DOCKETED	
Docket Number:	22-SPPE-01
Project Title:	Bowers Backup Generating Facility
TN #:	248688
Document Title:	BBGF Thermal Plume Analysis DR-45
Description:	N/A
Filer:	Scott Galati
Organization:	DayZenLLC
Submitter Role:	Applicant Representative
Submission Date:	2/7/2023 1:59:57 PM
Docketed Date:	2/7/2023

Vertical Plume Velocity Assessment

Bowers Backup Generating Facility

Santa Clara, California

Submitted to California Energy Commission

Submitted by

GI PARTNERS

Prepared by

Atmospheric Dynamics, Inc.



January 2023

Introduction

This report presents the evaluation of the Bowers Backup Generating Facility (BBGF) source generated plumes from the 32 Tier 4 Cummins diesel engines and 64 rooftop chillers on the effects on airport/aircraft operations. The Normal Y. Mineta San Jose International Airport is located approximately 3.1 kilometers east southeast of the BBGF. This report is based upon an analysis prepared by Atmospheric Dynamics, Inc. in accordance with the California Energy Commission (CEC) application requirements for a Small Power Plant Exemption (SPPE) pursuant to the power plant siting regulations. This analysis is but one part of a larger analysis, which seeks an SPPE Decision from the CEC.

Based on the stack parameter data, an analysis of the potential plume characteristics from the routine operation the diesel engines and rooftop chillers on vertical winds was prepared and compared to the California Energy Commission (CEC) significance criteria of 5.3 meters per second (m/s) for the average vertical plume velocities as described below.

Atmospheric Dynamics, Inc. (ADI) prepared a screening level plume vertical velocity assessment which are based on the calm wind Spillane methodology outlined in the "Aviation Safety and Buoyant Plumes" paper (Peter Best, et. al., presented at the Clean Air Conference, Newcastle, New South Wales, Australia, 2003). This methodology is also recognized as a screening tool for aviation safety set out by the Australian Civil Aviation Safety Authority (CASA) and presented in "AC 139-5(1) Plume Rise Assessments (CASA, 2012)".

The aim of this screening assessment is to conservatively determine the potential for turbulence generated by the diesel engines and rooftop chillers waste heat exhaust plumes. Part 139.370 of the Australian Civil Aviation Safety Regulations (1998, 2004) provides that CASA may determine that plume velocities in excess of 4.3 m/s is or will be a potential hazard to aircraft operations. The *Manual of Aviation Meteorology* (Australian Bureau of Meteorology 2003) defines severe turbulence as a vertical wind gust velocity in excess of 10.6 m/s. The assumed critical vertical velocity used as a CEC significance threshold is 5.3 meters per second* (m/s) but it should be noted that the basis of the original CASA derived threshold of 4.3 m/s has been lost in antiquity and that CASA no longer relies on the 1998 and 2004 regulations that established this critical threshold other than to note that a more rigorous analysis, which includes site specific meteorology, should be used if the 4.3 m/s and 10.6 m/s screening thresholds are exceeded. The screening method uses absolute worst-case assumptions of calm winds and neutral atmospheric conditions for the entire vertical extent of the plume to determine these worst-case impacts. It should be noted that these results are extremely conservative in that these worst-case conditions typically only occur during a few hours each year.

The Spillane methodology is generally applied to a limited number of plume source geometry's (turbines, power plant boilers, etc.) with the stacks arranged linearly (in a single straight-line) and separated by distances that typically exceed the individual stack diameters. For the diesel engines, this assumption was maintained. Only one engine stack was modeled consistent with the normal operational testing schedule of the emergency generator engines. For the chiller assessment, a conservative assumption was made in order to use the Spillane methodology on an atypical chiller plume configuration, which is made up of 88 chillers arranged on a two-dimensional surface. Here, the methodology, as described below, assumed that all sixteen chiller cells for each chiller were merged into a single stack with an effective diameter based on the combined area of all sixteen chiller cells. In other words, a single stack was assumed to initially



describe the release parameters of the combined chiller cells in each of the 88 individual chillers. The effective plume diameter is appropriate for each individual chiller based on the close proximity and arrangement of the sixteen chiller cells.

Screening Methodology and Vertical Plume Velocity Calculations

The Spillane methodology is based on worst-case calm wind neutral stability conditions to assess the average plume vertical velocity as a function of height. The methodology is based on well-verified laboratory and theoretical treatments of the rise and spread of a buoyant jet, both into a still ambient environment and into a light crosswind. This treatment covers in detail the initial dynamics of the plume as it exits the stack and the entrainment of ambient air into the plume as it rises directly above the stack. In addition to providing clarifications and algebraic solutions to the Spillane methodology, the 2003 Peter Best paper provides additional methodologies that also consider the enhancement of vertical velocities that may occur if the plumes from multiple identical stacks merge and form a higher buoyancy combined plume (referred to here as the enhanced Spillane methodology).

The vertical plume assessment will involve several stages of development. For individual plumes, the stages are:

- (a) In the first stage very close to the stack exit, the high plume momentum will result in a short section in which the conditions at the center of the plume are relatively unaffected by ambient and plume buoyancy conditions. This jet phase extends from the stack exit to approximately a distance of 6.25 D above the stack (where D is the stack diameter) in calm conditions. At the end of this stage, the plume-averaged vertical velocity has decreased to half of the stack exit velocity, with a corresponding increase, or doubling, in effective plume diameter.
- (b) In the second stage, the plume responds to differences between ambient and plume buoyancy conditions, with much cooler and less turbulent ambient air being entrained into the plume from the outside regions of the plume towards the plume centerline. The momentum and buoyancy of the plume significantly influences plume rise and subsequently the dilution of the stack exhaust to decrease plume vertical velocities. This dilution is very sensitive to ambient wind speed, so the calm wind conditions considered here are extremely conservative.
- (c) In the third stage of plume development, plume rise is due entirely to the buoyancy of the plume and continues from some distance until there is an equalization of turbulence conditions within and outside the plume. This final rise is often only achieved at considerable heights/distances from the stack where the effective average vertical velocity is then close to zero. Since there is very little turbulence and near-zero vertical velocities, this stage of plume development is usually not considered for this type of analysis.

In the second stage of development, the analytical solution of the governing equations under these conditions is given by:

$$a = 0.16(z - z_v)$$

 $V = \{(Va)o^3 + 0.12Fo [(z - zv)^2 - (6.25D - zv)^2]\}^{1/3} / a$



Where the subscript 'o' refers to values of the parameters at the stack outlet and the variables are:

- a plume radius (m)
- V average vertical velocity (m/s)
- z height above stack top (m)
- z_{ν} virtual source height (m)
- D stack diameter (m)
- F_o buoyancy flux evaluated at the stack outlet (m⁴s⁻³)

These are the two primary equations governing the growth of a single plume in the second stage of development under neutral calm wind conditions. Additional equations governing the first stage of single plume development as well as the interaction of multiple plumes in the second stage of development are discussed in detail in the Best paper.

For multiple stacks in the enhanced Spillane methodology, the equations governing the second stage are calculated from the point when the plumes begin to merge until they are fully merged. The plume merging begins at the height where the plume diameters equal the stack separations and the plumes are fully merged at the height where the plume diameters are equal to 2d(N-1)/2 for three or more stacks or 2d for two stacks. At the fully merged height, the merged plume diameter and velocity is enhanced by the fourth root of the number of stacks. Above the fully merged plume height, the enhanced plume diameter and plume velocities follow the regular equations given for the second stage. Below the fully merged plume height for the merging phase, plume velocities are linearly interpolated by height from the single plume velocity at the height where the plumes begin to merge to the enhanced plume velocity at the fully merged plume height.

Vertical Plume Velocity Calculations for the Diesel Engines

The BBGF is comprised of 44 individual large and one (1) small diesel emergency generator stacks. The small diesel emergency generator was not assessed as it would have smaller plume vertical velocities. Generator stack parameter data (plume exit velocity, plume exit temperature and stack exit diameter) were provided by Cummins. Only one (1) engine will be tested during any one hour. While the engines will be tested at minimum loads, the 100 percent load case was utilized for the worst-case plume analysis. For the engine analysis, two ambient conditions were considered: 41.0°F, the minimum monthly mean of daily minimum temperatures, and 84.3°F, the maximum monthly mean of daily maximum temperatures for the San Jose Airport (*"Climatology of the United States No. 81 – Monthly Station Normals of Temperature, Precipitation, and Heating and Cooling Degree Days 1971-2000 – California"*, February 2002, and *"Climatology of the United States No 20 – Monthly Station Climate Summaries, 1971-2000 – California"*, February 2004). These data is summarized in Table 1.



T. Cummins Diesel Stack Characterist	able 1 ics for Vertical	Plume Velocity A	nalysis
	Case #	1	2
Ambient Temperature (°F)*		41.0	41.0
Stack Diameter (m)		0.559	0.559
Exhaust Velocity (m/s)*		43.89	43.89
Exhaust Temperature (K)*		762.04	762.04
Stack Release Height (m)		15.24	15.24
Stack Buoyancy Flux (m ⁴ /s ³)		21.34	20.29
*Stack data provided by Cummins at 100% load			

Screening level vertical plume velocity assessments were made for two ambient temperatures with calm winds and neutral atmospheric conditions for the cases presented in Table 1 which are based on 100 percent load. The results based on the two ambient conditions are presented in Table 2 and the output from the calculation spreadsheet provided in Attachment A.

The initial jet phase extends to a height of about 62 feet above grade level (ft-agl) for both cases. After the jet phase, plume temperature buoyancy characteristics modeled in the Spillane methodology cause a uniform decrease in plume-averaged vertical velocities, with the critical plume-averaged vertical velocity of 5.3 m/s occurring at about 89 ft-agl for both cases.

Table 2 Diesel Engine Vertical Plume Velocity Analysis Re	sults for Referen	ce Height
Case #	1	2
Ambient Temperature (°F)	41.0	84.3
Single Plume Results:		
Plume-Averaged Vertical Velocity at 200 feet-agl (m/s)	2.48	2.45
Height of 5.3 m/s Plume-Averaged Vertical Velocity (feet-agl)	88.3	88.9

These screening results indicate that mechanical and thermal turbulence levels due to the flow from the diesel engine always remain in the light turbulence category and below the significance level of 5.3 m/s at all heights above about 89 ft-agl. Even light wind speeds can dramatically decrease the predicted plume-averaged vertical velocities, so the above results are very conservative indications of adverse conditions. The important factor for a given location is the appropriateness of available information for estimating true wind and temperature profiles throughout a typical year. Theoretical calculations, as shown in the tables above, are likely to overestimate the expected vertical velocities, for the following reasons:

- The wind profile is assumed constant with height with no occurrence of wind-shear when realistically, there is a considerable variation with height, especially in light winds;
- Worst-case scenarios are based on very light-wind, near-neutral atmospheric conditions with maximum loading.

Vertical Plume Velocity Calculations for the Rooftop Chillers

The 63 rooftop chillers are each comprised of 20 individual cells, with a cell fan diameter of 34 inches. The 63 chillers are generally arranged 21 along the longer building length (averaging 20 feet between adjacent chillers) by three (3) along the shorter building width (averaging 45 feet between adjacent chillers). Based on the groupings of chillers, the single and merged plumes were based on the 63 (3x21) chiller arrangement my merging plumes along the length (3 merged



stacks) and width (21 merged stacks). Chiller stack parameter data (exit velocity and temperature) were provided by the applicant. An effective stack diameter for all 20 cells was utilized for each chiller. The chillers will utilize variable speed fans and the number of fans that are operational are dependent upon ambient temperature and plant load. However, to be conservative, all chillers/cells were assumed to be operating at full load. These data are summarized in Table 3 for the same ambient temperatures used for the engine analysis.

	Case #	1	2
Ambient Temperature (°F)*		41.0	84.3
Effective Stack Diameter (m)**		3.86	3.86
Exhaust Velocity (m/s)*		8.06	8.06
Exhaust Temperature (K)*		289.26	313.32
Stack Release Height (m)		31.35	31.35
Stack Buoyancy Flux (m ⁴ /s ³)		11.33	10.45

The Spillane methodology was originally developed to treat multiple individual stacks that are arranged along a linear x or y direction, but not both directions at once, with stack separations much greater than the stack diameters, typical of boilers/turbines at large power plants. As noted above, the 63 chillers are generally arranged in a 3 x 21 pattern. Therefore, the enhanced Spillane methodology was based on calculating the total merging height for the largest linear direction of chiller placements (which is 21 chillers spaced 20.0 feet apart along the longer length of the building). The largest grouping of 63 (3x21) chillers were considered in the calculation of vertical velocity plume enhancement (both at and above the totally merged height, and for the interpolation down to the plume touching height.

Screening level vertical plume velocity assessments were made for the same ambient temperatures with calm winds and neutral atmospheric conditions as was done for the emergency generator engines. The results are presented in Table 4 and the output from the calculation spreadsheets are provided in Attachment A.

The initial jet phase extends to a height of about 182.5 ft-agl for both cases. The critical plume-averaged vertical velocity of 5.3 m/s occurs in the jet phase at about 157 ft-agl for both cases. The plumes touch (begin to merge) at about 167 ft-agl and are fully merged at about 1,356 ft-agl for both cases. Under the enhanced Spillane methodology, the merged plume-averaged vertical velocities never approach 5.3 m/s (either above the totally merged height or when interpolated down to the touching height).

Table 4 Chiller Vertical Plume Velocity Analysis Results	for Reference H	eight
Case #	1	2
Ambient Temperature (°F)	41.0	84.3
Single Plume Results:		
Height of 5.3 m/s Plume-Averaged Vertical Velocity (Within the Jet Phase, feet-agl)	157.6	157.6
Merged Plume Results:		
Plume-Averaged Vertical Velocity at 1,000 feet-agl (m/s)	3.97	3.89



From these results and for each ambient condition, the vertical plume velocities are less than the threshold value of 5.3 m/s for all heights above about 158 ft-agl and above for the chillers. The heights at which plume-averaged vertical velocities exceed 5.3 m/s only occur during the jet phase for both cases. These cases also represent worst-case conditions of calm winds at all levels of a neutral atmosphere.

These screening results indicate that mechanical and thermal turbulence levels due to the flow from the chillers always remain in the light turbulence category and below the significance level of 5.3 m/s at all heights above about 157.6 ft-agl. Even light wind speeds can dramatically decrease the predicted plume-averaged vertical velocities so the above results are very conservative indications of adverse conditions. The important factor for a given location is the appropriateness of available information for estimating true wind and temperature profiles throughout a typical year. Theoretical calculations, as shown in the tables above, are likely to overestimate the expected vertical velocities, for the following reasons:

- The wind profile is assumed constant with height with no occurrence of wind-shear when realistically, there is a considerable variation with height, especially in light winds;
- Worst-case scenarios are based on very light-wind, near-neutral atmospheric conditions with maximum loading.



Attachment A Spillane Method Plume Velocity Calculations



	"Aviation Sa	-	-					
	"The Evaluat		-	-			arious Heights in the Plume	
		from a Gas-	Turbine Pow	er Station a	it Oakey, Q	ueensland,	Australia," Dr. K.T. Spilla	ne
mbient Conditions:					Constants:		eutral conditions (dθ/dz=0 or	$\theta_a = \theta_e$)
Ambient Potential Temp θ _a	278.15	Kelvins	41.0	°F			meters/feet	
lume Exit Conditions:					Gravity g		m/s ²	
Maximum Stack Height h _s		meters	50	feet-inches	λ	1.11		
Stack Diameter D	0.5588			inches	λο	~1.0		
Stack Velocity V _{exit}	43.89		143.99					
Volumetric Flow		cu.m/sec	22,806		πV _{exit} D ² /4			Sect.2/¶1
Stack Potential Temp θ _s	762.04	Kelvins	912	°F				
Initial Stack Buoyancy Flux Fo	21.3430	m ⁴ /s ³			gV _{exit} D ² (1-6	$\theta_a/\theta_s)/4 = V$	ol.Flow(g/π)(1-θ _a /θ _s)	Sect.2/¶1
Plume Buoyancy Flux F	N/A	m ⁴ /s ³			$\lambda^2 g Va^2 (1-\theta_s)$	_a /θ _p) for a,V	θ_p at plume height (see below)	w)
No.of Stacks N	1			1.000	Multiple Sta	ack Multipli	cation Factor (N ^{0.25})	
onditions at End (Top) of Jet Phase:								
Height above Stack z _{jet}	3.493	meters*	11.5	feet*	$z_{jet} = 6.25D$, meters*=	meters above stack top	Sect.3/¶1
Height above Ground z _{jet} +h _s	18.733	meters	61.5	feet				
Vertical Velocity V _{jet}	21.945	m/s	72.00	ft/sec	$V_{jet} = 0.5V_{e}$	$v_{exit} = V_{exit}/2$		
Plume Top-Hat Diameter 2a _{jet}	1.118	meters	3.7	feet	$2a_{jet} = 2D$		Conservation of momentum	
pillane Methodology - Analytical Solutions f	or Calm Con	ditions for Pl	ume Heights	s above Jet	Phase			
Single Plume-averaged Vertical Velocity	/ given by Ar	nalytical Sol	ution in Pape	er where P	roduct Va	given by e	quations below:	
Plume Top-Hat Radius a		olutions in T					rease with height	Sect.2/Eq.6
Virtual Source Height z _v	1.382	meters*	4.5	feet*	,.		ers*=meters above stack top	Sect.2/Eq.6
Height above Ground z _v +h _s	16.622	meters	54.5	feet			where $(\theta_a/\theta_s)^{1/2} = (\theta_e/\theta_s)^{1/2} =$	
Vertical Velocity V		olutions in T			${(Va)_o}^3 + 0.$	12F _o [(z-z.	,) ² - (6.25D-z _v) ²]} ^(1/3) / a	Sect.2.1(6)
Product (Va) _o	7.409				$V_{exit}D/2(\theta_e/$			`,
					· =\-er	-,		
Solve for plume-averaged vertical veloc	city at height	200.0	feet	60 9e	meters abo	ve ground (z'+h。)	
Gives the following Height above Stack z'		meters*	150.0			g.Junu (- · · · » /	
Plume Top-Hat Diameter 2a'	14.188		46.5		2a'=2*0.16(7'-7)		Sect.2/Eq.6
Vertical Velocity V	2.478			ft/sec		,	/) ² -(6.25D-z _v) ²]} ^(1/3) /(2a/2)	Sect.2/Eq.6
vertical velocity v	2.478	m/s	8.13	π/sec	V={(Va) ₀ +	U.12Fo[(Z-Z	/) -(6.25D-Z _V)]}***/(2a/2)	Sect.2/Eq.6
Calva fan Halada af CACC anida al sandia al								
Solve for Height of CASC critical vertical			m/s plume-a			-		> Top of Jet (Spillan
Find Height above Stack z _{crit}	11.687		38.3				Iltaneously in both eqs. (i.e.,	
Height above Ground z _{crit} +h _s	26.927	meters	88.3	teet	for V=4.3 m		e cubic equation ax3+bx2+cx	
							and b=-(0.12F _o)/(4.3 ³ 0.16 ³)=	-4.20
		Phase:			and d	l=[0.12F _o (6.	$(25D-z_v)^2-(Va)_o^3]/(4.3^30.16^3)=$	-648.
Interpolated Height of critical vertical ve	-							
Find Height above Stack z _{crit}	#N/A	meters	#N/A					
-	#N/A		#N/A #N/A			give	s the real solution x = z-zv =	10.30
Find Height above Stack z _{crit}	#N/A	meters				give		/www.1728.org/cubic.ht 10.304 11.68
Find Height above Stack z _{crit}	#N/A	meters				give	s the real solution x = z-zv =	10.30
Find Height above Stack $z_{\rm crit}$ Height above Ground $z_{\rm crit}$ + $h_{\rm s}$	#N/A #N/A	meters meters	#N/A	feet	d of jet pha		s the real solution x = z-zv = or z(m/above stack) =	10.30 11.6
Find Height above Stack $z_{\rm crit}$ Height above Ground $z_{\rm crit}$ + $h_{\rm s}$	#N/A #N/A	meters meters	#N/A Velocities sta	feet arting at en			s the real solution x = z-zv = or z(m/above stack) =	10.30 11.6
Find Height above Stack $z_{\rm crit}$ Height above Ground $z_{\rm crit}$ + $h_{\rm a}$ able of Plume Top-Hat Diameters (2a) and P	#N/A #N/A flume-Averag (meters)	meters meters ed Vertical V	#N/A Velocities sta	feet arting at en Plume			s the real solution x = z-zv = or z(m/above stack) =	10.30 11.6
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and P Height (feet)	#N/A #N/A flume-Averag (meters)	meters meters ed Vertical V	#N/A Velocities sta SingleStk	feet arting at en Plume			s the real solution x = z-zv = or z(m/above stack) =	10.30 11.6
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground	#N/A #N/A flume-Averag (meters) above stack	meters meters ed Vertical Vertical Radius(m) 0.279	#N/A Velocities sta SingleStk VertVel(m/s)	rting at en Plume Temp(K)			s the real solution x = z-zv = or z(m/above stack) =	10.30 11.6 88
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0	#N/A #N/A flume-Averag (meters) above stack 0.00	meters meters ed Vertical Vertical Radius(m) 0.279	#N/A Velocities sta SingleStk VertVel(m/s) 43.89	rting at en Plume Temp(K)			s the real solution x = z-zv = or z(m/above stack) = z(ft/above ground) =	10.30 11.6 88 5 foot Interva
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0	#N/A #N/A *Iume-Averag (meters) above stack 0.00 1.52	meters meters ed Vertical Vertical Radius(m) 0.279 0.401	#N/A Velocities sta SingleStk VertVel(m/s) 43.89 34.35	feet arting at en Plume Temp(K)			s the real solution x = z-zv = or z(m/above stack) = z(ft/above ground) = Jet Phase Eqs:	10.30 11.6 88 5 foot Interva
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0	#N/A #N/A #Ilume-Averag (meters) above stack 0.00 1.52 3.05	meters meters ed Vertical Ver	#N/A Velocities sta SingleStk VertVel(m/s) 43.89 34.35 24.81	feet arting at en Plume Temp(K)			s the real solution x = z-zv = or z(m/above stack) = z(ft/above ground) = Jet Phase Eqs: Linearly interpolated from Stack R	10.30 11.6 88 5 foot Interva
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0	#N/A #N/A *N/A *N/A *N/A *N/A *N/A *N/A *N/A *	meters meters ed Vertical ' Plume Radius(m) 0.279 0.401 0.522 0.559 0.754	#N/A Velocities sta SingleStk VertVel(m/s) 43.89 34.35 24.81 21.95	arting at en Plume Temp(K) 363.00			s the real solution x = z-zv = or z(m/above stack) = z(ft/above ground) = Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: Vplume=((Va) ₀ 3+0.12F _s ((z-z _v) ² -(6.2	10.30 11.6 88 5 foot Interve el.Ht to Top of Jet 5D-z ₊) ²]) ^{1/2} / a
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0	#N/A #N/A *Iume-Averag (meters) above stack 0.00 1.52 3.05 3.51 6.10 9.14	meters meters ed Vertical \(^1\) Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242	#N/A Velocities sta SingleStk VertVel(m/s) 43.89 34.35 24.81 21.95	ring at en Plume Temp(K) 363.00 326.43			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.30 11.6 86 5 foot Intervenient to Top of Jet 5D-2.,) ²]) ^{1,3} / a 10 foot Interve
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0	#N/A #N/A *N/A *N/A *N/A *N/A *N/A *N/A *N/A *	meters meters ed Vertical ' Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730	#N/A Velocities stat SingleStk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12	ring at en Plume Temp(K) 363.00 326.43			s the real solution x = z-zv = or z(m/above stack) = z(ft/above ground) = Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: Vplume=((Va) ₀ 3+0.12F _s ((z-z _v) ² -(6.2	10.30 11.6 86 5 foot Intervenient to Top of Jet 5D-2.,) ²]) ^{1,3} / a 10 foot Interve
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.3	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters ed Vertical \(^1\) Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242	#N/A Velocities state SingleStk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30	arting at en Plume Temp(K) 363.00 326.43 310.22 312.24			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.30 11.6 8i 5 foot Interview to Top of Jet 5D-2.,) ²]) ^{1,2} / a 10 foot Interview
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a hable of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 Spillane 5.3 m/s Height = 88.3	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730 1.649 2.217	#N/A Velocities state SingleStk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33	feet Arting at en Plume Temp(K) 363.00 326.43 310.22 312.24 301.20			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.30 11.6 8i 5 foot Interview to Top of Jet 5D-2.,) ²]) ^{1,2} / a 10 foot Interview
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.3 100.0 110.0	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730 1.649 2.217 2.705	#N/A Velocities state SingleStk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33 3.85	arting at en Plume Temp(K) 363.00 326.43 310.22 312.24 301.20			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.30 11.6 81 5 foot Intervent to Top of Jet 5D-z _v) ²] ^{1/2} /a 10 foot Intervent 1
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack-Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.3 100.0 110.0 120.0	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730 1.649 2.217 2.705 3.193	#N/A Velocities state SingleStk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33 3.85	feet feet feet feet feet feet feet feet			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.30 11.6 81 5 foot Intervent to Top of Jet 5D-z _v) ²] ^{1/2} /a 10 foot Intervent 1
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 Spillane 5.3 m/s Height = 88.3 100.0 110.0 120.0 130.0	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730 1.649 2.217 2.705 3.193 3.680	#N/A Velocities state SingleStk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33 3.85 3.52 3.27	arting at en Plume Temp(K) 363.00 326.43 310.22 312.24 301.20 295.60 291.85 289.22			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.30 11.6 81 5 foot Intervent to Top of Jet 5D-z _v) ²] ^{1/2} /a 10 foot Intervent 1
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.3 100.0 110.0 120.0 130.0 130.0 140.0	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730 1.649 2.217 2.705 3.193 3.680 4.168	#N/A Velocities sta Single Stk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33 3.85 3.52 3.27 3.09	feet Arting at en Plume Temp(K) 363.00 326.43 310.22 312.24 301.20 295.60 291.85 289.22 287.30			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.30 11.6 81 5 foot Intervent to Top of Jet 5D-z _v) ²] ^{1/2} /a 10 foot Intervent 1
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.3 100.0 110.0 120.0 130.0 140.0 150.0	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730 1.649 2.217 2.705 3.193 3.680 4.168 4.656	#N/A Velocities state Single Stk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33 3.85 3.52 3.27 3.09 2.94	feet Arting at en Plume Temp(K) 363.00 326.43 310.22 312.24 301.22 295.60 291.85 289.22 287.30 285.86			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.30 11.6 88 5 foot Intervent to Top of Jet 5D-z-y^2]\frac{10}{2} / a 10 foot Intervent 10 foot Inter
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack-Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.3 100.0 110.0 120.0 130.0 140.0 150.0 200.0	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730 1.649 2.217 2.705 3.193 3.680 4.168 4.656 7.094	#N/A Velocities state SingleStk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33 3.85 3.52 3.27 3.09 2.94 2.48	arting at en Plume Temp(K) 363.00 326.43 310.22 312.24 301.20 295.60 291.85 289.22 287.30 285.86 282.09			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.30 11.6 8i 5 foot Interview to Top of Jet 5D-2.,) ²]) ^{1,2} / a 10 foot Interview
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 Spillane 5.3 m/s Height = 88.3 100.0 110.0 120.0 130.0 140.0 150.0 200.0 200.0	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730 1.649 2.217 2.705 3.193 3.680 4.168 4.656 7.094	#N/A Velocities state SingleStk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33 3.85 3.52 3.27 3.09 2.94 2.48 2.22	363.00 363.00 326.43 310.22 312.24 301.20 295.60 291.85 289.22 287.30 285.86 282.09 280.58			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.30 11.6 88 5 foot Intervent to Top of Jet 5D-z-y^2]\frac{10}{2} / a 10 foot Intervent 10 foot Inter
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.3 100.0 110.0 120.0 130.0 140.0 150.0 200.0 255.0 300.0	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730 1.649 2.217 2.705 3.193 3.680 4.168 4.656 7.094	#N/A Velocities state Single Stk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33 3.85 3.52 3.27 3.09 2.94 2.48 2.22 2.05	363.00 363.00 326.43 310.22 312.24 301.20 295.60 291.85 289.22 287.30 285.86 282.09 280.58 279.82			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.30 11.6 88 5 foot Intervent to Top of Jet 5D-z-y^2]\frac{10}{2} / a 10 foot Intervent 10 foot Inter
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.3 100.0 110.0 120.0 130.0 140.0 150.0 200.0 250.0 300.0 350.0	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730 1.649 2.217 2.705 3.193 3.680 4.168 4.656 7.094 9.532 11.971 14.409	#N/A Velocities state SingleStk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33 3.85 3.52 3.27 3.09 2.94 2.48 2.22 2.05 1.92	feet Arting at en Plume Temp(K) 363.00 326.43 310.22 312.24 301.22 295.60 291.85 289.22 287.30 285.86 282.09 280.58 279.82 279.38			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.30 11.6 88 5 foot Intervent to Top of Jet 5D-z-y^2]\frac{10}{2} / a 10 foot Intervent 10 foot Inter
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.3 100.0 110.0 120.0 130.0 140.0 150.0 200.0 250.0 300.0 350.0	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters Plume Radius(m) 0.279 0.401 0.522 0.5529 0.754 1.242 1.730 1.649 2.217 2.705 3.193 3.680 4.168 4.656 7.094 9.532 11.971 14.409 16.848	#N/A Velocities state SingleStk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33 3.85 3.52 3.27 3.09 2.94 2.48 2.22 2.05 1.92 1.82	arting at en Plume Temp(K) 363.00 326.43 310.22 312.24 301.20 295.60 291.85 289.22 287.30 285.86 282.09 280.58 279.82 279.38			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.30 11.6 88 5 foot Intervent to Top of Jet 5D-z-y^2]\frac{10}{2} / a 10 foot Intervent 10 foot Inter
Find Height above Stack z _{ort} Height above Ground z _{ort} +h _s height feet) able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 Spillane 5.3 m/s Height = 88.3 100.0 110.0 120.0 130.0 140.0 150.0 200.0 250.0 300.0 350.0 400.0 450.0	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730 1.649 2.217 2.705 3.193 3.680 4.168 4.656 7.094 9.532 11.971 14.409 16.848 19.286	#N/A Velocities state SingleStk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33 3.85 3.52 3.27 3.09 2.94 4.48 2.22 2.05 1.92 1.82	363.00 363.00 326.43 310.22 312.24 301.20 295.60 291.85 289.22 287.30 285.86 279.82 279.10 278.91			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.30 11.6 88 5 foot Intervent to Top of Jet 5D-z-y^2]\frac{10}{2} / a 10 foot Intervent 10 foot Inter
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.3 100.0 110.0 120.0 130.0 140.0 150.0 200.0 250.0 300.0 350.0	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730 1.649 2.217 2.705 3.193 3.680 4.168 4.656 7.094 9.532 11.971 14.409 16.848 19.286	#N/A Velocities state SingleStk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33 3.85 3.52 3.27 3.09 2.94 4.48 2.22 2.05 1.92 1.82	363.00 363.00 326.43 310.22 312.24 301.20 295.60 291.85 289.22 287.30 285.86 279.82 279.10 278.91			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	5 foot Intervent to Top of Jet 5D-z-y ²] ^{1/2} / a 10 foot Intervent a ² +λ ²))) Max<5.30 n
Find Height above Stack z _{ort} Height above Ground z _{ort} +h _s hable of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 6.0 70.0 80.0 70.0 80.0 Spillane 5.3 m/s Height = 88.3 100.0 110.0 120.0 130.0 250.0 300.0 350.0 400.0 450.0	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730 1.649 2.217 2.705 3.193 3.680 4.168 4.656 7.094 4.9.532 11.971 14.409 16.848 19.286 21.724	#N/A Velocities state SingleStk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33 3.85 3.52 3.27 3.09 2.94 4.48 2.22 2.05 1.92 1.82	feet Arting at en Plume Temp(K) 363.00 326.43 310.22 312.24 301.22 295.60 291.85 289.22 287.30 285.86 282.09 280.58 279.82 279.38 279.10 278.91 278.77			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.36 11.6 8 5 foot Intervel. Ht to Top of Jet 5D·2,⟩²]¹¹²/a 10 foot Interventa (a²+λ²))) Max<5.30 r
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.3 100.0 110.0 120.0 130.0 140.0 155.0 200.0 255.0 300.0 350.0 400.0	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730 1.649 2.217 2.705 3.193 3.680 4.168 4.656 7.094 9.532 11.971 14.409 16.848 19.286 21.724 26.601	#N/A Velocities state SingleStk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33 3.85 3.52 3.27 3.09 2.94 2.48 2.22 2.05 1.92 1.82 1.74 1.67	arting at en Plume Temp(K) 363.00 326.43 310.22 312.24 301.22 295.60 291.85 289.22 287.30 285.86 282.09 280.58 279.92 279.38 279.10 278.91 278.77 278.60			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.30 11.6 8i 5 foot Interv. el.Ht to Top of Jet 5D-z,⟩²]¹²² / a 10 foot Interv. ma*a²*\²))) Max<5.30 m
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.3 100.0 110.0 120.0 130.0 140.0 150.0 200.0 350.0 400.0 450.0 550.0 500.0	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730 1.649 2.217 2.705 3.193 3.680 4.168 4.656 7.094 9.532 11.971 14.409 16.848 19.286 21.724 26.601 31.478	#N/A Velocities state SingleStk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33 3.85 3.52 3.27 3.09 2.94 2.48 2.22 2.05 5.19 1.82 1.74 1.67 1.56 1.47	363.00 368.43 310.22 312.24 301.20 295.60 291.85 289.22 287.30 288.86 282.09 280.58 279.82 279.38 279.10 278.91 278.77 278.60 278.49			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.30 11.6 8i 5 foot Interv. el.Ht to Top of Jet 5D-z,⟩²]¹²² / a 10 foot Interv. ma*a²*\²))) Max<5.30 m
Find Height above Stack z _{ort} Height above Ground z _{ort} +h _a able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 Spillane 5.3 m/s Height = 88.3 100.0 110.0 120.0 130.0 140.0 250.0 300.0 250.0 300.0 450.0 450.0 500.0 600.0 600.0 600.0	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730 1.649 2.217 2.705 3.193 3.680 4.168 4.656 7.094 9.532 11.971 14.409 16.848 19.286 21.724 26.601 31.478 36.355	#N/A Velocities state SingleStk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33 3.85 3.52 3.27 3.09 2.94 2.48 2.22 2.05 5.19 1.82 1.74 1.67 1.56 1.47	arting at en Plume Temp(K) 363.00 326.43 310.22 312.24 301.20 295.60 291.85 289.22 287.30 285.86 282.09 280.58 279.82 279.38 279.10 278.91 278.91 278.91 278.60 278.49 278.41			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.30 11.6 8i 5 foot Interv. el.Ht to Top of Jet 5D-z,⟩²]¹²² / a 10 foot Interv. ma*a²*\²))) Max<5.30 m
Find Height above Stack z _{ort} Height above Ground z _{ort} +h _a hable of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 Spillane 5.3 m/s Height = 88.3 100.0 110.0 120.0 130.0 140.0 155.0 200.0 255.0 300.0 350.0 400.0 450.0 500.0 600.0 700.0 800.0	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730 1.649 2.217 2.705 3.193 3.680 4.168 4.656 7.094 4.9.532 11.971 14.409 16.848 19.286 21.724 26.601 31.478 36.355 41.232	#N/A Velocities state Single Stk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33 3.85 3.52 3.27 3.09 2.94 2.48 2.22 2.05 1.92 1.82 1.74 1.67 1.56 1.47 1.40 1.34	arting at en Plume Temp(K) 363.00 326.43 310.22 312.24 301.20 295.60 291.85 289.20 287.93 279.92 279.38 279.10 278.91 278.41 278.49			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.30 11.6 8i 5 foot Interv. el.Ht to Top of Jet 5D-z,⟩²]¹²² / a 10 foot Interv. ma*a²*\²))) Max<5.30 m
Find Height above Stack z _{ort} Height above Ground z _{ort} +h _a able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.3 100.0 110.0 120.0 130.0 140.0 150.0 200.0 250.0 300.0 350.0 400.0 450.0 600.0 600.0 600.0 600.0 800.0	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730 1.649 2.217 2.705 3.193 3.680 4.168 4.656 7.094 9.532 11.971 14.409 16.848 19.286 21.724 26.601 31.478 36.355 41.232 46.108	#N/A Velocities state Single Stk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33 3.85 3.52 3.27 3.09 2.94 2.48 2.22 2.05 1.92 1.82 1.74 1.67 1.56 1.47 1.40 1.34	arting at en Plume Temp(K) 363.00 326.43 310.22 312.24 301.20 295.60 291.85 289.22 287.30 285.86 282.09 280.58 279.10 278.91 278.77 278.60 278.49 278.41 278.36 278.33			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.36 11.6 8 5 foot Intervel. Ht to Top of Jet 5D·2,⟩²]¹¹²/a 10 foot Interventa (a²+λ²))) Max<5.30 r
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a sable of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.3 100.0 110.0 120.0 130.0 140.0 150.0 200.0 350.0 400.0 450.0 500.0 600.0 700.0 800.0 900.0	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730 1.649 2.217 2.705 3.193 3.680 4.168 4.656 7.094 9.532 11.971 14.409 16.848 19.286 21.724 26.601 31.478 36.355 41.232 46.108 50.985	#N/A Velocities state Single Stk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33 3.85 3.52 3.27 3.09 2.94 2.48 2.22 2.05 1.92 1.82 1.74 1.67 1.56 1.47 1.40 1.34 1.30 1.25	363.00 326.43 310.22 312.24 301.20 295.60 291.85 289.22 287.30 288.86 282.09 280.58 279.82 279.38 279.10 278.91 278.77 278.60 278.49 278.41 278.36 278.33 278.30			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.30 11.6 8i 5 foot Interv. el.Ht to Top of Jet 5D-z,⟩²]¹²² / a 10 foot Interv. ma*a²*\²))) Max<5.30 m
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a table of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 Spillane 5.3 m/s Height = 88.3 100.0 110.0 120.0 130.0 140.0 150.0 200.0 255.0 300.0 350.0 400.0 450.0 500.0 600.0 700.0 800.0 900.0 1000.0 900.0 1100.0	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730 1.649 2.217 2.705 3.193 3.680 4.168 4.656 7.094 4.9.532 11.971 14.409 16.848 19.286 21.724 26.601 31.478 36.355 41.232 46.108 50.985 55.862	#N/A Velocities state Single Stk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33 3.85 3.52 3.27 3.09 2.94 2.48 2.22 2.05 1.92 1.82 1.74 1.67 1.56 1.47 1.40 1.34 1.30 1.25 1.21	363.00 363.30 363.30 326.43 310.22 312.24 301.20 295.60 291.85 289.22 287.30 285.86 282.09 280.588 279.82 279.82 279.83 279.10 278.91 278.77 278.60 278.41 278.36 278.30 278.30 278.30			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.36 11.6 8 5 foot Intervel. Ht to Top of Jet 5D·2,⟩²]¹¹²/a 10 foot Interventa (a²+λ²))) Max<5.30 r
Find Height above Stack z _{ort} Height above Ground z _{ort} +h _a able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.3 100.0 110.0 120.0 130.0 150.0 250.0 350.0 400.0 450.0 600.0 600.0 600.0 600.0 900.0 1100.0 1100.0	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730 1.649 2.217 2.705 3.193 3.680 4.168 4.656 7.094 4.168 4.656 7.094 19.286 21.724 26.601 31.478 36.355 41.232 46.108 50.985 55.862 60.739	#N/A Velocities state Single Stk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33 3.85 3.52 3.27 3.09 2.94 2.48 2.22 2.05 1.92 1.82 1.74 1.67 1.56 1.47 1.40 1.34 1.30 1.25 1.21	arting at en Plume Temp(K) 363.00 326.43 310.22 312.24 301.22 295.60 291.85 289.22 287.30 285.86 282.09 280.58 279.82 279.10 278.91 278.77 278.60 278.49 278.41 278.36 278.33 278.30 278.28			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.36 11.6 8 5 foot Intervel. Ht to Top of Jet 5D·2,⟩²]¹¹²/a 10 foot Interventa (a²+λ²))) Max<5.30 r
Find Height above Stack z _{ort} Height above Ground z _{ort} +h _a sable of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.3 100.0 110.0 120.0 250.0 300.0 250.0 300.0 450.0 600.0 600.0 700.0 800.0 900.0 1100.0 1200.0 1200.0 1200.0 1300.0 1400.0	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730 1.649 2.217 2.705 3.193 3.680 4.168 4.656 7.094 9.532 11.971 14.409 16.848 19.286 21.724 26.601 31.478 36.355 41.232 46.108 50.985 55.862 60.739 65.616	#N/A Velocities state SingleStk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33 3.85 3.52 3.27 3.09 2.94 2.48 2.22 2.05 1.92 1.82 1.74 1.67 1.56 1.47 1.40 1.34 1.30 1.25 1.21	arting at en Plume Temp(K) 363.00 326.43 310.22 312.24 301.20 295.60 291.85 289.22 287.30 285.86 282.09 280.58 279.82 279.38 279.10 278.91 278.77 278.60 278.49 278.41 278.33 278.30 278.28 278.26 278.28			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.36 11.6 8 5 foot Intervel. Ht to Top of Jet 5D-2, y²])¹²² / a 10 foot Interventa (a²+x²))) Max<5.30 r
Find Height above Stack z _{ort} Height above Ground z _{ort} +h _s able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 6.0 70.0 80.0 70.0 80.0 80.0 8pillane 5.3 m/s Height = 88.3 100.0 110.0 120.0 130.0 250.0 300.0 250.0 300.0 450.0 500.0 600.0 700.0 800.0 900.0 1100.0 1100.0	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730 1.649 2.217 2.705 3.193 3.680 4.168 4.656 7.094 9.532 11.971 14.409 16.848 19.286 21.724 26.601 31.478 36.355 41.232 46.108 50.985 55.862 60.739 65.616 70.492	#N/A Velocities state Single Stk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33 3.85 3.52 3.27 3.09 2.94 2.48 2.22 2.05 1.92 1.82 1.74 1.67 1.40 1.34 1.30 1.25 1.21 1.18	arting at en Plume Temp(K) 363.00 326.43 310.22 312.24 301.20 295.60 291.85 289.22 287.30 285.86 282.09 280.58 279.82 279.83 279.10 278.91 278.77 278.60 278.41 278.36 278.30 278.26 278.26 278.26			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.36 11.6 8 5 foot Intervel. Ht to Top of Jet 5D·2,⟩²]¹¹²/a 10 foot Interventa (a²+λ²))) Max<5.30 r
Find Height above Stack z _{ort} Height above Ground z _{ort} +h _a able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.3 100.0 110.0 120.0 130.0 140.0 155.0 200.0 255.0 300.0 350.0 400.0 450.0 600.0 600.0 900.0 1100.0 1100.0 1100.0 120.0 1300.0 140.0 150.0 150.0 150.0 150.0 1600.0	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730 1.649 2.217 2.705 3.193 3.680 4.168 4.656 7.094 4.9.532 11.971 14.409 16.848 19.286 21.724 26.601 31.478 36.355 41.232 46.108 50.985 55.862 60.739 65.616 70.492 75.369	#N/A Velocities state Single Stk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33 3.85 3.52 3.27 3.09 2.94 2.48 2.22 2.05 1.92 1.82 2.05 1.92 1.82 1.74 1.67 1.56 1.47 1.40 1.34 1.30 1.25 1.21 1.18 1.15 1.12	arting at en Plume Temp(K) 363.00 326.43 310.22 312.24 301.22 295.60 291.85 289.22 287.30 285.86 282.09 280.588 279.82 279.83 279.10 278.81 278.77 278.60 278.49 278.41 278.36 278.32 278.32 278.32 278.32			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.36 11.6 8 5 foot Intervel. Ht to Top of Jet 5D·2,⟩²]¹¹²/a 10 foot Interventa (a²+λ²))) Max<5.30 r
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.3 100.0 110.0 120.0 130.0 140.0 150.0 200.0 350.0 400.0 450.0 500.0 600.0 700.0 800.0 900.0 1100.0 1100.0 120.0 130.0 140.0 150.0	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730 1.649 2.217 2.705 3.193 3.680 4.168 4.656 7.094 4.168 4.656 7.094 19.286 21.724 26.601 31.478 36.355 41.232 46.108 50.985 55.862 60.739 65.616 70.492 75.369 80.246	#N/A Velocities state Single Stk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33 3.85 3.52 3.27 3.09 2.94 2.48 2.22 2.05 1.92 1.82 1.74 1.67 1.56 1.47 1.40 1.34 1.30 1.25 1.21 1.18 1.15 1.12 1.10 1.08	arting at en Plume Temp(K) 363.00 326.43 310.22 312.24 301.22 295.60 291.85 289.22 287.30 285.86 282.09 280.58 279.82 279.10 278.91 278.77 278.60 278.49 278.41 278.33 278.30 278.28 278.22 278.32 278.24 278.25			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.36 11.6 8 5 foot Intervel. Ht to Top of Jet 5D·2,⟩²]¹¹²/a 10 foot Interventa (a²+λ²))) Max<5.30 r
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 7op of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.3 100.0 110.0 120.0 130.0 140.0 250.0 300.0 355.0 400.0 450.0 500.0 600.0 700.0 800.0 1100.0 1100.0 1200.0 1300.0 1400.0 1500.0 1600.0 1500.0	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730 1.649 2.217 2.705 3.193 3.680 4.168 4.656 7.094 9.532 11.971 14.409 16.848 19.286 21.724 26.601 31.478 36.355 41.232 46.108 50.985 55.862 60.739 65.616 70.492 75.369 80.246 85.123	#N/A Velocities state SingleStk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33 3.85 3.52 3.27 3.09 2.94 2.48 2.22 2.05 1.92 1.82 1.74 1.67 1.56 1.47 1.40 1.34 1.30 1.25 1.21 1.11 1.10 1.08	arting at en Plume Temp(K) 363.00 326.43 310.22 312.24 301.20 295.60 291.85 289.22 287.30 285.86 282.09 280.58 279.82 279.38 279.10 278.91 278.77 278.60 278.49 278.41 278.33 278.22 278.23			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.30 11.6 8l 5 foot Interviel. Ht to Top of Jet 5D-z,)²])¹²/a 10 foot Interviewa²²*\²))) Max<5.30 n
Find Height above Stack z cnt Height above Ground zcm+h _s able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 Spillane 5.3 m/s Height = 88.3 100.0 110.0 120.0 130.0 140.0 155.0 300.0 350.0 300.0 350.0 600.0 700.0 800.0 100.0 110.0 120.0 120.0 130.0 140.0 150.0	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730 1.649 2.217 2.705 3.193 3.680 4.168 4.656 7.094 9.532 11.971 14.409 16.848 19.286 21.724 26.601 31.478 36.355 41.232 46.108 50.985 55.862 60.739 65.616 70.492 75.369 80.246 85.123	#N/A Velocities state Single Stk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33 3.85 3.52 3.27 3.09 2.94 2.48 2.22 2.05 1.92 1.82 1.74 1.67 1.56 1.47 1.40 1.34 1.30 1.25 1.21 1.18 1.15 1.12 1.10 1.08 1.06 1.04	arting at en Plume Temp(K) 363.00 326.43 310.22 312.24 301.20 295.60 291.85 289.22 287.30 285.86 282.09 280.588 279.82 279.83 279.10 278.91 278.77 278.60 278.84 278.33 278.30 278.28 278.26 278.25 278.24 278.22 278.22			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.30 11.6 88 5 foot Intervent to Top of Jet 5D-z-y^2]\frac{10}{2} / a 10 foot Intervent 10 foot Inter
Find Height above Stack z _{ort} Height above Ground z _{ort} +h _a sable of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 Spillane 5.3 m/s Height = 88.3 100.0 110.0 120.0 130.0 140.0 250.0 300.0 250.0 300.0 450.0 600.0 600.0 700.0 800.0 100.0 1100.0 1100.0 1200.0 1500.0 1000.0 1100.0 1200.0 1300.0 1400.0 1500.0 1500.0 1500.0 1500.0 1500.0 1500.0 1500.0 1500.0	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	meters meters meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.754 1.242 1.730 1.649 2.217 2.705 3.193 3.680 4.168 4.656 7.094 4.656 7.094 1.242 26.601 31.478 36.355 41.232 46.108 50.985 55.862 60.739 65.616 70.492 75.369 80.246 85.123 90.000	#N/A Velocities state Single Stk VertVel(m/s) 43.89 34.35 24.81 21.95 10.18 6.60 5.12 5.30 4.33 3.85 3.52 3.27 3.09 2.94 2.48 2.22 2.05 1.92 1.82 1.74 1.67 1.56 1.47 1.40 1.34 1.30 1.25 1.21 1.18 1.15 1.12 1.10 1.08 1.06 1.044 1.00	arting at en Plume Temp(K) 363.00 326.43 310.22 312.24 301.20 295.60 291.85 289.22 287.30 285.86 282.09 280.588 279.82 279.38 279.10 278.91 278.77 278.60 278.49 278.49 278.24 278.32 278.22 278.32 278.22 278.25			s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(tl/above\ ground)=$ $z(tl/above\ ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $Spillane\ Equations:$ $V_{pinom}=V(va)^2+0.12F_0I(z-z_v)^2-(6.2 a=0.16(z-z_v))$	10.30 11.6 8l 5 foot Interviel. Ht to Top of Jet 5D-z,)²])¹²/a 10 foot Interviewa²²*\²))) Max<5.30 n



