the survey data indicated that model job descriptions developed for the job levels of Health Physics Technician Foreman/Supervisor, Senior/Lead Health Physics Technician, Health Physics Technician (Junior), and Assistant Health Physics Technician/Trainee would adequately describe the HPT population. These job descriptions are presented in Appendices A through D. Each model job description includes the following 10 components:

- o Job title,
- o Required qualifications,
- o General description of job requirements,
- o Description of job incumbent's position within the organization,
- o Description of major job areas (functional duties),
- o Description of work environment,
- o Tools and equipment,
- o Resource documents and references,
- o Description of target population, and
- o Task inventory.

These model descriptions are intended to be "industry-complete"; that is, the information included in most components should be germane to almost all nuclear power plants, but some revision to account for plant-specific or utility differences will be required. As an example, the task inventories contain a complete listing of tasks identified during the job analysis. Although most of these tasks can be expected to apply to incumbents at a specific plant, it is also expected that some tasks should be deleted from the plant-specific job description.

Included in the model job descriptions is some additional information intended to serve as an aid in developing plant-specific job descriptions. The lists of tools/equipment and reference documents indicate the percent of incumbents surveyed who use the tool/equipment or reference. In addition, the task inventories display percent-performing statistics. These industry-wide statistics will be useful in assessing the applicability of each tool/equipment, reference, and task to individual plants. Where appropriate, the percent-performing statistic is also presented for vendor HPTs, because this information might serve as a valuable aid in determining relevancy of tasks for these technicians on short-term assignment (for example, outage support) at nuclear power plants.

Step 11: Provide a final job analysis report and survey data to BNL.

Delivery of this final report and the project survey data constitutes the final step of this project. BNL and the NRC have provided the data to INPO to be included in INPO's industry-wide job and task analysis data base. This will permit accessibility of the data by INPO member utilities through previously established procedures.

3. JOB-ANALYSIS SURVEY

3.1 INTRODUCTION

This chapter provides details of the national job-analysis survey, including selection of the population sample, administration of questionnaires to job incumbents, analysis of survey results, and selection of tasks for detailed analysis.

The principal objectives of this survey were to:

1. Validate task inventories and listings of tools/equipment and references,

2. Obtain as complete a listing as possible of tools/equipment, references and tasks applicable to the job through the use of "write-ins" by survey participants,

3. Collect task-performance data on which the selection of tasks for detailed analysis can be based,

4. Collect demographic information about job incumbents surveyed, and

5. Collect the job-performance information needed to develop model job descriptions.

3.2 SURVEY METHODOLOGY

3.2.1 Sampling Plan

The sampling plan was based on a desire that the survey results reflect the entire population of HPTs throughout the country, so initially every operating nuclear power plant was selected as a potential survey participant.

The target total number of respondents (that is, the sample size) desired was based on the results of the "Target Population Report" (discussed in Section 2.3, Step 3), an estimated questionnaire return rate, and probability sampling methods. The total sample size was computed on the basis of the following criteria:

- A 95-percent statistical confidence that the sample would be an unbiased estimate of the population and

- An accuracy or precision level for the sample results within 5 percent of the population proportion.

The precision level is indicated by the standard error of the proportion (a standard error of 0.025 was used). With this standard error, a 95-percent probability would exist that a survey sample value (for example, percent of technicians performing a task) would fall within ±5 percent of the entire population value; for example, for a task performed by 40 percent of the survey respondents, one would be 95-percent assured that, if the entire population were sampled, between 35 percent and 45 percent (40 percent ±5 percent) of the entire population would perform that task. The resultant total sample size selected for plant HPTs based on these sampling methods was approximately 600 completed questionnaires.

After the sample size was determined, points of contact at utility and vendor organizations were contacted to identify the specific organizations that intended to participate in the effort and the number of job incumbents (see Section 2.3, Step 8).

3.2.2 Administration of Survey Questionnaires

After the survey questionnaires were printed, each was provided a plant or vendor identification number to permit sorting survey data for analysis.

Each plant and vendor point of contact was provided a set of instructions for administering the questionnaires. After the questionnaires were mailed, A&T personnel telephoned points of contact to verify receipt of questionnaires, to answer questions concerning administration procedures, and to check the completion and return mailing status of the questionnaires. Section 2.3, Step 8 provides additional details regarding survey administration.

3.2.3 Survey Returns

As completed questionnaires were returned, each was reviewed to identify any problems that might invalidate responses (for example, if information on the personnel information pages indicated that a respondent was not in the survey target population) or otherwise declare the questionnaire unusable. As a minimum, this inspection included:

1. Verifying that the plant code/vendor company code for that questionnaire was correct,

2. Verifying that the respondent completed the correct personnel information page depending on whether he/she was a utility employee, a vendor HPT on long-term assignment at a plant, or a vendor HPT on temporary, short-term assignment (for example, outage support),

3. Reviewing the personnel information pages for completeness and consistency, and

4. Reviewing responses to the task inventory criteria scales that might invalidate the questionnaire (for example, no tasks rated, the same rating used for the same criteria scale on nearly all tasks, or each task consistently received the same rating on all three criteria scales).

Each questionnaire was evaluated in this manner as usable or unusable before the responses were entered onto magnetic tape.

Tables 3-1 and 3-2 summarize survey return data. Questionnaires completed by vendor HPTs who indicated they were on long-term assignment to a plant, filling what otherwise might be a permanent utility position, were grouped with the plant HPT questionnaires for purposes of consistency in data analysis. Hence, survey return data listed for vendor companies in Table 3-2 applies only to the questionnaires received from vendor HPTs filling short-term, outage-support type assignments at power plants. By differentiating

TABLE 3-1
SURVEY RETURN DATA -- PLANT HPTs*

UTILITY	PLANT	TYPE	NUMBER OF QUESTIONNAIRES RETURNED FROM UTILITY HPTs	NUMBER OF QUESTIONNAIRES RETURNED FROM VENDOR HPTs ON LONG-TERM ASSIGNMENT	TOTAL NUMBER RETURNED	TOTAL NUMBER USABLE
Alabama Power Co.	Farley	PWR	15	0	15	15
Arkansas Power & Light Co.	Nuclear One	PWR	7	0	7	7
Baltimore Gas & Electric Co.	Calvert Cliffs	PWR	23	0	23	23
Boston Edison	Pilgrim	BWR	10	8	18	18
Carolina Power & Light	Brunswick	BWR	61	2	63	60
	H.B. Robinson	PWR	0	29	29	26
Commonwealth Edison	Zion	PWR	22	0	22	21
Connecticut Yankee	Connecticut Yankee	PWR	8	0	8	6
Consolidated Edison	Indian Point 2	PWR	19	7	26	24
Consumers Power	Palisades	PWR	19	0	19	18
Dairyland Power	LaCrosse	BWR	8	0	8	8
Duke Power	McGuire	PWR	47	0	47	45
	Oconee	PWR	0	3	3	3

*Plant HPTs were defined for purposes of this project to include utility HPT employees and vendor HPTs on long-term assignments at utility nuclear power plants.

TABLE 3-1
SURVEY RETURN DATA -- PLANT HPTs* (Continued)

UTILITY	PLANT	TYPE	NUMBER OF QUESTIONNAIRES RETURNED FROM UTILITY HPTs	NUMBER OF QUESTIONNAIRES RETURNED FROM VENDOR HPTs ON LONG-TERM ASSIGNMENT	TOTAL NUMBER RETURNED	TOTAL NUMBER USABLE
Duquesne Light Co.	Beaver Valley	PWR	16	0	16	16
Florida Power & Light Co.	St. Lucie	PWR	0	3	3	3
Georgia Power Co.	Hatch	BWR	11	7	18	18
GPU Nuclear Corp.	TMI-1	PWR	20	0	20	20
Indiana & Michigan Electric Co.	Donald C. Cook	PWR	26	2	28	28
Iowa Electric Light & Power Co.	Duane Arnold	BWR	27	0	27	27
Maine Yankee Atomic Power Co.	Maine Yankee	PWR	15	0	15	15
Mississippi Power & Light	Grand Gulf	BWR	0	3	3	3
Nebraska Public Power District	Cooper	BWR	6	0	6	6
Northern States Power Co.	Prairie Island	PWR	13	0	13	11
Northeast Utilities	Millstone 1	BWR	20	0	20	20

*Plant HPTs were defined for purposes of this project to include utility HPT employees and vendor HPTs on long-term assignments at utility nuclear power plants.

TABLE 3-1
SURVEY RETURN DATA -- PLANT HPTs* (Continued)

UTILITY	PLANT	TYPE	NUMBER OF QUESTIONNAIRES RETURNED FROM UTILITY HPTs	NUMBER OF QUESTIONNAIRES RETURNED FROM VENDOR HPTs ON LONG-TERM ASSIGNMENT	TOTAL NUMBER RETURNED	TOTAL NUMBER USABLE
Omaha Public Power District	Fort Calhoun	PWR	10	1	11	11
Portland General Electric Co.	Trojan	PWR	10	0	10	10
New York Power Authority	Indian Point 3	PWR	16	0	16	16
	James A. FitzPatrick	BWR	8	0	8	8
Rochester Gas & Electric	Ginna	PWR	0	1	1	1
Sacramento Municipal Utility District	Rancho Seco	PWR	19	0	19	19
Tennessee Valley Authority	Browns Ferry	BWR	15	0	15	15
	Sequoyah	PWR	24	0	24	24
Toledo Edison Co.	Davis-Besse	PWR	3	0	3	3
Vermont Yankee Nuclear Power Co.	Vermont Yankee	BWR	5	0	5	5

*Plant HPTs were defined for purposes of this project to include utility HPT employees and vendor HPTs on long-term assignments at utility nuclear power plants.

TABLE 3-1
SURVEY RETURN DATA -- PLANT HPTs* (Continued)

UTILITY	PLANT	TYPE	NUMBER OF QUESTIONNAIRES RETURNED FROM UTILITY HPTs	NUMBER OF QUESTIONNAIRES RETURNED FROM VENDOR HPTs ON LONG-TERM ASSIGNMENT	TOTAL NUMBER RETURNED	TOTAL NUMBER USABLE
Virginia Electric & Power Co.	North Anna	PWR	32	0	32	32
	Surry	PWR	21	0	21	20
Wisconsin Electric Power Co.	Point Beach	PWR	0	3	3	3
Wisconsin Public Service	Kewaunee	PWR	20	0	20	20
Yankee Atomic Power Co.	Yankee Rowe	PWR	9	0	9	8
TOTAL RETURN DATA FOR "PLANT" HPTs			585	69	654	636

*Plant HPTs were defined for purposes of this project to include utility HPT employees and vendor HPTs on long-term assignments at utility nuclear power plants.

TABLE 3-2
SURVEY RETURN DATA -- VENDOR HPTs ON SHORT-TERM ASSIGNMENT

HPT VENDOR COMPANY	NUMBER OF QUESTIONNAIRES RETURNED FROM VENDOR HPTs ON SHORT-TERM ASSIGNMENT	TOTAL NUMBER USABLE
American Nuclear Services Corp.	5	5
Applied Radiological Controls, Inc.	4	3
Institute for Resource Management	142	132
Nuclear Support Services Inc.	42	41
Numanco, Inc.	31	31
Radiation Services, Inc.	3	3
TOTAL RETURN DATA FOR VENDOR HPTs ON SHORT-TERM ASSIGNMENT	226	215

between vendor HPTs on long-term and short-term assignments in this manner, the resulting data better supports comparisons between questionnaire responses (for example, to determine if vendor HPTs providing short-term, outage support typically perform only a subset of the tasks performed by plant HPTs and, if so, which tasks).

3.3 DATA-ANALYSIS RESULTS

After the returned questionnaires were screened and responses were entered onto magnetic tape, computer-generated basic statistical summaries were used for data analysis. These computerized results included the following:

- o Summary of all demographic data from the "personnel information" pages,
- o Number of responses and calculated percent-using statistics for each tool/equipment and reference document,
- o Number of respondents who perform each task,
- o Percent of all respondents performing each task,
- o For each task, a distribution of responses for each of the five points of the rating scales for the criteria (frequency, importance, and difficulty), and
- o Average task ratings and associated standard deviation for each of the criteria (frequency, importance, and difficulty).

3.3.1 Demographic Data

On the "personnel information" page of each questionnaire, respondents were asked questions relating to their education and experience. This information has value to the training program designer because it can help serve as a basis for assumptions regarding trainee skills, knowledge, and abilities depending upon the job level of interest. To provide descriptive information about the survey respondent population, histograms and tables (Figures 3-1 through 3-4) were generated to display the following data for plant HPTs (utility employees and vendor HPTs on long-term assignment) and vendor HPTs on short-term assignment:

Education/Training

- Highest level of formal education completed and
- Number of weeks of health physics training received from a variety of sources (for example, vocational/technical school, correspondence courses, utility classroom/laboratory training, utility on-the-job training, military service, college courses, and short courses/seminars).

Experience

- Distribution of respondents by job-level descriptors (Foreman/Supervisor, Senior/Lead Technician, Technician (Junior), Assistant Technician, Technician Trainee) and average years of experience in that position for the utility/vendor company,
- Number of years of health physics experience at commercial nuclear power plants, and
- Number of years of experience in other health physics areas.

As shown in Figure 3-1, education demographics for plant HPTs and vendor HPTs were very similar, with a high percentage of job incumbents from both groups having attended college for some period of time (78 percent of plant HPTs and 66 percent of vendor HPTs). Of the plant HPTs, 48 percent held an A.A./A.S. or higher degree, and 35 percent of the vendor HPTs held at least an Associates Degree.

Figure 3-2 provides a breakdown of the weeks of formal health physics training received by job incumbents from various sources. The majority of plant and vendor HPTs had received some utility classroom/laboratory and on-the-job training and, for both groups, this was the primary source of health physics training. Military schools were the next most common source of health physics training. A review of Figure 3-2 indicates that the average number of weeks of training received from the different training sources by both HPT groups is generally consistent between the two groups.

In both the plant and vendor HPT groups, the majority of survey respondents were Senior/Lead Technicians (Figure 3-3). Respondents from all job levels were experienced at their jobs with an average of at least a year in their present job level. The Senior/Lead Technicians averaged over two years in their present positions. As shown in Figure 3-4, respondents from both HPT groups averaged approximately three to four years of commercial nuclear power reactor health physics experience and approximately two to four years of health physics experience in other areas (for example, military, medical).

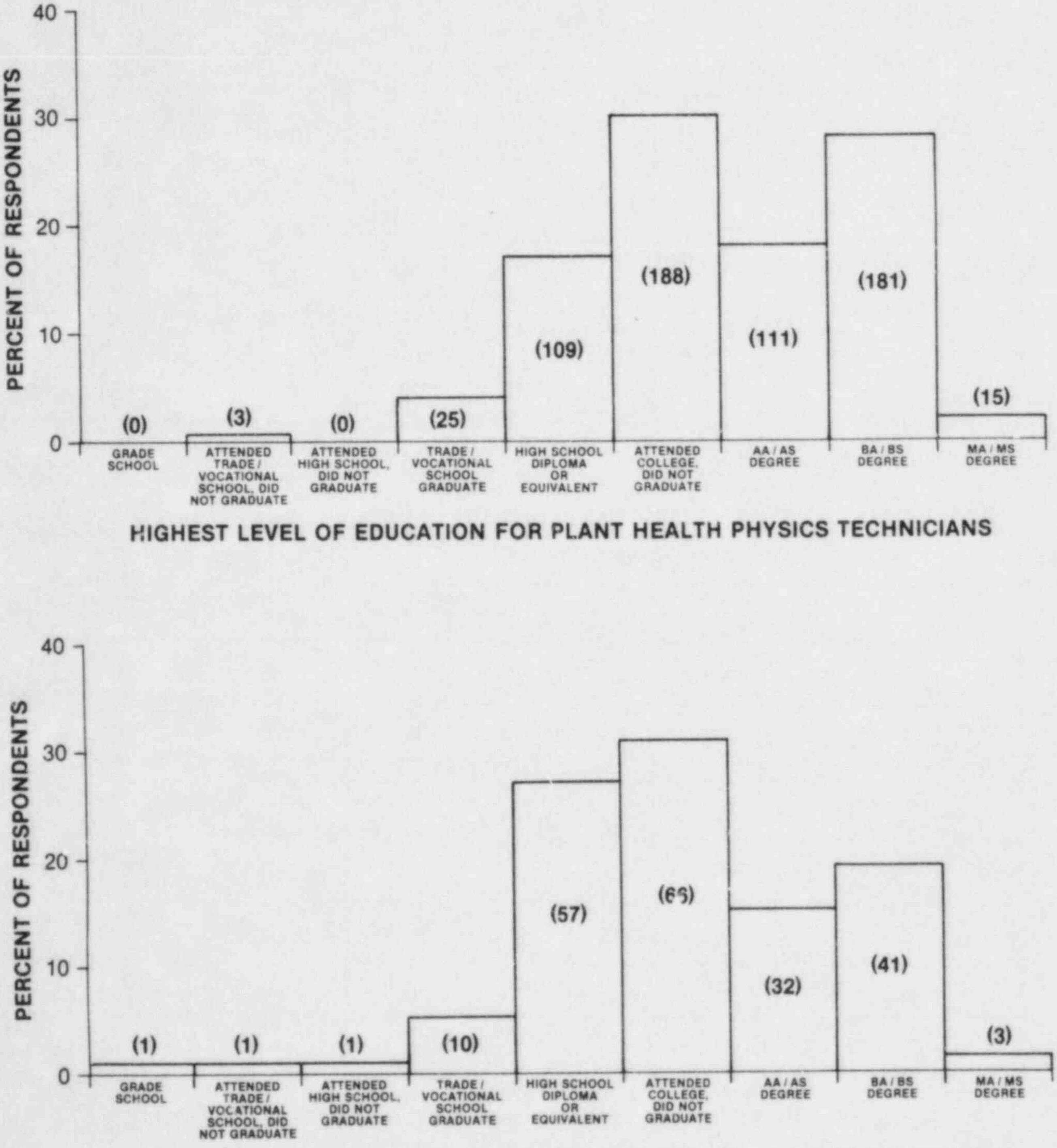


Figure 3-1. Summary of Education of Plant and Vendor Health Physics Technicians

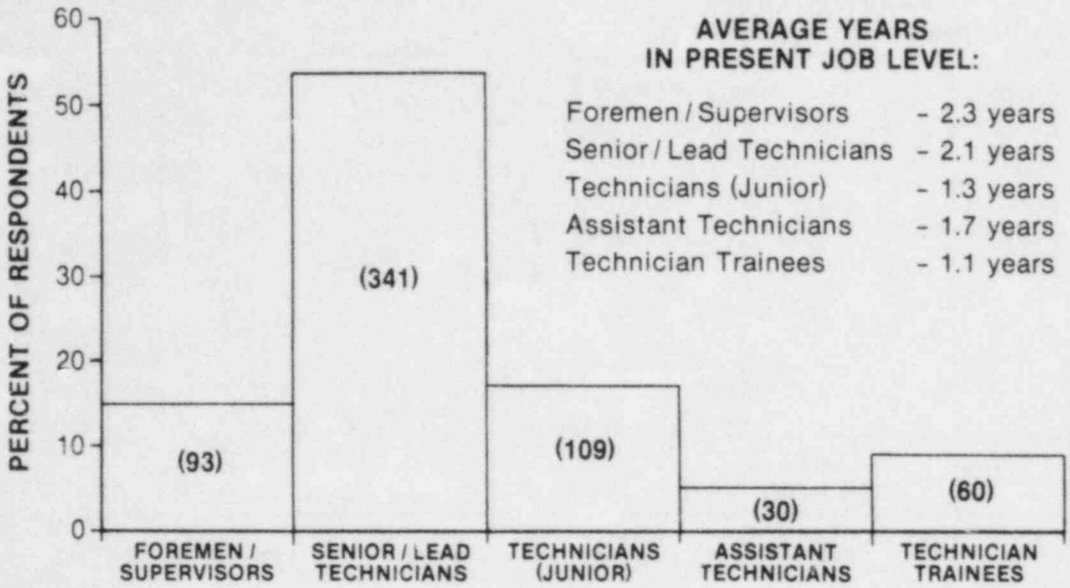
TRAINING SOURCES	FORMAL HEALTH PHYSICS TRAINING RECEIVED (number of responses)										AVERAGE OF ALL RESPONSES (weeks of training received)	AVERAGE OF NON-ZERO RESPONSES (weeks of training received)
	WEEKS						YEARS					
	0	1-5	6-10	11-15	16-20	21-26	0.5-1	1-1.5	1.5-2	2+		
VOCATIONAL / TECHNICAL SCHOOLS	565	17	16	4	5	4	14	6	7	1	3.5	30
CORRESPONDENCE COURSES	590	14	12	10	1	7	5	0	0	0	1	14
UTILITY CLASSROOM / LABORATORY TRAINING	211	124	90	54	58	44	48	3	5	2	10.5	15.7
UTILITY ON-THE-JOB TRAINING	215	84	63	39	34	47	67	24	23	43	27	40.8
MILITARY SCHOOLS	466	1[illegible]	12	34	22	18	36	25	6	2	8.8	32.5
COLLEGE	533	11	14	9	9	2	17	27	11	6	8.9	53.5
SHORT COURSES / SEMINARS	454	125	37	7	4	6	4	0	1	1	2	7

FORMAL TRAINING RECEIVED BY PLANT HEALTH PHYSICS TECHNICIANS

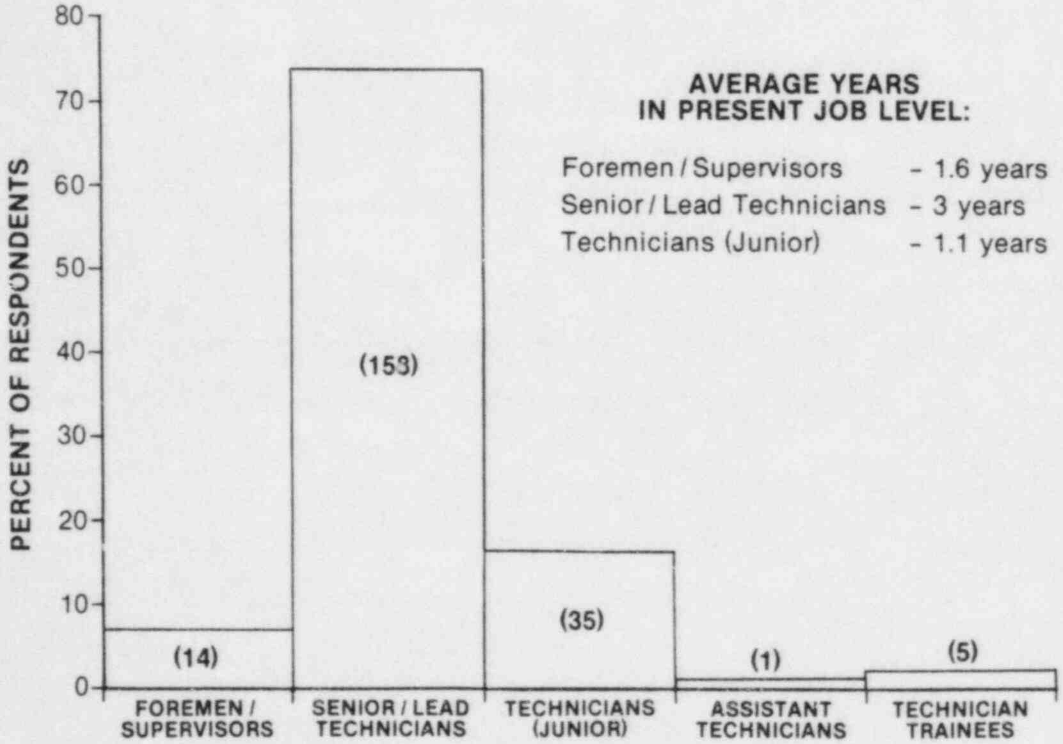
TRAINING SOURCES	FORMAL HEALTH PHYSICS TRAINING RECEIVED (number of responses)										AVERAGE OF ALL RESPONSES (weeks of training received)	AVERAGE OF NON-ZERO RESPONSES (weeks of training received)
	WEEKS						YEARS					
	0	1-5	6-10	11-15	16-20	21-26	0.5-1	1-1.5	1.5-2	2+		
VOCATIONAL / TECHNICAL SCHOOLS	188	7	2	0	10	1	5	1	0	1	3	24
CORRESPONDENCE COURSES	186	8	6	6	2	3	4	0	0	0	2	15
UTILITY CLASSROOM / LABORATORY TRAINING	107	42	36	5	14	2	8	1	0	0	5.3	10.6
UTILITY ON-THE-JOB TRAINING	100	27	20	13	8	10	12	4	4	17	24	44.7
MILITARY SCHOOLS	166	3	8	6	7	5	9	7	3	1	7.8	34
COLLEGE	169	5	2	4	5	2	9	7	10	2	10.2	47.6
SHORT COURSES / SEMINARS	165	27	10	4	4	2	2	1	0	0	2.3	9.8

FORMAL TRAINING RECEIVED BY VENDOR HEALTH PHYSICS TECHNICIANS

Figure 3-2. Summary of Formal Training Received by Plant and Vendor Health Physics Technicians



PLANT HEALTH PHYSICS TECHNICIAN DISTRIBUTION OF SURVEY RESPONDENTS BY JOB-LEVEL DESCRIPTOR



VENDOR HEALTH PHYSICS TECHNICIAN DISTRIBUTION OF SURVEY RESPONDENTS BY JOB-LEVEL DESCRIPTOR

Figure 3-3. Distribution of Survey Respondents by Job-Level Descriptor

EXPERIENCE CATEGORIES	YEARS OF EXPERIENCE (number of responses)										AVERAGE YEARS OF EXPERIENCE
	0-2	3-4	5-6	7-8	9-10	11-12	13-14	15-16	17-18	19-20+	
COMMERCIAL NUCLEAR POWER REACTOR HEALTH PHYSICS	315	142	100	40	26	9	4	0	1	2	3.7
OTHER HEALTH PHYSICS AREAS	385	53	71	40	30	22	11	7	6	14	3.6

RELATED EXPERIENCE OF PLANT HEALTH PHYSICS TECHNICIANS

EXPERIENCE CATEGORIES	YEARS OF EXPERIENCE (number of responses)										AVERAGE YEARS OF EXPERIENCE
	0-2	3-4	5-6	7-8	9-10	11-12	13-14	15-16	17-18	19-20+	
COMMERCIAL NUCLEAR POWER REACTOR HEALTH PHYSICS	77	87	36	8	3	1	0	0	0	3	4.1
OTHER HEALTH PHYSICS AREAS	144	22	14	15	6	3	3	5	2	1	2.8

RELATED EXPERIENCE OF VENDOR HEALTH PHYSICS TECHNICIANS

Figure 3-4. Summary of Related Experience of Plant and Vendor Health Physics Technicians

3.3.2 Tools, Equipment, and References

To assess the relative usage of each questionnaire tool/equipment and reference, computerized listings, showing percent of respondents using each, were generated for the aggregate results from all survey responses. These listings provide a means for identifying items that should likely appear in nearly all plant-specific job descriptions (that is, those with a high percent-using statistic). Although items with a low percent usage indicated might be considered as likely candidates for deletion from plant-specific job descriptions, a low percent usage indicated might also be due to a combination of other factors, including job specialization (for example, technicians assigned to a speciality area, such as dosimetry) and organizational differences among utilities. Thus, each item should be evaluated individually for applicability to the plant.

In addition to being asked to respond to the list of tools/equipment and references in the questionnaire, respondents were requested to "write in," in the space provided, additional tools/equipment and references used that were not listed in the questionnaire. These write-ins were recorded during the review of each questionnaire before data entry. Composite listings of write-ins were reviewed to eliminate items that were duplicates of items included in the questionnaire, identify items of a plant-specific nature, and eliminate inappropriate items. Final lists of write-ins were generated, and each item was added to the model job descriptions presented Appendices A through D.

Table 3-3 provides a list of tools and equipment that were included in the questionnaires. Table 3-4 provides a computerized listing of these tools and equipment showing the percent of survey respondents using them. Table 3-5 is a composite list of write-in tools and equipment following elimination of inappropriate items.

Table 3-6 lists the reference documents included in the questionnaire. Table 3-7 provides a computerized listing of these references showing the percent of survey respondents using them and Table 3-8 provides the composite list of write-in references.

3.3.3 Task Inventory

A computer printout of basic statistics for all responses to survey questionnaires was reviewed for consistency. For each task, this printout indicated the average task ratings and associated standard deviation for each of the criteria (frequency, importance, and difficulty) and displayed a distribution of responses for each of the five points of the rating scales. The standard distributions associated with each rating scale ranged from a low of 0.4 to a high of 1.7 (which occurred only once). Almost all of the standard deviations ranged from 0.9 to 1.2, indicating a relative consistency by respondents in rating tasks.

The survey results for percent performing each task were also reviewed since the percent of survey respondents who indicated that they perform a task has implications toward developing plant-specific job descriptions and task inventories. Although tasks with a low percent-performing rating might be considered as likely candidates for deletion from plant-specific task inventories, a low percent-performing rating might also be due to a combination of other factors, including job specialization (for example, technicians assigned to specialtiy areas, such as dosimetry or decontamination) and organizational differences among utilities. Also, some tasks may apply only to specific job levels (for example, supervisory tasks for HPT Foremen/Supervisors). Thus, each task should be evaluated individually for applicability to the plant. As an aid in making these decisions,

TABLE 3-3
TOOLS AND EQUIPMENT INCLUDED IN QUESTIONNAIRES

1. Laboratory Equipment
   - 1.01 Planchet
   - 1.02 Hot plate
   - 1.03 Pipette
   - 1.04 Beaker
   - 1.05 Filters and filter chimney
   - 1.06 Eye dropper
   - 1.07 Stir rods or magnetic stirrer
   - 1.08 Heating/stirring plate
   - 1.09 Reagent chemicals
   - 1.10 Graduated cylinders
   - 1.11 pH Meter/indicator
   - 1.12 Conductivity cell and bridge
   - 1.13 Centrifuge
   - 1.14 Test tubes
   - 1.15 Funnels

2. Protective/Safety Equipment
   - 2.01 Rubber gloves
   - 2.02 Rubber apron
   - 2.03 Face shield
   - 2.04 Respirators
   - 2.05 Self-contained breathing apparatus (SCBA)
   - 2.06 Fire extinguisher
   - 2.07 Hard hat
   - 2.08 Ear protectors
   - 2.09 Anti-contamination clothing (protective clothing)
   - 2.10 Safety harness
   - 2.11 Ground straps
   - 2.12 Portable/movable shielding
   - 2.13 Explosimeter

2. Protective/Safety Equipment (Continued)
   - 2.14 Dust mask
   - 2.15 Safety glasses/beta goggles
   - 2.16 Portable ventilation and filtration trains
   - 2.17 Safety shoes
   - 2.18 Bubble suit
   - 2.19 Steam suit
   - 2.20 Cool suit
   - 2.21 Cold weather/rain clothing
   - 2.22 Glove bags, tents, and other containment devices
   - 2.23 Step-off pads
   - 2.24 Radiation warning tape/rope/signs

3. Computers
   - 3.01 Hand-held calculator
   - 3.02 Desk-top computer
   - 3.03 Plant/process computer
   - 3.04 Corporate computer (on or off site)
   - 3.05 Computer diagnostic software

4. Hand Tools
   - 4.01 Box wrenches
   - 4.02 Burnishing tool
   - 4.03 Calipers
   - 4.04 Chisels
   - 4.05 Diagonal cutter
   - 4.06 Flaring tools
   - 4.07 Fuse pullers
   - 4.08 Gauges
   - 4.09 Gear puller

TABLE 3-3
TOOLS AND EQUIPMENT INCLUDED IN QUESTIONNAIRES (Continued)

4. Hand Tools (Continued)

- 4.10 Grease gun
- 4.11 Hack saw
- 4.12 Hammer
- 4.13 Knife
- 4.14 Level
- 4.15 Open-end wrenches
- 4.16 Pliers
- 4.17 Pocket screwdriver
- 4.18 Pop rivet gun
- 4.19 Punches
- 4.20 Ruler
- 4.21 Screwdriver
- 4.22 Screw starter
- 4.23 Scribe
- 4.24 Socket set
- 4.25 Spin-tight wrenches
- 4.26 Torque wrenches
- 4.27 Tweezers
- 4.28 Decontamination supplies

5. Test and Measuring Equipment

- 5.01 Ammeter
- 5.02 Barometer
- 5.03 Multimeter
- 5.04 Heat probe
- 5.05 Manometer
- 5.06 Ohmmeter
- 5.07 Pyrometer
- 5.08 Radiation source
- 5.09 Test gauges
- 5.10 Thermometer
- 5.11 Timer
- 5.12 Voltage tester

5. Test and Measuring Equipment (Continued)

- 5.13 Hand-operated hydro pump (test pressure source)
- 5.14 Vibration detectors
- 5.15 Strobe light
- 5.16 Oxygen analyzer (portable)
- 5.17 Micrometer
- 5.18 Hydrometer
- 5.19 Scales
- 5.20 Strip chart recorder
- 5.21 Oscilloscope
- 5.22 Annemometer
- 5.23 Audiometer

6. Communications Equipment

- 6.01 Two-way radio
- 6.02 Telephones
- 6.03 Teletalk system/intercom
- 6.04 Fixed/portable flashing lights (for example, magenta flashing lights)
- 6.05 Public address system/plant page
- 6.06 Respirator voice amplifiers
- 6.07 Beeper

7. Radiation Monitoring Equipment

- 7.01 Personnel dosimetry equipment
- 7.02 Portable beta-gamma monitoring instrument
- 7.03 Portable neutron monitoring instrument
- 7.04 Portable alpha monitoring instrument
- 7.05 Frisker

TABLE 3-3
TOOLS AND EQUIPMENT INCLUDED IN QUESTIONNAIRES (Continued)

7. Radiation Monitoring Equipment (Continued)

- 7.06 Portable air sampler (high volume)
- 7.07 Portable air sampler (low volume)
- 7.08 Gaseous sampler
- 7.09 Smear pads
- 7.10 Counter scaler
- 7.11 Multi-channel analyzer
- 7.12 Whole-body counting equipment
- 7.13 Portal monitor
- 7.14 Proportional counter
- 7.15 Beta counter
- 7.16 Gamma well counter
- 7.17 Area radiation monitor
- 7.18 Process radiation monitor
- 7.19 Liquid scintillation counter
- 7.20 TLD reader (manual or automatic)
- 7.21 Personal air sampler (lapel type)
- 7.22 Constant air monitor (CAM/APD)

8. Power-Driven Equipment

- 8.01 Air-driven wrenches
- 8.02 Compactor
- 8.03 Drill press
- 8.04 Portable drill
- 8.05 Grinder
- 8.06 Power-driven hydro pump
- 8.07 Power saw

8. Power-Driven Equipment (Continued)

- 8.08 Saber saw
- 8.09 Vacuum pump
- 8.10 Vacuum cleaner
- 8.11 Planer
- 8.12 Portable pumps

9. Work Aids

- 9.01 Extension cord
- 9.02 Flashlight
- 9.03 Hot-air gun
- 9.04 Ladder
- 9.05 Test tubing (copper, plastic, tygon, etc.)
- 9.06 Rope
- 9.07 Liquid solvents
- 9.08 Spray solvents
- 9.09 Trouble light
- 9.10 Heat lamp
- 9.11 Plastic filler
- 9.12 Decontamination high-pressure water cabinet (hydrolaser)
- 9.13 Ultrasonic decontamination unit
- 9.14 Decontamination vapor degreaser unit
- 9.15 Decontamination electro polisher unit

TABLE 3-4
PERCENT OF SURVEY RESPONDENTS USING TOOLS AND EQUIPMENT

%USING	REFERENCE#	TOOLS AND EQUIPMENT
80	1.01	PLANCHET
37	1.02	HOT PLATE
42	1.03	PIPETTE
42	1.04	BEAKER
41	1.05	FILTERS AND FILTER CHIMNEY
34	1.06	EYE DROPPER
27	1.07	STIR RODS OR MAGNETIC STIRRER
28	1.08	HEATING/STIRRING PLATE
29	1.09	REAGENT CHEMICALS
37	1.10	GRADUATED CYLINDERS
24	1.11	PH METER/INDICATOR
23	1.12	CONDUCTIVITY CELL AND BRIDGE
18	1.13	CENTRIFUGE
22	1.14	TEST TUBES
30	1.15	FUNNELS
92	2.01	RUBBER GLOVES
27	2.02	RUBBER APRON
64	2.03	FACE SHIELD
94	2.04	RESPIRATORS
82	2.05	SELF-CONTAINED BREATHING APPARATUS (SCBA)
59	2.06	FIRE EXTINGUISHER
96	2.07	HARD HAT
93	2.08	EAR PROTECTORS
97	2.09	ANTI-CONTAMINATION CLOTHING (PROTECTIVE CLOTHING)
50	2.10	SAFETY HARNESS
20	2.11	GROUND STRAPS
63	2.12	PORTABLE/MOVABLE SHIELDING
38	2.13	EXPLOSIMETER
44	2.14	DUST MASK
90	2.15	SAFETY GLASSES/BETA GOGGLES
60	2.16	PORTABLE VENTILATION AND FILTRATION TRAINS
53	2.17	SAFETY SHOES
50	2.18	BUBBLE SUIT
8	2.19	STEAM SUIT
16	2.20	COOL SUIT
66	2.21	COLD WEATHER/RAIN CLOTHING
66	2.22	GLOVE BAGS, TENTS, AND OTHER CONTAINMENT DEVICES
95	2.23	STEP-OFF PADS
94	2.24	RADIATION WARNING TAPE/ROPE/SIGNS
97	3.01	HAND HELD CALCULATOR
69	3.02	DESK TOP COMPUTER
48	3.03	PLANT/PROCESS COMPUTER
31	3.04	CORPORATE COMPUTER (ON OR OFF SITE)
24	3.05	COMPUTER DIAGNOSTIC SOFTWARE
48	4.01	BOX WRENCHES
8	4.02	BURNISHING TOOL
9	4.03	CALIPERS
14	4.04	CHISELS
16	4.05	DIAGONAL CUTTER

TABLE 3-4
PERCENT OF SURVEY RESPONDENTS USING TOOLS AND EQUIPMENT (Continued)

%USING	REFERENCE#	TOOLS AND EQUIPMENT
9	4.06	FLARING TOOLS
12	4.07	FUSE PULLERS
30	4.08	GAUGES
6	4.09	GEAR PULLER
10	4.10	GREASE GUN
20	4.11	HACK SAW
39	4.12	HAMMER
75	4.13	KNIFE
12	4.14	LEVEL
48	4.15	OPEN END WRENCHES
62	4.16	PLIERS
70	4.17	POCKET SCREWDRIVER
12	4.18	POP RIVET GUN
15	4.19	PUNCHES
76	4.20	RULER
74	4.21	SCREWDRIVER
10	4.22	SCREW STARTER
11	4.23	SCRIBE
35	4.24	SOCKET SET
13	4.25	SPIN TIGHT WRENCHES
13	4.26	TORQUE WRENCHES
80	4.27	TWEEZERS
88	4.28	DECONTAMINATION SUPPLIES
8	5.01	AMMETER
20	5.02	BAROMETER
12	5.03	MULTIMETER
7	5.04	HEAT PROBE
12	5.05	MANOMETER
12	5.06	OHMMETER
6	5.07	PYROMETER
86	5.08	RADIATION SOURCE
23	5.09	TEST GAUGES
47	5.10	THERMOMETER
58	5.11	TIMER
20	5.12	VOLTAGE TESTER
5	5.13	HAND OPERATED HYDRO PUMP (TEST PRESSURE SOURCE
2	5.14	VIBRATION DETECTORS
2	5.15	STROBE LIGHT
47	5.16	OXYGEN ANALYZER (PORTABLE)
7	5.17	MICROMETER
13	5.18	HYDROMETER
35	5.19	SCALES
48	5.20	STRIP CHART RECORDER
11	5.21	OSCILLOSCOPE
4	5.22	ANNEMOMETER
6	5.23	AUDIOMETER
69	6.01	TWO-WAY RADIO
99	6.02	TELEPHONES
63	6.03	TELETALK SYSTEM/INTERCOM
31	6.04	FIXED/PORTABLE FLASHING LIGHTS (FOR EXAMPLE, MAGENTA FLASHING LIGHTS)
95	6.05	PUBLIC ADDRESS SYSTEM/PLANT PAGE

TABLE 3-4
PERCENT OF SURVEY RESPONDENTS USING TOOLS AND EQUIPMENT (Continued)

%USING	REFERENCE#	TOOLS AND EQUIPMENT
32	6.06	RESPIRATOR VOICE AMPLIFIERS
30	6.07	BEEPER
98	7.01	PERSONNEL DOSIMETRY EQUIPMENT
95	7.02	PORTABLE BETA-GAMMA MONITORING INSTRUMENT
85	7.03	PORTABLE NEUTRON MONITORING INSTRUMENT
68	7.04	PORTABLE ALPHA MONITORING INSTRUMENT
99	7.05	FRISKER
82	7.06	PORTABLE AIR SAMPLER (HIGH VOLUME)
86	7.07	PORTABLE AIR SAMPLER (LOW VOLUME)
69	7.08	GASEOUS SAMPLER
92	7.09	SMEAR PADS
83	7.10	COUNTER SCALER
66	7.11	MULTI-CHANNEL ANALYZER
60	7.12	WHOLE BODY COUNTING EQUIPMENT
94	7.13	PORTAL MONITOR
78	7.14	PROPORTIONAL COUNTER
78	7.15	BETA COUNTER
42	7.16	GAMMA WELL COUNTER
74	7.17	AREA RADIATION MONITOR
54	7.18	PROCESS RADIATION MONITOR
50	7.19	LIQUID SCINTILLATION COUNTER
32	7.20	TLD READER (MANUAL OR AUTOMATIC)
40	7.21	PERSONAL AIR SAMPLER (LAPEL TYPE)
76	7.22	CONSTANT AIR MONITOR (CAM/APD)
8	8.01	AIR DRIVEN WRENCHES
17	8.02	COMPACTOR
7	8.03	DRILL PRESS
19	8.04	PORTABLE DRILL
10	8.05	GRINDER
6	8.06	POWER DRIVEN HYDRO PUMP
9	8.07	POWER SAW
8	8.08	SABER SAW
26	8.09	VACUUM PUMP
32	8.10	VACUUM CLEANER
4	8.11	PLANER
24	8.12	PORTABLE PUMPS
90	9.01	EXTENSION CORD
91	9.02	FLASHLIGHT
13	9.03	HOT AIR GUN
76	9.04	LADDER
63	9.05	TEST TUBING (COPPER, PLASTIC, TYGON, ETC.)
80	9.06	ROPE
57	9.07	LIQUID SOLVENTS
57	9.08	SPRAY SOLVENTS
39	9.09	TROUBLE LIGHT
36	9.10	HEAT LAMP
11	9.11	PLASTIC FILLER
19	9.12	DECONTAMINATION HIGH PRESSURE WATER CABINET (HYDROLASER)
32	9.13	ULTRASONIC DECONTAMINATION UNIT
7	9.14	DECONTAMINATION VAPOR DEGREASER UNIT
9	9.15	DECONTAMINATION ELECTRO-POLISHER UNIT

TABLE 3-5
ADDITIONAL TOOLS AND EQUIPMENT IDENTIFIED
THROUGH QUESTIONNAIRE WRITE-INS

WRITE-IN TOOLS AND EQUIPMENT	NUMBER OF TIMES ADDED
1.16 Convection oven	1
2.25 Respirator washer	1
2.26 Electric respirator drying cabinet	1
3.06 Word processor	1
4.29 Banding tool	1
4.30 Crimpers	1
4.31 Shovel	1
4.32 Speed wrench	1
4.33 File	1
5.24 Quantitative fit test equipment	1
5.25 Respirator leak test equipment	1
5.26 Voltmeter	1
5.27 Condenser R meter	1
5.28 Circuit jumpers	1
9.16 Forklift	1
9.17 Barrel cart/hand truck	1
9.18 Decontamination laundry unit	1
9.19 Portable generator	1
9.20 Mass flow heater	1
9.21 Keylock control	1

TABLE 3-6
REFERENCE DOCUMENTS INCLUDED IN QUESTIONNAIRES

1. Operational Procedures
   - 1.01 Plant operating procedures
   - 1.02 Surveillance procedures
   - 1.03 Maintenance procedures
   - 1.04 Site emergency plan
   - 1.05 Emergency operating procedures
   - 1.06 Abnormal, off-normal and alarm operating procedures
   - 1.07 Operating procedures change manual (temporary operating procedures)
   - 1.08 Fuel-handling procedures
   - 1.09 Computer operating manual
   - 1.10 Radiochemical laboratory manual (analytical and radiochemical procedures)
   - 1.11 Radiological protection procedures

2. Technical References
   - 2.01 Equipment location drawings
   - 2.02 Plant technical specifications
   - 2.03 Final Safety Analysis Report (FSAR)
   - 2.04 Code of Federal Regulations (10 CFR, 49 CFR, etc.)
   - 2.05 Plant blueprints/drawings
   - 2.06 Plant system descriptions
   - 2.07 Electrical schematics
   - 2.08 Equipment technical operating manuals
   - 2.09 Plant setpoints manual
   - 2.10 Steam tables
   - 2.11 DOT regulations
   - 2.12 State regulations

3. Operating Shift Documents
   - 3.01 Shift logs and status boards
   - 3.02 Shift turnover sheets/books
   - 3.03 Operations department orders/memos

3. Operating Shift Documents (Continued)
   - 3.04 Health Physics (rad chem) department orders/memos
   - 3.05 Survey log books
   - 3.06 Temporary shielding installation log
   - 3.07 Temporary jumper installation log (wiring or piping)
   - 3.08 Equipment tag log (removal and restoration log)
   - 3.09 Required work action log (work request log)
   - 3.10 Radiation work permit log
   - 3.11 Radioactive material accountability log
   - 3.12 Radiation exposure alert list
   - 3.13 Daily work log

4. Other References
   - 4.01 Station administrative directives
   - 4.02 NRC Regulatory Guides, NUREGs, and I.E. bulletins and notices
   - 4.03 Deviation report (non-conforming operations report)
   - 4.04 Plant incident/condition reports
   - 4.05 Licensee Event Reports (LERs)
   - 4.06 Special or required reading (e.g., system design, changes, etc.)
   - 4.07 First aid instructions/safety bulletins
   - 4.08 Radiological health handbook
   - 4.09 Chart of the nuclides
   - 4.10 Health physics textbooks
   - 4.11 Training department lesson plans
   - 4.12 INPO Notepad
   - 4.13 INPO Guidelines

TABLE 3-7
PERCENT OF SURVEY RESPONDENTS USING REFERENCES

%USING	REFERENCE#	TASK DESCRIPTOR
76	1.01	PLANT OPERATING PROCEDURES
67	1.02	SURVEILLANCE PROCEDURES
53	1.03	MAINTENANCE PROCEDURES
88	1.04	SITE EMERGENCY PLAN
72	1.05	EMERGENCY OPERATING PROCEDURES
55	1.06	ABNORMAL, OFF-NORMAL AND ALARM OPERATING PROCEDURES
45	1.07	OPERATING PROCEDURES CHANGE MANUAL (TEMPORARY OPERATING PROCEDURES)
50	1.08	FUEL HANDLING PROCEDURES
50	1.09	COMPUTER OPERATING MANUAL
38	1.10	RADIOCHEMICAL LABORATORY MANUAL (ANALYTICAL AND RADIOCHEMICAL PROCEDURES)
92	1.11	RADIOLOGICAL PROTECTION PROCEDURES
70	2.01	EQUIPMENT LOCATION DRAWINGS
77	2.02	PLANT TECHNICAL SPECIFICATIONS
42	2.03	FINAL SAFETY ANALYSIS REPORT (FSAR)
92	2.04	CODE OF FEDERAL REGULATIONS (10 CFR, 49 CFR, ETC.)
69	2.05	PLANT BLUEPRINTS/DRAWINGS
79	2.06	PLANT SYSTEM DESCRIPTIONS
32	2.07	ELECTRICAL SCHEMATICS
64	2.08	EQUIPMENT TECHNICAL OPERATING MANUALS
33	2.09	PLANT SETPOINTS MANUAL
13	2.10	STEAM TABLES
60	2.11	DOT REGULATIONS
50	2.12	STATE REGULATIONS
68	3.01	SHIFT LOGS AND STATUS BOARDS
71	3.02	SHIFT TURNOVER SHEETS/BOOKS
41	3.03	OPERATIONS DEPARTMENT ORDERS/MEMOS
85	3.04	HEALTH PHYSICS (RAD CHEM) DEPARTMENT ORDERS/MEMOS
83	3.05	SURVEY LOG BOOKS
39	3.06	TEMPORARY SHIELDING INSTALLATION LOG
10	3.07	TEMPORARY JUMPER INSTALLATION LOG (WIRING OR PIPING)
16	3.08	EQUIPMENT TAG LOG (REMOVAL AND RESTORATION LOG)
28	3.09	REQUIRED WORK ACTION LOG (WORK REQUEST LOG)
85	3.10	RADIATION WORK PERMIT LOG
52	3.11	RADIOACTIVE MATERIAL ACCOUNTABILITY LOG
61	3.12	RADIATION EXPOSURE ALERT LIST
69	3.13	DAILY WORK LOG
59	4.01	STATION ADMINISTRATIVE DIRECTIVES
89	4.02	NRC REGULATORY GUIDES, NUREGS, AND I.E. BULLETINS AND NOTICES
50	4.03	DEVIATION REPORT (NON-CONFORMING OPERATIONS REPORT)
69	4.04	PLANT INCIDENT/CONDITION REPORTS
53	4.05	LICENSEE EVENT REPORTS (LERS)
72	4.06	SPECIAL OR REQUIRED READING (E.G., SYSTEM DESIGN, CHANGES, ETC.)
81	4.07	FIRST AID INSTRUCTIONS/SAFETY BULLETINS
93	4.08	RADIOLOGICAL HEALTH HANDBOOK
92	4.09	CHART OF THE NUCLIDES
92	4.10	HEALTH PHYSICS TEXTBOOKS
64	4.11	TRAINING DEPARTMENT LESSON PLANS
41	4.12	INPO NOTEPAD
53	4.13	INPO GUIDELINES

TABLE 3-8
ADDITIONAL REFERENCES IDENTIFIED
THROUGH QUESTIONNAIRE WRITE-INS

WRITE-IN REFERENCES		NUMBER OF TIMES ADDED
4.14	Vendor training books	1
4.15	Gamma energy tables (isotopic)	1
4.16	Gamma spectrum catalog	1
4.17	Consensus standards (e.g., ANSI, ASTM)	1
4.18	Technical specialty publications	1
4.19	Professional/trade journals	1
4.20	Radioactive decay tables	1
4.21	Environmental texts	1
4.22	Environmental procedures	1
4.23	Respiratory protection procedures	1
4.24	Burial-site criteria	1
4.25	CNSI cask loading procedures	1
4.26	Quality assurance manuals	1
4.27	Off-site dose calculation manual	1
4.28	Safety Information Letters	1
4.29.	National Council of Radiation Protection and Measurements handbooks	1
4.30	International Commission of Radiological Protection publications	1

the model job descriptions in Appendices A through D indicate the survey percent-performing statistic for each task in the task inventory for each job level. The model job descriptions for the Senior/Lead Health Physics Technicians and Junior Health Physics Technicians indicate the percent-performing statistics for plant HPTs and vendor HPTs separately, since the vendor HPT respondents were concentrated in these two job levels (see Figure 3-3).

As discussed in Chapter 2, the questionnaire task inventory was developed by grouping tasks into the following 15 duty areas:

1. Counting Room and Associated Equipment
2. Radioactive Sources
3. Effluent Control (Liquid and Gaseous)

4. Process Monitoring
5. Portable Radiation Monitoring Equipment (Survey Meters and Air Samplers)
6. Personnel Monitoring Equipment (Friskers, Whole-Body Count Equipment)
7. Surveys (Radiation/Contamination/Airborne)
8. Radiation/Contamination Work Area Support
9. Shipping and Receiving Radioactive Materials
10. Decontamination
11. Environmental Sampling
12. Respirators and SCBA Equipment
13. Emergency/Abnormal Tasks
14. Administration/Training
15. Miscellaneous Supplies and Equipment.

Because of the specific nature of the tasks included in the inventory and the variability imposed by differences attributed to job levels, plant designs, equipment, and utility organizations, it was anticipated that the percent-performing statistic would be more variable across some duty areas than others. This was, in fact, the case as illustrated in Table 3-9. For example, in duty areas that are most germane to all HPTs, such as duty areas #7 (Surveys) and #8 (Radiation/Contamination Work Area Support), the majority of tasks were performed by more than 50 percent of the respondents; however, other duty areas, such as #3 (Effluent Control), #4 (Process Monitoring) and #11 (Environmental Sampling), had mostly low percent-performing ratings, indicating the likelihood that many of these tasks are performed at a number of plants by personnel other than Health Physics Technicians. Finally, duty area #14 (Administration/Training), shows the effects of job specialization, where a number of these tasks were focused at the supervisory level (for example, HPT Foreman) or were delegated to a select group of individuals (for example, specific HPTs responsible for ALARA reviews).

As discussed in Chapter 2, one objective for including vendor HPTs on short-term assignments at nuclear power plants in the survey population was to collect job analysis data that could be helpful in addressing questions related to the training and qualification utilities should require for vendor HPTs and the extent to which common training and qualification requirements could be applied to utility and vendor HPTs. Fundamental to these questions is knowing the differences in the tasks performed by plant HPTs and vendor HPTs on short-term assignments. To investigate these differences, a comparison of the task percent-performing results for the plant and vendor Senior/Lead Health Physics Technicians was made. The Senior/Lead Technician job level was selected for making this comparison because these job incumbents represent a majority of the survey respondents for plant and vendor HPTs (see Figure 3-3). A difference of 20 percentage points between the task percent-performing statistics for plant Senior/Lead Technicians versus vendor Senior/Lead Technicians was used as a threshold for identifying tasks or duty areas whose performance responsibility might be considered to be more applicable to one group than the other. This threshold is consistent with similar analyses conducted by INPO. (The model job description for Senior/Lead Health Physics Technician displays the percent-performing statistics for plant HPTs and vendor HPTs for all tasks.) Table 3-10 lists the tasks that were identified in this manner.

TABLE 3-9
DISTRIBUTION OF QUESTIONNAIRE TASKS
ACROSS THE RANGE OF PERCENT PERFORMING

QUESTIONNAIRE DUTY AREA	RESPONDENTS PERFORMING TASKS* (percent)									
	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
1. Counting Room and Equipment		9	6	5	7		6	4		
2. Radioactive Sources		1	3	1	3	2				
3. Effluent Control	1	4	2	2						
4. Process Monitoring	11	8	1		1	1	1			
5. Portable Radiation Monitoring Equipment	4	1	2	3		1	1	3	2	
6. Personnel Monitoring Equipment	2	8	6	12	5	5	3		3	
7. Surveys			1		2	4	4	13	4	
8. Radiation/ Contamination Work Area Support			1	2	1	3	7	10	4	
9. Shipping/ Receiving Radioactive Materials		5	6	3	6	3	5			
10. Decontamination	5	4	2	1	1	1	4	2		
11. Environmental Sampling	18	9		1						
12. Respirators and SCBA Equipment	1	4	5	7	2	3	1		1	
13. Emergency/ Abnormal Tasks		4	8	5	6	6	4	4		
14. Administration/ Training	16	14	9	2	4	1	2			
15. Miscellaneous Supplies and Equipment		4	1	1	2					

*Table values indicate the number of survey questionnaire tasks whose percent-performing statistic was within the indicated range.

