REVISIONS

SRB APPROVAL	REV.	DESCRIPTION	DATE	APPROVED
	A	CHANGES PER CHANGE REQUEST CN-AD-020-01	12/2/82	
	B	CHANGES PER CHANGE REQUEST CN-AD-020-02	7/14/83	
	C	CHANGES PER CHANGE REQUEST CN-AD-020-03	2/21/85	
	D	CHANGES PER CHANGE REQUEST CN-AD-020-04	9/4/85	

This procedure is current at the time of submittal. Changes may be made during the effective licensing period. Changes which involve significant safety aspects of the activities authorized by the license will be formally submitted. All changes to procedures are approved by the Chem-Nuclear Safety Review Board before implementation.

CNSI SAFETY REVIEW
FINAL APPROVAL
BY
DATE 12/13/80

REVISION STATUS

SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
REV.	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
SHEET	18	19															
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CHEM – NUCLEAR SYSTEMS, INC.

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CHEM-NUCLEAR SYSTEMS (CNSI) HEALTH PHYSICS POLICY MANUAL

CONTRACT NO.	DOCUMENT NO.	REV.	SHEET
	CN-AD-020	-D	1

TABLE OF CONTENTS

NOTE: THIS POLICY MANUAL DOES NOT APPLY TO CNSI OPERATIONS AT LICENSED FACILITIES THAT HAVE POLICIES AND PROCEDURES MEETING THE INTENT OF THIS DOCUMENT.

1.0 HEALTH PHYSICS POLICY MANUAL

1.1 Purpose

The purpose of the CNSI Health Physics Policy Manual is to define management policy for radiologically safe performance CNSI Operations. The provisions of this manual should be implemented by specific operating procedures which may be more stringent than the guidance herein.

1.2 Applicability

CNSI policy applies to all operations conducted by or involving CNSI Personnel. This policy may not supercede policies and procedures at facilities where CNSI operations occur meeting the intent of this document. This manual is meant to supplement but not supersede applicable federal and state rules and regulations.

2.0 REFERENCES

2.1 10 CFR 20

2.2 Applicable State Rules and Regulations

2.3 NRC Regulatory Guide 8.9

3.0 REQUIREMENTS

3.1 Prerequisites

In no instance will operational or related activities which exceed applicable safety limits knowingly be allowed to continue unless, in the judgment of management, the consequence of continuing such activities will mitigate the ultimate result.

3.2 Limits

The limits specified in References 2.1 and 2.2 will not be exceeded.

4.0 DETAILED PROCEDURE

4.1 Responsibilities

4.1.1 Vice President, Regulatory Affairs

The Vice President, Regulatory Affairs has overall responsibility for CNSI compliance with applicable state and federal regulations and this procedure.

4.1.2 Radiation Protection Officer (RPO)

The designated RPO at each CNSI licensed facility is responsible for the implementation of this policy manual at the facility.

4.1.3 Corporate Health Physicist (CHP)

The CHP is responsible for the implementation of this policy manual for CNSI projects at non-CNSI facilities.

4.1.4 Manager, Supervisors

All managers/supervisors are responsible for compliance with this policy manual by employees under their direction.

4.1.5 Individual

Each individual performing assigned duties for CNSI is responsible for compliance with this policy manual and the procedures which implement it.

4.2 Record Keeping

4.2.1 Personnel Radiation Exposure Records - Personnel radiation exposure data (see Section 4.4) shall be maintained indefinitely on an individual basis to provide an accurate record of accrued occupational radiation exposure and shall include:

4.2.1.1 Previous individual occupational radiation exposure histories;

4.2.1.2 Individual occupational external radiation exposure records; and

4.2.1.3 Individual occupational internal radiation exposure records.

4.2.2 Personnel Training Records - Records pertaining to radiation protection training of personnel (see Section 4.3) shall be maintained. These records shall include the following, where applicable:

4.2.2.1 Health physics technician training (including non-CNSI training);

4.2.2.2 Respiratory protection training and medical fitness evaluation; and

4.2.2.3 Worker indoctrination in working with radiation/ contamination.

4.2.3 Radiation/Contamination Survey Records - Records shall be maintained on radiation/contamination surveys (see Section 4.6) which have been conducted for the purpose of determining the required protective measures.