	"Aviation Sa	-						
	"The Evaluat		-	-			arious Heights in the Plume	
		from a Gas-	Turbine Pow		-		Australia," Dr. K.T. Spilla	
mbient Conditions:					Constants:		eutral conditions (dθ/dz=0 or	$\theta_a = \theta_e$)
Ambient Potential Temp θ _a	302.21	Kelvins	84.3	°F			meters/feet	
lume Exit Conditions:					Gravity g	9.81	m/s ²	
Maximum Stack Height h _s	15.24	meters	50	feet-inches	λ	1.11		
Stack Diameter D	0.5588	meters	22	inches	λο	~1.0		
Stack Velocity V _{exit}	43.89	m/s	143.99	ft/sec				
Volumetric Flow	10.76	cu.m/sec	22,806	ACFM	$\pi V_{exit}D^2/4$			Sect.2/¶1
Stack Potential Temp θ _s	762.04	Kelvins	912	°F				
Initial Stack Buoyancy Flux Fo	20.2818	m ⁴ /s ³			gV _{exit} D ² (1-6	$\theta_a/\theta_s)/4 = V_0$	ol.Flow(g/ π)(1- θ_a/θ_s)	Sect.2/¶1
Plume Buoyancy Flux F	N/A	m ⁴ /s ³			$\lambda^2 g Va^2 (1-\theta_0)$	_a /θ _p) for a,V	,θ _p at plume height (see belo	w)
No.of Stacks N	1			1.000	Multiple Sta	ack Multiplic	cation Factor (N ^{0.25})	
onditions at End (Top) of Jet Phase:								
Height above Stack z _{iet}	3.493	meters*	11.5	feet*	z _{iet} = 6.250), meters*=i	meters above stack top	Sect.3/¶1
Height above Ground z _{jet} +h _s		meters	61.5		,			
Vertical Velocity V _{jet}	21.945			ft/sec	V _{jet} = 0.5V _e	wie = Vowie/2		
Plume Top-Hat Diameter 2a _{iet}		meters		feet	2a _{iet} = 2D	zait - eath —	Conservation of momentum	
Fiditie Top-Hat Diameter Zajet	1.110	meters	3.7	icci	zajet – zD		Conservation of momentum	
nillana Mathadalagu. Analutiaal Calutiana f	ar Calm Can	litiana far Di	uma Haiabte	ahaya la	Dhasa			
pillane Methodology - Analytical Solutions f								
Single Plume-averaged Vertical Velocity		-	-	. wnere P			•	C-+2/F-2
Plume Top-Hat Radius a		olutions in T		e	. ,,		rease with height	Sect.2/Eq.6
Virtual Source Height z _v		meters*		feet*	σ.25D[1-(θ _e		ers*=meters above stack top	Sect.2/Eq.6
Height above Ground z _v +h _s		meters	54.2	teet			where $(\theta_a/\theta_s)^{1/2} = (\theta_e/\theta_s)^{1/2} =$	
Vertical Velocity V		olutions in T	able Below) ² - (6.25D-z _v) ²]) ^(1/3) / a	Sect.2.1(6)
Product (Va) _o	7.722	m ² /s			$V_{exit}D/2(\theta_e/$	$\theta_{\rm s})^{1/2}$		
Solve for plume-averaged vertical velo	city at height	200.0	feet	60.96	meters abo	ve ground (z'+h _s)	
Gives the following Height above Stack z'	45.720	meters*	150.0	feet*				
Plume Top-Hat Diameter 2a'	14.217	meters	46.6	feet	2a'=2*0.16(Sect.2/Eq.6
Vertical Velocity V	2.445	m/s	8.02	ft/sec	V={(Va) _o ³ +	0.12F _o [(z-z _v	,)2-(6.25D-z _v)2]}(1/3)/(2a//2)	Sect.2/Eq.6
Solve for Height of CASC critical vertical	velocity V _{crit}	5.30	m/s plume-a	veraged v	ertical velo	city	Critical VV	> Top of Jet (Spillar
Find Height above Stack z _{crit}		meters	38.9	_		_	Iltaneously in both eqs. (i.e.,	
Height above Ground z _{crit} +h _s		meters	88.9				e cubic equation ax3+bx2+cx	
Holghi aboto Ground Lenting	2700	motoro	00.0		101 V=4.011		and b=-(0.12F _o)/(4.3 ³ 0.16 ³)=	-3.99
Interpolated Height of critical vertical ve	locity in let	Phase.			and a		$25D-z_v)^2-(Va)_0^3]/(4.3^30.16^3)=$	-735
	locity ili set				and c	=[U. 12F ₀ (6.		/www.1728.org/cubic.h
	481/4							
Find Height above Stack z _{crit}		meters		feet		ai n		
	#N/A	meters	#N/A	feet	d of jet pha		s the real solution x = z-zv = or z(m/above stack) = z(ft/above ground) =	10.57 11.8 8
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and P Height (feet)	#N/A lume-Averag (meters)	meters ed Vertical 'Plume	#N/A Velocities sta SingleStk	feet arting at en Plume			s the real solution x = z-zv = or z(m/above stack) =	10.57 11.8
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground	#N/A lume-Averag (meters) above stack	meters ed Vertical Plume Radius(m)	#N/A /elocities sta SingleStk /ertVel(m/s)	feet arting at en Plume			s the real solution x = z-zv = or z(m/above stack) =	10.57 11.8
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0	#N/A lume-Averag (meters) above stack <i>0.00</i>	meters ed Vertical Plume Radius(m) 0.279	#N/A Velocities sta SingleStk VertVel(m/s) 43.89	rting at en Plume Temp(K)		ase:	s the real solution x = z-zv = or z(m/above stack) = z(ft/above ground) =	10.57 11.8 8
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0	#N/A lume-Averag (meters) above stack 0.00 1.52	ed Vertical Plume Radius(m) 0.279	#N/A Velocities sta SingleStk VertVel(m/s) 43.89 34.35	rting at en Plume Temp(K)		ase:	s the real solution x = z-zv = or z(m/above stack) = z(ft/above ground) = Jet Phase Eqs:	10.57 11.8 8 5 foot Interv
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0	#N/A lume-Averag (meters) above stack 0.00 1.52 3.05	meters ed Vertical Plume Radius(m) 0.279 0.401 0.522	#N/A /elocities sta SingleStk /ertVel(m/s) 43.89 34.35 24.81	rting at en Plume Temp(K)		150:	s the real solution x = z-zv = or z(m/above stack) = z(tf/above ground) = Jet Phase Eqs: Linearly interpolated from Stack R	10.5: 11.8 8 5 foot Interv
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5	#N/A lume-Averag (meters) above stack 0.00 1.52 3.05	ed Vertical Plume Radius(m) 0.279 0.401 0.522 0.559	#N/A Velocities sta SingleStk VertVel(m/s) 43.89 34.35 24.81 21.95	erting at en Plume Temp(K)		150:	s the real solution x = z-zv = or z(m/above stack) = z(ft/above ground) = Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations:	10.57 11.8 8 5 foot Interv
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a suble of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0	#N/A lume-Averag (meters) above stack 0.00 1.52 3.05 3.51 6.10	meters Plume Radius(m) 0.279 0.401 0.522 0.559 0.768	#N/A Velocities sta SingleStk VertVel(m/s) 43.89 34.35 24.81 21.95	arting at en Plume Temp(K)		ase:	s the real solution x = z-zv = or z(m/above stack) = z(ft/above ground) = z(ft/above ground) = Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: V _{plumo} =((Va) _o ³40.12F _{ol} (z-z _v)²-(6.2	10.5: 11.8 8 5 foot Interv el.Ht to Top of Jet
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0	#N/A lume-Averag (meters) above stack 0.00 1.52 3.05 3.51 6.10 9.14	meters ed Vertical ' Plume Radius(m) 0.279 0.401 0.522 0.559 0.768 1.256	#N/A Velocities sta SingleStk VertVel(m/s) 43.89 34.35 24.81 21.95 10.36 6.71	reting at en Plume Temp(K) 385.09 350.11		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a-0.16(z-z_a))]$	10.5; 11.4 8 5 foot Interv el-It to Top of Jet 5D-z,) ²]) ^{1,0} / a 10 foot Interv
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0	#N/A lume-Averag (meters) above stack 0.00 1.52 3.05 3.51 6.10 9.14 12.19	meters ed Vertical ' Plume Radius(m) 0.279 0.401 0.522 0.559 0.768 1.256 1.744	#N/A Velocities stat Single Stk VertVel(m/s) 43.89 34.35 24.81 21.95 10.36 6.71 5.18	reting at en Plume Temp(K) 385.09 350.11 334.39		ase:	s the real solution x = z-zv = or z(m/above stack) = z(ft/above ground) = z(ft/above ground) = Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: V _{plumo} =((Va) _o ³40.12F _{ol} (z-z _v)²-(6.2	10.5; 11.4 8 5 foot Interv el-It to Top of Jet 5D-z,) ²]) ^{1,0} / a 10 foot Interv
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.9	#N/A lume-Averag (meters) above stack 0.00 1.52 3.05 3.51 6.10 9.14 12.19 11.87	meters ed Vertical Plume Radius(m) 0.279 0.401 0.522 0.559 0.768 1.256 1.744 1.692	#N/A Velocities stat SingleStk VertVel(m/s) 43.89 34.35 24.81 21.95 10.36 6.71 5.18	arting at en Plume Temp(K) 385.09 350.11 334.39 335.64		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a-0.16(z-z_a))]$	10.5; 11.4 8 5 foot Interv el-It to Top of Jet 5D-z,) ²]) ^{1,0} / a 10 foot Interv
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 Spillane 5.3 m/s Height = 88.9 100.0	#N/A lume-Averag (meters) above stack 0.00 1.52 3.05 3.51 6.10 9.14 12.19 11.87	meters ed Vertical ' Plume Radius(m) 0.279 0.401 0.522 0.559 0.768 1.256 1.744 1.692 2.232	#N/A Velocities sta SingleStk VertVel(m/s) 43.89 34.35 24.81 21.95 10.36 6.71 5.18 5.30 4.36	rting at en Plume Temp(K) 385.09 350.11 334.39 335.64		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a-0.16(z-z_a))]$	10.5' 11.1 8 5 foot interv el-It to Top of Jet 5D-z,) ²]) ^{1,0} / a 10 foot interv
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a hable of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.9 100.0	#N/A lume-Averag (meters) above stack 0.00 1.52 3.05 3.51 6.10 9.14 12.19 11.87 15.24 18.29	meters ed Vertical ' Plume Radius(m) 0.279 0.401 0.522 0.559 0.768 1.256 1.744 1.692 2.232 2.719	#N/A Velocities state Single Stk VertVel(m/s) 43.89 34.35 24.81 21.95 10.36 6.71 5.18 5.30 4.36 3.85	Temp(K) 385.09 350.11 334.39 335.64 325.56		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a-0.16(z-z_a))]$	10.5' 11.1 8 5 foot Interv eli-lit to Top of Jet 50-2,) ²]) ^{1/2} / a 10 foot Interv ma ^{2a²} λ ²)))
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.9 100.0 110.0	#N/A lume-Averag (meters) above stack 0.00 1.52 3.05 3.51 6.10 9.14 12.19 11.87 15.24 18.29 21.34	meters ed Vertical ' Plume Radius(m) 0.279 0.401 0.522 0.559 0.768 1.256 1.744 1.692 2.232 2.719 3.207	#N/A /elocities sta SingleStk VertVe1(m/s) 43.89 34.355 24.81 21.95 10.36 6.771 5.18 5.30 4.36 3.855 3.551	arting at en Plume Temp(K) 385.09 350.11 334.39 325.64 325.05 320.00 316.26		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a-0.16(z-z_a))]$	10.5; 11.4 8 5 foot interv eli-lit to Top of Jet 50-2, $j^2 j_1^{1/2} / a$ 10 foot interv
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 Spillane 5.3 m/s Height = 88.9 100.0 110.0 120.0 130.0	#N/A lume-Averag (meters) above stack 0.00 1.52 3.05 3.51 6.10 9.14 12.19 11.87 15.24 18.29 21.34 24.38	meters ed Vertical ' Plume Radius(m) 0.279 0.401 0.522 0.559 0.768 1.256 1.744 1.692 2.232 2.719 3.207 3.695	#N/A /elocities state SingleStk VertVel(m/s) 43.89 34.35 24.81 21.95 10.36 6.71 5.18 5.30 4.36 3.85 3.515	arting at en Plume Temp(K) 385.09 350.11 334.39 355.64 320.00 318.26 313.61		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a-0.16(z-z_a))]$	10.5; 11.4 8 5 foot interv eli-lit to Top of Jet 50-2, $j^2 j_1^{1/2} / a$ 10 foot interv
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.9 100.0 110.0 120.0 130.0 130.0 140.0	#N/A lume-Averag (meters) above stack 0.00 1.52 3.05 3.51 6.10 9.14 12.19 11.87 15.24 18.29 21.34 24.38 27.43	meters ed Vertical ' Plume Radius(m) 0.279 0.401 0.522 0.559 0.788 1.256 1.744 1.692 2.232 2.719 3.207 3.6959 4.182	#N/A Velocities state Single Stk VertVel(m/s) 43.89 34.35 24.81 27.95 10.36 6.71 5.18 5.30 4.36 3.85 3.51 3.26 3.07	arting at en Plume Temp(K) 385.09 350.11 334.39 335.64 322.5.66 320.00 316.26 313.61 311.66		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a-0.16(z-z_a))]$	10.5; 11.4 8 5 foot interv eli-lit to Top of Jet 50-2, $j^2 j_1^{1/2} / a$ 10 foot interv
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a hible of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.9 100.0 110.0 120.0 130.0 140.0 150.0	#N/A lume-Averag (meters) above stack 0.00 1.52 3.05 3.51 6.10 9.14 12.19 11.87 15.24 18.29 21.34 24.38 27.43 30.48	meters ed Vertical ' Plume Radius(m) 0.279 0.401 0.522 0.559 0.768 1.266 1.744 1.692 2.232 2.213 3.207 3.695 4.182 4.670	#N/A /elocities sta Single Stk VertVe1(m/s) 43.89 34.55 24.81 21.95 10.36 6.71 5.18 5.30 4.36 3.85 3.51 3.26 3.07 2.91	feet Plume Temp(K) 385.09 350.11 334.39 335.64 325.56 320.00 316.26 313.61 311.66 310.19		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a-0.16(z-z_a))]$	10.5' 11.1 8 5 foot Interv eli-fit to Top of Jet 50-z _v / ² [] ^{1/2} / a 10 foot Interv m ² ² ² ² ²))) Max<5.30 i
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a table of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.9 100.0 110.0 120.0 130.0 130.0 140.0	#N/A lume-Averag (meters) above stack 0.00 1.52 3.05 3.51 6.10 9.14 12.19 11.87 15.24 18.29 21.34 24.38 27.43	meters ed Vertical ' Plume Radius(m) 0.279 0.401 0.522 0.559 0.768 1.266 1.744 1.692 2.232 2.213 3.207 3.695 4.182 4.670	#N/A Velocities state Single Stk VertVel(m/s) 43.89 34.35 24.81 27.95 10.36 6.71 5.18 5.30 4.36 3.85 3.51 3.26 3.07	feet Plume Temp(K) 385.09 350.11 334.39 335.64 325.56 320.00 316.26 313.61 311.66 310.19		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a-0.16(z-z_a))]$	10.5' 11.1 8 5 foot Interv eli-fit to Top of Jet 50-z _v / ² [] ^{1/2} / a 10 foot Interv m ² ² ² ² ²))) Max<5.30 i
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.9 100.0 110.0 120.0 130.0 140.0 150.0	#N/A lume-Averag (meters) above stack 0.00 1.52 3.05 3.51 6.10 9.14 12.19 11.87 15.24 18.29 21.34 24.38 27.43 30.48	meters ed Vertical ' Plume Radius(m) 0.279 0.401 0.522 0.559 0.768 1.266 1.744 1.692 2.232 2.213 3.207 3.695 4.182 4.670	#N/A /elocities sta Single Stk VertVe1(m/s) 43.89 34.55 24.81 21.95 10.36 6.71 5.18 5.30 4.36 3.85 3.51 3.26 3.07 2.91	feet Plume Temp(K) 385.09 350.11 334.39 335.64 325.56 320.00 316.26 313.61 311.66 310.19		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a-0.16(z-z_a))]$	10.5' 11.1 8 5 foot Interv eli-fit to Top of Jet 50-z _v / ² [] ^{1/2} / a 10 foot Interv m ² ² ² ² ²))) Max<5.30 i
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.9 100.0 110.0 120.0 130.0 140.0 150.0 200.0	#N/A lume-Averag (meters) above stack 0.00 1.52 3.05 3.51 6.10 9.14 12.19 11.87 15.24 18.29 21.34 24.38 27.43 30.48 45.72	meters ed Vertical ' Plume Radius(m) 0.279 0.401 0.522 0.559 0.768 1.256 1.744 1.692 2.232 2.719 3.207 3.695 4.182 4.670 7.108 9.547	#N/A /elocities sta SingleStk VertVeI(m/s) 43.89 34.35 24.81 21.95 10.36 6.771 5.18 5.30 4.36 3.858 3.51 3.26 3.07 2.91	385.09 385.09 350.11 334.39 35.64 320.00 316.26 313.61 311.66 310.19 306.31 304.75		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a-0.16(z-z_a))]$	10.5' 11.1 8 5 foot Interv eli-fit to Top of Jet 50-z _v / ² [] ^{1/2} / a 10 foot Interv m ² ² ² ² ²))) Max<5.30 i
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a hable of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 60.0 Top of jet = 61.5 70.0 80.0 Spillane 5.3 m/s Height = 88.9 100.0 110.0 120.0 130.0 140.0 150.0 200.0 250.0	#N/A lume-Averag (meters) above stack 0.00 1.52 3.05 3.51 6.10 9.14 12.19 11.87 15.24 18.29 21.34 24.38 27.43 30.48 45.72 60.96	meters ed Vertical ' Plume Radius(m) 0.279 0.401 0.522 0.559 0.768 1.256 1.744 1.692 2.232 2.719 3.207 3.695 4.182 4.670 7.108 9.547	#N/A /elocities state SingleStk VertVel(m/s) 43.89 34.35 24.81 21.95 10.36 6.71 5.18 5.30 4.36 3.85 3.26 3.07 2.91 2.454 2.19	arting at en Plume Temp(K) 385.09 350.11 334.39 335.64 320.00 316.26 313.61 311.66 310.19 306.31 304.75 303.96		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a-0.16(z-z_a))]$	10.5' 11.1 8 5 foot Interv eli-fit to Top of Jet 50-z _v / ² [] ^{1/2} / a 10 foot Interv m ² ² ² ² ²))) Max<5.30 i
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a hable of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.9 100.0 110.0 120.0 130.0 140.0 150.0 200.0 255.0 300.0	#N/A lume-Averag (meters) above stack 0.00 1.52 3.05 3.51 6.10 9.14 12.19 11.87 15.24 18.29 21.34 24.38 27.43 30.48 45.72 60.96 76.20	meters ed Vertical ' Plume Radius(m) 0.279 0.401 0.522 0.559 0.768 1.266 1.744 1.692 2.232 2.719 3.207 3.695 4.182 4.670 7.108 9.547 11.1985 14.424	#N/A /elocities sta Single Stk VertVe1(m/s) 43.89 34.95 24.81 21.95 10.36 6.77 5.18 5.30 4.38 3.85 3.51 3.26 3.07 2.91 2.45 2.19 2.02 1.89	set feet arting at en Plume Temp(K) 385.09 350.11 334.39 335.64 325.56 320.00 316.26 313.61 311.66 310.19 306.31 304.75 303.96 303.50		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a-0.16(z-z_a))]$	10.5' 11.1 8 5 foot Interv eli-fit to Top of Jet 50-z _v / ² [] ^{1/2} / a 10 foot Interv m ² ² ² ² ²))) Max<5.30 i
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a hible of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.9 100.0 110.0 120.0 130.0 140.0 150.0 200.0 255.0 300.0 350.0	#N/A lume-Averag	meters ed Vertical ' Plume Radius(m) 0.279 0.401 0.522 0.559 0.768 1.256 1.744 1.692 2.232 2.719 3.207 3.695 4.182 4.670 7.108 9.547 11.985 14.424 16.862	#N/A /elocities sta SingleStk VertVeI(m/s) 43.89 34.35 24.81 21.95 10.36 6.771 5.18 5.30 4.36 3.85 3.51 3.26 3.07 2.91 2.45 2.19 2.02 1.89 1.79	set feet arting at en Plume Temp(K) 385.09 350.11 334.39 335.64 325.56 320.00 316.26 313.61 311.66 310.19 306.31 304.75 303.96 303.50		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a-0.16(z-z_a))]$	10.5 11. 5 foot Intervel. Ht to Top of Jet 50-z, γ² γ² γ² / a 10 foot Intervel. a²² γλ²))) Max<5.30 i
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.9 100.0 110.0 120.0 130.0 140.0 150.0 200.0 250.0 300.0 350.0	#N/A lume-Averag (meters) above stack 0.00 1.52 3.05 3.51 6.10 9.14 12.19 11.87 15.24 18.29 21.34 24.38 27.43 30.48 45.72 60.96 76.20 91.44 106.68	meters ed Vertical ' Plume Radius(m) 0.279 0.401 0.522 0.559 0.768 1.256 1.744 1.692 2.232 2.719 3.207 3.695 4.182 4.670 7.108 9.547 11.985 14.424 16.882 19.300	#N/A /elocities sta SingleStk VertVeI(m/s) 43.89 34.35 24.81 21.95 10.36 6.771 5.18 5.30 4.36 3.85 3.51 3.26 3.07 2.91 2.45 2.19 2.02 1.89 1.79	385.09 350.11 334.39 356.64 320.00 316.26 313.61 311.66 310.19 306.31 304.75 303.96 303.50 303.21 303.50		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a-0.16(z-z_a))]$	10.5' 11.1 8 5 foot Interv eli-fit to Top of Jet 50-z _v / ² [] ^{1/2} / a 10 foot Interv m ² ² ² ² ²))) Max<5.30 i
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a hable of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 Spillane 5.3 m/s Height = 88.9 100.0 110.0 120.0 130.0 140.0 155.0 200.0 255.0 300.0 350.0 400.0	#N/A lume-Averag (meters) above stack 0.00 1.52 3.05 3.51 6.10 9.14 12.19 11.87 15.24 18.29 21.34 24.38 27.43 30.48 45.72 60.96 76.20 91.44 106.68 121.92	meters ed Vertical ' Plume Radlus(m) 0.279 0.401 0.522 0.559 0.768 1.256 1.744 1.692 2.232 2.719 3.207 3.695 4.182 4.670 7.108 9.5474 11.985 14.424 16.862 19.300 21.739	#N/A Velocities state Single Stk VertVel(m/s) 43.89 34.95 24.81 27.95 10.36 6.71 5.18 5.30 4.36 3.85 3.51 3.26 3.07 2.91 2.45 2.19 2.02 1.89 1.77 1.64	arting at en Plume Temp(K) 385.09 350.11 334.39 335.64 325.56 320.00 316.26 313.61 311.66 310.19 306.31 304.75 303.96 303.50 303.21 303.01 302.86		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a)_a=0.16(z-z_a)]$	10.5 11.1 8 5 foot interv eli-it to Top of Jet 5D-2, j² j) 1.0 / a 10 foot interv 10 foot interv Max<5.30 i
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a hable of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 6.0 70.0 80.0 70.0 80.0 Spillane 5.3 m/s Height = 88.9 100.0 110.0 120.0 130.0 250.0 300.0 350.0 400.0 450.0	#N/A lume-Averag (meters) above stack 0.00 1.52 3.05 3.51 6.10 9.14 12.19 11.87 15.24 18.29 21.34 24.38 27.43 30.48 45.72 60.96 76.20 91.44 106.68	meters ed Vertical ' Plume Radius(m) 0.279 0.401 0.522 0.559 0.768 1.266 1.744 1.692 2.232 2.719 3.207 3.695 4.182 4.670 7.108 9.547 11.985 14.424 16.862 19.300 21.739 26.616	#N/A /elocities sta Single Stk VertVe1(m/s) 43.89 34.35 24.81 21.95 10.36 6.77 5.18 5.30 4.36 3.85 5.31 3.26 3.30 70 2.91 2.45 2.19 2.02 1.89 1.79 1.71 1.64 1.53	set feet arting at en Plume Temp(K) 385.09 350.11 334.39 335.64 325.56 313.61 311.66 310.19 306.31 304.75 303.96 303.50 303.21 303.01 302.88		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a)_a=0.16(z-z_a)]$	10.5 11.1 8 5 foot interv eli-it to Top of Jet 5D-2, j² j) 1.0 / a 10 foot interv 10 foot interv Max<5.30 i
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a suble of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 Spillane 5.3 m/s Height = 88.9 100.0 110.0 120.0 130.0 140.0 250.0 300.0 250.0 300.0 450.0 500.0 600.0 600.0	#N/A lume-Averag (meters) above stack 0.00 1.52 3.05 3.51 6.10 9.14 12.19 11.87 15.24 18.29 21.34 24.38 27.43 30.48 45.72 60.96 76.20 91.44 106.68 121.92 137.16 167.64	meters ed Vertical ' Plume Radius(m) 0.279 0.401 0.522 0.559 0.768 1.256 1.744 1.692 2.232 2.719 3.207 7.108 9.547 11.985 14.424 16.862 19.300 21.739 26.616 31.492	#N/A /elocities sta SingleStk VertVel(m/s) 43.89 34.35 24.81 21.95 10.36 6.7/1 5.18 5.30 4.36 3.51 3.26 3.07 2.91 2.45 2.19 2.02 1.89 1.79 1.77 1.64	arting at en Plume Temp(K) 385.09 350.11 334.39 335.64 313.61 311.66 310.19 306.31 304.75 303.96 303.50 303.21 303.21 303.286 302.86		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a)_a=0.16(z-z_a)]$	10.5 11.1 8 5 foot interv eli-it to Top of Jet 5D-2, j² j) 1.0 / a 10 foot interv 10 foot interv Max<5.30 i
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a hable of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 Spillane 5.3 m/s Height = 88.9 100.0 110.0 120.0 130.0 140.0 155.0 200.0 255.0 300.0 350.0 400.0 450.0 500.0 600.0 700.0 800.0	#N/A lume-Averag (meters) above stack 0.00 1.52 3.05 3.51 6.10 9.14 12.19 11.87 15.24 18.29 21.34 24.38 27.43 30.48 45.72 60.96 76.20 91.44 106.68 121.92 137.16 167.64 198.12 228.60	meters ed Vertical ' Plume Radlus(m) 0.279 0.401 0.522 0.559 1.256 1.744 1.692 2.232 2.719 3.207 7.108 9.547 11.985 14.424 16.862 19.300 21.739 26.616	#N/A Velocities state Single Stk VertVel(m/s) 43.89 34.35 24.81 21.95 10.36 6.71 5.18 5.30 4.56 3.55 3.51 3.26 2.91 2.45 2.19 2.02 1.89 1.77 1.71 1.64 1.53 1.456 1.38	arting at en Plume Temp(K) 385.09 350.11 334.39 335.64 322.56 320.00 316.26 310.19 306.31 304.75 303.96 303.50 303.21 303.01 302.86 302.68		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a)_a=0.16(z-z_a)]$	10.5 11.1 8 5 foot interv eli-it to Top of Jet 5D-2, j² j) 1.0 / a 10 foot interv 10 foot interv Max<5.30 i
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a table of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 Spillane 5.3 m/s Height = 88.9 100.0 110.0 120.0 130.0 140.0 150.0 200.0 250.0 300.0 350.0 400.0 450.0 600.0 600.0 600.0 600.0 800.0	#N/A lume-Averag	meters ed Vertical ' Plume Radlus(m) 0.279 0.401 0.522 0.559 0.768 1.256 1.744 1.692 2.232 2.719 3.207 3.695 4.182 4.670 7.108 9.547 11.985 14.424 16.862 19.300 21.739 26.616 31.492 36.3699 41.246	#N/A //elocities statistics Single Stk VertVet(m/s) 43.89 34.95 24.81 21.95 10.36 6.71 5.18 5.30 4.36 3.85 3.51 3.26 3.07 2.91 2.45 2.19 2.02 1.88 1.79 1.77 1.14 1.64 1.53 1.45 1.38 1.32	arting at en Plume Temp(K) 385.09 350.11 334.39 335.64 325.56 320.00 316.26 310.19 306.31 304.75 303.96 303.50 303.21 303.01 302.86 302.88 302.68		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a)_a=0.16(z-z_a)]$	10.5 11.1 8 5 foot interv eli-it to Top of Jet 5D-2, j² j) 1.0 / a 10 foot interv 10 foot interv Max<5.30 i
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a hible of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.9 100.0 110.0 120.0 130.0 140.0 150.0 200.0 350.0 400.0 450.0 500.0 600.0 700.0 800.0 900.0	#N/A lume-Averag (meters) above stack 0.00 1.52 3.05 3.51 6.10 9.14 12.19 11.87 15.24 18.29 21.34 24.38 27.43 30.48 45.72 60.96 67.6.20 91.44 106.68 121.92 137.16 167.64 198.12 228.60 259.08 289.56	meters ed Vertical ' Plume Radius(m) 0.279 0.401 0.522 0.559 0.768 1.266 1.744 1.692 2.232 2.719 3.207 3.695 4.182 4.670 7.108 9.547 11.985 14.424 16.862 19.300 21.739 26.616 31.492 36.369 41.246 46.123	#N/A /elocities sta Single Stk VertVe1(m/s) 43.89 34.35 24.81 21.95 10.36 6.771 5.18 5.30 4.36 3.05 3.351 3.26 3.07 2.91 2.45 2.19 2.02 2.09 1.89 1.79 1.71 1.64 1.53 1.45 1.38 1.32 1.22	arting at en Plume Temp(K) 385.09 350.11 334.39 335.64 325.56 312.61 311.66 310.19 306.31 304.75 303.96 303.50 303.21 303.21 303.21 303.21 303.24 302.44		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a)_a=0.16(z-z_a)]$	10.5 11.1 8 5 foot interv eli-it to Top of Jet 5D-2, j² j) 1.0 / a 10 foot interv 10 foot interv Max<5.30 i
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a hable of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 Spillane 5.3 m/s Height = 88.9 100.0 110.0 120.0 130.0 140.0 150.0 200.0 250.0 300.0 350.0 400.0 450.0 500.0 600.0 770.0	#N/A lume-Averag (meters) above stack 0.00 1.52 3.05 3.51 6.10 9.14 12.19 11.87 15.24 18.29 21.34 24.38 27.43 30.48 45.72 60.96 76.20 91.44 106.68 121.92 137.16 167.64 198.12 228.60 259.08	meters ed Vertical ' Plume Radius(m) 0.279 0.401 0.522 0.559 0.768 1.256 1.744 1.692 2.232 2.719 3.207 7.108 9.547 11.985 14.424 16.862 19.300 21.739 26.616 31.492 36.369 41.246 46.123 51.000	#N/A //elocities stassingleStk //ertVeI(m/s) 43.89 34.35 24.81 21.95 10.36 6.7/1 5.18 5.30 4.36 3.51 3.26 3.07 2.91 2.45 2.19 2.02 1.89 1.79 1.77 1.64 1.53 1.45 1.38 1.32 1.27 1.23	385.09 350.11 334.39 356.64 313.61 311.66 310.19 306.31 304.75 303.96 303.50 303.21 303.01 302.86 302.86 302.80 302.40		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a)_a=0.16(z-z_a)]$	10.5 11.1 8 5 foot interv eli-it to Top of Jet 5D-2, j² j) 1.0 / a 10 foot interv 10 foot interv Max<5.30 i
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a hable of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 Spillane 5.3 m/s Height = 88.9 100.0 110.0 120.0 130.0 140.0 155.0 200.0 255.0 300.0 350.0 400.0 450.0 500.0 600.0 700.0 800.0 900.0	#N/A lume-Averag (meters) above stack 0.00 1.52 3.05 3.51 6.10 9.14 12.19 11.87 15.24 18.29 21.34 24.38 27.43 30.48 45.72 60.96 76.20 91.44 106.68 121.92 137.16 167.64 198.12 228.60 259.08 289.56 320.04	meters ed Vertical ' Plume Radius(m) 0.279 0.401 0.522 0.559 1.256 1.744 1.692 2.232 2.719 3.207 3.6955 4.182 4.670 7.108 9.5474 11.985 14.424 16.862 19.300 21.739 26.616 31.492 36.369 41.246 46.123 51.000 55.876	#N/A Velocities state Single Stk VertVel(m/s) 43.89 34.35 24.81 21.95 10.36 6.71 5.18 5.30 4.36 3.85 3.51 3.26 2.91 2.45 2.19 2.02 1.89 1.79 1.71 1.64 1.53 1.45 1.38 1.32 1.27 1.23 1.13	arting at en Plume Temp(K) 385.09 350.11 334.39 335.64 320.00 316.26 313.61 311.66 310.19 306.31 302.56 302.88 302.56 302.49 302.44 302.40		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a)_a=0.16(z-z_a)]$	10.5 11.1 8 5 foot interv eli-it to Top of Jet 5D-2, j² j) 1.0 / a 10 foot interv 10 foot interv Max<5.30 i
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.9 100.0 110.0 120.0 130.0 140.0 150.0 200.0 350.0 350.0 400.0 450.0 600.0 600.0 600.0 600.0 900.0 1100.0 1100.0	#N/A lume-Averag	meters ed Vertical ' Plume Radlus(m) 0.279 0.401 0.522 0.559 0.768 1.256 1.744 1.692 2.232 2.719 3.207 3.695 4.182 4.670 7.108 9.547 11.985 14.424 16.862 19.300 21.739 26.616 31.492 36.399 41.246 46.123 51.000 55.876 60.753	#N/A //elocities statistics in the state of	set feet Plume Temp(K) 385.09 350.11 334.39 335.64 325.56 320.00 318.26 310.19 306.31 304.75 303.96 303.50 303.21 303.01 302.66 302.48 302.49 302.44 302.40 302.37		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a)_a=0.16(z-z_a)]$	10.5 11.1 8 5 foot interv eli-it to Top of Jet 5D-2, j² j) 1.0 / a 10 foot interv 10 foot interv Max<5.30 i
Find Height above Stack z _{ent} Height above Ground z _{ent} +h _a able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.9 100.0 110.0 120.0 250.0 300.0 250.0 300.0 450.0 400.0 450.0 600.0 700.0 800.0 900.0 1100.0 1200.0 1200.0 1200.0 1200.0 1200.0 1200.0 1200.0 1200.0 1200.0 1200.0 1200.0 1200.0 1200.0	#N/A lume-Averag	meters ed Vertical ' Plume Radius(m) 0.279 0.401 0.522 0.559 0.768 1.256 1.744 1.692 2.232 2.719 3.207 7.108 9.547 11.985 14.424 16.862 19.300 21.739 26.616 31.492 36.369 41.246 46.123 51.000 55.876 60.753 65.630	#N/A /elocities sta Single Stk VertVe1(m/s) 43.89 34.35 24.81 21.95 10.36 6.77 5.18 5.30 4.36 3.05 5.30 2.91 2.45 2.19 2.02 1.89 1.79 1.71 1.64 1.53 1.45 1.32 1.27 1.23 1.19 1.16 1.13	arting at en Plume Temp(K) 385.09 350.11 334.39 335.64 320.00 316.26 313.61 311.66 310.19 306.31 304.75 303.96 303.20 303.21 303.21 303.21 303.31		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a)_a=0.16(z-z_a)]$	10.5 11. 5 foot intervel. Hit to Top of Jet 5D-2, j²]) 1.0 / a 10 foot intervel. a²²λ²))) Max<5.30 (
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.9 100.0 110.0 120.0 130.0 140.0 150.0 200.0 350.0 350.0 400.0 450.0 600.0 600.0 600.0 600.0 900.0 1100.0 1100.0	#N/A lume-Averag	meters ed Vertical ' Plume Radlus(m) 0.279 0.401 0.522 0.559 0.768 1.256 1.744 1.692 2.232 2.719 3.207 3.695 4.182 4.670 7.108 9.547 11.985 14.424 16.862 19.300 21.739 26.616 31.492 36.399 41.246 46.123 51.000 55.876 60.753	#N/A //elocities statistics in the state of	set feet Plume Temp(K) 385.09 350.11 334.39 335.64 325.56 320.00 318.26 310.19 306.31 304.75 303.96 303.50 303.21 303.01 302.66 302.48 302.49 302.44 302.40 302.37		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a)_a=0.16(z-z_a)]$	10.5 11. 5 foot intervel. Hit to Top of Jet 5D-2, j²]) 1.0 / a 10 foot intervel. a²²λ²))) Max<5.30 (
Find Height above Stack z _{ent} Height above Ground z _{ent} +h _a able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 100.0 110.0 120.0 130.0 140.0 250.0 300.0 350.0 400.0 450.0 600.0 700.0 800.0 1000.0 1100.0 1200.0 1200.0 1300.0 1400.0 1400.0 1500.0 1600.0 1700.0 1700.0 1800.0 1800.0 1800.0 1800.0 1800.0 1800.0 1800.0 1800.0 1800.0 1800.0 1800.0 1800.0 1800.0	#N/A lume-Averag	meters ed Vertical ' Plume Radius(m) 0.279 0.401 0.522 0.559 0.768 1.256 1.744 1.692 2.232 2.719 3.207 7.108 9.547 11.985 14.424 16.862 19.300 21.739 26.616 31.492 36.369 41.246 46.123 51.000 55.876 60.753 65.630 70.507	#N/A //elocities stz Single Stk //ertVel(m/s) 4.389 34.35 24.81 5.30 6.71 5.18 5.30 4.36 3.25 2.99 1.79 2.19 2.02 1.89 1.79 1.71 1.64 1.53 1.45 1.38 1.32 1.27 1.23 1.19 1.16 1.13 1.11	arting at en Plume Temp(K) 385.09 350.11 334.39 335.64 322.56 320.00 316.26 313.61 311.66 310.19 306.31 302.26 303.20 303.21 302.86 302.49 302.44 302.40 302.37 302.33 302.31		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a)_a=0.16(z-z_a)]$	10.5 11.1 8 5 foot interv eli-it to Top of Jet 5D-2, j² j) 1.0 / a 10 foot interv 10 foot interv Max<5.30 i
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 6.0 70.0 80.0 70.0 80.0 80.0 80.0 80.0 110.0 120.0 130.0 140.0 250.0 300.0 450.0 600.0 700.0 800.0 900.0 110.0 120.0 130.0 140.0 150.0	#N/A lume-Averag (meters) above stack	meters ed Vertical ' Plume Radius(m) 0.279 0.401 0.522 0.559 0.768 1.256 1.744 1.692 2.232 2.719 3.207 7.108 9.547 11.985 14.424 16.862 19.300 21.739 26.616 31.492 36.369 41.246 46.123 51.000 55.876 60.753 65.630 70.507	#N/A //elocities stz Single Stk //ertVel(m/s) 4.389 34.35 24.81 5.30 6.71 5.18 5.30 4.36 3.25 2.99 1.79 2.19 2.02 1.89 1.79 1.71 1.64 1.53 1.45 1.38 1.32 1.27 1.23 1.19 1.16 1.13 1.11	set feet Plume Temp(K) 385.09 350.11 334.39 335.64 325.56 320.00 316.26 313.61 311.66 310.19 306.31 302.86 302.88 302.68 302.44 302.40 302.37 302.35 302.33 302.31		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a)_a=0.16(z-z_a)]$	10.5 11.1 8 5 foot interv eli-it to Top of Jet 5D-2, j² j) 1.0 / a 10 foot interv 10 foot interv Max<5.30 i
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 Spillane 5.3 m/s Height = 88.9 100.0 110.0 120.0 130.0 140.0 155.0 300.0 350.0 300.0 350.0 600.0 600.0 600.0 1000.0 1100.0 1100.0 120.0 1300.0 140.0 150.0 150.0 150.0 150.0 150.0 150.0 150.0 150.0 150.0 150.0 150.0 150.0 150.0 150.0 150.0	#N/A lume-Averag	meters ed Vertical ' Plume Radlus(m) 0.279 0.401 0.522 0.559 0.768 1.256 1.744 1.692 2.232 2.719 3.207 3.695 4.182 4.670 7.108 9.547 11.995 14.424 16.862 19.300 21.739 26.616 31.492 36.369 41.246 46.123 51.000 55.876 60.753 65.630 70.507	#N/A //elocities state Single Stk VertVel(m/s) 43.89 34.95 24.81 27.95 10.36 6.71 5.18 5.30 4.36 3.85 3.51 3.26 3.07 2.91 2.45 2.19 2.02 1.89 1.77 1.145 1.64 1.53 1.45 1.38 1.32 1.27 1.23 1.19 1.16 1.11 1.10	set feet Plume Temp(K) 385.09 350.11 334.39 335.64 325.56 320.00 316.26 310.19 306.31 304.75 303.96 303.50 303.21 303.01 302.66 302.44 302.40 302.37 302.33 302.31 302.30		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a)_a=0.16(z-z_a)]$	10.5i 11.1 8 5 foot Interv eli-It to Top of Jet 5D-2, j²[j] 1/a / a 10 foot Interv 10 foot Interv Max<5.30 r
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a able of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 90.0 Spillane 5.3 m/s Height = 88.9 100.0 110.0 120.0 130.0 140.0 150.0 250.0 300.0 350.0 400.0 600.0 600.0 700.0 800.0 900.0 1100.0 1100.0 120.0 130.0 140.0 150.0	#N/A lume-Averag	meters ed Vertical ' Plume Radlus(m) 0.279 0.401 0.522 0.559 0.768 1.256 1.744 1.692 2.232 2.719 3.207 3.695 4.182 4.670 7.108 9.547 11.995 14.424 16.862 19.300 21.739 26.616 31.492 36.369 41.246 46.123 51.000 55.876 60.753 65.630 70.507	#N/A //elocities statistics Single Stk VertVet(m/s) 43.89 34.55 24.81 21.95 10.36 6.71 5.18 5.30 4.36 3.85 3.51 3.26 2.19 2.45 2.19 2.02 1.89 1.79 1.71 1.64 1.53 1.45 1.38 1.32 1.27 1.23 1.19 1.16 1.13 1.11 1.08 1.06	set arting at en Plume Temp(K) 385.09 350.11 334.39 335.64 320.00 316.26 313.61 311.66 310.19 306.31 304.75 303.96 303.21 303.01 302.86 302.49 302.44 302.40 302.37 302.33 302.31 302.30		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a-0.16(z-z_a))]$	10.5; 11.4 8 5 foot Interv el-It to Top of Jet 5D-z,) ²]) ^{1,0} / a 10 foot Interv
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _a sable of Plume Top-Hat Diameters (2a) and P Height (feet) above ground Stack.Rel.Ht = 50.0 55.0 60.0 Top of jet = 61.5 70.0 80.0 Spillane 5.3 m/s Height = 88.9 100.0 110.0 120.0 130.0 140.0 250.0 300.0 250.0 300.0 450.0 600.0 700.0 800.0 1000.0 1100.0 1100.0 1200.0 1200.0 1300.0 1400.0 1500.0 1500.0 1500.0 1500.0 1500.0 1500.0 1500.0 1500.0 1500.0 1500.0 1700.0	#N/A lume-Averag	meters ed Vertical ' Plume Radlus(m) 0.279 0.401 0.522 0.559 0.768 1.256 1.744 1.692 2.232 2.719 3.207 3.695 4.182 4.670 7.108 9.547 11.985 14.424 16.862 19.300 21.739 26.616 31.492 36.369 41.246 46.123 51.000 55.876 60.753 65.630 70.507 75.384 80.260 85.137 90.014	#N/A /elocities sta SingleStk VertVeI(m/s) 43.89 34.35 24.81 21.95 10.36 6.77 5.18 5.30 4.36 3.05 3.51 3.26 3.07 2.91 2.45 2.19 2.02 2.18 99 1.79 1.71 1.64 1.53 1.45 1.38 1.32 1.27 1.23 1.19 1.16 1.13 1.11 1.08 1.06 1.04	set feet Arting at en Plume Plume 385.09 350.11 334.39 335.64 322.56 320.00 316.26 310.19 306.31 304.75 303.96 303.50 303.21 302.40 302.44 302.40 302.37 302.33 302.33 302.33 302.33 302.28		ase:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)=$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: $V_{\text{pluma}}=(Va)_a^3+0.12F_a[(z-z_a)^2-(6.2a-0.16(z-z_a))]$	10.5i 11.1 8 5 foot Interv eli-It to Top of Jet 5D-2, j²[j] 1/a / a 10 foot Interv 10 foot Interv Max<5.30 r



