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• Sti	udy Calculations sha	all be used only for the	purpose of evaluating a	alternate design	options or assistir	ng the engineer	r in performing assessments.

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ENERGY	VERIFICATION CHECKLIST	Page No. 1.2	Cont'd on page
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Calculation/CMR NE-02-03-14	Revision 0		
was verified using the following			
Checklist Below	Alternate Calculat		ifier Initials
Methodology is clearly stated, s	analysis sufficiently detailed, and appropriate for the		<u>um</u>
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Evaluation Report, or are the in the Plant or ISFSI FSAR	the Plant or ISFSI FSAR or NRC Safety the results of the analysis/calculation as describ or NRC Safety Evaluation Report affected?		_
If Yes, ensure that the requ	irements of 10 CFR 50.59 and/or 10 CFR 72.4 cordance with SWP-LIC-02.		-
Does the analysis/calculation re document as identified in D	esult require revising any existing output interfaces. ES-4-1, Attachment 7.3?	ace	<u>m</u>
If Yes, ensure that the appr interface documents per Di	opriate actions are taken to revise the output ES-4-1, section 3.1.8 (i.e., document change is	<u>اب</u> ا ک	M
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1	J. V. Ramsdell, Jr. C. A. Simonen			Atmospheric Relative Concent Building Wakes	NUREG/CR-6331 PNNL-10521		
2	Burns and Roe, Inc		/2002 ev. 6	East Elevation (Reactor Building	ng)	DWG. A502	
3	Burns and Roe, Inc			HVAC Plan and Sections at 53 Generator Building	31'-0" Turbine	DWG. M803	
4	Burns and Roe, Inc		5/1983 ev. 5	West Elevation (Reactor Build	ing)	DWG. A504	
5	WPPSS	5/3	0/1990	Civil Site Paving & Grading		DWG. C875B	
6	WPPSS	5/3	0/1990	Civil Site Paving & Grading		DWG. C878B	
7	NRC	lune 2003		Atmospheric Relative Concent Control Room Habitability Ass Nuclear Power Plants	Reg. Guide 1.194		
8	Framatome, ANP (Ted Messier)		19/2003 ev. 1	Generation of Columbia Generati Meteorological Data Input Files fo Code ARCON96	32-5031898-01		
9	Energy Northwest	1/1	6/2002	Industrial Master Data Sheet, TE-11A	EPN MET-	DIC: 1801.1	
10	Energy Northwest	1/1	6/2002	Industrial Master Data Sheet, TE-10A	EPN MET-	DIC: 1801.1	
11	Burns and Roe, Inc		3/1988 lev. 7	North Elevation (Reactor Build	ling)	DWG. A501	
12	Burns and Roe, Inc	•	5/1983 ev.19	Structural Reactor Building Ex	terior Walls	DWG. S737	
13	Energy Northwest	Nover	nber 1998	WNP-2 FSAR			
14	Energy Northwest	Ameno	dment 169	Technical Specification Columbia Generating Station			
15	Energy Northwest Linda Woosley		15/2002 lev. 1	Secondary Containment Bypa Limit	ss Leakage	NE-02-85-12	
16	Energy Northwest		'02/01 ev. 19	Turbine Generator Building H	VAC system	Procedure No. 2.10.2	
17	Burns and Roe, Inc	1	9/1975 lev. 7	Condensate Storage Tanks	;	2-204-00, 88	
18	WPPSS	1	0/1990 Rev. 0	Civil Site Paving & Grading		DWG. C876B	

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The below listed output inte subject calculation. The lists have been revised, or the re- AFFECTED DOCUMENT NO. NE-02-99-13 NE-02-88-27	ed output ir evision defo (e.g., BD PDC 24 PDC 24	hterfaces require revi erred with Manager a HANGED BY PC, SCN, CMR, Rev.) 06 06	sion as a result of this c	alculation. The elow. RED	bion of the le documents DEPT. MANAGER *	
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CALCULATION OUTPUT SUMMARY

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Discussion of Results:

The ARCON96 X/Q results presented in Appendix B are summarized below for both filtered flow and unfiltered inleakage into the control room. The filtered flow effective X/Q was calculated based on the procedure described in section 5, whereas the unfiltered inleakage X/Q for each source was taken as the X/Q at the local intake since it represents the most likely point of entry for the unfiltered inleakage.

Conclusion: A summary of X/Q for the filtered flow and the unfiltered inleakage is presented in the 4 tables below for the different possible control room intake flow rate combinations. The first table is for the 1600/900 cfm combination assuming one train is secured within the first 2 hours, the second table is for the 1300/800 cfm combination assuming one train is secured within the first 2 hours, the third table is for the 1300/800 cfm combination assuming one train is secured between 2 - 8 hours, and the fourth table is for the 1300 cfm flow rate assuming both trains remained on for 30 days. A detailed description is given in section 5.

Filtered CR Intake Flow (using the 1600/900 cfm flow rate and assuming one train is Secured between 0-2 hrs) and Unfiltered inleakage X/Q (s/m³)

		Filt	ered		Unfiltered					
	SGT Roofline	KK doors SC Bypass	RBW SC Bypass	Turbine Building	SGT Roofline	KK doors SC Bypass	RBW SC Bypass	Turbine Building		
0 - t hrs	1.60E-04	4.07E-04	2.22E-04	4.41E-04	6.95E-04	5.34E-04	8.69E-04	4.70E-03		
t - 2 hrs	1.47E-04	3.75E-04	2.05E-04	7.83E-04	6.95E-04	5.34E-04	8.69E-04	4.70E-03		
2 - 8 hrs	1.08E-04	2.97E-04	1.48E-04	3.33E-04	3.36E-04	1.97E-04	4.40E-04	2.00E-03		
8 - 24 hrs	4.25E-05	1.21E-04	5.88E-05	1.72E-04	1.28E-04	8.41E-05	1.75E-04	1.03E-03		
1 - 4 days	3.61E-05	1.01E-04	5.13E-05	1.34E-04	9.72E-05	7.26E-05	1.38E-04	8.01E-04		
4 - 30 days	3.10E-05	8.83E-05	4.29E-05	1.28E-04	7.69E-05	7.00E-05	1.10E-04	7.69E-04		

Filtered CR Intake Flow (using the 1300/800 cfm flow rate and assuming one train is Secured between 0-2 hrs) and Unfiltered inleakage X/Q (s/m³)

		Filte	ered		Unfiltered					
	SGT Roofline	KK doors SC Bypass	RBW SC Bypass	Turbine Building	SGT Roofiine	KK doors SC Bypass	RBW SC Bypass	Turbine Building		
0 - t hrs	1.56E-04	3.98E-04	2.17E-04	5.42E-04	6.95E-04	5.34E-04	8.69E-04	4.70E-03		
t - 2 hrs	1.43E-04	3.65E-04	1.99E-04	8.81E-04	6.95E-04	5.34E-04	8.69E-04	4.70E-03		
2 - 8 hrs	1.05E-04	2.89E-04	1.44E-04	3.75E-04	3.36E-04	1.97E-04	4.40E-04	2.00E-03		
8 - 24 hrs	4.14E-05	1.18E-04	5.73E-05	1.93E-04	1.28E-04	8.41E-05	1.75E-04	1.03E-03		
1 - 4 days	3.52E-05	9.83E-05	5.00E-05	1.50E-04	9.72E-05	7.26E-05	1.38E-04	8.01E-04		
4 - 30 days	3.03E-05	8.61E-05	4.18E-05	1.44E-04	7.69E-05	7.00E-05	1.10E-04	7.69E-04		



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Filtered CR Intake Flow (using the 1300/800 cfm flow rate and assuming one train is Secured Between 2-8 hrs) and Unfiltered inleakage X/Q (s/m³)

		Filt	ered		Unfiltered					
	SGT Roofline	KK doors SC Bypass	RBW SC Bypass	Turbine Building	SGT Roofline	KK doors SC Bypass	RBW SC Bypass	Turbine Building		
0 - 2 hrs	1.56E-04	3.98E-04	2.17E-04	5.42E-04	6.95E-04	5.34E-04	8.69E-04	4.70E-03		
2 - t hrs	1.15E-04	3.15E-04	1.57E-04	2.31E-04	3.36E-04	1.97E-04	4.40E-04	2.00E-03		
t - 8 hrs	1.05E-04	2.89E-04	1.44E-04	3.75E-04	3.36E-04	1.97E-04	4.40E-04	2.00E-03		
8 - 24 hrs	4.14E-05	1.18E-04	5.73E-05	1.93E-04	1.28E-04	8.41E-05	1.75E-04	1.03E-03		
1 - 4 days	3.52E-05	9.83E-05	5.00E-05	1.50E-04	9.72E-05	7.26E-05	1.38E-04	8.01E-04		
4 - 30 days	3.03E-05	8.61E-05	4.18E-05	1.44E-04	7.69E-05	7.00E-05	1.10E-04	7.69E-04		

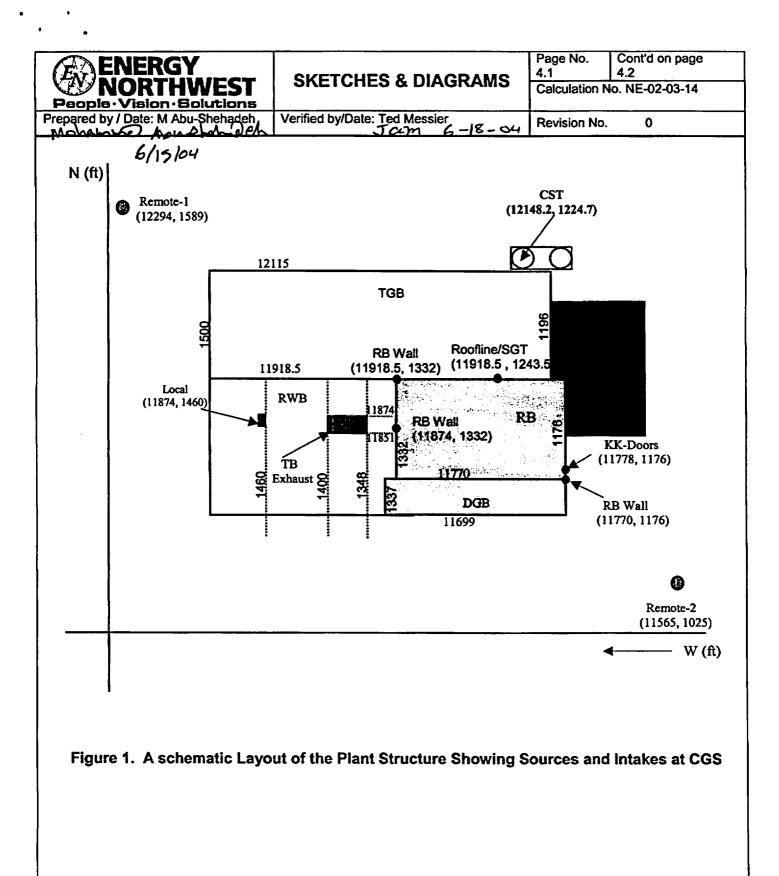
Filtered CR Intake Flow of 1300 cfm (Assuming Both Trains Remain on For 30 Days and Unfiltered inleakage X/Q (s/m³)

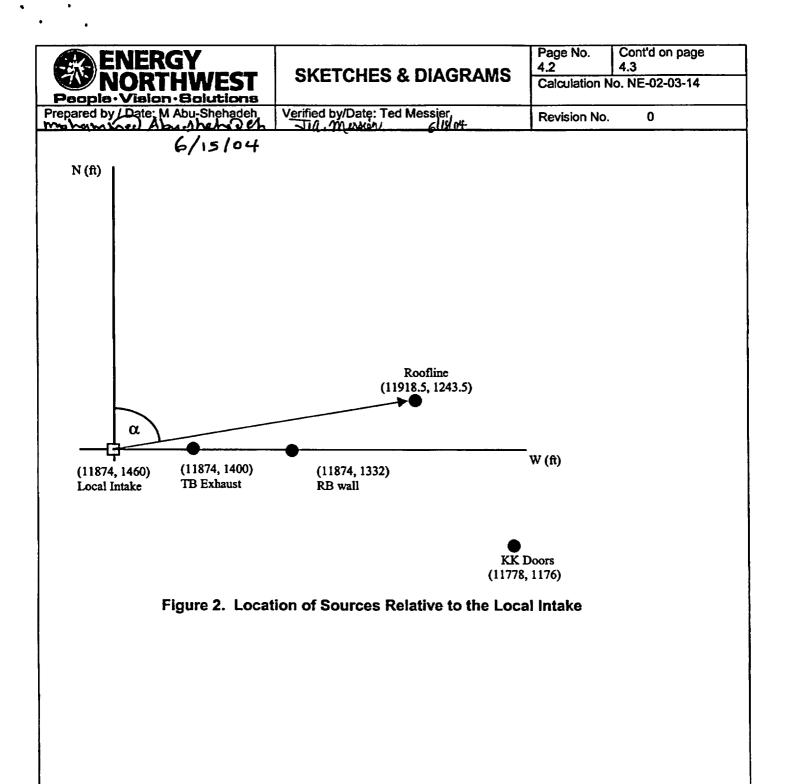
		Filt	ered	-	Unfiltered					
	SGT Roofline	KK doors SC Bypass	RBW SC Bypass	Turbine Building	SGT Roofline	KK doors SC Bypass	RBW SC Bypass	Turbine Building		
0 - 2 hrs	1.56E-04	3.98E-04	2.17E-04	5.42E-04	6.95E-04	5.34E-04	8.69E-04	4.70E-03		
2 - 8 hrs	1.15E-04	3.15E-04	1.57E-04	2.31E-04	3.36E-04	1.97E-04	4.40E-04	2.00E-03		
8 - 24 hrs	4.51E-05	1.28E-04	6.24E-05	1.19E-04	1.28E-04	8.41E-05	1.75E-04	1.03E-03		
1 - 4 days	3.83E-05	1.07E-04	5.44E-05	9.24E-05	9.72E-05	7.26E-05	1.38E-04	8.01E-04		
4 - 30 days	3.30E-05	9.38E-05	4.56E-05	8.87E-05	7.69E-05	7.00E-05	1.10E-04	7.69E-04		

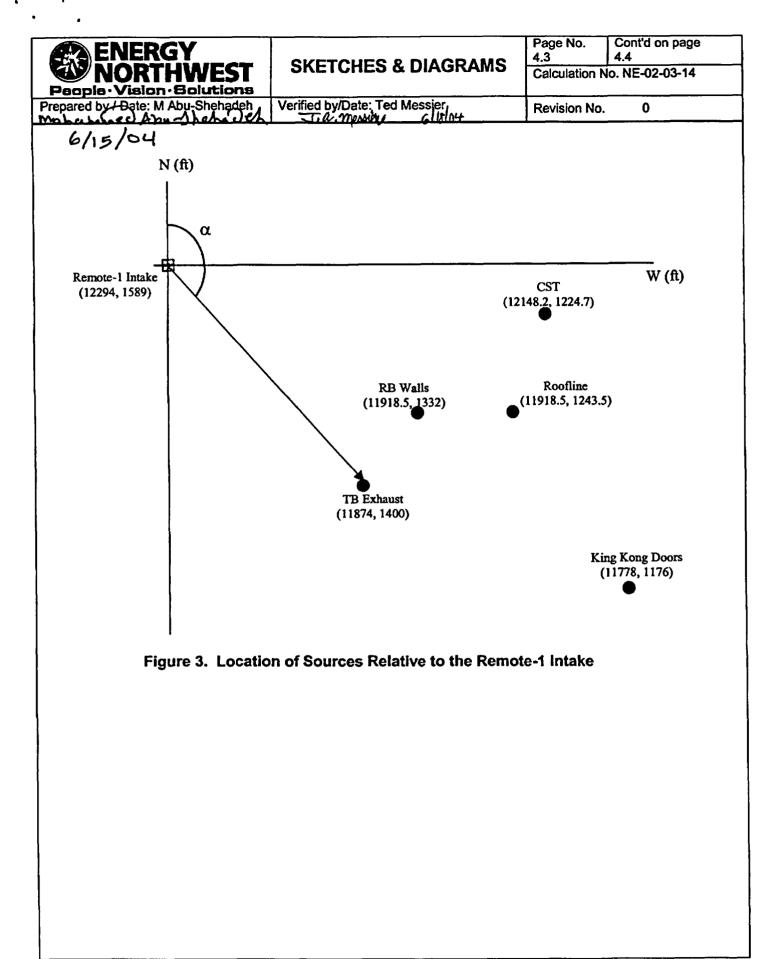
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Unverifie	d Program:				
Approach/Methodology					
		e X/Q for the 3 control room intal			
		ces are discussed in section 5. ted separately in Attachment-1.	The X/Q	for the Cond	ensate
2- Input parameters Guide 1.194.	were selected	/calculated based on the recomm	nendatior	ns provided ir	Regulatory
	teorological da	ta (96, 97, 98, 99) were used in t	the ARCO	DN96 calcula	tions.

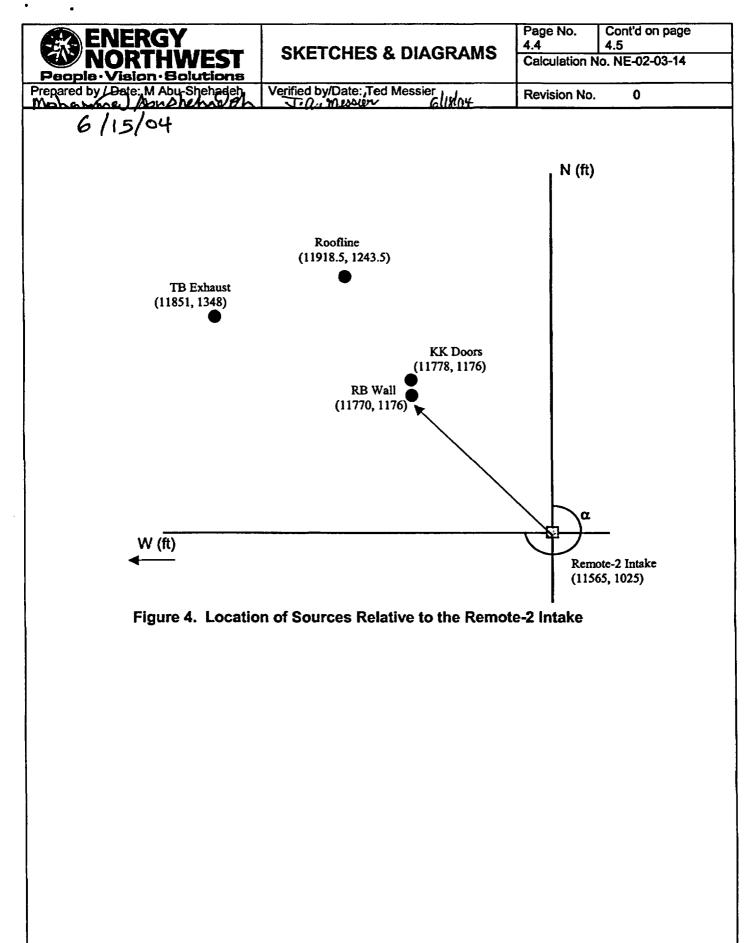
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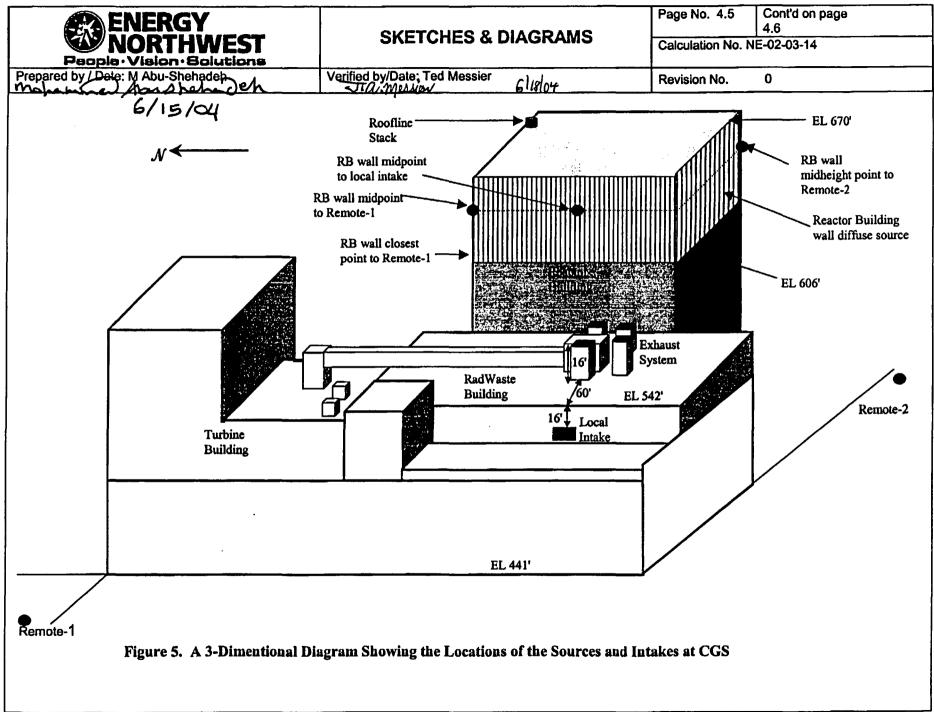
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People · Vision · Bolutions		Calculation	No. NE-02-03-14
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;	Sketches and Diagrams		

