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GENERAL HEALTH PHYSICS PLAN

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GENERAL HEALTH PHYSICS PLAN

Section: 1 Revision: 3 Subject: INTRODUCTION

183 Submitted by: Date: Radiation Protection Engineer 12/22/83 P Approved by: 2 Date: Manager, Plant Operations

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#### 1.0 Introduction

The operation of a nuclear power facility involves possible exposure of some personnel to significant levels of radiation; however, with proper radiation protection and exposure control measures the operation and maintenance of a nuclear power facility can be performed safely.

It is important to realize that radiation safety depends on the knowledge, training and attitude of each individual. This Plan is provided to each employee in an effort to promote a safe working environment and work practices to assure that personnel exposure to radiation is "as low as reasonably achievable" (ALARA).

Questions or concerns about radiation safety or this Plan should be directed to the Radiation Protection Engineer.

#### 1.1 Purpose

The purpose of this Plan is to provide the policy, procedures and requirements for radiological safety at CPSES to assure compliance with Federal and State regulations. The goal of this Plan is to provide appropriate protection for the public, the environment, and station personnel and to reduce radiation exposure to ALARA.

#### 1.2 Review and Approval

This plan is submitted by the Radiation Protection Engineer for the Station Operations Review Committee review. The plan is approved by the Manager, Plant Operations.

Revisions to this Plan shall be made by revising the applicable section. A vertical line on the right hand margin of the revised portion shall indicate the change. The Table of Contents shall be revised each time to reflect the change. Revisions shall be reviewed by SORC and approved by the Manager, Plant Operations.

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#### 1.3 Basis

The General Health Physics Plan is based on the regulations and requirements established by the USNRC. These regulations and requirements were established from recommendations of the International Commission On Radiological Protection (ICRP) and the National Council On Radiation Protection and Measurements (NCRP), leading authorities on radiation protection.

Additionally, Company policy statements in Section 12 of this plan provide the basis for specific requirements detailed in this Plan.

#### 1.4 Responsibilities

The ultimate responsibility for radiation safety rests with each individual. Each person is responsible for maintaining their exposure ALARA during the performance of their duties. Individuals are responsible for complying with all Radiation Controlled Area rules, procedures and safety practices and reporting to their immediate Supervisor, conditions or practices which are unsafe.

The Manager of Plant Operations has the overall responsibility for the establishment and implementation of the General Health Physics Plan for personnel radiation protection. He is responsible for compliance with the applicable Federal and State regulations pertaining to radiological safety.

Station Supervision is responsible for assuring that personnel comply with all requirements of the Plan. Supervision is responsible for maintaining personnel exposure ALARA on an individual and collective (group) basis. Additionally, Supervision is responsible for maintaining a current knowledge of personnel exposure and controlling such exposure so that limits are not exceeded and the ALARA concept is properly implemented.

The Radiation Protection Section is responsible in particular for development and implementation of the General Health Physics Plan. The responsibility for implementation includes compliance with all Federal and State regulations, establishment and evaluation of the plant radiological working environment, ALARA implementation, and personnel exposure control, monitoring and evaluation.

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#### 1.5 Implementation

The implementation of this Plan is executed by the Radiation Protection Section with the support and commitment of station supervision. The Radiation Protection Section shall establish the procedures, rules and practices necessary to implement the requirements of this Plan. Each employee's cooperation and support is required for successful implementation.

#### 1.6 Radiation Protection Section

The Radiation Protection Section shall establish radiation work permits, procedures and practices to assure control of personnel exposure. Their duties will include surveying, monitoring, dosimetry, support of radioactive waste handling, and applicable records and reporting. Additionally, Radiation Protection will function in an advisory capacity to all personnel to assure successful implementation of the Plan. The Radiation Protection that are being conducted in an unsafe radiological condition, or that violates CPSES radiation protection standards and/or

Radiation Protection shall maintain current exposure information for all personnel and provide this information to station supervision to assure control within limits and application of the ALARA philosophy. Access to Radiation Controlled Areas is controlled by Radiation Protection to assure a radiologically safe working environment prior to entry.

# SAFETY-RELATED

COMANCHE PEAK STEAM ELECTRIC STATION

GENERAL HEALTE PHYSICS PLAN

Section: 2 Revision: 4 Subject: Radiation Protection Standards

Submitted by: 7/9 Date: Radiation Protection Engineer 5/1/86 Approved by: Date: Mahager, Plant Operations

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#### 2.0 Radiation Protection Standards

#### 2.1 Development of Standards

Radiation Protection standards were developed to assure that the risk associated with radiation exposure is acceptable to the individual and the population at large in view of the benefits received from the use of radiation and radioactive materials. Dose standards have been established such that the risk of radiation effects due to exposure is significantly less than the risk associated with job hazards present in any occupation not involving radiation exposure.

Controversy exists over the effects of very low doses of radiation received over a long period of time. This issue will probably remain controversial for a long time since the effects are of the type which can only be observed statistically. The Radiation Protection Section will provide information, counseling and guidance to any employee concerning the effects of radiation and the CPSES program for radiation safety and protection.

#### 2.2 Personnel Exposure Limits

The USNRC has developed personnel radiation exposure limits following the criteria indicated above and these limits are set as the maximum permissible occupational exposure limits for CPSES. It should be recognized that the philosophy of ALARA is dedicated to reducing exposure to radiation to the minimum practicable, therefore, these limits are not goals for exposure usage rather they are the framework in which ALARA shall be

#### a) Radiation Workers

The following maximum permissible exposure limits apply to all radiation workers except those who are pregnant. Personnel under eighteen (18) years of age will be prohibited from Radiation Controlled Areas.