Based on 63 chillers w/ 20 cells/chiller. Calc'	"Aviation Sa							
ff.diam for each chiller with each cell at 34" ID	"The Evaluat		-	-			arious Heights in the Plume	
00,110 ACFM total for each chiller).		from a Gas-	Turbine Pow				Australia," Dr. K.T. Spilla	
mbient Conditions:					Constants:		eutral conditions (dθ/dz=0 or	$\theta_a = \theta_e$)
Ambient Potential Temp θ _a	278.15	Kelvins	41.0	°F			meters/feet	
lume Exit Conditions:	04.50	motors	400.05	foot	Gravity g		m/s ²	
Stack Height hs	-	meters	103.35		λ	1.11		
Individual Chiller Stack Diameter D				inches	λ ₀	~1.0		
Stack Velocity V _{exit}	8.06		26.45		4Vol/(60πD	-)		04-0/64
Individual Chiller Volumetric Flow		cu.m/sec	200,110		πV _{exit} D ² /4			Sect.2/¶1
Stack Potential Temp θ _s Initial Stack Buoyancy Flux F _o		Kelvins	61.0		-V D2(4.0	10 1/4 - 1/	ol.Flow(g/π)(1-θ _a /θ _s)	04-0/64
Plume Buoyancy Flux F		m ⁴ /s ³	20.0	ΔT(°F)			,θ _p at plume height (see belo	Sect.2/¶1
Number of Chillers n	63	111 /5		2 817			cation Factor (n ^{0.25})	vv)
Number of Officers II	00			2.017	iviuitipie Sta	ick ividitipiit	Sation ractor (ii)	
onditions at End (Top) of Jet Phase:								
Height above Stack z _{iet}	24 138	meters*	79.2	feet*	z = 6.25D	meters*=	meters above stack top	Sect.3/¶1
Height above Ground z _{jet} +h _s	55.639		182.5		Ljet - 0.202	,	notoro aboro otaon top	"
Vertical Velocity V _{jet}	4.031		13.22		$V_{jet} = 0.5V_e$	vit = Vavit/2		
Plume Top-Hat Diameter 2a _{iet}		meters	25.3		2a _{iet} = 2D	AIL - GAIL-	Conservation of momentum	
i i i i i i i i i i i i i i i i i i i					jet			
pillane Methodology - Analytical Solutions	for Calm Con	ditions for PI	ume Heights	above Je	Phase			
Single Plume-averaged Vertical Velocity						iven by e	quations below:	
Plume Top-Hat Radius a		olutions in T				-	rease with height	Sect.2/Eq.6
Virtual Source Height z _v		meters*		feet*			ers*=meters above stack top	Sect.2/Eq.6
Height above Ground z _v +h _s		meters	104.9			-	where $(\theta_a/\theta_s)^{1/2} = (\theta_e/\theta_s)^{1/2} =$	0.9806
Vertical Velocity V	S	olutions in T			${(Va)_o}^3 + 0.$	12F _o [(z-z _v) ² - (6.25D-z _v) ²]} ^(1/3) / a	Sect.2.1(6)
Product (Va) _o	15.265	m ² /s			V _{exit} D/2(θ _e /			
Single Chiller Results:								
Solve for plume-averaged vertical velo	city at height	940.0	feet	286.512	meters abo	ve ground (2	z'+h _s)	
Gives the following Height above Stack z'	255.011	meters*	836.7	feet*				
Plume Top-Hat Diameter 2a'	81.454	meters	267.2	feet	2a'=2*0.16(Sect.2/Eq.6
Vertical Velocity V	1.104	m/s	3.62	ft/sec	V={(Va) _o ³ +0).12F _o [(z-z _v) ² -(6.25D-z _v) ²]} ^(1/3) /(2a'/2)	Sect.2/Eq.6
Solve for Height of CASC critical vertical	velocity V _{crit}	5.30	m/s plume-a	veraged v	ertical velo	city	Critical	VV < Top of J
Find Height above Stack z _{crit}	#N/A	meters	#N/A	feet	Solve for x=	(z-z _v) simu	Iltaneously in both eqs. (i.e.,	Va and a)
Height above Ground z _{crit} +h _s	#N/A	meters	#N/A	feet	for V=V _{crit} u	ising the cu	bic equation ax3+bx2+cx+d=	0, where
						a=1, c=0, a	and b=- $(0.12F_0)/(V_{crit}^30.16^3)$ =	-2.229
Interpolated Height of critical vertical v	elocity in Jet	Phase:			and d=	=[0.12F _o (6.2	$(V_{crit}^3 - (V_a)_o^3] / (V_{crit}^3 - (V_a)_o^3) = 0$	-4584.
Find Height above Stack z _{crit}	16.537	meters	54.3	feet			http://www.17	28.org/cubic.ht
	16.537 48.039		54.3 157.6			give	$\frac{\text{http://www.17}}{\text{s the real solution } x = z-zv = }$	
Find Height above Stack z _{crit}						give		28.org/cubic.ht 17.389 17.85
Find Height above Stack z _{crit}						give	s the real solution x = z-zv=	17.389
Find Height above Stack z _{crit}	48.039	meters	157.6	feet	nd of jet pha		s the real solution x = z-zv = or z(m/above stack) =	17.38 17.8
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s	48.039 Plume-Averag	meters	157.6	feet	d of jet pha		s the real solution x = z-zv = or z(m/above stack) =	17.389 17.89
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground	48.039 Plume-Averag (meters)	meters ed Vertical Plume Radius(m)	157.6 /elocities sta SingleStk /ertVel(m/s)	feet erting at en Plume	d of jet pha		s the real solution x = z-zv = or z(m/above stack) =	17.389 17.89
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack. Rel. Ht = 103.4	48.039 Plume-Averag (meters) above stack 0.00	ed Vertical V Plume Radius(m) 1.931	157.6 Velocities sta SingleStk VertVel(m/s) 8.06	feet erting at en Plume	d of jet pha	ıse:	s the real solution x = z-zv = or z(m/above stack) = z(ft/above ground) =	17.38 17.8 161
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s Table of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0	48.039 Plume-Averag (meters) above stack 0.00 5.07	ed Vertical Vertical Radius(m)	Velocities sta SingleStk VertVel(m/s) 8.06 7.21	feet erting at en Plume	d of jet pha	ıse:	s the real solution x = z-zv = or z(m/above stack) = z(ft/above ground) = Jet Phase Eqs:	17.38 17.8 161 20 ft Intervals
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s Table of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack. Rel. Ht = 103.4 120.0 140.0	48.039 Plume-Averag (meters) above stack 0.00 5.07	ed Vertical	/elocities sta SingleStk VertVel(m/s) 8.06 7.21 6.20	feet erting at en Plume	d of jet pha	ıse:	s the real solution x = z-zv = or z(m/above stack) = z(ft/above ground) = Jet Phase Eqs: Linearly interpolated from Stack R	17.38 17.8 161 20 ft Intervals
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27	ed Vertical Vertical Nervices (m) 1.931 2.337 2.825 3.312	/elocities sta SingleStk VertVel(m/s) 8.06 7.21 6.20 5.18	feet erting at en Plume	d of jet pha	ıse:	s the real solution x = z-zv = or z(m/above stack) = z(ft/above ground) = Jet Phase Eqs:	17.38 17.8 161 20 ft Intervals
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 160.0 Single Jet 5.3 m/s Height = 157.6	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54	ed Vertical V Plume Radius(m) 1.931 2.337 2.825 3.312 3.254	/elocities sta SingleStk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30	feet Irting at en Plume Temp(K)	d of jet pha	ıse:	s the real solution x = z-zv = or z(m/above stack) = z(ft/above ground) = Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations:	17.38 17.8 161 20 ft Intervals
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 160.0 Single Jet 5.3 m/s Height = 157.6 180.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36	meters ed Vertical V Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800	157.6 /elocities sta SingleStk /ertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16	feet Irting at en Plume Temp(K)	d of jet pha	ise:	s the real solution x = z-zv = or z(m/above stack) = z(ft/above ground) = Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations: Vpuma=f((Va) ₀ ³ +0.12F ₆ [(z-z _v) ² -(6.2	17.38 17.8 161 20 ft Intervals
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 160.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14	meters ed Vertical V Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862	157.6 Velocities stat SingleStk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03	feet Irting at en Plume Temp(K)	d of jet pha	ise:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$	17.38 17.8 161 20 ft Intervals el.Ht to Top of Jet
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 160.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 200.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14	meters ed Vertical V Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.639	157.6 Velocities state SingleStk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40	feet riting at en Plume Temp(K)	d of jet pha	se:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(ft/above ground)=$ $z(ft/above $	17.38 17.8 161 20 ft Interval: el.Ht to Top of Jet
Find Height above Stack Z _{crit} Height above Ground Z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 150.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 200.0 220.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55	meters ed Vertical \(^1\) Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.639 5.614	157.6 Velocities state SingleStk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.93	riting at en Plume Temp(K)	d of jet pha	ise:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(ft/above ground)=$ $z(ft/above $	17.38 17.8 161 20 ft Interval: el.Ht to Top of Jet
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 160.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 200.0 220.0 240.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.639 5.614 6.589	Velocities state SingleStk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.93 2.61	feet rting at en Plume Temp(K) 282.49 281.71 280.97		ise:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(t/above ground)=$ $z(t/above ground)$	17.38 17.8 161 20 ft Interval: el.Ht to Top of Jet
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 140.0 160.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 200.0 220.0 240.0 260.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75	meters ed Vertical V Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.639 5.614 6.589 7.565	/elocities state Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.93 2.61 2.38	rting at en Plume Temp(K) 282.49 281.71 280.97 280.45		ise:	s the real solution x = z-zv = or z(m/above stack) = z(ft/above ground) = $ z(ft/above ground) = \\ z(ft/above ground) = \\ \\ Jet Phase Eqs: \\ Linearly interpolated from Stack R Spillane Equations: V_{pluna} = ((Va)_a^3 + 0.12F_a((z \cdot z_v)^2 \cdot (6.2 \cdot a - 0.16(z \cdot z_v) + (6.2 \cdot a - 0.16(z \cdot$	17.38 17.8 16: 20 ft Interval: el.Hit to Top of Jet 5D·z _v) ²]) ^{1/3} / a
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack. Rel. Ht = 103.4 120.0 140.0 140.0 160.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 200.0 220.0 244.0 260.0 280.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84	meters ed Vertical \(^1\) Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.639 5.614 6.589 7.565 8.540	157.6 Velocities state SingleStk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.93 2.61 2.38	rting at en Plume Temp(K) 282.49 281.71 280.97 280.45 280.06		ise:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(ft/above ground)=$ $z(ft/above $	17.38 17.8 16: 20 ft Interval: el.Hit to Top of Jet 5D·z _v) ²]) ^{1/3} / a
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 160.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 200.0 220.0 240.0 260.0 280.0 300.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 59.94	meters ed Vertical \(^1\) Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.639 5.614 6.589 7.565 8.540 9.515	157.6 Velocities state SingleStk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.93 2.61 2.38 2.20 2.07	282.49 281.71 280.97 280.45 280.45 280.06 279.77		ise:	s the real solution x = z-zv = or z(m/above stack) = z(ft/above ground) = $ z(ft/above ground) = \\ z(ft/above ground) = \\ \\ Jet Phase Eqs: \\ Linearly interpolated from Stack R Spillane Equations: V_{pluna} = ((Va)_a^3 + 0.12F_a((z \cdot z_v)^2 \cdot (6.2 \cdot a - 0.16(z \cdot z_v) + (6.2 \cdot a - 0.16(z \cdot$	17.38 17.8 16: 20 ft Interval: el.Hit to Top of Jet 5D·z _v) ²]) ^{1/3} / a
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 160.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 200.0 220.0 240.0 260.0 300.0 300.0 320.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 59.94 66.03	ed Vertical	Velocities state SingleStk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.93 2.61 2.38 2.20 2.07	rting at en Plume Temp(K) 282.49 281.71 280.97 280.45 280.06 279.77 279.54		ise:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(ft/above ground)=$ $z(ft/above $	17.38 17.8 16: 20 ft Interval: el.Hit to Top of Jet 5D·z _v) ²]) ^{1/3} / a
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 140.0 160.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 200.0 220.0 240.0 260.0 280.0 300.0 320.0 350.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 59.94 66.03 75.18	meters ed Vertical V Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.639 5.614 6.589 7.565 8.540 9.515 10.491 11.954	/elocities state Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.93 2.61 2.38 2.20 2.07 1.96 1.83	rting at en Plume Temp(K) 282.49 281.71 280.97 280.45 280.06 279.77 279.54 279.36		ise:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(ft/above ground)=$ $z(ft/above $	17.38 17.8 16.6 20 ft Interval: el.Hit to Top of Jet 5D-z _v) ²)) ^{1/3} / a 4V _{plume} *a ^{2*} λ ²)))
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack. Rel. Ht = 103.4 120.0 140.0 140.0 150.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 200.0 220.0 240.0 260.0 280.0 300.0 300.0 320.0 350.0 400.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 59.94 66.03 75.18 90.42	meters ed Vertical \(^1\) Plume Radius(m) 1.931 2.937 2.825 3.312 3.254 3.800 3.862 4.639 5.614 6.589 7.565 8.540 9.515 10.491 11.954 14.392	157.6 Velocities state SingleStk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.93 2.61 2.38 2.20 2.07 1.96 1.83 1.67	282.49 281.71 280.97 280.06 279.77 279.54 279.56 279.15		ise:	s the real solution $x=z-zv=$ or $z(m/above\ stack)=z(ft/above\ stack$	17.38 17.8 16: 20 ft Interval: el.Ht to Top of Jet 5D·z.,) ²]] ^{1/2} / a 4V _{plume} *a ^{2*} λ ²))) 50 ft Interval:
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 160.0 Single Jet 5.3 m/s Height = 167.6 180.0 Top of Single jet = 182.5 200.0 220.0 240.0 260.0 280.0 300.0 320.0 350.0 440.0 450.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 59.94 66.03 75.18 90.42 105.66	meters ed Vertical \(^1\) Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.639 5.614 6.589 7.565 8.540 9.515 10.491 11.954 14.392 16.831	157.6 Velocities state SingleStk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.93 2.61 2.38 2.20 2.07 1.96 1.83 1.67 1.55	282.49 281.71 280.97 280.06 279.77 279.54 279.15 278.91		ise:	s the real solution $x=z-zv=$ or $z(m/above stack)=$ $z(ft/above ground)=$ $z(ft/above $	17.38 17.8 16: 20 ft Interval: el.Ht to Top of Jet 5D·z.,) ²]] ^{1/2} / a 4V _{plume} *a ^{2*} λ ²))) 50 ft Interval:
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 160.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 200.0 220.0 240.0 260.0 280.0 300.0 300.0 300.0 400.0 450.0 500.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 66.03 75.18 90.42 105.66 120.90	meters ed Vertical \(\text{Plume} \) Radius(m) \(\text{1.931} \) 2.337 2.825 3.312 3.254 3.800 3.862 4.639 5.614 6.589 7.565 8.540 9.515 10.491 11.954 14.392 16.831 19.269	Velocities state SingleStk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.93 2.61 2.38 2.20 2.07 1.96 1.83 1.67 1.55 1.47	282.49 281.71 280.97 280.45 280.06 279.77 279.54 279.36 279.15 278.91		ise:	s the real solution $x=z-zv=$ or $z(m/above\ stack)=z(ft/above\ stack$	17.38 17.8 16: 20 ft Interval: el.Ht to Top of Jet 5D·z.,) ²]] ^{1/2} / a 4V _{plume} *a ^{2*} λ ²))) 50 ft Interval:
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 140.0 160.0 Single Jet 5.3 m/s Height = 182.5 200.0 220.0 240.0 260.0 280.0 300.0 300.0 320.0 350.0 400.0 650.0 550.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 59.94 66.03 75.18 90.42 105.66 120.90 136.14	meters ed Vertical V Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.639 5.614 6.589 7.565 8.540 9.515 10.491 11.954 14.392 16.831 19.269 21.707	/elocities state Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.93 2.61 2.38 2.20 2.07 1.96 1.83 1.67 1.55 1.47 1.40	282.49 281.71 280.97 280.45 280.06 279.77 279.54 279.15 278.91 278.74 278.63		ise:	s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(ft/above\ stack)=$ $z(ft/above$	17.38 17.8 16: 20 ft Interval: el.Ht to Top of Jet 5D·z.,) ²]] ^{1/2} / a 4V _{plume} *a ^{2*} λ ²))) 50 ft Interval:
Find Height above Stack Z _{crit} Height above Stack Z _{crit} Height dove Ground Z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 58ingle Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 200.0 240.0 240.0 260.0 280.0 300.0 320.0 350.0 400.0 450.0 500.0 500.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 59.94 66.03 75.18 90.42 105.66 120.90 136.14 151.38	meters ed Vertical \(^1\) Plume Radius(m) 1.931 2.937 2.825 3.312 3.254 3.800 3.862 4.639 5.614 6.589 7.565 8.540 9.515 10.491 11.954 14.392 16.831 19.269 21.707 24.146	157.6 Velocities state SingleStk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.93 2.61 2.38 2.20 2.07 1.96 1.83 1.67 1.55 1.47 1.40 1.34	282.49 281.71 280.97 280.45 280.06 279.77 279.54 279.54 278.81 278.83 278.55		ise:	s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(ft/above\ stack)=$ $z(ft/above$	17.38 17.8 16: 20 ft Interval: el.Ht to Top of Jet 5D·z.,) ²]] ^{1/2} / a 4V _{plume} *a ^{2*} λ ²))) 50 ft Interval:
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 160.0 Single Jet 5.3 m/s Height = 182.5 180.0 Top of Single jet = 182.5 200.0 220.0 240.0 220.0 240.0 260.0 280.0 300.0 320.0 350.0 440.0 450.0 550.0 660.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 59.94 66.03 75.18 90.42 105.66 120.90 136.14 151.38	meters ed Vertical V Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.639 7.565 8.540 9.515 10.491 11.954 14.392 16.831 19.269 21.707 24.146 26.584	Velocities state Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.93 2.61 2.38 2.20 2.07 1.96 1.83 1.67 1.55 1.47 1.40 1.34	282.49 281.71 280.97 280.45 280.06 279.77 279.54 279.36 279.15 278.91 278.74 278.63 278.655 278.48		ise:	s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(ft/above\ stack)=$ $z(ft/above$	17.38 17.8 16: 16: 20 ft Interval el.Ht to Top of Jet 5D·z.,) ²]) ^{1/2} / a 4V _{plume} *a ^{2*} λ ²)); 50 ft Interval
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140,0 160.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 200.0 220.0 240.0 280.0 280.0 380,0 300.0 300.0 350.0 400.0 450.0 550.0 600.0 660.0 660.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 59.94 66.03 75.18 90.42 105.66 120.90 136.14 151.38 166.62 181.86	meters ed Vertical V Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.639 5.614 6.589 7.565 8.540 9.515 10.491 11.954 14.392 16.831 19.269 21.707 24.146 26.584 29.023	Velocities state SingleStk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.93 2.61 2.38 2.20 2.07 1.96 1.83 1.67 1.55 1.47 1.40 1.34 1.29 1.25	rting at en Plume Temp(K) 282.49 281.71 280.97 280.45 280.06 279.77 279.54 279.36 279.15 278.89 278.74 278.63 278.55 278.48		ise:	s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(ft/above\ stack)=$ $z(ft/above$	17.38 17.8 16: 16: 20 ft Interval el.Ht to Top of Jet 5D·z.,) ²]) ^{1/2} / a 4V _{plume} *a ^{2*} λ ²)); 50 ft Interval
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 160.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 200.0 240.0 240.0 260.0 280.0 300.0 300.0 300.0 350.0 400.0 550.0 600.0 650.0 670.0 770.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 59.94 48.03 75.18 90.42 105.66 120.90 136.14 151.38 166.62 181.86 212.34	meters ed Vertical V Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 4.639 5.614 6.589 7.565 8.540 9.515 10.491 11.954 14.392 16.831 19.269 21.707 24.146 26.584 29.023 33.899	/elocities state Single Stk VertVel(m/s) 8.066 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.93 2.61 2.38 2.20 2.07 1.96 1.83 1.67 1.55 5.1.47 1.40 1.34 1.29 1.25 1.18	282.49 281.71 280.97 280.45 280.06 279.77 279.54 279.15 278.91 278.74 278.63 278.65 278.48 278.44 278.44		ise:	s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(ft/above\ stack)=$ $z(ft/above$	17.38 17.8 16.6 20 ft Interval: el.Ht to Top of Jet 50-z _v) ²]) ^{1/3} / a 4V _{plume} *a ^{2*} λ ²))) 50 ft Interval:
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 200.0 240.0 260.0 280.0 300.0 300.0 300.0 300.0 300.0 550.0 600.0 650.0 600.0 650.0 700.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 59.94 66.03 75.18 90.42 105.66 120.90 136.14 151.38 166.62 181.86	meters ed Vertical \(^1\) Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.639 5.614 6.589 7.565 8.540 9.515 10.491 11.954 14.392 16.831 19.269 21.707 24.146 26.584 29.023 33.899 38.776	Velocities state Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.93 2.61 2.38 2.20 2.07 1.96 1.83 1.67 1.55 1.47 1.40 1.34 1.29 1.25 1.18	282.49 281.71 280.97 280.45 280.06 279.77 279.54 279.36 279.15 278.91 278.74 278.83 278.84 278.40 278.34		ise:	s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(ft/above\ stack)=$ $z(ft/above$	17.38 17.8 16.6 20 ft Interval: el.Ht to Top of Jet 50-z _v) ²]) ^{1/3} / a 4V _{plume} *a ^{2*} λ ²))) 50 ft Interval:
Find Height above Stack z _{crit} Height above Ground Z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 140.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 200.0 240.0 220.0 240.0 280.0 300.0 320.0 350.0 400.0 450.0 550.0 600.0 650.0 700.0 800.0 900.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 59.94 66.03 75.18 90.42 105.66 120.90 136.14 151.38 166.62 181.86 212.34	meters ed Vertical V Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.639 7.565 8.540 9.515 10.491 11.954 14.392 16.831 19.269 21.707 24.146 26.584 29.023 33.899 38.776 43.653	Velocities state Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.93 2.61 2.38 2.20 2.07 1.96 1.83 1.67 1.55 1.47 1.40 1.34 1.29 1.25 1.18	282.49 281.71 280.97 280.45 280.06 279.17 279.54 278.63 278.55 278.48 278.44 278.40 278.34		ise:	s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(ft/above\ stack)=$ $z(ft/above$	17.38 17.8 16.6 20 ft Interval: el.Ht to Top of Jet 50-z _v) ²]) ^{1/3} / a 4V _{plume} *a ^{2*} λ ²))) 50 ft Interval:
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 160.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 200.0 220.0 240.0 280.0 280.0 300.0 300.0 300.0 400.0 450.0 550.0 600.0 600.0 600.0 600.0 600.0 800.0 900.0 1000.0 1100.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 59.94 66.03 75.18 90.42 105.66 120.90 136.14 151.38 166.62 181.86 212.34 242.82 273.30 303.78	meters ed Vertical V Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.639 5.614 6.589 7.565 8.540 9.515 10.491 11.954 14.392 16.831 19.269 21.707 24.146 26.584 29.023 33.899 38.776 43.653 48.530	Velocities state Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.93 2.61 2.38 2.20 2.07 1.96 1.83 1.67 1.55 1.47 1.40 1.34 1.29 1.25 1.18 1.12 1.08	282.49 281.71 280.97 280.45 280.06 279.77 279.54 279.36 279.15 278.83 278.44 278.40 278.40 278.30 278.24		ise:	s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(ft/above\ stack)=$ $z(ft/above$	17.38 17.6 16: 20 ft Interval el.Ht to Top of Jet 5D-z _v) ²]) ^{1/3} / a 4V _{plume} *a ^{2*} λ ²)) 51 ft Interval
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 160.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 200.0 240.0 240.0 260.0 280.0 300.0 300.0 300.0 350.0 400.0 550.0 600.0 650.0 700.0 800.0 900.0 900.0 1000.0 1100.0 1100.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 59.94 105.66 120.90 136.14 151.38 166.62 121.34 242.82 273.30 303.78	meters ed Vertical V Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.639 5.614 6.589 7.565 8.540 9.515 10.491 11.954 14.392 16.831 19.269 21.707 24.146 26.584 29.023 33.899 38.776 43.653 48.530 53.407	Velocities state SingleStk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.93 2.61 2.38 2.20 2.07 1.96 1.83 1.67 1.55 1.47 1.40 1.34 1.29 1.25 1.18 1.12 1.08 1.04 1.04	282.49 281.71 280.97 280.45 280.06 279.77 279.54 278.63 278.85 278.48 278.44 278.40 278.34 278.30 278.28		ise:	s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(ft/above\ stack)=$ $z(ft/above$	17.38 17.8 16.6 20 ft Interval: el.Ht to Top of Jet 50-z _v) ²]) ^{1/3} / a 4V _{plume} *a ^{2*} λ ²))) 50 ft Interval:
Find Height above Stack Z _{crit} Height above Stack Z _{crit} Height dove Ground Z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 160.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 200.0 240.0 240.0 260.0 280.0 300.0 320.0 350.0 400.0 450.0 500.0 655.0 600.0 665.0 700.0 800.0 900.0 1000.0 1100.0 1100.0 1100.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 59.94 66.03 75.18 90.42 105.66 120.90 136.14 151.38 166.62 181.86 212.34 242.82 273.30 303.78 334.26 364.74	meters ed Vertical \(^1\) Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 4.639 5.614 6.589 7.565 8.540 9.515 10.491 11.954 14.392 16.831 19.269 21.707 24.146 26.584 29.023 33.899 38.776 43.653 48.530 53.407 58.283	Jefocities states in the state of the state	282.49 281.71 280.97 280.45 280.06 279.77 279.54 279.36 279.15 278.91 278.74 278.83 278.84 278.40 278.34 278.30 278.28		ise:	s the real solution $x=z-zv=$ or $z(m/above\ stack)=$ $z(ft/above\ stack)=$ $z(ft/above$	17.38 17.8 16.6 20 ft Interval: el.Ht to Top of Jet 50-z _v) ²]) ^{1/3} / a 4V _{plume} *a ^{2*} λ ²))) 50 ft Interval:
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 160.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 220.0 240.0 240.0 260.0 240.0 300.0 320.0 350.0 450.0 550.0 650.0 600.0 600.0 900.0 900.0 900.0 1100.0 1100.0 1200.0 1200.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 66.03 75.18 90.42 105.66 120.90 136.14 151.38 166.62 181.86 212.34 242.82 273.30 303.78 334.26 364.74	meters ed Vertical \(\text{Plume} \) Radius(m) \(\text{1.931} \) 2.337 2.825 3.312 3.254 3.800 3.862 4.639 7.565 8.540 9.515 10.491 11.954 14.392 16.831 19.269 21.707 24.146 26.584 29.023 33.899 38.776 43.653 48.530 53.407 58.283 63.160	Velocities state Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.93 2.61 2.38 2.20 2.07 1.96 1.83 1.67 1.55 1.47 1.40 1.34 1.29 1.25 1.18 1.12 1.08 1.04 1.00 0.97	282.49 281.71 280.97 280.45 280.06 279.77 279.54 278.63 278.74 278.63 278.52 278.40 278.30 278.28 278.40 278.30		ise:	s the real solution $x=z-zv=$ or $z(m/above\ stack)=z(ft/above\ stack$	17.38 17.6 16: 20 ft Interval el.Ht to Top of Jet 5D-z _v) ²]) ^{1/3} / a 4V _{plume} *a ^{2*} λ ²)) 50 ft Interval
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 160.0 Single Jet 5.3 m/s Height = 182.5 200.0 220.0 244.0 260.0 280.0 380.0 300.0 320.0 350.0 400.0 550.0 600.0 600.0 650.0 600.0 600.0 1000.0 1100.0 1200.0 1200.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 59.94 66.03 75.18 90.42 105.66 120.90 136.14 151.38 166.62 181.86 212.34 242.82 273.30 303.78 334.26 364.74 395.22 425.70	meters ed Vertical V Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.639 5.614 6.589 7.565 8.540 9.515 10.491 11.954 14.392 16.831 19.269 21.707 24.146 26.584 29.023 33.899 38.776 43.653 48.530 53.407 58.283 63.160 68.037	Velocities state SingleStk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.93 2.61 2.38 2.20 2.07 1.96 1.83 1.67 1.55 1.47 1.40 1.34 1.29 1.25 1.18 1.12 1.08 1.04 1.00 0.97 0.95 0.92	rting at en Plume Temp(K) 282.49 281.71 280.97 280.45 280.06 279.77 279.54 279.36 279.57 278.83 278.55 278.84 278.44 278.30 278.24 278.34 278.34 278.34 278.34 278.34 278.34 278.34 278.34 278.34 278.34 278.34 278.34 278.34		ise:	s the real solution $x=z-zv=$ or $z(m/above\ stack)=z(ft/above\ stack$	17.38 17.6 16: 20 ft Interval el.Ht to Top of Jet 5D-z _v) ²]) ^{1/3} / a 4V _{plume} *a ^{2*} λ ²)) 50 ft Interval
Find Height above Stack Z _{crit} Height above Ground Z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 200.0 2240.0 240.0 260.0 280.0 300.0 320.0 330.0 400.0 450.0 500.0 600.0 650.0 700.0 800.0 900.0 1000.0 1100.0 1200.0 1300.0 1400.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 59.94 105.66 120.90 136.14 151.38 166.62 121.34 242.82 273.30 303.78 334.26 364.74 395.22 425.70 578.10	meters ed Vertical V Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.639 5.614 6.589 7.565 8.540 9.515 10.491 11.954 14.392 16.831 19.269 21.707 24.146 26.584 29.023 33.899 38.776 43.653 48.530 53.407 58.283 63.160 68.037 92.421	Velocities state Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.93 2.61 2.38 2.20 2.07 1.96 1.83 1.67 1.55 1.47 1.40 1.34 1.29 1.25 1.18 1.12 1.08 1.04 1.00 0.97 0.95 0.92 0.83	282.49 281.71 280.97 280.45 280.06 279.77 279.54 278.63 278.85 278.48 278.40 278.34 278.30 278.22 278.21		ise:	s the real solution $x=z-zv=$ or $z(m/above\ stack)=z(ft/above\ stack$	17.38 17.6 16: 20 ft Interval el.Ht to Top of Jet 5D-z _v) ²]) ^{1/3} / a 4V _{plume} *a ^{2*} λ ²)) 50 ft Interval
Find Height above Stack Z _{crit} Height above Ground Z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 180.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 200.0 240.0 240.0 260.0 280.0 300.0 320.0 350.0 450.0 650.0 650.0 700.0 800.0 900.0 1100.0 1200.0 1300.0 1200.0 1300.0 1200.0 1300.0 1200.0 1300.0 120	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 59.94 66.03 75.18 90.42 105.66 120.90 136.14 151.38 166.62 181.86 212.34 242.82 273.30 303.78 334.26 334.74 395.22 425.70 578.10 730.50	meters ed Vertical V Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.639 7.565 8.540 9.515 10.491 11.954 14.392 16.831 19.269 21.707 24.146 26.584 29.023 33.899 38.776 43.653 48.530 53.407 58.283 63.160 68.037 92.421 116.805	Velocities state Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.93 2.61 2.38 2.20 2.07 1.96 1.83 1.67 1.55 1.47 1.40 1.34 1.29 1.25 1.18 1.12 1.08 1.04 1.00 0.97 0.95 0.92 0.83 0.77	282.49 281.71 280.97 280.45 280.45 280.45 280.66 279.77 279.54 279.36 279.15 278.91 278.74 278.63 278.25 278.48 278.40 278.30 278.28 278.22 278.22 278.22		ise:	s the real solution $x=z-zv=$ or $z(m/above\ stack)=z(ft/above\ stack$	17.38 17.6 16: 20 ft Interval el.Ht to Top of Jet 5D-z _v) ²]) ^{1/3} / a 4V _{plume} *a ^{2*} λ ²)) 50 ft Interval
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s able of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 160.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 220.0 240.0 240.0 260.0 240.0 300.0 300.0 320.0 350.0 450.0 650.0 600.0 600.0 900.0 900.0 1100.0 1100.0 1100.0 1500.0 1500.0 1000.0 1100.0 1500.0 1200	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 66.03 75.18 90.42 105.66 120.90 136.14 151.38 166.62 181.86 212.34 242.82 273.30 303.78 334.26 364.74 395.22 425.70 578.10 882.90	meters ed Vertical \(\text{Plume} \) Radius(m) \(\text{1.931} \) 2.337 2.825 3.312 3.254 3.800 3.862 4.639 5.614 6.589 7.565 8.540 9.515 10.491 11.954 14.392 21.707 24.146 26.584 29.023 33.899 38.776 43.653 48.530 53.407 58.283 63.160 68.037 92.421 116.805 141.189	Velocities state SingleStk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.93 2.61 2.38 2.20 2.07 1.96 1.83 1.67 1.55 1.47 1.40 1.34 1.29 1.25 1.18 1.12 1.08 1.04 1.00 0.97 0.95 0.92 0.83 0.77 0.72	rting at en Plume Temp(K) 282,49 281,71 280,97 280,45 280,06 279,17 279,54 278,63 278,15 278,84 278,44 278,40 278,34 278,22 278,22 278,22 278,21 278,21 278,21 278,21 278,21		ise:	s the real solution $x=z-zv=$ or $z(m/above\ stack)=z(ft/above\ stack$	17.38 17.8 16.6 20 ft Interval: el.Ht to Top of Jet 5D-z _γ) ²)) ^{1/3} / a 4V _{plume} *a ^{2*} λ ²))) 50 ft Interval:
Find Height above Stack z _{crit} Height above Ground z _{crit} +h _s Table of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 160.0 Single Jet 5.3 m/s Height = 182.5 200.0 220.0 240.0 220.0 240.0 280.0 380.0 300.0 300.0 300.0 400.0 650.0 660.0 660.0 660.0 670.0 1100.0 1200.0 1100.0 1200.0 1300.0 1400.0 1500.0 1500.0 1500.0 1500.0 1500.0 1500.0 1500.0 1500.0 1500.0 1500.0 1500.0 1500.0 1500.0 1500.0 1500.0 1500.0 1500.0 1500.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 59.94 66.03 75.18 90.42 105.66 120.90 136.14 151.38 166.62 181.86 212.34 242.82 273.30 303.78 334.26 364.74 395.22 425.70 578.10 730.50 882.90 1035.30	meters ed Vertical V Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 4.639 5.614 6.589 7.565 8.540 9.515 10.491 11.954 14.392 16.831 19.269 21.707 24.146 26.584 29.023 33.899 38.776 43.653 48.530 53.407 58.283 63.160 68.037 92.421 116.805 141.189	Velocities state Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.93 2.61 2.38 2.20 2.07 1.96 1.83 1.67 1.55 1.47 1.40 1.34 1.29 1.25 1.18 1.12 1.08 1.04 1.00 0.97 0.95 0.92 0.83 0.77 0.72	rting at en Plume Temp(K) 282.49 281.71 280.97 280.45 280.06 279.77 279.54 279.36 279.15 278.91 278.74 278.63 278.55 278.44 278.30 278.22 278.21 278.21 278.21 278.17 278.17		ise:	s the real solution $x=z-zv=$ or $z(m/above\ stack)=z(ft/above\ stack$	17.38 17.8 16.6 20 ft Interval: el.Ht to Top of Jet 5D-z _γ) ²)) ^{1/3} / a 4V _{plume} *a ^{2*} λ ²))) 50 ft Interval:
Find Height above Stack Z _{crit} Height above Ground Z _{crit} +h _s Fable of Plume Top-Hat Diameters (2a) and Fable of Plume Top-Hat Diameters (2a) above Jacoba (2a). Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 200.0 240.0 240.0 260.0 280.0 300.0 300.0 350.0 550.0 550.0 600.0 660.0 660.0 900.0 1000.0 1100.0 1100.0 1100.0 1200.0 1300.0 2500.0 2500.0 3000.0 3500.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 59.94 105.66 61.20.90 136.14 151.38 166.62 121.34 242.82 273.30 303.78 334.26 364.74 395.22 425.70 578.10 730.50 882.90 1035.30 1187.70	meters ed Vertical V Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.639 5.614 6.589 7.565 8.540 9.515 10.491 11.954 14.392 16.831 19.269 21.707 24.146 26.584 29.023 33.899 38.776 43.653 53.407 58.283 63.160 68.037 92.421 116.805 141.189 165.573 189.957	Jefocities states in the state of the state	282.49 281.71 280.97 280.45 280.06 279.77 279.54 278.63 278.85 278.48 278.40 278.30 278.22 278.21 278.17 278.17		ise:	s the real solution $x=z-zv=$ or $z(m/above\ stack)=z(ft/above\ stack$	17.38 17.8 161 20 ft Interval: el.Ht to Top of Jet 5D·z _v) ²]) ^{1/2} / a 4V _{plume} *a ^{2*} λ ²))) 50 ft Interval:
Find Height above Stack z _{crit} Height dove Ground z _{crit} +h _s Fable of Plume Top-Hat Diameters (2a) and F Height (feet) above ground Stack. Rel. Ht = 103.4 120.0 140.0 160.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 220.0 240.0 220.0 240.0 220.0 240.0 220.0 300.0 320.0 350.0 450.0 650.0 700.0 650.0 700.0 1100.0 1100.0 1200.0 1200.0 1200.0 1200.0 1200.0 1200.0 1200.0 1200.0 1200.0 1200.0 1200.0 1200.0 1200.0 1200.0 1200.0 1200.0 1300.0 1200.0 1300.0 1200.0 1300.0 1400.0 1500.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 59.94 66.03 75.18 90.42 105.66 120.90 136.14 151.38 166.62 181.86 212.34 242.82 273.30 303.78 334.26 334.26 3364.74 395.22 425.70 578.10 730.50 882.90 1053.30 1187.70 1340.10	meters ed Vertical \(\text{Plume} \) Radius(m) \(\text{1.931} \) 2.337 2.825 3.312 3.254 3.800 3.862 4.639 7.565 8.540 9.515 10.491 11.954 14.392 16.831 19.269 21.707 24.146 26.584 29.023 33.899 38.776 43.653 48.530 53.407 58.283 63.160 68.037 92.421 116.805 141.189 165.573 189.957 214.341	Jefocities state Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.93 2.61 2.38 2.20 2.07 1.96 1.83 1.67 1.55 1.47 1.40 1.34 1.29 1.25 1.18 1.12 1.08 1.04 1.00 0.97 0.95 0.92 0.83 0.77 0.72 0.68 0.65 0.63	rting at en Plume Temp(K) 282.49 281.71 280.97 280.45 280.06 279.17 279.54 279.36 279.15 278.81 278.40 278.24 278.20 278.24 278.22 278.21 278.17 278.16 278.16		ise:	s the real solution $x=z-zv=$ or $z(m/above\ stack)=z(ft/above\ stack$	17.38 17.8 161 20 ft Intervals el.Ht to Top of Jet 5D-z _v) ²)) ^{1/3} / a 4V _{plume} *a ^{2*} λ ²))) 50 ft Intervals
Find Height above Stack Z _{crit} Height above Ground Z _{crit} +h _s Fable of Plume Top-Hat Diameters (2a) and Fable of Plume Top-Hat Diameters (2a) above Jacoba (2a). Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 200.0 240.0 240.0 260.0 280.0 300.0 300.0 350.0 550.0 550.0 600.0 660.0 660.0 900.0 1000.0 1100.0 1100.0 1100.0 1200.0 1300.0 2500.0 2500.0 3000.0 3500.0	48.039 Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 66.03 75.18 90.42 105.66 120.90 136.14 151.38 166.62 181.86 212.34 242.82 273.30 303.78 334.26 364.74 395.22 425.70 578.10 730.50 882.90 1035.30 1187.70 1340.10 1492.50	meters ed Vertical \(\text{Plume} \) Radius(m) \(\text{1.931} \) 2.337 2.825 3.312 3.254 3.800 3.862 4.639 5.614 6.589 7.565 8.540 9.515 10.491 11.954 14.392 21.707 24.146 26.584 29.023 33.899 38.776 43.653 48.530 53.407 58.283 63.160 68.037 92.421 116.805 141.189 165.573 189.957 214.341 238.725	Velocities state SingleStk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.93 2.61 2.38 2.20 2.07 1.96 1.83 1.67 1.55 1.47 1.40 1.34 1.29 1.25 1.18 1.12 1.08 1.04 1.00 0.97 0.95 0.92 0.83 0.77 0.72 0.68 0.65 0.63	rting at en Plume Temp(K) 282.49 281.71 280.97 280.45 280.45 280.45 279.54 279.36 279.15 278.91 278.74 278.63 278.55 278.84 278.40 278.30 278.22 278.21 278.17 278.17 278.16 278.16		ise:	s the real solution $x=z-zv=$ or $z(m/above\ stack)=z(ft/above\ stack$	17.38 17.8 161 20 ft Intervals el.Ht to Top of Jet 5D-z _v) ²)) ^{1/3} / a 4V _{plume} *a ^{2*} λ ²))) 50 ft Intervals



