RADIATION PROTECTION POLICY AND PROCEDURES MANUAL

FOR

DCM DECONTAMINATION FACILITY

DATE: December 5, 1986

FILE NO: 029020

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FACILITY DESCRIPTION

The PPB Decontamination Facility will consist of a 6000 sq. foot (approx.) building which houses a high bay area as well as offices, storage space and laboratory space. Only a portion of the high bay area will be used for decontamination work.

Decontamination work will generally be accomplished inside a containment tent equipped with HEPA ventilation. Roughing filters will be installed in containment tent walls to provide an airway when tent openings are closed. The HEPA unit will draw its suction from the end opposite the containment entrance and HEPA unit exhaust will be continuously monitored for airborne radioactivity. Access to the work area within the containment tent will be via radiologically clean step-off pads and airlocks.

Containers containing potentially contaminated equipment will be opened in close proximity to the suction plenum of the HEPA unit to assure that sufficient capture velocity exists to prevent uncontrolled airborne contamination. (125 ft/min air velocity is required). Small containers or bags may be opened under a fume hood with ample air flow.

This operation is intended to be primarily a damp wipe type of operation. Damp towels will be allowed to dry prior to disposal. Some work may be accomplished using ultrasonic cleaning or mechanical removal methods (e.g. grinding or abrasive blasting) where fixed contamination is to be removed.

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This work will be conducted either in containments or under a fume hood.

Regardless of the specific method of decontamination used, it is PPB's intent to use engineered controls (i.e. ventilation, process control and containments) in lieu of respiratory protection equipment. The latter will be considered only after all reasonable engineering control alternatives have been evaluated and determined to be impractical.

JOSEPH TAYLOR ALTHOUSE

EDUCATION

Radiation Safety Associates, Inc.

Radiation Safety Officer Course (5 days)

Respiratory Protection in Nuclear Power Plants Course (5 days)

Thomas Edison State College - B.S. Radiation Protectionn
35 Credits Remaining

Pertinent courses relative to this License application are:

Atomic Physics; Radiation Physics; Statistics; Fundamentals of Nuclear Energy; Radiation Safety; Radiological, Reactor, Environmental Safety; Radiation Effects; Nuclear Radiation Detection; Algebra; Trigonometry; Applied Calculus.

United States Navy
U.S. Naval Nuclear Power School - Orlando, Fla. (6 months)

U.S. Naval Nuclear Power Training Unit
Ballston Spa., N.Y., S3G Prototype. (6 months)

Southern Regional High School, Manahawkin, N.J.

QUALIFICATIONS

ANSI 3.1 Para. 4.3.2 - Qualified Health Physics Supervisor

ANSI 3.1 Para. 4.5.2 - Qualified Senior Health Physics Technician

WORK EXPERIENCE

November 1985 - Present
PROTO-POWER/BISCO NUCLEAR, INC. - West Valley Demonstration Project

Radiological Engineer

Responsible for radiological standards, procedure submittal and interface with West Valley Nuclear Services Radiation and Safety Department for control of radiological work operations. Performed analyses needed for contamination and exposure

control and prepared detailed procedures for radiological work. Responsible for conducting weekly Radiological and Industrial Safety meetings and the supervision of technicians. Experienced in working with contamination levels to 50,000 dpm Beta/Gamma and >1,000,000 dpm Alpha and Radiation Dose rates of 700 mR/hr Transuranic and Mixed Fisson Products.

January 1985 - November 1985
NUCLEAR SUPPORT SERVICES, INC.

Site Coordinator

Concurrent with the responsiblities at Oyster Creek below were the responsiblities and duties held as the Site Coordinator. Payroll approval for site NSSI employees, maintenance of employer/employee relations and screening perspective employees with Host Site management were the major duties. Miscellaneous administrative duties were also required to fulfill this position.

1983 - November 1985

OYSTER CREEK NUCLEAR GENERATING STATION, Forked River, N.J.
Nuclear Support Services, Inc.

Group Radiological Controls Supervisor

Performed duties of Senior Radiological Controls technician prior to being selected as Group Radiological Controls Supervisor in April, 1984.
Duties as Supervisor consisted of directing company and contractor personnel as assigned by Rad Con Field Operations Manager; implementing company policies and procedures in support of the Radiological Control program. Directed, supervised, and reviewed radiological surveys to identify trends or unusual plant conditions. Responsible for the radiological security of all radioactive material shipped, received, transferred or generated on site. Ensured proper notification of any event or condition that could have adverse effects on the radiological health and safety of personnel or the environment. Experienced in working with contamination levels to 7 Rad/hr/100cm2 Beta, 10Mr/hr/100cm2 Gamma and Radiation Dose rates of 20R/hr Mixed Fisson Products.

Radiological Training Administrator/Instructor

Assumed this position November, 1984.
Responsible for administration of the Radiological Controls Department training program to include implementation of the established qualification program for technicians as well as

their supervision. Conducted cyclic training for all Rad Con department technicians and foremen. Maintained utility and contractor qualification records. Administered and maintained written and oral examinations and kept qualification status for all technicians. Restructured the comprehensive written examination bank for point value and documented references to support the examination bank answer key.

1981 - 1983

UNITED STATES NAVY - USS Simon Lake AS-33, Kings Bay, GA.

Radiological Controls Supervisor

Responsible for Radiological Controls, personnel radiation exposure control, and operation of nuclear support facilities while supporting nuclear submarines in refit/shutdown status and throughout resin discharges and chemistry changeover. Acted as Radioactive Material Accountability and Shipping Petty Officer. Assumed administrator duties for Environmental Monitoring Program of King's Bay, GA. and Port Canaveral, FL., reading area TLD's and obtaining sediment and marine life samples. Experienced in working with contamination levels to 50,000 dpm/100 cm2 Beta/Gamma and Radiation Dose rates to 5 R/hr Mixed Fisson Products.

1977 - 1981

UNITED STATES NAVY - USS Daniel Webster, SSBN 626, Groton, CT.

Training Petty Officer/Electrical Operator/Shutdown Reactor Operator

Wrote and reviewed lesson plans; participated as classroom monitor to evaluate and critque other instructors. Responsible for scheduling of lectures in writing, adminstering, and proctoring comprehensive tests and quizes for instructors.

1976 - 1977

UNITED STATES NAVY - S3G Prototype Reactor Plant Student

MEMBERSHIPS:

American Nuclear Society
Health Physics Society
Society For Radiological Protection

RESUME
OF
MICHAEL A. PILO

SUMMARY

Mr. Pilo is Vice President and Director of Operations of PPB Nuclear. He is responsible for all PPB Project Work.

BACKGROUND

Mr. Pilo's experience with PPB and with Proto-Power Corp. includes assignments as Project Manager for Spent Fuel Pool Cleanup at Oyster Creek, Project Manager for development of Radiation Protection and ALARA Programs at D.C. Cook, Monticello, R.E.Ginna and San Onofre, Drywell Coordinator at Monticello and field engineer for special projects at Peach Bottom (removal of 1800 R/hr crud trap) and Fort St. Vrain (DOE availability study). Mr. Pilo was responsible for all administrative and financial activities of PPB before assuming his present position.

Prior to joining Proto-Power Corp. in 1979, Mr. Pilo was responsible for direct management of nuclear plant construction for submarine reactors at General Dynamics/Electric Boat Division. He also served as refueling engineer, project officer and engineering group leader during his six-year tenure with Electric Boat Shipyard.

Mr. Pilo worked for the Bethlehem Steel Corp. between 1967 and 1973 in various engineering and production oriented capacities.

AFFILIATIONS

Member American Society of Mechanical Engineers

EDUCATION

BSME, Polytechnic Institute of Brooklyn - 1967

Special Training Courses:

University of Lowell - Radiological Health Physics Graduate Course

Georgia Tech - Supervision of Asbestos Abatement Projects

RESUME

OF

DONALD K. SLINGSBY

SUMMARY

Mr. Slingsby is President and CEO of PPB Nuclear.

BACKGROUND

Mr. Slingsby was a founder of Proto-Power Corporation (one of PPB's stockholders), serving as Director of Marketing Administration, and Vice President of Business Development. Mr. Slingsby was also instrumental in the foundation of PPB and has served as its President since the formation.

Prior to the formation of Proto-Power Corp. in 1974, Mr. Slingsby was responsible for new business development at the Electric Boat Division of General Dynamics. Other experience at Electric Boat included various project/program management positions and technical assignments on nuclear test reactors and developmental submersibles.

Before joining Electric Boat, Mr. Slingsby was Chief Flight Test Engineer for Atlas, Centaur and Mercury space vehicles at the Astronautics Division of General Dynamics.

AFFILIATIONS

American Nuclear Society

National Management Association

EDUCATION

BSEE, San Diego State University

INSTRUMENT	ASSOCIATED PROBE	RADIATION DETECTED	SENSTIVITY RANGE	MDA (EST)*
E-520	HP-270 (GM)	BETA,GAMMA	0.2-2000 mR/hr	80 Kev
RM-14	HP-210/260 (GM)	BETA, GAMMA	bkgd-50,000 cpm	40 Kev
MS-3	AC-3-7 (Scint)	Alpha	Six-decade LED Readout	9 cpm per dpm/Cm2
SAC-4	Internal (Scint)	Alpha	Six-decade LED Readout	
RO-2/RO-2A	Internal (Ion Cham)	Beta, Gamma	0.1 mR/hr - 5000 mR/hr	12 Kev
ESP1/ESP2	SPA 3 (Scint)	High Sens. Gamma	BKGD - 50,000 cpm	60 Kev
SRM-100	SPA 3 (Scint)	High Sens. Gamma	BKGD - 50,000 cpm	60 Kev

MANUFACTURER: EBERLINE

* MDA is based on background and sample counts, background and sample count time, and, the check source used for MDA calculations.

PPB

LIST OF EFFECTIVE PAGES

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PPB-001	All	0
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PPB-704	All	0
PPB-705	All	0

PPB-000 ADMINISTRATIVE

PPB-001 PPB NUCLEAR CORPORATE RADIATION PROTECTION PLAN
PPB-002 RADIOLOGICAL CONTROLS PROCEDURE CHANGES
PPB-003 RADIATION WORK PERMIT
PPB-004 CONTROL OF HIGH RADIATION AREAS
PPB-005 ESTABLISHING AND POSTING RADIOLOGICALLY CONTROLLED AREAS
PPB-006 USE OF ANTI-CONTAMINATION CLOTHING
PPB-007 RADIOLOGICAL CONTROLS PERSONNEL QUALIFICATION/TRAINING STANDARD

PPB-100 RADIOLOGICAL SURVEYS

PPB-101 RADIOLOGICAL SURVEYS
PPB-102 SURFACE CONTAMINATION SURVEYS
PPB-103 RADIATION DOSE RATE SURVEYS
PPB-104 MONITORING FOR PERSONAL CONTAMINATION
PPB-105 RELEASE SURVEYS

PPB-200 AIR SAMPLING

PPB-201 AIR SAMPLING
PPB-202 AIR SAMPLE ANALYSIS

PPB-300 RESPIRATORY PROTECTION

PPB-301 PPB RESPIRATORY PROTECTION PROGRAM AND POLICY
PPB-302 OPERATION AND MAINTENANCE OF D.O.P. MAN TEST PENETROMETER MODEL TDA-50
PPB-303 QUANTITATIVE FIT TESTING RESPIRATORS WEARERS
PPB-304 EVALUATION OF RESPIRATOR FIT TEST DATA
PPB-305 DESCRIPTION AND SELECTION OF RESPIRATORY PROTECTION EQUIPMENT
PPB-306 USE OF RESPIRATORY PROTECTION EQUIPMENT
PPB-307 USE OF COMPRESSED AIR FOR SUPPLIED AIR RESPIRATORS
PPB-308 RESPIRATOR EQUIPMENT CLEANING AND MAINTENANCE
PPB-309 ISSUE AND CONTROL OF RESPIRATORY PROTECTION EQUIPMENT
PPB-310 INSPECTION AND MAINTENANCE OF RESPIRATORY PROTECTION EQUIPMENT

PPB-311 RESPIRATOR FILTER TESTING

PPB-400 BIOASSAY

PPB-401 BIOASSAY PROCEDURE

PPB-500 RADIOACTIVE MATERIAL SHIPPING/RECEIVING

PPB-501 RECEIPT OF RADIOACTIVE MATERIAL ON SITE
PPB-502 SHIPPING OF RADIOACTIVE MATERIAL OFF SITE

PPB-600 EXPOSURE CONTROL

PPB-601 EXTERNAL EXPOSURE CONTROL
PPB-602 DOSIMETRY ISSUE
PPB-603 INTERNAL EXPOSURE CONTROL

PPB-700 EMERGENCY PLANNING

PPB-701 MAINTAINING EMERGENCY PREPAREDNESS
PPB-702 EMERGENCY KITS/LOCKERS READINESS
PPB-703 SABOTAGE AND CIVIL DISTURBANCE
PPB-704 PERSONNEL INJURY
PPB-705 RADIATION OVEREXPOSURE

PPB pharmaceuticals nuclear, inc.

POLICY AND PROCEDURE MANUAL

TITLE

PPB NUCLEAR CORPORATE RADIATION PROTECTION PLAN

PROCEDURE No.	REVISION No.	EFFECTIVE DATE
PPB - 001	0	11/30/86

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ORIGINATOR	[signature]	RADIOLOGICAL ENGINEER	11-24-86
CONCURRED	[signature]	RADIATION SAFETY OFFICER	11-29-86
	[signature]	VICE-PRESIDENT	12/2/86
APPROVED	[signature]	PRESIDENT	12/2/86

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1.0 BASIS FOR PPB RADIOLOGICAL CONTROLS PROGRAM

1.1 The PPB Corporate Radiation Protection Policy sets forth the philosophies and basic policy guidelines for the Radiological Controls Program at the PPB Nuclear Decontamination Facility. The PPB Radiation Protection Plan implements the policy by following these objectives:

1.1.1 Minimize individual exposure to radiation and radioactive material so that the risks are consistent with those commonly accepted in our daily lives.

1.1.2 Prevent any significant internal exposure.

1.1.3 Minimize collective radiation exposure.

1.1.4 Minimize contamination of personnel, areas and equipment.

1.1.5 Minimize the production of radioactive waste.

1.1.6 Minimize exposure to the public.

1.2 These philosophies, policies, and objectives are based on and implement the regulations of the Nuclear Regulatory Commission (NRC) as contained in Title 10 of the Code of Federal Regulations, Parts 19, 20, 30, 50, and 71, and appropriate Regulatory Guides, specifically 1.8 Rev. 2, 8.8 Rev. 3 (1978), 8.10 Rev. 1-R (1975), 8.13 Rev. 1 (1975), and 8.15 (1976). The PPB Radiation Protection Plan is based on these references; therefore, they are not repeated in this document.

1.3 PPB is committed to incorporating the philosophies and guidelines found in the Institute for Nuclear Power Operations (INPO) document "Guidelines for Radiological Protection at Nuclear Power Stations".

1.4 Specific details as to how the PPB Radiation Protection Plan is implemented shall be set forth in the plant specific Radiological Controls procedures (RCPs). These procedures shall include those applicable areas addressed in Reg. Guide 1.33, Rev. 2 (1978), App. A. This PPB Radiation Protection Plan is to be used in conjunction with the RCPs.

1.5 The PPB Radiation Protection Plan and RCPs are

written to implement and increase the effectiveness of the Radiological Controls Program. Procedures shall provide adequate guidance and specify appropriate methods or techniques to ensure that the performance of each activity is in accordance with sound radiological controls principles, and is in compliance with applicable regulatory provisions. Compliance with RCPs is required so that work will be done according to pre-determined work practices. If compliance is not possible, the work will stop and supervision will be consulted to resolve the problem. The RCPs will be prepared, reviewed, approved, and controlled as described in the appropriate PPB Administrative procedures.

1.6 The PPB Radiological Controls Program is to be fully integrated into all aspects of operation. The Radiological Controls Program when carried out as specified will assure that the operation of the plant will be performed in accordance with the As Low As Reasonably Achievable (ALARA) philosphy discussed in Section 2.0.

1.7 Management as well as individual workers will take an active role in radiological controls including radiation exposure minimization and radioactive waste reduction. The performance of supervision must demonstrate support and commitment to corporate management for implementing a strong and effective Radiological Controls Program.

1.8 Radiation protection records shall be prepared using high standards of accuracy, traceability and legibility to meet the requirments of regulatory agencies and company procedures. Records shall be collected, and retained in such a manner that they are legible and retrievable at any time in the future. Appropriate radiation exposure, medical and personnel information shall be obtained for all personnel assigned to work in radiologically controlled areas.

2.0 ALARA POLICY

2.1 The policy of PPB is to ensure that those risks that result from ionizing radiation exposures associated with nuclear activities are maintained As Low As Reasonably Achievable (ALARA). Responsibility for the Radiological Controls and ALARA Programs as well

as the responsiblity for assuring the implementation of these programs resides with the RSO.

2.2 Radiological Controls is also an individual responsibility. PPB requires each employee working at the facility to maintain individual and collective radiation exposures to workers and the public and the generation and release of radioactive materials as far below regulatory limits as is reasonably achievable. Achievement of excellence in radiological protection requires a level of performance well above minimum regulatory requirements. It is not sufficient to judge performance in radiological protection by a lack of regulatory action. Willful or habitual violation of Radiological Controls procedures will result in disciplinary action.

2.3 PPB is committed to operating and maintaining its decontamination facility in a manner that will minimize risks to employees, visitors and the public from exposure to radiation and radioactivity while allowing efficient conduct of operations. PPB has implemented a radiation protection program to ensure compliance with regulatory requirements and the ALARA objective. The basic elements of the ALARA Program include the following:

2.3.1 Organizational responsibility and commitment.

2.3.2 Training programs.

2.3.3 Incorporation of ALARA considerations in the initial design and modification of facilities, processes and equipment.

2.3.4 Consideration of ALARA concepts in procedural development and reviews.

2.3.5 Dose trending and performance assessment.

2.3.6 In-house audit system to evaluate ALARA program effectiveness and correct possible deficiencies.

2.3.7 Feed-back system for workers (e.g. Radiological Awareness Reports).

2.4 The site will utilize and incorporate, by practice and/or procedure, management systems to ensure that

the commitment to ALARA is met. The functions to be performed by the person or persons responsible for the ALARA program are to assure that ALARA elements are considered in all applicable phases of operations involving exposure to workers. They also evaluate the effectiveness of ALARA actions by comparing actual data with goals which are established on an annual basis. From the evaluation results, recommendations for improvements are provided to management.

The extent of these functions is determined by the nature of the site activities and by the direction of management as may be set forth by policy or procedure. Persons or committees responsibile for ensuring that the ALARA commitment is met shall have direct access to plant management. Management is made aware of the company's commitment to the ALARA philosophy through company policies, (e.g., Radiation Protection Policy, Radiation Protection Plan) and interaction with Radiological Controls management. The philosophies and concepts are strengthened through general employee and special training programs (e.g., ALARA Awareness Training).

Management is kept aware of the workings of the ALARA program on a continual basis through staff feedback, a monthly Radiological Controls report, the Radiological Assessment Reports, and QA audits.

2.5 The PPB procedures are designed to maintain personnel radiation exposures in accordance with the ALARA objective. These procedures reflect the operating philosphy contained in this plan and will, as a minimum, establish requirements for pre-job planning, record keeping, use of special equipment, post-job evaluation, and other requirements as may be necessary to accomplish the ALARA objective. Task supervision as well as radiological controls surveillance is required for such jobs to ensure adherence to procedures, that precautions are observed, and potential problems, which may develop during job performance, are identified and resolved as quickly as possible.

2.6 In order to achieve the goal of reduced radiation exposure, it is essential that all personnel properly implement radiological protection techniques by understanding their individual responsibility for radiological controls, as well as

the responsiblity of PPB. To gain this understanding, training and retraining programs in the principles of radiological controls, the risk of low level radiation exposure and the ALARA concept are conducted for all employees who may be involved in radiological activities.

3.0 RESPONSIBILITIES OF WORKERS

3.1 Each individual working in a Radiologically Controlled Area must remain aware of the potential for radiological problems. Because individual actions directly affect exposure and contamination levels, each individual is responsbile for maintaining his or her exposure as low as reasonably achievable (ALARA).

The following rules shall be followed by individuals to minimize radiological problems:

3.1.1 Obey promptly "stop-work" and "evacuate" orders of Radiological Controls personnel.

3.1.2 Obey posted, oral, and written radiological controls instructions and procedures, including instructions on Radiation Work Permits (RWP).

3.1.3 Wear TLD and self reading dosimeter where required by signs or by Radiological Controls personnel. Immediately report loss of dosimetry or unexpected exposure and offscale dosimeter to the Radiological Controls Department.

3.1.4 Keep track of personal radiation exposure status to ensure that exposure limits are not exceeded.

3.1.5 Remain in as low a radiation area as practiable to accomplish work.

3.1.6 Do not loiter in radiation areas..

3.1.7 Do not smoke, eat, drink, or chew in Radiologically Controlled areas unless specifically authorized by Radiological Controls.

3.1.8 Wear anti-contamination clothing and

respiratory protection properly and wherever required by signs or by Radiological Controls personnel.

3.1.9 Remove anti-contamination clothing and respiratory protection properly to minimize the spread of contamination.

3.1.10 Fisk or be frisked for contamination when leaving a contaminated area or a radiological control point. Notify Radiological Controls personnel if contamination is found.

3.1.11 For a known or possible radioactive spill, minimize its spread and notify Radiological Controls personnel promptly.

3.1.12 Do not unnecessarily touch a contaminated surface or allow clothing, tools, or other equipment to do so.

3.1.13 Place contaminated tools, equipment and solid waste on disposable surfaces (e.g., sheet plastic) when not in use and inside plastic bags when work is finished.

3.1.14 Minimize the amount of material that has to be disposed of as radioactive waste.

3.1.15 Notify Radiological Controls personnel of faulty or alarming radiation protection equipment.

3.1.16 Report the presence of open wounds to Radiological Controls and medical personnel prior to work in areas where radioactive contamination exists and exit immediately if a wound occurs while in such an area.

3.1.17 Notify Radiological Controls personnel upon returning to the site after medical administration of radiopharmaceuticals.

3.1.18 Assure a mentally alert and physically sound condition for performing assigned work.

3.1.19 Ensure that your activities do not create radiological problems for others and be alert for the possibilities that the activities of

others may change the radiological conditions to which you are exposed.

3.1.20 Supervisors must recognize their responsibility to be at the work site to ensure that radiological controls practices and procedures are enforced.

4.0 AUDITS, REVIEWS AND REPORTS OF THE PPB RADIOLOGICAL CONTROLS PROGRAM

4.1 To ensure that the requirements of the PPB Radiological Controls Program are being met and to assist all site personnel in understanding and complying with these requirements, a system of audits and reviews will be established including criteria for timely and appropriate corrective action. The following audits and reviews shall be used:

4.1.1 Radiological Controls technicians shall monitor and aid the performance of workers insofar as radiological work practices are concerned.

4.1.2 Independant radiological assessments shall be performed by qualified personnel provided by the PPB home office.

4.1.3 The Radiological Controls Program is subject to the provisions of the Corporate Quality Assurance Plan.

4.1.4 The PPB Radiation Protection Plan, Radiological Controls procedures and changes thereto shall be reviewed in accordance with Corporate Procedure, "Document Change Request Procedure".

4.1.5 In addition to these reviews and audits, a system shall be employed to allow any individual to identify radiological controls deficiencies and/or suggest improvements. A radiological controls deficiency is defined as either a deviation from an established procedure or a practice which could and should be improved. The purpose of this system is to identify those items, the correction of which will result in an improved Radiological Controls Program.

These deficiencies/suggestions shall be evaluated by the RPO for desirable or necessary corrective action. The RPO will prepare a monthly report summarizing the radiological deficiencies.

4.1.6 The Nuclear Ragulatory Commission (NRC) also inspects and reviews the Radiological Controls Program. The Radiation Protection Plan and any changes thereto shall be submitted to the NRC for information.

4.1.7 Investigations shall be conducted to determine the causes of significant radiological incidents to determine the corrective actions and improvements necessary to prevent recurrence.

4.1.8 The RPO and RSO will review equipment and practices which affect radiological effluents in order to minimize dose to the public.

5.0 RADIOLOGICAL CONTROLS TRAINING

5.1 Radiological Controls training will be given to ensure each person who requires unescorted access to the facility or who may be involved with radiological activities understands his responsiblity to minimize his own exposure to radiation and to comply with radiological controls procedures.

5.2 Category I training is for individuals who require access to the PPB Decontamination Facility in other than visitor status and do not require unescorted access to radiologically controlled areas. This category requires individuals to pass a written examination initially and annually thereafter.

5.3 Category I training shall include, but not be limited to:

5.3.1 The effects of radiation and risks associated with radiation exposure.

5.3.2 Individual response to a radiation emergency.

5.3.3 Prenatal radiation exposure (Reg. Guide 8.13).

5.3.4 Radiologically controlled areas and recognition of the associated postings.

5.3.5 ALARA philosophy and concepts.

5.4 Category II training is radiation worker training for individuals who require unescorted access into Radiologically Controlled Areas. This category requires individuals to pass a written examination and performance of practical abilities initially and annually thereafter.

5.5 Category II training shall include but not be limited to:

5.5.1 Effect of radiation and risks associated with radiation exposure.

5.5.2 Compliance with procedures.

5.5.3 Use of dosimetry.

5.5.4 Personnel frisking techniques.

5.5.5 Anti-contamination clothing.

5.5.6 Response to unusual situations.

5.5.7 Exposure and contamination control.

5.5.8 ALARA philosophy and concepts.

5.5.9 Dose minimization.

5.6 Radiological Controls Technicians (RCTs) and the RPO will receive theoretical and practical training and training for unusal situations. Training shall also be given for changes to procedures, equipment and programs. They shall pass both written and oral examinations and complete an examination of practical abilities consistent with their job classification. Periodic practical drills and oral drills will be required for each technician and the RPO. Requalification shall be required every 2 years to include both written and oral examinations.

5.7 Respiratory Protection training is available for persons who need to use respiratory protection devices. Individuals are required to pass a written examination on the core course and to be trained on

each device specified. Individuals are required to pass a written examination and attend device training on an annual basis.

6.0 CONTROL OF EXTERNAL EXPOSURE

6.1 To aid in exposure reduction, adminstrative radiation exposure control levels shall be established. The PPB quarterly limit is 500 mrem. Collective (i.e., person-rem) exposure goals shall be established. Also, collective exposure goals for major work shall be established. Work involving radiation exposure shall be preplanned and/or proceduralized.

6.2 Each person entering a radiologically controlled area will be provided with a primary dosimetry device (thermoluminescent dosimeter) capable of measuring the worker's whole-body exposure and a self-indicating, dose-integrating device (SRD).

6.3 Personnel access to radiologically controlled areas shall be defined and controlled according to Radiological Controls procedures.

6.3.1 Any area accessible to personnel where a major portion of the body could receive in any one hour a dose in excess of 0.1 Rem shall be locked or guarded to prevent unauthorized entry. These areas will be posted as a "HIGH RADIATION AREA". The keys to these locked areas shall be maintained under the administrative control of the RSO or his designees.

Any individual or group of individuals entering a locked High Radiation Area shall:

a) Use a continuously indicating dose rate monitoring device, or
b) Use a dose rate integrating device which alarms at a preset dose level, or
c) Assure that a Radiological Controls Technician provides positive control over activities within the area and performs periodic radiation surveys with a dose rate monitoring instrument.

6.4 To evaluate radiological conditions, radiological surveys shall be conducted at regular intervals for airborne activity, removable surface contamination

and external radiation. Surveys are performed in order to (a) monitor the suitability of control measures, (b) evaluate the need for additional controls, (c) evaluate trends for ALARA purposes. Surveys outside of radiological controlled areas are provided to insure the effective control of radioactive material. Unusual conditions detected in the performance of radiological surveys shall immediately be brought to the attention of the RSO. Records of surveys shall be maintained. Radiation survey instruments will be calibrated to assure a consistent, reliable and predictable response to radiation levels.

7.0 CONTROL OF INTERNAL EXPOSURE

7.1 The PPB policy is to minimize internal exposure to personnel from radioactivity associated with PPB operations or activities. For personnel exposed to radioactive material during their work, this means that no one should receive from internal radioactivity more than one tenth of the quarterly allowable internal exposure (i.e., 52 MPC-hours per quarter).

7.2 The following controls are utilized to minimize internal exposure from airborne radioactivity:

7.2.1 Engineering and personnel access control shall be applied to the maximum extent practicable so work in radiologically controlled areas does not create conditions where an individual may breath airborne concentrations in excess of those listed in NRC regulations. When no other controls are practicable, and ALARA considerations have been made, respiratory protection equipment may be used. Those who may need to use respirators shall meet the qualifications set-forth in the Corporate Respiratory Protection Policy. They shall be trained, medically qualified and successfully complete an annual fit test for each device used.

7.2.2 Airborne radioactivity shall be measured regularly in areas where personnel may be exposed. Taking representative samples of air the person is breathing shall be performed to supplement periodic measurements during work which has the potential for the

generation of significant airborne radioactivity exposure to individuals.

7.3 Internal radioactivity shall be measured prior to assignment and at least annually in each person who works in an area requiring a Radiation Work Permit; this includes each person who wears respiratory protection. Internal radioactivity shall be measured promptly in each person who receives significant radioactive contamination on his skin, and in each person who is suspected of inhaling sufficient radioactivity to cause measurable internal radioactivity. Each measurement of internal radioactivity shall be reviewed.

8.0 CONTROL OF RADIOACTIVE CONTAMINATION

8.1 Radioactive surface contamination shall be controlled in order to minimize possible inhalation or ingestion of radioactivity and to minimize buildup of radioactivity in the environment. Measures to contain radioactivity and to minimize the number and extent of areas contaminated shall be taken in order to minimize personnel radiation exposure, to simplify subsequent personnel and area or facility decontamination, and to minimize the need for protective clothing.

8.2 The surface contamination limits for unrestricted release of materials and equipment are as follows:

	Removable (dpm/100 cm2)	Total Fixed plus Removable (dpm/100 cm2)
beta-gamma	1000	5000
alpha	20	300

NOTE: These values pertain to surface contamination in radiologically controlled areas, on equipment, on tools and on materials.

8.3 Personnel are considered contaminated when any portion of the body exceeds 100 counts/min (cpm) above background using a pancake GM detector and a count rate meter. Other instrumentation of equal or greater sensitivity may be used.

8.4 The facility will maintain procedures which address the identification and control of radioactive

contamination for personnel, areas, equipment and tools.

8.5 Emphasis in planning, training and working shall be placed on minimizing the occurrences of radioactive surface contamination of a person's skin or on areas not controlled for radioactive surface contamination. Occurrences of skin contamination shall be reviewed and documented in accordance with the RCPs.

9.0 CONTROL OF RADIOACTIVE MATERIALS

9.1 A radioactive material control system shall be established to ensure radioactive material is not lost or misplaced in a location where personnel could unknowingly be exposed to radiation and to prevent the uncontrolled spread of radioactivity to areas where the public might be affected. This system shall include the following requirements:

9.1.1 The number of areas in which radioactive materials are stored shall be minimized.

9.1.2 Any new radioactive material storage area shall be approved before use by the RSO.

9.1.3 The numbers of radioactive items and the amount of radioactivity in storage shall be minimized to the extent practicable.

9.1.4 All items having a potential for loose surface contamination shall be surveyed as they are removed from radiologically controlled areas.

9.1.5 Radioactive materials removed from the security area or removed from a restricted area outside the security area shall be controlled in accordance with an accountability procedure which ensures the materials are not lost or improperly handled during transfer or subject to unauthorized removal. This accountability procedure shall require inventory of radioactive materials which remain outside such areas.

9.1.6 Each incoming or outgoing shipment of radioactive material shall be handled in strict compliance with written procedures.

9.2 Each case in which radioactive material is lost or unaccounted for shall be reviewed to determine the potential radiation exposure personnel might receive, to correct deficiencies, and to improve control of radioactive materials.

10.0 RADIOLOGICAL CONTROLS ORGANIZATION

10.1 RESPONSIBLITY AND AUTHORITY

In order to carry out the policy, specific responsibilities and authorities are delegated by the Radiological Safety Committee. A summary of these responsibilities are as follows:

10.1.1 Radiological Safety Committee

1. The purpose of the Radiological Safety Committee is to review the operations and Radiological Controls procedures on a periodic basis to assure compliance with the company.

2. The minimum committee consists of two technically qualified personnel and a representative of the administrative staff of the company. The administrative staff member acts as the secretary to the committee and must maintain the minutes of the committee meetings. The chairman of the committee is also President of the Company, thus maintaining corporate cognizance of all radiological projects of the corporation.

3. The Radiation Safety Officer (RSO) is directly responsible for the Radiological Controls and safety of all field operations and reports directly to the Radiological Safety Committee, and the President. He is responsible for the training of all personnel in radiological safety, for the implementation of all facets of the Radiological Safety Program, and for the records management of same.

10.1.2 Radiation Safety Officer (RSO)

The Radiation Safety Officer is responsible for conducting activities safely. Radiation Safety responsibilities include the following:

1. Attain policy objectives with regard to personnel exposures, environmental containment, and minimizing spread of contamination.

2. Define radiological problems expected in new projects.

3. Prepare written procedures for safe execution of operations. The procedures are to be approved by the Radiological Safety Manual.

4. Prepare and keep up-to-date the Radiological Controls Training and Procedures Manual.

5. Recommend health physics instruments.

6. Ensure employees receive radiation safety training.

7. Appoint Radiation Records Control Officer and supervise his responsiblities.

8. Initiate necessary action in case of an emergency, acting on the advice of the Radiological Safety Committee.

9. Conduct investigations of all unusal occurrences and prepare a report making recommendations for preventing recurrence.

10. In-line responsibility for all Radiological Controls.

11. Perform the duties of Respiratory Protection Supervisor.

10.1.3 Site Radiation Protection Officer (RPO)

1. Maintain and provide current reports of

personnel monitoring data to Radiation Records Control Officer. Special notification to the RSO is to be made when an exposure or potential exposure is considered noteworthy.

2. Determine the radiation hazard existing in proposed work areas. Inform supervisor of survey results and advise on allowable work time or other protective measures required for safe entry in these work areas.

3. Inform the supervisor of the operation if any of the following appears likely: (1) unnecessary personnel exposure, (2) unnecessary contamination of the facility or equipment, (3) unnecessary environmental contamination.

4. Recommend to the operating supervisor that work be stopped immediately whenever work may result in: (1) personnel exposure in excess of the maximum permissible, (2) need for decontamination, (3) an incident of client and public off-site to radiation in excess of the maximum permissible.

5. Review and make necessary changes of the Radiological Controls procedures.

6. Certify radiation work permits for operations involving radioactive materials or other soucres of ionizing radiation.

7. Conduct or assist in on-site employee radiation safety training programs.

8. Advise the supervisor on radiation safety aspects of emergencies.

9. Inform the Radiation Safety Officer of any over-exposure, unusual contamination incident, excessive release of radioactivity to the environment, or any other unusual occurrence.

10. Specify personnel radiation monitoring requirements for work in radiation areas.

11. Specify protective clothing and equipment required for work in contaminated areas.

12. Specify radiation surveys needed in each area and recommend the frequency of such surveys.

13. Field check all health physics instruments.

10.1.4 Radiation Records Control Officer

1. Maintain and provide current reports of personnel monitoring data. Special notification is to be made to supervisor when exposure is judged to be noteworthy.

2. Report at least quarterly, the results of radiation surveys and the status of the radiation protection program to the Radiation Safety Officer.

3. Maintain and provide current reports of all radioactive materials shipments, including those reports required by the NRC.

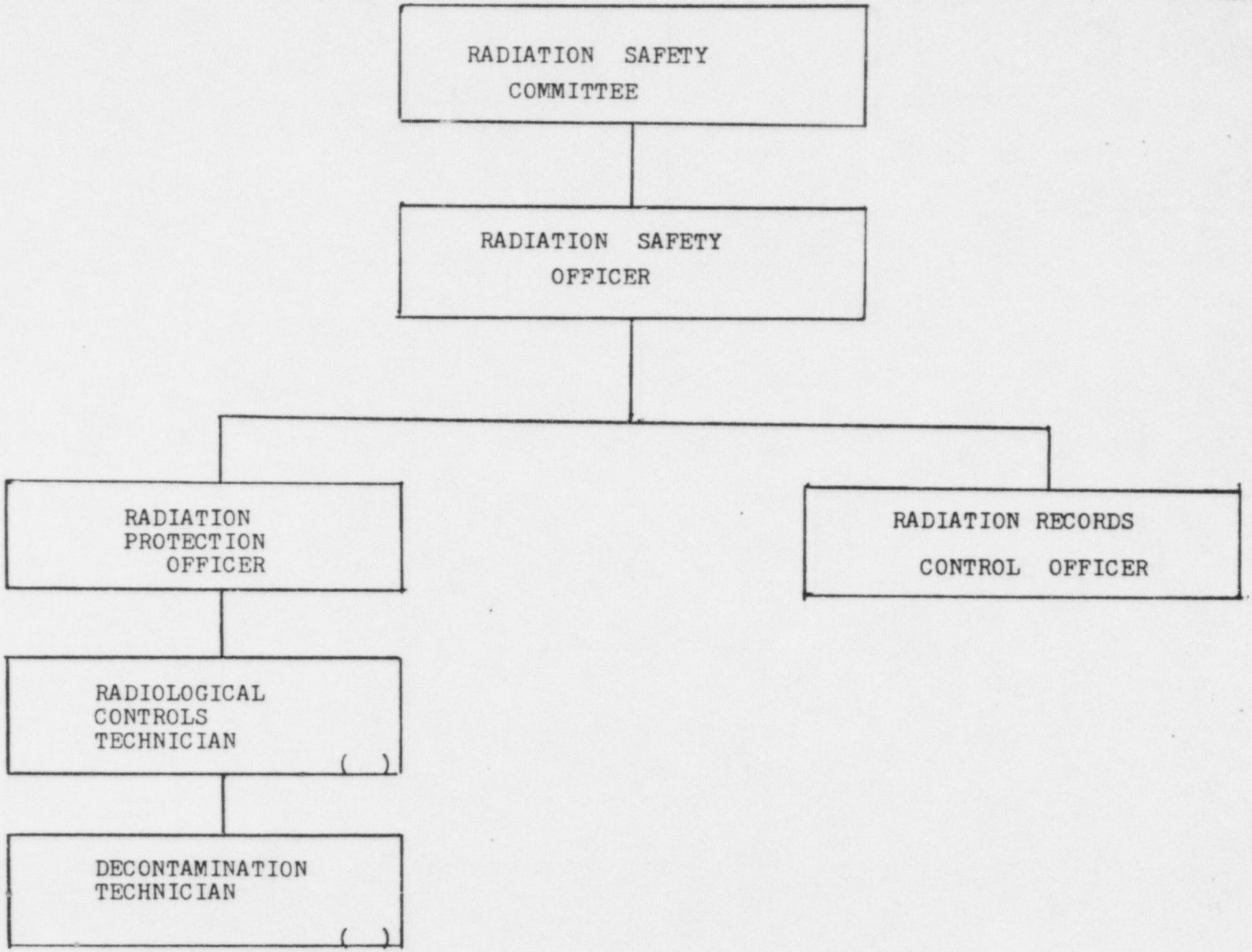
4. Coordinate and organize radiation safety training programs and records.

5. Maintain all equipment calibration records.

6. Maintain records by subject and date of all formal seminars, lectures and training courses attended by company personnel.

10.2 A Radiological Controls program cannot be strong and effective if left solely to the Radiological Controls Department. Each worker has the responsibility for radiological controls.

10.3 The Radiological Controls organization is depicted in Attachment #1.


RADIATION SAFETY COMMITTEE
RADIATION SAFETY OFFICER
RADIATION PROTECTION OFFICER
RADIATION RECORDS CONTROL OFFICER
RADIOLOGICAL CONTROLS TECHNICIAN ( )
DECONTAMINATION TECHNICIAN ( )

ppb pete-powerblace nuclear, inc.	POLICY AND PROCEDURE MANUAL

TITLE

RADIOLOGICAL CONTROLS PROCEDURE CHANGES

PROCEDURE No.	REVISION No.	EFFECTIVE DATE
PPB - 002	0	11/30/86

LIST OF EFFFECTIVE PAGES

Page	Revision
1.0	0
2.0	0
3.0	0
4.0	0
5.0	0
6.0	0
7.0	0
8.0	0
E1-1	0

	SIGNATURE	TITLE	DATE
ORIGINATOR	J Althouse	RADIATION SAFETY OFFICER	11-24-86
CONCURRED			
APPROVED		VICE-PRESIDENT	12/2/86

1.0 PURPOSE

1.1 This procedure establishes the method for effecting temporary changes to Proto-Power/Bisco Radiological Control Procedures.

2.0 APPLICATION/SCOPE

2.1 This procedure applies to personnel preparing or processing changes to Proto-Power/Bisco Radiological Controls Procedures.

3.0 DEFINITIONS

3.1 Radiation Records Control Officer (RRCO) - A member of the staff designated to provide a focal point for the control of documents being prepared or reviewed within the Proto-Power/Bisco Decontamination Facility.

3.2 Temporary Change - A procedure change which cannot be delayed for normal review and processing due to operational urgency or is of a "one time" nature. A temporary change cannot change the intent of the procedure.

3.3 One Time Change - A temporary change which describes an acceptable alternate method of job performance or control intended to apply to a particular event or evolution for a specified time period.

3.4 Revision - A permanent change or modification to an existing procedure.

4.0 POLICY

None

5.0 PREREQUISITES

None

6.0 PRECAUTIONS

None

7.0 PROCEDURE

7.1 Temporary changes shall be made to the master copy no. 01 located in the Radiation Safety office which is designated the master procedure file for Radiological Controls.

7.2 Each temporary change shall be assigned a unique temporary change number. These numbers shall be generated in the following manner:

7.2.1 The first two characters grouping shall be the last two digits of the current calendar year.

(Example: 8 4)

7.2.2 The last grouping consisting of four characters shall be a sequentially assigned number.

(Example: 0 0 0 1)

7.3 Temporary changes shall be recorded on the Temporary Change Log, maintained immediately

following the index of copy no. 01, Radiological Controls Policy and Procedure Manual.

7.4 Temporary changes shall be made by drawing a single line through the text to be deleted (master copy). Mark in the margin by the change, words to the effect "Temporary Change", the temporary change number and the date. Indicate if change is a "One Time Change". Short phrases may be written on the front by the deleted text if they fit conveniently; otherwise, write on the back of the sheet or attach additional pages.

NOTE: A "One Time Change" will not result in a permanent revision to a procedure and therefore shall have a specified expiration date. Proper use of a One Time Change includes the following circumstances:

1. Temporary change required by unique, temporary, plant conditions (i.e., equipment out of service).
2. Temporary changes to make procedure consistent with revisions pending approval (i.e., revision previously submitted).
3. Temporary changes to One Time Use Procedures (primarily one time tests or

modifications).

7.5 The temporary change shall be signed by the originator.

7.6 The temporary change shall be signed for approval by two (2) members of the PPB management staff who are Responsible Technical Reviewers (RTR) knowledgeable in the subject area.

7.7 Temporary changes to procedures concurred with by the President and Chairman Radiological Safety Committee also require the signature of the Radiation Safety Officer (RSO).

7.8 Temporary changes which delete or change a Quality Assurance requirement must have the approval of Quality Assurance.

7.9 Approved temporary changes are effective for ninety (90) days from the date of issuance except as follows:

7.9.1 Temporary change is cancelled by the Radiation Safety Officer.

7.9.2 Temporary change is not approved during the RTR review cycle.

7.9.3 In the case of a "One Time Change", an earlier date is established at the time of issuance.

7.10 The temporary change shall be submitted to the RRCO

for appropriate processing.

NOTE: RTR reviews of temporary changes shall be accomplished within fourteen (14) days of the date of issuance.

7.11 "One Time Changes" shall receive RTR reviews and Radiation Safety Officer approval prior to being forwrded to Processing for inclusion with the procedure file.

7.12 Temporary changes shall be cancelled by one of the following mechanisms:

7.12.1 Temporary Change is Replaced by a Procedure Revision

Procedure coordinator shall annotate revision number in the Temporary Change Log.

7.12.2 Temporary Change Outdates

RRCO shall request replacement (current revision) pages from the PPB Nuclear home office.

7.12.3 Temporary Change is Disapproved in the Review Cycle

7.12.3.1 The change shall be clearly marked "disapproved" with a short explanation and forwardedto Word Processing for inclusion with the procedure file.

7.12.3.2 RRCO shall request replacemnt (current revision) pages from the PPB Nuclear home office and make appropriate entries in the Temporary Change Log.

7.12.4 Temporary Change is Cancelled at the Direction of the RSO.

7.12.4.1 RRCO shall initiate a PPB Nuclear DCM Facility Request, with the following information:

A. Type (include procedure number and present rev. no.).

B. Item 1 - Title

C. Item 2 - Enter effective date of action

D. Item 3 - Enter a short explanation of the action

E. Item 4 - Cancel temporary change

F. Item 5 - RSO Signature

NOTE: RTR is not required as the procedure wording is being restored to the initial version which had received RTR approval.

7.12.4.2 The approval shall be forwarded to

Word Processing for inclusion with the procedure file.

7.12.4.3 RRCO shall request replacement (current version) pages from the PPB Nuclear home office and make appropriate entries in the Temporary Change Log.

8.0 RESPONSIBILITIES

8.1 Radiation Safety Officer shall approve temporary changes and approve temporary change cancellations in accordance with Paragraph 7.12.4.

8.2 RRCO shall process temporary changes and temporary change cancellations. He shall be primarily responsible for maintenance of the Temporary Change Log.

8.3 Radiological Controls personnel shall effect temporary procedure changes in accordance with Paragraph 7.0.

9.0 REFERENCES

None

10.0 ATTACHMENTS

10.1 Temporary Change Log.

TEMPORARY CHANGE LOG

Temporary Change No.	Procedure Title	Current Revision	Date Initiated	Expiration Date	Cancellation Date	Comments

PPB pro-protection nuclear, Inc.	POLICY AND PROCEDURE MANUAL

TITLE

RADIATION WORK PERMIT

PROCEDURE No.	REVISION No.	EFFECTIVE DATE
PPB - 003	0	11/30/86

LIST OF EFFFECTIVE PAGES

Page	Revision	Page	Revision
1.0	0	15.0	0
2.0	0	16.0	0
3.0	0	17.0	0
4.0	0	18.0	0
5.0	0	19.0	0
6.0	0	20.0	0
7.0	0	21.0	0
8.0	0	E1-1	0
9.0	0	E2-1	0
10.0	0	E3-1	0
11.0	0	E4-1	0
12.0	0	E5-1	0
13.0	0	E6-1	0
14.0	0	E7-1	0

	SIGNATURE	TITLE	DATE
ORIGINATOR	J Atthowe	RADIATION SAFETY OFFICER	11-24-86
CONCURRED			
APPROVED		VICE-PRESIDENT	12/2/86

1.0 PURPOSE

The purpose of this procedure is to set forth the requirements for the preparation and use of the Radiation Work Permit (RWP).

2.0 APPLICABILITY/SCOPE

The procedure is applicable to all personnel involved in preparation and use of RWP's.

3.0 DEFINITIONS

3.1 RWP - an administrative method of controlling personnel access to RWP required areas for the purpose of minimizing internal and external radiological hazards, maintaining the total dose equivalent as low as reasonably achievable (ALARA) and working with maximum radiological safety.

4.0 POLICY

Not Applicable

5.0 PREREQUISITES

None

6.0 PRECAUTIONS

None

7.0 PROCEDURE

7.1 General Requirements

7.1.1 An RWP is required for any of the following conditions:

1. Entering a radiation area

2. Entering a high radiation area
3. Entering a contaminated area
4. Entering an airborne radioactivity area
5. Unknown radiological conditions in an area, equipment or system to be entered or opened.
6. Handling exposed sources in excess of 10 times the quantity specified in Appendix C of 10 CFR 20 (Reference 9.11).

7.1.2 Entry may be made into an RWP Area without an RWP in the event that safety of personnel or equipment is endangered. The entry will be made with a Radiological Control Technician (RCT) and/or a dose rate monitoring device if the situation/time permits. Following such an entry, an RWP will be executed by Rad Con to document the entry.

7.1.3 RWP Classifications -

7.1.3.1 JOB SPECIFIC RWP's are normally prepared with current radiological survey data. Job Specific RWP's may be prepared without current radiological survey data and may authorize planned work to be performed when:

a) Job involves entry into numerous locations and/or areas not immediately accessible where acquiring all survey data prior to RWP issue is not practical, or dose to RCT can be minimized by having radiological working conditions checked just prior to commencement of work activities; and,

b) A qualified RCT provides continuous coverage until survey is performed and the workers are made aware of the radiological conditions. The survey must be documented following the entry and attached to the RWP.

c) These RWP's shall be authorized by Radiation Protection Officer.

7.1.3.2 STANDING RWP's are RWP's issued for routine repetitive duties such as inspections, surveillances, and others as determined by Radiological Controls. All Standing RWP's must be approved by the Radiation Protection

Officer. Other tasks may be performed using a Standing RWP if all the following conditions are met:

a) No contaminated or potentially contaminated system opening, with the exception of instrumentation.

b) Task is of short duration.

c) Task is not expected to cause any significant changes in static radiological conditions of areas.

d) Approval of Radiation Protection Officer.

7.1.4 Individual(s) entering "RWP" areas must be qualified Radiation Workers or be escorted by a qualified Radiation Worker. The escort shall be responsible to ensure the individual(s) complies with proper radiological work practices. Authorization for entry for the individual to be escorted is required in writing, prior to signing on the RWP. This authorization must be from the Radiation Safety Officer, or designee.

7.1.5 If RWP termination is greater than 24 hours following issue, the R.P.O. shall review the adequacy of working RWP's on a daily basis.

(RWP's which were not signed out during the 24 hour period or which have been placed on "hold" status need not receive this reveiew).

The review shall include, as a minimum:

1. DCM Facility Status
2. Job Status
3. Recent survey/air sample results
4. Impact of above items on the RWP

The date of review and the reviewer's signature shall be documented on the RWP or RWP Continuation Sheet. This is not applicable to Standing RWP's.

7.2 Initiation of RWP's

7.2.1 The supervisor of the person(s) who is going to perform the work will initiate the RWP.

7.2.2 The following priority codes, as applicable, will be entered by the initiator on all RWP's. The R.P.O. will contact the RWP initiator if the RWP cannot be processed in the required time frame.

Code 1: For RWP's that require work to be performed within 4 hours from the time and date the RWP was submitted to Radiological Controls for completion.

Code 2: For RWP's that require work to be performed greater than 4 hours and less than 24 hours from the time and date the RWP was submitted to Radiological Controls for completion.

Code 3: For RWP's that require work to be performed greater than 24 hours from the time and date the RWP was submitted to Radiological Controls for completion.

7.2.3 The Radiological Controls Technician (RCT) initiating the RWP completes the following (Refer to Attachment 10.1)

Block No. 3: Work Description - provide sufficient detail for Radiological Controls personnel to understand the scope of the task. If additional space is needed, an RWP Continuation Sheet (Attachment 10.2) may be used but is not mandatory.

Block No. 4: Priority Code - in accordance with Section 7.2.2.

Block No. 5: RWP Start Date - the date work

should start.

NOTE: May be left blank as directed by Radiological Controls, to be filled in prior to work.

Block No. 8: Job Location (be specific).

Block No. 16: Requested By - RCT prints and signs name in space provided; include telephone number and date submitted to Radiological Controls.

7.2.4 After completing the applicable portions of the RWP, it is taken to the R.P.O. and discussed. All supporting documentation should be included.

7.3 Preparation of RWP's

7.3.1 The R.P.O. shall review the initiated RWP and all supporting documentation for completeness and adequacy.

7.3.2 The qualified Radiological Controls Technician preparing the RWP completes the following (not necessarily in sequence):

Block No. 2: RWP Number and Type of RWP - assign next sequential RWP number, type of RWP, and

complete the RWP log entry (Attachment 10.4).

Block No. 6: RWP Expiration Date - may be for the duration of the job, to a maximum of one month.

Block No. 7: Job Category - Enter appropriate code as determined by job description and location.

Block No. 9: Radiological Data - Enter the most recent survey/data appropriate to the job location/scope. If radiological conditions significantly change, updated survey information shall be included either in Block No. 9 or Block No. 15 (Special Precautions). Survey serial numbers shall be recorded for both original and updated survey data.

a) All Contaminated and/or Airborne Radioactivity Areas require air samples

to be taken, unless exempted by the R.P.O.

b) Standing RWP's are written for areas with historically well known radiological conditions; therefore, survey data greater than two days old may be used to prepare the RWP.

c) Surveys used to prepare Job Specific RWP's must have been obtained within the previous two days except as specified by Paragraph 7.1.3.1.

Required Available Exposure - enter the available individual radiation exposure required for entry on the Radiation Work Permit. This value is determined by one of three methods as follows:

a) The R.P.O. Review - The R.P.O. must calculate the maximum exposed individual.

b) If an R.P.O. Review is not performed for the job, the RCT should determine the required available dose. One suggested method is to multiply the general area radiation reading from Block 9 by 3 or use 100 mrem, which ever is greater.

c) For Standing RWP's the Required Available Exposure will not be less than 100 mrem.

