



OFFICE MEMORANDUM

CPSES-9029494
TUS-90481
December 21, 1990

No Response Required

TO: All Copy Holders

COMANCHE PEAK STEAM ELECTRIC STATION
REVISION 5 TO THE CPSES OFFSITE DOSE
CALCULATION MANUAL (ODCM)

Enclosed is Revision 5 to the CPSES Offsite Dose Calculation Manual (ODCM) and receipt acknowledgement sheet. Please page check your assigned copy of the ODCM against the updated Effective Page Listing (EPL) which is included with Revision 5. Return the acknowledgement sheet as specified.

If you have any questions regarding the ODCM, contact Greg Bell at (214) 812-8219.

D. R. Woodlan
Docket Licensing Manager

GLB/grp
Enclosure

c - CCS E06
File # 953

A009
1/1

COMANCHE PEAK STEAM ELECTRIC STATION
OFFSITE DOSE CALCULATION MANUAL
INSTRUCTION SHEET

The following instructional information is being furnished to help insert Revision 5 into the Comanche Peak Steam Electric Station ODCM. In accordance with CPSES Technical Specification 6.14b, ODCM Revision 5 became effective when it was approved by the Vice President, Nuclear Operations on December 20, 1990.

Discard the old sheets and insert the new sheets as indicated below.

Holders of the CPSES ODCM should keep these instruction sheets in the front of the Effective Page Listing as a record of the changes, until a new listing is issued.

<u>Remove</u>	<u>Insert</u>
vi	vi
xi	xi
II 1-15 (Table 1.1)	II 1-15 (Table 1.1)
II 2-18	II 2-18
II 2-19	II 2-19
II 2-45 (Table 2.4)	II 2-45 (Table 2.4 Sheet 1)
II 2-46 (Table 2.5)	II 2-46 (Table 2.4 Sheet 2)
G-3	G-3
EPL-1 through EPL-8	EPL-1 through EPL-8

List of Tables

<u>Table No.</u>	<u>Title</u>	<u>Page</u>	
2.4	Controlling Receptor Pathways and Locations, and Atmospheric Dispersion Parameters (For Dose Calculations Required by Radiological Effluent Control 3/4.11.2.3)	II 2-45	5
2.5	Deleted	II 2-46	5
3.1	Environmental Sampling Locations	II 3-3	

REFERENCES

1. Eneghi, J.S., R. R. Bellamy, W. L. Britz, and R. L. Waterfield, "Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants," NUREG-0133 (October 1978).
2. Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10CFR Part 50, Appendix I, U. S. NRC Regulatory Guide 1.109, Rev. 1 (October 1977).
3. "Environmental Report," TU Electric, Comanche Peak Steam Electric Station.
4. "Final Safety Analysis Report," TU Electric, Comanche Peak Steam Electric Station.
5. Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors, U.S. NRC Regulatory Guide 1.111 (March 1976).
6. Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Release from Light - Water - Cooled Reactors, U.S. NRC Regulatory Guide 1.111, Rev. 1 (July 1977).
7. Meteorology and Atomic Energy; Edited by Slade, D. H.; U. S. Department of Commerce (July 1968).
8. "Unit 1 Technical Specifications," TU Electric, Comanche Peak Steam Electric Station. | 5
9. Implementation of Programmatic Controls for Radiological Effluent Technical Specifications in the Administrative Controls Section of the Technical Specifications and the Relocation of Procedural Details of RETS to the Offsite Dose Calculation Manual or to the Process Control Program (Generic Letter 89-01), USNRC, January 31, 1989. | 5
10. CPSES Technical Evaluation No. RP-90-3077, "Calculation of Site Related Ingestion Dose Commitment Factors For Sb-122." | 5
11. "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I," USNRC Regulatory Guide 1.109 (March 1976). | 5

TABLE 1.1

SITE RELATED INGESTION DOSE COMMITMENT FACTOR $A_{i\tau}$
(mRem/hr per uCi/ml)