			Chillers using oyant Plumes					
						ditions at \	∣ /arious Heights in the Merge	ed
	varua						, Queensland, Australia," D	
Ambient Conditions:							eutral conditions (dθ/dz=0 or θ	
Ambient Potential Temp θ _a	278.15	Kelvins	41.0	°F			meters/feet	
Plume Exit Conditions:					Gravity g		m/s ²	
Stack Height h _s		meters	103.35		λ	1.11 ~1.0		
Individual Stack Diameter D Stack Velocity V _{exit}	3.86213661 8.06		152.1 26.45	inches ft/sec	λ _o 4Vol/(60πD	-		
Individual Volumetric Flow		cu.m/sec	200,110		$\pi V_{\text{exit}} D^2/4$,		Sect.2/¶1
Stack Potential Temp θ _s		Kelvins	61.0		···· exit— · ·			
Initial Stack Buoyancy Flux Fo	11.33	m ⁴ /s ³	20.0	ΔT(°F)	gV _{exit} D ² (1-6	$\theta_a/\theta_s)/4 = V_0$	ol.Flow(g/π)(1-θ _a /θ _s)	Sect.2/¶1
Plume Buoyancy Flux F	N/A	m ⁴ /s ³			$\lambda^2 g V a^2 (1-\theta_s)$	_a /θ _p) for a,V	,θ _p at plume height (see below	w)
Total Number of Stacks n								
Average Adjacent Stack Separation d		meters	45.0	feet			e plume treatment in Peter Be	
Number of Stacks along Orientation N	3						sed by N ^{0.25} at the height wher low ht, single merged stack al	
Conditions at End (Top) of Jet Phase:					rully lifer get	a (interp. be	low nt, single merged stack a	bove nt)
Height above Stack z _{iet}	24.138	meters*	79.2	feet*	z _{iet} = 6.25D), meters*=	meters above stack top	Sect.3/¶1
Height above Ground z _{iet} +h _s	55.639	meters	182.5	feet	,			
Vertical Velocity V _{jet}	4.031	m/s	13.22	ft/sec	$V_{jet} = 0.5V_e$	exit = V _{exit} /2		
Plume Top-Hat Diameter 2a _{jet}	7.724	meters	25.3	feet	$2a_{jet} = 2D$		Conservation of momentum	
Spillane Methodology - Analytical Solutions								
Single Plume-averaged Vertical Velocity								Sect.2/Eq.6
Single Plume Values: Plume Top-Hat Radius a Virtual Source Height z _v		meters*	Merging Onl	y feet*			r increase with height , meters*=meters above stack top	
Virtual Source Height z _ν Height above Ground z _ν +h _s		meters	1.5		2v - 0.25D	1-(Oe/Os)	where $(\theta_a/\theta_s)^{1/2} = (\theta_e/\theta_s)^{1/2} =$	
Single Plume Values: Vertical Velocity V			Merging Onl		{(Va) ₂ 3 + 0	12F, [(z-z	$(\theta_a/\theta_s)^2 - (\theta_e/\theta_s)^2 = (\theta_e/\theta_s)^2 = (\theta_s/\theta_s)^2 + (\theta_s/\theta_s)^2 = (\theta_s/\theta_s)^2 + (\theta_s/\theta_s)^2 = (\theta_s/\theta_s)^2 + (\theta_s/\theta_s)^2 = (\theta_s/\theta_s)^2 + (\theta_s/\theta_s)^2 = $	Sect.2.1(6)
Product (Va) _o				-	V _{exit} (D/2)(θ _e		, (v/)) / a	
						-,		
Plume Merging - Based on Single Plume Cal	culations wh	ere:						Sect.3/¶3
Begin Merging Plume Top-Hat Diameter 2atouch	13.720	meters	45.0	feet	2a _{touch} =d, (or atouch=d/	2)	
Height above Stack z _{touch}	43.343	meters*	142.2		$z_{touch} = z_v +$	-d/(2*0.16),	meters*=meters above stack	top
Height above Ground z _{touch} +h _s		meters	245.6					
Vertical Velocity V _{touch}				ft/sec		, .	$F_0 [(z-z_v)^2 - (6.25D-z_v)^2]^{(1/3)}$	
Total Merging Plume Top-Hat Diameter 2afull		meters	90.0				=d(N-1)/2) FOR 2 STACKS,	
Height above Stack z _{full}		meters*	282.9		$z_{\text{full}} = z_{\text{v}} + 2$	d/(2*0.16), ı	meters*=meters above stack	top
Height above Ground z _{full} +h _s Vertical Velocity V _{full}	117.719 1.705		386.2	ft/sec	V - ((\/o)	3 . 0 125	[(z _{full} -z _v) ² - (6.25D-z _v) ²]} ^(1/3)	/ 0
Product (V ³ a) _{full}		m ⁴ /s ³	5.0	10'560	Vfull = {(Va)	6 T U. 12F6	[(Zfull=Zv) = (0.23D=Zv)]}.	/ afull
Conditions at End (Top) of Merging Phase - D			nd a in Mero	ed Plume c	alculations (hased on T	OTAL number of stacks):	
Merged Plume Values: Plume Diameter 2a			Table Below	00 1 101110 0			z _{full})), or linear increase with h	neiaht
Revised Merged Plume Radius a _m		meters	126.8	feet			nere Total Merging Occurs	
Revised Merged Plume Velocity V _m	4.802	m/s	15.76	ft/sec			here Total Merging Occurs	
Revised Virtual Source Height zfull	86.218	meters*	282.9	feet*			ere Total Merging Occurs (sh	iown above)
Revised Vertical Velocity V	S	olutions in 7	Tables Below		$V={n(V^3a)_f}u$	_{ıll} /a} ^{1/3} for he	eights above total merging ele	evation
					V=V _{touch} +(\		z-z _{touch})/(z _{full} -z _{touch})	
Multiple Plume Calculations	l						for heights below total mergin	ng elevation
Solve for plume-averaged vertical veloc					meters abo		z+h _s)	
Gives the following Height above Stack z Plume Top-Hat Radius a		meters*	836.7 215.4		REGULAR a=a _m +0.16		-	
Vertical Velocity V	4.025		13.20		$V=\{n(V^3a)_{fu}$			
volume volumenty v	4.020		10.20	10 000			z'-z _{touch})/(z _{full} -z _{touch}) if z _{touch} <	Z <z< td=""></z<>
							if z <z<sub>touch</z<sub>	luii
Solve for Height of CASC critical vertical	velocity V _{crit}	5.30	m/s		BEFORE T			VV < Top of
Find Height above Stack z _{crit}	JET	meters	JET	feet	Z _{crit} = Z _{full} +	⊦ {[n(V³a) _{full}	/(V _{crit}) ³]-a _m }/0.16 if V_{crit}<v<sub>m</v<sub>	
Height above Ground z _{crit} +h _s	JET	meters	JET	feet	Z _{crit} =Z _{touch} +	(Zfull-Ztouch)	*(V _{crit} -V _{touch})/(V _m -V _{touch}) if V _{cr}	V
. Ioigin above Ordana ZentTils								rit-V m
Table of MERGED Plume-Averaged Vertical \			ıching Height:			ne Eqns (se	ee Single Plume spreadsheet,	
Table of MERGED Plume-Averaged Vertical \ Height (feet)	(meters)	Plume	ıching Height: Vert.		V _{plume} ={(Va) _o	ne Eqns (se 3+0.12F _o [(z-z	ee Single Plume spreadsheet,	
Table of MERGED Plume-Averaged Vertical \ Height (feet) above ground	(meters) above stack	Plume Radius(m)	iching Height: Vert. Vel(m/s)		$V_{plume} = \{(Va)_o\}$ a = 0.16(z - 2)	ne Eqns (se 3+0.12F _o [(z-z, z _v)	,) ² -(6.25D-z _v) ²]} ^{1/3} / a	
Table of MERGED Plume-Averaged Vertical \ Height (feet) above ground Begin Merging (touch) = 245.6	(meters) above stack 43.36	Plume Radius(m) 6.860	iching Height: Vert. Vel(m/s) 2.54		$V_{plume} = \{(Va)_o\}$ a = 0.16(z-2) $\theta_p = \theta_s(1+(1-2))$	me Eqns (se ³ +0.12F _o [(z-z, z _v) -(θ _e /θ _s))*(V _e	_v) ² -(6.25D-z _v) ²]} ^{1/3} / a)
Table of MERGED Plume-Averaged Vertical \text{Height (feet)} above ground \text{Begin Merging (touch)} = 245.6 \text{260.0}	(meters) above stack 43.36 47.75	Plume Radius(m) 6.860 #N/A	vert. Vert. Vel(m/s) 2.54		$V_{plume}=\{(Va)_o\}$ $a=0.16(z-a)$ $\theta_p=\theta_s(1+(1-a))$ Interpolated	me Eqns (see 3 +0.12F _o [(z-z, z _v) $^{-}$ (θ_e/θ_s))*(V _e : of Layer Eqn	_v) ² -(6.25D-z _v) ²]} ^{1/3} / a)
Table of MERGED Plume-Averaged Vertical \ Height (feet) above ground Begin Merging (touch) = 245.6	(meters) above stack 43.36 47.75 53.84	Plume Radius(m) 6.860 #N/A #N/A	iching Height: Vert. Vel(m/s) 2.54		$V_{plume}=\{(Va)_o\}$ $a=0.16(z-a)$ $\theta_p=\theta_s(1+(1-a))$ Interpolated	me Eqns (see 3 +0.12F _o [(z-z, z _v) $^{-}$ (θ_e/θ_s))*(V _e : of Layer Eqn	_v) ² -(6.25D-z _v) ²]} ^{1/3} / a)
Table of MERGED Plume-Averaged Vertical \ Height (feet) above ground Begin Merging (touch) = 245.6 260.0 280.0	(meters) above stack 43.36 47.75 53.84 59.94	Plume Radius(m) 6.860 #N/A #N/A #N/A	vert. Vert. Vel(m/s) 2.54 2.77 3.09		$V_{plume}=\{(Va)_o\}$ $a=0.16(z-a)$ $\theta_p=\theta_s(1+(1-a))$ Interpolated	me Eqns (see 3 +0.12F _o [(z-z, z _v) $^{-}$ (θ_e/θ_s))*(V _e : of Layer Eqn	_v) ² -(6.25D-z _v) ²]} ^{1/3} / a 	
Table of MERGED Plume-Averaged Vertical Meight (feet) above ground Begin Merging (touch) = 245.6 260.0 280.0 300.0	(meters) above stack 43.36 47.75 53.84 59.94 66.03	Plume Radius(m) 6.860 #N/A #N/A #N/A	vert. Vert. Vel(m/s) 2.54 2.77 3.09 3.42		$V_{plume}=\{(Va)_o\}$ $a=0.16(z-a)$ $\theta_p=\theta_s(1+(1-a))$ Interpolated	me Eqns (see 3 +0.12F _o [(z-z, z _v) $^{-}$ (θ_e/θ_s))*(V _e : of Layer Eqn	_v) ² -(6.25D-z _v) ²]} ^{1/3} / a)
Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.6 260.0 280.0 320.0 320.0 324.0 360.0	(meters) above stack 43.36 47.75 53.84 59.94 66.03 72.13 78.23	Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A	vert Vert Vel(m/s) 2.54 2.77 3.09 3.42 3.74 4.06 4.38		$V_{plume}=\{(Va)_o\}$ $a=0.16(z-a)$ $\theta_p=\theta_s(1+(1-a))$ Interpolated	me Eqns (see 3 +0.12F _o [(z-z, z _v) $^{-}$ (θ_e/θ_s))*(V _e : of Layer Eqn	_v) ² -(6.25D-z _v) ²]} ^{1/3} / a)
Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.6 260.0 300.0 320.0 340.0 360.0 380.0	(meters) above stack 43.36 47.75 53.84 59.94 66.03 72.13 78.23 84.32	Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A #N/A	vert. Vel(m/s) 2.54 2.77 3.09 3.42 3.74 4.06 4.38 4.70		$V_{plume}=\{(Va)_o\}$ $a=0.16(z-a)$ $\theta_p=\theta_s(1+(1-a))$ Interpolated	me Eqns (see 3 +0.12F _o [(z-z, z _v) $^{-}$ (θ_e/θ_s))*(V _e : of Layer Eqn	_v) ² -(6.25D-z _v) ²]} ^{1/3} / a)
Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.6 260.0 300.0 300.0 340.0 360.0 360.0 360.0 400.0 400.0 400.0	(meters) above stack 43.36 47.75 53.84 59.94 66.03 72.13 78.23 84.32 90.42	Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	vert. Vert. Vel(m/s) 2.54 2.77 3.09 3.42 3.74 4.06 4.38 4.70 5.02		$\begin{split} & V_{\text{plume}} = & \{(Va)_o \\ & a = 0.16(z-z) \\ & \theta_p = \theta_s(1+(1-z)) \\ & \text{Interpolate} \\ & V' = V_{touch} + (1-z) \\ & V' = V_$	me Eqns (se me Eqns (se z _v) -(0 _e /0 _s))*(V _e , d Layer Eqn V _m -V _{touch})*(_v) ² -(6.25D-z _v) ²]} ^{1/3} / a)
Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.6	(meters) above stack 43.36 47.75 53.84 59.94 66.03 72.13 78.23 84.32 90.42	Plume Radius(m)) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	ching Height: Vert. Vel(m/s) 2.54 2.77 3.09 3.42 3.74 4.06 4.38 4.70 5.02		V _{plume} ={(Va) _o a = 0.16(z θ _p =θ _s (1+(1- Interpolated V'=V _{touch} +('	me Eqns (se me Eqns (se z _v) (e ₀ /e _s))*(V _e , d Layer Eqn V _m -V _{touch})*(_v) ² -(6.25D-z _v) ²]} ^{1/3} / a 	20 ft Interval
Table of MERGED Plume-Averaged Vertical Height (feet) above ground **Begin Merging (touch) = 245.6 260.0 280.0 300.0 320.0 340.0 360.0 380.0 400.0 **End Merging (full/mp) = 386.2 450.0	(meters) above stack 43.36 47.75 53.84 59.94 66.03 72.13 78.23 84.32 90.42 86.21	Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	sching Height: Vert. Vel(m/s) 2.54 2.77 3.09 3.42 3.74 4.06 4.38 4.70 5.02 4.80 4.68		$\begin{split} & V_{\text{plume}} = \{(Va)_o \\ & a = 0.16(z-a) \\ & \theta_p = \theta_s(1+(1-a)) \\ & V = V_{\text{touch}} + (1-a) \\ & W_{\text{touch}} = (1-$	me Eqns (see me Eqns (see """"""""""""""""""""""""""""""""""	_v) ² -(6.25D-z _v) ²]} ^{1/3} / a 	20 ft Interval
Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.6 260.0 280.0 300.0 320.0 340.0 360.0 360.0 400.0 End Merging (full/mp) = 366.2 450.0 500.0 500.0	(meters) above stack 43.36 47.75 53.84 59.94 66.03 72.13 78.23 84.32 90.42 86.21 105.66	Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A #N/A 4N/A 4N/A 4N/A 4N/A 4N/A 41.764 44.202	tching Height: Vert. Vel(m/s) 2.54 2.77 3.09 3.42 3.74 4.06 4.38 4.70 5.02 4.80 4.68		V _{plume} ={(Va) _o a = 0.16(z θ _p =θ _s (1+(1- Interpolated V'=V _{touch} +('	me Eqns (see me Eqns (see """"""""""""""""""""""""""""""""""	_v) ² -(6.25D-z _v) ²]} ^{1/3} / a 	20 ft Interval
Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.6 260.0 280.0 300.0 340.0 360.0 380.0 400.0 End Merging (full/mp) = 386.2 450.0 500.0 550.0	(meters) above stack 43.36 47.75 53.84 59.94 66.03 72.13 78.23 84.32 90.42 86.21 105.66 120.90	Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A #N/A 4N/A 4N/A 41.764 44.202 46.641	tching Height: Vert. Vel(m/s) 2.54 2.77 3.09 3.42 3.74 4.06 4.38 4.70 5.02 4.80 4.68 4.59 4.51		$\begin{split} & V_{\text{plume}} = \{(Va)_o \\ & a = 0.16(z-a) \\ & \theta_p = \theta_s(1+(1-a)) \\ & V = V_{\text{touch}} + (1-a) \\ & W_{\text{touch}} = (1-$	me Eqns (see me Eqns (see """"""""""""""""""""""""""""""""""	_v) ² -(6.25D-z _v) ²]} ^{1/3} / a 	20 ft Interval
Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.6 260.0 280.0 300.0 320.0 340.0 360.0 360.0 400.0 End Merging (full/mp) = 366.2 450.0 500.0 500.0	(meters) above stack 43.36 47.75 53.84 66.03 72.13 78.23 84.32 90.42 86.21 105.66 120.90 136.14 151.38	Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A #N/A 4N/A 4N/A 41.764 44.202 46.641 49.079	tching Height: Vert. Vel(m/s) 2.54 2.77 3.09 3.42 3.74 4.06 4.38 4.70 5.02 4.80 4.68		$\begin{split} & V_{\text{plume}} = \{(Va)_o \\ & a = 0.16(z-a) \\ & \theta_p = \theta_s(1+(1-a)) \\ & V = V_{\text{touch}} + (1-a) \\ & W_{\text{touch}} = (1-$	me Eqns (see me Eqns (see """"""""""""""""""""""""""""""""""	_v) ² -(6.25D-z _v) ²]} ^{1/3} / a 	20 ft Interval
Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.6 260.0 280.0 300.0 320.0 320.0 360.0 380.0 400.0 End Merging (full/mp) = 386.2 450.0 500.0	(meters) above stack 43.36 47.75 53.84 59.94 66.03 72.13 78.23 84.32 90.42 86.21 105.66 120.90 136.14 151.38	Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A 4N/A 41.764 44.202 46.641 49.079 51.518	ching Height: Vert. Vel(m/s) 2.54 2.77 3.09 3.42 3.74 4.06 4.38 4.70 5.02 4.80 4.68 4.59 4.51		$\begin{split} & V_{\text{plume}} = \{(Va)_o \\ & a = 0.16(z-a) \\ & \theta_p = \theta_s(1+(1-a)) \\ & V = V_{\text{touch}} + (1-a) \\ & W_{\text{touch}} = (1-$	me Eqns (see me Eqns (see """"""""""""""""""""""""""""""""""	_v) ² -(6.25D-z _v) ²]} ^{1/3} / a 	20 ft Interval
Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.6 260.0 280.0 300.0 320.0 340.0 360.0 360.0 400.0 End Merging (full/mp) = 366.2 450.0 500.0 550.0 660.0 660.0 650.0	(meters) above stack 43.36 47.75 53.84 59.94 66.03 72.13 78.23 84.32 90.42 86.21 105.66 120.90 136.14 151.38 166.62 181.86	Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A 4N/A 40.764 41.764 44.202 46.641 49.079 51.518 53.956	tching Height: Vert. Vel(m/s) 2.54 2.77 3.09 3.42 4.06 4.38 4.70 5.02 4.80 4.68 4.59 4.51 4.43		$\begin{split} & V_{\text{plume}} = \{(Va)_o \\ & a = 0.16(z-a) \\ & \theta_p = \theta_s(1+(1-a)) \\ & V = V_{\text{touch}} + (1-a) \\ & W_{\text{touch}} = (1-$	me Eqns (see me Eqns (see """"""""""""""""""""""""""""""""""	_v) ² -(6.25D-z _v) ²]} ^{1/3} / a 	20 ft Interval
Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.6 260.0 300.0 300.0 340.0 360.0 380.0 400.0 End Merging (full/mp) = 386.2 450.0 500.0 600.0 600.0	(meters) above stack 43.36 47.75 53.84 66.03 72.13 78.23 84.32 90.42 86.21 105.66 120.90 136.14 151.38 166.62 181.86	Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	tching Height: Vert. Vel(m/s) 2.54 2.77 3.09 3.42 3.74 4.06 4.38 4.70 5.02 4.80 4.68 4.59 4.51 4.43 4.36 4.30		$\begin{split} & V_{\text{plume}} = \{(Va)_o \\ & a = 0.16(z-a) \\ & \theta_p = \theta_s(1+(1-a)) \\ & V = V_{\text{touch}} + (1-a) \\ & W_{\text{touch}} = (1-$	me Eqns (see me Eqns (see """"""""""""""""""""""""""""""""""	_v) ² -(6.25D-z _v) ²]} ^{1/3} / a 	20 ft Interval
Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.6 260.0 280.0 300.0 320.0 340.0 360.0 380.0 400.0 End Merging (full/mp) = 386.2 450.0 550.0 600.0 650.0	(meters) above stack 43.36 47.75 53.84 66.03 72.13 78.23 84.32 90.42 86.21 105.66 120.90 136.14 151.38 166.62 181.86 212.34	Plume Radius(m) 6.880 #N/A #N/A #N/A #N/A #N/A #N/A #N/A 40.764 41.764 44.202 46.641 49.079 51.518 53.956 58.833 63.710	tching Height: Vert. Vel(m/s) 2.54 2.77 3.09 3.42 3.74 4.06 4.38 4.70 5.02 4.80 4.68 4.59 4.51 4.43 4.36 4.30 4.30		$\begin{split} & V_{\text{plume}} = \{(Va)_o \\ & a = 0.16(z-a) \\ & \theta_p = \theta_s(1+(1-a)) \\ & V = V_{\text{touch}} + (1-a) \\ & W_{\text{touch}} = (1-$	me Eqns (see me Eqns (see """"""""""""""""""""""""""""""""""	_v) ² -(6.25D-z _v) ²]} ^{1/3} / a 	20 ft Interval
Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.6 260.0 280.0 300.0 320.0 340.0 360.0 360.0 400.0 End Merging (full/mp) = 366.2 450.0 500.0 550.0 650.0 650.0 700.0 800.0 900.0	(meters) above stack 43.36 47.75 53.84 59.94 66.03 72.13 78.23 84.32 90.42 86.21 105.66 120.90 136.14 151.38 166.62 181.86 212.34 242.82 273.30	Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A #N/A 4N/A 40.641 44.702 46.641 49.079 51.518 53.956 58.833 63.710 68.586	tching Height: Vert. Vel(m/s) 2.54 2.77 3.09 3.42 3.74 4.06 4.38 4.70 5.02 4.80 4.68 4.59 4.51 4.43 4.36 4.30 4.17		$\begin{split} & V_{\text{plume}} = \{(Va)_o \\ & a = 0.16(z-a) \\ & \theta_p = \theta_s(1+(1-a)) \\ & V = V_{\text{touch}} + (1-a) \\ & W_{\text{touch}} = (1-$	me Eqns (see me Eqns (see """"""""""""""""""""""""""""""""""	_v) ² -(6.25D-z _v) ²]} ^{1/3} / a 	20 ft Interval
Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.6 280.0 300.0 300.0 360.0 380.0 380.0 400.0 End Merging (full/mp) = 386.2 450.0 500.0 600.0 650.0 700.0 800.0	(meters) above stack 43.36 47.75 53.84 66.03 72.13 78.23 84.32 90.42 86.21 105.66 120.90 136.14 151.38 166.62 181.86 212.34 242.82 273.30 303.78	Plume Radius/mo 6.860 #N/A #N/A #N/A #N/A #N/A #N/A #N/A 41.764 44.202 46.641 49.079 51.518 53.956 58.833 63.710 68.586 73.463	tching Height: Vert. Vel(m/s) 2.54 2.77 3.09 3.42 3.74 4.06 4.38 4.70 5.02 4.80 4.68 4.59 4.51 4.43 4.36 4.30 4.17 4.07		$\begin{split} & V_{\text{plume}} = \{(Va)_o \\ & a = 0.16(z-a) \\ & \theta_p = \theta_s(1+(1-a)) \\ & V = V_{\text{touch}} + (1-a) \\ & W_{\text{touch}} = (1-$	me Eqns (see me Eqns (see """"""""""""""""""""""""""""""""""	_v) ² -(6.25D-z _v) ²]} ^{1/3} / a 	20 ft Interval
Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.6 280.0 300.0 300.0 360.0 380.0 380.0 400.0 End Merging (full/mp) = 386.2 450.0 500.0 600.0 600.0 650.0 700.0 800.0 1000.0	(meters) above stack 43.36 47.75 53.84 59.94 66.03 72.13 78.23 84.32 90.42 86.21 105.66 120.90 136.14 151.38 166.62 181.86 212.34 242.82 273.30 303.78 334.26 334.26	Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A #N/A 41.764 44.202 46.641 49.079 51.518 53.956 58.833 63.710 68.586 73.463 73.463 83.217	tching Height: Vert. Vel(m/s) 2.54 2.77 3.09 3.42 3.74 4.06 4.38 4.70 5.02 4.80 4.59 4.51 4.43 4.36 4.30 4.17 4.07 3.97 3.88 3.79 3.72		$\begin{split} & V_{\text{plume}} = \{(Va)_o \\ & a = 0.16(z-a) \\ & \theta_p = \theta_s(1+(1-a)) \\ & V = V_{\text{touch}} + (1-a) \\ & W_{\text{touch}} = (1-$	me Eqns (see me Eqns (see """"""""""""""""""""""""""""""""""	_v) ² -(6.25D-z _v) ²]} ^{1/3} / a 	20 ft Interval
Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.6 260.0 280.0 300.0 340.0 360.0 380.0 400.0 End Merging (full/mp) = 386.2 450.0 550.0 600.0 650.0 700.0 1000.0 1100.0 1200.0	(meters) above stack 43.36 47.75 53.84 66.03 72.13 78.23 84.32 90.42 86.21 105.66 120.90 136.14 151.38 166.62 181.86 212.34 242.82 273.30 303.78 334.26 364.74 395.22	Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A #N/A 41.764 44.202 46.641 49.079 51.518 53.956 58.833 63.710 68.556 73.463 78.340 83.217 88.094	tching Height: Vert. Vel(m/s) 2.54 2.77 3.09 3.42 3.74 4.06 4.38 4.70 5.02 4.80 4.68 4.59 4.51 4.43 4.36 4.30 4.17 4.07 3.97 3.88 3.79 3.72 3.65		$\begin{split} & V_{\text{plume}} = \{(Va)_o \\ & a = 0.16(z-a) \\ & \theta_p = \theta_s(1+(1-a)) \\ & V = V_{\text{touch}} + (1-a) \\ & W_{\text{touch}} = (1-$	me Eqns (see me Eqns (see """"""""""""""""""""""""""""""""""	_v) ² -(6.25D-z _v) ²]} ^{1/3} / a 	20 ft Interval
Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.6 280.0 280.0 300.0 340.0 360.0 380.0 400.0 End Merging (full/mp) = 366.2 450.0 500.0 550.0 660.0 700.0 680.0 900.0 1000.0 1100.0 1200.0	(meters) above stack 43.36 47.75 53.84 66.03 72.13 78.23 84.32 90.42 86.21 105.66 120.90 136.14 151.38 166.62 181.86 212.34 242.82 273.30 303.78 334.26 364.74 395.22 425.70	Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A #N/A 41.764 44.202 46.641 49.079 51.518 53.956 58.833 63.710 68.586 73.463 77.343 83.217 88.904	tching Height: Vert. Vel(m/s) 2.54 2.77 3.09 3.42 3.74 4.06 4.38 4.70 5.02 4.80 4.59 4.51 4.43 4.36 4.30 4.17 4.07 3.97 3.88 3.79 3.72 3.655 3.58		$\begin{split} & V_{\text{plume}} = \{(Va)_o \\ & a = 0.16(z-a) \\ & \theta_p = \theta_s(1+(1-a)) \\ & V = V_{\text{touch}} + (1-a) \\ & W_{\text{touch}} = (1-$	me Eqns (see me Eqns (see """"""""""""""""""""""""""""""""""	_v) ² -(6.25D-z _v) ²]} ^{1/3} / a 	20 ft Interval
Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.6 280.0 300.0 300.0 340.0 380.0 380.0 380.0 400.0 End Merging (full/mp) = 386.2 450.0 550.0 600.0 650.0 600.0 1000.0 1100.0 1100.0 1200.0 1400.0	(meters) above stack 43.36 47.75 53.84 59.94 66.03 72.13 78.23 84.32 90.42 86.21 105.66 120.90 136.14 151.38 166.62 181.86 212.34 242.82 273.30 303.78 334.26 364.74 395.22 425.70 578.10	Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A #N/A 41.764 44.202 46.641 49.079 51.518 53.956 58.830 68.586 73.463 78.340 83.217 88.094 92.970 117.354	tching Height: Vert. Vel(m/s) 2.54 2.77 3.09 3.42 3.74 4.06 4.38 4.70 5.02 4.80 4.59 4.51 4.43 4.36 4.30 4.17 4.07 3.97 3.88 3.79 3.72 3.65 3.588 3.35		$\begin{split} & V_{\text{plume}} = \{(Va)_o \\ & a = 0.16(z-a) \\ & \theta_p = \theta_s(1+(1-a)) \\ & V = V_{\text{touch}} + (1-a) \\ & W_{\text{touch}} = (1-$	me Eqns (see me Eqns (see """"""""""""""""""""""""""""""""""	_v) ² -(6.25D-z _v) ²]} ^{1/3} / a 	20 ft Interval
Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.6 260.0 280.0 300.0 340.0 360.0 380.0 380.0 400.0 End Merging (full/mp) = 386.2 450.0 550.0 600.0 600.0 600.0 1000.0 1100.0 1200.0 1400.0	(meters) above stack 43.36 47.75 53.84 66.03 72.13 78.23 84.32 90.42 86.21 105.66 120.90 136.14 151.38 166.62 121.34 242.82 273.30 303.78 334.26 334.26 364.74 395.22 425.70 578.10 730.50	Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A #N/A 41.764 44.202 46.641 49.079 51.518 53.956 58.833 63.710 68.556 73.463 78.340 83.217 88.094 92.970 117.354 1141.738	tching Height: Vert. Vel(m/s) 2.54 2.77 3.09 3.42 3.74 4.06 4.38 4.70 5.02 4.80 4.68 4.59 4.51 4.43 4.36 4.30 4.17 4.07 3.97 3.88 3.79 3.72 3.65 3.58 3.32 3.11		$\begin{split} & V_{\text{plume}} = \{(Va)_o \\ & a = 0.16(z-a) \\ & \theta_p = \theta_s(1+(1-a)) \\ & V = V_{\text{touch}} + (1-a) \\ & W_{\text{touch}} = (1-$	me Eqns (see me Eqns (see """"""""""""""""""""""""""""""""""	_v) ² -(6.25D-z _v) ²]} ^{1/3} / a 	20 ft Interval
Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.6 280.0 280.0 300.0 300.0 340.0 360.0 380.0 400.0 End Merging (full/mp) = 366.2 450.0 550.0 660.0 700.0 680.0 900.0 1000.0 11000.0 1200.0 1500.0	(meters) above stack 43.36 47.75 53.84 66.03 72.13 78.23 84.32 90.42 86.21 105.66 120.90 136.14 151.38 166.62 181.86 212.34 242.82 273.30 303.78 334.26 364.74 395.22 425.70 578.10 730.50 882.90	Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A #N/A 41.764 44.202 46.641 49.079 51.518 53.956 58.833 63.710 68.586 73.463 773.463 78.340 83.217 88.094 92.970 117.354 141.7384	tching Height: Vert. Vel(m/s) 2.54 2.77 3.09 3.42 3.74 4.06 4.38 4.70 5.02 4.80 4.59 4.51 4.43 4.36 4.30 4.17 4.07 3.97 3.88 3.79 3.72 3.655 3.58 3.32 3.11		$\begin{split} & V_{\text{plume}} = \{(Va)_o \\ & a = 0.16(z-a) \\ & \theta_p = \theta_s(1+(1-a)) \\ & V = V_{\text{touch}} + (1-a) \\ & W_{\text{touch}} = (1-$	me Eqns (see me Eqns (see """"""""""""""""""""""""""""""""""	_v) ² -(6.25D-z _v) ²]} ^{1/3} / a 	20 ft Interval 50 ft Interval
Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.6 280.0 300.0 320.0 340.0 360.0 380.0 400.0 End Merging (full/mp) = 386.2 450.0 550.0 600.0 650.0 700.0 800.0 1100.0 1100.0 1200.0 1400.0 1500.0	(meters) above stack 43.36 47.75 53.84 59.94 66.03 72.13 78.23 84.32 90.42 86.21 105.66 120.90 136.14 151.38 166.62 181.86 212.34 242.82 273.30 303.78 334.26 364.74 395.22 425.70 578.10 730.50 882.90 1035.30	Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A 4N/A 40.72 46.641 49.079 51.518 53.956 68.373 68.586 73.463 78.340 83.217 88.094 92.970 117.354 141.738 166.122 190.506	tching Height: Vert. Vel(m/s) 2.54 2.77 3.09 3.42 3.74 4.06 4.38 4.70 5.02 4.80 4.59 4.51 4.43 4.36 4.30 4.17 4.07 3.97 3.88 3.79 3.72 3.65 3.58 3.32 3.11 2.95 2.82		$\begin{split} & V_{\text{plume}} = \{(Va)_o \\ & a = 0.16(z-a) \\ & \theta_p = \theta_s(1+(1-a)) \\ & V = V_{\text{touch}} + (1-a) \\ & W_{\text{touch}} = (1-$	me Eqns (see me Eqns (see """"""""""""""""""""""""""""""""""	_v) ² -(6.25D-z _v) ²]} ^{1/3} / a)
Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.6 280.0 280.0 300.0 300.0 340.0 360.0 380.0 400.0 End Merging (full/mp) = 366.2 450.0 550.0 650.0 600.0 700.0 800.0 900.0 1000.0 1100.0 1200.0 1500.0	(meters) above stack 43.36 47.75 53.84 66.03 72.13 78.23 84.32 90.42 86.21 105.66 120.90 136.14 151.38 166.62 121.34 242.82 273.30 303.78 334.26 334.26 364.74 395.22 425.70 730.50 882.90 1035.30 1187.70	Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A #N/A 41.764 44.202 46.641 49.079 51.518 53.956 73.463 78.340 49.297 117.354 141.738 166.122 190.506 214.890	tching Height: Vert. Vel(m/s) 2.54 2.77 3.09 3.42 3.74 4.06 4.38 4.70 5.02 4.80 4.59 4.51 4.43 4.36 4.30 4.17 4.07 3.97 3.88 3.79 3.72 3.655 3.58 3.32 3.11		$\begin{split} & V_{\text{plume}} = \{(Va)_o \\ & a = 0.16(z-a) \\ & \theta_p = \theta_s(1+(1-a)) \\ & V = V_{\text{touch}} + (1-a) \\ & W_{\text{touch}} = (1-$	me Eqns (see me Eqns (see """"""""""""""""""""""""""""""""""	_v) ² -(6.25D-z _v) ²]} ^{1/3} / a 	20 ft Interval 50 ft Interval