The Quarterly Exposure Available must be equal to or greater than the Required Available Exposure value in Block 9 prior to entering the RWP area. The R.P.O. may authorize entry with less quarterly exposure available based on a case by case review, prior to each entry. The R.P.O. must ensure that the

person is issued an alarming SRD or is aware of his exposure limit prior to authorizing the entry. This authorization must be documented in the R.P.O. Log.

Block No. 14: Protective Equipment Required -

a) Dosimetry

b) Monitoring - Mark the appropriate monitoring requirements based on work area radiological conditions, job scope, and applicable procedures. Periodically during the job, the radiological conditions involved in the job should be evaluated by radiological surveys.

1. If the RWP is being prepared for entry into a High Radiation Area, a dose rate instrument, alarming SRD with preset alarm setpoint,

or Radiological Controls Coverage is required.

2. When satisfying High Radiation Area monitoring requirements, if an alarming SRD fails or alarms, personnel shall immediately exit the High Radiation Area, unless the R.P.O. determines exit is not required based on ALARA considerations.

c) Protective Clothing -

1. For guidance on selection of Protective Clothing refer to Reference 9.10.

2. Respiratory Protection For guidance on selection of Respiratory Devices required refer to

Reference 9.1.

d) Other - Mark items which are appropriate for task to be performed.

Block No. 15: Special Precautions -

a) To be used for whatever additional instructions Radiological Controls deems necessary to ensure that the RWP task is performed in a radiologically safe manner.

b) If additional space is needed use an RWP Continuation Sheet (Attachment 10.2). Mark "See Continuation Sheet box.

Block No. 16: Radiological Contols Technician prints and signs the "Prepared by" space. Include the date the RWP was prepared.

7.3.3 The R.P.O. shall review the RWP and indicate approval for issuance by printing, signing and dating the "Radiological Controls

Approval" space in Block No. 16. Any changes to an approved RWP must be authorized in writing on all official copies by the R.P.O.

7.3.3.1 Upon receipt from the R.P.O., the Radiological Controls Technician shall deliver or forward the RWP to the R.S.O. for his review and approval by signature in Block No. 16.

7.3.4 Use of RWP Copies

7.3.4.1 The white copy (record copy) of the RWP and any attached documents shall be kept in the active RWP binder/ file.

7.3.4.2 All other official copies shall be distributed/used as directed by Radiological Controls. Official copies of RWP's taken to the job location shall be signed for on the RWP Receipt Form (Attachment 10.7).

7.4 RWP Entrance and Exit

7.4.1 After reading the RWP the worker shall complete RWP Attachment Sheet (Attachment 10.3) as follows:

7.4.1.1 Name, SSN, Signature, and Date -

Signature signifies understanding of the radiological conditions and requirements specified.

7.4.1.2 Comments - to be used for respiratory equipment deficiencies, dosimeter serial numbers, or other appropriate remarks by Radiation Worker or RCT.

7.4.1.3 Completion of the RWP Attachment Sheet entries for Standing RWP's is only necessary once/month when the new Standing RWP is issued.

7.4.2 Radiological Controls personnel, or those personnel issuing respiratory protection devices, shall verify the following qualifications prior to allowing entry onto the RWP:

1. RWP Training - current
2. Whole Body Count - in accordance with Reference 9.2.
3. Sufficient remaining quarterly exposure to complete task.
4. Respirator Training - current in accordance with Reference 9.3.
5. Respirator Medical Exam - within one year

6. Respirator Fit Date - current in accordance with Reference 9.3.

7. Respirator Fit Type

8. Respirator Training Type

NOTE 1: These qualifications shall be verified by use of Dose Assessment reports.

NOTE 2: Respiratory protection qualifications are applicable only if respiratory protection devices are going to be used and will be checked at the time respiratory protection devices are issued.

7.4.3 Individuals shall be informed of the radiological conditions and necessary radiological precautions associated with the work. This shall be accomplished via the RWP and, if required, a pre-job briefing.

7.4.4 RWP entrance and exit

NOTE: The Control Point Admission Ticket (CPAT) (Attachment 10.6) will be used to sign on and/or off an RWP.

7.4.4.1 For RWP entrance using CPAT's the RCT will fill in the blanks for:

a) Worker's name and social security number

b) RWP number

c) Date and Time In

d) Quarterly Dose remaining

e) SRD Dose In

f) Respirator Mode Code (if applicable) - enter "X" if respirator is not worn.

For exposure and training information use Dose Assessment Reports, and prior CPAT's as needed. The Radiological Controls Technician shall initial in the "Control Point Watch In" blank and will retain the CPAT.

7.4.4.2 For RWP exit using CPAT's the RCT will fill in the blanks for worker's name and social security number and RWP number if not already completed. The following blanks are then completed:

a) SRD Dose Out

b) Net Dose

c) Time Out

d) Quarterly Dose Remaining Out

The Radiological Controls Technician shall initial in the "Control Point Watch Out" blank and retain the CPAT original copy.

7.4.5 MPC hours calculated in accordance with Reference 9.4 shall be entered on the Dose Assessment System. If the Dose Assessment System is unavailable enter required data on CPAT until the system becomes available.

NOTE: If the CPAT is used and bioassay is required in accordance with Reference 9.2, instruct the individual that the bioassay requirements must be met prior to re-entering any RWP required areas.

7.5 Termination of RWP's

7.5.1 RWP's shall be terminated for the following conditions:

1. Work in the RCA is complete.
2. The expiration date has expired.
3. Work done on RWP is not being performed in accordance with instructions on the RWP. (The RWP may be placed on "hold" in lieu of termination).
4. Radiological conditions have degraded

significantly from the conditions for which the RWP was written.

7.5.2 Terminate the RWP by printing, signing and dating the space provided in Block No. 16. Also, enter the expiration date in the RWP Log.

7.5.3 Upon termination of the RWP, the white copies of the RWP, Continuation Sheets, and all Attachment Sheets are to be retained in Radiological Controls files.

8.0 RESPONSIBILITIES

8.1 Responsibilities are as stated in Section 7.0.

9.0 REFERENCES

9.1 PPB-305, Description and Selection of Respiratory Protection Equipment.

9.2 PPB-401, Bioassay Procedure.

9.3 PPB-301, Respiratory Protection Program.

9.4 PPB-202, Air Sample Analysis.

9.5 PPB-601, External Exposure Control.

9.6 PPB-603, Internal Exposure Control.

9.7 PPB-102, Surface Contamination Surveys.

9.8 PPB-101, Radiological Surveys.

9.9 PPB-005, Establishing and Posting Areas in the Radiologically Controlled Area (RCA).

9.10 PPB-006, Use of Anti-Contamination Clothing.

9.11 10 CFR 20.

10.0 ATTACHMENTS

10.1 Radiation Work Permit (RWP) Form (Example)

10.2 Radiation Work Permit Continuation Sheet (Example)

10.3 Radiation Work Permit Attachment Sheet

10.4 Radiation Work Permit Log Form

10.5 Respiratory Device Codes Sheets

10.6 Control Point Admission Tickets (Example)

10.7 Radiation Work Permit Receipt Form

PPG — pump generation nuclear, inc.

RADIATION WORK PERMIT

2 ☐ Job Specific ☐ Standing RWP #

3 WORK DESCRIPTION

4 PRIORITY CODE ☐

5 RWP START MO DY YR

6 RWP EXPIRATION MO DY YR

7 JOB CATEGORY

01	OPS & SURV
02	ROUT MAINT
03	INSERV INSP
04	SPEC MAINT
05	WASTE PROC

8 JOB LOCATION

9 RADIOLOGICAL DATA

SURVEY # _____

SURVEY # _____

SURVEY # _____

☐ SEE ATTACHED SURVEY

RADIATION LEVELS

MAX _____ mR/hr

AT _____

GEN _____ mR/hr

β⁻ _____ mRad/hr

CONTAMINATION LEVELS

MAX _____ dpm/100cm2

AT _____

GEN _____ dpm/100cm2

AIRBORNE ACTIVITY

μCi/cc	SAMPLE #

EXAMPLE

14 PROTECTIVE EQUIPMENT REQUIRED

DOSIMETRY
- ☐ WHOLE BODY TLD
- ☐ EXTREMITY TLDS
- ☐ WHOLE BODY NEUTRON TLD
- ☐ SELF READER (0-200 mR)
- ☐ SELF READER (0-500 mR)
- ☐ SELF READER _____
- ☐ ALARMING DOSIMETER
- ☐ OTHER _____

MONITORING
- ☐ AT START OF JOB
- ☐ DOSE RATE METER
- ☐ INTERMITTENT
- ☐ CONTINUOUS
- ☐ PERIODIC SURVEY EVERY _____
- ☐ OTHER _____

HEAD
- ☐ SURGEON'S CAP
- ☐ CLOTH HOOD
- ☐ PLASTIC HOOD
- ☐ OTHER _____

FACE
- ☐ BETA EYE PROTECTION
- ☐ FACE SHIELD
- ☐ OTHER _____

FEET
- ☐ CLOTH SHOE COVERS
- ☐ RUBBER SHOE COVERS
- ☐ RUBBER BOOTS
- ☐ OTHER _____

BODY
- ☐ LAB COAT
- ☐ ONE PAIR COVERALLS
- ☐ TWO PAIR COVERALLS
- ☐ WETSUIT
- ☐ OTHER _____

HANDS
- ☐ COTTON GLOVE LINERS
- ☐ SURGEON'S GLOVES
- ☐ RUBBER GLOVES _____ PAIR
- ☐ OTHER _____

OTHER
- ☐ PRE-JOB BRIEFING
- ☐ BZA SAMPLE
- ☐ _____
- ☐ _____

RESPIRATORY DEVICES REQUIRED

CODE	
☐ 1	FULL FACE NEG PRESSURE
☐ 2	POS PRESS AIR PURIFYING
☐ 3	CONTINUOUS FLOW AIRLINE
☐ 4	PRESSURE DEMAND AIRLINE
☐ 5	PRESSURE DEMAND SCBA
☐ 6	POSITIVE RECIRC SCBA
☐ 7	CONT FLOW HOOD/HELMET
☐ 8	AIR PURIFYING HOOD
☐ 9	_____

15 SPECIAL PRECAUTIONS _____

☐ SEE CONTINUATION SHEET

16 REQUESTED BY: _____ PHONE _____ DATE _____

PREPARED BY: _____ DATE _____

RAD-CON APPROVAL: _____ DATE _____

_____ DATE _____

RAD-CON TERMINATION _____ DATE _____

Print/Sign

Radiation Work Permit Continuation Sheet	RWP #
	Date
Additional Remarks and Special Instructions	Page of

EXAMPLE

Prepared By (Print/Sign)	Rad Con Approval (Print/Sign)

A0002302

ATTACHMENT 10.3

PROTO-POWER/BISCO
RADIATION WORK PERMIT
ATTACHMENT SHEET

RWP NUMBER_____

---STATEMENT---

BY MY SIGNATURE BELOW I STATE THAT I HAVE READ, UNDERSTAND, AND WILL COMPLY WITH THE RADIOLOGICAL REQUIREMENTS SPECIFIED FOR THE WORK TO BE PERFORMED AS OUTLINED WITHIN THIS RADIATION WORK PERMIT.

NAME (PRINT)	SOCIAL SECURITY NUMBER	RESPIRATOR EQUIP. #	SIGNATURE	DATE	COMMENTS

ATTACHMENT 10.4

RWP LOG FORM

RWP NUMBER	WORK LOCATION	WORK DESCRIPTION	INIT. DATE	DATE TERMINATED	REMARKS

ATTACHMENT 10.5

RESPIRATORY PROTECTION CODES

TRAINING

1. FULL FACEPIECE, NEGATIVE PRESSURE, AIR PURIFYING
2. FULL FACEPIECE, POSITIVE PRESSURE, AIR PURIFYING
3. FULL FACEPIECE, CONTINUOUS FLOW, AIR LINE
4. FULL FACEPIECE, PRESSURE DEMAND, AIR LINE
5. FULL FACEPIECE, PRESSURE DEMAND S.C.B.A.
6. FULL FACEPIECE, POSITIVE PRESSURE-RECIRCULATING S.C.B.A.
7. HOOD/HELMET, CONTINUOUS FLOW, AIR LINE
8. HOOD/HELMET, POSITIVE PRESSURE, AIR PURIFYING
9. OTHER

FIT

M MSA ULTRAVUE, BLACK, MEDIUM

Y MSA ULTRAVUE, YELLOW SILICONE, MEDIUM

S SCOTT SCOTTORAMIC

ATTACHMENT 10.6

CONTROL POINT ADMISSION TICKET

NAME _____ SSN _____

RWP # _____ RWP IN DATE _____ RWP OUT DATE _____

QTR DOSE REMAINING IN _____ RWP IN TIME _____ RWP OUT TIME _____

SRD IN DOSE _____ MREM SRD OUT DOSE _____ MREM

NET DOSE _____ RESPIRATOR CODE _____

QTR DOSE REMAINING OUT _____ MPC HOURS _____

CONTROL POINT WATCH _____ / _____
IN OUT

ATTACHMENT 10.7

RWP RECEIPT FORM

I HAVE RECEIVED A COPY OF RWP#_____

RWP PICK-UP DATE	RWP PICK-UP TIME	PRINT NAME/PHONE #	RWP RETURN DATE	RCT INITIAL

PPB puerto-precolitos nuclear, inc.	POLICY AND PROCEDURE MANUAL

TITLE

CONTROL OF HIGH RADIATION AREAS

PROCEDURE No.	REVISION No.	EFFECTIVE DATE
PPB - 004	0	11/30/86

LIST OF EFFFECTIVE PAGES

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12.0	0
13.0	0
14.0	0
E1-1	0
E2-1	0
E3-1	0

	SIGNATURE	TITLE	DATE
ORIGINATOR			
CONCURRED	J. Althouse	RADIATION SAFETY OFFICER	11-24-86
APPROVED		VICE-PRESIDENT	12/2/86

1.0 PURPOSE

1.1 This procedure establishes requirements and assigns responsibilities for the physical control of high radiation areas.

2.0 APPLICATION/SCOPE

2.1 This procedure applies to personnel responsible for controlling access to and maintaining key accountability for high radiation areas.

3.0 DEFINITIONS

3.1 High Radiation Area - Facility areas accessible to personnel in which there exists radiation at such levels, when measured at one foot, that a major portion of the body could receive a dose greater than 100 mrem/hr.

4.0 POLICY

None

5.0 PREREQUISITES

5.1 Accesses to High Radiation areas meeting the criteria of Para. 3.1 have been fitted with unique locks of a common lock series. Two master keys and three sets of individual lock keys shall be provided for issue.

NOTE: If a lock is damaged, closure will be as

specified in Para. 7.4.1.

5.2 The minimum keys available for issue is two master keys and three sets of individual lock keys. One core key is under the administrative control of the Radiation Safety Officer (RSO).

5.3 Spare keys are maintained in a locked cabinet under the control of the Radiation Protection Officer (RPO). It is his responsibility to maintain sufficient spares to replace damaged or worn keys. Spare keys are maintained in a separate location and segregated from the in-use population of keys by key-lock control. Additional administrative contols on the spare keys is neither reasonable nor prudent.

6.0 PRECAUTIONS

None

7.0 PROCEDURE

7.1 Normal locked High Radiation area entry.

NOTE 1: Emergency entry shall be as described in Para. 8.2.1.

NOTE 2: The briefing referred to in this procedure is defined as follows:

The RCT is to verify that the person signing out this locked High Radiation area key has read the posted instructions (identical to Form PPB-004-1, Side 2 of 2). The signature

of the person signing out the locked High Radiation area key on Form PPB-004-1 signifies he has read, understands and will comply with posted instructions.

7.1.1 Radiological Controls technicians, in addition to meet the requirements of Ref. 9.3, shall:

7.1.1.1 Conduct a high radiation area key and control responsibility briefing.

7.1.1.2 Require each person signing out locked High Radiation area keys to acknowledge this briefing by signing Form PPB-004-1.

7.1.1.3 Issue the appropriate key from the key locker. The time/date/name of responsible person for issue and return shall be recorded on Form PPB-004-1.

7.1.1.4 Ensure the High Radiation area key locker remains locked at all times that access is not required for key issue, return or inventory. Survey keys prior to returning them to key locker.

7.1.2 Persons signing out locked High Radiation area keys, in addition to the requirements of Reference 9.3 shall:

7.1.2.1 Receive and acknowledge a high radiation area key and access control briefing. Document on Form PPB-004-1.

7.1.2.2 After receiving the key(s) from the Radiological Control Technician, maintain the key(s) in his possession until completion of the task or the end of the work shift.

7.1.2.3 Verify with the Radiological Controls Technician (RCT) in person or by telephone, that a person assuming custody of a locked High Radiation area key has been properly briefed in accordance with Para. 7.1, Note 2.

7.1.2.4 Treat keys used within a contaminated area as contaminated until surveyed and decontaminated (if required).

7.1.2.5 Allow no one to enter the locked

area unless authorized by Radiological Controls.

7.1.2.6 If required, decontaminate area keys before returning them to the RWP Office.

7.2.1 RPO shall add or remove areas requiring locked access as necessary from the High Radiation Area Listing, Form PPB-004-2.

7.2.1.1 Each addition or deletion shall be signed and dated.

7.2.1.2 Unused keys shall be removed from the key locker and maintained in the RPO's Office or locked box.

7.2.1.3 The locked High Radiation area status board shall be updated to reflect additions/deletions.

7.2.2 RPO shall perform an inventory of the High Radiation Area Key Locker daily and ensure status board reflects actual key inventory status. In the event the RPO is unavailable, the inventory shall be performed by the RCT. This inventory shall be documented on Form PPB-004-2.

7.2.3 If inventory reveals a missing key, the RPO shall initiate an investigation to

determine:

7.2.3.1 The location of the missing key.

7.2.3.2 Party responsible for the key.

7.2.3.3 If unauthorized persons could have gained access to an area by use of the key.

NOTE: A Radiological Investigation Report shall be initiated if warranted.

7.3 Door Status and Integrity

7.3.1 RPO (or RCT) shall designate RCT(s) to perform door checks on a daily basis.

7.3.2 Door checks shall be performed in the following manner:

7.3.2.1 Perform inventory of key locker and ensure status board lists areas that reflect results of key inventory. (If discrepancy is found, notify RPO).

NOTE: Door checks are required of locked "High Radiation Areas" only if that area's key is issued after the previous door check.

7.3.2.2 Padlocked Areas. Grasp and attempt to open padlock. Where

hasp or chain is used to prevent unauthorized entry, ensure padlock is attached properly.

7.3.2.3 Locked Doors. Grasp doorknobs and attempt to open by turning knob and pulling/pushing on door.

7.3.2.4 If area is open and guarded, write the name of the guard in the appropriate space of Form PPB-004 -3.

7.3.2.5 If area is locked and secured, initial and enter time of door check in the appropriate space of Form PPB-004-3.

7.3.2.6 If door is found with loss of positive access control (i.e., door open and unguarded or key in lock), the discovering or responding (Para. 8.6.2) RCT shall:

a.) If possible, establish communication (either oral or visual) with individual(s) in the area; then order the area cleared.

b.) If unable to establish communication without entering, call for assistance and make entry to prove it is vacant.

c.) Once area is cleared, lock and notify RPO.

7.3.2.7 Entry of a locked High Radiation area for the sole purpose of checking door status within that area is not required.

a.) The High Radiation Door Status Sheet shall reflect....."behind #.....".

7.3.3 RPO shall be notified of any discrepancy noted during the performance of door checks.

7.3.4 Any area requiring use of protective clothing to perform door checks should be so noted in the comment section of Form PPB-004-3.

7.4 Damaged locks or lost keys.

7.4.1 In the event a door cannot be locked by normal means, a padlock and chain will be used until lock repairs can be made. The following provisions will apply:

7.4.1.1 Personnel making an entry shall provide a door guard who has met the requirement of Para. 7.1.2.

7.4.1.2 Two padlock keys shall be provided; one for the RPO and one for normal access issue, unless a high radiation padlock is used.

7.4.2 If a key is reported missing, the provisions of Para. 7.2.3 will apply.

7.4.2.1 If it is positively determined that the key has been destroyed or cannot be recovered, a replacement key shall be procured.

7.4.2.2 If the location of the key cannot be established, a padlock and chain will be used and the provisions of Para. 7.4.1 followed.

7.5 Records

7.5.1 Locked High Radiation Control and Key Usage Log, Form PPB-004-1. Completed forms shall:

7.5.1.1 Be retained by Radiological Controls for two weeks (minimum).

7.5.1.2 Then be forwarded to Radiation

Records Control Officer (RRCO) for retention.

7.5.2 Locked High Radiation Area Listing, Form PPB-004-2. Completed forms shall be forwarded to RRCO for retention.

8.0 RESPONSIBILITIES

8.1 Radiation Protection Office (RPO) shall:

8.1.1 Administer control of all locked high radiation areas.

8.1.2 Be responsible for one (1) key to the High Radiation area key locker. This key shall be assigned to the Radiological Controls Shift Technician.

8.1.3 Establish and maintain an inventory of all keys within the locker.

8.1.4 If required, initiate a high radiation area door unlocked/unguarded Radiological Investigative Report.

8.1.5 Initiate required work orders to replace or repair broken keys or locks.

8.2 Radiation Safety Officer (RSO) shall:

8.2.1 Maintain a master key to all locked High Radiation areas.

8.2.2 Maintain a spare key to the High Radiation area key locker.

8.2.3 Perform periodic inspections of the High Radiation Area inventory lists, key locker contents and key issue program.

8.3 Radiological Controls Technicians (RCT) shall:

8.3.1 Accept custody and receipt for the locked High Radiation area key locker (Shift Technician only).

8.3.2 Issue keys for locked High Radiation areas when required by an approved RWP.

NOTE: The RPO or his designee shall at all times remain in administrative control of the key issue and area control processes. The Radiological Controls Shift Technician shall refer any related problems to the RPO.

8.3.3 Conduct briefings for personnel signing out locked High Radiation area keys (Form PPB-004-1).

8.3.4 Perform door status and barrier integrity surveillances.

8.3.5 Participate in unlocked/unguarded door investigations.

8.3.6 Assume High Radiation area access control duties for those areas for which a manned

control point has been established.

8.4 Individuals signing out locked High Radiation area keys shall:

8.4.1 Have an approved Radiation Work Permit.

8.4.2 Carry a dose rate monitoring instrument or other designated exposure control device.

8.4.3 Receive and acknowledge a briefing concerning locked High Radiation area responsibilities.

NOTE: Briefing not required for areas covered by Para. 8.3.6.

8.4.4 Acknowledge custody of locked High Radiation area keys when issued.

8.4.5 Return locked High Radiation area keys promptly to RWP Office upon job completion or shift change.

8.5 All Facility personnel shall:

8.5.1 Notify Radiological Controls of any known or suspected improper High Radiation area postings or markings.

8.5.2 Notify Radiological Controls upon finding any unlocked, unguarded area designated as a locked High Radiation area.

8.5.3 Guard the entrance to those areas (Para. 8.5.2), allowing no improper entry, until

relieved by Radiological Controls personnel.

9.0 REFERENCES

9.1 Title 10, Code of Federal Regulations, Part 2.

9.2 Radiological Controls Procedure PPB-002, Investigation of Radiological Incidents.

9.3 PPB-003, Radiation Work Permit.

10.0 ATTACHMENTS

10.1 Locked High Radiation Area Control and Key Usage Log, Form PPB-004-1.

10.2 Locked High Radiation area Listing, Form PPB-004-2.

10.3 Locked High Radiation Area Door Status Sheet, Form PPB-004-3.

FORM PPB -1

LOCKED HIGH RADIATION AR CONTROL AND KEY USAGE LOG

High Radiation Area Key Locker Shift 1 2 3

Key Custody Acknowledgement _____ Date _____

Shift Technician

Proc.
Rev. 0 Side 1 of 2

No.	Area Key No.	RWP#	Responsible Person (Print)	Time (Issue)	Key Custody and Briefing Acknowledgement	Key Color	Time (Return)	Remarks	RCT Initial
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

Reviewed by _____ Date _____

R.P.O.

Proc. Rev. 0

FORM PPB - 004-2

Locked High Radiation Area Listing

Core/Key Number	Location	Date Added	Date Removed	R.P.O. Signature	Core/Key Number	Location	Date Added	Date Removed	R.P.O. Signature

Reviewed By: _____

_____

B2-1

Performed By: _____ FORM PPB-004-3 Proc. Rev.

Date: _____

Locked High Radiation Area Door Status Sheet

Core/Key Number	Location	Locked/ Secured	Open and Guarded By	Core/Key Number	Location	Locked/ Secured	Open and Guarded By

COMMENTS: _____

_____

_____

Reviewed By: _____

Date: _____

E3-1

PPB pro-protection nuclear, inc.	POLICY AND PROCEDURE MANUAL

TITLE

ESTABLISHING AND POSTING RADIOLOGICALLY CONTROLLED AREAS

PROCEDURE No.	REVISION No.	EFFECTIVE DATE
PPB - 005	0	11/30/86

LIST OF EFFFECTIVE PAGES

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	SIGNATURE	TITLE	DATE
ORIGINATOR			
CONCURRED		RADIOLOGICAL ENGINEER	11-24-86
		RADIATION SAFETY OFFICER	11-24-86
APPROVED		VICE-PRESIDENT	12/2/86

1.0 PURPOSE

The purpose of this procedure is to describe the minimum criteria used in establishing radiologically controlled areas and to describe the method by which these areas shall be posted.

2.0 APPLICABILITY/SCOPE

This procedure is applicable to all radiation workers.

3.0 DEFINITIONS

3.1 Radiologically Controlled Area - a generic term referring to any or all of the following: Radiation Area, High Radiation Area, Airborne Radioactivity Area, Radioactive Material Area, or Contaminated Area or any other posting established for Radiological Controls purposes.

3.2 Radiation Area - any area, accessible to personnel, in which there exists penetrating radiation at such levels that a major portion of the body could receive in any one hour a dose of 2.5 mrem or greater.

3.3 High Radiation Area - any area, accessible to personnel, in which there exists penetrating radiation at such levels when measured at one foot, that a major portion of the body could receive in any one hour a dose in excess of 100 mrem. High Radiation areas will be controlled in accordance

with procedure PPB-004 (Control of High Radiation Areas).

NOTE: In Paragraphs 3.2 and 3.3 the dose rate (mrem/hr) is intended to be the sum of all penetrating radiation.

3.4 Airborne Radioactivity Area - any room, enclosure or work area in which airborne radioactive materials exist in concentrations in excess of those listed in Appendix B, Table 1, Coluumn 1 of Reference 6.1 or in concentrations when averaged over the number of hours in any week during which individuals are in the area, exceed 25 percent of those listed in Appendix B, Table 1, Column 1 of Reference 6.1. When the isotopic content of the airborne radioactive material is unknown, use 2.25 E-9 uCi/ml for the value from Reference 6.1. (Based upon Co-60 being the limiting isotope).

3.5 Contaminated Area - any area contaminated with loose surface radioactive contamination above 1,000 DPM/100 cm2 for Beta-gamma or 100 DPM/100cm2 for alpha. Step off pads are considered to be radiologically clean and an integral part of the area boundry.

3.6 High Contamination Area - any area contaminated with loose surface radioactive contamination above

100,000 DPM/100cm2 for Beta-gamma or 10,000 DPM/100cm2 for alpha.

3.7 Radioactive Materials Area - any area or room in which licensed material is used or stored and which contains any radioactive material in an amount exceeding 10 times the quantity of such material specified in Appendix C of 10 CFR 20.

3.8 Hot Spot - a point or small area where a dose rate reading taken on contact with the surface in question would meet the following criteria:

3.8.1 For gamma radiation - Those areas not posted in accordance with Paragraph 3.3 shall be posted with hot spot markers if there are radiation measurements greater than 100 mrem/hr at contact with any radiation source.

3.8.2 For beta radiation - the dose rate reading is equal to or greater than (4) four times the general area dose rate reading and is equal to or greater than 200 mrad/hr.

4.0 POLICY

None

5.0 PREREQUISITES

None

6.0 PRECAUTIONS

None

7.0 PROCEDURE

7.1 Rad Con Technician (RCT):

7.1.1 Designate and post radiologically controlled areas in accordance with guidelines contained in Table 1.

7.1.2 Adjust posting as necessary whenever operations performed in the radiologically controlled area changes the radiological status or whenever surveys indicate reposting is required.

7.1.3 Inform the Radiation Protection Officer of any changes in postings.

7.2 Areas of specific concern that are located within a posted area may require additional posting. These areas should be posted with sign(s) bearing the radiation caution symbol and stating the appropriate requirements (Examples: Keep Out, Respiratory Protection required, TLD Required, etc.) or any additional information to aid individuals to minimize exposure to radiation or radioactive material.

7.3 Normally inaccessible areas, such as overheads, which may have radiation measurements resulting in the need for control as high radiation areas, will be posted with cautionary signs at appropriate

access points.

7.3.1 These signs will require notification of the Radiological Controls Department prior to working in such areas.

7.3.2 If these areas become accessible due to maintenance or modification work, then they will be managed in accordance with Paragraph 3.3.

8.0 RESPONSIBILITIES

Responsibilities are as set forth in Section 7.0 of this procedure.

9.0 REFERENCES

9.1 Title 10 Code of Federal Regulations Part 20.

9.2 PPB Procedure, PPB-001, PPB Nuclear Corporate Radiation Protection Plan.

9.3 PPB Procedure, PPB-202, Air Sample Analysis.

9.4 PPB Procedure, PPB-101, Radiological Surveys.

9.5 PPB Procedure, PPB-006, Use of Anti Contamination Clothing.

9.6 PPB Procedure, PPB-004, Control of High Radiation Areas.

10.0 ATTACHMENTS

10.1 Attachment 1, Table 1, Area Designations and Posting Requirements.

ATTACHMENT 1
TABLE 1

PPB-005

AREA DESIGNATIONS AND POSTING GUIDELINES

Area Designations	Area Definitions	Posting Requirements	Sign Inserts*
Radiation Area	Defn. 3.2	Caution-Radiation Area	1. Radiation Area 2. RWP Required for Entry 3. Personal Dosimetry Required
High Radiation Area	Defn. 3.3	Caution-High Radiation Area	1. High Radiation Area 2. RWP Required for Entry
Airborne Radioactivity Area	Defn. 3.4	Caution-Airborne Radioactivity Area	1. Airborne Radioactivity Area 2. RWP Required for Entry
Contamination Area	Defn. 3.5	Caution-Contamination Area**	1. Contamination Area 2. RWP Required for Entry
High Contamination Area	Defn. 3.6	Caution-High Contamination Area	1. High Contamination Area 2. RWP Required for Entry 3. Personal Dosimetry Required
Radioactive Materials Area	Defn. 3.7	Caution-Radioactive Materials	1. Radioactive Material
Hot Spot	Defn. 3.8	Hot Spot	1. None

* This column describes the minimum identification requirements for signs posted to identify singular situations. Additional inserts may be used to provide information or impose additional restrictions as deemed necessary by the RPO. Single signs may be used to identify multiple situations (i.e., a high radiation and contaminated area) as long as the minimum required inserts for both situations are used.

NOTE: Duplicate posting is not required if the outer boundary of the area has the appropriate posting.

** In addition to these posting requirements, entrances to contaminated areas must be identified with Step Off Pads.

NOTE: All barricades will be conspicuous and all postings will be clearly visible.

PPB proto-prevention nuclear, inc.	POLICY AND PROCEDURE MANUAL

TITLE

USE OF ANTI-CONTAMINATION CLOTHING

PROCEDURE No.	REVISION No.	EFFECTIVE DATE
PPB - 006	0	11/30/86

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1.0	0
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9.0	0

	SIGNATURE	TITLE	DATE
ORIGINATOR			
CONCURRED		RADIOLOGICAL ENGINEER	11-24-86
		RADIATION SAFETY OFFICER	11-24-86
APPROVED		VICE-PRESIDENT	12/4/86

1.0 PURPOSE

This procedure provides the guidelines for use of protective clothing and the purpose of its use.

2.0 APPLICABILITY/SCOPE

This procedure applies to any individual working in a contaminated area or with potentially contaminated materials.

3.0 DEFINITIONS

3.1 Protective Clothing (P.C.'s): any article of clothing such as coveralls, gloves, boots, etc. designed for use as a protective barrier between contamination and the people working around or with contamination.

3.2 Whole Body Frisk: the term assigned to the personnel survey technique used to qualitatively and quantitatively establish the presence of external personnel contamination.

3.3 Dosimetry: the term used to describe collectively, the devices used to measure personnel radiation exposure. Such devices include, thermoluminescent dosimeters (TLDs), and self-reading dosimeters (SRDs).

4.0 POLICY

None

5.0 PREREQUISITES

5.1 Any freshly laundered or otherwise unused protective

clothing found to have removable contamination will be relaundered.

5.2 All previously used protective clothing should be considered as radioactive material.

6.0 PRECAUTIONS

6.1 Any protective clothing found torn, worn or otherwise unsuitable for use will be discarded unless repair is deemed possible.

6.2 Protective clothing is not to be worn outside controlled areas.

7.0 PROCEDURE

7.1 GENERAL GUIDELINES FOR SELECTION AND USE OF PROTECTIVE CLOTHING

7.1.1 Protective clothing will be worn in controlled surface contamination areas.

7.1.2 Protective clothing will be worn consistent with the levels of surface contamination in the work area.

7.1.3 Full protective clothing will be worn when working in areas where beta-gamma contamination is greater than 1,000 DPM/100cm2 or when alpha contamination is greater than 100 DPM/100cm2.

7.1.4 Rubber footwear and plastic suits must be worn when water is present.

7.2 DONNING PROTECTIVE CLOTHING

7.2.1 Unless otherwise specified, street clothes will not be worn under protective clothing. Undergarments only (shorts & bodysuits are acceptable) will be worn under P.Cs.

7.2.2 In some cases it will not be necessary to don a full set of P.Cs. The articles of protective clothing required will be specified in the RWP.

7.2.3 Although all the following steps must be performed, it is not necessary for them all to be in the order described.

a. Put cloth boots over shoes and tape securely around ankle/calf area. Do not tape boot to skin.

b. Don coveralls, making sure the bottoms extend over the cloth boots. Tape the bottom of the coverall to the boot.

c. The worker's TLD and SRD will be worn on the outer coverall.

NOTE: Multiple sets of protective clothing can be required by Rad Con based on the contamination levels, etc. expected in the work area.

The SRD will be placed vertically inside

the pocket for easy access during work. The TLD will be hooked to the coverall, next to the SRD. The TLD will NOT be placed in the pocket, rather it will be secured to the coverall with tape.

NOTE: Be sure NOT to place tape over the beta window.

d. Rubber booties or a second pair of cloth boots are put on, extending over the coverall. The boot top is then taped to the leg of the coverall.

e. A skull cap is placed over the head and tied. This will help keep the hair covered and secured prior to donning a hood. The hood is placed over the head and the velcro fastened. When securing the back velcro tab, allow for head mobility. Tape the hood area extending over the shoulders by placing a strip of tape from the chest, over the shoulder and approximately 1/2 way down the back. This should be done over both shoulders.

f. Cotton glove liners can be put on next and tucked into the cuff of the coverall.

g. Two pair of rubber gloves must be worn

during work. The first pair are worn over the cotton liners and taped securely around the wrist (DO NOT TAPE GLOVES TO SKIN). The second set of gloves will be placed over the outer coveralls and taped to the sleeve.

7.3 REMOVAL OF PROTECTIVE CLOTHING

7.3.1 Removal of all protective clothing is done at the step-off-pad (SOP).

7.3.2 Removal of any protective clothing should be done deliberately and cautiously to reduce potential of contamination. Waste recepticles, appropriately labeled, will be at the SOP for proper disposition of clothing and waste. Clothing removal should be as follows:

a. Remove outer tape and dispose.

b. Remove respirator (if appropriate) per procedure PPB-306.

c. Remove hood by unfastening the velcro tabs and pulling the hood away from behind (grab the cloth at the back of the head and pull away).

d. Remove outer cloth or rubber boots and dispose of them accordingly.

e. Remove outer (contaminated) gloves. Do this by turning the gloves inside-out so that clean areas will touch other clean areas only.

f. Remove dosimetry, check SRD and place dosimetry on the SOP.

g. Remove the outer coveralls by folding them into themselves. To do this, turn the inside of the coverall (near the neck) out being sure to touch only the inside of the coverall. Roll the fabric down pulling arms out as the coverall is rolled down around the body. When the coveralls are rolled down around your ankles, lift one heel off the ground and push the coverall around the foot to step out of the suit.

h. Once the suit is off, the inner boots are removed. As the first boot is removed (exposing the street shoe) place that foot onto the SOP. Remove the second boot and bring that foot onto the SOP.

Important: At no time should street shoes touch the floor in the contaminated area.

i. Once standing on the SOP, the gloves and liners can be removed (from the inside out) and discarded.

j. Pick up dosimetry and proceed immediately to nearest frisking station and perform a whole body frisk in accordance with procedure PPB-104.

8.0 RESPONSIBILITIES

8.1 It is the responsibility of every individual entering a potentially contaminated area to follow the guidelines set forth in this procedure and strictly adhere to the requirements specified in the respective RWP.

8.2 It is the responsibility of each individual to notify Rad Con whenever skin or clothing contamination is found or if such contamination is questionable.

8.3 It is each person's responsibility to inspect all protective clothing prior to donning. Any questionable article (for whatever reason) should be returned for repair/disposal, etc.

9.0 REFERENCES

9.1 10 CFR Part 20, Standards for Protection Against Radiation.

9.2 PPB Procedure, PPB 306, Use of Respiratory

Protection Equipment.

9.3 PPB Procedure, PPB 104, Monitoring for Personal Contamination.

10.0 ATTACHMENTS

None

PPB Photo-Prevention Bureau, Inc.	POLICY AND PROCEDURE MANUAL

TITLE

RADIOLOGICAL CONTROLS PERSONNEL QUALIFICATION/TRAINING STANDARD

PROCEDURE No.	REVISION No.	EFFECTIVE DATE
PPB - 007	0	11/30/86

LIST OF EFFFECTIVE PAGES

Page	Revision	Page	Revision	Page	Revision
1.0	0	E1-8	0	E2-3	0
2.0	0	E1-9	0	E2-4	0
3.0	0	E1-10	0	E2-5	0
4.0	0	E1-11	0	E3-1	0
5.0	0	E1-12	0	E3-2	0
6.0	0	E1-13	0	E3-3	0
7.0	0	E1-14	0	E3-4	0
8.0	0	E1-15	0	E3-5	0
9.0	0	E1-16	0	E3-6	0
10.0	0	E1-17	0	E3-7	0
11.0	0	E1-18	0	E3-8	0
12.0	0	E1-19	0	E3-9	0
13.0	0	E1-20	0	E3-10	0
14.0	0	E1-21	0	E3-11	0
15.0	0	E1-22	0	E3-12	0
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E1-4	0	E1-26	0	E3-16	0
E1-5	0	E2-1	0	E3-17	0
E1-6	0	E2-2	0	E3-18	0
E1-7	0			E4-1	0

	SIGNATURE	TITLE	DATE
ORIGINATOR			
CONCURRED	J Althause	RADIATION SAFETY OFFICER	11-24-86
APPROVED		VICE-PRESIDENT	12/2/86

1.0 PURPOSE

The purpose of this procedure is to establish PPB DCM Facility qualification standards for Radiological Controls Technicians and Radiation Protection Officer (RPO). This standard includes the minimum theoretical and practical ability requirements to ensure that those technicians and Supervisors assigned to PPB DCM Facility understand their general and specific radiological duties.

2.0 APPLICABILITY/SCOPE

This procedure is applicable to all Rad Con Technicians and the Radiation Protection Officer (RPO).

3.0 DEFINITIONS

3.1 Radiological Controls Technican (Junior), is the entry level position within the Radiological Controls group.

3.2 Radiological Controls Technician (Senior) is the second level of advancement within the Radiological Controls Group. Personnel may advance to this level after a minimum of one year as a Radiological Controls Technician (Junior) and successfully passing the examinations at the levels described in Section 7.2. Reference to a qualified Radiological Controls Technician shall mean a PPB Radiological Controls Technician who has successfully completed the Rad Con qualification program.

3.3 Radiation Protection Officer (RPO) is the first-line supervisory position within the Radiological Controls Group. Personnel selected for this position must have a minimum of four years experience in Radiological Controls and must successfully complete the examinations at the levels described in Section 7.3.

4.0 POLICY

Compliance with the provisions of this procedure will be achieved by each Radiological Controls Technician/ Radiation Protection Officer by the date of their qualification/requalification.

5.0 PREREQUISITES

None

6.0 PRECAUTIONS/LIMITATIONS

None

7.0 PROCEDURE

7.1 RADIOLOGICAL CONTROLS TECHNICIAN - JUNIOR

7.1.1 Personnel shall be selected as Radiological Controls Technician - Junior, based upon the satisfactory completion (70 percent or higher) of a written screening examination.

NOTE: Nothing in this procedure shall prevent the Company from assigning a senior bidder or new employee to a

position higher than Radiological Controls Technician - Junior, based upon employee qualification.

7.1.2 A training program is established to impart the knowledge and skills (Attachment A) required to qualify for advancement to Radiological Controls Technician - Senior. This training may be provided by a Vendor approved by the R.S.O.

7.1.3 Each Radiological Controls Technician - Junior, shall be issued a Practical Factor Worksheet (Attachment B) and Qualification Standard (Attachment C). Tasks will be signed off by a qualified Radiological Controls Technician (Senior), R.P.O., or other individuals as designated in writing by the Radiological Safety Officer as they are satisfactorily performed.

7.1.4 Radiological Controls Technicians - Junior, shall perform without direct supervision only those tasks signed off on their worksheet. All other tasks shall be performed under the direct supervision of a qualified Radiological Controls Technician (Senior) or R.P.O. All surveys and documents completed

by Radiological Controls Technician - Junior, require review by a qualified Radiological Controls Technician (Senior) and approval by the R.P.O.

7.1.5 Within a period of one (1) year as a Radiological Controls Technician - Junior, the employee shall be administered a written examination covering selected material in Attachment A, selected systems, procedures, and items in the Job Specification. Passing grade shall be 80 percent or better.

7.1.6 Upon satisfactory completion of written examination and practical factors Sections B1 -B4, the employee shall be administered an oral examination.

7.1.7 Radiological Controls Technicians - Junior, shall be promoted to Radiological Controls Technician - Senior after successful completion of required Practical Factor, written and oral examination in accordance with Paragraphs 7.1.3, 7.1.5 and 7.1.6 and in accordance with the applicable Job Specification. Failure to pass any one of the above examinations will result in assignment restrictions to only those areas

where proficiency has been demonstrated. If a second failure of any of the above examinations occurs, the employee may be reclassified in accordance with applicable Job Specification.

7.2 RADIOLOGICAL CONTROLS TECHNICIAN - SENIOR

7.2.1 A training program is established to impart the knowledge and skills required to qualify for Radiological Controls Technician (Senior) (see Attachment A).

7.2.2 Each Radiological Controls Technician - Senior, shall be issued a Practical Factors Worksheet (Attachment B) and Qualification Standard (Attachment C) which must be completed in accordance with Paragraph 7.1.3.

7.2.3 Radiological Controls Technician - Senior, shall perform tasks only in accordance with Paragraph 7.1.4.

7.2.4 After satisfactory performance of all required Practical Factor Worksheet tasks, the employee shall be administered a written examination covering selected material in Attachment A, selected systems, procedures and items required in the Job Specification. Passing grade shall be 80 percent or better.

7.2.5 Upon satisfactory completion of the written examination and practical factors Section B1-B5, the employee shall be administered an oral examination in accordance with Paragraph 7.7.

7.2.6 Failure to pass any one of the above examinations will result in assignment restrictions to only those areas where proficiency has been demonstrated. If a second failure of any of the above examinations occurs, the employee may be reclassified in accordance with applicable Job Specification.

7.3 RADIATION PROTECTION OFFICER (R.P.O.)

7.3.1 An individual may be qualified as a Radiation Protection Officer (R.P.O) when the individual has:

7.3.1.1 A High School Diploma or equivalent and a minimum of four (4) years experience in Radiological Controls.

NOTE: One year of experience shall be defined as 2000 hours work experience in Radiological Controls in 40 weeks with no more than 60 hours in any one

week.

7.3.1.2 Demonstrated knowledge by successfully completing written examinations (85 percent or higher) covering subjects outlined in Attachment A, selected systems, procedures, and other appropriate material.

7.3.1.3 Demonstrated ability by successfully completing a Practical Factors exmination (Attachment B, Section B1-B6).

7.3.1.4 Satisfactorily completed an oral examination (85 percent or higher).

7.3.1.5 Been evaluated and recommended by the Radiation Safety Officer.

7.4 PRACTICAL FACTOR WORKSHEETS

The completion of the Practical Factor Worksheet is the responsibility of the individual issued the sheet. Each task should be completed in accordance with the designated performance mode stated on the Practical Factor Worksheet unless approved otherwise by the Radiation Safety Officer. The signature of a qualified Radiological Controls Technician - Senior, Radiation Protection Officer, or other individuals

as designated in writing by the Radiation Safety Officer on the Practical Factor Worksheet indicates that the individual has successfully performed the task, unaided and unassisted, in accordance with the applicable procedure/technical manuals while being observed by the same Radiological Controls Technician - Senior, Radiation Protection Officer or other individuals as designated in writing by the Radiation Safety Officer. It is also the responsibility of the qualifying individual to obtain the necessary signature and date immediately upon successful completion of each task for which he/she is being observed. Illegible signatures must also have printed name.

7.5 EXAMINATIONS

7.5.1 Oral examination boards shall be composed of personnel designated in writing as approved by the Radiation Safety Officer.

7.5.2 Each Radiological Controls Technician - Junior, Radiological Controls Technician - Senior, and Radiation Protection Officer is responsible for taking re-certification written and oral examinations and completing Practical Factor Worksheets once every two (2) years after initial qualification. The

passing grade for these examinations shall be 80 percent for Radiological Controls Technicians. Technicians shall only be allowed to perform at the level at which they have been certified.

7.5.2.1 Radiological Controls Technicians who fail an examination shall be given 30 days to retake the examination.

7.5.2.2 Those Radiological Controls Technicians required to retake the examination shall not be allowed to perform radiological control tasks except as verified by Practical Factor Worksheet or under the direct supervision of a qualified Radiological Controls Technician - Senior, or R.P.O.

7.5.2.3 If the Radiation Protection Officer fails a written requalification examination or an oral examination he/she shall have their duties reviewed. As a result of this review, the individual's duties may be limited until such examination

has been successfully passed. Other action may be taken as deemed appropriate by the Radiation Safety Officer.

7.5.2.4 Individuals failing to achieve a passing grade on written or oral qualifications or requalification examinations shall be informed of their test score and weak areas. They shall be directed to the applicable study material.

7.5.2.4.1 A second examination shall be taken by the individual within 30 days of the date of notification of the initial failure.

7.5.2.4.2 Failure to pass any one of the above will result in assignment restrictions to only those areas where proficiency has been demonstrated.

7.5.2.4.3 Failure to pass the second examination shall result in a review of that

individual's qualifications and possible reclassification.

7.5.2.4.4 Qualifying/requalifying Radiological Controls Technicians and Radiation Protection Officer have 90 days in which to complete their written examinations, practical factors, and oral board. Failure to complete all of the above within the specified period will result in disqualification. The disqualification will not take effect until the end of the 90 day period.

7.6 RECORDS

The following records of personnel training and training verification shall be maintained in order to document satisfactory completion of the requirements of this procedure:

7.6.1 All final written examinations given.

7.6.2 A summary statement of each person's performance during their qualification or requalification oral examination and the areas covered by the examination. This statement shall be signed by the chairman conducting the examination and the other examiners.

7.6.3 Training records for each Radiological Controls Technician and R.P.O. indicate the performance of practical abilities as delineated by Attachment B. Each practical ability shall be verfied by signature with the date.

7.6.4 The training record shall also contain a signed statement certifying that the person has completed all requirements, i.e., passed written and oral examinations and has all the signatures on the practical ability record sheet. This certification shall be signed by the Radiation Safety Officer. A certificate shall be issued to the individual and a copy kept by the Radiation Records Control Officer.

7.6.5 Each requalification shall be included in the

individual's training record.

7.6.6 All employee training records will be maintained by the Radiation Records Control Officer.

8.0 RESPONSIBILITIES

Responsibilities are as stated in Section 7.0 of this procedure.

9.0 REFERENCES

9.1 PPB Corporate Radiation Protection Plan, PPB-001.

9.2 ANSI 3.1 (1979) Section and Training of Nuclear Power Plant Personnel.

9.3 10 CFR 19.

9.4 Applicable Job Specification.

10.0 ATTACHMENTS

10.1 Attachment A - Theoretical and Practical Ability Requirements for Radiological Controls Technician and Radiation Protection Officer.

10.2 Attachment B - Radiological Controls Technician/ Radiation Protection Officer Practical Factors Worksheet.

10.3 Attachment C - Radiological Controls Technician/ Radiation Protection Officer Qualifications Standard.

10.4 Attachment D - Verification of Radiological Control Training Form.

ATTACHMENT A

THEORETICAL AND PRACTICAL ABILITY REQUIREMENTS
FOR
RADIOLOGICAL CONTROLS TECHNICIANS
AND
RADIATION PROTECTION OFFICER

This appendix sets forth a basic outline of topics to be covered for the training of Radiological Controls Personnel.

I. BASIC MATH AND ALGEBRA

A. The purpose of this subject is to enable the trainee to perform the following tasks:

1. Add, subtract, multiply, and divide whole numbers, fractions, and decimals.

2. Calculate percentages.

3. Determine significant figures.

4. Convert metric to English and English to metric units for length, volume, and flow rate measurements.

5. Add, subtract, multiply, and divide algebraic expressions, use parentheses, factor algebraic expressions, and change signs to the depth required in Radiological Protection Technology.

