Beaver Valley Power Station

Unit 1/2

1/2-ODC-3.01

ODCM: Dispersion Calculation Procedure and Source Term Inputs

Document Owner Manager, Nuclear Environmental & Chemistry

Revision Number	1
Level Of Use	General Skill Reference
Safety Related Procedure	Yes
Effective Date	12/29/06

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1.0 <u>PURPOSE</u>

- 1.1 This procedure contains the basic methodology that was used for calculating dispersion (χ/Q) and deposition (D/Q).
 - 1.1.1 Prior to issuance of this procedure, these items were located in Appendix A of the old ODCM.

1.2 This procedure also contains the input parameters to the various computer codes used by the Licensee and its subcontractors for determination of the liquid and gaseous source term mixes.

1.2.1 Prior to issuance of this procedure, these items were located in Appendix B of the old ODCM.

2.0 <u>SCOPE</u>

2.1 This procedure is applicable to all station personnel (including subcontractors) that are qualified to perform activities as described and referenced in this procedure.

3.0 <u>REFEFERENCES AND COMMITMENTS</u>

- 3.1 <u>References</u>
 - 3.1.1 NUS-2173, Development Of Terrain Adjustment Factors For Use At the Beaver Valley Power Station, For the Straight-Line Atmospheric Dispersion Model, NUS Corporation, June 1978
 - 3.1.2 NUREG/CR-2919, XOQDOQ: Computer Program For The Meteorological Evaluation Of Routine Effluent Releases At Nuclear Power Stations, September, 1982
 - 3.1.3 Regulatory Guide 1.23, Meteorological Measurement Program for Nuclear Power Plants
 - 3.1.4 Regulatory Guide 1.111, Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents In Routine Releases From Light-Water-Coded Reactors, Revision 1, July 1977
 - 3.1.5 NRC Gale Code,
 - 3.1.6 SWEC LIQ1BB Code,
 - 3.1.7 SWEC GAS1BB Code,
 - 3.1.8 NUREG-1301, Offsite Dose Calculation Manual Guidance, Standard Radiological Effluent Controls for Pressurized Water Reactors (Generic Letter 89-01, Supplement No. 1)
 - 3.1.9 1/2-ADM-1640, Control of the Offsite Dose Calculation Manual

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3 1 10	1/2-ADM-0100 Procedure Writer's Guide	. I <u>*</u>	<u> </u>
2 1 11			
3.1.11	1/2-ADM-0101, Review and Approval of Documents		
3.1.12	CR 05-01169, Chemistry Action Plan for Transition of RE CA-19, Revise procedure 1/2-ODC-3.01 to change docum Radiation Protection to Manager, Nuclear Environmental	ETS, REMI ient owner & Chemist	P and ODCM. from Manager, ry.
3.2 <u>Co</u>	ommitments		
3.2.1	None		
4.0 <u>R</u>	ECORDS AND FORMS		
4.1 <u>Re</u>	cords		
4.1.1	Any calculation supporting generation of dispersion, depo shall be documented, as appropriate, by a retrievable docu package) with an appropriate RTL number.	osition, or so ment (e.g.;	ource term mixes letter or calculation
4.2 <u>Fo</u>	<u>rms</u>		
4.2.1	None		
5.0 <u>PH</u>	RECAUTIONS AND LIMITATIONS		
5.1 Th Ap	is procedure contains the information that was previously copendix B of the previous BV-1 and 2 Offsite Dose Calculat	ontained in ion Manual	Appendix A and l.
5.1.1	In regards to this, the Tables that were transferred from A the appropriate ATTACHMENTS of this procedure will s an "A" or "B".	ppendix A till contain	and Appendix B to a prefix denoting
6.0 <u>A</u>	CCEPTANCE CRITERIA		
6.1 An ma Pa ac	by change to this procedure shall contain sufficient justificat aintain the level of radioactive effluent control required by 1 rt 190, 10 CFR 50.36a and Appendix I to 10 CFR 50, and no curacy or reliability of effluent dose or setpoint calculation.	ion that the 0 CFR 20.1 ot adversely	change will 1302, 40 CFR y impact the
6.1.1	All changes to this procedure shall be prepared in accorda and 1/2-ADM-1640. ^(3.1.9)	nce with 1/	2-ADM-0100 ^(3.1.10)
6.1. 2	All changes to this procedure shall be reviewed and appro $1/2$ ADM- $0101^{(3.1.11)}$ and $1/2$ -ADM- $1640^{(3.1.9)}$	oved in acco	ordance with