TABLE 3-10
COMPARISON OF PLANT AND
VENDOR SENIOR/LEAD HPT TASK
PERCENT-PERFORMING STATISTICS

TASK NO.	TASK DESCRIPTION	PERCENT OF PLANT SENIOR/LEAD HPTs PERFORMING TASK	PERCENT OF VENDOR SENIOR/LEAD HPTs PERFORMING TASK
1.11	Determine counter percent slope (response curve/detector voltage plateau)	57	34
2.01	Perform radioactive sealed-source leak test	60	35
2.04	Operate calibration source well or source calibrator	56	31
2.08	Calculate radioactive source activity strengths	53	32
3.01	Perform release rate calculations	39	15
3.02	Evaluate effluent release data	32	9
3.03	Prepare a gaseous waste release permit	27	9
3.04	Prepare a liquid waste release permit	33	11
5.04	Calibrate portable air sampling equipment	43	16
9.03	Prepare a Radiation Work Permit for handling and processing radioactive waste	65	38
13.01	Respond as a radiological emergency team member to a site or general emergency	84	40
13.02	Provide health physics coverage of contaminated and/or injured personnel during an emergency	80	52
13.03	Segregate contaminated personnel in accordance with emergency contamination criteria	63	32
13.04	Recommend emergency actions consistent with protective action guides	46	22
13.07	Issue additional dosimetry as required by the Plant Emergency Plan	52	22
13.08	Sample off-site air for iodine	63	28
13.09	Track a radioactive plume	56	23
13.10	Perform as a re-entry team member (post-accident)	61	29
13.12	Obtain post-accident samples	41	17
13.13	Prepare and handle post-accident samples	47	26
13.15	Store post-accident sample for recounting	36	15
13.22	Respond to a process radiation monitor alarm	55	30
14.01	Initiate a maintenance work request	66	30

This review of plant versus vendor task percent-performing statistics led to the following findings:

1. Task performance responsibilities for plant HPTs and vendor HPTs on short-term assignments at plants are, for the most part, quite similar (the percent-performing results for these two HPT groups were within 20 percentage points for 366 of the 389 tasks included in the survey questionnaire).

2. Of the 23 tasks whose percent-performing results varied by greater than 20 percentage points between plant and vendor HPTs, all were performed by a higher percentage of plant HPTs than vendor HPTs. This result implies that there are no tasks in the inventory for which vendor HPTs on short-term assignment have a significantly greater responsibility for performing than plant HPTs.

3. The responsibility for task performance in some duty areas focuses more on plant HPTs than vendor HPTs. These duty areas include:

   Duty area #2 - Radioactive Sources,
   Duty area #3 - Effluent Control (Liquid and Gaseous), and
   Duty Area #13 - Emergency/Abnormal Tasks.

4. Task percent-performing results for plant and vendor HPTs within some duty areas were extremely close in comparison. Of the 56 tasks included in duty areas #7 (Surveys) and #8 (Radiation/Contamination Work Area Support), 54 had plant and vendor percent-performing results within 10 percentage points.

A computer-generated listing of all survey questionnaire tasks displaying the composite value for percent performing and average ratings of frequency, importance, and difficulty for each task is provided at the end of Section 3.4 (Table 3-13). This table also identifies the tasks recommended for detailed analysis using the process described in Section 3.4.

A composite listing of write-in tasks identified by questionnaire respondents was developed and reviewed by the Subject Matter Expert Consensus Group for applicability. Table 3-11 is the resultant list of these write-in tasks, which are also included in the model job descriptions in Appendices A through D.

3.4 TASK SELECTIONS FOR DETAILED ANALYSIS

This section describes the methodology and provides the results of the process used by the SME Consensus Group to select tasks for future detailed task analysis.

Selecting tasks for detailed task analysis and formal training represents a critical step in the performance-based curriculum-development process because it is at this point that those tasks selected will obligate resources for the development of training curricula and the conduct of training. "Training" as used here is not necessarily classroom lecture. Formal training programs can take a number of forms such as correspondence study, training manuals, individualized learning packages (including self-paced instruction with and without computers), on-the-job training, simulator team and individual training, and plant drills and exercises, as well as classroom lecture.

TABLE 3-11
ADDITIONAL TASKS IDENTIFIED THROUGH QUESTIONNAIRE WRITE-INS

TASK NO.	WRITE-IN TASK	NUMBER OF TIMES ADDED	RATINGS		
			FRE-QUENCY	IMPORT-ANCE	DIFFI-CULTY
1.38	Review and evaluate counted sample data (process, effluent, and environmental samples)	1	5	2	4
2.11	Perform source distance calculations	1	3	3	3
4.24	Calibrate single-channel analyzer	1	-	-	-
7.29	Determine survey frequencies based upon changes in radiological conditions	1	5	5	4
8.29	Evaluate containment device vent unit filters for replacement	1	4	4	3
12.25	Set up positive pressure supplied air respiratory equipment	3	2	3	2
13.38	Analyze indications of potential radiological problems based on quantitative measurement results within a particular system or area	1†	-	-	-
13.39	Provide health physics coverage at the scene of an in-plant radiological incident to recommend or direct corrective actions to mitigate the consequences	1†	-	-	-
13.40	Advise management personnel of the significance and corrective action that should be taken during a radiological incident	1†	-	-	-
13.41	Advise workers of immediate actions to be taken within the radiologically controlled area during a radiological incident	1†	-	-	-
14.49	Prepare respiratory protection program reports	1	2	3	2

†Added by members of the Radiation Protection and Emergency Preparedness Division of INPO.

3.4.1 Task Selection Methodology

As discussed in Chapter 2, four criteria selected for the job analysis survey were used as the bases for selecting tasks to be recommended for detailed analysis:

- The percent of incumbents performing the task was used as a measure of the relevance of the task to the entire population. This criterion points to the need for training tasks that are most germane to the job.

- The average rating of task importance from the survey responses was used as a measure of the criticality of the task. Task importance in terms of consequences created by inadequate task performance points to the need for selecting tasks for analysis and training that are essential to job performance regardless of how often the task is performed.

- The third criterion, the average rating of task difficulty, was used as a measure of the need for formal training to ensure competent task performance. Some tasks are complicated and require specific, formal training, whereas other tasks are simple and can be learned easily on the job.

- The fourth criterion, the average rating for frequency of performing the task, was used as a measure of how much of the job a particular task represents and is useful in training development. Task performance frequency is a key consideration in determining the need for periodic retraining of tasks or the need for "as required" training of tasks performed very infrequently.

The process used to develop recommendations for selecting tasks for detailed analysis involved two basic steps:

Step 1: Sort tasks into groups according to task difficulty, importance, and frequency ratings.

All tasks in the questionnaire were sorted into 1 of 18 groups according to similar combinations of average difficulty, importance, and frequency ratings. Figure 3-5 graphically displays the model to be used for sorting the tasks. This grouping of tasks of similar ratings is one of the techniques used in the systems approach to training and is referred to as the DIF (for difficulty, importance, and frequency) model for the task selection process. This model applies a branching technique to group tasks along a scale so that one end of the scale contains difficult, important, and frequently performed tasks while the other end contains the easy, unimportant, and infrequently performed tasks. One of three training recommendations (train, no training, or train/retrain) are assigned to each group of tasks. The need for detailed task analysis is implied for all tasks recommended for training by this model.

The three training recommendations are defined as follows:

TRAIN	- provide a combination of formal training (as defined earlier).
NO TRAINING	- no formal training (the task can be learned on the job).
TRAIN/RETRAIN	- provide a combination of initial formal training plus periodic practice of the task (retraining).

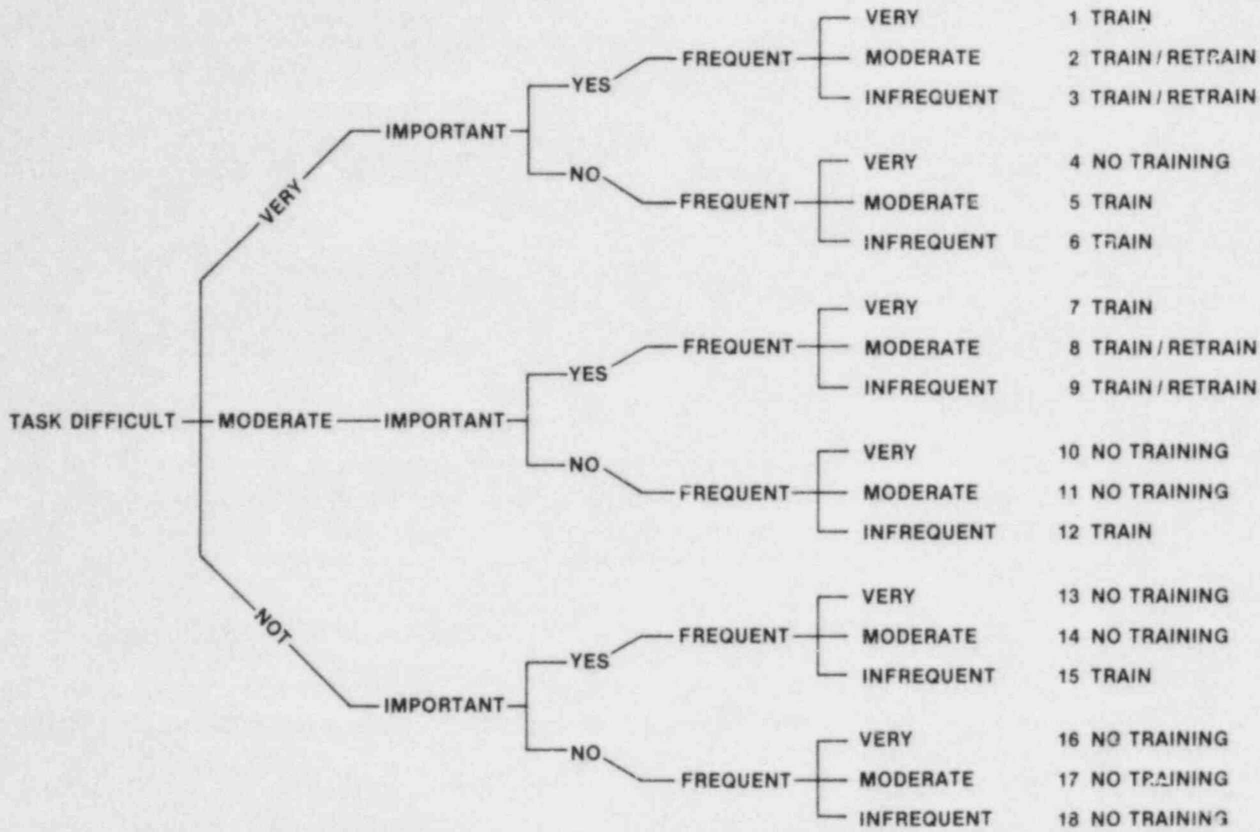


Figure 3-5. DIF Model for Selecting Tasks for Training

Computer-generated listings of all survey questionnaire tasks were prepared, displaying the value for percent performing and average ratings of frequency, importance, and difficulty. These listings identified the training recommendation group number and the resulting training recommendation. This information was provided to each member of the SME Consensus Group to serve as an aid in the next step of the task selection process.

Step 2: SME Consensus Group evaluate each task considering difficulty, importance, and percent-performing criteria ratings as well as the nature of the task. Identify tasks that do not require training or would not best utilize training resources.

Each task was evaluated individually by the SME Consensus Group using a list of criteria for deleting it from the list of tasks to be recommended for detailed analysis. After a consensus opinion was reached on each task, the Step 1 DIF selection model results were reviewed for comparison and a final decision was reached as to whether the task should be deleted from the list of tasks recommended for task analysis. The following deletion criteria were used by the SME Consensus Group reaching these decisions:

1. The task has low applicability to the job on the industry-wide level because of low average percent-performing rating (for example, less than 20 percent performing). Before applying this criterion, the existence of any extenuating reason for the low rating was investigated (for example, a supervisory task may be performed by a high percentage of HPT Foremen completing questionnaires, but was indicated as performed by a low percentage of the total number of survey respondents).

2. The task is likely to be learned easily on the job (regardless of its importance rating) due to a very low difficulty rating, implying that formal training is not necessary (for example, average difficulty is less than or equal to 2.0 average).

3. A low combination of difficulty and importance ratings indicates that training resources would not be best applied in formal training of the task. It is expected that the task can be learned on the job without difficulty and with no adverse impact.

4. The task represents a valid job requirement; however, formal training for the task is not applicable (for example, "attend general employee training").

5. The task is so similar to another task already selected that if a person is trained to do the other task, he/she will then be able to perform this task without additional training.

Write-in task listings were reviewed in a manner similar to that for questionnaire tasks. Due to the limited number of criteria responses (that is, frequency, importance, and difficulty) associated with write-in tasks, each was reviewed qualitatively by the SME Consensus Group to determine how well it met the criteria for deletion from the list of tasks recommended for analysis.

3.4.2 Health Physics Technician Task Inventory--Recommendations for Analysis

Table 3-13 (located at the end of this section) provides a computer-generated listing of all survey questionnaire tasks, displaying the value for percent performing and average ratings of frequency, importance, and difficulty for each task. This table also identifies with asterisks (*) tasks recommended for detailed analysis according to the task selection process described in Section 3.4.1. For tasks that are not recommended, the deletion criterion applied is indicated (a listing of deletion criteria is provided at the beginning of the table).

In a similar manner, Table 3-12 provides a listing of survey write-in tasks and identifies those tasks recommended for analysis. Tasks not recommended for analysis and reasons for their deletion are also indicated (see Table 3-13 for a listing of deletion criteria).

Of the 389 tasks listed in the survey questionnaire, 269 tasks are recommended for detailed analysis. Nine of the eleven write-in tasks added to the task inventory by the SME Consensus Group were also selected for analysis. Hence, a total of 278 tasks of the final 400-task inventory (69.5 percent) are recommended for detailed analysis. These selected tasks are indicated in Tables 3-12 and 3-13.

TABLE 3-12
HPT SURVEY WRITE-IN TASKS -- TASKS RECOMMENDED FOR ANALYSIS

	TASK NO.	WRITE-IN TASK	NUMBER OF TIMES ADDED	RATINGS		
				FRE-QUENCY	IMPORT-ANCE	DIFFI-CULTY
*	1.38	Review and evaluate counted sample data (process, effluent, and environmental samples)	1	5	2	4
*	2.11	Perform source distance calculations	1	3	3	3
1	4.24	Calibrate single-channel analyzer	1	-	-	-
*	7.29	Determine survey frequencies based upon changes in radiological conditions	1	5	5	4
5	8.29	Evaluate containment device vent unit filters for replacement	1	4	4	3
*	12.25	Set up positive pressure supplied air respiratory equipment	3	2	3	2
*	13.38	Analyze indications of potential radiological problems based on quantitative measurement results within a particular system or area	1†	-	-	-
*	13.39	Provide health physics coverage at the scene of an in-plant radiological incident to recommend or direct corrective actions to mitigate the consequences	1†	-	-	-
*	13.40	Advise management personnel of the significance and corrective action that should be taken during a radiological incident	1†	-	-	-
*	13.41	Advise workers of immediate actions to be taken within the radiologically controlled area during a radiological incident	1†	-	-	-
*	14.49	Prepare respiratory protection program reports	1	2	3	2

* Recommended for analysis

1,5 Criterion applied for deleting task from recommendations for analysis

† Added by members of the Radiation Protection and Emergency Preparedness Division of INPO.

TABLE 3-13
HPT SURVEY TASK INVENTORY --
TASKS RECOMMENDED FOR ANALYSIS

NOTES:

A. Tasks recommended for detailed analysis are indicated with an asterisk (*).

B. For tasks deleted from analysis recommendations, deletion criteria from the following list are indicated:

1. The task has low applicability to the job on the industry-wide level because of low average percent-performing rating (for example, less than 20 percent performing).

2. The task is likely to be learned easily on the job (regardless of its importance rating) due to a very low difficulty rating, implying that formal training is not necessary (for example, average difficulty is less than or equal to 2.0 average).

3. A low combination of difficulty and importance ratings indicates that training resources would not be best applied in formal training of the task. It is expected that the task can be learned on the job without difficulty and with no adverse impact.

4. The task represents a valid job requirement; however, formal training for the task is not applicable (for example, "attend general employee training").

5. The task is so similar to another task already selected that if a person is trained to do the other task, he/she will then be able to perform this task without additional training.

TABLE 3-13
HPT SURVEY TASK INVENTORY -- TASKS RECOMMENDED FOR ANALYSIS (Continued)

HEALTH PHYSICS TECHNICIAN TASK INVENTORY RESPONSES - RECOMMENDED TASKS FOR ANALYSIS

	IMPOR	DIFF	TASK#	TASK DESCRIPTOR	%PER	FREQ
*	2.53	2.35	1.01	PERFORM BACKGROUND CHECKS OF COUNTING ROOM EQUIPMENT (COUNTER SCALERS)	70	3.43
*	2.75	2.63	1.02	PERFORM PERFORMANCE CHECKS ON COUNTING ROOM EQUIPMENT (COUNTER SCALERS)	64	3.25
*	3.34	3.25	1.03	MANUALLY CALC AIRBORNE NUCLIDE CONC OF RAD MATERIAL FROM COUNTING ROOM DATA	70	3.63
*	3.02	3.39	1.04	CALIBRATE GROSS COUNTING SYSTEMS (SUCH AS EBERLINE MS-3, TENNELEC LB-5500)	35	2.33
*	2.71	2.33	1.05	PREPARE SAMPLES FOR COUNTING	79	4.24
*	2.89	2.72	1.06	OPERATE GROSS GAMMA COUNTING SYSTEMS (MANUAL OR AUTOMATIC)	71	4.05
*	2.81	2.61	1.07	OPERATE GROSS BETA COUNTERS (MANUAL OR AUTOMATIC)	72	4.01
*	2.78	2.64	1.08	OPERATE GROSS ALPHA COUNTING SYSTEMS (SUCH AS SAC-4)	64	3.35
*	2.90	3.01	1.09	DETERMINE COUNTER EFFICIENCY	62	2.90
*	2.85	3.26	1.10	DETERMINE COUNTER RELIABILITY (E.G., CHI-SQUARED DETERMINATION)	46	2.34
*	2.85	3.30	1.11	DETERMINE COUNTER PERCENT SLOPE (RESPONSE CURVE/DETECTOR VOLTAGE PLATEAU)	45	2.08
*	2.63	3.23	1.12	DETERMINE COUNTER RESOLVING TIME	26	1.94
*	3.32	3.66	1.13	DETERMINE GELI/INTRINSIC GER DETECTOR OPER PARAMETERS (DET EFF, DET RESOL, DET REL)	27	2.63
*	3.09	3.53	1.14	DETERMINE NA I DETECTOR OPERATING PARAMS (DET EFF, DET RESOL, DET REL, ENERGY CAL)	24	2.15
*	2.97	3.26	1.15	DETERMINE LIQUID SCINTILLATION COUNTER EFFICIENCY	21	2.32
*	2.78	2.72	1.16	PREPARE SAMPLES FOR LIQUID SCINTILLATION COUNTER	36	3.03
*	2.77	2.70	1.17	OPERATE LIQUID SCINTILLATION COUNTERS	32	3.05
1	3.01	3.37	1.18	CALIBRATE LIQUID SCINTILLATION DETECTORS	16	2.22
1	3.15	3.51	1.19	UPDATE THE GAMMA SPECTROMETER NUCLIDE LIBRARY	12	1.68
*	3.23	3.62	1.20	CALIBRATE COMPUTER-BASED MULTI-CHANNEL ANALYZER	19	2.22
1,5	3.11	3.47	1.21	CALIBRATE STAND-ALONE MULTI-CHANNEL ANALYZER	11	1.80
*	3.14	3.16	1.22	COUNT SAMPLES WITH COMPUTER-BASED MULTI-CHANNEL ANALYZER	43	3.43
*	3.10	3.15	1.23	COUNT SAMPLES WITH STAND-ALONE MULTI-CHANNEL ANALYZER	20	2.53
*	2.86	2.74	1.24	OPERATE THE GAS FLOW PROPORTIONAL COUNTER	59	3.69
2	2.29	2.05	1.25	CHANGE THE GAS CYLINDER FOR THE GAS FLOW PROPORTIONAL COUNTER	41	1.95
*	2.94	2.66	1.26	OPERATE THE GAMMA WELL COUNTER	22	3.01
3	2.61	2.54	1.27	REPLACE INSTALLED COUNTING EQUIPMENT DETECTORS (SUCH AS GM TUBES)	39	2.18
2	2.58	2.08	1.28	REFILL THE GELI LIQUID NITROGEN DEWAR	33	2.64
1	3.12	3.53	1.29	INPUT NEW CALIBRATION DATA INTO THE ISOTOPIC IDENTIFICATION COMPUTER	14	2.06
*	3.06	3.22	1.30	PREPARE THE ISOTOPIC IDENTIFICATION COMPUTER FOR ANALYSIS	17	2.77
*	2.63	3.14	1.31	CALCULATE LOWER LIMIT OF DETECTION (LLD) FOR COUNTER SCALERS (SUCH AS SAC-4, LCS-1)	31	2.85
*	2.58	3.03	1.32	CALCULATE MINIMUM DETECTABLE COUNTS (MDC) FOR COUNTER SCALERS (SUCH AS SAC-4, LCS-1)	46	2.99
*	2.84	3.28	1.33	PERFORM DECAY CONSTANT CALCULATIONS ON AIR SAMPLES	46	2.76
*	3.42	3.31	1.34	CALCULATE WEIGHTED MAXIMUM PERMISSIBLE CONCENTRATION (MPC) FROM ISOTOPIC DATA	61	2.92
*	2.70	2.93	1.35	PREPARE COUNTING DATA QC CHARTS	20	2.54
1	2.78	3.42	1.36	PREPARE SPIKED SAMPLES AND STANDARDS FROM STOCK RADIOISOTOPE SOLUTIONS	13	1.72
*	2.82	3.36	1.37	SUPERVISE (PLAN, BUDGET, SCHEDULE, EVALUATE) COUNTING ROOM ACTIVITIES	15	3.22
*	2.70	2.61	2.01	PERFORM RADIOACTIVE SEALED SOURCE LEAK TEST (INCLUDING DOCUMENTING RESULTS)	44	1.67
1,5	2.63	2.72	2.02	MONITOR RADIOACTIVE SEALED SOURCE LEAK DETECTION GRAPHS AND CHARTS	10	1.73
*	2.75	2.60	2.03	INVENTORY RADIOACTIVE SOURCES (INCLUDING DOCUMENTING RESULTS)	43	1.75
*	3.10	3.13	2.04	OPERATE CALIBRATION SOURCE WELL OR SOURCE CALIBRATOR	45	2.53
*	2.63	2.82	2.05	AUDIT RADIOACTIVE SOURCE AND MATERIAL RECORDS	20	1.74
*	2.98	3.34	2.06	DEVELOP CALIBRATION CHARTS FOR CALIBRATION SOURCES	20	1.55
*	2.70	2.40	2.07	TRANSFER RADIOACTIVE SOURCES FROM/TO OTHER DEPARTMENTS	50	2.22
*	2.76	3.24	2.08	CALCULATE RADIOACTIVE SOURCE ACTIVITY STRENGTHS	45	2.11
*	2.73	2.57	2.09	DISPOSE OF DECAYED OR NO LONGER USABLE RADIOACTIVE SOURCES	21	1.50
*	3.00	2.95	2.10	SUPERVISE CONTROL AND USE OF RADIOACTIVE SEALED SOURCES	33	2.73
*	3.77	3.66	3.01	PERFORM RELEASE RATE CALCULATIONS	30	2.68

TABLE 3-13
HPT SURVEY TASK INVENTORY -- TASKS RECOMMENDED FOR ANALYSIS (Continued)

HEALTH PHYSICS TECHNICIAN TASK INVENTORY RESPONSES - RECOMMENDED TASKS FOR ANALYSIS

	IMPOR	DIFF	TASK#	TASK DESCRIPTOR	%PER	FREQ
*	3.67	3.66	3.02	EVALUATE EFFLUENT RELEASE DATA	26	2.74
*	3.74	3.69	3.03	PREPARE A GASEOUS WASTE RELEASE PERMIT	20	2.63
*	3.67	3.51	3.04	PREPARE A LIQUID WASTE RELEASE PERMIT	23	3.10
I	3.55	3.50	3.05	PREPARE A LIQUID RELEASE REPORT	16	2.73
I	3.47	3.59	3.06	PREPARE A GASEOUS EFFLUENT ACCOUNT REPORT	13	2.37
I	3.41	3.42	3.07	COMPILE DATA FOR EFFLUENT RELEASE COMPOSITE REPORT	16	2.43
I	3.46	3.44	3.08	COMPILE DATA FOR EFFLUENT DISPOSAL RECORD	11	2.43
*	3.63	3.47	3.09	SUPERVISE EFFLUENT CONTROL ACTIVITIES	6	2.66
I	3.73	3.53	4.01	CALIBRATE LIQUID PROCESS EFFLUENT RADIATION MONITORS	11	1.64
I	3.75	3.51	4.02	CALIBRATE GASEOUS PROCESS EFFLUENT RADIATION MONITORS	11	1.78
I	3.68	3.60	4.03	CALIBRATE THE COG (CONDENSER OFF GAS) PROCESS VENT MONITORS	7	1.68
I	3.72	3.48	4.04	CALIBRATE THE STACK MONITORS	10	1.57
I	3.32	3.44	4.05	CALIBRATE THE DRY WELL ATMOSPHERE ACTIVITY MONITORS	4	1.83
I	3.51	3.41	4.06	CALIBRATE THE ESSENTIAL SERVICE WATER MONITORS	8	1.57
I	3.57	3.31	4.07	CALIBRATE THE REACTOR BUILDING VENT MONITORS	10	1.55
I	3.36	3.35	4.08	CALIBRATE THE REACTOR BUILDING CLOSED COOLING WATER/COMPONENT COOLING WATER MONITOR	8	1.49
I	3.38	3.23	4.09	CALIBRATE THE TURBINE BUILDING VENT MONITORS	6	1.52
*	3.10	3.41	4.10	CALIBRATE THE CONSTANT AIR MONITORS (SUCH AS CAM, APD)	20	1.84
3	2.56	2.29	4.11	CHANGE FILTERS IN CAMS	64	3.18
3	2.33	2.31	4.12	CHANGE RECORDING PAPER IN CAMS	57	2.63
I	3.06	3.33	4.13	CALIBRATE THE CONTAINMENT SPRAY HEAT EXCHANGER MONITORS	2	1.44
I	3.59	3.44	4.14	CALIBRATE THE EMERGENCY CONDENSER VENT MONITORS	3	1.41
I	3.15	3.09	4.15	CALIBRATE THE AREA RADIATION MONITOR PORTABLE CALIBRATION UNIT	9	1.75
I	3.24	3.15	4.16	CALIBRATE THE STATIONARY AREA RADIATION MONITORS	15	1.69
I	3.08	3.19	4.17	CALIBRATE THE PORTABLE AREA RADIATION MONITOR	16	1.93
*	3.00	2.77	4.18	SET UP PORTABLE AREA RADIATION MONITORS	47	2.21
I	3.72	3.44	4.19	CALIBRATE THE POST-ACCIDENT MONITORS (SJAE, MAIN STEAM LINE, CONTAINMENT HIGH RADIATION)	8	1.44
I	3.15	2.86	4.20	REPLACE DETECTORS IN PROCESS RADIATION MONITORS	9	1.77
*	3.41	3.37	4.21	CALCULATE PROCESS RADIATION MONITOR ALARM SETPOINTS	14	2.10
I	3.23	3.14	4.22	ASSIST IN INSTALLATION OF NEW PROCESS RADIATION MONITORS (INCLUDING SET UP)	11	1.48
*	3.26	3.43	4.23	SUPERVISE PROCESS MONITORING ACTIVITIES	8	2.68
*	3.30	3.43	5.01	CALIBRATE PORTABLE NEUTRON SURVEY EQUIPMENT (SUCH AS PORTABLE NEUTRON REM COUNTER PNR-4)	24	1.68
*	3.15	3.31	5.02	CALIBRATE PORTABLE ALPHA SURVEY EQUIPMENT (SUCH AS EBERLINE PAC-4)	22	1.77
*	3.37	3.33	5.03	CALIBRATE PORT BETA-GAMMA SURVEY EQUIP (E.G., CUTIE PIE 740A, EBERLINE ION CHAMBER)	33	2.29
*	3.23	3.08	5.04	CALIBRATE PORTABLE AIR SAMPLING EQUIPMENT	23	2.27
*	3.15	2.47	5.05	FIELD CHECK PORTABLE RADIATION MONITORING INSTRUMENTS	14	4.00
I	3.15	3.19	5.06	CALIBRATE THE BETA-GAMMA-ALPHA MONITOR (SUCH AS THE THYAC III)	8	2.01
*	3.29	2.81	5.07	OPERATE PORTABLE NEUTRON SURVEY EQUIPMENT (SUCH AS PORTABLE NEUTRON REM COUNTER PNR-4)	74	2.31
*	3.03	2.67	5.08	OPERATE PORTABLE ALPHA SURVEY EQUIPMENT (SUCH AS EBERLINE PAC-4)	59	2.34
*	3.37	2.79	5.09	OPERATE PORTABLE BETA-GAMMA SURVEY EQUIP (E.G., CUTIE PIE 740A, EBERLINE ION CHAMBER)	87	4.41
*	3.31	2.64	5.10	OPERATE PORTABLE AIR SAMPLING EQUIPMENT (SUCH AS RADECO, EBERLINE RAS-1)	83	4.16
*	3.50	3.12	5.11	OPERATE PORTABLE UNDERWATER GAMMA SURVEY EQUIPMENT (SUCH AS CPMU)	34	1.68
*	2.73	2.41	5.12	PERFORM MINOR REPAIRS ON PORT RAD MONITOR EQUIP (E.G., CHANGE BATTERIES, CHANGE CABLES)	78	3.10
I	2.77	3.69	5.13	PERFORM MAJOR REPAIRS ON PORTABLE RADIATION MONITORING EQUIPMENT	7	2.08
*	2.94	2.63	5.14	VERIFY PROPER OPERATION OF CAMS	61	3.37
I	3.07	3.27	5.15	CALIBRATE CONDENSER R CHAMBERS	8	1.61
I	3.00	3.23	5.16	PLOT CALIBRATION CURVES FOR PORTABLE RADIATION MONITORING EQUIPMENT	16	1.76
*	3.28	3.26	5.17	SUPERVISE PORTABLE RADIATION MONITORING ACTIVITIES	33	3.56
2	2.60	2.08	6.01	POST GENERAL AREA TLDS	34	1.96
*	3.07	2.68	6.02	PERFORM INITIAL ISSUE OF TLD/FILM BADGE	38	2.56

TABLE 3-13
HPT SURVEY TASK INVENTORY -- TASKS RECOMMENDED FOR ANALYSIS (Continued)

HEALTH PHYSICS TECHNICIAN TASK INVENTORY RESPONSES - RECOMMENDED TASKS FOR ANALYSIS

	IMPOR	DIFF	TASK#	TASK DESCRIPTOR	%PER	FREQ
*	3.17	3.15	6.03	OPERATE THE TLD READER TO READ TLDS	25	2.32
*	2.90	2.77	6.04	PREPARE TLD FOR REISSUE	23	2.38
*	2.77	2.50	6.05	PERFORM TLD/FILM BADGE CHANGE OUT	33	2.11
1	3.08	3.68	6.06	PERFORM MAINTENANCE ON TLD READERS	9	2.24
1	3.24	3.70	6.07	PERFORM CALIBRATION OF THE TLD READER	11	1.91
*	3.17	3.13	6.08	PERFORM CALIBRATION CHECKS OF THE TLD READER	17	2.41
*	2.96	3.03	6.09	PERFORM PERIODIC QA CHECKS OF TLDS (THAT IS, EXPOSURE TO A KNOWN SOURCE)	20	1.96
1,2	2.72	2.18	6.10	CHANGE FILM IN FILM BADGES	12	2.06
*	2.69	2.19	6.11	PERFORM DOSIMETERS DRIFT CHECK	47	2.27
2	3.02	1.88	6.12	READ POCKET DOSIMETERS	89	4.63
2	2.66	1.85	6.13	ZERO POCKET DOSIMETERS	84	4.27
2	2.68	1.93	6.14	ISSUE POCKET DOSIMETERS FOR USE	71	3.72
2	2.86	2.12	6.15	ISSUE AUDIBLE AND VISUAL DOSIMETERS	44	3.24
*	2.97	2.73	6.16	EXPOSE PERSONNEL DOSIMETERS FOR CAL PURPOSES (E.G., POCKET DOSIMETERS, TLDS)	37	2.13
2	2.67	1.97	6.17	COLLECT PERSONNEL DOSIMETERY DEVICES (FILM BADGES OR TLDS)	41	2.73
*	3.21	3.11	6.18	MANUALLY CALCULATE ESTIMATED INDIVIDUAL NEUTRON RADIATION EXPOSURE	49	2.10
*	2.72	2.37	6.19	PERFORM INITIAL RECEIPT TESTING OF DOSIMETRY EQUIPMENT (SUCH AS DRIFT TEST, DROP TEST)	28	1.93
*	3.27	2.58	6.20	ISSUE EXTREMITY DOSIMETRY	57	2.67
*	3.24	2.66	6.21	ISSUE SPECIAL PURPOSE DOSIMETRY (SUCH AS SPECIAL NEUTRON BADGES)	34	2.24
*	3.32	3.16	6.22	EVALUATE RESULTS FROM EXTREMITY AND SPECIAL PURPOSE DOSIMETRY	37	2.47
*	3.32	3.22	6.23	MAINTAIN COMPUTER RECORDS OF RADIATION EXPOSURE	21	3.24
*	2.74	2.87	6.24	PERFORM BACKGROUND CHECK ON WHOLE BODY COUNTER	35	2.56
*	2.83	3.09	6.25	PERFORM CALIBRATION CHECKS (ENERGY CALIBRATION AND EFFICIENCY) ON WHOLE BODY COUNTER	27	2.49
*	2.80	2.86	6.26	OPERATE WHOLE BODY COUNTER (WBC)	42	2.61
*	2.70	2.64	6.27	OBTAIN PRINTOUT AND/OR PLOT OF WHOLE BODY COUNT DATA	35	2.67
*	3.08	3.50	6.28	PERFORM CALCULATION FOR INTERNAL EXPOSURE BASED ON WBC RESULTS	18	1.63
1	2.91	3.38	6.29	CALIBRATE WHOLE BODY COUNTING SYSTEM	15	2.09
5	2.47	2.45	6.30	SELECT PERSONNEL FOR ROUTINE WHOLE BODY COUNTS	14	2.35
3,5	2.28	2.16	6.31	SCHEDULE PERSONNEL TO HAVE A WHOLE BODY COUNT	25	2.57
*	3.09	2.76	6.32	ASSIGN PERS TO HAVE PERIODIC WBC PERFORMED BASED ON HP MEASUREMENTS	36	2.15
2	2.86	2.37	6.33	COLLECT A BIOASSAY SAMPLE	18	1.62
*	3.01	2.53	6.34	COLLECT AND COUNT NASAL SMEARS	63	2.11
*	3.02	2.73	6.35	EVALUATE NASAL SMEARS	58	2.15
1,5	3.08	2.57	6.36	COLLECT AND COUNT THROAT SMEARS	13	1.63
1,5	3.19	2.72	6.37	EVALUATE THROAT SMEARS	12	1.63
*	2.97	2.89	6.38	CALIBRATE PERSONNEL MONITORING FRISKERS	29	2.46
*	3.03	3.13	6.39	CALIBRATE PORTAL MONITORS	22	2.04
*	2.73	2.17	6.40	PERFORM ROUTINE SOURCE CHECKS OF FRISKERS	64	3.39
*	2.77	2.18	6.41	PERFORM ROUTINE SOURCE CHECKS OF PORTAL MONITORS	48	2.96
*	2.91	2.20	6.42	PERFORM PERSONNEL CONTAMINATION MONITORING (FRISKING)	89	4.28
*	2.83	2.26	6.43	CONDUCT FUNCTIONAL CHECK OF EQUIPMENT (HAND AND FOOT MONITORS, PORTABLE MONITORS, FRISKERS)	56	3.48
*	2.95	2.47	6.44	SUPERVISE PERSONNEL MONITORING ACTIVITIES	53	3.90
*	3.55	3.33	7.01	PERFORM PRE-RADIATION WORK PERMIT (RWP) SURVEYS	77	3.89
*	3.46	3.18	7.02	PERFORM PERIODIC SURVEYS AT RADIATION WORK SITES TO EVALUATE CHANGES IN RADIOLOGICAL COND)	81	4.17
*	3.13	3.13	7.03	PERFORM POST-WORK SURVEYS AT RADIATION WORK SITES	76	3.91
*	3.42	3.14	7.04	PERFORM (OBTAIN, COUNT AND DOCUMENT) AN AIRBORNE ACTIVITY (INCLUDING IODINE SAMPLES) SURVEY)	79	4.14
*	3.33	3.12	7.05	PERFORM (OBTAIN, COUNT AND DOCUMENT) AN AIRBORNE GASEOUS ACTIVITY SURVEY	66	3.51
*	3.12	3.13	7.06	PERFORM (OBTAIN, COUNT AND DOCUMENT) A TRITIUM ACTIVITY SAMPLE	44	2.80
*	3.36	3.19	7.07	DETERMINE PERCENT MAXIMUM PERMISSIBLE CONCENTRATION (MPC) FROM AIR SAMPLE DATA	69	3.37
*	3.48	3.04	7.08	SELECT APPROPRIATE RESPIRATORY PROTECTION EQUIPMENT BASED ON AIR SAMPLE ANALYSIS	75	3.71

TABLE 3-13
HPT SURVEY TASK INVENTORY -- TASKS RECOMMENDED FOR ANALYSIS (Continued)

HEALTH PHYSICS TECHNICIAN TASK INVENTORY RESPONSES - RECOMMENDED TASKS FOR ANALYSIS

	IMPOR	DIFF	TASK#	TASK DESCRIPTOR	%PER	FREQ
*	3.28	3.02	7.09	REVIEW THE RESULTS OF AIR SAMPLE SURVEYS	77	4.21
*	3.71	2.85	7.10	PERFORM (OBTAIN, COUNT, AND DOCUMENT) A SMEAR SURVEY FOR LOOSE SURFACE CONTAMINATION	84	4.47
*	3.02	2.77	7.11	REVIEW THE RESULTS OF A SMEAR SURVEY	85	4.50
*	2.71	2.47	7.12	PERF PERIODIC RAD AND CONTAM SURVEYS THROUGHOUT THE PLANT IN NON-RAD CONTRLED AREAS	74	3.44
*	3.37	3.05	7.13	DETERMINE THE LOCATION OF RADIOACTIVE HOT SPOTS	79	3.76
*	3.34	2.73	7.14	POST AND LABEL RADIOACTIVE HOT SPOTS	77	3.49
*	3.07	3.00	7.15	PREPARE REPORTS REGARDING RADIATION AND CONTAMINATION SURVEYS	60	3.89
*	2.94	2.81	7.16	MAINTAIN RECORDS AND FILES ON RADIATION, CONTAMINATION, AND AIRBORNE ACTIVITY SURVEYS	56	3.97
*	3.20	2.88	7.17	PERFORM A GENERAL RADIATION SURVEY	83	4.33
*	3.56	3.16	7.18	PERFORM A HIGH RADIATION AREA SURVEY	81	3.89
*	3.32	3.12	7.19	PERFORM A TEMPORARY SHIELDING SURVEY	68	2.80
*	3.10	3.07	7.20	PERFORM AN INDUSTRIAL HYGIENE SURVEY TO DETERM PHYSICAL HABITABILITY OF AN AREA	25	2.30
*	3.72	3.77	7.21	PERFORM SURVEYS IN SUPPORT OF REACTOR CONTAINMENT BUILDING/DRYWELL ENTRY WHILE AT POWER	59	2.19
*	3.52	3.35	7.22	PERFORM A NEUTRON RADIATION SURVEY	68	2.24
*	3.17	2.98	7.23	PERFORM ON-THE-JOB GROSS ANALYSIS OF AIR SAMPLES (USING PORTABLE SURVEY INSTRUMENTS)	60	3.27
*	3.06	2.89	7.24	PERFORM SURVEYS TO SUPPORT THE MOVEMENT OF RADIOACTIVE MATERIALS	74	3.37
*	3.70	3.55	7.25	PERFORM SURVEYS IN SUPPORT OF ENTRY INTO AREAS OF UNKNOWN RADIOLOGICAL HAZARDS	72	2.82
*	3.15	3.08	7.26	PERFORM A BETA RADIATION SURVEY	77	3.65
*	3.62	3.16	7.27	PERFORM RAD MONITORING DURING INDUSTRIAL RADIOGRAPHIC OPERATIONS OR OTHER OPS INVOLVING X-RAY	52	2.03
*	3.27	3.23	7.28	SUPERVISE THE CONDUCT OF SURVEYS (RADIATION/CONTAMINATION/AIRBORNE)	43	3.41
*	2.53	2.62	8.01	SET UP A CONTROL POINT	70	2.45
*	2.74	2.69	8.02	SET UP A CONTROL AREA	71	2.72
*	2.78	2.83	8.03	MAINTAIN A CONTROL POINT (THAT IS, PERFORM NECESSARY SURVEYS, SUPPLY REQUIRED MATERIALS)	71	3.11
*	2.82	2.51	8.04	SURVEY TOOLS AND EQUIPMENT FOR RELEASE FROM A RADIOLOGICALLY CONTROLLED AREA	83	4.15
*	3.67	3.23	8.05	PERFORM STAY TIME CALCULATIONS	74	3.15
*	3.45	3.35	8.06	COMP A RWP (E.G., CLOTHING, DOSIMETRY, AND RESPIRATOR REQ) BASED ON SURVEY DATA AND RAD COND	70	3.59
*	3.44	3.14	8.07	DETERMINE REQUIRED DOSIMETRY FOR ENTRY INTO A JOB COVERAGE AREA	73	3.68
*	3.46	3.11	8.08	DETERMINE PROPER DOSIMETER PLACEMENT LOCATION ON THE BODY FOR ENTRY INTO A JOB COVERAGE AREA	76	3.40
*	3.04	2.93	8.09	REVIEW RWP FOR COMPLETENESS AND OBTAIN APPROPRIATE SIGNATURES FOR RWP APPROVAL	68	3.65
*	3.07	3.07	8.10	ESTIMATE INDIVIDUAL AND TOTAL WORKER DOSE FROM THE RWP INFORMATION IN ACCORDANCE WITH ALARA	58	3.34
*	3.03	2.92	8.11	INSPECT WORK AREAS TO ENSURE COMPLIANCE WITH RADIATION WORK PERMITS AND GOOD WORK PRACTICES	80	4.06
*	3.04	2.85	8.12	INSPECT PLANT FOR RADIATION POSTING, RADIOACTIVE MATERIAL STORAGE, AND CONTAM CONTROL	82	4.10
*	3.01	2.68	8.13	POST/REMOVE POSTING OF RADIOLOGICALLY-CONTROLLED AREAS	79	3.72
*	2.97	2.63	8.14	UPDATE POSTING OF RADIOLOGICALLY-CONTROLLED AREAS	76	3.80
*	2.76	2.53	8.15	SUPERVISE THE REMOVAL OF PERSONNEL DOSIMETRY EQUIPMENT AND PROTECTIVE CLOTHING	76	3.70
*	3.33	2.99	8.16	BRIEF WORKERS ON RADIOLOGICAL HAZARDS IN THE WORK AREA OR CHANGES IN RADIOLOGICAL CONDITIONS	83	4.11
*	3.15	2.71	8.17	CONTROL WORKER ACCESS TO A RADIOLOGICALLY-CONTROLLED AREA	75	3.88
*	3.58	3.28	8.18	ISSUE A STOP WORK ORDER WHEN SIGNIFICANT RADIOLOGICAL DISCREPANCIES ARE DISCOVERED	67	2.40
*	3.17	3.33	8.19	DETERMINE AMOUNT OF SHIELDING REQUIRED USING HALF VALUE LAYERS OR GRAPHS	49	2.00
*	3.22	3.02	8.20	DIRECT THE INSTALLATION AND REMOVAL OF TEMPORARY SHIELDING	60	2.28
*	3.13	2.97	8.21	EVALUATE THE EFFECTIVENESS OF TEMPORARY SHIELDING	64	2.39
*	3.24	3.36	8.22	PREP A CONTAINMENT AREA (TENT) WITH VENT TO REDUCE EXPOSURE TO AIRBORNE CONTAMINANTS	55	2.06
*	3.10	3.26	8.23	PREPARE A GLOVE BOX TO REDUCE PERSONNEL EXPOSURE TO AIRBORNE CONTAMINANTS	35	1.73
*	3.05	3.17	8.24	EVALUATE A WORK AREA FOR ADDITIONAL ALARA CONSIDERATIONS	67	3.11
*	3.08	3.16	8.25	PERFORM CERTIFICATION INSPECTIONS OF TENTS, GLOVE BOXES, AND OTHER CONTAINMENT DEVICES	29	2.26
*	4.01	3.95	8.26	PROVIDE CLOSE HP COVERAGE FOR WORKERS IN HIGH DOSE JOBS (E.G., STM GEN JUMPERS, CRD MECH)	69	2.67
*	3.28	3.14	8.27	PERFORM ON-THE-SPOT CORRECTION OF WORKERS NOT COMPLYING WITH PROPER RAD WORK PRACTICES	80	3.42
*	3.28	3.34	8.28	SUPERVISE HEALTH PHYSICS TECHNICIANS IN RADIATION/CONTAMINATION WORK AREA SUPPORT	39	3.41
*	3.18	3.33	9.01	ANALYZE SAMPLES OF RAD MATERIAL TO DETERMINE SHIPPING CATEGORY	29	2.44
*	3.22	3.32	9.02	DETERMINE TRANSPORT GROUP AND CLASSIFY RADIOACTIVE MATERIAL AS TYPE A, TYPE B, OR LSA	30	2.30

TABLE 3-13
HPT SURVEY TASK INVENTORY -- TASKS RECOMMENDED FOR ANALYSIS (Continued)

HEALTH PHYSICS TECHNICIAN TASK INVENTORY RESPONSES - RECOMMENDED TASKS FOR ANALYSIS

	IMPOR	DIFF	TASK#	TASK DESCRIPTOR	%PER	FREQ
*	3.16	3.15	9.03	PREPARE A RADIATION WORK PERMIT FOR HANDLING AND PROCESSING RADIOACTIVE WASTE	46	2.64
*	3.22	3.16	9.04	PROVIDE HEALTH PHYSICS COVERAGE DURING PREPARATION OF A SHIPMENT OF RADIOACTIVE MATERIAL	62	2.83
*	3.28	3.11	9.05	SURVEY A SHIPMENT OF RADIOACTIVE MATERIAL PRIOR TO SHIPPING	66	2.78
*	3.23	3.09	9.06	SELECT APPROPRIATE CONTAINERS AND PACKAGE RADIOACTIVE MATERIALS	26	2.61
*	3.19	3.04	9.07	PACKAGE (INCLUDING LABELING) DRY RADIOACTIVE WASTE MATERIAL FOR SHIPMENT	37	2.78
*	3.07	3.01	9.08	DOCUMENT PACKAGED MATERIAL SURVEY DATA IN THE RADIOACTIVE MATERIAL SHIPPING RECORD	43	2.66
*	2.97	2.48	9.09	PLACARD THE TRANSPORT VEHICLE	45	2.51
*	3.09	2.84	9.10	SURVEY TRANSPORT VEHICLES	63	2.65
*	3.11	2.99	9.11	SUPERVISE LOADING RADIOACTIVE MATERIAL ON TRANSPORT VEHICLE	44	2.63
*	3.13	3.33	9.12	EXAMINE REPORTS ACCOMPANYING RADIOACTIVE MATERIAL SHIPMENT RECEIVED TO ENSURE COMPLIANCE	28	2.34
*	2.94	2.97	9.13	PERFORM RADIATION AND CONTAMINATION SURVEYS OF RAD MATERIAL RECEIVED	58	2.37
*	2.96	2.97	9.14	MAINTAIN RECORDS OF THE RECEIPT/SHIPMENT OF RADIOACTIVE MATERIALS	24	2.61
*	3.08	3.03	9.15	PERFORM SURVEY IN CONJUNCTION WITH RECEIPT OF NEW FUEL AND RADIOACTIVE SEALED SOURCES	52	1.70
*	3.01	2.84	9.16	CONTROL THE MOVEMENT OF RADIOACTIVE MATERIAL THROUGH UNRESTRICTED (NON-RADIOLOGICAL) AREAS	66	2.72
*	2.91	2.81	9.17	DIRECT STORAGE OF RADIOACTIVE MATERIALS IN THE DESIGNATED AREAS OF THE PLANT	63	3.10
*	3.34	3.07	9.18	INSPECT THE TRANSPORT VEHICLE TO ENSURE SAFE TRANSPORTATION OF RADIOACTIVE MATERIALS	25	2.51
*	3.25	3.08	9.19	DETERMINE QUALIFICATIONS OF RECEIVER TO RECEIVE RADIOACTIVE MATERIAL SHIPMENT	12	2.22
1	3.07	2.96	9.20	OBTAIN RADIOACTIVE MATERIAL SHIPPING PERMITS	11	2.21
*	3.41	3.39	9.21	APPLY STATE AND FEDERAL SHIPPING REQUIREMENTS	23	2.54
*	3.13	2.85	9.22	SURVEY WASTE MATERIALS TO SEGREGATE HIGH AND LOW LEVEL WASTE IN PREPARATION FOR SHIPMENT	46	2.73
3	2.80	2.48	9.23	WEIGH DRUMS AND PACKAGES IN PREPARATION FOR SHIPMENT	31	2.69
*	3.06	2.82	9.24	PERFORM CONTAINER INSPECTIONS AND TESTS ON NON-CERTIFIED SHIPPING CONTAINERS AND PACKAGES	14	2.43
*	2.88	2.63	9.25	CONDUCT SURVEILLANCE OF DRUM AND BOX WASTE COMPACTOR OPERATIONS	44	2.81
*	2.79	2.42	9.26	SEGREGATE CONTAMINATED/NON-CONTAMINATED TRASH GENERATED WITHIN RAD CONTROLLED AREA BY FRISKING	49	3.28
1	2.96	2.73	9.27	ACCOMPANY RADIOACTIVE MATERIALS SHIPMENTS OFF SITE	11	1.66
*	3.34	3.33	9.28	SUPERVISE THE SHIPPING AND RECEIVING OF RADIOACTIVE MATERIALS	15	2.57
*	2.59	2.79	10.01	EVALUATE CONTAMINATED MATERIAL AND EQUIPMENT TO DETERMINE IF DECONTAMINATION IS PRACTICAL	77	3.41
*	2.64	2.75	10.02	DIRECT DECONTAMINATION OF EQUIPMENT OR MATERIALS	72	3.36
*	2.57	2.53	10.03	PERFORM DECONTAMINATION OF EQUIPMENT OR MATERIALS	70	3.06
3	2.43	2.39	10.04	PREPARE DECONTAMINATION SOLUTIONS AND AGENTS FOR USE (SUCH AS TURCO)	23	2.50
*	3.04	3.02	10.05	DIRECT DECONTAMINATION OF PERSONNEL	76	2.95
*	3.04	3.04	10.06	DECONTAMINATE PERSONNEL (INCLUDING DOCUMENTING RESULTS)	72	2.85
*	2.71	2.76	10.07	DIRECT AREA DECONTAMINATION	71	3.13
*	2.73	2.68	10.08	PERFORM AREA DECONTAMINATION (INCLUDING DOCUMENTING RESULTS)	52	2.78
3	2.48	2.16	10.09	COLLECT POTENTIALLY CONTAMINATED LAUNDRY	25	2.80
3	2.55	2.11	10.10	SORT LAUNDRY (HIGH LEVEL CONTAMINATION FROM LOW LEVEL CONTAMINATION AND NON-CONTAMINATED)	18	2.49
1	2.45	2.18	10.11	OPERATE CONTAMINATED LAUNDRY FACILITIES	9	2.62
3,5	2.61	2.26	10.12	SURVEY LAUNDRY FOR REUSE	34	2.72
1	2.55	2.54	10.13	PERFORM ROUTINE MAINTENANCE OF LAUNDRY FACILITIES (SUCH AS CHANGE FILTERS, CLEANING SOLUTIONS)	9	2.54
3	2.48	2.48	10.14	DIRECT CONTAMINATED LAUNDRY OPERATIONS	15	2.68
1	2.43	2.78	10.15	OPERATE DECONTAMINATION HIGH PRESSURE WATER CABINET EQUIPMENT	7	2.03
3	2.34	2.40	10.16	OPERATE ULTRASONIC DECONTAMINATION UNIT	19	2.01
1	2.82	2.76	10.17	OPERATE DECONTAMINATION VAPOR DEGREASER UNIT	3	2.09
1	2.30	2.63	10.18	OPERATE DECONTAMINATION ELECTRO-POLISHER UNIT	4	2.13
5	2.66	2.81	10.19	OVERSEE DECONTAMINATION OF EQUIPMENT AND WORK AREAS CARRIED OUT BY NON-HP PERSONNEL	59	3.21
*	2.78	2.96	10.20	SUPERVISE HEALTH PHYSICS TECHNICIAN DECONTAMINATION SUPPORT	30	3.23
1	2.89	3.11	11.01	COORDINATE ENVIRONMENTAL SAMPLING SCHEDULE	7	2.15
*	2.96	2.51	11.02	OBTAIN CHARCOAL FILTER SAMPLES	39	3.16
*	2.87	2.53	11.03	OBTAIN SURFACE WATER SAMPLES	19	2.17
1	2.84	2.41	11.04	OBTAIN SURFACE WATER TRITIUM SAMPLE	14	2.28

TABLE 3-13
HPT SURVEY TASK INVENTORY -- TASKS RECOMMENDED FOR ANALYSIS (Continued)