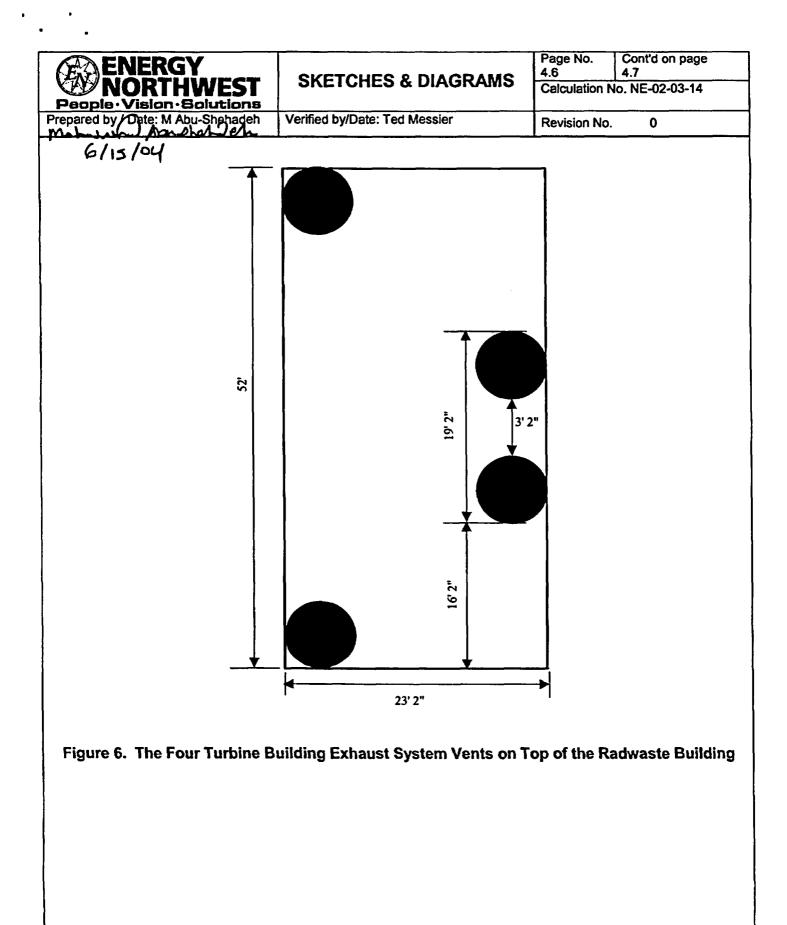


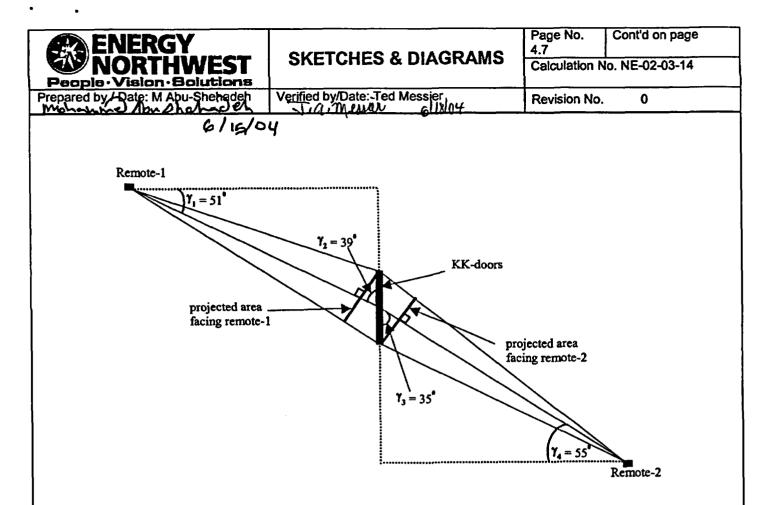














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ŗ	M.alat	d by / Date: M Abu-Shehaden	Jill, Menuer/ Gluint	Revision No.	0	
		6/15/04 NSE: The purpose of this calcula	tion is to perform control room air dispersion f	iactors X/O (X i	is the	REV BAR.
	concent Ci/s) ca Genera calculat	tration of a radionuclide at a rece elculations using ARCON96 comp ting Station, CGS, using the 1996 tion shall supersede all previous of	ptor location in Ci/m3-air normalized by the se outer code (ref. 1) following a core damage ac 6 – 1999 meteorological data. Upon license a control room X/Q calculations.	ource emission cident at Colur amendment ap	rate Q in nbia proval, this	
	radioac		are 5 sources at Columbia Generating Station g an accident. The relative locations of these below:			
	Α.	the ground through which routing reactor building passes through	ort stack) on top of the reactor building at a h e releases take place. Following an accident, the SGT filtration system before exiting throu vel point source in the X/Q calculations.	the exhaust ai	r from the	
	В.	building. It is assumed that som	doors are located at the ground level on the e ne leakage to the environment takes place thr tangular diffuse source that is 23 ft high x 20	ough these doo	ors. The King	
	C.	metal sheets and therefore they	the 606 ft level to the 670 ft level (top of reacter are assumed to be a diffuse source capable s source is also treated as a ground level rele	of leaking radio		
	D.	of the radwaste building roof, ea exhausted to the atmosphere th around the four vents, figure 6, f calculate the distance between 1 vent located at the closest point the source of radioactivity release proximity to the control room loc point. The TBES can shut off if operators to recover and run the	ystem (TBES) is a set of four circular vents (s ach vent is 8 ft in diameter, (ref. 3). Air from the rough these 4 vents, figures 5 and 6. A 52' x then the closest point on the perimeter of this the source (one of the 4 vents) and the correse represents the source. Instead of selecting the sed from the turbine building, the TBES has b cal intake resulting in higher concentrations (of the offsite power is lost, however plant procese e exhaust system when radiation is detected in t likely path (source) when radioactivity is pre-	the turbine build 23' rectangle is se sponding intake turbine build een selected d r X/Q) at the lo dures instruct t n the turbine bu	ling is was drawn elected to e. A single ling walls as lue to its close cal intake he reactor uilding.	
	Ε.	to release radioactivity from liqu	ST): Two tanks located to the north of the turb id leakage originating from the suppression p rsis for this release pathway is discussed separate	ool and bypass	sing the	
	room d		TORS): There are three intakes at CGS whice s post accident. The relative locations of thes re intakes is given below:			
	1-	Local intake point: The local int at an elevation of 527 ft (26.5 m	ake point is a vent located on the west side on above the ground, ref. 4).	f the radwaste	building wall	
	2-	from each other. One remote in	pround level remote intake points which are a ntake is located to the north-west side of the ta cated to the south-east side of the reactor bui	urbine building	and is labeled	
	ARCO A, and	N96 computer program to genera	vears of meteorological data (from 1996 to 19 ate X/Q values. Other input parameters have ng/calculating those input parameters are also ented in Table-1 below.	been calculate	d in appendix	
	Table-2 ARCO	2 presents a summary of the ARC N96 output files, while appendix (3 intakes, it was necessary to run ARCON96 CON96 X/Q results for the 12 scenarios. App C contains a description of the meteorological described below following Table-2.	endix B preser	its the	

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ENERGY	I		ΜΔΝ			LATIO	N	5.1		5.2		
People Vision Solutions							···	Ca	culation N	lo. NE-02	-03-14	
red by / Date: M Abu-Shehadeh 6/	15/04	Verified	by/Date: Trit. Me		sier 618	104		Re	ision No.	0		
			e-1. AR				ters	· 4				
Source	Ro	ofline St	ack	King	g Kong D	loors	Reacto	r Bulldi	ng Walls	Turbine	Building	Exhaus
Receptor	Local	Rem-1	Rem-2	Local	Rem-1	Rem-2	Local	Rem-1		Local	Rem-1	Rem-2
Parameter Meteorological input	Sen-1 RL-L	Sen-2 RL-R1	Sen-3 RL-R2	Sen-4 KK-L	Sen-5 KK-R1	Sen-6 KK-R2	Sen-7 RBW-L	Sen-8 RBW-R	Sen-9 IRBW-R2	Sen-10 TBE-L		Sen-12 TBE-R2
Lower Met Tower Sensor Height (m)	10	10	10	10	10	10	10	10	10	10	10	10
Upper Met Tower Sensor Height (m)	75	75_	75	75	75	75	75	75	75	75	75	75
Wind Speed Units	mph	mph	mph	mph	mph	mph	mph	mph	mph	mph	mph	mph
Receptor Input												
Distance to Receptor (m)	67.4	155.5	126.7	91.4	201.5	79.6	39	138.7	77.6	18.3	140.4	131.5
Intake Height Above Ground Level (m)	26.5	0	0	26.5	0	0	26.5	0	0	26.5	0	0
Elevation Difference (m)	0	0	0	0	0	0	0	0	0	0	0	0
Direction to Source (deg)	78.39	137.38	328.28	108.68	141.33	324.67	90	145.61	323.6	90	155.77	311.5
Source Input												
Release Type	ground	ground	ground	ground	ground	ground	ground	ground	ground	ground	ground	ground
Release Height Above Ground Level (m)	70	70	70	_3.5	3.5	3.5	60.0	60.0	60.0	36.3	36.3	36.3
Building X-sec area (m²)	1787	2861	2861	1787	2861	2861	1787	2861	2861	1787	2861	2861
Vertical Velocity (m/s)	0	0	0	0	0	0	0	0	0	0	0	0
Stack Flow Rate (m ³ /s)	2.1	2.1	2.1	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	55	55	55
Stack Radius (m)	0	0	0	0	0	0	0	0	0	0	0	0
Default Values												
Surface Roughness (m)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Wind Direction Window (deg.)	90	90	90	90	90	90	90	90	90	90	90	90
Minimum Wind Speed (m/s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Average Sector Width Constant	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Initial Diffusion Coefficients: Σ_{Y} (m)	0	0	0	1	0.64	0.58	6.8	10.2	10.2	0.41	0.41	0.41
_ Σ _Z (m)	0	0	0	1.16	1.16	1.16	3.25	3.25	3.25	0	0	0

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ed by / Da	te: M Abu-Sheha	deh Ve	Tia, Mesu	Fed Messier	618104 1	Revision No.	0
5/15/0	4		Ľ		e/Intake Scena	arios	
Scenario	Source-Intake 1	Time Period	X/Q	Scenario	Source-Intak	e Time Period	X/Q
1	RL-L			7	RBW-L		
		0-2 hrs	6.95E-04	1		0-2 hrs	8.69E-04
	1	2-8 hrs				2-8 hrs	4.40E-04
		8 - 24 hrs				8 - 24 hrs	1.75E-04
		1-4 d	9.72E-05			1-4 d	1.38E-04
		4-30 d	7.69E-05			4-30 d	1.10E-04
2	RL-R1			8	RBW-R1		
		0-2 hrs	2.31E-04			0-2 hrs	2.41E-04
		2-8 hrs	1.20E-04			2-8 hrs	1.41E-04
		8 - 24 hrs	4.72E-05			8 - 24 hrs	5.40E-05
		1-4 d	3.65E-05			1-4 d	4.40E-05
		4 - 30 d	3.27E-05			4-30 d	3.88E-05
3	RL-R2			9	RBW-R2		
		0-2 hrs	3.52E-04			0-2 hrs	4.91E-04
		2-8 hrs	2.59E-04			2-8 hrs	3.54E-04
		8 - 24 hrs	1.02E-04			8-24 hrs	1.41E-04
		1-4 d	8.67E-05			1-4 d	1.23E-04
		4-30 d	7.45E-05			4 - 30 d	1.03E-04
4	KK-L			10	TBE-L		
		0-2 hrs	5.34E-04			0-2 hrs	4.70E-03
		2-8 hrs	1.97E-04			2-8 hrs	2.00E-03
		8 - 24 hrs				8 - 24 hrs	1.03E-03
		1-4 d	7.26E-05			1-4 d	8.01E-04
		4-30 d	7.00E-05			4 - 30 d	7.69E-04
5	KK-R1			11	TBE-R1		
		0-2 hrs	1.85E-04			0-2 hrs	3.32E-04
		2-8 hrs	1.19E-04			2-8 hrs	·
		8-24 hrs	<u> </u>			8 - 24 hrs	
		1-4 d	3.71E-05	I		1-4 d	6.94E-05
	L	4-30 d	3.27E-05			4 - 30 d	6.17E-05
6	KK-R2			12	TBE-R2		
		0-2 hrs	8.99E-04			0-2 hrs	3.92E-04
		2-8 hrs				2 - 8 hrs	2.67E-04
		8-24 hrs	2.90E-04			8-24 hrs	1.08E-04
		1-4 d	2.42E-04			1-4 d	9.96E-05
	•	4-30 d	2.12E-04			4 - 30 d	8.63E-05

1 RL-L = Roof Line Stack to Local Intake RL-R2 = Roof Line Stack to Remote-2 Intake

KK-R1 = King Kong doors to Remote-1 Intake RBW-L = Reactor Building Walls to Local Intake RBW-R2 = Reactor Building Walls to Remote-2 Intake TBE-R1 = Turbine Building Exhaust to Remote-1 Intake

RL-R1 = Roof Line Stack to Remote-1 Intake KK-L = King Kong doors to Local Intake

KK-R2 = King Kong doors to Remote-2 Intake RBW-R1 = Reactor Building Walls to Remote-1 Intake TBE-L = Turbine Building Exhaust to Local Intake TBE-R2 = Turbine Building Exhaust to Remote-2 Intake

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Peop		RTHWEST	MANUAL CALCULATION	Calculation	No. NE-02-03-14
repare	dby	ate: M Aby-Shehadeb	Verified by/Date: Ted Messier	Revision No	p. 0
Effecti	 G /22 ive X/Q: ive X/Q: ive d below Immedication one of twithout flow ratesting these the theory of the test of test of the test of tes	Since the total intake to whas been used to calcul- iately following an accid room pressurization pro- the trains can be shut off a diversely affecting the the to the control room has the system characteriza- hree tests are different du. The surveillance testing keeping both remote in the flow rate for these of The characterization te- with both remotes oper operation with a single intake was secured dur. The tracer gas testing u control room, with a sin- rate for these conditions one remote closed and for these conditions is it is not clear which cond- ting results. Table-3 sho- ates of 1600/900 cfm ass	o the control room is a mixture from the three late the effective X/Q that enters into the con- dent at CGS, the control room local intake is a bocess begins with 2 trains (A and B) drawing I while the other remains on. The time at while control room dose will be determined in the ad been measured under three test conditions, ation testing, and the tracer gas testing. The is use to different test conditions and different flo- g uses a single train (either A or B) to draw a makes open and the local intake closed. The is conditions is greater than 900 cfm. esting (per procedure PPM 8.3.440) showed the n - the combined flow rate was 1544 cfm. In e remote open resulted in a combined flow rate ring the tests. uses the conservative alignment of two trains ingle remote intake open. The flow rate meas ns is greater than 1300 cfm. Then, the test run the other open, the flow rate measurement re- greater than 800 cfm. The local intake was s dition will result in higher doses, the effective was the effective X/Q results using the surveil suming that one train is secured at time t with	the intakes, the matrix room. automatically is air from the 2 matrix is ich one train or LOCA dose ar , the usual survent is into the content flow measurement in into the content flow measurement this same test, the of 1343 cfm. (A and B) to de surement shows the secured during the X/Q will be compared and compared to a survey of the compared the compared to a survey of the compared to a survey of the compared the compared to a survey of the compared to a	nethod secured and the remote intakes, an be shut off nalysis. The weillance results from ant locations: arol room, while pent shows that n operation - dual train . The local traw air into the s that the flow n only, keeping at the flow rate the test. calculated using rization testing (notice that the
2.	1544 c effecti one tra gas tes < 8 hrs of 130 The lo	ifm from the characterize ve X/Q results using the ain is secured at time t wisting intake flow rate results s, and Table-6 shows the 0 cfm, assuming that both cal intake vent is assume	ation testing has been approximated by 1600 tracer gas testing intake flow rate results of 1 with $0 < t < 2$ hrs. Table-5 shows the effective rults of 1300/800 cfm, assuming that one train effective X/Q results using the tracer gas test th trains will remain on for 30 days. ed to automatically close immediately follow	cfm), while Ta 1300/800 cfm, c X/Q results us n is secured at 1 sting dual train ring the acciden	blo-4 shows the assuming that sing the tracer time t with $2 < t$ intake flow rate at upon the
			vever, per Columbia Generating Station (CGS r (through its dampers) into the CR at a rate of		
3.	amour	nts of air into the CR. No	sumed to remain open for the duration of the to credit is taken for the fact that per plant pro within 3 hours following the start of the acc	ocedures, the o	
4.		alue of X/Q for the unfilt ponding to the TBES so	tered inleakage is assumed to be equal to the surce.	highest local is	ntake X/Q
5.	equati	ion 6b, section 3.3.2.2 of	oom intakes drawing air into the control room f RG 1.194, (ref. 7), is used to calculate the et l on the fact that no more than one intake can	ffective X/Q vi	alues, the use of

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	MANUAL CALCULATION		No. NE-02-03-14	4
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6/15/04				REV BAR.
				DAN.
($\frac{\chi}{Q}\Big _{AV} = \frac{\max\left[\left(\frac{\chi}{Q}\right)_{L} * F_{L} \cdot \left(\frac{\chi}{Q}\right)_{R1} * F_{R1} \cdot \left(\frac{\chi}{Q}\right)_{R2} * F_{R2}\right]}{F_{L} * F_{R1} + F_{R2}}$			
	$Q)_{AV} \qquad F_L + F_{R1} + F_{R2}$			
Where: L. R1. R2: denote the Lo	ocal, Remote-1, and Remote-2 intakes respe	ctively.		
F: denotes the flow rate.		···· · ·		
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NORTHV	NUAL CALCULATION				Calculation No. NE-02-03-14			
red by / Date: M Abu-	Shehadeh	Verified	by/Date: Ted Messier				vision No.	0
5/16/04	le-3. Effect	ive X/Q (s	- · · ·	ne 12 Sour	ce/intake S	cenario	S	
			0 - t hrs	t - 2 hrs	2 - 8 hrs	8 - 24 hrs	1-4d	4 - 30 d
Control Room Intake (cf	<u>m)</u>		1600	900	900	900	900	900
		Intake			F = Flow R	ate (cfm)		
		Local	150	150	150	150	150	150
	1 1	Remote 1	725	375	375	375	375	375
	Scenario	Remote 2	725	375	375	375	375	375
Roofline			6075.04	T	(X/Q) RESU		1	
		Local Remote 1	6.95E-04 2.31E-04	6.95E-04 2.31E-04	3.36E-04 1.20E-04	1.28E-04 4.72E-05		
		Remote 2	2.51E-04 3.52E-04	3.52E-04	2.59E-04	4.72E-05		
	f	Local	6.52E-04	1.16E-04	5.60E-05	2.13E-05		
		Remote 1	1.05E-04	9.63E-05	5.00E-05	1.97E-05	1.52E-05	
		Remote 2	1.60E-04	1.47E-04	1.08E-04	4.25E-05	3.61E-05	
Maximum Effective X/0	2		1.60E-04	1.47E-04	1.08E-04	4.25E-05		
King Kong doors	Scenario			ARCON96	(X/Q) RESUI	LTS (s/m ³)	
	4	Local	5.34E-04	5.34E-04	1.97E-04	8.41E-05		7.00E-05
	5	Remote 1	1.85E-04	1.85E-04	1.19E-04	4.18E-05	3.71E-05	3.27E-05
	6	Remote 2	8.99E-04	8.99E-04	7.12E-04	2.90E-04	2.42E-04	2.12E-04
		Local	5.01E-05	8.90E-05	3.28E-05	1.40E-05	1.21E-05	
(X/Q);*F; /(F1 + F2	· · F	Remote 1	8.38E-05	7.71E-05	4.96E-05	1.74E-05	1.55E-05	
		Remote 2	4.07E-04	3.75E-04	2.97E-04	1.21E-04	1	
Maximum Effective X/(<u> </u>		4.07E-04	3.75E-04	2.97E-04	1.21E-04		8.83E-05
Reactor building walls	Scenario				(X/Q) RESUI		1	
	1 F	Local Remote 1	8.69E-04 2.41E-04	8.69E-04 2.41E-04	4.40E-04 1.41E-04	1.75E-04 5.40E-05		
	1 5	Remote 2	4.91E-04	2.41E-04 4.91E-04	1.41E-04 3.54E-04	1.41E-04	1	
		Local	8.15E-05	1.45E-04	7.33E-05	2.92E-05	1	
(X/Q);*Fi /(F1 + F2		Remote 1	1.09E-04	1.00E-04	5.88E-05	2.25E-05	1.83E-05	
	F	Remote 2	2.22E-04	2.05E-04	1.48E-04	5.88E-05	5.13E-05	
Maximum Effective X/(2.22E-04	2.05E-04	1.48E-04	5.88E-05	5.13E-05	
Turbine building	Scenario				(X/Q) RESUL			
Exhaust System	10 1	local	4.70E-03	4.70E-03	2.00E-03	1.03E-03	8.01E-04	7.69E-04
		Remote 1	3.32E-04	3.32E-04		8.08E-05	6.94E-05	6.17E-05
		Remote 2	3.92E-04	3.92E-04	2.67E-04	1.08E-04	9.96E-05	
		Local	4.41E-04	7.83E-04	3.33E-04	1.72E-04	1.34E-04	
(X/Q)i*Fi /(F1 + F2	F	Remote 1	1.50E-04	1.38E-04		3.37E-05	2.89E-05	
	F	Remote 2	1.78E-04	1.63E-04	1.11E-04	4.50E-05	4.15E-05	3.60E-05

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Prepared by / Date: M Abu-Shehadeh

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Verified by/Date: Ted Messjer,

Revision No.