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7.0 **<u>PREREQUISITES</u>**

7.1 The user of this procedure shall be familiar with ODCM structure and content.

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8.0 <u>PROC</u> 8.1 <u>Summa</u> 8.1.1 An dej act	EDURE ry of Dispersion and Deposition Methodology nual average and grazing season average values of rela position (D/Q) were calculated for continuous and inter ivity from the site according to the straight-line airflow	tive concer mittent gas (Gaussian	ntration (χ/Q) and eous releases of) model described in		
8.1.1.1	Undecayed and undepleted sector average χ/Q and each of sixteen 22.5-degree sectors at the site bound receptors.	D/Q values lary and ma	were obtained for aximum individual		
8.1.1.2	For an elevated release, (i.e.; occurring at a height t of a nearby structure) credit was taken for the effect comprised of the physical release height plus mome terrain height at a given receptor.	hat is twice ive release ntum plum	the height or more height which is e rise minus the		
8112	A building water correction factor was used to adju	t calculatio	na for ground lovel		

- 8.1.1.4 Airflow reversals were also accounted for by applying site-specific terrain recirculation factors for both ground and elevated releases at the site.^(3.1.1)
- 8.1.1.5 The methodology employed in the calculation of intermittent release χ/Q and D/Q values is that described in NUREG/CR-2919.^(3.1.2)
- 8.1.2 The site continuous gaseous release points that have been evaluated include the following:
 - 8.1.2.1 PV-1/2: The Unit 1/2 Gaseous Waste/Process Vent attached to the Unit 1 natural draft cooling tower
 - 8.1.2.2 CV-1 and CV-2: The Unit 1 Rx Containment/SLCRS Vented the Unit 2 SLCRS Filtered Pathway
 - 8.1.2.3 VV-1 and VV-2: The Unit 1 Ventilation Vent and the Unit 2 SLCRS Unfiltered Pathway
 - 8.1.2.4 TV-2: The Unit 2 Turbine Building Vent

releases.

- 8.1.2.5 CB-2: The Unit 2 Condensate Polishing Building Vent
- 8.1.2.6 DV-2: The Unit 2 Decontamination Building Vent
- 8.1.2.7 WV-2: The Unit 2 Gaseous Waste Storage Tank Vault Vent
- 8.1.3 The intermittent releases are from PV-1/2, VV-1, VV-2, CV-1 and CV-2.

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8.1.4	Only PV-1/2 was considered to be an elevated release with treated as ground level releases. A summary of the release locations is given in ATTACHMENT A.	h all other ro e characteris	elease points being stics and their		
8.1.5	Onsite meteorological data for the period January 1, 1976 were used as input for the annual-average calculations.	through De	cember 31, 1980		
8.1.5	1 The grazing season was represented by a six-month October 31 for each year of the 5-year meteorologi season corresponds reasonably well with the growing	period from cal data base ng season.	May 1 through This grazing		
8.1.5	2 The data were collected according to guidance in N in Section 2.3 of the BVPS-2 FSAR.	RC RG-1.23	(^(3.1.3) as described		
.8.1.5	The parameters used in the χ/Q and D/Q calculation direction, and ΔT as an indicator of atmospheric stat (35 ft) and ΔT (150-35 ft) were used for all release which required the use of 500 ft winds and ΔT (500 of the release height (510 ft).	ns consist of bility. The l points excep -35 ft) whic	f wind speed, wind lower level winds t the Process Vent h are representative		
8.1.6	The annual average and grazing season χ/Q and D/Q value intermittent radioactive releases were calculated at the sit nearest vegetable garden, nearest milk cow, nearest milk	tes for the co e boundary, goat, and ne	ontinuous and nearest resident, arest meat animal.		
8.1.6	1 In the case of the Process Vent releases, several of evaluated in each downwind sector to determine th values.	each recepto e maximum	r type were X/Q and D/Q		
8.1.6	2 The distances of the limiting maximum individual release points are given in ATTACHMENT E (Tak	receptors fro le 2.2-3) of	m the radioactive 1/2-ODC-2.02.		
8.1.6	3 The continuous release annual average χ/Q values Containment Vents, Ventilation Vents, Process Ver Decontamination Building Vent, Waste Gas Storag Polishing Building Vent are given in ATTACHME 2.2-10) of 1/2-ODC-2.02. Continuous release annu release points are also given at ten incremental dov	at the special nt, Turbine E e Vault Ven NT F (Table al average X nwind dista	l locations for the Building Vents, t, and Condensate s 2.2-4 through /Q's for these same nces of 0-5 miles.		
8.1.6	4 Continuous release D/Q values for these same relea ATTACHMENT K (Tables 2.3-21 through 2.3-27 0-5 mile incremental distances, and in ATTACHM 2.3-34) of 1/2-ODC-2.02 for the special locations.	se points ard) of 1/2-OD(ENT L (Tab	e given in C-2.02 for the same les 2.3-28 through		
8.1.6	5 Due to their location adjacent to the Containment E Building and Gaseous Waste Storage Tank Vault χ the Containment Vent χ/Q's and D/Q's.	building, the /Q's and D/C	Decontamination I's are the same as		