	"Aviation Sa		oyant Plumes	," Peter Be	Methodolo est, et. al.			
						ditions at \	arious Heights in the Merg	ed
				•			, Queensland, Australia," [
mbient Conditions:							eutral conditions (dθ/dz=0 or t	
Ambient Potential Temp θ	278.15	Kelvins	41.0	°F		0.3048	meters/feet	
lume Exit Conditions:					Gravity g	9.81	m/s ²	
Stack Height h	-	meters	103.35	feet	λ	1.11		
Individual Stack Diameter D				inches	λο	~1.0		
Stack Velocity V _{exi}				ft/sec	4Vol/(60πD	¹²)		
Individual Volumetric Flov		cu.m/sec	200,110		πV _{exit} D ² /4			Sect.2/¶1
Stack Potential Temp θ	-	Kelvins	61.0		- 2			
Initial Stack Buoyancy Flux F		m ⁴ /s ³	20.0	ΔT(°F)			ol.Flow(g/ π)(1- θ_a/θ_s)	Sect.2/¶1
Plume Buoyancy Flux F		m ⁴ /s ³			λ-gva-(1-θ _ε	_s /θ _p) for a, v	θ _p at plume height (see below	w)
Total Number of Stacks r Average Adjacent Stack Separation of			20.0	foot	Calaa baaa	d on multiple	plume treatment in Peter Be	ot Donor.
		meters	20.0	ieet			sed by N ^{0.25} at the height when	
Number of Stacks along Orientation N	21						low ht, single merged stack a	
onditions at End (Top) of Jet Phase:					· y g	- (,, g g	,
Height above Stack z _{je}	24.138	meters*	79.2	feet*	z = 6.250), meters*=	meters above stack top	Sect.3/¶1
Height above Ground z _{iet} +h		meters	182.5		Ljet - 0.202	,	notoro above otdor top	"
Vertical Velocity V _{je}			_	ft/sec	$V_{jet} = 0.5V_e$	i. = Vi./2		
Plume Top-Hat Diameter 2aje		meters	25.3		2a _{jet} = 2D	AN CAN	Conservation of momentum	
					.,			
pillane Methodology - Analytical Solutions	for Calm Cor	ditions for	Plume Height	s above Je	t and Merg	ing Phases	3	
Single Plume-averaged Vertical Veloci								
ingle Plume Values: Plume Top-Hat Radius a			Merging Onl				r increase with height	Sect.2/Eq.6
Virtual Source Height z		meters*		feet*			, meters*=meters above stack top	
Height above Ground z _v +h		meters	104.9		,	. (5/)	where $(\theta_a/\theta_s)^{1/2} = (\theta_e/\theta_s)^{1/2} =$	
Single Plume Values: Vertical Velocity \			Merging Onl		{(Va) _o ³ + 0.	12F _o [(z-7.) ² - (6.25D-z _v) ²]) ^(1/3) / a	Sect.2.1(6)
Product (Va)					V _{exit} (D/2)(θ _e		, ,, , ,	
. roduct (va)	.0.200	_ · -				-,		
lume Merging - Based on Single Plume Ca	lculations wh	ere:						Sect.3/¶3
egin Merging Plume Top-Hat Diameter 2atoucl		meters	20.0	feet	2a _{touch} =d, (or atouch=d/	2)	
Height above Stack z _{toucl}		meters*		feet*			meters*=meters above stack	top
Height above Ground z _{touch} +h		meters	167.4		-1000II - ZVT	(= 0.10),	otoro above statik	
Vertical Velocity V _{touch} +1			_	ft/sec	V _{touch} = {(V	a) ₀ 3 + 0.12	= _o [(z-z _v) ² - (6.25D-z _v) ²]} ^(1/3)	/ a
otal Merging Plume Top-Hat Diameter 2a _{fu}			400.3				d(N-1)/2) FOR 2 STACKS,	
Height above Stack z _{fu}		meters*	1252.4				meters*=meters above stack	
Height above Ground z _{full} +h			1355.7		Tun V			
Vertical Velocity V _{fu}				ft/sec	V = {(Va)	3 + 0.12F	[(Z _{full} -Z _v) ² - (6.25D-Z _v) ²]} ^(1/3)	/ a
Product (V ³ a) _{fu}		m ⁴ /s ³			- 1 (()	0	[(= di =0), (======0)];	, uii
conditions at End (Top) of Merging Phase -			nd a in Mero	ed Plume c	alculations (based on T	OTAL number of stacks):	
Merged Plume Values: Plume Diameter 2a			Table Below				z _{full})), or linear increase with h	neight
Revised Merged Plume Radius an		meters	563.8	feet			nere Total Merging Occurs	loigi k
Revised Merged Plume Velocity V _n				ft/sec			here Total Merging Occurs	
Revised Virtual Source Height z _{fu}		meters*	1252.4				ere Total Merging Occurs (sh	lown above)
Revised Vertical Velocity V			Tables Below				eights above total merging ele	
Revised Vertical Velocity V			rabico Boion				z-z _{touch})/(z _{full} -z _{touch})	vacion
Multiple Plume Calculations					touch - (· III · todcii/ (-	for heights below total mergin	ng elevation
Solve for plume-averaged vertical velo	city at height	940.0	feet	286.512	meters abo	ve around (
Gives the following Height above Stack 2		meters*	836.7				MERGING PHASE-INTERPO	LATE
Plume Top-Hat Radius a		meters	#N/A	feet	a=a _m +0.16	(z-z _{full}) if z>	-Z _{full}	
Vertical Velocity \				ft/sec	V={n(V ³ a) _{fu}			
•							z'-z _{touch})/(z _{full} -z _{touch}) if z _{touch} <	Z <zfull< td=""></zfull<>
							if Z <z<sub>touch</z<sub>	
Solve for Height of CASC critical vertica	l velocity V _{crit}	5.30	m/s		V'=single p	lume values		VV < Top of J
			m/s JET	feet	V'=single p	lume values OUCHING	Critical	VV < Top of J
Find Height above Stack zeri	, JET	meters	JET		V'=single p BEFORE T z _{crit} = z _{full} +	lume values OUCHING - {[n(V ³ a) _{full}	Critical /(V _{crit}) ³]-a _m }/0.16 if V _{crit} <v<sub>m</v<sub>	VV < Top of J
	, JET		JET	feet	V'=single p BEFORE T z _{crit} = z _{full} +	lume values OUCHING - {[n(V ³ a) _{full}	Critical	
Find Height above Stack z _{crit} +h,	t JET	meters meters	JET JET	feet	V'=single p BEFORE T Z _{crit} = Z _{full} + Z _{crit} =Z _{touch} +	lume values OUCHING - { $[n(V^3a)_{full}$ - $(z_{full}$ - $z_{touch})$	Critical $(V_{crit})^3$]- a_m }/0.16 if V_{crit} V_{m} * $(V_{crit}$ - V_{touch})/ $(V_m$ - V_{touch}) if V_{crit}	_{it} >V _m
Find Height above Stack z _{en} Height above Ground z _{ent} +h, able of MERGED Plume-Averaged Vertical	JET JET Velocities sta	meters meters rting at Tou	JET JET	feet	V'=single p BEFORE T z _{crit} = z _{full} + z _{crit} =z _{touch} +	lume values OUCHING - {[n(V ³ a) _{full} (Z _{full} -Z _{touch}) ne Eqns (se	Critical /(V _{crit}) ³]-a _m)/0.16 if V _{crit} <v<sub>m (V_{crit}-V_{touch})/(V_m-V_{touch}) if V_{cri} ee Single Plume spreadsheet</v<sub>	it>V _m
Find Height above Stack z _{crit} +h,	JET JET Velocities sta (meters)	meters meters rting at Tou	JET JET Iching Height	feet	V'=single p BEFORE T z _{crit} = z _{full} + z _{crit} =z _{touch} +	lume values OUCHING - {[n(V³a) _{full} - (z _{full} -z _{touch}) - ne Eqns (se	Critical $(V_{crit})^3$]- a_m }/0.16 if V_{crit} V_{m} * $(V_{crit}$ - V_{touch})/ $(V_m$ - V_{touch}) if V_{crit}	it>V _m
Find Height above Stack z _{en} Height above Ground z _{ent} +h, able of MERGED Plume-Averaged Vertical Height (feet above ground	yelocities sta (meters) above stack	meters meters rting at Tou Plume Radius(m)	JET JET Iching Height: Vert. Vel(m/s)	feet	V'=single p BEFORE T $Z_{crit} = Z_{full} + Z_{crit} = Z_{touch} + Z_{crit} = Z_{touch} + Z_{crit} = Z_{touch} + Z_{crit} = Z_{touch} + $	lume values OUCHING - {[n(V³a) _{full} - (z _{full} -z _{touch}) - me Eqns (se	Critical ((V _{cntl}) ³]-a _m)/0.16 if V _{crit} <v<sub>m ((V_{cnit}-V_{touch})/(V_m-V_{touch}) if V_{cr} ee Single Plume spreadsheet)²-(6.25D-z_v)²])^{1/3} / a</v<sub>	it>V _m
Find Height above Stack z _{cn} Height above Ground z _{cni} +h, able of MERGED Plume-Averaged Vertical Height (feet	Velocities sta (meters) above stack	meters meters rting at Tou Plume Radius(m) 3.050	JET JET Iching Height: Vert.	feet	$\begin{array}{l} V'=single\ p\\ BEFORE\ T\\ Z_{crit}=Z_{full}\ +\\ Z_{crit}=Z_{touch}+\\ Single\ Plum\\ V_{plume}=\{(Va)_o\\ a=0.16(z-d_p)=\theta_s(1+(1-d_p)). \end{array}$	lume values OUCHING - $\{[n(V^3a)_{full} \cdot (z_{full} - z_{touch})^2 \cdot (z_{full} - z_{touch})^3 + 0.12F_o[(z-z, z_v)]$ - $(\Theta_e/\Theta_s))^*(V_e$	Critical ((V _{cmt}) ²]-a _m)/0.16 if V _{crit} <v<sub>m (V_{cmt}-V_{touch})/(V_m-V_{touch}) if V_{cr} es Single Plume spreadsheet y^2-(6.25D-x)²y^2-(6.25D-x)²y^2-(7.25D-y^2) y^2-(8.25D-y^2) y^2</v<sub>	_{it} >V _m
Find Height above Stack z _{en} Height above Ground z _{ent} +h, able of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 167.4	Velocities sta (meters) I above stack 1 19.52	meters meters rting at Tou Plume Radius(m) 3.050 #N/A	JET JET Iching Height: Vert. Vel(m/s)	feet	$\begin{array}{l} V\text{=single p} \\ \text{BEFORE T} \\ z_{crit} = z_{full} + \\ z_{crit} = z_{touch} + \\ \text{Single Plum} \\ v_{\text{plume}} = ((va)_o \\ a = 0.16(z-0.000) \\ v_{\text{plume}} = (1+(1-va)_o + 1) \\ v_{\text{plume}} = (1+(1-va)_o +$	lume values OUCHING $= \{[n(V^3a)_{full} - \{[n(V^3a)_{full} - Z_{touch})\}$ $= Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^$	$\label{eq:critical} \begin{split} & \text{Critical} \\ & (\text{V}_{\text{cnt}})^3 \text{-am}) / 0.16 \text{ if } \text{V}_{\text{crit}} \text{-V}_{\text{m}} \\ & (\text{V}_{\text{cnt}} \text{-V}_{\text{touch}}) / (\text{V}_{\text{m}} \text{-V}_{\text{touch}}) \text{ if } \text{V}_{\text{crit}} \\ & \text{ee Single Plume spreadsheet} \\ & p^2 - (6.25D - z_v)^2 p^{1/2} / \text{a} \\ & \text{sit} D^2 / (4 \text{V}_{\text{plume}} \text{*a}^2 \text{*a}^2 \text{*}))) \\ & \text{S} \end{split}$	it>V _m
Find Height above Stack z_{cn} Height above Ground z_{cnit} +h, able of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 167.4	yelocities sta (meters) I above stack 1 19.52 23.36	rting at Tou Plume Radius(m) 3.050 #N/A #N/A	JET JET Iching Height: Vert. Vel(m/s) 4.88 4.85	feet	$\begin{array}{l} V\text{=single p} \\ \text{BEFORE T} \\ z_{crit} = z_{full} + \\ z_{crit} = z_{touch} + \\ \text{Single Plum} \\ v_{\text{plume}} = ((va)_o \\ a = 0.16(z-0.000) \\ v_{\text{plume}} = (1+(1-va)_o + 1) \\ v_{\text{plume}} = (1+(1-va)_o +$	lume values OUCHING $= \{[n(V^3a)_{full} - \{[n(V^3a)_{full} - Z_{touch})\}$ $= Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^$	Critical ((V _{cmt}) ²]-a _m)/0.16 if V _{crit} <v<sub>m (V_{cmt}-V_{touch})/(V_m-V_{touch}) if V_{cr} es Single Plume spreadsheet y^2-(6.25D-x)²y^2-(6.25D-x)²y^2-(7.25D-y^2) y^2-(8.25D-y^2) y^2</v<sub>	it>V _m
Find Height above Stack z _{cn} Height above Ground z _{cni} +h _i able of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 167.4 180.0 200.0	yelocities sta (meters) 1 above stack 2 23.36 0 29.46 0 35.55	meters meters rting at Tou Plume Radius(m) 3.050 #N/A #N/A	JET JET Iching Height: Verl. Vel(m/s) 4.88 4.85 4.85	feet	$\begin{array}{l} V\text{=single p} \\ \text{BEFORE T} \\ z_{crit} = z_{full} + \\ z_{crit} = z_{touch} + \\ \text{Single Plum} \\ v_{\text{plume}} = ((va)_o \\ a = 0.16(z-0.000) \\ v_{\text{plume}} = (1+(1-va)_o + 1) \\ v_{\text{plume}} = (1+(1-va)_o +$	lume values OUCHING $= \{[n(V^3a)_{full} - \{[n(V^3a)_{full} - Z_{touch})\}$ $= Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^$	$\label{eq:critical} \begin{split} & \text{Critical} \\ & (\text{V}_{\text{cnt}})^3 \text{-am}) / 0.16 \text{ if } \text{V}_{\text{crit}} \text{-V}_{\text{m}} \\ & (\text{V}_{\text{cnt}} \text{-V}_{\text{touch}}) / (\text{V}_{\text{m}} \text{-V}_{\text{touch}}) \text{ if } \text{V}_{\text{crit}} \\ & \text{ee Single Plume spreadsheet} \\ & p^2 - (6.25D - z_v)^2 p^{1/2} / \text{a} \\ & \text{sit} D^2 / (4 \text{V}_{\text{plume}} \text{*a}^2 \text{*a}^2 \text{*}))) \\ & \text{S} \end{split}$	it>V _m
Find Height above Stack z _{en} Height above Ground z _{ent} +h, able of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 167.4 180.0 220.0	Velocities sta (meters) l above stack 19.52 23.36 0 29.46 0 35.55	meters meters rting at Tou Plume Radius(m) 3.050 #N/A #N/A #N/A	JET JET sching Height: Vert. Vel(m/s) 4.88 4.85 4.85 4.82	feet	$\begin{array}{l} V\text{=single p} \\ \text{BEFORE T} \\ z_{crit} = z_{full} + \\ z_{crit} = z_{touch} + \\ \text{Single Plum} \\ v_{\text{plume}} = ((va)_o \\ a = 0.16(z-0.000) \\ v_{\text{plume}} = (1+(1-va)_o + 1) \\ v_{\text{plume}} = (1+(1-va)_o +$	lume values OUCHING $= \{[n(V^3a)_{full} - \{[n(V^3a)_{full} - Z_{touch})\}$ $= Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^$	$\label{eq:critical} \begin{split} & \text{Critical} \\ & (\text{V}_{\text{cnt}})^3 \text{-am}) / 0.16 \text{ if } \text{V}_{\text{crit}} \text{-V}_{\text{m}} \\ & (\text{V}_{\text{cnt}} \text{-V}_{\text{touch}}) / (\text{V}_{\text{m}} \text{-V}_{\text{touch}}) \text{ if } \text{V}_{\text{cri}} \\ & \text{ee Single Plume spreadsheet} \\ & p^2 - (6.25D - z_v)^2 p^{1/2} / \text{a} \\ & \text{sit} D^2 / (4 \text{V}_{\text{plume}} \text{*a}^2 \text{*a}^2 \text{*}))) \\ & \text{S} \end{split}$	it>V _m
Find Height above Stack z _{en} Height above Ground z _{ent} +h, able of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 167.4 180.0 200.0 220.0 240.0	Velocities sta (meters) above stack 19.52 23.36 29.46 0 35.55 0 41.65 0 47.75	meters meters rting at Tou Plume Radius(m) 3.050 #N/A #N/A #N/A #N/A #N/A	JET JET sching Height: Vert. Vel(m/s) 4.88 4.85 4.82 4.78 4.78	feet	$\begin{array}{l} V\text{=single p} \\ \text{BEFORE T} \\ z_{crit} = z_{full} + \\ z_{crit} = z_{touch} + \\ \text{Single Plum} \\ v_{\text{plume}} = ((va)_o \\ a = 0.16(z-0.000) \\ v_{\text{plume}} = (1+(1-va)_o + 1) \\ v_{\text{plume}} = (1+(1-va)_o +$	lume values OUCHING $= \{[n(V^3a)_{full} - \{[n(V^3a)_{full} - Z_{touch})\}$ $= Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^$	$\label{eq:critical} \begin{split} & \text{Critical} \\ & (\text{V}_{\text{cnt}})^3 \text{-am}) / 0.16 \text{ if } \text{V}_{\text{crit}} \text{-V}_{\text{m}} \\ & (\text{V}_{\text{cnt}} \text{-V}_{\text{touch}}) / (\text{V}_{\text{m}} \text{-V}_{\text{touch}}) \text{ if } \text{V}_{\text{cri}} \\ & \text{ee Single Plume spreadsheet} \\ & p^2 - (6.25D - z_v)^2 p^{1/2} / \text{a} \\ & \text{sit} D^2 / (4 \text{V}_{\text{plume}} \text{*a}^2 \text{*a}^2 \text{*}))) \\ & \text{S} \end{split}$	it>V _m
Find Height above Stack z_{cn} Height above Ground z_{cnit} +h, able of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 167.4 180.0 200.0 220.0 240.0	Velocities stack (meters) I above stack (9.52) 29.46 35.55 41.65 0.47.75	meters meters rting at Tou Plume Radius(m) 3.050 #N/A #N/A #N/A #N/A #N/A #N/A	JET JET sching Height: Vert. Vel(m/s) 4.88 4.85 4.82 4.78 4.74 4.74	feet	$\begin{array}{l} V\text{=single p} \\ \text{BEFORE T} \\ z_{crit} = z_{full} + \\ z_{crit} = z_{touch} + \\ \text{Single Plum} \\ v_{\text{plume}} = ((va)_o \\ a = 0.16(z-0.000) \\ v_{\text{plume}} = (1+(1-va)_o + 1) \\ v_{\text{plume}} = (1+(1-va)_o +$	lume values OUCHING $= \{[n(V^3a)_{full} - \{[n(V^3a)_{full} - Z_{touch})\}$ $= Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^$	$\label{eq:critical} \begin{split} & \text{Critical} \\ & (\text{V}_{\text{cnt}})^3 \text{-am}) / 0.16 \text{ if } \text{V}_{\text{crit}} \text{-V}_{\text{m}} \\ & (\text{V}_{\text{cnt}} \text{-V}_{\text{touch}}) / (\text{V}_{\text{m}} \text{-V}_{\text{touch}}) \text{ if } \text{V}_{\text{cri}} \\ & \text{ee Single Plume spreadsheet} \\ & p^2 - (6.25D - z_v)^2 p^{1/2} / \text{a} \\ & \text{sit} D^2 / (4 \text{V}_{\text{plume}} \text{*a}^2 \text{*a}^2 \text{*}))) \\ & \text{S} \end{split}$	ii>V _m) 20 ft Interval
Find Height above Stack z _{en} Height above Ground z _{ent} +h, able of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 167.4 180.0 220.0 240.0 226.0 240.0 226.0	JET JET Velocities sta) (meters) 1 above stack 1 (19.52 0 23.36 0 35.55 0 41.65 0 47.75 0 53.88	meters meters rting at Tou Plume Radius(m) 3.050 #NVA #NVA #NVA #NVA #NVA #NVA	JET JET sching Height Vert. Vel(m/s) 4.85 4.85 4.82 4.78 4.74 4.71	feet	$\begin{array}{l} V\text{=single p} \\ \text{BEFORE T} \\ z_{crit} = z_{full} + \\ z_{crit} = z_{touch} + \\ \text{Single Plum} \\ v_{\text{plume}} = ((va)_o \\ a = 0.16(z-0.000) \\ v_{\text{plume}} = (1+(1-va)_o + 1) \\ v_{\text{plume}} = (1+(1-va)_o +$	lume values OUCHING $= \{[n(V^3a)_{full} - \{[n(V^3a)_{full} - Z_{touch})\}$ $= Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^$	$\label{eq:critical} \begin{split} & \text{Critical} \\ & (\text{V}_{\text{cnt}})^3 \text{-am}) / 0.16 \text{ if } \text{V}_{\text{crit}} \text{-V}_{\text{m}} \\ & (\text{V}_{\text{cnt}} \text{-V}_{\text{touch}}) / (\text{V}_{\text{m}} \text{-V}_{\text{touch}}) \text{ if } \text{V}_{\text{cri}} \\ & \text{ee Single Plume spreadsheet} \\ & p^2 - (6.25D - z_v)^2 p^{1/2} / \text{a} \\ & \text{sit} D^2 / (4 \text{V}_{\text{plume}} \text{*a}^2 \text{*a}^2 \text{*}))) \\ & \text{S} \end{split}$	ii>V _m) 20 ft Interval
Find Height above Stack z _{en} Height above Ground z _{ent} +h, able of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 167.4 180.0 200.0 220.0 240.0 260.0 280.0 300.0	JET JET Velocities sta (meters) above stack 1 19.52 23.36 29.46 29.46 35.55 0 41.65 0 47.75 53.84 0 59.94 0 75.18	meters meters rting at Tou Plume Radius(m) 3.050 #N/A #N/A #N/A #N/A #N/A #N/A #N/A	JET JET sching Height: Vert. Vel(m/s) 4.88 4.85 4.82 4.78 4.74 4.71 4.67 4.63	feet	$\begin{array}{l} V\text{=single p} \\ \text{BEFORE T} \\ z_{crit} = z_{full} + \\ z_{crit} = z_{touch} + \\ \text{Single Plum} \\ v_{\text{plume}} = ((va)_o \\ a = 0.16(z-0.000) \\ v_{\text{plume}} = (1+(1-va)_o + 1) \\ v_{\text{plume}} = (1+(1-va)_o +$	lume values OUCHING $= \{[n(V^3a)_{full} - \{[n(V^3a)_{full} - Z_{touch})\}$ $= Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^$	$\label{eq:critical} \begin{split} & \text{Critical} \\ & (\text{V}_{\text{cnt}})^3 \text{-am}) / 0.16 \text{ if } \text{V}_{\text{crit}} \text{-V}_{\text{m}} \\ & (\text{V}_{\text{cnt}} \text{-V}_{\text{touch}}) / (\text{V}_{\text{m}} \text{-V}_{\text{touch}}) \text{ if } \text{V}_{\text{cri}} \\ & \text{ee Single Plume spreadsheet} \\ & p^2 - (6.25D - z_v)^2 p^{1/2} / \text{a} \\ & \text{sit} D^2 / (4 \text{V}_{\text{plume}} \text{*a}^2 \text{*a}^2 \text{*}))) \\ & \text{S} \end{split}$	ii>V _m) 20 ft Interval
Find Height above Stack z _{cn} Height above Ground z _{cnit} +h, able of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 167.4 180.0 200.0 220.0 240.0 280.0 380.0 350.0	JET JET Velocities sta (meters) 1 above stack 1 19.52 23.86 0 29.46 0 35.55 0 41.65 0 47.75 0 53.84 0 59.94 0 75.18	meters meters rting at Tou Plume Radius(m) 3.050 #N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	JET JET vert. Vel(m/s) 4.88 4.85 4.82 4.74 4.71 4.63 4.63 4.64	feet	$\begin{array}{l} V\text{=single p} \\ \text{BEFORE T} \\ z_{crit} = z_{full} + \\ z_{crit} = z_{touch} + \\ \text{Single Plum} \\ v_{\text{plume}} = ((va)_o \\ a = 0.16(z-0.000) \\ v_{\text{plume}} = (1+(1-va)_o + 1) \\ v_{\text{plume}} = (1+(1-va)_o +$	lume values OUCHING $= \{[n(V^3a)_{full} - \{[n(V^3a)_{full} - Z_{touch})\}$ $= Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^$	$\label{eq:critical} \begin{split} & \text{Critical} \\ & (\text{V}_{\text{cnt}})^3 \text{-am}) / 0.16 \text{ if } \text{V}_{\text{crit}} \text{-V}_{\text{m}} \\ & (\text{V}_{\text{cnt}} \text{-V}_{\text{touch}}) / (\text{V}_{\text{m}} \text{-V}_{\text{touch}}) \text{ if } \text{V}_{\text{cri}} \\ & \text{ee Single Plume spreadsheet} \\ & p^2 - (6.25D - z_v)^2 p^{1/2} / \text{a} \\ & \text{sit} D^2 / (4 \text{V}_{\text{plume}} \text{*a}^2 \text{*a}^2 \text{*}))) \\ & \text{S} \end{split}$	ii>V _m
Find Height above Stack z _{en} Height above Ground z _{ent} +h, able of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 167.4 180.0 220.0 240.0 240.0 280.0 350.0 350.0	JET JET Velocities sta (meters) Jabove stack Jet	meters meters rting at Tou Plume Radius(m) 3.050 #N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	JET JET sching Height: Vert. Vel(m/s) 4.88 4.85 4.82 4.74 4.71 4.67 4.63 4.54 4.45 4.45	feet	$\begin{array}{l} V\text{=single p} \\ \text{BEFORE T} \\ z_{crit} = z_{full} + \\ z_{crit} = z_{touch} + \\ \text{Single Plum} \\ v_{\text{plume}} = ((va)_o \\ a = 0.16(z-0.000) \\ v_{\text{plume}} = (va)_o \\ v_$	lume values OUCHING $= \{[n(V^3a)_{full} - \{[n(V^3a)_{full} - Z_{touch})\}$ $= Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^$	$\label{eq:critical} \begin{split} & \text{Critical} \\ & (\text{V}_{\text{cnt}})^3 \text{-am}) / 0.16 \text{ if } \text{V}_{\text{crit}} \text{-V}_{\text{m}} \\ & (\text{V}_{\text{cnt}} \text{-V}_{\text{touch}}) / (\text{V}_{\text{m}} \text{-V}_{\text{touch}}) \text{ if } \text{V}_{\text{cri}} \\ & \text{ee Single Plume spreadsheet} \\ & p^2 - (6.25D - z_v)^2 p^{1/2} / \text{a} \\ & \text{sit} D^2 / (4 \text{V}_{\text{plume}} \text{*a}^2 \text{*a}^2 \text{*}))) \\ & \text{S} \end{split}$	ii>V _m
Find Height above Stack z _{en} Height above Ground z _{ent} +h, able of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 167.4 180. 200. 220. 240. 260. 300. 350. 400. 450.	JET JET Velocities sta (meters) 1 above stack 1 above stack 2 19.52 a 3.6 b 29.46 a 35.55 a 41.65 a 47.75 a 53.84 a 59.94 a 59	meters meters rting at Tou Plume Radius(m) 3.0500 #N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	JET JET Sching Height: Vert. Vel(m/s) 4.88 4.85 4.82 4.78 4.74 4.71 4.67 4.63 4.54 4.45	feet	$\begin{array}{l} V\text{=single p} \\ \text{BEFORE T} \\ z_{crit} = z_{full} + \\ z_{crit} = z_{touch} + \\ \text{Single Plum} \\ v_{\text{plume}} = ((va)_o \\ a = 0.16(z-0.000) \\ v_{\text{plume}} = (va)_o \\ v_$	lume values OUCHING $= \{[n(V^3a)_{full} - \{[n(V^3a)_{full} - Z_{touch})\}$ $= Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^$	$\label{eq:critical} \begin{split} & \text{Critical} \\ & (\text{V}_{\text{cnt}})^3 \text{-am}) / 0.16 \text{ if } \text{V}_{\text{crit}} \text{-V}_{\text{m}} \\ & (\text{V}_{\text{cnt}} \text{-V}_{\text{touch}}) / (\text{V}_{\text{m}} \text{-V}_{\text{touch}}) \text{ if } \text{V}_{\text{cri}} \\ & \text{ee Single Plume spreadsheet} \\ & p^2 - (6.25D - z_v)^2 p^{1/2} / \text{a} \\ & \text{sit} D^2 / (4 \text{V}_{\text{plume}} \text{*a}^2 \text{*a}^2 \text{*}))) \\ & \text{S} \end{split}$	ii>V _m
Find Height above Stack z _{en} Height above Ground z _{ent} +h, able of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 167.4 180.0 200.0 220.0 240.0 260.0 280.0 300.0 400.0 450.0	JET JET Velocities sta (meters) 1 above stack 1 19.52 23.86 0 29.46 0 35.55 0 41.65 0 47.75 0 53.84 0 75.18 0 90.42 105.66 0 120.90 0 136.14	meters meters rting at Tou Plume Radius(m) 3.050 #N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	JET JET sching Height: Vert. Vel(m/s) 4.88 4.85 4.82 4.78 4.71 4.67 4.63 4.54 4.45 4.45 4.36 4.27	feet	$\begin{array}{l} V\text{=single p} \\ \text{BEFORE T} \\ z_{crit} = z_{full} + \\ z_{crit} = z_{touch} + \\ \text{Single Plum} \\ v_{\text{plume}} = ((va)_o \\ a = 0.16(z-0.000) \\ v_{\text{plume}} = (va)_o \\ v_$	lume values OUCHING $= \{[n(V^3a)_{full} - \{[n(V^3a)_{full} - Z_{touch})\}$ $= Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^$	$\label{eq:critical} \begin{split} & \text{Critical} \\ & (\text{V}_{\text{cnt}})^3 \text{-am}) / 0.16 \text{ if } \text{V}_{\text{crit}} \text{-V}_{\text{m}} \\ & (\text{V}_{\text{cnt}} \text{-V}_{\text{touch}}) / (\text{V}_{\text{m}} \text{-V}_{\text{touch}}) \text{ if } \text{V}_{\text{cri}} \\ & \text{ee Single Plume spreadsheet} \\ & p^2 - (6.25D - z_v)^2 p^{1/2} / \text{a} \\ & \text{sit} D^2 / (4 \text{V}_{\text{plume}} \text{*a}^2 \text{*a}^2 \text{*}))) \\ & \text{S} \end{split}$	ii>V _m
Find Height above Stack zen Height above Ground zent height above Ground zent height (feet above ground Begin Merging (touch) = 167.4 180.0 200.0 240.0 240.0 280.0 300.0 350.0 400.0 450.0 550.0	JET JET Velocities sta (meters) (meters) (above stack for 19.52 and 19.52 an	meters meters rting at Tou Plume Radius(m) 3.050 #N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	JET JET Sching Height: Vert. Vel(m/s) 4.88 4.85 4.82 4.74 4.71 4.67 4.63 4.54 4.45 4.45 4.45 4.46 4.47 4.41	feet	$\begin{array}{l} V\text{=single p} \\ \text{BEFORE T} \\ z_{crit} = z_{full} + \\ z_{crit} = z_{touch} + \\ \text{Single Plum} \\ v_{\text{plume}} = ((va)_o \\ a = 0.16(z-0.000) \\ v_{\text{plume}} = (va)_o \\ v_$	lume values OUCHING $= \{[n(V^3a)_{full} - \{[n(V^3a)_{full} - Z_{touch})\}$ $= Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^$	$\label{eq:critical} \begin{split} & \text{Critical} \\ & (\text{V}_{\text{cnt}})^3 \text{-am}) / 0.16 \text{ if } \text{V}_{\text{crit}} \text{-V}_{\text{m}} \\ & (\text{V}_{\text{cnt}} \text{-V}_{\text{touch}}) / (\text{V}_{\text{m}} \text{-V}_{\text{touch}}) \text{ if } \text{V}_{\text{cri}} \\ & \text{ee Single Plume spreadsheet} \\ & p^2 - (6.25D - z_v)^2 p^{1/2} / \text{a} \\ & \text{sit} D^2 / (4 \text{V}_{\text{plume}} \text{*a}^2 \text{*a}^2 \text{*}))) \\ & \text{S} \end{split}$	ii>V _m