6/15/04

Table-4. Effective X/Q (s/m3) for the Source/Intake Scenarios (the CR Intake is 1300/800 cfm with one train secured at time t, with 0<t<2)

•										
			0 - t hrs	t - 2 hrs	2 - 8 hrs	8 - 24 hrs	1-4d	4 - 30 d		
Control Room Intake	(cfm)		1300	800	800	800	800	800		
		Intake	F = Flow Rate (cfm)							
		Local	150	150	150	150	150	150		
		Remote 1	575	325	325	325	325	325		
		Remote 2	575	325	325	325	325	325		
Roofline	Scenario			ARCON96	(X/Q) RESI	/LTS (s/m ³)				
	1	Local	6.95E-04	6.95E-04	3.36E-04	1.28E-04	9.72E-05	7.69E-05		
	2	Remote 1	2.31E-04	2.31E-04	1.20E-04	4.72E-05	3.65E-05	3.27E-0		
	3	Remote 2	3.52E-04	3.52E-04	2.59E-04	1.02E-04	8.67E-05	7.45E-0		
		Local	8.02E-05	1.30E-04	6.30E-05	2.40E-05	1.82E-05	1.44E-0		
(X/Q);*F; /(F1 + F2	: + F3)	Remote 1	1.02E-04	9.38E-05	4.88E-05	1.92E-05	1.48E-05	1.33E-05		
		Remote 2	1.56E-04	1.43E-04	1.05E-04	4.14E-05	3.52E-05	3.03E-0		
Maximum Effective X/Q			1.56E-04	1.43E-04	1.05E-04	4.14E-05	3.52E-05	3.03E-0		
King Kong doors	Scenario			ARCON96	(X/Q) RESU	LTS (s/m ³)				
0 0	4	Local	5.34E-04	5.34E-04	1.97E-04	8.41E-05	7.26E-05	7.00E-0		
	5	Remote 1	1.85E-04	1.85E-04	1.19E-04	4.18E-05	3.71E-05	3.27E-0		
	6	Remote 2	8.99E-04	8.99E-04	7.12E-04	2.90E-04	2.42E-04	2.12E-0		
		Local	6.16E-05	1.00E-04	3.69E-05	1.58E-05	1.36E-05	1.31E-0		
(X/Q) _i *F _i /(F1 + F2	: + F3)	Remote 1	8.18E-05	7.52E-05	4.83E-05	1.70E-05	1.51E-05	1.33E-0		
		Remote 2	3.98E-04	3.65E-04	2.89E-04	1.18E-04	9.83E-05	8.61E-0		
Maximum Effective X/Q			3.98E-04	3.65E-04	2.89E-04	1.18E-04	9.83E-05	8.61E-0		
Reactor building walls	Scenario			ARCON96	(X/Q) RESU	LTS (s/m ³)				
Ŭ	7	Local	8.69E-04	8.69E-04	4.40E-04	1.75E-04	1.38E-04	1.10E-04		
	8	Remote 1	2.41E-04	2.41E-04	1.41E-04	5.40E-05	4.40E-05	3.88E-05		
	9	Remote 2	4.91E-04	4.91E-04	3.54E-04	1.41E-04	1.23E-04	1.03E-04		
		Local	1.00E-04	1.63E-04	8.25E-05	3.28E-05	2.59E-05	2.06E-0		
(X/Q);*F; /(F1 + F2	+ F3)	Remote 1	1.07E-04	9.79E-05	5.73E-05	2.19E-05	1.79E-05	1.58E-05		
		Remote 2	2.17E-04	1.99E-04	1.44E-04	5.73E-05	5.00E-05	4.18E-05		
Maximum Effective X/Q			2.17E-04	1.99E-04	1.44E-04	5.73E-05	5.00E-05	4.18E-05		
Turbine building	Scenario			ARCON96	(X/Q) RESU					
Exhaust System	10	Local	4.70E-03	4.70E-03	2.00E-03	1.03E-03	8.01E-04	7.69E-04		
•	11	Remote 1	3.32E-04	3.32E-04	2.08E-04	8.08E-05	6.94E-05	6.17E-05		
	12	Remote 2	3.92E-04	3.92E-04	2.67E-04	1.08E-04	9.96E-05	8.63E-05		
	··· ··· ··· ···	Local	5.42E-04	8.81E-04	3.75E-04	1.93E-04	1.50E-04	1.44E-04		
	+ F3)	Remote 1	1.47E-04	1.35E-04	8.45E-05	3.28E-05	2.82E-05	2.51E-05		
(X/Q)i*Fi /(F1 + F2	,									
(X)Q)i ⁻ Fi/(F1 + F2		Remote 2	1.73E-04	1.59E-04	1.08E-04	4.39E-05	4.05E-05	3.51E-05		

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Calculation N	0 NE-02-03-14

Prepared by / Bate: M Abu-Shehadeh

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Verified by/Date: Ted Messier

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6/15/04

Table-5. Effective X/Q (s/m3) for the Source/Intake Scenarios (the CR Intake is 1300/800 cfm with one train secured at time t, with 2<t<8)

			0 - 2 hrs	2-t hrs	t - 8 hrs	8 - 24 hrs	<u>1-4 d</u>	4 - 30 d
Control Room Intake	(cfm)		1300	1300	800	800	800	800
		Intake			F = Flow l	Rate (cfm)		
		Local	150	150	150	150	150	150
		Remote 1	575	575	325	325	325	325
		Remote 2	575	575	325	325	325	325
Roofline	Scenario			ARCON96	(X/Q) RESL	LTS (s/m ³)		-
	1	Local	6.95E-04	3.36E-04	3.36E-04	1.28E-04	9.72E-05	7.69E-05
	2	Remote 1	2.31E-04	1.20E-04	1.20E-04	4.72E-05	3.65E-05	3.27E-05
	3	Remote 2	3.52E-04	2.59E-04	2.59E-04	1.02E-04	8.67E-05	7.45E-05
		Local	8.02E-05	3.88E-05	6.30E-05	2.40E-05	1.82E-05	1.44E-05
(X/Q);*F;/(F ₁ + F ₂ +	+F3) =	Remote 1	1.02E-04	5.31E-05	4.88E-05	1.92E-05	1.48E-05	1.33E-05
		Remote 2	1.56E-04	1.15E-04	1.05E-04	4.14E-05	3.52E-05	3.03E-05
Maximum Effective X/Q			1.56E-04	1.15E-04	1.05E-04	4.14E-05	3.52E-05	3.03E-05
King Kong doors	Scenario			ARCON96	(X/Q) RESL	LTS (s/m ³)		
8 0	4	Local	5.34E-04	1.97E-04	1.97E-04	8.41E-05	7.26E-05	7.00E-05
	5	Remote 1	1.85E-04	1.19E-04	1.19E-04	4.18E-05	3.71E-05	3.27E-05
	6	Remote 2	8.99E-04	7.12E-04	7.12E-04	2.90E-04	2.42E-04	2.12E-04
		Local	6.16E-05	2.27E-05	3.69E-05	1.58E-05	1.36E-05	1.31E-05
(X/Q);*F;/(F1 + F2 +	+F3) =	Remote 1	8.18E-05	5.26E-05	4.83E-05	1.70E-05	1.51E-05	1.33E-05
		Remote 2	3.98E-04	3.15E-04	2.89E-04	1.18E-04	9.83E-05	8.61E-05
Maximum Effective X/Q		attiviti en	3.98E-04	3.15E-04	2.89E-04	1.18E-04	9.83E-05	8.61E-05
Reactor building	Scenario			ARCON96	(X/Q) RESU	LTS (s/m ³)		
Exhaust System	7	Local	8.69E-04	4.40E-04	4.40E-04	1.75E-04	1.38E-04	1.10E-04
·	8	Remote 1	2.41E-04	1.41E-04	1.41E-04	5.40E-05	4.40E-05	3.88E-05
	9	Remote 2	4.91E-04	3.54E-04	3.54E-04	1.41E-04	1.23E-04	1.03E-04
		Local	1.00E-04	5.08E-05	8.25E-05	3.28E-05	2.59E-05	2.06E-05
(X/Q);*F;/(F ₁ + F ₂ +	+F ₃) =	Remote 1	1.07E-04	6.24E-05	5.73E-05	2.19E-05	1.79E-05	1.58E-05
		Remote 2	2.17E-04	1.57E-04	1.44E-04	5.73E-05	5.00E-05	4.18E-05
Maximum Effective X/Q			2.17E-04	1.57E-04	1.44E-04	5.73E-05	5.00E-05	4.18E-05
Turbine building walls	Scenario			ARCON96	(X/Q) RESU	LTS (s/m ³)		
	10	Local	4.70E-03	2.00E-03	2.00E-03	1.03E-03	8.01E-04	7.69E-04
	11	Remote 1	3.32E-04	2.08E-04	2.08E-04	8.08E-05	6.94E-05	6.17E-05
	12	Remote 2	3.92E-04	2.67E-04	2.67E-04	1.08E-04	9.96E-05	8.63E-05
		Local	5.42E-04	2.31E-04	3.75E-04	1.93E-04	1.50E-04	1.44E-04
(X/Q) _i *F _i /(F ₁ + F ₂ +	+F ₃) =	Remote 1	1.47E-04	9.20E-05	8.45E-05	3.28E-05	2.82E-05	2.51E-05
		Remote 2	1.73E-04	1.18E-04	1.08E-04	4.39E-05	4.05E-05	3.51E-05
Maximum Effective X/Q		1	5.42E-04	2.31E-04	3.75E-04	1.93E-04	1.50E-04	1.44E-04

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Table-6. Effective X/Q (s/m3) for the Source/Intake Scenarios (the CR Intake is 1300 cfm with both trains running for 30 days)

		<u> </u>	0 - 2 hrs	2 - 8 hrs	8 - 24 hrs	1-4d	4 - 30 d
Control Room Intake (c	:fm)		1300	1300	1300	1300	1300
		Intake	F = Flow Rate (cfm)				
		Local	150	150	150	150	150
		Remote 1	575	575	575	575	575
		Remote 2	575	575	575	575	575
Roofline	Scenario		ARC	:ON96 (X/Q)	RESULTS (s/m³)	
	1	Local	6.95E-04	3.36E-04	1.28E-04	9.72E-05	7.69E-05
	2	Remote 1	2.31E-04	1.20E-04	4.72E-05	3.65E-05	3.27E-05
	3	Remote 2	3.52E-04	2.59E-04	1.02E-04	8.67E-05	7.45E-05
		Local	8.02E-05	3.88E-05	1.48E-05	1.12E-05	8.87E-06
(X/Q);*F;/(F ₁ + F ₂ +	·F ₃) =	Remote 1	1.02E-04	5.31E-05	2.09E-05	1.61E-05	1.45E-05
		Remote 2	1.56E-04	1.15E-04	4.51E-05	3.83E-05	3.30E-05
Maximum Effective X/Q	n alah Managaran Ang		1.56E-04	1.15E-04	4.51E-05	3.83E-05	3.30E-05
King Kong doors	Scenario		ARC	ON96 (X/Q)	RESULTS (s/m³)	
0 0	4	Local	5.34E-04	1.97E-04	8.41E-05	7.26E-05	7.00E-05
	5	Remote 1	1.85E-04	1.19E-04	4.18E-05	3.71E-05	3.27E-05
	6	Remote 2	8.99E-04	7.12E-04	2.90E-04	2.42E-04	2.12E-04
		Local	6.16E-05	2.27E-05	9.70E-06	8.38E-06	8.08E-06
(X/Q) _i *F _i /(F ₁ + F ₂ +	(F ₃) =	Remote 1	8.18E-05	5.26E-05	1.85E-05	1.64E-05	1.45E-05
		Remote 2	3.98E-04	3.15E-04	1.28E-04	1.07E-04	9.38E-05
Maximum Effective X/Q	× · · · ·		3.98E-04	3.15E-04	1.28E-04	1.07E-04	9.38E-05
Reactor building	Scenario		ARC	ON96 (X/Q)	RESULTS (s/m ³)	
Exhaust System	7	Local	8.69E-04	4.40E-04	1.75E-04	1.38E-04	1.10E-04
·	8	Remote 1	2.41E-04	1.41E-04	5.40E-05	4.40E-05	3.88E-05
	9	Remote 2	4.91E-04	3.54E-04	1.41E-04	1.23E-04	1.03E-04
		Local	1.00E-04	5.08E-05	2.02E-05	1.59E-05	1.27E-05
(X/Q);*F;/(F ₁ + F ₂ +	F3) =	Remote 1	1.07E-04	6.24E-05	2.39E-05	1.95E-05	1.72E-05
		Remote 2	2.17E-04	1.57E-04	6.24E-05	5.44E-05	4.56E-05
Maximum Effective X/Q	y an		2.17E-04	1.57E-04	6.24E-05	5.44E-05	4.56E-05
Turbine building walls	Scenario		ARC	ON96 (X/Q)	RESULTS (s/m ³)	
0	10	Local	4.70E-03	2.00E-03	1.03E-03	8.01E-04	7.69E-04
	11	Remote 1	3.32E-04	2.08E-04	8.08E-05	6.94E-05	6.17E-05
	12	Remote 2	3.92E-04	2.67E-04	1.08E-04	9.96E-05	8.63E-05
		Local	5.42E-04	2.31E-04	1.19E-04	9.24E-05	8.87E-05
(X/Q);*F;/(F ₁ + F ₂ +	F ₃) =	Remote 1	1.47E-04	9.20E-05	3.57E-05	3.07E-05	2.73E-05
· · · · · -	-	Remote 2	1.73E-04	1.18E-04	4.78E-05	4.41E-05	3.82E-05
Maximum Effective X/Q	Alternation and the	_	5.42E-04	2.31E-04	1.19E-04	9.24E-05	8.87E-05

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repared by / Date: M Abu-Shehadeb	Verified by/Date: Ted Messier	Revision No	o. 0
6/15/04			
	APPENDIX A		
Description	ns / Calculations of the ARCO	ON96 Parame	eters
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Pag		RTHWEST	APPENDIX A		No. NE-02-03-1	4	
Prepar	ed by / D	ate: M Abu-Shehadeh	Verified by/Date: Ted Messier	Revision No	. 0		
		this appendix is to provide sented in Table 1.	de detailed calculations and descriptions of a	ll ARCON96 i	nput	REV BAR.	
1.0	Meteo	rological Input					
	a. b. c. d.	spanning the period from with the recommended a reference 8. Lower Measurement He at a height of 33 feet (10 Upper Measurement He at a height of 245 feet (10	les: Four met data files have been used as an in 1996 to 1999. The certified data has been is regulatory procedure and the formatting proce- eight: Wind speed, wind direction, and temper 0 m) on the met tower (ref. 9). ight: Wind speed, wind direction, and temper 75 m) on the met tower (ref. 10). is per hour (mph), (ref. 8).	formatted in ac ess is described erature sensors	cordance d in are placed		
2.0	Recept	tor Input					
	8.	North and West coordin given in units of feet an directions. Figure 1 is a Table-A1 is a summary	the plant civil drawings (ref. 5 and 6) have been tates of the sources, intakes, and building wal d have been used to calculate the source to in a layout of the Columbia plant buildings show of the source to intake distance calculations losest point to the intake. The distance has be	lls. Those coor take distances ving these coor showing for ea	rdinates are and rdinates. ach source		
		$d = 0.3048 \sqrt{(N_r - N_s)}$ where:	$\overline{)^2 + (W_r - W_s)^2}$				
		$N_r = North coordinate fN_s = North coordinate fW_r = West coordinate fW_s = West coordinate f0.3048 = The feet to m$	for the source, ft for the receptor, ft for the source, ft				
		Example: calculate the	horizontal distance between the roofline sou	rce and the loc	al intake.		
		Local Intake (receptor)	nates = $(N_s, W_s) = (11918.5, 1243.5)$ coordinates = $(N_r, W_r) = (11874, 1460)$ QRT [$(11874 - 11918.5)^2 + (1460 - 1243.5)^2$]				
	b.	Intake Height: as previously mentioned, there are three control room intakes, two ground level remote intakes (remote-1 and remote-2) and one local intake at a height of 26.5 m above ground located on the eastern wall of the radwaste building (ref. 4).					
	C .	Elevation Difference: this is the difference in terrain elevation between the source and the receptor. At CGS all plant buildings and structures are at the same level (no difference in elevation), therefore the value of this parameter is zero in all cases.					
	d.						
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People · Vision · Solutions			Calculation	No. NE-02-03-1	4
Prepared by / Date: M Abu-Shehadeh	Verified by/Date: Ted Me	ssier	Revision No. 0		
People · Vision · Bolutions Prepared by / Date: M Abu-Shehadeh east, the direction is 90 and so forth. Figures 1 where angle α represe and direction. An exa Calculate the angle α From figure 2, (repeat as follows: Local intake coordinat Roofline stack coordinat	Verified by/Date: Ted Me O°, to the south, the direction 2, 3, and 4 show the location ints the direction . Table-A2 imple of calculating the direct between the local intake and ed below), the coordinates f	ssier n is 180°, to the was of the four source is a summary of the ction angle is given the roofline stack. for the local intake a	Revision No est, the directi es relative to e he intake to so below: and the rooflin	. 0 on is 270°, each intake urce distance	4 REV BAR.
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		Local	Remote-1	Remote-2
		intake	intake	intake
	North (y)	11874	12294	11565
	West (x)	1460	1589	1025
Roofline C	Coordinates			
North (y)	11918.5	67.4	165.5	126.7
West (x)	1243.5	07.4	155.5	120.7
King Kong Do	ors Coordinates			
North (y)	11778	91.4	201.5	79.6
West (x)	1176	71.4	201.5	/9.0
	uilding Walls			
· · · · ·	Coordinates to			
	Intake	! 		
North (y)	11874	39.0		
West (x)	1332	37.0		
Remote-1				
North (y)	11918.5		138.7	
West (x)	1332		150.7	
Remote-2				
North (y)	11770			77.6
West (x)	1176			11.0
	haust Nearest			
	ordinates to			
	Intake			
North (y)	11874	18.3		1
West (x)	1400	10.5		1
	note-1			4
North (y)	11874		140.4	1
West (x)	1400			ł
North (y)	11851			
West (x)	1348			131.5
WCSL(X)	1346	L	F	



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REV BAR.

Table-A2. Source to Intake Distance and Direction

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Intake	Local intake		Remote-1 intake		Remote-2 intake	
Source	Distance (m)	Direction a (deg)	Distance (m)	Direction α (deg)	Distance (m)	Direction a (deg)
1.3. Roofline	67.4	78.39	155.5	137.38	126.7	328.28
1.4. King Kong Doors	91.4	108.68	201.5	141.33	79.6	324.67
1.5. Reactor Building Walls	39.0	90.00	138.7	145.6	77.6	323.63
1.6. TB Exhaust	18.3	90.00	140.4	155.77	131.5	311.5

3.0 **Source Input**

- Α. Release Type: ground release has been used in all cases for all sources since none of the sources at CGS meets the requirements for elevated (or stack) release.
- B. Release Height: the height of each of the four sources is discussed below:
 - 1. Roofline Stack: this is a short stack located on top of the reactor building at elevation 670 ft (ref. 11). The ground level of the reactor building (and all of the plant structures) is at an elevation of 441 ft above sea level, therefore the height of the top of the reactor building is 229 ft (670 - 441 = 229 ft = 69.8 m).
 - 2. King Kong Doors: this door is at ground level with a height of 23 ft and width of 20 ft (ref. 2). Therefore, per RG 1.194, the source height is the midpoint at 11.5 ft = 3.5 m.
 - 3. Reactor Building Walls: the metal sheets of the reactor building which is considered a diffuse source starts at the 606 ft elevation and ends at the 670 ft elevation (ref. 2). Per RG 1.194, the midpoint is at 638 ft elevation, hence the height of this source is 197 ft (638 - 441 = 197 ft = 60.0 m).
 - 4. Turbine Building Exhaust: four short stacks (16 ft high = 4.9 m) located on top of the radwaste building at elevation 544 ft (544 - 441 = 103 ft = 31.4 m) make up the TB exhaust system (ref. 3). The total height of the source is 36.3 m (4.9 + 31.4 = 36.3 m).
- С. Building Area: the width of the east and west walls of the reactor building is 135 ft (41 m), whereas that of the north and south walls is 151 ft (46 m), (ref. 12). The area of the smallest reactor building wall is 2861 m² (69.8 x 41 = 2861 m²), this area is applicable to the remote intakes only. However, since the local intake is at a higher elevation (elevation 527 ft), only the portion of the reactor building wall above this elevation is considered in calculating the area, this partial wall is 41 m wide and 43.6 m high (670 - 527 = 143 ft = 43.6 m), therefore its area is 41 x $43.6 = 1787 \text{ m}^2$.
- D. Vertical Velocity: the vertical velocity of the release is applicable only to stack releases, since we have ground release only, the vertical velocity is zero.
- Е. Flow Rate: the flow rate, if entered, is used to ensure that effluent concentrations in the atmosphere are always less than the concentration at the release point. Effluent flow from the four sources is discussed below:
 - 1) Roofline Stack: this source releases through the SGT system at a flow rate of 4457 cfm $(2.1 \text{ m}^3/\text{s})$, (ref. 13, FSAR section 6.5.1.1).
 - 2) Reactor Building Walls and King Kong Doors: these two diffuse sources leak radioactivity to the environment as a result of two primary containment leakages. The first primary containment (PC) leakage is from the PC to the inside of the reactor

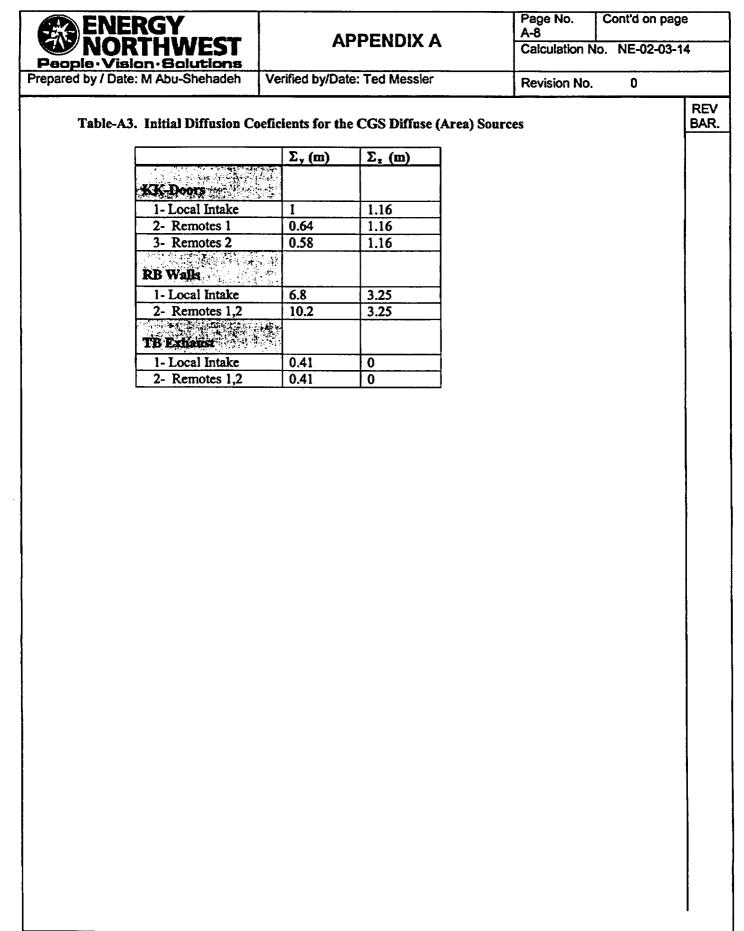
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	B) and has a volumetric flow rate of 0.5 % PC	• • •		REV BAR.
complete, Doors and bypassing PC volum	12). It is assumed that before the Secondary C ne 0.5% PC volume per day will directly leak to RB-walls. The second PC leakage is from the he secondary containment; this SC bypass leak per day (ref. 15, p. 2.000). This leakage takes C and end outside of the SC. The flow rates h	o the environment PC directly to the age has a flow ra place through pig	t via the KK- environment te of 0.04% bes that start	
	$drywell = 200,540 \text{ ft}^3 \text{ (ref.13, 6.2-1)}$			
	wet well above water = $144,184$ ft ³ (ref.13, 6.2	-1)		
	blume = $344,724 \text{ ft}^3 (9761.5 \text{ m}^3)$ e = $0.5\% + 0.04\% \text{ v/d} = 0.54\% \text{ v/d} = 52.7 \text{ m}^3/3$	$d = 6.1E-4 m^{3}/s$		
since the	ate is assumed to be applicable to the KK door ow rate is extremely low, ARCON96 automatic	cally rounds it up	to zero.	
(TEA-FN non-outag m ³ /s (ref. as the sou values, fu	ilding Exhaust: the turbine building exhaust sy A, B, C, and D), each fan has a flow rate of 1 times, at least two exhaust fans will be runnin 6, section 5.1.10). However, only one fan with e. This is conservative since higher flow rates hermore considering 2 fans means the second h also results in lower X/Q values.	20,000 cfm (55 m g for a total flow 55 m ³ /s flow rate usually generate	¹³ /s). During rate of 110 e is considered lower X/Q	
F. Stack Radius: th only.	parameter is not applicable to ground release,	it is required for	stack release	
4.0 Default Values				
in lieu of the 0.1 r	s length: per reference 7, a surface roughness default value given in ARCON96 manual (ref.	1).		
	indow: per references 1 and 7, the preferred v peed: per references 1 and 7, the preferred values	• · · · •		
4. Average Sector V	idth Constant: per RG-1.194 (ref. 7), an avera	ige sector width c		
5. Initial Diffusion sources are calcul	eu of the 4.0 default value given in ARCON96 oefficients: the initial diffusion coefficients Σ ed based on the equations below given in RG- ts are summarized in Table-A3.	y and Σz for the t		
$\sum_{y} = \frac{\text{width}_{\text{area sc}}}{6}$				
$\sum_{z} = \frac{\text{Height}_{\text{area}}}{6}$	urce_			