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on Calculation Procedure and Source Term Inputs Likewise, the Turbine Building Vent γ/O 's and D/O	<u>1/2</u> Revision:	General Skill Reference
I ikewise, the Turbine Building Vent γ/O 's and D/O	Revision:	Page Number:
$-$ Likewise, the Turbine Building Vent γ/O 's and D/O	1	I I ARC INUMOCI".
Likewise the Turbine Building Vent γ/O 's and D/O		7 of 12
Polishing Building as well due to its location adjace	's apply to int to the Ti	the Condensate 1rbine Building.
ACHMENT M (Tables 2.3-35 through 2.3-38) of 1/2 alues for batch releases originating from the Contain rocess Vent releases respectively.	-ODC-2.02 ment Vent	2 contain short term , Ventilation Vent,
The values in these tables are based on 32 hours per Ventilation Vent purges and 74 hours per year of Pr	year of Co ocess Vent	ntainment and purges.
of Source Term Inputs		
d Source Term Inputs		
Inputs to the NRC Gale Code used for generation of Mixes are shown in ATTACHMENT B (Table B:1a	BV-1 Liqu 1).	id Source Term
Inputs to the SWEC LIQ1BB Code used for generat Term Mixes are shown in ATTACHMENT B (Tabl	ion of BV- e B:1b)	2 Liquid Source
ous Source Term Inputs		
Inputs to the SWEC GAS1BB Code for generation of Mixes are shown in ATTACHMENT C (Table B:2a	of BV-1 Ga	seous Source Term
Inputs to the SWEC GAS1BB Code for generation of Mixes are shown in ATTACHMENT C (Table B:26	of BV-2 Ga)	seous Source Term
		·
	ACHMENT M (Tables 2.3-35 through 2.3-38) of 1/2 alues for batch releases originating from the Contain rocess Vent releases respectively. The values in these tables are based on 32 hours per Ventilation Vent purges and 74 hours per year of Pr of Source Term Inputs d Source Term Inputs Inputs to the NRC Gale Code used for generation of Mixes are shown in ATTACHMENT B (Table B: 1a Inputs to the SWEC LIQ1BB Code used for generat Term Mixes are shown in ATTACHMENT B (Table Dus Source Term Inputs Inputs to the SWEC GAS1BB Code for generation of Mixes are shown in ATTACHMENT C (Table B:2a Inputs to the SWEC GAS1BB Code for generation of Mixes are shown in ATTACHMENT C (Table B:24)	ACHMENT M (Tables 2.3-35 through 2.3-38) of 1/2-ODC-2.02 alues for batch releases originating from the Containment Vent rocess Vent releases respectively. The values in these tables are based on 32 hours per year of Co Ventilation Vent purges and 74 hours per year of Process Vent of Source Term Inputs d Source Term Inputs Inputs to the NRC Gale Code used for generation of BV-1 Liqu Mixes are shown in ATTACHMENT B (Table B:1a). Inputs to the SWEC LIQ1BB Code used for generation of BV- Term Mixes are shown in ATTACHMENT B (Table B:1b) ous Source Term Inputs Inputs to the SWEC GAS1BB Code for generation of BV-1 Ga Mixes are shown in ATTACHMENT C (Table B:2a) Inputs to the SWEC GAS1BB Code for generation of BV-2 Ga Mixes are shown in ATTACHMENT C (Table B:2b)