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#### NRC Maximum Permissible Exposure Limits

Exposure Period	Whole Body	Skin	Extremities
Quarterly	1.25 rem*	7.5 rem	18.75 rem
Lifetime	5(N-18) rem	None	None

N = Employee's age in years

#### b. Maximum Permissible Exposure Limits For Employees Who Are Pregnant

NCRP recommendations are that pregnant employees be limited to a maximum permissible exposure of 0.5 rem during the gestation period.

\*If the individual's exposure history is documented and the lifetime permissible exposure is not exceeded, an individual may be allowed to receive 3 rem whole-body exposure during a calendar quarter for each quarter during a calendar year, with prior approval by Radiation Protection.

#### c) Exposure Limits Applied to Airborne Concentrations

The USNRC has established in 10CFR20 Appendix B maximum permissible concentration limits for airborne radioactive material to which a licensee may expose an individual. The limits in Table I, Column 1, of Appendix B apply to radiation workers, and limit exposure to those concentrations to a maximum of 40 hours per 7 consecutive days.

Specific and detailed information is available from Radiation Protection concerning exposure limits for airborne radioactive material.

#### 2.3 Personnel Exposure Control

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As previously indicated, the above established limits are considered the maximum permissible. Application of the ALARA philosophy to personnel exposure is best implemented by the use of administrative exposure controls to assure personnel exposure

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is ALARA and that the maximum limits will not be exceeded. Therefore, the following administrative limits shall be applied at CPSES for the purpose of exposure control and ALARA planning.

In no case may the maximum permissible limits established by the US NRC be exceeded.

a) <u>CPSES Administrative External Exposure Control Limits</u>

Exposure Poriod	Whole Body	Skin	Extremities
Weekly	0.3 rem	0.5 rem	1.5 rem
Quarterly	1.25 rem	4 rem	9 rem
Yearly	5 rem	16 rem	36 rem

Specific authorization and approval to exceed these administrative limits is required by a Radiation Protection Supervisor for weekly limits, the Radiation Protection Engineer or his designee for quarterly limits and the Manager, Plant Operations for yearly limits.

b) <u>CPSES Administrative External Exposure Control Limit For</u> Radiation Workers Who Are Pregnant

The administrative control limit for the entire gestation period shall be 0.3 rem. Authorization shall not be given to exceed the administrative control limits for pregnant employees.

c) <u>CPSES Administrative Control Limits for Exposure to Airborne</u> Radioactive Materials

The administrative control limit for radiation workers shall be 20 hours per 7 consecutive days exposure at the maximum permissible concentration specified in 10CFR20, Appendix B, Table I, Column 1.

Specific authorization and approval from a Radiation Protection Supervisor is required to exceed this 7 consecutive day limit.

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General Health Physics Plan

Section: 3 Revision: 2 Subject: Personnel Radiation Dosimetry

Submitted by: 11/18/83 Date: Radiation Protection Engineer Approved by: 6 Date: Manager, Plant Operations

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#### 3.0 Personnel Radiation Dosimetry

All personnel who enter Radiation Controlled Areas are required to wear approved personnel dosimetry devices.

Personnel who are assigned dosimetry devices shall wear them at all times within Radiation Controlled Areas and are responsible for their safekeeping. All dosimetry devices shall be serviced, maintained and evaluated by Radiation Protection. Personnel assigned dosimetry devices shall not tamper with them in any way or cause them to be exposed or the dose otherwise altered except during the performance of work requirements at CPSES. Personnel dosimetry devices shall not be removed from CPSES premises without prior authorization and approval by the Radiation Protection Engineer. Lost or damaged dosimetry devices shall be reported to Radiation Protection immediately.

Dosimetry devices shall normally be worn on the front of the body, between the waist and head and if more than one device is issued they shall be worn together. Other placement of dosimetry will require prior approval by Radiation Protection. Dosimetry shall be worn so as to prevent contamination of the dosimetry itself.

#### 3.1 External Dosimetry

The official and permanent record of an individual's external radiation exposure will be obtained from thermoluminescent dosimeters (TLD's). Badges will be issued to individuals requiring dosimetry and will contain several TLD elements to be used for assessment of external exposure. Dosimeters (TLDs) will be processed periodically on a scheduled basis to determine each individual's exposure, and new badges issued. Processing frequency may be increased depending on each individual's work requirements within the Radiation Controlled Area.

Additionally, a pocket ionization chamber dosimeter will be used for estimating personnel exposure for specific jobs and between periods of badge (TLD) processing. The pocket dosimeter will allow dose control by the individual since it can be read directly at any time. Pocket dosimeters shall be reset (Zeroed) by Radiation Protection prior to exceeding the maximum dose indicated on the scale. Each individual shall return his pocket dosimeter to Radiation Protection for resetting (Zeroing) when the indicated dose is 75% of full scale on the dosimeter.

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Radiation Protection may establish special dosimetry requirements for certain jobs. Such dosimetry may include finger rings (TLDs), extremity badges (TLDs), neutron dosimetry or other devices. Instructions and information for these devices will be provided by Radiation Protection at the time of issue.

#### 3.2 Internal Dosimetry

Internal dose determination will be made by special methods of body burden analysis, including whole-body counting, thyroid counting and bioassay as described in the Bioassay Program (HPA-103). Additionally, for exposure to known concentrations of specific isotopes, calculational methods may be required to support dose determinations.

Whole body counting will be used to determine the dose resulting from the uptake by the body of radioisotopes. Each employee who will work in Radiation Controlled Areas shall have a whole-body count prior to initial entry into Radiation Controlled Areas. Whole-body counts will be required annually thereafter, or more frequently as determined by Radiation Protection.