Find Height above Stack z _{ent} Height above Stack z _{ent} Height above Ground z _{ent} +h. able of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 167.4 180.0 200.0 240.0 260.0 380.0 350.0 450.0 550.0 600.0	JET JET Velocities sta (meters) (meters) (1 above stack 1	meters meters rting at Tou Plume Radius(m) 3.050 #N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	JET JET Jething Height: Vert. Vel(m/s) 4.88 4.85 4.82 4.74 4.71 4.67 4.63 4.54 4.45 4.36 4.27 4.18	feet	$\begin{array}{l} V\text{=single p} \\ \text{BEFORE T} \\ z_{crit} = z_{full} + \\ z_{crit} = z_{touch} + \\ \text{Single Plum} \\ v_{\text{plume}} = ((va)_o \\ a = 0.16(z-0.000) \\ v_{\text{plume}} = (va)_o \\ v_$	lume values OUCHING $= \{[n(V^3a)_{full} - \{[n(V^3a)_{full} - Z_{touch})\}$ $= Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^$	$\label{eq:critical} \begin{split} & \text{Critical} \\ & (\text{V}_{\text{cnt}})^3 \text{-am}) / 0.16 \text{ if } \text{V}_{\text{crit}} \text{-V}_{\text{m}} \\ & (\text{V}_{\text{cnt}} \text{-V}_{\text{touch}}) / (\text{V}_{\text{m}} \text{-V}_{\text{touch}}) \text{ if } \text{V}_{\text{cri}} \\ & \text{ee Single Plume spreadsheet} \\ & p^2 - (6.25D - z_v)^2 p^{1/2} / \text{a} \\ & \text{sit} D^2 / (4 \text{V}_{\text{plume}} \text{*a}^2 \text{*a}^2 \text{*}))) \\ & \text{S} \end{split}$	ii>V _m
Find Height above Stack z _{en} Height above Ground z _{ent} +h, able of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 167.4 180.0 200.0 220.0 240.0 260.0 280.0 300.0 400.0 450.0 550.0 660.0	JET JET Velocities sta (meters) 1 above stack 1 19.52 23.86 0 29.46 0 35.55 0 41.65 0 47.75 0 53.84 0 90.42 105.66 0 120.90 136.14 151.38 0 166.62 0 168.86	meters meters rting at Tou Plume Radius(m) 3.050 #N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	JET JET sching Height: Vert. Vel(m/s) 4.88 4.85 4.82 4.78 4.71 4.67 4.63 4.54 4.45 4.45 4.36 4.27 4.18 4.08 3.99	feet	$\begin{array}{l} V\text{=single p} \\ \text{BEFORE T} \\ z_{crit} = z_{full} + \\ z_{crit} = z_{touch} + \\ \text{Single Plum} \\ v_{\text{plume}} = ((va)_o \\ a = 0.16(z-0.000) \\ v_{\text{plume}} = (va)_o \\ v_$	lume values OUCHING $= \{[n(V^3a)_{full} - \{[n(V^3a)_{full} - Z_{touch})\}$ $= Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^$	$\label{eq:critical} \begin{split} & \text{Critical} \\ & (\text{V}_{\text{cnt}})^3 \text{-am}) / 0.16 \text{ if } \text{V}_{\text{crit}} \text{-V}_{\text{m}} \\ & (\text{V}_{\text{cnt}} \text{-V}_{\text{touch}}) / (\text{V}_{\text{m}} \text{-V}_{\text{touch}}) \text{ if } \text{V}_{\text{cri}} \\ & \text{ee Single Plume spreadsheet} \\ & p^2 - (6.25D - z_v)^2 p^{1/2} / \text{a} \\ & \text{sit} D^2 / (4 \text{V}_{\text{plume}} \text{*a}^2 \text{*a}^2 \text{*}))) \\ & \text{S} \end{split}$	20 ft Interval
Find Height above Stack z _{en} Height above Ground z _{ent} +h able of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 167.4 180.0 220.0 240.0 240.0 240.0 280.0 300.0 300.0 400.0 450.0 550.0 600.0 650.0	JET JET Velocities sta (meters) [1, 12, 12] [1	meters meters rting at Tou Plume Radius(m) 3.050 #N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	JET JET Sching Height: Vert. Vel(m/s) 4.88 4.85 4.82 4.74 4.71 4.67 4.63 4.54 4.45 4.36 4.27 4.18 4.08 3.99 3.90	feet	$\begin{array}{l} V\text{=single p} \\ \text{BEFORE T} \\ z_{crit} = z_{full} + \\ z_{crit} = z_{touch} + \\ \text{Single Plum} \\ v_{\text{plume}} = ((va)_o \\ a = 0.16(z-0.000) \\ v_{\text{plume}} = (va)_o \\ v_$	lume values OUCHING $= \{[n(V^3a)_{full} - \{[n(V^3a)_{full} - Z_{touch})\}$ $= Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^$	$\label{eq:critical} \begin{split} & \text{Critical} \\ & (\text{V}_{\text{cnt}})^3 \text{-am}) / 0.16 \text{ if } \text{V}_{\text{crit}} \text{-V}_{\text{m}} \\ & (\text{V}_{\text{cnt}} \text{-V}_{\text{touch}}) / (\text{V}_{\text{m}} \text{-V}_{\text{touch}}) \text{ if } \text{V}_{\text{cri}} \\ & \text{ee Single Plume spreadsheet} \\ & p^2 - (6.25D - z_v)^2 p^{1/2} / \text{a} \\ & \text{sit} D^2 / (4 \text{V}_{\text{plume}} \text{*a}^2 \text{*a}^2 \text{*}))) \\ & \text{S} \end{split}$	20 ft Interval
Find Height above Stack z _{ent} Height above Stack z _{ent} Height above Ground z _{ent} +h. able of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 167.4 220.0 240.0 240.0 250.0 300.0 350.0 450.0 600.0 650.0 700.0 800.0	JET JET Velocities sta (meters) (meters) (above stack for 19.52 and 19.53 and 19.54 an	meters meters rting at Tou Plume Radius(m) 3.050 #N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	JET JET Jething Height: Vert. Vel(m/s) 4.88 4.85 4.82 4.78 4.74 4.71 4.67 4.63 4.54 4.45 4.36 4.27 4.18 4.08 3.99 3.90 3.72	feet	$\begin{array}{l} V\text{=single p} \\ \text{BEFORE T} \\ z_{crit} = z_{full} + \\ z_{crit} = z_{touch} + \\ \text{Single Plum} \\ v_{\text{plume}} = ((va)_o \\ a = 0.16(z-0.000) \\ v_{\text{plume}} = (va)_o \\ v_$	lume values OUCHING $= \{[n(V^3a)_{full} - \{[n(V^3a)_{full} - Z_{touch})\}$ $= Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^$	$\label{eq:critical} \begin{split} & \text{Critical} \\ & (\text{V}_{\text{cnt}})^3 \text{-am}) / 0.16 \text{ if } \text{V}_{\text{crit}} \text{-V}_{\text{m}} \\ & (\text{V}_{\text{cnt}} \text{-V}_{\text{touch}}) / (\text{V}_{\text{m}} \text{-V}_{\text{touch}}) \text{ if } \text{V}_{\text{cri}} \\ & \text{ee Single Plume spreadsheet} \\ & p^2 - (6.25D - z_v)^2 p^{1/2} / \text{a} \\ & \text{sit} D^2 / (4 \text{V}_{\text{plume}} \text{*a}^2 \text{*a}^2 \text{*}))) \\ & \text{S} \end{split}$	20 ft Interval
Find Height above Stack z _{en} Height above Ground z _{ent} +h able of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 167.4 180.0 220.0 240.0 240.0 240.0 280.0 300.0 300.0 400.0 450.0 550.0 600.0 650.0 700.0 800.0	JET JET Velocities sta (meters) 1 above stack 1 19.52 23.86 0 29.46 0 35.55 0 41.65 0 47.75 0 53.84 0 90.42 0 105.66 0 120.90 0 136.14 0 151.38 0 166.62 0 120.90 0 138.14 0 151.38 0 163.24 0 152.34	meters meters rting at Tou Plume Radius(m) 3.050 #N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	JET JET Vert. Vel(m/s) 4.88 4.85 4.82 4.78 4.74 4.71 4.67 4.63 4.54 4.45 4.36 4.27 4.18 4.08 3.99 3.90 3.72 3.54 3.35	feet	$\begin{array}{l} V\text{=single p} \\ \text{BEFORE T} \\ z_{crit} = z_{full} + \\ z_{crit} = z_{touch} + \\ \text{Single Plum} \\ v_{\text{plume}} = ((va)_o \\ a = 0.16(z-0.000) \\ v_{\text{plume}} = (va)_o \\ v_$	lume values OUCHING $= \{[n(V^3a)_{full} - \{[n(V^3a)_{full} - Z_{touch})\}$ $= Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^$	$\label{eq:critical} \begin{split} & \text{Critical} \\ & (\text{V}_{\text{cnt}})^3 \text{-am}) / 0.16 \text{ if } \text{V}_{\text{crit}} \text{-V}_{\text{m}} \\ & (\text{V}_{\text{cnt}} \text{-V}_{\text{touch}}) / (\text{V}_{\text{m}} \text{-V}_{\text{touch}}) \text{ if } \text{V}_{\text{cri}} \\ & \text{ee Single Plume spreadsheet} \\ & p^2 - (6.25D - z_v)^2 p^{1/2} / \text{a} \\ & \text{sit} D^2 / (4 \text{V}_{\text{plume}} \text{*a}^2 \text{*a}^2 \text{*}))) \\ & \text{S} \end{split}$	20 ft Interval
Find Height above Stack z _{ent} Height above Stack z _{ent} Height above Ground z _{ent} +h. able of MERGED Plume-Averaged Vertical Height (feet above ground. Begin Merging (touch) = 167.4 220.0 220.0 240.0 240.0 280.0 300.0 350.0 450.0 600.0 650.0 600.0 800.0 900.0 1100.0	JET	meters meters rting at Tou Plume Radius(m) 3.050 #N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	JET JET Vert. Vel(m/s) 4.88 4.85 4.82 4.78 4.74 4.71 4.67 4.63 4.54 4.45 4.36 4.27 4.18 4.08 3.99 3.90 3.72 3.54 3.35 3.17	feet	$\begin{array}{l} V\text{=single p} \\ \text{BEFORE T} \\ z_{crit} = z_{full} + \\ z_{crit} = z_{touch} + \\ \text{Single Plum} \\ v_{\text{plume}} = ((va)_o \\ a = 0.16(z-0.000) \\ v_{\text{plume}} = (va)_o \\ v_$	lume values OUCHING $= \{[n(V^3a)_{full} - \{[n(V^3a)_{full} - Z_{touch})\}$ $= Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (\theta_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^*(V_e d \ Layer Eqns \ (see 3.40.12F_o[(z-z, z_v)] - (g_e/\theta_s))^$	$\label{eq:critical} \begin{split} & \text{Critical} \\ & (\text{V}_{\text{cnt}})^3 \text{-am}) / 0.16 \text{ if } \text{V}_{\text{crit}} \text{-V}_{\text{m}} \\ & (\text{V}_{\text{cnt}} \text{-V}_{\text{touch}}) / (\text{V}_{\text{m}} \text{-V}_{\text{touch}}) \text{ if } \text{V}_{\text{cri}} \\ & \text{ee Single Plume spreadsheet} \\ & p^2 - (6.25D - z_v)^2 p^{1/2} / \text{a} \\ & \text{sit} D^2 / (4 \text{V}_{\text{plume}} \text{*a}^2 \text{*a}^2 \text{*}))) \\ & \text{S} \end{split}$	20 ft Interval
Find Height above Stack z _{ent} Height above Stack z _{ent} Height above Ground z _{ent} +h. able of MERGED Plume-Averaged Vertical Height (feet above ground: Begin Merging (touch) = 167.4 180. 200. 220. 240. 260. 260. 300. 350. 400. 450. 550. 600. 700. 600. 900. 1000. 1100.	JET JET Velocities sta (meters) (meters) (above stack for 19.52 and 19.52 an	meters meters rting at Tou Plume Radius(m) 3.050 #N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	JET JET sching Height: Vert. Vel(m/s) 4.88 4.85 4.82 4.74 4.71 4.67 4.63 4.54 4.45 4.36 4.27 4.18 4.08 3.99 3.90 3.72 3.54 3.35 3.17	feet	V'=single p BEFORE T Zerie Z'tul Zerie Z't	lume values (In(V³a)tul terms term	$\label{eq:critical} \begin{split} & \text{Critical} \\ & (\text{V}_{\text{cnt}})^3 \text{-am}) / 0.16 \text{ if } \text{V}_{\text{crit}} \text{-V}_{\text{m}} \\ & (\text{V}_{\text{cnt}} \text{-V}_{\text{touch}}) / (\text{V}_{\text{m}} \text{-V}_{\text{touch}}) \text{ if } \text{V}_{\text{cri}} \\ & \text{ee Single Plume spreadsheet} \\ & p^2 - (6.25D - z_v)^2 p^{1/2} / \text{a} \\ & \text{sit} D^2 / (4 \text{V}_{\text{plume}} \text{*a}^2 \text{*a}^2 \text{*}))) \\ & \text{S} \end{split}$	20 ft Interval
Find Height above Stack z _{en} Height above Ground z _{ent} +h able of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 167.4 180.0 220.0 240.0 240.0 240.0 280.0 300.0 300.0 400.0 450.0 550.0 600.0 650.0 700.0 800.0 1100.0 1100.0 End Merging (full/mp) = 1355.7	JET JET Velocities sta (meters) 1 above stack 1 19.52 23.86 0 29.46 0 35.55 0 41.65 0 47.75 0 53.84 0 90.42 105.66 0 120.90 136.14 0 151.38 0 166.62 0 1212.34 0 153.84 0 153.84 0 303.78	meters meters rting at Tou Plume Radius(m) 3.050 #N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	JET JET Jething Height: Vert. Vel(m/s) 4.88 4.85 4.82 4.74 4.71 4.67 4.63 4.54 4.45 4.36 4.27 4.18 4.08 3.99 3.90 3.72 3.54 3.35 3.17 2.99	feet	V'=single p BEFORE T. Zent = Zrig t t Zent =	Iume values OUCHING {[n(N²a), h] re Eqns (st av) (e/av) Av) He Eqns Vm-Vtouch)*($\label{eq:critical} \begin{split} & \text{Critical} \\ & (\text{V}_{\text{cnt}})^3 \text{-am}) / 0.16 \text{ if } \text{V}_{\text{crit}} \text{-V}_{\text{m}} \\ & (\text{V}_{\text{cnt}} \text{-V}_{\text{touch}}) / (\text{V}_{\text{m}} \text{-V}_{\text{touch}}) \text{ if } \text{V}_{\text{cri}} \\ & \text{ee Single Plume spreadsheet} \\ & p^2 - (6.25D - z_v)^2 p^{1/2} / \text{a} \\ & \text{sit} D^2 / (4 \text{V}_{\text{plume}} \text{*a}^2 \text{*a}^2 \text{*}))) \\ & \text{S} \end{split}$	20 ft Interval
Find Height above Stack z _{ent} Height above Stack z _{ent} Height dove Ground z _{ent} +h. able of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 167.4 180.0 220.0 220.0 240.0 240.0 280.0 300.0 350.0 450.0 600.0 650.0 600.0 650.0 900.0 1100.0 1100.0 1200.0 End Merging (full/mp) = 1355.7	JET JET Velocities sta (meters) I above stack 1 above stack 2 19.46 19.52 19.46 19.52 19.46 19.52 19.46 19.52 19.46 19.52 19.47 75.18 19.47 75.18 19.47 19.50 19.42 19.50 19.5	meters meters rting at Tou Plume Radius(m) 3.050 #N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	JET JET Vert. Vel(m/s) 4.88 4.85 4.82 4.78 4.74 4.71 4.67 4.63 4.54 4.45 4.36 4.27 4.18 4.08 3.99 3.90 3.72 3.54 3.35 3.17 2.99 2.70 2.72	feet	V'=single p BEFORE T Zeffi 2Fush Zeffi 2Fu	Iume values OUCHING ([n(V ³ a), vl) me Eqns (st s ³ +0.12F _o (z-z. z.) dd Layer Eqns vm-Vtouch)*(output	$\label{eq:critical} \begin{split} & \text{Critical} \\ & (\text{V}_{\text{cnt}})^3 \text{-am}) / 0.16 \text{ if } \text{V}_{\text{crit}} \text{-V}_{\text{m}} \\ & (\text{V}_{\text{cnt}} \text{-V}_{\text{touch}}) / (\text{V}_{\text{m}} \text{-V}_{\text{touch}}) \text{ if } \text{V}_{\text{cri}} \\ & \text{ee Single Plume spreadsheet} \\ & p^2 - (6.25D - z_v)^2 p^{1/2} / \text{a} \\ & \text{sit} D^2 / (4 \text{V}_{\text{plume}} \text{*a}^2 \text{*a}^2 \text{*}))) \\ & \text{S} \end{split}$	20 ft Interval
Find Height above Stack z _{ent} Height above Stack z _{ent} Height dove Ground z _{ent} +h. able of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 167.4 180.0 200.0 240.0 260.0 280.0 300.0 350.0 400.0 450.0 550.0 650.0 700.0 800.0 1000.0 1100.0 1200.0 End Merging (full/mp) = 1355.7 1300.0 1300.0 1300.0 1400.0 1400.0	JET JET Velocities sta (meters) 1 above stack 1 19.52 0 23.36 0 35.55 0 41.65 0 53.84 0 59.94 0 105.66 0 120.90 0 136.14 0 151.38 0 166.62 0 121.34 0 242.82 0 273.30 0 303.78 0 334.26	meters meters rting at Tou Plume Radius(m) 3.050 #N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	JET JET Jething Height: Vert. Vel(m/s) 4.88 4.85 4.82 4.74 4.71 4.67 4.63 4.54 4.45 4.36 4.27 4.18 4.08 3.99 3.70 3.72 3.54 3.35 3.17 2.99 2.70 2.72 2.69	feet	V'=single p BEFORE T. Zent = Zrig t t Zent =	Iume values OUCHING ([n(V ³ a), vl) me Eqns (st s ³ +0.12F _o (z-z. z.) dd Layer Eqns vm-Vtouch)*(output	$\label{eq:critical} \begin{split} & \text{Critical} \\ & (\text{V}_{\text{cnt}})^3 \text{-am}) / 0.16 \text{ if } \text{V}_{\text{crit}} \text{-V}_{\text{m}} \\ & (\text{V}_{\text{cnt}} \text{-V}_{\text{touch}}) / (\text{V}_{\text{m}} \text{-V}_{\text{touch}}) \text{ if } \text{V}_{\text{cri}} \\ & \text{ee Single Plume spreadsheet} \\ & p^2 - (6.25D - z_v)^2 p^{1/2} / \text{a} \\ & \text{sit} D^2 / (4 \text{V}_{\text{plume}} \text{*a}^2 \text{*a}^2 \text{*}))) \\ & \text{S} \end{split}$	20 ft Interval
Find Height above Stack z _{ent} Height above Stack z _{ent} Height dove Ground z _{ent} +h. able of MERGED Plume-Averaged Vertical Height (feet above ground. Begin Merging (touch) = 167.4 180.0 200.0 240.0 240.0 240.0 280.0 300.0 300.0 400.0 450.0 550.0 600.0 600.0 600.0 1000.0 1100.0 End Merging (full/mp) = 1355.7 1300.0 1400.0 1400.0 1400.0 1500.0 1400.0 1400.0 1400.0 1400.0 1500.0 1500.0 1400.0 1400.0 1500.0 1500.0 1500.0 1500.0 1500.0 1600.0 1600.0 1600.0 1700.0	JET JET Velocities sta (meters) 1 above stack 1 19.52 23.86 0 29.46 0 35.55 0 41.65 0 47.75 0 53.84 0 90.42 105.66 0 120.90 136.14 0 151.38 0 166.25 0 141.86 0 122.34 0 334.25 0 334.25 0 334.25 0 364.74	meters meters rting at Tou Plume Radius(m) 3.050 #N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	JET JET Jething Height: Vert. Vel(m/s) 4.88 4.85 4.82 4.78 4.74 4.71 4.67 4.63 4.54 4.45 4.36 4.27 4.18 4.08 3.99 3.70 3.72 3.54 3.35 3.17 2.99 2.70 2.72	feet	V'=single p BEFORE T Zeffi 2Fush Zeffi 2Fu	Iume values OUCHING ([n(V ³ a), vl) me Eqns (st s ³ +0.12F _o (z-z. z.) dd Layer Eqns vm-Vtouch)*(output	$\label{eq:critical} \begin{split} & \text{Critical} \\ & (\text{V}_{\text{cnt}})^3 \text{-am}) / 0.16 \text{ if } \text{V}_{\text{crit}} \text{-V}_{\text{m}} \\ & (\text{V}_{\text{cnt}} \text{-V}_{\text{touch}}) / (\text{V}_{\text{m}} \text{-V}_{\text{touch}}) \text{ if } \text{V}_{\text{cri}} \\ & \text{ee Single Plume spreadsheet} \\ & p^2 - (6.25D - z_v)^2 p^{1/2} / \text{a} \\ & \text{sit} D^2 / (4 \text{V}_{\text{plume}} \text{*a}^2 \text{*a}^2 \text{*}))) \\ & \text{S} \end{split}$	20 ft Interval
Find Height above Stack z _{ent} Height above Stack z _{ent} Height dabove Ground z _{ent} +h. able of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 167.4 180.0 200.0 220.0 240.0 240.0 280.0 300.0 350.0 450.0 550.0 600.0 650.0 600.0 650.0 1100.0 1100.0 1200.0 End Merging (full/mp) = 1355.2 1300.0 1400.0 1400.0 1500.0 200.0 1400.0 1500.0 200.0 1400.0 1400.0 1500.0 1400.0 1500.0	JET	meters meters rting at Tou Plume Radius(m) 3.050 #N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	JET JET JET Sching Height: Vert. Vel(m/s) 4.88 4.85 4.82 4.74 4.71 4.67 4.63 4.54 4.45 4.36 4.36 4.27 4.18 4.08 3.99 3.70 3.72 3.54 3.35 3.17 2.99 2.70 2.72 2.69 2.67 2.56	feet	V'=single p BEFORE T Zeffi 2Fush Zeffi 2Fu	Iume values OUCHING ([n(V ³ a), vl) me Eqns (st s ³ +0.12F _o (z-z. z.) dd Layer Eqns vm-Vtouch)*(output	$\label{eq:critical} \begin{split} & \text{Critical} \\ & (\text{V}_{\text{cnt}})^3 \text{-am}) / 0.16 \text{ if } \text{V}_{\text{crit}} \text{-V}_{\text{m}} \\ & (\text{V}_{\text{cnt}} \text{-V}_{\text{touch}}) / (\text{V}_{\text{m}} \text{-V}_{\text{touch}}) \text{ if } \text{V}_{\text{cri}} \\ & \text{ee Single Plume spreadsheet} \\ & p^2 - (6.25D - z_v)^2 p^{1/2} / \text{a} \\ & \text{sit} D^2 / (4 \text{V}_{\text{plume}} \text{*a}^2 \text{*a}^2 \text{*}))) \\ & \text{S} \end{split}$	20 ft Interval
Find Height above Stack z _{ent} Height above Ground z _{ent} +h. able of MERGED Plume-Averaged Vertical Height (feet above ground. Begin Merging (touch) = 167.4 180.0 200.0 240.0 240.0 260.0 300.0 350.0 450.0 600.0 650.0 700.0 800.0 1000.0 1100.0 End Merging (full/mp) = 1355.7 1300.0 1400.0 1500.0 2000.0 1500.0 2200.0 2200.0 2200.0 2200.0 2200.0 2200.0	JET	meters meters rting at Tou Plume Radius(m) 3.050 #N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	JET JET JET Jething Height: Vert. Vel(m/s) 4.88 4.85 4.82 4.78 4.74 4.71 4.63 4.54 4.45 4.36 4.27 4.18 4.08 3.99 3.90 3.72 3.54 3.35 3.17 2.99 2.70 2.72 2.69 2.67 2.56	feet	V'=single p BEFORE T Zeffi 2Fush Zeffi 2Fu	Iume values OUCHING ([n(V ³ a), vl) me Eqns (st s ³ +0.12F _o (z-z. z.) dd Layer Eqns vm-Vtouch)*(output	$\label{eq:critical} \begin{split} & \text{Critical} \\ & (\text{V}_{\text{cnt}})^3 \text{-am}) / 0.16 \text{ if } \text{V}_{\text{crit}} \text{-V}_{\text{m}} \\ & (\text{V}_{\text{cnt}} \text{-V}_{\text{touch}}) / (\text{V}_{\text{m}} \text{-V}_{\text{touch}}) \text{ if } \text{V}_{\text{cri}} \\ & \text{ee Single Plume spreadsheet} \\ & p^2 - (6.25D - z_v)^2 p^{1/2} / \text{a} \\ & \text{sit} D^2 / (4 \text{V}_{\text{plume}} \text{*a}^2 \text{*a}^2 \text{*}))) \\ & \text{S} \end{split}$	20 ft Interval 50 ft Interval
Find Height above Stack z _{en} Height above Ground z _{ent} +h Table of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 167.4 180.0 220.0 240.0 240.0 240.0 280.0 300.0 300.0 400.0 450.0 450.0 600.0 650.0 600.0 600.0 1100.0 1100.0 1100.0 1200.0 1400.0 1400.0 1400.0 1500.0 1500.0 1000.0 11	JET JET Velocities sta (meters) 1 above stack 1 19.52 23.86 0 29.46 0 35.55 0 41.65 0 47.75 0 53.84 0 90.42 105.66 0 120.99 136.14 0 151.38 0 166.25 0 141.86 0 1212.34 0 334.26 0 334.26 0 334.26 0 347.73 0 364.74 0 395.22 0 378.10	meters meters rting at Tou Plume Radius(m) 3.050 #N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	JET JET JET Vert. Vel(m/s) 4.88 4.85 4.82 4.78 4.74 4.71 4.67 4.63 4.54 4.45 4.36 4.27 4.18 4.08 3.99 3.70 3.72 3.54 3.35 3.17 2.99 2.70 2.72 2.69 2.67 2.56 2.46 2.38	feet	V'=single p BEFORE T Zeffi 2Fush Zeffi 2Fu	Iume values OUCHING ([n(V ³ a), vl) me Eqns (st s ³ +0.12F _o (z-z. z.) dd Layer Eqns vm-Vtouch)*(output	$\label{eq:critical} \begin{split} & \text{Critical} \\ & (\text{V}_{\text{cnt}})^3 \text{-am}) / 0.16 \text{ if } \text{V}_{\text{crit}} \text{-V}_{\text{m}} \\ & (\text{V}_{\text{cnt}} \text{-V}_{\text{touch}}) / (\text{V}_{\text{m}} \text{-V}_{\text{touch}}) \text{ if } \text{V}_{\text{cri}} \\ & \text{ee Single Plume spreadsheet} \\ & p^2 - (6.25D - z_v)^2 p^{1/2} / \text{a} \\ & \text{sit} D^2 / (4 \text{V}_{\text{plume}} \text{*a}^2 \text{*a}^2 \text{*}))) \\ & \text{S} \end{split}$	20 ft Interval 50 ft Interval
Find Height above Stack z _{ent} Height above Ground z _{ent} +h. able of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 167.4 Begin Merging (touch) = 167.4 220.6 240.0 240.0 280.6 300.0 350.6 450.0 550.0 600.0 650.6 700.0 1100.0 1200.6 End Merging (full/mp) = 1355.2 1300.6 1400.0 1400.0 1500.0 2000.6 2000.6 2000.6 2000.6 2000.6 2000.6 2000.6 2000.6 2000.6 2000.6 2000.6 2000.6 2000.6 2000.6 2000.6 2000.6 2000.6	JET	meters meters rting at Tou Plume Radius(m) 3.050 #N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	JET JET JET Vert. Vel(m/s) 4.88 4.85 4.82 4.74 4.71 4.67 4.63 4.54 4.45 4.36 4.36 4.27 4.18 4.08 3.99 3.72 3.54 3.35 3.17 2.99 2.70 2.72 2.69 2.69 2.69 2.66 2.38	feet	V'=single p BEFORE T Zeffi 2Fush Zeffi 2Fu	Iume values OUCHING ([n(V ³ a), vl) me Eqns (st s ³ +0.12F _o (z-z. z.) dd Layer Eqns vm-Vtouch)*(output	$\label{eq:critical} \begin{split} & \text{Critical} \\ & (\text{V}_{\text{cnt}})^3 \text{-am}) / 0.16 \text{ if } \text{V}_{\text{crit}} \text{-V}_{\text{m}} \\ & (\text{V}_{\text{cnt}} \text{-V}_{\text{touch}}) / (\text{V}_{\text{m}} \text{-V}_{\text{touch}}) \text{ if } \text{V}_{\text{cri}} \\ & \text{ee Single Plume spreadsheet} \\ & p^2 - (6.25D - z_v)^2 p^{1/2} / \text{a} \\ & \text{sit} D^2 / (4 \text{V}_{\text{plume}} \text{*a}^2 \text{*a}^2 \text{*}))) \\ & \text{S} \end{split}$	it>V _m
Find Height above Stack z _{en} Height above Ground z _{ent} +h able of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 167.4 180.0 200.0 240.0 240.0 240.0 240.0 240.0 240.0 250.0 240.0 260.0 260.0 260.0 260.0 260.0 270.0 280.0 280.0 280.0 300.0 300.0 400.0 450.0 600.0 650.0 600.0 650.0 650.0 1000.0 1100.0 1100.0 1200.0 1200.0 1400.0 1400.0 1500.0 1500.0 1500.0 1500.0 1500.0 1500.0 1500.0 1500.0 1500.0 2000.0 2500.0	JET JET Velocities sta (meters) 1 above stack 1 19.52 23.36 29.46 35.55 41.65 60 47.75 60 53.84 60 105.66 60 120.90 60 136.14 151.38 60 166.62 60 1212.34 60 181.86 60 212.34 60 242.82 60 334.26 60 334.26 60 334.26 60 334.26 60 335.20 60 578.10 60 60 60 60 60 60 60 60 60 60 60 60 60	meters meters rting at Tou Plume Radius(m) 3.050 #N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	JET JET JET Vert. Vel(m/s) 4.88 4.85 4.82 4.78 4.74 4.71 4.67 4.63 4.54 4.45 4.36 4.27 4.18 4.08 3.99 3.70 3.72 3.54 3.35 3.17 2.99 2.70 2.72 2.69 2.67 2.56 2.46 2.38	feet	V'=single p BEFORE T Zeffi 2Fush Zeffi 2Fu	Iume values OUCHING ([n(V ³ a), vl) me Eqns (st s ³ +0.12F _o (z-z. z.) dd Layer Eqns vm-Vtouch)*(output	$\label{eq:critical} \begin{split} & \text{Critical} \\ & (\text{V}_{\text{cnt}})^3 \text{-am}) / 0.16 \text{ if } \text{V}_{\text{crit}} \text{-V}_{\text{m}} \\ & (\text{V}_{\text{cnt}} \text{-V}_{\text{touch}}) / (\text{V}_{\text{m}} \text{-V}_{\text{touch}}) \text{ if } \text{V}_{\text{crit}} \\ & \text{ee Single Plume spreadsheet} \\ & p^2 - (6.25D - z_v)^2 p^{1/2} / \text{a} \\ & \text{sit} D^2 / (4 \text{V}_{\text{plume}} \text{*a}^2 \text{*a}^2 \text{*}))) \\ & \text{S} \end{split}$	20 ft Interval 50 ft Interval