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	BV-1 AN	D 2 RELEASE COND	DITIONS	5	
		TABLE A:1			
	VV-1 VENTILATION VENT (PAB EXHAUST)	CV-1 RX CONTAINMENT/ SLCRS VENT	PV-1/2 WASTE VENT	GASEOUS E/PROCESS	TV-2 TURBINE BUILDING VENT
	VV-2 SLCRS UNFILTERED PATHWAY	CV-2 RX CONTAINMENT/ SLCRS FILTERED PATHWAY			
TYPE OF RELEASE	GROUND LEVEL	GROUND LEVEL	ELE	EVATED	GROUND LEVEL
	Long Term And Short Term	Long Term And Short Term	Long Term And Short Term		Long Term And Short Term
Release Point Height (m)	26	47	155		33
Adjacent Building Height (m)	19	44		155	33
Relative Loca tion To Adjacent Structures	E. Side Of Primary Auxiliary Bldg	Top Center Of Containment Dome	Atop Co	poling Tower	Turbine Building
Exit Velocity(m/sec)	NA	NA		9.4	NA
Internal Stack Diameter (m)	NA	NA	0.25		NA
Building Cross- Sectional Area (m ²)	1600	1600	NA		NA
Purge Frequency* (hours/year)	32	32	74		NA
Purge Duration (hrs/release)	8	8		NA	NA

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*Applied to Short Term calculations only

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			ATTACHN	MENT B			<u>_</u>			
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		LIOU	JD SOURCE	TERM INP	UTS					
				B:la		-				
INPUTS TO C	JALE CODE	E FOR GEN	ERATION O	FBV-1 LIQ	UID SO	URCE	IERM	MIXES		
	ΡV	1 DWD IND	ITTS			VAT	THE			
 	DV·		015			VAL	UE	·		
Thermal Power	Level (megav	watts)	•			270	56.000			
Plant Capacity	Factor					_/	.800			
Mass Of Primar	ry Coolant (th	ousand lbs)				34	45.000			
Percent Fuel W	ith Cladding I	Defects					.120			
Primary System	h Letdown Rat	te (gpm)				(50.000			
	ъ · 1'						< 000			
Letdown Cation	n Demineraliz	er Flow				3,000				
Total Steam Flo	w (million lb	s s/hr)				11 620				
Mass Of Steam	In Each Stear	m Generator	(thousand lbs)			6.772				
Mass Of Liquid	In Each Steam	m Generator	(thousand lbs)			. 9	97.000			
_										
Total Mass Of S	Secondary Co	olant (thousa	and lbs)			12	96.000			
Mass Of Water	In Steam Gen	thous	sand lbs)			291.000				
Blowdown Rate	e (thousand lb	S/NF) Pata (lha/dar	.)			100.000				
Finary 10 Sec	Corry-Over B	Rate (105/0a))			100.000				
115510111100000	cally-Over 1	Taouon		x			.001			
Halogen Carry-	Over Fraction	1					.010			
Condensate Der	mineralizer Fl	low Fraction					0.000			
Radwaste Dilut	ion Flow (tho	usand gpm)					22.500			
		DV		FINDITS						
	<u>.</u> .	Dv-		COLLECTION	DELAY	DECC	NTAM	INATION		
	FLOW RATE	FRACTION	FRACTION	TIME	TIME		FACT	ORS		
STREAM	(gal/day)	OF PCA	DISCHARGE	(days)	(days)	I	Ċs	OTHERS		
Cl.: D1 1	1.20174	1 000	0.000	11.200	7 000	1777	1127	157		
Shim Bleed	1.32E4	1,000	0.000	11,260	7.220	IE/	1E7	IE7		
Kale										
Equipment	6.00E2	1.000	0.000	11.260	7.220	1E7	1E7	1E7		
Drains										
Clean Waste	7.50E1	1 000	1 000	0.071	0.648	1E5	2E4	1E5		