Whole-body counting will be required for non-plant personnel prior to initial entry into Radiation Controlled Areas except at the discretion of the Radiation Protection Engineer. Persons who have received a whole body count at CPSES shall have a final whole body count prior to termination of employment or assignment at CPSES.

Bioassay will be used as a supplement to whole-body counting for internal dose determination, except in the case of alpha or beta emitting radionuclides when it will be the primary means of dose determination. Bioassay is the radiochemical analysis of tissues, fluids, or excretions from the body and commonly involves both urine and fecal analysis. Bioassay shall be performed routinely for selected personnel, as confirmation of the effectiveness of CPSES radiation protection measures.

## 3.3 Dosimetry Records and Reporting

Radiation Protection shall maintain personnel exposure records for all persons entering the Radiation Controlled Area and issued personnel dosimetry. Records shall include previous occupational exposure prior to employment with TUGCO at CPSES, occupational exposure received at CPSES or at other facilities while employed

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at CPSES, and the results of all personnel external and internal dosimetry while employed at CPSES.

Radiation Protection shall issue reports pertaining to radiation exposure as required by Federal and State regulations. Radiation exposure reports will include daily or weekly exposure as estimated by pocket dosimeters, and monthly, quarterly, and annual exposure for each individual as determined by TLD badge results. Additionally, reports of accidental or emergency exposure, as well as exposure investigations, shall be made as required by Radiation Protection.

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General Health Physics Plan

Section: 4 Revision: 2 Subject: Radiation Protection Training

11/18/23 Submitted by: Date: Radiation Protection Engineer Approved by: Date:

Manager, Elant Operations

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#### 4.0 Radiation Protection Training

All personnel who enter Radiation Controlled Areas at CPSES shall have received prior training in radiation protection, rules, regulations and requirements unless escorted by a radiation worker. Radiation protection training is considered an essential part of establishing radiation safety, a safe working environment, and implementation of the Health Physics program and ALARA philosophy.

#### 4.1 Requirements

All radiation workers shall be properly trained in radiation protection methods and procedures prior to entry and work in Radiation Controlled Areas at CPSES.

#### 4.2 Radiation Worker Training

Training for those persons requiring entry and work within Radiation Controlled Areas shall include both theory and practical aspects of radiation protection necessary to assure the worker can perform his duties within Radiation Controlled Areas at CPSES in a safe manner, consistent with the requirements of this Plan.

General Radiation Worker Training will be supplemented with additional specialized training depending on the requirements for Radiation Controlled Area work and the work group involved.

## 4.3 Radiation Protection Personnel Training

Radiation Protection technicians will be given specialized training in Radiation Protection in accordance with TRA-301.

#### 4.4 On-The-Job Training

Whenever on-the-job training is given to personnel, supervisors shall include Radiation Protection work practices, contamination control, exposure control and reduction (ALARA), and other specific areas determined by the type of work and location. On-the-job training will be a continuous effort provided directly by supervision or by their designate.

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#### 4.5 Training Evaluation and Records

The technical competence and proficiency of personnel in radiation protection methods and procedures shall be evaluated through testing, demonstration exercises and other means as appropriate. The evaluation of training and a record of the specific training provided and experience possessed shall be maintained for each individual. Successful completion of the appropriate training shall be prerequisite for Radiation Controlled Area entry. Comanche Peak Steam Electric Station

General Health Physics Plan

Section: 5 Revision: 3 Subject: Radiation Exposure Control

Submitted by: 4/16/85 Date: Radiation Protection Engineer Approved by: Date: Manager, Plant Operations

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#### 5.0 Radiation Exposure Control

Methods of personnel exposure control are necessary to assure exposure is maintained within limits and further reduced to ALARA. Control of personnel exposure will require control of access to Radiation Controlled Areas, control over the storage, handling and use of radioactive material and use of appropriate personnel work practices.

#### 5.1 Personnel Exposure Control

Each person is responsible for controlling his exposure within the limits specified and furthermore to take all practical steps to reduce his exposure to "as low as reasonably achievable" (ALARA). Control of personal exposure depends on the knowledge of good radiation/contamination area work practices, specific exposure reduction (ALARA) methods, and knowledge of the current status of one's exposure. Radiation/Contamination area work practices will be presented as part of the Radiation Worker Training, specific procedures developed by Radiation Protection (ALARA) methods are detailed in the ALARA Program (HPA-101). Radiation Protection will provide periodic reports giving the current exposure status for all Radiation workers as an aide to personnel exposure control and planning.

#### 5.2 Access Control

Access to the Radiation Controlled Areas at CPSES is controlled by the use of certain administrative methods, including general access permits (GAPs), radiation work permits (RWPs), access control points, posting and specific procedures.

Radiation Controlled Area entry requires the authorization of a General Access Permit (GAP) or Radiation Work Permit (RWP), appropriate prior training, and appropriate dosimetry. Without only if the individual is escorted by an approved and appropriately trained escort.

Radiation Areas, Contamination Areas and Airborne Radioactivity Areas shall be controlled by the use of control points, appropriate barriers and posting. Access to High Radiation Areas shall be controlled as required by 10CFR20, with positive physical locked barriers or other authorized means of positive physical

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access control. Additionally, all such areas shall be posted and labeled as required by 10CFR20.

Entry into Radiation, High Radiation, Extremely High Radiation, Contamination or Airborne Radioactive Material Areas for specific jobs will require a Radiation Work Permit (RWP) which will specify the job to be performed and the radiation protection measures to be used for the job. Entry into such areas may require continuous monitoring (local or remote), timekeeping or other means of positive control of personnel exposure during occupancy of the area.