HEALTH PHYSICS TECHNICIAN TASK INVENTORY RESPONSES - RECOMMENDED TASKS FOR ANALYSIS

	IMPOR	DIFF	TASK#	TASK DESCRIPTOR	%PER	FREQ
1	2.98	2.52	11.05	OBTAIN SURFACE WATER BETA SAMPLE	12	2.21
1	2.64	2.32	11.06	OBTAIN AQUATIC VEGETATION SAMPLES	5	1.56
1	2.82	2.50	11.07	OBTAIN ZOOPLANKTON SAMPLES	2	1.50
1	2.74	2.58	11.08	OBTAIN BENTHIC ORGANISM SAMPLES	2	1.42
1	2.63	2.25	11.09	OBTAIN FISH SAMPLES	3	1.50
1	2.45	1.91	11.10	OBTAIN SHRIMP SAMPLES	1	1.64
1	2.50	2.13	11.11	OBTAIN OYSTER SAMPLES	1	1.63
1	2.70	2.63	11.12	OBTAIN BOTTOM SEDIMENT SAMPLES	5	1.59
1	2.79	2.44	11.13	OBTAIN SHORELINE SEDIMENT SAMPLES	4	1.46
1	2.51	2.04	11.14	OBTAIN RAIN WATER SAMPLES	8	1.81
1	2.63	2.11	11.15	OBTAIN GROUNDWATER SAMPLES	9	1.75
1	2.93	2.41	11.16	OBTAIN MILK SAMPLE	8	1.89
1	2.85	2.27	11.17	OBTAIN TERRESTRIAL VEGETATION SAMPLES	9	1.53
1	2.82	2.32	11.18	OBTAIN FOOD CROP SAMPLES	8	1.49
1	3.10	2.55	11.19	OBTAIN FODDER AND FEED CROP SAMPLES	5	1.63
1	2.58	2.09	11.20	OBTAIN DEEP WELL SAMPLES	8	1.64
2	2.67	2.17	11.21	OBTAIN SOIL SAMPLES	19	1.56
1	2.79	3.05	11.22	CALIBRATE ENVIRONMENTAL AREA RADIATION MONITORS AND SAMPLING EQUIPMENT	10	1.90
1	2.68	2.74	11.23	PERFORM ROUTINE MAINTENANCE ON ENVIRONMENTAL AIR SAMPLING EQUIPMENT	13	1.87
1	2.85	2.82	11.24	OBTAIN METEOROLOGICAL MONITORING DATA (INCLUDING DOCUMENTATION)	7	2.06
1	2.70	2.60	11.25	PREPARE ENVIRONMENTAL SAMPLES FOR TRANSFERS TO PROPER SYSTEM LAB	10	2.03
1	2.68	2.49	11.26	PACKAGE ENVIRONMENTAL SAMPLES FOR TRANSFER TO OUTSIDE FACILITIES	10	2.08
1	3.13	3.02	11.27	REVIEW ENVIRONMENTAL DATA FOR COMPLIANCE WITH TECHNICAL SPECIFICATIONS	7	2.17
*	2.98	3.13	11.28	SUPERVISE ENVIRONMENTAL SAMPLING ACTIVITIES PERFORMED BY HEALTH PHYSICS TECHNICIANS	6	2.15
*	3.09	2.60	12.01	CONDUCT REQUIRED ROUTINE INSPECTIONS OF RESPIRATORS	58	2.95
*	3.14	2.81	12.02	REPAIR RESPIRATORY PROTECTIVE EQUIPMENT	40	2.53
*	3.10	2.68	12.03	LEAK TEST RESPIRATOR AFTER REPAIR	32	2.51
*	3.20	2.74	12.04	PERFORM CHECKS OF HOSE, REGULATOR AND MANIFOLD FOR FORCED AIR RESPIRATOR	52	2.52
*	3.03	2.62	12.05	PREPARE RESPIRATORS FOR REUSE	45	2.76
*	2.84	2.33	12.06	ISSUE RESPIRATORY PROTECTIVE EQUIPMENT	66	3.29
*	3.15	2.57	12.07	USE RESPIRATORY PROTECTIVE EQUIPMENT	85	3.35
*	3.05	2.50	12.08	PERFORM INSPECTION OF RESPIRATOR CANNISTERS PRIOR TO REUSE	37	2.74
*	2.87	2.39	12.09	PERFORM RADIOLOGICAL SURVEYS OF RESPIRATORS	55	2.88
*	2.88	2.36	12.10	DECONTAMINATE RESPIRATORS	27	2.35
2,3	2.44	2.04	12.11	PACKAGE RESPIRATORS FOR STORAGE	38	2.65
*	2.88	2.69	12.12	REFILL SCBA BOTTLES	25	2.18
*	3.03	2.77	12.13	PERFORM CHECKS ON SCBA	43	2.31
*	3.02	2.82	12.14	PERFORM QUALITATIVE RESPIRATOR FIT TESTS FOR PERSONNEL	30	2.51
*	3.04	3.00	12.15	PERFORM QUANTITATIVE RESPIRATOR FIT TESTS FOR PERSONNEL	26	2.43
1	2.77	3.15	12.16	CALIBRATE THE RESPIRATOR FITTING BOOTH	14	2.12
*	3.08	2.61	12.17	PERFORM FUNCTIONAL TEST OF RESPIRATORY EQUIPMENT	41	2.86
1	3.04	2.57	12.18	CHECK RESPIRATOR CANNISTERS FOR DIFFERENTIAL PRESSURE REQUIREMENT CONFORMITY	15	2.58
*	2.87	2.31	12.19	CHECK RESPIRATOR CANNISTERS FOR CONTAMINATION	36	2.74
1	3.14	2.75	12.20	REPLACE THE CATALYST AGENT IN A RE-BREATHER TYPE RESPIRATOR (SUCH AS BIOPACK-60, SCOTT)	6	1.95
*	2.99	2.53	12.21	REPLACE THE OXYGEN BOTTLE ON A RE-BREATHER TYPE RESPIRATOR (SUCH AS BIOPAK-60, SCOTT)	22	2.05
*	2.99	2.73	12.22	PERFORM CHECKS ON A RE-BREATHER TYPE RESPIRATOR (SUCH AS BIOPACK-60, SCOTT, MSA)	16	2.28
*	3.20	2.92	12.23	PERFORM AIR QUALITY CHECKS ON PLANT BREATHING AIR SYSTEMS	27	2.14
*	3.18	3.07	12.24	SUPERVISE RESPIRATORS AND SCBA EQUIPMENT ACTIVITIES PERFORMED BY HEALTH PHYSICS TECHNICIANS	17	2.95
*	4.18	4.07	13.01	RESPOND AS A RADIOLOGICAL EMERGENCY TEAM MEMBER TO A SITE OR GENERAL EMERGENCY	68	1.32
*	3.94	4.05	13.02	PROVIDE HP COVERAGE OF CONTAMINATED/INJURED PERSONNEL DURING EMERGENCY	64	1.36

TABLE 3-13
HPT SURVEY TASK INVENTORY -- TASKS RECOMMENDED FOR ANALYSIS (Continued)

HEALTH PHYSICS TECHNICIAN TASK INVENTORY RESPONSES - RECOMMENDED TASKS FOR ANALYSIS

	IMPOR	DIFF	TASK#	TASK DESCRIPTOR	%PER	FREQ
*	3.62	3.69	13.03	SEGREGATE CONTAMINATED PERSONNEL IN ACCORDANCE WITH EMERGENCY CONTAMINATION CRITERIA	48	1.27
*	4.18	3.98	13.04	RECOMMEND EMERGENCY ACTIONS CONSISTENT WITH PROTECTIVE ACTION GUIDES	38	1.27
*	4.08	3.95	13.05	ASSIST IN EMERGENCY RESPONSE PLANNING DURING AN EMERGENCY	32	1.24
4	3.92	3.79	13.06	MAINTAIN THE EMERGENCY DATA STATUS BOARDS	17	1.25
*	3.74	3.32	13.07	ISSUE ADDITIONAL DOSIMETRY AS REQUIRED BY THE PLANT EMERGENCY PLAN	41	1.25
*	4.10	3.69	13.08	SAMPLE OFF-SITE AIR FOR IODINE	46	1.26
*	4.23	3.92	13.09	TRACK A RADIOACTIVE PLUME	43	1.27
*	4.38	4.34	13.10	PERFORM AS A RE-ENTRY TEAM MEMBER (POST ACCIDENT)	45	1.19
*	4.46	4.28	13.11	DIRECT THE RE-ENTRY TEAM	21	1.22
*	4.27	4.10	13.12	OBTAIN POST-ACCIDENT SAMPLES	40	1.23
*	4.25	4.14	13.13	PREPARE AND HANDLE POST-ACCIDENT SAMPLES	35	1.23
*	4.20	4.00	13.14	ANALYZE POST-ACCIDENT SAMPLES	29	1.19
*	3.90	3.60	13.15	STORE POST-ACCIDENT SAMPLE FOR RECOUNTING	25	1.20
*	3.70	3.45	13.16	DISPOSE OF POST-ACCIDENT SAMPLES	23	1.17
*	4.18	3.99	13.17	RESPOND TO AN UNCONTROLLED RELEASE OF ACTIVITY TO THE ENVIRONMENT	51	1.29
*	2.90	2.78	13.18	RESPOND TO A PORTAL MONITOR ALARM	71	2.78
*	3.80	3.88	13.19	RESPOND TO A FIRE IN A CONTROLLED AREA	51	1.59
*	3.28	3.15	13.20	RESPOND TO A CONSTANT AIR MONITOR ALARM	68	2.43
*	3.39	3.18	13.21	RESPOND TO AN AREA RADIATION MONITOR ALARM	70	2.24
*	3.48	3.32	13.22	RESPOND TO A PROCESS RADIATION MONITOR ALARM	41	2.00
1	3.18	3.23	13.23	RESPOND TO A CONDUCTIVITY ALARM	10	1.79
*	3.58	3.45	13.24	RESPOND TO AN EFFLUENT ALARM	23	1.77
*	4.61	4.54	13.25	RESPOND TO A FUEL HANDLING ACCIDENT	31	1.11
*	3.51	3.31	13.26	RESPOND TO AN ABNORMAL TLD READOUT	30	1.81
*	3.10	2.98	13.27	RESPOND TO A LOST TLD	70	2.27
*	3.11	2.86	13.28	RESPOND TO A POCKET DOSIMETER BEING FOUND OFF SCALE	80	2.79
*	3.74	3.54	13.29	RESPOND TO PERSONNEL EXPOSURE EXCEEDING REGULATORY OR ADMINISTRATIVE LIMITS	44	1.46
*	3.99	4.14	13.30	PROVIDE HEALTH PHYSICS COVERAGE FOR OFF-SITE RADIOLOGICAL TRANSPORTATION INCIDENTS	19	1.13
*	3.10	3.25	13.31	EVALUATE RADIOLOGICAL INCIDENT (SUCH AS PERSONNEL CONTAMINATION) TO DETERMINE THE CAUSE	62	2.58
*	3.71	3.71	13.32	RESPOND TO A FIRE AS A MEMBER OF THE PLANT FIRE BRIGADE	22	1.83
1	4.26	4.35	13.33	COORDINATE A BOMB SEARCH IN CONTROLLED/RADIATION AREAS	10	1.14
4	3.46	3.96	13.34	ADMINISTER FIRST AID TO INJURED PERSONNEL	44	1.65
4	3.87	4.42	13.35	ADMINISTER CPR	26	1.18
*	3.94	3.94	13.36	PERFORM OFF-SITE DOSE ASSESSMENT USING A COMPUTER	13	1.39
*	4.10	4.13	13.37	PERFORM OFF-SITE DOSE ASSESSMENT MANUALLY	21	1.22
*	2.30	2.63	14.01	INITIATE A MAINTENANCE WORK REQUEST	56	2.55
1	2.98	3.26	14.02	COMPILE DATA FOR STEAM GENERATOR COMPOSITE REPORT	10	1.89
*	2.84	3.21	14.03	PREPARE SPECIAL RADIATION CONTROL REPORTS	20	2.04
*	3.28	3.09	14.04	PROCESS REQUESTS TO EXCEED THE CURRENT RADIATION EXPOSURE AUTHORIZATION	26	2.39
*	3.34	3.02	14.05	AUTHORIZE REQUESTS TO EXCEED THE ADMINISTRATIVE RADIATION EXPOSURE LIMITS	11	2.40
3	1.66	2.19	14.06	ORDER TECHNICAL PUBLICATIONS	13	1.79
*	2.72	2.98	14.07	PREPARE ROUTINE RADIATION CONTROL REPORTS	19	2.96
1	2.84	2.90	14.08	PREPARE DAILY EXPOSURE STATUS REPORT	16	3.09
*	2.88	3.01	14.09	COLLECT DATA TO BE INCLUDED IN THE RADIATION EVALUATION PROGRAM	22	2.94
*	2.96	3.21	14.10	CONDUCT AN ALARA EVALUATION OF THE RADIATION PROTECTION PROGRAM	14	2.46
*	2.83	3.16	14.11	REVIEW PERIODIC RADIATION EVALUATION PROGRAM	10	2.12
1	2.61	3.24	14.12	MAINTAIN STATION MAN-REM PLOTS AND GRAPHS	7	2.24
*	2.94	3.48	14.13	PREPARE HEALTH PHYSICS PROCEDURES (INCLUDING REVISION PREPARATION)	35	2.19
*	2.95	3.24	14.14	REVIEW HEALTH PHYSICS PROCEDURES (INCLUDING PROPOSED REVISIONS)	55	2.69
*	3.05	3.35	14.15	CONDUCT JOB-SPECIFIC ALARA REVIEW	25	2.92

TABLE 3-13
HPT SURVEY TASK INVENTORY -- TASKS RECOMMENDED FOR ANALYSIS (Continued)

HEALTH PHYSICS TECHNICIAN TASK INVENTORY RESPONSES - RECOMMENDED TASKS FOR ANALYSIS

	IMPOR	DIFF	TASK#	TASK DESCRIPTOR	%PER	FREQ
1	2.48	3.43	14.16	PREPARE POST-OUTAGE ALARA REPORT	6	1.95
1	2.70	3.17	14.17	REVIEW METEOROLOGICAL MONITORING REPORTS	2	1.65
1	3.01	3.38	14.18	REVIEW EFFLUENT AND ENVIRONMENTAL MONITORING REPORTS	8	2.19
*	2.85	3.52	14.19	REVIEW PROPOSED PLANT DESIGN CHANGES FOR RADIOLOGICAL CONCERNS	8	1.77
4	2.74	2.91	14.20	REVIEW NRC HEALTH PHYSICS BULLETINS AND REGULATIONS	59	2.72
*	3.00	2.90	14.21	REVIEW PERSONNEL EXPOSURE HISTORY	40	2.92
*	2.92	3.10	14.22	REVIEW CONTRACTOR HP TECHNICIAN QUALIFICATIONS PRIOR TO TECHNICIAN STARTING WORK	16	2.22
*	2.92	2.71	14.23	REVIEW DAILY COMPUTER PRINTOUT OF PERSONNEL EXPOSURE	49	3.88
*	2.79	3.24	14.24	SCHEDULE HP TECHNICIAN COVERAGE FOR OUTAGE SUPPORT	21	2.92
*	2.94	3.39	14.25	DEVELOP PROGRAMS FOR INITIAL TRAINING OF HP TECHNICIANS	9	1.99
*	2.79	3.40	14.26	DEVELOP PERIODIC RETRAINING PROGRAMS FOR HP TECHNICIANS	7	1.79
*	2.86	3.38	14.27	DEVELOP CONTRACTOR HP TECHNICIAN TRAINING PROGRAM	5	1.68
*	2.94	3.15	14.28	PERFORM GENERAL EMPLOYEE TRAINING IN RADIOLOGICAL PROTECTION	11	1.88
1	2.93	3.31	14.29	SUPERVISE CONDUCT OF THE HEALTH PHYSICS PORTION OF GENERAL EMPLOYEE TRAINING	5	2.00
*	3.16	3.15	14.30	INSTRUCT PERSONNEL IN RESPIRATORY PROTECTION	27	2.57
*	2.93	3.40	14.31	INSTRUCT HEALTH PHYSICS TECHNICIANS IN CLASSROOM TRAINING	9	1.98
*	3.03	3.35	14.32	PROVIDE ON-THE-JOB TRAINING TO HEALTH PHYSICS PERSONNEL	45	3.17
*	3.00	3.31	14.33	CONDUCT ORAL EXAMINATIONS TO VERIFY THE ADEQUACY OF TECHNICIANS AND THEIR TRAINING	16	2.67
*	2.77	3.05	14.34	CONDUCT WRITTEN EXAMINATIONS TO VERIFY ADEQUACY OF TECHNICIANS AND THEIR TRAINING	6	1.93
*	2.91	3.39	14.35	SUPERVISE THE CONDUCT OF HEALTH PHYSICS TECHNICIAN TRAINING	8	2.54
4	2.94	3.19	14.36	PARTICIPATE IN MOCK-UP TRAINING	37	1.80
1	2.61	3.58	14.37	PROVIDE HP TRAINING TO OFF SITE ORGANIZATIONS (FIREMEN, RESCUE SQUADS, ETC.)	4	1.39
1	2.87	3.45	14.38	ASSIST IN ORGANIZING THE ANNUAL MEDICAL DRILL (INJURED CONTAMINATED MAN DRILL)	9	1.24
1	3.05	3.56	14.39	ASSIST IN ORGANIZING THE ANNUAL SITE EMERGENCY EXERCISE	9	1.24
*	2.87	2.96	14.40	INTERPRET RADIOACTIVE SEALED SOURCE LEAK TEST RESULTS	17	1.65
*	2.88	3.05	14.41	INTERPRET RADIOACTIVE SOURCE INVENTORY RESULTS	15	1.67
*	3.09	3.23	14.42	EVALUATE PROCESS MONITOR RESULTS	8	2.35
*	3.29	3.21	14.43	UPDATE EXPOSURE RECORDS USING TLD DATA	15	2.71
*	3.17	3.25	14.44	AUDIT DAILY RADIATION EXPOSURE RECORDS	14	3.35
5	3.01	2.64	14.45	RECORD INDIVIDUAL DOSE ON DAILY EXPOSURE CARDS OR RWPS	49	3.98
*	2.95	2.82	14.46	REVIEW DAILY DOSIMETER RECORDS	28	3.77
*	2.94	2.97	14.47	COMPARE TLD DATA WITH POCKET DOSIMETER DATA	25	2.78
1	2.92	3.42	14.48	ADMINISTER THE HEALTH PHYSICS QA PROGRAM (DEVELOP, REVIEW)	4	2.20
*	2.47	2.51	15.01	MAINTAIN INVENTORY OF RADIATION PROTECTION SUPPLIES	36	2.92
3	2.36	2.21	15.02	MAINTAIN CHANGE ROOMS STOCKED WITH PROTECTIVE CLOTHING	17	2.89
1,3	2.70	2.45	15.03	INVENTORY AND REPLENISH FIRST AID SUPPLY STATIONS	13	2.06
4	2.38	2.79	15.04	ORDER SUPPLIES FOR OUTAGE WORK	19	2.11
4	2.02	2.51	15.05	FILL OUT A PURCHASE REQUISITION FORM	37	2.50
*	2.92	2.78	15.06	PERFORM ROUTINE CHECKS/AUDITS OF RADIOLOGICAL EMERGENCY EQUIPMENT AND KITS	43	2.15
*	2.53	2.57	15.07	ISSUE AND RECEIVE CONTAMINATED TOOLS AND EQUIPMENT	20	2.89
1	2.51	2.63	15.08	INVENTORY CONTAMINATED TOOLS AND EQUIPMENT	13	2.41

4. APPLICATION OF JOB-ANALYSIS RESULTS

4.1 INTRODUCTION

The application of the job-analysis results to specific nuclear power plants requires an understanding of:

- o Job descriptions and the development of procedures to construct plant-specific job descriptions and
- o Performance-based training and the relationship of job analysis to the performance-based training process.

This chapter is intended to aid the reader in understanding the application of job analysis results to:

- o Job description development,
- o Performance-based training development, and
- o Other related applications.

4.2 JOB-DESCRIPTION DEVELOPMENT

4.2.1 Purpose of Job-Description Development

Job descriptions are developed for several reasons:

1. Job descriptions assist the job incumbent in understanding the expectations or requirements of the position, in addition to recognizing specific lines of authority.

2. Job descriptions assist plant personnel managers in their selection and hiring procedures and requirements by ensuring that criteria are based on the work that is actually performed.

3. Job descriptions are used to facilitate employee evaluation through the development of performance standards based on validated job descriptions.

4. Job descriptions assist the job incumbents and plant personnel managers in identifying career paths, particularly as qualifications for line management positions become clearly delineated.

5. Training programs can be developed from validated job-description task listings. (This topic will be discussed further in Section 4.2.)

The personnel most likely to use job descriptions (hereinafter referred to as the "user") are the job incumbent, supervisors, training personnel, and human resources management staff.

4.2.2 Job-Description Components

Comprehensive job descriptions typically include all or most of the following 10 components:

1. Job Title
2. Required Qualifications
3. General Description of Job Requirements
4. Description of Incumbent's Position within the Organization
5. Description of Major Job Areas (Functional Duties)
6. Description of Work Environment
7. Tools and Equipment
8. Resource Documents and References
9. Description of Target Population
10. Task Inventory

Each of these components of a job description is described below:

1. Job Title

   The job title corresponds to the group of positions that are identical with respect to their major or significant tasks; for example, Senior/Lead Health Physics Technician. If appropriate, this job title may also include any specialization areas, such as dosimetry or radioactive waste disposal.

2. Required Qualifications

   This section of a job description describes the prerequisite or background skills, knowledge, and/or experience that a potential job-holder must possess. For example, these qualifications may include:

   - Formal education (high school diploma or equivalent),
   - Years of related experience,
   - Physical and mental health,
   - Satisfactory completion of a formal training program,
   - Certification by appropriate personnel that the individual has learned to perform specified tasks in a safe and competent manner, and
   - Any licenses or other professional designations (for example, NRRPT registration).

3. General Description of Job Requirements

   A summary of the major job responsibilities is included in this section. This description provides a broad overview of the various duties required for this position and those general duties that differentiate this position from all others.

4. Description of Incumbent's Position within the Organization

This section outlines the overall context in the plant organization in which the job fits and generally describes the chain of command or line of authority, personnel interfaces, and responsibilities within that organizational structure.

5. Description of Major Job Areas (Functional Duties)

This section of a job description describes the major duty areas that are related to the conditions under which the job tasks are performed. The following are samples of duty area descriptions:

- Counting Room Activities. Supervises all counting room activities performed by technicians, including equipment calibration, operation, performance checks, and associated calculations.

- Radioactive Sources. Supervises the control and use of radioactive sealed sources. Reviews and audits administrative records associated with radioactive sealed-source integrity, inventory, calibration, transfer, and disposal.

6. Description of Work Environment

A description of the actual working environment, such as special illumination requirements, seating arrangements, behavioral factors, and temperature and humidity control, is provided in this section of the job description.

7. Tools and Equipment

This section lists the tools and equipment, including special clothing, required for the job incumbent to perform assigned tasks.

8. Resource Documents and References

The resource documents and references to which the job incumbent must refer in performing his/her job are listed in this section. These documents provide key information to the job-holder during the performance of his job, and may include:

- Operational and administrative procedures,
- Technical references,
- Log books,
- Regulations, and
- Training materials.

9. Description of Target Population

The job analysis also establishes the baseline entry point for a job prospect. These job candidates comprise the target population -- the group of persons to whom training programs would be directed: for example, the target population for a Health Physics Technician Foreman/Supervisor may be:

The population of Senior Health Physics Technicians who have successfully carried out the duties and tasks of a Senior Health Physics Technician for a specified period of time and, in addition, have shown evidence that they possess the skills, knowledge, and aptitude required of a Foreman/Supervisor.

Since the target population description defines position entry requirements, the "Required Qualifications" job description component may also reflect parts of the target population description.

10. Task Inventory

The task listings, which are generated for each duty area, illustrate exactly what tasks the job incumbent is required to perform.

This portion of the job description is the most time consuming to develop and also is the most useful part for training and development, as it is from this information that the content of the training program is derived.

4.3 TRAINING PROGRAM DEVELOPMENT

In a performance-based training program (one based upon the performance requirements of a specific job), job analysis results provide an important "anchor" for training program development. Figure 4-1 shows the activities that are typical of a performance-based training system. In Figure 4-1, note that the job analysis is the first activity after a training need is identified. The activity immediately following job analysis is task analysis. Through task analysis, the skills and knowledge required to perform the job tasks are systematically determined. The job analysis identifies those tasks that are critical to adequate job performance (that is, based upon consideration of factors such as difficulty of task performance, consequences of inadequate performance, and frequency of task performance) and that therefore justify task analysis and subsequent training emphasis.

Performance-based training programs [also known as systems approach to training (SAT), instructional systems development (ISD), criterion-referenced instruction (CRI), and mastery learning] have gained acceptance in the defense, aerospace, and health care industries, because of their demonstrated ability to improve effectiveness, accountability, and control in managing complex training requirements.

As shown in Figure 4-1, an effective performance-based training program includes activities to:

- Identify what training is necessary for each position (based on analysis of job-performance requirements and the initial qualifications of trainees),
- Design and develop programs with appropriate content and explicit learning objectives to provide that training,
- Conduct training as designed,
- Ensure that trainees accomplish the learning objectives before they begin working in their assigned positions, and

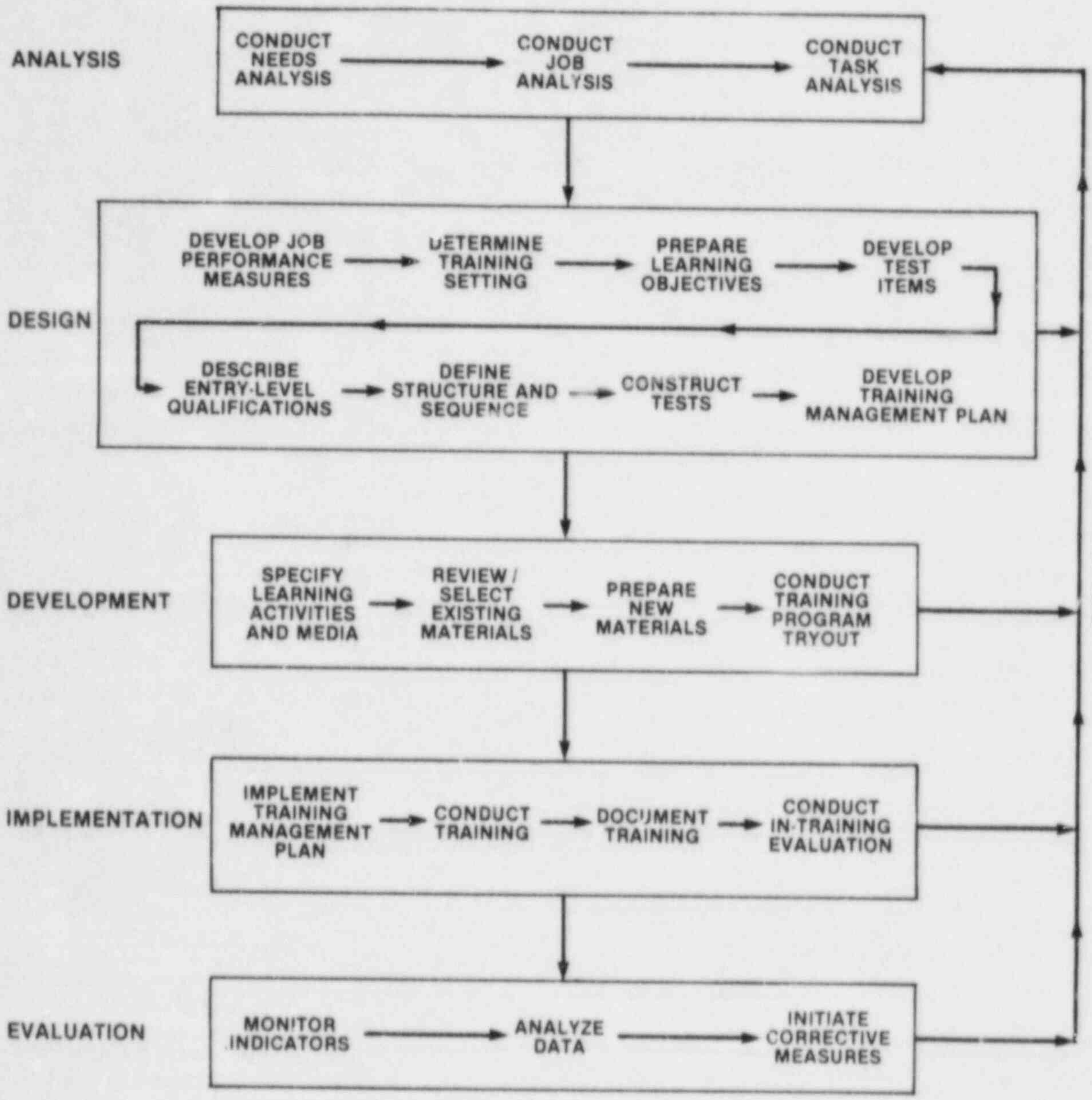


Figure 4-1. Performance-Based Training System Development Activities

- o Evaluate training effectiveness and use these evaluation results to improve training.

A well-managed performance-based training system has a number of advantages over other systems:

- o It is cost effective. Only elements required for proper job performance are included, and resources can be prioritized and justified.
- o It is fully accountable. It includes the knowledge required to perform the job properly.
- o It provides continual feedback. Training effectiveness is monitored systematically, and results are used to improve program design and implementation.
- o It permits effective control. Because measurable objectives are established and performance is evaluated regularly, those responsible for training can measure performance and correct any performance deficiencies.

Many organizations in the nuclear industry have implemented or are implementing performance-based training programs. INPO has taken a leading role in this area with the Training System Development (TSD) approach. The data from this Health Physics Technician job analysis has been collected and formatted in a manner that is compatible with the INPO TSD job and task analysis automated data bases.

4.4 OTHER JOB-ANALYSIS APPLICATIONS

In addition to training program development, there are several related applications to which job-analysis results should be applied. They include:

- o Evaluation of qualifications,
- o Performance appraisal/advancement,
- o Screening and selection, and
- o Job-performance aids/procedures.

In Figure 4-1, it can be seen that the first three items above are inherently a part of an effective performance-based training program. They are identified separately here to provide them visibility because this integrated approach toward selection, training, qualification, and performance evaluation is often not included in conventional training programs. In addition, the job-performance aid/procedure development application is also integrated in the performance-based training approach through the training needs analysis (the first activity in Figure 4-1). The training needs analysis will aid in determining whether identified human performance problems are best corrected through training, job performance aids, reorganization, revised selection methods, or a combination of these individual solutions.

The following sections briefly describe the relationship between job-analysis results and each of the individual applications. It should be recognized, however, that the selection, training, job-performance aids, qualification, and performance appraisal should all be aimed toward providing adequate on-the-job performance, and that changing selection criteria (for example) without reviewing the impact on training may mean that unnecessary training is being provided or that skills and knowledge necessary for adequate job performance are not being trained.

4.4.1 Evaluating Qualifications

Job-analysis results, when combined with task-analysis information on necessary skills and knowledge for performing each task, provide an objective and auditable means for evaluating the qualifications of an individual for a particular job (group of related tasks).

The qualifications area in health physics with great potential for using job-analysis results is qualifying vendor Health Physics Technicians for outage support or other specific, short-term health physics work. If the qualification requirements (skills and knowledge) for a particular job/duty area (for example, control point monitor, decontamination specialist, respirator technician) were identified and separated into two categories (generic skills and knowledge and plant-specific skills and knowledge), then industry-wide qualification/examination tests or procedures could be developed for the generic skills and knowledge. If these generic qualification tests or procedures were generally adapted by utilities, a great deal of duplication of effort could be eliminated and utilities could be assured that vendor technician qualifications were appropriate for assigned jobs. The plant-specific portion of the qualification could then be administered much as general employee training is now conducted.

4.4.2 Performance Appraisal/Advancement

In its simplest form, performance appraisal is the determination of whether a job incumbent/trainee's performance is satisfactory with respect to the requirements of the job or the training program. The definition of performance appraisal is not limited to one-on-one situations where a supervisor discusses with an employee areas deserving recognition and areas where improvement is needed. A performance appraisal is any personnel decision that affects the status of employees in regard to their retention, termination, promotion, demotion, transfer, salary increase or decrease, or admission into a training program.

One primary advantage of a performance appraisal based upon job requirements is that much of the objectivity and mystery is removed from the appraisal. Performance appraisal criteria are unambiguously known to both the evaluator(s) and the employee being evaluated. "Surprises" and complaints about favoritism are kept to a minimum because the individual being evaluated is receiving regular and objective feedback concerning his/her performance.

Job-analysis results, along with task-analysis associated skills and knowledge information, provide the bases for developing a performance appraisal system. For example, satisfactorily completing the qualification program for specific tasks may be the criterion for advancement from a trainee position to an entry-level Health Physics Technician position, rather than some specified time (for example, six months) as a trainee. Through this job requirements-based approach to advancement, superior performance is rewarded with a minimum amount of subjectivity involved in the decision.

4.4.3 Screening and Selection

The selection of an applicant for any given job or training program involves the attempt to predict how successful the applicant will be if selected for the position/program in question.

In general, the development of a performance-based screening or selection procedure is based initially on the development of a valid performance appraisal procedure as discussed in Section 4.4.2. The performance appraisal procedure is used to differentiate successful performers from unsuccessful ones. The next step is to determine various characteristics shared by the successful performers. These may be educational level, years of related experience, special skills, scores on selected aptitude tests, personality measures, etc. These criterion characteristics become the basis for selecting applicants/candidates. The logic is that, if a successful job incumbent has a characteristic A, then an applicant who also has characteristic A would be expected to be successful as well.

An effective performance-based screening and selection procedure can markedly reduce training attrition rates and personnel turnover. This reduction, in turn, translates into cost savings. Note, however, that the development of an effective performance-based screening and selection procedure rests ultimately on the data collected in a well-defined job and task analysis.

4.4.4 Job-Performance Aids/Procedures

A job-performance aid is a device or document containing information that a person uses to complete an activity or task. Performance aids are designed to be used during performance. They help to reduce the mental processing required by the task, usually by reducing the amount of information to be remembered. They can also be used effectively as alternatives to some types of training. The most familiar job-performance aid (JPA) is an operating procedure. Other more rigorous JPAs have been developed that include drawings or pictures of the equipment to be operated (including the location and positioning of controls), flowcharts, and overlays.

JPAs are recommended for tasks of medium to high difficulty and for tasks performed infrequently, even if fairly simple. The consequences of inadequate performance should also be considered. Thus, job analysis information concerning tasks difficulty, importance, and frequency of performance can be used to aid in making decisions concerning the need for JPAs, and also in determining the need for fully developed graphically oriented JPAs.

The decision as to whether JPAs are to be used should be coordinated with a decision on the training resources to be devoted to the task. Often it is more economical, over the lifetime of the plant, to develop JPAs than it is to continually train people to perform the task or, as a minimum, the training time devoted to a task may be reduced if a performance-based JPA is available.

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9. Institute of Nuclear Power Operations, "1982 Survey of Nuclear-Related Occupational Employment in U.S. Electric Utilities," December 1982. Available from Institute of Nuclear Power Operations, Atlanta, GA 30339.

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APPENDIX A

MODEL JOB DESCRIPTION FOR

HEALTH PHYSICS TECHNICIAN
FOREMAN/SUPERVISOR

A. JOB TITLE: Health Physics Technician Foreman/Supervisor (first-line manager)

B. REQUIRED QUALIFICATIONS

1. High school diploma or GED certificate (3).

2. Four years (minimum) of health physics experience of which one year shall be nuclear power plant experience (3).

3. Satisfactory completion of an applicable training program required by the utility to meet ANSI or other requirements (3).

4. Satisfactory completion of any certification of performance capability required by the utility (for example, any oral or written qualification examination).*

5. Satisfactory completion of any additional qualifications required by the utility, which may include (but are not limited to) the following:*

   a) Required period of satisfactory performance in a Health Physics Technician (HPT) position of lower classification,

   b) Satisfactory completion of formal education or vocational/technical training requirements relating to radiological controls,

   c) Required period of satisfactory performance at the facility,

   d) Satisfactory periodic physical examination, and

   e) Satisfactory completion of any selection testing required by the utility for the position of Health Physics Supervisor.

C. GENERAL DESCRIPTION OF JOB REQUIREMENTS

Responsible for implementation of the health physics program under the direction of plant supervision. Delegates and supervises the work activities of Health Physics Technicians and contracted health physics personnel. Responsible for the quality and quantity of work performed by technicians, assigning their work and evaluating their job performance.

Responsible for ensuring that the radiological surveillance and control requirements of the nuclear plant health physics program are properly carried out by his/her work group. Ensures that routine radiological surveillance is performed as scheduled and recommends to supervision any change in the schedule of surveys and other assigned surveillance requirements necessary to ensure that adequate protection of personnel, the plant, and the environs is maintained. Ensures that zoning and posting requirements are maintained as prescribed. Supervises the decontamination of plant space, equipment, machinery, and personnel. Initiates applicable corrective measures and notifies supervision upon any unusual conditions. Makes

*Based on a sample of utility job descriptions.

adequacy checks by frequent observation of radiological control work and zoning, by discussion with plant personnel, and by review of prescribed documentation for adequacy, consistency, and accuracy.

Responsible for ensuring that nonroutine or unexpected radiological surveillance requirements, which are necessary for the operation and maintenance of plant components in radiological control areas, are properly carried out. Makes frequent observations of work in progress to assure appropriate health physics coverage and proper work. Ensures adequate shift coverage. Assists and advises other plant supervision in maintaining safe radiological control practices while performing work in radiological control areas. Supervises unusual surveillance requirements.

Assists supervision in carrying out special studies, tests, or investigations as required. As directed, prepares written instructions for guidance of assigned Health Physics Technicians. Reviews records and survey results for completeness and accuracy.

Supervises the orientation and training of Health Physics Technicians. By means of oral examination or other methods, verifies the adequacy of new technicians and their training. Assures that Health Physics Technicians periodically review applicable written procedures and obtains or performs remedial training as necessary.

Performs routine and nonroutine surveys and other assigned surveillance requirements if necessary.

Responsible for (or shares responsibility for) maintaining an adequate stock of supplies and other items required to carry out the health physics program. Ensures that sufficient instruments are available and maintained within prescribed calibration schedules.

D. DESCRIPTION OF INCUMBENT'S POSITION WITHIN THE ORGANIZATION

Under the direct supervision of the Radiation Protection Manager, directs the work activities of Health Physics Technicians and/or contracted health physics personnel, trainees, and any personnel who may be temporarily assigned to his/her group. Interfaces with other plant personnel who are performing their duties within the plant; these personnel include (but are not limited to) licensed and non-licensed operators and supervisors, chemistry technicians, instrument and control technicians, mechanics, electricians, quality control/quality assurance inspectors, engineers, and plant management. Assumes duties as assigned in the absence of the Radiation Protection Manager.

Principal line of promotion is from Senior/Lead Health Physics Technician.

E. DESCRIPTION OF MAJOR JOB AREAS (FUNCTIONAL DUTIES)

1. Counting Room Activities. Supervises all counting room activities performed by technicians, including equipment calibration, operation, performance checks and associated calculations.

2. Radioactive Sources. Supervises the control and use of radioactive sealed sources. Reviews and audits administrative records associated with radioactive sealed-source integrity, inventory, calibration, transfer, and disposal.

3. Effluent Control. Reviews and evaluates effluent release data. May perform release rate calculations.

4. Process Monitoring. Responsible for activities performed by HPTs involving liquid and gaseous process monitoring.

5. Portable Radiation Monitoring. Supervises portable radiation monitoring activities performed by technicians, including equipment calibration and minor repair efforts.

6. Personnel Monitoring. Oversees personnel monitoring activities, including the issuing, reading, calibration, and maintenance of various personnel dosimetry and monitoring devices and associated equipment. Assigns personnel to have periodic whole-body counts performed based on health physics measurements (for example, air sampling results, bioassay results, nasal smears). Reviews (and may perform) calculations of radiation exposure based on personnel monitoring results.

7. Surveys (Radiation/Contamination/Airborne). Supervises the conduct of radiation, contamination, and airborne surveys conducted by technicians. Reviews survey results and is responsible for the maintenance of records and files on radiation, contamination, and airborne activity surveys. Uses survey results to make recommendations/decisions regarding appropriate respiratory protection equipment, actions necessitated by changes in radiological conditions at work sites, maximum permissible concentrations, decontamination needs, posting and labeling of radioactive hot spots, temporary shielding needs, movement of radioactive materials, and radiographic operations. Prepares reports regarding radiation and contamination surveys.

8. Radiation/Contamination Work Area Support. Responsible for HPT radiation/contamination work area support. Reviews Radiation Work Permits for completeness. Inspects work areas and plant areas to ensure compliance with Radiation Work Permits, good working practices, proper radiation posting, adequacy of temporary shielding, radioactive material storage, and contamination control. Evaluates work areas for additional ALARA considerations. Briefs radiation workers on radiological hazards in work areas or changes in radiological conditions. Responsible for issuing a stop-work order when significant radiological discrepancies are discovered at work sites. Performs on-the-spot correction of workers not complying with proper radiological work practices or not following Radiation Work Permit requirements.

9. Shipping and Receiving Radioactive Materials. Responsible for HPT activities associated with shipping and receiving of radioactive materials. Directs storage of radioactive materials in the designated areas of the plant. Controls movement of radioactive material through unrestricted (non-radiological) areas of the plant. Reviews radioactive shipment/receipt records for completeness and accuracy.

10. Decontamination. Supervises Health Physics Technician decontamination support. Evaluates contaminated material and equipment to determine if decontamination effort is practical. May direct decontamination of personnel, equipment, materials, or general areas.

11. Respirators and Self-Contained Breathing Apparatus (SCBA) Equipment. Responsible for the respirators and SCBA equipment activities performed by Health Physics Technicians, including the inspection, testing, repair, calibration, and preventive maintenance efforts associated with maintaining and using this equipment.

12. Emergency/Abnormal Conditions. Analyzes indications of potential radiological problems based on quantitative measurement results within a particular system or area. Responsible for providing health physics coverage at the scene of a radiological incident. Directs corrective actions or makes recommendations at the scene to mitigate the consequences of a radiological incident. Advises management personnel of the significance and corrective action that should be taken during a radiological incident. Responds as a radiological emergency team member to a site or general emergency. Assists in emergency response planning during an emergency. Evaluates radiological incidents to determine the cause.

13. Administration and Training. Performs miscellaneous administrative tasks of a supervisory nature, such as reviewing and preparing health physics procedures, processing requests to exceed current radiation exposure authorization, conducting job-specific ALARA reviews, reviewing NRC health physics bulletins and regulations, reviewing personnel exposure history, and scheduling HPT coverage for outage and work support. Responsible for the on-the-job-training of health physics personnel. Conducts oral examinations to verify the adequacy of technicians and their training. Reviews contractor HPT qualifications before technicians start work.

14. Miscellaneous Supplies and Equipment. Responsible for inventory maintenance of radiation protection supplies, including ordering supplies for outage work and completing routine purchase requisitions.

F. DESCRIPTION OF WORK ENVIRONMENT

Performs duties in various locations throughout the plant. Plant piping and equipment are divided among various floor levels in interconnected buildings. Some equipment is not enclosed. Access is restricted inside the primary containment during reactor operations and controlled to all known radiation areas under all conditions. Noise levels and temperatures may be excessive in the vicinity of some operating equipment. Exposed to inherent hazards that exist in nuclear power plant operation, such as electric shock, chemical hazards, high-temperature metals, radiation exposure, and the presence of high-pressure and high-temperature steam and water.

G. TOOLS AND EQUIPMENT

The tools and equipment in the following list are used by Health Physics Technician Foremen/Supervisors to varying degrees in performing their duties. In each tool/equipment category, the percent of Foremen using the tool/equipment is indicated, based on the results of the national survey. Additional tools/equipment identified by write-ins during the survey are listed separately. (Tool and equipment lists for utility job descriptions should include the applicable items listed.)

		Percent of Foremen/Supervisors Using Tool/Equipment
1.	**Laboratory Equipment**	
	Tools and equipment listed on survey questionnaires:	
1.01	Planchet	54
1.02	Hot plate	26
1.03	Pipette	26
1.04	Beaker	26
1.05	Filters and filter chimney	25
1.06	Eye dropper	20
1.07	Stir rods or magnetic stirrer	18
1.08	Heating/stirring plate	17
1.09	Reagent chemicals	19
1.10	Graduated cylinders	22
1.11	pH Meter/indicator	18
1.12	Conductivity cell and bridge	16
1.13	Centrifuge	12
1.14	Test tubes	16
1.15	Funnels	19
	Additional tools and equipment identified:	
1.16	Convection oven	
2.	**Protective/Safety Equipment**	
	Tools and equipment listed on survey questionnaires:	
2.01	Rubber gloves	89

		Percent of Foremen/Supervisors Using Tool/Equipment
2.	**Protective/Safety Equipment (Continued)**	
2.02	Rubber apron	25
2.03	Face shield	60
2.04	Respirators	93
2.05	Self-contained breathing apparatus (SCBA)	79
2.06	Fire extinguisher	53
2.07	Hard hat	96
2.08	Ear protectors	92
2.09	Anti-contamination clothing (protective clothing)	97
2.10	Safety harness	43
2.11	Ground straps	11
2.12	Portable/movable shielding	59
2.13	Explosimeter	38
2.14	Dust mask	29
2.15	Safety glasses/beta goggles	79
2.16	Portable ventilation and filtration trains	61
2.17	Safety shoes	46
2.18	Bubble suit	44
2.19	Steam suit	5
2.20	Cool suit	16
2.21	Cold weather/rain clothing	47
2.22	Glove bags, tents, and other containment devices	53
2.23	Step-off pads	91
2.24	Radiation warning tape/rope/signs	82

Additional tools and equipment identified:

2.25 Respirator washer

2.26 Electric respirator drying cabinet

	Percent of Foremen/Supervisors Using Tool/Equipment
3. Computers	
Tools and equipment listed on survey questionnaires:	
3.01 Hand-held calculator	96
3.02 Desk-top computer	67
3.03 Plant/process computer	46
3.04 Corporate computer (on or off site)	37
3.05 Computer diagnostic software	29
Additional tools and equipment identified:	
3.06 Word processor	
4. Hand Tools	
Tools and equipment listed on survey questionnaires:	
4.01 Box wrenches.	33
4.02 Burnishing tool	5
4.03 Calipers	6
4.04 Chisels	11
4.05 Diagonal cutter	16
4.06 Flaring tools	10
4.07 Fuse pullers	8
4.08 Gauges	22
4.09 Gear puller	6
4.10 Grease gun	3
4.11 Hack saw	12
4.12 Hammer	27
4.13 Knife	59
4.14 Level	9
4.15 Open-end wrenches	34
4.16 Pliers	49
4.17 Pocket screwdriver	63
4.18 Pop rivet gun	6

	Percent of Foremen/Supervisors Using Tool/Equipment
4. Hand Tools (Continued)	
4.19 Punches	7
4.20 Ruler	76
4.21 Screwdriver	63
4.22 Screw starter	3
4.23 Scribe	4
4.24 Socket set	22
4.25 Spin-tight wrenches	6
4.26 Torque wrenches	7
4.27 Tweezers	62
4.28 Decontamination supplies	70
Additional tools and equipment identified:	
4.29 Banding tool	
4.30 Crimpers	
4.31 Shovel	
4.32 Speed wrench	
4.33 File	
5. Test and Measuring Equipment	
Tools and equipment listed on survey questionnaires:	
5.01 Ammeter	3
5.02 Barometer	13
5.03 Multimeter	9
5.04 Heat probe	1
5.05 Manometer	8
5.06 Ohmmeter	4
5.07 Pyrometer	3
5.08 Radiation source	81
5.09 Test gauges	12
5.10 Thermometer	36

	Percent of Foremen/Supervisors Using Tool/Equipment
5. Test and Measuring Equipment (Continued)	
5.11 Timer	35
5.12 Voltage tester	9
5.13 Hand-operated hydro pump (test pressure source)	2
5.14 Vibration detectors	0
5.15 Strobe light	0
5.16 Oxygen analyzer (portable)	38
5.17 Micrometer	3
5.18 Hydrometer	9
5.19 Scales	21
5.20 Strip chart recorder	44
5.21 Oscilloscope	7
5.22 Annemometer	3
5.23 Audiometer	3

Additional tools and equipment identified:

5.24 Quantitative fit test equipment

5.25 Respirator leak test equipment

5.26 Voltmeter

5.27 Condenser R meter

5.28 Circuit jumpers

6. Communications Equipment

Tools and equipment listed on survey questionnaires:

6.01 Two-way radio	69
6.02 Telephones	98
6.03 Teletalk system/intercom	62
6.04 Fixed/portable flashing lights (for example, magenta flashing lights)	33
6.05 Public address system/plant page	98

		Percent of Foremen/Supervisors Using Tool/Equipment
6.	Communications Equipment (Continued)	
6.06	Respirator voice amplifiers	34
6.07	Beeper	51
7.	Radiation Monitoring Equipment	
	Tools and equipment listed on survey questionnaires:	
7.01	Personnel dosimetry equipment	98
7.02	Portable beta-gamma monitoring instrument	93
7.03	Portable neutron monitoring instrument	77
7.04	Portable alpha monitoring instrument	66
7.05	Frisker	98
7.06	Portable air sampler (high volume)	66
7.07	Portable air sampler (low volume)	67
7.08	Gaseous sampler	55
7.09	Smear pads	76
7.10	Counter scaler	74
7.11	Multi-channel analyzer	54
7.12	Whole-body counting equipment	51
7.13	Portal monitor	92
7.14	Proportional counter	60
7.15	Beta counter	64
7.16	Gamma well counter	31
7.17	Area radiation monitor	65
7.18	Process radiation monitor	50
7.19	Liquid scintillation counter	25
7.20	TLD reader (manual or automatic)	24
7.21	Personal air sampler (lapel type)	33
7.22	Constant air monitor (CAM/APD)	63

	Percent of Foremen/Supervisors Using Tool/Equipment
8. Power-Driven Equipment	
Tools and equipment listed on survey questionnaires:	
8.01 Air-driven wrenches	6
8.02 Compactor	8
8.03 Drill press	4
8.04 Portable drill	8
8.05 Grinder	6
8.06 Power-driven hydro pump	0
8.07 Power saw	4
8.08 Saber saw	4
8.09 Vacuum pump	12
8.10 Vacuum cleaner	23
8.11 Planer	1
8.12 Portable pumps	18
9. Work Aids	
Tools and equipment listed on survey questionnaires:	
9.01 Extension cord	69
9.02 Flashlight	83
9.03 Hot-air gun	7
9.04 Ladder	58
9.05 Test tubing (copper, plastic, tygon, etc.)	46
9.06 Rope	60
9.07 Liquid solvents	38
9.08 Spray solvents	43
9.09 Trouble light	26
9.10 Heat lamp	21
9.11 Plastic filler	5
9.12 Decontamination high-pressure water cabinet (hydrolaser)	12
9.13 Ultrasonic decontamination unit	23

		Percent of Foremen/Supervisors Using Tool/Equipment
9.	Work Aids (Continued)	
9.14	Decontamination vapor degreaser unit . . .	5
9.15	Decontamination-electro polisher unit . . .	6

Additional tools and equipment identified:

9.16 Forklift

9.17 Barrel cart/hand truck

9.18 Decontamination laundry unit

9.19 Portable generator

9.20 Mass flow heater

9.21 Keylock control

H. RESOURCE DOCUMENTS AND REFERENCES

The resource documents and references in the following list are used by Health Physics Technician Foremen/Supervisors to varying degrees in performing their duties. For each reference, the percent of Foremen using the reference is indicated based on the results of the national survey. Additional references identified by write-ins during the survey are listed separately. (Resource documents and reference lists for utility job descriptions should include the applicable items listed below.)

1. Operational Procedures

References listed on survey questionnaires:

		Percent of Foremen/Supervisors Using Reference
1.01	Plant operating procedures	84
1.02	Surveillance procedures	79
1.03	Maintenance procedures	64
1.04	Site emergency plan	93
1.05	Emergency operating procedures	82
1.06	Abnormal, off-normal, and alarm operating procedures	65
1.07	Operating procedures change manual (temporary operating procedures)	59
1.08	Fuel-handling procedures.	53
1.09	Computer operating manual	52
1.10	Radiochemical laboratory manual (analytical and radiochemical procedures) .	46
1.11	Radiological protection procedures.	98

2. Technical References

References listed on survey questionnaires:

2.01	Equipment location drawings	80
2.02	Plant technical specifications.	91
2.03	Final Safety Analysis Report (FSAR). . . .	63
2.04	Code of Federal Regulations (10 CFR, 49 CFR, etc.)	95
2.05	Plant blueprints/drawings	84
2.06	Plant system descriptions	88

	Percent of Foremen/Supervisors Using Reference
2. Technical References (Continued)	
2.07 Electrical schematics	47
2.08 Equipment technical operating manuals	78
2.09 Plant setpoints manual	51
2.10 Steam tables	18
2.11 DOT regulations	73
2.12 State regulations	61
3. Operating Shift Documents	
References listed on survey questionnaires:	
3.01 Shift logs and status boards	78
3.02 Shift turnover sheets/books	75
3.03 Operations department orders/memos	52
3.04 Health Physics (Rad Chem) Department orders/memos	95
3.05 Survey log books	90
3.06 Temporary shielding installation log	52
3.07 Temporary jumper installation log (wiring or piping)	9
3.08 Equipment tag log (removal and restoration log)	20
3.09 Required work action log (work request log)	39
3.10 Radiation work permit log	87
3.11 Radioactive material accountability log	62
3.12 Radiation exposure alert list	69
3.13 Daily work log	69

		Percent of Foremen/Supervisors Using Reference

4. Other References

References listed on survey questionnaires:

		Percent of Foremen/Supervisors Using Reference
4.01	Station administrative directives	83
4.02	NRC Regulatory Guides, NUREGs, and I.E. bulletins and notices	96
4.03	Deviation report (non-conforming operations report)	62
4.04	Plant incident/condition reports.	80
4.05	Licensee Event Reports (LERs)	68
4.06	Special or required reading (e.g., system design, changes).	79
4.07	First aid instructions/safety bulletins . . .	89
4.08	Radiological health handbook	97
4.09	Chart of the nuclides	96
4.10	Health physics textbooks.	97
4.11	Training department lesson plans	70
4.12	INPO Notepad	67
4.13	INPO Guidelines	78

Additional references identified:

4.14 Vendor training books

4.15 Gamma energy tables (isotopic)

4.16 Gamma spectrum catalog

4.17 Consensus standards (e.g., ANSI, ASTM)

4.18 Technical specialty publications

4.19 Professional/trade journals

4.20 Radioactive decay tables

4.21 Environmental texts

4.22 Environmental procedures

4.23 Respiratory protection procedures

4.24 Burial-site criteria

4.25 CNSI cask loading procedures

4.26 Quality assurance manuals

4. Other References (Continued)

4.27 Off-site dose calculation manual

4.28 Safety Information Letters

4.29 National Council of Radiation Protection and Measurements handbooks

4.30 International Commission of Radiological Protection publications

I. DESCRIPTION OF TARGET POPULATION

The target population from which persons may be drawn for training and advancement to HPT Foreman/Supervisor is the population of Senior/Lead HPTs at the facility who satisfy other required qualifications and have successfully carried out the duties and tasks of Senior/Lead HPTs for a minimum period required by station directives. In addition to possessing the skills, knowledge, and aptitude of a Senior/Lead Health Physics Technician, a candidate for HPT Foreman/Supervisor training and advancement should possess:*

- The initiative for increased responsibility,
- The demonstrated ability to make quick and accurate decisions during emergencies or when under stress,
- The ability to analyze operational and maintenance problems and to initiate actions leading to solutions of problems,
- The ability to plan and organize a work force and to delegate work effectively,
- A willingness to cooperate with, advise, and assist foremen/supervisors of other plant groups,
- Leadership skills, and
- Effective writing and oral communication skills.

*Additional characteristics may be identified as target population requirements upon completion of Health Physics Technician position task analyses.

J. TASK INVENTORY

Tasks performed by Foremen/Supervisors are listed in the following categories:

1. Counting Room and Associated Equipment
2. Radioactive Sources
3. Effluent Control (Liquid and Gaseous)
4. Process Monitoring
5. Portable Radiation Monitoring Equipment (Survey Meters and Air Samplers)
6. Personnel Monitoring Equipment (Friskers, Whole-Body Count Equipment)
7. Surveys (Radiation/Contamination/Airborne)
8. Radiation/Contamination Work Area Support
9. Shipping and Receiving Radioactive Materials
10. Decontamination
11. Environmental Sampling
12. Respirators and SCBA Equipment
13. Emergency/Abnormal Tasks
14. Administration/Training
15. Miscellaneous Supplies and Equipment

For tasks included in the survey questionnaire, the percent of Health Physics Technician Foremen/Supervisors who indicated on the questionnaire that they performed the task is indicated. This information provides an aid in making decisions regarding the applicability of a task for job descriptions at specific plants. A low percent-performing rating for a specific task could be due to a combination of factors, including specialization (for example, a foreman assigned specifically to dosimetry) and organizational differences among utilities. Thus, each task should be evaluated individually for applicability to the plant. Additional tasks identified through questionnaire write-ins are also included.