<u>ISOTOPE</u>	<u>BONE</u>	<u>LIVER</u>	<u>T-BODY</u>	<u>THYROID</u>	<u>KIDNEY</u>	<u>LUNG</u>	<u>GI-ILLI</u>
Pr-144	4.31E-03	1.79E-03	2.19E-04	0.00E+00	1.01E-03	0.00E+00	6.19E-10
Nd-147	9.00E-01	1.04E+00	6.22E-02	0.00E+00	6.08E-01	0.00E+00	4.99E+03
W-187	3.04E+02	2.55E+02	8.90E+01	0.00E+00	0.00E+00	0.00E+00	8.34E+04
Np-239	1.28E-01	1.25E-02	6.91E-03	0.00E+00	3.91E-02	0.00E+00	2.57E+03
*Sb-122	1.98E+01	3.90E-01	5.79E+00	2.69E-01	0.00E+00	1.03E+01	5.68E+03
**Sb-124	2.41E+02	4.54E+00	9.50E+01	5.81E-01	0.00E+00	1.87E+02	6.81E+03

5

* The adult dose conversion factors, DF_i , for Sb-122 are not published in Reference 2. The calculation of dose conversion factors and site-related ingestion dose commitment factors for Sb-122 is documented in Reference 10.

5

**The adult dose conversion factors, DF_i , for Sb-124 are not published in Reference 2. The site-related dose commitment factors for Sb-124 were calculated using the "Adult Ingestion Dose Factors" given in Table A-3 of Reference 11, and Equation 1-10 of Part II, Section 1.2.1 of this Manual.

5

Note: If the methodology in this section is used in determining dose to an individual rather than air dose due to noble gases, substitute K_i for M_i , $(L_i + 1.1 M_i)$ for N_i , and the Annual Average X/Q values from Table 2.4 for the highest annual average relative concentration $(\overline{X/Q})$ at the SITE BOUNDARY. | 5

2.2.2 Dose Due to Radioiodines, Tritium, and Particulates

For implementation of Radiological Effluent Control 3/4.11.2.3, the cumulative dose to each organ of an individual due to iodine-131, iodine-133, tritium, and particulates with half-lives greater than 8 days will be calculated at least once per 31 days and a cumulative summation of these doses will be maintained for each calendar quarter and each calendar year. The dose over the desired period will be calculated as follows:

D_p = dose due to all real pathways to organ, o , of an individual in age group, a , from iodine-131, iodine-133, tritium, and radionuclides in particulate form with half-lives greater than eight days (mRem).

$$D_p = \sum_{PATHS} 3.17 \times 10^{-8} W' \sum_{IP\&T} R_{i,a,o}^p Q'_i \quad [Eq. 2-27]$$

Where: W' = the dispersion parameter for estimating the dose to an individual at the location where the combination of existing pathways and receptor age groups indicates the maximum potential exposures. Locations of interest are listed in Table 2.4. | 5

W' = X/Q for the inhalation pathway in sec/m^3 . X/Q is the annual average relative concentration at the location of interest. Values for X/Q are listed in Table 2.4. If desired, the highest individual receptor X/Q value may be used, or

W' = D/Q for the food and ground plane pathways in m^{-2} .
 D/Q is the annual average deposition at the location of interest. Values for D/Q are listed in Table 2.4. If desired, the highest individual receptor D/Q value may be used.

NOTE: For tritium, the dispersion parameter, W' is taken as the annual average X/Q values from Table 2.4 for inhalation, food and ground plane pathways.

$RP_{i,a,o}$ = dose factor for radionuclide i , pathway p , age group a and organ o , in $mRem/yr$ per uCi/m^3 for the inhalation pathway and $m^2(mRem/yr)$ per uCi/sec for food and ground plane pathways, except for tritium which is in $mRem/yr$ per uCi/m^3 for all pathways. The values for $RP_{i,a,o}$ for each pathway, radionuclide, age group and organ are listed in Table 2.3*.

Q'_i = cumulative release of radionuclide, i , during the period of interest (uCi). Q'_i is based on the activities measured in each plant vent stack from the analyses of the particulate and iodine samples required by Radiological Effluent Control 3/4.11.2.1. Table 4.11-2.

I&PT = Iodines, particulates with half-lives greater than eight days, and tritium. These are the isotopes over which the summation function is to be performed.

PATHS = the real pathways of exposure to individuals at the locations of interest as indicated in Table 2.4.

5

*The methodologies used for determining values of $RP_{i,a,o}$ for each pathway are given in Appendices B through F.