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			Calculation N	lo. NE-02-03-1	4
Prepared by / Date: M A	bu-Shehadeh	Verified by/Date: Ted Messier	Revision No.	0	
1)	23 ft (7 m) and	or: the bottom of this door is at ground level (its width is approximately 20 ft (6.1 m) (ref. 2 calculated as follows:			REV BAR.
		ntake: the local intake faces the doors directly ents are:	y, hence the di	ffusion	
	$\Sigma_y = 6$	5.1/6 = 1.0 m			
	$\Sigma_z = 7$	1/6 = 1.16 m			
		note intakes do not face the doors directly, the oors is calculated based on the angles shown			
	1.	Remote-1 intake			
		projected Width = $6.1\sin(39^\circ) = 6.1 \times 0.63 =$	3.84 m,		
		hence the diffusion coefficients are:			
	•	3.84/6 = 0.64 m 3/6 = 1.16 m			
	2.	Remote-2 Intake			
		projected Width = $6.1\sin(35^\circ) = 6.1 \times 0.57 =$	= 3.48 m,		
	S - 2	hence the diffusion coefficients are: $128/6 = 0.52$			
	-	4.48/6 = 0.58 m 1/6 = 1.16 m			
2)	_		11 /4h a diffuse		
2)		ig Walls: Σ_y and Σ_z for the reactor building was calculated as follows:	all (the diffuse	source above	
	which l	take: the local intake faces the east side wall has a width of 41 m, with a source height of 6 on coefficients are:			
		41/6 = 6.8 m 9.5/6 = 3.25 m			
		s 1 and 2 intakes: these two intakes face the reas a length of 61.6 m calculated by taking th			
	the wid	of the widths of two walls ($\sqrt{41^2 + 46^2} = 6$) ths of the reactor building walls in meters). T 5 m, (670 - 606 = 64 ft), therefore, the diffus	The height of th	he source is 64	
		1.6/6 = 10.2 m 19.5/6 = 3.25 m			
3)	vent that is 8-ft	ig Exhaust System: as mentioned earlier, this (2.44 m) in diameter. Since this source is hold Σz for all intakes are calculated as follows:			
		2.44/6 = 0.41 m 0/6 = 0 m			
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	APPENDIX B	Calculation No. NE-02-03-14		
Prepared by / Bate: M Aby-Shefradeh	Verified by/Date: Ted Messier STA: MILLION 6118/174	Revision No	. 0	
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	APPENDIX B ARCON96 OUTPUT FILES			
	ARCON90 OUTFUT FILES			
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Prepared by / Date	: M Abu-Shehadeh	Verified by/Date: Ted Messier	Revision No. 0
·			
	Roofline	Stack to Local Intake with 96 - 99	Met Data Files
		RI-L-4	
Program Title:	ARCONSE		
	U.S. Nuclear Regulatory Commission		
	Office of Nuclear Reactor Regulation		
	Division of Reactor Program Management		
Date:	June 25, 1997 11:00 a.m.		
NRC Contacts:	J. Y. Lee Phone: (301) 415 1080		
	e-mail: jyll@nrc.gov		
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	e-mail: lab2@nrc.gov		
Code Developer:	J. V. Ramsdell Phone: (509) 372 6316		
-	e-mail: j_ramsdell@pnl.	gov	
	ion: NUREG/CR-6331 Rev. 1		
	prepared for an agency of the United St		
	es Government nor any agency thereof, no		
	s any warranty, expressed or implied, or		
	sponsibilities for any third party's use		
	tion of this program or represents that	its use by such third	
	infringe privately owned rights. /14/2003 at 14:51:50		
Program Run 12	/14/2003 AC 14151150		
****** ARCON	INPUT ********		
Number of M	eteorological Data Files = 4		
	cal Data File Names		
	6\METDAT-2\CGSAR96.MET		
	6\METDAT-2\CGSAR97.MET		
	6\METDAT-2\CGSAR98.MET		
	6\MBTDAT-2\CGSAR99.MET ower wind instrument (m) = 10.0		
	pper wind instrument (m) = 75.0		
	entered as miles per hour		
Ground-leve			
Release hei			
Building Ar			
	rtical velocity (m/s) = .00		
	ck flow (m ³ /s) = 2.1 ck radius (m) = .00		
vent or sta	CK LOUIUB (M)00		
Direction	. intake to source (deg) = 078		
	ion sector width (deg) = 90		
	ion window (deg) = 033 - 123		
Distance to	intake (m) = 67.4		
Intake heig			
Terrain ele	vation difference (m) = .0		
A.L	75706		
Output file RL-L-4.0U			
RL-L-4.CF			
NU-U-4.6F	-		

	ENE	RGY							Page No. B-3	Cont'd on page B-4	
	NOF	NHTS				APPEN	dix B			No. NE-02-03-14	
pared by / Da		ion•80lu •Shehadeh	tions_	Ve	erified by/Da	ate: Ted M	essier		Revision N	lo. 0	
	ind Speed (•	.5 .20							
	roughness le veraging con		•	4.3							
Initial	value of sig value of sig	ma y	-	.00							
	-		-								
-	-	code testing									
Hours of	missing dat		cessed = .	35064 2772							
Hours ele		w/ dir. in w		2836 0							
	calm winds rection not	in window or		1982 27474							
DISTRIBUT	TON SUMMARY	DATA BY AVER	AGING INTER	TVAL							
AVER. PER. UPPER LIM.		1 2 2 1.00E-02	4 1.00E-02	8 1.00E-02	12 1.00E-02	24 1.00E-02	96 1.00E-02	168 1.00E-02	360 1.00E-02	720 1.00E-02	
LOW LIM. ABOVE RANGE	1.00E-0	6 1.00B-06	1.00E-06 0.	1.00E-06 0.	1.00E-06	1.00E-06 0.	1.00E-06 0.	1.00B-06 0.	1.00E-06 0.	1.00B-06 0.	
IN RANGE	: 4818	. 6785.	9497. 0.	12785.	15902.	20978. 0.	27709.	27931.	27370.	26608.	
ZERC	27474	. 25134.	21700.	17035.	14668.	8875.	477.	5.	0.	0.	
TOTAL X/QE 1 NON ZERC			31197. 30.44	29820. 42.87		29853. 70.27	28186. 98.31	27936. 99.98	27370. 100.00	26608. 100.00	
95th PERC	ENTILE X/Q									A 307 AF	
		4 5.478-04		4.268-04	3.35E-04	2.27E-04	1.30E-04	1.11E-04	9.22E-05	8.392-05	
		averaging in	tervals								
0 to 2 ho 2 to 8 ho	urs	6.95B-04 3.36B-04									
8 to 24 h 1 to 4 da		1.28E-04 9.72E-05									
4 to 30 d		7.69E-05									
		HOURLY MAX X/Q	VALUE RANG	E MIN X/Q							
	ERLINB	1.27E-03		6.03E-05							
	OR-AVERAGE	7.448-04		3.51E-05							
NORMAL PROGRA	M COMPLETIO	N									

Program APPEnDIX B Calculation No. NE-02-03-14 Prepared by / Date: M Abu-Shehadeh Vetified by/Date: Ted Messier Revision No. 0 Prepared by / Date: M Abu-Shehadeh Vetified by/Date: Ted Messier Revision No. 0 Roofline Stack to Remote-1 Intake with 96 - 99 Met Data FileS RL-R1-4 Program File: AbCHM6. Program File: AbcHm6. Date: Date Shehadeh Output: Sign File Shehadeh Date: Date: Sign File Shehadeh Output: Sign File Shehadeh Date: Date: Sign File Shehadeh Output: Sign File Shehadeh Date: Date: Sign File Shehadeh Output: Sign File Shehadeh Calculation No. ME-02-03-14 Date: Date: Sign File Shehadeh Output: Sign File Shehadeh Output: Sign File Shehadeh Calculation No. ME-02-03-04 Calculation No. ME-02-03-04 Calculation No. ME-02-03-04 Revision No. ME-02-03-04 Calculation No. ME-02-03-04 Revision No. ME-02-03-04		ENERGY		Page No. Cont'd on page B-4 B-5
Prepared by / Date: M Abu-Shehadeh Verified by/Date: Ted Messier Revision No. 0 Roofile Stack to Remote-1 Intake with 96 - 99 Met Data Files RI-RI-4 Program Title: ARCW96: Beveloped Tor: U.S. Noi-example and the sequilatory Commission Curves of Revision of Sector Program Masseemen Date: June 25, 1997 11:00 An. MRC Contacts: J. Y. Les Phone: (20)1 415 1000 J. J. Hayse Phone: (20)1 415 1000 J. J. Hayse Phone: (20)1 415 1000 Code Developer: J. Y. Remodell and Sector Program Masseemen Date: A Brown Phone: (20)1 415 1000 Code Developer: J. Y. Remodell and Sector Program Masseemen Code Developer: J. Y. Remodell and Sector Program Code Code e-mail: / jemmedellepin.pov Code Developer: J. Y. Remodell and Sector Program Code Code Code Code Code Code Code Code	Peop		APPENDIX B	
<pre>Program file: MACNES Developed Fir: U.S. Nuclear Regulatory Commission Office of Nuclear Regulatory Commission Division of Nuclear Resplatory Regulatory Duration of Nuclear Resplatory Regulatory Duration of Nuclear Resplatory Duration of Nuclear Resplatory Nuclear Response Nuclear Resplatory Duration of Nuclear Resplatory Duration of Nuclear Resplatory Duration of Nuclear Resplatory Duration Nuclear Response Nuclear Resplatory Duration Nuclear Response Nuclear Resplatory Duration Nuclear Response Nuclear Response Nuclear History Nuclear Response Nuclear Response Nuclear History Program Run 12/4/2005 at 14:53:50 Torgram Run 12/4/2005 at 14:53:55 Torgram Run 12/4/2005 at 14:55:5 Torgram Run 12/4/2005 a</pre>			Verified by/Date: Ted Messier	Revision No. 0
<pre>Program Tills MCONF Developed Fir U.S. Noclear Regulatory Configured Division of Necetor Program Munagement Dure St. 1997 lino and Dure St. 1997 lino and D</pre>			1	
Program Tiles ARCOMPS. Developed For: U.S. Nuclear Regulatory Commission Office of Nuclear Rescript Regulation Division of Rescript Program Management. Des. J. X. Les Phones (301) 435 1367 . A Brown science of the State S		Roofline St	tack to Remote-1 Intake with 96 - 9	99 Met Data FileS
<pre>Developed For: U.S. Nuclear Repulatory Commission Office of Nuclear Repulatory Repulation Due to Due t</pre>			RL-R1-4	
NRC Contacts. J. Y. Lee Phone: (001) 415 1080 e-mail: JiMerc.gov J. J. Neves Phone: (001) 415 117 c. A Brown Phone: (001) 415 127 c. A Brown Phone: (001) 415 127 Code Developert J. V. Remdell Phone: (509) 72 2016 e-mail: J_rammdellephil.gov Code Documentation: NURES/CR-6311 Rev. 1 The program was prepared for an agency of the United States Government. Weither The program was prepared for an agency of the United States Government. Weither the United States Government nor any segmony theres, nor any of their use, of any portion of this program or represents that its use by such third party would not infringe privately owned rights. Program Num 12/14/2003 at 14:51:0	Developed For:	U.S. Nuclear Regulatory Commission Office of Nuclear Reactor Regulation Division of Reactor Program Management		
L. A Broom Phone: (301) 415 1233 e-mail: lab2Brack.gov Code Developer: J. V. Ramedal Phone: (509) 372 6316 Code Documentation: MUEE/Cr.6311 Rev. 1 The program was prepayed for an agency of the bit distants Government. Neither height or responsibilities for an agency of the bit distants Government. Neither height of any portion of this program or represents that its use by such third party would not infringe privately owned rights. Program Run 12/14/2003 at 14:53:50 ******* AACON IMPUT ************************************		J. Y. Lee Phone: (301) 415 1080 e-mail: jyll@nrc.gov J. J. Hayes Phone: (301) 415 3167		
Code Documentation: NURBO/CR-6311 Rev. 1 The program was preared for an agency of the United States Government. Neither the United States Government nor any segncy thereof, nor any of their employees, makes any werranty, expressed of implied, or assumes any legal liability or responsibilities for any third party's use, or the results of such use, of any portion of this program or represents that its use by such third party would not infringe privately owned rights. Program Run 12/14/2003 at 14:53:50 ******* ARCOM INFUT 'Societal Data Files = 4 Menter of Data Files Files = 4 Menter of Data Files Makes MET C:\ARCOMS+\ARCOMS-\LOSSAB97.MET C:\ARCOMS+\ARCOMS-\LOSSAB97.MET C:\ARCOMS4\ARCOMS-\LOSS	Code Developer:	L. A Brown Phone: (301) 415 1232 e-mail: lab2@nrc.gov J. V. Ramsdell Phone: (509) 372 6316	201	
Number of Meteorological Data Files = 4 Meteorological Data Files = 4 C:\ARCONS6\ARCONS-1\CGSAR93.MET C:\ARCONS6\ARCONS-1\CGSAR93.MET Height of lower wind instrument (m) = 10.0 Height of lower wind instrument (m) = 75.0 Wind speeds entered as miles per hour Ground-level release Release height (m) = 70.0 Building Area (m ² 2) = 2261.0 Diffciuent vertical velocity (m/s) = 0.0 Vent or stack flow (m ³ /s) = 2.1 Vent or stack flow (m ³ /s) = 2.1 Vent or stack radius (m) = .00 Diffcicion sentor width (deg) = 90 Wind direction sentor width (deg) = 092 - 182 Distance to intake (m) = .0 Terrain elevation difference (m) = .0	The program was the United Stat employees, make liability or re use, of any por	ion: NUREG/CR-6331 Rev. 1 prepared for an agency of the United St es Government nor any agency thereof, no s any warranty, expressed or implied, or sponsibilities for any third party's use tion of this program or represents that	ates Government. Neither r any of their assumes any legal , or the results of such	
Height of upper wind instrument (m) -75.0Wind speeds entered as miles per hourGround-level releaseRelease height (m) -70.0Building Area (m ² 2) -2861.0Effluent vertical velocity (m/s)00Vent or stack flow (m ³ 3/s) -2.1Vent or stack radius (m)00Direction intake to source (deg) -137Wind direction window (deg) -092 - 182Distance to intake (m)0Terrain elevation difference (m)0	Number of M Meteorologi C:\ArCON9 C:\ArCON9 C:\ArCON9	INPUT ********* Secorological Data Files = 4 cal Data File Names G\ARCON9-1\CGSAR96.MET G\ARCON9-1\CGSAR97.MET G\ARCON9-1\CGSAR98.MET		
Release height (m)=70.0Building Area (m^2)=2861.0Effluent vertical velocity (m/s)=.00Vent or stack flow (m^3/s)=2.1Vent or stack radius (m)=.00Direction intake to source (deg)=137Wind direction sector width (deg)=90Wind direction window (deg)092 - 182Distance to intake (m)=.00Terrain elevation difference (m)=.0	Height of u	pper wind instrument (m) = 75.0		
Wind direction sector width (deg) = 90 Wind direction window (deg) = 092 - 182 Distance to intake (m) = 155.5 Intake height (m) = .0 Terrain elevation difference (m) = .0	Release hei Building Ar Effluent ve Vent or sta	ght (m) = 70.0 ea (m ² 2) = 2861.0 rtical velocity (m/s) = .00 ck flow (m ³ /s) = 2.1		
	Wind direct Wind direct Distance to Intake heig	ion sector width (deg) = 90 ion window (deg) = 092 - 182 intake (m) = 155.5 ht (m) = .0		
Output file names RL-R1-4.OUT RL-R1-4.CFD	RL-R1-4.0	UT		

People Vision Bolutions	Propered by / Date: M Abu-Shehadeh Verified by/Date: Ted Messier Revision No. 0 Prepared by / Date: M Abu-Shehadeh 5 .6 .6 .6 .6 Surface roughness langed (m/s) 5 .6 .6 .6 .6 Surface roughness langer (m) 6 .6 .6 .6 .6 Bactor sversiging constant 60 .6 .6 .6 .6 Bactor sversiging constant 60 .6 .6 .6 .6 Bactor sversiging constant 60 .6 .6 .6 .6 Bactor sversign set for set signer s .60 .60 .777 .6 .6 Bours claveted plane w/ dir. in window 6 .6 .2 .2 .6	ENERGY		Page No. Cont'd on page 3-5 B-6
repared by / Date: M Abu-Shehadeh Verified by/Date: Ted Messier Revision No. 0 Minimum Wind Speed (m/s) 5 Surface roughness length (m) .20 Sector averaging constant - 4.3 Initial value of sigma y 00 Initial value of sigma y 00 Barded output for code testing not selected 00 Total methor of house of data processed3566 00 Hours direction not in window 00 Hours direction not in window 00 Hours direction not in window 00 Hours direction not in window or cain24637 NUTER. PER. 1 2 24 .000-03 1.000-03<	repared by / Date: M Abu-Shehadeh Verified by/Date: Ted Messier Revision No. 0 Minimum Wind Speed (m/s) 5 .20 Sector averaging constant 0 Initial value of sigms y 00 Expanded output for code testing not selected 00 Total makes w/ size of sigms y 00 Bours of residing date w/ 00 Bours of residing date w/ 00 Hours of calw winds 00 Mours of calw winds 00 Hours of calw winds 00 Justing Hours 00 Justing Hours 00 Justing Hours 00	NORTHWEST People Vision Bolutions		Calculation No. NE-02-03-14
Burface roughness length (m)20 Sector severaging constant - 4.3 Initial value of sigma y00 Initial value of sigma y00 Initial value of sigma y00 Expanded output for code testing not selected Total number of hours of data processed - 35064 Hours of missing data - 2772 Nours direction in window - 5573 Hours direction not in window of calm - 24637 DisTRIBUTION SUMMARY DATA BY AVERAGING INTERVAL AVER, DEN. 1.00E-07 1.00E-07 1.00E-07 1.00E-07 1.00E-07 1.00E-07 1.00E-07 LOW LIN. 1.00E-07 1.00E-07 1.00E-07 1.00E-07 1.00E-07 1.00E-07 1.00E-07 LOW LIN. 1.00E-07 1.00E-07 1.00E-07 1.00E-07 1.00E-07 1.00E-07 1.00E-07 IN RANGE 7555. 10072. 13258. 16971. 20422. 23196. 22996. 27370. 26608. ZENO MARGE 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	Burdace roughness length (m) • 1.0 Sector severaging constant • 4.3 Initial value of sigme y • 0.0 Initial value of sigme y • 0.0 Expanded output for code testing not selected - 2772 Total mumber of hours of data processed - 3564 - 2772 Nours of missing data - 2772 Nours of cala window - 5573 Hours elevated plume w/ dir. in window - 0 - 1002 Nours direction not in window or calm - 24637 DisTRIBUTION SUMMAY DATA BY AVENAGINO INTERNAL - 24637 NURT BURN 1.000-07 1.000-07 1.000-07 1.000-07 1.000-07 NOR KRB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 NUR KRB 7655, 10072, 12526, 1591, 24637, 21847, 1080-07 1.000-07<	repared by / Date: M Abu-Shehadeh	Verified by/Date: Ted Messier	Revision No. 0
2.31E-04 2.10E-04 1.79E-04 1.48E-04 1.16E-04 8.08E-05 4.76E-05 4.21E-05 3.81E-05 3.47E-05 95% X/Q for standard averaging intervals 0 to 2 hours 2.31E-04 2 to 8 hours 1.20E-04 8 to 24 hours 4.72E-05 1 to 4 days 3.65E-05 4 to 30 days 3.27E-05 HOURLY VALUE RANGE MAX X/Q MIN X/Q CENTERLINE 3.06E-04 8.39E-06	2.31E-04 2.10E-04 1.79E-04 1.48E-04 1.16E-04 8.08E-05 4.76E-05 4.21E-05 3.81E-05 3.47E-05 95% X/Q for standard averaging intervals 0 to 2 hours 2.31E-04 2 to 8 hours 1.20E-04 8 to 24 hours 3.65E-05 4 to 30 days 3.27E-05 HOURLY VALUE RANGE MAX X/Q MIN X/Q CENTERLINE 3.06E-04 8.39E-06 SECTOR-AVERAGE 1.79E-04 4.89E-06	Surface roughness length (m) 20 Sector averaging constant - 4.3 Initial value of sigma y 00 Initial value of sigma z 00 Expanded output for code testing not selected Total number of hours of data processed - 35064 Hours of missing data = 2772 Hours direction in window - 5673 Hours of calm winds - 1982 Hours of calm winds - 1982 Hours direction not in window or calm - 24637 DISTRIBUTION SUMMARY DATA BY AVERAGING INTERVAL AVER. PER. AVER. PER. 1 2 ABOVE RANGE 0. 0. IN RANGE 7655. 10072. 13258. BELOW RANGE 0. 0. 0. ZERO 24637. 21847. 17939. 1284.	:-03 1.00E-03 1.00E-03 1.00E-03 :-07 1.00E-07 1.00E-07 1.00E-07 0. 0. 0. 0. (71. 20422. 25196. 28109. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 20. 30570. 29853. 28186. 27936.	1.00E-03 1.00E-03 1.00E-07 1.00E-07 0. 0. 27370. 26608. 0. 0. 27370. 26608.
0 to 2 hours 2.31E-04 2 to 8 hours 1.20E-04 8 to 24 hours 4.72E-05 1 to 4 days 3.65E-05 4 to 30 days 3.27E-05 HOURLY VALUE RANGE MAX X/Q MIN X/Q CENTERLINE 3.06E-04 8.39E-06	0 to 2 hours 2.31E-04 2 to 8 hours 1.20E-04 8 to 24 hours 4.72E-05 1 to 4 days 3.65E-05 4 to 30 days 3.27E-05 HOURLY VALUE RANGE MAX X/Q MIN X/Q CENTERLINE 3.06E-04 8.39E-06 SECTOR-AVERAGE 1.79E-04 4.89E-06		-04 1.168-04 8.088-05 4.768-05 4.218-05	3.81E-05 3.47E-05
2 to 8 hours 1.20E-04 8 to 24 hours 4.72E-05 1 to 4 days 3.65E-05 4 to 30 days 3.27E-05 HOURLY VALUE RANGE MAX X/Q MIN X/Q CENTERLINE 3.06E-04 8.39E-06	2 to 8 hours 1.20E-04 8 to 24 hours 4.72E-05 1 to 4 days 3.65E-05 4 to 30 days 3.27E-05 HOURLY VALUE RANGE MAX X/Q MIN X/Q CENTERLINE 3.06E-04 8.39E-06 SECTOR-AVERAGE 1.79E-04 4.89E-06	·		
MAX X/Q MIN X/Q CENTERLINE 3.06B-04 8.39E-06	MAX X/Q MIN X/Q CENTERLINE 3.06E-04 8.39E-06 SECTOR-AVERAGE 1.79E-04 4.89E-06	2 to 8 hours 1.20E-04 8 to 24 hours 4.72E-05 1 to 4 days 3.65E-05 4 to 30 days 3.27E-05		
		MAX X/Q MIN 7 CENTERLINE 3.06B-04 8.39E-	-06	