4.2.4 Radiation Work Permit (RWP) Records - Records of RWP's issued for the purpose of controlling personnel entries into potentially hazardous radiation/contamination areas shall be maintained (see Section 4.8).

4.2.5 Effluent Records - Records shall be maintained which document any radioactive effluents discharged from the facility (see Section 4.10).

4.2.6 Environmental Monitoring Records - Records shall be maintained on the CNSI Environmental Monitoring Program which document sample collection and the related radioassay results (see Section 4.11).

4.2.7 Instrumentation Records - Records which document the maintenance and calibration performed on radiological monitoring instrumentation shall be maintained for the lifetime of the instrument.

4.2.8 Radioactive Source Control Records - Records on licensable quantities of radioactive sources shall be maintained to document compliance with applicable state and federal regulations (see Section 4.9) and shall include:

4.2.8.1 Receipt of radioactive source material;

4.2.8.2 Shipment of radioactive source material;

4.2.8.3 Periodic inventory of radioactive source material;

4.2.8.4 Sealed and plated source leak testing; and

4.2.8.5 Disposal of radioactive source material.

4.2.9 Intradepartmental Inspection and Audit Records - Records shall be maintained for a minimum of five (5) years on intra-departmental inspections and audits conducted for the purpose of monitoring the Radiation Protection Program.

4.2.10 Health Physics (HP) Log Books - All log books pertaining to HP activities shall be maintained (see Section 4.12).

4.2.11 Health Physics Record Retention

4.2.11.1 Health Physics Records (4.2.2 through 4.2.10) pertaining to operations performed at CNSI facilities shall be maintained in a secure location at the facility ten years after either decommissioning or the expiration of the nuclear liability policy which ever is longer, unless otherwise specified. Complete and legible microfilm copies of these records are suitable for long term storage. Microfilm copies of these records shall be transmitted annually to CNSI Corporate Document Control.

4.2.11.2 Health Physics records pertaining to CNSI operations at non-CNSI facilities shall be maintained by the operating group performing the work for ten years after completion of the project. Microfilm copies of these records shall be transmitted to CNSI Corporate Document Control within a reasonable time after completion of the project.

4.2.11.3 Personnel Radiation Exposure Records shall be maintained indefinitely by the CNSI Dosimetry Laboratory.

4.2.12 Responsibilities

4.2.12.1 The Director, Regulatory Affairs is responsible for maintaining the Personnel Radiation Exposure Records.

4.2.12.2 Maintenance of all other Health Physics records and transmittal of copies to CNSI Corporate Document Control shall be the responsibility of the Managers/Supervisors under whose direction the record was generated.

4.3 Personnel Training Policy

4.3.1 Prework Indoctrination - All personnel whose work assignments involve direct working contact with licensed radioactive materials or who are within posted radiation areas shall receive a pre-work indoctrination which shall include:

4.3.1.1 Principles of radiation protection;

4.3.1.2 Use of protective clothing and respiratory equipment;

4.3.1.3 Specific job precautions and requirements;

4.3.1.4 Emergency alarms and responses;

4.3.1.5 10 CFR Parts 19 and 20 requirements; and

4.3.1.6 Applicable sections of state regulations.

4.3.2 Reindoctrination - All personnel subject to this policy shall be required, as necessary, to receive an annual re-indoctrination. In addition, instructions for specific job precautions or requirements shall be administered as the need arises.

4.3.3 Prework Indoctrination Exemption - Visitors may be exempted from pre-work indoctrination requirements provided such personnel are provided with an approved escort.