Survey questionnaire tasks and write-in tasks recommended for detailed analysis are indicated in Section 3.4.2 of this report.

JOB CODE: HPT FOREMAN/SUPERVISOR

TASK INVENTORY

Task No.	Tasks	Percent of HPT Foremen/Supervisors Performing Task
1.	Counting Room and Associated Equipment	
	Tasks listed on survey questionnaires:	
1.01	Perform background checks of counting room equipment (counter scalers)	35
1.02	Perform performance checks on counting room equipment (counter scalers)	32
1.03	Manually calculate airborne nuclide concentration of radioactive material from counting room data (using a prepared form)	55
1.04	Calibrate gross counting systems (such as Eberline MS-3, Tennelec LB-5500)	23
1.05	Prepare samples for counting	41
1.06	Operate gross gamma counting systems (manual or automatic)	44
1.07	Operate gross beta counters (manual or automatic)	51
1.08	Operate gross alpha counting systems (such as SAC-4)	43
1.09	Determine counter efficiency	46
1.10	Determine counter reliability (e.g., chi-squared determination)	35
1.11	Determine counter percent slope (response curve/detector voltage plateau)	35
1.12	Determine counter resolving time	21
1.13	Determine GeLi/intrinsic germanium detector operating parameters (detector efficiency, detector resolution, detector reliability, energy calibration, and background determination)	20

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TASK INVENTORY

Task No.	Tasks	Percent of HPT Foremen/Supervisors Performing Task
1.	Counting Room and Associated Equipment (Continued)	
1.14	Determine Na I detector operating parameters (detector efficiency, detector resolution, detector reliability, energy calibration, and background determination)	16
1.15	Determine liquid scintillation counter efficiency	7
1.16	Prepare samples for liquid scintillation counter	12
1.17	Operate liquid scintillation counters	13
1.18	Calibrate liquid scintillation detectors	7
1.19	Update the gamma spectrometer nuclide library	12
1.20	Calibrate computer-based multi-channel analyzer	16
1.21	Calibrate stand-alone multi-channel analyzer	8
1.22	Count samples with computer-based multi-channel analyzer	27
1.23	Count samples with stand-alone multi-channel analyzer	10
1.24	Operate the gas flow proportional counter	40
1.25	Change the gas cylinder for the gas flow proportional counter	21
1.26	Operate the gamma well counter	11
1.27	Replace installed counting equipment detectors (such as GM tubes)	26
1.28	Refill the GeLi liquid nitrogen dewar	17
1.29	Input new calibration data into the isotopic identification computer	19
1.30	Prepare the isotopic identification computer for analysis	17

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TASK INVENTORY

Task No.	Tasks	Percent of HPT Foremen/Supervisors Performing Task
1.	Counting Room and Associated Equipment (Continued)	
1.31	Calculate lower limit of detection (LLD) for counter scalers (such as SAC-4, LCS-1)	16
1.32	Calculate minimum detectable counts (MDCs) for counter scalers (such as SAC-4, LCS-1)	25
1.33	Perform decay constant calculations on air samples	39
1.34	Calculate weighted maximum permissible concentration (MPC) from isotopic data	59
1.35	Prepare counting data QC charts	15
1.36	Prepare spiked samples and standards from stock radioisotope solutions	13
1.37	Supervise (plan, budget, schedule, evaluate) counting room activities	50
	Additional tasks identified:	
1.38	Review and evaluate counted sample data (process, effluent, and environmental samples)	
2.	Radioactive Sources	
	Tasks listed on survey questionnaires:	
2.01	Perform radioactive sealed-source leak test (including documenting results)	30
2.02	Monitor radioactive sealed-source leak detection graphs and charts	13
2.03	Inventory radioactive sources (including documenting results)	31
2.04	Operate calibration source well or source calibrator	34
2.05	Audit radioactive source and material records	38
2.06	Develop calibration charts for calibration sources	25

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TASK INVENTORY

Task No.	Tasks	Percent of HPT Foremen/Supervisors Performing Task
2.	Radioactive Sources (Continued)	
2.07	Transfer radioactive sources from/to other departments	26
2.08	Calculate radioactive source activity strengths	80
2.09	Dispose of decayed or no-longer-usable radioactive sources	22
2.10	Supervise control and use of radioactive sealed sources	65
	Additional tasks identified:	
2.11	Perform source distance calculations	
3.	Effluent Control (Liquid and Gaseous)	
	Tasks listed on survey questionnaires:	
3.01	Perform release rate calculations	33
3.02	Evaluate effluent release data	37
3.03	Prepare a gaseous waste release permit	17
3.04	Prepare a liquid waste release permit	16
3.05	Prepare a liquid release report	12
3.06	Prepare a gaseous effluent account report	15
3.07	Compile data for effluent release composite report	13
3.08	Compile data for effluent disposal record	9
3.09	Supervise effluent control activities	22

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TASK INVENTORY

Task No.	Tasks	Percent of HPT Foremen/Supervisors Performing Task
4.	Process Monitoring (Liquid and Gaseous)	
	Tasks listed on survey questionnaires:	
4.01	Calibrate liquid process effluent radiation monitors	16
4.02	Calibrate gaseous process effluent radiation monitors	16
4.03	Calibrate the condenser off gas (COG) process vent monitors	9
4.04	Calibrate the stack monitors	16
4.05	Calibrate the dry well atmosphere activity monitors	5
4.06	Calibrate the essential service water monitors	10
4.07	Calibrate the reactor building vent monitors	11
4.08	Calibrate the reactor building closed cooling water/component cooling water monitor	10
4.09	Calibrate the turbine building vent monitors	7
4.10	Calibrate the constant air monitors (such as CAM, APD)	13
4.11	Change filters in CAMs	33
4.12	Change recording paper in CAMs	30
4.13	Calibrate the containment spray heat exchanger monitors	2
4.14	Calibrate the emergency condenser vent monitors	1
4.15	Calibrate the area radiation monitor portable calibration unit	9
4.16	Calibrate the stationary area radiation monitors	13
4.17	Calibrate the portable area radiation monitor	9
4.18	Set up portable area radiation monitors	26

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TASK INVENTORY

Task No.	Tasks	Percent of HPT Foremen/Supervisors Performing Task
4.	Process Monitoring (Liquid and Gaseous) (Continued)	
4.19	Calibrate the post-accident monitors (steam jet air ejector, main steam line, containment high radiation system)	11
4.20	Replace detectors in process radiation monitors	6
4.21	Calculate process radiation monitor alarm setpoints	21
4.22	Assist in installation of new process radiation monitors (including set up)	9
4.23	Supervise process monitoring activities	39
	Additional tasks identified:	
4.24	Calibrate single-channel analyzer	
5.	Portable Radiation Monitoring Equipment (Survey Meters and Air Samplers)	
	Tasks listed on survey questionnaires:	
5.01	Calibrate portable neutron survey equipment (such as Portable Neutron RemCounter PNR-4)	13
5.02	Calibrate portable alpha survey equipment (such as Eberline PAC-4)	12
5.03	Calibrate portable beta-gamma survey equipment (such as Cutie Pie 740A, Eberline Ion Chamber Model RO-2A, Teletector)	17
5.04	Calibrate portable air sampling equipment	24
5.05	Field check portable radiation monitoring instruments	51
5.06	Calibrate the beta-gamma-alpha monitor (such as the Thyac III)	5
5.07	Operate portable neutron survey equipment (such as Portable Neutron Rem Counter PNR-4)	53

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TASK INVENTORY

Task No.	Tasks	Percent of HPT Foremen/Supervisors Performing Task
5.	Portable Radiation Monitoring Equipment (Survey Meters and Air Samplers) (Continued)	
5.08	Operate portable alpha survey equipment (such as Eberline PAC-4)	44
5.09	Operate portable beta-gamma survey equipment (such as Cutie Pie 740A, Eberline Ion Chamber Model RO-2A, Teletector)	68
5.10	Operate portable air sampling equipment (such as RADECO, Eberline RAS-1)	53
5.11	Operate portable underwater gamma survey equipment (such as CPMU)	23
5.12	Perform minor repairs on portable radiation monitoring equipment (such as change batteries, change cables, replace mylar windows)	44
5.13	Perform major repairs on portable radiation monitoring equipment (such as repair and test circuit boards)	3
5.14	Verify proper operation of CAMs	41
5.15	Calibrate condenser R chambers	6
5.16	Plot calibration curves for portable radiation monitoring equipment	12
5.17	Supervise portable radiation monitoring activities	77
6.	Personnel Monitoring Equipment (Friskers, Whole-Body Count Equipment)	
	Tasks listed on survey questionnaires:	
6.01	Post general area TLDs	13
6.02	Perform initial issue of TLD/film badge	23
6.03	Operate the TLD reader to read TLDs	13

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TASK INVENTORY

Task No.	Tasks	Percent of HPT Foremen/Supervisors Performing Task
6.	Personnel Monitoring Equipment (Friskers, Whole-Body Count Equipment) (Continued)	
6.04	Prepare TLD for reissue	8
6.05	Perform TLD/film badge change out	18
6.06	Perform maintenance on TLD readers	3
6.07	Perform calibration of the TLD reader	8
6.08	Perform calibration checks of the TLD reader	9
6.09	Perform periodic QA checks of TLDs (that is, exposure to a known source)	13
6.10	Change film in film badges	7
6.11	Perform dosimeters drift check	20
6.12	Read pocket dosimeters	67
6.13	Zero pocket dosimeters	61
6.14	Issue pocket dosimeters for use	38
6.15	Issue audible and visual dosimeters	35
6.16	Expose personnel dosimeters for calibration purposes (e.g., pocket dosimeters, TLDs, digital-audible alarm dosimeters)	20
6.17	Collect personnel dosimetery devices (film badges or TLDs)	20
6.18	Manually calculate estimated individual neutron radiation exposure	44
6.19	Perform initial receipt testing of dosimetry equipment (such as drift test, drop test)	15
6.20	Issue extremity dosimetry	40
6.21	Issue special purpose dosimetry (such as special neutron badges)	26

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TASK INVENTORY

Task No.	Tasks	Percent of HPT Foremen/Supervisors Performing Task
6.	Personnel Monitoring Equipment (Friskers, Whole-Body Count Equipment) (Continued)	
6.22	Evaluate results from extremity and special purpose dosimetry	46
6.23	Maintain computer records of radiation exposure	18
6.24	Perform background check on whole-body counter	15
6.25	Perform calibration checks (energy calibration and efficiency) on whole-body counter	15
6.26	Operate whole-body counter (WBC)	30
6.27	Obtain printout and/or plot of whole-body count data	29
6.28	Perform calculation for internal exposure based on WBC results	25
6.29	Calibrate whole-body counting system	9
6.30	Select personnel for routine whole-body counts	22
6.31	Schedule personnel to have a whole-body count	35
6.32	Assign personnel to have periodic whole-body counts performed based on health physics measurements (such as air sampling results, bioassay results, nasal smears)	52
6.33	Collect a bioassay sample	11
6.34	Collect and count nasal smears	31
6.35	Evaluate nasal smears	45
6.36	Collect and count throat smears	5
6.37	Evaluate throat smears	8
6.38	Calibrate personnel monitoring friskers	12
6.39	Calibrate portal monitors	15

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TASK INVENTORY

Task No.	Tasks	Percent of HPT Foremen/Supervisors Performing Task
6.	Personnel Monitoring Equipment (Friskers, Whole-Body Count Equipment) (Continued)	
6.40	Perform routine source checks of friskers	37
6.41	Perform routine source checks of portal monitors	27
6.42	Perform personnel contamination monitoring (frisking)	64
6.43	Conduct functional check of equipment (hand and foot monitors, portable monitors, friskers, laundry monitors)	29
6.44	Supervise personnel monitoring activities	77
7.	Surveys (Radiation/Contamination/Airborne)	
	Tasks listed on survey questionnaires:	
7.01	Perform pre-Radiation Work Permit (RWP) surveys	38
7.02	Perform periodic surveys at radiation work sites to evaluate changes in radiological conditions	44
7.03	Perform post-work surveys at radiation work sites	37
7.04	Perform (obtain, count, and document) an airborne activity (including iodine samples) survey	43
7.05	Perform (obtain, count, and document) an airborne gaseous activity survey	34
7.06	Perform (obtain, count, and document) a tritium activity sample	15
7.07	Determine percent maximum permissible concentration (MPC) (based on radionuclide) from air sample data	56
7.08	Select appropriate respiratory protection equipment based on air sample analysis	62
7.09	Review the results of air sample surveys	81

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TASK INVENTORY

Task No.	Tasks	Percent of HPT Foremen/Supervisors Performing Task
7.	Surveys (Radiation/Contamination/Airborne) (Continued)	
7.10	Perform (obtain, count, and document) a smear survey for loose surface contamination	46
7.11	Review the results of a smear survey	83
7.12	Perform periodic radiation and contamination surveys throughout the plant in non- radiologically controlled areas (warehouse, parking lot, lunch room, etc.)	26
7.13	Determine the location of radioactive hot spots	35
7.14	Post and label radioactive hot spots	27
7.15	Prepare reports regarding radiation and contamination surveys	54
7.16	Maintain records and files on radiation, contamination, and airborne activity surveys	54
7.17	Perform a general radiation survey	47
7.18	Perform a high radiation area survey	48
7.19	Perform a temporary shielding survey	44
7.20	Perform an industrial hygiene survey (air quality, temperature, noise) to determine physical habitability of an area	19
7.21	Perform radiological surveys in support of reactor containment building/drywell entry while at power	31
7.22	Perform a neutron radiation survey	43
7.23	Perform on-the-job gross analysis of air samples (using portable survey instruments)	25
7.24	Perform surveys to support the movement of radioactive materials	35
7.25	Perform surveys in support of entry into areas of unknown radiological hazards	40

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TASK INVENTORY

Task No.	Tasks	Percent of HPT Foremen/Supervisors Performing Task
7.	Surveys (Radiation/Contamination/Airborne) (Continued)	
7.26	Perform a beta radiation survey	45
7.27	Perform radiological monitoring during industrial radiographic operations or other operations involving X-ray devices	24
7.28	Supervise the conduct of surveys (radiation/contamination/airborne)	79
	Additional tasks identified:	
7.29	Determine survey frequencies based upon changes in radiological conditions	
8.	Radiation/Contamination Work Area Support	
	Tasks listed on survey questionnaires:	
8.01	Set up a control point	26
8.02	Set up a control area	32
8.03	Maintain a control point (that is, perform necessary surveys, supply required materials, logs, etc.)	21
8.04	Survey tools and equipment for release from a radiologically controlled area	39
8.05	Perform stay time calculations	53
8.06	Complete a Radiation Work Permit (RWP) (for example, clothing, dosimetry, and respirator requirements) based on survey data and radiological conditions expected	54
8.07	Determine required dosimetry for entry into a job coverage area	64
8.08	Determine proper dosimeter placement location on the body for entry into a job coverage area	66

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TASK INVENTORY

Task No.	Tasks	Percent of HPT Foremen/Supervisors Performing Task
8.	Radiation/Contamination Work Area Support (Continued)	
8.09	Review RWP for completeness and obtain appropriate signatures for RWP approval	70
8.10	Estimate individual and total worker dose from the RWP information in accordance with ALARA procedures	53
8.11	Inspect work areas to ensure compliance with Radiation Work Permits and good work practices	78
8.12	Inspect plant areas for proper radiation posting, radioactive material storage, and contamination control	83
8.13	Post/remove posting of radiologically controlled areas	40
8.14	Update posting of radiologically controlled areas	35
8.15	Supervise the removal of personnel dosimetry equipment and protective clothing (including frisking)	52
8.16	Brief radiation workers on radiological hazards in the work area or changes in radiological conditions	72
8.17	Control worker access to a radiologically controlled area	44
8.18	Issue a stop work order when significant radiological discrepancies are discovered	67
8.19	Determine amount of shielding required using half-value layers or graphs	53
8.20	Direct the installation and removal of temporary shielding	55
8.21	Evaluate the effectiveness of temporary shielding	59
8.22	Prepare a containment area (tent) with associated ventilation to reduce personnel exposure to airborne contaminants	27

JOB CODE: HPT FOREMAN/SUPERVISOR

TASK INVENTORY

Task No.	Tasks	Percent of HPT Foremen/Supervisors Performing Task
8.	Radiation/Contamination Work Area Support (Continued)	
8.23	Prepare a glove box to reduce personnel exposure to airborne contaminants	20
8.24	Evaluate a work area for additional ALARA considerations	63
8.25	Perform certification inspections of tents, glove boxes, and other containment devices	18
8.26	Provide close health physics coverage for workers in high-dose jobs (for example, steam generator jumpers, control rod drive mechanism replacement)	34
8.27	Perform on-the-spot correction of workers not complying with proper radiological work practices or not following RWP requirements	68
8.28	Supervise health physics technicians in radiation/ contamination work area support	86
	Additional tasks identified:	
8.29	Evaluate containment device vent unit filters for replacement	
9.	Shipping and Receiving Radioactive Materials	
	Tasks listed on survey questionnaires:	
9.01	Analyze samples of radioactive material to determine shipping category (radionuclide content, oil and moisture content)	22
9.02	Determine transport group and classify radioactive material as Type A, Type B, or LSA	35
9.03	Prepare a Radiation Work Permit for handling and processing radioactive waste	37
9.04	Provide health physics coverage during preparation of a shipment of radioactive material	31

JOB CODE: HPT FOREMAN/SUPERVISOR

TASK INVENTORY

Task No.	Tasks	Percent of HPT Foremen/Supervisors Performing Task
9.	Shipping and Receiving Radioactive Materials (Continued)	
9.05	Survey a shipment of radioactive material prior to shipping	32
9.06	Select appropriate containers and package radioactive materials	18
9.07	Package (including labeling) dry radioactive waste material for shipment	13
9.08	Document packaged material survey data in the radioactive material shipping record	30
9.09	Placard the transport vehicle	23
9.10	Survey transport vehicles	31
9.11	Supervise loading radioactive material on transport vehicle	39
9.12	Examine reports accompanying radioactive material shipment received to ensure compliance with federal regulations	37
9.13	Perform radiation and contamination surveys of radioactive material received (including recording survey data on receipt form)	32
9.14	Maintain records of the receipt/shipment of radioactive materials	31
9.15	Perform a radiological survey in conjunction with the receipt of new fuel and radioactive sealed sources	29
9.16	Control the movement of radioactive material through unrestricted (non-radiological) areas of the plant	50
9.17	Direct storage of radioactive materials in the designated areas of the plant	61

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TASK INVENTORY

Task No.	Tasks	Percent of HPT Foremen/Supervisors Performing Task
9.	Shipping and Receiving Radioactive Materials (Continued)	
9.18	Inspect the transport vehicle to ensure safe transportation of radioactive materials over public thoroughfares	18
9.19	Determine qualifications of receiver to receive radioactive material shipment	22
9.20	Obtain radioactive material shipping permits	15
9.21	Apply state and federal shipping requirements	31
9.22	Survey waste materials to segregate high and low level waste in preparation for shipment	18
9.23	Weigh drums and packages in preparation for shipment	15
9.24	Perform container inspections and tests on non-certified shipping containers and packages	12
9.25	Conduct surveillance of drum and box waste compactor operations	30
9.26	Segregate contaminated and non-contaminated trash generated within the radiological controlled area by frisking	17
9.27	Accompany radioactive materials shipments off site	8
9.28	Supervise the shipping and receiving of radioactive materials	41
10.	Decontamination	
	Tasks listed on survey questionnaires:	
10.01	Evaluate contaminated material and equipment to determine if decontamination effort is practical	65
10.02	Direct decontamination of equipment or materials	51
10.03	Perform decontamination of equipment or materials	20

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TASK INVENTORY

Task No.	Tasks	Percent of HPT Foremen/Supervisors Performing Task
10.	Decontamination (Continued)	
10.04	Prepare decontamination solutions and agents for use (such as TURCO)	12
10.05	Direct decontamination of personnel	63
10.06	Decontaminate personnel (including documenting results)	32
10.07	Direct area decontamination	51
10.08	Perform area decontamination (including documenting results)	18
10.09	Collect potentially contaminated laundry	9
10.10	Sort laundry (high-level contamination from low-level contamination and non-contaminated articles)	9
10.11	Operate contaminated laundry facilities	4
10.12	Survey laundry for reuse	13
10.13	Perform routine maintenance of laundry facilities (such as change filters, cleaning solutions, etc.)	2
10.14	Direct contaminated laundry operations	21
10.15	Operate decontamination high pressure water cabinet equipment	5
10.16	Operate ultrasonic decontamination unit	9
10.17	Operate decontamination vapor degreaser unit	3
10.18	Operate decontamination electro-polisher unit	4
10.19	Oversee decontamination efforts of equipment and work areas carried out by non-health physics personnel	35
10.20	Supervise Health Physics Technician decontamination support	75

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TASK INVENTORY

Task No.	Tasks	Percent of HPT Foremen/Supervisors Performing Task
11.	Environmental Sampling	
	Tasks listed on survey questionnaires:	
11.01	Coordinate environmental sampling schedule	10
11.02	Obtain charcoal filter samples	16
11.03	Obtain surface water samples	11
11.04	Obtain surface water tritium sample	5
11.05	Obtain surface water beta sample	6
11.06	Obtain aquatic vegetation samples	4
11.07	Obtain zooplankton samples	1
11.08	Obtain benthic organism samples	1
11.09	Obtain fish samples	1
11.10	Obtain shrimp samples	1
11.11	Obtain oyster samples	1
11.12	Obtain bottom sediment samples	2
11.13	Obtain shoreline sediment samples	3
11.14	Obtain rain water samples	4
11.15	Obtain groundwater samples	5
11.16	Obtain milk sample	7
11.17	Obtain terrestrial vegetation samples	5
11.18	Obtain food crop samples	5
11.19	Obtain fodder and feed crop samples	1
11.20	Obtain deep well samples	5
11.21	Obtain soil samples	9

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TASK INVENTORY

Task No.	Tasks	Percent of HPT Foremen/Supervisors Performing Task
11.	Environmental Sampling (Continued)	
11.22	Calibrate environmental area radiation monitors and sampling equipment	5
11.23	Perform routine maintenance on environmental air sampling equipment	5
11.24	Obtain meteorological monitoring data (including documentation)	6
11.25	Prepare environmental samples for transfers to proper system lab	5
11.26	Package environmental samples for transfer to outside facilities	5
11.27	Review environmental data for compliance with technical specifications	8
11.28	Supervise environmental sampling activities performed by Health Physics Technicians	24
12.	Respirators and Self-Contained Breathing Apparatus (SCBA) Equipment	
	Tasks listed on survey questionnaires:	
12.01	Conduct required routine inspections of respirators	29
12.02	Repair respiratory protective equipment	21
12.03	Leak test respirator after repair	15
12.04	Perform checks of hose, regulator, and manifold for forced-air respirator	22
12.05	Prepare respirators for reuse	20
12.06	Issue respiratory protective equipment	31
12.07	Use respiratory protective equipment	67

JOB CODE: HPT FOREMAN/SUPERVISOR

TASK INVENTORY

Task No.	Tasks	Percent of HPT Foremen/Supervisors Performing Task
12.	Respirators and Self-Contained Breathing Apparatus (SCBA) Equipment (Continued)	
12.08	Perform inspection of respirator cannisters prior to reuse	21
12.09	Perform radiological surveys of respirators	24
12.10	Decontaminate respirators	11
12.11	Package respirators for storage	19
12.12	Refill SCBA bottles	10
12.13	Perform checks on SCBA	23
12.14	Perform qualitative respirator fit tests for personnel	17
12.15	Perform quantitative respirator fit tests for personnel	17
12.16	Calibrate the respirator fitting booth	7
12.17	Perform functional test of respiratory equipment	19
12.18	Check respirator cannisters for differential pressure requirement conformity	11
12.19	Check respirator cannisters for contamination	19
12.20	Replace the catalyst agent in a re-breather type respirator (such as BIOPACK-60, SCOTT, MSA)	1
12.21	Replace the oxygen bottle on a re-breather type respirator (such as BIOPAK-60, SCOTT, MSA)	10
12.22	Perform checks on a re-breather type respirator (such as BIOPACK-60, SCOTT, MSA)	5
12.23	Perform air quality checks on plant breathing air systems	17
12.24	Supervise respirators and SCBA equipment activities performed by health physics technicians	53

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TASK INVENTORY

Task No.	Tasks	Percent of HPT Foremen/Supervisors Performing Task
12.	Respirators and Self-Contained Breathing Apparatus (SCBA) Equipment (Continued)	
	Additional tasks identified:	
12.25	Set up positive pressure supplied air respiratory equipment	
13.	Emergency/Abnormal Tasks	
	Tasks listed on survey questionnaires:	
13.01	Respond as a radiological emergency team member to a site or general emergency	76
13.02	Provide health physics coverage of contaminated and/or injured personnel during an emergency (on site or at an area medical facility)	60
13.03	Segregate contaminated personnel in accordance with emergency contamination criteria	43
13.04	Recommend emergency actions consistent with protective action guides	64
13.05	Assist in Emergency Response Planning during an emergency	54
13.06	Maintain the emergency data status boards	30
13.07	Issue additional dosimetry as required by the Plant Emergency Plan	38
13.08	Sample off-site air for iodine	33
13.09	Track a radioactive plume	48
13.10	Perform as a re-entry team member (post accident)	43
13.11	Direct the re-entry team	49
13.12	Obtain post-accident samples	30
13.13	Prepare and handle post-accident samples	25

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TASK INVENTORY

Task No.	Tasks	Percent of HPT Foremen/Supervisors Performing Task
13.	Emergency/Abnormal Tasks (Continued)	
13.14	Analyze post-accident samples	22
13.15	Store post-accident sample for recounting	19
13.16	Dispose of post-accident samples	20
13.17	Respond to an uncontrolled release of activity to the environment	60
13.18	Respond to a portal monitor alarm	53
13.19	Respond to a fire in a controlled area	47
13.20	Respond to a constant air monitor alarm	54
13.21	Respond to an area radiation monitor alarm	54
13.22	Respond to a process radiation monitor alarm	41
13.23	Respond to a conductivity alarm	11
13.24	Respond to an effluent alarm	25
13.25	Respond to a fuel-handling accident	36
13.26	Respond to an abnormal TLD readout	38
13.27	Respond to a lost TLD	59
13.28	Respond to a pocket dosimeter being found off scale	63
13.29	Respond to personnel exposure exceeding regulatory or administrative limits	54
13.30	Provide health physics coverage for off-site radiological transportation incidents	27
13.31	Evaluate radiological incident (such as personnel contamination) to determine the cause	72
13.32	Respond to a fire as a member of the plant fire brigade	18

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TASK INVENTORY

Task No.	Tasks	Percent of HPT Foremen/Supervisors Performing Task
13.	Emergency/Abnormal Tasks (Continued)	
13.33	Coordinate a bomb search in controlled/radiation areas	9
13.34	Administer first aid to injured personnel	40
13.35	Administer CPR	27
13.36	Perform off-site dose assessment using a computer	24
13.37	Perform off-site dose assessment manually	30
	Additional tasks identified:	
13.38	Analyze indications of potential radiological problems based on quantitative measurement results within a particular system or area	
13.39	Provide health physics coverage at the scene of an in-plant radiological incident to recommend or direct corrective actions to mitigate the consequences	
13.40	Advise management personnel of the significance and corrective action that should be taken during a radiological incident	
13.41	Advise workers of immediate actions to be taken within the radiologically controlled area during a radiological incident	
14.	Administration	
	Tasks listed on survey questionnaires:	
14.01	Initiate a maintenance work request	79
14.02	Compile data for steam generator composite report	12
14.03	Prepare special radiation control reports	39
14.04	Process requests to exceed the current radiation exposure authorization	50

JOB CODE: HPT FOREMAN/SUPERVISOR

TASK INVENTORY

Task No.	Tasks	Percent of HPT Foremen/Supervisors Performing Task
14.	Administration (Continued)	
14.05	Authorize requests to exceed the administrative radiation exposure limits	44
14.06	Order technical publications	44
14.07	Prepare routine radiation control reports	30
14.08	Prepare daily exposure status report	17
14.09	Collect data to be included in the radiation evaluation program	36
14.10	Conduct an ALARA evaluation of the radiation protection program	29
14.11	Review periodic radiation evaluation program	31
14.12	Maintain station man-rem plots and graphs	11
14.13	Prepare health physics procedures (including revision preparation)	78
14.14	Review health physics procedures (including proposed revisions)	84
14.15	Conduct job-specific ALARA review	46
14.16	Prepare post-outage ALARA report	16
14.17	Review meteorological monitoring reports	6
14.18	Review effluent and environmental monitoring reports	16
14.19	Review proposed plant design changes for radiological concerns	27
14.20	Review NRC health physics bulletins and regulations	80
14.21	Review personnel exposure history	56
14.22	Review contractor HPT qualifications prior to technician starting work	47

JOB CODE: HPT FOREMAN/SUPERVISOR

TASK INVENTORY

Task No.	Tasks	Percent of HPT Foremen/Supervisors Performing Task
14.	Administration (Continued)	
14.23	Review daily computer printout of personnel exposure	65
14.24	Schedule HPT coverage for outage support	66
14.25	Develop programs for initial training of HPTs within guidelines of plant and regulatory requirements	36
14.26	Develop periodic retraining programs for HPTs	30
14.27	Develop contractor HPT training program	21
14.28	Perform general employee training in radiological protection	22
14.29	Supervise conduct of the health physics portion of general employee training	17
14.30	Instruct personnel in respiratory protection	33
14.31	Instruct health physics technicians in classrcom training	23
14.32	Provide on-the-job training to health physics personnel	75
14.33	Conduct oral examinations to verify the adequacy of technicians and their training	51
14.34	Conduct written examinations to verify adequacy of technicians and their training	24
14.35	Supervise the conduct of Health Physics Technician training	35
14.36	Participate in mock-up training	30
14.37	Provide HP training to off-site organizations (firemen, rescue squads, etc.)	12
14.38	\ssist in organizing the annual medical drill (injured contaminated man drill)	19

JOB CODE: HPT FOREMAN/SUPERVISOR

TASK INVENTORY

Task No.	Tasks	Percent of HPT Foremen/Supervisors Performing Task
14.	Administration (Continued)	
14.39	Assist in organizing the annual site emergency exercise	19
14.40	Interpret radioactive sealed-source leak test results	41
14.41	Interpret radioactive source inventory results	39
14.42	Evaluate process monitor results	21
14.43	Update exposure records using TLD data	9
14.44	Audit daily radiation exposure records	27
14.45	Record individual dose on daily exposure cards or RWPs	26
14.46	Review daily dosimeter records	34
14.47	Compare TLD data with pocket dosimeter data	27
14.48	Administer the health physics QA program (develop, review)	20
	Additional tasks identified:	
14.49	Prepare respiratory protection program reports	
15.	Miscellaneous Supplies and Equipment	
	Tasks listed on survey questionnaires:	
15.01	Maintain inventory of radiation protection supplies	46
15.02	Maintain change rooms stocked with protective clothing	13
15.03	Inventory and replenish first aid supply stations	12
15.04	Order supplies for outage work	45
15.05	Fill out a purchase requisition form	65

JOB CODE: HPT FOREMAN/SUPERVISOR

TASK INVENTORY

Task No.	Tasks	Percent of HPT Foremen/Supervisors Performing Task
15.	Miscellaneous Supplies and Equipment (Continued)	
15.06	Perform routine checks/audits of radiological emergency equipment and kits	30
15.07	Issue and receive contaminated tools and equipment	11
15.08	Inventory contaminated tools and equipment	10

APPENDIX B

MODEL JOB DESCRIPTION FOR SENIOR/LEAD HEALTH PHYSICS TECHNICIAN

A. JOB TITLE: Senior/Lead Health Physics Technician

B. REQUIRED QUALIFICATIONS

1. High school diploma or GED certificate (3).

2. Three years of health physics working experience (3).

3. Satisfactory completion of an applicable training program to meet ANSI or other requirements (3).

4. Satisfactory completion of any certification of performance capability required by the utility (for example, any oral or written qualification examination).*

5. Fulfillment of any additional qualifications required by the utility, which may include (but are not limited to) the following:*

   a) Required period of satisfactory performance in a Health Physics Technician position of lower classification,

   b) Satisfactory completion of formal education or vocational/technical training requirements relating to radiological controls,

   c) Required period of satisfactory performance at the facility,

   d) Satisfactory periodic physical examination, and

   e) Satisfactory completion of any selection testing required by the utility for the position of Senior/Lead Health Physics Technician.

C. GENERAL DESCRIPTION OF JOB REQUIREMENTS†

Under the supervision of the Health Physics Technician Foreman/Supervisor, verifies and coordinates health physics functions for radiological controls, control of personnel exposure, contamination control, and the safe handling of radioactive materials. May serve in the capacity of shift coordinator of other Health Physics Technicians on a rotating work shift basis. As work coordinator, is responsible for scheduling and assigning routine and special radiation and contamination surveys and issuing radiation work permits.

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*Based on a sample of utility job descriptions.

†At some utilities, job incumbents may be permanently assigned to work in a particular specialty area (such as radioactive waste, calibration, dosimetry, or decontamination). In these cases, this part of the job description should address the applicable requirements of the job consistent with the specialty area of interest.

Ensures radiation and contamination surveys are performed as scheduled. Performs radiological surveys to ascertain conditions and establishes precautionary requirements for work in radiation areas, high-radiation areas, and contaminated areas. Performs on-the-job radiological surveys during maintenance operations and makes recommendations to ensure safety. Carries out special written or oral instructions for nonroutine operations.

Provides direction and assistance to other Health Physics Technicians in performing their job functions. Provides guidance to workers to maintain radiation exposures as low as practicable and verifies work activities are performed with proper radiological considerations.

Operates equipment, manual and automated, such as radiation detection instruments, multi-channel analyzers, air monitors, digital computers, dosimetry instruments, and any other equipment or instruments, as required. Performs laboratory and radiation counting tests to determine levels and compositions of radioactive contamination.

Assists in the maintenance of records and reports pertaining to personnel radiation exposure, calibration of radiation monitoring devices, radioactive wastes, plant training, and other associated areas. Verifies procedures and records are up to date.

May assist in planning jobs with respect to the ALARA program. Performs pre- and post-job ALARA reviews.

Assists in providing on-the-job training for Health Physics Technician trainees.

Maintains instruments and equipment in good repair and calibration. Functionally checks calibration of radiation and contamination monitoring equipment. Under field conditions, tests new instruments and techniques for adequacy and reliability.

Serves as a member of the emergency response team in a radiological emergency and for fire, explosions, or unusual incidents. Ensures plant management has necessary radiological data. Performs other duties as assigned.

D. DESCRIPTION OF INCUMBENT'S POSITION WITHIN THE ORGANIZATION

Under the immediate supervision of a Health Physics Technician Foreman/Supervisor, directs the work of Health Physics Technicians or contracted health physics personnel. In emergencies, when there is not time to ask for direction from supervisors, may operate on individual initiative to correct the existing condition. Interfaces with other plant personnel who are performing their duties within the plant; these personnel include (but are not limited to) licensed and non-licensed operators and supervisors, instrument and control technicians, chemistry technicians, mechanics, electricians, quality assurance/quality control inspectors, engineers, and plant management. May assume duties as assigned in the absence of the Health Physics Technician Foreman/Supervisor.

Principal lines of promotion are from Health Physics Technician (Junior) and to Health Physics Technician Foreman/Supervisor.

E. DESCRIPTION OF MAJOR JOB AREAS (FUNCTIONAL DUTIES)*

1. Counting Room Activities. Performs background and performance checks on counting room equipment. Prepares samples for counting. Operates gross alpha, beta, and gamma counting systems and multi-channel analyzers. Determines counter efficiency, reliability, and percent slope (response curve/detector voltage plateau). Performs calculations, such as minimum detectable counts for counter scalers, decay constant calculations on air samples, airborne nuclide concentration of radioactive material, and weighted maximum permissible concentration from isotopic data. Performs minor repairs, such as replacing installed counting equipment detectors.

2. Radioactive Sources. Inventories radioactive sources and documents results. Operates calibration source well or source calibrator. Performs radioactive sealed-source leak tests and calculates radioactive source activity strengths. Transfers radioactive sources from/to other departments.

3. Effluent Control. May perform release rate calculations and evaluate effluent release data.

4. Process Monitoring. Sets up portable area radiation monitors. Performs minor maintenance on constant air monitors, such as changing filters and recording paper.

5. Portable Radiation Monitoring. Field checks and operates portable neutron, alpha, and beta-gamma survey equipment. Operates portable air sampling equipment and verifies proper operation of constant air monitors. Performs minor repairs on portable radiation monitoring equipment. May operate portable underwater gamma survey equipment and perform calibrations on portable neutron, alpha, beta-gamma survey equipment and air sampling equipment.

6. Personnel Monitoring. Issues and collects all types of dosimetry devices [pocket dosimeters, film badges, thermal-luminescent dosimeters (TLDs) extremity dosimetry, and special-purpose dosimetry]. Exposes personnel dosimeters for calibration purposes and performs dosimeter drift checks. Evaluates the results from extremity and special-purpose dosimetry and manually calculates estimated individual neutron radiation exposure. Performs background checks and operates whole-body counters. Assists in assigning personnel to have periodic whole-body counts performed and may plot whole-body count data. Collects, counts, and evaluates nasal smears. Performs routine source checks and functional checks of friskers and portal monitors. Performs personnel contamination monitoring. Supervises personnel monitoring activities performed by other technicians.

7. Surveys (Radiation/Contamination/Airborne). Performs pre-work and post-work surveys at radiation work sites and periodic surveys to evaluate changes in radiological conditions at work sites. Reviews the results of air sample

*At some utilities, job incumbents may be permanently assigned to work in a particular specialty area (such as radioactive waste, calibration, dosimetry, or decontamination). In these cases, this part of the job description should address the applicable requirements of the job consistent with the specialty area of interest.

surveys and determines percent maximum permissible concentration and appropriate respiratory protection equipment based on air sample results. Reviews the results of smear surveys for loose surface contamination. Determines the location of radioactive hot spots and the posting and labeling required. Performs (obtains, counts, and documents) all types of radiological surveys conducted, including airborne activity and gaseous activity, tritium activity, smear, general radiation, high radiation, temporary shielding, neutron radiation, and beta radiation surveys. Performs radiological surveys to support specific activities (reactor containment/drywell entry while at power, movement of radioactive materials, void entry, and industrial radiographic operations). Supervises Health Physics Technicians performing survey activities. Prepares and maintains records and files regarding radiation and contamination surveys.

8. Radiation/Contamination Work Area Support. Sets up control points and control areas. Performs routine functions while maintaining a control point, such as performing necessary surveys, performing stay-time calculations, completing radiation work permits, determining dosimetry requirements, estimating worker dose in accordance with ALARA procedures, inspecting work areas to ensure compliance with radiation work permits, and supervising the removal of personnel dosimetry equipment and protective clothing. May prepare contamination areas (tents) and glove boxes to reduce personnel exposure to airborne contaminants. Provides close health physics coverage for workers in high-dose jobs. Determines temporary shielding requirements and directs the installation and removal of temporary shielding. Performs on-the-spot corrections of workers not complying with proper radiological work practices and issues stop-work orders when significant radiological discrepancies are discovered. Oversees Health Physics Technicians providing radiation/contamination work area support.

9. Shipping and Receiving Radioactive Materials. Prepares radiation work permits for handling and processing radioactive waste. Provides health physics coverage during preparation of radioactive waste shipments, which may include conducting appropriate surveys of radioactive materials and transport vehicles, packaging dry radioactive waste material, documenting survey data on shipping records, placarding transport vehicles, and supervising loading of radioactive material on transport vehicles. Performs radiation and contamination surveys of radioactive material received. Performs radiological surveys in conjunction with the receipt of new fuel and radioactive sealed sources. Controls the movement of radioactive material through unrestricted areas of the plant and directs storage of radioactive materials in the designated areas of the plant.

10. Decontamination. Evaluates contaminated material and equipment to determine if decontamination effort is practical. Performs and directs decontamination of personnel, equipment, materials, and work areas. Oversees decontamination efforts carried out by non-health physics personnel.

11. Environmental Sampling. May obtain some samples, such as charcoal filter samples, soil and surface water samples.

12. Respirators and Self-Contained Breathing Apparatus (SCBA) Equipment. Performs required routine inspections and checks of respirators and SCBA

equipment. Prepares respirators for reuse. Issues respirators and performs radiological surveys of respirators, including checking respirator cannisters for contamination. Performs functional testing of respiratory equipment.

13. Emergency/Abnormal Conditions. Analyzes indications of potential radiological problems based on quantitative measurement results within a particular system or area. Provides health physics coverage at the scene of a radiological incident to recommend or direct corrective actions to mitigate the consequences. Advises workers of immediate actions to be taken within the radiologically controlled area during a radiological incident. Responds as a radiological emergency team member to a site or general emergency, performing activities, such as issuing dosimetry as required by the Plant Emergency Plan, sampling off-site air for iodine, tracking a radioactive plume, performing as a post-accident re-entry team member, and obtaining and preparing post-accident samples. Responds to other abnormal plant conditions, such as portal monitor alarms, fire in controlled areas, constant air monitor alarms, area/process radiation monitor alarms, lost TLDs, off-scale pocket dosimeters, personnel exposure exceeding regulatory or administrative limits, and other radiological incidents.

14. Administration and Training. Performs some miscellaneous administrative tasks, such as initiating maintenance requests, reviewing health physics procedures, reviewing NRC health physics bulletins and regulations, reviewing daily personnel exposure records and personnel exposure history, and recording individual doses on exposure cards or radiation work permits. Participates in mock-up training and provides on-the-job training to health physics personnel.

15. Miscellaneous Supplies and Equipment. Assists in maintaining inventory of radiation protection supplies. Performs routine checks/audits of radiological emergency equipment and kits.

F. DESCRIPTION OF WORK ENVIRONMENT

Performs duties in various locations throughout the plant. Plant piping and equipment are divided among various floor levels in interconnected buildings. Some equipment is not enclosed. Access is restricted inside the primary containment during reactor operations and controlled to all known radiation areas under all conditions. Noise levels and temperatures may be excessive in the vicinity of some operating equipment. Exposed to inherent hazards that exist in nuclear power plant operation, such as electric shock, chemical hazards, high-temperature metals, radiation exposure, and the presence of high-pressure and high-temperature steam and water.

G. TOOLS AND EQUIPMENT

The tools and equipment in the following list are used by Senior/Lead Health Physics Technicians to varying degrees in performing their duties. In each tool/equipment category, the percent of Senior Technicians using the tool/equipment is indicated, based on the results of the national survey. Additional tools/equipment identified by write-ins during the survey are listed separately. (Tool and equipment lists for utility job descriptions should include the applicable items listed.)

	Percent of Senior/Lead HPTs Using Tool/Equipment
1. Laboratory Equipment	
Tools and equipment listed on survey questionnaires:	
1.01 Planchet	86
1.02 Hot plate	40
1.03 Pipette	44
1.04 Beaker	45
1.05 Filters and filter chimney	43
1.06 Eye dropper	36
1.07 Stir rods or magnetic stirrer	29
1.08 Heating/stirring plate	30
1.09 Reagent chemicals	31
1.10 Graduated cylinders	41
1.11 pH Meter/indicator	25
1.12 Conductivity cell and bridge	25
1.13 Centrifuge	19
1.14 Test tubes	24
1.15 Funnels	31
Additional tools and equipment identified:	
1.16 Convection oven	
2. Protective/Safety Equipment	
Tools and equipment listed on survey questionnaires:	
2.01 Rubber gloves	93
2.02 Rubber apron	27
2.03 Face shield	69
2.04 Respirators	96
2.05 Self-contained breathing apparatus (SCBA)	85

		Percent of Senior/Lead HPTs Using Tool/Equipment
2.	**Protective/Safety Equipment (Continued)**	
2.06	Fire extinguisher	62
2.07	Hard hat.	95
2.08	Ear protectors	94
2.09	Anti-contamination clothing (protective clothing).	97
2.10	Safety harness	57
2.11	Ground straps	21
2.12	Portable/movable shielding.	68
2.13	Explosimeter	41
2.14	Dust mask	50
2.15	Safety glasses/beta goggles.	92
2.16	Portable ventilation and filtration trains . .	70
2.17	Safety shoes	59
2.18	Bubble suit.	58
2.19	Steam suit	9
2.20	Cool suit.	18
2.21	Cold weather/rain clothing	69
2.22	Glove bags, tents, and other containment devices.	74
2.23	Step-off pads.	97
2.24	Radiation warning tape/rope/signs.	97
	Additional tools and equipment identified:	
2.25	Respirator washer	
2.26	Electric respirator drying cabinet	
3.	**Computers**	
	Tools and equipment listed on survey questionnaires:	
3.01	Hand-held calculator	97
3.02	Desk-top computer	70
3.03	Plant/process computer	48
3.04	Corporate computer (on or off site)	32

	Percent of Senior/Lead HPTs Using Tool/Equipment
3. Computers (Continued)	
3.05 Computer diagnostic software	24
Additional tools and equipment identified:	
3.06 Word processor	
4. Hand Tools	
Tools and equipment listed on survey questionnaires:	
4.01 Box wrenches	51
4.02 Burnishing tool	9
4.03 Calipers	10
4.04 Chisels	14
4.05 Diagonal cutter	17
4.06 Flaring tools	9
4.07 Fuse pullers	13
4.08 Gauges	30
4.09 Gear puller	7
4.10 Grease gun	11
4.11 Hack saw	23
4.12 Hammer	42
4.13 Knife	78
4.14 Level	12
4.15 Open-end wrenches	52
4.16 Pliers	65
4.17 Pocket screwdriver	71
4.18 Pop rivet gun	14
4.19 Punches	18
4.20 Ruler	78
4.21 Screwdriver	76
4.22 Screw starter	11
4.23 Scribe	14
4.24 Socket set	38
4.25 Spin-tight wrenches	16

	Percent of Senior/Lead HPTs Using Tool/Equipment
4. Hand Tools (Continued)	
4.26 Torque wrenches	13
4.27 Tweezers	83
4.28 Decontamination supplies	90
Additional tools and equipment identified:	
4.29 Banding tool	
4.30 Crimpers	
4.31 Shovel	
4.32 Speed wrench	
4.33 File	
5. Test and Measuring Equipment	
Tools and equipment listed on survey questionnaires:	
5.01 Ammeter	10
5.02 Barometer	23
5.03 Multimeter.	14
5.04 Heat probe.	8
5.05 Manometer.	12
5.06 Ohmmeter	13
5.07 Pyrometer	8
5.08 Radiation source	89
5.09 Test gauges	26
5.10 Thermometer.	50
5.11 Timer	65
5.12 Voltage tester	21
5.13 Hand-operated hydro pump (test pressure source)	7
5.14 Vibration detectors	4
5.15 Strobe light	4
5.16 Oxygen analyzer (portable)	51
5.17 Micrometer	9
5.18 Hydrometer	15

	Percent of Senior/Lead HPTs Using Tool/Equipment

5. Test and Measuring Equipment (Continued)

5.19	Scales	36
5.20	Strip chart recorder	57
5.21	Oscilloscope	11
5.22	Annemometer	6
5.23	Audiometer	6

Additional tools and equipment identified:

- 5.24 Quantitative fit test equipment
- 5.25 Respirator leak test equipment
- 5.26 Voltmeter
- 5.27 Condenser R meter
- 5.28 Circuit jumpers

6. Communications Equipment

Tools and equipment listed on survey questionnaires:

6.01	Two-way radio	73
6.02	Telephones.	99
6.03	Teletalk sys em/intercom	65
6.04	Fixed/portable flashing lights (for example, magenta flashing lights) . . .	30
6.05	Public address system/plant page	96
6.06	Respirator voice amplifiers.	36
6.07	Beeper	30

7. Radiation Monitoring Equipment

Tools and equipment listed on survey questionnaires:

7.01	Personnel dosimetry equipment	99
7.02	Portable beta-gamma monitoring instrument	98
7.03	Portable neutron monitoring instrument . .	91
7.04	Portable alpha monitoring instrument . . .	73
7.05	Frisker	100

		Percent of Senior/Lead HPTs Using Tool/Equipment
7.	**Radiation Monitoring Equipment (Continued)**	
7.06	Portable air sampler (high volume)	87
7.07	Portable air sampler (low volume)	91
7.08	Gaseous sampler	76
7.09	Smear pads	95
7.10	Counter scaler	89
7.11	Multi-channel analyzer	71
7.12	Whole-body counting equipment	60
7.13	Portal monitor	95
7.14	Proportional counter	84
7.15	Beta counter	82
7.16	Gamma well counter	45
7.17	Area radiation monitor	80
7.18	Process radiation monitor	60
7.19	Liquid scintillation counter	55
7.20	TLD reader (manual or automatic)	33
7.21	Personal air sampler (lapel type)	48
7.22	Constant air monitor (CAM/APD)	83
8.	**Power-Driven Equipment**	
	Tools and equipment listed on survey questionnaires:	
8.01	Air-driven wrenches	8
8.02	Compactor	18
8.03	Drill press	8
8.04	Portable drill	23
8.05	Grinder	12
8.06	Power-driven hydro pump	7
8.07	Power saw	10
8.08	Saber saw	8
8.09	Vacuum pump	32
8.10	Vacuum cleaner	37

	Percent of Senior/Lead HPTs Using Tool/Equipment
8. Power-Driven Equipment (Continued)	
8.11 Planer	5
8.12 Portable pumps	30
9. Work Aids	
Tools and equipment listed on survey questionnaires:	
9.01 Extension cord	95
9.02 Flashlight	94
9.03 Hot-air gun	15
9.04 Ladder	82
9.05 Test tubing (copper, plastic, tygon, etc.)	69
9.06 Rope	85
9.07 Liquid solvents	63
9.08 Spray solvents	62
9.09 Trouble light	44
9.10 Heat lamp	38
9.11 Plastic filler	13
9.12 Decontamination high-pressure water cabinet (hydrolaser)	21
9.13 Ultrasonic decontamination unit	36
9.14 Decontamination vapor degreaser unit	9
9.15 Decontamination electro-polisher unit	9
Additional tools and equipment identified:	
9.16 Forklift	
9.17 Barrel cart/hand truck	
9.18 Decontamination laundry unit	
9.19 Portable generator	
9.20 Mass flow heater	
9.21 Keylock control	

H. RESOURCE DOCUMENTS AND REFERENCES

The resource documents and references in the following list are used by Senior/ Lead Health Physics Technicians to varying degrees in performing their duties. For each reference, the percent of Senior Technicians using the reference is indicated based on the results of the national survey. Additional references identified by write-ins during the survey are listed separately. (Resource documents and reference lists for utility job descriptions should include the applicable items listed below.)

		Percent of Senior/Lead HPTs Using Reference
1.	**Operational Procedures**	
	References listed on survey questionnaires:	
1.01	Plant operating procedures	78
1.02	Surveillance procedures	68
1.03	Maintenance procedures	58
1.04	Site emergency plan	89
1.05	Emergency operating procedures	75
1.06	Abnormal, off-normal and alarm operating procedures	58
1.07	Operating procedures change manual (temporary operating procedures)	46
1.08	Fuel-handling procedures	54
1.09	Computer operating manual	49
1.10	Radiochemical laboratory manual (analytical and radiochemical procedures)	38
1.11	Radiological protection procedures	93
2.	**Technical References**	
	References listed on survey questionnaires:	
2.01	Equipment location drawings	73
2.02	Plant technical specifications	78
2.03	Final Safety Analysis Report (FSAR)	38

		Percent of Senior/Lead HPTs Using Reference
2.	**Technical References (Continued)**	
2.04	Code of Federal Regulations (10 CFR, 49 CFR, etc.)	93
2.05	Plant blueprints/drawings	70
2.06	Plant system descriptions	80
2.07	Electrical schematics	32
2.08	Equipment technical operating manuals	65
2.09	Plant setpoints manual	40
2.10	Steam tables	12
2.11	DOT regulations	59
2.12	State regulations	48
3.	**Operating Shift Documents**	
	References listed on survey questionnaires:	
3.01	Shift logs and status boards	71
3.02	Shift turnover sheets/books	75
3.03	Operations department orders/memos	44
3.04	Health Physics (Rad Chem) Department orders/memos	87
3.05	Survey log books	85
3.06	Temporary shielding installation log	38
3.07	Temporary jumper installation log (wiring or piping)	12
3.08	Equipment tag log (removal and restoration log)	15
3.09	Required work action log (work request log)	27
3.10	Radiation work permit log	89
3.11	Radioactive material accountability log	55
3.12	Radiation exposure alert list	65
3.13	Daily work log	70

	Percent of Senior/Lead HPTs Using Reference
4. Other References	
References listed on survey questionnaires:	
4.01 Station administrative directives	61
4.02 NRC Regulatory Guides, NUREGs, and I.E. bulletins and notices	90
4.03 Deviation report (non-conforming operations report)	51
4.04 Plant incident/condition reports.	70
4.05 Licensee Event Reports (LERs)	53
4.06 Special or required reading (e.g., system design, changes).	72
4.07 First aid instructions/safety bulletins . . .	80
4.08 Radiological health handbook	94
4.09 Chart of the nuclides	93
4.10 Health physics textbooks.	93
4.11 Training department lesson plans	66
4.12 INPO Notepad	42
4.13 INPO Guidelines	53

Additional references identified:

4.14 Vendor training books

4.15 Gamma energy tables (isotopic)

4.16 Gamma spectrum catalog

4.17 Consensus standards, (e.g., ANSI, ASTM)

4.18 Technical specialty publications

4.19 Professional/trade journals

4.20 Radioactive decay tables

4.21 Environmental texts

4.22 Environmental procedures

4.23 Respiratory protection procedures

4.24 Burial-site criteria

4.25 CNSI cask loading procedures

4. Other References (Continued)

4.26 Quality assurance manuals

4.27 Off-site dose calculation manual

4.28 Safety Information Letters

4.29 National Council of Radiation Protection and Measurements handbooks

4.30 International Commission of Radiological Protection publications

I. DESCRIPTION OF TARGET POPULATION

The target population from which persons may be drawn for training and advancement to Senior/Lead Health Physics Technician is the population of Junior Health Physics Technicians who satisfy any longevity and other required qualifications for Senior/Lead HPT. In addition to possessing the skills, knowledge, and aptitude required of a Junior Health Physics Technician, a candidate for Senior/Lead HPT training and advancement should possess the ability to:*

- o Establish priorities,
- o Develop recommendations for supervisors,
- o Coordinate and direct actions of other personnel,
- o Communicate and work effectively with all levels of the organization,
- o Plan activities,
- o Make quick and correct decisions in emergencies,
- o Perform administrative functions, and
- o Deal effectively with subordinates.

*Additional characteristics may be identified as target population requirements upon completion of Health Physics Technician position task analyses.

J. TASK INVENTORY

Tasks performed by Senior/Lead Technicians are listed in the following categories:

1. Counting Room and Associated Equipment
2. Radioactive Sources
3. Effluent Control (Liquid and Gaseous)
4. Process Monitoring
5. Portable Radiation Monitoring Equipment (Survey Meters and Air Samplers)
6. Personnel Monitoring Equipment (Friskers, Whole-Body Count Equipment)
7. Surveys (Radiation/Contamination/Airborne)
8. Radiation/Contamination Work Area Support
9. Shipping and Receiving Radioactive Materials
10. Decontamination
11. Environmental Sampling
12. Respirators and SCBA Equipment
13. Emergency/Abnormal Tasks
14. Administration/Training
15. Miscellaneous Supplies and Equipment

For tasks included in the survey questionnaire, the percent of plant and vendor Senior/Lead Health Physics Technicians who indicated on the questionnaire that they performed the task is indicated. This information provides an aid in making decisions regarding the applicability of a task for job descriptions at specific plants or companies. A low percent-performing rating for a specific task could be due to a combination of factors, including specialization (for example, only specific technicians assigned to decontamination), and organizational differences among utilities. Thus, each task should be evaluated individually for applicability to the plant. "Plant" Senior/Lead HPTs include utility employees and vendor employees on long-term assignment at plants. "Vendor" Senior/Lead HPTs are vendor employees on short-term, outage-type assignment at plants. Additional tasks identified through questionnaire write-ins are also included.