ENERGY		Page No.	Cont'd on page B-7
NORTHWEST	APPENDIX B	B-6 Calculation N	0. NE-02-03-14
People · Vision · Solutions		Culture in the	
repared by / Date: M Abu-Shehadeh	Verified by/Date: Ted Messier	Revision No.	0
	· · · · · · · · · · · · · · · · · · ·		
Roofline	Stack to Local Intake with 96 - 99	Met Data Files	
Program Title: ARCON96.	RL-R2-4		
Developed Por: U.S. Nuclear Regulatory Commission Office of Nuclear Reactor Regulation Division of Reactor Program Management			
Date: June 25, 1997 11:00 a.m. NRC Contacts: J. Y. Lee Phone: (301) 415 1080 e-mail: jyll@nrc.gov J. J. Hayes Phone: (301) 415 3167			
e-mail: jjh@nrc.gov L. & Brown Phone: (301) 415 1232 e-mail: lab2@nrc.gov Code Developer: J. V. Ramsdell Phone: (509) 372 6316			
code Developer: D. V. Ramadell Finder (505, 572 516 e-mail: j_ramadell@pnl. Code Documentation: NUREG/CR-6331 Rev. 1	gov		
The program was prepared for an agency of the United St the United States Government nor any agency thereof, no employees, makes any warranty, expressed or implied, or liability or responsibilities for any third party's use use, of any portion of this program or represents that party would not infringe privately owned rights.	or any of their assumes any legal , or the results of such		
Program Run 12/14/2003 at 14:55:15			
ARCON INPUT			
Number of Meteorological Data Files = 4 Meteorological Data File Names U:\ARCON96\METDAT-2\CGSAR96.MET U:\ARCON96\METDAT-2\CGSAR97.MET U:\ARCON96\METDAT-2\CGSAR98.MET U:\ARCON96\METDAT-2\CGSAR99.MET			
Height of lower wind instrument (m) = 10.0 Height of upper wind instrument (m) = 75.0 Wind speeds entered as miles per hour			
Ground-level release Release height (m) = 70.0 Building Area (m ⁴ 2) = 2861.0			
Effluent vertical velocity (m/s) = .00			
Vent or stack flow (m ³ /s) = 2.1			
Vent or stack flow $(m^3/s) = 2.1$ Vent or stack radius $(m) = .00$ Direction intake to source (deg) = 328 Wind direction sector width (deg) = 90			
Vent or stack flow $(m^3/s) = 2.1$ Vent or stack radius $(m) = .00$ Direction intake to source (deg) = 328			

	RGY	ECT				DIX B		Page No. B-7	Cont'd on page B-8 n No. NE-02-03-14
People · Vis	Ion · Bolut							Calculation	1 N0. N≿-02-03-14
ared by / Date: M Abu	-Shehadeh		Ve	rified by/Da	ate: Ted M	essier		Revision N	ło. 0
Minimum Wind Speed Surface roughness 1 Sector averaging co Initial value of si	ength (m) nstant gma y	:	.5 .20 4.3 .00						
Initial value of si Expanded output for	-	•	.00						
Total number of hou Hours of missing da Hours direction in Hours elevated plum Hours of calm winds Hours direction not	rs of data pro ta window e w/ dir. in w	Cessed = 3 - 1 indow = - 7	5064 2772 0562 0 1982						
DISTRIBUTION SUMMAR AVER. PER.	T DATA BY AVER	AGING INTER 4	VAL 8	12	24	96	168	360	720
UPPER LIM. 1.008- LOW LIM. 1.008-	03 1.00E-03 07 1.00E-07 0. 0.	1.00E-03 1.00E-07 0. 18393,	1.00E-03 1.00E-07 0. 21644.	1.00E-03 1.00E-07 0. 24645.	1.00E-03 1.00E-07 0. 27499,	1.00E-03 1.00E-07 0. 28149.	1.00E-03 1.00E-07 0. 27936.	1.00E-03 1.00E-07 0. 27370,	1.00E-03 1.00E-07 0. 26608.
). 0. 3. 16782.	0. 12804. 31197.	0. 8176. 29820.	0. 5925. 30570.	0. 2354. 29853.	0. 37. 28186.	0. 0. 27936.	0. 0. 27370.	0. 0. 26608.
NON ZERO 38.1		58.96	72.58	80.62	92.11	99.87	100.00	100.00	100.00
95th PERCENTILE X/Q 3.52B-(3.10E-04	2.828-04	2.28E-04	1.622-04	1.06E-04	9.59R-05	8.33E-05	7.872-05
95% X/Q for standard	l averaging int	ervals							
2 to 8 hours	3.528-04 2.598-04 1.028-04 8.678-05 7.458-05								
Centerline Sector-Average	HOURLY MAX X/Q 4.15E-04 2.42E-04	VALUE RANGE	MIN X/Q 1.06E-05 6.17E-06						
ORMAL PROGRAM COMPLETIO	N								

ENERGY		Page No. Cont'd on page B-8 B-9	
	APPENDIX B	Calculation No. NE-02-03-14	
Prepared by / Date: M Abu-Shehadeh	Verified by/Date: Ted Messier	Revision No. 0	· · · · · · · · · · · · · · · · · · ·
King K	ong Doors to Local Intake with 96 - 9	99 Met Data Files	
	KK-L-4		
Program Title: ARCON96.			
Developed For: U.S. Nuclear Regulatory Commission			
Office of Nuclear Reactor Regulation			
Division of Reactor Program Manageme Date: June 25, 1997 11:00 a.m.	ent		
NRC Contacts: J. Y. Lee Phone: (301) 415 108	10		
e-mail: jyll@nrc.gov			
J. J. Hayes Phone: (301) 415 316	57		
e-mail: jjh@nrc.gov L. A Brown Phone: (301) 415 123	••		
L. A Brown Phone: (301) 415 123 e-mail: lab2@nrc.gov			
Code Developer: J. V. Ramsdell Phone: (509) 372 631			
e-mail: j_ramsdell@p	onl.gov		
Code Documentation: NUREG/CR-6331 Rev. 1 The program was prepared for an agency of the United	States Government, Neither		
the United States Government nor any agency thereof,			
employees, makes any warranty, expressed or implied,			
liability or responsibilities for any third party's			
use, of any portion of this program or represents th	at its use by such third		
party would not infringe privately owned rights.			
Program Run 12/14/2003 at 14:56:38			
ARCON INPUT			
Number of Meteorological Data Piles = 4			
Meteorological Data File Names U:\ARCON96\METDAT-2\CG9AR96.MET			
U: \ARCON96\METDAT-2\CGSAR97.MET			
U: \ARCON96\METDAT-2\CGSAR98.MET			
U:\ARCON96\METDAT~2\CGSAR99.MET			
Height of lower wind instrument (m) = 10.0			
Height of upper wind instrument $(m) = 75.0$			
Wind speeds entered as miles per hour			
Ground-level release Release height (m) - 3.5			
Building Area (m ²) = 1787.0			
Effluent vertical velocity (m/s) = .00			
Vent or stack flow (m ³ /s) = .00			
Vent or stack radius (m) = .00			
Direction intake to source (deg) = 109			
Wind direction sector width (deg) = 90			
Wind direction window (deg) = 064 - 1 Distance to intake (m) = 91.4	54		
Distance to intake (m) = 91.4 Intake height (m) = 26.5			
Terrain elevation difference (m) = .0			
Output file names			
KK-L-4.OUT			
KK-L-4.CFD			

ENERGY NORTHWEST	APPEN	DIX B		Cont'd on page 3-10 NE-02-03-14
Paople · Vision · Solutions epared by / Date: M Abu-Shehadeh	Verified by/Date: Ted Me	essier	Revision No.	0
Minimum Wind Speed (m/s)5 Surface roughness length (m)20 Sector averaging constant - 4.3				
Initial value of sigma y - 1.00 Initial value of sigma z - 1.16				
Expanded output for code testing not selected				
Total number of hours of data processed = 35064 Hours of missing data = 2772 Hours direction in window = 3503 Hours elevated plume w/ dir. in window = 0 Hours of calm winds = 1534 Hours direction not in window or calm = 27255				
DISTRIBUTION SUMMARY DATA BY AVERAGING INTERVAL Aver, per. 1 2 4 Upper Lim. 1.00E-03 1.00E-03 1.00E-03 1.00E- Low Lim. 1.00E-07 1.00E-07 1.00E-07 1.00E-		96 168 1.00E-03 1.00E-03 1.00E-07 1.00E-07		720 DE-03 DE-07
ABOVE RANGE 0. 0. 0. IN RANGE 5037. 7406. 10698. 1467	0. 0. 0. 9. 18282. 23705.	0. 0. 28063. 27936.	0. 27370. 20	0. 5608.
BELOW RANGE 0. 0. 0. ZERO 27255. 24513. 20499. 1514 TOTAL X/Qs 32292. 31919. 31197. 2982		0. 0. 123. 0. 28186. 27936.	0. 0. 27370. 20	0. 0. 5608.
* NON ZERO 15.60 23.20 34.29 49.	23 59.80 79.41	99.56 100.00	100.00 10	00.00
95th PERCENTILE X/Q VALUES 5.34E-04 3.87E-04 3.43E-04 2.81E-	04 2.19E-04 1.50E-04	9.20E-05 8.27E-05	7.54E-05 7.30	DE-05
95% X/Q for standard averaging intervals				
0 to 2 hours 5.34E-04 2 to 8 hours 1.97E-04 8 to 24 hours 8.41E-05 1 to 4 days 7.26E-05				
4 to 30 days 7.00E-05				
HOURLY VALUE RANGE MAX X/Q NIN X CENTERLINE 8.78E-04 9.06E- SECTOR-AVERAGE 5.12E-04 5.28E-	05			
NORMAL PROGRAM COMPLETION				

	ENERGY			Page No. B-10	Cont'd on page B-11
NORTHWEST					o. NE-02-03-14
People Prepared by / Date:	Vision · Solutions	Verified by/Date	· Tod Massion		
				Revision No.	0
	Kin	g Kong Doors to Remo		- 99 Met Data File	25
			KK-R1-4		
Program Title:					
	J.S. Nuclear Regulatory Comm Office of Nuclear Reactor Reg				
	Division of Reactor Program				
	June 25, 1997 11:00 a.m.				
	J. Y. Lee Phone: (301)	415 1080			
	e-mail: jyl10				
	J. J. Hayes Phone: (301)				
	e-mail: jjh@n				
1	A Brown Phone: (301)				
Code Developer.	e-mail: lab20 J. V. Ramsdell Phone: (509)				
cone neveroper: (374 5315 msdell@pnl.gov			
Code Documentatio	n: NUREG/CR-6331 Rev. 1				
		United States Government. 1	leither		
the United State	Government nor any agency (hereof, nor any of their			
employees, makes	any warranty, expressed or i	implied, or assumes any legal			
		party's use, or the results of			
		ents that its use by such th	ird		
	infringe privately owned righ	its.			
Program Run 12/1	4/2003 at 14:59:10				
****** ARCON IN	ipur ********				
Number of Met	eorological Data Files = 4	L			
	l Data File Names				
	METDAT-2\CGSAR96.MET				
	METDAT-2\CGSAR97.MET				
	METDAT-2\CGSAR98.MET				
U: ARCONSE	METDAT-2\CGSAR99.MET				
Weight of low	er wind instrument (m) -	10.0			
	er wind instrument (m) =	75.0			
	intered as miles per hour				
Ground-level					
Release heigh		3.5			
Building Area		2861.0			
	ical velocity (m/s) =	.00			
	flow (m ³ /s) -	.00			
Vent or stack	TAGIUS (M)	.00			
Direction	intake to source (deg) =	141			
	n sector width (deg) =	90			
	n window (deg) =	096 - 186			
Distance to i		201.5			
Intake height		.0			
	tion difference (m) -	.0			
Output file m					
KK-R1-4.OUT					
KK-R1-4.CFD	1				

	APPENI	DIX B	Page No. Cont [*] B-11 B-12 Calculation No. NE-	d on page 02-03-14
epared by / Date: M Abu-Shehadeh	Verified by/Date: Ted Me	essier	Revision No.)
Minimum Wind Speed (m/s) = .5 Surface roughness length (m) = .20 Sector averaging constant = 4.3 Initial value of sigma y = .64 Initial value of sigma z = 1.16				
Expanded output for code testing not selected				
Total number of hours of data processed - 35064Hours of missing data- 2772Hours direction in window- 8223Hours elevated plume w/ dir. in window0Hours of calm winds- 1534Hours direction not in window or calm- 22535				
DISTRIBUTION SUMMARY DATA BY AVERAGING INTERVAL AVER. PER. 1 2 4	B 12 24	96 168	360 720	
UPPER LIM. 1.00E-03 1.00E-03 1.00E-03 1.00 LOW LIM. 1.00E-07 1.00E-07 1.00E-07 1.00	E-03 1.00E-03 1.00E-03	1.008-03 1.008-03 1.008-07 1.008-07	1.00E-03 1.00E-03 1.00E-07 1.00E-07	
ABOVE RANGE 0. 0. 0.	0. 0. 0.	0. 0.	0. 0.	
IN RANGE 9757. 12447. 15810. 19 BELOW RANGE 0. 0. 0.	113. 22766. 26575. 0. 0. 0.	28165. 27936. 0. 0.	27370. 26608. 0. 0.	
ZERO 22535. 19472. 15387. 10	107. 7804. 3278.	21. 0.	0. 0.	
	820, 30570, 29853. 5.10 74.47 89.02	28186. 27936. 99.93 100.00	27370. 26608. 100.00 100.00	
95th PERCENTILE X/Q VALUES 1.85E-04 1.75E-04 1.57E-04 1.35	E-04 1.07E-04 7.29E-05	4.60E-05 4.07E-05	3.70E-05 3.45E-05	
95% X/Q for standard averaging intervals				
0 to 2 hours 1.85E-04				
2 to 8 hours 1.198-04				
8 to 24 hours 4.18E-05 1 to 4 days 3.71E-05				
4 to 30 days 3.27E-05				
HOURLY VALUE RANGE				
MAX X/Q MIN CENTERLINE 2.20E-04 1.36	X/Q			
SECTOR-AVERAGE 1.29E-04 7.92				
NORMAL PROGRAM COMPLETION				