4.4 Personnel Radiation Exposure Policy

4.4.1 Exposure Planning - Exposure planning shall be performed for every operation with the potential for radiation exposure.

4.4.2 Administrative Limits - Occupational radiation exposures at CNSI shall be administratively controlled at levels below regulatory limits. The administrative limits are established to control personnel exposures resulting from routine and non-routine operations. CNSI administrative limits are given in Appendix B.

4.4.2.1 Approval to exceed these administrative exposure limits shall be obtained from whichever of the following is applicable:

4.4.2.1.1 Mgr. -The designated Manager of the operational group to which the employee reports or a designated alternate - The Management of each operational group shall designate a senior manager as responsible for approvals of exposure extension. This designation shall be made in writing to the Director, Regulatory Affairs

4.4.2.1.2 Dir., RA - The Director, Regulatory Affairs or his designated alternate

4.4.2.1.3 VP, RA - The Vice President, Regulatory Affairs or his designated alternate

4.4.2.2 Extensions beyond 1250 mrem whole body quarterly exposure shall be issued from the Barnwell Environmental and Dosimetry Laboratory upon approval of the Director or designated alternates. Extensions shall be granted in increments of no more than 250 mrem. Requests for extensions shall be made by the designated manager or his designated atlernate.

4.4.3 Radiation Exposure Equalization - In instances where an individual's quarterly cumulative exposure reaches 1.0 rem whole body, 1.25 rem skin, or 6.5 rem extremities, equalization of exposures within the limitations imposed by job classifications and personnel availability shall be practiced.

4.4.4 Individual Limitations - The following individual limitations shall be administratively imposed:

4.4.4.1 Individuals under 18 years of age shall not be allowed to enter posted radiation areas of the facility.

4.4.4.2 Individuals employed prior to their 19th birthday shall not be allowed to accumulate whole body exposure in excess of 1000 mrem per quarter.

4.4.4.3 Individuals shall not be allowed to exceed an accumulated whole body occupational dose of 5(N-18) rem where N equals the individual's age in years at the time of his/her last birthday.

4.4.4.4 Individuals who do not have a signed NRC Form 4, or equivalent (previous occupational exposure history), on file shall be limited to a maximum radiation exposure accumulation of 1000 mrem per quarter.

4.4.4.5 Individuals shall enter radiation areas only when their current dose accumulation is less than the applicable limit of Appendix B.

4.4.4.6 Non-CNSI employees or visitors shall be subject to the administrative personnel radiation exposure policy.

4.4.5 Exposure Rate Limit - Except in extreme emergency conditions, no individual shall be allowed to carry on work activities in areas where the radiation field in an occupiable area is known to exceed, or has been measured to be greater than 100 R/hr without written permission of the RPO and the applicable Senior Manager, or their designated alternates.

4.4.6 Regulatory Agency Limits - Federal and state regulations for occupationally exposed workers, as prescribed in References 1 and 2 shall serve as the absolute limits for CNSI personnel exposure.

4.4.7 (RESERVED)

4.4.8 Methods of Estimating Internal Dose Commitment - Methods of estimating the radiation dose commitment resulting from internally deposited radionuclides shall follow the recommendations of the International Commission on Radiological Protection (ICRP) and Reg. Guide 8.9 (Reference 3).

4.4.9 Emergency Exposures - A volunteer may be allowed to receive a one time dose of 100 rem in a life saving action. A volunteer may be allowed to receive a one time dose of 25 rem to save critical equipment or mitigate releases of radioactivity.

4.5 Personnel Monitoring and Dosimetry Policy

4.5.1 Personnel Radiation Exposure History - As part of the CNSI new employee orientation, all employees shall be required to complete a radiation exposure history questionnaire on which the employee shall list and identify (to the best of his knowledge) all prior employment where occupational exposure to ionizing radiation was received.