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SIKEAW	(galuay)	OF FCA	DISCHARGE	(uays)	(uays)	L	US	
Shim Bleed Rate	1.32E4	1.000	0.000	11.260	7.220	1E7	1E7	1E 7
Equipment Drains	6.00E2	1.000	0.000	11.260	7.220	1 E7	1E7	1E7
Clean Waste Input	7.50E1	1.000	1.000	0.071	0.648	1E5	2E4	1E5
Dirty Waste Input	1.35E3	0.035	1.000	0.071	0.648	1E5	2E4	1E5
Blowdown	9.75E4		1.000	0.071	0.648	1E5	2E4	1E5
Untreated Blowdown	0.0							

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INPUTS T Therr Plant Mass Perce Prima Letdo Numl Total Mass Mass Blow Prima	O SWEC LIC nal Power Lev Capacity Fact Of Primary C nt Fuel With (ary System Le own Cation De ber Of Steam (Of Steam In I Of Liquid In Mass Of Seco Of Water In S down Rate (th ary To Second	LIC Q1BB COD BV- Vel (megawar tor coolant (thou Cladding Dei tdown Rate (emineralizer Generators million lbs/h Each Steam Clads Steam ondary Coola Steam Gener iousand lbs/h lary Leak Ra	ATTAC Page QUID SOURC TAB E FOR GENER 2 PWR INPUTS tts) sand Ibs) fects (gpm) Flow r) Generator (thous ator (thousand Ibr) ator (thousand Ibr) tt (lbs/day)	arce Term 1 HMENT B 2 of 2 CE TERM I LE B:1b RATION OF S and lbs) sand lbs) sand lbs) so)	nputs NPUTS BV-2 LIQ			ERM MIXES VALUE 2766.000 .800 385.000 .120 57.000 5.700 3.000 11.600 8.700 100.000 2000.000 298.000 22.300 100.000	
Finna Fissio Halog Cond Radw	on Product Ca gen Carry-Ove ensate Demin vaste Dilution	rry-Over Fra er Fraction eralizer Flow Flow (thousa	v Fraction and gpm)					.001 .010 .700 7.800	
· · · ·		E	SV-2 LIQUID W	ASTE INPUT	S		CONTRAN		
	FLOW RATE	FRACTION	FRACTION	TIME	TIME	Y DECONTAMINATION FACTORS			
STREAM	(gal/day)	OF PCA	DISCHARGE	(hrs)	(hrs)	I	CsRb	OTHERS	
Containment Sump	40	1.000	1.0	35.5	6.2	1E3	1E4	1E4	
Auxiliary Building Sump	200	0.100	1.0	35.5	6.2	1E3	1E4	1E4	
Miscellaneous Sources	700	0.010	1.0	35.5	6.2	1E3	1E4	1E4	
Rx Plant Samples	35	1.000	1.0	35.5	6.2	1E3	1E4	1E4	
Lab Drains	400	0.002	1.0	35.5	6.2	1E3	1E4	1E4	
Cond: Demin. Rinse Water	2685	1.1E-4	1.0	35.5	6.2	1E3	1E4	1E4	
CVCS	60		1.0	1300	173	1E4	4E3	1E5	
Turbine Bldg.Drains	7200		1.0						