TABLE 2.4
(Sheet 1 of 2)

CONTROLLING RECEPTOR PATHWAYS AND LOCATIONS (NOTE 1), AND
ATMOSPHERIC DISPERSION PARAMETERS (FOR DOSE CALCULATIONS
REQUIRED BY RADIOLOGICAL EFFLUENT CONTROL 3/4.11.2.3)

Sector	Pathway (Note 2)	Distance (Miles)	X/Q (Notes 3, 4)	D/Q (Notes 5, 6)
N	Resident	2.20	9.28E-07	5.32E-09
	Garden	None	--	--
	Milk Cow	None	--	--
NNE	Resident	2.30	5.12E-07	2.60E-09
	Garden	2.40	--	2.30E-09
	Milk Cow	None	--	--
NE	Resident	2.30	3.58E-07	1.28E-09
	Garden	2.70	--	8.92E-10
	Milk Cow	4.50	--	2.70E-10
ENE	Resident	2.40	2.58E-07	7.08E-10
	Garden	2.60	--	5.77E-10
	Milk Cow	None	--	--
E	Resident	2.40	3.02E-07	6.62E-10
	Garden	None	--	--
	Milk Cow	None	--	--
ESE	Resident	2.30	3.68E-07	9.00E-10
	Garden	2.30	--	9.00E-10
	Milk Cow	None	--	--
SE	Resident	2.00	7.10E-07	2.80E-09
	Garden	2.50	--	1.60E-09
	Milk Cow	None	--	--
SSE	Resident	1.60	9.96E-07	5.92E-09
	Garden	4.80	--	4.48E-10
	Milk Cow	2.20	--	1.80E-09
S	Resident	1.60	7.74E-07	4.66E-09
	Garden	4.30	--	4.34E-10
	Milk Cow	4.20	--	4.56E-10
SSW	Resident	1.90	4.42E-07	2.06E-09
	Garden	None	--	--
	Milk Cow	None	--	--

5

TABLE 2.4
(Sheet 2)

CONTROLLING RECEPTOR PATHWAYS AND LOCATIONS (NOTE 1), AND
ATMOSPHERIC DISPERSION PARAMETERS (FOR DOSE CALCULATIONS
REQUIRED BY RADIOLOGICAL EFFLUENT CONTROL 3/4.11.2.3)

Sector	Pathway (Note 2)	Distance (Miles)	X/Q (Notes 3, 4)	D/Q (Notes 5, 6)
SW	Resident	1.00	1.60E-06	7.50E-09
	Garden	2.10	--	1.10E-09
	Milk Cow	4.70	--	1.79E-10
WSW	Resident	1.00	1.80E-06	6.50E-09
	Garden	1.10	--	5.64E-09
	Milk Cow	None	--	--
W	Resident	1.50	8.40E-07	2.80E-09
	Garden	1.50	--	2.80E-09
	Milk Cow	None	--	--
WNW	Resident	2.00	7.30E-07	2.50E-09
	Garden	3.00	--	1.04E-09
	Milk Cow	None	--	--
NW	Resident	2.70	6.98E-07	2.24E-09
	Garden	None	--	--
	Milk Cow	None	--	--
NNW	Resident	2.70	7.62E-07	3.22E-09
	Garden	4.90	--	8.48E-10
	Milk Cow	4.50	--	9.60E-10

NOTES:

- (1) Receptor locations are taken from the nearest receptor locations identified in the CPSES 1990 land use census.
- (2) In addition to the pathways shown, the inhalation and ground plane pathways are present at the nearest resident.
- (3) The units for X/Q are Sec/Cubic Meter.
- (4) X/Q Values at distances 1.0, 1.5, 2.0, 2.5, 3.5, 4.0, 4.5, and 6.0 miles were taken from Table 2.3-16, "Average Annual Relative Concentration at CPSES," of the CPSES Environment Report, Operating Licensing Stage (Reference 3). The X/Q values at other distances were determined by linear interpolation.
- (5) The units for D/Q are inverse square meters
- (6) D/Q values at distances 1.0, 1.5, 2.0, 2.5, 3.5, 4.0, 4.5, and 6.0 miles were taken from Table 2.3-17, "Average Annual Relative Deposition Rate," of the CPSES Environmental Report, Operating License Stage (Reference 3). The D/Q values at other distances were determined by linear interpolation.