6. Apply the concept of exponential buildup and decay to solve radioactive decay and gamma ray shielding problems.

7. Use exponents, radicals, and scientific notation in Radiological Protection Technology.

8. Graph Sample Data.

B. Topic Outline

1. Mathematical Manipulation

a. Math sysmbols
b. Rule of Operation
c. Ratio and Proportion
d. Solving Equations

e. Dimensional/Unit Analysis
f. Significant Numbers
g. Exponents
h. Logarithms
i. Scientific Notation
j. Percent
k. Graphing

2. Practical Application

a. Half-Life Calculation
b. Shielding Calculation
c. Curie Content Calculation
d. Dose Rate/Distance Calculations
e. Equalibrium Calculation
f. Air Activity Calculation
g. Minimum Detectable Count Rate/Activity
h. Lower Limit of Detectability

II. BASIC ELECTRICAL AND MECHANICAL CONCEPTS

A. The purpose of this subject is to enable the trainee to demonstrate knowledge of the following:

1. Demonstrate an understanding of fundamental concepts, units, and laws.

2. Systems of Units.

3. The concepts and relationships between work, energy, and momentum.

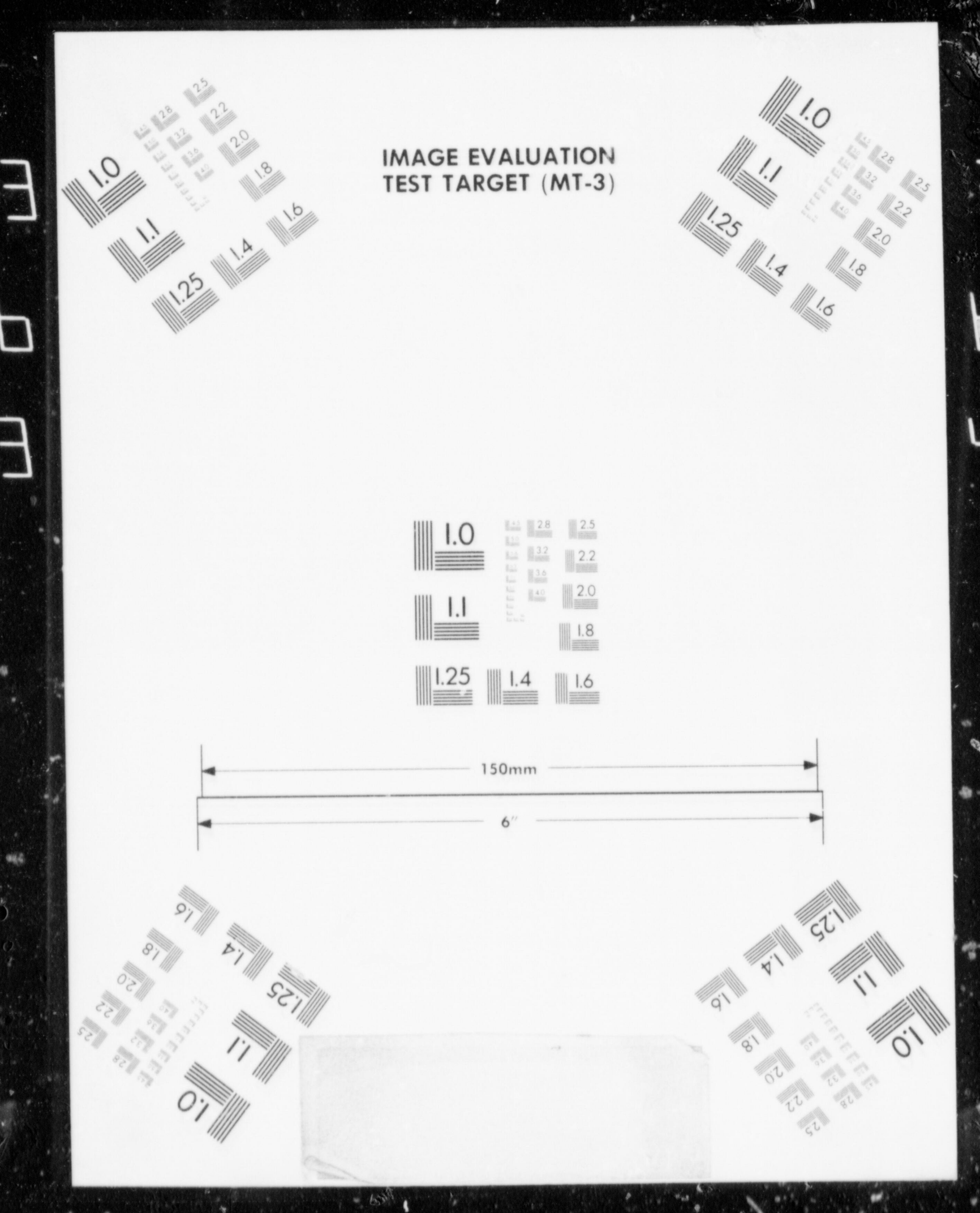
B. Topic Outline

1. Basic Electrical Fundamentals

a. Laws (Ohms/Kirchhoff/Coulomb)
b. Simple Circuit Problems
c. Units

2. Basic Mechanical Fundamentals

a. Heat Transfer
b. Fluid Flow
c. Basic Physics
d. Basic Power Plant Components
   1) Pumps
   2) Valves
   3) Heat Exchangers
e. Units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TEST TARGET (MT-3)
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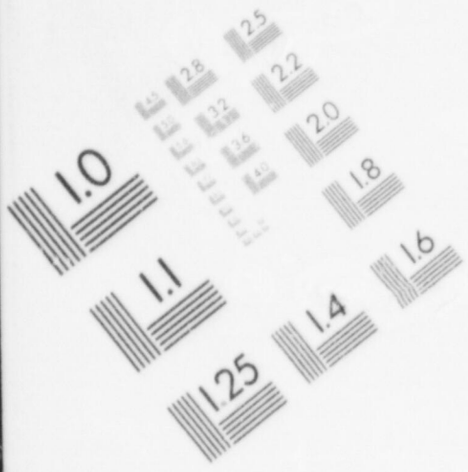
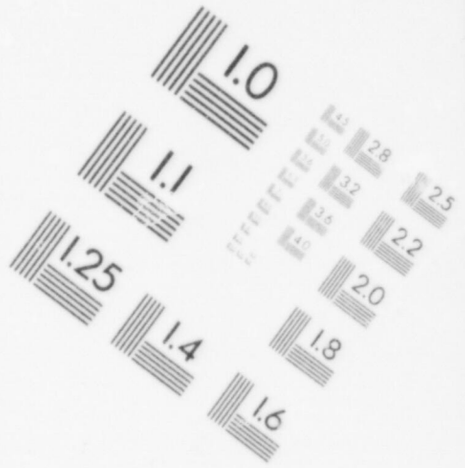
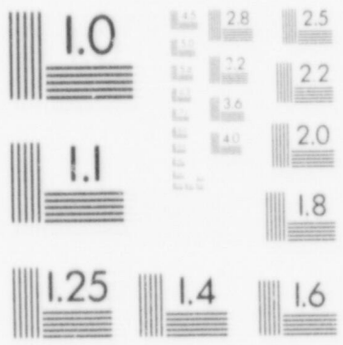
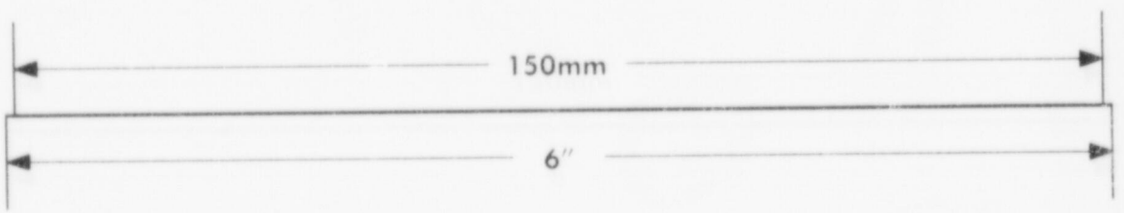
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
150mm
6"

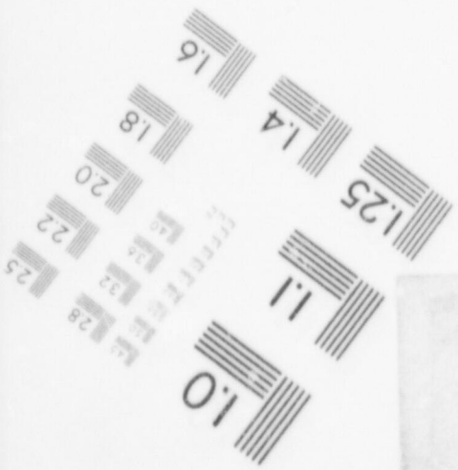
IMAGE EVALUATION
TEST TARGET (MT-3)

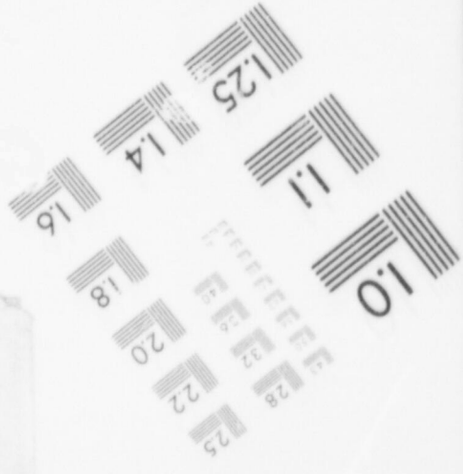












III. BASIC ATOMIC THEORY

A. The purpose of this subject is to enable the trainee to demonstrate knowledge of the following:

1. Atoms, elements, molecules, compounds, and checmical bonding
2. Nuclear terminology and symbols
3. Isotopes
4. Mass-energy equivalence
5. Nuclear forces
6. Binding energy and binding energy per nucleon
7. Fission and fusion
8. Fission yield curve

B. Topic Outline

1. States of Matter
   a. Energy changes
   b. Property changes
2. Chemical Theory
   a. Atoms
   b. Elements
   c. Molecules
   d. Compounds
   e. Checmical Bonding/Valance
   f. Periodic Table of Elements
3. Atomic Structure
   a. Nucleus
   b. Electron Cloud
   c. Charges of Particles
   d. Mass of Particles
   e. Atomic and Nuclear Sizes
   f. Atomic Terminology and Units
      1) Z, X, A Notation
      2) Units of Energy

3) Units of Mass

g. Isotopes

4. Nuclear Binding Energy

a. Coulomb Forces
b. Nuclear Forces
c. Mass Energy Relationships

5. Fission and Fusion Process (Basic)

a. Binding Energy/Nucleon
b. Fissile and Fissionable Material
c. Energy Release
d. Yield Curve

IV. RADIATION, RADIOACTIVITY AND RADIOACTIVE DECAY

A. The purpose of this subject is to enable the trainee to perform the following:

1. Identify the modes of radioactive decay.

2. Write simple equations describing each mode of decay.

3. Perform Radioactive Decay Calculations using exponential equations and appropriate graphs.

4. Characterize Alpha Particles, Beta Particles, Gamma Rays, and Neutrons.

5. Write simple equations describing the process of neutron activation.

6. Demonstrate the practical application of the Chart of the Nuclides.

B. Topic Outline

1. Nuclear Stability

a. Binding Energy
b. Neutron Proton Ratio
c. Neutron Proton Pairing
d. Magic Numbers

2. Radioactive Decay

a. Types of radiation

1) Alpha
2) Beta - Beta (+) and Beta (-)
3) Gamma
4) Neutron
5) Neutrino and other miscellaneous

b. Modes of Radioactive Decay
1) Alpha
2) Beta
3) Gamma Emission
4) Fission (spontaneous)
5) Positron
6) Electron Capture

c. Decay Operations
1) For each in "b" above
2) Conservation of Mass and Energy
3) Decay Schemes

d. Units of Decay
1) Curie
2) Subunits

3. Nuclear Reactions

a. Activation Process
1) Neutron (Thermal and Fast)
2) Cross section of absorption factor.
3) Major activation products found in a nuclear power plant.
4) Excitation
5) Production and decay equations for major activation products.

b. Fission Process
1) Thermal
2) Fast
3) Spontaneous
4) Major Products
5) Production and Decay Equations

4. Decay Calculation

a. Half-Life Concept
1) Decay
2) Biological
3) Effective

b. Half-Life Calculations
1) Decay

2) Build-up
3) Effective T 1/2 Calc.

c. Graphing
1) Use of Graphs (Linear and Exponent).
2) Types of Graphs (Log-Log, Semi-Log, Linear).
3) Relate Decay Half-Life to graphing technique.

5. Chart of the Nuclides

a. Construction
b. Important Data
c. Decay - schemes

V. SOURCES OF RADIATION

A. The purpose of this subject is to enable the trainee to identify and quantify the major sources of natural background radiation, man-made sources of background radiation, and radioactive sources routinely found in the nuclear plant.

B. Topic Outline

1. Types of Radiation
a. Ionizing
b. Non-Ionizing

2. Sources of Ionizing Radiation

a. Natural
1) Cosmic
2) Earth (food and building materials)
3) Major nuclides and forms of radiation
4) Contribution to annual dose

b. Man-Made
1) Medical applications
2) Consumer products
3) Nuclear weapons testing
4) Nuclear power
4a. During operations
4b. During shutdown
4c. Waste and waste handling
5) Typical dose received to individual
5a. Occupational
5b. Non-Occupational
6) Major nuclides

7) Environmental consideration
Concentration of Nuclides in food chain

VI. INTERACTION OF RADIATION WITH MATTER

A. The purpose of this subject is to enable the trainee to perform the following:

1. Define the terms Excitation, Ionization, and Specific Ionization.

2. Identify the charateristics of energy loss by charged particles (Alpha and Beta Particles) and uncharged particles (Gamma Rays and Neutrons).

3. Select the type(s) of shielding material required for each type of radiation.

B. Topic Outline

1. Energy Loss Mechanisms

a. Ionization
1) Ion Pairs
2) Specific Ionization
b. Excitation
c. Bremsstrahlung

2. Radiation Units of Energy

3. Forms of Radiation and their interaction.

a. Gamma Radiation and X-Rays
1) Production and Nature
2) Mechanisms of interactions with Matter
3) Penetrability in Matter
4) Shielding selection

b. Alpha Radiation
1) Production and Nature
2) Mechanisms of interactions with Matter
3) Penetrability in Matter
4) Shielding selection

c. Beta Radiation
1) Production and Nature
2) Mechanisms of interactions with Matter
3) Penetrability in Matter
4) Shielding selection

d. Neutron Radiation
    1) Production and Nature
    2) Classification
    3) Mechanisms of interactions with Matter
    4) Shielding selection

VII. RADIOLOGICAL QUANTITIES AND UNITS

A. The purpose of this subject is to enable the trainee to identify and use the radiological quantities and their units, differentiate between dose and dose rate, equate radioactivity to dose rate through simple rules of thumb and associated simple calculations, and convert radiological units to their respective subunits.

B. Topic Outline

1. The Curie

    a. History
    b. Definitions
    c. Subunits
    d. Calculations - DPM/Curie with Subunits

2. Units of Ionizing Radiation

    a. Roentgen
    b. RAD
    c. REM
    d. Definitions of each
    e. Subunits of each
    f. Relationships to each other
        1) Use of the Units
        2) Forms of Radiation

3. Dose and Dose Rate

    a. Concepts
    b. Calculations (mixed Radiation Fields)
    c. Gamma Dose to source activity relationship
        1) Thumb rules
        2) Calculation using thumb rules

VIII. BIOLOGICAL EFFECTS AND RISKS ASSOCIATED WITH EXPOSURE TO IONIZING RADIATION

A. The purpose of this subject is to introduce the trainee to the following concepts so that he/she

can objectively base radiation exposure risk on the present knowledge and experiences of the scientific community:

1. Simple mechanisms of radiation interactions with cells.

2. Somatic effects of radiation exposure.

3. Genetic effects of radiation exposure.

4. Long-term health effects of low-level radiation exposure.

5. Radiation risk and how it relates to other risks accepted in everday life.

6. The important aspects of low-level radiation exposure and its relationship to public health concerns.

B. Topic Outline

1. Cell Structure

   a. Major Components
   b. Component Functions

2. Radiation Interaction With Cells

   a. Ionization

   b. Radiation effect on water
      1) Free radical formations
      2) Breaking of chemical bonds

   c. Biological damage
      1) Direct effect
      2) Indirect effect

   d. Cell Radiosensitivity
      1) Factors - Dose, Type of Cell, Form of Radiation

   e. Biological Effect Parameters
      1) Dose
      2) Dose Rate
      3) Tissue exposed

3. Radiation Effect on Organs

a. Radiosensitivity - Critical organ
b. Effect on body functions
c. Somatic and Genetic, Teratogenetic effects

4. Whole Body Effects

a. Acute effects
b. Chronic effect (late effects)
c. Treatment
d. Body burden - body burden limits
e. Data sources for acute effects

5. Risk of exposure to Ionizing Radiation and risk of other environmental conditions.

IX. RADIATION PROTECTION STANDARDS

A. The purpsoe of this subject is to enable the trainee to perform the following:

1. Explain the purpose of Radiation Protection Standards and Guidelines and identify the Regulatory and Advisory Organizations that have cognizance in this area.

2. Demonstrate proficiency in using Nuclear Regulatory Commission (NRC) and Department of Transportation (DOT) Standards, and Utility Administrative limits in practical situations.

3. Implement Guidelines when necessary.

B. Topic Outline

1. Code of Federal Regulation

a. Title 10 Part 20
b. Title 10 Part 19
c. Title 49 Part 100 - 177 and D.O.T.
d. Applicable information from each above and their usage.

2. NUREGS

a. Section 8
b. 0041

3. Plant Radiation Protection Program

a. Rad Con Department Divisions and Responsibilities
b. Rad Con Procedures
   1) Scope
   2) Use Requirements
c. Rad Con Program Philosophy
   1) INPO 85-004
   2) Site Radiation Protection Plan

X. EXTERNAL RADIATION EXPOSURE CONTROL

A. The purpose of this subject is to enable the trainee to perform the following:

1. Demonstrate the ability to utilize the principles of Time, Distance, and Shielding to reduce personnel exposure.

2. Solve simple distance attenuation problems for line and point sources.

3. Perform Gamma Ray Shielding Calculations using these terms:

   - Exponential Shielding Equation
   - Half and Tenth Thickness Values
   - Empirically derived graphs from sources such as National Council on Radiation Protection and Measurement and Rad Health Handbook.

4. Explain the concept of buildup.

5. Identify Common Shielding Practices for Beta Particles and Neutrons.

6. Define all Radiation Field Standards (i.e., Radiation Area) and demonstrate the ability to post Radiation and High Radiation Areas properly.

7. Explain the "As Low As Reasonably Achievable" (ALARA) concept, its purpose, and methods of implementation.

8. Implement Proto-Power/Bisco Exposure Control Systems.

9. Define Plant Personnel Dosimetry Requirements for Gamma Rays and Beta Particles.

10. Identify the Personnel Dosimetry Administrative Control Requirements and Exposure Limits and Records Methodology.

11. Demonstrate the proper use of all personnel dosimetry.

B. Topic Outline

1. Concept of Time, Distance and Shielding

a. Calculation involving Distance from Source.
   1) Point Source
   2) Line Source
   3) Plane Source

b. Calculations involving commonly used Shielding.
   1) For Alpha, Beta, Gamma and Neutron

c. Effect of Shielding
   1) Concept of Tenth Thickness
   2) Concept of Half-Value Layer
   3) Tenth and Half-Value Thickness for Materials

d. Selection of Shielding Materials
   1) Type of Radiation to be Shielded

e. Guidelines and Procedures for use of Shielding in Plant
   1) Temporary
   2) Permanent

2. External Exposure Control Technique and Limits

a. Limits
   1) Federal
   2) Local Administrative
   3) Non-Occupational
   4) Emergency

b. Actions necessary for exceeding local Administrative Limits.
   1) Dose Upgrades
   2) Emergency Limit Authorizations
   3) Responsibilities
   4) Reporting Requirements
      4a. Exceeding Local Limits
      4b. Exceeding Federal Limits

c. Applied Dose Control
   1) Use of Dose Assessment Systems.
   2) Back-up techniques for failure of computer systems.

d. Methods of Dose Reduction
   1) Concept of ALARA
   2) Application of Time, Distance, and Shielding in the field.
   3) Calculation of Stay Time (Whole Body Dose/Extremity Dose)

3. Definitions, Controls and Requirements for Access Into Radiation Environment

   a. Federal and Plant Requirements

   b. Definitions
      1) Unrestricted Area
      2) Restricted Area
      3) Radiation Area
      4) High Radiation Area

   c. Posting Requirements

4. Selection and Use of Dosimetry Equipment

   a. Whole Body
   b. Extremities
   c. Neutron
   d. Documentation of Dose
      1) Legal Requirements
      2) Administrative

XI. RADIOACTIVE CONTAMINATION CONTROL

A. The purpose of this subject is to enable the trainee to perform the following:

1. Identify the sources of Radioactive Contamination.

2. Define all Proto-Power/Bisco Working Limits.

3. Demonstrate proper survey techniques (e.g., swipes, fixed contamination, personnel contamination) using appropriate instrumentation.

4. Demonstrate proper techniques and procedures for limiting the spread of contamination.

5. Demonstrate the ability to post a contamination area properly with the required signs.

6. Identify the Proto-Power/Bisco Contamination Monitoring Systems and their operating principles and capabilities.

7. Demonstrate proper donning and removal of anticontamination clothing, and define the conditions that dictate the use and selection of anticontamination clothing.

8. Convert meter reading to radioactivity levels.

9. Estimate Surface Contamination Levels resulting from various working conditions and incidents.

10. Demonstrate the proper procedures and techniques for personnel, equipment, clothing, and area decontamination.

11. Identify the problems that might be encountered during decontamination efforts.

B. Topic Outline

1. Definition of Contamination and Contamination Limits

   a. Loose Surface Contamination

   b. Fixed Contamination

   c. Sources of Contamination
      1) Maintenance Activities
      2) Operation Processes
      3) Major Nuclides expected

   d. Federal and Local Administrative Contamination Limits
      1) Personnel
      2) Equipment
      3) Work Activity vs. Respirator Usage
      4) R.I.R. Reporting Requirements
      5) Contaminated Liquid

   e. Posting Requirements

2. Contamination Survey Technique and Activity Calculation

   a. Smear Survey
      1) Equipment
      2) Activity Calculations

   b. Personnel Monitoring Technique
      1) External
      2) Internal

   c. Thumb Rules for Contamination vs. Dose Rate
      1) Dry
      2) Wet

3. Contamination Control Techniques

   a. Use of Anti-contamination clothing
      1) Surveys of washed gear.
      2) Clothing requirements for differing contamination conditions.

   b. Work area preparation

   c. Work practices to minimize contamination spread

4. Use of Containment Devices

   a. Construction
   b. Verification of Construction - Testing
   c. Corrective Actions for leaks, tears, etc.
   d. Proper selections for job

5. Decontamination

   a. Equipment and Area Decon Technique

   b. Decon Solution/Chemical Precautions
      1) Compatibility with Rad Waste Process Systems
      2) Hazards to personnel

   c. Personnel Decon
      1) Structure of skin
      2) Basic Skin Decon Technique
      3) Clothing Contamination Requirements
      4) Documentation and Reporting
      5) Evaluation of Results

6) Release Requirements

6. Causes of Contamination and Assessment of Contamination Spread Potential

a. Routine Maintenance Activity
   1) Valve disassembly
   2) Welding, Grinding, Cutting Radioactive Materials

b. System Operations
   1) Historical problems

c. Rules of Thumb and Calculations

XII. AIRBORNE RADIOACTIVITY CONTROL

A. The purpose of this subject is to enable the trainee to perform the following:

1. Define Maximum Permissible Concentration in air (MPC), Maximum Permissible Body Burden (MPBB), Maximum Permissible Organ Burden (MPOB), and Critical Organ.

2. Explain how the MPBB, MPOB, and the Critical Organ relate to the appropriate MPC .

3. Estimate dose to internal organs from swallowing and breathing radioactivity.

4. Demonstrate the ability to find MPC values and to use them in practical situations.

5. Discuss Biological Half-Life and Effective Half-Life.

6. Identify the airborne radionuclides of concern in the DCM Facility.

7. Identify the Main Ventilation and Filtration Systems in the Facility.

8. Explain the concept of Airborne Radioactivity elimination as a function of ventilation rate.

9. Explain the operation of the Continuous Air Monitors (CAMs) and other air sampling and monitoring equipment.

10. Demonstrate the use of Portable Air Sampling equipment.

11. Identify techniques that can be used to reduce airborne activity.

12. Respond to CAM Alarms.

13. Determine Airborne Radioactivity levels based on appropriate measurements.

14. The proper use of all respiratory equipment used at the Proto-Power/Bisco DCM Facility.

15. The required conditions under which each type of respiratory equipment must be utilized.

16. Entrance into confined spaces and work under subatmospheric conditions.

17. Identify the uncertainties associated with Internal Dosimetry determinations.

18. Identify all Bioassay requirements.

B. Topic Outline

1. Sources of Airborne Radioactivity

   a. Definitions

   b. Major Radionuclides
      1) Fission Products
      2) Activation Products

   c. Airborne Radioactivity Producing Tasks and Plant Evolutions

2. Radiation Exposure From Airborne Radioactivity

   a. M.P.C. Deriviations and Use
      1) Pathways into the body
      2) M.P.C. Calculations
      3) Body Burden and Critical Organ Limits
      4) Airborne Radioactivity External Dose
      5) Calculations based on Thumb Rules
         5a. Internal Exposure
         5b. External Exposure

   b. Bioassay Requirements

3. Air Sampling and Detection

   a. Equipment
      1) Proper use

   b. Calculations
      1) Field Counting
      2) Laboratory Counting
      3) M.P.C. Calculations
      4) Equilibrium Calculations

   c. Action Limits
      1) Local Administrative
      2) Federal

4. Control of Radioactive Airborne Activity

   a. Ventilation Systems

   b. Portable H.E.P.A. filter units
      1) Normal use
      2) Detection of failed unit

   c. Respiratory Protection Devices
      1) Types of equipment used.
      2) Protection factors for each type.
      3) Limitations and requirements of use for each type of unit.

   d. Posting Requirements for Air Activity

   e. Response to Abnormal Conditions
      1) High Field Count
      2) AMS-3 Alarm

XIII. RADIATION DETECTION AND MEASUREMENT PRINCIPLES AND RADIOLOGICAL SURVEY AND MONITORING INSTRUMENTS

A. The purpose of this subject is to enable the trainee to demonstrate a knowledge of, or perform the following:

   1. The basic theory of operation and operating characteristics of Gas-Filled Detectors, Scintillation Detectors, Semiconductor Detectors, Thermoluminescent Dosimeters (TLDs) or Film Badges, and Accident Dosimeters.

   2. The basic theory of operation and operating

characteristics of Single and Multi-Channel Analyzers.

3. Instrument efficiency, the factors that affect instrument efficiency, and calculation of efficiency from given information.

4. The effects of background radiation

5. Differentiation between the operating characteristics of a radiation Field Survey Instrument and a Radioactive Contamination Survey Instrument.

6. Relate the statistical nature of Radioactive Decay to uncertainties encountered when measuring radioactivity.

7. Perform Minimum Detectable Activity Calculations when necessary.

8. Explain how to improve the statistical accuracy of a measurement.

9. Identify the operating characteristics of each Plant Survey Instrument and all Counting and Spectroscopy Equipment.

10. Demonstrate the proper use of all survey and monitoring instruments including physical checks prior to use, source and response checking, background determination, and calibration when required.

11. Demonstrate the proper use of all Counting and Spectroscopy Equipment.

12. Identify unusual conditions that might affect instrument response, such as high humidity or mixed radiation fields.

13. Explain the operating characteristics of Thermoluminescent Dosimeters (TLDs) and Pocket Ionization Chambers, including operating ranges, as well as fading and drift problems.

B. Topic Outlines

1. Principle of Operation

a. Gas-Filled Detectors
b. Scintillation Detectors
c. Neutron Detectors
d. Thermoluminescent Dosimeters
e. Pocket Dosimeters
f. Solid State Detectors

2. Health Physics Instrument Selection and Use

a. Types of Instrumentation
   1) Detection
   2) Dose Rate
   3) Counting
   4) Process Monitors

b. Practical Use of Instrumentation
   1) Instruments - Types described in (a.) above used in Plant.
   2) Type of Detection for each.
   3) Conversion of meter readings to appropriate units.
   4) Use of applicable Rules of Thumb and Nomograms.
   5) Operational checks.

c. Performance and Accuracy Interference
   1) Humidity
   2) Changing background
   3) Excessive Count Rate/Activity
   4) Backscatter
   5) Interfering forms of Radiation and/or Average Energy.

d. Equipment Set-Up Description

3. Counting Statistics

a. Basic Principles - Decay Statistics

b. Calculations
   1) Basic Counting Formula
   2) Lower Limit of Detectability
   3) M.D.A., M.D.C.R.

c. Factors affecting accuracy

d. Geometry factors

XIV. RADIOLOGICAL SURVEYS

A. The purpose of this subject is to enable the trainee to perform the following tasks:

1. All routine surveys at the Plant

2. All Radiological Work Permit Surveys

3. Personnel Surveys

4. Surveys that may be required during emergency conditions.

5. Other surveys, as necessary

6. Review of survey results, as necessary

B. Topic Outline

1. Reasons for Surveys

a. Area Surveillance
b. Entry into unknown environment
c. RWP Requirements
d. Trend Analysis
e. Job Planning/Worker Protection
f. Shipment and Receipt of Radioactive Materials
g. Unusual Event/Incident Conditions
h. Legal Considerations
i. Release of Material for Unrestricted Use

2. Performance of Surveys - Technique

a. Airborne Activity
   1) General Area
   2) Breathing Zone

b. Radiation Surveys
   1) Type of Radiation
      1a. Beta
      1b. Gamma
      1c. Neutron
   2) General Area
   3) Hot Spot

c. Contamination
   1) Personnel
   2) Equipment
   3) Area

3. Survey Documentation

a. Procedure Requirements

4. Interpretation of Results

a. Normal (expected levels)

b. Trend - Trend Analysis

c. Actions - When limits are approached/ exceeded

XV. ACCESS CONTROL AND WORK MONITORING

A. The purpose of this subject is to enable the trainee to perform the following:

1. Define all access control requirements.

2. Demonstrate proper construction procedures at all permanent access control points.

3. Demonstrate the proper construction of a temporary access control point and use of correct operating procedures.

4. Identify when a Radiological Work Permit (RWP) is required and demonstrate the proper issuance of an RWP.

5. Identify the criteria used to determine Health Physics coverage as a function of the work to be done.

B. Topic Outline

1. Set-Up and Maintenance of a Control Point

a. Work Load/Job Assessment Considerations
1) Type of work/equipment used
2) Number of entries/workforce
3) Waste generation/radioactive Equipment movement

2. Access Requirments

a. Site Access
b. RCA
c. RWP

3. Radiation Work Permit

   a. Requirements for use (criteria)

   b. Preparation and issue

   c. Purpose

   d. Augmenting documents (R.E.R., ALARA Review)

   e. Violations of RWP Requirements (R.I.R.)

4. Communication With Workers

XVI. RADIOACTIVE MATERIAL CONTROL

A. The purpose of this subject is to enable the trainee to perform the following:

1. Identify the liquid and gaseous control engineered systems and explain their operation.

2. Identify the NRC-Licensed Radioactive sources that must be controlled and demonstrate familiarity with the control procedures.

3. Identify Radioactive material storage areas and demonstrate knowledge of storage procedures.

4. Demonstrate knowledge of procedures that prevent the loss of radioactive materials.

5. List the regulations that govern the shipping and receiving of radioactive materials.

6. Explain the radiological problems associated with solid waste compactor operations.

7. Explain the Radiological Controls that govern Radiological Waste.

8. Demonstrate knowledge of procedures and practices that minimize solid and liquid radioactive waste, wherever possible.

9. Demonstrate knowledge of Waste Solidification Systems, processing procedures, and hazards associated with processing.

B. Topic Outline

1. Rad Waste Generation

   a. Solid
      1) Low Specific Activity (L.S.A.)
      2) High Activity - Classifications
      3) Source of Production

   b. Liquids
      1) High Purity
      2) Chem Waste
      3) Sources of Production

   c. Gases - Production and Control

2. Control and Tracking of Radioactive Material

   a. Methods/Procedure used at Proto-Power/Bisco
      1) L.S.A. Waste
      2) Items for reuse/decon (equipment/protective clothing)
      3) High Activity/Rad Level Waste
      4) Radioactive Calibration Sources
         4a. Licensed/Non-Licensed/ Special Nuclear Material
      5) Survey Requirements

   b. Regulations/Legal Requirements
      1) Source Handling
      2) Source Definition
      3) Release of Control Criteria
         3a. Solids Waste
         3b. Liquid Waste

   c. Transport of Radioactive Material
      1) Requirements/Procedures within the facility
      2) Requirements outside the facility
      3) Actions for Missing/Lost Radioactive Materials
      4) Transport Regulations

   d. Waste Disposal
      1) Segregation of waste
         1a. Solids/Liquids
         1b. Proper Containers
         1c. Shipping/Packing/Burial Considerations
      2) Minimization of Waste

2a. Work Habits
2b. Job Planning

3) Solid Waste Compactor Usage
3a. Procedure Requirements
3b. Potential Problems/Historical Problems

3. Rad Waste Processing Systems

a. Solid Waste
1) Solification System
2) Radiological Considerations

b. Liquid Waste
1) Process for Reuse System
2) Radiological Considerations
3) Solification System

XVII. RADIOLOGICAL ACCIDENT AND INCIDENT EVALUATION AND CONTROL

A. The purpose of this subject is to enable the trainee to be able to do the following:

1. Identify the radiological conditions that might Result from different accidents and incidents.

2. Recognize the potential for an accident or incident from observations of improper work practices or instrument responses and alarms.

3. Take immediate action to control the accident or incident.

4. Evaluate the accident or incident to determine the cause.

5. Take follow-up action to correct the same.

6. Demonstrate proper procedures for handling contaminated, injured personnel.

B. Topic Outline

1. General Incident Analysis Technique

a. Evaluation of Initial Symtoms
b. Immediate Actions
c. Supplemental Actions
d. Analysis/Problem Identification

2. Corrective Actions

   a. Type of Incident
      1) Spill
      2) Contamination Spread
      3) Contaminated Injured Man
      4) Fire with Radiological Considerations
      5) High Radiation
      6) High Airborne Activity

   b. Reasons for Actions Taken

   c. Radiological Problems Resulting
      1) Dose (internal/external)
      2) Dose Rates
      3) Activity Concentration
      4) Radionuclides of Concerns

   d. Possible Causes

   e. Consequences of Improper Actions

ATTACHMENT B

RADIOLOGICAL CONTROLS TECHNICIAN/RPO
PRACTICAL FACTORS WORKSHEET

Name:_____ SSN:_____

Employee No:_____

The following Job/Task Description shall be completed by Performing (P), Simulating (S), or Discussing (D) each Job/Task in accordance with the applicable procedure in accordance with Procedure PPB-007.

Job/Task Description	Approval Signature/Date
B-1 Use of Instruments	
1.1 Portable Survey Instrumentation Operation and Pre-Operational Checks	
a) E520/E530	_____/_____P
b) ESP-1/ESP-2	_____/_____P
c) R02/R02A	_____/_____P
d) RM-14	_____/_____P
e) PRM-6	_____/_____P
1.2 Air Sampler Operation	
a) RADECO (Hi-Vol)	_____/_____P
b) RAS-1 (Lo-Vol)	_____/_____P
c) Lapel	_____/_____P
d) Continuous Air Monitor AMS-3	_____/_____P
1.3 Laboratory Counter Operation	
a) MS-3	_____/_____P
b) SAC-4	_____/_____P
c) SRM-100	_____/_____P
1.4 Use of MCA Laboratory Equipment	
a) MCA Operational Equipment	_____/_____P
B-2 Surveys	
2.1 Perform and Document	
a) Routine Beta/Gamma Surveys	_____/_____P

b) Job Specific Beta/Gamma Surveys _____/_____P
c) Neutron Dose Rate Survey _____/_____P
d) Alpha Contamination Survey _____/_____P
e) Incoming Radioactive Material _____/_____P
f) Outgoing Radioactive Material _____/_____P
g) Shipping Vehicle Survey _____/_____P

2.2 Survey Tools/Equipment for Release _____/_____P

2.3 Air Sample Collection and Analysis

a) Perform field count analysis with RM-14/R02(A) _____/_____P
b) Gross Beta Particulate Activity _____/_____P
c) Gross Alpha Particulate Activity _____/_____P

2.4 Personnel Contamination Monitoring _____/_____P,S,D

B-3 Duties-Radiological Controls Technician - Junior

3.1 Control Point Operation

a) Signing personnel in and out of RWP's _____/_____P
b) Self Reading Dosimeters zero, issue and receipt _____/_____P
c) Log Keeping _____/_____P

3.2 Protective Clothing and Respirator Use

a) Don and remove double set of ANTI "C's _____/_____P
b) Don, Leak Check, and Remove Filter Respirator _____/_____P

3.3 Completing HP Related Areas of RWP's

a) Calculating MPC-hours _____/_____P,S
b) Calculating stay times in airborne areas _____/_____P,S
c) Calculating stay times in radiation areas _____/_____P,S

3.4 Posting Areas

a) Radiation Area _____/_____P,S
b) High Radiation Area _____/_____P,S
c) Contamination Area _____/_____P,S
d) Airborne Radioactivity Area _____/_____P,S
e) Radioactive Materials Area _____/_____P,S

3.5 Rad Con Job Coverage

a) Routine Area Coverage _____/_____P
b) Maintenance work in high radiation areas _____/_____P,S,D
c) Maintenance work causing contamination or airborne _____/_____P,S

3.6 High Radiation Area and Key Control _____/_____P,S,D

3.7 Verification of Containments _____/_____P

3.8 Reporting Violations of Rad Con Procedures/Practices

a) Radiological Investigative Report (RIR) _____/_____P,S,D
b) Radiological Awareness Report (RAR) _____/_____P,S,D
c) Surveillance Inspection Report (SIR) _____/_____P,S,D

B-4 Emergency Response - Two must be performed or simulated

4.1 Radioactive Liquid Spill _____/_____P,S,D

4.2 CAM Alarm _____/_____P,S,D

4.3 Contaminated Injured Man _____/_____P,S,D

4.4 High Radiation Casualty _____/_____P,S,D

4.5 Effluent Releases _____/_____P,S,D

4.6 Onsite Monitoring _____/_____P,S,D

I have reviewed and evaluated the above individual's performance and certify that he/she has demonstrated proficiency in the performance of practical factors. Section B-1 through B-4 are complete.

_____ _____
Date Radiation Protection Officer

ATTACHMENT B (continnnued)

RADIOLOGICAL CONTROLS TECHNICIAN/RPO
PRACTICAL FACTORS WORKSHEET

Name: _____ SSN: _____

Employee No: _____

The following Job/Task Description shall be performed by Performing (P), Simulating (S), or Discussing (D) each Job/ Task in accordance with the applicable procedure in accordance with Procedure PPB-007.

Job/Task Description	Approval Signature/Date
B-5 Duties - Radiological Controls Technician - Senior	
5.1 Write and Terminate RWP's	_____/_____P
5.2 Approve Posting of areas	_____/_____P
5.3 Review surveys, analyses, and calculations performed by Radiological Controls Technicians - Junior	_____/_____P
5.4 Instruct personnel on high radiation area and key control/issue high radiation area keys	_____/_____P,S

I have reviewed and evaluated the above individual's performance and certify that he/she has demonstrated proficiency in the performance of practical factors. Sections B-5 is complete.

_____ _____
Date Radiation Protection Officer

ATTACHMENT B (continued)

RADIOLOGICAL CONTROLS TECHNICIAN/RPO
PRACTICAL FACTORS WORKSHEET

Name: _____ SSN: _____

Employee No.: _____

The following Job/Task Description shall be completed by Performing (P), Simulating (S), or Discussing (D) each Job/Task in accordance with the applicable procedure in accordance with Procedure PPB-007.

Job/Task Description	Approval Signature/Date
B-6 Radiation Protection Officer	
6.1 Review and approve RWP's	_____/_____P R.S.O.
6.2 Review surveys, analyses, and calculations performed by radiological controls technicians	_____/_____P R.S.O.
6.3 Radiological Health	
a) Bioassay	_____/_____D R.S.O.
b) Instrumentation	_____/_____D R.S.O.
c) Dosimetry	_____/_____D R.S.O.
6.4 Radiological Engineering - ALARA	_____/_____D R.S.O.

I have reviewed and evaluated the above individual's performance and certify that he/she has demonstrated proficiency in the performance of practical factors. Sections B-6 is complete.

_____ _____
Date Radiation Safety Officer

ATTACHMENT C

RADIOLOGICAL CONTROLS TECHNICIAN - R.P.O.

QUALIFICATION STANDARD

PURPOSE:

This standard will outline the basic knowledge level required to complete the practical factors outlined in Attachment B. The explanations and questions that follow serve as the minimum asked of each qualifying technician, although more information may be required depending on the level of qualification of the trainee. This standard will also explain each area on the practical factor sheets in Attachment B.

COVER SHEET SIGNATURE VERIFICATION:

This section will be signed by the immediate supervisor of the technician/RPO upon satisfactory completion of the specific section of practical factors. It will serve as an overview of the qualification process and indicate which areas have or have not been completed.

PRACTICAL FACTORS SIGNATURE VERIFICATION:

The following is an item by item breakdown of the basic knowledge level required for each practical factors section. Upon satisfactory completion of demonstrated knowledge or ability, the person administering the check out shall sign their name and record the date next to the applicable area.

C-1 Use of Instruments:

1.1 Portable Survey Instrumentation

Operational and Pre-operational Checks

The following is the minimum knowledge level required for each of the instruments listed in Attachment B Sect. C-1.1.

1.1.1 Describe the principle of operation of the instrument.

1.1.2 State the type of detector.

1.1.3 State which region of the gas amplification curve the instrument operates in.

1.1.4 Identify what type of radiation the instrument detects.

1.1.5 Demonstrate ability to properly perform all pre-operational checks.

1.1.6 Demonstrate ability to properly source check the instrument.

1.2 Air Sample Operation

The following is the minimum knowledge level required for each of the air samplers listed in Attachment B Sect. C-1.2.

1.2.1 State the minimum and maximum run times.

1.2.2 State the minimum sample volume to be obtained.

1.2.3 Demonstrate ability to properly change out

the sample filter.

1.2.4 Discuss placement of air sampler.

1.2.5 Demonstrate ability to correctly operate the air sampler.

1.2.6 Discuss what constitutes a breathing zone air sample.

1.2.7 Discuss the principle of operation of the continuous air monitor AMS-3 (to include alarm setpoint and background subtraction).

1.3 Laboratory Counter Operation

The following is the minimum knowledge level required for each of the instruments listed in Attachment B Sect. C-1.3.

1.3.1 Describe the principle of operation of the instrument.

1.3.2 State the type of detector.

1.3.3 Identify what type of radiation it detects.

1.3.4 Demonstrate ability to properly perform all pre-operational checks.

1.3.5 Demonstrate ability to properly source check the instrument.

1.3.6 Perform background checks on the instrument.

1.3.7 Define "correction factor".

1.4 Use of MCA Laboratory Equipment

1.4.a MCA Operational Check

1.4.a.1 Demonstrate ability to perform an operational check.

1.4.a.2 Discuss when operational checks are performed.

1.4.a.3 Discuss the principle of operation.

C-2 Surveys

2.1 Perform and Document

2.1.a Routine Beta/Gamma Surveys

2.1.a.1 Satisfactorily perform a routine radiation/contamination survey.

2.1.a.2 Quote formula for determining activity.

2.1.a.3 State the mimimum count time for smears.

2.1.a.4 Describe direct and indirect survey methods.

2.1.b Job Specific Beta/Gamma Surveys

2.1.b.1 Satisfactorily perform a job specific radiation/contamination survey.

2.1.b.2 Define: Hot spot.

2.1.b.3 Describe the requirements for start of job and RWP surveys.

2.1.b.4 Discuss the necessity for concise survey records.

2.1.c Neutron Dose Rate Survey

2.1.c.1 Discuss when neutron dose rate surveys are performed.

2.1.c.2 Discuss when neutron dosimetry is required.

2.1.c.3 Satisfactorily perform a neutron dose rate survey.

2.1.d Alpha Contamination Survey

2.1.d.1 Discuss when alpha contamination surveys are performed.

2.1.d.2 State the minimum count time for smears.

2.1.d.3 Satisfactorily perform an alpha contamination survey.

2.1.e Incoming Radioactive Material Shipment Survey

2.1.e.1 State the federal and administrative dose rate limits for shipping.

2.1.e.2 State the federal and administrative contamination limits for shipping.

2.1.e.3 Demonstrate ability to properly perform an incoming radioactive material shipment survey.

2.1.f Outgoing Radioactive Material Shipment Survey

2.1.f.1 State the federal and administrative dose rate limits for shipping.

2.1.f.2 State the federal and administrative contamination limits for shipping.

2.1.f.3 Demonstrate ability to properly perform an outgoing radioactive material shipment survey.

2.1.g Shipping Vehicle Survey

2.1.g.1 State the federal and administrative dose rate limits inside the occupied area of the shipping vehicle.

2.1.g.2 State the federal and administrative contamination limits for the occupied areas of the shipping vehicle.

2.1.g.3 Demonstrate ability to properly perform a shipping vehicle survey.

2.2 Survey Tools/Equipment for Release

2.2.1 Define "Release for Unrestricted/ Unconditional Use".

2.2.2 State all of the release criteria.

2.2.3 Describe methods of determining whether an item is internally contaminated.

2.2.4 Describe direct and indirect survey methods.

2.2.5 Demonstrate ability to correctly perform release surveys on various equipment and complete applicable documentation.

2.3 Air Sample Collection and Analysis

2.3.a Perform field count analysis with RM14/R02(A)

2.3.a.1 Discuss minimum count time of an air sample.

2.3.a.2 Demonstrate ability to correctly interpret a nomograph.

2.3.a.3 Demonstrate ability to convert cubic feet (ft 3) to cc's.

2.3.a.4 Quote the basis on which field analysis are performed.

2.3.b Gross Beta Particulate Activity

2.3.b.1 Define: Minimum Detectable Count Rate (MDCR)

2.3.b.2 Define: Minimum Detectable Concentration (MDC)

2.3.b.3 Quote the formula for determining airborne activity concentrations.

2.3.b.4 State the minimum background and sample count times.

2.3.b.5 Quote the formula for determining MDCR.

2.3.b.6 Quote the formula for determining MDC.

2.3.b.7 Demonstrate ability to correctly perform a gross beta analysis.

2.3.c Gross Alpha Particulate Activity

Ref. 2.3.b.1-6

2.3.c.7 Demonstrate ability to correctly perform a gross alpha analysis.

2.3.c.8 State when a gross alpha analysis would receive a recount.

2.4 Personnel Contamination Monitoring

2.4.1 Discuss when a whole body frisk is required.

2.4.2 Discuss methods of decontaminating personnel who are externally contaminated.

2.4.3 Discuss methods of determining if a person is internally contaminated.

2.4.4 State under who's direction should severely injured/internally contaminated personnel be decontaminated.

2.4.5 Discuss what precautions must be taken when decontaminating personnel.

C-3 Duties - Radiological Controls Technician - Junior

3.1 Control Point Operation

3.1.a Signing Personnel in and out on RWP's

3.1.a.1 Demonstrate ability to determine stay times.

3.1.a.2 Check individuals qualifications and exposures via computor or printout.

3.1.a.3 Demonstrate ability to correctly

operate the on-line dose assessment terminals under normal and abnormal system operations.

3.1.b Self Reading Dosimeter - zero, issue, and receipt

3.1.b.1 Demonstrate ability to correctly zero/charge an SRD.

3.1.b.2 Identify at what times an SRD is required to be rezeroed.

3.1.c Log Keeping

3.1.c.1 Demonstrate proper log keeping techniques.

3.2 Protective Clothing and Respirator Use

3.2.a Don and remove double set of Anti-C's

3.2.a.1 Discuss the guidelines for use.

3.2.a.2 Demonstrate proper method for donning and removing a double set of Anti-C's.

3.2.b Don, leak check and remove filter respirator

3.2.b.1 Demonstrate ability to properly don, leak check and remove a filter respirator.

3.2.b.2 Differentiate between the various types of respirators, their protection factors and what they

protect against.

3.3 Completing HP Related Areas of RWP's

3.3.a Calculating MPC-hours

3.3.a.1 Demonstrate ability to calculate MPC-hrs.

3.3.a.2 State the administrative limit for unidentified beta/gamma emitters.

3.3.a.3 State the administrative limit for unidentified alpha emitters.

3.3.b Calculating Stay Times in Airborne Areas

3.3.b.1 Demonstrate ability to calculate stay times in an airborne area.

3.3.c Calculating Stay Times in Radiation Areas

3.3.c.1 Demonstrate ability to calculate stay times in a radiation area.

3.3.c.2 Discuss three methods for determining stay times.

3.4 Posting Areas

3.4.a Radiation Area

3.4.a.1 Define: Radiation Area per 10 CFR 20.

3.4.a.2 State the radiation level at which areas are posted as radiation areas.

3.4.a.3 Identify necessary posting materials.

3.4.a.4 Identify necessary posting instructions.

3.4.b High Radiation Area

3.4.b.1 Define: High Radiation Area per 10 CFR 20.

3.4.b.2 Identify necessary posting materials.

3.4.b.3 Identify necessary posting instructions.

3.4.c Contamination Area

3.4.c.1 State the contamination level at which an area is posted as a contaminated area.

3.4.c.2 State the contamination level at which an area is posted as a high contamination area.

3.4.c.3 Identify the necessary posting instructions.

3.4.c.4 Identify the necessary materials for establishing contamination/high contamination area.

3.4.d Airborne Radioactivity Area

3.4.d.1 Discuss at what level of airborne contamination is an area posted an airborne radioactivity area.

3.4.d.2 State the administrative limit for unidentified beta/gamma emitters.

3.4.d.3 State the administrative limit for unidentified alpha emitters.

3.4.d.4 Identify the necessary posting materials.

3.4.d.5 Identify the necessary posting instructions.

3.4.d.6 Demonstrate a working knowledge of 10 CFR 20, Appendix B.

3.4.e Radioactive Materials Area

3.4.e.1 Define radioactive materials area per 10 CFR 20.

3.4.e.2 Identify the necessary posting materials.

3.4.e.3 Identify the necessary posting instructions.

3.5 Rad Con Job Coverage

3.5.a Routine Area Coverage

3.5.a.1 Demonstrate ability to correctly interpret an RWP.

3.5.a.2 Discuss the need for updated surveys/status boards.

3.5.a.3 Discuss all necessary materials to perform proper coverage.

3.5.a.4 Demonstrate routine job area coverage as determined by RWP.

3.5.b Maintenance Work in a High Radiation Area

3.5.b.1 Discuss the ALARA principle.

3.5.b.2 Discuss how to determine and how to identify hot spots.

3.5.b.3 Discuss the use of extremity dosimetry.

3.5.b.4 Explain the benefits of proper job planning and use of mock-ups.

3.5.c Maintenance Work Causing Contamination or Airborne

3.5.c.1 Explain the operation of portable ventilation units (HEPA).

3.5.c.2 Discuss the use of an anemometer to check flow rate of a HEPA unit.

3.5.c.3 Discuss methods for minimizing the possibility of creating airborne radioactivity.

3.5.c.4 State the contamination levels requiring respiratory protection for various kinds of work.

3.5.c.5 Demonstrate proper contamination control during routine job coverage.

3.6 High Radiation Area and Key Control

3.6.1 Know the location of the various high radiation area associated with the high radiation area boundary and door check.

3.6.2 Define: High Radiation Area.

3.6.3 Demonstrate a thorough knowledge of "Control of High Radiation Areas" procedure.

3.6.4 Satisfactorily perform any portion of the high radiation area boundary and door checks.

3.7 Verification of Containments

3.7.1 Demonstrate ability to inspect various containments for adequate support.

3.7.2 Discuss placement of drain lines.

3.7.3 Identify what precautions must be taken when using poly bottles for collection of liquid.

3.8 Reporting Violations of Rad Con Procedures/Practices

3.8.a Radiological Investigative Report (RIR)

3.8.a.1 State the criteria for initiating an investigation/preparing an RIR.

3.8.a.2 State the purpose of an RIR.

3.8.a.3 State who initiates an RIR.

3.8.b Radiological Awareness Report (RAR)

3.8.b.1 Define: Radiological Deficiency.

3.8.b.2 Define: Radiological Concern.

3.8.b.3 State the purposes of an RAR.

3.8.b.4 State who initiates an RIR.

3.8.c Surveillance Inspection Report (SIR)

3.8.c.1 State the purpose of an SIR.

3.8.c.2 State the time limit in which corrective action must be initiated.

3.8.c.3 State the time limit in which corrective action must be completed.

C-4 Emergency Response

For all of the emergency situations listed under "Emergency Response" the technician shall:

4.1 Be able to state all of the immediate actions that must be taken to control or stop the casualty.

4.2 Demonstrate their ability to make a correct evaluation of the situation, set priorities, utilize available personnel, make proper notifications and complete all applicable documentation.

4.3 Demonstrate good radiological controls and discuss supplemental actions.

Demonstrated performance in an actual or simulated situation is required for two of the listed casualties.

C-5 Duties - Radiological Controls Technician - Senior

5.1 Write and Terminate RWP's

5.1.1 State the conditions that require an RWP.

5.1.2 Discuss the responsibilities of the initiator of an RWP.

5.1.3 Discuss the various RWP classifications.

5.1.4 Discuss what conditions must be met for any maintenance work to be performed on an extended RWP.

5.1.5 Demonstrate ability to correctly write, route and terminate an RWP.

5.1.6 Demonstrate ability to correctly enter an RWP into the on-line dose assessment system.

5.2 Approve Posting of Areas

5.2.1 Demonstrate ability to approve the correct initial set up of a work area.

5.3 Review surveys, analyses and calculations performed by Radiological Controls technician - Junior

5.3.1 Review, for completeness and accuracy, surveys, analyses and calculations performed by Junior Rad Con technicians under direction.

5.4 Instruct personnel on high radiation area and key control/issue high radiation area keys.

5.4.1 Reference: High radiation area and Key Control Section 3.6.

5.4.2 Discuss the locked high radiation area access control briefing review sheet.

5.4.3 Discuss the responsibilities of the access control monitor.

5.4.4 Discuss the responsibilities of the shift technician in regard to high radiation

area/key control.

5.4.5 Discuss what actions must be taken if an inventory of the high radiation area keys reveals a missing key.

C-6 Radiation Protection Officer

6.1 Review and Approve RWP's

6.1.1 Discuss on what basis should periodic field surveys be performed.

6.1.2 Discuss on what basis an RWP may be extended past its expiration date.

6.2 Review Surveys, Analyses and Calculations Performed by Radiological Controls Technicians

6.2.1 Review for completeness and accuracy surveys, analyses and calculations performed by technicians.

6.3 Radiological Health

6.3.a Bioassay

6.3.a.1 Discuss the purpose of the bioassay program.

6.3.a.2 Discuss on what basis personnel are chosen for bioassay analysis and who chooses them.

6.3.a.3 Discuss when a person is required to receive a whole body count.

6.3.a.4 Describe the various bioassay

analyses.

6.3.b Instrumentation

6.3.b.1 Discuss the principle of operation of the whole body counters in use.

6.3.b.2 Discuss the principle of operation of the various portable monitors in use.

6.3.b.3 Discuss the principle of operation of the MCA laboratory equipment.

6.3.c Dosimetry

6.3.c.1 Identify who issues dosimetry under emergency conditions.

6.3.c.2 Discuss the basis for use of extremity dosimetry.

6.3.c.3 Discuss the placement of extremity dosimetry.