4.5.2 NRC Form 4, CNSI Employees - An NRC Form 4, or equivalent, shall be completed and signed by all CNSI employees before they will be allowed to receive radiation exposures in excess of 1000 mrem per quarter.

4.5.3 NRC Form 4 Non-CNSI Employees - An NRC Form 4, or equivalent, shall be completed and signed by all non-CNSI employees before they will be allowed to receive radiation exposures in excess of 1000 mrem per quarter.

4.5.4 Personnel Monitoring Methods - At least one of the following personnel monitoring devices shall be used to monitor personnel radiation exposures:

4.5.4.1 External

4.5.4.1.1 Thermoluminescent dosimeters (TLD's)

4.5.4.1.2 Self-reading pocket ionization chambers (pocket dosimeters)

4.5.4.1.3 Film badges

4.5.4.2 Internal

4.5.4.2.1 Bioassay

4.5.4.2.2 Whole body counting

4.5.5 Personnel Monitoring Program - The issuing of personnel monitoring devices to CNSI employees shall comply with the requirements of References 1 and 2. In addition, anyone who, while carrying out a work assignment for CNSI or visiting a CNSI site, may be exposed to radiation shall be appropriately monitored for potential exposure to radiation.

4.5.6 Personnel Dosimetry Program - All CNSI personnel who routinely enter posted radiation/contamination areas and who, while carrying out their work assignments, are likely to be exposed to concentrations of radioactive materials in the work environment that exceed those listed in Reference 2.1 Appendix B Table I and applicable state regulations and/or who receive more than 500 mrem/yr of external whole body radiation exposure, shall be subject to the applicable CNSI personnel dos- imetry program requirements.

4.5.6.1 Bioassay and Whole Body Counting - CNSI employees subject to the CNSI personnel dosimetry program shall submit bioassay samples and/or receive whole body counts as directed by the RPO or the the facility license.

4.5.6.2. Termination - All personnel subject to the CNSI personnel dosimetry program will be requested to submit bioassay samples and/or receive whole body counts upon completion of their work assignments for CNSI.

4.5.6.3 Temporary Visitor or Employee - Visitors or employees temporarily assigned to work in CNSI posted radiation/contamination areas (i.e., for a period of three months or longer) shall be subject, as a minimum, to Sections 4.5.6.1 and 4.5.6.2 of the CNSI personnel dosimetry program.

4.5.7 Investigation Levels - Investigation levels for the various techniques used in the CNSI personnel dosimetry program will reflect, as a minimum, the recommendations of current regulatory standards.

4.5.8 Personnel Monitoring and Dosimetry Program Data

Availability - All data collected on an individual in the personnel monitoring and dosimetry program shall be considered private information. Personnel exposure information shall not be released except as required by regulation or license condition or at the written request of the individual.

4.6 Contamination Control Policy

4.6.1 Contamination Areas - Contamination areas shall be posted and boundaried areas furnished with step-off pads wherever it is practical. The following restrictions shall apply to contamination areas:

4.6.1.1 Entries - All entries into posted contamination areas shall require approval of the appropriate radiological control group.

4.6.1.2 Smoking, Eating, and/or Drinking - Smoking, eating, and/or drinking shall not be allowed in any area which is posted as contaminated.

4.6.1.3 Open Wounds and/or Sores - Personnel who have open wounds and/or sores may be excluded from participating in work activities in areas which are labelled as contaminated.

4.6.1.4 Personnel Clothing - Personnel working in areas where substantial contamination is present shall not wear personal clothing other than socks and underwear.

4.6.1.5 Personal Articles - Personnel who wear wrist watches, rings, etc. into contamination areas shall do so at their own risk.

4.6.2 Designation of Radiation/Contamination Areas - The appropriate radiological control group, shall have the sole responsibility and authority for the posting and/or removal of the boundaries for radiation/contamination areas.

4.6.3 Item Control - Contamination status shall control the movement and/or use of items removed from contaminated areas.