## 5.3 Area and Facility Control

For the purposes of exposure control, the following controls shall be used at CPSES for the establishment, posting and barricading of specific areas. All posting shall be done in accordance with the requirements of 10CFR20.

5.3.1 Airborne Radioactivity Area - any room, enclosure, or operating area in which airborne radioactive materials, composed wholly or partly of licensed material, exist in concentrations in excess of the amounts specified in 10CFR20, Appendix "B", Table I, Column 1; or any room, enclosure, or operating area in which airborne radioactive material composed wholly or partly of licensed material exists in concentrations which, averaged over the number of hours in any week (40 hours) during which individuals are in the area, exceed 25% of the amounts specified in 10CFR20, Appendix "B", Table I, Column 1.

5.3.2 Contamination Area - any area, accessible to personnel in which loose surface contamination levels are greater than

> 1000 dpm/100 cm<sup>2</sup> for beta-gamma radiation 20 dpm/100 cm<sup>2</sup> for alpha radiation

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- 5.3.3 Radiation Area any area, accessible to personnel, in which there exists radiation originating in whole or in part within licensed material, at such levels that a major portion of the body could receive in any one hour a dose in excess of 5 millirem, or in any 5 consecutive days a dose in excess of 100 millirem.
- 5.3.4 <u>High Radiation Area</u> any area, accessible to personnel, in which there exists radiation originating in whole or in part within licensed material, at such levels that a major portion of the body could receive in any one hour a dose in excess of 100 millirem.
- 5.3.5 Extremely High Radiation Area any area, accessible to individuals, in which there exists radiation at such levels that a major portion of the body could receive in any one hour a dose in excess of 1000 millirem.
- 5.3.6 Radiation Controlled Area any area where access is controlled by the licensee for purposes of protection of individuals from exposure to radiation and radioactive materials. The following are examples of RCA's: Radiation Area, High Radiation Area, Extremely High Radiation Area, Airborne Radioactivity Area, Contamination Area, and Radioactive Material(s) Area.
- 5.3.7 <u>Radioactive Material(s) Area</u> any area or room in which licensed material is used or stored and which contains any radioactive material in an amount exceeding the quantity specified in 10CFR20, Sec. 20.203(e)(1) and (2).

Comanche Peak Steam Electric Station General Health Physics Plan

> Section: 6 Revision: 3 Subject: Personnel Radiation Protection

Submitted iy: <u>B.T. Awenta</u> Radiation Protection Engineer Date: <u>2/22/25</u> Approved by: <u>CRWitted</u> Date: <u>3/22/85</u> Manager, Plant Operations

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#### 6.0 Personnel Radiation Protection

The CPSES facility is operated with the philosophy of minimizing radiation and contamination levels throughout the plant in order to maintain a safe working environment and reduce personnel exposure to ALARA. Specific measures are taken and equipment provided to assure personnel radiation safety and protection for the radiation and contamination levels present. Personnel protection is provided by means of specific procedures and work practices for Radiation Controlled Area work, by personnel protective equipment and supplies, and by continuing assessment of the hazards present to determine appropriate corrective action when needed.

## 6.] Personnel Protective Equipment

Personnel protective equipment for Radiation Controlled Area work includes protective clothing such as lab coats, coveralls, hoods, gloves, shoe covers and other items. The requirements for use of specific clothing items shall be established by Radiation Protection and communicated through the Radiation Work Permit (RWP) or General Access Permit (GAP). The protective clothing necessary depends upon the conditions encountered and as previously mentioned, facility operation is based on the philosophy of maintaining areas in the plant such that a minimum of protective clothing will be required.

Additionally, protective equipment shall be provided when necessary for respiratory protection. A special program has been developed for respiratory protection and the equipment available, use and care are detailed therein. Use of re-piratory protective equipment shall be allowed only for qualified and trained personnel, with no exceptions to this rule. Qualification and training are detailed in the Respiratory Protection Program (HPA-102).

## 6.2 Radiation Controlled Area Work Requirements

Access and work in Radiation Controlled Areas requires a Radiation Work Permit, or General Access Permit. General Access Permits (GAPs) are required for routine entry, inspection, testing and equipment operation in the Radiation Controlled Area when radiation levels are known and generally stable. Radiation Work Permits (RWPs) are required for non-routine activities where radiation levels are subject to erratic or large changes. Access and work permits provide the means of communicating personnel protection requirements and accountability of exposure usage by job, for ALARA analysis.

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General rules for Radiation Controlled Area work are issued by Radiation Protection and apply to all Radiation Controlled Area entries.

Individuals are required to acknowledge their understanding of radiation conditions, protective and safety measures required, and their responsibility for following all Radiation Controlled Area rules and practices, by signing access and work permits or by entering access information into Radiation Protection computer systems.

#### 6.3 Personnel Radiation Monitoring

Monitoring of plant radiological conditions is accomplished by several methods including fixed monitoring instrumentation, portable monitoring instrumentation employed by Radiation Protection and monitoring instrumentation employed by personnel entering or leaving the Radiation Controlled Areas.

Fixed monitoring instrumentation is provided throughout the plant to monitor area and process (liquid and gaseous) systems. This instrumentation provides warning for personnel of increasing or abnormally high radiation levels in a work area and provides monitoring of process systems for controlling the transfer and release of radioactive concentrations in air and water. These systems provide records for trend analysis and information concerning emergency or accident conditions.

Portable instrumentation is utilized by Radiation Protection to establish radiological conditions and monitor the conditions during the progress of work. This instrumentation provides a means for planning and controlling exposure of personnel and controlling radioactive material and contamination. This instrumentation provides the primary means for radiological monitoring and establishing personnel exposure control methods.