6.4 Radiological Engineering

6.4.1 Perform an ALARA review.

6.4.2 Participate in a post job debrief/critique.

ATTACHMENT D

VERIFICATION OF RADIOLOGICAL CONTROLS TRAINING

Date:_____

1. Name:_____

2. Social Security Number_____/____/_____

3. Qualified/Not Qualified at: PPB DCM Facility (circle one)

4. Qualification level:_____

5. Qualification date:_____

   A. Written Exam Grade_____% Date_____

   B. Practical Factors Complete on:_____

   C. Oral Board Date:_____

   D. Oral Board Grades:_____,_____,_____

6. Requalification Due:_____

Comments:_____
_____
_____
_____
_____
_____

Signed_____
Radiation Records Controls Officer

RADIATION PROTECTION POLICY AND PROCEDURES MANUAL

FOR

DCM DECONTAMINATION FACILITY

DATE: DECEMBER 5, 1986

FILE NO: 029020

ML10

"OFFICIAL RECORD COPY"

ppb® proto-power boiss nuclear, Inc.	POLICY AND PROCEDURE MANUAL

TITLE

RADIOLOGICAL SURVEYS

PROCEDURE No.	REVISION No.	EFFECTIVE DATE
PPB - 101	0	11/30/86

LIST OF EFFFECTIVE PAGES

Page	Revision
1.0	0
2.0	0
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12.0	0
E1-1	0
E2-1	0
E3-1	0
E4-1	0
E5-1	0

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	SIGNATURE	TITLE	DATE
ORIGINATOR			
CONCURRED	J. Althouse	RADIATION SAFETY OFFICER	11-24-86
APPROVED		VICE-PRESIDENT	12/2/86

DEC 08 1986

1.0 PURPOSE

The purpose of this procedure is to establish the minimum survey requirements and provide requirements for the documentation of Radiological Surveys. Radiological Surveys are conducted on both a routine and non-rountine basis for verification and documentation of radiation and contamination levels for use in the control of personnel exposure.

2.0 APPLICABILITY/SCOPE

This procedure is applicable to Radiological Controls personnel.

3.0 DEFINITIONS

None

4.0 POLICY

None

5.0 PREREQUISITES

None

6.0 PRECAUTIONS

When documenting surveys on survey maps care should be taken not to provide so much information crowded on this form that it loses its usefulness.

7.0 PROCEDURE

7.1 Discussion

7.1.1 Radiological Surveys as used in this procedure are radiation, contamination, and air activity surveys performed by Radiological Controls technicians.

7.1.2 Specific radiological survey techniques are presented in the appliacable References 9.1, 9.2 and 9.3.

7.1.3 Radiological Survey requirements for release of areas and items for unrestricted use is presented in Reference 9.4.

7.1.4 Personnel contamination survey requirements are presented in Reference 9.5.

7.2 Precautions/Limitations

See Section 6.0.

7.3 Documentation

7.3.1 All survey documentation shall be accurately and legibly completed.

7.3.2 Survey data must contain enough detail to provide personnel with adequate information concerning radiological conditions existing within the area surveyed.

7.3.3 Any alteration or change to survey records, (either existing or being generated), shall

be made neatly by drawing a single line through the incorrect entry and recording the correction/alteration adjacent to the incorrect entry. Correction fluids or other correction media/techniques which obliterates the original entry are not acceptable. The original entry must remain legible. The person making the change shall initial and date the correction. Only the person making the error can change or alter the survey data. Administrative information errors not involving survey results may be changes by the Radiation Protection Officer (RPO).

7.3.4 Radiological Surveys shall be recorded on appropriate forms as follows:

7.3.4.1 The technician performing the survey shall print and sign his name with the time and date of survey on the Rad Con Survey (Form A, Attachment 10.1). The purpose of the survey must be documented and recorded. Each survey should be provided with a unique identification number which can be referenced on the RWP.

7.3.4.2 Radiation readings shall be recorded

directly on a Rad Con Survey (Form A) with attached survey map (if necessary Record radiation readings on the Radiological Survey Record (Form A) as follows:

1. Sequentially number and identify the locations where the radiation readings were taken. A Survey Record Continuation Sheet may be used if necessary.
2. Record the actual radiation reading on the Radiological Control Survey Record (Form B) under the appropriate dose rate column (i.e. β, γ, α). If a type of radiation was not taken, the code "N/T" should be used.
3. Indicate in the "Distance" column if the reading is contact general area (G/A) 3 feet, etc.
4. If a map is used, it should be clearly marked with the Survey Record number, and the date. Numbers matching the sequential numbers listed on the

Radiological Control Survey Record should be placed on the map at the approximate location the survey was taken. All numbers should be neatly boxed ([7]).

5. The Survey Meter Model, serial number; calibration due date and beta correction factor shall be clearly marked on the Radiological Control Survey Record in the spaces provided.

7.3.4.3 Contamination readings shall be recorded directly on a Rad Con Survey (Form A) with Survey Map (if necessary).

1. Record contamination readings on survey maps as follows:
   Form A (Attachment 10.1)
   Sequentially number and identify locations where the contamination measurements are taken. Record the contamination level after counting on the Radiological Controls Survey

Record (Form A) under the appropriate contamination column (β, γ, α). Results are in dpm/100cm2 unless otherwise noted. Record counting instrument model, serial number, calibration due date, background, beta correction factor if applicable and technicians name, signature and date. If a map is used, it will be clearly marked as noted in 7.3.4.2.4. When results in any column on Form A are consistent (i.e., all readings <1000 dpm/100 cm2, N/T or G/A, etc.) a vertical line may be drawn from the first to the last reading which is consistent. An arrow (↑↓) shall be placed at the top and bottom of this line.

2. Printouts from automatic counting devices may be used as survey records. (The printout must contain the survey number

and locations must be permanently attached and identified on the Rad Con Survey Form).

7.3.4.4 All airborne activity sample data shall be recorded in accordance with Reference 9.3 Space is also provided on both Radiological Controls Surveys to document the results of airborne activity measurements performed in conjunction with surface contamination and/or radiation surveys. (If air survey was not taken the technician will not "N/T" in the space provided).

7.3.4.5 Layouts or drawings for Rad Con Survey Record (Form A) may be preprinted or drawn as needed. All surveys should be documented on Form A unless approved by the Radiation Safety Officer.

7.3.5 The original copy of all survey records shall be maintained until disposition in accordance with applicable records retention program. Copies of the most recent surveys shall be

maintained by Radiation Records Controls Officer.

7.3.6 The Radiation Protection Officer signature and date must be recorded on all surveys to indicate his review for content, completeness and trend analysis.

7.4 Survey Frequencies

7.4.1 The frequency of routine surveys depends on the nature, quantity, and frequency of use of radioactive materials, as well as the specific protective facilities, equipment, and procedures that are designed to protect the worker from enternal and internal exposure.

7.4.2 Routine and repetive surveys are necessary to control the containment of radioactive materials within handling systems and to ensure the continued integrity of protective equipment and procedures.

7.4.3 Non-radiological area should be surveyed periodically to ensure that radiation and radioacitve material are adequately controlled.

7.4.4 The surveys required by Attachments 10.5, 10.6 and 10.7 are considered to be the

minimum survey requirements except as noted in Section 7.4.7. Additional surveys may be performed as necessary to properly assess radiological conditions.

7.4.5 A routine survey status system shall be maintained by Radiological Controls. The Radiation Safety Officer, or his designee, shall provide the Radiation Protection Officer with daily, weekly, and monthly schedules for the performance of routine surveys.

7.4.6 The Radiation Protection Officer shall ensure that the surveys are performed as scheduled. At the end of each shift, the schedule should be checked for completeness and status system updated upon completion of the required surveys.

7.4.7 Any scheduled surveys not performed by the designated shift should be performed by the next shift.

NOTE: If a survey required to be performed once a shift is missed, it does not need to be done twice by the on-coming shift.

7.4.8 Routine surveys should not be performed in

locked high radiation areas except as directed by the Radiation Protection Officer.

7.4.9 Consideration should be given to performing job specific surveys whenever operation or maintenance to be performed includes breaking the integrity of a radioactive system. This includes work on components which could present a radiological hazard to personnel or result in release of radioacitve material. When possible, routine surveys should be performed in conjunction with job specific surveys for ALARA considerations.

7.4.10 Airborne activity, surface contamination, including alpha contamination surveys and radiation surveys - including beta radiation surveys - are required whenever entering an area/cubicle in which the radiological status is not known.

8.0 RESPONSIBILITIES

Responsibilities are as stated in Section 7.0 of this procedure.

9.0 REFERENCES

9.1 PPB Procedure, PPB-103, Radiation Dose Rate Surveys.

9.2 PPB Procedure, PPB-102, Surface Contamination

Surveys.

9.3 PPB Procedure, PPB-201, Air Sampling.

9.4 PPB Procedure, PPB-105, Release Surveys.

9.5 PPB Procedure, PPB-104, Monitoring for Personal Contamination.

10.0 ATTACHMENTS

10.1 Radiological Controls Survey Record (Form A)

10.2 Radiological Controls Survey Record (Form B) Continuation Sheet

10.3 Routine Radiation Surveys (Table 1)

10.4 Routine Smear Surveys (Table 2)

10.5 Air Activity Surveys (Table 3)

Rev. 0

Radiological Control Survey Record
ATTACHMENT 10.1 - FORM A

NO. Page 1 of ___

DATE

TIME

LOCATION: _____

REASON FOR SPECIAL SURVEY: _____

_____

☐ ROUTINE
☐ SPECIAL

ALARA #

ITEM NO.	ITEMS		DOSE RATES			DISTANCE	SMEARABLE CONTAMINATION		SMEAR
		β mrad/hr	γ mr/hr	Neutron mrem/hr	Total mrem/hr		β & γ dpm	α dpm	AREA
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									

RADIATION SURVEY		β, γ CONTAMINATION SURVEY	α CONTAMINATION SURVEY
INST.		INST.	INST/PROBE
S.N.	S.N.	S/N	S/N's
CAL DUE DATE	CAL DUE DATE	CAL DUE DATE	CAL DUE DATES
B.C.F.	B.C.F.	EFF	EFF
		BKG	BKG
REMARKS:			AIR SAMPLE DATA:

Surveyor (print name)_____

Surveyor (signature)_____ Reviewed by_____ Date _____

Original-Survey File, Canary-Field Ops, Pink-Job Site, Goldenrod-Rad. Eng.

A0001747 8-84

ATTACHMENT 10.Z

Radiological Control Survey Record
Continuation Sheet

Page _____ of _____

RWO

ITEM NO	ITEMS		DOSE RATES			DISTANCE	SMEARABLE CONTAMINATION		SMEAR
		β mrad/hr	γ mr/hr	Neutron mrem/hr	Total mrem/hr		β & γ dpm	α dpm	AREA

Surveyor (print name)_____

Surveyor (signature)_____ Reviewed by_____ Date_____

Original-Survey File Canary-Field Ops Pink-Job Site Goldenrod-Rad Eng

A0001748 7-84

ATTACHMENT 10.3

Routine Radiation Surveys

(Table 1)

Location	Frequency		
	Daily	Weekly	Monthly
1. Occupied Decontamination facilities.	X		
2. Accessible areas adjacent to decontaminate facilities.			X
3. Occupied radioactive sample preparation and/or counting labs.	X		
4. Accessible areas adjacent to sample preparation and counting labs.			X
5. High radiation area boundaries.		X	
6. Radiation area boundaries (including temporary boundaries established in excess of 24 hours).		X	
7. Radioactve material storage areas.		X	
8. Selected area (on a rotating basis) outside radiologically controlled areas within the protected areas.			X
9. Selected buildings and work areas outside the protected area fence on a rotating basis.			X

*Normally occupied spaces and high personnel traffic area.

ATTACHMENT 10.4

Routine Smear Surveys

(Table 2)

Location	Frequency			
	Once a Shift	Daily	Weekly	Monthly
1. Occupied Contamination Areas.			X	
2. Exits from occupied Contamination Areas*.	X	X		
3. Occupied areas immediately surrounding Contamination Areas.			X	
4. Sample preparation and/or Counting Labs**.		X	X	
5. Accessible areas adjacent to sample preparation and/or Counting Labs.			X	
6. Occupied Decontamination Facilities.		X		
7. Radioactive Material Storage Areas.		X		
8. Selected spaces (on a rotating basis within the protected area) outside Radiological Areas.				X
9. Selected buildings and work areas outside the Protected Area Fence on a rotating basis.				X

*High traffic areas once a shift.

**Daily when in use, weekly when not in use.

FORM [illegible] 1218 01-2 (11 82)

A0001050 11-82

ATTACHMENT 10.5

Air Activity Surveys

(Table 3)

Requirements	Frequency	Sample Type	Comments
Occupied contamination areas when continuous air monitor is not operating.	Once a day.	Particulate	Gas and/or charcoal samples will be considered if the potential for noble gas or Radioactive Iodine exists.
Air samples shall be taken in the immediate vicinity of Radiological work that has the potential to cause airborne radioactivity.	Immediately after work starts at a frequency determined by the Group Rad Con Supervisor.	Particulate	Gas and/or charcoal samples will be considered if the potential for noble gas or Radioactive Iodine exists.
Air samples shall be taken upon initially entering spaces where a significant potential exists for airborne radioactivity.	Upon entry	Particulate	Gas and/or charcoal samples will be considered if the potential for noble gas or Radioactive Iodine exists.

PPB pro-pharmaceutical, inc.	POLICY AND PROCEDURE MANUAL

TITLE

SURFACE CONTAMINATION SURVEYS

PROCEDURE No.	REVISION No.	EFFECTIVE DATE
PPB - 102	0	11/30/86

LIST OF EFFFECTIVE PAGES

Page	Revision
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2.0	0
3.0	0
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8.0	0
9.0	0
10.0	0
11.0	0
12.0	0
E1-1	0

	SIGNATURE	TITLE	DATE
ORIGINATOR			
CONCURRED	J Althouse	RADIATION SAFETY OFFICER	11-24-86
APPROVED		VICE-PRESIDENT	12/2/86

1.0 PURPOSE

The purpose of this procedure is to establish guidelines and requirements for the performance of surface contamination surveys.

2.0 APPLICABILITY/SCOPE

This procedure is applicable to all Radiological Controls personnel.

3.0 DEFINITIONS

3.1 The surface contamination survey techniques used are:

3.1.1 Indirect Survey Method

This method measures removable contamination. The indirect survey techniques (smear and wipe) are as follows:

3.1.1.1 Smear Surveys - A smear is obtained by using an absorbent filter disk to wipe with moderate pressure, across the area/item to be surveyed. The smear is to cover an area of approximately 100 cm2. The smear is then counted by using either laboratory counting equipment or an RM-14, with an HP 210/260 probe, (or

equivalent) using reproducible geometry.

3.1.1.2 Wipe Surveys - A wipe is obtained by wiping an absorbent pad or towel over a larger area or the entire surface, if practical. The wipe is then counted using an RM-14, HP 210/260, or equivalent.

3.1.2 Direct Survey Method - This method measures both fixed and removable levels of surface contamination. The direct frisk is performed by scanning the survey location using an open window count rate instrument such as an RM-14, HP 210/260, or equivalent.

4.0 POLICY

None

5.0 PREREQUISITES

None

6.0 PRECAUTIONS

6.1 Survey techniques used to monitor personnel contamination are presented in Reference 9.3 (Monitoring for Personnel Contamination).

6.2 Surface contamination survey requirements for the release of area/items/or materials are contained in Reference 9.4 (Release Surveys).

6.3 Documentation and record keeping requirements for surface contamination surveys are contained in Reference 9.1 (Radiological Surveys).

6.4 The adminatrative limits for surface contamination are contained in Reference 9.2 (Establishing and Posting areas in the Radiologically Controlled Area (RCA)).

6.5 General Guidelines and Requirements

6.5.1 Personnel performing/counting surface contamination surveys shall take necessary precautions to minimize the possiblity of cross contamination.
(i.e., changing gloves after hadling highly contaminated surfaces, wrapping instruments in poly or other suitable material).

6.5.2 Prior to enting the area for the purpose of performing a surface contamination survey, personnel must be aware of anticipated contamination levels. A review of previous surveys and operations performed in the area since the last survey should be made to determine the expected radiation and surface contamination levels.

6.5.3 When high levels of surface contamination are expected, start the survey at the periphery

of the area and proceed toward the point suspected of having high levels of contamination. To minimize the spread of high levels, change shoe covers prior to leaving the highly contaminated area, if practical.

6.5.4 When low background, sufficient sensitivity, accessibility, surface geometry, etc., permit, a direct scan using an HP 210/260 probe with an appropriate compatible count rate meter for Beta/Gamma contamination surveys or an approporiate Alpha Count Rate Meter for alpha surveys should be performed in accordance with Section 7.1 of this procedure. Any portable count rate instument used for contamination surveys should have the capability of providing an audible response for the observed count rate.

6.5.5 If background levels, surface geometry, large area to be surveyed (floors, walls, etc.) do not permit a direct frisk, a smear survey in accordance with Section 7.2 or a wipe survey in accordance Section 7.3 should be performed. When background radiation levels permit, smear/wipes may be counted on the spot with

the RM-14 with HP 210, (or equivalent) or dose rate instrument for Beta-Gamma or the PAC-4S (or equivalent) for alpha surveys. Where background levels do not permit on-the-spot counting, the smears/wipes shall be taken to a low background area within a radiological control area for counting. Care must be taken to ensure that the smears/wipes are counted such that no spread of loose surface contamination takes place as a result of the counting process.

6.5.6 Contamination surveys in non-contaminated areas shall be performed as required by Reference 9.1. Any surface contamination found in non-contaminated areas shall have the area immediately secured and further surveys made in the vicinity to determine the extent of the activity. The survey data shall be reported to Radiation Protection Officer for evaluation.

6.5.7 Major changes in loose surface contamination in known contaminated areas should be reported to Radiation Protection Officer.

6.5.8 Smears/wipes in known highly contaminated

areas that do not serve a specific purpose should not be taken.

7.0 PROCEDURE

7.1 Perform a direct frisk as follows:

1. Observe general requirements addressed in Section 6.5
2. Taking precautions to ensure the instrument/probe does not come in contact with the surveyed surface, hold the probe within 1/2" of the surface.
   (Approximately 1/8" if using alpha meter).
3. Scan the entire surface of the survey point or item at a slow rate.
   (Approximately 3" per second).
4. If the direct scan indicates levels greater than the allowable limits of Reference 9.2, perform a smear or wipe survey as indicated in Section 7.2 or Section 7.3 as spplicable. Control the area as a contamination area if the smears/wipes indicate levels greater than the allowable limits of Reference 9.2.
5. Background levels must be $\leq$ 300 cpm for a direct frisk.
6. Determine activity levels in accordance with Section 7.4.

7. Document results in accordance with Reference 9.1.

7.2 Smear Survey Technique (indirect method).

7.2.1 Where background levels, surface geometry, etc., prohibit direct scans for surface contamination, perform a smear survey as follows:

1. Observe general requirements addressed in Section 6.5.
2. Obtain a survey form to map the locations of the smear samples.
3. Using moderate pressure, wipe an area approximately 100 cm2 with the smear.
4. Count the smear samples in accordance with Section 7.4 in a low background area. (Background levels must be $\leq$ 300 cpm). Document results in accordance with Reference 9.1.
5. If local background is not $\leq$ 300 cpm, scan the smears with a portable instrument to detect high levels of contamination (mR/hr and/or mRad/hr range).
6. Transfer samples to a lower background area for counting in accordance with

Section 7.4. High activity samples need not be transported.

7. Determine activity levels in accordance with Section 7.4

8. Document the results in accordance with Reference 9.1.

7.3 Wipe Survey Technique (Indirect Method).

7.3.1 Where background levels, surface geometry, etc., prohibit direct frisk of an area and/or it is desired to survey large areas, perform a wipe survey as follows:

1. Observe the general requirements listed in Section 6.5

2. Wipe the surface to be surveyed with cloth or paper wipe. Masslin or other oil impregnated materials are not to be used.

3. Count samples in accordance with Section 7.4 in a low background area. (Background levels must be $\leq$ 300 cpm). Document results in accordance with Reference 9.1.

4. If local background is not $\leq$ 300 cpm, scan the wipe with a portable instument to detect the high levels of

contamination (mR/hr and/or mRad/hr range). Transfer samples to a lower background area for counting in accordance with Section 7.4. High activity samples need not be transported.

5. Determine the activity levels in accordance with Section 7.4
6. Document the results in accordance with Reference 9.1.

7.4 Counting Smear/Wipe Samples.

7.4.1 Prior to handling smear/wipe samples, take the necessary precautions to prevent cross-contamination.

7.4.2 Scan the samples with an HP 210/260 probe or equivalent prior to continuing.

7.4.3 When counting smears/wipes using RM-14, HP 210/260, (or equivalent) count for at least 15 seconds. If there is an increase in counts then count for 30 seconds.

7.4.4 Determine the activity levels as follows:

$$dpm = \frac{(\text{gross cpm} - \text{background cpm})}{\text{instrument efficiency}}$$

NOTE: An efficiency of 10 percent shall be used when using the HP 210/260 in the hand held geometry.

7.4.4.1 Record the results in accordance with Reference 9.1.

7.4.5 If a more precise measurement is desired such as for release surveys, alpha, etc., smears may be counted using laboratory count equipment.

7.4.5.1 Determine the Minimum Detectable Count Rate (MDCR) and Minimum Detectable Activity (MDA) using Attachment 1.

For activity levels less then MDA, report as <MDA.

7.4.5.2 Determine activity levels as follows:

Count smears for at least 0.5 minutes.

$$dpm = \frac{(\text{gross CPM}) - (\text{Background CPM})}{\text{Counter efficiency}}$$

7.4.5.3 Record the results in accordance with Reference 9.1.

7.4.6 If further analysis is not desired, (i.e., isotopic analysis), dispose of samples appropriately.

7.5 Equipment

7.5.1 Survey Forms

7.5.2 Envelopes or Plastic Bags

7.5.3 Smear Paper, Cloths

7.5.4 Appropriate Portable Survey Instruments

7.5.5 Laboratory Counters

8.0 RESPONSIBILITIES

8.1 Surface contamination surveys are performed by the Radiological Controls Technicians to assess surface contamination to aid in controlling the spread of radioactive contamination to unrestricted or less contaminated surfaces.

9.0 REFERENCES

9.1 PPB Procedure, PPB-101, Radiological Surveys.

9.2 PPB Procedure, PPB-104, Monitoring for Personal Contamination.

9.3 PPB Procedure, PPB-105, Release Surveys.

10.0 ATTACHMENTS

10.1 Attachment 1, MDA/MDCR Calculation Sheet.

ATTACHMENT 1

MDA/MDCR CALCULATION SHEET

Calculate MDCR using the following formulae:

$$MDCR = 3.3\sqrt{\frac{BKG}{BCT} + \frac{BKG}{SCT}} \quad \text{or} \quad 4.66\sqrt{\frac{BKT^*}{BCT}}$$

*If count times are equal

Where: BKG = Background CPM
BCT = Background Count Time
SCT = Sample Count Time

NOTE: MDCR calculations shall be made at the 95 percent confidence level.

Calculate MDA using the following formula:

$$MDA = \frac{MDCR}{\text{counter efficiency decimal form}}$$

PPB pro-protection nuclear, inc.	POLICY AND PROCEDURE MANUAL

TITLE

RADIATION DOSE RATE SURVEYS

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1.0 PURPOSE

The purpose of this procedure is to provide guidelines and requirements for the performance of radiation surveys.

2.0 APPLICABILITY/SCOPE

This procedure applies to all Radiological Controls personnel.

3.0 DEFINITIONS

None

4.0 POLICY

None

5.0 PREREQUISITES

None

6.0 PRECAUTIONS

None

7.0 PROCEDURE

7.1 Radiation surveys, as used in this procedure, are gamma, beta, and neutron surveys performed to control/assess personnel radiation exposures.

7.2 The minimum required frequencies for routine and non-routine radiation surveys are contained in Reference 9.2.

7.3 Documentation requirements for radiation surveys are contained in Reference 9.2.

7.4 General guideleines and requirements.

7.4.1 Instrument selections for making radiation measurements depends upon the type of radiation anticipated, the anticipated levels and the characteristics/capabilities of the instrument.

7.4.2 Technicians performing radiation surveys shall take the necessary precautions to maintain their exposures as low as reasonably achhhievable. The following precautionary measures should be considered.

7.4.2.1 Perform a review of previous surveys and operations performed in the area since the last survey to determine the expected radiation level.

7.4.2.2 Ensure instrument operability prior to entering the area to be surveyed or the controlled area surrounding the area to be surveyed, if applicable.

7.4.2.3 Ensure the necessary support equipment is available (recording equipment, watch, bags for contamination control if applicable, etc.) prior to entering the area or surrounding controlled area.

7.4.2.4 If an instrument must be carried through or into a contaminated or potentially contaminated area and is likely to become contaminated, ensure the instrument is enclosed in protective material prior to entering the area.

7.4.2.5 Enter survey area with instrument set on a scale appropriate for expected radiation levels. (Avoid saturation of the detector).

7.4.2.6 Use instruments with extendable probes and take advantage of existing shielding whenever surveying areas expected to have high levels of radiation.

7.4.3 Radiation surveys shall be taken in such a manner that no portion of the surveyor's body is placed between the sensitive portion of the detector and the source of radiation. (This is to ensure the most accurate measurement possible of the area being surveyed is obtained). For example:

7.4.3.1 The surveyor should not wrap his/her hand completely around an instrument

probe. The probe should be held at the base.

7.4.3.2 General area surveys should be taken in such a manner to ensure a 360 degree indication of the area surveyed is obtained.

7.4.4 Major changes in radiation levels should be reported to the Radiation Protection Officer.

7.4.5 Surveys shall include both beta and gamma unless otherwise specified such as neutron radiation survey. If there is no beta radiation present state so on the survey.

7.5 Beta/Gamma Radiation Surveys

7.5.1 Observe general guidelines and requirements addressed in Section 7.4 of the procedure above.

7.5.2 Obtain survey maps for area to be surveyed.

7.5.3 Log all required survey and instrument information on survey map.

7.5.4 Use the instrument selected in accordance with the operating instructions provided in the applicable instruction manual.

7.5.5 For general area surveys, hold the instrument/probe at waist level and orientate your body such that a 360 degree unshielded

indication is observed.

7.5.6 For hot spots surveys, scan the component/system with the instrument/probes center of detection within 1 inch of the surface (avoid contact with a contaminated/potentally contaminated surface).

7.5.7 Surveys taken prior to the performance of specific work tasks should consist of general work area surveys, including hot spot surveys, surveys performed on contact with the item/component/system to be worked, and head level surveys to obtain a clear picture of the radiation level status for use in determining stay times and dosimetry placement requirements.

7.5.8 Record results in accordance with Reference 9.2.

7.5.9 When the survey is completed, return the survey form to the R.P.O. for review and approval.

8.0 RESPONSIBILITIES

The responsibilities are as stated in Section 7.0 of this procedure.

9.0 REFERENCES

9.1 PPB Procedure, PPB 001, PPB Nuclear Corporate Radiation Protection Plan.

9.2 PPB Procedure, PPB 101, Radiological Surveys.

10.0 ATTACHMENTS

None

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TITLE

MONITORING FOR PERSONAL CONTAMINATION

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1.0 PURPOSE

1.1 This procedure describes personnel contamination monitoring and describes actions to be taken upon detecting contamination during frisking.

2.0 APPLICABILITY/SCOPE

2.1 This procedure applies to all personnel working within the Radiologically Controlled Area (RCA).

3.0 DEFINITIONS

3.1 Contaminated Individual - The term assigned to an individual who is found to be externally contaminated as indicated by a pancake probe frisk of > 100 net cpm or a positive nasal smear.

3.2 Whole Body Frisk - The term assigned to the personnel survey technique used to qualitatively and quantitatively establish the presence of external personnel contamination. A whole body frisk is a complete frisk of the individual with a pancake type survey instrument.

4.0 POLICY

None

5.0 PREREQUISITES

None

6.0 PRECAUTIONS

None

7.0 PROCEDURE

7.1 Radiological Control Technicians will conspicuously place monitoring equipment at strategic locations adjacent to Radiologically Controlled Areas except as noted in Paragraph 7.1.1.

NOTE: This equipment can be, but is not limited to, friskers, portable survey meters, hand and foot monitors and portal monitors. The location of this equipment will vary depending upon radiological conditions and the potential for radioactive contaminations. All personnel will use these instruments as they are encountered.

7.1.1 It is the responsibility of all individuals to perform a complete Whole Body Frisk in accordance with this procedure when leaving a posted contamination area or whenever directed to do so by Radiological Controls personnel.

NOTE: Frisking is not required when exiting radiation areas where the possibility of contamination does not exist as determined by the Radiation Safety Officer (RSO) or the Radiation Protection Officer (RPO). Such areas

will be posted as not requiring frisking.

7.1.2 Whole Body Frisk using the pancake type (Gieger Mueler Tube) probe.

7.1.2.1 Upon leaving a contamination control point, proceed to the nearest frisking unit. Ensure the frisker is set on the lowest scale and the background is less than 300 cpm. If you are not sure about the setting or the background reading is questionable, notify Radiological Controls personnel for assistance. Do not touch the instrument until your hands are properly frisked.

7.1.2.2 Conduct whole body frisk in accordance with Attachment 2, "Frisking Instructions and Sequence".

NOTE: A proper whole body frisk should take 2-3 minutes. If for any reason a whole body frisk cannot be performed on an individual prior to exiting a Radiologically Controlled Area, that

individual shall be considered potentially contaminated until frisking is accomplished.

7.1.2.3 While performing the frisk, pay particular attention to facial areas (nostrils, mouth, ears) and contact points (elbows, hips, knees, feet) by pausing at these areas. If you cannot reach all portions of your body ask a fellow worker or Radiological Controls Technician for assistance (ensure the individual frisks his hands prior to touching the probe).

7.1.2.4 If the alarm sounds, remain at that point and notify Radiological Controls. If necessary, have another worker notify Radiological Controls.

7.1.3 It is the responsibility of Radiological Controls personnel to evaluate personnel frisking operations to ensure established frisking techniques are followed. This responsibility may include:

7.1.3.1 Perodically observing personnel frisking operations to ensure compliance with the frisking procedure.

7.1.3.2 Perform spot check frisks of individuals. Direct individuals to re-perform improper frisks.

7.1.3.3 Initiate RAR in accordance with Reference 9.2 if members of a specific work group continually perform improper frisks.

7.1.3.4 Periodically check the settings of friskers.

7.1.3.5 Assure whole body frisks are conducted in an area where background is less than 300 cpm.

7.1.3.6 Assure that frisking station is set up as close to the step-off pad or control point as possible.

7.2 Hand and Foot Monitor (supplemental frisks: reserved for future use).

7.3 Portal Monitor (supplemental frisks: reserved for future use).

7.4 Response of Radiological Controls personnel to monitor alarms.

7.4.1 Upon notification by a radiation worker that an alarm has sounded, frisk/re-frisk the individual, paying particular attention to the areas in which the instrument has indicated contamination present.

7.4.2 If the alarm is valid, measure the contamination as follows:

7.4.2.1 Using a frisker, measure the activity and note the approximate area(s) and location(s) of the contamination.

NOTE: Ensure that all frisk survey results are logged in net CPM (NCPM) unless otherwise specified and the time of each survey is included on the skin contamination report.

7.4.2.2 If the contamination levels exceed the range of the frisker, measure the dose rate using the open window on the RO-2.

7.4.3 When personnel clothing contamination > 100 cpm above background is detected, complete the applicable sections of the Clothing Contamination Report (Attachment 3). Document

the circumstances decon method, survey results, and disposition of the clothing determined to be contaminated.

7.4.4 When skin contamination > 100 cpm above background is detected, complete the appliacable sections of the Personnel Skin Contamination Report Form (Attachment 4) and initiate decontamination as follows:

7.4.4.1 Attachment 1 describes basic personnel decontamination methods which may be used if a simple water flush, such as a shower, is not successful in removing the contamination. Other methods may be approved on a case basis by the RSO. These methods are not to be considered as applicable for the decontamination of severely injured or internally-contaminated workers. These workers shall be decontaminated under the direction of qualified medical personnel.

7.4.4.2 The decontmaination of workers shall be accomplished in progressive steps beginning with a water flush, with

an evaluation performed after each step. No decontamination shall be taken to the point of skin abrasion. If skin reddening appears as a result of decontamination efforts, notify the RSO/RPO for evaluation.

7.4.4.3 Decontamination of the ears, eyes, and mouth should be limited to water rinses conducted by the individual, for example, while showering. Nasal irrigation should only be used if blowing the nose is not effective and shall only be done by qualified medical personnel.

7.4.4.4 Decontamination of minor wounds shall be limits to flushes with water only. Refer further decontamination to qualified medical personnel.

7.4.4.5 The psychological well-being of the contaminated worker should always be considered. The unusual nature of ionizing radiation may create apprehension, and occassionally unreasonable fear may accompany

contamination. Every effort to reassure the worker and to allay his fears should be made.

7.4.4.6 As a guideline, all attempts should be made to reduce levels to less than 100 cpm. If this level cannot be obtained, the Radiation Safety Officer or his designee shall be notified.

7.4.5 Question the individual to determine when the contamination may have been received and initiate controls to prevent further contamination until corrective actions have been determined and initiated.

7.5 After decontamination the worker shall report to the Radiation Protection Officer with the Skin Contamination Report. Review the results of decontamination report and WBC (if applicable) with the RPO and sign the Skin Contamination Report.

NOTE: Where inhalation, ingestion, or absorption through the skin is suspected, the worker will take the Skin Contamination Report and obtain a Whole Body Count (WBC) as soon as possible after decontamination. The WBC Technician shall complete and sign the

applicable sections of the Skin Contamination Report.

7.6 The RPO shall reveiw the incident to determine the cause of the contamination and provide recommendations to prevent recurrence. If a critique of the incident is required, it will be conducted in accordance with Reference 9.5.

NOTE: Notification of Radiation Safety Officer is not necessary if contamination levels are less than 5,000 dpm, levels are below the action levels for WBC results per Reference 9.4 and there is no personal injury associated with the contamination. For any other incidents, the RPO is to use his own discretion if notification of the above is necessary.

7.7 The RPO shall review the Skin Contamination Report, attach comments if necessary, sign and forward to the RSO for evaluation.

7.8 The RSO shall evaluate the Skin Contamination Report and calculate a skin dose using MIRD/11, ORNL/5000 or equivalent methods. Use 10 cm2 as the minimum area to calculate a skin dose from the contamination.

7.9 The RSO shall forward to the Radiation Records Control Officer (RRCO) for incorporation into the

individual's exposure record.

7.10 The RRCO shall incorporate the assessed dose into the individual's exposure record.

7.11 The RPO will initiate a Radiological Investigative Report (RIR) on skin contamination incidents when required by Reference 9.5.

8.0 RESPONSIBILITIES

8.1 Radiation Safety Officer shall:

8.1.1 Review all Personnel Skin Contamination Reports.

8.1.2 Review all instances where skin contamination levels cannot be reduced to less than 100 cpm.

8.1.3 Perform skin dose calculations for all skin contaminations.

8.2 Radiation Protection Officer shall:

8.2.1 Review all Personnel Contamination Reports.

8.2.2. Initiate Radiological Investigative Reports as indicated.

8.3 Radiological Controls Technicians shall:

8.3.1 Evaluate personnel frisking operations.

8.3.2 Provide required information for personnel contamination reports.

8.3.3 Peform personnel decontamination in accordance with Paragraph 7.4.3 and

Attachment 1.

8.4 All Plant Personnel shall frisk in accordance with Paragraph 7.1.2.

8.5 Radiation Records Control Officer shall incorporate the assessed skin dose into the individual's exposure record.

9.0 REFERENCES

9.1 PPB Procedure, PPB-005, Establishing and Posting Radiologically Controlled Areas.

9.2 PPB Procedure, PPB-xxx Radiological Awareness Reporting (RAR).

9.3 PPB Procedure, PPB-101, PPB Nuclear Corporate Radiation Protection Plan.

9.4 PPB Procedure, PPB-401, Bioassay Procedure.

9.5 PPB Procedure, PPB-xxx, Investigation of Radiological Incidents (RIR).

9.6 MIRD 11

9.7 ORNL 5000

10.0 ATTACHMENTS

10.1 Attachment 1 Table of Skin Decontamination Methods

10.2 Attachment 2 Frisking Instructions and Sequences

10.3 Attachment 3 Clothing Contamination Report (Example)

10.4 Attachment 4 Personnel Contamination Report Form

ATTACHMENT 1

TABLE OF SKIN DECONTAMINATION METHODS

METHOD	ADMINISTRATING PERSON	EFFECTIVE FOR	INSTRUCTIONS
Masking Tape	RC Technician	Visible Particulate	Apply tape to skin by light patting. Remove carefully.
Waterless Hand Cleaner	RC Technician	All Skin Contam-ination	Apply to affected area and allow it to melt onto skin. Remove with cotton or soft disposable towel.
Soap and Tepid Water	RC Technician	All Skin Contam-ination	Wash area with low alkaline, non-abrasive soap and tepid water. Repeat until further attempts do no reduce the level. A surgical hand brush may be used with moderate pressure.
Cornmeal Detergent Paste	RC Technician	All Skin Contam-ination	Mix cornmeal and powder detergent in equal parts with enough water to form a paste. Put onto affected area for five (5) minutes. Remove with cotton or disposable towel. Rinse skin.
Shampoo	RC Technician	Hair Cont-amination	Wash hair and rise. Repeat as necessary. Remove any hair that cannot be decontaminated. DO NOT SHAVE HAIR.

			Cut hair as close to the skin as possible with scissors.
Nose Blowing	Individual	Nasal Contamination	Blow nose into a rag, tissue, kim wipe, etc. Monitor tissue after attempt. Stop when no increase in activity is noted.
Titanium Dioxide Paste	Medical Personnel	Fission Product Contamination	Form a paste of Titanium Dioxide powder and water. Apply small amounts of water to paste to keep it moist while massaging it onto area. Continue massage for five (5) minutes. Remove paste with cotton. Rinse thoroughly with lukewarm water followed by a wash with soap and water.
EDTA Cream*	Medical Personnel	Fission Product Contamination	Mix a cream consisting of 1% EDTA, 3% powered detergent, 8% Carboxy-Methyl-Cellulose, and 8% distilled water. Scrub area with cream. Remove with cotton.
Potassium	Medical	Alpha	Mix an equal volume of a saturated solution of Potassium Permanganate (6.4 grams) ($KMnO_4$/100 ml water) with 1% Sulfuric Acid

solution (0.2N). Pour this solution over WET contaminated areas. Rub lightly for several minutes with surgical hand brush. Rinse with tepid water to remove the resulting brown stain. Pour a freshly prepared 5% Sodium Bisulfite solution (10g NaHSO3/200 ml water). Rinse with tepid water and scrub lightly for several minutes. This procedure may be repeated several times without harm. Limit washing to two (2) minutes each.

* NOTE: Do not use EDTA on Halogens such as I-131 contamination.

ATTACHMENT 2

FRISKING INSTRUCTIONS AND SEQUENCES

IMPORTANT

(A) Verify frisker is on X1 scale.

(B) Hold probe approximately 1/2" from surface being surveyed and move probe slowly (2-3 inches/second).

(C) If background count increases to greater than 100 counts above background, remain in area and notify Radiological Controls Technician.

(D) A minimum two-minute frisk is required.

PERFORM SURVEY AS FOLLOWS:

(1) Survey hands before picking up probe.

(2) Depress button on timer to start.

(3) Proceed to survey in following order:

(a) Head (pause at mouth and nose; if wearing hard hat, remove it, frisk inside and out, then frisk head).

(b) Neck and shoulders.

(c) Arms (pause at each elbow).

(d) Chest and abdomen, including TLD and pocket dosimeter.

(e) Back, hips and seat of pants.

(f) Legs (pause at each knee).

(g) Shoe tops.

(h) Shoe bottoms (pause at sole and heel). If exiting from RCA, step across line into uncontrolled area as the bottom of each foot is completed.

(4) Timer will sound buzzer at end of two minutes. Complete frisking carefully, return probe to holder, recheck each hand, then leave area.

Clothing Contamination Report

SURVEY NO.

RWP NO.

NAME	SS NO.	DATE
DEPT.	SUPERVISOR	TIME

LOCATION:

DESCRIBE CAUSE OF CONTAMINATION

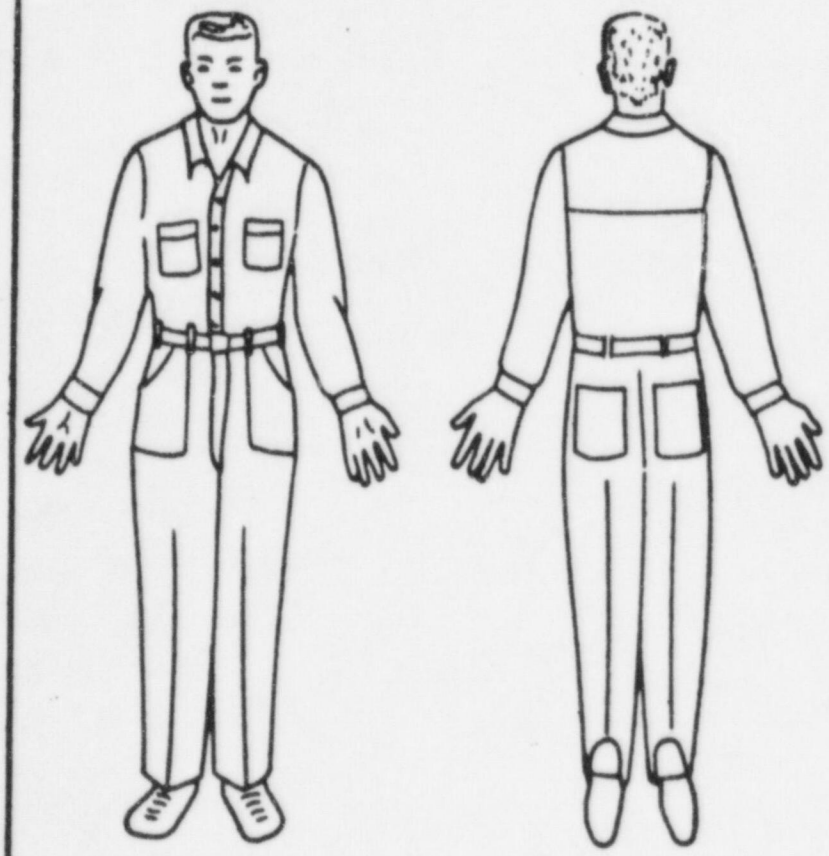
DESCRIBE HOW CONTAMINATION COULD HAVE BEEN PREVENTED

SURVEY DATA

BY _____ DATE _____ TIME _____ INST: _____

METHOD OF DECON: ☐ WASH ☐ DECAY ☐ OTHER _____

LOCATION OF CONTAMINATION TO BE DESIGNATED NUMERICALLY BELOW
USE ADDITIONAL SHEETS IF NECESSARY:



SURVEY RESULTS

ITEM	INITIAL	DECON 1	DECON 2
1			
2			
3			
4			
5			
6			
	TIME DPM	TIME DPM	TIME DPM

DISPOSITION

☐ RELEASED CLEAN ☐ DISPOSED OF

REVIEWED BY

Personnel Contamination Report

Name	Time of Contamination	RIR/IER/RAR No.
		Date
Dept.	Supervisor	SS No.
		RWP No.

Describe cause of contamination:

Plant Location:

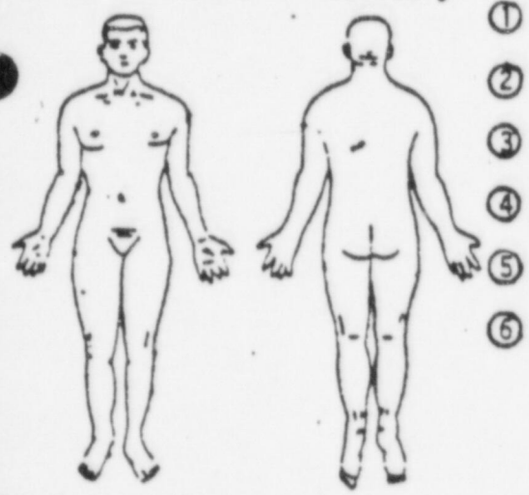
Describe how contamination could have been prevented:

SURVEY DATA

By _____ Date _____ Time _____ Inst _____ CDD _____
Name Print/Signature Bg _____ cpm

Method of Decon: ☐ Soap & Water ☐ Detergent ☐ Decay
☐ Potassium Permanganate _____ RC Supv. _____ Medical Rep*
☐ Other _____ RC Supv. _____ Medical Rep*

Location of contamination to be designated numerically below: Use additional sheets if necessary



Total time of contamination ____ min.

SURVEY RESULTS (IN NCPM UNLESS OTHERWISE SPECIFIED)

Predecon/Time	Decon 1/Time	Decon 2/Time	Decon 3/Time

Whole Body Count Results(Isotopes, Activity-nCi, File Nos.)

_____
WBC Operator Signature

I have been informed of the results of my decontamination and any questions concerning this matter have been explained to me.

_____
Individual

Reviewed by:

_____ / _____
/Date

PPB pro-petrochem nuclear, inc.	POLICY AND PROCEDURE MANUAL

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RELEASE SURVEYS

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1.0 PURPOSE

The purpose of this procedure is to provide guidelines and criteria for the performance of surveys to release areas as clean and items for unrestricted use.

2.0 APPLICABILITY/SCOPE

This procedure applies to work at the DCM Facility.

3.0 DEFINITION

None

4.0 POLICY

None

5.0 PREREQUISITES

5.1 Equipment:

5.1.1 Survey maps, smear survey record, Radiological Survey of Material and Equipment Exiting Radiological Controls Points (Form PPB-105-1).

5.1.2 Envelopes or poly bags.

5.1.3 Smear papers. masslinn cloths.

5.1.4 Appropriate portable survey instruments, RM-14 with HP 210/260 probe, E-520, PAC-4S, or equivalents of each of these.

5.1.5 Shielded smear counters for beta/gamma and alpha.

6.0 PRECAUTIONS

6.1 Surface Contamination Limits:

6.1.1 To release an area/item for unrestricted use, removable contamination levels shall be less than 1000 dpm/100 cm2 Beta/Gamma and less than 20 dpm/100 cm2 alpha. Total fixed plus removable contamination levels shall not exceed 300 dpm/100 cm2 alpha and 5000 dpm/100 cm2 Beta/Gamma when surveying by direct frisk which shall be the PREFERABLE means of monitoring for surface contamination. Other release survey techniques require the RPO's permission to ensure they are of equal or greater sensitivity.

6.1.2 If beta-gamma contamination levels are less than 100 cpm above background, alpha contamination levels may be considered to be less than the limit and alpha measurements need not be taken.

6.2 Contamination levels on items to be released for unrestricted use shall be maintained below the contamination limits specified in Section 6.1 and also ALARA. All potentially contaminated surfaces of areas/items shall be surveyed by appropriate instruments and techniques before being released to verify that the contamination limits are within Section 6.1. If an item is found to be contaminated

in excess of the limits and still must be removed from a Radiologically Controlled Area, it must either be decontaminated or treated as radioactive material.

6.3 The contamination level on the interior surfaces of pipes, drain lines, ductwork, etc., shall be determined by making measurements at all traps and other available access points provided that contamination at these locations is likely to be representative of contamination on such interiors. Surfaces of areas, equipment, etc. which are likely to be contaminated but are of such size, construction, or location as to make the surfaces inaccessible for measurement shall be presumed to be contaminated in excess of the limits specified in Section 6.1.

6.4 Covering over contamination by painting, plating, taping, etc. is not an acceptable method for reducing contamination to releasable limits for those items being released for unrestricted use.

6.5 Records shall be maintained of all release surveys.

6.6 An area/item could have the contamination "fixed" on or in the surface within the limits specified in Section 6.1 and yet be subjected to forces far beyond those of the standard smear survey technique

(such as welding, grinding, hammering, weathering, etc. during use or repair). Such actions could convert the previously "fixed" contamination to a smearable form. Decisions as to "fixed" or "loose" require an input as to past history and probable future use. If the person performing the survey determines that actions will be occurring to cause "fixed" contamination to become "loose", the item shall be treated as contaminated even though it is below the limits specified in Section 6.1.

6.7 The contamination survey techniques to be used are those described in Reference 9.3.

6.8 The number of items entering a restricted area and thereby eventually requiring a release survey shall be limited; i.e., consideration shall be given before items are transported into a restricted area as to the necessity of their use. Tools used in a contaminated area should be stored in the designated Contaminated Tool Room for reuse, as required, to minimize the number of items requiring decontamination.

6.9 Trash collected in noncontaminated areas within the restricted area shall be surveyed and released in accordance with Reference 9.2.

7.0 PROCEDURE

7.1 Measurement and Sampling:

7.1.1 The direct survey method or direct frisk technique is the preferred method for surveying for surface contamination. Beta/gamma and alpha contamination can all be detected using this method. Direct surveys for release of items for unrestricted use should be performed in areas where the background is less than 100 cpm. When the survey must be performed in a background exceeding 100 cpm, it may be necessary to use the indirect survey method (Section 7.1.2) to provide the additional sensitivity required. The direct frisk technique is described in Reference 9.2.

7.1.1.1 If the direct survey method is used for measurement and contamination is found, it should be followed by using the indirect survey method, Section 7.1.2.

7.1.2 Certain situations may require the use of indirect survey methods (smear survey technique and wipe survey technique) such as high background (greater than 100 cpm),

insufficient sensitivity, lack of accessibility, or large area to be surveyed (floors, walls, etc.). The indirect survey techniques (smear and wipe) are described in more detail in Reference 9.2.

7.1.2.1 A wipe is obtained by using an absorbant pad or towel to collect removable activity from a surface being surveyed. The wipe in conjunction with a portable survey instrument is principally used for rapid estimation of removable contamination levels.

7.1.2.2 A smear is obtained by using an absorbant filter disk to collect removable activity from a surface area of approximately 100 cm2. The smear may be counted with either an RM-14 HP-210/260 probe using reproducible geometry or lab counting equipment.

7.1.3 Low background levels using the RM-14 HP-210/260 or equivalent for release surveys are as follows:

7.1.3.1 Direct surveys for release of items

for unrestricted use should be performed in areas where the background is less than 100 cpm. The maximum background for the release of any item shall be 300 cpm.

7.1.3.2 < 300 cpm for releasing clean areas within a restricted area (Section 7.3) by direct frisk or for counting smears/wipes.

7.2 Release of items (tools, equipment, material, etc.) to unrestricted areas:

7.2.1 Items which must exit a restricted area to an unrestricted area shall be thoroughly surveyed by the Radiological Controls Technician using the methods described in Section 7.1 (The direct frisk technique is the preferred survey method to use.)

NOTE: All personal items such as clipboards, flashlights, notebooks, etc, taken into a restricted area which have not entered a contaminated area, may be frisked by the individual.

7.2.2 All externally exposed surfaces shall be surveyed.

7.2.3 If needed use cotton tips or some other means to ensure that cracks, crevices, corners, and

hard to reach areas are adequately surveyed.

7.2.4 All internal surfaces of pipes, drain lines, ductwork, etc. shall be surveyed at all traps and other available access points, provided that contamination at these locations is likely to be representative of contamination on all of the internals. Surfaces which are likely to be considered contaminated but are inaccessible for surveying shall be considered contaminated in excess of the limits specified in Section 6.1.

7.2.5 Items which can be disassembled, will be, and the internals surveyed.

NOTE: If item has "fixed" contamination within the limits specified in Section 6.1 but will be used in grinding, welding, blasting, or any action which could cause the "fixed" contamination to become "loose" contamination, the item shall not be released.

7.2.6 Wipe down items with absorbant towel/cloth to remove any residual contamination before release to maintain contamination levels ALARA even though it may be below the limits specified in Section 6.1.

NOTE: Special attention should be given to items being released with protective coatings, since they may conceal contamination.

7.2.7 All items found to be contaminated above the limits specified in Section 6.1 shall not be released for unrestricted use and shall be handled as radioactive material.

7.2.8 All surveys for items to be released for use in unrestricted areas shall be documented using Form PPB-105-1 in accordance with Section 7.4.

7.3 Release of Areas (floors, walls, ceilings) and associated equipment (piping, valves, pumps, and tanks) within those areas:

7.3.1 The contamination limits applicable to releasing an area within the Radiologically Controlled area as "clean" are less than 1000 dpm/100 cm2 beta/gamma smear technique, or less than 100 cpm above background direct frisk and when measuring for alpha activity less than 100 dpm/100 cm2 smearable. The contamination limits applicable to releasing an area not within the Radiologically Controlled Area as "clean" are those specified in Section 6.1.

7.3.2 For surveying large areas it is more advantageous to use the indirect survey method (smear and/or wipe) and count the

smears/wipes in a low background area with an RM-14, HP 210/260 probe, or equivalent, rather than a direct frisk method.

7.3.3 During decontamination operations of areas, checks should be performed to evaluate progress of decontamination efforts.

7.3.4 If the checks indicate that the areas may have been decontaminated, the Radiological Controls Technician shall perform a detailed survey of the areas/equipment. The detailed survey required to release an area including the associated equipment shall be performed as follows:

7.3.4.1 Use the indirect method wipe technique. The wipes taken shall be representative of the entire area and more concentrated in those areas previously known to be contaminated or most likely to be contaminated. Areas which are generally inaccessible may be excluded from the area to be released if this exclusion is consistent with the ALARA philosophy and good contamination controls practice.

Internal surfaces which have been previously exposed to radioactive liquids or in which contamination is expected to be present shall be treated as internally contaminated.

7.3.4.2 When surveying to release an area it is acceptable and advantageous to use large area wipes or masslinn mops and then check them with a frisker. If greater than 100 cpm above background, then the area is probably contaminated and additional surveying using the smear technique is needed to determine contamination levels. If the wipe survey technique shows no contamination greater than the limits, the area may be released as clean.

7.3.5 All surveys for areas to be released as clean areas within a restricted area shall be documented in accordance with Reference 9.2.

7.3.6 The Radiation Protection Officer (RPO) shall review the release surveys and give approval for the release of previously contaminated areas.