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ATTACHMENT C				
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GASEOUS SOURCE TERM INPUT	S			
	-			
TABLE B:2a INPUTS TO SWEC GAS1BB CODE FOR GENERATION OF BV-1 GAS	EOUS SOUR	CE TERM MIXES		
BV-1 PWR INPUTS		VALUE		
Thermal Power Level (megawatts)		2766 000		
Plant Capacity Factor		.800		
Mass Of Primary Coolant (thousand lbs)		385.000		
Percent Fuel With Cladding Defects		.120		
Primary System Letdown Rate (gpm)		57.000		
Letdown Cation Demineralizer Flow		5.700		
Number Of Steam Generators		3.000		
Total Steam Flow (million lbs/hr)		.11.600		
Mass Of Steam In Each Steam Generator (thousand lbs)		8.700		
Mass Of Liquid In Each Steam Generator (thousand lbs)		100.000		
Total Mass Of Secondary Coolant (thousand lbs)		2000.000		
Mass Of Water In Steam Generator (thousand lbs)		298.000		
Blowdown Rate (thousand lbs/hr)		52.000		
Primary To Secondary Leak Rate (lbs/day)		100.000		
Fission Product Carry-Over Fraction		.001		
Halogen Carry-Over Fraction		.010		
Condensate Demineralizer Flow Fraction		0.000		
Radwaste Dilution Flow (thousand gpm)		15.000		
BV-1 GASEOUS WASTE INPUTS		VALUE		
There Is Not Continuous Stripping Of Full Letdown Flow				
Hold Up Time For Xenon (days)	·	39.000		
Hold Up Time For Krypton (days)		2.000		
Primary Coolant Leak To Auxiliary Building (lb/day)		160.000		
Auxiliary Building Leak Iodine Partition Factor		7.5E-3		
Gas Waste System Particulate Release Fraction		0.000		
Auxiliary Building Charcologine Release Fraction		1.000		
Auxiliary Building Particulate Release Fraction		1.000		
Containment Volume (million cu-it)		1.800		
Primary To Secondary Look Pate (h/day)		2.000		
There is A Kidney Filter		100.000		
Containment Atmosphere Cleanup Rate (thousand cfm)		· 2 000		
Purge Time Of Containment (hours)		8 000		
There Is Not A Condensate Demineralizer		0.000		
Iodine Partition Factor (gas/lig) In Steam Generator		0.010		
Frequency Of Containment Building High Vol Purge (times/vr)*		4.000		
Containment Volume Purge Iodine Release Fraction		1.000		
Containment Volume Purge Particulate Release Fraction		1.000		
Steam Leak To Turbine Building (lbs/hr)		1700.000		
Fraction Iodine Released From Blowdown Tank Vent		0.000		
Fraction Iodine Released From Main Condensate Air Ejector		0.440		
There Is Not A Cryogenic Off Gas System				
*2 cold and 2 hot purges		۸.		
2 cold and 2 not purges				

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INPUTS TO SWEC GAS1BB CODE FOR GENERATION OF BV-2 GAS	EOUS SOUR	CE TERM MIXES	
		VALUE	
		VALUE	
Thermal Power Level (megawatts)		2766.000	
Plant Capacity Factor		.800	
Mass Of Primary Coolant (thousand los)		.385.000	
Percent Fuel With Cladding Detects		.120	
Primary System Letdown Rate (gpm)		57.000	
Letdown Cation Demineralizer Flow		5.700	
Number Of Steam Generators		3.000	
Total Steam Flow (million lbs/hr)		11.600	
Mass Of Steam In Each Steam Generator (thousand lbs)		8.700	
Mass Of Liquid In Each Steam Generator (thousand lbs)		100.000	
Total Mass Of Secondary Coolant (thousand lbs)		2000.000	
Mass Of Water In Steam Generator (thousand lbs)		298.000	
Blowdown Rate (thousand lbs/hr)		22.300	
Primary To Secondary Leak Rate (lbs/day)		100.000	
Fission Product Carry-Over Fraction		.001	
Halogen Carry-Over Fraction		.010	
Condensate Demineralizer Flow Fraction		.700	
Radwaste Dilution Flow (thousand gpm)		7,800	
BV-2 GASEOUS WASTE INPUTS	<u>.</u>	VALUE	
There Is Not Continuous Stripping Of Full Letdown Flow			
Hold Up Time For Xenon (days)		45.800	
Hold Up Time For Krypton (days)		2.570	
Primary Coolant Leak To Auxiliary Building (lb/day)		160.000	
Auxiliary Building Leak Iodine Partition Factor		7.5E-3	
Gas Waste System Particulate Release Fraction		0.000	
Auxiliary Building Charcoiodine Release Fraction		0.100	
Auxiliary Building Particulate Release Fraction		0.010	
Containment Volume (million cu-ft)		1.800	
Frequency Of Primary Coolant Degassing (times/yr)		2.000	
Primary To Secondary Leak Rate (lb/day)		100.000	
There Is A Kidney Filter			
Containment Atmosphere Cleanup Rate (thousand cfm)		20.000	
Purge Time Of Containment (hours)		8.000	
There Is Not A Condensate Demineralizer		4	
Iodine Partition Factor (gas/liq) In Steam Generator		0.010	
Frequency Of Containment Building High Vol Purge (times/yr)*		4.000	
Containment Volume Purge Iodine Release Fraction		1.000	
Containment Volume Purge Particulate Release Fraction		1.000	
Steam Leak To Turbine Building (lbs/hr)		1700.000	
Fraction Iodine Released From Blowdown Tank Vent		0.000	
Fraction Iodine Released From Main Condensate Air Ejector		0.270	

x' ,

*2 cold and 2 hot purges