Monitoring instrumentation is provided for personnel entering or exiting Radiation Controlled Areas to assure control of contamination and radioactive material. The instrumentation consists of portal monitors, hand and foot monitors and probe detectors to monitor personnel and equipment and thus prevent the spread of contamination to unrestricted areas of the facility. Use of this equipment is required by all personnel upon leaving Radiation

## Comanche Peak Steam Electric Station General Health Physics Plan

Section: 7 Revision: 4 Subject: Handling and Control of Radioactive Material

Submitted by: 3/28/85 Date: Radiation Protection Engineer Approved by: Date: Manager, Flant Operations

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## 7.0 Handling and Control of Radioactive Material

Radioactive contamination is simply radioactive material in a location where it is unwanted. The purpose of control of radioactive material at CPSES is to control contamination and provide as clean a work area and environment as possible, resulting in reduced exposure of personnel. To assure proper control of radiation and contamination, all materials and equipment to be removed from the Radiation Controlled Area, or to be transferred between radiation control areas, require monitoring and authorization for transfer, by Radiation Protection.

7.1 Contamination Control

Contamination control is accomplished by several methods including establishment and posting of Contaminated Areas, controls for movement of traffic and materials, protective clothing for personnel, contamination containment methods, and proper surveillance measures to indicate corrective action when necessary. The degree of control is dependent upon the severity or amount of

Additionally, specific limits have been established for control of contamination within the CPSES facility. The following working limits have been established for personnel, equipment and surfaces in both Radiation Controlled and unrestricted areas. The basis for these limits is that contamination shall be controlled such that the hazard to personnel is minimal and compliance with exposure limits (internal and external) is

A.) Contamination Limits for Unrestricted Areas \* (Applicable to tools, equipment and surfaces)

Removable: Less than 1000 dpm/100 cm<sup>2</sup> beta-gamma, Less than 20 dpm/100 cm<sup>2</sup> alpha.

Total: Less than 5000 dpm/100 cm<sup>2</sup> or 100 counts/minute As measured with a HP-210 frisker probe or equivalent.

\*Above background.

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B.) Contamination Limits for Radiation	Controlled Area Storage
Contaminated equipment and materia areas which are contaminated to th the equipment. General storage re Radiation Controlled Area are:	al should be stored in the same range of levels as equirements within the
Contamination Level Locat	ion/Storage Requirements
>1000 dpm/100 cm <sup>2</sup> B-X and 20 dpm/100 cm <sup>2</sup> × loose >100 cpm/probe area total	Contaminated Equipment Storage
>10,000 dpm/100 cm <sup>2</sup> B-X and De 200 dpm/cm <sup>2</sup> ~ loose >5000 cpm/probe area total	econtamination or Special Storage
Contaminated equipment storage area Radiation Controlled Area for items than 10,000 dpm/100 cm <sup>2</sup> (B, $\delta$ ) and 2	s are provided within the contaminated with less
C.) Protective Clothing	
Protective clothing used within the Area shall be monitored, sorted and special instructions. After launder must be free of removable contaminat	Radiation Controlled laundered as defined by ring, protective clothing tion before use.
D.) Personnel Contamination	
Personnel found with any detectable decontaminated. The method of decon upon the type of location of the con determined on an individual basis.	contamination will be tamination is dependent tamination and shall be
Contamination containment methods shall b cal to control contamination on equipment bags or other containment shall be used f and materials. Containment work structur ever practicable to minimize the spread of promote rapid cleanup. Radiation Protects ance and instructions through the RWP and	e used whenever practi- and surfaces. Plastic or storage of equipment es shall be used when- f contamination and ion will provide guid- on-the-job evaluation

Radiation Protection shall provide routine and periodic surveillance of Contamination Areas and equipment and evaluate the

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conditions to determine if decontamination or special precautions are necessary.

#### 7.2 Decontamination

Contamination occurs as a result of reactor operations, maintenance, sampling, waste disposal operations, refueling and the use of radioactive materials. When contamination levels exceed the working limits established, decontamination is preferred rather than "reclassifying" the area as a Contamination Area. As an example, if levels in a portion of the Radiation Controlled Area increased from  $\leq 1000 \text{ dpm}/100 \text{ cm}^2$  to  $> 1,000 \text{ dpm}/100 \text{ cm}^2$ , rather than establishing the area as a permanent Contamination Area, it should be posted temporarily as a Contamination Area until decontaminated to the original levels or less. In accordance with the philosophy of keeping contamination levels at CPSES as low as reasonably achievable, routine decontamination is desirable even though limits have not been reached.

Surfaces, areas, and equipment will be decontaminated routinely to minimize personnel exposure, prevent the spread of contamination as a general condition in the plant, and to prepare for shipment, transfer or release of items from the plant. It is the responsibility of each individual to perform his work in such a manner as to prevent or minimize the spread of contamination, therefore, if decontamination becomes necessary as a result of specific work activities, the personnel whose work resulted in the contamination. Routine decon work will be performed by a dedicated decon crew under the guidance of Radiation Protection.

Special decon equipment is available for decontamination of personnel, areas, surfaces and equipment. Additionally, special areas are provided at CPSES for decon work. Specific decon procedures and methods will be recommended by Radiation

#### 7.3 Radioactive Waste Disposal

Release of radioactive material from CPSES shall be controlled within the limits specified by 10CFR20 and other applicable guidelines and regulations. Therefore, all radioactive waste disposal (solid, liquid, and gaseous) shall be performed under

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the guidance and direction of Radiation Protection. Additionally, it is the policy of TUGCO to reduce the amount of radioactive material waste disposal to ALARA.