Survey questionnaire tasks and write-in tasks recommended for detailed analysis are indicated in Section 3.4.2 of this report.

JOB CODE: SENIOR/LEAD HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Senior/Lead HPTs Performing Task	Percent of Vendor Senior/Lead HPTs Performing Task
1.	Counting Room and Associated Equipment		
	Tasks listed on survey questionnaires:		
1.01	Perform background checks of counting room equipment (counter scalers)	81	77
1.02	Perform performance checks on counting room equipment (counter scalers)	78	68
1.03	Manually calculate airborne nuclide concentration of radioactive material from counting room data (using a prepared form)	79	74
1.04	Calibrate gross counting systems (such as Eberline MS-3, Tennelec LB-5500)	43	33
1.05	Prepare samples for counting	88	81
1.06	Operate gross gamma counting systems (manual or automatic)	82	75
1.07	Operate gross beta counters (manual or automatic)	80	79
1.08	Operate gross alpha counting systems (such as SAC-4)	76	68
1.09	Determine counter efficiency	74	65
1.10	Determine counter reliability (e.g., chi-squared determination)	56	38
1.11	Determine counter percent slope (response curve/detector voltage plateau)	57	34
1.12	Determine counter resolving time	26	24
1.13	Determine GeLi/intrinsic germanium detector operating parameters (detector efficiency, detector resolution, detector reliability, energy calibration, and background determination)	34	24

JOB CODE: SENIOR/LEAD HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Senior/Lead HPTs Performing Task	Percent of Vendor Senior/Lead HPTs Performing Task
1.	Counting Room and Associated Equipment (Continued)		
1.14	Determine Na I detector operating parameters (detector efficiency, detector resolution, detector reliability, energy calibration, and background determination)	29	17
1.15	Determine liquid scintillation counter efficiency	26	18
1.16	Prepare samples for liquid scintillation counter	43	31
1.17	Operate liquid scintillation counters	41	26
1.18	Calibrate liquid scintillation detectors	17	17
1.19	Update the gamma spectrometer nuclide library	13	12
1.20	Calibrate computer-based multi-channel analyzer	21	17
1.21	Calibrate stand-alone multi-channel analyzer	13	10
1.22	Count samples with computer-based multi-channel analyzer	54	37
1.23	Count samples with stand-alone multi-channel analyzer	23	29
1.24	Operate the gas flow proportional counter	68	53
1.25	Change the gas cylinder for the gas flow proportional counter	49	37
1.26	Operate the gamma well counter	25	25
1.27	Replace installed counting equipment detectors (such as GM tubes)	46	44
1.28	Refill the GeLi liquid nitrogen dewar	43	27
1.29	Input new calibration data into the isotopic identification computer	17	8

JOB CODE: SENIOR/LEAD HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Senior/Lead HPTs Performing Task	Percent of Vendor Senior/Lead HPTs Performing Task
1.	Counting Room and Associated Equipment (Continued)		
1.30	Prepare the isotopic identification computer for analysis	23	14
1.31	Calculate lower limit of detection (LLD) for counter scalers (such as SAC-4, LCS-1)	39	32
1.32	Calculate minimum detectable counts (MDCs) for counter scalers (such as SAC-4, LCS-1)	55	48
1.33	Perform decay constant calculations on air samples	54	51
1.34	Calculate weighted maximum permissible concentration (MPC) from isotopic data	70	64
1.35	Prepare counting data QC charts	28	8
1.36	Prepare spiked samples and standards from stock radioisotope solutions	16	8
1.37	Supervise (plan, budget, schedule, evaluate) counting room activities	14	8
	Additional tasks identified:		
1.38	Review and evaluate counted sample data (process, effluent, and environmental samples)		
2.	Radioactive Sources		
	Tasks listed on survey questionnaires:		
2.01	Perform radioactive sealed-source leak test (including documenting results)	60	35
2.02	Monitor radioactive sealed-source leak detection graphs and charts	11	7
2.03	Inventory radioactive sources (including documenting results)	55	37

JOB CODE: SENIOR/LEAD HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Senior/Lead HPTs Performing Task	Percent of Vendor Senior/Lead HPTs Performing Task
2.	Radioactive Sources (Continued)		
2.04	Operate calibration source well or source calibrator	56	31
2.05	Audit radioactive source and material records	22	14
2.06	Develop calibration charts for calibration sources	26	10
2.07	Transfer radioactive sources from/to other departments	58	50
2.08	Calculate radioactive source activity strengths	53	32
2.09	Dispose of decayed or no-longer-usable radioactive sources	26	12
2.10	Supervise control and use of radioactive sealed sources	41	22
	Additional tasks identified:		
2.11	Perform source distance calculations		
3.	Effluent Control (Liquid and Gaseous)		
	Tasks listed on survey questionnaires:		
3.01	Perform release rate calculations	39	15
3.02	Evaluate effluent release data	32	9
3.03	Prepare a gaseous waste release permit	27	9
3.04	Prepare a liquid waste release permit	33	11
3.05	Prepare a liquid release report	19	10
3.06	Prepare a gaseous effluent account report	15	7
3.07	Compile data for effluent release composite report	20	8

JOB CODE: SENIOR/LEAD HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Senior/Lead HPTs Performing Task	Percent of Vendor Senior/Lead HPTs Performing Task
3.	Effluent Control (Liquid and Gaseous) (Continued)		
3.08	Compile data for effluent disposal record	13	6
3.09	Supervise effluent control activities	5	3
4.	Process Monitoring (Liquid and Gaseous)		
	Tasks listed on survey questionnaires:		
4.01	Calibrate liquid process effluent radiation monitors	13	5
4.02	Calibrate gaseous process effluent radiation monitors	12	6
4.03	Calibrate the condenser off gas (COG) process vent monitors	7	5
4.04	Calibrate the stack monitors	12	6
4.05	Calibrate the dry well atmosphere activity monitors	4	4
4.06	Calibrate the essential service water monitors	9	5
4.07	Calibrate the reactor building vent monitors	13	6
4.08	Calibrate the reactor building closed cooling water/component cooling water monitor	10	4
4.09	Calibrate the turbine building vent monitors	7	5
4.10	Calibrate the constant air monitors (such as CAM, APD)	26	14
4.11	Change filters in CAMs	77	72
4.12	Change recording paper in CAMs	68	68
4.13	Calibrate the containment spray heat exchanger monitors	2	1
4.14	Calibrate the emergency condenser vent monitors	3	2

JOB CODE: SENIOR/LEAD HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Senior/Lead HPTs Performing Task	Percent of Vendor Senior/Lead HPTs Performing Task
4.	<u>Process Monitoring (Liquid and Gaseous) (Continued)</u>		
4.15	Calibrate the area radiation monitor portable calibration unit	9	10
4.16	Calibrate the stationary area radiation monitors	19	15
4.17	Calibrate the portable area radiation monitor	19	14
4.18	Set up portable area radiation monitors	58	56
4.19	Calibrate the post-accident monitors (steam jet air ejector, main steam line, containment high radiation system)	12	2
4.20	Replace detectors in process radiation monitors	10	10
4.21	Calculate process radiation monitor alarm setpoints	16	10
4.22	Assist in installation of new process radiation monitors (including set up)	12	10
4.23	Supervise process monitoring activities	5	4
	Additional tasks identified:		
4.24	Calibrate single-channel analyzer		
5.	<u>Portable Radiation Monitoring Equipment (Survey Meters and Air Samplers)</u>		
	Tasks listed on survey questionnaires:		
5.01	Calibrate portable neutron survey equipment (such as Portable Neutron RemCounter PNR-4)	33	17
5.02	Calibrate portable alpha survey equipment (such as Eberline PAC-4)	30	14

JOB CODE: SENIOR/LEAD HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Senior/Lead HPTs Performing Task	Percent of Vendor Senior/Lead HPTs Performing Task
5.	Portable Radiation Monitoring Equipment (Survey Meters and Air Samplers) (Continued)		
5.03	Calibrate portable beta-gamma survey equipment (such as Cutie Pie 740A, Eberline Ion Chamber Model RO-2A, Teletector)	41	25
5.04	Calibrate portable air sampling equipment	43	16
5.05	Field check portable radiation monitoring instruments	85	75
5.06	Calibrate the beta-gamma-alpha monitor (such as the Thyac III)	9	7
5.07	Operate portable neutron survey equipment (such as Portable Neutron Rem Counter PNR-4)	87	75
5.08	Operate portable alpha survey equipment (such as Eberline PAC-4)	67	67
5.09	Operate portable beta-gamma survey equipment (such as Cutie Pie 740A, Eberline Ion Chamber Model RO-2A, Teletector)	95	89
5.10	Operate portable air sampling equipment (such as RADECO, Eberline RAS-1)	91	89
5.11	Operate portable underwater gamma survey equipment (such as CPMU)	44	47
5.12	Perform minor repairs on portable radiation monitoring equipment (such as change batteries, change cables, replace mylar windows)	86	84
5.13	Perform major repairs on portable radiation monitoring equipment (such as repair and test circuit boards)	7	6
5.14	Verify proper operation of CAMs	73	67
5.15	Calibrate condenser R chambers	8	6

JOB CODE: SENIOR/LEAD HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Senior/Lead HPTs Performing Task	Percent of Vendor Senior/Lead HPTs Performing Task
5.	Portable Radiation Monitoring Equipment (Survey Meters and Air Samplers) (Continued)		
5.16	Plot calibration curves for portable radiation monitoring equipment	18	15
5.17	Supervise portable radiation monitoring activities	37	29
6.	Personnel Monitoring Equipment (Friskers, Whole-Body Count Equipment)		
	Tasks listed on survey questionnaires:		
6.01	Post general area TLDs	40	37
6.02	Perform initial issue of TLD/film badge	45	33
6.03	Operate the TLD reader to read TLDs	29	24
6.04	Prepare TLD for reissue	27	24
6.05	Perform TLD/film badge change out	38	35
6.06	Perform maintenance on TLD readers	11	6
6.07	Perform calibration of the TLD reader	13	8
6.08	Perform calibration checks of the TLD reader	22	14
6.09	Perform periodic QA checks of TLDs (that is, exposure to a known source)	24	17
6.10	Change film in film badges	12	14
6.11	Perform dosimeters drift check	53	46
6.12	Read pocket dosimeters	91	93
6.13	Zero pocket dosimeters	86	88

JOB CODE: SENIOR/LEAD HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Senior/Lead HPTs Performing Task	Percent of Vendor Senior/Lead HPTs Performing Task
6.	Personnel Monitoring Equipment (Friskers, Whole-Body Count Equipment) (Continued)		
6.14	Issue pocket dosimeters for use	78	77
6.15	Issue audible and visual dosimeters	45	55
6.16	Expose personnel dosimeters for calibration purposes (e.g., pocket dosimeters, TLDs, digital-audible alarm dosimeters)	45	31
6.17	Collect personnel dosimetery devices (film badges or TLDs)	44	43
6.18	Manually calculate estimated individual neutron radiation exposure	57	46
6.19	Perform initial receipt testing of dosimetry equipment (such as drift test, drop test)	35	20
6.20	Issue extremity dosimetry	65	58
6.21	Issue special purpose dosimetry (such as special neutron badges)	41	34
6.22	Evaluate results from extremity and special purpose dosimetry	44	34
6.23	Maintain computer records of radiation exposure	22	19
6.24	Perform background check on whole-body counter	46	25
6.25	Perform calibration checks (energy calibration and efficiency) on whole-body counter	33	18
6.26	Operate whole-body counter (WBC)	51	32
6.27	Obtain printout and/or plot of whole-body count data	41	26
6.28	Perform calculation for internal exposure based on WBC results	17	13

JOB CODE: SENIOR/LEAD HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Senior/Lead HPTs Performing Task	Percent of Vendor Senior/Lead HPTs Performing Task
6.	Personnel Monitoring Equipment (Friskers, Whole-Body Count Equipment) (Continued)		
6.29	Calibrate whole-body counting system	17	10
6.30	Select personnel for routine whole-body counts	14	12
6.31	Schedule personnel to have a whole-body count	24	23
6.32	Assign personnel to have periodic whole-body counts performed based on health physics measurements (such as air sampling results, bioassay results, nasal smears)	38	32
6.33	Collect a bioassay sample	20	20
6.34	Collect and count nasal smears	73	74
6.35	Evaluate nasal smears	68	67
6.36	Collect and count throat smears	14	13
6.37	Evaluate throat smears	13	11
6.38	Calibrate personnel monitoring friskers	37	23
6.39	Calibrate portal monitors	28	17
6.40	Perform routine source checks of friskers	73	70
6.41	Perform routine source checks of portal monitors	58	45
6.42	Perform personnel contamination monitoring (frisking)	93	92
6.43	Conduct functional check of equipment (hand and foot monitors, portable monitors, friskers, laundry monitors)	65	56
6.44	Supervise personnel monitoring activities	56	51

JOB CODE: SENIOR/LEAD HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Senior/Lead HPTs Performing Task	Percent of Vendor Senior/Lead HPTs Performing Task
7.	Surveys (Radiation/Contamination/Airborne)		
	Tasks listed on survey questionnaires:		
7.01	Perform pre-Radiation Work Permit (RWP) surveys	88	87
7.02	Perform periodic surveys at radiation work sites to evaluate changes in radiological conditions	89	91
7.03	Perform post-work surveys at radiation work sites	85	89
7.04	Perform (obtain, count, and document) an airborne activity (including iodine samples) survey	89	82
7.05	Perform (obtain, count, and document) an airborne gaseous activity survey	75	70
7.06	Perform (obtain, count, and document) a tritium activity sample	54	52
7.07	Determine percent maximum permissible concentration (MPC) (based on radionuclide) from air sample data	80	70
7.08	Select appropriate respiratory protection equipment based on air sample analysis	86	80
7.09	Review the results of air sample surveys	83	82
7.10	Perform (obtain, count, and document) a smear survey for loose surface contamination	91	90
7.11	Review the results of a smear survey	87	89
7.12	Perform periodic radiation and contamination surveys throughout the plant in non- radiologically controlled areas (warehouse, parking lot, lunch room, etc.)	85	81
7.13	Determine the location of radioactive hot spots	88	91
7.14	Post and label radioactive hot spots	87	90

JOB CODE: SENIOR/LEAD HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Senior/Lead HPTs Performing Task	Percent of Vendor Senior/Lead HPTs Performing Task
7.	Surveys (Radiation/Contamination/Airborne) (Continued)		
7.15	Prepare reports regarding radiation and contamination surveys	63	65
7.16	Maintain records and files on radiation, contamination, and airborne activity surveys	60	58
7.17	Perform a general radiation survey	91	91
7.18	Perform a high radiation area survey	90	89
7.19	Perform a temporary shielding survey	80	79
7.20	Perform an industrial hygiene survey (air quality, temperature, noise) to determine physical habitability of an area	28	27
7.21	Perform radiological surveys in support of reactor containment building/drywell entry while at power	72	63
7.22	Perform a neutron radiation survey	82	73
7.23	Perform on-the-job gross analysis of air samples (using portable survey instruments)	69	72
7.24	Perform surveys to support the movement of radioactive materials	85	86
7.25	Perform surveys in support of entry into areas of unknown radiological hazards	85	85
7.26	Perform a beta radiation survey	86	86
7.27	Perform radiological monitoring during industrial radiographic operations or other operations involving X-ray devices	68	60
7.28	Supervise the conduct of surveys (radiation/contamination/airborne)	49	46

JOB CODE: SENIOR/LEAD HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Senior/Lead HPTs Performing Task	Percent of Vendor Senior/Lead HPTs Performing Task
7.	Surveys (Radiation/Contamination/Airborne) (Continued)		
	Additional tasks identified:		
7.29	Determine survey frequencies based upon changes in radiological conditions		
8.	Radiation/Contamination Work Area Support		
	Tasks listed on survey questionnaires:		
8.01	Set up a control point	81	86
8.02	Set up a control area	84	84
8.03	Maintain a control point (that is, perform necessary surveys, supply required materials, logs, etc.)	78	86
8.04	Survey tools and equipment for release from a radiologically controlled area	91	91
8.05	Perform stay time calculations	86	84
8.06	Complete a Radiation Work Permit (RWP) (for example, clothing, dosimetry, and respirator requirements) based on survey data and radiological conditions expected	85	75
8.07	Determine required dosimetry for entry into a job coverage area	84	83
8.08	Determine proper dosimeter placement location on the body for entry into a job coverage area	85	87
8.09	Review RWP for completeness and obtain appropriate signatures for RWP approval	82	68
8.10	Estimate individual and total worker dose from the RWP information in accordance with ALARA procedures	69	62

JOB CODE: SENIOR/LEAD HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Senior/Lead HPTs Performing Task	Percent of Vendor Senior/Lead HPTs Performing Task
8.	Radiation/Contamination Work Area Support (Continued)		
8.11	Inspect work areas to ensure compliance with Radiation Work Permits and good work practices	90	86
8.12	Inspect plant areas for proper radiation posting, radioactive material storage, and contamination control	88	87
8.13	Post/remove posting of radiologically controlled areas	88	89
8.14	Update posting of radiologically controlled areas	86	88
8.15	Supervise the removal of personnel dosimetry equipment and protective clothing (including frisking)	81	86
8.16	Brief radiation workers on radiological hazards in the work area or changes in radiological conditions	90	91
8.17	Control worker access to a radiologically controlled area	83	86
8.18	Issue a stop work order when significant radiological discrepancies are discovered	78	79
8.19	Determine amount of shielding required using half-value layers or graphs	56	59
8.20	Direct the installation and removal of temporary shielding	70	74
8.21	Evaluate the effectiveness of temporary shielding	74	73
8.22	Prepare a containment area (tent) with associated ventilation to reduce personnel exposure to airborne contaminants	63	74
8.23	Prepare a glove box to reduce personnel exposure to airborne contaminants	41	53

JOB CODE: SENIOR/LEAD HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Senior/Lead HPTs Performing Task	Percent of Vendor Senior/Lead HPTs Performing Task
8.	Radiation/Contamination Work Area Support (Continued)		
8.24	Evaluate a work area for additional ALARA considerations	74	75
8.25	Perform certification inspections of tents, glove boxes, and other containment devices	34	39
8.26	Provide close health physics coverage for workers in high-dose jobs (for example, steam generator jumpers, control rod drive mechanism replacement)	82	84
8.27	Perform on-the-spot correction of workers not complying with proper radiological work practices or not following RWP requirements	87	89
8.28	Supervise health physics technicians in radiation/ contamination work area support	42	43
	Additional tasks identified:		
8.29	Evaluate containment device vent unit filters for replacement		
9.	Shipping and Receiving Radioactive Materials		
	Tasks listed on survey questionnaires:		
9.01	Analyze samples of radioactive material to determine shipping category (radionuclide content, oil and moisture content)	35	29
9.02	Determine transport group and classify radioactive material as Type A, Type B, or LSA	34	31
9.03	Prepare a Radiation Work Permit for handling and processing radioactive waste	65	38
9.04	Provide health physics coverage during preparation of a shipment of radioactive material	72	73

JOB CODE: SENIOR/LEAD HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Senior/Lead HPTs Performing Task	Percent of Vendor Senior/Lead HPTs Performing Task
9.	Shipping and Receiving Radioactive Materials (Continued)		
9.05	Survey a shipment of radioactive material prior to shipping	74	73
9.06	Select appropriate containers and package radioactive materials	25	34
9.07	Package (including labeling) dry radioactive waste material for shipment	39	50
9.08	Document packaged material survey data in the radioactive material shipping record	48	46
9.09	Placard the transport vehicle	51	52
9.10	Survey transport vehicles	70	70
9.11	Supervise loading radioactive material on transport vehicle	48	55
9.12	Examine reports accompanying radioactive material shipment received to ensure compliance with federal regulations	33	21
9.13	Perform radiation and contamination surveys of radioactive material received (including recording survey data on receipt form)	72	62
9.14	Maintain records of the receipt/shipment of radioactive materials	24	23
9.15	Perform a radiological survey in conjunction with the receipt of new fuel and radioactive sealed sources	65	50
9.16	Control the movement of radioactive material through unrestricted (non-radiological) areas of the plant	76	74
9.17	Direct storage of radioactive materials in the designated areas of the plant	70	70

JOB CODE: SENIOR/LEAD HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Senior/Lead HPTs Performing Task	Percent of Vendor Senior/Lead HPTs Performing Task
9.	Shipping and Receiving Radioactive Materials (Continued)		
9.18	Inspect the transport vehicle to ensure safe transportation of radioactive materials over public thoroughfares	26	25
9.19	Determine qualifications of receiver to receive radioactive material shipment	11	11
9.20	Obtain radioactive material shipping permits	12	13
9.21	Apply state and federal shipping requirements	25	20
9.22	Survey waste materials to segregate high and low level waste in preparation for shipment	48	58
9.23	Weigh drums and packages in preparation for shipment	26	44
9.24	Perform container inspections and tests on non-certified shipping containers and packages	12	15
9.25	Conduct surveillance of drum and box waste compactor operations	45	60
9.26	Segregate contaminated and non-contaminated trash generated within the radiological controlled area by frisking	51	55
9.27	Accompany radioactive materials shipments off site	13	11
9.28	Supervise the shipping and receiving of radioactive materials	15	14
10.	Decontamination		
	Tasks listed on survey questionnaires:		
10.01	Evaluate contaminated material and equipment to determine if decontamination effort is practical	85	77

JOB CODE: SENIOR/LEAD HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Senior/Lead HPTs Performing Task	Percent of Vendor Senior/Lead HPTs Performing Task
10.	Decontamination (Continued)		
10.02	Direct decontamination of equipment or materials	78	81
10.03	Perform decontamination of equipment or materials	74	77
10.04	Prepare decontamination solutions and agents for use (such as TURCO)	21	34
10.05	Direct decontamination of personnel	82	81
10.06	Decontaminate personnel (including documenting results)	79	82
10.07	Direct area decontamination	76	85
10.08	Perform area decontamination (including documenting results)	52	71
10.09	Collect potentially contaminated laundry	22	32
10.10	Sort laundry (high-level contamination from low-level contamination and non-contaminated articles)	16	16
10.11	Operate contaminated laundry facilities	7	10
10.12	Survey laundry for reuse	34	39
10.13	Perform routine maintenance of laundry facilities (such as change filters, cleaning solutions, etc.)	7	10
10.14	Direct contaminated laundry operations	13	14
10.15	Operate decontamination high pressure water cabinet equipment	6	9
10.16	Operate ultrasonic decontamination unit	20	24
10.17	Operate decontamination vapor degreaser unit	3	5
10.18	Operate decontamination electro-polisher unit	2	8

JOB CODE: SENIOR/LEAD HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Senior/Lead HPTs Performing Task	Percent of Vendor Senior/Lead HPTs Performing Task
10.	Decontamination (Continued)		
10.19	Oversee decontamination efforts of equipment and work areas carried out by non-health physics personnel	65	72
10.20	Supervise Health Physics Technician decontamination support	28	34
11.	Environmental Sampling		
	Tasks listed on survey questionnaires:		
11.01	Coordinate environmental sampling schedule	8	3
11.02	Obtain charcoal filter samples	41	46
11.03	Obtain surface water samples	22	21
11.04	Obtain surface water tritium sample	14	18
11.05	Obtain surface water beta sample	13	13
11.06	Obtain aquatic vegetation samples	6	2
11.07	Obtain zooplankton samples	2	1
11.08	Obtain benthic organism samples	2	1
11.09	Obtain fish samples	3	3
11.10	Obtain shrimp samples	0	1
11.11	Obtain oyster samples	1	1
11.12	Obtain bottom sediment samples	7	3
11.13	Obtain shoreline sediment samples	5	1
11.14	Obtain rain water samples	8	5

JOB CODE: SENIOR/LEAD HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Senior/Lead HPTs Performing Task	Percent of Vendor Senior/Lead HPTs Performing Task
11.	Environmental Sampling (Continued)		
11.15	Obtain groundwater samples	11	6
11.16	Obtain milk sample	9	4
11.17	Obtain terrestrial vegetation samples	12	2
11.18	Obtain food crop samples	10	2
11.19	Obtain fodder and feed crop samples	6	2
11.20	Obtain deep well samples	11	3
11.21	Obtain soil samples	24	20
11.22	Calibrate environmental area radiation monitors and sampling equipment	12	4
11.23	Perform routine maintenance on environmental air sampling equipment	17	8
11.24	Obtain meteorological monitoring data (including documentation)	10	5
11.25	Prepare environmental samples for transfers to proper system lab	14	5
11.26	Package environmental samples for transfer to outside facilities	14	5
11.27	Review environmental data for compliance with technical specifications	7	4
11.28	Supervise environmental sampling activities performed by Health Physics Technicians	5	1

JOB CODE: SENIOR/LEAD HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Senior/Lead HPTs Performing Task	Percent of Vendor Senior/Lead HPTs Performing Task
12.	Respirators and Self-Contained Breathing Apparatus (SCBA) Equipment		
	Tasks listed on survey questionnaires:		
12.01	Conduct required routine inspections of respirators	63	60
12.02	Repair respiratory protective equipment	45	40
12.03	Leak test respirator after repair	35	36
12.04	Perform checks of hose, regulator, and manifold for forced-air respirator	59	60
12.05	Prepare respirators for reuse	48	41
12.06	Issue respiratory protective equipment	74	58
12.07	Use respiratory protective equipment	91	87
12.08	Perform inspection of respirator cannisters prior to reuse	35	41
12.09	Perform radiological surveys of respirators	63	57
12.10	Decontaminate respirators	29	24
12.11	Package respirators for storage	41	34
12.12	Refill SCBA bottles	27	20
12.13	Perform checks on SCBA	50	38
12.14	Perform qualitative respirator fit tests for personnel	37	25
12.15	Perform quantitative respirator fit tests for personnel	30	23
12.16	Calibrate the respirator fitting booth	16	13
12.17	Perform functional test of respiratory equipment	45	48

JOB CODE: SENIOR/LEAD HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Senior/Lead HPTs Performing Task	Percent of Vendor Senior/Lead HPTs Performing Task
12.	Respirators and Self-Contained Breathing Apparatus (SCBA) Equipment (Continued)		
12.18	Check respirator cannisters for differential pressure requirement conformity	15	15
12.19	Check respirator cannisters for contamination	39	44
12.20	Replace the catalyst agent in a re-breather type respirator (such as BIOPACK-60, SCOTT, MSA)	9	6
12.21	Replace the oxygen bottle on a re-breather type respirator (such as BIOPAK-60, SCOTT, MSA)	25	29
12.22	Perform checks on a re-breather type respirator (such as BIOPACK-60, SCOTT, MSA)	21	18
12.23	Perform air quality checks on plant breathing air systems	31	28
12.24	Supervise respirators and SCBA equipment activities performed by health physics technicians	17	14
	Additional tasks identified:		
12.25	Set up positive pressure supplied air respiratory equipment		
13.	Emergency/Abnormal Tasks		
	Tasks listed on survey questionnaires:		
13.01	Respond as a radiological emergency team member to a site or general emergency	84	40
13.02	Provide health physics coverage of contaminated and/or injured personnel during an emergency (on site or at an area medical facility)	80	52
13.03	Segregate contaminated personnel in accordance with emergency contamination criteria	63	32

JOB CODE: SENIOR/LEAD HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Senior/Lead HPTs Performing Task	Percent of Vendor Senior/Lead HPTs Performing Task
13.	Emergency/Abnormal Tasks (Continued)		
13.04	Recommend emergency actions consistent with protective action guides	46	22
13.05	Assist in Emergency Response Planning during an emergency	35	20
13.06	Maintain the emergency data status boards	19	12
13.07	Issue additional dosimetry as required by the Plant Emergency Plan	52	22
13.08	Sample off-site air for iodine	63	28
13.09	Track a radioactive plume	56	23
13.10	Perform as a re-entry team member (post accident)	61	29
13.11	Direct the re-entry team	26	11
13.12	Obtain post-accident samples	53	31
13.13	Prepare and handle post-accident samples	47	26
13.14	Analyze post-accident samples	41	17
13.15	Store post-accident sample for recounting	36	15
13.16	Dispose of post-accident samples	31	13
13.17	Respond to an uncontrolled release of activity to the environment	65	37
13.18	Respond to a portal monitor alarm	82	74
13.19	Respond to a fire in a controlled area	63	51
13.20	Respond to a constant air monitor alarm	82	72
13.21	Respond to an area radiation monitor alarm	83	77
13.22	Respond to a process radiation monitor alarm	55	30

JOB CODE: SENIOR/LEAD HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Senior/Lead HPTs Performing Task	Percent of Vendor Senior/Lead HPTs Performing Task
13.	Emergency/Abnormal Tasks (Continued)		
13.23	Respond to a conductivity alarm	11	7
13.24	Respond to an effluent alarm	31	13
13.25	Respond to a fuel-handling accident	40	23
13.26	Respond to an abnormal TLD readout	36	22
13.27	Respond to a lost TLD	76	82
13.28	Respond to a pocket dosimeter being found off scale	84	89
13.29	Respond to personnel exposure exceeding regulatory or administrative limits	48	43
13.30	Provide health physics coverage for off-site radiological transportation incidents	24	10
13.31	Evaluate radiological incident (such as personnel contamination) to determine the cause	69	63
13.32	Respond to a fire as a member of the plant fire brigade	33	10
13.33	Coordinate a bomb search in controlled/radiation areas	13	8
13.34	Administer first aid to injured personnel	50	37
13.35	Administer CPR	28	18
13.36	Perform off-site dose assessment using a computer	16	4
13.37	Perform off-site dose assessment manually	24	10
	Additional tasks identified:		
13.38	Analyze indications of potential radiological problems based on quantitative measurement results within a particular system or area		

JOB CODE: SENIOR/LEAD HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Senior/Lead HPTs Performing Task	Percent of Vendor Senior/Lead HPTs Performing Task
13.	Emergency/Abnormal Tasks (Continued)		
13.39	Provide health physics coverage at the scene of an in-plant radiological incident to recommend or direct corrective actions to mitigate the consequences		
13.40	Advise management personnel of the significance and corrective action that should be taken during a radiological incident		
13.41	Advise workers of immediate actions to be taken within the radiologically controlled area during a radiological incident		
14.	Administration		
	Tasks listed on survey questionnaires:		
14.01	Initiate a maintenance work request	66	30
14.02	Compile data for steam generator composite report	11	12
14.03	Prepare special radiation control reports	22	18
14.04	Process requests to exceed the current radiation exposure authorization	26	20
14.05	Authorize requests to exceed the administrative radiation exposure limits	10	6
14.06	Order technical publications	12	8
14.07	Prepare routine radiation control reports	22	17
14.08	Prepare daily exposure status report	17	15
14.09	Collect data to be included in the radiation evaluation program	23	22

JOB CODE: SENIOR/LEAD HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Senior/Lead HPTs Performing Task	Percent of Vendor Senior/Lead HPTs Performing Task
14.	Administration (Continued)		
14.10	Conduct an ALARA evaluation of the radiation protection program	14	12
14.11	Review periodic radiation evaluation program	11	5
14.12	Maintain station man-rem plots and graphs	6	5
14.13	Prepare health physics procedures (including revision preparation)	39	20
14.14	Review health physics procedures (including proposed revisions)	59	48
14.15	Conduct job-specific ALARA review	26	27
14.16	Prepare post-outage ALARA report	7	5
14.17	Review meteorological monitoring reports	2	1
14.18	Review effluent and environmental monitoring reports	9	4
14.19	Review proposed plant design changes for radiological concerns	7	3
14.20	Review NRC health physics bulletins and regulations	60	53
14.21	Review personnel exposure history	39	36
14.22	Review contractor HPT qualifications prior to technician starting work	15	16
14.23	Review daily computer printout of personnel exposure	47	59
14.24	Schedule HPT coverage for outage support	19	23
14.25	Develop programs for initial training of HPTs within guidelines of plant and regulatory requirements	6	10

JOB CODE: SENIOR/LEAD HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Senior/Lead HPTs Performing Task	Percent of Vendor Senior/Lead HPTs Performing Task
14.	Administration (Continued)		
14.26	Develop periodic retraining programs for HPTs	4	6
14.27	Develop contractor HPT training program	3	5
14.28	Perform general employee training in radiological protection	11	10
14.29	Supervise conduct of the health physics portion of general employee training	3	5
14.30	Instruct personnel in respiratory protection	28	29
14.31	Instruct Health Physics Technicians in classroom training	9	11
14.32	Provide on-the-job training to health physics personnel	53	44
14.33	Conduct oral examinations to verify the adequacy of technicians and their training	17	9
14.34	Conduct written examinations to verify adequacy of technicians and their training	4	6
14.35	Supervise the conduct of Health Physics Technician training	6	3
14.36	Participate in mock-up training	40	50
14.37	Provide HP training to off-site organizations (firemen, rescue squads, etc.)	4	2
14.38	Assist in organizing the annual medical drill (injured contaminated man drill)	10	5
14.39	Assist in organizing the annual site emergency exercise	9	6
14.40	Interpret radioactive sealed-source leak test results	21	8
14.41	Interpret radioactive source inventory results	17	5

JOB CODE: SENIOR/LEAD HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Senior/Lead HPTs Performing Task	Percent of Vendor Senior/Lead HPTs Performing Task
14.	Administration (Continued)		
14.42	Evaluate process monitor results	9	2
14.43	Update exposure records using TLD data	16	15
14.44	Audit daily radiation exposure records	13	14
14.45	Record individual dose on daily exposure cards or RWPs	48	63
14.46	Review daily dosimeter records	24	37
14.47	Compare TLD data with pocket dosimeter data	23	29
14.48	Administer the health physics QA program (develop, review)	3	1
	Additional tasks identified:		
14.49	Prepare respiratory protection program reports		
15.	Miscellaneous Supplies and Equipment		
	Tasks listed on survey questionnaires:		
15.01	Maintain inventory of radiation protection supplies	38	31
15.02	Maintain change rooms stocked with protective clothing	16	15
15.03	Inventory and replenish first aid supply stations	17	5
15.04	Order supplies for outage work	20	10
15.05	Fill out a purchase requisition form	41	24
15.06	Perform routine checks/audits of radiological emergency equipment and kits	55	29
15.07	Issue and receive contaminated tools and equipment	19	23
15.08	Inventory contaminated tools and equipment	11	18

APPENDIX C

MODEL JOB DESCRIPTION FOR

HEALTH PHYSICS TECHNICIAN (JUNIOR)

A. JOB TITLE: Health Physics Technician (Junior)

B. REQUIRED QUALIFICATIONS

1. High school diploma or GED certificate (3).

2. Health physics experience as required by the utility (3).

3. Satisfactory completion of an applicable training program to meet ANSI or other requirements (3).

4. Satisfactory completion of any certification of performance capability required by the utility (for example, any oral or written qualification examination).*

5. Fulfillment of any additional qualifications required by the utility, which may include (but are not limited to) the following:*

   a) Required period of satisfactory performance in a Health Physics Technician position of lower classification,

   b) Satisfactory completion of formal education or vocational/technical training requirements relating to radiological controls,

   c) Required period of satisfactory performance at the facility,

   d) Satisfactory periodic physical examination, and

   e) Satisfactory completion of any selection testing required by the utility for the position of Health Physics Technician (Junior).

C. GENERAL DESCRIPTION OF JOB REQUIREMENTS†

Under directive supervision, is responsible for monitoring plant facilities and work environment to detect the presence and degree of radioactivity in connection with the operation of the plant. Maintains radiological control of immediate working environment to reduce radiation exposure to individual workers, to avoid exposures in excess of limits, and to ensure compliance with all appropriate regulations and procedures.

Conducts radiation, contamination, and airborne surveys, evaluating the results and taking immediate corrective action when necessary. Recommends proper respiratory protection equipment when conditions warrant. Determines radioactive hot

*Based on a sample of utility job descriptions.

†At some utilities, job incumbents may be permanently assigned to work in a particular specialty area (such as radioactive waste, calibration, dosimetry, or decontamination). In these cases, this part of the job description should address the applicable requirements of the job consistent with the specialty area of interest.

spot locations and installs required posting and shielding. Inspects, tests, adjusts, maintains, and calibrates equipment used for performing Health Physics Technician tasks.

Surveys radioactive waste shipments to ensure all plant, state, and federal regulations are complied with, and prepares necessary records and forms.

Performs decontamination of contaminated personnel, equipment, and areas. Monitors decontamination efforts to determine when acceptable levels have been achieved. Prepares tents and glove boxes to be used to minimize the spread of contamination and reduce personnel exposure to airborne contaminants.

Issues personnel monitoring devices and maintains appropriate dosimetry records. Performs whole-body counting.

Performs as a member of the radiological emergency team and provides assistance in responding to radiological incidents.

D. DESCRIPTION OF INCUMBENT'S POSITION WITHIN THE ORGANIZATION

Under the immediate supervision of a Senior/Lead Health Physics Technician and the general supervision of the Health Physics Technician Foreman/Supervisor. May direct the activities of one or more Assistant Health Physics Technicians/Trainees as necessary in completing assigned tasks. In emergencies, when there is not time to ask for direction from supervisors, may operate on individual initiative to correct the existing condition or to save life or property.

Principal lines of promotion are from Assistant Health Physics Technician/Trainee and to Senior Health Physics Technician.

E. DESCRIPTION OF MAJOR JOB AREAS (FUNCTIONAL DUTIES)*

1. Counting Room Activities. Performs background and performance checks on counting room equipment. Prepares samples for counting. Operates gross alpha, beta, and gamma counting systems and multi-channel analyzers. Determines counter efficiency, reliability, and percent slope (response curve/detector voltage plateau). Performs calculations, such as minimum detectable counts for counter scalers, decay constant calculations on air samples, airborne nuclide concentration of radioactive material, and weighted maximum permissible concentration from isotopic data. Performs minor repairs, such as replacing installed counting equipment detectors.

*At some utilities, job incumbents may be permanently assigned to work in a particular specialty area (such as radioactive waste, calibration, dosimetry, or decontamination). In these cases, this part of the job description should address the applicable requirements of the job consistent with the specialty area of interest.

2. Radioactive Sources. Inventories radioactive sources and documents results. Operates calibration source well or source calibrator. May perform radioactive sealed-source leak tests and calculate radioactive source activity strengths. Transfers radioactive sources from/to other departments.

3. Effluent Control. May perform release rate calculations and evaluate effluent release data. May prepare waste release permits.

4. Process Monitoring. May set up portable area radiation monitors. Performs minor maintenance on constant air monitors, such as changing filters and recording paper.

5. Portable Radiation Monitoring. Field checks and operates portable neutron, alpha, and beta-gamma survey equipment. Operates portable air sampling equipment and verifies proper operation of constant air monitors. Performs minor repairs on portable radiation monitoring equipment. Performs calibrations on portable neutron, alpha, beta-gamma survey equipment and air sampling equipment.

6. Personnel Monitoring. Issues and collects all types of dosimetry devices [pocket dosimeters, film badges, thermal-luminescent dosimeters (TLDs) extremity dosimetry, and special-purpose dosimetry]. Exposes personnel dosimeters for calibration purposes and performs dosimeter drift checks. Performs initial receipt testing of dosimetry equipment. Performs background checks and calibration checks, and operates whole-body counters. Assists in assigning personnel to have periodic whole-body counts performed and may plot whole-body count data. Collects, counts, and evaluates nasal smears. Performs routine source checks and functional checks of friskers and portal monitors. Performs personnel contamination monitoring.

7. Surveys (Radiation/Contamination/Airborne). Performs pre-work and post-work surveys at radiation work sites and periodic surveys to evaluate changes in radiological conditions at work sites. Reviews the results of air sample surveys and determines percent maximum permissible concentration and appropriate respiratory protection equipment based on air sample results. Reviews the results of smear surveys for loose surface contamination. Determines the location of radioactive hot spots and the posting and labeling required. Performs (obtains, counts, and documents) radiological surveys conducted, including airborne activity and gaseous activity, smear, general radiation, high radiation, temporary shielding, neutron radiation, and beta radiation surveys. Performs radiological surveys to support specific activities (reactor containment/drywell entry while at power, movement of radioactive materials, void entry, and industrial radiographic operations). Prepares and maintains records and files regarding radiation and contamination surveys.

8. Radiation/Contamination Work Area Support. Sets up control points and control areas. Performs routine functions while maintaining a control point, such as performing necessary surveys, performing stay-time calculations, completing radiation work permits, determining dosimetry requirements, estimating worker dose in accordance with ALARA procedures, inspecting work areas to ensure compliance with radiation work permits, and supervising the removal of personnel dosimetry equipment and protective clothing. Performs on-the-spot corrections of workers not complying with proper radiological

work practices and may issue stop-work orders when significant radiological discrepancies are discovered. May prepare containment areas (tents) with associated ventilation to reduce personnel exposure to airborne contaminants. Provides close health physics coverage for workers in high-dose jobs.

9. Shipping and Receiving Radioactive Materials. Provides health physics coverage during preparation of radioactive waste shipments, which may include conducting appropriate surveys of radioactive materials and transport vehicles, packaging dry radioactive waste material, documenting survey data on shipping records, and placarding transport vehicles. Segregates contaminated and non-contaminated trash generated within radiologically controlled areas. Performs radiation and contamination surveys of radioactive material received. May perform radiological surveys in conjunction with the receipt of new fuel and radioactive sealed sources. Controls the movement of radioactive material through unrestricted areas of the plant and may direct storage of radioactive materials in the designated areas of the plant.

10. Decontamination. Evaluates contaminated material and equipment to determine if decontamination effort is practical. Performs decontamination of personnel, equipment, materials, and work areas. Oversees decontamination efforts carried out by non-health physics personnel.

11. Environmental Sampling. May obtain some samples, such as charcoal filter samples.

12. Respirators and Self-Contained Breathing Apparatus (SCBA) Equipment. Performs required routine inspections and checks of respirators and SCBA equipment. Prepares respirators for reuse. Issues respirators and performs radiological surveys of respirators, including checking respirator cannisters for contamination. Performs functional testing of respiratory equipment. May perform qualitative and quantitative respirator fit tests for personnel.

13. Emergency/Abnormal Conditions. Advises workers of immediate actions to be taken within the radiologically controlled area during a radiological incident. Responds as a radiological emergency team member to a site or general emergency, performing activities, such as issuing dosimetry as required by the Plant Emergency Plan, sampling off-site air for iodine, and performing as a post-accident re-entry team member. Responds to other abnormal plant conditions, such as portal monitor alarms, fire in controlled areas, constant air monitor alarms, area radiation monitor alarms, lost TLDs, off-scale pocket dosimeters, personnel exposure exceeding regulatory or administrative limits, and other radiological incidents.

14. Administration and Training. Performs some miscellaneous administrative tasks, such as initiating maintenance requests, reviewing health physics procedures, reviewing NRC health physics bulletins and regulations, reviewing daily personnel exposure records and personnel exposure history, and recording individual doses on exposure cards or radiation work permits. Participates in training.

15. Miscellaneous Supplies and Equipment. Assists in maintaining inventory of radiation protection supplies. Performs routine checks/audits of radiological emergency equipment and kits.

F. DESCRIPTION OF WORK ENVIRONMENT

Performs duties in various locations throughout the plant. Plant piping and equipment are divided among various floor levels in interconnected buildings. Some equipment is not enclosed. Access is restricted inside the primary containment during reactor operations and controlled to all known radiation areas under all conditions. Noise levels and temperatures may be excessive in the vicinity of some operating equipment. Exposed to inherent hazards that exist in nuclear power plant operation, such as electric shock, chemical hazards, high-temperature metals, radiation exposure, and the presence of high-pressure and high-temperature steam and water.

G. TOOLS AND EQUIPMENT

The tools and equipment in the following list are used by Junior Health Physics Technicians to varying degrees in performing their duties. In each tool/equipment category, the percent of Junior Health Physics Technicians using the tool/equipment is indicated, based on the results of the national survey. Additional tools/equipment identified by write-ins during the survey are listed separately. (Tool and equipment lists for utility job descriptions should include the applicable items listed.)

1. Laboratory Equipment

Tools and equipment listed on survey questionnaires:

		Percent of Junior HPTs Using Tool/Equipment
1.01	Planchet	87
1.02	Hot plate	37
1.03	Pipette	50
1.04	Beaker	46
1.05	Filters and filter chimney	50
1.06	Eye dropper	42
1.07	Stir rods or magnetic stirrer	39
1.08	Heating/stirring plate	35
1.09	Reagent chemicals	36
1.10	Graduated cylinders	39
1.11	pH Meter/indicator	32
1.12	Conductivity cell and bridge	31
1.13	Centrifuge	25
1.14	Test tubes	26

	Percent of Junior HPTs Using Tool/Equipment
1. Laboratory Equipment (Continued)	
1.15 Funnels	34
Additional tools and equipment identified:	
1.16 Convection oven	
2. Protective/Safety Equipment	
Tools and equipment listed on survey questionnaires:	
2.01 Rubber gloves	92
2.02 Rubber apron	32
2.03 Face shield	63
2.04 Respirators	93
2.05 Self-contained breathing apparatus (SCBA)	80
2.06 Fire extinguisher	66
2.07 Hard hat	99
2.08 Ear protectors	95
2.09 Anti-contamination clothing (protective clothing)	97
2.10 Safety harness	44
2.11 Ground straps	23
2.12 Portable/movable shielding	55
2.13 Explosimeter	42
2.14 Dust mask	48
2.15 Safety glasses/beta goggles	93
2.16 Portable ventilation and filtration trains	48
2.17 Safety shoes	42
2.18 Bubble suit	47
2.19 Steam suit	10
2.20 Cool suit	16
2.21 Cold weather/rain clothing	73
2.22 Glove bags, tents, and other containment devices	67
2.23 Step-off pads	97

	Percent of Junior HPTs Using Tool/Equipment
2. Protective/Safety Equipment (Continued)	
2.24 Radiation warning tape/rope/signs.	94
Additional tools and equipment identified:	
2.25 Respirator washer	
2.26 Electric respirator drying cabinet	
3. Computers	
Tools and equipment listed on survey questionnaires:	
3.01 Hand-held calculator	97
3.02 Desk-top computer	69
3.03 Plant/process computer	51
3.04 Corporate computer (on or off site)	30
3.05 Computer diagnostic software	26
Additional tools and equipment identified:	
3.06 Word processor	
4. Hand Tools	
Tools and equipment listed on survey questionnaires:	
4.01 Box wrenches.	52
4.02 Burnishing tool	6
4.03 Calipers	9
4.04 Chisels	12
4.05 Diagonal cutter.	12
4.06 Flaring tools	6
4.07 Fuse pullers	11
4.08 Gauges	38
4.09 Gear puller.	4
4.10 Grease gun.	8
4.11 Hack saw	15
4.12 Hammer	43

	Percent of Junior HPTs Using Tool/Equipment
4. Hand Tools (Continued)	
4.13 Knife	80
4.14 Level	15
4.15 Open-end wrenches	51
4.16 Pliers	69
4.17 Pocket screwdriver	78
4.18 Pop rivet gun	12
4.19 Punches	15
4.20 Ruler	73
4.21 Screwdriver	78
4.22 Screw starter	13
4.23 Scribe	9
4.24 Socket set	38
4.25 Spin-tight wrenches	13
4.26 Torque wrenches	14
4.27 Tweezers	86
4.28 Decontamination supplies	95
Additional tools and equipment identified:	
4.29 Banding tool	
4.30 Crimpers	
4.31 Shovel	
4.32 Speed wrench	
4.33 File	
5. Test and Measuring Equipment	
Tools and equipment listed on survey questionnaires:	
5.01 Ammeter	8
5.02 Barometer	21
5.03 Multimeter	9
5.04 Heat probe	7
5.05 Manometer	14

		Percent of Junior HPTs Using Tool/Equipment
5.	**Test and Measuring Equipment (Continued)**	
5.06	Ohmmeter	12
5.07	Pyrometer	4
5.08	Radiation source	89
5.09	Test gauges	26
5.10	Thermometer.	47
5.11	Timer	61
5.12	Voltage tester	20
5.13	Hand-operated hydro pump (test pressure source)	2
5.14	Vibration detectors	0
5.15	Strobe light	2
5.16	Oxygen analyzer (portable)	56
5.17	Micrometer	9
5.18	Hydrometer	15
5.19	Scales	37
5.20	Strip chart recorder	46
5.21	Oscilloscope	11
5.22	Annemometer	1
5.23	Audiometer	6
	Additional tools and equipment identified:	
5.24	Quantitative fit test equipment	
5.25	Respirator leak test equipment	
5.26	Voltmeter	
5.27	Condenser R meter	
5.28	Circuit jumpers	
6.	**Communications Equipment**	
	Tools and equipment listed on survey questionnaires:	
6.01	Two-way radio	65
6.02	Telephones.	98

		Percent of Junior HPTs Using Tool/Equipment
6.	**Communications Equipment (Continued)**	
6.03	Teletalk system/intercom	64
6.04	Fixed/portable flashing lights (for example, magenta flashing lights) . . .	35
6.05	Public address system/plant page	93
6.06	Respirator voice amplifiers.	27
6.07	Beeper	28
7.	**Radiation Monitoring Equipment**	
	Tools and equipment listed on survey questionnaires:	
7.01	Personnel dosimetry equipment	93
7.02	Portable beta-gamma monitoring instrument	95
7.03	Portable neutron monitoring instrument . .	79
7.04	Portable alpha monitoring instrument . . .	64
7.05	Frisker	97
7.06	Portable air sampler (high volume)	82
7.07	Portable air sampler (low volume)	88
7.08	Gaseous sampler	61
7.09	Smear pads.	95
7.10	Counter scaler	77
7.11	Multi-channel analyzer	53
7.12	Whole-body counting equipment.	64
7.13	Portal monitor	94
7.14	Proportional counter	85
7.15	Beta counter	79
7.16	Gamma well counter	43
7.17	Area radiation monitor	75
7.18	Process radiation monitor	46
7.19	Liquid scintillation counter.	45
7.20	TLD reader (manual or automatic).	33
7.21	Personal air sampler (lapel type)	29
7.22	Constant air monitor (CAM/APD)	81

	Percent of Junior HPTs Using Tool/Equipment

8. Power-Driven Equipment

Tools and equipment listed on survey questionnaires:

		Percent of Junior HPTs Using Tool/Equipment
8.01	Air-driven wrenches	6
8.02	Compactor	17
8.03	Drill press	3
8.04	Portable drill	15
8.05	Grinder	5
8.06	Power-driven hydro pump	5
8.07	Power saw	9
8.08	Saber saw	6
8.09	Vacuum pump	20
8.10	Vacuum cleaner	28
8.11	Planer	4
8.12	Portable pumps	12

9. Work Aids

Tools and equipment listed on survey questionnaires:

		Percent of Junior HPTs Using Tool/Equipment
9.01	Extension cord	95
9.02	Flashlight	93
9.03	Hot-air gun	6
9.04	Ladder	80
9.05	Test tubing (copper, plastic, tygon, etc.)	65
9.06	Rope	82
9.07	Liquid solvents	57
9.08	Spray solvents	57
9.09	Trouble light	32
9.10	Heat lamp	38
9.11	Plastic filler	8
9.12	Decontamination high-pressure water cabinet (hydrolaser)	20
9.13	Ultrasonic decontamination unit	26
9.14	Decontamination vapor degreaser unit	5

	Percent of Junior HPTs Using Tool/Equipment
9. Work Aids (Continued)	
9.15 Decontamination electro-polisher unit . . .	8

Additional tools and equipment identified:

9.16 Forklift

9.17 Barrel cart/hand truck

9.18 Decontamination laundry unit

9.19 Portable generator

9.20 Mass flow heater

9.21 Keylock control

H. RESOURCE DOCUMENTS AND REFERENCES

The resource documents and references in the following list are used by Junior Health Physics Technicians to varying degrees in performing their duties. For each reference, the percent of Junior Health Physics Technicians using the reference is indicated based on the results of the national survey. Additional references identified by write-ins during the survey are listed separately. (Resource documents and reference lists for utility job descriptions should include the applicable items listed below.)

		Percent of Junior HPTs Using Reference

1. Operational Procedures

References listed on survey questionnaires:

		Percent of Junior HPTs Using Reference
1.01	Plant operating procedures	77
1.02	Surveillance procedures	62
1.03	Maintenance procedures	45
1.04	Site emergency plan	90
1.05	Emergency operating procedures	77
1.06	Abnormal, off-normal, and alarm operating procedures	55
1.07	Operating procedures change manual (temporary operating procedures)	42
1.08	Fuel-handling procedures	50
1.09	Computer operating manual	55
1.10	Radiochemical laboratory manual (analytical and radiochemical procedures)	43
1.11	Radiological protection procedures	95

2. Technical References

References listed on survey questionnaires:

		Percent of Junior HPTs Using Reference
2.01	Equipment location drawings	58
2.02	Plant technical specifications	73
2.03	Final Safety Analysis Report (FSAR)	40
2.04	Code of Federal Regulations (10 CFR, 49 CFR, etc.)	96
2.05	Plant blueprints/drawings	56

		Percent of Junior HPTs Using Reference
2.	**Technical References (Continued)**	
2.06	Plant system descriptions	71
2.07	Electrical schematics	20
2.08	Equipment technical operating manuals . .	60
2.09	Plant setpoints manual.	33
2.10	Steam tables	12
2.11	DOT regulations	62
2.12	State regulations	52
3.	**Operating Shift Documents**	
	References listed on survey questionnaires:	
3.01	Shift logs and status boards.	63
3.02	Shift turnover sheets/books.	71
3.03	Operations department orders/memos . . .	36
3.04	Health Physics (Rad Chem) Department orders/memos	84
3.05	Survey log books	84
3.06	Temporary shielding installation log	32
3.07	Temporary jumper installation log (wiring or piping)	4
3.08	Equipment tag log (removal and restoration log)	12
3.09	Required work action log (work request log).	24
3.10	Radiation work permit log	79
3.11	Radioactive material accountability log.	44
3.12	Radiation exposure alert list	55
3.13	Daily work log	71

	Percent of Junior HPTs Using Reference
4. Other References	
References listed on survey questionnaires:	
4.01 Station administrative directives	41
4.02 NRC Regulatory Guides, NUREGs, and I.E. bulletins and notices	88
4.03 Deviation report (non-conforming operations report)	44
4.04 Plant incident/condition reports	65
4.05 Licensee Event Reports (LERs)	51
4.06 Special or required reading (e.g., system design, changes)	69
4.07 First aid instructions/safety bulletins	83
4.08 Radiological health handbook	92
4.09 Chart of the nuclides	89
4.10 Health physics textbooks	89
4.11 Training department lesson plans	59
4.12 INPO Notepad	34
4.13 INPO Guidelines	48

Additional references identified:

4.14 Vendor training books

4.15 Gamma energy tables (isotopic)

4.16 Gamma spectrum catalog

4.17 Consensus standards (e.g., ANSI, ASTM)

4.18 Technical specialty publications

4.19 Professional/trade journals

4.20 Radioactive decay tables

4.21 Environmental texts

4.22 Environmental procedures

4.23 Respiratory protection procedures

4.24 Burial-site criteria

4.25 CNSI cask loading procedures

4.26 Quality assurance manuals

4. Other References (Continued)

4.27 Off-site dose calculation manual

4.28 Safety Information Letters

4.29 National Council of Radiation Protection and Measurements handbooks

4.30 International Commission of Radiological Protection publications

I. DESCRIPTION OF TARGET POPULATION

The target population from which persons may be drawn for training and advancement to Junior Health Physics Technician is the population of Assistant Health Physics Technicians/Trainees who have successfully carried out the duties and tasks required of them for the required period of time. In addition to possessing the skills, knowledge, and aptitude required of an Assistant Health Physics Technician/Trainee, a candidate for training and advancement to Junior Health Physics Technician should be able to:*

- o Retain and recall information,
- o Communicate verbal and written information clearly,
- o React in a calm, rational manner under stress,
- o Be observant and alert,
- o Be able to follow definitive written or oral instructions, and
- o Be able to work in cramped spaces, wearing radiological protective clothing and respiratory protection for prolonged periods of time.