Bas ed on 63 chillers w/ 20 cells/chiller. Calc	"A viation Sal					F147	6-d	
eff.diam for each chiller wiith each cell at 34" ID	"The Evaluat							
220,110 ACFM total for each chiller).		from a Gas-	Turbine Pow	er Station a	at Oakey, G	ueensland,	Australia," Dr. K.T. Spilla	ne
mbient Conditions					Con stants:	Assume ne	eutral conditions (de/dz=0 or	$\Theta_n = \Theta_n$)
Ambient Potential Temp θ ₁	302.21	Kelvins	84.3	°F		0.3048	meters/feet	
Plume Exit Conditions					Gravity g	9.81	m/s ²	
Stack Height h	31.50	meters	103.35	feet	λ	1.11		
Individual Chiller Stack Diameter D	3.8621	meters	152.1	inches	λο	~1.0		
Stack Velocity Vext	8.08	m/s	26.45	ft/s ec	4Vol/(60πE) ²)		
In dividual Chiller Volumetric Flow	94 44	cu.m/s ec	200,110		πVexitD2/4	,		Sect.2/¶1
Stack Potential Temp 6:		Kelvins	104.3		II VOLID / T			Jeu.2 1
					=2			
Initial Stack Buoyancy Flux Fo			20.0	ΔT(°F)			ol.Flow(g/π)(1-θ ₁ /θ ₃)	Sect.2/¶1
Plume Buoyancy Flux F		m ⁴ /s ³					,θ ₀ at plume height (see belo	w)
Number of Chillers n	63			2.817	Multiple St	ack Multipli	cation Factor (n ^{0.25})	
Conditions at End (Top) of Jet Phase:								
Height above Stack z _{lot}	24.138	meters *	79.2	feet*	z _{jet} = 6.250), meters*=	meters above stack top	Sect.3/¶1
Height above Ground ziet+hs	55.639	meters	182.5	feet				
Vertical Velocity V _{id}	4.031		13 22	ft/s ec	V = 0.5V	odt = V _{ext} /2		
Plume Top-Hat Diameter 2a _d		meters	25.3		2a _{iot} = 2D	DEC VENEZ	Cons ervation of momentum	
Flume Top-hat Diameter 24 _d	1.124	metes	20.3	reet	28jet - 20		Cors evation or momentum	
pillane Methodology - Analytical Solutions								
Single Plume-averaged Vertical Velocity	V given by A	nalytical Sol	ution in Pap	erwhene P	roduct Va	given by e	quations below:	
Plume Top-Hat Radius a	S	olution s in T	able Below		0.16(z-z _v),	or linear ind	crease with height	Sect.2/Eq.6
Virtual Source Height zv	0.432	meters *	1.4	feet*	6.25D[1-(0:	/θs) ^{1/2}], meta	ers*=meters above stack top	Sect.2/Eq.6
Height above Ground zv+ha		meters	104.8		- ,-		where $(\theta_0/\theta_s)^{1/2} = (\theta_0/\theta_s)^{1/2} =$	
Vertical Velocity V		olution s in T			{(√a/ ₃ + 0	12Fc [/=-=) ² - (6.25D-z _V) ²]} ^(1/3) / a	Sect.2.1(6)
		_	LOIC DEIGW		((va)ο + 0. VoottD/2(θο/	. 21 0 [(2-2) 0. 1 ^{1/2}	, - (0.200-21)]} / B	Jeu. 2. 1(U)
Product (Va)	15.289	m /s			vestD/2(0a/	os)		
Single Chiller Results								
Solve for plume-a veraged vertical velo	city at height	1,000.0	feet	304.8	meters abo	we ground (z'+hs)	
Gives the following Height above Stack z	273.299	meters *	896.7	feet*				
Plume Top-Hat Diameter 2a	87.318	meters	286.5	feet	2a'=2*0.16	z'-zv)		Sect.2/Eq.6
Vertical Velocity V							,)2-(6.25D-z _v)2]}(1/3)/(2a//2)	Sect.2/Eq.6
	200		2.11		£ po	- SE(- 2)		
Solve for Height of CASC critical vertica	luplocity V. ≃	E 20	m/s plume-a	verseed	ertical val	ncity.	Celti1	VV < Top of J
_	_		-			-		
Find Height above Stack z _{crit}		meters	#N/A				ultaneously in both eqs. (i.e.,	
Height above Ground zork+hs	#N/A	meters	#N/A	feet	for V=V _{crit}		ubic equation ax3+bx2+cx+d=	
						a=1, c=0,	and b=-(0.12F _o)/(V _{crit} 30.16 ³)=	-2.057
Interpolated Height of critical vertical v	elocity in Jet	Phase:			and d	$=[0.12F_{\circ}(6.2$	25D-z _v) ² -(Va) _o 3]/(V _{crit} 30.163)=	-4704.
Find Height above Stack zont	16.537	meters	54.3	foot			http://www.17	28.org/cubic.ht
							TILLDAY STREET, 17	
Height above Ground z> +h-	48 039					give		
Height above Ground z _{crit} +h _s	48.039		157.6			give	s the real solution x = z-zv =	17.47
Height above Ground z _{crk} +h _s	48.039					give	s the real solution x = z-zv = or z(m/above stack) =	17.47 17.9
		meters	157.6	feet			s the real solution x = z-zv =	17.47 17.9
Height above Ground z_{crt} +h _o able of Plume Top-Hat Diameters (2a) and I		meters	157.6	feet arting at en	nd of jet ph		s the real solution x = z-zv = or z(m/above stack) =	17.47 17.9
able of Plume Top-Hat Diameters (2a) and I Height (feet)	Plume-Averag (meters)	meters ped Vertical ¹ Plume	157.6 Velocities st	feet arting at en Plume			s the real solution x = z-zv = or z(m/above stack) =	17.47 17.9
able of Plume Top-Hat Diameters (2a) and l Height (feet) above ground	Plume-Averag (meters)	meters ped Vertical ¹ Plume	157.6 Velocities st	feet arting at en Plume			s the real solution x = z-zv = or z(m/above stack) =	17.47 17.9
able of Plume Top-Hat Diameters (2a) and I Height (feet)	Plume-Averag (meters)	meters ed Vertical V Plume Radius(m)	157.6 Velocities st	feet arting at en Plume			s the real solution x = z-zv = or z(m/above stack) =	17.47 17.9
able of Plume Top-Hat Diameters (2a) and l Height (feet) above ground	Plume-Averag (meters) above stack	meters ged Vertical Plume Radius(m) 1.931	157.6 Velocitiesst SingleStk VertVel(m/s)	feet arting at en Plume			s the real solution x = z-zv = or z(m/above stack) =	17.47 17.9 160
able of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Ref.Ht = 103.4	Plume-Averag (meters) above stack 0.00	ped Vertical Vertical Radius(m)	157.6 Velocities st. Single Stk VertVel(m/s) 8.06	feet arting at en Plume Temp(K)			s the real s olution x = z-zv = or z(m/above s tack) = z(ft/above ground) =	17.47 17.9 160 20 ft Interval
able of Plume Top-Hat Diameters (2a) and f Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0	Plume-Averag (meters) above stack 0.00 5.07	ed Vertical Vertical Plume Radius(m) 1.931 2.337 2.825	157.6 Velocities st. Single Stk VertVel(m/s) 8.06 7.21 6.20	feet arting at en Plume Temp(K)			s the real s olution x = z-zv = or z(m/above s tack) = z(ft/above ground) = Jet Phase Eqs: Linearly interpolated from Stack R	17.47 17.9 160 20 ft Interval
able of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Ref.Ht = 103.4 120.0 140.0	Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27	meters Plume Radius(m) 1.931 2.337 2.825 3.312	157.6 Velocities st. Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18	feet arting at en Plume Temp(K)			s the real s olution x = z-zv = or z(m/above s tack) = z(ft/above ground) = Jet Phase Eqs:	17.47 17.9 160 20 ft Interval
able of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Sfack.Ref.Ht = 103.4 120.0 140.0 Single Jet 5.3 m/s Height = 157.6	Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54	red Vertical Plume Radius(m) 1.931 2.937 2.825 3.312 3.254	157.6 Velocitie s st. Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18	feet arting at en Plume Temp(K)			s the real s olution x = z-zv = or z (m/above s tack) = z(ft/above ground) = Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations	17.47 17.9 162 20 ft Interval
Table of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 Single Jet 5.3 m/s Height = 157.6 180.0	Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.38	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800	157.6 Velocities st. Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16	feet arting at en Plume Temp(K)			s the real s olution x = z-zv = or z (m/above s tack) = z(ft/above ground) = Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations V _{plane} = ((Va) ₀ ³ +0.12F _o [(z-z _v) ² -(6.2)	17.47 17.9 160 20 ft Interval
able of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Ref.Ht = 103.4 140.0 140.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5	Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.38 24.14	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862	157.6 Velocitie s st. Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03	feet arting at en Plume Temp(K)			s the real s olution x = z-zv = or z(m/above stack) = z(ft/above ground) = Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equation s V _{phase} = ((Va) _o ² +0.12F _o (z-z _v) ² -(6.2 a = 0.16(z-z _v)	17.47 17.5 16; 20 ft Interval el-lit to Top of Jet
Table of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 Single Jet 5.3 m/s Height = 157.6 180.0	Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.38	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862	157.6 Velocities st. Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16	feet arting at en Plume Temp(K)			s the real s olution x = z-zv = or z (m/above s tack) = z(ft/above ground) = Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations V _{plane} = ((Va) ₀ ³ +0.12F _o [(z-z _v) ² -(6.2)	17.47 17.5 16; 20 ft Interval el-lit to Top of Jet
able of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Ref.Ht = 103.4 140.0 140.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5	Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.38 24.14	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.644	157.6 Velocitie s st. Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03	feet arting at en Plume Temp(K)			s the real s olution x = z-zv = or z(m/above stack) = z(ft/above ground) = Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equation s V _{phase} = ((Va) _o ² +0.12F _o (z-z _v) ² -(6.2 a = 0.16(z-z _v)	17.47 17.5 16; 20 ft Interval el-lit to Top of Jet
Table of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Ref.Ht = 103.4 120.0 140.0 600.0 Single Jet 5.3 m/s Height = 157.6 Top of Single jet = 182.5 200.0	Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.38 24.14	meters ed Vertical ' Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.644 5.620	157.6 Velocitie s st. Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40	feet arting at en Plume Temp(K) 308.58			s the real s olution x = z-zv = or z(m/above s tack) = z(ft/above ground) = Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equation s V _{juma} =((Va) _o ²⁺⁰ .12F _o (z-z _v) ² -(6.2 a = 0.16(z-z _v) b _o =6 _o (1+(1-(6 _o /6 _o))*(V _{ost} 0 ²)/(V _{ost} 0 ²)/(17.47 17.5 16: 20 ft Interval el.Ht to Top of Jet
Table of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Ref.Ht = 103.4 120.0 140.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 220.0 220.0 240.0	Plume-Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.38 24.14 29.46 35.55 41.65	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.644 5.620 6.595	157.6 Velocitie s st. Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92	feet arting at en Plume Temp(K) 308.56 305.78			s the real s olution $x = z \cdot z \cdot v =$ or $z \cdot (m'above s tack) =$ $z \cdot (ft/above ground) =$ $z \cdot (ft/above ground) =$ Jet Phase Eqs: Linearly interpolated from Stack R. Spillane Equation s $V_{zbma} = ((Val_0^{-1}a \cdot 0.12F_z(z \cdot z_v)^{2} \cdot (6.2 a = 0.16(z \cdot z \cdot v)) = (9.96)(14(1 \cdot (6.96)))^{*}(V_{odf}D^{2}/(0.26)) = (9.96)(14(1 \cdot (6.96))) = ($	17.47 17.5 16: 20 ft Interval el.Ht to Top of Jet
Table of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Ref.Ht = 103.4 140.0 140.0 Single Jet 5.3 m/sHeight = 157.6 180.0 Top of Single jet = 182.5 200.0 2240.0 240.0	Plume -Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.48 47.75	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.644 5.620 6.695 7.570	157.6 Velocitie s st. Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59	feet arting at en Plume Temp(K) 306.56 305.78 305.04			s the real s olution x = z-zv = or z(m/above s tack) = z(ft/above ground) = Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations V _{phan} = ((Va) ₀ ² +0.12F ₀ (z-z _v) ² -(6.2 a = 0.16(z-z _v) B ₀ =0 ₄ (1+(1-(0 ₂ /0 ₆))*(V _{oolt} D ² /(CEC Staff Equation: V _{ps} =nc ²²² V _{vp} Brigg's Equation:	17.47 17.5 16: 20 ft Interval ei.Ht to Top of Jet 50-z_\^T]\frac{1}{2} / a 4V_plume**ei**\lambda^2 \lambda^2)\rangle
Table of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Ref.Ht = 103.4 120.0 140.0 Single Jet 5.3 m/sHeight = 157.6 200.0 220.0 240.0 280.0	Plume-Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.644 5.620 6.595 7.570 8.546	157.6 Velocities st. Single Stk. VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.599 2.38	arting at en Plume Temp(K) 308.56 305.78 305.04 304.63 304.15			s the real solution $x = z \cdot z \cdot y = $ or $z(m/above stack) = $ $z(ft/above ground) = $ $z(ft/above ground) = $ Jet Phase Eqs: Linearly interpolated from Stack R. Spillane Equations. $V_{phan} = \{(Va)_o^{3+0}, 12F_d(z \cdot z_v)^2 \cdot (6.2 \cdot z$	17.4] 17.5 16 20 ft Interval el-Ht to Top of Je 50-z_γ-η η 10-z γ-η 4 Vplume "a²-λ²))
Table of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 200.0 240.0 280.0 280.0 300.0	Plume -Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 59.94	meters ed Vertical ' Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.644 5.620 6.695 7.570 8.546 9.521	157.6 Velocitie s st. Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59 2.38 2.18	arting at en Plume Temp(K) 308.56 305.78 305.04 304.15 303.85			s the real s olution x = z-zv = or z(m/above s tack) = z(ft/above ground) = Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations V _{phan} = ((Va) ₀ ² +0.12F ₀ (z-z _v) ² -(6.2 a = 0.16(z-z _v) B ₀ =0 ₄ (1+(1-(0 ₂ /0 ₆))*(V _{oolt} D ² /(CEC Staff Equation: V _{ps} =nc ²²² V _{vp} Brigg's Equation:	17.4] 17.5 16 20 ft Interval el-Ht to Top of Je 50-z_γ-η η 10-z γ-η 4 Vplume "a²-λ²))
Table of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Ref.Ht = 103.4 120.0 140.0 Single Jet 5.3 m/sHeight = 157.6 200.0 220.0 240.0 280.0	Plume -Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 59.94	meters ed Vertical ' Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.644 5.620 6.695 7.570 8.546 9.521	157.6 Velocitie s st. Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59 2.38 2.18	arting at en Plume Temp(K) 308.56 305.78 305.04 304.15 303.85			s the real solution $x = z \cdot z \cdot y = $ or $z(m/above stack) = $ $z(ft/above ground) = $ $z(ft/above ground) = $ Jet Phase Eqs: Linearly interpolated from Stack R. Spillane Equations. $V_{phan} = \{(Va)_o^{3+0}, 12F_d(z \cdot z_v)^2 \cdot (6.2 \cdot z$	17.4] 17.5 16 20 ft Interval el-Ht to Top of Je 50-z_γ-η η 10-z γ-η 4 Vplume "a²-λ²))
Table of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 200.0 240.0 280.0 280.0 300.0	Plume-Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.38 24.14 29.48 35.55 41.65 47.75 53.84 59.94 66.03	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.644 5.620 6.595 7.570 8.546 9.521 10.497	Velocities st. Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59 2.38 2.18 2.04	arting at en Plume Temp(K) 308.568 305.78 305.04 304.53 304.15 303.85 303.62			s the real solution $x = z \cdot z \cdot y = $ or $z(m/above stack) = $ $z(ft/above ground) = $ $z(ft/above ground) = $ Jet Phase Eqs: Linearly interpolated from Stack R. Spillane Equations. $V_{phan} = \{(Va)_o^{3+0}, 12F_d(z \cdot z_v)^2 \cdot (6.2 \cdot z$	17.47 17.5 16: 20 ft Interval ei.Ht to Top of Jet 50-z_\^T]\frac{1}{2} / a 4V_plume**ei**\lambda^2 \lambda^2)\rangle
Table of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Ref.Ht = 103.4 120.0 140.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 200.0 240.0 260.0 280.0 300.0 300.0	Plume -Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.38 24.14 29.46 35.55 41.65 47.75 53.84 59.94 66.03 75.18	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.644 5.620 6.695 7.570 8.546 9.521 10.497 11.960	Velocitie's st. Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59 2.36 2.18 2.04 1.93	arting at en Plume Temp(K) 306.56 305.78 305.04 304.53 304.15 303.85 303.85 303.85			s the real solution $x = z \cdot z \cdot y = $ or $z(m/above stack) = $ $z(ft/above ground) = $ $z(ft/above ground) = $ Jet Phase Eqs: Linearly interpolated from Stack R. Spillane Equations. $V_{phan} = \{(Va)_o^{3+0}, 12F_d(z \cdot z_v)^2 \cdot (6.2 \cdot z$	17.47 17.5 16: 20 ft Interval ei.Ht to Top of Jet 5D-z_\rangle^3\rangle^1/2 / a 4V_plume *s^2 \lambda^2))
Top of Single jet = 182.5 200.0	Plume -Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 647.75 53.84 69.94 66.03 75.18 90.42	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.644 5.620 6.595 7.570 8.546 9.521 10.497 11.980 14.398	Velocities sta Single Sta VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59 2.36 2.18 2.04 1.93 1.79	arting at en Plume Temp(K) 308.56 305.78 305.04 304.53 304.15 303.85 303.82 303.44			s the real solution $x = z \cdot z \cdot v =$ or $z \cdot (m'above s tack) =$ $z \cdot (ft/above ground) =$ $z \cdot (ft/above ground) =$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations $V_{phase} = ((Va)_{s_0}^{3+0} \cdot 12F_0(z \cdot z_s)^2 \cdot (6.2$ $a = 016(z \cdot z_s)$ $\theta_0 = \theta_0 \cdot (1+(1-(\theta_0/\theta_0)))^* (V_{out}D^2)/(CEC Staff Equation:$ $V_{np} = 0.20 \cdot V_{np}$ Fig $g's$ Equation: $V_{ntigsh} = (23) \times 1.8^{(23)} \times F_{np}^{-(10)} \times U_{np}^{-(10)} \times $	17.41 17.5 16 20 ft Interval el Ht to Top of Je SD-z_\rangle D \(\frac{1}{2} \) \(
Table of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 Single Jet 5.3 m/sHeight = 157.6 180.0 Top of Single jet = 182.5 200.0 240.0 240.0 280.0 300.0 320.0 350.0 400.0 450.0	Plume -Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 59.94 66.03 75.18 90.42 105.66	meters ed Vertical ' Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.644 5.620 6.595 7.570 8.546 9.521 10.497 11.960 14.398 16.836	157.6 Velocities st. Single Stk. VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59 2.38 2.04 1.93 1.79 1.63 1.63	arting at en Plume Temp(K) 308.56 305.78 305.04 304.53 304.15 303.85 303.62 303.44 303.23 302.98			s the real solution $x = z \cdot z \cdot y = $ or $z(m/above stack) = $ $z(ft/above ground) = $ $z(ft/above ground) = $ Jet Phase Eqs: Linearly interpolated from Stack R. Spillane Equations: $V_{phan} = \{(Va)_o^{3+0}, 12F_d(z \cdot z_v)^2 \cdot (6.2 \cdot z$	17.41 17.5 16 20 ft Interval el Ht to Top of Je SD-z_\rangle D \(\frac{1}{2} \) \(
Table of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Ref.Ht = 103.4 120.0 140.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 200.0 240.0 220.0 240.0 280.0 300.0 300.0 300.0 450.0 450.0 500.0	Plume -Averag (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.38 24.14 29.48 35.55 41.65 47.75 53.84 68.03 75.18 90.42 105.68 120.90	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.644 5.620 6.695 7.570 8.546 9.521 10.497 11.980 14.398 16.836 19.275	Velocities st. Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59 2.38 2.18 2.04 1.93 1.79 1.63 1.52	arting at en Plume Temp(K) 308.56 305.78 305.04 304.53 304.15 303.85 303.82 303.44 303.23 302.98			s the real solution $x = z \cdot z \cdot v =$ or $z \cdot (m'above s tack) =$ $z \cdot (ft/above ground) =$ $z \cdot (ft/above ground) =$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations $V_{phase} = ((Va)_{s_0}^{3+0} \cdot 12F_0(z \cdot z_s)^2 \cdot (6.2$ $a = 016(z \cdot z_s)$ $\theta_0 = \theta_0 \cdot (1+(1-(\theta_0/\theta_0)))^* (V_{out}D^2)/(CEC Staff Equation:$ $V_{np} = 0.20 \cdot V_{np}$ Fig $g's$ Equation: $V_{ntigsh} = (23) \times 1.8^{(23)} \times F_{np}^{-(10)} \times U_{np}^{-(10)} \times $	17.41 17.5 16 20 ft Interval el Ht to Top of Je SD-z_\rangle D \(\frac{1}{2} \) \(
Table of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 Single Jet 5.3 m/sHeight = 157.6 180.0 Top of Single jet = 182.5 200.0 220.0 240.0 280.0 300.0 300.0 350.0 450.0 550.0	Plume -Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 59.94 105.66 120.90 136.14	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.644 5.620 6.695 7.570 8.546 9.521 10.497 11.960 14.398 16.836 19.275 21.713	Velocitie's st. Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59 2.36 2.18 2.04 1.93 1.79 1.63 1.52 1.43	arting at en Plume Temp(K) 306.56 305.78 305.04 304.53 304.15 303.85 303.85 303.82 303.23 302.23 302.23			s the real solution $x = z \cdot z \cdot v =$ or $z \cdot (m'above s tack) =$ $z \cdot (ft/above ground) =$ $z \cdot (ft/above ground) =$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations $V_{phase} = ((Va)_{s_0}^{3+0} \cdot 12F_0(z \cdot z_s)^2 \cdot (6.2$ $a = 016(z \cdot z_s)$ $\theta_0 = \theta_0 \cdot (1+(1-(\theta_0/\theta_0)))^* (V_{out}D^2)/(CEC Staff Equation:$ $V_{np} = 0.20 \cdot V_{np}$ Fig $g's$ Equation: $V_{ntigsh} = (23) \times 1.8^{(23)} \times F_{np}^{-(10)} \times U_{np}^{-(10)} \times $	17.41 17.5 16 20 ft Interval el Ht to Top of Je SD-z_\rangle D \(\frac{1}{2} \) \(
Top of Single jet = 182.0 280.0 280.0 280.0 280.0 280.0 280.0 280.0 380.0 380.0 460.0 560.0 660.0 660.0	Plume -Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 69.94 66.03 75.18 90.42 105.66 120.90 136.14 151.38	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 4.644 5.620 6.595 7.570 8.546 9.521 10.497 11.960 14.398 16.836 19.275 21.713 24.152	Velocitie's sta Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59 2.36 2.18 2.04 1.93 1.79 1.63 1.52	arting at en Plume Temp(K) 308.56 305.78 305.04 304.53 304.15 303.85 303.82 302.98 302.98 302.98 302.90 302.62			s the real solution $x = z \cdot z \cdot v =$ or $z \cdot (m'above s tack) =$ $z \cdot (ft/above ground) =$ $z \cdot (ft/above ground) =$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations $V_{phase} = ((Va)_{s_0}^{3+0} \cdot 12F_0(z \cdot z_s)^2 \cdot (6.2$ $a = 016(z \cdot z_s)$ $\theta_0 = \theta_0 \cdot (1+(1-(\theta_0/\theta_0)))^* (V_{out}D^2)/(CEC Staff Equation:$ $V_{np} = 0.20 \cdot V_{np}$ Fig $g's$ Equation: $V_{ntigsh} = (23) \times 1.8^{(23)} \times F_{np}^{-(10)} \times U_{np}^{-(10)} \times $	17.41 17.5 16 20 ft Interval el Ht to Top of Je SD-z_\rangle D \(\frac{1}{2} \) \(
Table of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 Single Jet 5.3 m/sHeight = 157.6 180.0 Top of Single jet = 182.5 200.0 220.0 240.0 280.0 300.0 300.0 350.0 450.0 550.0	Plume -Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 69.94 66.03 75.18 90.42 105.66 120.90 136.14 151.38	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 4.644 5.620 6.595 7.570 8.546 9.521 10.497 11.960 14.398 16.836 19.275 21.713 24.152	Velocities sta Single Sta VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59 2.36 2.18 2.04 1.93 1.79 1.63 1.52	arting at en Plume Temp(K) 308.56 305.78 305.04 304.53 304.15 303.85 303.82 302.98 302.98 302.98 302.90 302.62			s the real solution $x = z \cdot z \cdot v =$ or $z \cdot (m'above s tack) =$ $z \cdot (ft/above ground) =$ $z \cdot (ft/above ground) =$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations $V_{phase} = ((Va)_{s_0}^{3+0} \cdot 12F_0(z \cdot z_s)^2 \cdot (6.2$ $a = 016(z \cdot z_s)$ $\theta_0 = \theta_0 \cdot (1+(1-(\theta_0/\theta_0)))^* (V_{out}D^2)/(CEC Staff Equation:$ $V_{np} = 0.20 \cdot V_{np}$ Fig $g's$ Equation: $V_{ntigsh} = (23) \times 1.8^{(23)} \times F_{np}^{-(10)} \times U_{np}^{-(10)} \times $	17.41 17.5 16 20 ft Interval el Ht to Top of Je SD-z_\rangle D \(\frac{1}{2} \) \(
able of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 160.0 Single Jet 5.3 m/sHeight = 157.6 200.0 220.0 240.0 280.0 300.0 320.0 350.0 400.0 450.0 550.0 600.0	Plume -Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 69.94 66.03 75.18 90.42 105.66 120.90 136.14 151.38 166.62	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.644 5.620 6.595 7.570 8.546 9.521 10.497 11.960 14.398 16.836 19.275 21.713 24.152 26.590	Velocitie s st. Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59 2.36 2.18 2.04 1.93 1.79 1.63 1.36 1.31 1.36	arting at en Plume Temp(K) 308.56 305.78 305.04 304.53 303.82 303.44 303.23 302.98 302.82 302.70 302.62 302.55			s the real solution $x = z \cdot z \cdot v =$ or $z \cdot (m'above s tack) =$ $z \cdot (ft/above ground) =$ $z \cdot (ft/above ground) =$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations $V_{phase} = ((Va)_{s_0}^{3+0} \cdot 12F_0(z \cdot z_s)^2 \cdot (6.2$ $a = 016(z \cdot z_s)$ $\theta_0 = \theta_0 \cdot (1+(1-(\theta_0/\theta_0)))^* (V_{out}D^2)/(CEC Staff Equation:$ $V_{np} = 0.20 \cdot V_{np}$ Fig $g's$ Equation: $V_{ntigsh} = (23) \times 1.8^{(23)} \times F_{np}^{-(10)} \times U_{np}^{-(10)} \times $	17.41 17.5 16 20 ft Interval el Ht to Top of Je SD-z_\rangle D \(\frac{1}{2} \) \(
able of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 100.0 Single Jet 5.3 m/sHeight = 157.6 180.0 Top of Single jet = 182.5 200.0 240.0 280.0 300.0 320.0 300.0 320.0 400.0 450.0 550.0 600.0	Plume -Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 23.46 35.55 41.65 47.75 53.84 59.94 66.03 75.18 90.42 105.66 120.90 136.14 151.38 166.62 181.86	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.644 5.620 6.695 7.570 8.546 9.521 10.497 11.990 14.398 16.836 19.275 21.713 24.152 26.690 29.028	Velocities st. Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59 2.38 2.14 1.93 1.79 1.63 1.31 1.38 1.31 1.22	arting at en Plume Temp(K) 306.56 305.78 305.04 304.15 303.85 303.62 303.44 303.23 302.82 302.70 302.62 302.55 302.50			s the real solution $x = z \cdot z \cdot v =$ or $z \cdot (m'above s tack) =$ $z \cdot (ft/above ground) =$ $z \cdot (ft/above ground) =$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations $V_{phase} = ((Va)_{s_0}^{3+0} \cdot 12F_0(z \cdot z_s)^2 \cdot (6.2$ $a = 016(z \cdot z_s)$ $\theta_0 = \theta_0 \cdot (1+(1-(\theta_0/\theta_0)))^* (V_{out}D^2)/(CEC Staff Equation:$ $V_{np} = 0.20 \cdot V_{np}$ Fig $g's$ Equation: $V_{ntigsh} = (23) \times 1.8^{(23)} \times F_{np}^{-(10)} \times U_{np}^{-(10)} \times $	17.41 17.5 16 20 ft Interval el Ht to Top of Je SD-z_\rangle D \(\frac{1}{2} \) \(
able of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 160.0 Single Jet 5.3 m/s Height = 157.6 200.0 220.0 240.0 220.0 240.0 300.0 320.0 350.0 400.0 450.0 550.0 600.0 650.0 700.0 800.0	Plume -Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 66.03 75.18 90.42 105.66 120.90 136.14 151.38 166.62 181.88 212.34	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.644 5.620 6.695 7.570 8.546 9.521 10.497 11.960 14.398 16.836 19.275 21.713 24.152 26.590 29.028 33.905	Velocitie's st. Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59 2.36 2.18 2.04 1.93 1.79 1.63 1.52 1.43 1.36 1.31 1.26 1.22	arting at en Plume Temp(K) 306.56 305.78 306.04 304.53 304.15 303.85 303.82 303.44 303.23 302.98 302.82 302.70 302.62 302.55 302.56 302.60 302.46			s the real solution $x = z \cdot z \cdot v =$ or $z \cdot (m'above s tack) =$ $z \cdot (ft/above ground) =$ $z \cdot (ft/above ground) =$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations $V_{phase} = ((Va)_{s_0}^{3+0}, 12F_0(z \cdot z_s)^2 \cdot (6.2$ $a = 016(z \cdot z_s)$ $\theta_0 = \theta_0 \cdot (1+(1-(\theta_0/\theta_0)))^* (V_{out}D^2)/(CEC$ Staff Equation: $V_{nep} = 0.20 \cdot (v_{nep} \cdot v_{nep} \cdot v_{$	17.4) 17.5 16 20 ft Interval ei.Ht to Top of Je 50-z_\(^2\)] 10 4V_plume *a^2 *\(^2\)) 50 ft Interval
able of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 160.0 Single Jet 5.3 m/s Height = 157.6 200.0 220.0 240.0 280.0 300.0 320.0 350.0 400.0 450.0 650.0 600.0 680.0 700.0 880.0	Plume -Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 647.75 53.84 69.94 66.03 75.18 90.42 105.66 120.90 136.14 151.38 166.62 181.86 212.94 242.82	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.644 5.620 6.595 7.570 8.546 9.521 10.497 11.960 14.398 16.836 19.275 21.713 24.152 26.590 29.028 33.905 38.782	Velocities sta Single Sta VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59 2.36 2.18 2.04 1.93 1.79 1.63 1.52 1.43 1.32 1.26 1.22 1.26	arting at en Plume Temp(K) 308.56 305.78 305.04 304.53 304.15 303.85 303.82 302.98 302.98 302.98 302.55 302.62			s the real solution $x = z \cdot z \cdot v =$ or $z \cdot (m'above s tack) =$ $z \cdot (ft/above ground) =$ $z \cdot (ft/above ground) =$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations $V_{phase} = ((Va)_{s_0}^{3+0}, 12F_0(z \cdot z_s)^2 \cdot (6.2$ $a = 016(z \cdot z_s)$ $\theta_0 = \theta_0 \cdot (1+(1-(\theta_0/\theta_0)))^* (V_{out}D^2)/(CEC$ Staff Equation: $V_{nep} = 0.20 \cdot (v_{nep} \cdot v_{nep} \cdot v_{$	17.4) 17.5 16 20 ft Interval ei.Ht to Top of Je 50-z_\(^2\)] 10 4V_plume *a^2 *\(^2\)) 50 ft Interval
able of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 160.0 Single Jet 5.3 m/sHeight = 157.6 180.0 Top of Single jet = 182.5 200.0 240.0 280.0 300.0 320.0 300.0 450.0 550.0 600.0 650.0 700.0 800.0 900.0	Plume -Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 69.94 66.03 75.18 90.42 105.66 120.90 136.14 151.38 166.62 181.88 212.34 242.82 273.30	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.644 5.620 6.595 7.570 8.546 9.521 10.497 11.960 14.398 16.836 19.275 21.713 24.152 26.590 29.028 33.3055 38.782 43.659	Velocities st. Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59 2.38 2.18 2.04 1.93 1.79 1.63 1.36 1.31 1.26 1.22 1.15 1.09	arting at en Plume Temp(K) 306.566 305.78 305.04 304.53 303.85 303.82 303.44 303.29 302.70 302.62 302.55 302.50 302.46 302.44			s the real solution $x = z \cdot z \cdot v =$ or $z \cdot (m'above s tack) =$ $z \cdot (ft/above ground) =$ $z \cdot (ft/above ground) =$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations $V_{phase} = ((Va)_{s_0}^{3+0}, 12F_0(z \cdot z_s)^2 \cdot (6.2$ $a = 016(z \cdot z_s)$ $\theta_0 = \theta_0 \cdot (1+(1-(\theta_0/\theta_0)))^* (V_{out}D^2)/(CEC$ Staff Equation: $V_{nep} = 0.20 \cdot (v_{nep} \cdot v_{nep} \cdot v_{$	17.4) 17.5 16 20 ft Interval ei.Ht to Top of Je 50-z_\(^2\)] 10 4V_plume *a^2 *\(^2\)) 50 ft Interval
able of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 180.0 Single Jet 5.3 m/s Height = 157.6 180.0 Top of Single jet = 182.5 200.0 240.0 220.0 240.0 300.0 300.0 350.0 400.0 650.0 650.0 670.0 800.0 800.0 800.0 1000.0	Plume -Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 59.94 105.66 120.90 136.14 151.38 166.62 121.34 242.82 273.30 303.78	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.644 5.620 6.695 7.570 8.546 9.521 10.497 11.980 14.398 16.836 19.275 21.713 24.152 26.690 28.028 33.905 38.782 43.659	Velocities sta Single Stk VertVel(m/s) 8.066 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59 2.38 2.18 2.04 1.93 1.79 1.63 1.32 1.32 1.32 1.32 1.33 1.32 1.34	arting at en Plume Temp(K) 306.56 305.78 305.04 304.15 303.85 303.62 303.44 303.23 302.82 302.70 302.62 302.55 302.50 302.40 302.41 302.31			s the real solution $x = z \cdot z \cdot v =$ or $z \cdot (m'above s tack) =$ $z \cdot (ft/above ground) =$ $z \cdot (ft/above ground) =$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations $V_{phase} = ((Va)_{s_0}^{3+0}, 12F_0(z \cdot z_s)^2 \cdot (6.2$ $a = 016(z \cdot z_s)$ $\theta_0 = \theta_0 \cdot (1+(1-(\theta_0/\theta_0)))^* (V_{out}D^2)/(CEC$ Staff Equation: $V_{nep} = 0.20 \cdot (v_{nep} \cdot v_{nep} \cdot v_{$	17.4) 17.5 16 20 ft Interval ei.Ht to Top of Je 50-z_\(^2\)] 10 4V_plume *a^2 *\(^2\)) 50 ft Interval
able of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 160.0 Single Jet 5.3 m/s Height = 187.6 200.0 220.0 240.0 220.0 240.0 280.0 300.0 320.0 350.0 400.0 550.0 600.0 650.0 700.0 800.0 900.0 1100.0 1100.0	Plume -Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 68.03 75.18 90.42 105.66 120.90 136.14 151.38 166.62 181.86 212.34 242.82 273.30 303.78 334.26	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.644 5.620 6.695 7.570 8.546 9.521 10.497 11.960 14.398 16.836 19.275 21.713 24.152 26.590 29.028 33.905 38.782 43.659 48.536 53.412	Velocitie's st. Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59 2.36 2.18 2.04 1.93 1.79 1.63 1.52 1.43 1.26 1.21 1.15 1.09 1.05 1.01 0.98	arting at en Plume Temp(K) 306.56 305.78 306.04 304.53 304.15 303.85 303.82 302.98 302.82 302.70 302.62 302.55 302.50 302.46 302.41 302.32			s the real solution $x = z \cdot z \cdot v =$ or $z \cdot (m'above s tack) =$ $z \cdot (ft/above ground) =$ $z \cdot (ft/above ground) =$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations $V_{phase} = ((Va)_{s_0}^{3+0}, 12F_0(z \cdot z_s)^2 \cdot (6.2$ $a = 016(z \cdot z_s)$ $\theta_0 = \theta_0 \cdot (1+(1-(\theta_0/\theta_0)))^* (V_{out}D^2)/(CEC$ Staff Equation: $V_{nep} = 0.20 \cdot (v_{nep} \cdot v_{nep} \cdot v_{$	17.4) 17.5 16 20 ft Interval ei.Ht to Top of Je 50-z_\(^2\)] 10 4V_plume *a^2 *\(^2\)) 50 ft Interval
able of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 Single Jet 5.3 m/sHeight = 157.6 180.0 Top of Single jet = 182.5 200.0 220.0 240.0 280.0 280.0 300.0 300.0 350.0 400.0 450.0 550.0 600.0 650.0 600.0 800.0 900.0 1100.0	Plume -Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 68.03 75.18 90.42 105.66 120.90 136.14 151.38 166.62 181.86 212.34 242.82 273.30 303.78 334.26	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.644 5.620 6.695 7.570 8.546 9.521 10.497 11.960 14.398 16.836 19.275 21.713 24.152 26.590 29.028 33.905 38.782 43.659 48.536 53.412	Velocitie's st. Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59 2.36 2.18 2.04 1.93 1.79 1.63 1.31 1.26 1.31 1.26 1.22 1.15 1.09 1.05 1.01 0.98	arting at en Plume Temp(K) 306.56 305.78 306.04 304.53 304.15 303.85 303.82 302.98 302.82 302.70 302.62 302.55 302.50 302.46 302.41 302.32			s the real solution $x = z \cdot z \cdot v =$ or $z \cdot (m'above s tack) =$ $z \cdot (ft/above ground) =$ $z \cdot (ft/above ground) =$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations $V_{phase} = ((Va)_{s_0}^{3+0}, 12F_0(z \cdot z_s)^2 \cdot (6.2$ $a = 016(z \cdot z_s)$ $\theta_0 = \theta_0 \cdot (1+(1-(\theta_0/\theta_0)))^* (V_{out}D^2)/(CEC$ Staff Equation: $V_{nep} = 0.20 \cdot (v_{nep} \cdot v_{nep} \cdot v_{$	17.4) 17.5 16 20 ft Interval ei.Ht to Top of Je 50-z_\(^2\)] 10 / a 4V_plume *a^2 *\(^2\)) 50 ft Interval
able of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 160.0 Single Jet 5.3 m/s Height = 187.6 200.0 220.0 240.0 280.0 300.0 320.0 350.0 400.0 450.0 650.0 650.0 7700.0 800.0 800.0 800.0 1000.0	Plume -Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 64.7.75 53.84 69.94 66.03 75.18 90.42 105.66 120.90 136.14 151.38 166.62 181.96 212.34 242.82 273.30 303.78 334.26 364.74	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 4.644 5.620 6.595 7.570 8.546 9.521 10.497 11.960 14.398 16.836 19.275 21.713 24.152 26.590 29.028 33.905 38.782 43.659 48.536 53.412 58.289	Velocitie's st. Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59 2.36 2.18 2.04 1.93 1.79 1.63 1.52 1.43 1.30 1.22 1.15 1.09 1.05 1.01 0.98	arting at en Plume Temp(K) 308.568 305.78 305.04 304.53 304.15 303.85 303.82 302.98 302.98 302.98 302.55 302.62 302.55 302.41 302.37 302.37 302.37 302.37			s the real solution $x = z \cdot z \cdot v =$ or $z \cdot (m'above s tack) =$ $z \cdot (ft/above ground) =$ $z \cdot (ft/above ground) =$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations $V_{phase} = ((Va)_{s_0}^{3+0}, 12F_0(z \cdot z_s)^2 \cdot (6.2$ $a = 016(z \cdot z_s)$ $\theta_0 = \theta_0 \cdot (1+(1-(\theta_0/\theta_0)))^* (V_{out}D^2)/(CEC$ Staff Equation: $V_{nep} = 0.20 \cdot (v_{nep} \cdot v_{nep} \cdot v_{$	17.4) 17.5 16 20 ft Interval ei.Ht to Top of Je 50-z_\(^2\)] 10 / a 4V_plume *a^2 *\(^2\)) 50 ft Interval
able of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 160.0 Single Jet 5.3 m/s Height = 157.6 200.0 220.0 240.0 220.0 240.0 220.0 240.0 300.0 320.0 350.0 400.0 500.0 650.0 600.0 600.0 900.0 900.0 1100.0 1200.0 1300.0	Plume Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 69.94 66.03 75.18 90.42 105.66 120.90 136.14 151.38 166.62 181.86 212.34 242.82 273.30 303.78 334.26 394.74 395.22	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.644 5.620 6.595 7.570 8.546 9.521 10.497 11.960 14.398 16.836 19.275 21.713 24.152 26.590 29.028 33.905 38.782 43.659 48.536 53.412 58.289 63.166	Velocities st. Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59 2.38 2.18 2.04 1.93 1.79 1.63 1.31 1.26 1.21 1.15 1.09 1.05 1.01 0.988 0.955 0.92	arting at en Plume Temp(K) 308.568 305.78 305.04 304.53 304.15 303.85 303.82 302.70 302.82 302.70 302.82 302.55 302.50 302.48 302.37 302.34 302.37 302.30 302.30			s the real solution $x = z \cdot z \cdot v =$ or $z \cdot (m'above s tack) =$ $z \cdot (ft/above ground) =$ $z \cdot (ft/above ground) =$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations $V_{phase} = ((Va)_{s_0}^{3+0}, 12F_0(z \cdot z_s)^2 \cdot (6.2$ $a = 016(z \cdot z_s)$ $\theta_0 = \theta_0 \cdot (1+(1-(\theta_0/\theta_0)))^* (V_{out}D^2)/(CEC$ Staff Equation: $V_{nep} = 0.20 \cdot (v_{nep} \cdot v_{nep} \cdot v_{$	17.4; 17.5 16 20 ft Interval ei.Ht to Top of Je 50-z_\[^2]\] 10 / a 4V_plume*a^2*\[^2_2]\] 50 ft Interval
able of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 Single Jet 5.3 m/sHeight = 187.6 180.0 Top of Single jet = 182.5 200.0 220.0 240.0 280.0 280.0 300.0 350.0 400.0 450.0 650.0 600.0 650.0 700.0 1100.0 1100.0 1200.0 1300.0 1300.0	Plume -Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 59.94 16.66 120.90 136.14 151.38 168.62 273.30 303.78 334.26 3364.74 395.22 425.70	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.644 5.620 6.695 7.570 8.546 9.521 10.497 11.980 14.398 16.836 19.275 21.713 24.152 26.890 29.028 33.905 38.782 43.659 48.536 53.412 58.289 63.166 68.043	Velocities sta Single Stk VertVel(m/s) 8.066 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59 2.38 2.18 2.04 1.93 1.79 1.63 1.32 1.32 1.32 1.32 1.33 1.32 1.32 1.3	arting at en Plume Temp(K) 306.56 305.78 305.04 304.53 304.15 303.85 303.62 303.44 303.23 302.98 302.82 302.70 302.62 302.46 302.41 302.37 302.34 302.32 302.30 302.28			s the real solution $x = z \cdot z \cdot v =$ or $z \cdot (m'above s tack) =$ $z \cdot (ft/above ground) =$ $z \cdot (ft/above ground) =$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations $V_{phase} = ((Va)_{s_0}^{3+0}, 12F_0(z \cdot z_s)^2 \cdot (6.2$ $a = 016(z \cdot z_s)$ $\theta_0 = \theta_0 \cdot (1+(1-(\theta_0/\theta_0)))^* (V_{out}D^2)/(CEC$ Staff Equation: $V_{nep} = 0.20 \cdot (v_{nep} \cdot v_{nep} \cdot v_{$	17.4; 17.5 16 20 ft Interval ei.Ht to Top of Je 50-z_\[^2]\] 10 / a 4V_plume*a^2*\[^2_2]\] 50 ft Interval
able of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 160.0 Single Jet 5.3 m/s Height = 157.6 200.0 220.0 244.0 220.0 280.0 300.0 320.0 320.0 400.0 450.0 550.0 600.0 650.0 700.0 800.0 1000.0 1100.0 1200.0 1300.0 1400.0 1500.0 1500.0	Plume -Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 59.94 68.03 75.18 90.42 105.66 120.90 138.14 151.38 168.62 121.34 242.82 273.30 303.78 334.26 364.74 395.22 425.70 578.10	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 4.644 5.620 6.695 7.570 8.546 9.521 10.497 11.960 14.398 16.836 19.275 21.713 24.152 26.590 29.028 33.905 38.782 43.659 48.636 53.412 58.289 63.166 68.043 92.427	Velocitie's st. Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59 2.36 2.18 2.04 1.93 1.79 1.63 1.52 1.43 1.26 1.22 1.15 1.09 1.05 1.01 0.98 0.95 0.92 0.90 0.81	arting at en Plume Temp(K) 306.56 305.78 306.04 304.53 304.15 303.85 303.62 303.44 303.23 302.98 302.82 302.70 302.62 302.55 302.50 302.46 302.41 302.37 302.34 302.32 302.30 302.29			s the real solution $x = z \cdot z \cdot v =$ or $z \cdot (m'above s tack) =$ $z \cdot (ft/above ground) =$ $z \cdot (ft/above ground) =$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations $V_{phase} = ((Va)_{s_0}^{3+0}, 12F_0(z \cdot z_s)^2 \cdot (6.2$ $a = 016(z \cdot z_s)$ $\theta_0 = \theta_0 \cdot (1+(1-(\theta_0/\theta_0)))^* (V_{out}D^2)/(CEC$ Staff Equation: $V_{nep} = 0.20 \cdot (v_{nep} \cdot v_{nep} \cdot v_{$	17.4; 17.5 16 20 ft Interval ei.Ht to Top of Je 50-z_j/j 110 / a 4V _{plume} *a ² *λ ²)) 50 ft Interval
Top of Single jet = 182.0 280.0 280.0 280.0 280.0 280.0 280.0 280.0 280.0 280.0 280.0 280.0 280.0 280.0 300.0 3150.0 650.0 650.0 700.0 800.0 800.0 1000.0 1100.0 1200.0 1200.0 1200.0 280.0 280.0 280.0 350.0 350.0 450.0 550.0 650.0 700.0 800.0 1000.0 1100.0 1200.	Plume -Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 64.7.75 53.84 69.94 66.03 75.18 90.42 105.66 120.90 136.14 151.38 166.62 181.86 212.34 242.82 273.30 303.78 334.26 364.74 395.22 425.70 578.10 730.50	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 4.644 5.620 6.595 7.570 8.546 9.521 10.497 11.960 14.398 16.836 19.275 21.713 24.152 26.590 29.028 33.905 33.782 43.659 48.536 53.412 58.289 63.166 68.043 92.427 116.811	Velocitie s st. Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59 2.36 2.18 2.04 1.93 1.79 1.63 1.31 1.26 1.22 1.15 1.09 1.05 1.01 0.98 0.96 0.92 0.90 0.81	arting at en Plume Temp(K) 308.56 305.78 305.04 304.53 303.82 303.44 303.23 302.98 302.82 302.70 302.60 302.46 302.41 302.37 302.34 302.39 302.25 302.30 302.27 302.34 302.37 302.34 302.37 302.34 302.37 302.34 302.37 302.34			s the real solution $x = z \cdot z \cdot v =$ or $z \cdot (m'above s tack) =$ $z \cdot (ft/above ground) =$ $z \cdot (ft/above ground) =$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations $V_{phase} = ((Va)_{s_0}^{3+0}, 12F_0(z \cdot z_s)^2 \cdot (6.2$ $a = 016(z \cdot z_s)$ $\theta_0 = \theta_0 \cdot (1+(1-(\theta_0/\theta_0)))^* (V_{out}D^2)/(CEC$ Staff Equation: $V_{nep} = 0.20 \cdot (v_{nep} \cdot v_{nep} \cdot v_{$	17.4) 17.5 16 20 ft Interval el-Ht to Top of Jer 50-z_1/2] 110 4V _{plume} *a ² *λ ²)) 50 ft Interval
Table of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Ref.Ht = 103.4 140.0 140.0 140.0 Single Jet 5.3 m/s Height = 182.5 200.0 220.0 240.0 240.0 240.0 240.0 300.0 320.0 350.0 400.0 650.0 600.0 650.0 600.0 650.0 1100.0 1200.0 1100.0 1200.0	Plume -Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.38 24.14 29.46 35.55 41.65 47.75 53.84 69.94 66.03 75.18 90.42 105.66 120.90 136.14 151.38 168.62 273.30 303.78 334.26 364.74 395.22 425.70 578.10 882.90	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.644 5.620 6.595 7.570 8.546 9.521 10.497 11.980 14.398 16.836 19.275 21.713 24.152 26.590 29.028 33.905 38.782 43.659 48.536 53.412 58.289 63.166 68.043 92.427 116.811 141.195	Velocities sta Single Stk VertVel(m/s) 8.066 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59 2.38 2.18 2.04 1.93 1.79 1.63 1.31 1.22 1.15 1.09 1.05 1.01 0.98 0.99 0.90 0.81 0.95 0.90 0.81 0.95 0.90 0.81 0.95 0.90	arting at en Plume Temp(K) 306.566 305.78 305.04 304.53 303.82 303.44 303.23 302.98 302.82 302.70 302.62 302.55 302.50 302.48 302.37 302.39 302.32 302.30 302.32 302.32 302.32 302.32 302.32 302.32 302.32 302.32 302.32 302.32 302.32 302.32 302.32 302.32 302.32 302.32 302.32 302.32 302.32			s the real solution $x = z \cdot z \cdot v =$ or $z \cdot (m'above s tack) =$ $z \cdot (ft/above ground) =$ $z \cdot (ft/above ground) =$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations $V_{phase} = ((Va)_{s_0}^{3+0}, 12F_0(z \cdot z_s)^2 \cdot (6.2$ $a = 016(z \cdot z_s)$ $\theta_0 = \theta_0 \cdot (1+(1-(\theta_0/\theta_0)))^* (V_{out}D^2)/(CEC$ Staff Equation: $V_{np} = n^{0.25}V_{xp}$ Brigg's Equation: $V_{ntigs} = (23) \times 1.8^{0.23} \times F_{np}^{-1.03} \times t$ w here $F_{np} = nF_{sp}$	17.4) 17.5 16 20 ft Interval el-Ht to Top of Jer 50-z_1/2] 110 4V _{plume} *a ² *λ ²)) 50 ft Interval
Top of Single jet = 182.0 280.0 280.0 280.0 280.0 280.0 280.0 280.0 280.0 280.0 280.0 280.0 280.0 280.0 300.0 3150.0 650.0 650.0 700.0 800.0 800.0 1000.0 1100.0 1200.0 1200.0 1200.0 280.0 280.0 280.0 350.0 350.0 450.0 550.0 650.0 700.0 800.0 1000.0 1100.0 1200.	Plume -Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.38 24.14 29.46 35.55 41.65 47.75 53.84 69.94 66.03 75.18 90.42 105.66 120.90 136.14 151.38 168.62 273.30 303.78 334.26 364.74 395.22 425.70 578.10 882.90	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.644 5.620 6.595 7.570 8.546 9.521 10.497 11.980 14.398 16.836 19.275 21.713 24.152 26.590 29.028 33.905 38.782 43.659 48.536 53.412 58.289 63.166 68.043 92.427 116.811 141.195	Velocities sta Single Stk VertVel(m/s) 8.066 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59 2.38 2.18 2.04 1.93 1.79 1.63 1.31 1.22 1.15 1.09 1.05 1.01 0.98 0.99 0.90 0.81 0.95 0.90 0.81 0.95 0.90 0.81 0.95 0.90	arting at en Plume Temp(K) 306.566 305.78 305.04 304.53 303.82 303.44 303.23 302.98 302.82 302.70 302.62 302.55 302.50 302.48 302.37 302.39 302.32 302.30 302.32 302.32 302.32 302.32 302.32 302.32 302.32 302.32 302.32 302.32 302.32 302.32 302.32 302.32 302.32 302.32 302.32 302.32 302.32			s the real solution $x = z \cdot z \cdot v =$ or $z \cdot (m'above s tack) =$ $z \cdot (ft/above ground) =$ $z \cdot (ft/above ground) =$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations $V_{phase} = ((Va)_{s_0}^{3+0}, 12F_0(z \cdot z_s)^2 \cdot (6.2$ $a = 016(z \cdot z_s)$ $\theta_0 = \theta_0 \cdot (1+(1-(\theta_0/\theta_0)))^* (V_{out}D^2)/(CEC$ Staff Equation: $V_{np} = n^{0.25}V_{xp}$ Brigg's Equation: $V_{ntigs} = (23) \times 1.8^{0.23} \times F_{np}^{-1.03} \times t$ w here $F_{np} = nF_{sp}$	17.4) 17.5 16 20 ft Interval el-Ht to Top of Jer 50-z_1/2] 110 4V _{plume} *a ² *λ ²)) 50 ft Interval
able of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Ref.Ht = 103.4 140.0 140.0 140.0 Single Jet 5.3 m/sHeight = 182.5 200.0 220.0 240.0 240.0 240.0 260.0 300.0 300.0 350.0 400.0 650.0 600.0 650.0 600.0 1100.0 1200.0 1100.0 1200.0 1200.0 1200.0 1200.0 300.0 300.0 300.0 300.0 300.0 300.0 300.0 300.0 300.0 300.0 300.0 300.0 300.0 300.0 300.0 300.0 300.0	Plume -Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.38 24.14 29.46 35.55 41.65 47.75 53.84 59.94 105.66 120.90 136.14 151.38 168.62 273.30.78 334.26 336.75 18 304.26 356.22 275.30 1035.30 1035.30 1035.30	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 4.644 5.620 6.695 7.570 8.546 9.521 10.497 11.980 14.398 16.836 19.275 21.713 24.152 26.590 23.028 33.905 38.782 42.659 48.536 53.412 58.289 48.636 68.043 92.427 116.811 141.195 165.579	Velocities sta Single Stk VertVel(m/s) 8.066 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59 2.38 2.18 2.04 1.93 1.79 1.63 1.31 1.22 1.15 1.09 1.05 1.01 0.98 0.95 0.92 0.90 0.81 0.75 0.70 0.67	arting at en Plume Temp(K) 306.56 305.78 305.04 304.53 304.15 303.62 303.44 303.23 302.98 302.82 302.70 302.62 302.46 302.41 302.37 302.34 302.32 302.90 302.24 302.27			s the real solution $x = z \cdot z \cdot v =$ or $z \cdot (m'above s tack) =$ $z \cdot (ft/above ground) =$ $z \cdot (ft/above ground) =$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations $V_{phase} = ((Va)_{s_0}^{3+0}, 12F_0(z \cdot z_s)^2 \cdot (6.2$ $a = 016(z \cdot z_s)$ $\theta_0 = \theta_0 \cdot (1+(1-(\theta_0/\theta_0)))^* (V_{out}D^2)/(CEC$ Staff Equation: $V_{np} = n^{0.25}V_{xp}$ Brigg's Equation: $V_{ntigs} = (23) \times 1.8^{0.23} \times F_{np}^{-1.03} \times t$ w here $F_{np} = nF_{sp}$	17.4) 17.5 16 20 ft Interval el-Ht to Top of Jer 50-z_1/2] 110 4V _{plume} *a ² *λ ²)) 50 ft Interval
able of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 Single Jet 5.3 m/sHeight = 187.6 180.0 Top of Single jet = 182.5 200.0 240.0 240.0 280.0 300.0 350.0 400.0 450.0 650.0 600.0 650.0 700.0 800.0 1100.0 1200.0 1400.0 1500.0	Plume -Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 47.75 53.84 68.03 75.18 90.42 105.66 120.90 136.14 151.38 166.62 181.98 212.34 242.82 273.30 303.78 334.26 364.74 395.22 425.70 578.10 730.50 882.90 10055.30 1187.70	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 4.644 5.620 6.695 7.570 8.546 9.521 10.497 11.960 14.398 16.836 19.275 21.713 24.152 26.590 29.028 33.905 38.782 43.659 63.412 58.289 63.166 68.043 92.427 116.811 141.195	Velocitie's st. Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59 2.36 2.18 2.04 1.93 1.79 1.63 1.52 1.43 1.26 1.22 1.15 1.09 1.05 1.01 0.98 0.95 0.92 0.90 0.81 0.75 0.70 0.67	arting at en Plume Temp(K) 306.56 305.78 306.04 304.53 304.15 303.85 303.62 303.44 303.23 302.98 302.82 302.70 302.65 302.56 302.46 302.41 302.37 302.32 302.30 302.22 302.30 302.22 302.25			s the real solution $x = z \cdot z \cdot v =$ or $z \cdot (m'above s tack) =$ $z \cdot (ft/above ground) =$ $z \cdot (ft/above ground) =$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations $V_{phase} = ((Va)_{s_0}^{3+0}, 12F_0(z \cdot z_s)^2 \cdot (6.2$ $a = 016(z \cdot z_s)$ $\theta_0 = \theta_0 \cdot (1+(1-(\theta_0/\theta_0)))^* (V_{out}D^2)/(CEC$ Staff Equation: $V_{np} = n^{0.25}V_{xp}$ Brigg's Equation: $V_{ntigs} = (23) \times 1.8^{0.23} \times F_{np}^{-1.03} \times t$ w here $F_{np} = nF_{sp}$	17.47 17.5 16. 20 ft Interval el-Ht to Top of Jet 50-z_y^2])** 4V _{plume} ***s ² =*\lambda^2)) 50 ft Interval
able of Plume Top-Hat Diameters (2a) and I Height (feet) above ground Stack.Rel.Ht = 103.4 120.0 140.0 160.0 Single Jet 5.3 m/s Height = 157.6 200.0 220.0 244.0 220.0 280.0 300.0 300.0 300.0 450.0 600.0 600.0 600.0 600.0 1000.0 1100.0 1200.0 1200.0 1300.0 1400.0 1500.0	Plume -Average (meters) above stack 0.00 5.07 11.17 17.27 16.54 23.36 24.14 29.46 35.55 41.65 64.7.75 53.84 69.94 66.03 75.18 90.42 105.66 120.90 303.78 344.26 242.82 273.30 303.78 344.26 364.74 395.22 425.70 136.14 1730.50 882.90 1035.30 1187.70 1340.10	meters Plume Radius(m) 1.931 2.337 2.825 3.312 3.254 3.800 3.862 4.644 5.620 6.595 7.570 8.546 9.521 10.497 11.960 14.398 16.836 19.275 21.713 24.152 26.590 29.028 33.905 38.782 43.659 48.636 53.412 58.289 63.166 68.043 92.427 116.811 141.195 165.579 18.993 214.347	Velocitie's st. Single Stk VertVel(m/s) 8.06 7.21 6.20 5.18 5.30 4.16 4.03 3.40 2.92 2.59 2.36 2.18 2.04 1.93 1.79 1.63 1.52 1.43 1.26 1.22 1.15 1.09 1.05 1.01 0.98 0.95 0.92 0.81 0.75 0.70 0.67	arting at en Plume Temp(K) 308.568 305.78 305.04 304.53 303.82 303.82 302.70 302.82 302.70 302.60 302.40 302.31 302.37 302.34 302.37 302.34 302.37 302.34 302.37 302.34 302.37 302.34 302.37 302.34 302.37 302.34 302.37 302.34 302.37 302.34 302.37 302.34 302.37 302.34 302.37 302.34 302.37 302.34 302.37 302.38			s the real solution $x = z \cdot z \cdot v =$ or $z \cdot (m'above s tack) =$ $z \cdot (ft/above ground) =$ $z \cdot (ft/above ground) =$ Jet Phase Eqs: Linearly interpolated from Stack R Spillane Equations $V_{phase} = ((Va)_{s_0}^{3+0}, 12F_0(z \cdot z_s)^2 \cdot (6.2$ $a = 016(z \cdot z_s)$ $\theta_0 = \theta_0 \cdot (1+(1-(\theta_0/\theta_0)))^* (V_{out}D^2)/(CEC$ Staff Equation: $V_{np} = n^{0.25}V_{xp}$ Brigg's Equation: $V_{ntigs} = (23) \times 1.8^{0.23} \times F_{np}^{-1.03} \times t$ w here $F_{np} = nF_{sp}$	17.47 17.5 16: 20 ft Interval el Ht to Top of Jet SD-z_\^D]^1/2 / a 4Vplume*a^2 \lambda^2)}