APPENDIX B P-12 Calculation No. repared by / Date: M Abu-Shehadeh Verified by/Date: Ted Messier Revision No. King Kong Doors to Remote-2 Intake with 96 - 99 Met Data Files KK-R2-4 King Kong Doors to Remote-2 Intake with 96 - 99 Met Data Files KK-R2-4 Program Tible: MACUME. Developed For: 0.0.0 Met Pones: (00) 415 100 methods of Network Repuistor Program Rangement Division of Resctor Program Rangement Date: June 35, 1997 111:00 a.m. KK-R2-4 NRC Contacts: J. Y. Lee Phones: (00) 415 100 methods of Network (00) 415 102 methods of Network (00) 415 102 methods (00) 72 616 KK-R2-4 Octo Developer: J. V. Ressell Phone: (00) 415 102 methods (00) 72 616 KK-R2-4 Octo Developer: J. V. Ressell Phone: (00) 415 102 methods (00) 415 102 m	ont'd on page -13
epared by / Date: M Abu-Shehedeh Verified by/Date: Ted Messier Revision No. King Kong Doors to Remote-2 Intake with 96 - 99 Met Data Files KK-R2-4 Program Title: ARCONSE. Developed For: U.S. Nucley Resultancy Commission Division of Rescore Program Management Date: June 35, 1997 11:00 a.m. RRC Contacts: J.Y. Very Phone: (301) 415 1080 e-mail: (3)Herrc.gov J. J. Neyse Phone: (301) 415 1080 e-mail: (3)Herrc.gov Code Developer: J. V. Remdell Phone: (509) 172 5316 e-mail: j.Paradellepil.gov Code Developer: J. V. Remdell Phone: (509) 172 5316 e-mail: j.Paradellepil.gov Code Developer: J. V. Remdell Phone: (509) 173 5316 e-mail: j.Paradellepil.gov Code Documentation: NUREO(JC-6331 Rev. 1 The program was prepared for an agency thereof, nor any of their the luited States Government nor any agency thereof, nor any of their program tail: j.Paradellepil.gov Code Documentation: NUREO(JC-6331 Rev. 1 The program responsibilities for any agency thereof, nor any of their the luited States Government cont any agency thereof, nor any of their program Run 12/14/2003 et 15:00:16 ************************************	NE-02-03-14
KK-R2-4 Program Title: ARCONS: Developed For: U.S. Nuclear Regulatory Commission Office of Nuclear Resource Regulation NRC Contacts. J. Y. Lee Phone: (1301) 415 1387 e-mail: jjlemtrc.gov J. J. Nayes Phone: (1301) 415 1232 e-mail: lab2mtrc.gov Code Developer: J. V. Remodell Phone: (1309) 372 6316 e-mail: jjlemtrc.gov Code Documentation: NURRD/CF-6331 Rev. 1 The program swap program for an genu of the thited Btates Government. Neither the Nuled States Government nor any agency thereof, nor any of their party would not infringe privately wound rights. Program Run 12/14/2003 at 15:00:16 Former ACON INPUT Number of Meteorological Data Files - 4 Meteorological Data Files - 0 Mind speeds entered as miles per hour Mind speeds entered as miles per hour Mind speeds entered (eg) - 35. Mind direction window (feg) - 00 Mind direction window (feg) - 00 Mind direction window (feg) - 00 Mind direction for Mifference (m) - 00 Distance to intake (m) Distance file Annees KK-R2-4.0007 Kines (file Annee) KK-R2-4.007 Kines (file Annee) KK-	0
KK-R2-4 Program Title: ARCONS6: Developed Por: U.S. Nuclear Regulatory Commission Office of Nuclear Reactor Regulation Nuclear Reactor Nuclear Restore Regulation Office of Nuclear Reactor Regulation Office of Nuclear Regulation Office of Nuclear Reactor Regulation Office of Office of Nuclear Reactor Regulation Office	
Program Tills: ARCONSS. Developed For U.S. Nuclear Regulatory Commission Division of Reactor Regulation Division of Reactor Regulation Division of Reactor Regulation Division of Reactor Program Management Date: June 25, 1997 11:00 a.m. RRC Contacts: J.Y. Les Phones (301) 415 1080 e-mail: jjlmmrc.gov J.J. Nayes Phones (301) 415 1030 c-mail: jjlmmrc.gov L.A. Brown Phones (301) 415 1030 Code Developer: J. V. Remsdell Phones (301) 415 1030 Code Developer: J. V. Remsdell Phones (301) 415 1030 Code Developer: J. V. Remsdell Phones (309) 372 6316 e-mail: j_ramudellephil.gov Code Documentation: NUREO/CR-6331 Rev. 1 The program was prepared for an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees. makes any warranty, expressed or inpliced, or asemuse any legal liability or responsibilities for any third party's use, or the results of such use, of any portion of this program or represents that its use by such third party would not infringe privately owned rights. Program Nar J3/4/2003 at 13:0016 ****** ARCON INPUT ******** Number of Meteorological Data Files - 4 Meteorological Data File Names U.VARCOMSS(WETDAT-2\COGARSS.MET U.VARCOMSS(WETDAT-2\COGARSS.MET U.VARCOMSS(WETDAT-2\COGARSS.MET Height of lower wind instrument (m) - 10.0 Height of upper wind instrument (m) - 2561.0 Stfluent vertical velocity (m/3/) - 00 Vent or stack filow (m/3/s) - 00 Vent or stack filow (m/3/s) - 00 Diraction ., intake to source (deg) - 325 Mind diraction exidence (deg) - 20 90 Mind speeds enterced (deg) - 325 Net diraction exidence (deg) - 20 90 Mind speeds enterced (deg) - 325 Net diraction exidence (m) - 0 Output file names KK-R24.GUT	
Developed For: U.S. Nuclear Regulatory Commission Office of Nuclear Reactor Regulation Division of Reactor Program Management Date: June 25, 1997 11:00 a.m. NRC Contacts: J. Y. Lee Phones (301) 415 1080 e-mail: jjimfr.gov J. J. Nayes Phone: (301) 415 1231 Code Developer: J. V. Ramsdell Phone: (302) 312 4516 Code Developer: J. V. Ramsdell Phone: (302) 312 4516 Phone: (302) 415 123 4216 Phone: (302) 415 123 4216 Phone: (302) 415 123 4216 Phone: (302) 415 415 4216 Number of https: privetely owned rights. Program Run 12/14/2003 at 15:00:16 Phone: ALCON INFUT Number of Meteorological Date Files - 4 Meteorological Date Files Manage U.VARCOMS6(WETDAT-2)COERNS9. MET U.VARCOMS6(WETDAT-2)COERNS9. MET U.VARCOMS6(WETDAT-2)COERNS9. MET U.VARCOMS6(WETDAT-2)COERNS9. MET Wind speeds entered as miles per hour Ground-level release Release height (m) - 1.00 Vent or stack flow (m3/s)00 Vent or stack flow (m3/	
Office of Nucleir Reactor Regulation Division of Reactor Program Remagement Date June 25, 1997 NRC Contacts J. Y. Lee Phones (301) 415 1080 e-mail: jlemrc.gov J. J. Reyee Phones (301) 415 1080 e-mail: jlemrc.gov L. A Brown Phones (301) 415 1032 e-mail: jlemrc.gov Code Developer: J. V. Remedell Phones (503) 327 6316 momentation: NUREO/CR-4331 Rev. 1 The program was prepared for an agency of the theraof, nor any of their mombulation: Nume 27 gene particity or responsibilities for any third party's use, or the results of such use; of any portion of this program or represents that its use by such third party would not infringe privetely owned rights. Program Run 12/14/2003 at 15:00:16 e	
Division of Reactor Program Management Date: June 25, 1997 11:00 a.m. NRC Contacts: J. Y. Lee Phone: (301) 415 1080 e-mail: jiffenrc.gov J. J. Hayee Phone: (301) 415 1327 e-mail: jiffenrc.gov L. A Broom Phone: (301) 415 1323 e-mail: jiffenrc.gov Code Developer: J. V. Remdell Phone: (509) 372 6316 e-mail: jiffendellepnl.gov Code Documentation: NUREM/CR-6331 Rev. 1 The program Was prepared for an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, expressed or implied, or asumes any legal liability or responsibilities for any third party's use, or the results of auch use, of any portion of this program or represents that its use by such third party would not infringe privately owned rights. Program Run 12/14/2003 at 15:00:16 ******* ARCON INPUT U.\ARCONS(WETDAT-2\COSANSS.MET U.\ARCONS(WETDAT-2\COSANSS.MET U.\ARCONS(WETDAT-2\COSANSS.MET U.\ARCONS(WETDAT-2\COSANSS.MET U.\ARCONS(WETDAT-2\COSANSS.MET U.\ARCONS(WETDAT-2\COSANSS.MET U.\ARCONS(WETDAT-2\COSANSS.MET U.\ARCONS(WETDAT-2\COSANSS.MET U.\ARCONS(WETDAT-2\COSANSS.MET U.\ARCONS(WETDAT-2\COSANSS.MET U.\ARCONSS(WETDAT-2\COSANSS.MET	
<pre>Dete: June 25, 197 1100 a.m. NRC Contacts: J. Y. Lee Phone: (301) 415 1080</pre>	
 amesini jjišarc.gov J. J. Nayes phone: (301) 415 3157	
J. J. Hayes Phone: [301] 415]167 e-mail: hjbmrc.gov L. A Brown Phone: [301] 415 [322 e-mail: hjbmrc.gov Code Decumentation: NUREG/CR-531 Rev. 1 The programs was prepared for an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, supressed or implied, or assumes any legal liability or responsibilities for any third party: use, or the results of such use, of any portion of this program or represents that its use by such third party would not infringe privately owned rights. Program Run 12/14/2003 at 15:00:16 ****** ARCON INPUT ******** Number of Meteorological Data Files = 4 Meteorological Dats File Names U:\ARCOM56(METDAT-2\COSANS.MET D:\COM56(METDAT-2\COSANS.MET Mind direction school (deg) = 250.0 Vent or stack flow (m ³ /3*) = .00 Vent or stack flow (m ³ /3*) = .00 Mind di	
 e-mail: jjhenrc.gov L. A Brown Phone: (301) 415 1232 e-mail: labZenrc.gov Code Developer: J. V. Remsdell Phone: (509) 372 6316 e-mail: j ramadellephl.gov Code Documentation: NURES/CR-531 Rev. 1 The program was prepared for an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, expressed or implied, or assumes any legal llability or responsibilities for any third party's use, or the results of such use, of any portion of this program or represents that its use by such third party would not infringe privately owned rights. Program Run 12/14/2003 at 15:00:16 ****** ARCON IMPUT ******** Number of Meteorological Data Files - 4 Meteorological Data Files - 4 Mind instrument (m) - 10.0 Height of Lower wind instrument (m) - 75.0 Mind ingende entered as miles per hour Ground-level release Release height (m) - 3.5 Duilding Area (m²) - 2061.0 Effluent vertical velocity (m/s) - 00 Vent or stack flow (m³/s) - 00 Vent or stack radius (m) - 00 Vent or stack radius (m) - 00 Mind direction indow (deg) - 250 - 010 Distance to intake (m) - 73.6 Intake height (m) - 73.6 	
L. A Brown Phone: (301) 415 1232 e-mail: AlsoBerrc.gov Code Deculoper: J. V. Ramadell Phone: (509) 372 6316 e-mail: j.ramadellepol.gov Code Documentation: NURER/CR-6331 Rev. 1 The program was prepared for an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, wapresed of inplied, or assumes any legal liability or responsibilities for any third party's use, or the results of such use, of any portion of this program or represents that its use by such third party would not infringe privately owned rights. Program Run 12/14/2003 at 15:00:16 ******* ARCON INPUT ******** Number of Meteorological Data Files = 4 Meteorological Data File Names U:\ARCONS(VHETDAT-2\COSAR95.HET U:\A	
<pre>e-mail labd@mrc.gov Code Developer; J. V. Ramdell Phone: (509) 372 6316 e-mail: j_ramdell@phl.gov Code Documentation: NUREPC/C-6131 Rev. 1 The program was prepared for an agency of the United States Government. Neither the United States Government nor any agency thereof, or asy of their employces, makes any warranty, expressed or implied, or assumes any legal llability or responsibilities for any third patry's use, or the results of such use, of any portion of this program or represents that its use by such third party would not infringe privately owned rights. Program Run 13/14/2003 at 15:00:16 ******* AKCON INPUT ******** Number of Meteorological Data Files - 4 Meteorological Data File Names U:\AKCONS6(METDAT-2)COSARS7.MET U:\AKCONS6(METDAT-2)COSARS7.MET U:\AKCONS6(METDAT-2)COSARS9.MET Height of lower wind instrument (m) = 10.0 Height of lower wind instrument (m) = 75.0 Wind speeds entered as miles per hour Ground-level release Release height (m) = 0.5 Duilding Ares (m²) = 2861.0 Effluent vertical velocity (m/s) = .00 Vent or stack flow (m²/s) = .00 Vent or stack flow (m²/s) = .00 Vent or stack flow (m²) = .206 Mind direction sector width (deg) = .00 Wind direction sector width (deg) = .00 Mind direction window (deg) = .206 .010 Distance to intake (m) = .0 Terrain slewation difference (m) = .0 Output file names KK-82+6.0UT</pre>	
<pre>e-mail; j_ramsdellepnl.gov Code Documentation: NURBG/CK-5311 Rev. 1 The program was prepared for an agency of the United States Government. Neither the United States Government nor any agency thereof; nor any of their employees, makes any warranty, expressed or implied, or assumes any legal liability or responsibilities for any third party's use, or the results of such use; of any portion of this program or represents that its use by such third party would not infringe privately owned rights. Program Number of Meteorological Data Files = 4 Meteorological Data File Names U:\ARCOMSeKMETIMT-2\CGSARS5.MET U:\ARCOMSeKMETIMT-2\CGSARS5.MET U:\ARCOMSeKMETIMT-2\CGSARS5.MET U:\ARCOMSeKMETIMT-2\CGSARS5.MET U:\ARCOMSeKMETIMT-2\CGSARS5.MET Eleight of lower wind instrument (m) = 10.0 Height of lower wind instrument (m) = 75.0 Wind speeds entered as miles per hour Ground-level release Release height (m) = 3.5 Duilding Ares (m²) = 2861.0 Effluent vertical velocity (m/s) = 00 Vent or stack flow (m²/s) = 00 Vent or stack flow (m²/s) = 00 Vent or stack flow (m²/s) = 00 Direction intake to source (deg) = 325 Mind direction sector with (deg) = 90 Mind direction sector with (deg) = 78.6 Intake height (m) = 0 Terrain elewstion difference (m) = 0 Output file names KK-R2+4.0UT</pre>	
Code Documentation: NURBCJ/CR-6311 Rev. 1 The program was prepared for an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, expressed or implied or assumes any legal liability or responsibilities for any third party's use, or the results of such use, of any portion of this program or represents that its use by such third party would not infinge privately owned rights. Program Run 12/14/2003 at 15:00:16 ****** ARCON INPUT ******** Number of Meteorological Data Files - 4 Meteorological Data File Names U:\ARCOM96(WETDAT-2\CGSAR95.MET U:\ARCOM96(WETDAT-2\CGSAR95.MET U:\ARCOM96(WETDAT-2\CGSAR95.MET U:\ARCOM96(WETDAT-2\CGSAR95.MET U:\ARCOM96(WETDAT-2\CGSAR95.MET U:\ARCOM96(WETDAT-2\CGSAR95.MET U:\ARCOM96(METDAT-2\CGSAR95.MET D:\CGM96(METDAT-2\CGSAR95.MET U:\ARCOM96(METDAT-2\CGSAR95.MET D:\CGM96(METDAT-2\CGSAR95.MET D:\GGAR9.MET D:\GGAR9.METDAT D:\GGAR9.MET D:\GGAR9.METDAT D:\GGAR9.METDAT D:\GGAR9.METDAT D:\GGAR9.METDAT D:\GGAR9.METDAT D:\GGAR9.MET D:\G	
The program was prepared for an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employces, makes any warranty, expressed or implied, or assumes any legal liability or responsibilities for any third party's use, or the results of such use, of any portion of this program or represents that its use by such third party would not infringe privately owned rights. Program Number of Meteorological Data Files = 4 Meteorological Data File Names U:\ARCONS(METDAT-2)(COSARS.MET U:\ARCONS6(METDAT-2)(COSARS.MET U:\ARCONS6(METDAT-2)(COSARS.MET U:\ARCONS6(METDAT-2)(COSARS.MET U:\ARCONS6(METDAT-2)(COSARS.MET U:\ARCONS6(METDAT-2)(COSARS.MET U:\ARCONS6(METDAT-2)(COSARS.MET U:\ARCONS6(METDAT-2)(COSARS.MET U:\ARCONS6(METDAT-2)(COSARS.MET U:\ARCONS6(METDAT-2)(COSARS.MET U:\ARCONS6(METDAT-2)(COSARS.MET U:\ARCONS6(METDAT-2)(COSARS.MET U:\ARCONS6(METDAT-2)(COSARS.MET U:\ARCONS6(METDAT-2)(COSARS.MET U:\ARCONS6(METDAT-2)(COSARS.MET U:\ARCONS6(METDAT-2)(COSARS.MET U:\ARCONS6(METDAT-2)(COSARS.MET U:\ARCONS6(METDAT-2)(COSARS.MET U:\ARCONS6(METDAT-2)(COSARS.MET U:\ARCONS6(METDAT-2)(COSARS.MESARS.MET U:\ARCONS6(METDAT-2)(COSARS.MESARS.MET U:\ARCONS6(METDAT-2)(COSARS.METARS.MET Height of lower wind instrument (m) = 10.0 Height of lower wind instrument (m) = 25.0 Building Area (m'2) = 2661.0 Diffuent vertical velocity (m/s) = .00 Vent or stack flow (m'3/s) = .00 Vent or stack flow (m'3/s) = .00 Vint or stack flow (deg) = 325 Wind direction sector vidth (deg) = 90 Wind direction window (deg) = .200.010 Distance to intake (m) = .0 Terrain elevation difference (m) = .0 Terrain elevation difference (m) = .0 Output file names KK.R2-4.0UT	
<pre>the United States Government nor any agency thereof, nor any of their employees, makes any warranty, expressed or implied, or assumes any legal liability or responsibilities for any third party's use, or the results of such use, of any portion of this program or represents that its use by such third party would not infringe privately owned rights. Program Run 12/14/2003 at 15:00:16 ****** ARCON INPUT ******** Number of Meteorological Data Files - 4 Meteorological Data Files - 7 U:\ARCOM96\METDAT-2\COSAR95.MET U:\ARCOM96\METDAT-2\COSAR95.MET U:\ARCOM96\METDAT-2\COSAR95.MET U:\ARCOM96\METDAT-2\COSAR95.MET Height of lower wind instrument (m) - 10.0 Height of upper wind instrument (m) - 75.0 Wind speeds entered as miles per hour Ground-level release Release height (m) - 2861.0 Effluent vertical velocity (m/s) - 00 Vent or stack flow (m'3/s) - 00 Vent or stack flow (m'3/s) - 00 Direction intake to source (deg) - 325 Wind direction sector width (deg) = 90 Wind direction indow (deg) - 200 - 010 Distance to intake (m) - 79.6 Intake height (m) - 0 Terrain elevation difference (m) - 0 Output file names KK.R2-4.0UT</pre>	
<pre>employces, makes any warranty, expressed or implied, or assumes any legal liability or responsibilities for any third party's use, or the results of such use, of any portion of this program or represents that its use by such third party would not infringe privately owned rights. Program Run 12/14/2003 at 15:00:16 ******* ARCON INPUT ******** Number of Meteorological Data Files = 4 Meteorological Data File Names U.\ARCON96\METDAT-2\COSAR96.MET U.\ARCON96\METDAT-2\COSAR97.MET U.\ARCON96\METDAT-2\COSAR98.MET U.\ARCON96\METDAT-2\COSAR97.MET U.\ARCON96\METDAT-2\COSAR98.MET U.\ARCON96\METDAT-2\COSAR98.MET U.\ARCON96\METDAT-2\COSAR98.MET U.\ARCON96\METDAT-2\COSAR98.MET U.\ARCON96\METDAT-2\COSAR99.MET U.\ARCON96\METDAT-2\COSAR99.MET U.\ARCON96\METDAT-2\COSAR99.MET U.\ARCON96\METDAT-2\COSAR99.MET Mind speede entered as miles per hour Ground-level release Release height (m) = 3.5 Building Area (m²2) = 2861.0 Effluent vertical velocity (m/s) = .00 Vent or stack flow (m³/s) = .00 Vent or stack flow (m³/s) = .00 Vent or stack flow (m³/s) = .00 Direction intake to source (deg) = 325 Mind direction sector vidth (deg) = 90 Mind direction didow (deg) = .200 - 010 Distance to intake (m) = .0 Output file names KK.R2-4.0UT</pre>	
<pre>use, of any portion of this program or represents that its use by such third party would not infringe privately owned rights. Program Run 12/14/2003 at 15:00:16 ****** ARCON INPUT ******* Number of Meteorological Data Files = 4 Meteorological Data Files = 10.0 U_\ARCON96(METDAT-2\COSAR98.MET D_\CON96(METDAT-2\COSAR98.MET U_\ARCON96(METDAT-2\COSAR98.MET U_\ARCON96(METDAT-2\COSAR98.MET U_\ARCON96(METDAT-2\COSAR98.METDAT-2\COSAR98.MET U_\ARCON96(METDAT-2\COSAR98.METDAT-2\COSAR9.MET U_\ARCON96(METDAT-2\COSAR98.METDAT-2\COSAR98.MET U_\ARCON96(METDAT-2\COSAR9.MET</pre>	
<pre>party would not infringe privately owned rights. Program Run 12/14/2003 at 15:00:16 ****** ARCON INPUT ******* Number of Meteorological Data Files = 4 Meteorological Data Files = 4 U:\ARCOM96\METDAT-2\COGSAR95.MET U:\ARCOM96\METDAT-2\COGSAR95.MET U:\ARCOM96\METDAT-2\COGSAR95.MET U:\ARCOM96\METDAT-2\COGSAR95.MET U:\ARCOM96\METDAT-2\COGSAR95.MET Wind speeds entered as miles per hour Ground-level release Release height (m) = 3.5 Building Arca (m²2) = 2861.0 Vent or stack flow (m³/s) = .00 Vent or stack flow (m³/s) = .00 Vent or stack radius (m) = .00 Direction intake to source (deg) = 325 Wind direction sector width (deg) = 280 - 010 Distance to intake (m) = .72.6 Intake height (m) = .0 Output file names KK-R2-4.OUT</pre>	
Program Run 12/14/2003 at 15:00:16 ******* ARCON INPUT ******** Number of Meteorological Data Files - 4 Meteorological Data Files - 4 Meteorological Data Files - 4 Meteorological Data Files ** U:\ARCOM96\METDAT-2\CGSAR96.MET U:\ARCOM96\METDAT-2\CGSAR98.MET U:\ARCOM96\METDAT-2\CGSAR98.MET U:\ARCOM96\METDAT-2\CGSAR98.MET U:\ARCOM96\METDAT-2\CGSAR99.MET Height of upper wind instrument (m) - 10.0 Height of upper wind instrument (m) - 75.0 Wind speeds entered as miles per hour Ground-level release Release height (m) - 3.5 Duilding Area (m [*] 2) - 2861.0 Effluent vertical velocity (m/s) - 00 Vent or stack flow (m [*] 3/s) - 00 - 00 Vent or stack flow (m) - 00 - 2861.0 Direction intake to source (deg) - 325 - 00 Wind direction sector width (deg) - 90 90 Wind direction window (deg) - 280 - 010 - 280 - 010 Distance to intake (m) - 79.6 - 0 Intake height (m) - 0 - 0 Output file names - 0 K-R2-4.00T - 0	
ARCON INPUT ******* Number of Meteorological Data Files = 4 Meteorological Data File Names U:\ARCON96\METDAT-2\CGSAR96.MET U:\ARCON96\METDAT-2\CGSAR97.MET U:\ARCON96\METDAT-2\CGSAR98.MET U:\ARCON96\METDAT-2\CGSAR98.MET U:\ARCON96\METDAT-2\CGSAR98.MET U:\ARCON96\METDAT-2\CGSAR98.MET U:\ARCON96\METDAT-2\CGSAR98.MET U:\ARCON96\METDAT-2\CGSAR98.MET U:\ARCON96\METDAT-2\CGSAR98.MET U:\ARCON96\METDAT-2\CGSAR99.MET Height of lower wind instrument (m) = 10.0 Height of upper wind instrument (m) = 75.0 Wind speeds entered as miles per hour Ground-level release Release height (m) = 3.5 Building Area (m ²) = 2861.0 Effluent vertical velocity (m/s) = .00 Vent or stack flow (m^3/s) = .00 Vent or stack flow (m^3/s) = .00 Direction intake to source (deg) = 325 Wind direction sector width (deg) = 280 - 010 Distance to intake (m) = .0 Output file names .0 K-R2-4.0UT .0	
Number of Meteorological Data Files - 4 Meteorological Data File Names U:\ARCON96\METDAT-2\CGSAR95.MET U:\ARCON96\METDAT-2\CGSAR95.MET U:\ARCON96\METDAT-2\CGSAR95.MET U:\ARCON96\METDAT-2\CGSAR95.MET U:\ARCON96\METDAT-2\CGSAR95.MET Height of lower wind instrument (m) = 10.0 Height of upper wind instrument (m) = 75.0 Wind speeds entered as miles per hour Ground-level release Release height (m) = 3.5 Building Area (m ²) = 2861.0 Effluent vertical velocity (m/s) = .00 Vent or stack flow (m ³ /s) = .00 Vent or stack flow (m ³ /s) = .00 Direction intake to source (deg) = 325 Wind direction sector width (deg) = 90 Wind direction window (deg) = 280 - 010 Distance to intake (m) = .0 Terrsin elevation difference (m) = .0 Output file names KK-R2-4.OUT	
<pre>Meteorological Date File Names U:\ARCON96\WETDAT-2\CGSAR95.MET U:\ARCON96\WETDAT-2\CGSAR95.MET U:\ARCON96\WETDAT-2\CGSAR95.MET U:\ARCON96\WETDAT-2\CGSAR95.MET U:\ARCON96\WETDAT-2\CGSAR95.MET Height of lower wind instrument (m) = 10.0 Height of upper wind instrument (m) = 75.0 Wind speeds entered as miles per hour Ground-level release Release height (m) = 3.5 Building Area (m²2) = 2861.0 Effluent vertical velocity (m/s) = .00 Vent or stack flow (m⁴3/s) = .00 Vent or stack radius (m) = .00 Direction ., intake to source (deg) = 325 Wind direction sector width (deg) = 90 Wind direction sector width (deg) = 90 Wind direction window (deg) = 280 - 010 Distance to intake (m) = 79.6 Intake height (m) = .0 Terrain elevation difference (m) = .0 Output file names KK-R2-4.OUT</pre>	
<pre>Meteorological Data Pile Names U:\ARCON96\METDAT-2\COSAR96.MET U:\ARCON96\METDAT-2\COSAR98.MET U:\ARCON96\METDAT-2\COSAR99.NET Height of lower wind instrument (m) = 10.0 Height of upper wind instrument (m) = 75.0 Wind speeds entered as miles per hour Ground-level release Release height (m) = 3.5 Building Area (m²2) = 2861.0 Effluent vertical velocity (m/s) = .00 Vent or stack flow (m⁴3/s) = .00 Vent or stack radius (m) = .00 Direction intake to source (deg) = .325 Wind direction sector width (deg) = .90 Wind direction sector width (deg) = .00 Distance to intake (m) = .0 Terrain elevation difference (m) = .0 Output file names KX-R2-4.OUT</pre>	
U:\ARCON96\METDAT-2\CGSAR96.MET U:\ARCON96\METDAT-2\CGSAR96.MET U:\ARCON96\METDAT-2\CGSAR99.MET U:\ARCON96\METDAT-2\CGSAR99.MET Height of lower wind instrument (m) = 10.0 Height of upper wind instrument (m) = 75.0 Wind speeds entered as miles per hour Ground-level release Release height (m) = 3.5 Building Area (m ² 2) = 2861.0 Effluent vertical velocity (m/s) = .00 Vent or stack flow (m ³ /s) = .00 Vent or stack flow (m ³ /s) = .00 Direction intake to source (deg) = 325 Wind direction sector width (deg) = 90 Wind direction sector width (deg) = 280 - 010 Distance to intake (m) = .0 Terrain elevation difference (m) = .0 Output file names KK-R2-4.0UT	
U:\ARCON96\METDAT-2\CGSAR97.MET U:\ARCON96\METDAT-2\CGSAR99.MET U:\ARCON96\METDAT-2\CGSAR99.MET U:\ARCON96\METDAT-2\CGSAR99.MET Height of lower wind instrument (m) = 10.0 Height of upper wind instrument (m) = 75.0 Wind speeds entered as miles per hour Ground-level release Release height (m) = 3.5 Building Ares (m ² 2) = 2861.0 Effluent vertical velocity (m/s) = .00 Vent or stack flow (m ³ /s) = .00 Vent or stack flow (m ³ /s) = .00 Direction intake to source (deg) = 325 Wind direction sector width (deg) = 90 Wind direction window (deg) = 280 - 010 Distance to intake (m) = .0 Terrain elevation difference (m) = .0 Output file names KK-R2-4.0UT	
U:\ARCON96\METDAT-2\CGSAR98.MET U:\ARCON96\METDAT-2\CGSAR99.MET Height of lower wind instrument (m) = 10.0 Height of upper wind instrument (m) = 75.0 Wind speeds entered as miles per hour Ground-level release Release height (m) = 3.5 Building Area (m ²) = 2861.0 Effluent vertical velocity (m/s) = .00 Vent or stack flow (m ³ /s) = .00 Vent or stack flow (m ³ /s) = .00 Direction intake to source (deg) = 325 Wind direction sector width (deg) = 90 Wind direction sector width (deg) = 90 Wind direction window (deg) = 280 - 010 Distance to intake (m) = .0 Terrain elevation difference (m) = .0 Output file names KK-R2-4.OUT	
U:\ARCON96(WETDAT-2\CGSAR99.MET Height of lower wind instrument (m) = 10.0 Height of upper wind instrument (m) = 75.0 Wind speeds entered as miles per hour Ground-level release Release height (m) = 3.5 Building Area (m ²) = 2861.0 Effluent vertical velocity (m/s) = .00 Vent or stack flow (m ⁴ 3/s) = .00 Vent or stack radius (m) = .00 Direction intake to source (deg) = 325 Wind direction sector width (deg) = 90 Wind direction window (deg) = 280 - 010 Distance to intake (m) = .0 Terrain elevation difference (m) = .0 Output file names KK-R2-4.0UT	
Height of upper wind instrument (m) = 75.0 Wind speeds entered as miles per hour 75.0 Ground-level release	
Height of upper wind instrument (m) = 75.0 Wind speeds entered as miles per hour 75.0 Ground-level release	
Wind speeds entered as miles per hour Ground-level release Release height (m) 3.5 Building Area (m ² 2) 2861.0 Effluent vertical velocity (m/s) .00 Vent or stack flow (m ³ /s) .00 Vent or stack radius (m) .00 Direction intake to source (deg) .225 Wind direction sector width (deg) .90 Wind direction window (deg) .280 - 010 Distance to intake (m) .79.6 Intake height (m) .0 Output file names .0 KK-R2-4.OUT .0	
Ground-level release Release height (m) = 3.5 Building Area (m ² 2) = 2861.0 Effluent vertical velocity (m/s) = .00 Vent or stack flow (m ³ /s) = .00 Vent or stack radius (m) = .00 Direction intake to source (deg) = 325 Wind direction sector width (deg) = 90 Wind direction window (deg) = 280 - 010 Distance to intake (m) = .0 Terrain elevation difference (m) = .0 Output file names KK-R2-4.OUT	
Release height (m) = 3.5 Building Area (m ²) = 2861.0 Effluent vertical velocity (m/s) = .00 Vent or stack flow (m ³ /s) = .00 Direction intake to source (deg) = 325 Wind direction sector width (deg) = 90 Wind direction window (deg) = 280 - 010 Distance to intake (m) = 79.6 Intake height (m) = .0 Output file names .0 KK-R2-4.OUT -	
Release height (m) = 3.5 Building Area (m ²) = 2861.0 Effluent vertical velocity (m/s) = .00 Vent or stack flow (m ³ /s) = .00 Vent or stack radius (m) = .00 Direction intake to source (deg) = 325 Wind direction sector width (deg) = 90 Wind direction window (deg) = 280 - 010 Distance to intake (m) = 79.6 Intake height (m) = .0 Output file names .0 KK-R2-4.OUT -	
Effluent vertical velocity (m/s) = .00 Vent or stack flow (m ² 3/s) = .00 Vent or stack radius (m) = .00 Direction intake to source (deg) = 325 Wind direction sector width (deg) = 90 Wind direction window (deg) = 280 - 010 Distance to intake (m) = .0 Terrain elevation difference (m) = .0 Output file names KK-R2-4.OUT	
Vent or stack flow (m ³ /s)00 Vent or stack radius (m)00 Direction intake to source (deg) - 325 Wind direction sector width (deg) - 90 Wind direction window (deg) - 280 - 010 Distance to intake (m) - 79.6 Intake height (m)0 Terrain elevation difference (m)0 Output file names KK-R2-4.OUT	
Vent or stack radius (m) - .00 Direction intake to source (deg) - 325 Wind direction sector width (deg) - 90 Wind direction window (deg) - 280 - 010 Distance to intake (m) - 79.6 Intake height (m) - .0 Terrain elevation difference (m) - .0 Output file names - .0 KK-R2-4.OUT - .0	
Direction intake to source (deg) = 325 Wind direction sector width (deg) = 90 Wind direction window (deg) = 280 - 010 Distance to intake (m) = 79.6 Intake height (m) = .0 Terrain elevation difference (m) = .0 Output file names KK-R2-4.OUT	
Wind direction sector width (deg) = 90 Wind direction window (deg) = 280 - 010 Distance to intake (m) = 79.6 Intake height (m) = .0 Terrain elevation difference (m) = .0 Output file names KK-R2-4.OUT	
Wind direction sector width (deg) = 90 Wind direction window (deg) = 280 - 010 Distance to intake (m) = 79.6 Intake height (m) = .0 Terrain elevation difference (m) = .0 Output file names KK-R2-4.OUT	
Distance to intake (m) = 79.6 Intake height (m) = .0 Terrain elevation difference (m) = .0 Output file names KK-R2-4.OUT	
Intake height (m) = .0 Terrain elevation difference (m) = .0 Output file names KK-R2-4.0UT	
Terrain elevation difference (m) = .0 Output file names KK-R2-4.0UT	
Output file names KK-R2-4.OUT	
KK-R2-4.OUT	