4.6.4 Contamination Limits - Contamination limits will be established by the appropriate radiological control group.

4.6.5 Item Tagging - Items which are contaminated in excess of the applicable limit(s) shall be appropriately wrapped, tagged to denote conditions, and appropriately isolated.

4.6.6 Unconditional Release - Items shall not be released from controlled area for unrestricted use if the appropriate contamination limits are exceeded.

4.7 Respiratory Protection Policy

4.7.1 Respiratory Protection Program - All CNSI personnel who, while carrying out their work assignments, are likely to be exposed to airborne radioactive materials shall be subject to the CNSI Respiratory Protection Program.

4.7.2 Evaluation - If airborne radionuclide concentrations exceed .25 MPC an evaluation of the need for respiratory protection will be performed and documented prior to beginning work.

4.7.3 Protection Factors - The protection factors shown in Appendix A for the use of respiratory protection devices have been outlined in Reference 2.3 and approved under the provisions of Reference 2.1 and applicable state regulations.

4.7.4 Respiratory Protection Training - All personnel who are subject to this policy shall be fitted for an appropriate respiratory protective device and shall receive applicable training prior to use. Refitting and retraining shall be carried out at least annually.

4.7.5 Respiratory Protective Device Leak Check - The fit of individually worn respiratory protective devices shall be leak checked by a smoke test, or equivalent, immediately prior to being worn under the following conditions:

4.7.5.1 Entering areas suspected to contain high, unmeasured concentrations of airborne radioactive materials;

4.7.5.2 Entering airborne areas where the measured radioactive material concentration is twenty (20) times the applicable maximum permissible concentration (MPC).

4.7.6 Time Limits - No person shall wear a respiratory protective device for a period of more than four (4) consecutive hours without a one (1) hour break and for more than a total of six (6) hours in any work day.

4.7.7 Working Concentration Limits - Work activities shall not be carried on under conditions where air sample data show the concentration of airborne radioactive material exceeds 1000 times the applicable maximum permissible concentration (MPC).

4.7.8 Physical-Emotional Discomfort - All personnel who are required to wear respiratory protective devices shall be instructed that, should they experience physical and/or emotional discomfort that may be caused by the wearing of respiratory protective devices, they may leave the area at any time for relief.

4.7.9 Airborne Radioactive Materials Sampling - In areas of known, or suspected, high airborne radioactive material concentrations, the following air sampling requirements shall be imposed to ensure the adequacy of prescribed respiratory protective devices:

4.7.9.1 Prior to the start of work activities, airborne radioactive material concentrations shall be determined;

4.7.9.2 Once work activities have begun in posted radioactive airborne areas, at least one air sample per shift shall be collected from the area(s) and the concentration of airborne radioactive materials determined.

4.7.10 Exemption from Airborne Radioactive Materials Sampling - Exemption from the provisions of Section 4.7.8 shall be granted for a specific area when the history of airborne radioactivity concentrations of the area are adequately documented and significant personnel radiation exposures are accrued during air sample collection.

4.7.11 Unidentified Airborne Radioactive Material Concentration - In instances where there are unidentified radionuclides contributing to the airborne conditions, the most limiting maximum permissible concentration (MPC) for radionuclides likely to be present shall be applied to the unidentified components(s) when respiratory protective devices are being prescribed.

4.7.12 Facial Hair - Any person who is required by CNSI to wear a respiratory protective device and who cannot, because of the presence of facial hair, obtain a proper respiratory protection device fit, shall be excluded from entering posted radioactive airborne areas until an approved fit can be obtained.

4.7.13 Respiratory Protective Device Maintenance - A respiratory protective device maintenance program, consisting of cleaning, sanitizing, and inspection shall be carried on by CNSI. Respiratory protective devices worn by an individual shall not be reissued for general use until the maintenance program requirements have been performed.