7.4 Completion of Form PPB-105-1:

7.4.1 Complete applicable portions of Form PPB-105-1 when releasing item for unrestricted use.

7.4.2 When releasing via a direct frisk the results should be in cpm.

7.4.3 The RPO shall review and sign the form.

8.0 RESPONSIBILITIES

8.1 As stated in Section 7.0 of this procedure.

9.0 REFERENCES

9.1 PPB Nuclear Radiation Protection Plan, PPB-001.

9.2 Procedure PPB-102, Surface Contamination Surveys.

9.3 Procedure PPB-101, Radiological Surveys.

10.0 ATTACHMENTS

10.1 Form PPB-105-1, Radiological Release Survey of Material and Equipment Exiting the Radiological Controlled Area (RCA).

RADIOLOGICAL RELEASE SURVEY OF MATERIAL AND EQUIPMENT EXITING THE RADIOLOGICAL CONTROLLED AREA (RCA)
(Form PPB-105-1)

	No.	Instrument Type	Serial No.	Calibration Due Date	Remarks
Control Point_____	1				
Reviewed by:	2				
_____ (R.P.O.)	3				
	4				
	5				
	6				
	7.				

Date and Time of Survey	Organization Responsible for Item/Material	Description of Item	Instr. Used (No.)	Survey Direct Frisk cpm	Results Rad Con Tech

PPB® proto-pennsylvania nuclear, inc.	POLICY AND PROCEDURE MANUAL

TITLE

AIR SAMPLING

PROCEDURE No.	REVISION No.	EFFECTIVE DATE
PPB - 201	0	11/30/86

LIST OF EFFFECTIVE PAGES

Page	Revision
1.0	0
2.0	0
3.0	0
4.0	0
5.0	0
6.0	0

	SIGNATURE	TITLE	DATE
ORIGINATOR			
CONCURRED		Radiological Engineer	11-29-86
		RADIATION SAFETY OFFICER	11-29-86
APPROVED		VICE-PRESIDENT	12/2/86

1.0 PURPOSE

This procedure provides quidance for the collection of air samples in the plant.

2.0 APPLICABILITY/SCOPE

This procedure applies to Radiological Controls personnel performing air sampling.

3.0 DEFINITIONS

3.1 Continuous Air Sampling/Monitoring: a method of sampling used to detect changes in airborne activity levels in routinely occupied areas. These units provide alarm capabilities for air activity levels which exceed predetermined setpoints.

3.2 Grab Sample: an air sample technique which consists of drawing a known volume of air in a short duration through a media and measuring the activity collected in the media. The sample is used to access airborne radiological conditions during entry into an area, during work evolution and to verify airborne conditions indicated by continuous air sampling/monitoring equipment.

3.3 Breathing Zone Air Sample: a sample of the breathing zone air concentration capable of verifying a minimum of 25% Maximum Permissible

Concentration (MPC). In cases where the air sample is used to verify adequate respiratory protection, a sample of sufficient volume to detect MPC including the Protection Factor (PF) provided by respiratory protection device(s) is needed.

4.0 POLICY

None

5.0 PREREQUISITES

None

6.0 PRECAUTIONS

None

7.0 PROCEDURE

7.1 Particulate and Iodine Air Sampling

7.1.1 Obtain air sampling equipment, filters and envelopes/tags.

7.1.2 Set up the sampling system with the appropriate filter and/or cartridge.

7.1.2.1 Particulate Sample: place filter in the air sampler with the grid/fuzzy side as the collection surface.

7.1.2.2 Iodine Sample as applicable: place the iodine cartridge in the air sampler with the premarked arrow pointing in the direction of the air flow: place the particulate filter

upstream of the iodine cartridge with the grid/fuzzy side as the collection surface.

7.1.3 Complete the following sections, as applicable, of the Air Sample Collection Envelope/Tag:

a. Date on/off

b. Time Sample on/off

c. Flow Rate

d. Total Time

e. Total Volume

f. Technician Initials

g. Type of Sample (including RWP # as appropriate)

h. Sampler Number

i. Sampler Calibration Due date

j. Location

k. Respirator Type/Code

l. Field Count Results (as applicable)

7.1.4 Operate the air sampler in accordance with the approporiate operating procedures.

7.1.5 Start the air sampler once the filter/cartridge is properly installed. Adjust the flow if necessary.

7.1.6 Draw an air sample in a manner that would

result in a representative sample as defined in 3.3.

NOTE: The sample should be of sufficient volume to detect 25% of MPC. Lapel samplers may not provide the necessary volume required to obtain 25% of MPC due to sampler limitations.

7.1.6.1 Use the formula for MDC in Reference 9.1 and solve for the required volume for 25% of MPC.

7.1.7 Turn the air sampler off once a sample has been drawn.

7.1.8 Ensure the remainder of the applicable information (i.e., Time/Date off) is on the envelope or tag.

7.1.9 Field count as necessary per Reference 9.1.

7.1.10 Place the iodine cartridge and/or particulate filter into the appropriate envelope or container.

7.1.11 Transport the sample to a counting station.

7.1.12 Analyze the sample in accordance with Reference 9.1.

8.0 RESPONSIBILITIES

8.1 Radiological Controls Technician

8.1.1 Insure all equipment used for air sample collection is operating properly and has current calibration.

8.1.2 Place air sampler in a location that is representative of the air concentration in that area or breathing zone, as applicable.

8.1.3 Ensure the sample being collected is a valid air sample and not surface contamination.

8.1.4 Perform a field analysis per Reference 9.1 as necessary.

8.1.5 Submit sample(s) to the count facility for analysis as soon as possible after collection.

8.1.6 Use proper Rad Con practices to ensure that no cross-contamination occurs.

9.0 REFERENCES

9.1 PPB Procedure, PPB 202, "Air Sample Analysis".

9.2 Applicable equipment operating procedures.

10.0 ATTACHMENTS

None

PPB pro-psychiatric nuclear, inc.	POLICY AND PROCEDURE MANUAL

TITLE

AIR SAMPLE ANALYSIS

PROCEDURE No.	REVISION No.	EFFECTIVE DATE
PPB - 202	0	11/30/86

LIST OF EFFFECTIVE PAGES

Page	Revision
1.0	0
2.0	0
3.0	0
4.0	0
5.0	0
6.0	0
7.0	0
8.0	0
9.0	0
10.0	0
E1-1	0
E2-1	0
E3-1	0
E4-1	0
E5-1	0
E6-1	0
E7-1	0
E7-2	0
E7-3	0

	SIGNATURE	TITLE	DATE
ORIGINATOR			
CONCURRED		RADIOLOGICAL ENGINEER	11-24-86
		RADIATION SAFETY OFFICER	11-24-86
APPROVED		VICE-PRESIDENT	12/3/86

1.0 PURPOSE

1.1 This Procedure provides guidance for handling, counting, radionuclide determination, laboratory analysis, technical and managerial review of data and actions to be taken on air sample results.

2.0 APPLICABILITY/SCOPE

This Procedure applies to Radiological Controls Personnel performing air sampling analysis and supervisors responsible for the sample analysis operation.

3.0 DEFINITIONS

3.1 Minimum Detectable Count Rate (MDCR): the smallest count rate that has a 95 percent probability of being detected.

3.2 Minimum Detectable Concentration (MDC): the minimum detectable count rate corrected by the factors used to convert an actual sample from cpm to uCi/cc or equivalent units.

3.3 Gross Beta MPC Value: Based on Cobalt 60 and is 9.0E-9 uCi/cc.

3.4 Gross Alpha MPC Value: Based on insoluble Pu 238 and is 3.0E-11 uCi/cc.

4.0 POLICY

None

5.0 PREREQUISITES

None

6.0 PRECAUTIONS

None

7.0 PROCEDURE

7.1 Calculate daily, values of Minimum Detectable Count Rate (MDCR) and Minimum Detectable Concentration (MDC) of the counters used to evaluate air samples. Refer to Form-01, "MDC/MDCR Calculation Sheet" for the appropriate calculational method.

7.1.1 Complete the "Counting Equipment Daily Status Log", Form-02.

NOTE: If the sample net count rate is less than MDCR and the volume is at least 1.0E6cc enter "< MDC" in the MDC column of Form-02. If the sample net count rate is less than MDCR and the sample volume is less than 1.0E6cc, recalculate MDC using the actual sample volume.

7.2 Obtain and label the air sample per Reference 9.1.

7.3 Requirements for Particulate Air Sample Analysis.

7.3.1 Particulate samples may be removed to a low background area and counted with a field

survey instrument for immediate gross activity indications.

7.3.1.1 Analysis using an RM-14/HP-210 or equivalent instrument.

a. Counting shall be performed with the sample within 1/2" of the frisker window.

b. The sample count time shall be at least 30 seconds.

c. The air activity (field analysis) shall be performed on the basis of 220 cpm being approximately equal to 1000 pCi (1.0 E-3 uCi). Form-03, Air Concentration Nomogram, gives additional assistance in determining air activity during field analysis.

7.3.1.2 Analysis using a portable ion chamber (RO-2, RO-2A).

a. Measurement shall be performed with the sample within 1/2" of the open detector window.

b. Form-04, Air Concentration vs. Dose Rate Nomogram may be used

to determine air activity.

NOTE: RO-2/RO-2A Ion Chambers should only be used for field analysis of air samples if the sample activity is beyond the range of the RM-14.

7.4 Move all air samples to the Count Room for further analysis.

7.5 Perform all required analysis on air samples in accordance with Sections 7.7 and 7.8.

7.6 Complete the Air Activity Log, Form-05.

7.7 Requirements for Gross Beta Analysis.

7.7.1 All particulate air samples received in the Count Room shall have a gross beta analysis except as noted below:

7.7.1.1 Samples received which have been determined by field analysis to have activities greater than 25% MPC may be submitted directly for Gamma Spectral Analysis.

7.7.1.2 Radiological Controls supervision may require an air sample to receive Gamma Spectral Analysis without prior gross beta analysis.

7.7.2 Radiological Controls supervision shall be notified as soon as possible of any Gross Beta Analysis greater than 25% of MPC.

7.8 Requirements for Gross Alpha Analysis.

7.8.1 All air samples for which alpha activity is suspected shall be analyzed for gross alpha activity.

7.8.2 All air samples exceeding 25% MPC beta/gamma activity shall be analyzed for gross alpha activity.

7.8.3 Air samples found to have a gross alpha activity greater than 25% MPC, (taking into account the respirator protection factor, Pf, for lapel air samples only), shall be counted for the presence of long lived alpha activity by either of the methods below.

7.8.3.1 Recount the sample and determine the half life. If the half life is greater than two (2) hours, proceed as in 7.8.3.2. If the half life is less than two (2) hours, no further analysis is required.

7.8.3.2 Recount the sample after a 24 hour or longer decay time to determine long lived air activity.

7.9 Requirements for Gamma Spectral Analysis.

7.9.1 Gamma Spectral Analysis shall be performed on all noble gas samples, and on all particulate samples which have been determined by Field or Count Room Analysis to be greater than 25% MPC taking into account the respirator protection factor, if known.

7.9.2 Gamma Spectral or Gross Gamma Analysis (e.g., NaI) shall be performed on all radioiodine air samples.

7.9.3 Analysis shall be performed in accordance with Reference 9.2.

7.9.4 Radiological Controls supervision will be notified as soon as possible if Gamma Spectral Analysis determines airborne radionuclide concentrations greater than 25% MPC.

7.10 Calculate MPC-hours when the net MPC fraction (from the Air Activity Log) is greater than or equal to 0.25.

7.10.1 For lapel samples, multiply the net MPC fraction by the total time (from Form-05). If the MPC-Hrs are greater than 0.1 enter the value on Form-05.

7.10.2 For other types of air samples, calculate

MPC-Hrs. on the Daily MPC-Hr. Assignment Sheet, Form-06. This calculation should be performed for each individual on the RWP(s) during the air sample collection period.

NOTE: MPC's will not be assigned from AMS-3 or any non-breathing zone air sample results (i.e., Hi-Vol, Lo-Vol) unless specifically required by Radiological Controls Supervision.

8.0 RESPONSIBILITIES

8.1 The Radiation Protection Officer (RPO) responsible for operation of the Count Room shall:

8.1.1 Ensure the Radiological Controls Technician (RCT) analyzing air samples is qualified to perform all assigned tasks, (i.e. RCT qualifications are current).

8.1.2 Review and sign completed "Air Activity Logs". Form-05.

8.1.2.1 The review signature on the log verifies the following:

a. log is completed per Attachment 01.

b. air samples requiring Gamma Spectral Analysis, has the analysis performed.

c. air samples requiring decayed Gross Alpha Analysis has the analysis performed and all the supplementary entries have been made.

8.1.3 Review and sign completed "Counting Equipment Daily Status Log", Form-02.

8.1.4 Review and sign completed MPC-hr Calculation Sheets, Form-06.

8.2 The RCT documenting air sample counting will:

8.2.1 Complete "Counting Equipment Daily Status Log". Form-02.

8.2.2 Complete "Air Activity Log", Form - 05.

8.2.3 Complete "Daily MPC-hr Assignment Sheet", Attachment 01, as required.

9.0 REFERENCES

9.1 PPB Procedure, PPB-201, Air Sampling.

9.2 PPB Procedure, PPB-xxx, Geli Operating Procedure

10.0 ATTACHMENTS

10.1 MDC/MDCR Calculation Sheet, Form-01.

10.2 Counting Equipment Daily Status Log, Form-02.

10.3 Air Concentration Nomogram, Form-03.

10.4 Air Concentration vs. Dose Rate Nomogram, Form-04.

10.5 Air Activity Log, Form-05.

10.6 Daily MPC-Hr Assignment Sheet, Form-06.

10.7 Instruction for Air Activity Log, Attachment 01.

FORM 01

MDC/MDCR CALCULATION SHEET

Calculate MDCR using the following formulae:

$$MDCR = 3.3\sqrt{\frac{BKG}{BCT} + \frac{BKG}{SCT}} \quad \text{or} \quad 4.66\sqrt{\frac{BKG^*}{BCT}}$$

*If count times are equal

Where: BKG = Background CPM
BCT = Background Count Time
SCT = Sample Count Time

NOTE: MDCR calculations shall be made at the 95 percent confidence level.

Calculate MDC using the following formula:

$$MDC = \frac{MDCR}{\text{sample volume ml} \times \text{counter efficiency (decimal form)} \times 2.22E6 \text{ DPM uci}}$$

NOTE: MDC shall be calculated using an air volume appropriate to the collection method.

ppb pico-precision nuclear, inc.	PROCEDURE No.
TITLE	REVISION No

FORM 02

COUNTING EQUIPMENT DAILY STATUS LOG

DATE_____

GELI DETECTOR OPERATIONAL CHECKS

GEOMETRY	DETECTOR 1			DETECTOR 2			RCT
	Sat	Unsat	Not Done	Sat	Unsat	Not Done	

SCALERS

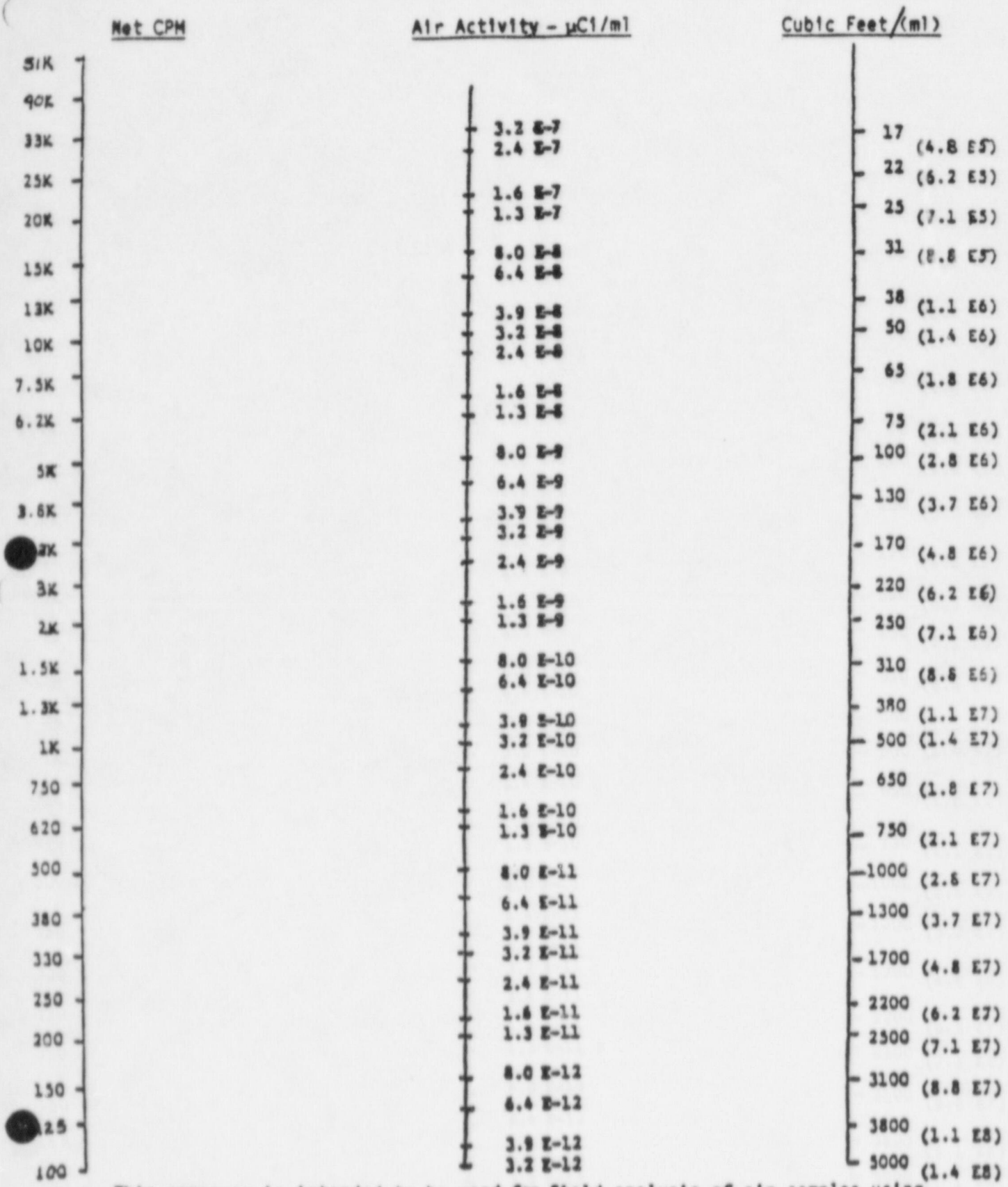
Model	Serial No.	Probe Type Ser #	Cal. Due Date	Eff.	Op. Check				
					Sat.	Unsat O.O.S.	RCT	MDCR	MDC*

* This value is based on a volume = _____

Reviewed By:_____

FORM - 03

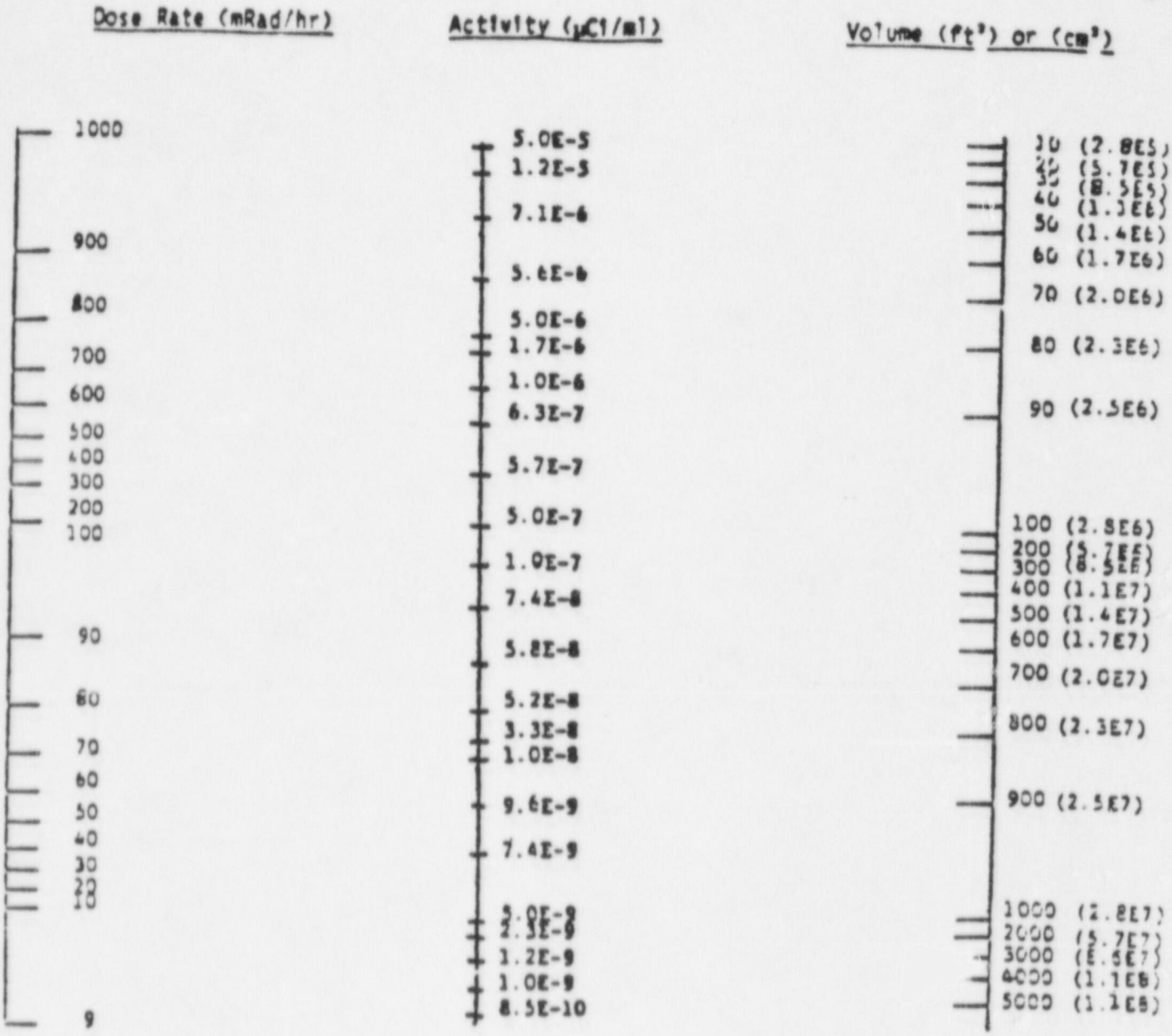
AIR ACTIVITY NOMOGRAM



This nomogram is intended to be used for field analysis of air samples using an RM-14/HP210 or equivalent instrument. A detection efficiency of 10% has been assumed.

FORM - 04

AIR ACTIVITY VS. DOSE RATE NOMOGRAM



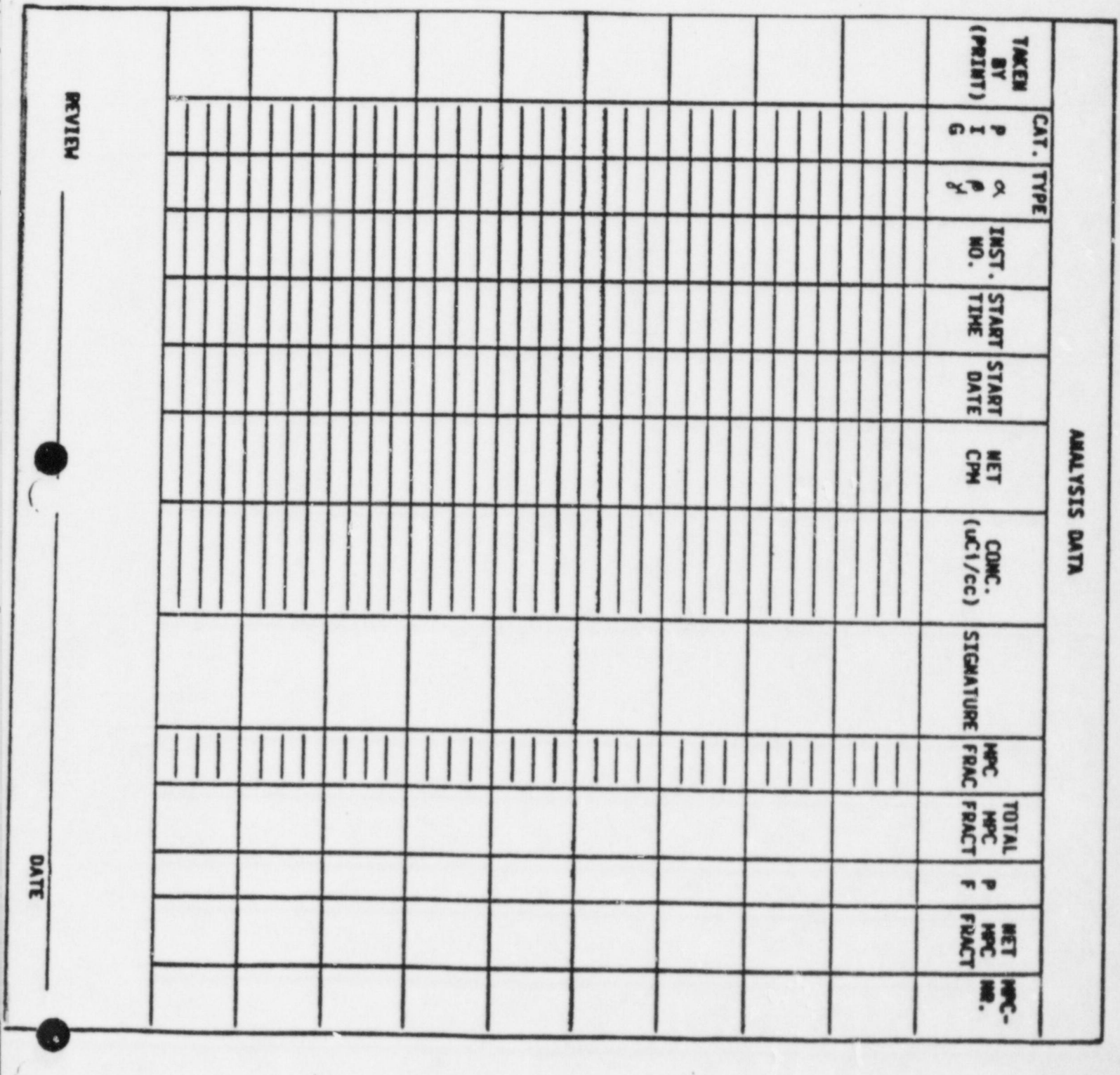
FORM - 05

AIR ACTIVITY LOG

SAMPLE ID	LOCATION	TYPE	SAMPLER SER #	CAL DUE	RWP #	DATE ON	TIME OFF	TOTAL TIME	FLOW RATE (uCi/cc) VOL. (cc)

FORM - 05

AIR ACTIVITY LOG (Continued)



FORM - 06

Page ____ of ____
Date ____

DAILY MPC-HR ASSIGNMENT SHEET

INDIVIDUAL'S NAME	SSN	AIR SAMPLE #	RWP No.	MPC FRACT.	/	PF	=	NET MPC FRACT.	x	STAY TIME	=	MPC HOURS	ASSIGNED BY
					/		=		x		=		
					/		=		x		=		
					/		=		x		=		
					/		=		x		=		
					/		=		x		=		
					/		=		x		=		
					/		=		x		=		
					/		=		x		=		
					/		=		x		=		
					/		=		x		=		
					/		=		x		=		
					/		=		x		=		
					/		=		x		=		
					/		=		x		=		
					/		=		x		=		
					/		=		x		=		

COMMENTS

REVIEWED BY _____ RPO DATE

E6-1

Attachment 01

INSTRUCTIONS FOR AIR ACTIVITY LOG

1. Enter Sample Identification Number

2. Enter location of air sample and a job description. If it is a lapel air sample, enter the name and SSN of the worker.

3. Enter B for Breathing Zone Air Sample or A for an Area Air Sample.

4. Enter air sampler I.D. number and calibration due date.

5. Enter RWP number (if applicable).

6. Enter start and stop date/time of air sample.

7. Enter total time of air sample in minutes.

8. Enter flow rate in cc/min and total volume sampled in cc.

9. Enter initials of the individual taking the sample. Leave blank if it is a lapel air sample.

10. Enter type of air sample:

    P = Particulate
    I = Iodine

11. Enter type of analysis performed.

    = gross alpha
    = gross beta
    = gamma isotopic

12. Enter identification of instrument used for the analysis (name and/or number).

13. Enter start count time.

14. Enter start count date.

15. Enter net count rate calculated as follows:

    Net Count Rate = Gross Rate - Background Count Rate
    (all units in cpm)

Attachment 01 (Cont'd)

INSTRUCTIONS FOR AIR ACTIVITY LOG

16. Enter air concentration for Gamma Spectral Analysis; enter air concentration from (total decay corrected activity.

    For Gross Beta or Alpha Analysis calculate the air concentration as follows:

$$\frac{(NCR)\ (SA)}{(2.22E6\ dpm/uCi)\ (E)\ (V)}$$

    NCR : Net Count Rate (cpm)
    E : Efficiency
    SA : Self Absorption Factor (for alpha only)
    V : Sample Volume (cc)

NOTE: Alpha self-absorption factors (SA) are provided by the RPO.

17. Enter the signature of the individual performing the analysis. If one individual performs many consecutive analyses, one signature is sufficient with a vertical arrow through the other signature blocks.

    NOTE: Steps 18-21 need not be completed if sample is an AMS or routine area sample.

18. Enter the MPC fraction for each analysis per the following:

    Air Concentration/MPC Value

19. Enter the sum of the MPC fractions. If the sum of the MPC fractions is greater than 25% of MPC, notify the GRCS. Use Gamma Isotopic and Decayed Alpha results, if available. Do not include alpha MPC fraction when the alpha half life is less than 2 hours. Values less than MDC shall be reported as zero.

20. Enter protection factor.

21. Enter the net MPC fraction by dividing MPC fraction by the protection factor. Iodine must be handled separately to calculate proper MPC fractions due to the different

protection factor (PF). Consult the RPO for PF values to be incorporated into net MPC fraction calculations.

22. If the air sample was a lapel, enter the MPC-hrs. and the initials of the person assigning the MPC-hours, otherwise, leave it blank.

PPB proto-power/bisco nuclear, inc.	POLICY AND PROCEDURE MANUAL

TITLE PROTO-POWER/BISCO NUCLEAR, INC.
RESPIRATORY PROTECTION PROGRAM AND POLICY

PROCEDURE No.	REVISION No.	EFFECTIVE DATE
PPB - 301	0	11/30/86

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APPROVED	[signature]	President	12/5/86

1.0 PURPOSE

The purpose of this procedure is to provide guidance in the application of the PPB Respiratory Protection Policy and Program.

2.0 APPLICABILITY/SCOPE

This procedure is applicable to all personnel who select, use, maintain, inspect, or administrate the program for respiratory protection equipment.

3.0 DEFINITIONS

The duties of Respiratory Protection Supervisor shall be performed by the Radiation Safety Officer.

4.0 POLICY

The Respiratory Protection Policy is as stated in Attachment A.

5.0 PREREQUISITES

None

6.0 PRECAUTIONS

None

7.0 PROCEDURE

7.1 Program Administration

7.1.1 Policy Statement - The program shall be administered in accordance with the PPB Policy on Respiratory Protection.

7.1.2 Procedures - Procedures shall be written to

cover all phases of the Respiratory Protection Program.

7.2 Engineering/Process Controls

The following Engineering and Process Controls shall be considered prior to the prescription of respiratory protection equipment:

7.2.1 Containment control by the normal facility ventilation system and/or portable ventilation units.

7.2.2 Area and/or component decontamination.

7.2.3 Area and/or component containment.

7.2.4 Reduction of leaks to the extent practicable.

7.2.5 Component and/or system depressurization, purging or flushing.

7.2.6 Delay work to allow for decay of short lived isotopes.

7.2.7 Other controls as deemed appropriate by the Radiation Safety Officer.

7.3 Air Sampling

An air sample(s) representative of the air being breathed by the worker shall be used in estimating exposure and as a guideline in selecting respiratory protective equipment.

7.4 Training

7.4.1 Employee Training

Employees required to use respiratory protective devices must be trained prior to initial use.

7.4.2 Individuals responsible for maintenance, inspection and repair of respiratory protective equipment shall be trained and qualified in accordance with a program approved by the Respiratory Protection Supervisor.

7.5 Wearer Requirements

7.5.1 Medical Examination

Personnel must pass a medical examination prior to wearing any respiratory protection device. A physician shall determine the physical and psychological factors which could limit or prohibit use by the individual of respiratory protective equipment. The medical status of each respirator user shall be reviewed annually. Additionally, the technician performing the fit test shall observe the wearer during testing. If the wearer exhibits excessive anxiety, the testing technician shall notify the Respiratory Protection Supervisor, who shall investigate the circumstances to further evaluate the

individual's psychological qualification status.

7.5.2 Fit Testing

Annual quantitative fit tests shall be performed in accordance with applicable procedures for each type of facepiece the individual will be required to use. Record of fit testing shall be maintained to determine which type of facepieces an individual is qualified to wear.

7.5.3 Bioassay

A whole body count is required prior to respirator usage and on an annual basis thereafter.

7.5.4 Special Considerations

7.5.4.1 Corrective Lenses

Glasses with standard temple bars shall not be worn with full facepiece respirators. If corrective lenses must be worn with a full facepiece respirator, a special mounting which does not interfere with the sealing surfaced shall be used. Contact lenses shall not be worn with any type of respirator.

7.5.4.2 Dentures

Full dentures should be left in place, since removing them could cause distortion of the jaw and interfere with the facepiece seal. Small partial dentures may be removed if the potential for becoming dislodged exists.

7.5.4.3 Facial Hair

Since certain variations of facial hair can cause facepiece leakage, all personnel who wear facepiece for fit testing, or who are assigned work which may require a respirator, must be clean shaven. Clean shaven is defined as:

No facial hair between the sealing periphery of the facepiece and the face; and no facial hair which may interfere with valve function. The sealing surface of the facepiece is that area which is designed to contact and provide a gas tight seal with the face.

7.6 Selection and Use

Whenever Engineering or Process Controls are impractical, or while they are being implemented, respiratory protective equipment may be used to limit personnel exposure to airborne radioactive materials. All equipment which is selected to afford a protection factor against airborne radiological contaminants shall be NIOSH certified. Protection factors are specified in Reference 9.1 App A.

7.7 Wearer Acceptance

To determine employee acceptance, Radiological Control, personnel will observe wearers during use and solicit wearer comments on a continuing basis. The following factors are to be considered:

Comfort

Ability to breathe without objectionable effort

Adequate visibility under all conditions

Ability to Communicate

Ability to perform tasks without undue interferences

7.8 Maintenance/Inspection/Repair

Maintenance, inspection and repair of respiratory protective equipment shall be conducted only by trained and qualified personnel.

7.9 Air Supplies - Breathing air may be supplied to

respirators from the plant breathing air systems, cylinders or air compressors. All sources of compressed breathing air must meet the requirements for Type I, Grade D air as specified in ANSI Z88.2, "Commodity Specifications for Air" and must be approved for use by the Respiratory Protection Supervisor.

7.10 Inventory

Respiratory protective devices and the related spare parts inventory control shall be accomplished by the PPB Nuclear, Inc. inventory control system. Minimum/maximum and on-hand quantities of respiratory equipment shall be maintained to insure the operational requirements of the Respiratory Protection Program are met.

7.11 Quality Assurance

7.11.1 The Respiratory Protection Supervisor will evaluate the effectiveness of the overall Respiratory Protection Program. Audits shall be performed on all phases of the program and deficiencies reported to the appropriate departments.

7.11.2 An annual review of the entire Respiratory Protection Program shall be conducted by the Respiratory Protection Supervisor, reporting

the program deficiencies and improvements to the PPB Director of Operations.

8.0 RESPONSIBILITIES

Responsibilities for program implementation and administration are addressed in the PPB Policy on Respiratory Protection (Attachment A).

9.0 REFERENCES

9.1 10 CFR Part 20, Standards for Protection Against Radiation.

9.2 Regulatory Guide 8.15, Acceptable Programs for Respiratory Protection.

9.3 NUREG 0041, Manual of Respiratory Protection Against Airborne Radioactive Materials.

9.4 29 CFR Part 1910.134, General Industry Standard-Respiratory Protection.

9.5 30 CFR Part 11, Respiratory Protective Devices - Tests for Permissibility.

9.6 ANSI Z88.2-1980. Practices for Respiratory Protection.

9.7 PPB Policy for Respiratory Protection.

9.8 Maintenance and Inspection of Respiratory Protective Equipment.

9.9 Quantitative Respirator Fit Test.

10.0 ATTACHMENTS

10.1 Proto-Power/ Bisco Nuclear, Inc. Policy on

Respiratory Protection in Radioactively Contaminated Areas.

PROTO-POWER/BISCO NUCLEAR. INC. POLICY

ON

RESPIRATORY PROTECTION IN RADIOACTIVELY

CONTAMINATED AREAS

POLICY INTENT

It is the policy of Proto-Power/Bisco Nuclear, Inc. (PPB) to provide a safe working environment at its work sites. The establishment of a comprehensive Respiratory Protection Program is vital to attaining the goal of providing a safe working environment. The PPB Respiratory Protection Program will comply with all applicable regulations, including 10 CFR 20, Regulatory Guide 8.15, NUREG 0041, 29 CFR Parts 1910 and 1926. In an effort to minimize the inhalation of air contaminated with dusts, fumes, mists, gases, vapors and radionuclides, the primary objective of the program will be to prevent or mitigate the condition at the sources.

Every reasonable effort will be made to achieve this objective by the use of engineering controls, including process modification, containment and ventilation techniques whenever feasible.

RESPONSIBILITIES AND PROCEDURES

The Respiratory Protection Supervisor is responsible for developing the overall program, providing technical direction and evaluating the effectiveness of the program. He will oversee and interface with PPB Radiological Protection personnel to control exposure to airborne radiological materials, and provide technical assistance relative to

respiratory protection devices. The Respiratory Protection Supervisor will approve all procedures and directives relative to the Respiratory Protection Program, and has the latitude to stop work in cases where program compliance is in question. He will routinely conduct overviews of the overall program for compliance with this policy and applicable regulations. This overview shall include a trend analysis to help ensure that the Program in effect at each work location is improving and to promptly identify adverse trends. He has the authority and full management support to perform this function.

The Respiratory Protection Supervisor shall develop and ensure implementation of procedures designed to minimize the inhalation of airborne radioactive materials to within, and as low as reasonably achievable below, regulatory limits. The PPB Radiological Protection Personnel will evaluate environments containing radiological contaminants and prescribe respiratory protection devices as are appropriate where engineering controls are inadequate or have not been implemented.

It is the responsibility of all supervisors directing tasks requiring the use of respiratory protection devices to ensure that all work is performed in compliance with the requirements of the Respiratory Protection Program.

It is the responsibility of all employees to comply with the requirements of the Respiratory Protection Program and use the provided respiratory devices in accordance with the instructions and training received, to guard against damage to

respiratory equipment, and to report any malfunction of respiratory equipment to a responsible person.

USE CONDITIONS

In general, the use of respirators is less desirable in providing respiratory protection than the use of engineering controls (i.e. process, containment, and ventilation techniques). The use of respirators as a substitute for engineering controls entails both increased potential of accidental exposures and a potential for such exposures to go undetected. It might also subject the wearer to additional stress, and increase his risk of injury by interfering with his vision, freedom of motion, and ability to communicate.

Routine tasks should be pre-planned such that potential sources of airborne contaminants will be managed by engineering controls. Respirators may be used, however, while engineering controls are being instituted or evaluated.

WORK PERIODS

It is impractical to set specific time limits for respirator use under all conditions. Relief from wearing respirators at reasonable intervals and limitations on the total time of continuous use is recognized by management. Guidance for stay times relative to ambient temperature, humidity, and protective clothing specified will be provided by radiation protection personnel. When wearing respirators, personnel are required, as soon as practical, to leave areas in case of equipment malfunction, undue physical or psychological stress, procedural or communication failure, significant

deterioration of operational conditions, or any other condition that might require such relief.

Concurrence: _____
Michael A. Pilo, Vice President

Approved: _____
Donald K. Slingsby, President

PPB pete-peterbilt nuclear, inc.	POLICY AND PROCEDURE MANUAL

TITLE

OPERATION AND MAINTENANCE OF DOP
MAN TEST PENETROMETER MODEL TDA-50

PROCEDURE No.	REVISION No.	EFFECTIVE DATE
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APPROVED		VICE-PRESIDENT	12/3/86

1.0 PURPOSE

The purpose of this procedure is to ensure consistent operation and proper maintenance of the TDA-50 test equipment. The TDA-50 DOP Man Test Penetrometer is used to provide quantitative fit tests for respirator wearers (as per NUREG 0041). The system consists of a polydispersed DOP (Corn Oil) Aerosol Generator, a Fit Test Booth and a Forward Light Scattering Photometer. The system is designed to produce a challenge atmosphere in which an individual may be quantitatively tested for respirator protection efficiency.

2.0 APPLICABILITY/SCOPE

This procedure applies to all Radiological Controls personnel qualified by the Radiation Safety Officer to perform respirator fit tests.

3.0 DEFINITIONS

None

4.0 POLICY

None

5.0 PREREQUISITES

5.1 Test System (TDA-50) and Test Booth must be fully assembled.

5.1.1 Aerosol inlet/outlet hoses must be properly

connected.

5.1.2 Upstream and downstream sample lines must be properly connected.

5.2 Breathing air supplied to test booth if required for test.

5.3 110 VAC single phase, 60 Hz power available.

6.0 PRECAUTIONS

None

7.0 PROCEDURE

7.1 Start-Up

7.1.1 Energize line voltage conditioner at circuit breaker panel in closet.

7.1.2 Turn on power to electronics and allow to warm up (approximately 15 minutes).

7.1.3 Check oil level in generator (level should be midway on sight glass).

7.1.4 Turn compressor on. Using generator pressure adjustment valve and gauge, adjust the generator pressure to the desired level (usually 7 psig).

7.1.5 Turn dilution air blower switch on front panel to "ON" position.

7.1.6 Use the variable transformer control to adjust the blower speed until magnehelic gauge indicates flow desired (usually 4"H20).

7.1.7 Allow the challenge atmosphere in the booth to reach an equilibrium condition (approximately 20 minutes).

7.1.8 Adjust generstor pressure and dilution air flow as needed to balance booth concentration.

7.1.9 Test System should now be ready to perform desired testing function. Proceed to appropriate test procedure.

7.2 Shut-Down

At completion of trsting, or if no testing is to be done, the system should be shut down.

7.2.1 Turn all activated switches to off position.

7.2.2 Secure breathing air supply at source (if used).

7.2.3 Secure system power at breaker.

7.3 Maintenance

Little routine maintenance is required other than maintaining proper liquid level in generator.

7.4 Trouble Shooting

Refer to the appropriate section of TDA-50 operating manual.

8.0 RESPONSIBILITIES

The procedure responsiblities are as stated in the text.

9.0 REFERENCES

9.1 Operating Manual, Model TDA-50 DOP Man Test Penetrometer.

9.2 NUREG 0041

10.0 ATTACHMENTS

None

ppb proto-power blaco nuclear, inc.	POLICY AND PROCEDURE MANUAL

TITLE

QUANTITATIVE FIT TESITNG RESPIRATOR WEARERS

PROCEDURE No.	REVISION No.	EFFECTIVE DATE
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1.0 PURPOSE

The purpose of this procedure is to provide instructions for performing required fit tests of respirator wearers and to ensure valid and consistent results.

2.0 APPLICABILITY/SCOPE

This procedure applies to all Radiological Controls personnel qualified by the Radiation Safety Officer to perform respirator fit tests.

3.0 DEFINITIONS

None

4.0 POLICY

None

5.0 PREREQUISITES

5.1 Prior to fit test, each test subject shall have:

5.1.1 Current medical approval form (within the last 12 months) on file, stating that the individual is physically able to wear a respirator.

5.1.2 Satisfactorily completed GENERAL RESPIRATORY PROTECTION TRAINING.

5.1.3 Satisfactorily completed any SPECIAL RESPIRATORY EQUIPMENT TRAINING, if required for that individual.

5.2 Test system operator shall be certified to operate

equipment and evaluate results.

6.0 PRECAUTIONS

6.1 Test subject shall be clean shaven (in respirator seal area).

6.2 Test subject shall not be wearing contact lenses or glasses with conventional temple bars.

7.0 PROCEDURE

7.1 Prepare test system in accordance with the TDA-50 operation and maintenance procedure.

7.2 Set RANGE switch to zero % position.

7.3 Turn STRIP CHART RECORDER unit on and set print out speed to 1" per minute.

7.4 Ensure strip chart corresponds to PERCENT PENETRATION meter by adjusting STRIP CHART ZERO control.

7.5 Set SAMPLE control to CLEAR position.

7.6 Set RANGE switch to 100% and allow machine to stabilize for approximately 36 seconds. PERCENT PENETRATION meter and STRIP CHART should indicate zero %.

7.7 If PERCENT PENETRATION meter and STRIP CHART indicate zero, proceed to 7.8; if not, repeat step 7.5 and 7.8.

7.8 Set sample control to UPSTREAM position and use Gain Control to adjust PERCENT PENETRATION meter to 95% +/- 4%. STRIP CHART should indicate a consistent 95% +/- 4%.

7.9 Switch SAMPLE control to clear and set RANGE switch to 1% and allow STRIP CHART to stabilize.

7.10 Set RANGE switch to .1% and allow STRIP CHART to level off. If Strip Chart indicated greater than .1%, use STRAY LIGHT to adjust recorder to approximately .03%. When STRIP CHART indicates a consistent reading, use STRAY LIGHT control to obtain .03% reading +/- .01%.

7.11 Set RANGE switch to 100% and verify PERCENT PENETRATION meter reading of 0%. If not, repeat step 7.11 and step 7.12.

7.12 Set RANGE switch to UPSTREAM sample position. Allow one minute for machine to stabilize. A consistent PERCENT PENETRATION meter reading of 95% +/- 4%. Use GAIN control to adjust.

7.13 Switch SAMPLE control to CLEAR and allow STRIP CHART to indicate a consistent reading. PERCENT PENETRATION meter should indicate zero. If not, return to step 7.5.

7.14 Set RANGE switch to 10% and allow machine one minute to stabilize PERCENT PENETRATION meter should read

less than .1%. STRIP CHART should indicate a corresponding reading of less than .1%. If not, return to step 7.10.

7.15 Set RANGE switch to 1% and allow machine one minute to stabilize. PERCENT PENETRATION meter should read .03% +/- .01%. STRIP CHART should indicate a corresponding reading of .03% +/- .01%. If not, return to step 7.10.

7.16 Set RANGE switch to .1% and allow machine one minute to stabilize. PERCENT PENETRATION meter should read .03% +/- .01%. If not, return to step 7.10.

7.17 Set RANGE switch to 100% and SAMPLE control to CLEAR. Machine is now ready for testing.

7.18 Instruct test subject to complete top section of QUANTITATIVE RESPIRATOR FIT TEST form.

7.19 Direct test subject to don test mask using proper donning method for that particular device.

7.20 Direct test subject to enter TEST BOOTH and connect DOWNSTREAM sample hose to adapter fitting of mask (direct him to connect BREATHING AIR supply hose also, if necessary). Insure door of test booth is closed securely.

7.21 Set SAMPLE control to UPSTREAM position. Using ink pen, mark STRIP CHART "100% CLR". Run for 1 minute.

7.22 Set SAMPLE control to CLEAR position and allow

approximately 30 seconds for response to stabilize. Mark STRIP CHART "100% CLR".

7.23 Set RANGE switch to 10% position and allow STRIP CHART to stabilize. Mark STRIP CHART "10% CLR".

7.24 Set RANGE switch to 1% position and allow STRIP CHART to stabilize. Mark STRIP CHART "1% CLR". If test is to be performed with filter respirator, proceed to step 7.26; for air line respirator, proceed to step 7.25.

7.25 Set RANGE switch to .1% position and allow STRIP CHART to stabilize. Mark STRIP CHART ".

7.26 Set SAMPLE control to DOWNSTREAM position and mark STRIP CHART DSS.

7.27 Direct test subject to perform the following physical exercises. During each exercise, mark STRIP CHART accordingly.

7.27.1 BREATH NORMALLY FOR 1 MINUTE. Mark chart NB.

7.27.2 BREATH DEEPLY FOR 30 SECONDS. Mark chart DB.

7.27.3 MOVE HEAD SIDE-TO-SIDE FOR 1 MINUTE. Mark chart HSS.

7.27.4 MOVE HEAD UP-DOWN-DOWN FOR 1 MINUTE. Mark chart HUD.

7.27.5 MAKE FROWNING FACES FOR 1 MINUTE. Mark chart F.

7.27.6 TALK FOR 1 MINUTE. Mark chart F.

7.27.7 DO DEEP KNEE BENDS FOR 1 MINUTE. Mark chart KB.

7.27.8 BREATH NORMALLY FOR 1 MINUTE. Mark chart NB>

7.27.9 BREAK RESPIRATOR SEAL. Mark chart BS.

7.28 Set SAMPLE control to CLEAR position and mark chart CLR. Allow 45 seconds for response to stabilize.

7.29 Set RANGE switch to 100% position and set SAMPLE switch to UPSTREAM position. Allow 45 seconds for response to stabilize and mark chart 100% USS.

7.30 If test is being performed with air-supplied respirator, an emergency drill will be administered at this point. (If test is being performed with filter respirator continue with step 7.31.).

7.30.1 Without giving the test subject any forewarning, secure the breathing air supply to his respirator.

7.30.2 Test subject should react by removing respirator and existing test booth.

7.30.3 Careful observation is necessary during the drill to ensure proper reaction of the individual.

7.30.4 If any adverse reaction is observed, make a special note explaining problem on QUANTITATIVE RESPIRATOR FIT TEST form.

7.30.5 Proceed to step 7.32.

7.31 Direct test subject to disconnect downstream sample hose from mask, exit test booth, and remove mask.

7.32 Fit test is now complete. Tear off test data portion of STRIP CHART and attach to QUANTITATIVE RESPIRATOR FIT TEST form.

7.33 Fill in COMFORT RATING section at bottom of QUANTITATIVE RESPIRATOR FIT TEST form. Comfort rating will be indicated with a numbering system 1-5.

7.33.1 VERY COMFORTABLE; test subject appeared very comfortable during fit test. No signs of distress. (1)

7.33.2 COMFORTABLE; test subject appeared fairly comfortable during fit test. Some signs of slight distress. (2)

7.33.3 BARELY COMFORTABLE; test subject appeared uncomfortable. (3)

7.33.4 UNCOMFORTABLE; test subject appeared extremely uncomfortable during fit test. Distress was encountered to the point where fit test nearly had to be discontinued. (4)

7.33.5 INTOLERABLE; test subject experienced overwhelming distress to the point where fit test could not be performed. (5)

7.34 Test data will be analyzed to determine respirator

protection efficiency in accordance with appropriate procedure (Procedure No. PPB-301 EVALUATION OF RESPIRATOR FIT TEST DATA).

8.0 RESPONSIBLITIES

The procedure responsiblities are as stated in the text.

9.0 REFERENCES

None

10.0 ATTACHMENTS

None

PPB proto-power/zoo nuclear, inc.	POLICY AND PROCEDURE MANUAL

TITLE

EVALUATION OF RESPIRATOR FIT TEST DATA

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APPROVED		VICE PRESIDENT	12/3/86

1.0 PURPOSE

The purpose of this procedure is to provide instructions for evaluating quantitative fit test data. Evaluation results will determine respirator protection efficiency.

2.0 APPLICABILITY/SCOPE

This procedure applies to all Radiological Controls personnel qualified by the Radiation Safety Officer to perform respirator fit tests.

3.0 DEFINITIONS

None

4.0 POLICY

None

5.0 PREREQUISITES

The individual perfomring the analysis must be thoroughly trained and qualified.

6.0 PRECAUTIONS

None

7.0 PROCEDURE

When a respirator fit test subject has completed his test, the resulting data will be forwarded to the repiratory protection program supervisor who will assign a qualified individual to perform the analysis. The test data will consist of strip chart recording and the quantitative respirator fit test form.

NOTE: To properly evaluate data, the following information should be clearly understood:

a) All sections of the chart marked 100% indicate a full scale sample penetration of 100%. The chart line 9 will indicate 90% penetration, the line 8 will indicate 80% penetration and so on.

b) All sections of the chart marked 10% indicate a full scale sample penetration of 10%. The chart line 9 will indicate 9%, the line 8 will indicate 8%, and so on.

c) All sections of the chart marked 1% indicate a full scale sample penetration of 1%. The chart line 9 will indicate 0.9%, the line 8 will indicate 0.8%, and so on.

d) All sections of the chart marked 0.1% indicate a full scale sample penetration of 0.1%. The chart line 9 will indicate 0.09%, the line 8 will indicate 0.08%, and so on.

e) The percent value of each chart division may be determined simply by dividing the total number of divisions by the full scale penetration value.

Data shall be evaluated in the following manner:

7.1 Determine the average upstream penetration by averaging the chart sections marked 100% USS (100% unstream sample). Do this by counting up from the

zero (0) line to the top peak in each grid.

NOTE: A grid being the vertical divisions on the chart. Total the numbers in each grid and divide by the number of grids in the USS section.