People · Visic epared by / Date: M Abu-S						Calculation	No. NE-02-03-14	
	Shehadeh	Verified by/[Date: Ted Me	ssier		Revision N	o. 0	
Total number of hours Hours of missing data Hours direction in wir Hours elevated plume w Hours of calm winds Hours direction not in	gth (m) = tant = 4.3 a y = a z = 1.3 ode testing not selected of data processed = 3500 = 277 ndow = 1097 w/ dir. in window = m window or calm = 1976 DATA BY AVERAGING INTERVAL 2 4 1.00E-02 1.00E-02 1 1.00E-06 1.00E-06 1 0. 0. 15316. 18619.	20 3 58 16 64 72 76 0 34 82	1.00E-02 5 1.00E-06 0. 27542.	96 1.00E-02 1.00E-06 0. 28147. 0.	168 1.008-02 1.008-06 0. 27936. 0.	360 1.008-02 1.008-06 0. 27370. 0.	720 1.008-02 1.008-06 0. 26608. 0.	
ZERO 19782. TOTAL X/QS 32292. % NON ZERO 38.74	16603. 12578. 31919. 31197.	7966. 5783. 29820. 30570. 73.29 81.08	2311. 29853.	39. 28186. 99.86	0. 27936. 100.00	0. 27370. 100.00	0. 26608. 100.00	
95th PERCENTILE X/Q VA 8.99E-04	ALUES 8.828-04 8.338-04 7		4.46E-04	2.93E-04	2.708-04	2.41E-04	2.238-04	
2 to 8 hours 7. 8 to 24 hours 2. 1 to 4 days 2.	averaging intervals .99E-04 .12E-04 .90E-04 .42E-04 .12E-04							
CENTERLINE SECTOR-AVERAGE	1.19B-03 4	MIN X/Q 8.452-05 2.602-05						
NORMAL PROGRAM COMPLETION								

ENERGY				Page No. Cont'd on page B-14 B-15				
					on No. NE-02-03-14			
Prepared by / Date			ied by/Date: Ted Messier	Revision No.	0			
·····		1	• • • • • • • • • • • • • • • • •					
	P	actor Building	Walls to Local Intake with 9	6 - 00 Met Data Fi	les			
		netor panamb	RBW-L-4					
Program Title:	ARCON96.							
Developed For:	U.S. Nuclear Regulatory Co							
	Office of Nuclear Reactor							
Date:	Division of Reactor Progra June 25, 1997 11:00 a.m							
NRC Contacts:		1) 415 1080						
		llenrc.gov						
		1) 415 3167						
	e-mail: jj							
		1) 415 1232 b2@nrc.gov						
Code Developer:	J. V. Ramsdell Phone: (50							
		ramsdell@pnl.gov						
	ion: NUREG/CR-6331 Rev. 1							
	prepared for an agency of							
	s Government nor any agenc							
	any warranty, expressed o ponsibilities for any thir							
	ion of this program or rep							
	infringe privately owned r		by Buch Child					
	14/2003 at 15:01:42							
****** ARCON								
	teorological Data Files -	4						
	al Data File Names							
	NETDAT-2\CGSAR96.MET							
	METDAT-2\CGSAR98.MET							
	METDAT-2\CGSAR99.MET							
-								
	wer wind instrument (m) =	10.0						
	per wind instrument (m) =	75.0						
wind speeds	entered as miles per hour							
Ground-level	release							
Release heig		60.0						
Building Are	a (m^2) =	1787.0						
	tical velocity (m/s) =	.00						
	k flow (m ³ /s) =	.00						
Vent or stat	K TAQIUS (M)	.00						
Direction	intake to source (deg) -	090						
	on sector width (deg) =	90						
	on window (deg) =	045 - 135						
Distance to		39.0						
Intake heigh		26.5						
Terrain elev Output file	ation difference (m) =	.0						
RBW-L-4.OL								
RBW-L-4.CE								

People Vision • epared by / Date: M Abu-Sheh Minimum Wind Speed (m/s) Surface roughness length (Sector averaging constant Initial value of sigma y Initial value of sigma z Expanded output for code t Total number of hours of d	adeh m) = .5 .20 - 4.3 - 6.80 - 3.25	Verified by/Da	te: Ted Mes	ssier		Revision No	o. O
Surface roughness length (Sector averaging constant Initial value of sigma y Initial value of sigma z Expanded output for code t Total number of hours of d	m) = .20 = 4.3 = 6.80 = 3.25						
LOW LIM. 1.00E-06 1. Above Range 0. In Range 4583. Below Range 0.	ata processed = 35064 = 2772 = 2528 r. in window = 0 = 2055 dow or calm = 27709	-06 1.00E-06 0. 0. 08. 15916. 0. 0.		96 1.002-02 1.002-06 0. 27814. 0. 372.	168 1.008-02 1.008-06 0. 27931. 0. 5.	360 1.008-02 1.008-06 0. 27370. 0. 0.	720 1.008-02 1.00E-06 0. 26608. 0.
TOTAL X/QS 32292. Y NON ZERO 14.19	31919. 31197. 298 20.53 29.73 42	20. 30570. .62 52.06	29853. 70.97	28186. 98.68	27936. 99.98	27370. 100.00	26608. 100.00
95th PERCENTILE X/Q VALUES 8.69E-04 7.	07E-04 6.42E-04 5.47B	-04 4.362-04	2.998-04	1.79E-04	1.51B-04	1.34E-04	1.192-04
95% X/Q for standard avera	jing intervals						
0 to 2 hours 8.69E- 2 to 8 hours 4.40E- 8 to 24 hours 1.75E- 1 to 4 days 1.38E- 4 to 30 days 1.10E-	04 04 04						
CENTERLINE 1.	HOURLY VALUE RANGE AX X/Q MIN 3 53E-03 1.05E 93E-04 6.12E	-04					
NORMAL PROGRAM COMPLETION							

	APPENDIX B	Page No. Cont'd on page B-16 B-17 Calculation No. NE-02-03-14
People · Vision · Bolutions		
epared by / Date: M Abu-Shehadeh	Verified by/Date: Ted Messier	Revision No. 0
Reactor Build	ing Walls to Remote-1 Intake with	96 - 99 Met Data Files
	RBW-R1-4	
Program Title: ARCON96. Developed For: U.S. Nuclear Regulatory Commission Office of Nuclear Reactor Regulation Division of Reactor Program Management Date: June 25, 1997 11:00 a.m. NRC Contacts: J.Y. Lee Phone: (301) 415 1080 e-mail: jyllenrc.gov J. J. Hayes Phone: (301) 415 1132 e-mail: jhlenrc.gov L. A Brown Phone: (301) 415 1232 e-mail: lab2@nrc.gov Code Developer: J. V. Ramsdell Phone: (300) 415 1232 e-mail: lab2@nrc.gov Code Documentation: NUREG/CR-6331 Rev. 1 The program was prepared for an agency of the United S the United States Government nor any agency thereof, n employees, makes any warranty, expressed or implied, o liability or responsibilities for any third party's us use, of any portion of this program or represents that party would not infringe privately owned rights. Program Run 12/14/2003 at 17:59:31 ****** ARCON INPUT ******* Number of Meteorological Data Files = 4 Meteorological Data File Names U:\ARCON96\METDAT-2\CGSAR96.MET U:\ARCON96\METDAT-2\CGSAR97.MET U:\ARCON96\METDAT-2\CGSAR99.MET Height of lower wind instrument (m) = 10.0 Height of lower wind instrument (m) = 75.0 Wind speeds entered as miles per hour Ground-level release Release height (m) = 60.0 Building Area (m ²) = 2861.0 Effluent vertical velocity (m/s) = .00 Vent or stack flow (m ³ /s) = .00 Vent or stack flow (m ³ /s) = .00 Vent or stack flow (m ³ /s) = .00 Vent or stack flow width (deg) = .00 Net direction sector width (deg) = .00	L.gov States Government. Neither Nor any of their or assumes any legal se, or the results of such	
Wind direction window (deg)= 101 - 191Distance to intake (m)= 138.7Intake height (m)= .0Terrain elevation difference (m)= .0		
· · · · · · · · · · · · · · · · · · ·		

ENERGY			Pa B-1		Cont'd on page B-18
People · Vision · Bolutions		PPENDIX B	Ca	culation No	. NE-02-03-14
epared by / Date: M Abu-Shehadeh	Verified by/Date:	: Ted Messier	Re	vision No.	0
LOW LIM. 1.00E-07 1.00E-07 1.00E-07 1. Above Range 0. 0. 0. In Range 8984. 11469. 14672. Below Range 0. 0. 0.	8 12 00E-03 1.00E-03 1. 00E-07 1.00E-07 1. 0. 0. 18235. 21599. 0. 0.	.00E-07 1.00E-07 0. 0. 26051. 28143. 0. 0.	1.00E-07 1. 0.	00E-07 1.0 0.	720 008-03 308-07 0. 26608. 0.
	11585. 8971. 29820. 30570. 61.15 70.65	3802. 43. 29853. 28186. 87.26 99.85			0. 26608. 200.00
95th PERCENTILE X/Q VALUES 2.418-04 2.208-04 1.958-04 1.	66E-04 1.31E-04 9.	.12E-05 5.58E-05	1.91E-05 4.	37E-05 4.1	18-05
95% X/Q for standard averaging intervals					
0 to 2 hours 2.41E-04 2 to 8 hours 1.41E-04 8 to 24 hours 5.40E-05 1 to 4 days 4.40E-05 4 to 30 days 3.88E-05					
CENTERLINE 3.08E-04 1.	IN X/Q 45E-05 44E-06				
NORMAL PROGRAM COMPLETION					

ENERGY	,		Page No. B-18	Cont'd on page B-19
People · Vision · Bo		APPENDIX B		lo. NE-02-03-14
Prepared by / Date: M Abu-Shehade		Verified by/Date: Ted Messier	Revision No.	0
· · · · · · · · · · · · · · · · · · ·		.I		
	Reactor Buildi	ng Walls to Remote-2 Intake with	96 - 99 Met Data	Files
		RBW -R2-4	Jo JJ Matt Dutu	
Program Title: ARCON96.		· · · · ·		
Developed For: U.S. Nuclear Regul				
	Reactor Regulation			
	r Program Management			
	.1:00 a.m. Lone: (301) 415 1080			
	mail: jyll@nrc.gov			
	ione: (301) 415 3167			
	mail: jjh@nrc.gov			
	ione: (301) 415 1232			
	mail: lab2@nrc.gov			
Code Developer: J. V. Ramsdell Ph	one: (509) 372 6316 mail: j_ramsdell@pnl	00Y		
Code Documentation: NUREG/CR-6331		.90*		
The program was prepared for an ag		ates Government. Neither		
the United States Government nor a				
employees, makes any warranty, exp				
liability or responsibilities for				
use, of any portion of this progra		its use by such third		
party would not infringe privately				
Program Run 12/14/2003 at 18:00	:02			
******* ARCON INPUT *********				
······································				
Number of Meteorological Data Meteorological Data File Names				
U:\ARCON96\METDAT~2\CGSAR96.				
U:\ARCON96\METDAT-2\CGSAR97.1				
U: \ARCON96 \METDAT~2 \CGSAR98.				
U:\ARCON96\METDAT-2\CGSAR99.	MET			
Height of lower wind instrument				
Height of upper wind instrumen Wind speeds entered as miles p				
WINT PROCE CULCERCE OF HILLS D	1004			
Ground-level release				
Release height (m)	■ 60.0			
Building Area (m ²)	- 2861.0			
Effluent vertical velocity (m/s				
Vent or stack flow (m ³ /s)	= .00			
Vent or stack radius (m)	00			
Direction intake to source	(deg) = 324			
Wind direction sector width (de				
Wind direction window (deg)	= 279 - 009			
Distance to intake (m)	= 77.6			
Intake height (m)	-) - 0			
Terrain elevation difference (Output file names	n) = .0			
RBW-R2-4.OUT				
RBW-R2-4.CFD				

		Page No. Cont'd on page B-19 B-20 Calculation No. NE-02-03-14
People · Vision · Solutions epared by / Date: M Abu-Shehadeh	Verified by/Date: Ted Messier	Revision No. 0
IN RANGE 12588. 15203. 18490. 21760 BELOW RANGE 0. 0. 0. 0. ZERO 19704. 16716. 12707. 8060 TOTAL X/Q8 32292. 31919. 31197. 29820 % NON ZERO 38.98 47.63 59.27 72.9 95th PERCENTILE X/Q VALUES	07 1.00E-07 1.00E-07 1.00E-07 1.00E-07 0. 0. 0. 0. 0. 0. 24803. 27594. 28149. 27936. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 5767. 2259. 37. 0. 0. 30570. 29853. 28186. 27936. 97 81.14 92.43 99.87 100.00	360 720 1.00E-03 1.00E-03 1.005-07 1.00E-07 0. 0. 27370. 26608. 0. 0. 0. 0. 27370. 26608. 100.00 100.00
4.91E-04 4.67E-04 4.30E-04 3.88E-0	04 3.14E-04 2.23E-04 1.48E-04 1.34E-04	1.18E-04 1.09E-04
95% X/Q for standard averaging intervals 0 to 2 hours 4.91E-04 2 to 8 hours 3.54E-04 8 to 24 hours 1.41E-04 1 to 4 days 1.23E-04 4 to 30 days 1.03E-04 HOURLY VALUE RANGE	10	
MAX X/Q MIN X/ CENTERLINE 5.90E-04 1.91E-0 SECTOR-AVERAGE 3.44E-04 1.12E-0	05	
NORMAL PROGRAM COMPLETION		

ENERGY		Page No. Cont'd on page B-20 B-21	
	APPENDIX B	Calculation No. NE-02-03-14	
repared by / Date: M Abu-Shehadeh	Verified by/Date: Ted Messier	Revision No. 0	
Turbine Buik	ding Exhaust to Local Intake with 9	6 - 99 Met Data Files	
	TBE-L-4		
Program Title: ARCON96.			
Developed For: U.S. Nuclear Regulatory Commission Office of Nuclear Reactor Regulation			
Division of Reactor Program Management	:		
Date: June 25, 1997 11:00 a.m. NRC Contacts: J. Y. Lee Phone: (301) 415 1080			
e-mail: jyll@nrc.gov			
J. J. Hayes Phone: (301) 415 3167			
e-mail: jjh@nrc.gov L. A Brown Phone: (301) 415 1232			
e-mail: lab2@nrc.gov			
Code Developer: J. V. Ramsdell Phone: (509) 372 6316 e-mail: j ramsdell@pnl			
Code Documentation: NUREG/CR-6331 Rev. 1			
The program was prepared for an agency of the United S			
the United States Government nor any agency thereof, r employees, makes any warranty, expressed or implied, c			
liability or responsibilities for any third party's us	se, or the results of such		
use, of any portion of this program or represents that	: its use by such third		
party would not infringe privately owned rights. Program Run 12/14/2003 at 15:06:32			
ARCON INPUT			
Number of Meteorological Data Files = 4 Meteorological Data File Names			
U:\ARCON96\METDAT-2\CGSAR96.MET			
U:\ARCON96\METDAT-2\CGSAR97.MET			
U:\ARCON96\METDAT-2\CGSAR98.MET U:\ARCON96\METDAT-2\CGSAR99.MET			
Height of lower wind instrument (m) = 10.0			
Height of upper wind instrument (m) = 75.0 Wind speeds entered as miles per hour			
Ground-level release			
Release height (m) = 36.3 Building Area (m^2) = 1787.0			
Building Area (m ² 2) = 1787.0 Bffluent vertical velocity (m/s) = .00			
Vent or stack flow (m ³ /s) = 55.00			
Vent or stack radius (m) = .00			
Direction intake to source (deg) = 090			
Wind direction sector width (deg) = 90			
Wind direction window (deg) = 045 - 135 Distance to intake (m) = 18.3			
Intake height (m) = 26.5 Terrain elevation difference (m) = .0			
Output file names			
TBE-L-4.OUT			
TBB-L-4.CFD			

	ERGY RTHWEST		APPEN	DIX B		Page No. B-21 Calculation	Cont'd on page B-22 No. NE-02-03-14
repared by / Date: M A		Verified by/I	Date: Ted M	essier		Revision N	lo. 0
Total number of h Hours of missing Hours direction i Hours direction i Hours of calm win Hours of calm win Hours direction n DISTRIBUTION SUMM AVER. PER. UPPER LIM. 1.00 LOW LIM. 1.00 ABOVE RANGE IN RANGE 3 BELOW RANGE ZERO 28 TOTAL X/QS 32	<pre>length (m)</pre>	41 00 64 72 25 0 34 33	1.00B-02 1.00E-06 0. 20900. 0. 8953. 29853.	96 1.00E-02 1.00E-06 0. 27585. 0. 601. 28186. 97.87	168 1.00E-02 1.00E-06 0. 27928. 0. 8. 27936. 99.97	360 1.002-02 1.002-06 0. 27370. 0. 0. 27370. 100.00	720 1.00E-02 1.00E-06 0. 26608. 0. 0. 26608. 100.00
95th PERCENTILE X				9.86E-04	9.02E-04		7.918-04
	ard averaging intervals						
0 to 2 hours 2 to 8 hours 8 to 24 hours 1 to 4 days 4 to 30 days	4.70E-03 2.00E-03 1.03E-03 8.01E-04 7.69E-04 HOURLY VALUE RANGE MAX X/Q 8.81E-03	MIN X/Q 1.67E-03					

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ENERGY	APPENDIX B	Page No. Cont'd on page B-22 B-23	
		Calculation No. NE-02-03-14	
repared by / Date: M Abu-Shehadeh	Verified by/Date: Ted Messier	Revision No. 0	
Turbine Build	ding Exhaust to Remote-1 Intake with TBE-R1-4	n 96 - 99 Met Data Files	
	1 DE-R1-4		
Program Title: ARCON96. Developed For: U.S. Nuclear Regulatory Commission Office of Nuclear Reactor Regulation Division of Reactor Program Manageme			
Date: June 25, 1997 11:00 a.m. NRC Contacts: J. Y. Lee Phone: (301) 415 100 e-mail: jyll@nrc.gov	v		
J. J. Hayes Phone: (301) 415 31 e-mail: jjh@nrc.gov L. A Brown Phone: (301) 415 123 e-mail: lab2@nrc.gov	32		
Code Developer: J. V. Ramsdell Phone: (509) 372 633 e-mail: j_ramsdeller Code Documentation: NUREG/CR-6331 Rev. 1	16		
The program was prepared for an agency of the United the United States Government nor any agency thereof, employees, makes any warranty, expressed or implied, liability or responsibilities for any third party's use, of any portion of this program or represents th party would not infringe privately owned rights. Program Run 12/14/2003 at 15:08:20 ******* ARCON IMPUT ******	, nor any of their , or assumes any legal use, or the results of such		
Number of Meteorological Data Files - 4 Neteorological Data File Names U:\ARCON96\METDAT-2\CGSAR96.MET U:\ARCON96\METDAT-2\CGSAR97.MET U:\ARCON96\METDAT-2\CGSAR98.MET U:\ARCON96\METDAT-2\CGSAR99.MET			
Height of lower wind instrument (m) = 10.0 Height of upper wind instrument (m) = 75.0 Wind speeds entered as miles per hour			
Ground-level release Release height (m) = 36.3 Building Area (m ²) = 2861.0 Effluent vertical velocity (m/s) = .00 Vent or stack flow (m ² 3/s) = 55.00			
Vent or stack radius (m)00 Direction intake to source (deg) - 156)		
Wind direction sector width (deg) = 90 Wind direction window (deg) = 111 - 2 Distance to intake (m) = 140.4 Intake height (m) = .0 Terrain elevation difference (m) = .0	201		