4.7.14 Emergency Respiratory Protection Equipment - The need for supply of respiratory protection equipment dedicated for emergency use in mobile units and at all CNSI sites shall be determined by the appropriate manager.

4.8 Radiation Work Permit Policy

4.8.1 Radiation Work Permit Program - All CNSI personnel who are required to enter posted radiation/contamination/airborne areas are subject to the RWP policy.

4.8.2 Radiation Work Permit Issue - Except for the exemptions listed below, RWP's shall be issued by the appropriate radiological control group for all work activities carried on within posted radiation/contamination/airborne areas.

4.8.3 RWP Exemptions - The following may be exempt from RWP issuing requirements:

4.8.3.1 Approved Procedures - All persons who are performing work tasks according to approved operating procedures may be exempt from the RWP issuing requirements.

4.8.3.2 Routine Receiving and Shipping of Radioactive Materials - Routine work activities directly related to receiving and shipping of radioactive materials which are covered by an approved operating procedure may be exempt from RWP issuing requirements.

4.8.3.3 Short-Term Entries - At the discretion of the appropriate radiological control group, short-term entries to posted radiation/contamination/airborne areas may be exempt from RWP issuing requirements.

4.8.4 RWP Authorization - An RWP shall not be valid until all authorizing supervision signatures have been entered on the RWP form.

4.8.5 RWP Termination - RWP's can be terminated by any one, or combination, of the following:

4.8.5.1 Work Completion - Work activities for which the RWP was issued are completed.

4.8.5.2 Time Limit Expiration - RWP authorization shall be for a period of not more than 5 days from the time of issue and shall be automatically terminated at the end of that time period; changing conditions may require more frequent termination.

4.8.5.3 Withdrawal of Authorization - The appropriate radiological control group and/or authorizing supervisors shall have the prerogative of withdrawing their specific authorization and thus terminating an RWP at any time.

4.8.6 RWP Personnel Coverage - After initial validation, the addition of additional personnel on an RWP form shall require the authorization of the appropriate radiological control group.

4.9 Radioactive Source Control Policy

4.9.1 Requisition - Prior to ordering, all requisitions for radioactive sources shall be approved by the appropriate radiological control group.

4.9.2 Receipt of Radioactive Sources - Any package or container arriving on a CNSI site which is labelled as containing or is known to contain radioactive sources shall be surveyed by the appropriate radiological controlled group.

4.9.3 Source Inventory - All licensable quantities of radioactive laboratory and calibration sources whose possession is authorized by a CNSI radioactive material license shall be inventoried on a least a semi-annual basis.

4.9.4 Leak Testing - All sealed radioactive sources whose possession is authorized by a CNSI radioactive material license shall be leak tested on a semi-annual basis. All licensable sealed radioactive sources which have been stored for a period exceeding (6) months shall be leak tested prior to use.

4.9.5 Radioactive Source Material Shipment - Prior to release by CNSI, all shipments containing radioactive sources shall be cleared by the appropriate radiological control group.

4.9.6 Radioactive Source Material Disposal - The disposal of all radioactive laboratory and calibration sources whose possession is authorized by a CNSI radioactive material license shall be under the surveillance of the appropriate radiological control group.

4.9.7 Plated Source Material - Plated source material shall be leak tested every quarter.

4.10 Effluent and Radioactive Material Release

4.10.1 All releases of radioactive material from a CNSI controlled area, including air or liquid effluents, shall be documented.

4.10.2 Documentation shall include:

4.10.1.1 Quantity and Isotope

4.10.1.2 Chemical and Physical form

4.10.1.3 Point and Rate of release

4.10.1.3 Release Survey Forms.

4.11 Environmental Monitoring

4.11.1 Environmental monitoring shall be performed for all CNSI licensed facilities/sites where the potential exists, for release to the environment of radioactive material.