Liquid and gaseous radioactive material disposal will require the review and approval of the Shift Supervisor prior to disposal or release from process systems. All handling and disposal activities shall be performed in accordance with procedures for contamination and personnel exposure control. Material which is "clean," as indicated by meeting the limits for release to unrestricted areas, shall not be disposed of as radioactive waste. Additionally, every effort shall be made to minimize waste volumes prior to final disposal.

## 7.4 Control of Licensed Material

Licensed radioactive material must be strictly controlled and accounted for in accordance with the requirements of 10CFR20 and the license conditions. License applications for source and by-product materials for use or shipment to CPSES shall be submitted by the Radiation Protection Engineer. for obtaining and using licensable material are established by Requirements the Radiation Protection Engineer, and his approval is required for the order of such material. Radiation Protection shall be notified immediately upon receipt of licensed material to allow proper monitoring, inspection, recording and storage within the period of time required by 10CFR20. All licensed material shall be assigned to individuals who will act as custodians of the material and be responsible for its safekeeping, proper use, storage and handling. Additionally, the custodians are required to maintain accountability and prove such for periodic inventories of licensed material performed by Radiation Protection. Licensed material, while not in use, shall be kept in locked storage. Disposal of any licensed material is prohibited without prior notification to and approval from Radiation Protection.

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## Comanche Peak Steam Electric Station

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General Health Physics Plan

Section: 8 Revision: 2 Subject: Radiological Control Incidents

Submitted by: 11/18/83 Date: Radiation Protection Engineer Approved by: len. Date: Manager, Plant Operations

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#### 8.0 Radiological Control Incidents

Radiological control incidents are events which involve the actual or potential loss of control of radioactive materials, concentrations or radiation dose rates. Loss of control creates the potential for personnel injury, damage to equipment or facilities, and financial loss due to cleanup or disposal. Prompt action is necessary to minimize the impact of or prevent the loss of control of radiological conditions. Each person is responsible for being alert to any situation which could lead to a loss of control and reporting such situations promptly to the Shift Supervisor and Radiation Protection. Immediate action will be taken to insure the safety of all personnel, evaluate the radiological conditions, minimize the consequences, and reestablish control as quickly as possible. The Radiation Protection Engineer or designee shall determine if incidents require notification to the State, USNRC, or other agencies and shall effect such notifications as required. Information concerning some of the major incidents and responses is provided below.

## 8.1 Personnel Exposure in Excess of Limits

If an individual exceeds a personnel exposure limit, administrative or mandatory (10CFR20), or it is suspected that a limit has been exceeded, it shall be reported to the Radiation Protection Engineer immediately. Such an individual will be prohibited from entering a Radiation Controlled Area until the actual dose received is ascertained and approval and authorization from the Radiation Protection Engineer is granted. If it is suspected that the dose received could result in illness or injury, prompt medical care shall be provided for the individual. Surveys and sampling by Radiation Protection will be initiated upon notification of a potential overexposure to assure prompt identification of radiological conditions which the individual was exposed to. Once the initial response to protect the individual and establish the dose and radiological conditions present during the incident has been taken, an official investigation will be initiated. All reports of overexposure investigations shall be sent to the Manager of Plant Operations and a copy of the report maintained in the individual's personnel exposure history file.

## 8.2 Loss of Control of Radioactive Material

Loss of control includes spills, unexpected high airborne activity, unplanned release of radioactive materials, unexpected high

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radiation levels, and contamination detected outside of established Contamination Areas in excess of allowable limits. As in all radiological incidents, the initial action shall be to protect personnel then minimize the spill or consequences of the loss of control and reestablish control as quickly as possible. The consequences of the loss of control shall then be determined and formal investigation and reporting made as required.

#### 8.3 Fire in a Radiation Controlled Area

Fires involving radioactive materials require the assumption that airborne activity exists and therefore, respiratory protection is mandatory. Only personnel trained in radiation protection shall be involved in fighting such fires, unless off-site fire fighting assistance is required. When off-site fire fighting personnel are involved, they shall be accompanied by TUGCO personnel trained in radiation protection. The response will be to assure the safety of personnel first, then to minimize the spread of fire and damage, and of course extinguishing the blaze as soon as possible. All equipment (including that to fight the fire) and areas affected by the fire, smoke and ventilation from the fire area will be assumed contaminated until proven otherwise. Radiation Protection shall provide approval and authorization for re-entry, recovery and decontamination work, after the fire is extinguished. Working times shall be established by Radiation Protection during the fire fighting procedure and for subsequent cleanup to assure personnel exposures do not exceed limits. Radiation protection methods and responses for loss of control of radioactive material will apply to all fires involving such material.

## 8.4 Personnel Injury or Illness Inside a Radiation Controlled Area

Personnel illness or injury in a Radiation Controlled Area requires response which takes into consideration the radiological conditions present. Immediate response for serious illness or injury is to protect the injured and assure his safety and well being. Treatment of ill or injured personnel shall always take precedence over contamination or radiation control. However, every effort should be made to control personnel exposure and the spread of contamination without jeopardizing the person needing treatment. It shall be assumed that the person involved is contaminated until proven otherwise, therefore tearing of clothing, opening of wound areas, dressing wounds and all first aid measures shall consider this hazard. If the ill or injured can

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be moved (based on sound first aid practices) he should be taken as soon as possible to an area of minimal or no contamination or radiation, and a control zone shall be established to prevent the spread of contamiration. Radiation Protection shall be notified and present as soon as possible during transfer or treatment of the person to assure proper radiation protection measures are taken. Any incident involving the transport of a person out of the Radiation Controlled Area or off-site requires the constant accompaniment by Radiation Protection. Any support by personnel who have not received radiation protection training requires the constant attendance by Radiation Protection. Radiation Protection shall perform the necessary surveys and collect the necessary data to assure accurate dose or exposure determination for the person treated and for those providing treatment.