NOTE: A section being the horizontal divisions on the chart. This is the average upstream penetration for this section. Do this also for the USS section at the end of the chart. Do this also for the USS section at the end of the chart. Total these two (2) averages and divide by two (2) to obtain the average upstream penetration. Record this on strip chart and analysis form.

7.2 Determine the average clear penetration by averaging the sections marked "clear" immediately prior to an after the DSS (downstream sampling) portion of the chart. To do this, count up from the zero (0) line to the top peak in each grid. Total the numbers in each grid and divide by the number of grids in the clear section immediately prior to the DSS portions of the chart. Do this, also, for the clear section immediately after the DSS portions. Total these two (2) averages and divide by two (2) to obtain the average clear penetration. Record this on strip

chart and analysis form.

7.3 Establish the base line for calculations by drawing a straight line from point "A" to point "B" (the points being in the centers of the average clears immediately before and after the DSS (downstream sample) portion of the chart). If the average clear at point "A" is higher than the average clear at point "B" (or visa versa), this is normal.

7.4 Divide the DSS portion of the chart into sections by drawing lines separating the individual exercise.

7.5 Determine the average peak penetration for each exercise. This is done by counting up from the baseline to the highest peak in each grid. Total the numbers in each grid and divide by the number of grids in the section. Record this on strip chart and analysis form.

NOTE: If a spike -- a sudden rise and equally sudden fall -- is encountered while analyzing the data, it is to be disregarded. It is not an indication of excessive leakage.

7.6 Record the maximum allowable percent penetration for the particular respiratory protective device in the corresponding section on the fit test form.

i.e. Filter respirator - 2%

Airline respirator - 0.05%

Self-contained breathing apparatus
(pressure demand type) - 0.01%

7.7 Record the standard protection factor for that particular respiratory protective device in the corresponding section on the fit test form.

i.e. Filter 50
Air line 2,000
SCBA 10,000

7.8 Determine the fit test as being satisfactory or unsatisfactory and record this in the corresponding section on the fit test form.

7.8.1 A satisfactory fit test shall be determined if the average peak penetration for all exercise sections is less than the maximum allowable percent penetration.

7.8.2 An unsatisfactory fit test shall be determined if the average peak penetration of merely one (or more than one) exercise section is greater than the maximum allowable percent penetration.

7.9 Place the completed respirator fit test data into an envelope which has the test subject:

a) Name

b) Social Security Number

c) Company

d) Date

e) Type of Equipment Used for Test

f) Pass or Fail

7.10 Return the envelope to the person in charge of the respiratory protection program who will review and initial the data. He will then forward this data to the dosimetry records department for entry on the computer and proper filing.

8.0 RESPONSIBILITIES

The procedure responsibilities are as stated in the text.

9.0 REFERENCES

9.1 NUREG 0041 - Manual of Respiratory Protection Against Radioactive Materials.

9.2 Los Alamos Scientific Laboratories Publication, a guide to Industrial Respiratory Protection.

9.3 Polydispersed DOP Aerosol Test System Operating Manual.

10.0 ATTACHMENTS

None

PPB pro-protection nuclear, inc.	POLICY AND PROCEDURE MANUAL

TITLE

DESCRIPTION AND SELECTION OF RESPIRATORY PROTECTION EQUIPMENT

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APPROVED	[signature]	VICE-PRESIDENT	12/3/86

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	10.1 Description of Respiratory Protection Devices	

1.0 PURPOSE

This procedure describes the types of respiratory protection devices available and gives the criteria to be used for their proper selection to minimize personnel exposure to airborne radioactive material.

2.0 APPLICABILITY/SCOPE

This procedure applies to any individual involved in the selection of respiratory protection equipment for use against radiological contaminants.

3.0 DEFINITIONS

3.1 RADIOLOGICAL WORK PERMIT (RWP) -- The document used as an administrative method of controlling personnel access to areas designated as radiological hazards for the purpose of minimizing exposure to internal and external radiation.

3.2 BREATHING ZONE -- Region near a worker's mouth and nostrils from which air is drawn into the worker's lungs during work. Air taken from this region will represent the air the worker is breathing while he/she works, whether standing, sitting or moving.

4.0 POLICY

Not applicable.

5.0 PREREQUISITES

5.1 All respiratory protection devices which are selected to afford a protection factor against

,airborne radioactive material shall be NIOSH certified in accordance with Reference 9.3, or specifically approved for use by the Nulcear Regulatory Commission.

5.2 Engineering and process controls (HEPA filtered ventilation, containments, etc.) will be considered prior to the selection of respiratory protection equipment.

5.3 One copy of the RWP will be maintained at the Radiological Controls Office and another will be maintained at the appropriate control point.

6.0 PRECAUTIONS

None

7.0 PROCEDURE

7.1 Refer to Attachment 1 for description of available respirator types.

7.2 Obtain the air sample concentrations and contamination survey data from the Radiological Work Permit (RWP) survey and identify the type and concentration of radionuclides present.

7.2.1 AIRBORNE CONCENTRATION

Respiratory protection equipment is to be selected to provide a Protection factor greater than the multiple by which peak concentrations of airborne radioactive

materials are expected to exceed the values specified in Appendix B, Table I, Column I, of 10 CFR 20, as determined by the sampling of airborne contamination. Isotopes for which a protection factor may not be taken are not considered in this respirator selection process. Exposures to these isotopes are calculated as if no respirator were worn.

7.2.1.1 If it is impractical or impossible to obtain current airborne radioactivity measurements prior to an entry, airborne concentration histories for the area or the type of work to be performed shall be used in estimating expected airborne radioactivity levels. An air sample shall be taken during such an entry to verify the actual levels.

7.2.2 SURFACE CONTAMINATION

Where surface contamination exists in concentrations which may be expected to become airborne during the work to be performed, airborne concentration histories for the area and the type of work will be used in estimating expected airborne radioactivity

levels.

7.2.3 Air samples will be obtained during work activities for estimating exposure to workers, and for continuing evaluation to determine adequate respiratory protection. Air samples shall be representative of the breathing zone airborne radioactivity concentration where work activities are likely to create airborne contamination.

7.3 As a guideline, when similar work is to be performed, respiratory protection may be used if past airborne concentrations for that area show a probability that an airborne concentration of 1 MPC or more may develop. Both internal and external sources of exposure will be considered such that the total exposure to the individual will be minimized.

7.4 Respirators are not selected on the basis of contamination levels, although contamination level data may be used to determine the probability of airborne levels developing during certain work activities.

7.5 Apply criteria specified in Attachment 1 for respirator selection based on airborne concentrations and the protection factor afforded by each device.

7.6 Use of respirators affording greater protection

against higher concentrations may be dictated based on evaluation of the following characteristics of the work and user requirements.

7.6.1 Activity to be performed.

7.6.2 Working conditions, i.e., temperature, presence of water, mobility and space constraints.

7.6.3 Duration of required respirator usage.

7.6.4 Proximity of respirable air.

7.6.5 User acceptance, comfort and qualifications.

NOTE: User comfort and the degree of stress associated with respirators are considered during fit testing. Respirators are selected so that any specific job can be performed with a minimum of stress compatible with the job requirements and the degree of protection needed.

7.7 Document the type of respirator required on the RWP.

8.0 RESPONSIBILITIES

8.1 RADIOLOGICAL CONTROLS DEPARTMENT

8.1.1 Those persons evaluating the need for, and determining the type of, respiratory protection devices to be used shall adhere to the requirements and guidelines set forth in

this procedure when writing an RWP.

8.1.2 Radiological Controls Technicians (RCT) are responsible for the collection and analysis of radiological air samples, and contamination surveys. Calculation of MPC hours of these records is the responsibility of the Radiation Protection Officer (RPO). On a regular schedule these records are transferred to the Radiological Records Control Officer (RRCO) for storage:

Contamination Survey Records

Air Sample Records

8.1.3 The RCT will monitor worker compliance with RWP requirements.

8.2 RADIOLOGICAL PROTECTION OFFICER (RPO) OR DESIGNEE

Specifications for the selection of respiratory protection devices, and a periodic review of the selection process to ensure compliance with this procedure, is the responsibility of the Radiation Safety Officer.

9.0 REFERENCES

9.1 10 CFR 20, "Standards for Protection Against Radiation".

9.2 29 CFR 1910.134, "General Industry Standards - Respiratory Protection".

9.3 30 CFR 11, "Respiratory Protective Devices; Tests for Permissibility".

9.4 ANSI Z88.2 - 1980, "Practices for Respiratory Protection".

9.5 ANSI N13.1-1969, "Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities".

9.6 Reg Guide 8.15, "Acceptable Programs for Respiratory Protection".

9.7 NUREG 0041, "Manual of Respiratory Protection Against Airborne Radiation Materials".

9.8 PPB Procedure, PPB-301, "Respiratory Protection Program".

9.9 PPB Procedure, PPB-003, "Radiation Work Permit (RWP)".

9.10 PPB Procedure, PPB-202, "Air Sample Analysis".

9.11 PPB Procedure, PPB-309, "Issue and Control of Respiratory Protection Equipment".

10.0 ATTACHMENTS

10.1 Attachment 1 - Description of Respiratory Protection Devices

ATTACHMENT 1

DESCRIPTION OF RESPIRATORY PROTECTION DEVICES

Respirator Type	Mode of Operation	Protection Factors: Particulate, Gas Vapor	Protection Factors: Particulate ONLY	Acceptable Devices	Comments
Full, Facepiece, negative pressure, air purifying	NP		50	MSA black, Ultravue facepiece MSA yellow silicone, Ultravue facepiece Scott Scottoramic facepiece	1. Nose cups are available to minimze fogging and facepiece dead air space. 2. Various adsorber canisters are available for different contaminants, although no protection factor may be taken for radionuclides. 3. Welders's adaptor available. When a welder's adaptor is used, a grilless speaking diaphragm cover must also be installed to protect the diaphragm unless an adhesive disc supplied with the welding adaptor is placed over the speaking diaphragm retainer. 4. Not acceptable for use in oxygen deficient or IDLH atomospheres.
Full Facepieces, positive pressure, air purifying	PP NP		1000 50	MSA Powered Air Purifying Respirator with: black Ultravue facepiece NOTE: This facepiece differes from the usual Ultravue in that it has 2 exhalation valves.	1. When fully charged, the unit will maintain operation for approxiamately 4 hours. 2. Welder's adaptor available. When a welder's adaptor is used, a grilless speaking diaphragm cover must also be installed to protect the diaphragm unless an adhesive disc supplied with the welding adaptor is placed over the speaking diaphragm retainer. 3. Not acceptable for use in oxygen deficient or IDLH atmospheres.
Full facepieces	CF	2000	50	MSA Duo-Flo with: black ultravue facepiece yellow silicone ultravue facepiece	1. Welder's adaptor available. When a welder's adaptor is ued, a grilless speaking diaphragm cover must also be installed to protect the diaphragm unless an adhesive disc supplied with the welding adaptor is placed over the speaking diaphragm retainer. 2. Not acceptable for use in IDLH atmospheres. 3. Requires a supporting air source as defined in Procedure PPB-307, "Use of Compressed Air for Supplied Air Respirators". 4. Duo-Flo only: a. The switching valve controls flow from either a supplied air line or an attached filter. The attached filter may be either a GMR-I or an Ultra Filter. b. Not acceptable for use in oxygen deficient atmospheres.

DESCRIPTIONS OF RESPIRATORY PROTECTION DEVICES

Respirator Type	Mode of Operation	Protection Factors: Particulate, Gas Vapor	Protection Factors: Particulate ONLY	Acceptable Devices	Comments
Full facepiece, Pressure Demand, Self Contained Breathing Apparatus	PD	10,000		Scott Presur-Pak IIA with Scottoramic facepiece(s)	1. Acceptable for use in oxygen deficient atmosphere or atmospheres which are IDLH. 2. Welder's adaptor available. 3. Device is to be operated only in the pressure -demand mode. The demand mode is to be used only during donning and doffing. 4. Nosecup is required for use inside the facepiece at ambient temperatures below 32 degree F. 5. Air used to change SCBA cylinders must meet the requirements specified in PPB-307. "Use of Compressed Air for Supplied Air Respirators".
Hood/Helmet, Continuous flow, Air Line	CF	2,000		MSA Blastfoe II helmet (with flow control valve)	1. Requires no fit test. 2. Exhaust air provides body cooling. 3. Variable cooling provided by vortex tube for certain models only. 4. Standard glasses may be used. 5. Not acceptable for use in IDLH atmospheres. Acceptable for use in oxygen deficient atmospheres. (16.0-19.5%) 6. Requires a supporting air source as defined in Procedure PPB-307, "Use of Compressed Air for Supplied Air Respirators". 7. Hood/helmet volume provides approximately 2 minutes of breathing air in the event of loss of flow. 8. Flow control valve, if provided, must be operated in the full open position.

MODES OF OPERATION

NP = negative pressure
PP = positive pressure
CF = continuous flow
PD = pressure demand
Training codes (numbers) and fit computer codes (letters) are listed in parentheses.

NOTE: Radioactive contaminants that present an absorption or submersion hazard are excluded. For tritium oxide, approximately one half of the intake occurs by absorption through skin, so that an overall protection factor of 2 is appropriate when atmosphere supplying respirators are used.

PPB puerto-rriqueña nuclear, inc.	POLICY AND PROCEDURE MANUAL

TITLE

USE OF RESPIRATORY PROTECTION EQUIPMENT

PROCEDURE No.	REVISION No.	EFFECTIVE DATE
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ORIGINATOR			
CONCURRED	J. Althouse	RADIATION SAFETY OFFICER	11-24-86
APPROVED		VICE-PRESIDENT	12/3/86

1.0 PURPOSE

The purpose of this procedure is to provide direction for minimizing personnel exposure to airborne radioactive material through the proper use of respiratory protection equipment.

2.0 APPLICABILITY/SCOPE

This procedure applies to all individuals who use respiratory protection equipment.

3.0 DEFINITIONS

3.1 CLEAN SHAVEN A subject has no facial hair between his/her face and the sealing surface of the respirator and no facial hair interfering with valve function of the respirator.

3.2 VALID INSPECTION TAG A tag that indicates all procedural requirements for the issuance of the equipment to which it is attached have been met. It indicates that there has been a comprehensive evaluation of the equipment's function and condition to determine suitability for use within the last thirty (30) days (Routine use equipment) or calendar month (Emergency use equipment). (See Attachment 10.1)

3.3 USE OF RESPIRATORS

3.3.1 Radiological Use - The use of a respirator per an approved RWP.

3.3.2 Emergency Use - The use of a respirator for unplanned events characterized by risks sufficient to require immediate action.

3.4 NIDLH - Not Immediately Dangerous to Life or Health

3.5 IDLH - Immediately Dangercus to Life or Health

3.6 RCA - Radiologically Controlled Area

3.7 RSO - Radiation Safety Officer

3.8 RPO - Radiation Protection Officer

3.9 RRCO - Radiation Records Control Officer

4.0 POLICY

The Respiratory Protection Policy is as stated in Reference 9.1.

5.0 PREREQUISITIES

5.1 All individuals who use, or may be expected to use, respiratory protection devices in the daily performance of their duties or during an emergency, shall meet the training, fit test, whole body count, medical, eyeglass and clean shaven requirements for respirator user qualification.

5.2 Prior to entering a respirator use area with a facepiece device, the respirator user shall perform a negative pressure test to detect leaks and to ensure proper function of the device.

5.3 Contact lenses shall not be worn with respiratory protection devices. Standard glasses with temple

bars are prohibitied when using any respiratory protection facepiece, but may be used with hoods or helmets. Respirator eye glasses are available through the RRCO.

5.4 Prior to entering a respirator use area in the RCA, the wearer shall ensure that a receptacle for respirator return is available for disposal of the used device. If a receptacle for respirator return is not available, no entry shall be made into that area except for emergency purposes until one is available. (All receptacles shall be labeled "Respirators Only").

5.5 Respirators issued for a job and not used shall be returned to the respirator issue point.

5.6 If equipment defects are found during the pre-use inspection, immediately return the device to the point of issue and report the problem to the issue person.

6.0 PRECAUTIONS

6.1 Facial changes, due to dentures, scars, surgery, or weight loss, may adversely affect the facepiece to face seal and require further evaluation by a fit booth technician when the user detects face seal leakage on performing the negative pressure test.

6.2 Prior to entering a respirator area, the respirator

user shall ensure that nothing protrudes into the sealing surface of the respirator. Cranial microphones and other such devices shall never be placed under head straps or harnesses.

6.3 Fogging of the respirator facepiece may be prevented with the use of a nose cup, issued on request with the respiraotr facepiece, or, with the use of an anti-fog chemical available as a stock item from the RRCO.

6.4 In a NIDLH environment, if a respirator user experiences a loss of facepiece to face seal, equipment malfunction, undue physical discomfort or psychological stress, procedural or communication breakdown, significant deterioration of operational conditions, or any other situation that requires a relief from work, he should secure his work station and leave the area. The respirator is removed only if it is necessary to perform the exit in a safe manner. In an IDLH environment, the user should leave his work area immediately and should not remove his respirator.

6.5 The length of supply hose used with a filter regulator shall be limited if the minimum pressure specified in Attachment 10.2 cannot be maintained.

6.6 Should any equipment malfunction or should a defect

be identified during use, notify the Radiological Control Technician (RCT) and return the defective equipment to the issue point.

6.7 Don and doff respiratory equipment per the applicable steps of the protective clothing guidelines.

6.8 Return all respiratory equipment intact, i.e., filters attached, welders lenses installed, etc. Spectacle kits must be removed.

7.0 PROCEDURE

7.1 Donning of all types of respiratory protection facepieces.

7.1.1 Ensure facepiece has a valid inspection tag.

7.1.2 Inspect the respirator to ensure it is free of defects or damage, i.e., torn or frayed straps, bent or poor working buckles, loose or poor fitting facepiece, etc.

7.1.3 Mount filter(s) to inhalation port as required.

7.1.4 As required, insert prescription respirator eyeglasses into the facepiece.

NOTE: Only eyeglass assemblies approved for use in a specific brand of respirator facemask shall be used.

7.1.5 Pull all head harness straps out to the end

tabs.

7.1.6 Insert chin into facepiece and lay seal surface against face.

7.1.7 Pull head harness back over the head. This can be accomplished by either pulling the harness over the head while inserting the face, or by initially placing the harness over the lens, inserting the face, then pulling the harness over the head.

7.1.8 Adjust the headband straps for a snug, comfortable fit.

7.1.8.1 Make sure all straps are flat against the head.

7.1.8.2 Tighten the two lower or neck straps.

7.1.8.3 Tighten the two side or temple straps.

7.1.8.4 Tighten the forehead strap if necessary.

7.1.8.5 Ensure that no hair, protion of skull cap, or anything else protrudes into the sealing periphery of the facepiece.

7.1.9 Each time a full facepiece respirator is donned or adjusted, the wearer shall conduct

check blower operation.

7.3.1.3 Mount blower unit on belt, and don belt.

7.3.1.4 Don facepiece per Section 7.1.

7.3.1.5 Connect breathing tube to facepiece and turn blower on prior to entering area.

7.3.1.6 Upon exiting turn off the blower, and remove the belt.

7.3.1.7 Holding the battery pack and belt in one hand, and grasping the facepiece with the other hand, remove facepiece per 7.2.

NOTE: The PAPR battery pack/blower assembly with breathing tube may be kept in service with new facepieces. A log must be maintained by the RCT for each unit to ensure total use does not exceed 4 hours. A smear survey of the breathing tube/facepiece connection must be made by a Radiological Controls Technician before a new

a negative pressure test as follows:

7.1.9.1 Cover the filter inlet(s), the end of the breathing tube, or the facepiece inlet port while gently inhaling.

7.1.9.2 Hold breath for 10 seconds.

7.1.9.3 The mask should be observed to collapse and should remain collasped with no leakage detected.

7.2 Doffing of all types of respiratory protection facepieces.

7.2.1 Remove the facepiece by bending forward at the waist, grasping the snout area, and pulling the respirator out and away from the face.

7.2.2 Remove personal respirator eyeglasses and/or nosecups, as appliacable.

7.2.3 Place the equipment in the proper return receptacle.

7.3 Use of available respiratory protection equipment.

7.3.1 M.S.A. POWERED AIR PURIFYING RESPIRATOR (PAPR)

7.3.1.1 Ensure all equipment has a valid inspection tag.

7.3.1.2 Inspect all equipment for damage and

facepiece is connected to the PAPR battery pack/blower assembly.

7.3.1.8 Bag the facepiece, and then bag the entire unit including the facepiece. Place the equipment in the proper receptacle.

7.3.2 M.S.A. DUO-FLO

7.3.2.1 The job supervisor shall ensure the requirements of Procedure PPB-307, "Use of Compressed Air Supplied Air Respirators", have been fulfilled.

7.3.2.2 Ensure all equipment has a valid inspection tag, and visually inspect it for damage or defects.

7.3.2.3 Set up the filter regulator manfold under Radiological Controls Supervision. Ensure that the proper pressure setting is established and maintained as specified on Attachment 10.2.

7.3.2.4 Attach the high efficiency filter to the Duo-Flo valve, mount the valve on the belt, and don the belt.

7.3.2.5 Don facepiece per Section 7.1.

7.3.2.6 Connect the breathing tube between the facepiece and Duo-Flo valve.

NOTE: In negative pressure air purifying mode, a protection factor of (50) fifty is provided for particulates. This mode is not to be utilized in areas with high airborne concentrations of radioactive materials or during work which may generate this condition, except for emergency egress.

7.3.2.7 Enter work area and connect Duo Flo valve to the air system.

7.3.2.8 When exiting the area, disconnect the airline, remove the belt, then remove the facepiece per Section 7.2.

7.3.2.9 Follow instructions of the Radiological Controls Technician for equipment disposition.

7.3.3 HOOD/HELMET, CONTINUOUS FLOW AIRLINE

7.3.4.1 Follow pre-use criteria in Sections 7.3.2.1 and 7.3.2.2.

7.3.3.2 Connect airline to filter-regulator, and regulate air pressure as specified on Attachment 10.2.

7.3.3.3 Connect to airline and don hood placing the inner cape inside the outer layer of protective clothing. Adjust the chin strap, if provided, and secure at mid-torso points where the front meets the back. Place the outer cape outside the top layer of protective clothing and secure. Secure capes in a manner that minimizes cape movement, yet will not impede removal in case of an emergency.

7.3.3.4 Mount hose connection with flow regulator (if provided) to belt, and don belt. Enter area.

7.3.3.5 Doffing

A. Disconnect securing devices on outer cape and remove belt.

B. Disconnect securing devices on inner cape.

C. Remove hood carefully to

avoid spread of contamination to head or face.

D. Disconnect air supply.

E. For helmets, bag entire assembly and place in the proper receptacle.

F. For hoods, place the belt and flow control valve (if provided) in the proper receptacle. Dispose of the hood as radioactive waste.

7.3.4 PRESSURE DEMAND, SELF CONTAINED BREATHING APPARATUS (SCBA) SCOTT PRESUR-PAK IIA

7.3.4.1 Ensure equipment has a valid inspection tag, and visually inspect all equipment for damage or defects. Pay particular attention to the regulator.

7.3.4.2 Ensure cylinder is full.

7.3.4.3 Ensure regulator by-pass valve is shut, mainline valve is open, and pressure demand selector is in the "off" position.

7.3.4.4 Place unit on a horizontal surface, cylinder valve away from wearer, and

the backplate up. Extend all straps.

7.3.4.5 Lean forward and grasp both edges of the backplate, just above the waist belt area.

7.3.4.6 Lift the cylinder apparatus straight up and over the head, keeping the elbows close to the body. Rest the apparatus on the back while slightly bent forward at the waist. The shoulder straps will slide along the arms and into place.

7.3.4.7 Connect the chest buckle, and pull down firmly on the side straps to adjust the harness.

7.3.4.8 Connect and adjust the waist buckle, and standing straight, adjust the unit and straps for a comfortable fit.

7.3.4.9 Fully open the cylinder valve.

NOTE: Opening the valve will cause a clicking noise due to the safety latch in older models. If no noise is heard, ensure safety latch is engaged.

7.3.4.10 Ensure low pressure alarm rings as pressure builds up. When pressure has equalized, verify that the regulator gauge indicates full.

7.3.4.11 Don facepiece per Section 7.1 and conduct negative pressure test per Section 5.2.

7.3.4.12 Hold breathing tube inlet port against the regulator outlet port without tightening the threads, and inhale to check regulator operation. Connect breathing tube to regulator, and flip the pressure demand switch to the ON position. Enter area.

7.3.4.13 Check the regulator pressure gauge occasionally for remaining air supply to allow sufficient time to exit the contaminated area.

7.3.4.14 When the low pressure alarm bell sounds, leave the area as soon as possible. This alarm indicates that approximately 20-25 percent of the air (about 5 minutes) remains in the cylinder.

7.3.4.15 Doffing of Scott SCBA.

A. Flip pressure demand switch to the "OFF" position.

B. Disconnect breathing tube from regulator.

C. Remove the facepiece per 7.2 and place the facepiece in a return receptacle.

D. Close cylinder valve by pressing in on the handwheel and turning it.

E. Bleed off high pressure line by slowly flipping the pressure demand switch to the "ON" position. When the air has bled off, flip the pressure demand switch to the "OFF" position.

7.3.4.16 Emergency Operation: Should the regulator become damaged or inoperative during use, proceed as follows:

WARNING: This operating mode is for emergency usage only. Consequently, the duration of the air supply is greatly reduced when the unit is operating through the by-pass valve.

Only use this operating mode to escape from an area. Open BY-PASS valve (red knob) to allow an acceptable flow. Depress the locking tab under the regulator MAIN LINE valve (yellow knob) and turn the valve off (full clockwise). Adjust the BY-PASS valve to suit the requirements of the user.

7.3.4.17 Cylinder Replacement

NOTE: Do not attempt to do this alone! This is a two person operation.

A. Flip the pressure demand switch to the "OFF" position.

B. Disconnect breathing tube from regulator.

C. Close cylinder valve by pressing in on the handwheel, or releasing ratchet device, then turning.

D. Bleed off high pressure line by slowly flipping the pressure demand switch to the "ON" position. When the air has bled

off, flip the pressure demand switch to the "OFF" position.

E. Uncouple regulator hose coupling from the cylinder valve.

F. Pull the cylinder clamping lever down to release the cylinder from the backplate.

G. Lift the cylinder out of the backplate and replace with a fully charged cylinder.

H. Raise and push the cylinder clamping lever up to secure the cylinder.

I. If being used in a contaminated area, a Radiological Controls Technician shall smear survey breathing air hose prior to hook up.

J. Attach and hand tighten the regulator hose coupling to the cylinder valve.

K. Fully open the cylinder valve.

L. Connect breathing tube to regulator.

M. Apparatus is now ready for

reuse.

N. Flip pressure demand switch to the "ON" position as you enter the area.

8.0 RESPONSIBLITIES

8.1 It is the responsibility of each individual to keep his inhalation of airborne radioactive material as low as reasonably achievable consistent with discharging his duties in accordance with procedural specifications.

8.2 Radiological Controls personnel are responsible for surveillance of work areas to ensure that workers are properly using the respiratory protection equipment specified on an R.W.P. Any deficiencies, discrepancies, or problems in the use of respiratory protection equipment must be reported to the Radiation Safety Officer or designee immediately.

8.3 Radiation Safety Officer, or designee is responsible for periodcally observing and evaluating respirator use.

9.0 REFERENCES

9.1 Procedure PPB-301, "PPB Respiratory Protection Program and Policy".

9.2 Manufacturers Instructions and NIOSH Certifications.

9.2.1 M.S.A. - Mine Safety Appliances Respiratory

Protective Equipment.

9.2.2 Scott Aviation Respiratory Protective Equipment.

9.3 Procedure PPB-003, "Radiation Work Permit (RWP)".

10.0 ATTACHMENTS

10.1 Form PPB-306-1 Inspection Tag

10.2 Filter Regulator Operating Specification

ATTACHMENT 10.1

Inspection Tag

RESPIRATORY EQUIPMENT INSPECTION

This equipment has been cleaned, surveyed, inspected and found to be operable.

Date_____ Inspector_____

(Green Card)

EMERGENCY RESPIRATORY EQUIPMENT INSPECTION

This equipment has been inspected and found to be operable.

Date_____ Inspector_____

(Red Card)

ATTACHMENT 10.2

FILTER REGULATOR OPERATING SPECIFICATIONS

Device	Number of Workers Per Regulator	Number of Hose Sections per Worker	Total Hose Length Ft (per worker)	Pressure Setting
MSA DUO-FLO (With Ultravue Facepiece)	1-4	1-12	25-300	35-40
*Safety And Supply Hood	1-3	1	25-50	26-29
	1-3	2	50-100	32-36
	1-3	3	75-150	38-42
	1-3	4	100-200	42-47
	1-3	5	125-250	46-51
	1-3	6	150-250	51-57
MSA Nulcear Comfo Hood	1-5	1-2	15-50	16-18
	1-5	1-5	50-125	21-23
	1-5	3-8	125-200	25-28
	1-5	4-12	200-300	34-38

* A maximum of one 25' section of yellow recoil hose may be included.

ppb pete-peerebloom nuclear, inc.	POLICY AND PROCEDURE MANUAL

TITLE

USE OF COMPRESSED AIR FOR SUPPLIED AIR RESPIRATORS

PROCEDURE No.	REVISION No.	EFFECTIVE DATE
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1.0 PURPOSE

This procedure provides guidance for the safe use of compressed air in breathing air systems.

2.0 APPLICABILITY/SCOPE

Applies to all breathing air systems where supplied air respirators are used.

3.0 DEFINITIONS

3.1 BREATHING AIR - Air that is processed by a breathing air system which is delivered directly to the breathing apparatus or to a storage container.

3.2 BREATHING AIR SYSTEM - This refers to the complete assembly of equipment required to deliver breathing air to the user, including but not limited to compressors, purification media, pressure regulators, safety devices, manifolds, interconnecting pipelines or hoses, and cylinders or receivers.

3.3 RECEIVER - This is a high pressure cylinder, tank or secondary compressor which immediately supplies breathing air to the supplied air respirator user(s) should the primary system compressor malfunction or fail. The air supplied to the user(s) must be sufficient to allow egress to a point where respiratory protection is not required. See Attachment 10.4 for the filter regulator operating

specifications.

3.4 RCT - Radiological Controls Technician

4.0 POLICY

N/A

5.0 PREREQUISITES

5.1 Air compressors must be set up and used in a manner that ensures air quality (Reference 9.3), and be approved for use by the Radiation Safety Officer (RSO). Modifications to the compressor and associated equipment, repairs or relocation of same where equipment is disassembled and re-assembled requires re-approval for use by the R.S.O.

5.2 Compressors being used for breathing air purposes are to be run in accordance with written operating instructions. These are provided by the department responsible for the compressor to ensure proper mechanical operation and compliance with necessary safety precautions. These operating instructions must be reviewed and approved by the R.S.O.

5.2.1 The scope of these instructions should include:

a. How to turn the compressor on and off.

b. How to check the operation of the high temperature and carbon monoxide alarms.

c. Requirements to prevent contaminants from

entering the air intake.

d. Emergency actions necessary when compressor malfunctions or failure occurs.

e. Precautions about alternate uses of air supplied from breathing air compressors.

f. Use of double check valves to protect the integrity of a breathing air system.

g. Air sampling requirements: when they are necessary; who performs the task.

h. Receiver requirements.

i. Hose specifications.

j. Direction to review compressor maintenance records. This ensures the compressor is in optimal working condition before the start of a job and precludes interuption of a job for scheduled routine maintenance.

5.3 Air used for breathing purposes must meet or exceed the requirements of the Compressed Gas Association for Type I, Grade D air (Reference 9.6). Samples for Grade D air shall be taken at the point in the breathing air system indicated by the R.S.O. The air analysis report must be a QA reveiwed service and the vendor must be on the QCL list. Air quality

analysis result must be verified by the R.S.O. prior to initial onsite use and at least every 6 months thereafter.

5.4 A suitable drain shall be installed in the bottom of the receiver so that all condensate which might accumulate may be drained from the unit.

5.5 The breathing air compressor must be sampled at the point of end use for radiological contamination prior to initial use and at least every 30 days thereafter while in use. Air sample results must be less than 3 E-10 uci/cc gross Beta/Gamma. If the results exceed this value, usage of that system for breathing air must be terminated immediately. Air sample requests are made by the Radiation Protection Officer (RPO). Samples for radiological contamination are taken by the RCT (Reference 9.13) and are delivered by same to the Counting Room for analysis.

5.5.1 Install a particulate filter and charcoal cartridge in the breathing air sample holder in the following order: particulate filter with fibrous (fuzzy) surface upstream (facing "in") and then charcoal cartridge with arrow in direction of flow. Reassemble the sample head.

5.5.2 Set the regulator on the breathing air distribution manifold for zero flow.

5.5.3 Insert the male fitting of the breathing air sample holder in the female fitting of the breathing air distribution manifold.

5.5.4 Set the regulator on the breathing air distribution manifold to indicate 60 liters per minute (LPM) on the sample holder flow meter.

5.5.5 Note the date, RWP number, sample start time, flowrate, and RCT initials on the "Air Sample Colection Data" envelope "On" column. Under "Location" enter the serial number of the Delmonox Air Purification System being sampled.

5.5.6 Allow the sample to run for 48 minutes. Then back off the regulator on the breathing air distribution manifold to zero flow. Remove the sample holder.

5.5.7 Note the date, sample stop time, flowrate, and RCT initials under the "Off" column. Enter the total time and total volume (2.88 E6 cm3).

5.5.8 Disassemble the sample head and (using caution not to cross-contaminate the filter

paper) remove the filter. Place it in the envelope and submit to the count room technician for analysis. The charcoal need not be counted.

5.6 Compressors used for breathing air must be situated in a manner that prevents contaminants from entering the air intake, including contamination from the work project or the compressor itself.

5.7 The compressor alarm systems for mobile air compressors shall be located within visual or audio distance of the personnel utilizing the airline equipment. If location of the alarms in the work area is not possible, provisions shall be made to ensure personnel utilizing airline equipment can be immediately notified in case of compressor failure, alarm indications, or if emergency action is required. This requirement shall be verified by the R.S.O. or designee prior to use of air for breathing.

5.8 Breathing air outlets shall be fitted with a 3/4" Bowes fitting prior to use. Bowes fittings shall be used strictly for breathing air purposes and shall not be used in other plant operations.

5.9 Only feed hose with a Bowes fitting will be used to supply air to the air distribution/filter regulator

unit.

5.10 If, due to the location of the work being performed, the distribution manifold and feed hose cannot be stationed in a clean area, plastic sheet and sleeving shall be utilized to protect the equipment from contamination. All airlines used to supply breathing air from the filter regulator to the respiratory protection devices shall be sleeved in plastic when working in a radiologically contaminated area.

5.11 Breathing air supplied by either compressor or compressed breathing air cylinders must be less than 125 psi prior to use with feed hose and filter regulator/distribution unit.

5.12 All alternate uses of air supplied from breathing air compressors must be approved for use by the R.S.O. Breathing air systems shall never be directly connected to a contaminated system. An interface of a breathing air system with a contaminated air system (radiological and/or other material) may be permitted with the approval of the R.S.O. There must be a double check valve after the compressor header protecting the breathing air system from back flow of contaminated material.

6.0 PRECAUTIONS

6.1 The length of feed hose supplying a filter regulator shall be limited if the minimum pressure specified in Attachment 10.4 cannot be maintained.

6.2 All air line couplings must be handled and operated to avoid contamination and covered when not in use. Hoses must be layed out in a manner that would avoid pinching and kinking and not present a trip hazard.

7.0 PROCEDURE

7.1 The R.C.T. shall ensure proper setup of airline breathing equipment as follows:

7.1.1 Secure Bowes fitting for the compressor breathing air outlet by contacting the R.P.O.

7.1.2 Secure an Air Filter and Distribution Unit Issue Sheet (Attachment 10.1), a Preoperational Item Check Sheet (Attachment 10.2) and Breathing Air Tags (Attachment 10.3) from the Respirator Issue Area and complete appropriate information.

7.1.3 Inspect equipment for indications of damage or deterioration.

7.1.4 Connect the feed hose to the compressor/cylinder regulator or outlet.

7.1.5 Connect feed hose to the filter regulator.

7.1.6 Tag the compressor/air cylinder system to ensure against improper or inadvertent misuse

of the system (see Attachment 10.3).

7.2 Radiological Controls Personnel shall meet initial test criteria required on Attachment 10.1 to use the breathing air system.

7.2.1 Air connection - radiological smear survey completed satisfactorily, if applicable.

7.2.2 Air system blowdown - particulate filter for 1 minute; moisture separator for 1 minute or until no moisture is evidenced.

7.2.3 Air pressure - proper setting for the respiratory protection device being used in accordance with the appropriate section of PPB Procedure PPB-306, "Use of Respiratory Protection Equipment", and Attachment 10.4.

7.2.4 Air leaks - ensure setup has no major air leaks which would affect the integrity of the system such that air pressure cannot be maintained.

7.2.5 Approval signature - sign off by Rad Con Technician, signifying criteria were satisfactorily complete.

7.2.6 Return the top copy of Attachment 10.1 to the Radiation Records Control Office after completion of all sections and signature by the Radiological Control Technician. This

form must be reviewed by the Issue Technician prior to issuing devices for use on this system.

7.3 OPERATING CONDITIONS

7.3.1 After initial setup and sign off of the Air Distribution Unit Issue Sheet, the R.C.T. is responsible to ensure the daily test criteria are properly performed and signed off (see Attachment 10.2).

7.3.2 The R.C.T. shall ensure that periodic inspection of the air filter distribution unit is made for proper pressure setting, moisture buildup and overall operating conditions of the equipment.

7.3.3 If the proper pressure setting for the respiratory protection devices being used cannot be maintained, the job will be immediately terminated and the R.S.O. or his designee notified.

7.4 Termination of the Use of a Breathing Air System.

Upon completion of work, the R.C.T. shall:

7.4.1 Notify the R.P.O. that work and breathing air use has been terminated when facility activities are affected.

7.4.2 Ensure all feed hose, filter regulator and

hose sleevings have been removed and properly dispositioned as equipment is removed from the RWP area.

7.4.3 Ensure return of breathing air equipment to the respirator issue area, or other designated location for decontamination. After decontamination, all equipment shall be delivered to the respirator issue area.

8.0 RESPONSIBLITIES

8.1 The R.S.O. approves compressors for use, is responsible for verifying the air quality of all compressors prior to use, and maintains compressor air quality reports.

8.2 The R.C.T. is responsible for verifying compliance with this procedure for the setup of all components of a breathing air system. This individual will take whatever steps are necessary to protect all equipment in the breathing air system from damage and contamination, and to return them in good condition to the respirator issue area.

8.3 It is the responsibility of R.C.T. to radiologically evaluate the air in the work areas and specify the respiratory protection necessary in accordance with PPB Procedure PPB-305, "Description and Selection of Respiratory Protection Equipment". The R.C.T. will

monitor work requiring breathing air systems in radiological areas in accordance with PPB Procedure PPB-306, "Use of Respirastory Protection Equipment". Responsibilities for monitoring the use of breathing air systems are: radiologically evaluating compressors supplying breathing air; performing smear surveys, as required, and checking the set up of equipment at the work location.

8.4 It is the responsibility of the Radiation Records Control Officer to maintain records of issuance, field checks and return of equipment used for breathing air purposes. Records shall be transferred on a periodic basis to the PPB New London Office for filing.

8.5 It is the responsibility of the R.P.O. to ensure that respiratory protection airline equipment is maintained in accordance with PPB Procedure PPB-310, "Inspection and Maintenance of Respiratory Protection Equipment".

9.0 REFERENCES

9.1 10 CFR 20, Standards for Protection Against Radiation.

9.2 NUREG 0041, Manual of Respiratory Frotection Against Airborne Radioactive Materials.

9.3 29 CFR Part 1910.134, General Industry Standard -

Respiratory Protection.

9.4 30 CFR Part 11, Respiratory Protective Devices - Test for Permissibility.

9.5 ANSI Z88.2-1980, Practices for Respiratory Protection.

9.6 ANSI Z86.1-1973, Commodity Specifications for Air.

9.7 PPB Procedure PPB-301, "PPB Respiratory Protection Program and Policy".

9.8 PPB Procedure PPB-105, "Release Surveys".

9.9 PPB Procedure PPB-306, "Use of Respiratory Protection Equipment".

9.10 PPB Procedure PPB-305, "Description and Selection of Respiratory Protection Equipment".

9.11 PPB Procedure PPB-202, "Air Sampling Analysis".

10.0 ATTACHMENTS

10.1 "Air Filter and Distribution Issue Sheet".

10.2 "Precperational Item Check".

10.3 "Breathing Air in Use Tag".

10.4 "Filter Regulator Operating Specifications".

ATTACHMENT 10.1

AIR FILTER AND DISTRIBUTION UNIT ISSUE SHEET
UNIT NUMBER_____

Issued to: Name: _____ RWP: _____

SSN: _____ Location: _____

Related equipment issued: _____25 ft. whips

_____50 ft. whips

_____50 ft. feed hose

_____Bowes fitting

Issued by: _____ Date: _____ Expected Return Date: ___

Compliance with Section 5.1 _____/_____
R.C.T. Date

Tagging Completed _____/_____
R.C.T. Date

R.P.O. Notified _____/_____
R.C.T. Date

Air Filter Distributionn Unit Initial Setup and Test Criteria

Breathing Air Connection - Survey Completed Satisfactorily.

Air System Blowdown.

Air pressure set____psig, in accordance with Procedure PPB-306.

No air leaks detected.

Rad Con Tech Signature: _____ Date: _____

Date returned to Resp. Issue Area: _____ Received by: _____

Comments:

ATTACHMENT 10.2

PREOPERATIONAL ITEM CHECK

DATE	SYSTEM BLOWDOWN	PRESSURE SETTING (psig)	R.P.O. NOTIFIED	R.C.T. (INIT)

ATTACHMENT 10.3

FILTER REGULATOR OPERATING SPECIFICATIONS

DEVICE	NUMBER OF WORKERS PER REGULATOR	NUMBER OF HOSE SECTIONS PER WORKER	TOTAL HOSE LENGTH FT (PER WORKER)	PRESSURE SETTING
MSA Constant Flow	1-4	1-12	25-300	35-40
MSA DUO-FLO (with Ultravue Facepiece)	1-4	1-12	25-300	35-40
*Safety And Supply Hood	1-3	1	25-50	26-29
	1-3	2	50-100	32-36
	1-3	3	75-150	38-42
	1-3	4	100-200	42-47
	1-3	5	125-250	46-51
	1-3	6	150-250	51-57
MSA Sandblast II or Blastfoe II Hood (with Constant Flow Valve)	1-3	1-12	25-300	54-60
MSA Sandblast II or Blastfoe II Hood (with Vortex Tube)	1-3	1-12	25-300	90-100

*A maximum of one 25' section of yellow recoil hose may be included.

ATTACHMENT 10.4

BREATHING AIR TAGS

C A U T I O N

BREATHING AIR
IN USE

NOTIFY

R.C.T._____

_____

Extension_____

Prior to any changes or
adjustments of this system

RESERVED FOR FUTURE USE

PPB puerto-parvisblaco nuclear, inc.	POLICY AND PROCEDURE MANUAL

TITLE

ISSUE AND CONTROL OF RESPIRATORY PROTECTION EQUIPMENT

PROCEDURE No.	REVISION No.	EFFECTIVE DATE
PPB - 309	0	11/30/86

LIST OF EFFFECTIVE PAGES

Page	Revision
1.0	0
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10.0	0
11.0	0
12.0	0
E1-1	0
E2-1	0
E3-1	0
E4-1	0

	SIGNATURE	TITLE	DATE
ORIGINATOR			
CONCURRED		RADIOLOGICAL ENGINEER	11-24-86
		RADIATION SAFETY OFFICER	11-24-86
APPROVED		VICE - PRESIDENT	12/3/86

1.0 PURPOSE

This procedure sets forth the proper methods for issuance and control of all respiratory protection equipment utilized at the PPB Decontamination Facility.

2.0 APPLICABILITY/SCOPE

This procedure applies to individuals required to issue and/or control respiratory protection equipment.

3.0 DEFINITIONS

3.1 Qualified User - An individual who has successfully completed Medical, Training, Fit Testing and Bioassay requirements necessary for issuance of respiratory protection equipment.

3.2 Clean Shaven - No facial hair which intrudes into the sealing surface of the respirator, or which may interfere with the valve function of the respirator.

3.3 SCBA - Self-Contained Breathing Apparatus.

3.4 Nosecup - A device required in the facepiece of a SCBA when ambient air temperature is less than 32 degrees Farenheit and available, if desired, to reduce fogging and dead air space in full-facepiece, negative pressure respirators.

3.5 RWP - Radioactive Work Permit.

3.6 RPO - Radiation Protection Officer.

3.7 RSO - Radiation Safety Officer.

3.8 RCT - Radiological Controls Technician.

3.9 RRCO - Radiological Records Control Officer.

3.10 Emergency Issue - When an immediate response to a facility problem is required, as determined by a RCT or the RPO.

3.11 Unused Respiratory Equipment - Equipment which has not been worn into a contamination or airborne area, and equipment (including inspection tag) which has not been removed from its sealed clean plastic bag.

3.12 Releasable Clean - Less than 1000 DPM/100 cm2 Beta/Gamma smearable activity and less than 20 CPM for total (fixed and smearable activity) as measured with and RM-14/HP 260 or equivalent.

4.0 POLICY

None

5.0 PREREQUISITES

5.1 Only NIOSH certified respiratory protection equipment which has been reviewed and approved by the RSO is to be issued for use.

5.2 All respirators issued must be in sealed, clear plastic bags with an inspection tag that has been dated and signed. It must have an identifying equipment number. The completed inspection tag is valid for 30 days (see Attachment 10.1).

5.3 All emergency use respiratory equipment must be

inspected monthly. It will have an identifying equipment number, be in a clear plastic bag or storage case, and have a red inspection tag signed and dated. (see Attachment 10.1)

5.4 Only clean shaven, qualified users shall be issued respiratory protection equipment. (see Reference 9.14).

5.5 Individuals issuing or supervising the issuance of respiratory protection equipment must be trained in the proper application and operation of this equipment for routine and emergency situations.

5.6 Only respiratory protection equipment specified in an up-to-date, valid RWP shall be issued.

5.7 All equipment which fails receipt inspection or recertification testing will be marked as defective and segregated from acceptable equipment.

6.0 PRECAUTIONS

6.1 Reuse of respiratory equipment shall be in accordance with the "Use of Respiratory Protection Equipment", PPB-306.

7.0 PROCEDURE

7.1 Points of Issue

7.1.1 Routine issue of respiratory protection equipment will be from the designated Respirator Issue Area.

7.1.2 If an immediate response is required to a facility problem, respiratory protection equipment may be issued by Radiological Controls Personnel from a convenient location as directed by the RPO.

7.1.3 Emergency issue of repiratory protection equipment shall be performed from areas dictated by PPB-701, "Maintaining Emergency Preparedness", and in accordance with PPB-703, "Emergency Respiratory Protection".

7.2 Respirator Issue

7.2.1 Verify the identity of the individual requesting respiratory protection equipment by examining their employee picture badge.

7.2.2 Ensure that the individual is clean shaven. Any individual who is not clean shaven shall not be issued, nor allowed to wear, a full facepiece respirator even though that individual has previously obtained a satisfactory fit with that particular device.

7.2.3 Verify that the RWP cited by the individual has not expired and requires the type of respiratory protection equipment requested.

NOTE: Should a question arise as to the application of the respiratory

protection equipment specified on the RWP, do not issue any device and contact the RSO for clarification. In his absence, contact the RPO.

7.2.4 Verify that the individual meets the requirements below by referring to the current worker qualification list. The list will be generated daily, based on information in the Employee Processing Clearance Form (see Attachment 10.2).

7.2.4.1 Annual Respiratory Protection Training Date

7.2.4.2 Annual Whole Body Count Date

7.2.4.3 Annual Respirator Fit Test Date

7.2.4.4 Annual Medical Examination Date

7.2.5 Should any of the individual's qualifications be expired or questionable, the Issue Technician shall direct him/her to the RSO for clarification of status.

7.2.6 Once verification is complete, record the following information on the Respirator Issue Log. (Attachment 10.3)

7.2.6.1 Date of issue.

7.2.6.2 Time of issue.

7.2.6.3 Name of user, Last, First, and

Initial.

7.2.6.4 RWP Number.

7.2.6.5 Location of use.

7.2.6.6 Type of respirator.

7.2.6.7 Equipment number of the device being used.

7.2.6.8 Technician Initials.

7.2.7 One (1) device shall be issued to an individual and that individual must be present to recive it.

7.2.8 If a nosecup, welding adapter, or other auxiliary device is requested, provide the proper device for the respiratory protection equipment being issued.

7.2.9 Upon issuing the respiratory protection equipment, inform the individual to return any unused equipment to the issue location.

7.2.10 When respiratory protection equipment is returned unused, draw a line through the original issue entry on the issue sheet and initial it.

7.3 Control

7.3.1 All respiratory protection equipment which is issued shall be logged on the appropriate Respiratory Issue Log. (see Attachment 10.3)

7.3.2 Respiratory protection equipment (excluding Airlines and Filter/Regulator Distribution Units), shall be issued for one (1) work day/shift only.

7.3.3 All respiratory protection equipment which is issued shall be returned to the Respirator Maintenance area in accordance with Procedure PPB-306, "Use of Respiratory Protection Equipment".

7.3.4 Should any respiratory protection equipment be returned by the individual user due to a discrepancy or malfunction, issue an equivalent respiratory protection device, note the pertinent facts, and contact the RPO. If for any reason an individual does not achieve an adequate facial seal with a full facepiece respirator, notify the RSO or RPO.

7.3.5 Disposal of respiratory protection equipment shall be at the direction of the RSO and recorded on the Respirator History Card for the device (see Attachment 10.4).

7.3.6 A quarterly inventory report shall be prepared, indicating the number of each type of respiratory protection equipment

discarded, in need of repair, in reserve, and in use for submission to the RSO. This report shall cover equipment in inventory for routine, outage and emergency facility conditions.

7.3.7 Respiratory protection equipment designated for emergency use shall be maintained on a current basis and shall only be used in an actual emergency. If respiratory protection equipment is required for drills or training, arrangements will be made with the RSO to supply the devices needed. All devices so issued will be returned to the Respirator Maintenance Area at the conclusion of the drill or training session.

8.0 RESPONSIBILITIES

8.1 Qualified User

8.1.1 Responsible for the proper use and disposition of respiratory protection equipment issued for his/her personal use.

8.2 Radiation Safety Officer (RSO)

8.2.1 Verify that only individuals who meet the requirements of this procedure are issued respiratory protection equipment.

8.2.2 Review the quarterly inventory report to ensure sufficient availability of devices for routine and emergency use.

8.2.3 Evaluate the total hazard and recommended engineering controls and ensure proper selection of respiratory protection equipment.

8.2.4 Make prior arrangements for equipment to be used during emergency drills and arrange for the return of all respiratory protection equipment utilized.

8.3 Radiological Controls

8.3.1 To issue respiratory protection equipment and maintain complete and accurate logs for record.

8.3.2 Prepare the Quarterly Inventory Report for review by the Respiratory Protection Supervisor.

8.3.3 Ensure equipment is inspected and cleaned in accordance with applicable Procedures.

8.3.4 Ensure those individuals who issue and/or maintain respiratory protection equipment adhere to this Procedure.

8.4 Radiological Records Control Officer

8.4.1 Ensure all respirator fit test data and/or

whole body count data is forwarded to the respirator issue facility daily.

8.4.2 Ensure all medical exam data is received and recorded.

8.4.3 Notify the respirator issue area immediately of any users disqualified from wearing respirators for medical reasons.

8.5 Training Department

8.5.1 Ensure all respiratory protection training data is forwarded to the RRCO when training is completed.

8.6 Decontamination Technicians

8.6.1 Transport used respiratory protection equipment from collection sit s to the respirator decon facility.

9.0 REFERENCES

9.1 10 CFR Part 20, "Standards for Protection Against Radiation".

9.2 Regulatory Guide 8.15, "Acceptable Programs for Respiratory Protection".

9.3 NUREF 0041, "Manual of Respiratory Protection Against Airborne Radioactive Materials".

9.4 29 CFR Part 1910.134, "General Industry Standard - Respiratory Protection".

9.5 30 CFR 11, "Respiratory Protective Devices - Tests

for Permissibility".

9.6 ANSI Z88.2 - 1980, "Practices for Respiratory Protection".

9.7 PPB Procedure, PPB-301, Respiratory Protection Program and Policy.

9.8 PPB Procedure, PPB-701, Maintaing Emergency Preparedness.

9.9 PPB Procedure, PPB-703, Emergency Respiratory Protection.

9.10 PPB Procedure, PPB-310, Inspection and Maintenance of Respiratory Protection Equipment.

9.11 PPB Procedure PPB-311, Respirator Filter Testing.

9.12 PPB Procedure PPB-308, Respiratory Equipment Cleaning and Maintenance.

10.0 ATTACHMENTS

10.1 Inspection Tag

10.2 Employee Processing Clearance Form

10.3 Respirator Issue Log

10.4 Respirator History Card

ATTACHMENT 10.1

Inspection Tag

RESPIRATORY EQUIPMENT INSPECTION

This equipment has been cleaned, surveyed, inspected and found to be operable.

Date_____ Inspector_____

(Green Card)

EMERGENCY RESPIRATORY EQUIPMENT INSPECTION

This equipment has been inspected and found to be operable.