ENERGY	APPENDIX B	Page No. Cont'd on page 3-23 B-24
		Calculation No. NE-02-03-14
epared by / Date: M Abu-Shehadeh	Verified by/Date: Ted Messier	Revision No. 0
Minimum Wind Speed (m/s) = .5 Surface roughness length (m) = .20 Sector averaging constant = 4.3		
Initial value of sigma y = .41 Initial value of sigma z = .00		
Expanded output for code testing not selected		
Total number of hours of data processed = 35064 Hours of missing data = 2772 Hours direction in window = 10197 Hours elevated plume w/ dir. in window = 0 Hours of calm winds = 1534 Hours direction not in window or calm = 20561		
DISTRIBUTION SUMMARY DATA BY AVERAGING INTERVAL Aver. Per. 1 2 4 Upper Lim. 1.00e-03 1.00e-03 1.00e-03 1.00e-	8 12 24 96 168 -03 1.00E-03 1.00E-03 1.00E-03	360 720 1.00E-03 1.00E-03
LOW LIM. 1.00E-07 1.00E-07 1.00E-07 1.00E- ABOVE RANGE 0. 0. 0.	-07 1.00E-07 1.00E-07 1.00E-07 1.00E-07 0. 0. 0. 0. 0. 0.	1.00E-07 1.00E-07 0. 0.
IN RANGE 11731. 14316. 17478. 2071 BELOW RANGE 0. 0. 0. ZERO 20561. 17603. 13719. 910	0. 0. 0. 0. 0.	27370. 26608. 0. 0. 0. 0.
TOTAL X/Q8 32292. 31919. 31197. 2982 NON ZERO 36.33 44.85 56.02 69.	20. 30570. 29853. 28186. 27936.	27370. 26608. 100.00 100.00
95th PERCENTILE X/Q VALUES 3.29E-04 3.11E-04 2.76E-04 2.39E-	-04 1.888-04 1.338-04 8.528-05 7.538-05	6.89E-05 6.47E-05
95% X/Q for standard averaging intervals		
0 to 2 hours 3.32E-04 2 to 8 hours 2.08E-04 8 to 24 hours 8.08E-05 1 to 4 days 6.94E-05 4 to 30 days 6.17E-05		
HOURLY VALUE RANGE MAX X/Q MIN X CENTERLINE 4.04E-04 6.71E- SECTOR-AVERAGE 2.38E-04 3.91E-	06	
NORMAL PROGRAM COMPLETION		

	ENERGY		APPENDIX B	Page No. B-24	Cont'd on page B-25								
People	NORTHV •·Vision·So		Calculation No. NE-02-03-14		Calculation No. NE-02-03-14		Calculation No. NE-02-03-14		Calculation No. NE-02-03-14		Calculation No. NE-02-03-14		lo. NE-02-03-14
	: M Abu-Shehade		Verified by/Date: Ted Messier	Revision No.	0								
					· · · · · · · · · · · · · · · · · · ·								
		Turbine Buildin	g Exhaust to Remote-2 Intake wit	h 96 - 99 Met Dat	a Files								
Program Title:													
Developed For:	U.S. Nuclear Regul												
		Reactor Regulation or Program Management											
Dater		11:00 a.m.											
		hone: (301) 415 1080											
		-mail: jyll@nrc.gov											
		hone: (301) 415 3167											
		-mail: jjh@nrc.gov hone: (301) 415 1232											
		-mail: lab2@nrc.gov											
Code Developer:		hone: (509) 372 6316											
	e-	-mail: j_ramsdell@onl.	gov										
	ion: NUREG/CR-6331												
			ates Government. Neither										
		any agency thereof, no											
		pressed or implied, or											
			, or the results of such its use by such third										
	infringe privately		its use by such child										
	/14/2003 at 15:09												
	INPUT *********												
	teorological Data												
	al Data File Names												
	5\METDAT-2\CGSAR96.												
	5\METDAT-2\CGSAR97. 5\METDAT-2\CGSAR98.												
	5\METDAT-2\CGSAR99.												
01 (181001170	(
Height of lo	ower wind instrumen	nt (m) = 10.0											
	oper wind instrumen												
Wind speeds	entered as miles p	er hour											
Gunued Javal	, IELEABE	= 36.3											
Ground-level	int (m)												
Release heig		= 2861.0											
Release heig Building Are		= 2861.0											
Release heig Building Are Effluent ver Vent or stac	a (m ²) tical velocity (m/ ck flow (m ³ /s)	= 2861.0 (s) = .00 = 55.00											
Release heig Building Are Effluent ver	a (m ²) tical velocity (m/ ck flow (m ³ /s)	= 2861.0 (s) = .00											
Release heig Building Are Effluent ver Vent or stac Vent or stac	ea (m ²) rtical velocity (m/ ck flow (m ³ /s) ck radius (m)	= 2861.0 /s) = .00 = 55.00 = .00											
Release heig Building Are Effluent ver Vent or stac Vent or stac Direction	a (m^2) rtical velocity (m/ ck flow (m^3/s) ck radius (m) . intake to source	= 2861.0 = .00 = 55.00 = .00 (deg) = 312											
Release heig Building Are Effluent var Vent or stac Vent or stac Direction Wind directi	a (m ²) rtical velocity (m/ ck flow (m ³ /s) ck radius (m) . intake to source ton sector width (d	= 2861.0 = .00 = 55.00 = .00 (deg) = 312											
Release heig Building Are Effluent var Vent or stac Vent or stac Direction Wind directi	a (m [*] 2) trical velocity (m/ sk flow (m [*] 3/s) sk radius (m) , intake to source ion sector width (d (on window (deg)	= 2861.0 = .00 = 55.00 00 (deg) = 312 deg) = 90											
Release heig Building Are Effluent var Vent or stac Vent or stac Direction Wind directi Wind directi	a (m ²) trical velocity (m/ ck flow (m ³ /s) ck radius (m) . intake to source ion sector width (d intake (m)	<pre> 2861.0 00 = .55.00 00 (deg) = .312 seg) = .90 = .267357 = .131.5 = .0 </pre>											
Release heig Building Are Effluent ver Vent or stac Vent or stac Direction Wind directi Wind directi Distance to Intake heigh	a (m ²) trical velocity (m/ ck flow (m ³ /s) ck radius (m) . intake to source ion sector width (d intake (m)	<pre> 2861.0 00 55.00 00 (deg) - 312 90 267 - 357 131.5 .0 </pre>											
Release heig Building Are Effluent ver Vent or stac Vent or stac Direction Wind directi Wind directi Distance to Intake heigh	a (m ²) tical velocity (m/ ck flow (m ³ /s) ck radius (m) intake to source ion sector width (d ion window (deg) intake (m) at (m)	<pre> 2861.0 00 55.00 00 (deg) - 312 90 267 - 357 131.5 .0 </pre>											

repared by / Date: M Abu-Shehadeh Verified by/Date: Ted Messier Rev Output file names TBE-R2-4.0UT TEG-R2-4.0UT TEG-R2-4.0UT TGE-R2-4.0UT TG	vision No. 0
TBE-R2-4.OUT TBE-R2-4.CFD Minimum Wind Speed (m/s) - Surface roughness length (m) - Sector averaging constant - Initial value of sigma y - Initial value of sigma z - Sector averaging constant - Initial value of sigma z - Sector averaging constant - Initial value of sigma z - Sector averaging constant - Initial value of sigma z - O - Expanded output for code testing not selected Total number of hours of data processed - 35064 Hours of missing dat - Section in window - Hours elevated plume w/ dir. in window - Hours of calm winds - Section not in window or calm -	
AVER. PER. 1 2 4 8 12 24 96 168 UPPER LIM. 1.00E-03 1.00E-07 1.0	360 720 .00E-03 1.00E-03 .00E-07 1.00E-07 0. 0. 27370. 26608. 0. 0. 27370. 26608. 100.00 100.00 .83E-05 9.04E-05

ENERGY		Page No. Cont'd on page B-26 B-27	
NORTHWEST	APPENDIX B	Calculation No. NE-02-03-14	
People · Vision · Solutions			
Prepared by / Date: M Abu-Shehadeh	Verified by/Date: Ted Messier	Revision No. 0	
		· · · · · · · · · · · · · · · · · · ·	
Condensate Storag	e Tanks (CST) to Remote-1 Intake	with 96 - 99 Met Data Files	
	CST-R1-1		
Program Title: ARCON96.			
Developed For: U.S. Nuclear Regulatory Commission Office of Nuclear Reactor Regulation			
Division of Reactor Program Managemen	t		
Date: June 25, 1997 11:00 a.m.			
NRC Contacts: J. Y. Lee Phone: (301) 415 1080 e-mail: jyll@nrc.gov			
J. J. Hayes Phone: (301) 415 3167			
e-mail: jjh@nrc.gov			
L. A Brown Phone: (301) 415 1232			
e-mail: lab2@nrc.gov Code Developer: J. V. Ramsdell Phone: (509) 372 6316			
e-mail: j_ramsdell@pn			
Code Documentation: NURBG/CR-6331 Rev. 1			
The program was prepared for an agency of the United the United States Government nor any agency thereof,			
employees, makes any warranty, expressed or implied,			
liability or responsibilities for any third party's u			
use, of any portion of this program or represents that			
party would not infringe privately owned rights.			
Program Run 4/ 7/2004 at 14:29:54			
******* ARCON INPUT *********			
Number of Meteorological Data Files - 4			
Meteorological Data File Names			
U:\ARCON96\METDAT-2\CGSAR96.MET			
U:\ARCON96\METDAT-2\CGSAR97.MET			
U:\ARCON96\METDAT-2\CGSAR98.MET U:\ARCON96\METDAT-2\CGSAR99.MET			
Height of lower wind instrument (m) = 10.0			
Height of upper wind instrument (m) = 75.0 Wind speeds entered as miles per hour			
wind speeds entered as wires ber war			
Ground-level release			
Release height (m) = 13.0 Building Area (m ² 2) = 146.0			
Effluent vertical velocity (m/s) = .00			
Vent or stack flow (m ³ /s) = .00			
Vent or stack radius (m) = .00			
Direction intake to source (deg) = 112			
Wind direction sector width (deg) = 90	_		
Wind direction window (deg) = 067 - 15 Distance to intake (m) = 119.6	1		
Intake height (m) = .0			
Terrain elevation difference (m) = .0			

ENERGY		A 7	יסבאסי	VD		Page No. B-27	Cont'd on page
	APPENDIX B				Calculation No.	NE-02-03-14	
Prepared by / Date: M Abu-Shehadeh	Verified by/	Date: Ted I	Messier			Revision No.	0
Output file names CST-R1-3.OUT CST-R1-3.CFD						I	
Minimum Wind Speed (m/s)5 Surface roughness length (m)20 Sector averaging constant - 4.3							
Initial value of sigma y = .00 Initial value of sigma z = .00							
Expanded output for code testing not selected							
Total number of hours of data processed - 35064Hours of missing data - 2772Hours direction in window - 3877Hours elevated plume w/ dir. in window - 0Hours of calm winds - 1534Hours direction not in window or calm - 26901							
	07 1.00E-07 0. 0.	24 1.00E-03 1.00E-07 0.	96 1.00E-03 1.00E-07 0.	168 1.008-03 1.00E-07 0.	360 1.00E-03 1.00E-07 0.	720 1.008-03 1.008-07 0.	
IN RANGE 5391. 7850. 11236. 1528 BELOW RANGE 0. 0. 0. ZERO 26901. 24069. 19961. 1453	0. 0.	24283. 0. 5570.	28130. 0. 56.	27936. 0. 0.	27370. 0. 0.	26608. 0. 0.	
TOTAL X/Qs 32292. 31919. 31197. 2982 \$ NON ZERO 16.69 24.59 36.02 51.3	0. 30570.	29853. 81.34	28186. 99.80	27936. 100.00	27370. 100.00	26608. 100.00	
95th PERCENTILE X/Q VALUES 4.182-04 3.00E-04 2.71E-04 2.24E-0	04 1.74 5-0 4	1.17E-04	7.25E-05	6.57E-05	6.04E-05	5.79E-05	
95% X/Q for standard averaging intervals					·		
0 to 2 hours 4.18E-04 2 to 8 hours 1.59E-04 8 to 24 hours 6.31E-05 1 to 4 days 5.78E-05 4 to 30 days 5.57E-05							
HOURLY VALUE RANGE MAX X/Q MIN X/ CENTERLINE 6.51E-04 6.22E-0 SECTOR-AVERAGE 3.79E-04 3.63E-0	5						
SECTOR-AVERAGE 3.79E-04 3.63E-0 NORMAL PROGRAM COMPLETION	13						
NORMAL PROGRAM COMPLETION							

ENERGY	METEOROLOGICAL DATA	Page No. C-1	Cont'd on page C-2
People · Vision · Bolutions	APPENDIX C	Calculation I	NO. NE-02-03-14
Prepared by / Date: M Abu-Shehadeh	Verified by/Date; Ted Messier	Revision No.	
6/15/04	Meteorological Data		REV BAR.
25291 R1		. <u></u>	

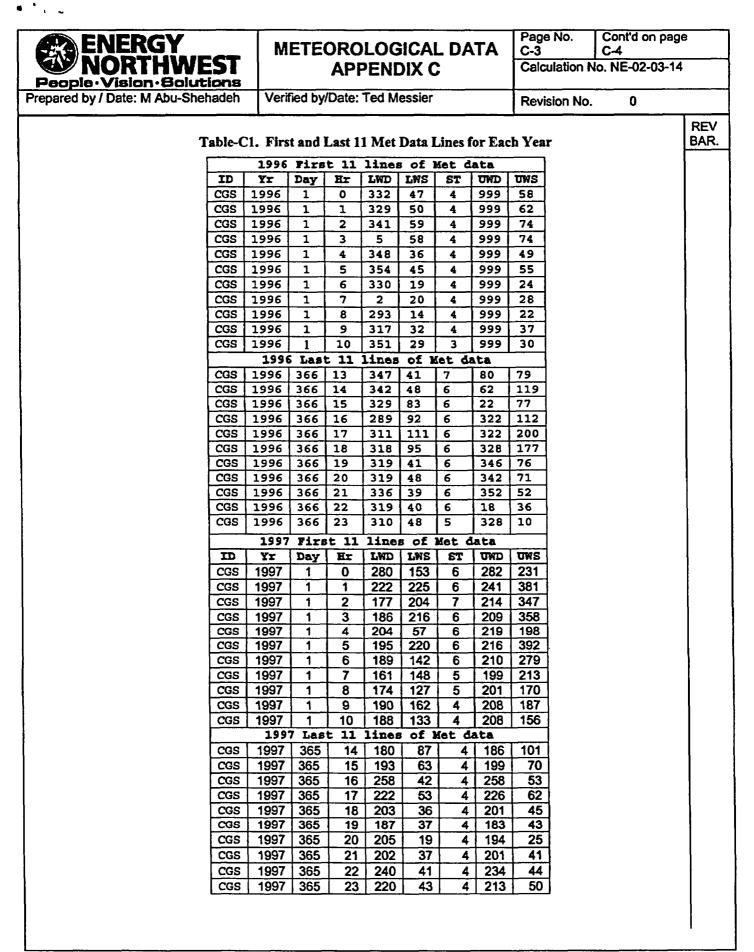
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		ENERGY	METEOROLOGICAL DATA	Page No. C-2	Cont'd on page C-3	9
	Peop	NORTHWEST	APPENDIX C	Calculation N	o. NE-02-03-14	
		d by / Date: M Abu-Shehadeh	Verified by/Date: Ted Messier	Revision No.	0	
	Purpose		s to give a brief description about the meteoro	logical data us	ed in this	REV BAR.
	Energy The pro	Northwest to find 5 consecutive cess for the clean-up and format	ta were used in the calculations instead of five years of high quality data that would meet all ting of the raw data is described in the Framat calculation were given the following file name	regulatory requirements and the second secon	uirements.	
	CGSAI CGSAI	896.MET 897.MET 898.MET 899.MET				
	Each fi	le contains hourly meteorologica	l data lines that include the following informa	tion:		1
i	1)	Location identifier, ID.				
	2)	The number of the Julian day of and so forth to 365.	the year, for January 1 the number is 1, for F	ebruary 3 the n	umber is 34	
	3)	hour of the day (0 to 23)				
	4)	Lower wind direction, LWD.				
	5)		LWS is in miles per hour (mph), entered with in the table means 5.3 mph, and so on.	an implied dec	imal point.	
	6)	Stability class (ST: 1=A, 2=B, 3	=C, 4=D, 5=E, 6=F, and 7=G)			
	7)	Upper wind direction, UWD.				
	8)		UWS is in miles per hour (mph), entered with) in the table means 8.0 mph, and so on.	an implied dec	cimal point.	
	Missin; respect		directions, and wind speeds were denoted by 9	99, 999, and 99	99,	
	The fire	st and last 10 lines (hours) of met	t data from each data file are given in Table-C	1 below:		
l						1
				•		

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METEOROLOGICAL DATA APPENDIX C

Page No. Cont'd on page C-4

Calculation No. NE-02-03-14

0

Prepared by / Date: M Abu-Shehadeh

Verified by/Date: Ted Messier

Revision No.

REV BAR.

			Table	-C1. (cont.)			
	199	8 Fir	st 11	line	s of	Met d	ata	
ID	Yr	Day	Hr	LWD	LWS	ST	UWD	UWS
CGS	1998	1	0	273	35	5	243	38
CGS	1998	1	1	239	26	5	193	45
CGS	1998	1	2	207	33	5	185	42
CGS	1998	1	3	180	49	5	175	56
CGS	1998	1	4	175	57	5	159	63
CGS	1998	1	5	152	52	5	151	75
CGS	1998	1	6	155	67	6	154	131
CGS	1998	1	7	172	92	6	167	115
CGS	1998	1	8	178	69	6	167	114
CGS	1998	1	9	185	71	7	161	146
CGS	1998	1	10	174	103	7	176	171
	199	8 Las		line		det de	ta	
CGS	1998	365	14	999	9999	99	999	9999
CGS	1998	365	15	999	9999	99	999	9999
CGS	1998	365	16	999	8999	99	999	9999
CGS	1998	365	17	286	67	5	293	124
CGS	1998	365	18	259	70	5	286	141
CGS	1998	365	19	297	56	6	295	170
CGS	1998	365	20	268	44	7	282	95
CGS	1998	365	21	241	33	5	291	66
CGS	1998	365	22	209	49	7	236	73
CGS	1998	365	23	192	74	7	219	74
	199		st 11			<u>`</u>	ata	
ID	Yr	Day	Hr	LWD	LWS	ST	UWD	UWS
CGS	1999	1	0	191	77	7	213	103
CGS	1999	1	1	169	64	7	203	108
CGS	1999	1	2	183	57	7	208	72
CGS	1999	1	3	184	59	7	210	44
CGS	1999	1	4	189	85	7	214	71
CGS	1999	1	5	185	88	7	231	99
CGS	1999	1	6	177	65	7	269	59
CGS	1999	1	7	194	40	6	293	55
CGS	1999		8	235	60	6	278	81
CGS	1999	1	9	208	49	6	261	55
CGS	1999	1	10	24	11	6	278	34
	199	9 La	<u> </u>	line	s of 1	Met di	ata	1
CGS	1999	365	14	131	75	5	150	93
CGS	1999	365	15	139	82	5	154	102
CGS	1999	365	16	128	87	5	148	123
CGS	1999	365	17	155	88	5	180	133
CGS	1999	365	18	175	61	6	220	74
CGS	1999	365	19	183	29	6	199	48
CGS	1999	365	20	230	31	6	225	25
CGS	1999	365	21	231	37	7	276	15
CGS	1999	365	22	310	33	7	341	19
CGS	1999	365	23	308	32	7	324	40
.00	1993	1 000	_ 23	1 300	<u> </u>		524	40

ENERGY	ATTAOURICAIT 4	Page No. AT-1	Cont'd on page AT-2
People · Vision · Solutions	ATTACHMENT 1	Calculation I	No. NE-02-03-14
Prepared by / Date: M Abu-Shehadeh	Verified by/Date: Ted Messier	Revision No	
6/15/04	•		REV BAR.
	Calculation of CST X/Q		
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25291 R1			

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Prepared by / Date: M Abu-Shehadeh	Verified by/Date: Ted Messier	Revision No. 0							
Condensate Storage Tanks (CST) source	ent is to provide a detailed calculation of the to the remote-1 intake. This X/Q is need tainment (SC) Liquid Leakage Bypass (LL	ed for the calculation of the	REV BAR.						
Description of the Source: Liquid leakage from the suppression pool to the CST via the HPCS and RCIC isolation valves is assumed to occur bypassing the SC. The CST is a set of two tanks located to the north of the TGB (Figure 1) with the remote-1 control room intake being the closest of the 3 intakes to the tanks. Each of the 2 tanks has a vent on the top located in the center of the tank roof (Ref. 17). Each tank has a diameter of 45 ft (13.72 m) and a height (including the height of the dome shaped-roof) of 43.5 ft (~13 m), Ref. 17. The tank that is closer to the remote-1 intake was conservatively assumed to represent the source.									
⊥	put parameters for the remote-1 intake were nined using the methodology provided in A								
Distance from the source (CST) to receptor (remote-1): The North and West coordinates for the source were taken from reference 18, the distance is calculated using the formula given in Appendix A, section 2, as stated in the Appendix the coordinates are given in units of feet and the distance was calculated using the conversion factor 9 .3048 meter per foot.									
Remote-1 Intake (rece	, W_s) = (12148.2, 1224.7) ptor) coordinates = (N _r , W _r) = (12294, 158 x SQRT [(12294 - 12148.2) ² + (1589 - 122 h								
Height of the source: The height of the	e vent on top of the tank roof is 13 m (Ref 1	7).							
	rce and the receptor was calculated using the ordinates given above, the angle was calcul								
Building Area: The building area is the	e cross-sectional area of the tank.								
45 ft (diameter) x 35 ft	(height) = 1575 ft 2 = 146.3 m 2								
The 35 ft height does n	ot include the height of the tank roof.								
Initial Diffusion Coefficients: A point	source has been assumed with Σy and Σz a	e set to zero.							
The rest of the ARCON96 parameters have the same values listed in Table –1.									
-	at the end of Appendix B. The X/Q values	are summarized below:							
Table AT-1. X	/Q (s/m ³) Values from the CST to Remote-	1 Intake							
Ĺ	Time Period X/Q (s/m ³)								
	0 - 2 h 4.18E-04 2 - 8 h 1.59E-04	-							
	8 - 24 h 6.31E-05	-{							
· · · · ·	1 - 4 d 5.78E-05								
L	4 - 30 d 5.57E-05								