#### 8.5 Personnel Violations

Personnel in violation of radiation protection rules, and practices shall be reported immediately. Any person observing such actions on the part of others shall report such incidents to their immediate Supervisor and Radiation Protection. Such violations include tampering with personnel or radiation monitoring devices so as to alter the dose or dose rate recorded or render the instrument inoperable, violation of control boundaries or administrative controls regarding control of exposure or radioactive material, violation of GAP or RWP requirements, and "horseplay" or improper conduct in radiologically controlled

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## Comanche Peak Steam Electric Station

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General Health Physics Plan

Section: 9 Revision: 2 Subject: Radiation Protection Records and Reports

Submitted by: Date: 11/18/83 Date: 12/27/43 Radiation Protection Engineer Approved by: nen Manager, Plant Operations

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#### 9.0 Radiation Protection Records and Reports

Records and reports of radiation protection activities and radioactive material control are required by 10CFR19 and 10CFR20. The records required include those for personnel exposure, radiation surveys, monitoring, sampling and analysis, licensed material control, waste disposal, ALARA analysis, radiological control incidents and others. Radiation protection records shall be readily accessible and available for audits.

#### 9.1 Personnel Exposure Records and Reports

Records of personnel exposure and applicable reports shall be maintained and issued by Radiation Protection and will include personnel exposure history, current exposure, body burden or bioassay analysis, reports and investigations of overexposure. Non-occupational or medical radiation exposures will not be recorded or filed. Additionally, requests and approvals for exceeding administrative control limits shall be recorded and filed. Personnel exposure records will include status of trainmedical/physical history, and status of training for work in Radiation Controlled Areas.

## 9.2 Radioactive Materials Records and Reports

Records shall be maintained and reports issued concerning the shipment, receipt, transfer, use and disposal of all licensed radioactive material in accordance with HPT-201. Included in such records shall be the specific activity, isotopic analysis, custodians, users and methods of disposal of licensed radioactive material. Radioactive material shipment records and inventory records shall be maintained. Releases of radioactive effluents shall be recorded and reported as required.

## 9.3 Reporting Radiological Control Incidents

Records and reports of all radiological control incidents shall be maintained and shall include details as to persons involved, extent of the incident, impact on personnel and the environment, and resolution of the incident, including corrective action requirements. Any incidents requiring notification to offsite authorities shall be documented and filed, including records of telephone conversations and telegraph messages as well as letters or other supporting documents. A specific file shall be

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maintained for each separate incident, containing all necessary information and appropriate approval signatures to indicate that all actions related to the incident have been completed properly.

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#### Comanche Peak Steam Electric Station

General Health Physics Plan

Section: 10 Revision: 2 Subject: Radiation Protection Procedures and Instructions

Submitted by: Radiation Protection Engineer Approved by: Manager, Plant Operations

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## 10.0 Radiation Protection Procedures and Instructions

Implementation of this plan requires the development of certain Radiation Protection procedure and instructions. Compliance with the requirements of this plan, procedures and instructions is manditory unless specifically exempted or excluded as detailed below.

## 10.1 Health Physics Administrative Manual

The Health Physics Administrative Manual contains administrative procedures applicable to all personnel at CPSES. These procedures establish various programs which implement this plan.

## 10.2 Health Physics Technical Manual

The Health Physics Technical Manual contains procedures applicable to Radiation Protection personnel only. These procedures control the various programs and requirements of this plan.

## 10.3 Health Physics Instruction Notebook

The Health Physics Instruction Notebook contains instructions for use by Radiation Protection personnel in implementing the various Radiation Protection Section Programs.

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Comanche Peak Steam Electric Station

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General Health Physics Plan

Section: 11 Revision: 2 Subject: Definitions

11/18/83 Submitted by: Date: Radiation Protection Engineer Approved by: Manager, Brant Operations Date:

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#### 11.0 Definitions

Airborne Radioactivity Area - An area where airborne radioactive materials exist in concentrations greater than or equal to those specified in 10CFR20, Appendix B, Table 1, Column 1, or any area where the average concentration over a 40 hour week, during which individuals are in the area, is greater than or equal to 25% of the concentrations indicated above.

ALARA - "as low as reasonably achievable;" the philosophy that exposure to ionizing radiation involves some risk, no matter how small, and should be reduced to the minimum amount practicable considering all technical and economical factors in light of the benefits resulting from the exposure received.

<u>Calendar Quarter</u> - thirteen consecutive calendar weeks. The first calendar quarter begins on January 1 of each year with subsequent quarters beginning on April 1, July 1, and October 1 respectively.

Contamination Area - Any area accessible to personnel in which contamination levels are greater than or equal to:

1,000 dpm/100 cm<sup>2</sup> for beta-gamma radiation

20 dpm/100  $\rm cm^2$  for alpha radiation

Dose - Radiation absorbed per unit of mass, by the body or any portion of the body.

Dose Rate - Absorbed dose over a specific period of time.

Exposure - Dose in air as opposed to dose absorbed by the body.

External Exposure - Exposure to radiation sources which are outside (external to) the body.

Extremely High Radiation Area - any area, accessible to individuals, in which there exists radiation at such levels that a major portion of the body could receive in any one hour a dose in excess of 1000

Extremity Dose - Dose to the hands, fingers, forearms, feet or ankles.

<u>High Radiation Area</u> - Any area, accessible to personnel, in which radiation levels are such that a major portion of the body could receive, in any one hour, a dose in excess of 100 millirems.

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Internal Exposure - Exposure to radiation sources which are inside (internal to) the body.