SUPPLEMENTAL GUIDANCE STATEMENT #3

SUBJECT: TRITIUM LEAKAGE FROM THE TURBINE GENERATOR PRIMARY WATER COOLING SYSTEM (TGPWCS)

The purpose of this statement is to provide guidance for handling tritium detected in the Turbine Building sumps or Waste Water Holdup Tanks (WWHTs), due to leakage from the TGPWCS, when there is no primary-to-secondary leakage. (Note: Tritium is used in the TGPWCS as a tracer to detect leakage of cooling water into the generator coils.) Discharge of the Turbine Building Sumps or WWHTs to the Low Volume Retention Pond may continue when tritium is detected due to known leakage from the TGPWCS, provided that: (1) the average tritium concentration does not exceed the 10 CFR 20 limit for release to an unrestricted area (3×10^{-3} $\mu\text{Ci}/\text{ml}$); and (2) there are no detectable principal gamma emitters or I-131. Per 10 CFR 20.106(a), concentrations may be averaged over a period of not greater than 1 year.

5

Radiological Effluent Control 3/4.11.1.1, Table 4.11-1, requires that Turbine Building Sump discharges be diverted to the Waste Water Holdup Tanks when radioactivity is present in the sumps at concentrations greater than or equal to the maximum LLD values given in Table 4.11-1. It also requires that the Waste Water Holdup Tanks be discharged directly to the Circulating Water Discharge Tunnel when the maximum LLD values are exceeded. For tritium, the value established for required diversion and discharged to the Circulating Water Discharge Tunnel is 1×10^{-5} $\mu\text{Ci}/\text{ml}$. These requirements are established based on acceptable activities in the sump resulting from primary-to-secondary leakage. This supplemental guidance, which allows discharges of tritium to continue to the Low Volume Retention Pond provided that the average tritium concentration does not exceed 3×10^{-3} $\mu\text{Ci}/\text{ml}$, is acceptable since the total activity of tritium is a known, fixed quantity. (Note: The maximum inventory of tritium in the TGPWCS is approximately 700 mCi.) Additionally, the dose associated with the release of tritium, due to TGPWCS leakage, is negligible, as demonstrated by the calculation shown below.

5

5

The total activity of tritium discharged due to TGPWCS leakage shall be determined from sampling of the TGPWCS and reported in the Semiannual Radioactive Effluent Release report.

CPSES - ODCM

List of Effective Pages

Preface

The Effective Page Listing (EPL) provides a tabulation of the current pages in the CPSES ODCM.

Each page in the CPSES ODCM is identified with a page number, including pages that contain tables or figures.

A revision number and date are included on each page. The revision number and date are changed when the change represents a substantive revision to the information that is provided on the page. If the page is revised or reprinted but the revision is not considered substantive (i.e., it is an editorial correction), the revision number will not be changed, but will have the reprint date.

Since the EPL may not be updated with each revision, an Instruction Sheet(s) will be provided for subsequent revisions of the CPSES ODCM; it should be retained immediately in front of the EPL. To identify the effective revision level of a page in the CPSES ODCM, check these Instruction Sheets first and, if not found, the EPL second.

If any effective page cannot be found, notify TU Electric Nuclear Licensing and the required effective pages will be provided. Contact may be made by phone (214/812-8873) or by mail. A marked up copy of pages from the Instruction sheets or the EPL is a convenient way to identify the required pages.

CPSES/ODCM

Effective Page Listing

<u>Page No.</u>	<u>Revision No.</u>
<u>TABLE OF CONTENTS</u>	
i	2
ii	1
iii	0
iv	1
v	1
vi	December 1990
vii	0
viii	0
ix	0
x	0
xi	December 1990
xii	0
xiii	1
 <u>PART I</u>	
I 1-0	0
I 1-1	0
I 1-2	0
I 1-3	0
I 1-4	0
I 1-5	0
I 1-6	0
 I 2-0	 1
I 3/4-0	0
I 3/4-1	0
I 3/4-2	0
I 3/4-3	0
I 3/4-4	0
I 3/4-5	0
I 3/4-6	0
I 3/4-7	0
I 3/4-8	1
I 3/4-9	4
I 3/4-10	4