Date_____ Inspector_____

(Red Card)

ATTACHMENT 10.2

EMPLOYEE PROCESSING CLEARANCE
PPB DECONTAMINATION FACILITY

NAME _____

EMPLOYER _____ SSN_____

1. Annual Respiratory Protection Training

   Respiratory Protection Training Date _____

   Type of Respirator

   FFNP ____
   SUPPLIED AIR ____
   SCBA ____
   HELMET ____
   PAPR ____

   _____
   Authorized Signature

2. Annual Whole Body Count

   Date of WBC _____

   _____
   Authorized Signature

3. Annual Respirator Fit Test

   Date of Fit Test _____

   Qualified____ Not Qualified____

   FFNP____
   SUPPLIED AIR ____
   SCBA ____
   HELMET ____
   PAPR _____

4. Annual Medical Examination

   Date of Exam _____

   Spirometry Test: Qualified____ Not Qualified____

   Eyeglasses: Required____ Not Required____

   _____
   Authorized Signature

ATTACHMENT 10.3

RESPIRATOR ISSUE LOG

DATE: _____

Time	Name	RWP	Location	Type	Serial No.	Initial

ATTACHMENT 10.4

RESPIRATOR HISTORY CARD

RESPIRATOR EQUIPMENT HISTORY

Identification No.		Description	
Manufacturer	Serial No.	Model No.	Type
Date in Service		Date Returned	
Tech Manual		Parts List	Inspection Interval
Remarks			

Date	Recorded By	Symptoms	Work Performed	Part Name

Manufacturer	Type	Serial No.

PPB pro-providence nuclear, inc.	POLICY AND PROCEDURE MANUAL

TITLE

INSPECTION AND MAINTENANCE OF RESPIRATORY PROTECTION EQUIPMENT

PROCEDURE No.	REVISION No.	EFFECTIVE DATE
PPB - 310	0	11/30/86

LIST OF EFFFECTIVE PAGES

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3.0	0	18.0	0	E1-1	0
4.0	0	19.0	0	E2-1	0
5.0	0	20.0	0	E3-1	0
6.0	0	21.0	0	E4-1	0
7.0	0	22.0	0	E5-1	0
8.0	0	23.0	0	E6-1	0
9.0	0	24.0	0	E7-1	0
10.0	0	25.0	0	E8-1	0
11.0	0	26.0	0	E9-1	0
12.0	0	27.0	0	E10-1	0
13.0	0	28.0	0	E11-1	0
14.0	0	29.0	0		
15.0	0	30.0	0		

	SIGNATURE	TITLE	DATE
ORIGINATOR			
CONCURRED	[signature]	RADIOLOGICAL ENGINEER	11-24-86
	[signature]	RADIATION SAFETY OFFICER	11-24-86
APPROVED	[signature]	VICE-PRESIDENT	12/3/86

1.0 PURPOSE

The purpose of this procedure is to set forth the requirements for inspection and maintenance of respiratory protection equipment to ensure its full effectiveness and readiness for use. This procedure provides the methods to be used for inspecting, maintaining and repairing equipment in accordance with Federal Regulations and industry accepted standards.

2.0 APPLICABILITY/SCOPE

This procedure applies to all personnel who inspect, maintain, or administrate the program for respiratory protection equipment.

3.0 DEFINITIONS

3.1 Routine Use Equipment - Respiratory protection equipment which is regularly and ordinarily used for protection against airborne contaminants.

3.2 Emergency Use Equipment - Respiratory protection equipment which is made available for use in an unusual event, i.e., fire, radiological incident, etc.

3.3 SCBA - Self Contained Breathing Apparatus.

3.4 RPO - Radiation Protection Officer.

3.5 RCT - Radiological Controls Technician

4.0 POLICY

N/A

5.0 PREREQUISITES

5.1 Personnel Qualifications

5.1.1 Replacement of parts or repairs shall be done by qualified personnel, trained in accordance with a program approved by the Radiation Safety Officer (RSO).

5.1.2 High pressure regulators, alarms and valves shall be repaired by the manufacturer, or by a factory-trained technician.

5.1.2.1 Technicians performing work on a high pressure regulator must wear a full face shield.

5.2 Maintenance and Repairs

5.2.1 No attempt shall be made to replace components or to make adjustments or repairs beyond the manufacturer's recommendations.

5.2.2 Respirators shall be maintained and issued in a NIOSH certified configuration. The certification for a respirator is automatically voided if:

5.2.2.1 The respirator is not the same in all respects as certified by NIOSH.

5.2.2.2 The respirator is not maintained in a certified condition.

5.2.3 Protective coverings applied to minimize

equipment contamination or damage are acceptable.

5.2.4 A binder containing all manufacturers' instruction manuals and the appropriate NIOSH approval labels, or certificates when available, shall be maintained in the Radiation Records Control Office. This binder shall be used as a reference during the performance of all work in accordance with this procedure.

5.3 New Equipment

All new respiratory protection equipment shall be receipt inspected at the PPB Decontamination Faciltiy in accordance with Section 10.1 of NUREG 0041 by qualified Respirator Maintenance Personnel.

5.4 Cleaning

Each piece of equipment shall be cleaned after use. Cleaning may be performed at the PPB Decontamination Facility in accordance with Referecne 9.9 or by other means in accordance with the manufacturer's instructions.

5.5 Records

An Equipment History Record shall be maintained for all respiratory protection equipment bearing an identification number. All repairs or maintenance

must be logged on the appropriate Equipment History Card. (see Attachment 10.1)

5.6 Purchasing

5.6.1 Purchase orders for SCBA regulator overhaul and cylinder refurbishing, must be placed with vendors on the Supplier Quality Classification List, or the manufacturer.

5.6.2 Breathing air analysis will be done in accordance with ANSI Z86.1-1973 Commodity Specification For Air, Section 5 Analytical Procedures.

5.7 Quality Assurance, (QA)

The RPO or RCT under the direction of the RPO shall, on a bi-weekly basis, randomly select a sample of clean, inspected, ready-for-issue respiratory equipment for QA check. He/she shall inspect this equipment for radiological survey compliance, functional testing, operability testing (functional), and inspection data. All findings shall be entered on the Respirator Maintenance QA Checksheet, Attachment 10.13, and be signed by the RPO. Completed copies of the QA Checksheet shall be maintained in a looseleaf log book at the facility. The log sheets will be forwarded to the Radiation Records Control Office for filing.

6.0 PRECAUTIONS

N/A

7.0 PROCEDURE

7.1 Inspection and Maintenance Periodicity

7.1.1 Routine use equipment shall be inspected after each use, not more than thirty (30) days prior to use, and after washing.

7.1.2 Emergency use equipment shall be inspected after each use and at least once each calendar month. Record the results on the Emergency Full Face Respirator Inspection Log (see Attachment 10.3) for full face emergency respirators, and the SCBA Check Log (see Attachment 10.7) for SCBA Emergency equipment.

NOTE: Equipment available for use shall have an inspection tag (green for routine use, red for emergency use) signed and dated by a qualified individual and placed with the device in a sealed bag or storage case. (see Attachment 10.2)

7.1.3 Filter-regulators shall be inspected after each use, every six (6) months, and following maintenance.

7.1.4 Pressure gauges shall be calibrated every twelve (12) months.

7.1.5 Filter-regulator cartridges shall be changed every six (6) months.

7.1.6 Each new or repaired facepiece shall be inspected for leaks per Reference 9.8.

7.1.7 Flow rate test gauges shall be calibrated every twelve (12) months.

7.1.8 Self contained breathing apparatus cylinders shall be hydrostatically tested as follows:

7.1.8.1 Composite cylinders - every three (3) years.

7.1.8.2 Steel, aluminum, and all others - every five (5) years.

7.1.9 Self contained breathing apparatus regulators shall be flow tested every two (2) years. If the regulator fails the flow test, it shall be removed from service, repaired, and retested.

7.1.10 All new or repaired flow control valves or vortex tubes shall be tested to ensure sufficient air flow prior to being placed in service.

7.1.11 All airline hoses must be inspected prior to use.

7.2 Filter Testing

7.2.1 All reused high efficiency particulate filters shall be tested to ensure that penetration and air flow resistance measurements are within the certification limits specified in 30 CFR 11 in accordance with Reference 9.10.

7.3 Surveying

7.3.1 Smearable Contaminnation Levels

7.3.1.1 Respiratory equipment shall be surveyed after cleaning and decontamination to verify that there is no smearable contamination in excess of 20 dpm per 100 cm2 alpha or 1000 dpm per 100 cm2 beta-gamma above background.

7.3.2 Fixed Limits

7.3.2.1 Unrestricted Release: For equipment to be utilized outside the RCA, fixed contamination on any surface of the facepiece, or helmet, or related equipment shall not exceed 100 CPM.

7.3.2.2 Restricted Release: For equipment to be utilized inside the RCA, fixed

contamination on any surface of the facepeces or helmets shall not exceed 0.2 mR per hour <720 cpm on an RM-14 with an HP-260 probe or equivalent.

On related equipment such as airline hoses, air maifolds, belts, regulators, etc. fixed contamination shall not exceed 0.5 mR <1800 cpm on any RM-14 with an HP-260 probe or equivalent.

7.4 Inspection Specifics

7.4.1 Full Facepiece, Negative Pressure, Air Purifying Respirator

Applicable devices are:

All MSA Facepieces

Scott, Scottoramic Facepiece

7.4.1.1 Examine the facepiece shell for excessive dirt, cracks, tears or distortion of the facial sealing surface.

7.4.1.2 Examine the head harness for breaks, loss of elasticity or excessively worn serrations on the head harness which might permit slippage.

7.4.1.3 Remove exhalation valve cover and

examine exhalation valve for foregin material, dust particles, or hair. Inspect valve for cracks, tears, or distortion in the valve material. Ensure that the valve and seat are properly mounted and replace valve cover.

7.4.1.4 Inspect inhalation valve and valve seat integrity, when applicable.

7.4.1.5 Examine buckles to ensure that they are operational, free of defects, and securely mounted.

7.4.1.6 Check clamps and connections and ensure that they are secure.

7.4.1.7 Check the filter mounting assembly and ensure that there is a gasket present and that it is not worn. If a speaking diaphragm is provided, inspect it for indications of damage or deterioration.

7.4.1.8 Check coupling or receptacle and ensure that it is secure and the threads are in good condition.

7.4.1.9 Check the lens and ensure that it is not cracked or badly scratched so as

to impair vision.

7.4.1.10 Check the lens frame and ensure that it is securely mounted and in good condition.

7.4.1.11 Ensure the facepiece is labeled with an equipment number.

7.4.1.12 Complete an inspection tag (see Attachment 10.2) and place it with the facepiece in a plastic bag or storage case. Complete Facepiece Check Log as appropriate. (see Attachment 10.4)

7.4.1.13 Record all maintenance on the appropriate Equipment History Card(s). (see Attachment 10.1)

7.4.2 Full Facepiece, Positive Pressure, Air Purifying Respirator

Applicable device is:

MSA Powered Air Purifying Respirator (PAPR)

7.4.2.1 Inspect facepiece per Section 7.4.1 of this procedure.

NOTE: The PAPR facepiece MUST have two exhalation valve assemblies.

7.4.2.2 Remove the filters.

7.4.2.3 With the filters removed, remove the battery.

7.4.2.4 Charge the battery for at least 16 hours before each issuance. Shelf life for a charge is 30 days.

7.4.2.5 Visually inspect the motor-blower module and battery for any indication of damage or deterioration. Pay particular attention to the filter sealing gaskets.

7.4.2.6 Visually inspect the breathing tube for cracking, splitting or other signs of deterioration.

7.4.2.7 Inspect breathing tube couplings.

7.4.2.8 Inspect the waist belt and ensure that it is in good condition.

7.4.2.9 Reassemble the device using a fully charged battery pack and new or tested filters.

7.4.2.10 Connect breathing tube to the flow tester coupling and turn on the power switch Test the unit for approximately one (1) minute to ensure that the flow rate is >4CFM.

7.4.1.10.1 If the unit does not perform satisfactorily, test the battery and motor-blower assembly using the manufacturer's test device.

7.4.2.11 Ensure the motor-blower is labelled with an equipment number.

7.4.2.12 Complete an inspection tag and place with the unit in a sealed bag or storage case.

7.4.2.13 Complete MSA PAPR Check Log. (see Attachment 10.5)

7.4.2.14 Record all maintenance on the appropriate Equipment History Card(s). (see Attachment 10.1)

7.4.3 Full Facepiece, Supplied Air Respirator

Applicable Devices are:

MSA Duo-Flo with black Ultravue facepiece

MSA Duo-Flo with yellow silicone Ultravue facepiece.

7.4.3.1 Inspect facepiece per Section 7.4.1 of this procedure.

7.4.3.2 Inspect breathing tube for cracking, splitting or other signs of deterioration.

7.4.3.3 Inspect breathing tube couplings and ensure that the gasket is in good condition.

7.4.3.4 Duo-Flo:

7.4.3.4.1 Inspect adapter for any indication of damage or deterioration. Pay particular attention to the threads, couplings, and inhalation valve.

7.4.3.4.2 Inspect the filter mount gasket.

7.4.3.4.3 Test check valves as follows:

a. Attempt to pass air through the adaptor by blowing lightly into the air line inlet. No air should pass. If air passes through, leakage could occur when used in the cartridge mode of operation.

b. Attempt to pass air through the adaptor by

blowing lightly into the breathing tube port. No air should pass.

7.4.3.5 Inspect the waist belt and ensure it is in good condition.

7.4.3.6 Ensure the Duo-Flo device is labeled with an equipment number.

7.4.3.7 Complete an inspection tag and place with the unit in a sealed bag or storage case.

7.4.3.8 Complete the appropriate blocks of the MSA Duo-Flo Check Log. (see Attachment 10.6)

7.4.3.9 Record all maintenance on the appropriate Equipment History Card(s). (see Attachment 10.1)

7.4.4 Full Facepiece, Pressure Demand, Self-Contained Breathing Apparatus

Applicable Device is:

Scott Presur-Pak IIa with Scottoramic Facepiece.

7.4.4.1 Inspect the facepiece per Section 7.4.1 of this procedure.

7.4.4.1.1 SCBA facepieces shall be disassembled for cleaning

and santizing including the disassembly, inspection, and cleaning of the balanced exhalation valve assembly.

7.4.4.2 Visually inspect the complete apparatus (belts, harness, buckles, etc.) for worn or aging rubber parts and damaged components.

7.4.4.3 Inspect the cylinder as follows:

7.4.4.3.1 Check the latest cylinder hydrostatic test date to ensure it is current.

7.4.4.3.2 Visually inspect cylinder for large dents or gouges in the metal. Cylinders which show exposure to high heat or flame, such as paint turned brown or black, decals charred or missing, gauge lens melted or elastomer bumper distorted, shall be removed from service.

7.4.4.3.3 Check cylinder pressure gauge for full indication. If cylinder pressure is less than full, replace with a fully charged cylinder.

7.4.4.4 Ensure cylinder valve is off. Disconnect regulator hose coupling. Inspect nipple gasket for wear or damage. Reconnect hand-tight to cylinder valve outlet.

NOTE: Wrenches shall not be used, as damage to coupling gasket may result.

7.4.4.5 Close regulator BY-PASS valve (red knob) by turning clockwise.

7.4.4.6 Close regulator MAIN LINE valve (yellow knob) by depressing lock-tab and turning knob clockwise.

7.4.4.7 Check to ensure regulator cover is tight and not lifted. If cover is loose or lifted, remove regulator from service.

7.4.4.8 Unthread breathing tube from regulator and ensure that the "O"

ring on the outlet probe is in good condition.

7.4.4.9 Verify diaphragm integrity as follows:

7.4.4.9.1 Place mouth over regulator outlet probe and gently inhale. This negative pressure shall be maintained with no leakage (flow) through the regulator.

7.4.4.9.2 Gently blow into regulator outlet. This positive pressure shall be maintained with no leakage (flow) through the regulator.

NOTE: If leakage is present, recheck BY-PASS and MAIN LINE valves to be sure they are fully closed and retest per Steps 7.4.4.9.1 and 7.4.4.9.2. If leakage is still present, remove

regulator from service.

7.4.4.10 Open regulator MAIN LINE valve by turning full counterclockwise. A clicking sound will be audible, indicating the lock-tab is functioning.

7.4.4.11 Slowly open the cylinder valve knob fully. The Pak-Alarm should ring monentarily. The regulator gauge will indicate FULL. Check for leakage at cylinder valve, regulator, and all connections. Push in and rotate cylinder valve knob clockwise to close valve. (Some versions may require releasing a ratchet device). Note the pressure on the regulator gauge. Wait 2-3 minutes. If leakage is detected (evidenced by a change in gauge indication), remove the regulator from service.

7.4.4.12 Visually inspect facepiece breathing tube for cracking, splitting, or other signs of deterioration.

7.4.4.13 Cover the breathing tube coupling,

gently stretch the breathing tube out and ensure that the diaphragm remains collapsed for at least 10 seconds. Uncover the breathing tube coupling and ensure that the diaphragm returns to its normal configuration.

7.4.4.14 Open the cylinder valve fully by pushing in and rotating the valve counterclockwise. Connect test facepiece breathing tube coupling securely to regulator outlet and don test facepiece. Inhale. Air should be delivered with very slight effort, and no honking sounds will be heard.

7.4.4.15 Place selector lever in the "ON" position. A slight increase in facepiece pressure will be noted. Breath several times. No honking sounds will be heard. Place control lever in the "OFF" position. Disconnect test facepiece breathing tube and remove test facepiece.

7.4.4.16 Push in and rotate the cylinder

valve knob clockwise to close valve. (Some versions may require releasing a ratchet device).

7.4.4.17 Open BY-PASS valve slowly until air flow begins, then shut BY-PASS valve. If air flow requires one full turn or more, remove regulator from service and contact RPO.

7.4.4.18 Release remaining air pressure by slowly placing selector lever in the "ON" position. Pak Alarm will ring at or before 1/4 (575 psi) on the regulator gauge. After pressure is released (no flow), place lever in the "OFF" position.

7.4.4.19 For complete units:

7.4.4.19.1 Ensure the cylinder, regulator and facepiece are labeled with equipment numbers.

7.4.4.19.2 Complete an inspection tag and place with the unit in a sealed bag or storage case. (see Attachment 10.2)

7.4.4.19.3 Complete appropriate blocks of the SCBA Check Log. (see Attachment 10.7)

7.4.4.19.4 Record all maintenance on the appropriate Equipment History Card(s). (see Attachment 10.1)

7.4.5 Constant Flow, Supplied Air, Abrasive Blasting Hoods/Helmets

Applicable Devices are:

MSA Blastfoe

(w/flow control valve)

(w/vortex tube)

MSA Sandblast II Blasting Helmet

(w/flow control valve)

(w/vortex tube)

7.4.5.1 Visually inspect the helmet for damage or deterioration, paying particular attention to joints.

7.4.5.2 Examine the headgear and suspension.

7.4.5.3 Examine the protective faceshield to ensure lens is free of cracks, breaks or scratches due to rebounding abrasive particles which

would cause impaired vision.

7.4.5.4 Ensure that the protective screen is intact (if applicable) and properly secured over the face shield.

7.4.5.5 Inspect the collar and/or bib assemblies to ensure they are free of rips, tears, and holes.

7.4.5.6 Inspect the breathing tube assembly and gasket(s) for cracking, splitting or indications of damage or deterioration. Inspect/install muffler (if applicable). Check all connections and hoses for tightness and integrity.

7.4.5.7 Inspect the flow control valve or vortex tube assembly, paying particular attention to indications of damage or deterioration to the body, screens, moving parts and connections.

7.4.5.8 Test all new or repaired flow control valves or vortex tubes to ensure the flow rate is >6CFM by shutting the flow control valve or adjusting the vortex tube to reduce

flow to the hood/helmet to the minimum possible. Connect the device to an air line regulated to the low end of the pressure band, for the given hose length/number of sections as specified in Procedure PPB-306 and a flow tester. Operate for one (1) minute to ensure the flow rate remains greater than 6CFM.

NOTE: For MSA Hood only, muffler must be installed in breathing tube assembly when a vortex tube is utilized.

7.4.5.9 Ensure the flow control valve is fully open, or the vortex tube is backed out 1-1/2 turns.

7.4.5.10 Visually inspect the belt assembly (if applicable) for rips, tears, or damaged components.

7.4.5.11 Ensure the helmet, and flow control valve or vortex tube assembly, are labeled with equipment numbers.

7.4.5.12 Complete an inspection tag and place with the unit in a sealed bag or storage case. (see Attachment 10.2)

7.4.5.13 Complete appropriate bocks of the Airline Hood/Helmet Check Log. (see Attachment 10.8)

7.4.5.14 Record all maintenance on the appropriate Equipment History Card(s). (see Attachment 10.1)

7.4.6 Supplied Air Support Equipment

7.4.6.1 Filter-Regulator Applicable Device: Bullard 41P4 or Bullard 41P6

7.4.6.1.1 Inspect couplings for proper operation.

7.4.6.1.2 Inspect the housing and supports for indications of damage or deterioration.

7.4.6.1.3 Connect the inlet to a pressurized air line of 50-100 PSI. Raise and lower the outlet pressure to ensure proper operation of the regulator and pressure gauge. Check the housing, couplings and sealing area for leaks.

Slight leakage in the sealing area is acceptable.

7.4.6.1.4 Ensure the filter-regulator is labeled with equipment number.

7.4.6.1.5 Complete an inspection tag and place with the unit. (see Attachment 10.2)

7.4.6.1.6 Complete appropriate blocks of the Filter Regulator Check Log. (see Attachment 10.11)

7.4.6.1.7 Record all maintenance on the appropriate Equipment History Card(s). (see Attachment 10.1)

7.4.6.2 Filter Distribution Units

Applicable Device is:

MSA Manifold

7.4.6.2.1 Each unit shall be inspected prior to issue.

7.4.6.2.2 Change the two (2) organic cartridges and

the one (1) HEPA filter and gaskets. Verify that the filter container is clean, unbroken, adequately tight and the drain valve is operational.

7.4.6.2.3 Verify adequacy of operation for manifold quick disconnet fittings.

7.4.6.2.4 Rotate the regulator control valve so that the pressure increases and decreases on the manifold pressure gauge. Adjust regulator such that gauge reading is +/- 5 psig of the regulator setting. Replace or repair the regulator if necessary.

7.4.6.2.5 Manifold pressure gauge must be calibrated every 12 months.

7.4.6.2.6 Check the entire distribution manifold for

obvious deficiencies. Repair if necessary.

7.4.6.2.7 Complete an inspection tag and place with the unit. (see Attachment 10.2)

7.4.6.2.8 Complete appropriate blocks of Filter-Regulator Check Log. (see Attachment 10.11)

7.4.6.2.9 Record all maintenance on the appropriate Equipment History Card(s). (see Attachment 10.1)

7.4.6.3 Supplied Air Hoses

Applicable Devices are:

Bullard Hose

MSA Hose

Main Air Hose - 3/4"

NOTE:
The standard fitting to be used on the plant Service Air System outlets, compressed breathing air cylinder regulator outlets, and air compressor regulator outlets (set up for direct breathing use) shall be a

Bowes Fitting.

7.4.6.3.1 Inspect couplings for sealing ring condition and proper operation.

7.4.6.3.2 Inspect the entire hose and couplings for indications of damage on deterioration.

7.4.6.3.3 Connect the hose to a 50-100 PSI air supply and check for leaks.

7.4.6.3.4 Blow air through the hose for several minutes to check for and remove, particles, moisture, or other foreign material.

7.4.6.3.5 Ensure each hose is labeled with an equipment number.

7.4.6.3.6 Complete an inspection tag and place with the hose in a sealed plastic bag. (see Attachment 10.2)

7.4.6.3.7 Complete appropriate

blocks of the Breathing Air Hose Check Log. (see Attachment 10.12)

7.4.6.3.8 Record all maintenance on the appropriate Equipment History Card(s). (see Attachment 10.1)

NOTE:

Except for tightening or replacing connectors, no attempt shall be made to repair any manufacturer approved air line hose. Any defective hoses must be discarded.

7.4.7 High Efficiency Particulate Air Filters (HEPA)

Applicable Devices are:

MSA Ultra Filters

MSA PAPR Filters

7.4.7.1 Reused filters shall be tested in accordance with Section 7.2 of this procedure.

7.4.7.2 All reused filters shall be inspected to ensure that there are

no indications of damage or deterioration.

8.0 RESPONSIBILTIES

8.1 The Radiation Protection Officer will ensure that maintenance and inspection of respiratory protection equipment is affected per this procedure.

9.0 REFERENCES

9.1 10 CFR Part 20, Standards for Protection Against Radiation.

9.2 Regulatory Guide 8.15, Acceptable Programs for Respiratory Protection.

9.3 NUREG 0041, Manual of Respiratory Protection Against Airborne Radioactive Materials.

9.4 29 CFR Part 1910.134, General Industry Standard - Respiratory Protection.

9.5 30 CFR Part 11, Respiratory Protective Devices - Test for Permissibility.

9.6 ANSI Z88.2-1980, Practices for Respiratory Protection.

9.7 PPB Procedure PPB-301, Respiratory Protection Program and Policy.

9.8 PPB Procedure PPB-3XX. Operation of the TDA-90 Respirator Leak Test Apparatus.

9.9 PPB Procedure PPB-308, Respiratory Equipment Decontamination and Testing.

9.10 PPB Procedure PPB-311, Respirator Filter Testing.

9.11 PPB Procedure PPB-102, Surface Contamination Surveys.

9.12 PPB Procedure PPB-105, Release Surveys.

9.13 PPB Procedure PPB-702, Emergency Kit/Lockers Readiness.

9.14 PPB Procedure PPB-703, Emergency Respiratory Protection.

9.15 Manufacturer's instructions and NIOSH Certification Labels for:

Mine Safety Appliances Respiratory Protective Equipment.

Scott Aviation Respiratory Protective Equipment.

10.0 ATTACHMENTS

10.1 Equipment History Card

10.2 Respiratory Equipment Inspection Tag

10.3 Emergency Full-Face Respirator Issue Log

10.4 Facepiece Check Log

10.5 MSA PAPR Check Log

10.6 MSA Duo-Flo Check Log

10.7 SCBA Check Log

10.8 Airline Hood/Helmet Check Log

10.9 Filter-Regulator Check Log

10.10 Breathing Air Hose Check Log

10.11 Respirator Maintenance QA Check Sheet

ATTACHMENT 10.1

EQUIPMENT HISTORY CARD

RESPIRATOR EQUIPMENT HISTORY

Identification No.		Description	
Manufacturer	Serial No.	Model No.	Type
Date in Service		Date Returned	
Tech Manual		Parts List	Inspection Interval
Remarks			

Date	Recorded By	Symptoms	Work Performed	Part Name

Manufacturer	Type	Serial No.

ATTACHMENT 10.2

RESPIRATORY EQUIPMENT INSPECTION

This equipment has been cleaned, surveyed, inspected and found to be operable.

Date_____Inspector_____

(green card)

EMERGENCY

RESPIRATORY EQUIPMENT INSPECTION

This equipment has been inspected and found to be operable.

Date_____Inspector_____

(red card)

ATTACHMENT 10.3

EMERGENCY FULL-FACE RESPIRATOR

Facepiece Serial #	Location	Canister Expiration Date	Inspection	Signature/ Date	Facepiece Serial #	Location	Canister Expiration Date	Inspection	Signature/ Date

(X) Satisfactory (U) Unsatisfactory

ATTACHMENT 10.4

FACEPIECE CHECK LOG

Inspecting Technicians Signature _____ Date_____

Equipment Number	Inspection	Equipment Number	Inspection	Equipment Number	Inspection	Equipment Number	Inspection

(X) = Satisfactory (R) = Repaired (See TDA Log)

ATTACHMENT 10.5

MSA PAPR CHECK LOG

Motor-Blower Equipment Number	Flow Test Spec: 4CFM	Visual and Functional Check	Battery Charged	Comments	Date/ Signature

ATTACHMENT 10.6

MSA DUO-FLO CHECK LOG

Facepiece Equipment Number	Flow Test Spec: 4CFM	Inspection and Functional Check	Comments	Date/ Signature

(X) Satisfactory (U) Unsatisfactory

ATTACHMENT 10.7

SCBA CHECK LOG

SCBA Unit No.	Location	CYLINDER			REGULATOR		Facepiece Equipment Number	Visual and Functional Check	Comments	Date/ Signature
		Equipment Serial Number	Hydro Date	Pressure	Equipment Serial Number	Calibration Date				

(X) Satisfactory (U) Unsatisfactory

ATTACHMENT 10.8

AIRLINE HOOD/HELMET CHECK LOG

Flow Control Valve or Vortex Tube	Hood/Helmet Equipment Number	Flow Test Spec: 6CFM	Visual and Functional Check	Comments	Date/ Signa.

(X) Satisfactory (U) Unsatisfactory

ATTACHMENT 10.9

FILTER-REGULATOR CHECK LOG

EQUIP. NUMBER	FILTER CHANGE DATE	GAUGE CALIBRAT. DATE	QUANT/TYPE COUPLINGS	VISUAL AND FUNCTIONAL CHECK	COMMENTS	SIGNA

ATTACHMENT 10.10

BREATHING AIR HOSE CHECK LOG

Bowes Fitting Number	Hose Number	Blown Down	Pressure Tested	Issued To	Location	Date/ Signature	Comments	Returned By	Date/ Signature

(X) Satisfactory

(U) Unsatisfactory

ATTACHMENT 10.11

RESPIRATOR MAINTENANCE QA CHECKSHEET

PURPOSE: To provide vehicle on which to document QA random checks of respirator maintenance work and assure compliance with Procedure "Inspection and Maintenance of Respiratory Protection Equipment".

Respirator Type and ID No.	Initial Inspec Date	QA Inspec Date	Rad Survey Data	Inspec Data	Funct Test	Medical Data	Supervisor Signature

COMMENTS:

PPB photo-processing nuclear, inc.	POLICY AND PROCEDURE MANUAL

TITLE

RESPIRATOR FILTER TESTING

PROCEDURE No.	REVISION No.	EFFECTIVE DATE
PPB - 311	0	11/30/86

LIST OF EFFFECTIVE PAGES

Page	Revision
1.0	0
2.0	0
3.0	0
4.0	0
5.0	0
6.0	0
7.0	0
8.0	0
9.0	0
10.0	0
11.0	0
12.0	0
E1-1	0

	SIGNATURE	TITLE	DATE
ORIGINATOR			
CONCURRED	Stthouse	RADIATION SAFETY OFFICER	11-24-86
APPROVED		VICE-PRESIDENT	12/3/86

1.0 PURPOSE

To set forth procedures and requirements for respirator filter testing for determining filter efficiency and resistance to air flow.

2.0 APPLICABILITY/SCOPE

This procedure applies to all personnel who inspect and maintain respiratory protection equipment on this site.

3.0 DEFINITIONS

3.1 Q-127 - Respirator Filter Tester (TDA-100 Air Techniques, Inc.)

3.2 Chuck - Q-127 component which holds filter jigs in place during testing.

3.3 Jig - a device for holding a filter in place.

3.4 SLPM - Standard Liters Per Minute.

3.5 RSO - Radiation Safety Officer.

3.6 RPO - Radiation Protection Officer.

3.7 RRCO - Radiation Records Control Officer.

3.8 RCT - Radiological Controls Technician.

4.0 POLICY

N/A

5.0 PREREQUISITES

5.1 Position analyzer exhauster hose to remove smoke from the mechanical analyzer region.

5.2 Ensure that the DOP level is between the 1-1/2 inch and 1 inch levels etched on the sight glass.

5.3 Ensure that air cylinder lubricator oil level is full and air cylinder pressure is between 15 psi and 30 psi.

5.4 Ensure that the vacuum pump oil level is full.

5.5 Check moisture separators for presence of condensate and drain if necessary.

5.6 Place the instrument breaker, on the right side of the instrument, in the ON position.

5.7 Ensure that the filters to be tested have been surveyed and found to be less than 1000 dpm/100 cm2 Beta Gamma, 100 dpm/100 cm2 Alpha, and 0.1 mr/hr Beta-Gamma fixed contamination.

5.8 Ensure that all operational maintenance has been performed in accordance with Attachment 10.1.

6.0 PRECAUTIONS

N/A

7.0 NORMAL CALIBRATION AND OPERATING PROCEDURE

NOTE: Should any of the following steps not produce the required results, immediately place the Q-127 in a safe condition and consult the RPO.

7.1 Depress master "ON" button.

7.2 Allow Q-127 to reach normal operating temperature of 168 degrees C. This takes at least 30 minutes.

7.3 When normal operating temperature is achieved, turn pump on.

NOTE: Vacuum pump head pressure shall be maintained at 11" to 12" Hg, and the vacuum operating head shall be maintained at 5" Hg.

7.4 Turn the particle meter power switch on.

7.5 Flow settings:

7.5.1 Adjust vapor flow meter to 20 SLPM +/- 2 SLPM, a setting of 41 on the gauge.

7.5.2 Adjust diluent flow meter to 80 LPM +/- 2 LPM, a setting of 164 on the gauge.

7.6 Set calibration switch to "C".

7.7 Set meter sensitivity switch to the "HIGH" position.

7.8 Adjust meter zero control to "0".

7.9 Turn the cell lamp on the particle size meter to the "ON" position.

7.10 Adjust mechanical analyzer to 45 degrees.

7.11 Set calibration switch to "A" and adjust "A" fine straylight for "0".

7.12 Set calibration switch to "B" and adjust "B" fine straylight for "0".

7.13 Set calibration switch to "N".

7.14 Set meter sensitivity switch to the "LOW" position.

7.15 Remove smoke tube from holder and place on magnehelic gauge. Adjust vacuum valve at rear of mixing chamber to obtain a reading of 3 psig.

7.16 Remove smoke tube from gauge and connect to the

mechanical analyzer sampling port.

7.17 Completely remove the standard lamp from the analyzer.

7.18 Adjust the sample flow by turning the valve at the top of the filter in a counterclockwise direction. When the smoke stream visible through the top of the standard lamp port just begins to "BREAK UP", turn the valve clockwise until a solid stream of smoke is visible.

NOTE: The sample flow should not be overly adjusted in either direction as damage to the mechanical analyzer will result.

7.19 Place the standard lamp back into the analyzer in the raised position.

7.20 Adjust analyzer to "0" and note the reading.

7.21 Remove smoke tube from analyzer sampling port and turn cell lamp off.

7.22 Turn standard lamp on and insert it into the port.

7.23 Adjust intensity control to obtain reading noted in Step 7.20.

7.24 Adjust analyzer to 45 degrees.

7.25 Switch meter sensitivity to the "HIGH" position.

7.26 Adjust "A" and "B" fine gain controls equally and in opposite directions to obtain "0" on particle size meter.

7.27 Switch meter sensitivity to the "LOW" position.

7.28 Turn off standard lamp and remove it from the cell leaving it in the raised position.

7.29 Turn cell lamp on and connect the smoke tube to the analyzer port.

7.30 Rotate mechanical analyzer to obtain a reading of "0" +/- 2 on the particle size meter.

7.31 Switch meter sesitivity to the "HIGH" position.

7.32 Check the meter sensitivity by rotating the mechanical analyzer to obtain a reading of "25" on either side of the particle size meter. Note the analyzer reading. Rotate the mechanical analyzer to obtain a reading of "25" on the opposite side of the meter. Again, note the analyzer reading. The difference between the two should be 5 degrees which indicates a sensitivity of 10 to 1. If the difference is more than 5 degrees, increase the "TOTAL GAIN". If it is less, reduce the "TOTAL GAIN".

7.33 If the "TOTAL GAIN" knob was adjusted in Step 7.32, remove smoke tube and repeat Steps 7.10 through 7.32.

7.34 Connect smoke tube to the analyzer port. Adjust mechanical analyzer to 29 degrees. If the particle size meter is to the right of "0", increase the

particle size dial slightly. If the particle size meter is to the left of "0", decrease the particle size dial slightly.

7.35 When the particle size meter indicates "0" +/- 2, switch meter sensitivity to the "HIGH" position. A reading of +/- 15 in this position is equivalent to a particle size of .3 microns.

7.36 Repeat Step 7.32. If the "TOTAL GAIN" knob is adjusted, remove smoke tube and repeat Steps 7.10 through 7.34.

7.37 Increase or decrease the particle size dial as necessary to maintain +/- 15 on the particle size meter.

7.38 Repeat Step 7.32 periodically to ensure the proper meter sensitivity. If the "TOTAL GAIN" knob is adjusted, remove smoke tube and repeat Steps 7.10 through 7.34.

7.39 Calibrate the percent penetration meter.

7.39.1 Turn the scattering chamber cell lamp on.

7.39.2 Turn the percent penetration meter power switch on.

7.39.3 Set meter zero switch on the percent penetration meter to the zero position, and adjust meter zero control to obtain "0" on the meter.

7.39.4 Place type of filter to be tested in the appropriate jig and close chuck.

7.39.5 Adjust flow indicator to obtain the desired setting for the filter being tested. See Attachment 10.2.

NOTE: Vacuum operating head pressure should be maintained at 5 inches Hg by using the regulating valve.

7.39.6 Open chuck and remove filter.

7.39.7 Switch percent penetration meter to 100% scale and close chuck.

7.39.8 Adjust coarse and fine gain controls respectively to obtain a reading of 100 on the percent penetration meter.

7.39.9 Open chuck.

7.39.10 Switch percent penetration meter to the 0.1% scale.

7.39.11 Adjust straylight control to obtain a reading of "0" on the percent penetration meter.

7.40 Place the same type of filter used in Step 7.39.4 in the jig and close chuck.

NOTE: If a different type of filter is to be tested, Steps 7.39.4 through 7.39.11 must be repeated.

7.41 Wait at least 5 to 10 seconds for reading to

stabilize. If the reading on the percent penetration meter is less than 30, this filter has an acceptable efficiency. If the reading is greater than 30, discard filter.

NOTE: Under no circumstances are any repairs to be made to any filters.

7.42 Check filter resistance reading on the magnehelic gauge. If it does not meet the criteria set forth in Attachment 10.2, 30 CFR 11.140-9, 30 CFR 11.162-1, or 30 CFR 11.183-1, it should be discarded.

7.43 IDLE PROCEDURE

7.43.1 Remove smoke tube from the analyzer port.

7.43.2 Switch meter sensitivity to the "LOW" position and turn cell lamp off.

7.43.3 Turn scattering chamber cell lamp off.

7.43.4 Turn vacuum pump off.

7.43.5 Reverse the steps above to resume operation.

7.44 SHUTDOWN PROCEDURE

7.44.1 Switch meter sensitivity to the "LOW" position.

7.44.2 Set calibration switch on particle size indicator to "C".

7.44.3 Turn cell lamp off and disconnect smoke tube from analyzer port.

7.44.4 Turn off power to particle size indicator.

7.44.5 Switch scattering chamber cell lamp to the "OFF" position.

7.44.6 Switch penetration meter knob to meter zero.

7.44.7 Turn off power to penetration meter.

7.44.8 Wait two minutes and turn vacuum off.

7.44.9 Depress master "OFF" button.

7.44.10 Secure instrument breaker in the OFF position.

7.44.11 The air supply should turn off automatically in 45 minutes. If it does not shut off, contact the RPO.

7.45 CHANGING DOP (performed every 40 hours of operation)

7.45.1 Ensure that DOP is above room temperature.

7.45.2 Ensure that system is not charged with air. This takes 45 minutes from the time it is shut down.

NOTE: The chuck will drop to the closed position when all air is purged.

7.45.3 Don protective faceshield and rubber gloves.

7.45.4 Remove cap from fill port.

7.45.5 Open valve on fill port by turning lever to a position parallel with the filling pipe.

7.45.6 Place storage container under drain tube at rear of Q-127.

7.45.7 Open petcock on drain tube.

7.45.8 Allow DOP to drain completely.

7.45.9 Close petcock.

7.45.10 Seal storage container and set aside.

7.45.11 Pour clean DOP into fill port ensuring that the level does not rise beyond the 1-1/2 inch mark etched on the sight glass.

7.45.12 Close valve on fill port by turning lever to a position perpendicular to the filling pipe.

7.45.13 Replace cap on fill port.

7.45.14 Clean up any DOP spills. Place wipe rags in a plastic bag and seal bag.

7.45.15 Remove rubber gloves. Place in plastic bag and seal bag.

7.45.16 Dispose of all used gloves, rags and DOP as environmental waste in accordance with applicable procedures.

8.0 RESPONSIBILITIES

8.1 The Radiation Protection Officer (RPO) shall be responsible for ensuring proper calibration of the Q-127.

8.2 The R.P.O. shall be responsible for the routine preventive maintenance associated with the operation of the Q-127.

8.3 Radiological Control Technicians shall be

responsible for compliance with procedures and references applicable to respirator filter testing and to notify the RPO in the event that the procedures cannot be complied with.

9.0 REFERENCES

9.1 NUREG 0041, "Manual of Respiratory Protection Against Airborne Radioactive Materials".

9.2 Regulatroy Guide 8.15, "Acceptable Programs fro Respiratory Protection".

9.3 ANSI Z88.2, "Practices for Respiratory Protection".

9.4 NIOSH Technical Report, "A Guide to Industrial Respiratory Protection".

9.5 29 CFR Part 1910.134.

9.6 30 CFR Part II.

9.7 PPB-301, "PPB Respiratory Protection Program and Policy".

9.8 PPB-310, "Inspection and Maintenance of Respiratory Protection Equipment".

9.9 ATI Q-127, "DOP Penetrometer Operating Instructions".

9.10 10 CFR Part 20.

10.0 ATTACHMENTS

10.1 Operation Maintenance Schedule

10.2 Excerpts from 30 CFR 11.

ATTACHMENT 10.1

10.1 Equipment Preventive Maintenance

10.1.1 The following is to be performed on a monthly basis predicated upon a maximum operating time of 40 hours per week. Should this operating time be exceeded, contact the GRMS.

10.1.1.1 Change sample flow filter.

10.1.1.2 Change test flow filter.

10.2.2 The following is to be performed on a yearly basis.

10.2.2.1 Change reference filter.

10.2.2.2 Change purge filter.

10.2.2.3 Remove Percent Penetration Meter and mechanical analyzer and return to Air Techniques Incorporated for overhaul and recalibration.

10.2.2.4 Remove Particle Size Meter and return to Air Techniques Incorporated for recalibration.

10.2.2.5 Remove and disassembly Scattering Chamber. Clean and recoat the inside of the chamber. Reassembly Scattering Chamber. Realign the cell lamp.

ATTACHMENT 2

11.140–9 Airflow resistance tests; all dust, fume, and mist respirators; minimum requirements.

MAXIMUM RESISTANCE

[Millimeter water column height]

Type of chemical-cartridge respirator	Inhalation		Exhalation
	Initial	Final [1]	
Other than single-use vinyl chloride respirators:			
For gases, vapors, or gases and vapors	40	45	20
For gases, vapors, or gases and vapors, and dusts, fumes, and mists	50	70	20
For gases, vapors, or gases and vapors, and mists of paints, lacquers, and enamels	50	70	20
Single-use respirator with valves:			
For vinyl chloride	20	25	20
For vinyl chloride and pneumoconiosis and fibrosis producing dusts	30	45	20
Single-use respirator without valves:			
For vinyl chloride	15	20	[2]
For vinyl chloride and pneumoconiosis and fibrosis producing dusts	25	40	[2]

[1] Measured at end of service life specified in Table 11 and 11a.
[2] Same as inhalation.

[37 FR 6244, Mar. 25, 1972, as amended at 42 FR 65167, Dec. 30, 1977]

11.162–1 Breathing resistance test; minimum requirements.

MAXIMUM RESISTANCE

[mm. water-column height]

Type of respirator	Initial inhalation	Final inhalation	Exhalation
Single-use	12	15	15
Dust, fume, and mist, with single-use filter	30	50	20
Dust, fume, and mist, with reusable filter	20	40	20
Radon daughter	18	[1]25	15
Asbestos dust and mist	18	25	15

[1] Measured after silica dust test described in § 11.140–4.

§ 11.183–1 Breathing resistance test; minimum requirements.

MAXIMUM RESISTANCE

[mm. water-column height]

Type of pesticide respirator	Inhalation		Exhalation
	Initial	Final [1]	
Front- or back-mounted gas mask	70	85	20
Chin-style gas mask	65	80	20
Powered air-purifying	[2]50	[2]70	[2]20
Chemical cartridge	50	70	20

[1] Measured at end of the service life specified in Table 12.
[2] Resistance of filter(s), cartridge(s), and breathing tube(s) only with blower not operating.

ppb proto-power Boise nuclear, Inc.	POLICY AND PROCEDURE MANUAL

TITLE		
PROCEDURE No.	REVISION No.	EFFECTIVE DATE
PP - 401	0	11/30/86

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CONCURRED		RADIOLOGICAL ENGINEER	11-24-86
		RADIATION SAFETY OFFICER	11-24-86
APPROVED		VICE-PRESIDENT	12/3/86

1.0 PURPOSE

The purpose of this procedure is to establish bioassay frequencies, bioassay method requirements and bioassay action levels.

2.0 APPLICABILITY/SCOPE

This procedure is appliacable to all Radiological Controls personnel.

3.0 DEFINITIONS

None

4.0 POLICY

None

5.0 PREREQUISITES

none

6.0 PRECAUTIONS

None

7.0 PROCEDURE

7.1 General Description

7.1.1 The bioassay program provides monitoring of internal radioactive material. Due to the specific decay characteristics of various isotopes, several different bioassay methods are utilized. Whole body counting (WBC) is the principal means of bioassay. This method

monitors only for photon emitting nuclides. Radioanalysis of excreta (urine and feces) samples is used primarily for identification of alpha and beta emitting materials.

7.1.2 Requirements of this procedure do not supercede or void current contracts but will be incorporated into new contracts.

7.1.3 Bioassay sample results/reporting shall be calculated and reported in accordance with Lohamy (NBS Special Publication 456 - Measurements for the Safe Use of Radiation, U.S. Department of Commerce, 1976).

7.2 Bioasssay Sampling Requirements

7.2.1 A baseline WBC is required initially prior to entering RWP areas. This WBC will normally be obtained in conjunction with permanent TLD assignment.

NOTE: This baseline WBC must be re-established each time an individual returns from another licensed facility where he entered a Radiologically Controlled Area.

7.2.2 A routine WBC is required annually following the baseline count.

7.2.3 A WBC is required prior to going to a facility which entry into a Radiologically

Controlled Area is expected.

7.2.4 A WBC is required upon termination of employment or completion of radiological work assignment. This WBC will normally be obtained in conjunction with permanent TLD termination.

7.2.5 A WBC is required following assignment of > 2 mpc-hours in any one day or > 10 mpc-hours in a calendar week.

7.2.6 A WBC is required for individuals found to have skin contamination above the limits specified per Reference 9.2. (9.1)?

7.2.7 A WBC is required following any event which indicates a respirator failure during radiological work.

7.2.8 Supplemental bioassay shall be performed as directed by the Radiation Safety Officer.

NOTE: Specific exemption/modification to the above bioassay requirements may be granted by the Radiation Safety Officer. Such exemption shall be documented in writing.

7.3 Bioassay Method Requirement

7.3.1 WBC

7.3.1.1 The operation and quality assurance

of the WBC unit(s) shall be performed in accordance with vendor procedures, approved by the Radiation Safety Officer.

7.3.1.2 The WBC isotopic search library shall be specified by the Radiation Safety Officer.

7.3.2 Excreta

7.3.2.1 Excreta samples shall be collected and handled as detailed in Section 7.6.

7.3.2.2 Excreta analysis onsite/offsite vendor shall participate in a recognized QA or intercomparison testing program which is traceable to the U.S. National Bureau of Standards. The results of this testing shall be reviewed and maintained by the Radiation Safety Officer.

7.3.2.3 Excreta analysis methods shall be capable of measuring the following MDA values:

1.	Sr-90	.005 pCi/ml
2.	Sr-89	.005 pCi/ml

3.	HTO	20 pCi/ml
4.	Gross alpha	.05 pCi/ml
5.	Gross beta	3 pCi/ml (K-40 subtracted, using the photon measurement method)

7.4 Bioassay Investigative Reports

A bioassay investigative report is to be completed by the Radiation Safety Officer for all bioassay results that exceed the action levels established in Section 7.5.

7.4.1 The Radiation Safety Officer will perform an investigation and make dose commitments based on appropriate methodology (e.g., ICRP 2, 6, 9, 10, 10A, 12, MIRD, etc.). This evaluation shall include, as necessary:

1. Calculated mpc-hours
2. Calculated dose to the critical organ or total body as appropriate
3. Subsequent bioassay evaluation
4. Limitations imposed on the individual

This information is to be documented using Attachment 10.2.

7.4.2 The completed assesment shall be forwarded to

the Radiation Records Control Officer for personnel records update.

7.5 Bioassay Action Levels

A Bioassay Investigative Report is required for bioassay results which exceed the following:

Bioassay Type	Action Level
WBC	> 5% MPBB or MPOB (excluding K-40)
Urinalysis/Fecal	> MDA Sr-90
	> MDA Sr-89
	> 1000 pCi/ml HTO
	> MDA gross alpha
	> MDA gross beta when isotopic not performed

7.6 Excreta Sample Collection and Handling

7.6.1	Radiation Protection Officer	Complete Sections 1 through 4 of the Excreta Sample Log for each individual requiring a bioassay excreta sample. Establish the sample number using the last two digits of the year followed by a sequential number (i.e., 84-01, 84-02, etc.).
7.6.2		Provide the individual with a copy of the appropriate sample collection instructions

		(Exhibits 3 and 4 as applicable) and a new sample collection container marked with the sample number, the individuals name and social security number.
7.6.3	Individual	Collect the sample in accordance with the provided instructions.
7.6.4	Radiation Protection Officer	Upon receipt of the returned sample, complete Sections 5 through 7 of the Excreta Sample Log. Within the next 5 working days, send the excreta sample to the approporiate laboratory for analysis. Samples are to be refrigerated during pre-shipment periods. Ship samples to off-site laboratories using the following requirements: 1. Tightly seal all containers. 2. Include a packing list which indicates the sample inventory and the analysis to be performed. 3. Send a copy of the packing list to the laboratory under

separate cover.

4. Notify the laboratory by phone when emergency sample evaluation os required.

7.6.5 Complete item 8 when the sample is sent. Complete item 9 when the analysis results are received from the laboratory. Submit the results to the Radiation Safety Officer for review.

8.0 RESPONSIBLITIES

8.1 The procedure responsibilities are as stated in the text.

9.0 REFERENCES

9.1 PPB Procedure, PPB 104, Monitoring for Personal Contamination.

10.0 ATTACHMENTS

10.1 Excreta Sample Log (Exhibit 1)

10.2 Bioassay Investigative Report (Exhibit 2)

10.3 24 Hour Urine Sample Collection Instructions (Exhibit 3)

10.4 Fecal Sample Collection Instructions (Exhibit 4)

EXHIBIT 1

Rev. 0

EXCRETA SAMPLE LOG

1 Sample Number	2 Type Sample U-Urine F-Fecal	3 Name (Last, First, MI) 4 SSN	5 Sample Start Date - Time 6 Sample Stop Date - Time	7 Sample Volume (ml) or Weight (gm)	8 Date Sample to Lab 9 Date Results Returned	Requested Analyses	Remarks

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EXHIBIT 2

BIOASSAY INVESTIGATIVE REPORT

1. Individual Name_____ 2. SSN_____ ____ _____

3. Bioassay Type_____Bioassay Date___/___/___Bioassay Results_____

4. Action Taken:

5. Results of Investigation/Dose Commitment:

Assessment Completed By_____
Signature/Title/Date

Assessment Reviewed By_____
R.S.O. ./Date

---

6. REM System updated on_____by_____
Date Signature

7. Reviewed By_____
Radiation Safety Officer /Date

Distribution:
Original: Individual's Radiation History File
cc: Radiation Safety Officer

FORM 1000 ADM 1218 01-2 (11 82)

A0001050 11-82

EXHIBIT 3

24 HOUR URINE SAMPLE COLLECTION INSTRUCTIONS

Utilizing the container provided, collect a urine sample using the method described below. Any special sampling instructions modifying this procedure are stipulated in the special instructions section below.

PRECAUTIONS:

1. Use good personal hygiene during the collection of the sample.
2. Do not take the sample collection container in any radiological controlled areas.

A. Begin collection of the urine sample after your next normal sleep period.

B. Record the date and time of the first collection on the sample container.

C. Record the date and time of the exposure on the sample container.

D. Continue collecting your urine excreta for the next 24 hours.

E. Record the date and time of the last collection on the sample container.

F. Return the completed sample to dosimetry within the next working day.

SPECIAL INSTRUCTIONS:

EXHIBIT 4

FECAL SAMPLE COLLECTION INSTRUCTIONS

Utilizing the container provided, collect a fecal sample using the method described below. Any special sampling instructions modifying this procedure are stipulated in the special instructions section below.

PRECAUTIONS:

1. Use good personal hygiene during the collection of the sample.
2. Do not take the sample collection container in any radiological controlled areas.

A. Begin collection of the fecal sample after your next normal sleep period. Record the date and time of the first collection on the sample container. Record the date and time of the exposure on the sample container.