Non-Plant Personnel - Personnel other than those defined as plant personnel.

Plant Personnel - Personnel employed by TUGCO and permanently assigned to CPSES.

Prefixes:

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refix	Symbol	Multiplication Factor
wega	М	10 <sup>6</sup>
kilo	К	10 <sup>3</sup>
cent	i c	10-2
mill	i m	10 <sup>-3</sup>
micro	· 4	10 <sup>-6</sup>
nano	n	10 <sup>-9</sup>
pico	р	10-12

Radiation - Any or all of the following: alpha rays, beta rays, gamma rays, X-rays, neutrons, high-speed electrons or protons, or other atomic particles; but not sound or radio waves, visible infrared or ultraviolet light.

Radiation Area - Any area, accessible to personnel, in which radiation levels are such that a major portion of the body could receive in any one hour a dose in excess of 5 millirems, or in any five consecutive days (40 hours) a dose in excess of 100 millirems.

Radiation Controlled Area - Any area to which access is controlled for the purposes of radiation protection. Any area where an individual could receive a dose in excess of 2 millirem during any one hour period.

Radiation Worker - Those individuals which have successfully completed Radiation Worker Training, are knowledgeable in radiation protection rules and practices and have established exposure histories.

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Radioactive Material - Material which emits radiation spontaneously.

Radioactive Waste - Material which is radioactive such that decontamination for unrestricted use is not practicable and the material must be disposed of under prescribed conditions.

<u>Rem</u> - A unit of measure of absorbed radiation dose in terms of its biological effect.

Unrestricted Area - Any area to which access is not controlled or limited for purpose of radiation protection.

Whole Body Dose - A dose to the entire body or major portion of the body such as the gonads, blood-forming organs, the head and trunk, or the lens of the eye.

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#### Comanche Peak Steam Electric Station

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General Health Physics Plan

Section: 12 Revision: 3 Subject: Policy

Submitted by: 12/20/83 Date: Radiation totection Engineer Approved by: Date: Manager, Plant Operations

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#### STATEMENT OF POLICY

This General Health Physics Plan establishes the Radiation Protection requirements, responsibilities and policy to be implemented at Comanche Peak Steam Electric Station by station and non-station personnel, for all entry and work in Radiation Controlled Areas at the station.

The requirements of this Plan are implemented with the authority of the Manager of Plant Operations with the complete support of Company management. All aspects of the administration and implementation of this Plan are subject to the concurrence of the Engineering Superintendent and subject to review and approval by the Kadiation Protection Engineer.

All persons performing work or directing the work of others under the guidance of this Plan are required to familiarize themselves with the policies, procedures and guidelines set forth in this manual, and shall be responsible for executing those requirements pertinent to their respective

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#### ALARA POLICY STATEMENT

It is the policy of Texas Utilities Generating Company (TUGCO) that all operations involving radiation and radioactive material shall be conducted such that every reasonable effort shall be made to reduce radiation exposures. Radiation exposures to employees, contractors, and the general public and the release of radioactive material to unrestricted areas shall be maintained As Low As Reasonably Achievable (ALARA) below the limits specified in 10CFR20. "Reasonably achievable" will take into account the state of technology and the cost of reduced exposure in relationship to the benefits to TUGCO and its employees or to public health and safety.

The Manager, Plant Operations has the responsibility and authority to develop and implement an effective ALARA Program at Comanche Peak Steam Electric Station. He has the complete support of Company management.

Accomplishment of the ALARA policy objectives requires the following major

- Management commitment and support. 1.
- Careful design of facilities and equipment. 2.
- 3. Good radiation protection practices, including good planning and proper use of appropriate material and equipment by qualified, well-trained, and dedicated personnel.
- Continual vigilance by the operational staff to reduce exposure, 4. minimize releases, minimize the generation of radioactive waste, and control radioactive airborne and surface contamination areas.

All persons involved in operations involving radiation and radioactive material are required to familiarize themselves with the associated policies, plans, and procedures and shall be responsible for executing those requirements pertinent to their assignments.

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#### RESPIRATORY PROTECTION POLICY

It is the intent of Texas Utilities Generating Company (TUGCO) Comanche Peak Steam Electric Station (CPSES) to maintain the levels of radioactive and non-radioactive airborne contaminants as low as is reasonably achievable (ALARA) under routine, non-routine and emergency conditions. This intent will be primarily accomplished by accepted engineering control measures such as process, containment and ventilation equipment controls. Only when such controls are not reasonably achievable will the use of respiratory protection devices be permitted.

It is the policy of TUGCO to provide only approved respiratory protection equipment for use by trained and qualified personnel and to prohibit the use of such equipment by personnel not qualified according to the requirements of this program.

Personnel who wear respiratory protection equipment have the right to leave any area where respiratory protection equipment is required at anytime for relief from respirator use in the event of equipment malfunction, physical or psychological distress, procedural or communication failure, significant deterioration of operating conditions, or any other condition that might

It is the policy of TUGCO to reduce personnel exposure to all forms of radioactive material to ALARA.

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#### RADIOACTIVE WASTE MINIMIZATION

It is the intent and goal of Comanche Peak Steam Electric Station to minimize the production of radioactive waste, which will result in savings to the plant in manpower, ime, money and personnel exposure.

To attain this goal, a volume reduction program shall be implemented consisting of the following: Control of materials entering into contaminated areas, an aggressive decontamination program, waste stream control and segregation of radioactive waste from non-radioactive waste.

All personnel performing work or directing the work of others in the Radiation Controlled Areas should remain cognizant of how their activities impact radioactive waste and strive to minimize radioactive waste

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B. R. Clements, Vice President, Nuclear

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