CPSES/ODCM

Effective Page Listing

<u>Page No.</u>	<u>Revision No.</u>
<u>PART I</u>	
I 3/4-11	4
I 3/4-12	0
I 3/4-13	0
I 3/4-14	0
I 3/4-15	0
I 3/4-16	0
I 3/4-17	0
I 3/4-18	3
I 3/4-19	0
I 3/4-20	3
I 3/4-21	0
I 3/4-22	1
I 3/4-22a	2
I 3/4-22b	2
I 3/4-23	0
I 3/4-24	1
I 3/4-25	0
I 3/4-26	0
I 3/4-27	0
I 3/4-28	0
I 3/4-29	0
I 3/4-30	0
I 3/4-31	0
I 3/4-32	0
I 3/4-33	0
I 3/4-34	0
I 3/4-35	0
I 3/4-36 (rev. bar was inadvertently omitted)	1
I 3/4-37 (rev. bar was inadvertently omitted)	1
I 3/4-38 (rev. bar was inadvertently omitted)	1
I 3/4-39	0
I 3/4-40	0
I 3/4-41	0
I 3/4-42 (rev. bar should be deleted)	0
I 3/4-43	0
I 3/4-44	1
I 3/4-45	0

CPSES/ODCM

Effective Page Listing

<u>Page No.</u>	<u>Revision No.</u>
<u>PART I</u>	
I B 3/4-0	1
I B 3/4-1	0
I B 3/4-2	0
I B 3/4-3	0
I B 3/4-4	2
I B 3/4-5	2
I B 3/4-6	Oct. 22, 1990
I B 3/4-7	Oct. 22, 1990
I B 3/4-8	Oct. 22, 1990
I B 3/4-9	Oct. 22, 1990
I B 3/4-10	Oct. 22, 1990
I B 3/4-11	Oct. 22, 1990
I B 3/4-12	Oct. 22, 1990
I 5-0	(no revision no. & no date)
I 5-1	0
I 5-2	0
I 6-0	(no revision no. & no date)
I 6-1	0
I 6-2	0
I 6-3	1
I 6-4	0

CPSES/ODCM

Effective Page Listing

<u>Page No.</u>	<u>Revision No.</u>
<u>PART II</u>	
II 1-1	0
II 1-2	1
II 1-3	1
II 1-4	1
II 1-4a	1
II 1-5	0
II 1-6	0
II 1-7	0
II 1-8	0
II 1-9	0
II 1-10	0
II 1-11	0
II 1-12	0
II 1-13	0
II 1-14	0
II 1-15	Rev. 5
II 1-16	1
II 1-17	1
II 1-18	0
II 1-19	0
II 1-20	0
II 1-21	0
II 1-22	3
II 1-23	0
II 1-24	0
II 1-25	0
II 2-1	0
II 2-2	4
II 2-3	0
II 2-4	0
II 2-5	4
II 2-6	0
II 2-7	4
II 2-8	0
II 2-9	0

CPSES/ODCM

Effective Page Listing

<u>Page No.</u>	<u>Revision No.</u>
<u>PART II</u>	
II 2-10	0
II 2-11	0
II 2-12	0
II 2-13	0
II 2-14	1
II 2-15	0
II 2-16	1
II 2-17	0
II 2-18	Rev. 5
II 2-19	Rev. 5
II 2-20	0
II 2-21	0
II 2-22	0
II 2-23	0
II 2-24	0
II 2-25	0
II 2-26	0
II 2-27	0
II 2-28	0
II 2-29	0
II 2-30	0
II 2-31	0
II 2-32	0
II 2-33	0
II 2-34	0
II 2-35	0
II 2-36	0
II 2-37	0
II 2-38	0
II 2-39	0
II 2-40	0
II 2-41	0
II 2-42	0
II 2-43	0
II 2-44	0
II 2-45	Rev. 5

CPSES/ODCM

Effective Page Listing

<u>Page No.</u>	<u>Revision No.</u>
<u>PART II</u>	
II 2-46	Rev. 5
II 2-47	0
II 2-48	0
II 2-49	0
II 2-50	1
II 2-51	0
II 2-52	0
II 2-53	0
II 2-54	0
II 2-55	1
II 2-56	0
II 2-57	0
II 2-58	0
II 2-59	0
II 2-60	0
II 3-1	0
II 3-2	0
II 3-3	0
II 3-4	0
II 3-5	0
II 3-6	0
II 3-7	0
II 3-8	0
II 3-9	0
II A-1	0
II B-1	0
II C-1	1
II D-1	0
II D-2	0
II E-1	0
II E-2	0
II F-1	0
II F-2	0

CPSES/ODCM

Effective Page Listing

Page No.

Revision No.

PART II

G-0
G-1
G-2
G-3
G-4
G
G-6

1
1
1
Rev. 5
1
1
1