B. Collect your fecal excreta for at least the next 24 hours or until a sample is collected, whichever is longer.

C. Record the date and time of the last collection on the sample container.

D. Return the completed sample to dosimetry within the next working day.

SPECIAL INSTRUCTIONS:

PPB photo-preventive nuclear, Inc.	POLICY AND PROCEDURE MANUAL

TITLE

RECEIPT OF RADIOACTIVE MATERIAL ON SITE

PROCEDURE No.	REVISION No.	EFFECTIVE DATE
PPB - 501	0	11/30/86

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ORIGINATOR			
CONCURRED	J Althouse	RADIATION SAFETY OFFICER	11-24-86
APPROVED		VICE-PRESIDENT	12/3/86

1.0 PURPOSE

The purpose of this procedure is to assure that all radioactive material received on site is in compliance with State, NRC, and DOT reglations, and to provide traceability of licensed radioactive material received at PPB Decon Facility.

2.0 APPLICABILITY/SCOPE

This procedure applies to all personnel working at the PPB Decon Facility.

3.0 DEFINITIONS

None

4.0 POLICY

None

5.0 PREREQUISITES

5.1 All applicable radiation protection regulations and procedures will be followed during any operation involving radioactive material.

5.2 The Radiation Safety Officer shall be notified prior to package opening.

5.3 The package shall be monitored for leakage and radiation levels external to the package as soon as practicable after receipt, but no later than three hours after the package is received at the station if received during normal working hours, or 18 hours

if received after normal working hours.

NOTE: Limited quantities of radioactive material are exempted from this requirement.

5.4 All packages of radioactive material will be opened in the RCA or other approved area designated by the Rad Con Department, in accordance with procedures that are established and maintained by the Rad Con Department for the safe opening of packages in which licensed material is received. Due consideration shall be given to special instructions for the type of packaged being opened.

6.0 PRECAUTIONS

None

7.0 PROCEDURE

7.1 Upon arrival of radioactive material, the PSO will notify the Radiological Controls Technician (RCT) and inform him of his responsibility with regard to this procedure.

7.2 After notification, the RCT will be responsible to coordinate the activities of this procedure.

7.2.1 Perform and record the proper surveys required.

7.2.2 Perform QA and QC activities, if QA and QC inspection is required.

7.2.3 RCT will arrange for its opening,

disposition, and storage.

7.2.4 RCT will prepare Figure 501.1 and deliver to RSO when complete.

7.3 The Rad Con technician will be responsible to direct the opening of the package and obtaining the proper surveys.

7.4 A Rad Con technician will survey the vehicle and package, as applicable for radiation levels and contaminationn levels, and fill in the applicable information on the "Radioactive Material Receipt Form" (Figure 501.1).

7.4.1 If removable radioactive contamination on the external surface of the package is in excess of 22,000 dpm per 100 square centimeters, the Radiation Safety Officer or his designee shall be notified, and he will immediately notify by telephone, telegraph, mailgram, or facsimile the Region 1 US NRC Office of Inspection and Enforcement, 631 Park Avenue, King of Prussia, PA 19406. Phone (215) 337-5000 and the final delivering carrier of the package. He shall also initiate an unusual incident report, pursuant to 10 CFR 20, Section 403, "Investigation of Radiation

Incidents Procedures".

NOTE: If removable contamination levels exceed 22,000 dpm/100cm2, perform a "Smear Efficiency Test" in accordance with Attachment 1.

NOTE: The following are exceptions to Step 7.4.1:

1. Packages containing no more than the Type A quantity as specified in 10 CFR 71, Table A-1.

2. Packages containing no more than 10 millicuries of radioactive material consisting solely of tritium, carbon-14, sulfur-35, or iodine-125.

3. Packages containing only radioactive material as gases or in special form.

4. Packages containing only radionuclides with half-lives of less than 30 days and a total quantity of no more than 100 millicuries.

5. Packages containing only radioactive material in other than liquid form (including Mo-99/Tc-99m generators) and not exceeding the Type A quantity limit as specified in 10CFR 71, Table A-1.

7.4.2 Upon receipt of a package containing radioactive material in excess of the Type A quantity limit in 10 CFR 71, Table A-1, a Rad Con technician shall survey the radiation levels external to the package.

7.4.3 If radiation levels are found on the external surface of the package in excess of 200 millirem per hour on contact, or 10 millirem per hour at three feet from the surface, the Radiation Safety Officer shall be nctified,

and he will immediately notify by telephone, telegraph, mailgram, or facsimile, the Region 1 US NRC Office of Inspection and Enforcement, 631 Park Avenue, King of Prussia, PA 19406. Phone (215) 337-5000 and the final delivering carrier of the package. He shall also initiate an unusual incident report pursuant to 10 CFR 20, Section 403.

NOTE: The limits in Step 7.4.3 do not apply if the package is transported in an exclusive use vehicle.

7.5 Receipt of Radioactive Material in an Exclusive Use Vehicle

The following limits shall apply:

7.5.1 Loose surface contamination shall not exceed 22,000 dpm per 100 cm2.

7.5.2 1000 millirem per hour on contact with the surface of the package (closed transport vehicle only), 200 millirem per hour on contact (open transport vehicle).

7.5.3 Ten millirem per hour at any point two meters from the vertical planes projected by the outer lateral surface of the vehicle.

7.5.4 Two millirem per hour in any normally occupied position in the vehicle.

7.5.5 If any of these limits are exceeded, the

Radiation Safety Officer shall be notified, and he will immediately notify by telephone, telegraph, mailgram, or facsimile, the Region 1 US NRC Office of Inspection and Enforcement, 631 Park Avenue, King of Prussia, PA 19406. Phone (215) 337-5000 and the final delivering carrier of the package. He shall also initiate an unusual incident report pursuant to 10 CFR 20, Section 403.

7.6 Upon satisfactory review of the receipt form, the Rad Con technician shall complete Step 7 of Figure 501.1 and determine the disposition of the material for proper storage.

NOTE: Document on Figure 501.1, Step 9.

7.7 The Rad Con technician shall radiologically post the radioactive material.

7.8 Two copies of the Radioactive Materials Receipt Form are distributed as follows:

7.8.1 Radiation Records Control Officer (original).

7.8.2 With the radioactive material package (Xerox copy).

8.0 RESPONSIBLITIES

8.1 The Radiation Protection Officer (RPO) is responsible to inspect the shipment and to insure that it is in compliance with applicable State, NRC,

and Dot regulations. He shall sign and date the end of the "Radioactive Material Receipt Form" (Figure 501.1), indicating that all the specific requirements for this procedure have been completed.

8.2 The Radiological Controls Technician shall provide the radiological controls functions required by this procedure. The Rad Con technician assigned to this function shall provide the radiological surveys required by this procedure and work under the guidance of the RPO to insure that the requirements of this procedure are satisfied, consistent with safe radiological work practices.

9.0 REFERENCES

9.1 10 CFR 71, "Packaging of Radioactive Material and Transportation of Radioactive Material".

9.2 10 CFR 20, "Standards for Protection Against Radiation".

9.3 49 CFR 170-189, "Department of Transportation Regulations".

9.4 NRC IE Information Notice No. 85-46, "Clarification of Several Aspects of Removable Radioactive Surface Contamination Limits for Transport Packages".

9.5 10 CFR 39, "Publication 6, U.S. Postal Service".

10.0 ATTACHMENTS

10.1 Smear Efficiency Test (Attachment 1).

10.2 Receipt of Radioactive Material on Site Form (Figure 501.1).

10.3 Radiological Control Survey Record (Figure 501.2).

ATTACHMENT 1

If removable contamination level exceeds 22,000 dpm/100 cm2, perform a Smear Efficiency Test as allowed in NRC IE Information Notice 85-46 and as described below:

1. Perform this test within one foot of the location of the smear identified to be greater than 22,000 dpm/100 cm2.

2. Mount a template containing a 1.5 inch x 10 inch slit.

3. Take 10 successive smears through the slit taking care not to move the template and keeping track of the order in which the smears were taken.

4. Count the first smears and calculate a "less than 10% limit" as outlined on the Survey Form (Figure 501.2).

5. Continue to count the smears in order until two consecutive smears read less than 10% of the initial smear. (This may require taking another set of smears if this criteria is not met with the first 10 smears).

6. Total the dpm's for the smears counted and document results in the "Remarks" section of the Survey Form (Figure 501.2).

7. Under "Template Location" on Survey Form (Figure 501.2), enter the survey points where the template was located.

8. Repeat Steps 1 through 7 for each smear location identified to be greater than 22,000 dpm/100 cm2.

9. The RCT shall immediately notify the Radiation Safety Officer (or his designee) of the smear efficiency test results.

10. Survey Form shall also insure removable contamination limits do not exceed 100 times the table limits of 49 CFR 173.443.

The 22,000 dpm/100cm2 NRC limit on shipments for smearable contamination is based on a smear efficiency of 10%. The smear efficiency test is a ratio of 22,000 dpm/100 cm2 at 10% efficiency to the efficiency calculated by survey (Figure 501.2), resulting in a new limit established for a particular location. The new limit is now compared to the original smear found to be > 22,000 dpm/100cm2, and if less than the calculated limit, it is considered acceptable. See examples.

Formula:

$$\frac{A}{B} \times 220{,}000 = \text{New Limit in dpm/100cm2}$$

Where A = First smear from efficiency test (Figure 351.26-2)
B = Total of all 10 smears from test (Figure 351.26-2)

$$220{,}000 = \frac{\text{22,000 dpm/100cm2 Limit}}{\text{0.10 (efficiency for limit)}}$$

Example #1:

Given - Smear (x) from "A", "B", or NRC surveys
22,000 dpm/100cm2

X = 95,000 dpm/100cm2

A = 23,000 dpm/100cm2

B = 46,000 dpm/100cm2

$$\frac{23{,}000}{46{,}000} \times 220{,}000 = 110{,}000 \text{ dpm/cm2}$$

The new limit of 110,000 dpm/cm2 is not exceeded by the original smear of 95,000 dpm/100cm2.

Example #2

X = 95,000 dpm/100cm2

A = 46,000 dpm/100cm2

B = 150,000 dpm/100cm2

$$\frac{46,000}{150,000} \times 220,000 = 67,466 \text{ dpm/cm2}$$

The new limit of 67,466 dpm/cm2 is exceeded by the original smear of 95,000 dpm/100cm2.

FIGURE 501.1

RADIOACTIVE MATERIAL RECEIPT FORM

1. Time and Date of Receipt: _____

2. Shipment Congignor: _____

3. Carrier: _____

4. Description of Material: _____

_____

5. Rad Con Survey Time/Date: _____ Survey Number: _____

   a. Loose Contamination: _____ dpm/100 cm2

   _____ dpm/100 cm2

   b. Radiation Levels:

   Max. on Contact _____ mR/hr

   Max. at three feet _____ mR/hr

   Max. at six feet _____ mR/hr

   Max. in driver area _____ mR/hr

6. Comments: _____

_____

7. Inspection: The radioactive material shipment has been inspected with regard to radiation and contamination levels, proper labeling and placarding, and proper packaging, and has been found to be acceptable for receipt.

   _____ _____

   RCT Signature Date

8. RSO notified: _____

9. I have accepted receipt of the radioactive material shipment.

   _____ _____ _____

   RSO Signature Department Date/Time

FIGURE 501.2

Radiological Control Survey Record

NO. Page 1 of ___

LOCATION: _____

REASON FOR SPECIAL SURVEY: _____

_____

DATE _____

TIME _____

☐ ROUTINE ☐ SPECIAL

ALARA # _____

ITEM NO	ITEMS		DOSE RATES			DISTANCE	SMEARABLE CONTAMINATION		SMEAR
		β mrad/hr	γ mr/hr	Neutron mrem/hr	Total mrem/hr		β & γ dpm	α dpm	AREA
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									

RADIATION SURVEY		β, γ CONTAMINATION SURVEY	α CONTAMINATION SURVEY
INST.		INST.	INST/PROBE
S.N.	S.N.	S/N	S/N's
CAL DUE DATE	CAL DUE DATE	CAL DUE DATE	CAL DUE DATES
B.C.F.	B.C.F.	EFF	EFF
		BKG	BKG

REMARKS:	AIR SAMPLE DATA:

Surveyor (print name)_____

Surveyor (signature)_____ Reviewed by_____ Date _____

Original Survey File Pink-Job Site

RESERVED FOR FUTURE USE

PPB pro-phylactic pharmaceuticals, inc.	POLICY AND PROCEDURE MANUAL

TITLE

EXTERNAL EXPOSURE CONTROL

PROCEDURE No.	REVISION No.	EFFECTIVE DATE
PPB - 601	0	11/30/86

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ORIGINATOR	J Abthane	RADIATION SAFETY OFFICER	11-24-86
CONCURRED			
APPROVED	[signature]	VICE-PRESIDENT	12/3/86

1.0 PURPOSE

This procedure establishes the standards for protection from radiation. The establishment of administrative exposure limits ensure that regulatory limits will not be exceeded.

2.0 APPLICABILITY/SCOPE

This procedure applies to ALL personnel working at the PPB DCM Facility.

3.0 DEFINITIONS

3.1 RSO - Radiation Safety Officer

3.2 RRCO - Radiation Records Control Officer

4.0 POLICY

None

5.0 PREREQUISITES

None

6.0 PRECAUTIONS

None

7.0 PROCEDURE

7.1 OCCUPATIONAL RADIATION EXPOSURE LIMITS

7.1.1 Occupational radiation exposure limits are used for controlling personnel exposure to radiation (excluding medical and dental exposures) to levels which are believed to cause no ill-effects even if the employee is

exposed to these levels throughout his entire working life. These limits are based on those promulgated by 10 CFR 20.101, "Standards For Protection Against Radiation". Personnel should endeavor to maintain their own exposures as low as reasonably achievable (ALARA) below these limits. The occupational exposure limits are contained in Attachment 10.1.

7.1.2 Normal operations shall be controlled such that no employee exceeds any Federal or Administrative occupational exposure limit and the total of all employee's exposures is limited to the lowest levels reasonably achievable.

7.2 OCCUPATIONAL RADIATION EXPOSURE CONTROLS

7.2.1 The following radiation exposure control levels, which are below the 10 CFR 20 limits, shall be used as one means to maintain personnel radiation exposures as low as reasonably achievable.

7.2.1.1 Except as approved in 7.2.1.3 below, doses of penetrating radiation to the whole body or designed radiosensitive organs of

Radiation Workers shall not exceed 0.5 rem per calendar quarter or 2 rem per calendar year; dose to the skin of the whole body shall not exceed 3 rem per calendar quarter, doses to the hands or forearms, feet or ankles, shall not exceed 9 rem per calendar quarter.

7.2.1.2 Except as approved in 7.2.1.3 below, doses of radiation to the whole body or designated radiosensitive organs of all personnel who are not Radiation Workers shall not exceed 0.5 rem per calendar year. Similarly, doses to the skin, bone, other organs and extremities should not exceed one-tenth of the applicable occupational exposure limit in Attachment 10.1.

7.2.1.3 Prior to any individual exceeding the above administrative control levels in a and b above, written approval shall be obtained from the Radiation Safety Officer. A copy of

the written approval and justification for exceeding the control levels shall be included in the individual's permanent exposure history file.

7.2.2 A summary of the radiation exposure control levels is contained in Attachment 10.1. Exposures above the annual or quarterly PPB administrative control levels without prior written approval shall be considered an unusual occurrence and an evaluation of the events which led to the exposure shall be documented and included in the individual's permanent exposure history file.

7.2.3 When the exposure status of an employee becomes uncertain or an exposure control is likely to have been exceeded, that individual shall be restricted from entering controlled areas until the exposure has been determined (PPB-602-7.5).

7.3 NON-OCCUPATIONAL EXPOSURE LIMITS

7.3.1 PPB shall control the radioactive material and radiation generating equipment in its possession so that exposure to members of the general public is limited to the lowest

practical levels not to exceed 0.5 rem in any period of one calendar year to the Whole Body.

7.4 THE ALARA PROGRAM

7.4.1 To assist in maintaining the exposure of personnel to ionizing radiation at PPB as low as reasonably achievable (ALARA) the Radiation and Safety department has instituted an ALARA program; details are included in the PPB Policy and Procedure.

7.4.2 The ALARA Program incorporates measures for reducing occupational radiation exposures through physical and administrative control mechanisms. The control mechanisms include the preplanning of tasks, continued evaluation and improvement of protective clothing utilization, evaluation of performance of the dosimetry program, continued emphasis on the removal of contamination and reduction of radiation backgrounds, the effective use of shielding and remote handling devices, and upgraded waste management practices. Exposure levels are analyzed monthly on an individual basis. The conclusions of this analysis are then

reported to each individual.

7.5 EXPOSURE TO MINORS

7.5.1 The exposure of any individual under the age of 18 is not permitted to exceed 0.5 rem to the whole body during any calendar year at PPB DCM Facility. Dose to students under the age of 18 exposed to radiation during educational activities shall not exceed 0.1 rem/year. This exposure shall be considered a part of the 0.5 rem/year limit explained above and not supplemental to it.

7.6 EXPOSURE TO UNBORN CHILD

7.6.1 All employees shall be advised of the Nuclear Regulatory Commission's and the National Council on Radiation Protection and Measurements recommendations to keep radiation exposure to an embryo or fetus to the very lowest practicable level during the entire gestation period and to limit the dose to the unborn child to a maximum 0.5 rem. PPB will limit the exposure of the embryo or fetus in accordance with USNRC Reg. Guide 8.13.

7.6.2 Personnel shall be informed of the biological risks to the embryo and fetus from radiation

during Radiation Worker Training.

7.7 EMERGENCY EXPOSURES

7.7.1 In an emergency situation, it may be necessary for emergency personnel to exceed the exposure limits (Attachment 10.1) in order to save lives or valuable property. In such situations, the probable effect of high exposure to the rescuer must be weighed against the expected benefits. Any emergency exposure or rescue action that may invlove substantial personal risk shall be performed by volunteers, and each volunteer shall be advised of the known or estimated extent of such risk by the Emergency Director or his delegate prior to participation.

7.7.2 In emergency situations which require search and recovery for injured personnel, or in operations undertaken to prevent conditions that would injure numbers of people, no rigid upper limit of exposure has been established, however, a whole body dose of 75 rem per individual is recommended. The above allows the Emergency Director to determine the amount of exposure that should be permitted to perform the emergency mission.

7.7.3 In situations where it is desirable to enter a hazardous area to protect facilities, eliminate further escape of effluents, or to control fires, the planned whole body dose shall not exceed 25 rem per individual.

7.7.4 The allowed exposure from an emergency situation shall be determined by the Emergency Director. Each individual's planned exposure shall not exceed the above limits and the total exposure allowed should be consistent with the potential risk from the situation.

7.7.5 Volunteers or other personnel in an emergency situation who may have received exposures exceeding the administrative control limits of Attachment 10.1 will, on an individual basis, have their exposure evaluated and appropriate action taken to limit future occupational exposure.

7.7.6 These instructions recognize that accident situations involving the saving of lives will require separate criteria from those of actions required to recover deceased victims or to save property. In latter instances, the amount of exposure expected to be

received by persons shall be controlled to the extent practicable within administrative control limits.

7.8 EXPOSURE TO PPB PERSONNEL WHILE OFF-SITE

7.8.1 If during an off-site visit, an employee anticipates entering a radiation area, the employee shall contact the RRCO. The RRCO must immediately pull and process this employee's TLD badge, and initiate the request for a record of the radiation dose received at the off-site facility. Upon return of the exposure data for the employee from their off-site visit, the RRCO will sum the on and off-site exposures to ensure that PPB administrative exposure limits are not exceeded. If the administrative exposure limits have been exceeded, the RRCO must notify immediately the RSO. The TLD badge will not be reissued until exposure during the visit has been determined.

7.9 EXPOSURE TO VISITORS AT PPB DCM FACILITY

7.9.1 PPB shall control the exposure of visitors to its' facilities to levels as low as is reasonably achievable. For exposure control purposes a "visitor" is defined as any

non-PPB employee or any PPB employee not qualified as a Radiation Worker who requires access to PPB controlled areas.

7.9.2 All visitors will receive a radiological orientation prior to entering the facility. If the visitor will not enter any controlled areas, the visitor will be instructed such that they can recognize how these areas are marked and further instructed to not enter any area so marked. Visitors inside radiologically controlled areas will require a Radiation Worker-trained escort.

7.9.3 If entry to a controlled area will be necessary by the visitor and will not require repeated or frequent entries, the requirements are:

7.9.3.1 Assignment of a temporary TLD badge;

7.9.3.2 Escort by a qualified Radiation Worker at all times while in the controlled area;

7.9.3.3 Application of the following exposure controls:

7.9.3.3.1 Less than an estimated dose of 50 mrem per week or visit, whichever is

longer, if the visitor signs a statement that an additional 50 mrem will not cause their exposure to exceed 300 mrem in the current calendar quarter year or 500 mrem in the current calendar year; or

7.9.3.3.2 An estimated dose exceeding 50 mrem if prior authorization is obtained from the visitor's employer. This authorization must be from a Radiation Safety Officer or equivalent and must include:

(1) Name;

(2) Social Security Number;

(3) Exposure limit to be applied;

(4) Dated copy of the individual's current radiation exposure

history.

7.9.3.3.3 No access to any area where there is a significant risk of internal deposition of radioactive material.

7.9.4 If the visitor is to make repeated entries into controlled areas for more than two weeks, the visitor's exposure history must be reviewed by the RRCO prior to the visitor re-entering a controlled area. In addition to the above requirements, visitors must meet the appropriate requirements of Radiation Worker training.

8.0 RESPONSIBILITIES

The responsibilities are as stated in Sect. 7.0 of this procedure.

9.0 REFERENCES

9.1 10 CFR 19

9.2 10 CFR 20

9.3 PPB Procedure, PPB-602, Dosimetry Issue.

10.0 ATTACHMENTS

10.1 Occupational Exposure Limits and Controls

OCCUPATIONAL EXPOSURE LIMITS AND CONTROLS

TYPE OF EXPOSURE	NRC LIMITS, REM	PPB ADMINISTRATIVE CONTROLS, REM	
	Quarter	Annual	Quarter
Whole Body, Head, and Trunk, Gonda, Lens of Eye, Active Blood Forming Organs	1.25 (1)	2 (2)	0.500 (2)
Hands and Forearms, Feet and Ankles	18.75		0.9
Skin of Whole Body	7.5		0.3

(1) In accordance with 10 CFR 20.1016 an individual in a restricted area may be permitted to receive a total occupational dose to the whole body greater than 1.25 rem/quarter provided:

a) Calendar quarter dose does not exceed 3 rem to the whole body; and

b) Dose to the whole body when added to the accumulated occupational dose does not exceed 5 (N-18) REMS where "N" equals the individual's age in years at his last birthday; and

c) Accumulated occupational whole body dose is recorded clear and legibly on Form NRC-4.

(2) NRC Form 4 must have completed data for these limits to apply.

ppb proto-prevention nuclear, inc.	POLICY AND PROCEDURE MANUAL

TITLE

DOSIMETRY ISSUE

PROCEDURE No.	REVISION No.	EFFECTIVE DATE
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ORIGINATOR	Stillhouse	RADIATION SAFETY OFFICER	11-24-86
CONCURRED			
APPROVED	[signature]	VICE-PRESIDENT	12/3/86

1.0 PURPOSE

The purpose of this procedure is to describe the issuance of dosimetry for Personnel Radiation Exposure Monitoring.

2.0 APPLICABILITY/SCOPE

This procedure is applicable to all personnel required to work within Radiologically Controlled boundaries.

3.0 DEFINITIONS

3.1 R.S.O. - Radiation Safety Officer

3.2 R.P.O. - Radiation Protection Officer

3.3 R.R.C.O. - Radiation Records Control Officer

3.4 R.C.T. - Radiological Controls Technician

3.5 R.W.P. - Radiation Work Permit

4.0 POLICY

None

5.0 PREREQUISITES

None

6.0 PRECAUTIONS

None

7.0 PROCEDURE

7.1 PERSONNEL DOSIMETERS

7.1.1 The TLD badge is the device used for measuring personnel radiation exposure for permanent record puroses. This dosimeter

measures beta and gamma exposure and distinguishes between penetrating and non-penetrating radiation. The results of the dosimetry measurements are the basis of the legal record of an employee's exposure; therefore, any deliberate action by an employee which invalidates the dosimetry measurements is cause for disciplinary action.

7.1.2 Those personnel who have qualified as Radiation Workers and who have a need to enter a controlled area may be issued a permanent dosimeter.

7.1.3 An individual's permanent dosimeter shall be worn on the front of the body between the waist and neck, facing away from the body.

7.1.4 In some specific work situations where the source of radiation is oriented relative to the individual in an unusual manner, (for example, some part of the head or trunk will receive a substantially higher dose than other parts of the body), assignment of additional dosimeters may be required by the RCT. These dosimeters shall be worn at the point(s) of highest dose rate as directed by

the RCT.

7.1.5 TLD Badge processing frequency shall be monthly for selected Radiation Workers and quarterly for all others. Non-routine processing may be required by the Radiation Safety Officer.

7.2 LOSS, DAMAGE, OR CONTAMINATION OF DOSIMETERS

7.2.1 Each instance of a lost, damaged, or contaimated personnel doismeter shall be reported promptly to Radiological Controls.

7.2.2 Individuals who lose, damage, or contaminate their dosimetry equipment while in a controlled area shall immediately exit the area and report the condition to the RCT. The individual shall be restricted from entering controlled areas until an exposure assessment has been completed and a new dosimeter issued.

7.2.3 Individuals who discover they have entered a controlled area without their dosimetry shall immediately exit the area and report the condition to a RCT. The individual shall be restricted from entering controlled areas until an exposure estimate has been completed.

7.2.4 Dosimeters which become contaminated shall

only be decontaminated by Radiological Controls Technicians. A special dose assessment will be prepared in accordance with 7.5.

7.3 DOSIMETRY BADGE INSSUANCE PROCEDURES

7.3.1 For assigning a permanent dosimetry badge to a PPB employee the procedure is the following:

7.3.1.1 The employee must successfully complete Radiation Worker Training and receive a physical by a physician;

7.3.1.2 Upon successful completion of Radiation Worker Training the RSO signs (item a) and issues Form PPB-602-1 (Attachment 10.1) to the employee;

7.3.1.3 Upon successful completion of the physical, the physician signs items b and c of Form PPB-602-1.

7.3.1.4 The RPO signs Form PPB-602-1 indicating that the supervisor is aware of any work restrictions placed on the employee;

7.3.1.5 The RRCO schedules a whole body

count with the WBC Operator;

7.3.1.6 Upon completion of the whole body count and receipt of the completed (all signatures present) Form PPB-602-1 appropriate dosimetry will be issued to the employee along with a written explanation of the care and wearing instructions for the device(s).

Important: Permanent dosimetry badges will under no circumstances be issued without a whole body count, and the completed Form PPB-602-1.

7.3.2 For assigning temporary dosimetry badges to visitors, the following procedure applies:

7.3.2.1 Visitor dosimetry badges are available in the Radiation Safety Office. Visitors and their qualified escorts will complete the visitor dosimetry log, (Attachment 10.2) as instructed by the RRCO. Before being issued the badge, a visitor will be required to read and acknowledge that they have read, and

to the best of their knowledge will comply with, the PPB visitor policy printed at the top of Form PPB-602-2.

7.3.2.2 The visitor's escort will sign Form PPB-602-2 indicating that he/she will be responsible for the visitor's actions while in controlled areas, ensuring the visitor is frisked out by a Radiological Control Technician, and acknowledging that the visitor does not have access to areas where protective clothing is required without the advance approval of the Radiation Safety Officer.

7.3.2.3 RRCO will issue a temporary badge which is valid for the calendar week in which it is issued.

7.3.2.4 The visitor will be instructed to return the visitor's badge to the RRCO at the end of each work day and place it in a badge rack provided for that purpose. If the visit is longer than one day, the visitor

will pick up the previously assigned badge at that point each morning.

7.3.2.5 At the end of the normal work week, the visitor's badge will be collected from the rack. Badges will be processed and the doses recorded.

7.3.2.6 If the visitor requires a badge for a second week, a new badge will be issued in accordance with steps 1 and 2.

7.3.2.7 In special cases, when authorized by the RSO, a single visitor badge may be issued to a large tour group.

7.4 SUPPLEMENTARY DOSIMETRY

7.4.1 The need for extremity dosimeters shall be evaluated by Radiological Control Technicians.

7.4.2 In situations where dose rates to the extremities exceed dose rates to the whole body by a 4 to 1 ratio or the anticipated extremity dose could exceed 1 rem, extremity dosimeters shall be worn per RCT instructions.

7.4.3 Self reading dosimeters (SRD) will be issued by RCT's to individuals who enter controlled

areas. These dosimeters shall be utilized as required by RWP and shall be returned to the RCT for processing. The RRCO shall maintain a record of these results. The dosimeters shall be worn next to the permanent TLD badge.

7.4.4 Individuals whose TLD badges are processed quarterly may be temporarily issued a SRD, to be processed on a daily basis, if the nature of their present work indicates the need for a SRD. The need for the temporary SRD will be evaluated by the Radiological Controls Technician and if the need is determined to be present, an RWP will be issued including this requirement. In this case, the SRD should be returned at the end of the day to be read by the Radiological Controls Technicians and recorded on the RWP.

7.4.5 Self reading dosimeters shall be read out, charged (zeroed), and recorded daily or more frequently if specified by RWP. The dosimeter should not be allowed to exceed 3/4 scale.

7.4.6 Off scale or higher than expected readings on a self reading dosimeter will be promptly

reported to the RCT for investigation of the circumstances resulting in the reading. Processing of the wearer's TLD badge may be required as part of the investigation. The individual involved will be restricted from controlled area entry until the dose has been evaluated.

7.5 ESTIMATION OF DOSE

7.5.1 All exposures indicated by the TLD badge shall be considered to have been received by the individual unless it can be clearly demonstrated to be erroneous.

7.5.2 If an exposure measurement from a dosimeter is lost or proven erroneous, an estimate of the dose received by the individual during the period in question shall be established by the RPO and documented as a part of the employee's Dosimetry Record.

7.5.3 Estimates of dose received shall consider at least the following:

7.5.3.1 Dose rates in the individual's work area;

7.5.3.2 Actions taken by the individual during the time for which dose information is desired. This review

should include consideration of work position, time in controlled areas, etc.

7.5.3.3 Doses received by other personnel doing similar work.

8.0 RESPONSIBILITIES

Responsibilities are as stated in Section 7.0 of this procedure.

9.0 REFERENCES

9.1 10 CFR 19

9.2 10 CFR 20

9.3 PPB Procedure, PPB-003, Radiation Work Permit.

10.0 ATTACHMENTS

10.1 Permanent Dosimetry Assignment Form (PPB-602-1)

10.2 Visitors Dosimetry Log (PPB-602-2)

DOSIMETRY ASSIGNMENT CHECKLIST

Form PPB-602-1

PERMANENT DOSIMETRY ASSIGNMENT FOR:

Name (Last, First, MI) Social Security Number

Company Date of Birth

Radiation Safety Officer (Signature, Date)

The above individual has completed the following in accordance with the Radiation Worker Training Program:

a. Radiation Worker Training_____(R.R.C.O.)

b. Medical Baseline Examination and/or Physician's Report on file _____(Medical)

c. Work Restrictions _____(Medical)
[ ] Yes [ ] No
If yes, explain: (on back)

DOSIMETRY ASSIGNMENT TO BE COMPLETED BY R.R.C.O.

Whole body count

[ ] Baseline complete_____(date)

[ ] Scheduled for_____(month)

Urinalysis

[ ] Not required

[ ] Baseline 24-hr sample received_____(date)

[ ] Scheduled for _____(month)

Radiation dose history

[ ] No previous history

[ ] Requested_____(date)

[ ] Received_____(date)

TLD number_____SRO number_____

Date badged_____Assigned by_____

PPB NUCLEAR DCM FACILITY

Visitor Dosimetry Log

PPB-602-2

Name_____
Soc. Sec. #_____
Date of Birth_____
Visitor DB#_____ PDN#_____
Address [ ] Home [ ] Business

_____

_____

_____

Escort Name_____
Escort DB#_____
Date Issued_____
Date Returned_____

Record Dose NP_____mrem

P_____mrem

Visitor Complies with PPB Policy:

_____
Visitor Signature

Authorization to enter SCA:

_____
R.S.O. Signature

PPB VISITOR POLICY:

1. Each visitor's external dose is limited to less than 50 mrem per week or visit, whichever is longer.

2. No visitor will be issued visitor dosimetry if an additional 50 mrem would cause his dose to exceed 300 mrem in the current calendar quarter or 500 mrem in the current calendar year, unless prior authorization by the visitor's employer is on file at the Radiation Records Control Office.

3. All visitors must be escorted by a qualified PPB radiation worker AT ALL TIMES while in the radiologically controlled areas.

4. All visitors must be frisked by a Radiological Control Technician upon leaving the controlled area.

ppb® proto-prosthesis rubber, Inc.	POLICY AND PROCEDURE MANUAL

TITLE

INTERNAL EXPOSURE CONTROL

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ORIGINATOR			
CONCURRED	Althouse	RADIATION SAFETY OFFICER	11-24-86
APPROVED			
	[signature]	VICE-PRESIDENT	12/3/86

1.0 PURPOSE

The purpose of this procedure is to establish the necessary controls for protection from internal radiation exposure.

2.0 APPLICABILITY/SCOPE

This procedure is applicable to all personnel required to work within Radiologically Controlled boundaries.

3.0 DEFINITIONS

3.1 R.S.O. - Radiation Safety Officer

3.2 R.P.O. - Radiation Protection Officer

3.3 R.R.C.O. - Radiation Records Controls Officer

3.4 R.C.T. - Radiological Controls Technician

4.0 POLICY

None

5.0 PREREQUISITES

None

6.0 PRECAUTIONS

None

7.0 PROCEDURE

7.1 BIOASSAY

7.1.1 WHOLE BODY COUNTING

7.1.1.1 The R.S.O. shall ensure that an adequate whole body (in-vivo) counting program is in place and that employees are evaluated by whole body

examination as dictated by their level of risk of internal exposure.

7.1.1.2 Individuals who are required to be qualified as Radiation Workers shall be required to be evaluated by whole body counting at the start of their employment and upon termination of employment at the PPB DCM Facility. All Radiation Workers, including contractors, and non-PPB personnel, as well as PPB employees, must receive a whole body count at least annually.

7.1.2 IN-VITRO

7.1.2.1 The program for internal dose evaluation shall include the analysis of samples of nasal swabs, urine and possibly feces. Samples of other biological media may also be obtained in special situations. The R.S.O. is responsible for administering the program and ensuring that employees receive evaluations at a frequency appropriate to their level of risk.

Employees shall submit the samples for bioassay as requested by Radiological Controls.

7.1.2.2 Prior to termination, employees who were Radiation Workers shall report for a whole body count and/or submit a bioassay sample for analysis as required by Radiological Controls.

7.2 SPECIAL INTERNAL DOSIMETRY EVALUATION

7.2.1 Personnel who are involved in radiological incidents shall have internal dosimetry evaluations when internal contamination is suspected, in accordance with the following criteria:

7.2.1.1 A whole body count and a urinalysis and/or other biological media shall be required in the following circumstances:

1. Nasal or mouth swabs exceeding:
   a) 50 dpm/swab alpha, or
   b) 5,000 dpm/swab beta-gamma
2. Any detectable radioactivity on nasal or mouth swabs, and
   a) Facial contamination exceeding
      (1) 50 dpm/probe area alpha, or

(2) 1,000 dpm/probe area beta-gamma, or

b) Skin or clothing contamination exceeding

(1) 50,000 dpm/probe area alpha, or

(2) 500,000 dpm/probe area beta-gamma

3. Facial contamination exceeding

a) 100 dpm/probe area alpha, or

b) 10,000 dpm/probe area beta-gamma

4. Whenever required by the R.S.O.

7.2.1.2 Contact with the facility physician may be required to assess the need for immediate medical action for contamination which exceeds the levels of 7.2.1.1.

7.2.2 Internal dosimetry evaluations at levels of contamination lower than the above may be required by Radiological Controls.

7.2.3 When in-vivo examinations are required as a result of an incident, the involved personnel shall be transported directly to the Whole Body Counter facility as soon as practicable

(following a shower and change to clean clothing) after the incident. The individual's permanent TLD badge will be temporarily pulled until the special examinations are completed and/or the requested urinalysis/fecal samples are collected and the samples returned to the R.R.C.O.

7.3 DOSE COMMITMENT

7.3.1 When an internal deposition is detected, the employee's dose commitment shall be estimated by methods consistent with the assumptions and recommendations of the International Commission on Radiological Protection (ICRP). The dose commitment shall be reported to the employee and shall become a part of the exposure history file. The dose commitment is defined as the dose equivalent (rem) received by specific organs during a period of one calendar year, that was the result of intakes (single or multiple) of radionuclides by a person occupationally exposed. The dose commitment will be calculated for the remainder of the calendar year in which the internal deposition occurred, and will

continue to be calculated for each following calendar year as long as the dose commitment calculation is required.

7.4 WORK RESTRICTION

7.4.1 An employee may have their radiation work activities altered or limited as a result of:

7.4.1.1 approaching the control levels of Ref. 9.3;

7.4.1.2 unknown exposure status;

7.4.1.3 increased potential for internal deposition such as an open skin break;

7.4.1.4 repeated violations of safety requirments;

7.4.1.5 internal deposition;

7.4.1.6 medical radionuclides; or

7.4.1.7 failure of an oral or practical requalification examination.

7.4.2 The Radiation Safety Officer is responsible for implementing work restrictions when necessary. The employee shall be notified verbally that a work restriction has been imposed within two hours of the decision to initiate a work restriction.

7.4.3 Any employee who has exceeded the PPB

administrative control levels of Ref. 9.3 will have their TLD pulled and shall not enter a controlled area that quarter/year without prior, written approval of the R.S.O.

7.4.4 Any employee whose exposure status is unknown (e.g., lost TLD badge) shall not enter a controlled area until their current exposure status is determined by the R.R.C.O.

7.4.5 When an employee has an internal deposition of a radionuclide, excluding those medically induced, their radiation work activities shall be limited if the estimated dose commitment is greater than one-half the appropriate limit. If the internal deposition cannot be adequately assessed with the equipment available on-site, the worker will be placed on work restriction until an adequate assessment can be completed.

7.4.6 When an employee has an internal deposition of a radionuclide that was medically induced or implanted, the R.P.O. must be informed when the employee returns to the site, so that appropriate measures can be taken.

7.4.7 Employee's who work with radioactive materials, shall report any skin breaks which

they may have to the R.C.T. before entering a contaminated area. The R.C.T. shall ensure the protection afforded the skin break is adequate for the nature of the work to be performed and the potential or existing contamination status of the work location. Health services should be consulted as necessary.

7.4.8 Skin breaks include unhealed wounds, open cracks from chapping, injuries such as lacerations, abrasions, punctures, and blisters or burns. Health Services will provide a dressing or protection for the skin break, as deemed advisable by the Radiological Control Technician.

7.4.9 If approval to perform certain work is contingent upon maintaining the protection afforded by a dressing, the individual will not be allowed to enter a surface contamination area.

7.4.10 Safeguards shall be maintained by workers and the R.C.T. to minimize the likelihood of accidental introduction of radioactive materials beneath the skin. If the skin is broken while working with radioactive

materials, the employee shall exit the work area and report to the R.C.T. immediately. The R.C.T. will survey the skin break, and determine if additional follow-up action is required.

7.4.11 The R.S.O. may allow a contaminated employee to go home when, in the R.S.O.'s judgement, further decontamination effort would be more harm than good. Suitable contamination control measures shall be documented, invoked, and appropriate follow-up shall be continued until all detectable contamination has been removed. Only Radiological Controls personnel and qualified medical personnel are permitted to direct personnel decontamination efforts.

8.0 RESPONSIBILITIES

Responsibilities are as stated in Section 7.0 of this procedure.

9.0 REFERENCES

9.1 PPB Procedure, PPB-104, Monitoring For Personal Contamination.

9.2 PPB Procedure, PPB-401, Bioassay Procedure.

9.3 PPB Procedure, PPB-601, External Exposure Control.

9.4 ICRP-2

9.5 ICRP-26

9.6 ICRP-30

10.0 ATTACHMENTS

None

PPB pro-phase number, inc.	POLICY AND PROCEDURE MANUAL

TITLE

MAINTAINING EMERGENCY PREPAREDNESS

PROCEDURE No.	REVISION No.	EFFECTIVE DATE
PPB - 701		

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PPG	POLICY AND PROCEDURE MANUAL

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PPG pharmaceutical services, inc.	POLICY AND PROCEDURE MANUAL

TITLE

SABOTAGE OR CIVIL DISTURBANCE

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CONCURRED	Stthouse	RADIATION SAFETY OFFICER	11/25/86
APPROVED	[signature]	VICE-PRESIDENT	12/3/86

1.0 PURPOSE

1.1 To provide instructions for dealing with attempted or actual sabotage of the DCM facility.

1.2 To provide methods for dealing with a civil disturbance in the vicinity that threatens the DCM facility.

2.0 APPLICABILITY/SCOPE

This procedure applies to all personnel working at the PPB Nuclear DCM Facility.

3.0 DEFINITIONS

None

4.0 POLICY

None

5.0 PREREQUISITES

Threatened or actual subversive destruction of plant facilities or equipment has occurred.

6.0 PRECAUTIONS

If you receive a threatening telephone message attempt to evaluate it yourself: AND CALL the R.S.O. or designee.

7.0 PROCEDURE

7.1 If the threat involves a suggested bomb planted on the site, the Radiation Protection Officer will have primary responsibility for search operations. Volunteer members of the plant staff who are familiar with the facility layout and equipment should be

assembled to assist the R.P.O.

CAUTION: RADIOS SHOULD NOT BE USED IN THE VICINITY OF A SUSPECTED BOMB.

NOTE: IF A KNOWN OR SUPECTED BOMB DETONATION TIME EXISTS, STOP ALL SEARCHES AND EVACUATE REMAINING PERSONNEL FROM BUILDING 15 MINUTES BEFORE ANNOUNCED TIME. DO NOT REENTER BUILDINGS UNTIL 30 MINUTES BEYOND ANNOUNCED DETONATION TIME.

7.2 R.S.O. Actions include:

a. Announce a plant personnel assembly, if deemed necessary, and determine the desired onsite Assembly Point. Initiate "Personnel Accountability";

b. Notify the R.P.O. of any details he/she may not be aware of and maintain continuous communications with him/her throughout the duration of the incident;

c. Notify the PPB Nuclear Home Office (203) 444-2100;

7.3 Individual Actions include:

a. If you receive a phone call threatening the facility with a bomb or incendiary device:

1. Keep the caller on the phone as long as possible;

2. Obtain as much information as possible;

3. As soon as possible, obtain a copy of the Bomb Threat Report Form (Attachment 10.1).

Using the Bomb Threat Report Form as a guide, report accurate information about the caller's message to the R.P.O.

4. Immediately notify the R.S.O.

5. Notify your supervisor; and

6. Immediately and personnally take the complete form to the R.P.O.

b. If a written bomb threat is received:

1. Preserve and protect the documentation with an outer cover;

2. Deliver the document to the R.P.O.

c If a civil disturbance or act of sabotage is discovered which has damaged or threatens to damage any plant equipment or property:

1. Notify the R.S.O. or designee immediately, giving all available information;

2. Act as directed by the R.S.O. or designee.

7.4 Security Force Actions include:

a. Secure the main gate and prevent exit or entrance to the site unless authorization is given by the R.P.O.

b. Request assistance from Law Enforcement Departments if required;

c. Keep the R.S.O. or designee informed of all changes in facility security status;

d. If facility personnel assembly is called, obtain specific instructions from the R.S.O. as to the effect on the security force.

8.0 RESPONSIBILITIES

8.1 The R.S.O. or designee is responsible for implementing this procedure.

8.2 The R.P.O. or designee is responsible for implementing applicable Security Procedures and informing the R.S.O. of security force actions.

8.3 Any individual which receives a threatening telephone message is responsible for reporting it to the R.S.O. or designee, and his/her direct supervisor immediately using Attachment 10.1.

9.0 REFERENCES

9.1 "Notification/Communication".

9.2 "Personnel Accountability".

10.0 ATTACHMENTS

10.1 Bomb Threat Report Form

ATTACHMENT 10.1

BOMB THREAT REPORT FORM

This form is provided for your use. It will help you to obtain all the necessary information.

DATE:_____ TIME:_____A.M.____ P.M.____

Exact Words of Person Placing Call: _____

_____

_____

_____

QUESTIONS TO ASK:

1. When is the bomb going to explode?_____
2. Where is the bomb right now? _____
3. What kind of bomb is it? _____
4. What does it look like? _____
5. Why did you place the bomb? _____
6. What will prevent you from doing this? _____
7. What is your name? (He/she may inadvertently give it)_____

****

TRY TO DETERMINE THE FOLLOWING (CIRCLE AS APPROPRIATE)

Caller's Description: Male Female Adult Juvenile Middle Age Old

Voice: Loud Soft High-Pitch Deep Raspy Pleasant Intoxicated

Accent: Local Nonlocal Foreign Region Other_____

Speech: Fast Slow Distinct Distorted Stutter Nasal Slurred Lisp

Language: Excellent Good Fair Poor Foul Other_____

Manner: Calm Angry Rational Irrational Coherent Incorherent
Deliberate Emotional Righteous Laughing Intoxicated

Background Noises: Office Machine Factory Machines Bedlam Trains
Animals Music Quiet Voices Mixed Airplanes
Street Traffic Party Atmosphere

NOTIFY: Radiation Safety Officer _____

Radiation Protection Officer _____

ADDITIONAL INFORMATION: _____

_____

_____

DO NOT PANIC AND DO NOT DISCUSS THE INFORMATION THAT YOU HAVE RECEIVED EXCEPT WITH THE R.S.O., OR DESIGNEE OR SUPERVISOR.

_____

Person Receiving Bomb Threat Phone Call

PPB pacific preventive nuclear, inc.	POLICY AND PROCEDURE MANUAL

TITLE

PERSONNEL INJURY

PROCEDURE No.	REVISION No.	EFFECTIVE DATE
PPB - 704	0	11/30/86

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PERSONNEL INJURY

1.0 PURPOSE

The purpose of this procedure is to provide guidance for the treatment of injured and contaminated/injured personnel. This procedure will also provide instruction for the transportation of injured personnel to an off-site facility.

2.0 APPLICABILITY/SCOPE

2.1 This procedure is applicable to all personnel involved in locating, treating and transporting injured or contaminated/injured individuals.

3.0 DEFINITIONS

3.1 EMT - Emergency Medical Team

4.0 POLICY

None

5.0 PRECAUTIONS

5.1 Immediate medical treatment of SEVERE injuries is the highest priority. Radiological controls are to be secondary considerations.

5.2 If an emergency vehicle is required, the RPO or RSO shall ensure that Security is notified immediately to coordinate vehicle entry.

5.3 Ambulance teams take medical treatment orders from doctors only.

6.0 PREREQUISITES

6.1 A person has been injured and requires medical attention.

7.0 PROCEDURE

7.1 IMMEDIATE ACTIONS

7.1.1 Person discovering injured individual:

7.1.1.1 Administer first aid if you have been trained to do so.

7.1.1.2 Report the incident to the RPO or RSO as soon as possible.

Include the following:

a) location of the accident
b) name of person(s) injured
c) brief discription of injuries
d) other emergency conditions necessary (i.e., fire, contamination)
e) if additional assistance is required

7.1.1.3 Continue to administer first aid (as necessary) and per 7.1.1.1.

7.2.1 The RPO, RSO or designee will:

7.2.1.1 Activate and dispatch an emergency team.

7.2.1.2 Determine if physician or EMT and ambulance service will be needed.

7.2.1.3 Determine the hospital to be used (See Attachment 10.2 "Hospital Selection Criteria").

7.2.1.4 Notify immediately appropriate off-site medical assistance per Attachment 10.3 "Ambulance/Medical Service Request".

7.2.1.5 Notify Security of the impending arrival of off-site assistance, and the location of the injured person.

7.2.1.6 If the injured person is contaminated and will be taken off-site, provide a RCT to accompany the ambulance.

7.2.1.7 Coordinate notification of the injured individual's immediate family.

7.3 Transportation of A Contaminated Injured Individual

7.3.1 If time and medical conditions allow, the RCT shall:

7.3.1.1 Complete the Personnel Contamination Report per Procedure PPB-104.

7.3.1.2 Complete Form PPB-704-1, Emergency Medical Information Form, Attachment #10.1, and provide one copy for attending medical personnel.

7.3.1.3 Ensure the contaminated areas are wrapped with porous material

(cotton, etc.).

7.3.1.4 Provide ambulance personnel with plastic gloves, cotton liners, etc. for handling the contaminated individual.

7.3.2 Security Personnel shall:

7.3.2.1 Notify the RPO, RSO or his designee when the ambulance and/or EMT support arrives.

7.3.2.2 Coordinate entry and escort of emergency vehicles.

7.3.2.3 Collect employee badges of any personnel leaving site. (This includes the injured individual's badge).

7.3.3 Radiological Records Control Officer (RRCO) shall:

7.3.3.1 Dispatch a RCT or other qualified individual to the Security area to distribute dosimetry to off-site medical personnel entering the site.

NOTE: Dosimetry is permitted to leave the site with personnel involved with contaminated individuals and will be retrived by the RCT.

7.3.4 A RCT shall accompany contaminated individuals to the hospital when practical and ensure:

7.3.4.1 That all personnel handling the victim wear appropriate dosimetry.

7.3.4.2 That the transporting vehicle uses the appropriate hospital receiving area (Attachment 10.5 or 10.6 as appropriate).

7.3.4.3 That decontamination, as appropriate is performed enroute to the hospital.

7.3.5 Upon arrival at the hospital, the RCT will:

7.3.5.1 Remove any protective covering/ lining from the transport vehicle and bag it for return to the PPB DCM Facility.

7.3.5.2 Retrieve dosimetry issued to accompanying personnel and return them to the Radiological Records Control Office.

7.3.5.3 Assist the hospital staff in the decontamination of personnel, as required.

7.3.5.4 Dispatch the emergency vehicle to the PPB DCM Facility for decontamination, if necessary.

7.3.5.3 Inform the RPO/RSO or designee (from

7.2.1) individual's condition.

7.4 Trasportation of a non-contaminated injured individual.

7.4.1 If time and medical conditions allow, the RCT shall:

7.4.1.1 Complete Form PPB-704-1, Emergency Medical Information Form, Attachment #10.1 and provide one copy for attending medical personnel.

7.4.2 Security Personnel shall:

7.4.2.1 Notify the RPO/RSO or designee when ambulance, and/or EMT support arrives.

7.4.2.2 Coordinate entry and escort of emergency vehicles.

7.4.2.3 Collect employee badges of any personnel leaving site. (This includes the injured individual's badge)

7.4.3 Radiological Records Controls Officer (RRCO) shall:

7.4.3.1 Dispatch a RCT or other qualified individual to the Security area to distribute dosimetry to off-site medical personnel entering the site.

NOTE: Dosimetry is NOT permitted to leave site with personnel

involved with non-contaminated injuries and will be collected prior to egress.

8.0 RESPONSIBILITIES

8.1 Those as stated in Section 7.0.

8.2 The RPO/RSO is responsible for implementing this procedure.

8.3 Emergency team members and Rad Con Technicians are responsible for performing the actions specified by this procedure.

8.4 Security personnel are responsible for providing on-site escorts and expediting access to emergency vehicles.

9.0 REFERENCES

9.1 PPB-104, Personal Decontamination.

9.2 PPB-705, Radiation Overexposure.

10.0 ATTACHMENTS

10.1 Emergency Medical Information Form PPB-704-1

10.2 Hospital Selection Criteria, PPB-704-2

10.3 Ambulance Medical Service Request, PPB-704-3

10.4 Hospital Telephone List, PPB-704-4

10.5 Hospital Emergency Route, PPB-704-5

10.6 Hospital Emergency Route, PPB-704-6

PPB-704-1

EMERGENCY MEDICAL INFORMATION FORM

PATIENT NAME_____

PATIENT ADDRESS_____

HOME PHONE NUMBER_____

PATIENT CONTAMINATED	YES	NO
FIRST AID PERFORMED	YES	NO

BRIEF DESCRIPTION OF INJURIES_____

HOSPITAL SELECTION CRITERIA

RESERVED FOR FUTURE
USE

PPB-704-3

AMBULANCE/MEDICAL SERVICE REQUEST

AMBULANCE TRANSPORTATIONN

a) CALL_____AMB SERVICE

AT TEL#_____AND PROVIDE THE FOLLOWING:

- An ambulance is needed at the Proto-Power/Bisco Nuclear Decontamination Facility
- EMT support is needed
- The injured is or is not contaminated
- The injured is or is not overexposed

b) Call the appropriate hospital. See Hospital Phone List Attachment 10.4.

Advise:

- An injured person will be arriving
- Contamination status
- If an over-exposure case
- Nature of injuries
- If conscious/unconscious
- If a resuscitator is required
- The current PPB insurance carrier (name and phone number)

HOSPITAL TELEPHONE LIST

RESERVED FOR FUTURE USE

PPB-704-5

HOSPITAL EMERGENCY ROUTE

RESERVED FOR FUTURE USE

PPB-704-6

HOSPITAL EMERGENCY ROUTE

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PPC pacific power & controls, inc.	POLICY AND PROCEDURE MANUAL

TITLE

RADIATION OVEREXPOSURE

PROCEDURE No.	REVISION No.	EFFECTIVE DATE
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