4.11.2 Environmental monitoring shall include, as appropriate:

4.11.2.1 Air sampling

4.11.2.2 Ground and surface water sampling

4.11.2.3 Direct radiation monitoring

4.11.2.4 Flora and fauna sampling.

4.11.3 A site specific environmental monitoring program shall be developed for each CNSI facility/site to include:

4.11.3.1 The locations to be sampled

4.11.3.2 The media to be sampled

4.11.3.3 The frequency of sampling

4.11.3.4 The radioassays to be performed

4.11.3.5 The actions to be taken and action levels.

4.12 Health Physics Log Books

4.12.1 A Health Physics Log book shall be maintained at or near the control point to CNSI radiologically controlled area.

4.12.2 The Log Book shall contain daily records of the activities performed in the controlled area, the personnel involved, the HP controls applied, and any problems identified.

4.12.3 Entries in the Log Book shall be in ink and signed by the individual making the entry.

APPENDIX A

PROTECTION FACTORS FOR RESPIRATORS

(2 PAGES)

PROTECTION FACTORS FOR RESPIRATORS[a]

DESCRIPTION[b]	MODES[c]	PROTECTION FACTORS[d] PARTICULATES ONLY	PROTECTION FACTORS[d] PARTICULATES, GASES & VAPORS[e]	SELECTION OF TESTED & CERTIFIED EQUIPMENT BUREAU OF MINES/NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH APPROVALS
I. AIR-PURIFYING RESPIRATORS				
Facepiece, half-mask[f]	NP	10		30 CFR Part 11 Subpart K
Facepiece, full	NP	50		
Facepiece, half-mask, full, or hood	PP	1000		
II. ATMOSPHERE-SUPPLYING RESPIRATORS				
1. Air-line respirator				
Facepiece, half-mask	CF		1000	30 CFR Part 11 Subpart J
Facepiece, half-mask	D		10	
Facepiece, full	CF		2000	
Facepiece, full	D		50	
Facepiece, full	PD		2000	
Hood	CF		2000[g]	
Suit	CF		h	
2. Self-contained breathing apparatus (SCBA)				
Facepiece, full	D		50	30 CFR Part 11 Subpart H
Facepiece, full	PD		10,000[i]	
Facepiece, full	R		50	
III. COMBINATION RESPIRATOR				
Any combination of air-purifying and atmosphere-supplying respirators		Protection factor for type and mode of operation as listed above		30 CFR Part 11 § 11.63(b)

---

[a]For use in the selection of respiratory protective devices to be used where the contaminant has been identified and the concentration (or possible concentration) is known.

[b]Only for shaven faces and where nothing interferes with the seal of tight-fitting facepieces against the skin. (Hoods and suits are excepted.)

[c]The mode symbols are defined as follows:

- CF = continuous flow
- D = demand
- NP = negative pressure (i.e., negative phase during inhalation)
- PD = pressure demand (i.e., always positive pressure)
- PP = positive pressure
- R = demand, recirculating (closed circuit)

[d]1. The protection factor is a measure of the degree of protection afforded by a respirator, defined as the ratio of the concentration of airborne radioactive material outside the respiratory protective equipment to that inside the equipment (usually inside the facepiece) under conditions of use. It is applied to the ambient airborne concentration to estimate the concentration inhaled by the wearer according to the following formula:

$$\text{Concentration Inhaled} = \frac{\text{Ambient Airborne Concentration}}{\text{Protection Factor}}$$

2. The protection factors apply:

(a) Only for trained individuals wearing properly fitted respirators used and maintained under supervision in a well-planned respiratory protective program.

(b) For air-purifying respirators only when high efficiency particulate filters [above 99.97% removal efficiency by thermally generated 0.3 μm dioctyl phthalate (DOP) test] are used in atmospheres not deficient in oxygen and not containing radioactive gas or vapor respiratory hazards.

(c) For atmosphere-supplying respirators only when supplied with adequate respirable air.