*Additional characteristics may be identified as target population requirements upon completion of Health Physics Technician position task analyses.

J. TASK INVENTORY

Tasks performed by Senior/Lead Technicians are listed in the following categories:

1. Counting Room and Associated Equipment
2. Radioactive Sources
3. Effluent Control (Liquid and Gaseous)
4. Process Monitoring
5. Portable Radiation Monitoring Equipment (Survey Meters and Air Samplers)
6. Personnel Monitoring Equipment (Friskers, Whole-Body Count Equipment)
7. Surveys (Radiation/Contamination/Airborne)
8. Radiation/Contamination Work Area Support
9. Shipping and Receiving Radioactive Materials
10. Decontamination
11. Environmental Sampling
12. Respirators and SCBA Equipment
13. Emergency/Abnormal Tasks
14. Administration/Training
15. Miscellaneous Supplies and Equipment

For tasks included in the survey questionnaire, the percent of plant and vendor Junior Health Physics Technicians who indicated on the questionnaire that they performed the task is indicated. This information provides an aid in making decisions regarding the applicability of a task for job descriptions at specific plants or companies. A low percent-performing rating for a specific task could be due to a combination of factors, including specialization (for example, only specific technicians assigned to decontamination), and organizational differences among utilities. Thus, each task should be evaluated individually for applicability to the plant. "Plant" Senior/Lead HPTs include utility employees and vendor employees on long-term assignment at plants. "Vendor" Senior/Lead HPTs are vendor employees on short-term, outage-type assignment at plants. Additional tasks identified through questionnaire write-ins are also included.

Survey questionnaire tasks and write-in tasks recommended for detailed analysis are indicated in Section 3.4.2 of this report.

JOB CODE: JUNIOR HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Junior HPTs Performing Task	Percent of Vendor Junior HPTs Performing Task
1.	<u>Counting Room and Associated Equipment</u>		
	Tasks listed on survey questionnaires:		
1.01	Perform background checks of counting room equipment (counter scalers)	77	54
1.02	Perform performance checks on counting room equipment (counter scalers)	65	48
1.03	Manually calculate airborne nuclide concentration of radioactive material from counting room data (using a prepared form)	77	40
1.04	Calibrate gross counting systems (such as Eberline MS-3, Tennelec LB-5500)	33	25
1.05	Prepare samples for counting	90	60
1.06	Operate gross gamma counting systems (manual or automatic)	77	60
1.07	Operate gross beta counters (manual or automatic)	71	57
1.08	Operate gross alpha counting systems (such as SAC-4)	58	45
1.09	Determine counter efficiency	63	28
1.10	Determine counter reliability (e.g., chi-squared determination)	46	31
1.11	Determine counter percent slope (response curve/detector voltage plateau)	46	25
1.12	Determine counter resolving time	33	22
1.13	Determine GeLi/intrinsic germanium detector operating parameters (detector efficiency, detector resolution, detector reliability, energy calibration, and background determination)	25	14

JOB CODE: JUNIOR HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Junior HPTs Performing Task	Percent of Vendor Junior HPTs Performing Task
1.	Counting Room and Associated Equipment (Continued)		
1.14	Determine Na I detector operating parameters (detector efficiency, detector resolution, detector reliability, energy calibration, and background determination)	30	50
1.15	Determine liquid scintillation counter efficiency	20	14
1.16	Prepare samples for liquid scintillation counter	33	17
1.17	Operate liquid scintillation counters	26	20
1.18	Calibrate liquid scintillation detectors	14	11
1.19	Update the gamma spectrometer nuclide library	11	11
1.20	Calibrate computer-based multi-channel analyzer	20	8
1.21	Calibrate stand-alone multi-channel analyzer	8	8
1.22	Count samples with computer-based multi-channel analyzer	35	22
1.23	Count samples with stand-alone multi-channel analyzer	13	17
1.24	Operate the gas flow proportional counter	69	40
1.25	Change the gas cylinder for the gas flow proportional counter	45	31
1.26	Operate the gamma well counter	22	8
1.27	Replace installed counting equipment detectors (such as GM tubes)	40	25
1.28	Refill the GeLi liquid nitrogen dewar	33	17
1.29	Input new calibration data into the isotopic identification computer	10	11

JOB CODE: JUNIOR HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Junior HPTs Performing Task	Percent of Vendor Junior HPTs Performing Task
1.	Counting Room and Associated Equipment (Continued)		
1.30	Prepare the isotopic identification computer for analysis	13	8
1.31	Calculate lower limit of detection (LLD) for counter scalers (such as SAC-4, LCS-1)	28	14
1.32	Calculate minimum detectable counts (MDCs) for counter scalers (such as SAC-4, LCS-1)	50	25
1.33	Perform decay constant calculations on air samples	46	22
1.34	Calculate weighted maximum permissible concentration (MPC) from isotopic data	58	31
1.35	Prepare counting data QC charts	22	8
1.36	Prepare spiked samples and standards from stock radioisotope solutions	12	2
1.37	Supervise (plan, budget, schedule, evaluate) counting room activities	7	2
	Additional tasks identified:		
1.38	Review and evaluate counted sample data (process, effluent, and environmental samples)		
2.	Radioactive Sources		
	Tasks listed on survey questionnaires:		
2.01	Perform radioactive sealed-source leak test (including documenting results)	44	14
2.02	Monitor radioactive sealed-source leak detection graphs and charts	10	2
2.03	Inventory radioactive sources (including documenting results)	44	20

JOB CODE: JUNIOR HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Junior HPTs Performing Task	Percent of Vendor Junior HPTs Performing Task
2.	Radioactive Sources (Continued)		
2.04	Operate calibration source well or source calibrator	56	20
2.05	Audit radioactive source and material records	15	14
2.06	Develop calibration charts for calibration sources	20	5
2.07	Transfer radioactive sources from/to other departments	54	42
2.08	Calculate radioactive source activity strengths	50	22
2.09	Dispose of decayed or no-longer-usable radioactive sources	26	0
2.10	Supervise control and use of radioactive sealed sources	18	8
	Additional tasks identified:		
2.11	Perform source distance calculations		
3.	Effluent Control (Liquid and Gaseous)		
	Tasks listed on survey questionnaires:		
3.01	Perform release rate calculations	30	8
3.02	Evaluate effluent release data	27	5
3.03	Prepare a gaseous waste release permit	15	5
3.04	Prepare a liquid waste release permit	25	5
3.05	Prepare a liquid release report	24	5
3.06	Prepare a gaseous effluent account report	20	5
3.07	Compile data for effluent release composite report	21	2

JOB CODE: JUNIOR HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Junior HPTs Performing Task	Percent of Vendor Junior HPTs Performing Task
3.	Effluent Control (Liquid and Gaseous) (Continued)		
3.08	Compile data for effluent disposal record	14	2
3.09	Supervise effluent control activities	2	5
4.	Process Monitoring (Liquid and Gaseous)		
	Tasks listed on survey questionnaires:		
4.01	Calibrate liquid process effluent radiation monitors	16	2
4.02	Calibrate gaseous process effluent radiation monitors	14	5
4.03	Calibrate the condenser off gas (COG) process vent monitors	11	2
4.04	Calibrate the stack monitors	12	2
4.05	Calibrate the dry well atmosphere activity monitors	7	2
4.06	Calibrate the essential service water monitors	11	0
4.07	Calibrate the reactor building vent monitors	11	2
4.08	Calibrate the reactor building closed cooling water/component cooling water monitor	12	0
4.09	Calibrate the turbine building vent monitors	8	0
4.10	Calibrate the constant air monitors (such as CAM, APD)	25	14
4.11	Change filters in CAMs	67	42
4.12	Change recording paper in CAMs	62	34
4.13	Calibrate the containment spray heat exchanger monitors	1	0
4.14	Calibrate the emergency condenser vent monitors	5	0

JOB CODE: JUNIOR HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Junior HPTs Performing Task	Percent of Vendor Junior HPTs Performing Task
4.	Process Monitoring (Liquid and Gaseous) (Continued)		
4.15	Calibrate the area radiation monitor portable calibration unit	10	2
4.16	Calibrate the stationary area radiation monitors	14	5
4.17	Calibrate the portable area radiation monitor	22	5
4.18	Set up portable area radiation monitors	45	20
4.19	Calibrate the post-accident monitors (steam jet air ejector, main steam line, containment high radiation system)	8	0
4.20	Replace detectors in process radiation monitors	9	11
4.21	Calculate process radiation monitor alarm setpoints	12	14
4.22	Assist in installation of new process radiation monitors (including set up)	12	11
4.23	Supervise process monitoring activities	3	0
	Additional tasks identified:		
4.24	Calibrate single-channel analyzer		
5.	Portable Radiation Monitoring Equipment (Survey Meters and Air Samplers)		
	Tasks listed on survey questionnaires:		
5.01	Calibrate portable neutron survey equipment (such as Portable Neutron RemCounter PNR-4)	23	5
5.02	Calibrate portable alpha survey equipment (such as Eberline PAC-4)	22	8
5.03	Calibrate portable beta-gamma survey equipment (such as Cutie Pie 740A, Eberline Ion Chamber Model RO-2A, Teletector)	39	11

JOB CODE: JUNIOR HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Junior HPTs Performing Task	Percent of Vendor Junior HPTs Performing Task
5.	Portable Radiation Monitoring Equipment (Survey Meters and Air Samplers) (Continued)		
5.04	Calibrate portable air sampling equipment	42	11
5.05	Field check portable radiation monitoring instruments	79	57
5.06	Calibrate the beta-gamma-alpha monitor (such as the Thyac III)	10	2
5.07	Operate portable neutron survey equipment (such as Portable Neutron Rem Counter PNR-4)	76	25
5.08	Operate portable alpha survey equipment (such as Eberline PAC-4)	56	22
5.09	Operate portable beta-gamma survey equipment (such as Cutie Pie 740A, Eberline Ion Chamber Model RO-2A, Teletector)	94	65
5.10	Operate portable air sampling equipment (such as RADECO, Eberline RAS-1)	86	71
5.11	Operate portable underwater gamma survey equipment (such as CPMU)	20	8
5.12	Perform minor repairs on portable radiation monitoring equipment (such as change batteries, change cables, replace mylar windows)	84	68
5.13	Perform major repairs on portable radiation monitoring equipment (such as repair and test circuit boards)	9	2
5.14	Verify proper operation of CAMs	67	25
5.15	Calibrate condenser R chambers	9	2
5.16	Plot calibration curves for portable radiation monitoring equipment	18	5
5.17	Supervise portable radiation monitoring activities	16	0

JOB CODE: JUNIOR HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Junior HPTs Performing Task	Percent of Vendor Junior HPTs Performing Task
6.	Personnel Monitoring Equipment (Friskers, Whole-Body Count Equipment)		
	Tasks listed on survey questionnaires:		
6.01	Post general area TLDs	44	28
6.02	Perform initial issue of TLD/film badge	48	28
6.03	Operate the TLD reader to read TLDs	29	11
6.04	Prepare TLD for reissue	27	20
6.05	Perform TLD/film badge change out	41	34
6.06	Perform maintenance on TLD readers	11	2
6.07	Perform calibration of the TLD reader	10	11
6.08	Perform calibration checks of the TLD reader	14	11
6.09	Perform periodic QA checks of TLDs (that is, exposure to a known source)	24	20
6.10	Change film in film badges	12	22
6.11	Perform dosimeters drift check	55	48
6.12	Read pocket dosimeters	91	91
6.13	Zero pocket dosimeters	86	85
6.14	Issue pocket dosimeters for use	77	68
6.15	Issue audible and visual dosimeters	46	31
6.16	Expose personnel dosimeters for calibration purposes (e.g., pocket dosimeters, TLDs, digital-audible alarm dosimeters)	47	25
6.17	Collect personnel dosimetery devices (film badges or TLDs)	47	51

JOB CODE: JUNIOR HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Junior HPTs Performing Task	Percent of Vendor Junior HPTs Performing Task
6.	Personnel Monitoring Equipment (Friskers, Whole-Body Count Equipment) (Continued)		
6.18	Manually calculate estimated individual neutron radiation exposure	46	11
6.19	Perform initial receipt testing of dosimetry equipment (such as drift test, drop test)	37	28
6.20	Issue extremity dosimetry	60	54
6.21	Issue special purpose dosimetry (such as special neutron badges)	33	31
6.22	Evaluate results from extremity and special purpose dosimetry	27	22
6.23	Maintain computer records of radiation exposure	24	17
6.24	Perform background check on whole-body counter	47	11
6.25	Perform calibration checks (energy calibration and efficiency) on whole-body counter	37	11
6.26	Operate whole-body counter (WBC)	52	17
6.27	Obtain printout and/or plot of whole-body count data	44	20
6.28	Perform calculation for internal exposure based on WBC results	22	5
6.29	Calibrate whole-body counting system	22	8
6.30	Select personnel for routine whole-body counts	14	5
6.31	Schedule personnel to have a whole-body count	24	20
6.32	Assign personnel to have periodic whole-body counts performed based on health physics measurements (such as air sampling results, bioassay results, nasal smears)	33	17

JOB CODE: JUNIOR HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Junior HPTs Performing Task	Percent of Vendor Junior HPTs Performing Task
6.	Personnel Monitoring Equipment (Friskers, Whole-Body Count Equipment) (Continued)		
6.33	Collect a bioassay sample	18	8
6.34	Collect and count nasal smears	68	37
6.35	Evaluate nasal smears	60	25
6.36	Collect and count throat smears	16	5
6.37	Evaluate throat smears	14	2
6.38	Calibrate personnel monitoring friskers	31	20
6.39	Calibrate portal monitors	21	17
6.40	Perform routine source checks of friskers	66	45
6.41	Perform routine source checks of portal monitors	54	25
6.42	Perform personnel contamination monitoring (frisking)	93	82
6.43	Conduct functional check of equipment (hand and foot monitors, portable monitors, friskers, laundry monitors)	62	40
6.44	Supervise personnel monitoring activities	41	51
7.	Surveys (Radiation/Contamination/Airborne)		
	Tasks listed on survey questionnaires:		
7.01	Perform pre-Radiation Work Permit (RWP) surveys	80	57
7.02	Perform periodic surveys at radiation work sites to evaluate changes in radiological conditions	84	71
7.03	Perform post-work surveys at radiation work sites	82	62

JOB CODE: JUNIOR HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Junior HPTs Performing Task	Percent of Vendor Junior HPTs Performing Task
7.	Surveys (Radiation/Contamination/Airborne) (Continued)		
7.04	Perform (obtain, count, and document) an airborne activity (including iodine samples) survey	88	54
7.05	Perform (obtain, count, and document) an airborne gaseous activity survey	65	45
7.06	Perform (obtain, count, and document) a tritium activity sample	35	5
7.07	Determine percent maximum permissible concentration (MPC) (based on radionuclide) from air sample data	65	37
7.08	Select appropriate respiratory protection equipment based on air sample analysis	76	40
7.09	Review the results of air sample surveys	75	40
7.10	Perform (obtain, count, and document) a smear survey for loose surface contamination	92	74
7.11	Review the results of a smear survey	84	65
7.12	Perform periodic radiation and contamination surveys throughout the plant in non- radiologically controlled areas (warehouse, parking lot, lunch room, etc.)	83	45
7.13	Determine the location of radioactive hot spots	86	68
7.14	Post and label radioactive hot spots	85	65
7.15	Prepare reports regarding radiation and contamination surveys	63	45
7.16	Maintain records and files on radiation, contamination, and airborne activity surveys	59	31
7.17	Perform a general radiation survey	86	74
7.18	Perform a high radiation area survey	86	60

JOB CODE: JUNIOR HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Junior HPTs Performing Task	Percent of Vendor Junior HPTs Performing Task
7.	Surveys (Radiation/Contamination/Airborne) (Continued)		
7.19	Perform a temporary shielding survey	64	40
7.20	Perform an industrial hygiene survey (air quality, temperature, noise) to determine physical habitability of an area	22	11
7.21	Perform radiological surveys in support of reactor containment building/drywell entry while at power	51	17
7.22	Perform a neutron radiation survey	66	25
7.23	Perform on-the-job gross analysis of air samples (using portable survey instruments)	57	34
7.24	Perform surveys to support the movement of radioactive materials	77	48
7.25	Perform surveys in support of entry into areas of unknown radiological hazards	71	28
7.26	Perform a beta radiation survey	81	54
7.27	Perform radiological monitoring during industrial radiographic operations or other operations involving X-ray devices	46	25
7.28	Supervise the conduct of surveys (radiation/contamination/airborne)	16	11
	Additional tasks identified:		
7.29	Determine survey frequencies based upon changes in radiological conditions		
8.	Radiation/Contamination Work Area Support		
	Tasks listed on survey questionnaires:		
8.01	Set up a control point	68	54
8.02	Set up a control area	67	37

JOB CODE: JUNIOR HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Junior HPTs Performing Task	Percent of Vendor Junior HPTs Performing Task
8.	Radiation/Contamination Work Area Support (Continued)		
8.03	Maintain a control point (that is, perform necessary surveys, supply required materials, logs, etc.)	77	74
8.04	Survey tools and equipment for release from a radiologically controlled area	89	77
8.05	Perform stay time calculations	72	40
8.06	Complete a Radiation Work Permit (RWP) (for example, clothing, dosimetry, and respirator requirements) based on survey data and radiological conditions expected	66	20
8.07	Determine required dosimetry for entry into a job coverage area	71	37
8.08	Determine proper dosimeter placement location on the body for entry into a job coverage area	75	37
8.09	Review RWP for completeness and obtain appropriate signatures for RWP approval	62	28
8.10	Estimate individual and total worker dose from the RWP information in accordance with ALARA procedures	56	17
8.11	Inspect work areas to ensure compliance with Radiation Work Permits and good work practices	76	37
8.12	Inspect plant areas for proper radiation posting, radioactive material storage, and contamination control	79	54
8.13	Post/remove posting of radiologically controlled areas	86	57
8.14	Update posting of radiologically controlled areas	83	57
8.15	Supervise the removal of personnel dosimetry equipment and protective clothing (including frisking)	81	65

JOB CODE: JUNIOR HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Junior HPTs Performing Task	Percent of Vendor Junior HPTs Performing Task
8.	Radiation/Contamination Work Area Support (Continued)		
8.16	Brief radiation workers on radiological hazards in the work area or changes in radiological conditions	81	62
8.17	Control worker access to a radiologically controlled area	80	65
8.18	Issue a stop work order when significant radiological discrepancies are discovered	64	20
8.19	Determine amount of shielding required using half-value layers or graphs	42	17
8.20	Direct the installation and removal of temporary shielding	46	22
8.21	Evaluate the effectiveness of temporary shielding	53	31
8.22	Prepare a containment area (tent) with associated ventilation to reduce personnel exposure to airborne contaminants	48	20
8.23	Prepare a glove box to reduce personnel exposure to airborne contaminants	28	8
8.24	Evaluate a work area for additional ALARA considerations	66	25
8.25	Perform certification inspections of tents, glove boxes, and other containment devices	21	11
8.26	Provide close health physics coverage for workers in high-dose jobs (for example, steam generator jumpers, control rod drive mechanism replacement)	67	34
8.27	Perform on-the-spot correction of workers not complying with proper radiological work practices or not following RWP requirements	78	48
8.28	Supervise health physics technicians in radiation/contamination work area support	14	5

JOB CODE: JUNIOR HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Junior HPTs Performing Task	Percent of Vendor Junior HPTs Performing Task
8.	Radiation/Contamination Work Area Support (Continued)		
	Additional tasks identified:		
8.29	Evaluate containment device vent unit filters for replacement		
9.	Shipping and Receiving Radioactive Materials		
	Tasks listed on survey questionnaires:		
9.01	Analyze samples of radioactive material to determine shipping category (radionuclide content, oil and moisture content)	31	8
9.02	Determine transport group and classify radioactive material as Type A, Type B, or LSA	33	8
9.03	Prepare a Radiation Work Permit for handling and processing radioactive waste	46	5
9.04	Provide health physics coverage during preparation of a shipment of radioactive material	63	37
9.05	Survey a shipment of radioactive material prior to shipping	72	42
9.06	Select appropriate containers and package radioactive materials	29	20
9.07	Package (including labeling) dry radioactive waste material for shipment	38	34
9.08	Document packaged material survey data in the radioactive material shipping record	50	22
9.09	Placard the transport vehicle	50	14
9.10	Survey transport vehicles	70	34
9.11	Supervise loading radioactive material on transport vehicle	38	20

JOB CODE: JUNIOR HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Junior HPTs Performing Task	Percent of Vendor Junior HPTs Performing Task
9.	Shipping and Receiving Radioactive Materials (Continued)		
9.12	Examine reports accompanying radioactive material shipment received to ensure compliance with federal regulations	31	2
9.13	Perform radiation and contamination surveys of radioactive material received (including recording survey data on receipt form)	57	22
9.14	Maintain records of the receipt/shipment of radioactive materials	30	8
9.15	Perform a radiological survey in conjunction with the receipt of new fuel and radioactive sealed sources	52	20
9.16	Control the movement of radioactive material through unrestricted (non-radiological) areas of the plant	62	25
9.17	Direct storage of radioactive materials in the designated areas of the plant	63	20
9.18	Inspect the transport vehicle to ensure safe transportation of radioactive materials over public thoroughfares	28	5
9.19	Determine qualifications of receiver to receive radioactive material shipment	11	2
9.20	Obtain radioactive material shipping permits	11	5
9.21	Apply state and federal shipping requirements	24	2
9.22	Survey waste materials to segregate high and low level waste in preparation for shipment	55	34
9.23	Weigh drums and packages in preparation for shipment	35	25
9.24	Perform container inspections and tests on non-certified shipping containers and packages	17	8

JOB CODE: JUNIOR HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Junior HPTs Performing Task	Percent of Vendor Junior HPTs Performing Task
9.	<u>Shipping and Receiving Radioacitve Materials (Continued)</u>		
9.25	Conduct surveillance of drum and box waste compactor operations	42	22
9.26	Segregate contaminated and non-contaminated trash generated within the radiological controlled area by frisking	59	48
9.27	Accompany radioactive materials shipments off site	12	5
9.28	Supervise the shipping and receiving of radioactive materials	6	5
10.	<u>Decontamination</u>		
	Tasks listed on survey questionnaires:		
10.01	Evaluate contaminated material and equipment to determine if decontamination effort is practical	77	60
10.02	Direct decontamination of equipment or materials	66	62
10.03	Perform decontamination of equipment or materials	77	74
10.04	Prepare decontamination solutions and agents for use (such as TURCO)	14	22
10.05	Direct decontamination of personnel	78	54
10.06	Decontaminate personnel (including documenting results)	78	54
10.07	Direct area decontamination	71	45
10.08	Perform area decontamination (including documenting results)	47	45
10.09	Collect potentially contaminated laundry	22	28
10.10	Sort laundry (high-level contamination from low-level contamination and non-contaminated articles)	21	22

JOB CODE: JUNIOR HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Junior HPTs Performing Task	Percent of Vendor Junior HPTs Performing Task
10.	Decontamination (Continued)		
10.11	Operate contaminated laundry facilities	11	20
10.12	Survey laundry for reuse	33	37
10.13	Perform routine maintenance of laundry facilities (such as change filters, cleaning solutions, etc.)	11	11
10.14	Direct contaminated laundry operations	13	17
10.15	Operate decontamination high pressure water cabinet equipment	8	2
10.16	Operate ultrasonic decontamination unit	19	14
10.17	Operate decontamination vapor degreaser unit	1	2
10.18	Operate decontamination electro-polisher unit	4	2
10.19	Oversee decontamination efforts of equipment and work areas carried out by non-health physics personnel	56	42
10.20	Supervise Health Physics Technician decontamination support	6	8
11.	Environmental Sampling		
	Tasks listed on survey questionnaires:		
11.01	Coordinate environmental sampling schedule	4	2
11.02	Obtain charcoal filter samples	50	11
11.03	Obtain surface water samples	19	2
11.04	Obtain surface water tritium sample	16	0
11.05	Obtain surface water beta sample	16	0
11.06	Obtain aquatic vegetation samples	7	2

JOB CODE: JUNIOR HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Junior HPTs Performing Task	Percent of Vendor Junior HPTs Performing Task
11.	Environmental Sampling (Continued)		
11.07	Obtain zooplankton samples	5	0
11.08	Obtain benthic organism samples	2	0
11.09	Obtain fish samples	5	0
11.10	Obtain shrimp samples	1	0
11.11	Obtain oyster samples	1	0
11.12	Obtain bottom sediment samples	4	2
11.13	Obtain shoreline sediment samples	3	2
11.14	Obtain rain water samples	11	2
11.15	Obtain groundwater samples	11	2
11.16	Obtain milk sample	14	2
11.17	Obtain terrestrial vegetation samples	11	2
11.18	Obtain food crop samples	14	2
11.19	Obtain fodder and feed crop samples	11	2
11.20	Obtain deep well samples	13	2
11.21	Obtain soil samples	17	2
11.22	Calibrate environmental area radiation monitors and sampling equipment	13	5
11.23	Perform routine maintenance on environmental air sampling equipment	18	5
11.24	Obtain meteorological monitoring data (including documentation)	5	2
11.25	Prepare environmental samples for transfers to proper system lab	12	2

JOB CODE: JUNIOR HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Junior HPTs Performing Task	Percent of Vendor Junior HPTs Performing Task
11.	Environmental Sampling (Continued)		
11.26	Package environmental samples for transfer to outside facilities	12	2
11.27	Review environmental data for compliance with technical specifications	11	2
11.28	Supervise environmental sampling activities performed by Health Physics Technicians	1	2
12.	Respirators and Self-Contained Breathing Apparatus (SCBA) Equipment		
	Tasks listed on survey questionnaires:		
12.01	Conduct required routine inspections of respirators	60	60
12.02	Repair respiratory protective equipment	44	28
12.03	Leak test respirator after repair	35	31
12.04	Perform checks of hose, regulator, and manifold for forced-air respirator	50	31
12.05	Prepare respirators for reuse	49	51
12.06	Issue respiratory protective equipment	76	71
12.07	Use respiratory protective equipment	88	71
12.08	Perform inspection of respirator cannisters prior to reuse	43	45
12.09	Perform radiological surveys of respirators	61	57
12.10	Decontaminate respirators	27	34
12.11	Package respirators for storage	42	42
12.12	Refill SCBA bottles	34	11

JOB CODE: JUNIOR HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Junior HPTs Performing Task	Percent of Vendor Junior HPTs Performing Task
12.	<u>Respirators and Self-Contained Breathing Apparatus (SCBA) Equipment (Continued)</u>		
12.13	Perform checks on SCBA	48	17
12.14	Perform <u>qualitative</u> respirator fit tests for personnel	37	31
12.15	Perform <u>quantitative</u> respirator fit tests for personnel	35	28
12.16	Calibrate the respirator fitting booth	16	14
12.17	Perform functional test of respiratory equipment	45	25
12.18	Check respirator cannisters for differential pressure requirement conformity	18	20
12.19	Check respirator cannisters for contamination	39	51
12.20	Replace the catalyst agent in a re-breather type respirator (such as BIOPACK-60, SCOTT, MSA)	4	8
12.21	Replace the oxygen bottle on a re-breather type respirator (such as BIOPAK-60, SCOTT, MSA)	22	14
12.22	Perform checks on a re-breather type respirator (such as BIOPACK-60, SCOTT, MSA)	17	14
12.23	Perform air quality checks on plant breathing air systems	28	20
12.24	Supervise respirators and SCBA equipment activities performed by health physics technicians	3	5
	Additional tasks identified:		
12.25	Set up positive pressure supplied air respiratory equipment		

JOB CODE: JUNIOR HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Junior HPTs Performing Task	Percent of Vendor Junior HPTs Performing Task
13.	Emergency/Abnormal Tasks		
	Tasks listed on survey questionnaires:		
13.01	Respond as a radiological emergency team member to a site or general emergency	75	25
13.02	Provide health physics coverage of contaminated and/or injured personnel during an emergency (on site or at an area medical facility)	75	22
13.03	Segregate contaminated personnel in accordance with emergency contamination criteria	48	17
13.04	Recommend emergency actions consistent with protective action guides	41	5
13.05	Assist in Emergency Response Planning during an emergency	32	11
13.06	Maintain the emergency data status boards	13	2
13.07	Issue additional dosimetry as required by the Plant Emergency Plan	52	70
13.08	Sample off-site air for iodine	54	5
13.09	Track a radioactive plume	51	2
13.10	Perform as a re-entry team member (post accident)	52	8
13.11	Direct the re-entry team	12	2
13.12	Obtain post-accident samples	46	11
13.13	Prepare and handle post-accident samples	37	11
13.14	Analyze post-accident samples	29	8
13.15	Store post-accident sample for recounting	22	8
13.16	Dispose of post-accident samples	24	5

JOB CODE: JUNIOR HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Junior HPTs Performing Task	Percent of Vendor Junior HPTs Performing Task
13.	Emergency/Abnormal Tasks (Continued)		
13.17	Respond to an uncontrolled release of activity to the environment	53	14
13.18	Respond to a portal monitor alarm	68	54
13.19	Respond to a fire in a controlled area	53	31
13.20	Respond to a constant air monitor alarm	71	40
13.21	Respond to an area radiation monitor alarm	66	40
13.22	Respond to a process radiation monitor alarm	36	22
13.23	Respond to a conductivity alarm	14	2
13.24	Respond to an effluent alarm	24	8
13.25	Respond to a fuel-handling accident	32	5
13.26	Respond to an abnormal TLD readout	31	25
13.27	Respond to a lost TLD	69	60
13.28	Respond to a pocket dosimeter being found off scale	89	68
13.29	Respond to personnel exposure exceeding regulatory or administrative limits	43	31
13.30	Provide health physics coverage for off-site radiological transportation incidents	20	5
13.31	Evaluate radiological incident (such as personnel contamination) to determine the cause	56	37
13.32	Respond to a fire as a member of the plant fire brigade	20	5
13.33	Coordinate a bomb search in controlled/radiation areas	12	0

JOB CODE: JUNIOR HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Junior HPTs Performing Task	Percent of Vendor Junior HPTs Performing Task
13.	Emergency/Abnormal Tasks (Continued)		
13.34	Administer first aid to injured personnel	53	14
13.35	Administer CPR	32	8
13.36	Perform off-site dose assessment using a computer	16	0
13.37	Perform off-site dose assessment manually	26	2
	Additional tasks identified:		
13.38	Analyze indications of potential radiological problems based on quantitative measurement results within a particular system or area		
13.39	Provide health physics coverage at the scene of an in-plant radiological incident to recommend or direct corrective actions to mitigate the consequences		
13.40	Advise management personnel of the significance and corrective action that should be taken during a radiological incident		
13.41	Advise workers of immediate actions to be taken within the radiologically controlled area during a radiological incident		
14.	Administration		
	Tasks listed on survey questionnaires:		
14.01	Initiate a maintenance work request	60	14
14.02	Compile data for steam generator composite report	7	0
14.03	Prepare special radiation control reports	13	5
14.04	Process requests to exceed the current radiation exposure authorization	21	14

JOB CODE: JUNIOR HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Junior HPTs Performing Task	Percent of Vendor Junior HPTs Performing Task
14.	Administration (Continued)		
14.05	Authorize requests to exceed the administrative radiation exposure limits	1	0
14.06	Order technical publications	6	0
14.07	Prepare routine radiation control reports	13	8
14.08	Prepare daily exposure status report	18	5
14.09	Collect data to be included in the radiation evaluation program	21	2
14.10	Conduct an ALARA evaluation of the radiation protection program	10	5
14.11	Review periodic radiation evaluation program	3	0
14.12	Maintain station man-rem plots and graphs	2	14
14.13	Prepare health physics procedures (including revision preparation)	26	8
14.14	Review health physics procedures (including proposed revisions)	55	22
14.15	Conduct job-specific ALARA review	14	8
14.16	Prepare post-outage ALARA report	0	2
14.17	Review meteorological monitoring reports	1	0
14.18	Review effluent and environmental monitoring reports	8	2
14.19	Review proposed plant design changes for radiological concerns	2	2
14.20	Review NRC health physics bulletins and regulations	55	42
14.21	Review personnel exposure history	39	34

JOB CODE: JUNIOR HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Junior HPTs Performing Task	Percent of Vendor Junior HPTs Performing Task
14.	Administration (Continued)		
14.22	Review contractor HPT qualifications prior to technician starting work	0	8
14.23	Review daily computer printout of personnel exposure	32	40
14.24	Schedule HPT coverage for outage support	1	2
14.25	Develop programs for initial training of HPTs within guidelines of plant and regulatory requirements	2	0
14.26	Develop periodic retraining programs for HPTs	2	2
14.27	Develop contractor HPT training program	0	2
14.28	Perform general employee training in radiological protection	10	8
14.29	Supervise conduct of the health physics portion of general employee training	1	0
14.30	Instruct personnel in respiratory protection	26	25
14.31	Instruct health physics technicians in classroom training	2	2
14.32	Provide on-the-job training to health physics personnel	27	11
14.33	Conduct oral examinations to verify the adequacy of technicians and their training	3	2
14.34	Conduct written examinations to verify adequacy of technicians and their training	0	2
14.35	Supervise the conduct of Health Physics Technician training	0	0
14.36	Participate in mock-up training	32	14

JOB CODE: JUNIOR HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Junior HPTs Performing Task	Percent of Vendor Junior HPTs Performing Task
14.	Administration (Continued)		
14.37	Provide HP training to off-site organizations (firemen, rescue squads, etc.)	1	0
14.38	Assist in organizing the annual medical drill (injured contaminated man drill)	9	2
14.39	Assist in organizing the annual site emergency exercise	8	0
14.40	Interpret radioactive sealed-source leak test results	13	2
14.41	Interpret radioactive source inventory results	12	2
14.42	Evaluate process monitor results	3	2
14.43	Update exposure records using TLD data	19	28
14.44	Audit daily radiation exposure records	8	14
14.45	Record individual dose on daily exposure cards or RWPs	54	51
14.46	Review daily dosimeter records	22	34
14.47	Compare TLD data with pocket dosimeter data	26	22
14.48	Administer the health physics QA program (develop, review)	2	0
	Additional tasks identified:		
14.49	Prepare respiratory protection program reports		
15.	Miscellaneous Supplies and Equipment		
	Tasks listed on survey questionnaires:		
15.01	Maintain inventory of radiation protection supplies	30	37

JOB CODE: JUNIOR HPT

TASK INVENTORY

Task No.	Tasks	Percent of Plant Junior HPTs Performing Task	Percent of Vendor Junior HPTs Performing Task
15.	Miscellaneous Supplies and Equipment (Continued)		
15.02	Maintain change rooms stocked with protective clothing	14	17
15.03	Inventory and replenish first aid supply stations	14	8
15.04	Order supplies for outage work	12	14
15.05	Fill out a purchase requisition form	33	28
15.06	Perform routine checks/audits of radiological emergency equipment and kits	52	22
15.07	Issue and receive contaminated tools and equipment	23	31
15.08	Inventory contaminated tools and equipment	13	17

APPENDIX D

MODEL JOB DESCRIPTION FOR

ASSISTANT HEALTH PHYSICS TECHNICIAN/TRAINEE

A. JOB TITLE: Assistant Health Physics Technician/Trainee

B. REQUIRED QUALIFICATIONS

1. High school diploma or GED certificate (3).

2. Health physics or related experience as required by the utility (3).

3. Satisfactory completion of an applicable training program to meet ANSI or other requirements (3).

4. Satisfactory completion of any selection testing required by the utility.*

5. Fulfillment of any additional qualifications required by the utility, which may include (but are not limited to) the following:*

   a) Satisfactory completion of formal education or vocational/technical training requirements relating to radiological controls,

   b) Satisfactory completion of general employee training, such as general radiation protection training, safety rules, and utility policy and procedures, and

   c) Satisfactory periodic physical examination.

C. GENERAL DESCRIPTION OF JOB REQUIREMENTS†

Under directive or close supervision, assists employees of higher classification in their duties and may perform some tasks without direct supervision. Participates in the plant's training program for advancement to Health Physics Technician (Junior).

Assists in monitoring plant facilities and environment to detect the presence and degree of radioactivity in connection with plant operations. Performs radiation and contamination surveys in accordance with plant procedures. Performs routine checks on radiation monitoring instruments and services this equipment. Performs decontamination laundry tasks and decontaminates areas and/or equipment as directed.

Assists with issue, use, and control of personnel dosimetry. Assists with the inspection, issue, testing, and decontamination of respirators. Assists in receipt, storage, and shipment of radioactive materials and protective clothing.

Collects routine and special samples for laboratory analysis and operates counting equipment.

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*Based on a sample of utility job descriptions.

†At some utilities, job incumbents may be permanently assigned to work in a particular specialty area (such as radioactive waste, calibration, dosimetry, or decontamination). In these cases, this part of the job description should address the applicable requirements of the job consistent with the specialty area of interest.

D. DESCRIPTION OF INCUMBENT'S POSITION WITHIN THE ORGANIZATION

Under the immediate supervision of a Senior/Lead Health Physics Technician and the general supervision of the Health Physics Technician Foreman/Supervisor. May be directed by a Health Physics Technician of higher classification.

Principal line of promotion is to Health Physics Technician (Junior).

E. DESCRIPTION OF MAJOR JOB AREAS (FUNCTIONAL DUTIES)*

1. Counting Room Activities. Performs background and performance checks on counting room equipment. Prepares samples for counting. Operates gross alpha, beta, and gamma counting systems, liquid scintillation counters, and multi-channel analyzers. Determines counter efficiency, reliability, and percent slope (response curve/detector voltage plateau). Performs some calculations, such as minimum detectable counts for counter scalers, airborne nuclide concentration of radioactive material, and weighted maximum permissible concentration from isotopic data.

2. Radioactive Sources. May perform radioactive sealed-source leak tests and calculate radioactive source activity strengths. Transfers radioactive sources from/to other departments.

3. Effluent Control. May perform release rate calculations and evaluate effluent release data. May prepare waste release permits.

4. Process Monitoring. May set up portable area radiation monitors. Performs minor maintenance on constant air monitors, such as changing filters and recording paper.

5. Portable Radiation Monitoring. Field checks and operates portable neutron, alpha, and beta-gamma survey equipment. Operates portable air sampling equipment and verifies proper operation of constant air monitors. Performs minor repairs on portable radiation monitoring equipment. May perform calibrations on portable neutron, alpha, beta-gamma survey equipment and air sampling equipment.

6. Personnel Monitoring. Issues and collects all types of dosimetry devices [pocket dosimeters, film badges, thermal-luminescent dosimeters (TLDs) extremity dosimetry, and audible/visual dosimeters]. May expose personnel dosimeters for calibration purposes and perform dosimeter drift checks.

*At some utilities, job incumbents may be permanently assigned to work in a particular specialty area (such as radioactive waste, calibration, dosimetry, or decontamination). In these cases, this part of the job description should address the applicable requirements of the job consistent with the specialty area of interest.

Operates the TLD reader to read TLDs. Performs background checks and operates whole-body counters. May plot whole-body count data. Collects and counts nasal smears. Performs routine source checks and functional checks of friskers and portal monitors. Performs personnel contamination monitoring.

7. Surveys (Radiation/Contamination/Airborne). Performs pre-work and post-work surveys at radiation work sites and periodic surveys to evaluate changes in radiological conditions at work sites. Reviews the results of air sample surveys and determines percent maximum permissible concentration and appropriate respiratory protection equipment based on air sample results. Reviews the results of smear surveys for loose surface contamination. Determines the location of radioactive hot spots and the posting and labeling required. Performs (obtains, counts, and documents) radiological surveys conducted, including airborne activity and gaseous activity, smear, general radiation, high radiation, temporary shielding, neutron radiation, and beta radiation surveys. Performs radiological surveys to support specific activities (reactor containment/drywell entry while at power, movement of radioactive materials, void entry, and industrial radiographic operations). Prepares and maintains records and files regarding radiation and contamination surveys.

8. Radiation/Contamination Work Area Support. Sets up control points and control areas. Performs routine functions while maintaining a control point, such as performing necessary surveys, performing stay-time calculations, completing radiation work permits, determining dosimetry requirements, estimating worker dose in accordance with ALARA procedures, inspecting work areas to ensure compliance with radiation work permits, and supervising the removal of personnel dosimetry equipment and protective clothing. Performs on-the-spot corrections of workers not complying with proper radiological work practices. May prepare containment areas (tents) with associated ventilation to reduce personnel exposure to airborne contaminants. Provides close health physics coverage for workers in high-dose jobs.

9. Shipping and Receiving Radioactive Materials. Provides health physics coverage during preparation of radioactive waste shipments, which may include conducting appropriate surveys of radioactive materials and transport vehicles, packaging dry radioactive waste material, documenting survey data on shipping records, and placarding transport vehicles. Segregates contaminated and non-contaminated trash generated within radiologically controlled areas. Weighs drums and packages in preparation for shipment. Conducts surveillance of drum and box waste compactor operations. Performs radiation and contamination surveys of radioactive material received. May perform radiological surveys in conjunction with the receipt of new fuel and radioactive sealed sources. Controls the movement of radioactive material through unrestricted areas of the plant and may direct storage of radioactive materials in the designated areas of the plant.

10. Decontamination. Collects and sorts (according to contamination levels) potentially contaminated laundry. Surveys laundry for reuse. Performs decontamination of personnel, equipment, materials, and work areas. May oversee decontamination efforts carried out by non-health physics personnel.

11. Environmental Sampling. May obtain some samples, such as charcoal filter samples.

12. Respirators and Self-Contained Breathing Apparatus (SCBA) Equipment. Performs required routine inspections and checks of respirators and SCBA equipment. Refills SCBA bottles. Prepares respirators for reuse and storage. Issues respirators and performs radiological surveys of respirators, including checking respirator cannisters for contamination. Decontaminates respirators. Performs functional testing of respiratory equipment.

13. Emergency/Abnormal Conditions. Advises workers of immediate actions to be taken within the radiologically controlled area during a radiological incident. May provide health physics coverage of contaminated and/or injured personnel during an emergency. Responds as a radiological emergency team member to a site or general emergency, performing activities, such as issuing dosimetry as required by the Plant Emergency Plan, sampling off-site air for iodine, and performing as a post-accident re-entry team member. Responds to other abnormal plant conditions, such as portal monitor alarms, constant air monitor alarms, area radiation monitor alarms, lost TLDs, off-scale pocket dosimeters, personnel exposure exceeding regulatory or administrative limits, and other radiological incidents. Administers first aid to injured personnel.

14. Administration and Training. Performs some miscellaneous administrative tasks, such as initiating maintenance requests, reviewing NRC health physics bulletins and regulations, reviewing daily personnel exposure records and personnel exposure history, and recording individual doses on exposure cards or radiation work permits. Participates in training.

15. Miscellaneous Supplies and Equipment. Maintains inventory of radiation protection supplies and change rooms stocked with protective clothing. Performs routine checks/audits of radiological emergency equipment and kits. Fills out purchase requisition forms.

F. DESCRIPTION OF WORK ENVIRONMENT

Performs duties in various locations throughout the plant. Plant piping and equipment are divided among various floor levels in interconnected buildings. Some equipment is not enclosed. Access is restricted inside the primary containment during reactor operations and controlled to all known radiation areas under all conditions. Noise levels and temperatures may be excessive in the vicinity of some operating equipment. Exposed to inherent hazards that exist in nuclear power plant operation, such as electric shock, chemical hazards, high-temperature metals, radiation exposure, and the presence of high-pressure and high-temperature steam and water.

G. TOOLS AND EQUIPMENT

The tools and equipment in the following list are used by Assistant Health Physics Technicians/Trainees to varying degrees in performing their duties. In each tool/equipment category, the percent of Assistant Technicians/Trainees using the tool/equipment is indicated, based on the results of the national survey. Additional tools/equipment identified by write-ins during the survey are listed separately. (Tool and equipment lists for utility job descriptions should include the applicable items listed.)

		Percent of Assistant HPTs/Trainees Using Tool/Equipment
1.	**Laboratory Equipment**	
	Tools and equipment listed on survey questionnaires:	
1.01	Planchet	69
1.02	Hot plate	33
1.03	Pipette	38
1.04	Beaker	39
1.05	Filters and filter chimney	37
1.06	Eye dropper	26
1.07	Stir rods or magnetic stirrer	14
1.08	Heating/stirring plate	19
1.09	Reagent chemicals	19
1.10	Graduated cylinders	33
1.11	pH Meter/indicator	15
1.12	Conductivity cell and bridge	12
1.13	Centrifuge	8
1.14	Test tubes	17
1.15	Funnels	30
	Additional tools and equipment identified:	
1.16	Convection oven	
2.	**Protective/Safety Equipment**	
	Tools and equipment listed on survey questionnaires:	
2.01	Rubber gloves	93
2.02	Rubber apron	27
2.03	Face shield	55
2.04	Respirators	91

		Percent of Assistant HPTs/Trainees Using Tool/Equipment
2.	Protective/Safety Equipment (Continued)	
2.05	Self-contained breathing apparatus (SCBA) .	68
2.06	Fire extinguisher	46
2.07	Hard hat.	97
2.08	Ear protectors	92
2.09	Anti-contamination clothing (protective clothing).	95
2.10	Safety harness	39
2.11	Ground straps	19
2.12	Portable/movable shielding	52
2.13	Explosimeter	20
2.14	Dust mask	33
2.15	Safety glasses/beta goggles.	91
2.16	Portable ventilation and filtration trains . .	34
2.17	Safety shoes	53
2.18	Bubble suit.	29
2.19	Steam suit	9
2.20	Cool suit.	12
2.21	Cold weather/rain clothing	64
2.22	Glove bags, tents, and other containment devices.	50
2.23	Step-off pads.	95
2.24	Radiation warning tape/rope/signs.	94

Additional tools and equipment identified:

2.25 Respirator washer

2.26 Electric respirator drying cabinet

3. Computers

Tools and equipment listed on survey questionnaires:

3.01	Hand-held calculator	92
3.02	Desk-top computer	63

		Percent of Assistant HPTs/Trainees Using Tool/Equipment
3.	**Computers (Continued)**	
3.03	Plant/process computer	47
3.04	Corporate computer (on or off site)	23
3.05	Computer diagnostic software	17
	Additional tools and equipment identified:	
3.06	Word processor	
4.	**Hand Tools**	
	Tools and equipment listed on survey questionnaires:	
4.01	Box wrenches	42
4.02	Burnishing tool	9
4.03	Calipers	10
4.04	Chisels	19
4.05	Diagonal cutter	16
4.06	Flaring tools	10
4.07	Fuse pullers	12
4.08	Gauges	29
4.09	Gear puller	6
4.10	Grease gun	12
4.11	Hack saw	22
4.12	Hammer	33
4.13	Knife	77
4.14	Level	12
4.15	Open-end wrenches	42
4.16	Pliers	54
4.17	Pocket screwdriver	62
4.18	Pop rivet gun	13
4.19	Punches	16
4.20	Ruler	70
4.21	Screwdriver	68
4.22	Screw starter	8

		Percent of Assistant HPTs/Trainees Using Tool/Equipment
4.	**Hand Tools (Continued)**	
4.23	Scribe	11
4.24	Socket set	32
4.25	Spin-tight wrenches	12
4.26	Torque wrenches	17
4.27	Tweezers	77
4.28	Decontamination supplies	90

Additional tools and equipment identified:

4.29 Banding tool

4.30 Crimpers

4.31 Shovel

4.32 Speed wrench

4.33 File

5. Test and Measuring Equipment

Tools and equipment listed on survey questionnaires:

5.01	Ammeter	7
5.02	Barometer	14
5.03	Multimeter	14
5.04	Heat probe	6
5.05	Manometer	13
5.06	Ohmmeter	14
5.07	Pyrometer	6
5.08	Radiation source	75
5.09	Test gauges	16
5.10	Thermometer	42
5.11	Timer	49
5.12	Voltage tester	25
5.13	Hand-operated hydro pump (test pressure source)	5
5.14	Vibration detectors	1

		Percent of Assistant HPTs/Trainees Using Tool/Equipment
5.	**Test and Measuring Equipment (Continued)**	
5.15	Strobe light	1
5.16	Oxygen analyzer (portable)	27
5.17	Micrometer	4
5.18	Hydrometer	5
5.19	Scales	39
5.20	Strip chart recorder	20
5.21	Oscilloscope	13
5.22	Annemometer	1
5.23	Audiometer	9
	Additional tools and equipment identified:	
5.24	Quantitative fit test equipment	
5.25	Respirator leak test equipment	
5.26	Voltmeter	
5.27	Condenser R meter	
5.28	Circuit jumpers	
6.	**Communications Equipment**	
	Tools and equipment listed on survey questionnaires:	
6.01	Two-way radio	56
6.02	Telephones	99
6.03	Teletalk system/intercom	64
6.04	Fixed/portable flashing lights (for example, magenta flashing lights) . . .	28
6.05	Public address system/plant page	93
6.06	Respirator voice amplifiers	21
6.07	Beeper	19

	Percent of Assistant HPTs/Trainees Using Tool/Equipment

7. Radiation Monitoring Equipment

Tools and equipment listed on survey questionnaires:

7.01	Personnel dosimetry equipment	99
7.02	Portable beta-gamma monitoring instrument	88
7.03	Portable neutron monitoring instrument . .	71
7.04	Portable alpha monitoring instrument . . .	57
7.05	Frisker	99
7.06	Portable air sampler (high volume)	80
7.07	Portable air sampler (low volume)	82
7.08	Gaseous sampler	63
7.09	Smear pads.	93
7.10	Counter scaler	75
7.11	Multi-channel analyzer	67
7.12	Whole-body counting equipment.	58
7.13	Portal monitor	93
7.14	Proportional counter	66
7.15	Beta counter	71
7.16	Gamma well counter	41
7.17	Area radiation monitor	60
7.18	Process radiation monitor	42
7.19	Liquid scintillation counter.	57
7.20	TLD reader (manual or automatic).	31
7.21	Personal air sampler (lapel type)	30
7.22	Constant air monitor (CAM/APD)	53

8. Power-Driven Equipment

Tools and equipment listed on survey questionnaires:

8.01	Air-driven wrenches.	9
8.02	Compactor.	23
8.03	Drill press	11
8.04	Portable drill.	21

		Percent of Assistant HPTs/Trainees Using Tool/Equipment
8.	**Power-Driven Equipment (Continued)**	
8.05	Grinder	12
8.06	Power-driven hydro pump	9
8.07	Power saw	9
8.08	Saber saw	9
8.09	Vacuum pump	22
8.10	Vacuum cleaner.	26
8.11	Planer.	2
8.12	Portable pumps	24
9.	**Work Aids**	
	Tools and equipment listed on survey questionnaires:	
9.01	Extension cord	8[illegible]
9.02	Flashlight	84
9.03	Hot-air gun	15
9.04	Ladder	68
9.05	Test tubing (copper, plastic, tygon, etc.) . .	57
9.06	Rope	79
9.07	Liquid solvents	55
9.08	Spray solvents	56
9.09	Trouble light	38
9.10	Heat lamp	42
9.11	Plastic filler	12
9.12	Decontamination high-pressure water cabinet (hydrolaser)	13
9.13	Ultrasonic decontamination unit	31
9.14	Decontamination vapor degreaser unit . . .	4
9.15	Decontamination electro-polisher unit . . .	10
	Additional tools and equipment identified:	
9.16	Forklift	
9.17	Barrel cart/hand truck	

9. Work Aids (Continued)

9.18 Decontamination laundry unit

9.19 Portable generator

9.20 Mass flow heater

9.21 Keylock control

H. RESOURCE DOCUMENTS AND REFERENCES

The resource documents and references in the following list are used by Assistant Health Physics Technicians/Trainees to varying degrees in performing their duties. For each reference, the percent of Assistant Technicians/Trainees using the reference is indicated based on the results of the national survey. Additional references identified by write-ins during the survey are listed separately. (Resource documents and reference lists for utility job descriptions should include the applicable items listed below.)

		Percent of Assistant HPTs/Trainees Using Reference
1.	**Operational Procedures**	
	References listed on survey questionnaires:	
1.01	Plant operating procedures	58
1.02	Surveillance procedures	56
1.03	Maintenance procedures	38
1.04	Site emergency plan.	71
1.05	Emergency operating procedures	49
1.06	Abnormal, off-normal, and alarm operating procedures	36
1.07	Operating procedures change manual (temporary operating procedures)	35
1.08	Fuel-handling procedures.	32
1.09	Computer operating manual	44
1.10	Radiochemical laboratory manual (analytical and radiochemical procedures) .	23
1.11	Radiological protection procedures	80
2.	**Technical References**	
	References listed on survey questionnaires:	
2.01	Equipment location drawings	58
2.02	Plant technical specifications.	62
2.03	Final Safety Analysis Report (FSAR). . . .	35
2.04	Code of Federal Regulations (10 CFR, 49 CFR, etc.)	80
2.05	Plant blueprints/drawings	58
2.06	Plant system descriptions	70

		Percent of Assistant HPTs/Trainees Using Reference

2. Technical References (Continued)

2.07	Electrical schematics	28
2.08	Equipment technical operating manuals . .	50
2.09	Plant setpoints manual.	26
2.10	Steam tables	12
2.11	DOT regulations	45
2.12	State regulations	43

3. Operating Shift Documents

References listed on survey questionnaires:

3.01	Shift logs and status boards.	47
3.02	Shift turnover sheets/books.	49
3.03	Operations department orders/memos . . .	23
3.04	Health Physics (Rad Chem) Department orders/memos	64
3.05	Survey log books	72
3.06	Temporary shielding installation log	37
3.07	Temporary jumper installation log (wiring or piping)	14
3.08	Equipment tag log (removal and restoration log)	18
3.09	Required work action log (work request log).	24
3.10	Radiation work permit log	76
3.11	Radioactive material accountability log.	41
3.12	Radiation exposure alert list	41
3.13	Daily work log	56

4. Other References

References listed on survey questionnaires:

4.01	Station administrative directives	39

	Percent of Assistant HPTs/Trainees Using Reference
4. Other References (Continued)	
4.02 NRC Regulatory Guides, NUREGs, and I.E. bulletins and notices	76
4.03 Deviation report (non-conforming operations report)	38
4.04 Plant incident/condition reports.	53
4.05 Licensee Event Reports (LERs)	39
4.06 Special or required reading (e.g., system design, changes).	64
4.07 First aid instructions/safety bulletins . . .	67
4.08 Radiological health handbook	86
4.09 Chart of the nuclides	83
4.10 Health physics textbooks.	85
4.11 Training department lesson plans	58
4.12 INPO Notepad	20
4.13 INPO Guidelines	35

Additional references identified:

4.14 Vendor training books

4.15 Gamma energy tables (isotopic)

4.16 Gamma spectrum catalog

4.17 Consensus standards (e.g., ANSI, ASTM)

4.18 Technical specialty publications

4.19 Professional/trade journals

4.20 Radioactive decay tables

4.21 Environmental texts

4.22 Environmental procedures

4.23 Respiratory protection procedures

4.24 Burial-site criteria

4.25 CNSI cask loading procedures

4.26 Quality assurance manuals

4.27 Off-site dose calculation manual

4.28 Safety Information Letters

4. <u>Other References (Continued)</u>

4.29 National Council of Radiation Protection and Measurements handbooks

4.30 International Commission of Radiological Protection publications

I. DESCRIPTION OF TARGET POPULATION

The target population from which persons may be drawn for Assistant Health Physics Technician/Trainee are high school graduates who satisfy applicable required qualfications for the position (Section B of the job description) and who possess good mechanical aptitude and communication abilities (reading, writing, and verbal), as well as a willingness to learn. In addition, candidates for Assistant Health Physics Technician/Trainee should possess all physical and sensory abilities required by the work environment and job requirements. These include:*

- o Balance and mobility,
- o Good vision, including color discrimination and depth perception,
- o Good hearing,
- o Ability to work with small and medium-sized hand tools,,
- o Ability to work in damp and high-temperature atmosphere, including working from ladders or scaffolds,
- o Ability to effectively wear all safety equipment necessary for job performance.