[e]Excluding radioactive contaminants that present an absorption or submersion hazard. For tritium oxide, approximately one half of the intake occurs by absorption through the skin so that an overall protection factor of less than 2 is appropriate when atmosphere-supplying respirators are used to protect against tritium oxide; for example:

If the protection factor for a device is:	PF overall for tritium oxide is:
10	1.82
100	1.98
1,000	1.99

(Continued)

Air-purifying respirators are not suitable for protection against tritium oxide. See also footnote g concerning supplied-air suits.

[f]Under-chin type only. This type of respirator is not satisfactory for use where it might be possible (e.g., if an accident or emergency were to occur) for the ambient airborne concentration to reach instantaneous values greater than 10 times the pertinent values in Table I, Column 1 of Appendix B to 10 CFR Part 20, "Standards for Protection Against Radiation." This type of respirator is not suitable for protection against plutonium or other high-toxicity materials. The mask is to be tested for fit with irritant smoke, prior to use, each time it is donned.

[g]The design of the supplied-air hood or helmet (with a minimum flow of 6 cfm of air) may determine its overall efficiency and the protection it provides. For example, some hoods aspirate contaminated air into the breathing zone when the wearer works with hands-over-head. Such aspiration may be overcome if a short cape-like extention to the hood is worn under a coat or coveralls. Other limitations specified by the approval agency must be considered before using a hood in certain types of atmospheres (see footnote h). Manufacturers' recommended pressure settings for the air supply cannot always be relied on to ensure a minimum 6 cfm air flow. Equipment must be operated in a manner that ensures proper flow rates are maintained.

[h]Appropriate protection factors must be determined, taking into account the design of the suit and its permeability to the contaminant under conditions of use.

[i]No approval schedules are currently available for this equipment. Equipment is to be evaluated by testing or on the basis of reliable test information.

[j]This type of respirator may provide greater protection and be used as an emergency device in unknown concentrations for protection against inhalation hazards. External radiation hazards and other limitations to permitted exposure such as skin absorption must be taken into account in such circumstances.

Note 1: Protection factors for respirators, as may be approved by the U.S. Bureau of Mines/National Institute for Occupational Safety and Health (NIOSH) according to applicable approvals for respirators to protect against airborne radionuclides, may be used to the extent that they do not exceed the protection factors listed in this table. The protection factors listed in this table may not be appropriate to circumstances where chemical or other respiratory hazards exist in addition to radioactive hazards. The selection and use of respirators for such circumstances should take into account applicable approvals of the U.S. Bureau of Mines/NIOSH.

Note 2: Radioactive contaminants for which the concentration values in Table I of Appendix B to 10 CFR Part 20 are based on internal dose due to inhalation may, in addition, present external exposure hazards at higher concentrations. Under such circumstances, limitations on occupancy may have to be governed by external dose limits.

APPENDIX B

CNSI ADMINISTRATIVE LIMITS FOR RADIATION EXPOSURE

(1 PAGE)

CNSI ADMINISTRATIVE LIMITS FOR RADIATION EXPOSURE

Accumulated Dose in mrem	Part of Body	Calendar Period	Approvals Required to Exceed Limit
300	Whole body	Month	Mgr. or designee
800	Skin	Month	Mgr. or designee
2,000	Extremities	Month	Mgr. or designee
600	Whole Body	Month	Dir., RA or designee
1,600	Skin	Month	Dir., RA or designee
3,800	Extremities	Month	Dir., RA or designee
1,250	Whole Body	Quarter	Dir., RA or designee
3,400	Skin	Quarter	Dir., RA or designee
8,000	Extremities	Quarter	Dir., RA or designee
2,000	Whole Body	Quarter	VP, RA or designee
5,200	Skin	Quarter	VP, RA or designee
12,800	Extremities	Quarter	VP, RA or designee
2,500	Whole Body	Quarter	No Approval
6,500	Skin	Quarter	No Approval
16,000	Extremities	Quarter	No Approval