*Additional characteristics may be identified as target population requirements upon completion of Health Physics Technician position task analyses.

J. TASK INVENTORY

Tasks performed by Assistant Technicians/Trainees are listed in the following categories:

1. Counting Room and Associated Equipment
2. Radioactive Sources
3. Effluent Control (Liquid and Gaseous)
4. Process Monitoring
5. Portable Radiation Monitoring Equipment (Survey Meters and Air Samplers)
6. Personnel Monitoring Equipment (Friskers, Whole-Body Count Equipment)
7. Surveys (Radiation/Contamination/Airborne)
8. Radiation/Contamination Work Area Support
9. Shipping and Receiving Radioactive Materials
10. Decontamination
11. Environmental Sampling
12. Respirators and SCBA Equipment
13. Emergency/Abnormal Tasks
14. Administration/Training
15. Miscellaneous Supplies and Equipment

For tasks included in the survey questionnaire, the percent of plant Assistant Health Physics Technicians/Trainees who indicated on the questionnaire that they performed the task is indicated. This information provides an aid in making decisions regarding the applicability of a task for job descriptions at specific plants. A low percent-performing rating for a specific task could be due to a combination of factors, including specialization (for example, only specific technicians assigned to decontamination) and organizational differences among utilities. Thus, each task should be evaluated individually for applicability to the plant. Additional tasks identified through questionnaire write-ins are also included.

Survey questionnaire tasks and write-in tasks recommended for detailed analysis are indicated in Section 3.4.2 of this report.

JOB CODE: ASSISTANT HPT/TRAINEE

TASK INVENTORY

Task No.	Tasks	Percent of Assistant HPTs/ Trainees Performing Task
1.	Counting Room and Associated Equipment	
	Tasks listed on survey questionnaires:	
1.01	Perform background checks of counting room equipment (counter scalers)	53
1.02	Perform performance checks on counting room equipment (counter scalers)	46
1.03	Manually calculate airborne nuclide concentration of radioactive material from counting room data (using a prepared form)	53
1.04	Calibrate gross counting systems (such as Eberline MS-3, Tennelec LB-5500)	28
1.05	Prepare samples for counting	77
1.06	Operate gross gamma counting systems (manual or automatic)	57
1.07	Operate gross beta counters (manual or automatic)	62
1.08	Operate gross alpha counting systems (such as SAC-4)	51
1.09	Determine counter efficiency	44
1.10	Determine counter reliability (e.g., chi-squared determination)	38
1.11	Determine counter percent slope (response curve/ detector voltage plateau)	39
1.12	Determine counter resolving time	26
1.13	Determine GeLi/intrinsic germanium detector operating parameters (detector efficiency, detector resolution, detector reliability, energy calibration, and background determination)	24

JOB CODE: ASSISTANT HPT/TRAINEE

TASK INVENTORY

Task No.	Tasks	Percent of Assistant HPTs/ Trainees Performing Task
1.	Counting Room and Associated Equipment (Continued)	
1.14	Determine Na I detector operating parameters (detector efficiency, detector resolution, detector reliability, energy calibration, and background determination)	20
1.15	Determine liquid scintillation counter efficiency	21
1.16	Prepare samples for liquid scintillation counter	50
1.17	Operate liquid scintillation counters	38
1.18	Calibrate liquid scintillation detectors	21
1.19	Update the gamma spectrometer nuclide library	9
1.20	Calibrate computer-based multi-channel analyzer	19
1.21	Calibrate stand-alone multi-channel analyzer	8
1.22	Count samples with computer-based multi-channel analyzer	50
1.23	Count samples with stand-alone multi-channel analyzer	14
1.24	Operate the gas flow proportional counter	48
1.25	Change the gas cylinder for the gas flow proportional counter	34
1.26	Operate the gamma well counter	22
1.27	Replace installed counting equipment detectors (such as GM tubes)	25
1.28	Refill the GeLi liquid nitrogen dewar	28
1.29	Input new calibration data into the isotopic identification computer	18
1.30	Prepare the isotopic identification computer for analysis	14

JOB CODE: ASSISTANT HPT/TRAINEE

TASK INVENTORY

Task No.	Tasks	Percent of Assistant HPTs/ Trainees Performing Task
1.	Counting Room and Associated Equipment (Continued)	
1.31	Calculate lower limit of detection (LLD) for counter scalers (such as SAC-4, LCS-1)	25
1.32	Calculate minimum detectable counts (MDCs) for counter scalers (such as SAC-4, LCS-1)	32
1.33	Perform decay constant calculations on air samples	25
1.34	Calculate weighted maximum permissible concentration (MPC) from isotopic data	46
1.35	Prepare counting data QC charts	22
1.36	Prepare spiked samples and standards from stock radioisotope solutions	19
1.37	Supervise (plan, budget, schedule, evaluate) counting room activities	8
	Additional tasks identified:	
1.38	Review and evaluate counted sample data (process, effluent, and environmental samples)	
2.	Radioactive Sources	
	Tasks listed on survey questionnaires:	
2.01	Perform radioactive sealed-source leak test (including documenting results)	34
2.02	Monitor radioactive sealed-source leak detection graphs and charts	12
2.03	Inventory radioactive sources (including documenting results)	32
2.04	Operate calibration source well or source calibrator	35
2.05	Audit radioactive source and material records	14

JOB CODE: ASSISTANT HPT/TRAINEE

TASK INVENTORY

Task No.	Tasks	Percent of Assistant HPTs/ Trainees Performing Task
2.	Radioactive Sources (Continued)	
2.06	Develop calibration charts for calibration sources	15
2.07	Transfer radioactive sources from/to other departments	50
2.08	Calculate radioactive source activity strengths	39
2.09	Dispose of decayed or no-longer-usable radioactive sources	18
2.10	Supervise control and use of radioactive sealed sources	16
	Additional tasks identified:	
2.11	Perform source distance calculations	
3.	Effluent Control (Liquid and Gaseous)	
	Tasks listed on survey questionnaires:	
3.01	Perform release rate calculations	30
3.02	Evaluate effluent release data	28
3.03	Prepare a gaseous waste release permit	24
3.04	Prepare a liquid waste release permit	26
3.05	Prepare a liquid release report	18
3.06	Prepare a gaseous effluent account report	13
3.07	Compile data for effluent release composite report	16
3.08	Compile data for effluent disposal record	12
3.09	Supervise effluent control activities	7

JOB CODE: ASSISTANT HPT/TRAINEE

TASK INVENTORY

Task No.	Tasks	Percent of Assistant HPTs/ Trainees Performing Task
4.	Process Monitoring (Liquid and Gaseous)	
	Tasks listed on survey questionnaires:	
4.01	Calibrate liquid process effluent radiation monitors	7
4.02	Calibrate gaseous process effluent radiation monitors	6
4.03	Calibrate the condenser off gas (COG) process vent monitors	5
4.04	Calibrate the stack monitors	5
4.05	Calibrate the dry well atmosphere activity monitors	2
4.06	Calibrate the essential service water monitors	5
4.07	Calibrate the reactor building vent monitors	5
4.08	Calibrate the reactor building closed cooling water/component cooling water monitor	5
4.09	Calibrate the turbine building vent monitors	4
4.10	Calibrate the constant air monitors (such as CAM, APD)	14
4.11	Change filters in CAMs	35
4.12	Change recording paper in CAMs	25
4.13	Calibrate the containment spray heat exchanger monitors	2
4.14	Calibrate the emergency condenser vent monitors	2
4.15	Calibrate the area radiation monitor portable calibration unit	7
4.16	Calibrate the stationary area radiation monitors	8
4.17	Calibrate the portable area radiation monitor	12

JOB CODE: ASSISTANT HPT/TRAINEE

TASK INVENTORY

Task No.	Tasks	Percent of Assistant HPTs/ Trainees Performing Task
4.	Process Monitoring (Liquid and Gaseous) (Continued	
4.18	Set up portable area radiation monitors	26
4.19	Calibrate the post-accident monitors (steam jet air ejector, main steam line, containment high radiation system)	5
4.20	Replace detectors in process radiation monitors	5
4.21	Calculate process radiation monitor alarm setpoints	8
4.22	Assist in installation of new process radiation monitors (including set up)	6
4.23	Supervise process monitoring activities	4
	Additional tasks identified:	
4.24	Calibrate single-channel analyzer	
5.	Portable Radiation Monitoring Equipment (Survey Meters and Air Samplers)	
	Tasks listed on survey questionnaires:	
5.01	Calibrate portable neutron survey equipment (such as Portable Neutron RemCounter PNR-4)	22
5.02	Calibrate portable alpha survey equipment (such as Eberline PAC-4)	22
5.03	Calibrate portable beta-gamma survey equipment (such as Cutie Pie 740A, Eberline Ion Chamber Model RO-2A, Teletector)	34
5.04	Calibrate portable air sampling equipment	37
5.05	Field check portable radiation monitoring instruments	60
5.06	Calibrate the beta-gamma-alpha monitor (such as the Thyac III)	10

JOB CODE: ASSISTANT HPT/TRAINEE

TASK INVENTORY

Task No.	Tasks	Percent of Assistant HPTs/ Trainees Performing Task
5.	Portable Radiation Monitoring Equipment (Survey Meters and Air Samplers) (Continued)	
5.07	Operate portable neutron survey equipment (such as Portable Neutron Rem Counter PNR-4)	62
5.08	Operate portable alpha survey equipment (such as Eberline PAC-4)	48
5.09	Operate portable beta-gamma survey equipment (such as Cutie Pie 740A, Eberline Ion Chamber Model RO-2A, Teletector)	80
5.10	Operate portable air sampling equipment (such as RADECO, Eberline RAS-1)	74
5.11	Operate portable underwater gamma survey equipment (such as CPMU)	12
5.12	Perform minor repairs on portable radiation monitoring equipment (such as change batteries, change cables, replace mylar windows)	73
5.13	Perform major repairs on portable radiation monitoring equipment (such as repair and test circuit boards)	9
5.14	Verify proper operation of CAMs	33
5.15	Calibrate condenser R chambers	10
5.16	Plot calibration curves for portable radiation monitoring equipment	15
5.17	Supervise portable radiation monitoring activities	15
6.	Personnel Monitoring Equipment (Friskers, Whole-Body Count Equipment)	
	Tasks listed on survey questionnaires:	
6.01	Post general area TLDs	22

JOB CODE: ASSISTANT HPT/TRAINEE

TASK INVENTORY

Task No.	Tasks	Percent of Assistant HPTs/ Trainees Performing Task
6.	Personnel Monitoring Equipment (Friskers, Whole-Body Count Equipment) (Continued)	
6.02	Perform initial issue of TLD/film badge	33
6.03	Operate the TLD reader to read TLDs	25
6.04	Prepare TLD for reissue	21
6.05	Perform TLD/film badge change out	24
6.06	Perform maintenance on TLD readers	10
6.07	Perform calibration of the TLD reader	14
6.08	Perform calibration checks of the TLD reader	17
6.09	Perform periodic QA checks of TLDs (that is, exposure to a known source)	14
6.10	Change film in film badges	14
6.11	Perform dosimeters drift check	40
6.12	Read pocket dosimeters	91
6.13	Zero pocket dosimeters	88
6.14	Issue pocket dosimeters for use	65
6.15	Issue audible and visual dosimeters	29
6.16	Expose personnel dosimeters for calibration purposes (e.g., pocket dosimeters, TLDs, digital-audible alarm dosimeters)	28
6.17	Collect personnel dosimetery devices (film badges or TLDs)	37
6.18	Manually calculate estimated individual neutron radiation exposure	45
6.19	Perform initial receipt testing of dosimetry equipment (such as drift test, drop test)	22

JOB CODE: ASSISTANT HPT/TRAINEE

TASK INVENTORY

Task No.	Tasks	Percent of Assistant HPTs/ Trainees Performing Task
6.	Personnel Monitoring Equipment (Friskers, Whole-Body Count Equipment) (Continued)	
6.20	Issue extremity dosimetry	46
6.21	Issue special purpose dosimetry (such as special neutron badges)	20
6.22	Evaluate results from extremity and special purpose dosimetry	30
6.23	Maintain computer records of radiation exposure	20
6.24	Perform background check on whole-body counter	33
6.25	Perform calibration checks (energy calibration and efficiency) on whole-body counter	29
6.26	Operate whole-body counter (WBC)	39
6.27	Obtain printout and/or plot of whole-body count data	36
6.28	Perform calculation for internal exposure based on WBC results	16
6.29	Calibrate whole-body counting system	18
6.30	Select personnel for routine whole-body counts	10
6.31	Schedule personnel to have a whole-body count	19
6.32	Assign personnel to have periodic whole-body counts performed based on health physics measurements (such as air sampling results, bioassay results, nasal smears)	25
6.33	Collect a bioassay sample	16
6.34	Collect and count nasal smears	43
6.35	Evaluate nasal smears	33
6.36	Collect and count throat smears	9

JOB CODE: ASSISTANT HPT/TRAINEE

TASK INVENTORY

Task No.	Tasks	Percent of Assistant HPTs/ Trainees Performing Task
6.	Personnel Monitoring Equipment (Friskers, Whole-Body Count Equipment) (Continued)	
6.37	Evaluate throat smears	9
6.38	Calibrate personnel monitoring friskers	30
6.39	Calibrate portal monitors	19
6.40	Perform routine source checks of friskers	58
6.41	Perform routine source checks of portal monitors	39
6.42	Perform personnel contamination monitoring (frisking)	89
6.43	Conduct functional check of equipment (hand and foot monitors, portable monitors, friskers, laundry monitors)	51
6.44	Supervise personnel monitoring activities	37
7.	Surveys (Radiation/Contamination/Airborne)	
	Tasks listed on survey questionnaires:	
7.01	Perform pre-Radiation Work Permit (RWP) surveys	63
7.02	Perform periodic surveys at radiation work sites to evaluate changes in radiological conditions	70
7.03	Perform post-work surveys at radiation work sites	63
7.04	Perform (obtain, count, and document) an airborne activity (including iodine samples) survey	69
7.05	Perform (obtain, count, and document) an airborne gaseous activity survey	63
7.06	Perform (obtain, count, and document) a tritium activity sample	45

JOB CODE: ASSISTANT HPT/TRAINEE

TASK INVENTORY

Task No.	Tasks	Percent of Assistant HPTs/ Trainees Performing Task
7.	Surveys (Radiation/Contamination/Airborne) (Continued)	
7.07	Determine percent maximum permissible concentration (MPC) (based on radionuclide) from air sample data	55
7.08	Select appropriate respiratory protection equipment based on air sample analysis	52
7.09	Review the results of air sample surveys	58
7.10	Perform (obtain, count, and document) a smear survey for loose surface contamination	82
7.11	Review the results of a smear survey	79
7.12	Perform periodic radiation and contamination surveys throughout the plant in non- radiologically controlled areas (warehouse, parking lot, lunch room, etc.)	70
7.13	Determine the location of radioactive hot spots	72
7.14	Post and label radioactive hot spots	61
7.15	Prepare reports regarding radiation and contamination surveys	48
7.16	Maintain records and files on radiation, contamination, and airborne activity surveys	49
7.17	Perform a general radiation survey	78
7.18	Perform a high radiation area survey	70
7.19	Perform a temporary shielding survey	52
7.20	Perform an industrial hygiene survey (air quality, temperature, noise) to determine physical habitability of an area	23
7.21	Perform radiological surveys in support of reactor containment building/drywell entry while at power	55

JOB CODE: ASSISTANT HPT/TRAINEE

TASK INVENTORY

Task No.	Tasks	Percent of Assistant HPTs/ Trainees Performing Task
7.	Surveys (Radiation/Contamination/Airborne) (Continued)	
7.22	Perform a neutron radiation survey	54
7.23	Perform on-the-job gross analysis of air samples (using portable survey instruments)	54
7.24	Perform surveys to support the movement of radioactive materials	63
7.25	Perform surveys in support of entry into areas of unknown radiological hazards	57
7.26	Perform a beta radiation survey	63
7.27	Perform radiological monitoring during industrial radiographic operations or other operations involving X-ray devices	24
7.28	Supervise the conduct of surveys (radiation/ contamination/airborne)	14
	Additional tasks identified:	
7.29	Determine survey frequencies based upon changes in radiological conditions	
8.	Radiation/Contamination Work Area Support	
	Tasks listed on survey questionnaires:	
8.01	Set up a control point	57
8.02	Set up a control area	57
8.03	Maintain a control point (that is, perform necessary surveys, supply required materials, logs, etc.)	64
8.04	Survey tools and equipment for release from a radiologically controlled area	82
8.05	Perform stay time calculations	51

JOB CODE: ASSISTANT HPT/TRAINEE

TASK INVENTORY

Task No.	Tasks	Percent of Assistant HPTs/ Trainees Performing Task
8.	Radiation/Contamination Work Area Support (Continued)	
8.06	Complete a Radiation Work Permit (RWP) (for example, clothing, dosimetry, and respirator requirements) based on survey data and radiological conditions expected	41
8.07	Determine required dosimetry for entry into a job coverage area	42
8.08	Determine proper dosimeter placement location on the body for entry into a job coverage area	46
8.09	Review RWP for completeness and obtain appropriate signatures for RWP approval	39
8.10	Estimate individual and total worker dose from the RWP information in accordance with ALARA procedures	36
8.11	Inspect work areas to ensure compliance with Radiation Work Permits and good work practices	62
8.12	Inspect plant areas for proper radiation posting, radioactive material storage, and contamination control	62
8.13	Post/remove posting of radiologically controlled areas	69
8.14	Update posting of radiologically controlled areas	65
8.15	Supervise the removal of personnel dosimetry equipment and protective clothing (including frisking)	67
8.16	Brief radiation workers on radiological hazards in the work area or changes in radiological conditions	69
8.17	Control worker access to a radiologically controlled area	60
8.18	Issue a stop work order when significant radiological discrepancies are discovered	34

JOB CODE: ASSISTANT HPT/TRAINEE

TASK INVENTORY

Task No.	Tasks	Percent of Assistant HPTs/ Trainees Performing Task
8.	Radiation/Contamination Work Area Support (Continued)	
8.19	Determine amount of shielding required using half-value layers or graphs	23
8.20	Direct the installation and removal of temporary shielding	41
8.21	Evaluate the effectiveness of temporary shielding	45
8.22	Prepare a containment area (tent) with associated ventilation to reduce personnel exposure to airborne contaminants	39
8.23	Prepare a glove box to reduce personnel exposure to airborne contaminants	19
8.24	Evaluate a work area for additional ALARA considerations	46
8.25	Perform certification inspections of tents, glove boxes, and other containment devices	20
8.26	Provide close health physics coverage for workers in high-dose jobs (for example, steam generator jumpers, control rod drive mechanism replacement)	45
8.27	Perform on-the-spot correction of workers not complying with proper radiological work practices or not following RWP requirements	61
8.28	Supervise health physics technicians in radiation/ contamination work area support	12
	Additional tasks identified:	
8.29	Evaluate containment device vent unit filters for replacement	

JOB CODE: ASSISTANT HPT/TRAINEE

TASK INVENTORY

Task No.	Tasks	Percent of Assistant HPTs/ Trainees Performing Task
9.	Shipping and Receiving Radioactive Materials	
	Tasks listed on survey questionnaires:	
9.01	Analyze samples of radioactive material to determine shipping category (radionuclide content, oil and moisture content)	21
9.02	Determine transport group and classify radioactive material as Type A, Type B, or LSA	20
9.03	Prepare a Radiation Work Permit for handling and processing radioactive waste	20
9.04	Provide health physics coverage during preparation of a shipment of radioactive material	50
9.05	Survey a shipment of radioactive material prior to shipping	60
9.06	Select appropriate containers and package radioactive materials	22
9.07	Package (including labeling) dry radioactive waste material for shipment	36
9.08	Document packaged material survey data in the radioactive material shipping record	33
9.09	Placard the transport vehicle	39
9.10	Survey transport vehicles	59
9.11	Supervise loading radioactive material on transport vehicle	32
9.12	Examine reports accompanying radioactive material shipment received to ensure compliance with federal regulations	16
9.13	Perform radiation and contamination surveys of radioactive material received (including recording survey data on receipt form)	43

JOB CODE: ASSISTANT HPT/TRAINEE

TASK INVENTORY

Task No.	Tasks	Percent of Assistant HPTs/ Trainees Performing Task
9.	Shipping and Receiving Radioactive Materials (Continued)	
9.14	Maintain records of the receipt/shipment of radioactive materials	17
9.15	Perform a radiological survey in conjunction with the receipt of new fuel and radioactive sealed sources	46
9.16	Control the movement of radioactive material through unrestricted (non-radiological) areas of the plant	57
9.17	Direct storage of radioactive materials in the designated areas of the plant	46
9.18	Inspect the transport vehicle to ensure safe transportation of radioactive materials over public thoroughfares	26
9.19	Determine qualifications of receiver to receive radioactive material shipment	9
9.20	Obtain radioactive material shipping permits	8
9.21	Apply state and federal shipping requirements	15
9.22	Survey waste materials to segregate high and low level waste in preparation for shipment	37
9.23	Weigh drums and packages in preparation for shipment	39
9.24	Perform container inspections and tests on non-certified shipping containers and packages	22
9.25	Conduct surveillance of drum and box waste compactor operations	42
9.26	Segregate contaminated and non-contaminated trash generated within the radiological controlled area by frisking	52
9.27	Accompany radioactive materials shipments off site	12

JOB CODE: ASSISTANT HPT/TRAINEE

TASK INVENTORY

Task No.	Tasks	Percent of Assistant HPTs/ Trainees Performing Task
9.	Shipping and Receiving Radioactive Materials (Continued)	
9.28	Supervise the shipping and receiving of radioactive materials	7
10.	Decontamination	
	Tasks listed on survey questionnaires:	
10.01	Evaluate contaminated material and equipment to determine if decontamination effort is practical	70
10.02	Direct decontamination of equipment or materials	62
10.03	Perform decontamination of equipment or materials	81
10.04	Prepare decontamination solutions and agents for use (such as TURCO)	27
10.05	Direct decontamination of personnel	68
10.06	Decontaminate personnel (including documenting results)	66
10.07	Direct area decontamination	62
10.08	Perform area decontamination (including documenting results)	59
10.09	Collect potentially contaminated laundry	44
10.10	Sort laundry (high-level contamination from low-level contamination and non-contaminated articles)	37
10.11	Operate contaminated laundry facilities	18
10.12	Survey laundry for reuse	44
10.13	Perform routine maintenance of laundry facilities (such as change filters, cleaning solutions, etc.)	14
10.14	Direct contaminated laundry operations	16

JOB CODE: ASSISTANT HPT/TRAINEE

TASK INVENTORY

Task No.	Tasks	Percent of Assistant HPTs/ Trainees Performing Task
10.	Decontamination (Continued)	
10.15	Operate decontamination high pressure water cabinet equipment	9
10.16	Operate ultrasonic decontamination unit	21
10.17	Operate decontamination vapor degreaser unit	5
10.18	Operate decontamination electro-polisher unit	7
10.19	Oversee decontamination efforts of equipment and work areas carried out by non-health physics personnel	45
10.20	Supervise Health Physics Technician decontamination support	17
11.	Environmental Sampling	
	Tasks listed on survey questionnaires:	
11.01	Coordinate environmental sampling schedule	8
11.02	Obtain charcoal filter samples	42
11.03	Obtain surface water samples	18
11.04	Obtain surface water tritium sample	16
11.05	Obtain surface water beta sample	12
11.06	Obtain aquatic vegetation samples	10
11.07	Obtain zooplankton samples	3
11.08	Obtain benthic organism samples	3
11.09	Obtain fish samples	6
11.10	Obtain shrimp samples	3
11.11	Obtain oyster samples	3

JOB CODE: ASSISTANT HPT/TRAINEE

TASK INVENTORY

Task No.	Tasks	Percent of Assistant HPTs/ Trainees Performing Task
11.	Environmental Sampling (Continued)	
11.12	Obtain bottom sediment samples	7
11.13	Obtain shoreline sediment samples	8
11.14	Obtain rain water samples	15
11.15	Obtain groundwater samples	9
11.16	Obtain milk sample	10
11.17	Obtain terrestrial vegetation samples	14
11.18	Obtain food crop samples	10
11.19	Obtain fodder and feed crop samples	9
11.20	Obtain deep well samples	9
11.21	Obtain soil samples	15
11.22	Calibrate environmental area radiation monitors and sampling equipment	13
11.23	Perform routine maintenance on environmental air sampling equipment	18
11.24	Obtain meteorological monitoring data (including documentation)	7
11.25	Prepare environmental samples for transfers to proper system lab	15
11.26	Package environmental samples for transfer to outside facilities	14
11.27	Review environmental data for compliance with technical specifications	10
11.28	Supervise environmental sampling activities performed by Health Physics Technicians	5

JOB CODE: ASSISTANT HPT/TRAINEE

TASK INVENTORY

Task No.	Tasks	Percent of Assistant HPTs/ Trainees Performing Task
12.	Respirators and Self-Contained Breathing Apparatus (SCBA) Equipment	
	Tasks listed on survey questionnaires:	
12.01	Conduct required routine inspections of respirators	65
12.02	Repair respiratory protective equipment	39
12.03	Leak test respirator after repair	31
12.04	Perform checks of hose, regulator, and manifold for forced-air respirator	48
12.05	Prepare respirators for reuse	56
12.06	Issue respiratory protective equipment	76
12.07	Use respiratory protective equipment	82
12.08	Perform inspection of respirator cannisters prior to reuse	38
12.09	Perform radiological surveys of respirators	48
12.10	Decontaminate respirators	39
12.11	Package respirators for storage	46
12.12	Refill SCBA bottles	34
12.13	Perform checks on SCBA	49
12.14	Perform qualitative respirator fit tests for personnel	18
12.15	Perform quantitative respirator fit tests for personnel	15
12.16	Calibrate the respirator fitting booth	9
12.17	Perform functional test of respiratory equipment	36

JOB CODE: ASSISTANT HPT/TRAINEE

TASK INVENTORY

Task No.	Tasks	Percent of Assistant HPTs/ Trainees Performing Task
12.	Respirators and Self-Contained Breathing Apparatus (SCBA) Equipment (Continued)	
12.18	Check respirator cannisters for differential pressure requirement conformity	14
12.19	Check respirator cannisters for contamination	26
12.20	Replace the catalyst agent in a re-breather type respirator (such as BIOPACK-60, SCOTT, MSA)	3
12.21	Replace the oxygen bottle on a re-breather type respirator (such as BIOPAK-60, SCOTT, MSA)	15
12.22	Perform checks on a re-breather type respirator (such as BIOPACK-60, SCOTT, MSA)	9
12.23	Perform air quality checks on plant breathing air systems	16
12.24	Supervise respirators and SCBA equipment activities performed by health physics technicians	5
	Additional tasks identified:	
12.25	Set up positive pressure supplied air respiratory equipment	
13.	Emergency/Abnormal Tasks	
	Tasks listed on survey questionnaires:	
13.01	Respond as a radiological emergency team member to a site or general emergency	60
13.02	Provide health physics coverage of contaminated and/or injured personnel during an emergency (on site or at an area medical facility)	44
13.03	Segregate contaminated personnel in accordance with emergency contamination criteria	36

JOB CODE: ASSISTANT HPT/TRAINEE

TASK INVENTORY

Task No.	Tasks	Percent of Assistant HPTs/ Trainees Performing Task
13.	Emergency/Abnormal Tasks (Continued)	
13.04	Recommend emergency actions consistent with protective action guides	18
13.05	Assist in Emergency Response Planning during an emergency	23
13.06	Maintain the emergency data status boards	12
13.07	Issue additional dosimetry as required by the Plant Emergency Plan	28
13.08	Sample off-site air for iodine	37
13.09	Track a radioactive plume	35
13.10	Perform as a re-entry team member (post accident)	30
13.11	Direct the re-entry team	14
13.12	Obtain post-accident samples	23
13.13	Prepare and handle post-accident samples	30
13.14	Analyze post-accident samples	22
13.15	Store post-accident sample for recounting	16
13.16	Dispose of post-accident samples	17
13.17	Respond to an uncontrolled release of activity to the environment	35
13.18	Respond to a portal monitor alarm	59
13.19	Respond to a fire in a controlled area	26
13.20	Respond to a constant air monitor alarm	39
13.21	Respond to an area radiation monitor alarm	43
13.22	Respond to a process radiation monitor alarm	23

JOB CODE: ASSISTANT HPT/TRAINEE

TASK INVENTORY

Task No.	Tasks	Percent of Assistant HPTs/ Trainees Performing Task
13.	Emergnecy/Abnormal Tasks (Continued	
13.23	Respond to a conductivity alarm	10
13.24	Respond to an effluent alarm	17
13.25	Respond to a fuel-handling accident	17
13.26	Respond to an abnormal TLD readout	19
13.27	Respond to a lost TLD	49
13.28	Respond to a pocket dosimeter being found off scale	64
13.29	Respond to personnel exposure exceeding regulatory or administrative limits	28
13.30	Provide health physics coverage for off-site radiological transportation incidents	13
13.31	Evaluate radiological incident (such as personnel contamination) to determine the cause	44
13.32	Respond to a fire as a member of the plant fire brigade	17
13.33	Coordinate a bomb search in controlled/radiation areas	8
13.34	Administer first aid to injured personnel	42
13.35	Administer CPR	29
13.36	Perform off-site dose assessment using a computer	9
13.37	Perform off-site dose assessment manually	17
	Additional tasks identified:	
13.38	Analyze indications of potential radiological problems based on quantitative measurement results within a particular system or area	

JOB CODE: ASSISTANT HPT/TRAINEE

TASK INVENTORY

Task No.	Tasks	Percent of Assistant HPTs/ Trainees Performing Task
13.	Emergency/Abnormal Tasks (Continued)	
13.39	Provide health physics coverage at the scene of an in-plant radiological incident to recommend or direct corrective actions to mitigate the consequences	
13.40	Advise management personnel of the significance and corrective action that should be taken during a radiological incident	
13.41	Advise workers of immediate actions to be taken within the radiologically controlled area during a radiological incident	
14.	Administration	
	Tasks listed on survey questionnaires:	
14.01	Initiate a maintenance work request	53
14.02	Compile data for steam generator composite report	10
14.03	Prepare special radiation control reports	7
14.04	Process requests to exceed the current radiation exposure authorization	18
14.05	Authorize requests to exceed the administrative radiation exposure limits	3
14.06	Order technical publications	9
14.07	Prepare routine radiation control reports	14
14.08	Prepare daily exposure status report	13
14.09	Collect data to be included in the radiation evaluation program	12
14.10	Conduct an ALARA evaluation of the radiation protection program	9

JOB CODE: ASSISTANT HPT/TRAINEE

TASK INVENTORY

Task No.	Tasks	Percent of Assistant HPTs/ Trainees Performing Task
14.	Administration (Continued)	
14.11	Review periodic radiation evaluation program	7
14.12	Maintain station man-rem plots and graphs	11
14.13	Prepare health physics procedures (including revision preparation)	20
14.14	Review health physics procedures (including proposed revisions)	34
14.15	Conduct job-specific ALARA review	17
14.16	Prepare post-outage ALARA report	5
14.17	Review meteorological monitoring reports	4
14.18	Review effluent and environmental monitoring reports	5
14.19	Review proposed plant design changes for radiological concerns	11
14.20	Review NRC health physics bulletins and regulations	51
14.21	Review personnel exposure history	36
14.22	Review contractor HPT qualifications prior to technician starting work	5
14.23	Review daily computer printout of personnel exposure	43
14.24	Schedule HPT coverage for outage support	6
14.25	Develop programs for initial training of HPTs within guidelines of plant and regulatory requirements	1
14.26	Develop periodic retraining programs for HPTs	1
14.27	Develop contractor HPT training program	1

JOB CODE: ASSISTANT HPT/TRAINEE

TASK INVENTORY

Task No.	Tasks	Percent of Assistant HPTs/ Trainees Performing Task
14.	Administration (Continued)	
14.28	Perform general employee training in radiological protection	5
14.29	Supervise conduct of the health physics portion of general employee training	1
14.30	Instruct personnel in respiratory protection	14
14.31	Instruct health physics technicians in classroom training	2
14.32	Provide on-the-job training to health physics personnel	17
14.33	Conduct oral examinations to verify the adequacy of technicians and their training	1
14.34	Conduct written examinations to verify adequacy of technicians and their training	1
14.35	Supervise the conduct of Health Physics Technician training	2
14.36	Participate in mock-up training	26
14.37	Provide HP training to off-site organizations (firemen, rescue squads, etc.)	2
14.38	Assist in organizing the annual medical drill (injured contaminated man drill)	7
14.39	Assist in organizing the annual site emergency exercise	5
14.40	Interpret radioactive sealed-source leak test results	9
14.41	Interpret radioactive source inventory results	7
14.42	Evaluate process monitor results	6
14.43	Update exposure records using TLD data	10

JOB CODE: ASSISTANT HPT/TRAINEE

TASK INVENTORY

Task No.	Tasks	Percent of Assistant HPTs/ Trainees Performing Task
14.	Administration (Continued)	
14.44	Audit daily radiation exposure records	9
14.45	Record individual dose on daily exposure cards or RWPs	40
14.46	Review daily dosimeter records	24
14.47	Compare TLD data with pocket dosimeter data	21
14.48	Administer the health physics QA program (develop, review)	2
	Additional tasks identified:	
14.49	Prepare respiratory protection program reports	
15.	Miscellaneous Supplies and Equipment	
	Tasks listed on survey questionnaires:	
15.01	Maintain inventory of radiation protection supplies	36
15.02	Maintain change rooms stocked with protective clothing	29
15.03	Inventory and replenish first aid supply stations	12
15.04	Order supplies for outage work	14
15.05	Fill out a purchase requisition form	28
15.06	Perform routine checks/audits of radiological emergency equipment and kits	40
15.07	Issue and receive contaminated tools and equipment	23
15.08	Inventory contaminated tools and equipment	12

APPENDIX E

RESUME BRIEFS OF MEMBERS OF SUBJECT MATTER EXPERT CONSENSUS GROUP

FRANK J. MAROTTA

TITLE:	Training Supervisor Brookhaven National Laboratory Safety and Environmental Protection Division
EDUCATION:	B.S., Biology, Manhattan College M.S., General Science and Education, St. Johns University

EXPERIENCE:

1979 - Present	Brookhaven National Laboratory (BNL) Project Manager, Job Analysis of Nuclear Power Reactor Health Physics Technicians. Administrator of BNL Health Physics Training Program Coordinator of Safety Training for BNL. Coordinator of Safety Training for off-site emergency response organizations. Adjunct Professor, Suffolk County Community College. Training Consultant.
1972 - 1979	Biology Instructor

ALAN K. ROECKLEIN

TITLE:	Staff Health Physicist Occupational Radiation Protection Branch Office of Research United States Nuclear Regulatory Commission (USNRC)
EDUCATION:	B.S., Physics, State University of New York at Stony Brook M.S., Health Physics, Vanderbilt University

EXPERIENCE:

1978 - Present	Staff Health Physicist, U.S. Nuclear Regulatory Commission.
1974 - 1978	Chairman, Department of Physics and Engineering, Montgomery Community College, MD. Performed contract health physics work at various nuclear power plants.
1964 - 1974	Director of two-year health physics technician program at Montgomery Community College, MD.

ALAN V. KUEHNER

TITLE:	Deputy Section Head Brookhaven National Laboratory (BNL) Safety and Environmental Protection Division Technical Support Section
EDUCATION:	B.S., Education, Physics, Edinboro State College Atomic Energy Commission Health Physics Fellowship Program, University of Rochester

EXPERIENCE:

1981 - Present — Deputy Section Head, BNL. Responsibilities include supervision of:

- o Training in safety, health physics, and industrial hygiene,
- o Instrumentation engineering and repair,
- o Personnel monitoring services,
- o Computer systems development and maintenance,
- o Calibration services,
- o Hazardous waste management,
- o Radiological Assistance Program (RAP, DOE Region I), and,
- o Decontamination facility.

1977 - 1981 — Group Leader, Computer Programming and Systems Group, Safety and Environmental Protection Division, Brookhaven National Laboratory, Upton, NY

1967 - 1977 — Health Physics Associate, Research and Special Projects Group, Health Physics Division, Brookhaven National Laboratory, Upton, NY.

ROBERT J. RODRIGUEZ

TITLE:	Senior Project Manager Institute of Nuclear Power Operations (INPO) Staff Radiological Protection and Emergency Preparedness Division
EDUCATION:	B.S., Georgia Institute of Technology M.S., Nuclear Science, Georgia Institute of Technology M.B.A. Candidate, Mercer University

EXPERIENCE:

1981 - Present	Senior Project Manager, Institute of Nuclear Power Operations.
1980 - 1981	Health Physics Training Supervisor, Tennessee Valley Authority.
1975 - 1980	Applied Health Physicist, Union Carbide Corporation, Oak Ridge, TN.

PATRICIA A. WILSON

TITLE:	Senior Project Engineer Institute of Nuclear Power Operations (INPO) Staff Training and Education Division Training Assistance Department
EDUCATION:	B.S., Illinois State University M.S., Illinois State University Ph.D., Candidate, Georgia State University

EXPERIENCE:

1980 - Present	Senior Project Engineer, INPO.
	Conduct job and task analysis.
	Develop various training manuals and conduct internal training.
	Participate in accreditation visits.
1976 - 1980	University professor. Served as vocational instructor and in-service trainer.
	Contribute to curriculum development.
1974 - 1975	High school instructor in business education.

PETER W. STEELE

TITLE:	Project Manager Institute of Nuclear Power Operations (INPO) Staff Training and Education Division Training Assistance Department
EDUCATION:	A.B., Chemistry, Duke University Some credits toward M.B.A., Georgia State University

EXPERIENCE:

1980 - Present	Project Manger, INPO. Conducted plant evaluations of personnel training and qualification. Manager of INPO task analysis projects for Chemistry and Health Physics Technicians.
1979 - 1980	Chemist, U.S. Nuclear Regulatory Commission. Conducted safeguards inspections at fuel fabrication and processing facilities.
1977 - 1979	Training Engineer, NUS Corporation. Conducted basic theory training for cold license candidates at several nuclear power plants.
1975 - 1977	Reactor theory instructor, U.S. Navy Nuclear Power School.
1972 - 1975	Commissioned Officer, U.S. Navy. Division Officer in Engineering Department of nuclear submarine.

MICHAEL S. TERPILAK

TITLE:	Health Physics Consultant to the Institute for Resource Management (IRM)
EDUCATION:	A.B., (Pre-Med), New York University Graduate Training, Biochemistry, New York University, Graduate School of Art and Science, New York, NY. Atomic Energy Commision Fellowship Program, Radiological Physics, New York University Post Graduate Medical School Public Health Service Fellowship Program, Nuclear Engineering Catholic University, Graduate School of Engineering

EXPERIENCE:

1983 - Present	Health Physics Consultant, Institute for Resource Management (IRM).
1980 - 1983	Deputy Director, Office of Health Physics, NCDRH, Rockville, MD.
1975 - 1980	Chief, Standards and Regulations Branch, Department of Commerce, Bureau of Radiological Health (BRH), Rockville, MD.
1971 - 1975	Chief, Environmental Radiation Branch, Region II Environmental Protection Agency, New York, NY.
1969 - 1971	Assistant Director for Operations, Division of Environmental Radiation, Bureau of Radiological Health, Rockville, MD.
1965 - 1969	Assistant Chief, Radiological Health Training Section, Bureau of Radiological Health, Rockville, MD.
1964 - 1965	Senior Health Physicist, Nuclear Engineering Section, Niagara Mohawk Power Corporation, Buffalo, NY.
1959 - 1964	Health Physicist, Training and Technical Group Supervisor, Naval Reactors Division, Combustion Engineering, Windsor, CT.

FRANCIS J. HAUGHEY

TITLE: Professor of Radiation Science
Rutgers University

EDUCATION: B.S., Physics, Hofstra University
M.S., Environmental Sciences, Rutgers University
Ph.D., Environmental Sciences, Rutgers University

EXPERIENCE:

1982 - Present Professor of Radiation Science, Rutgers University.

1976 - 1982 Associate Professor, Radiation Science, Rutgers University.

1974 - 1976 Guest Associate Health Physicist, Brookhaven National Laboratory (BNL) (Faculty Academic Study Leave).

Member of the Environmental Monitoring Research Group of Safety and Environmental Protection Division. Specific projects included:

- o Radiological Environmental Surveillance - Bikini Atoll, Marshall Islands, Trust Territory of the Pacific,
- o Movement of and effects of heated water recharged to the ground water, and
- o Non-radiological environmental monitoring of air, surface, and ground water.

Training Supervisor on BNL staff, Long Island Lighting Company personnel staffing Shoreham nuclear power plant.

1968 - 1976 Associate Professor, Environmental Science, Rutgers University.

1966 - 1968 Assistant Professor, Radiation Science, Rutgers University.

1958 - 1966 Lecturer in Health Physics and University Health Physicist, Rutgers University.

1955 - 1958 Health Physicist, Brookhaven National Laboratory.

1951 - 1955 Served in U.S. Air Force.

1948 - 1951 Test Technician Mechanical Engineering, Consolidated Edison Company of New York.

LARRY T. DAVIS

TITLE:	Nuclear Services Group Manager Analysis & Technology, Inc.
EDUCATION:	B.S., Mathematics, United States Naval Academy M.S., Mathematics, United States Naval Postgraduate School

EXPERIENCE:

1979 - Present	Nuclear Services Group Manager, Analysis & Technology, Inc. Responsible for the technical direction, scheduling, and budgeting of a variety of projects providing services to nuclear utility, government, and industry service organization clients. Project Manager for a number of major projects involving job and task analysis, training program development, guideline preparation, and training program evaluation for INPO, nuclear utilities, NRC, and DOE.
1970 - 1979	U.S. Navy. Completed Naval Nuclear Power School training and served as Division Officer in Engineering Department of nuclear submarine. Completed a tour as Chief Engineering Officer of a nuclear submarine before leaving the Navy.

THOMAS J. MAZOUR

TITLE: Group Manager
Analysis & Technology, Inc.

EDUCATION: B.S., Mathematics, United States Naval Academy
M.B.A., University of New Haven
M.S., Industrial Engineering, University of New Haven
Registered Professional Engineer (Nuclear/Mechanical)

EXPERIENCE:

1977 - Present Group Manager, Analysis & Technology, Inc.

Responsible for project management of a number of training-related projects for government and utility clients. Project experience includes industry-wide and plant-specific job and task analyses, cost-benefit analysis, training program evaluation, performance specifications development, human factors evaluation, training materials development, and guideline development.

1976 - 1977 Burns & ROE, Inc. Group Supervisor and Supervisor of Safety and Licensing for Clinch River Breeder Reactor project.

1971 - 1976 U.S. Navy. Completed Naval Nuclear Power School training and held Division Officer and Department Head positions on nuclear submarines.

APPENDIX F

JOB TASK QUESTIONNAIRE FOR NUCLEAR POWER REACTOR HEALTH PHYSICS TECHNICIANS

JOB TASK QUESTIONNAIRE
FOR
NUCLEAR POWER REACTOR
HEALTH PHYSICS TECHNICIANS

Brookhaven
National Laboratory

QUESTIONNAIRE ID:
PLANT / COMPANY ID:

JOB TASK QUESTIONNAIRE FOR NUCLEAR POWER REACTOR HEALTH PHYSICS TECHNICIANS

Brookhaven National Laboratory

and

Analysis & Technology, Inc.

August 1983

INTRODUCTION

This questionnaire is part of a national survey designed to gather information about commercial nuclear power reactor Health Physics Technician jobs. Its specific purpose is to obtain from you, the job incumbent, information concerning tasks that make up your job. The information collected from this questionnaire will be used by Brookhaven National Laboratory and Analysis & Technology, Inc., to make decisions on tasks that represent training needs. The eventual goal is to design and validate training and education programs that reflect information gathered directly from you. Your contribution to this effort is essential.

The information that you provide about your job will be combined with that from many other Health Physics Technicians to provide an industry-wide picture of the job requirements. The skills and knowledge required to perform tasks listed in this questionnaire should be defined in the next phase, task analysis. Because the success of the whole effort is very dependent on your individual help, we ask that you carefully consider each item in this questionnaire and respond to the best of your ability. Please be assured that your responses will have absolutely no impact on either your present or future employment status. Only group information will be used to help design improved training procedures for the industry. Your individual responses to this questionnaire will be treated confidentially. This questionnaire is in no way a test of your ability or work performance.

The expected time to complete this questionnaire is 1 to 2 hours. After completing the questionnaire, please put it in the envelope provided and return it to the individual responsible for collecting them for your organization.

If you have any questions or problems related to this questionnaire, please call Mr. Tom Davis or Mr. Tom Mazour collect at Analysis & Technology, Inc., (203) 599-3910 between 8 A.M. and 5 P.M. Eastern Time. Thank you very much for your assistance in this effort.

GENERAL INSTRUCTIONS

1. If you are assigned both health physics and chemistry technician tasks at your plant, please make a concentrated effort to respond to this questionnaire with just your health physics technician job experience.

2. Before beginning the questionnaire, look through the booklet and become familiar with the contents and all instructions. It is important to review the task inventory and become familiar with it in order to make a valid assessment of each tool/equipment, reference, and task statement.

3. The questionnaire is divided into four sections.

   Section I (Biographical Information) asks for some information about your background, general job description, and plant facilities. These descriptions will be used by the computer as a means of sorting questionnaire answers into common groups. In the event clarification of a response is required, your name is necessary. This information will be treated confidentially.

   Section II (Tasks) is a list of a number of specific tasks that may or may not be a part of your particular job. The tasks are grouped in duty areas so that related tasks are together to make it easier for you to think about any tasks you perform but were not included in the list. You are asked to make several judgements (frequency, importance, and difficulty) about each task. These three terms are defined in the directions preceding Section II.

   Section III (References) is a list of documents. You are asked to estimate how often you refer to each of these references as you carry out your job.

   Section IV (Tools and Equipment) is a list of tools and equipment. You are asked to estimate how often you use each of these items in carrying out your present job.

4. Remember that your responses about the items in this questionnaire should reflect what you do when performing your current job. If referring to a procedure or reference would assist you in responding to an item, please feel free to do so, but give your own opinion.

SECTION I. BIOGRAPHICAL INFORMATION

DIRECTIONS

1. This section asks for some information about your background, general job description, and plant facilities. Two separate sections of biographical questions are provided. Your responses are needed for only one section. To determine which section to complete, please answer the following question:

   Which descriptor best describes your employment status? (Mark only one)

(1) ___ I am employed by a utility company.

(2) ___ I am employed by a contractor (vendor) company, but I am assigned on a long-term basis to a plant to fill a utility position that might otherwise be vacant.

(3) ___ I am employed by a contractor (vendor) company on a temporary assignment to a plant (for example, outage support).

If you checked (1) or (2) above, please complete the first biographical information section (labeled A, pages 7 through 9) and then proceed to page 15.

If you checked (3) above, please complete the second biographical information section (labeled B, pages 11 through 13) and then proceed to page 15.

A. UTILITY HEALTH PHYSICS TECHNICIAN BIOGRAPHICAL INFORMATION

NOTE: Complete this biographical information section if you are:

a) A utility company employee, or

b) Employed by a contractor (vendor) company but assigned on long-term basis to fill a utility position.

Please provide the requested information by marking the appropriate response or CLEARLY PRINTING the information:

NAME: ______________________________

PLANT: ______________________________

DATE: ______________________________

1. Present job title: ______________________________

2. Are you permanently assigned to work in a particular specialty area on your job? (such as Radioactive Waste, Calibration, Dosimetry, Decontamination, etc.)

   ___ Yes ___ No

   If yes, briefly describe: ______________________________

   ____

3. What job level descriptor best describes your job? (Mark only one)

   (1) ___ Technician Trainee
   (2) ___ Assistant Technician
   (3) ___ Technician (Junior)
   (4) ___ Senior/Lead Technician
   (5) ___ Foreman or Supervisor (first line manager)

4. How long have you worked in your present job level at this utility?

   ___ years and ___ months

A. <u>Utility Health Physics Technician Biographical Information (Continued)</u>

5. How long have you worked in the Health Physics area for this utility?

   ___ years and ___ months

6. How many total years have you worked in the commercial nuclear power reactor health physics industry?

   ___ years and ___ months

7. How many total years have you worked in other health physics areas (for example, military, medical, etc.)?

   ___ years and ___ months

8. Does your job also include Chemistry Technician duties (i.e., your utility combines Health Physics Technician and Chemistry Technician responsibilities into one job position)?

   ___ Yes ___ No

9. What is the highest level of education you have received? (Mark only <u>one</u>)

   (1) ___ Grade school

   (2) ___ Attended high school, but did not graduate

   (3) ___ Attended trade/vocational school, but did not graduate

   (4) ___ Graduated from high school or equivalent

   (5) ___ Graduated from trade/vocational school

   (6) ___ Attended college, but did not graduate

   (7) ___ Graduated from junior college (AA or AS degree)

   (8) ___ Graduated from college (BA or BS degree)

   (9) ___ Graduated from post-graduate college (MA or MS degree)

   (10) ___ PhD Degree

A. Utility Health Physics Technician Biographical Information (Continued)

10. Indicate the total number of weeks of health physics training you have received at any location in each of the following areas:

(1) __ Vocational/technical

(2) __ Correspondence

(3) __ Utility classroom/laboratory training

(4) __ Utility on-the-job training

(5) __ Military schools

(6) __ College

(7) __ Short courses/seminars

11. Has your commercial nuclear power reactor health physics experience been mostly:

(1) ___ Boiling Water Reactor (BWR)?

(2) ___ Pressurized Water Reactor (PWR)?

(3) ___ Both BWR and PWR?

(4) ___ High Temperature Gas-Cooled Reactor (HTGR)?

12. Where do you perform your job? (Mark only one)

(1) ___ On-site (most of your time is spent in the vicinity of the reactor plant)

(2) ___ Off-site (most of your time is not spent at the plant)

Please turn to page 15 and begin Section II.

B. VENDOR HEALTH PHYSICS TECHNICIAN BIOGRAPHICAL INFORMATION

> *NOTE: Complete this biographical information section if you are employed by a contractor (vendor) company on short-term temporary assignment to a plant (for example, outage support).*

Please provide the requested information by marking the appropriate response or CLEARLY PRINTING the information:

NAME: ____

CONTRACTOR AFFILIATED WITH: ____________________________

DATE: ____

1. Present job title: ________________________________

2. Are you permanently assigned to work in a particular specialty area on your job? (such as Radioactive Waste, Calibration, Dosimetry, Decontamination, etc.)

   ___ Yes ___ No

   If yes, briefly describe: ______________________________

   ____

3. When assigned to a plant, what is the <u>equivalent plant job level</u> for the work you perform? (Mark only <u>one</u>)

   (1) ___ Technician Trainee
   (2) ___ Assistant Technician
   (3) ___ Technician (Junior)
   (4) ___ Senior/Lead Technician
   (5) ___ Foreman or Supervisor (first line manager)

4. With respect to question 3, how long have you been performing work at this equivalent plant job level?

   ___ years and ___ months

B. Vendor Health Physics Technician Biographical Information (Continued)

5. How long have you worked as a vendor Health Physics Technician?

___ years and ___ months

6. How many total years have you worked in the commercial nuclear power reactor health physics industry?

___ years and ___ months

7. How many total years have you worked in other health physics areas (for example, military, medical, etc.)?

___ years and ___ months

8. What is the highest level of education you have received? (Mark only one)

(1) ___ Grade school

(2) ___ Attended high school, but did not graduate

(3) ___ Attended trade/vocational school, but did not graduate

(4) ___ Graduated from high school or equivalent

(5) ___ Graduated from trade/vocational school

(6) ___ Attended college, but did not graduate

(7) ___ Graduated from junior college (AA or AS degree)

(8) ___ Graduated from college (BA or BS degree)

(9) ___ Graduated from post-graduate college (MA or MS degree)

(10) ___ PhD Degree

B. Vendor Health Physics Technician Biographical Information (Continued)

9. Indicate the total number of weeks of health physics training you have received at any location in each of the following areas:

(1) __ Vocational/technical

(2) __ Correspondence

(3) __ Utility classroom/laboratory training

(4) __ Utility on-the-job training

(5) __ Military schools

(6) __ College

(7) __ Short courses/seminars

10. Has your commercial nuclear power reactor health physics experience been mostly:

(1) ___ Boiling Water Reactor (BWR)?

(2) ___ Pressurized Water Reactor (PWR)?

(3) ___ Both BWR and PWR?

(4) ___ High Temperature Gas-Cooled Reactor (HTGR)?

11. Where do you perform your job? (Mark only one)

(1) ___ On-site (most of your time is spent in the vicinity of the reactor plant)

(2) ___ Off-site (most of your time is not spent at the plant)

Please turn to page 15 and begin Section II.

SECTION II. TASKS

DIRECTIONS

1. This section contains a list of tasks each of which may or may not be a part of what you do on your present job. Because this questionnaire is being taken by several experience and responsibility levels (technician trainee through supervisor), we expect that some individuals will not perform many of the tasks and few individuals will perform all of the tasks. The tasks are grouped into 15 different duty areas. Please review the following list of duty areas so that you will understand how the task list is arranged:

    1. Counting Room and Associated Equipment
    2. Radioactive Sources
    3. Effluent Control (Liquid and Gaseous)
    4. Process Monitoring
    5. Portable Radiation Monitoring Equipment (Survey Meters and Air Samplers)
    6. Personnel Monitoring Equipment (Friskers, Whole Body Count Equipment)
    7. Surveys (Radiation/Contamination/Airborne)
    8. Radiation/Contamination Work Area Support
    9. Shipping and Receiving Radioactive Materials
    10. Decontamination
    11. Environmental Sampling
    12. Respirators and SCBA Equipment
    13. Emergency/Abnormal Tasks
    14. Administration/Training
    15. Miscellaneous Supplies and Equipment

2. You are asked to make three ratings for each of the tasks that is a part of your job: Frequency (how often you do the task), Importance (how serious it is if the task is done improperly), and Difficulty (how hard it is to do the task properly). If you are not responsible for being able to perform a particular task, just circle zero (NEVER) for that task and then go on to the next task. It is anticipated that there may be tasks listed for which you are responsible, but may not have performed (for example, a task which is rarely performed, such as "analyze post-accident samples"). Please rate these tasks to the best of your ability. Be sure to mark an answer for every task. Please use a pencil in case it becomes necessary to change a response. The three rating scales are explained in more detail as follows (the scales are repeated on the last page of the booklet which should be folded out for easy reference):

FREQUENCY

In this column you are asked to indicate how often you perform each task. When estimating the frequency of performance, think back over your activities and indicate how often you personally have performed each task by circling the appropriate frequency code number from the scale below:

- 0 = Never (not a part of the job)
- 1 = Rarely (must be able to perform but actually performed once a year or less often)
- 2 = Seldom (about 3 or 4 times a year)
- 3 = Occasionally (about once a month)
- 4 = Often (about once a week)
- 5 = Very Often (daily)

IMPORTANCE

This column asks you to rate the importance of each task in terms of the consequences that would result if the task was performed inadequately. You should consider the overall impact with regard to possible unnecessary radiation exposure to workers, damage to equipment and systems, injury to personnel, loss of power generation capabilities, and possible radiation releases from failure to perform a task properly (given that all the other systems or automatic functions operate as designed). Rate the task consequences using the following guidelines:

- 1 = Negligible (Improper task performance results in no unnecessary radiation dose or makes no difference in plant operation and poses no personnel or environmental safety consequences.)
- 2 = Undesirable (Improper task performance may result in a dose considered inconsistent with ALARA or some undesirable consequences to plant operation, or some personnel or environmental safety consequences, or may require some moderate corrective action.)
- 3 = Serious (Improper task performance may result in exceeding administrative exposure limits or serious consequences to plant operation, personnel injury, or an unusual occurrence event, or it may require considerable corrective actions.)

4 = <u>Severe</u> (Improper task performance may result in exceeding federal exposure limits or consequences requiring extensive corrective action, or it may result in an alert event.)

5 = <u>Extremely Severe</u> (Improper task performance may result in serious overexposure implying possible health consequences or consequences that may be enormously time consuming or costly to correct, or it may result in a site or general emergency.)

DIFFICULTY

This scale is used to rate the difficulty of performing a task in the *typical* setting or location, rather than in unusual circumstances or in locations rarely encountered. In judging task difficulty, consider the two major factors that affect the task complexity: mental activities and motor-coordination requirements. Mental activities include such areas as:

- Recognition, evaluation, comprehension, and understanding (for example, understanding the effect on a system or systems of shutting a specific valve),
- Retention and recall (for example, remembering the correct sequence of procedures for completing a task), and
- Problem solving (for example, determining the cause of an equipment malfunction).

Motor-coordination abilities include gross motor coordination (for example, weighing drums and packages), fine manual dexterity (for example, calibrating an instrument that requires precision for making adjustments), and ability to perform tasks under restricted conditions (for example, while wearing anti-contamination clothing). Rate the task performance difficulty using the following guidelines:

- First, determine the degree of mental activity required for performing the task, either low, medium, or high.
- Second, using the following listing, find the level of mental activity determined above, and then determine the degree of motor coordination needed. This will yield the difficulty rating to be entered.

1 = The mental activity required is low and the degree of motor coordination is low.

2 = The mental activity required is low and the degree of motor coordination is high.

3 = The mental activity required is medium (irrespective of the motor coordination rating).

4 = The mental activity required is high and the degree of motor coordination is low.

5 = The mental activity required is high and the degree of motor coordination is high.

3. The examples below illustrate how to make your ratings for each task. The ratings shown in these examples are not meant to be accurate for any given job, but to show the correct way to mark your responses. (Fold out the last page of this booklet to use as a reference for these examples.)

Example 1 - Shows the most common type of response where the task is performed as part of the individual's job. He does this "about once a week," so he has circled the 4 in the Frequency column. In the Importance column, he has circled a 3 because he feels that "improper performance of this task may result in consequences requiring considerable corrective action." He has circled the 4 under the Difficulty column because he feels that task performance "requires a high degree of mental activity and a low degree of motor coordination."

TASK	NEVER	FREQUENCY	IMPORTANCE	DIFFICULTY
1. Perform stay time calculations	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

Example 2 - For Task 2 in the example below, the person filling out this questionnaire does not perform the task as part of his present position, so he has circled the zero under Frequency and does not mark the other two rating scales. This individual is a supervisor. In a previous position as a junior technician he performed this task, but not in his present position.

TASK	NEVER	FREQUENCY	IMPORTANCE	DIFFICULTY
2. Weigh LSA drums in preparation for shipment	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

Example 3 - For Task 3 below, the person filling out this questionnaire has never performed that task, but it is part of his job responsibilities if the accident condition ever arises. Therefore, in the Frequency column, he has circled a 1, because it is rarely performed, and he has rated Difficulty and Importance based upon what he has learned about the task through training and experience. He has circled a 5 under the Importance column because "improper task performance may result in serious overexposure." He has circled a 5 under the Difficulty column because task performance "requires a high degree of mental activity and motor coordination."

TASK	NEVER	FREQUENCY	IMPORTANCE	DIFFICULTY
3. Perform as a re-entry team member (post-accident)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

4. Following each group of tasks (duty area), there is a write-in section. This is provided for you to list any other tasks that you perform that are not included in the list. Please include your ratings with each new task that you add.

If you are a health physics supervisor, add only tasks that are uniquely performed by you as compared to the other types of group supervisors. For example, if the task "Prepare time sheets" is performed by you as well as the mechanical maintenance supervisor, instrument and control supervisor, or the electrical maintenance supervisor, the task should not be added to this questionnaire list. These common supervisory tasks have been separately identified.

NOTE:

1. If you haven't done so already, fold out the last page of this booklet to use as a reference while completing the task information.
2. Be sure to mark a response to every task. If a task is not a part of your job responsibilities, circle the zero (0) under Never and go on to the next task. Do not mark the Importance and Difficulty ratings for those tasks that you never do.

1. COUNTING ROOM AND ASSOCIATED EQUIPMENT

Task No.	Task	Never	Frequency	Importance	Difficulty
1.01	Perform background checks of counting room equipment (counter scalers)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.02	Perform performance checks on counting room equipment (counter scalers)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.03	Manually calculate airborne nuclide concentration of radioactive material from counting room data (using a prepared form)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.04	Calibrate gross counting systems (such as Eberline MS-3, Tennelec LB-5500)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.05	Prepare samples for counting	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.06	Operate gross gamma counting systems (manual or automatic)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.07	Operate gross beta counters (manual or automatic)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.08	Operate gross alpha counting systems (such as SAC-4)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.09	Determine counter efficiency	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.10	Determine counter reliability (e.g., chi-squared determination)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.11	Determine counter percent slope (response curve/detector voltage plateau)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.12	Determine counter resolving time	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

1. COUNTING ROOM AND ASSOCIATED EQUIPMENT (Continued)

Task No.	Task	Never	Frequency	Importance	Difficulty
1.13	Determine GeLi/intrinsic geranium detector operating parameters (detector efficiency, detector resolution, detector reliability, energy calibration, and background determination)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.14	Determine Na I detector operating parameters (detector efficiency, detector resolution, detector reliability, energy calibration, and background determination)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.15	Determine liquid scintillation counter efficiency	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.16	Prepare samples for liquid scintillation counter	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.17	Operate liquid scintillation counters	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.18	Calibrate liquid scintillation detectors	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.19	Update the gamma spectrometer nuclide library	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.20	Calibrate computer-based multi-channel analyzer	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.21	Calibrate stand-alone multi-channel analyzer	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.22	Count samples with computer-based multi-channel analyzer	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

1. COUNTING ROOM AND ASSOCIATED EQUIPMENT (Continued)

Task No.	Task	Never	Frequency	Importance	Difficulty
1.23	Count samples with stand-alone multi-channel analyzer	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.24	Operate the gas flow proportional counter	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.25	Change the gas cylinder for the gas flow proportional counter	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.26	Operate the gamma well counter	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.27	Replace installed counting equipment detectors (such as GM tubes)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.28	Refill the GeLi liquid nitrogen dewar	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.29	Input new calibration data into the isotopic identification computer	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.30	Prepare the isotopic identification computer for analysis	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.31	Calculate lower limit of detection (LLD) for counter scalers (such as SAC-4, LCS-1)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.32	Calculate minimum detectable counts (MDC) for counter scalers (such as SAC-4, LCS-1)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.33	Perform decay constant calculations on air samples	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

1. COUNTING ROOM AND ASSOCIATED EQUIPMENT (Continued)

Task No.	Task	Never	Frequency	Importance	Difficulty
1.34	Calculate weighted maximum permissible concentration (MPC) from isotopic data	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.35	Prepare counting data QC charts	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.36	Prepare spiked samples and standards from stock radioisotope solutions	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.37	Supervise (plan, budget, schedule, evaluate) counting room activities	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	Please list (print) any tasks which you perform which are not listed. Include scale ratings.				
1.38	______________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
1.39	______________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

2. RADIOACTIVE SOURCES

Task No.	Task	Never	Frequency	Importance	Difficulty
2.01	Perform radioactive sealed source leak test (including documenting results)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
2.02	Monitor radioactive sealed source leak detection graphs and charts	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
2.03	Inventory radioactive sources (including documenting results)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
2.04	Operate calibration source well or source calibrator	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
2.05	Audit radioactive source and material records	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
2.06	Develop calibration charts for calibration sources	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
2.07	Transfer radioactive sources from/to other departments	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
2.08	Calculate radioactive source activity strengths	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
2.09	Dispose of decayed or no longer usable radioactive sources	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
2.10	Supervise control and use of radioactive sealed sources	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	Please list (print) any tasks which you perform which are not listed. Include scale ratings.				
2.11	______________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
2.12	______________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

3. EFFLUENT CONTROL (LIQUID AND GASEOUS)

Task No.	Task	Never	Frequency	Importance	Difficulty
3.01	Perform release rate calculations	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
3.02	Evaluate effluent release data	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
3.03	Prepare a gaseous waste release permit	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
3.04	Prepare a liquid waste release permit	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
3.05	Prepare a liquid release report	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
3.06	Prepare a gaseous effluent account report	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
3.07	Compile data for effluent release composite report	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
3.08	Compile data for effluent disposal record	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
3.09	Supervise effluent control activities	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	Please list (print) any tasks which you perform which are not listed. Include scale ratings.				
3.10	____________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
3.11	____________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

4. PROCESS MONITORING (LIQUID AND GASEOUS)

Task No.	Task	Never	Frequency	Importance	Difficulty
4.01	Calibrate liquid process effluent radiation monitors	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
4.02	Calibrate gaseous process effluent radiation monitors	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
4.03	Calibrate the COG (condenser off gas) process vent monitors	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
4.04	Calibrate the stack monitors	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
4.05	Calibrate the dry well atmosphere activity monitors	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
4.06	Calibrate the essential service water monitors	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
4.07	Calibrate the reactor building vent monitors	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
4.08	Calibrate the reactor building closed cooling water/component cooling water monitor	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
4.09	Calibrate the turbine building vent monitors	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
4.10	Calibrate the constant air monitors (such as CAM, APD)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
4.11	Change filters in CAMs	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
4.12	Change recording paper in CAMs	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
4.13	Calibrate the containment spray heat exchanger monitors	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

4. PROCESS MONITORING (LIQUID AND GASEOUS) (Continued)

Task No.	Task	Never	Frequency	Importance	Difficulty
4.14	Calibrate the emergency condenser vent monitors	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
4.15	Calibrate the area radiation monitor portable calibration unit	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
4.16	Calibrate the stationary area radiation monitors	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
4.17	Calibrate the portable area radiation monitor	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
4.18	Set up portable area radiation monitors	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
4.19	Calibrate the post-accident monitors (steam jet air ejector, main steam iine, containment high radiation system)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
4.20	Replace detectors in process radiation monitors	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
4.21	Calculate process radiation monitor alarm setpoints	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
4.22	Assist in installation of new process radiation monitors (including set up)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
4.23	Supervise process monitoring activities	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	Please list (print) any tasks which you perform which are not listed. Include scale ratings.				
4.24	____________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
4.25	____________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

5. PORTABLE RADIATION MONITORING EQUIPMENT (SURVEY METERS & AIR SAMPLERS)

Task No.	Task	Never	Frequency	Importance	Difficulty
5.01	Calibrate portable neutron survey equipment (such as Portable Neutron Rem Counter PNR-4)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
5.02	Calibrate portable alpha survey equipment (such as Eberline PAC-4)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
5.03	Calibrate portable beta-gamma survey equipment (such as Cutie Pie 740A, Eberline Ion Chamber Model RO-2A, Teletector)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
5.04	Calibrate portable air sampling equipment	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
5.05	Field check portable radiation monitoring instruments	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
5.06	Calibrate the beta-gamma-alpha monitor (such as the Thyac III)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
5.07	Operate portable neutron survey equipment (such as Portable Neutron Rem Counter PNR-4)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
5.08	Operate portable alpha survey equipment (such as Eberline PAC-4)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
5.09	Operate portable beta-gamma survey equipment (such as Cutie Pie 740A, Eberline Ion Chamber Model RO-2A, Teletector)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

5. PORTABLE RADIATION MONITORING EQUIPMENT (SURVEY METERS & AIR SAMPLERS) (Continued)

Task No.	Task	Never	Frequency	Importance	Difficulty
5.10	Operate portable air sampling equipment (such as RADECO, Eberline RAS-1)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
5.11	Operate portable underwater gamma survey equipment (such as CPMU)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
5.12	Perform minor repairs on portable radiation monitoring equipment (such as change batteries, change cables, replace mylar windows)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
5.13	Perform major repairs on portable radiation monitoring equipment (such as repair and test circuit boards)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
5.14	Verify proper operation of CAMs	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
5.15	Calibrate condenser R chambers	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
5.16	Plot calibration curves for portable radiation monitoring equipment	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
5.17	Supervise portable radiation monitoring activities	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	Please list (print) any tasks which you perform which are not listed. Include scale ratings.				
5.18	______________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
5.19	______________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

6. PERSONNEL MONITORING EQUIPMENT (FRISKERS, WHOLE BODY COUNT EQUIPMENT)

Task No.	Task	Never	Frequency	Importance	Difficulty
6.01	Post general area TLDs	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.02	Perform initial issue of TLD/film badge	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.03	Operate the TLD reader to read TLDs	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.04	Prepare TLD for reissue	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.05	Perform TLD/film badge change out	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.06	Perform maintenance on TLD readers	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.07	Perform calibration of the TLD reader	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.08	Perform calibration checks of the TLD reader	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.09	Perform periodic QA checks of TLDs (that is, exposure to a known source)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.10	Change film in film badges	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.11	Perform dosimeters drift check	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.12	Read pocket dosimeters	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.13	Zero pocket dosimeters	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.14	Issue pocket dosimeters for use	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.15	Issue audible and visual dosimeters	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

6. PERSONNEL MONITORING EQUIPMENT (FRISKERS, WHOLE BODY COUNT EQUIPMENT) (Continued)

Task No.	Task	Never	Frequency	Importance	Difficulty
6.16	Expose personnel dosimeters for calibration purposes (e.g., pocket dosimeters, TLDs, digital-audible alarm dosimeters)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.17	Collect personnel dosimetery devices (film badges or TLDs)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.18	Manually calculate estimated individual neutron radiation exposure	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.19	Perform initial receipt testing of dosimetry equipment (such as drift test, drop test)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.20	Issue extremity dosimetry	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.21	Issue special purpose dosimetry (such as special neutron badges)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.22	Evaluate results from extremity and special purpose dosimetry	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.23	Maintain computer records of radiation exposure	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.24	Perform background check on whole body counter	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.25	Perform calibration checks (energy calibration and efficiency) on whole body counter	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.26	Operate whole body counter (WBC)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

6. PERSONNEL MONITORING EQUIPMENT (FRISKERS, WHOLE BODY COUNT EQUIPMENT) (Continued)

Task No.	Task	Never	Frequency	Importance	Difficulty
6.27	Obtain printout and/or plot of whole body count data	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.28	Perform calculation for internal exposure based on WBC results	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.29	Calibrate whole body counting system	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.30	Select personnel for routine whole body counts	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.31	Schedule personnel to have a whole body count	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.32	Assign personnel to have periodic whole body counts performed based on health physics measurements (such as air sampling results, bioassay results, nasal smears)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.33	Collect a bioassay sample	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.34	Collect and count nasal smears	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.35	Evaluate nasal smears	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.36	Collect and count throat smears	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.37	Evaluate throat smears	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.38	Calibrate personnel monitoring friskers	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.39	Calibrate portal monitors	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.40	Perform routine source checks of friskers	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

6. PERSONNEL MONITORING EQUIPMENT (FRISKERS, WHOLE BODY COUNT EQUIPMENT) (Continued)

Task No.	Task	Never	Frequency	Importance	Difficulty
6.41	Perform routine source checks of portal monitors	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.42	Perform personnel contamination monitoring (frisking)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.43	Conduct functional check of equipment (hand and foot monitors, portable monitors, friskers, laundry monitors)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.44	Supervise personnel monitoring activities	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	Please list (print) any tasks which you perform which are not listed. Include scale ratings.				
6.45	______________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.46	______________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

7. SURVEYS (RADIATION/CONTAMINATION/AIRBORNE)

Task No.	Task	Never	Frequency	Importance	Difficulty
7.01	Perform pre-Radiation Work Permit (RWP) surveys	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.02	Perform periodic surveys at radiation work sites to evaluate changes in radiological conditions	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.03	Perform post-work surveys at radiation work sites	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.04	Perform (obtain, count and document) an airborne activity (including iodine samples) survey	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.05	Perform (obtain, count and document) an airborne gaseous activity survey	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.06	Perform (obtain, count and document) a tritium activity sample	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.07	Determine percent maximum permissible concentration (MPC) (based on radionuclide) from air sample data	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.08	Select appropriate respiratory protection equipment based on air sample analysis	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.09	Review the results of air sample surveys	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.10	Perform (obtain, count, and document) a smear survey for loose surface contamination	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

7. SURVEYS (RADIATION/CONTAMINATION/AIRBORNE) (Continued)

Task No.	Task	Never	Frequency	Importance	Difficulty
7.11	Review the results of a smear survey	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.12	Perform periodic radiation and contamination surveys throughout the plant in non-radiologically controlled areas (warehouse, parking lot, lunch room, etc.)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.13	Determine the location of radioactive hot spots	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.14	Post and label radioactive hot spots	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.15	Prepare reports regarding radiation and contamination surveys	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.16	Maintain records and files on radiation, contamination, and airborne activity surveys	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.17	Perform a general radiation survey	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.18	Perform a high radiation area survey	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.19	Perform a temporary shielding survey	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.20	Perform an industrial hygiene survey (air quality, temperature, noise) to determine physical habitability of an area	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

7. SURVEYS (RADIATION/CONTAMINATION/AIRBORNE) (Continued)

Task No.	Task	Never	Frequency	Importance	Difficulty
7.21	Perform radiological surveys in support of reactor containment building/drywell entry while at power	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.22	Perform a neutron radiation survey	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.23	Perform on-the-job gross analysis of air samples (using portable survey instruments)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.24	Perform surveys to support the movement of radioactive materials	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.25	Perform surveys in support of entry into areas of unknown radiological hazards	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.26	Perform a beta radiation survey	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.27	Perform radiological monitoring during industrial radiographic operations or other operations involving X-Ray devices	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.28	Supervise the conduct of surveys (radiation/contamination/airborne)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	Please list (print) any tasks which you perform which are not listed. Include scale ratings.				
7.29	______________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.30	______________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

8. RADIATION/CONTAMINATION WORK AREA SUPPORT

Task No.	Task	Never	Frequency	Importance	Difficulty
8.01	Set up a control point	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.02	Set up a control area	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.03	Maintain a control point (that is, perform necessary surveys, supply required materials, logs, etc.)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.04	Survey tools and equipment for release from a radiologically controlled area	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.05	Perform stay time calculations	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.06	Complete a Radiation Work Permit (RWP) (for example, clothing, dosimetry, and respirator requirements) based on survey data and radiological conditions expected	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.07	Determine required dosimetry for entry into a job coverage area	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.08	Determine proper dosimeter placement location on the body for entry into a job coverage area	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.09	Review RWP for completeness and obtain appropriate signatures for RWP approval	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.10	Estimate individual and total worker dose from the RWP information in accordance with ALARA procedures	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

8. RADIATION/CONTAMINATION WORK AREA SUPPORT (Continued)

Task No.	Task	Never	Frequency	Importance	Difficulty
8.11	Inspect work areas to ensure compliance with Radiation Work Permits and good work practices	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.12	Inspect plant areas for proper radiation posting, radioactive material storage, and contamination control	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.13	Post/remove posting of radiologically-controlled areas	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.14	Update posting of radiologically-controlled areas	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.15	Supervise the removal of personnel dosimetry equipment and protective clothing (including frisking)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.16	Brief radiation workers on radiological hazards in the work area or changes in radiological conditions	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.17	Control worker access to a radiologically-controlled area	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.18	Issue a stop work order when significant radiological discrepancies are discovered	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.19	Determine amount of shielding required using half value layers or graphs	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

8. RADIATION/CONTAMINATION WORK AREA SUPPORT (Continued)

Task No.	Task	Never	Frequency	Importance	Difficulty
8.20	Direct the installation and removal of temporary shielding	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.21	Evaluate the effectiveness of temporary shielding	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.22	Prepare a containment area (tent) with associated ventilation to reduce personnel exposure to airborne contaminants	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.23	Prepare a glove box to reduce personnel exposure to airborne contaminants	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.24	Evaluate a work area for additional ALARA considerations	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.25	Perform certification inspections of tents, glove boxes, and other containment devices	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.26	Provide close health physics coverage for workers in high dose jobs (for example, steam generator jumpers, control rod drive mechanism replacement)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.27	Perform on-the-spot correction of workers not complying with proper radiological work practices or not following RWP requirements	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

8. RADIATION/CONTAMINATION WORK AREA SUPPORT (Continued)

Task No.	Task	Never	Frequency	Importance	Difficulty
8.28	Supervise health physics technicians in radiation/contamination work area support	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	Please list (print) any tasks which you perform which are not listed. Include scale ratings.				
8.29	____________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.30	____________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

9. SHIPPING AND RECEIVING RADIOACTIVE MATERIALS

Task No.	Task	Never	Frequency	Importance	Difficulty
9.01	Analyze samples of radioactive material to determine shipping category (radionuclide content, oil and moisture content)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9.02	Determine transport group and classify radioactive material as Type A, Type B, or LSA	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9.03	Prepare a Radiation Work Permit for handling and processing radioactive waste	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9.04	Provide health physics coverage during preparation of a shipment of radioactive material	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9.05	Survey a shipment of radioactive material prior to shipping	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9.06	Select appropriate containers and package radioactive materials	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9.07	Package (including labeling) dry radioactive waste material for shipment	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9.08	Document packaged material survey data in the radioactive material shipping record	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9.09	Placard the transport vehicle	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9.10	Survey transport vehicles	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9.11	Supervise loading radioactive material on transport vehicle	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

9. SHIPPING AND RECEIVING RADIOACTIVE MATERIALS (Continued)

Task No.	Task	Never	Frequency	Importance	Difficulty
9.12	Examine reports accompanying radioactive material shipment received to ensure compliance with federal regulations	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9.13	Perform radiation and contamination surveys of radioactive material received (including recording survey data on receipt form)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9.14	Maintain records of the receipt/shipment of radioactive materials	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9.15	Perform a radiological survey in conjunction with the receipt of new fuel and radioactive sealed sources	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9.16	Control the movement of radioactive material through unrestricted (non-radiological) areas of the plant	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9.17	Direct storage of radioactive materials in the designated areas of the plant	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9.18	Inspect the transport vehicle to ensure safe transportation of radioactive materials over public thoroughfares	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9.19	Determine qualifications of receiver to receive radioactive material shipment	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9.20	Obtain radioactive material shipping permits	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

9. SHIPPING AND RECEIVING RADIOACTIVE MATERIALS (Continued)

Task No.	Task	Never	Frequency	Importance	Difficulty
9.21	Apply state and federal shipping requirements	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9.22	Survey waste materials to segregate high and low level waste in preparation for shipment	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9.23	Weigh drums and packages in preparation for shipment	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9.24	Perform container inspections and tests on non-certified shipping containers and packages	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9.25	Conduct surveillance of drum and box waste compactor operations	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9.26	Segregate contaminated and non-contaminated trash generated within the radiological controlled area by frisking	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9.27	Accompany radioactive materials shipments off site	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9.28	Supervise the shipping and receiving of radioactive materials	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	Please list (print) any tasks which you perform which are not listed. Include scale ratings.				
9.29	______________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9.30	______________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

10. DECONTAMINATION

Task No.	Task	Never	Frequency	Importance	Difficulty
10.01	Evaluate contaminated material and equipment to determine if decontamination effort is practical	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
10.02	Direct decontamination of equipment or materials	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
10.03	Perform decontamination of equipment or materials	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
10.04	Prepare decontamination solutions and agents for use (such as TURCO)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
10.05	Direct decontamination of personnel	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
10.06	Decontaminate personnel (including documenting results)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
10.07	Direct area decontamination	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
10.08	Perform area decontamination (including documenting results)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
10.09	Collect potentially contaminated laundry	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
10.10	Sort laundry (high level contamination from low level contamination and non-contaminated articles)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
10.11	Operate contaminated laundry facilities	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
10.12	Survey laundry for reuse	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
10.13	Perform routine maintenance of laundry facilities (such as change filters, cleaning solutions, etc.)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

10. DECONTAMINATION (Continued)

Task No.	Task	Never	Frequency	Importance	Difficulty
10.14	Direct contaminated laundry operations	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
10.15	Operate decontamination high pressure water cabinet equipment	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
10.16	Operate ultrasonic decon-tamination unit	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
10.17	Operate decontamination vapor degreaser unit	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
10.18	Operate decontamination electro-polisher unit	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
10.19	Oversee decontamination efforts of equipment and work areas carried out by non-health physics personnel	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
10.20	Supervise health physics technician decontamination support	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	Please list (print) any tasks which you perform which are not listed. Include scale ratings.				
10.21	______________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
10.22	______________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

11. ENVIRONMENTAL SAMPLING

Task No.	Task	Never	Frequency	Importance	Difficulty
11.01	Coordinate environmental sampling schedule	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
11.02	Obtain charcoal filter samples	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
·03	Obtain surface water samples	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
11.04	Obtain surface water tritium sample	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
11.05	Obtain surface water beta sample	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
11.06	Obtain aquatic vegetation samples	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
11.07	Obtain zooplankton samples	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
11.08	Obtain benthic organism samples	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
11.09	Obtain fish samples	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
11.10	Obtain shrimp samples	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
11.11	Obtain oyster samples	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
11.12	Obtain bottom sediment samples	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
11.13	Obtain shoreline sediment samples	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
11.14	Obtain rain water samples	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
11.15	Obtain groundwater samples	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
11.16	Obtain milk sample	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
11.17	Obtain terrestrial vegetation samples	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
11.18	Obtain food crop samples	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
11.19	Obtain fodder and feed crop samples	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

11. ENVIRONMENTAL SAMPLING (Continued)

Task No.	Task	Never	Frequency	Importance	Difficulty
11.20	Obtain deep well samples	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
11.21	Obtain soil samples	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
11.22	Calibrate environmental area radiation monitors and sampling equipment	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
11.23	Perform routine maintenance on environmental air sampling equipment	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
11.24	Obtain meteorological monitoring data (including documentation)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
11.25	Prepare environmental samples for transfers to proper system lab	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
11.26	Package environmental samples for transfer to outside facilities	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
11.27	Review environmental data for compliance with technical specifications	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
11.28	Supervise environmental sampling activities performed by health physics technicians	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	Please list (print) any tasks which you perform which are not listed. Include scale ratings.				
11.29	______________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
11.30	______________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

12. RESPIRATORS AND SELF-CONTAINED BREATHING APPARATUS (SCBA) EQUIPMENT

Task No.	Task	Never	Frequency	Importance	Difficulty
12.01	Conduct required routine inspections of respirators	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
12.02	Repair respiratory protective equipment	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
12.03	Leak test respirator after repair	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
12.04	Perform checks of hose, regulator and manifold for forced air respirator	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
12.05	Prepare respirators for reuse	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
12.06	Issue respiratory protective equipment	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
12.07	Use respiratory protective equipment	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
12.08	Perform inspection of respirator cannisters prior to reuse	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
12.09	Perform radiological surveys of respirators	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
12.10	Decontaminate respirators	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
12.11	Package respirators for storage	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
12.12	Refill SCBA bottles	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
12.13	Perform checks on SCBA	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
12.14	Perform qualitative respirator fit tests for personnel	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
12.15	Perform quantitative respirator fit tests for personnel	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

12. RESPIRATORS AND SELF-CONTAINED BREATHING APPARATUS (SCBA) EQUIPMENT (Continued)

Task No.	Task	Never	Frequency	Importance	Difficulty
12.16	Calibrate the respirator fitting booth	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
12.17	Perform functional test of respiratory equipment	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
12.18	Check respirator cannisters for differential pressure requirement conformity	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
12.19	Check respirator cannisters for contamination	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
12.20	Replace the catalyst agent in a re-breather type respirator (such as BIOPACK-60, SCOTT, MSA)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
12.21	Replace the oxygen bottle on a re-breather type respirator (such as BIOPAK-60, SCOTT, MSA)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
12.22	Perform checks on a re-breather type respirator (such as BIOPACK-60, SCOTT, MSA)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
12.23	Perform air quality checks on plant breathing air systems	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
12.24	Supervise respirators and SCBA equipment activities performed by health physics technicians	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

12. <u>RESPIRATORS AND SELF-CONTAINED BREATHING APPARATUS (SCBA) EQUIPMENT</u> (Continued)

Task No.	Task	Never	Frequency	Importance	Difficulty
	Please list (print) any tasks which you perform which are not listed. Include scale ratings.				
12.25	________________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
12.26	________________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

13. EMERGENCY/ABNORMAL TASKS

Note: It is quite likely that you have not performed some of the emergency tasks listed below, even though they may be a part of your job responsibility if they should occur. For those tasks that are a part of your job but you have never performed, please rate them to the best of your ability based upon experience or drills, exercises or other training you have received. (See example 3 on page 19 for an example of how to rate such as task.)

Task No.	Task	Never	Frequency	Importance	Difficulty
13.01	Respond* as a radiological emergency team member to a site or general emergency	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.02	Provide health physics coverage of contaminated and/or injured personnel during an emergency (on site or at an area medical facility)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.03	Segregate contaminated personnel in accordance with emergency contamination criteria	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.04	Recommend emergency actions consistent with protective action guides	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.05	Assist in Emergency Response Planning during an emergency	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.06	Maintain the emergency data status boards	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.07	Issue additional dosimetry as required by the Plant Emergency Plan	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.08	Sample off-site air for iodine	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.09	Track a radioactive plume	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

*For tasks listed in this group "Respond" includes taking appropriate immediate and subsequent corrective action.

13. EMERGENCY/ABNORMAL TASKS (Continued)

Task No.	Task	Never	Frequency	Importance	Difficulty
13.10	Perform as a re-entry team member (post accident)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.11	Direct the re-entry team	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.12	Obtain post-accident samples	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.13	Prepare and handle post-accident samples	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.14	Analyze post-accident samples	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.15	Store post-accident sample for recounting	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.16	Dispose of post-accident samples	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.17	Respond to an uncontrolled release of activity to the environment	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.18	Respond to a portal monitor alarm	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.19	Respond to a fire in a controlled area	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.20	Respond to a constant air monitor alarm	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.21	Respond to an area radiation monitor alarm	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.22	Respond to a process radiation monitor alarm	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.23	Respond to a conductivity alarm	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.24	Respond to an effluent alarm	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.25	Respond to a fuel handling accident	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

13. EMERGENCY/ABNORMAL TASKS (Continued)

Task No.	Task	Never	Frequency	Importance	Difficulty
13.26	Respond to an abnormal TLD readout	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.27	Respond to a lost TLD	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.28	Respond to a pocket dosimeter being found off scale	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.29	Respond to personnel exposure exceeding regulatory or administrative limits	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.30	Provide health physics coverage for off-site radiological transportation incidents	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.31	Evaluate radiological incident (such as personnel contamination) to determine the cause	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.32	Respond to a fire as a member of the plant fire brigade	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.33	Coordinate a bomb search in controlled/radiation areas	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.34	Administer first aid to injured personnel	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.35	Administer CPR	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.36	Perform off-site dose assessment using a computer	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.37	Perform off-site dose assessment manually	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

13. EMERGENCY/ABNORMAL TASKS (Continued)

Task No.	Task	Never	Frequency	Importance	Difficulty
	Please list (print) any tasks which you perform which are not listed. Include scale ratings.				
13.38	______________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13.39	______________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

14. ADMINISTRATION/TRAINING

Task No.	Task	Never	Frequency	Importance	Difficulty
14.01	Initiate a maintenance work request	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.02	Compile data for steam generator composite report	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.03	Prepare special radiation control reports	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.04	Process requests to exceed the current radiation exposure authorization	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.05	Authorize requests to exceed the administrative radiation exposure limits	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.06	Order technical publications	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.07	Prepare routine radiation control reports	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.08	Prepare daily exposure status report	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.09	Collect data to be included in the radiation evaluation program	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.10	Conduct an ALARA evaluation of the radiation protection program	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.11	Review periodic radiation evaluation program	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.12	Maintain station man-rem plots and graphs	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.13	Prepare health physics procedures (including revision preparation)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

14. ADMINISTRATION/TRAINING (Continued)

Task No.	Task	Never	Frequency	Importance	Difficulty
14.14	Review health physics procedures (including proposed revisions)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.15	Conduct job-specific ALARA review	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.16	Prepare post-outage ALARA report	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.17	Review meteorological monitoring reports	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.18	Review effluent and environmental monitoring reports	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.19	Review proposed plant design changes for radiological concerns	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.20	Review NRC health physics bulletins and regulations	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.21	Review personnel exposure history	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.22	Review contractor HP technician qualifications prior to technician starting work	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.23	Review daily computer printout of personnel exposure	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.24	Schedule HP Technician coverage for outage support	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.25	Develop programs for initial training of HP technicians within guidelines of plant and regulatory requirements	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

14. ADMINISTRATION/TRAINING (Continued)

Task No.	Task	Never	Frequency	Importance	Difficulty
14.26	Develop periodic retraining programs for HP technicians	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.27	Develop contractor HP Technician training program	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.28	Perform general employee training in radiological protection	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.29	Supervise conduct of the health physics portion of general employee training	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.30	Instruct personnel in respiratory protection	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.31	Instruct health physics technicians in classroom training	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.32	Provide on-the-job training to health physics personnel	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.33	Conduct oral examinations to verify the adequacy of technicians and their training	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.34	Conduct written examinations to verify adequacy of technicians and their training	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.35	Supervise the conduct of health physics technician training	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.36	Participate in mock-up training	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.37	Provide HP training to off site organizations (firemen, rescue squads, etc.)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.38	Assist in organizing the annual medical drill (injured contaminated man drill)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

14. ADMINISTRATION/TRAINING (Continued)

Task No.	Task	Never	Frequency	Importance	Difficulty
14.39	Assist in organizing the annual site emergency exercise	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.40	Interpret radioactive sealed source leak test results	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.41	Interpret radioactive source inventory results	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.42	Evaluate process monitor results	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.43	Update exposure records using TLD data	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.44	Audit daily radiation exposure records	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.45	Record individual dose on daily exposure cards or RWPs	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.46	Review daily dosimeter records	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.47	Compare TLD data with pocket dosimeter data	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.48	Administer the health physics QA program (develop, review)	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	Please list (print) any tasks which you perform which are not listed. Include scale ratings.				
14.49	________________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14.50	________________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

15. MISCELLANEOUS SUPPLIES AND EQUIPMENT

Task No.	Task	Never	Frequency	Importance	Difficulty
15.01	Maintain inventory of radiation protection supplies	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
15.02	Maintain change rooms stocked with protective clothing	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
15.03	Inventory and replenish first aid supply stations	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
15.04	Order supplies for outage work	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
15.05	Fill out a purchase requisition form	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
15.06	Perform routine checks/audits of radiological emergency equipment and kits	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
15.07	Issue and receive contaminated tools and equipment	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
15.08	Inventory contaminated tools and equipment	0	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	Please list (print) any tasks which you perform which are not listed. Include scale ratings.				
15.09	______________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
15.10	______________________		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

SECTION III. <u>REFERENCES</u>

DIRECTIONS

1. Please estimate how often you refer to each document listed in this section. Use the Frequency scale described below in making your estimate (this is the same scale which is repeated on the last page of the booklet and used in the previous section). In completing this section, think back over your activities and indicate how often <u>you personally</u> have referred to each document by circling the appropriate frequency code number. If you are not responsible for using a reference at all, circle the zero (0).

FREQUENCY

0	=	<u>Never</u>
1	=	<u>Rarely</u> (Must be able to use, but actually used once a year or less often)
2	=	<u>Seldom</u> (about 3 or 4 times a year)
3	=	<u>Occasionally</u> (about once a month)
4	=	<u>Often</u> (about once a week)
5	=	<u>Very Often</u> (daily)

2. If you use a reference which is not listed, please print the title in the space provided at the end of the list and indicate the frequency with which you use it.

REFERENCES

1. OPERATIONAL PROCEDURES

		Frequency					
		Never	Rarely	Seldom	Occasionally	Often	Very Often
1.01	Plant Operating Procedures	0	1	2	3	4	5
1.02	Surveillance Procedures	0	1	2	3	4	5
1.03	Maintenance Procedures	0	1	2	3	4	5
1.04	Site Emergency Plan	0	1	2	3	4	5
1.05	Emergency Operating Procedures	0	1	2	3	4	5
1.06	Abnormal, Off-Normal and Alarm Operating Procedures	0	1	2	3	4	5
1.07	Operating Procedures Change Manual (Temporary Operating Procedures)	0	1	2	3	4	5
1.08	Fuel Handling Procedures	0	1	2	3	4	5
1.09	Computer Operating Manual	0	1	2	3	4	5
1.10	Radiochemical Laboratory Manual (Analytical and Radiochemical Procedures)	0	1	2	3	4	5
1.11	Radiological Protection Procedures	0	1	2	3	4	5

2. TECHNICAL REFERENCES

		Never	Rarely	Seldom	Occasionally	Often	Very Often
2.01	Equipment Location Drawings	0	1	2	3	4	5
2.02	Plant Technical Specifications	0	1	2	3	4	5

		Frequency					
2. TECHNICAL REFERENCES (Continued)		Never	Rarely	Seldom	Occasionally	Often	Very Often
2.03	Final Safety Analysis Report (FSAR)	0	1	2	3	4	5
2.04	Code of Federal Regulations (10 CFR, 49 CFR, etc.)	0	1	2	3	4	5
2.05	Plant Blueprints/Drawings	0	1	2	3	4	5
2.06	Plant System Descriptions	0	1	2	3	4	5
2.07	Electrical Schematics	0	1	2	3	4	5
2.08	Equipment Technical Operating Manuals	0	1	2	3	4	5
2.09	Plant Setpoints Manual	0	1	2	3	4	5
2.10	Steam Tables	0	1	2	3	4	5
2.11	DOT Regulations	0	1	2	3	4	5
2.12	State Regulations	0	1	2	3	4	5
3. OPERATING SHIFT DOCUMENTS							
3.01	Shift Logs and Status Boards	0	1	2	3	4	5
3.02	Shift Turnover Sheets/ Books	0	1	2	3	4	5
3.03	Operations Department Orders/Memos	0	1	2	3	4	5
3.04	Health Physics (Rad Chem) Department Orders/Memos	0	1	2	3	4	5

3. OPERATING SHIFT DOCUMENTS (Continued)		Never	Rarely	Seldom	Occasionally	Often	Very Often
		Frequency					
3.05	Survey Log Books	0	1	2	3	4	5
3.06	Temporary Shielding Installation Log	0	1	2	3	4	5
3.07	Temporary Jumper Installation Log (Wiring or Piping)	0	1	2	3	4	5
3.08	Equipment Tag Log (Removal and Restoration Log)	0	1	2	3	4	5
3.09	Required Work Action Log (Work Request Log)	0	1	2	3	4	5
3.10	Radiation Work Permit Log	0	1	2	3	4	5
3.11	Radioactive Material Accountability Log	0	1	2	3	4	5
3.12	Radiation Exposure Alert List	0	1	2	3	4	5
3.13	Daily Work Log	0	1	2	3	4	5
4. OTHER REFERENCES							
4.01	Station Administrative Directives	0	1	2	3	4	5
4.02	NRC Regulatory Guides, NUREGs, and I.E. Bulletins and Notices	0	1	2	3	4	5
4.03	Deviation Report (Non-conforming Operations Report)	0	1	2	3	4	5

4. OTHER REFERENCES (Continued)		Never	Rarely	Seldom	Occasionally	Often	Very Often
				Frequency			
4.04	Plant Incident/Condition Reports	0	1	2	3	4	5
4.05	Licensee Event Reports (LERs)	0	1	2	3	4	5
4.06	Special or Required Reading (e.g., System Design, Changes, etc.)	0	1	2	3	4	5
4.07	First Aid Instructions/ Safety Bulletins	0	1	2	3	4	5
4.08	Radiological Health Handbook	0	1	2	3	4	5
4.09	Chart of the Nuclides	0	1	2	3	4	5
4.10	Health Physics Textbooks	0	1	2	3	4	5
4.11	Training Department Lesson Plans	0	1	2	3	4	5
4.12	INPO NOTEPAD	0	1	2	3	4	5
4.13	INPO Guidelines	0	1	2	3	4	5

Please list (print) any references used in performing your job, but not listed above. Include frequency ratings.

______________________________	1	2	3	4	5
______________________________	1	2	3	4	5
______________________________	1	2	3	4	5
______________________________	1	2	3	4	5

SECTION IV. TOOLS AND EQUIPMENT

DIRECTIONS

1. Please estimate how often you use each tool or piece of equipment listed in this section. Use the Frequency scale described below in making your estimate (this is the same scale which is repeated on the last page of the booklet and used in the two previous sections). In completing this section, think back over your activities and indicate how often you personally have used each tool or piece of equipment by circling the appropriate frequency code number. If you do not use the tool or piece of equipment at all, circle the zero (0).

FREQUENCY

0	=	Never
1	=	Rarely (Must be able to use, but actually used once a year or less often)
2	=	Seldom (about 3 or 4 times a year)
3	=	Occasionally (about once a month)
4	=	Often (about once a week)
5	=	Very Often (daily)

2. If you use a tool or piece of equipment which is not listed, please print the name in the space provided at the end of the list and indicate the frequency with which you use it.

TOOLS AND EQUIPMENT

		Frequency					
1. LABORATORY EQUIPMENT		Never	Rarely	Seldom	Occasionally	Often	Very Often
1.01	Planchet	0	1	2	3	4	5
1.02	Hot Plate	0	1	2	3	4	5
1.03	Pipette	0	1	2	3	4	5
1.04	Beaker	0	1	2	3	4	5
1.05	Filters and Filter Chimney	0	1	2	3	4	5
1.06	Eye Dropper	0	1	2	3	4	5
1.07	Stir Rods or Magnetic Stirrer	0	1	2	3	4	5
1.08	Heating/Stirring Plate	0	1	2	3	4	5
1.09	Reagent Chemicals	0	1	2	3	4	5
1.10	Graduated Cylinders	0	1	2	3	4	5
1.11	pH Meter/Indicator	0	1	2	3	4	5
1.12	Conductivity Cell and Bridge	0	1	2	3	4	5
1.13	Centrifuge	0	1	2	3	4	5
1.14	Test Tubes	0	1	2	3	4	5
1.15	Funnels	0	1	2	3	4	5
2. PROTECTIVE/SAFETY EQUIPMENT							
2.01	Rubber Gloves	0	1	2	3	4	5
2.02	Rubber Apron	0	1	2	3	4	5
2.03	Face Shield	0	1	2	3	4	5
2.04	Respirators	0	1	2	3	4	5

2. PROTECTIVE/SAFETY EQUIPMENT (Continued)		Frequency: Never	Rarely	Seldom	Occasionally	Often	Very Often
2.05	Self-Contained Breathing Apparatus (SCBA)	0	1	2	3	4	5
2.06	Fire Extinguisher	0	1	2	3	4	5
2.07	Hard Hat	0	1	2	3	4	5
2.08	Ear Protectors	0	1	2	3	4	5
2.09	Anti-Contamination Clothing (Protective Clothing)	0	1	2	3	4	5
2.10	Safety Harness	0	1	2	3	4	5
2.11	Ground Straps	0	1	2	3	4	5
2.12	Portable/Movable Shielding	0	1	2	3	4	5
2.13	Explosimeter	0	1	2	3	4	5
2.14	Dust Mask	0	1	2	3	4	5
2.15	Safety Glasses/Beta Goggles	0	1	2	3	4	5
2.16	Portable Ventilation and Filtration Trains	0	1	2	3	4	5
2.17	Safety Shoes	0	1	2	3	4	5
2.18	Bubble Suit	0	1	2	3	4	5
2.19	Steam Suit	0	1	2	3	4	5
2.20	Cool Suit	0	1	2	3	4	5
2.21	Cold Weather/Rain Clothing	0	1	2	3	4	5
2.22	Glove bags, tents, and other containment devices	0	1	2	3	4	5
2.23	Step-Off Pads	0	1	2	3	4	5
2.24	Radiation Warning Tape/Rope/Signs	0	1	2	3	4	5

TOOLS AND EQUIPMENT (Continued)

		Never	Rarely	Seldom	Occasionally	Often	Very Often
		Frequency					
3.	COMPUTERS						
3.01	Hand Held Calculator	0	1	2	3	4	5
3.02	Desk Top Computer	0	1	2	3	4	5
3.03	Plant/Process Computer	0	1	2	3	4	5
3.04	Corporate Computer (on or off site)	0	1	2	3	4	5
3.05	Computer Diagnostic Software	0	1	2	3	4	5
4.	HAND TOOLS						
4.01	Box Wrenches	0	1	2	3	4	5
4.02	Burnishing Tool	0	1	2	3	4	5
4.03	Calipers	0	1	2	3	4	5
4.04	Chisels	0	1	2	3	4	5
4.05	Diagonal Cutter	0	1	2	3	4	5
4.06	Flaring Tools	0	1	2	3	4	5
4.07	Fuse Pullers	0	1	2	3	4	5
4.08	Gauges	0	1	2	3	4	5
4.09	Gear Puller	0	1	2	3	4	5
4.10	Grease Gun	0	1	2	3	4	5
4.11	Hack Saw	0	1	2	3	4	5
4.12	Hammer	0	1	2	3	4	5
4.13	Knife	0	1	2	3	4	5
4.14	Level	0	1	2	3	4	5
4.15	Open End Wrenches	0	1	2	3	4	5

		Never	Rarely	Seldom	Occasionally	Often	Very Often
4.	HAND TOOLS (Continued)						
4.16	Pliers	0	1	2	3	4	5
4.17	Pocket Screwdriver	0	1	2	3	4	5
4.18	Pop Rivet Gun	0	1	2	3	4	5
4.19	Punches	0	1	2	3	4	5
4.20	Ruler	0	1	2	3	4	5
4.21	Screwdriver	0	1	2	3	4	5
4.22	Screw Starter	0	1	2	3	4	5
4.23	Scribe	0	1	2	3	4	5
4.24	Socket Set	0	1	2	3	4	5
4.25	Spin Tight Wrenches	0	1	2	3	4	5
4.26	Torque Wrenches	0	1	2	3	4	5
4.27	Tweezers	0	1	2	3	4	5
4.28	Decontamination supplies	0	1	2	3	4	5
5.	TEST AND MEASURING EQUIPMENT						
5.01	Ammeter	0	1	2	3	4	5
5.02	Barometer	0	1	2	3	4	5
5.03	Multimeter	0	1	2	3	4	5
5.04	Heat Probe	0	1	2	3	4	5
5.05	Manometer	0	1	2	3	4	5
5.06	Ohmmeter	0	1	2	3	4	5

The column headings Never through Very Often are grouped under the heading "Frequency".

		Never	Rarely	Seldom	Occasionally	Often	Very Often
5.	TEST AND MEASURING EQUIPMENT (Continued)		Frequency				
5.07	Pyrometer	0	1	2	3	4	5
5.08	Radiation Source	0	1	2	3	4	5
5.09	Test Gauges	0	1	2	3	4	5
5.10	Thermometer	0	1	2	3	4	5
5.11	Timer	0	1	2	3	4	5
5.12	Voltage Tester	0	1	2	3	4	5
5.13	Hand Operated Hydro Pump (Test Pressure Source)	0	1	2	3	4	5
5.14	Vibration Detectors	0	1	2	3	4	5
5.15	Strobe Light	0	1	2	3	4	5
5.16	Oxygen Analyzer (Portable)	0	1	2	3	4	5
5.17	Micrometer	0	1	2	3	4	5
5.18	Hydrometer	0	1	2	3	4	5
5.19	Scales	0	1	2	3	4	5
5.20	Strip Chart Recorder	0	1	2	3	4	5
5.21	Oscilloscope	0	1	2	3	4	5
5.22	Annemometer	0	1	2	3	4	5
5.23	Audiometer	0	1	2	3	4	5
6.	COMMUNICATIONS EQUIPMENT						
6.01	Two-way Radio	0	1	2	3	4	5
6.02	Telephones	0	1	2	3	4	5
6.03	Teletalk System/Intercom	0	1	2	3	4	5

		Frequency					
6.	COMMUNICATIONS EQUIPMENT (Continued)	Never	Rarely	Seldom	Occasionally	Often	Very Often
6.04	Fixed/Portable Flashing Lights (for example, magenta flashing lights)	0	1	2	3	4	5
6.05	Public Address System/ Plant Page	0	1	2	3	4	5
6.06	Respirator Voice Amplifiers	0	1	2	3	4	5
6.07	Beeper	0	1	2	3	4	5
7.	RADIATION MONITORING EQUIPMENT						
7.01	Personnel Dosimetry Equipment	0	1	2	3	4	5
7.02	Portable Beta-Gamma Monitoring Instrument	0	1	2	3	4	5
7.03	Portable Neutron Monitoring Instrument	0	1	2	3	4	5
7.04	Portable Alpha Monitoring Instrument	0	1	2	3	4	5
7.05	Frisker	0	1	2	3	4	5
7.06	Portable Air Sampler (high volume)	0	1	2	3	4	5
7.07	Portable Air Sampler (low volume)	0	1	2	3	4	5
7.08	Gaseous Sampler	0	1	2	3	4	5
7.09	Smear Pads	0	1	2	3	4	5

		Frequency					
7.	RADIATION MONITORING EQUIPMENT (Continued)	Never	Rarely	Seldom	Occasionally	Often	Very Often
7.10	Counter Scaler	0	1	2	3	4	5
7.11	Multi-Channel Analyzer	0	1	2	3	4	5
7.12	Whole Body Counting Equipment	0	1	2	3	4	5
7.13	Portal Monitor	0	1	2	3	4	5
7.14	Proportional Counter	0	1	2	3	4	5
7.15	Beta Counter	0	1	2	3	4	5
7.16	Gamma Well Counter	0	1	2	3	4	5
7.17	Area Radiation Monitor	0	1	2	3	4	5
7.18	Process Radiation Monitor	0	1	2	3	4	5
7.19	Liquid Scintillation Counter	0	1	2	3	4	5
7.20	TLD Reader (manual or automatic)	0	1	2	3	4	5
7.21	Personal Air Sampler (lapel type)	0	1	2	3	4	5
7.22	Constant Air Monitor (CAM/APD)	0	1	2	3	4	5
8.	POWER DRIVEN EQUIPMENT						
8.01	Air Driven Wrenches	0	1	2	3	4	5
8.02	Compactor	0	1	2	3	4	5
8.03	Drill Press	0	1	2	3	4	5
8.04	Portable Drill	0	1	2	3	4	5

		Never	Rarely	Seldom	Occasionally	Often	Very Often
				Frequency			
8.	POWER DRIVEN EQUIPMENT (Continued)						
8.05	Grinder	0	1	2	3	4	5
8.06	Power Driven Hydro Pump	0	1	2	3	4	5
8.07	Power Saw	0	1	2	3	4	5
8.08	Saber Saw	0	1	2	3	4	5
8.09	Vacuum Pump	0	1	2	3	4	5
8.10	Vacuum Cleaner	0	1	2	3	4	5
8.11	Planer	0	1	2	3	4	5
8.12	Portable Pumps	0	1	2	3	4	5
9.	WORK AIDS						
9.01	Extension Cord	0	1	2	3	4	5
9.02	Flashlight	0	1	2	3	4	5
9.03	Hot Air Gun	0	1	2	3	4	5
9.04	Ladder	0	1	2	3	4	5
9.05	Test Tubing (copper, plastic, tygon, etc.)	0	1	2	3	4	5
9.06	Rope	0	1	2	3	4	5
9.07	Liquid Solvents	0	1	2	3	4	5
9.08	Spray Solvents	0	1	2	3	4	5
9.09	Trouble Light	0	1	2	3	4	5

9. WORK AIDS (Continued)	Never	Rarely	Seldom	Occasionally	Often	Very Often
			Frequency			
9.10 Heat Lamp	0	1	2	3	4	5
9.11 Plastic Filler	0	1	2	3	4	5
9.12 Decontamination High Pressure Water Cabinet (hydrolaser)	0	1	2	3	4	5
9.13 Ultrasonic Decontamination Unit	0	1	2	3	4	5
9.14 Decontamination Vapor Degreaser Unit	0	1	2	3	4	5
9.15 Decontamination Electro-Polisher Unit	0	1	2	3	4	5

Please list (print) any tools/ equipment used in performing your job, but not listed above. Include frequency ratings.

______________________________	1	2	3	4	5
______________________________	1	2	3	4	5
______________________________	1	2	3	4	5
______________________________	1	2	3	4	5

CRITERIA SCALES

FREQUENCY

0 = Never

1 = Rarely (once a year or less often)

2 = Seldom (about 3 or 4 times a year)

3 = Occasionally (about once a month)

4 = Often (about once a week)

5 = Very Often (daily)

IMPORTANCE

1 = Negligible (Improper task performance results in no unnecessary radiation dose or makes no difference in plant operation and safety consequences)

2 = Undesirable (Improper task performance may result in dose considered inconsistent with ALARA, some undesirable consequences to plant operation, safety consequences, or some moderate corrective action)

3 = Serious (Improper task performance may result in exceeding administrative exposure limits or serious consequences to plant operation, personnel injury, or an unusual occurrence event, or may require considerable corrective actions)

4 = Severe (Improper task performance may result in exceeding federal exposure limits or consequences requiring extensive corrective action or an alert event may result)

5 = Extremely Severe (Improper task performance may result in serious over-exposure implying possible health consequences or consequences that may be enormously time consuming or costly to correct or a site or general emergency may result)

DIFFICULTY

1 = The mental activity required is low and the degree of motor coordination is low.

2 = The mental activity required is low and the degree of motor coordination is high.

3 = The mental activity required is medium (irrespective of the motor coordination rating).

4 = The mental activity required is high and the degree of motor coordination is low.

5 = The mental activity required is high and the degree of motor coordination is high.

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14. ABSTRACT (200 words or less)
This report describes a project, an industry-wide Job Analysis of Nuclear Power Reactor Health Physics Technicians (HPTs), sponsored by the Nuclear Regulatory Commission and conducted by Brookhaven National Laboratory and Analysis & Technology, Inc., to provide the industry with job-performance data that can be used in systematically defining training programs in terms of required job functions, responsibilities, and performance standards. The job-analysis methodology is consistent with that used by the Institute of Nuclear Power Operations (INPO) in similar industry-wide projects and includes administration of over 850 job task questionnaires to utility and contractor Health Physics Technicians throughout the country. Data collected includes task performance (difficulty, importance, and frequency) and industry-wide demographics (job levels, experience, education, and training). The results of this project discussed herein include model job descriptions for HPT positions, summaries of HPT experience, education, and training, industry-wide listings with task-performance characteristics, and recommendations of selected tasks as a basis for HPT training development. Finally, potential future applications of the data base by utility and contractor organizations in training program development and evaluation and personnel qualifications are discussed.

15a. KEY WORDS AND DOCUMENT ANALYSIS

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