	"Aviation Sa	fety and Bu	oyant Plumes	," Peter Be	f Methodolo est, et. al.			
		tion of Max	imum Updraft	Speeds for	r Calm Cond		arious Heights in the Merge	
					ower Statio	n at Oakey	, Queensland, Australia," D	r. K.T. Spilla
mbient Conditions:					Constants:		eutral conditions (dθ/dz=0 or 6	$\theta_a = \theta_e$)
Ambient Potential Temp θ _ε	302.21	Kelvins	84.3	°F			meters/feet	
lume Exit Conditions:	04.50		400.05	f	Gravity g		m/s ²	
Stack Height h		meters	103.35	inches	λ	1.11 ~1.0		
Stack Velocity V _{exi}				ft/sec	4Vol/(60πD	-		
Individual Volumetric Flow		cu.m/sec	200,110		$\pi V_{exit} D^2/4$,		Sect.2/¶1
Stack Potential Temp 0		Kelvins	104.3		UAR -			
Initial Stack Buoyancy Flux F		m ⁴ /s ³		ΔT(°F)	gV _{exit} D ² (1-6	$\theta_a/\theta_s)/4 = V_0$	ol.Flow(g/π)(1-θ _a /θ _s)	Sect.2/¶1
Plume Buoyancy Flux F		m ⁴ /s ³					θ _p at plume height (see below	v)
Total Number of Stacks r	63					i i		
Average Adjacent Stack Separation of	13.72	meters	45.0	feet	Calcs base	d on multiple	plume treatment in Peter Be	st Paper:
Number of Stacks along Orientation N	3						sed by N ^{0.25} at the height wher	
					fully merge	d (interp. be	low ht, single merged stack al	oove ht)
Conditions at End (Top) of Jet Phase:								
Height above Stack z _{je}		meters*		feet*	$z_{jet} = 6.25D$), meters*=	meters above stack top	Sect.3/¶1
Height above Ground z _{jet} +h _s		meters	182.5					
Vertical Velocity V _{je}				ft/sec	$V_{jet} = 0.5V_e$	$v_{exit} = V_{exit}/2$		
Plume Top-Hat Diameter 2a _{je}	7.724	meters	25.3	feet	2a _{jet} = 2D		Conservation of momentum	-
	for 0.1 0							
Spillane Methodology - Analytical Solutions								
Single Plume-averaged Vertical Velocit Single Plume Values: Plume Top-Hat Radius a			Merging Onl					Sect.2/Eq.6
							, meters*=meters above stack top	
Virtual Source Height z _v Height above Ground z _v +h _s		meters*	1.4	feet*	Zv = 0.25D	[(Ue/Us)]	, meters*=meters above stack top where $(\theta_a/\theta_s)^{1/2} = (\theta_e/\theta_s)^{1/2} =$	
Single Plume Values: Vertical Velocity V			Merging Onl		{(Va).3 ± 0	12F, [/z-~	$(\theta_a/\theta_s)^2 = (\theta_e/\theta_s)^2 = (0.25D-z_v)^2 (1/3) / a$	Sect.2.1(6)
Product (Va)		_	99 0111		$V_{\text{exit}}(D/2)(\theta_0$, (0.200 2v) jj ·/a	_001.2.1(0)
r loudet (Va)	, 13.209	.11 / 5			- exit(D/Z)(O	os,		
Plume Merging - Based on Single Plume Ca	lculations wh	ere:						Sect.3/¶3
Begin Merging Plume Top-Hat Diameter 2atouch		meters	45.0	feet	2a _{touch} =d, (or a _{touch} =d/		
Height above Stack z _{touch}		meters*	142.1				meters*=meters above stack	top
Height above Ground z _{touch} +h _s		meters	245.4			,		
Vertical Velocity V _{touch}	2.521	m/s	8.3	ft/sec	V _{touch} = {(V	a) _o ³ + 0.12I	o [(z-z _v) ² - (6.25D-z _v) ²]} ^(1/3)	'a
Total Merging Plume Top-Hat Diameter 2aful	27.440	meters	90.0	feet	2a _{f ull} =2d(N-	-1)/2, (or a _{ft}	=d(N-1)/2) FOR 2 STACKS,	2a _{full} =2d
Height above Stack z _{ful}	86.182	meters*	282.7	feet*	$z_{full} = z_v + 2$	d/(2*0.16), i	meters*=meters above stack	top
Height above Ground zfull+h	117.683	meters	386.1	feet				
Vertical Velocity V _{ful}	1.673	m/s	5.5	ft/sec	$V_{full} = \{(Va)$	o ³ + 0.12F ₀	[$(z_{full}-z_v)^2 - (6.25D-z_v)^2$] $)^{(1/3)}$	/ a _{full}
Product (V ³ a) _{ful}	64	m ⁴ /s ³						
Conditions at End (Top) of Merging Phase - [Define new valu	es for V _{full} a	ind a _{full} in Merg	ed Plume c	alculations (based on T	OTAL number of stacks):	
Merged Plume Values: Plume Diameter 2a			Table Below				z _{full})), or linear increase with h	eight
Revised Merged Plume Radius and		meters	126.8	feet			nere Total Merging Occurs	
Revised Merged Plume Velocity V _n				ft/sec			here Total Merging Occurs	
Revised Virtual Source Height z _{ful}		meters*	282.7	feet*			ere Total Merging Occurs (sh	
Revised Vertical Velocity V	S	olutions in	Tables Below		V={n(V ³ a) _{fu}	_{ill} /a} ^{1/3} for he	eights above total merging ele	vation
					V=V _{touch} +(\		z-Z _{touch})/(Z _{full} -Z _{touch})	
Multiple Plume Calculations							for heights below total mergin	ng elevation
Solve for plume-averaged vertical velo					meters abo		z+h _s)	
Gives the following Height above Stack z			896.7 225.0				_	
Plume Top-Hat Radius a	00.592	meters			$a=a_m+0.16i$ $V=\{n(V^3a)_{fu}$			
Vertical Velocity V	2 902							
Vertical Velocity V	3.893	m/s	12.77	IV SEC				7-7
Vertical Velocity V	3.893	m/s	12.77	ivsec	V'=V _{touch} +('	V _m -V _{touch})*(z'-z _{touch})/(z _{full} -z _{touch}) if z _{touch} <	Z <z<sub>full</z<sub>
				IU Sec	V'=V _{touch} +(' V'=single p	V _m -V _{touch})*(lume values	if z <z<sub>touch</z<sub>	
Solve for Height of CASC critical vertical	velocity V _{crit}	5.30	m/s		V'=V _{touch} +(' V'=single pi BEFORE T	V _m -V _{touch})*(lume values OUCHING	if z <z<sub>touch</z<sub>	
Solve for Height of CASC critical vertical Find Height above Stack z_{crit}	velocity V _{crit}	5.30 meters	m/s JET	feet	$V'=V_{touch}+(V'=Single p)$ $V'=Single p)$ $V'=Single p)$ $V'=Single p)$ $V'=V_{touch}+(V'=V'=V'=V'=V'=V'=V'=V'=V'=V'=V'=V'=V'=V$	V _m -V _{touch})*(lume values OUCHING - {[n(V ³ a) _{full}	if $z < z_{touch}$ Critical $((V_{crit})^3]$ - $a_m)/0.16$ if $V_{crit} < V_m$	VV < Top of 、
Solve for Height of CASC critical vertical	velocity V _{crit}	5.30	m/s JET		$V'=V_{touch}+(V'=Single p)$ $V'=Single p)$ $V'=Single p)$ $V'=Single p)$ $V'=V_{touch}+(V'=V'=V'=V'=V'=V'=V'=V'=V'=V'=V'=V'=V'=V$	V _m -V _{touch})*(lume values OUCHING - {[n(V ³ a) _{full}	if z <z<sub>touch</z<sub>	VV < Top of .
Solve for Height of CASC critical vertical Find Height above Stack z _{cri} Height above Ground z _{crit} +h _t	velocity V _{crit} JET	5.30 meters meters	m/s JET JET	feet feet	$V'=V_{touch}+(')$ $V'=single\ pi$ $BEFORE\ T$ $Z_{crit}=Z_{full}+(')$ $Z_{crit}=Z_{touch}+(')$	V _m -V _{touch})*(lume values OUCHING + {[n(V ³ a) _{full} ·(z _{full} -z _{touch})	if z <z<sub>touch Critical (/(V_{crit})³]-a_m}/0.16 if V_{crit}<v<sub>m ((V_{crit}-V_{touch})/(V_m-V_{touch}) if V_{crit}</v<sub></z<sub>	VV < Top of 、
Solve for Height of CASC critical vertical Find Height above Stack z _{cri} Height above Ground z _{crit} +h _t	velocity V _{crit} JET JET	5.30 meters meters	m/s JET JET uching Height:	feet feet	V'=V _{touch} +(' V'=single pi BEFORE T Z _{crit} = Z _{full} + Z _{crit} =Ztouch+	V _m -V _{touch})*(lume values OUCHING - {[n(V³a) _{full} - (Zfull-Ztouch)	if $z < z_{touch}$ Critical $((V_{crit})^3]$ - $a_m)/0.16$ if $V_{crit} < V_m$	VV < Top of 、
Solve for Height of CASC critical vertical Find Height above Stack z _{cri} Height above Ground z _{crit} +h _s Table of MERGED Plume-Averaged Vertical	velocity V _{crit} JET JET Velocities sta	5.30 meters meters rting at Tou Plume	m/s JET JET Iching Height: Vert.	feet feet	V'=V _{touch} +(' V'=single pi BEFORE T Z _{crit} = Z _{full} + Z _{crit} =Ztouch+	V _m -V _{touch})*(lume values OUCHING + {[n(V³a) _{full} - (z _{full} -z _{touch}) me Eqns (se	if z <z<sub>touch Critical ((V_{crit})³]-a_m)/0.16 if V_{crit}<v<sub>m ((V_{crit}-V_{touch})/(V_m-V_{touch}) if V_{cr} ee Single Plume spreadsheet,</v<sub></z<sub>	VV < Top of 、
Solve for Height of CASC critical vertical Find Height above Stack z _{ent} Height above Ground z _{ent} +h _e Table of MERGED Plume-Averaged Vertical Height (feet)	velocity V _{crit} JET JET Velocities sta (meters)	5.30 meters meters rting at Tou Plume	m/s JET JET Iching Height: Vert.	feet feet	$\begin{aligned} &V\text{'=}V_{touch}\text{+}(')\\ &V\text{'=}single \text{ pl}\\ &BEFORE \text{ T}\\ &Z_{crit}=Z_{touch}\text{+}\\ &Z_{crit}\text{=}Z_{touch}\text{+}\\ &Single \text{ Plum}\\ &V_{plume}\text{=}((Va)_o\\ &a=0.16(z\text{-}c)\end{aligned}$	V _m -V _{touch})*(lume values OUCHING + {[n(V³a) _{full} -(z _{full} -z _{touch})	if z <z<sub>touch Critical ((V_{crit})³]-a_m)/0.16 if V_{crit}<v<sub>m ((V_{crit}-V_{touch})/(V_m-V_{touch}) if V_{cr} ee Single Plume spreadsheet,</v<sub></z<sub>	VV < Top of 、
Solve for Height of CASC critical vertical Find Height above Stack z _{cri} Height above Ground z _{crit} +h _e Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.4	velocity V _{crit} JET JET Velocities sta (meters) 1 above stack 43.30 47.75	5.30 meters meters rting at Tou Plume Radius(m) 6.860 #N/A	m/s JET JET sching Height: Vert. Vel(m/s) 2.52 2.75	feet feet	$\begin{aligned} &V\text{'=}V_{touch}\text{+}(')\\ &V\text{'=}single \text{ pl}\\ &BEFORE \text{ T}\\ &Z_{crit}=Z_{touch}\text{+}\\ &Z_{crit}\text{=}Z_{touch}\text{+}\\ &Single \text{ Plum}\\ &V_{plume}\text{=}((Va)_o\\ &a=0.16(z\text{-}c)\end{aligned}$	V_m - V_{touch})*(V_m - V_{touch})*(V_m - V_{touch})*(V_m - V_{touch})*(V_m - V_m	if z <z<sub>touch Critical (V_{crnl})²₁-a_m)/0.16 if V_{crit}<v<sub>m (V_{crit}-V_{touch}) (V_m-V_{touch}) if V_{cr} se Single Plume spreadsheet, j²-(6.25Dz,)²j)^{1/2} / a ktl²/(4V_{plume}*a²+λ²)))</v<sub></z<sub>	VV < Top of 、
Solve for Height of CASC critical vertical Find Height above Stack Z _{cri} Height above Ground Z _{crit} +h _c Height above Ground Z _{crit} +h _c Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.4 260.0 280.0	velocity V _{crit} JET JET Velocities sta (meters) above stack 43.30 47.75 53.84	5.30 meters meters rting at Tou Plume Radius(m) 6.860 #N/A #N/A	m/s JET JET uching Height: Vert. Vel(m/s) 2.52	feet feet	$\begin{aligned} &V = V_{touch} + (t) \\ &V' = single \ pi \\ &BEFORE \ T \\ &Z_{crit} = Z_{full} + Z_{crit} = Z_{touch} + (t) \\ &Single \ Plum \\ &V_{plume} = ((Va)_o) \\ &a = 0.16(z^{-1}, t^{-1}) \\ &\theta_p = \theta_s (1 + (1-Interpolated)) \end{aligned}$	V_m - V_{touch})*(V_m - V_{touch})*(V_m - V_{touch})*(V_m - V_{touch})*(V_m - V_m	if z <z<sub>touch Critical (V_{crnl})²₁-a_m)/0.16 if V_{crit}<v<sub>m (V_{crit}-V_{touch}) (V_m-V_{touch}) if V_{cr} se Single Plume spreadsheet, j²-(6.25Dz,)²j)^{1/2} / a ktl²/(4V_{plume}*a²+λ²)))</v<sub></z<sub>	VV < Top of
Solve for Height of CASC critical vertical Find Height above Stack z _{cri} Height above Ground z _{crit} +h _e Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.4	velocity V _{crit} JET JET Velocities sta (meters) above stack 43.30 47.75 53.84	5.30 meters meters rting at Tou Plume Radius(m) 6.860 #N/A #N/A	m/s JET JET sching Height: Vert. Vel(m/s) 2.52 2.75	feet feet	$\begin{aligned} &V = V_{touch} + (t) \\ &V' = single \ pi \\ &BEFORE \ T \\ &Z_{crit} = Z_{full} + Z_{crit} = Z_{touch} + (t) \\ &Single \ Plum \\ &V_{plume} = ((Va)_o) \\ &a = 0.16(z^{-1}, t^{-1}) \\ &\theta_p = \theta_s (1 + (1-Interpolated)) \end{aligned}$	V_m - V_{touch})*(V_m - V_{touch})*(V_m - V_{touch})*(V_m - V_{touch})*(V_m - V_m	if $z < z_{touch}$ Critical $(V_{cris})^3 - a_m / 0.16$ if $V_{cris} < V_m$ $(V_{cris})^3 - v_m / 0.16$ if $V_{cris} < V_m$ $(V_{cris} < V_{touch}) (V_m - V_{touch})$ if $V_{cris} < V_m > 0$ Solve $v_m > v_m > 0$ Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) if $V_{cris} < V_m > 0$ Solve $v_m > v_m > 0$ Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) (V_{cris}) (V_{cris}) (V_{cris}) (V_{cris}) (V_m - V_{coul}) Solve $v_m > 0$ Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) (V_m - V_{touch}) (V_{cris}) (V_{cris}) (V_{cris}) (V_m - V_{touch})	VV < Top of
Solve for Height of CASC critical vertical Find Height above Stack z _{cri} Height above Ground z _{crit} +h _c Table of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 245.4 260.0 280.0 300.0	velocity V _{crit} JET JET Velocities sta (meters) above stack 43.30 47.75 53.84 59.94 66.03	5.30 meters meters rting at Tou Plume Radius(m) 6.860 #N/A #N/A #N/A	m/s JET JET sching Height: Vel(m/s) 2.52 2.75 3.06 3.37 3.68	feet feet	$\begin{aligned} &V = V_{touch} + (t) \\ &V' = single \ pi \\ &BEFORE \ T \\ &Z_{crit} = Z_{full} + Z_{crit} = Z_{touch} + (t) \\ &Single \ Plum \\ &V_{plume} = ((Va)_o) \\ &a = 0.16(z^{-1}, t^{-1}) \\ &\theta_p = \theta_s (1 + (1-Interpolated)) \end{aligned}$	V_m - V_{touch})*(V_m - V_{touch})*(V_m - V_{touch})*(V_m - V_{touch})*(V_m - V_m	if $z < z_{touch}$ Critical $(V_{cris})^3 - a_m / 0.16$ if $V_{cris} < V_m$ $(V_{cris})^3 - v_m / 0.16$ if $V_{cris} < V_m$ $(V_{cris} < V_{touch}) (V_m - V_{touch})$ if $V_{cris} < V_m > 0$ Solve $v_m > v_m > 0$ Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) if $V_{cris} < V_m > 0$ Solve $v_m > v_m > 0$ Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) (V_{cris}) (V_{cris}) (V_{cris}) (V_{cris}) (V_m - V_{coul}) Solve $v_m > 0$ Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) (V_m - V_{touch}) (V_{cris}) (V_{cris}) (V_{cris}) (V_m - V_{touch})	VV < Top of
Solve for Height of CASC critical vertical Find Height above Stack z _{cri} Height above Ground z _{crit} +h _e Height above Ground z _{crit} +h _e Table of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 245.4 260.0 280.0 300.0 320.0 340.0	velocity V _{crit} JET JET Velocities sta (meters) above stack 43.30 47.75 53.84 59.94 66.93 72.13	5.30 meters meters rting at Tou Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A	m/s JET JET sching Height Vert. Vel(m/s) 2.52 2.75 3.06 3.37 3.68 3.99	feet feet	$\begin{aligned} &V = V_{touch} + (t) \\ &V' = single \ pi \\ &BEFORE \ T \\ &Z_{crit} = Z_{full} + Z_{crit} = Z_{touch} + (t) \\ &Single \ Plum \\ &V_{plume} = ((Va)_o) \\ &a = 0.16(z^{-1}, t^{-1}) \\ &\theta_p = \theta_s (1 + (1-Interpolated)) \end{aligned}$	V_m - V_{touch})*(V_m - V_{touch})*(V_m - V_{touch})*(V_m - V_{touch})*(V_m - V_m	if $z < z_{touch}$ Critical $(V_{cris})^3 - a_m / 0.16$ if $V_{cris} < V_m$ $(V_{cris})^3 - v_m / 0.16$ if $V_{cris} < V_m$ $(V_{cris} < V_{touch}) (V_m - V_{touch})$ if $V_{cris} < V_m > 0$ Solve $v_m > v_m > 0$ Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) if $V_{cris} < V_m > 0$ Solve $v_m > v_m > 0$ Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) (V_{cris}) (V_{cris}) (V_{cris}) (V_{cris}) (V_m - V_{coul}) Solve $v_m > 0$ Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) (V_m - V_{touch}) (V_{cris}) (V_{cris}) (V_{cris}) (V_m - V_{touch})	VV < Top of
Solve for Height of CASC critical vertical Find Height above Stack z _{cri} Height above Ground z _{crit} +h _i Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.4 260.0 280.0 300.0 320.0 340.0	velocity V _{crit} JET Velocities sta (meters) above stack 43.30 47.75 53.84 59.94 66.03 72.13 78.23	5.30 meters meters rting at Tou Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A	m/s JET JET Uching Height: Vert. Vel(m/s) 2.52 2.75 3.06 3.37 3.68 3.99 4.31	feet feet	$\begin{aligned} &V = V_{touch} + (t) \\ &V' = single \ pi \\ &BEFORE \ T \\ &Z_{crit} = Z_{full} + Z_{crit} = Z_{touch} + (t) \\ &Single \ Plum \\ &V_{plume} = ((Va)_o) \\ &a = 0.16(z^{-1}, t^{-1}) \\ &\theta_p = \theta_s (1 + (1-Interpolated)) \end{aligned}$	V_m - V_{touch})*(V_m - V_{touch})*(V_m - V_{touch})*(V_m - V_{touch})*(V_m - V_m	if $z < z_{touch}$ Critical $(V_{cris})^3 - a_m / 0.16$ if $V_{cris} < V_m$ $(V_{cris})^3 - v_m / 0.16$ if $V_{cris} < V_m$ $(V_{cris} < V_{touch}) (V_m - V_{touch})$ if $V_{cris} < V_m > 0$ Solve $v_m > v_m > 0$ Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) if $V_{cris} < V_m > 0$ Solve $v_m > v_m > 0$ Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) (V_{cris}) (V_{cris}) (V_{cris}) (V_{cris}) (V_m - V_{coul}) Solve $v_m > 0$ Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) (V_m - V_{touch}) (V_{cris}) (V_{cris}) (V_{cris}) (V_m - V_{touch})	VV < Top of
Solve for Height of CASC critical vertical Find Height above Stack z _{cri} Height above Ground z _{crit} +h _c Table of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 245.4 260.0 280.0 300.0 300.0 340.0 340.0 360.0	velocity V _{crit} JET JET Velocities sta (meters) above stack 43.30 47.75 53.84 59.94 66.03 72.13 78.23	5.30 meters meters reting at Tou Plume Radius(m) 6.860 #NVA #NVA #NVA #NVA #NVA #NVA	m/s JET JET sching Height: Vert. Vel(m/s) 2.52 2.75 3.06 3.37 3.68 3.99 4.31 4.62	feet feet	$\begin{aligned} &V = V_{touch} + (t) \\ &V' = single \ pi \\ &BEFORE \ T \\ &Z_{crit} = Z_{full} + Z_{crit} = Z_{touch} + (t) \\ &Single \ Plum \\ &V_{plume} = ((Va)_o) \\ &a = 0.16(z^{-1}, t^{-1}) \\ &\theta_p = \theta_s (1 + (1-Interpolated)) \end{aligned}$	V_m - V_{touch})*(V_m - V_{touch})*(V_m - V_{touch})*(V_m - V_{touch})*(V_m - V_m	if $z < z_{touch}$ Critical $(V_{cris})^3 - a_m / 0.16$ if $V_{cris} < V_m$ $(V_{cris})^3 - v_m / 0.16$ if $V_{cris} < V_m$ $(V_{cris} < V_{touch}) (V_m - V_{touch})$ if $V_{cris} < V_m > 0$ Solve $v_m > v_m > 0$ Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) if $V_{cris} < V_m > 0$ Solve $v_m > v_m > 0$ Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) (V_{cris}) (V_{cris}) (V_{cris}) (V_{cris}) (V_m - V_{coul}) Solve $v_m > 0$ Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) (V_m - V_{touch}) (V_{cris}) (V_{cris}) (V_{cris}) (V_m - V_{touch})	VV < Top of
Solve for Height of CASC critical vertical Find Height above Stack zen Height above Ground zeni+he Height of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.4 260.0 280.0 300.0 340.0 360.0 380.0	velocity V _{crit} JET JET Velocities sta (meters) above stack 43.30 47.75 53.84 59.94 66.03 72.13 78.23 98.432	5.30 meters meters rting at Tou Plume Radius(m) 6.8600 #NVA #NVA #NVA #NVA #NVA #NVA #NVA	m/s JET JET sching Heights Vert. Vel(m/s) 2.52 2.75 3.06 3.37 3.68 3.99 4.31 4.62 4.93	feet feet	$\begin{split} &V{}^{\prime}{=}V_{touch}{+}(^{\prime}\\ &V{}^{\prime}{=}single\ p\\ &B{\in}FORE\ T\\ &Z_{cnt}=Z_{touch}{+}\\ &Z_{cnt}{=}Z_{touch}{+}\\ &Z_{cnt}{=}Z_{touch}{+}(Va)_o\\ &a=0.16(z-\theta_p{=}\theta_s(1{+}(1-Interpolate V'{=}V_{touch}{+}('Va)_o)) \end{split}$	$\begin{array}{ll} V_{m^*}V_{touch})^*(\\ \text{lume values} \\ \text{OUCHING} \\ & \{ (n(V^3a)_{tuli} - z_{touch}) \\ \text{one } Eqns \ (starting - starting -$	if $z < z_{touch}$ Critical $(V_{cris})^3 - a_m / 0.16$ if $V_{cris} < V_m$ $(V_{cris})^3 - v_m / 0.16$ if $V_{cris} < V_m$ $(V_{cris} < V_{touch}) (V_m - V_{touch})$ if $V_{cris} < V_m > 0$ Solve $v_m > v_m > 0$ Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) if $V_{cris} < V_m > 0$ Solve $v_m > v_m > 0$ Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) (V_{cris}) (V_{cris}) (V_{cris}) (V_{cris}) (V_m - V_{coul}) Solve $v_m > 0$ Critical (V_{cris})^3 - (a_{coul}) (V_m - V_{touch}) (V_m - V_{touch}) (V_{cris}) (V_{cris}) (V_{cris}) (V_m - V_{touch})	VV < Top of
Solve for Height of CASC critical vertical Find Height above Stack z _{cri} Height above Ground z _{crit} +h _i Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.4 260.0 280.0 300.0 320.0 320.0 340.0 360.0 380.0 400.0 End Merging (full/mp) = 386.1	velocity V _{crit} JET Velocities sta (meters) above stack 43.30 47.75 53.84 59.94 66.03 72.13 78.23 84.32 90.42 86.18	5.30 meters meters rting at Tou Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	m/s JET JET Uching Height: Vert. Vel(m/s) 2.52 2.75 3.06 3.37 3.68 3.99 4.31 4.62 4.93 4.71	feet feet	V'=Vtouch+(' V'=single pi BEFORE T Zent = Zfull 4 Zent=Ztouch+ Single Plum Vplum=((Va) ₀ a = 0.16(zc - 0.00 + 0.0	V _m -V _{touch})*(Iume values OUCHING U(Iume values OUCHING (In(V ² a), Ium (Iztul-Ztouch) me Eqns (se 3,3+0.12F _a (z-z,z,y) (Ieg/Is),*(V _e 1 Layer Eqn* V _m -V _{touch})*(ime Eqns	if z <ztouch (vcrn)<sup="" critical="">2]-a_m)/0.16 if V_{crti}<v<sub>m (Vcrn²Vtouch)/(Vm-Vtouch) if V_{cr} ee Single Plume spreadsheet, y²-(6.25D-z,²])^{1/3} / a crit D²/(4Vplume *a²*λ²))) s z'-Z_{touch}//(z_{full}=Z_{touch})</v<sub></ztouch>	VV < Top of . nt>Vm
Solve for Height of CASC critical vertical Find Height above Stack z _{cri} Height above Ground z _{crit} +h _s Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.4 260.0 280.0 380.0 390.0 340.0 380.0 480.0 480.0 580.0 580.0 580.0 580.0 580.0 580.0 580.0 580.0 580.0 580.0 580.0 580.0 580.0 580.0 580.0 580.0	velocity V _{crit} JET JET Velocities sta (meters) above stack 43.30 47.75 53.84 59.94 66.03 72.13 78.23 84.32 90.42 86.18 105.66	5.30 meters meters rting at Tou Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A #N/A 4N/A 4N/A 4N/A 4N/A 4N/A 4N/A 4N/A 4	m/s JET JET sching Height: Vert. Vel(m/s) 2.52 2.75 3.06 3.37 3.68 3.99 4.31 4.62 4.93 4.71 4.59	feet feet	V'=Vtouch+(' V'=single pl BEFORE T Zent = Zfutl + Zent=Ztouch+ Zent=Ztouch+ Single Plum Vplum=(Va), a = 0.16(z-1, p0,=9a(+1-1). Interpolate V'=Vtouch+(' Merged Plum V=(n(Va))a)t	V_m - V_{touch})*(Illume values OUCHING $\begin{cases} \{[n(V^3a)_{tuli}^2 + (v_t)^2 $	if z <ztouch (vcrn)<sup="" critical="">2]-a_m)/0.16 if V_{crti}<v<sub>m (Vcrn²Vtouch)/(Vm-Vtouch) if V_{cr} ee Single Plume spreadsheet, y²-(6.25D-z,²])^{1/3} / a crit D²/(4Vplume *a²*λ²))) s z'-Z_{touch}//(z_{full}=Z_{touch})</v<sub></ztouch>	VV < Top of
Solve for Height of CASC critical vertical Find Height above Stack z _{cri} Height above Ground z _{crit} +h _c Height above Ground z _{crit} +h _c Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.4 260.0 280.0 380.0 340.0 340.0 340.0 380.0 400.0 End Merging (full/mp) = 385.1 450.0	velocity V _{crit} JET JET Velocities sta (meters) above stack 43.30 47.75 53.84 59.94 66.03 72.13 78.23 9.42 86.18 105.66 1120.90	5.30 meters meters rting at Tou Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A 4N/A 4N/A 4N/A 4N/A 41.770 44.208	m/s JET JET sching Height: Vert. Vel(m/s) 2.52 2.75 3.06 3.37 3.68 3.99 4.31 4.62 4.93 4.71 4.59 4.51	feet feet	V'=Vtouch+(' V'=single pi BEFORE T Zent = Zfull 4 Zent=Ztouch+ Single Plum Vplum=((Va) ₀ a = 0.16(zc - 0.00 + 0.0	V_m - V_{touch})*(Illume values OUCHING $\begin{cases} \{[n(V^3a)_{tuli}^2 + (v_t)^2 $	if z <ztouch (vcrn)<sup="" critical="">2]-a_m)/0.16 if V_{crti}<v<sub>m (Vcrn²Vtouch)/(Vm-Vtouch) if V_{cr} ee Single Plume spreadsheet, y²-(6.25D-z,²])^{1/3} / a crit D²/(4Vplume *a²*λ²))) s z'-Z_{touch}//(z_{full}=Z_{touch})</v<sub></ztouch>	VV < Top of . nt>Vm
Solve for Height of CASC critical vertical Find Height above Stack z _{cri} Height above Ground z _{crit} +h _i Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.4 260.0 280.0 300.0 320.0 320.0 340.0 360.0 380.0 400.0 End Merging (full/mp) = 386.1 450.0 550.0	velocity V _{crit} JET JET Velocities sta (meters) 43.30 47.75 53.84 59.94 66.03 72.13 78.23 84.32 90.42 86.18 105.66 120.90 136.14	5.30 meters meters rting at Tou Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A 41.770 44.2648	m/s JET JET Uching Height: Vert. Vel(m/s) 2.52 2.75 3.06 3.37 3.68 3.99 4.31 4.62 4.93 4.71 4.59 4.51 4.43	feet feet	V'=Vtouch+(' V'=single pl BEFORE T Zent = Zfutl + Zent=Ztouch+ Zent=Ztouch+ Single Plum Vplum=(Va), a = 0.16(z-1, p0,=9a(+1-1). Interpolate V'=Vtouch+(' Merged Plum V=(n(Va))a)t	V_m - V_{touch})*(Illume values OUCHING $\begin{cases} \{[n(V^3a)_{tuli}^2 + (v_t)^2 $	if z <ztouch (vcrn)<sup="" critical="">2]-a_m)/0.16 if V_{crti}<v<sub>m (Vcrn²Vtouch)/(Vm-Vtouch) if V_{cr} ee Single Plume spreadsheet, y²-(6.25D-z,²])^{1/3} / a crit D²/(4Vplume *a²*λ²))) s z'-Z_{touch}//(z_{full}=Z_{touch})</v<sub></ztouch>	VV < Top of . nt>Vm
Solve for Height of CASC critical vertical Find Height above Stack z _{cri} Height above Ground z _{crit} +h _s Height feet above ground Begin Merging (touch) = 245.4 260.0 280.0 300.0 340.0 340.0 380.0 480.0 580.0 End Merging (full/mp) = 386.1 550.0 600.0	velocity V _{crit} JET JET Velocities sta (meters) above stack 43.30 47.75 53.84 59.94 66.03 72.13 78.23 90.42 86.18 105.66 120.90 136.14 151.38	5.30 meters meters rting at Tou Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A 41.770 44.208	m/s JET JET Jething Height: Vert. Vel(m/s) 2.52 2.75 3.06 3.37 3.68 3.99 4.31 4.62 4.93 4.71 4.59 4.51 4.43 4.43	feet feet	V'=Vtouch+(' V'=single pl BEFORE T Zent = Zfutl + Zent=Ztouch+ Zent=Ztouch+ Single Plum Vplum=(Va), a = 0.16(z-1, p0,=9a(+1-1). Interpolate V'=Vtouch+(' Merged Plum V=(n(Va))a)t	V_m - V_{touch})*(Illume values OUCHING $\begin{cases} \{[n(V^3a)_{tuli}^2 + (v_t)^2 $	if z <ztouch (vcrn)<sup="" critical="">2]-a_m)/0.16 if V_{crti}<v<sub>m (Vcrn²Vtouch)/(Vm-Vtouch) if V_{cr} ee Single Plume spreadsheet, y²-(6.25D-z,²])^{1/3} / a crit D²/(4Vplume *a²*λ²))) s z'-Z_{touch}//(z_{full}=Z_{touch})</v<sub></ztouch>	VV < Top of . nt>Vm
Solve for Height of CASC critical vertical Find Height above Stack z _{cri} Height above Ground z _{crit} +h _c Height above Ground z _{crit} +h _c Table of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 245.4 260.0 280.0 380.0 390.0 340.0 340.0 340.0 380.0 480.0 480.0 End Merging (full/mp) = 386.1 450.0 500.0 650.0	velocity V _{crit} JET JET Velocities sta (meters) above stack 43.30 47.75 53.84 0.59.94 66.03 72.13 78.23 84.32 0.90.42 86.18 0.105.66 0.120.90 136.14 151.38 166.62	5.30 meters meters rting at Tou Plume Radius(m) 6.860 #NVA #NVA #NVA #NVA #NVA 4NVA 4NVA 4NVA 40.654 44.208 46.647 49.085 51.523	m/s JET JET sching Height: Vel(m/s) 2.52 2.75 3.06 3.37 3.68 3.99 4.31 4.62 4.93 4.71 4.59 4.51 4.43 4.35 4.43	feet feet	V'=Vtouch+(' V'=single pl BEFORE T Zent = Zfutl + Zent=Ztouch+ Zent=Ztouch+ Single Plum Vplum=(Va), a = 0.16(z-1, p0,=9a(+1-1). Interpolate V'=Vtouch+(' Merged Plum V=(n(Va))a)t	V_m - V_{touch})*(Illume values OUCHING $\begin{cases} \{[n(V^3a)_{tuli}^2 + (v_t)^2 $	if z <ztouch (vcrn)<sup="" critical="">2]-a_m)/0.16 if V_{crti}<v<sub>m (Vcrn²Vtouch)/(Vm-Vtouch) if V_{cr} ee Single Plume spreadsheet, y²-(6.25D-z,²])^{1/3} / a crit D²/(4Vplume *a²*λ²))) s z'-Z_{touch}//(z_{full}=Z_{touch})</v<sub></ztouch>	VV < Top of 20 ft Interval
Solve for Height of CASC critical vertical Find Height above Stack z _{cri} Height above Ground z _{crit} +h _s Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.4 260.0 300.0 320.0 320.0 340.0 380.0 400.0 End Merging (full/mp) = 386.1 450.0 550.0 650.0 650.0	velocity V _{crit} JET JET Velocities sta (meters) 43.30 47.75 53.84 59.94 66.03 72.13 78.23 9.422 86.18 105.66 120.90 136.14 151.38 166.62 181.86	5.30 meters meters rting at Tou Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A 41.770 44.208 46.647 49.085 51.523 53.962	m/s JET JET Vert. Vel(m/s) 2.52 2.75 3.06 3.37 3.68 3.99 4.31 4.62 4.93 4.71 4.59 4.51 4.43 4.35 4.28	feet feet	V'=Vtouch+(' V'=single pl BEFORE T Zent = Zfutl + Zent=Ztouch+ Zent=Ztouch+ Single Plum Vplum=(Va), a = 0.16(z-1, p0,=9a(+1-1). Interpolate V'=Vtouch+(' Merged Plum V=(n(Va))a)t	V_m - V_{touch})*(Illume values OUCHING $\begin{cases} \{[n(V^3a)_{tuli}^2 + (v_t)^2 $	if z <ztouch (vcrn)<sup="" critical="">2]-a_m)/0.16 if V_{crti}<v<sub>m (Vcrn²Vtouch)/(Vm-Vtouch) if V_{cr} ee Single Plume spreadsheet, y²-(6.25D-z,²])^{1/3} / a crit D²/(4Vplume *a²*λ²))) s z'-Z_{touch}//(z_{full}=Z_{touch})</v<sub></ztouch>	VV < Top of 20 ft Interval
Solve for Height of CASC critical vertical Find Height above Stack z _{cri} Height above Ground z _{crit} +h _s Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.4 260.0 280.0 300.0 320.0 340.0 380.0 380.0 480.0 580.0 600.0 650.0 700.0 800.0	velocity V _{crit} JET JET Velocities sta (meters) above stack 43.30 47.75 53.84 59.94 66.03 72.13 78.23 90.42 86.18 105.66 120.90 136.14 151.38 166.62 181.86	5.30 meters meters rting at Tou Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A 41.770 44.208 46.647 49.085 51.523 53.962 53.862 55.839	m/s JET JET Jething Height: Vert. Vel(m/s) 2.52 2.75 3.06 3.37 3.68 3.99 4.31 4.62 4.93 4.71 4.59 4.51 4.43 4.35 4.28 4.28 4.22	feet feet	V'=Vtouch+(' V'=single pl BEFORE T Zent = Zfutl + Zent=Ztouch+ Zent=Ztouch+ Single Plum Vplum=(Va), a = 0.16(z-1, p0,=9a(+1-1). Interpolate V'=Vtouch+(' Merged Plum V=(n(Va))a)t	V_m - V_{touch})*(Illume values OUCHING $\begin{cases} \{[n(V^3a)_{tuli}^2 + (v_t)^2 $	if z <ztouch (vcrn)<sup="" critical="">2]-a_m)/0.16 if V_{crti}<v<sub>m (Vcrn²Vtouch)/(Vm-Vtouch) if V_{cr} ee Single Plume spreadsheet, y²-(6.25D-z,²])^{1/3} / a crit D²/(4Vplume *a²*λ²))) s z'-Z_{touch}//(z_{full}=Z_{touch})</v<sub></ztouch>	VV < Top of it>Vm 20 ft Interval
Solve for Height of CASC critical vertical Find Height above Stack z _{cri} Height above Ground z _{crit} +h _s Table of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 245.4 260.0 280.0 380.0 340.0 340.0 340.0 360.0 380.0 400.0 End Merging (full/mp) = 386.1 450.0 650.0 650.0 670.0 880.0 880.0 890.0	velocity V _{crit} JET JET Velocities sta (meters) above stack 43.30 47.75 53.84 59.94 66.03 72.13 78.23 84.32 90.42 86.18 105.66 0 120.90 136.14 151.38 166.62 181.86 0 124.34	5.30 meters meters rting at Tou Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A 4.08654 41.770 44.208 51.523 53.962 58.839 63.715	m/s JET JET sching Height: Vert. Vel(m/s) 2.52 2.75 3.06 3.37 3.68 3.99 4.31 4.62 4.93 4.71 4.59 4.51 4.43 4.35 4.28 4.22 4.10 3.99	feet feet	V'=Vtouch+(' V'=single pl BEFORE T Zent = Zfull + Zent=Ztouch+ Zent=Ztouch+ Single Plum Vplum=(Va), a = 0.16(z-1, 0), p=0,4(1-1). Interpolate V'=Vtouch+(' Merged Plum V=(n(Va)),	V_m - V_{touch})*(Illume values OUCHING $\begin{cases} \{[n(V^3a)_{tuli}^2 + (v_t)^2 $	if z <ztouch (vcrn)<sup="" critical="">2]-a_m)/0.16 if V_{crti}<v<sub>m (Vcrn²-Vtouch)/(Vm-Vtouch) if Vcr es Single Plume spreadsheet, y²-(6.25D-z,²])¹⁰/ a kit D²/(4V plume *a²*λ²))) S z²-Ztouch)/(Zfull²-Ztouch)</v<sub></ztouch>	VV < Top of 20 ft Interval
Solve for Height of CASC critical vertical Find Height above Stack z _{cri} Height above Ground z _{crii} +h _i Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.4 260.0 280.0 300.0 320.0 320.0 340.0 360.0 380.0 400.0 End Merging (full/mp) = 386.1 450.0 500.0 600.0 650.0 7700.0 800.0	velocity V _{crit} JET JET Velocities sta (meters) 1 above stack 1 43.30 47.75 53.84 59.94 66.03 72.13 78.23 84.32 90.42 86.18 105.66 120.90 136.14 151.38 166.62 118.66 212.34 242.82	5.30 meters meters rting at Tou Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A 41.770 44.208 46.647 49.085 51.523 53.962 58.839 63.715 68.592	m/s JET JET Uching Height: Vert. Vel(m/s) 2.52 2.75 3.06 3.37 3.68 3.99 4.31 4.62 4.93 4.71 4.59 4.51 4.43 4.35 4.22 4.10 3.99 3.89	feet feet	V'=Vtouch+(' V'=single pl BEFORE T Zent = Zfull + Zent=Ztouch+ Zent=Ztouch+ Single Plum Vplum=(Va), a = 0.16(z-1, 0), p=0,4(1-1). Interpolate V'=Vtouch+(' Merged Plum V=(n(Va)),	V_m - V_{touch})*(Illume values OUCHING $\begin{cases} \{[n(V^3a)_{tuli}^2 + (v_t)^2 $	if z <ztouch (vcrn)<sup="" critical="">2]-a_m)/0.16 if V_{crti}<v<sub>m (Vcrn²-Vtouch)/(Vm-Vtouch) if Vcr es Single Plume spreadsheet, y²-(6.25D-z,²])¹⁰/ a kit D²/(4V plume *a²*λ²))) S z²-Ztouch)/(Zfull²-Ztouch)</v<sub></ztouch>	VV < Top of it>Vm 20 ft Interval
Solve for Height of CASC critical vertical Find Height above Stack z _{cri} Height above Ground z _{crit} +h _s Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.4 300.0 380.0 380.0 380.0 380.0 380.0 580.0 600.0 650.0 600.0 650.0 600.0 600.0 600.0 600.0 600.0 600.0 600.0 600.0 600.0 600.0 600.0 600.0 600.0	velocity V _{crit} JET JET Velocities sta (meters) 1 above stack 43.30 47.75 53.84 59.94 66.03 72.13 78.23 90.42 86.18 105.66 120.90 136.14 151.38 166.62 181.66 212.34 242.82 213.30 303.78	5.30 meters meters rting at Tou Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A 41.770 44.208 45.49.45 51.523 53.962 58.839 63.715 68.592 73.469	m/s JET JET Jething Height: Vert. Vel(m/s) 2.52 2.75 3.06 3.37 3.68 3.99 4.31 4.62 4.93 4.71 4.59 4.51 4.43 4.35 4.28 4.22 4.10 3.99 3.89 3.89	feet feet	V'=Vtouch+(' V'=single pl BEFORE T Zent = Zfull + Zent=Ztouch+ Zent=Ztouch+ Single Plum Vplum=(Va), a = 0.16(z-1, 0), p=0,4(1-1). Interpolate V'=Vtouch+(' Merged Plum V=(n(Va)),	V_m - V_{touch})*(Illume values OUCHING $\begin{cases} \{[n(V^3a)_{tuli}^2 + (v_t)^2 $	if z <ztouch (vcrn)<sup="" critical="">2]-a_m)/0.16 if V_{crti}<v<sub>m (Vcrn²-Vtouch)/(Vm-Vtouch) if Vcr es Single Plume spreadsheet, y²-(6.25D-z,²])¹⁰/ a kit D²/(4V plume *a²*λ²))) S z²-Ztouch)/(Zfull²-Ztouch)</v<sub></ztouch>	VV < Top of it>Vm 20 ft Interval
Solve for Height of CASC critical vertical Find Height above Stack z _{cri} Height above Ground z _{crit} +h _e Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.4 360.0 280.0 340.0 340.0 340.0 360.0 460.0 End Merging (full/mp) = 386.1 500.0 550.0 660.0 6700.0 900.0 900.0 1000.0 1100.0	velocity V _{crit} JET JET Velocities sta (meters) 43.30 47.75 53.84 59.94 66.03 72.13 78.23 84.32 90.42 86.18 105.66 0 120.90 136.14 151.38 0 166.62 121.34 0 121.34 0 136.90 136.14 0 136.38	5.30 meters meters rting at Tou Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A 41.028 46.647 49.085 51.523 53.962 58.839 63.715 68.592 73.469 78.346	m/s JET JET Jething Height: Vert. Vel(m/s) 2.52 2.75 3.06 3.37 3.68 3.99 4.31 4.62 4.93 4.71 4.59 4.51 4.43 4.35 4.28 4.22 4.10 3.99 3.89 3.81 3.72	feet feet	V'=Vtouch+(' V'=single pl BEFORE T Zent = Zfull + Zent=Ztouch+ Zent=Ztouch+ Single Plum Vplum=(Va), a = 0.16(z-1, 0), p=0,4(1-1). Interpolate V'=Vtouch+(' Merged Plum V=(n(Va)),	V_m - V_{touch})*(Illume values OUCHING $\begin{cases} \{[n(V^3a)_{tuli}^2 + (v_t)^2 $	if z <ztouch (vcrn)<sup="" critical="">2]-a_m)/0.16 if V_{crti}<v<sub>m (Vcrn²-Vtouch)/(Vm-Vtouch) if Vcr es Single Plume spreadsheet, y²-(6.25D-z,²])¹⁰/ a kit D²/(4V plume *a²*λ²))) S z²-Ztouch)/(Zfull²-Ztouch)</v<sub></ztouch>	VV < Top of it>Vm 20 ft Interval
Solve for Height of CASC critical vertical Find Height above Stack z _{cri} Height above Ground z _{crii} +h _i Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.4 260.0 280.0 300.0 320.0 320.0 340.0 360.0 380.0 400.0 End Merging (full/mp) = 386.1 450.0 600.0 650.0 700.0 800.0 900.0 1100.0 1100.0	velocity V _{crit} JET JET Velocities sta (meters) 43.30 47.75 55.84 59.94 66.03 72.13 78.23 84.32 90.42 86.18 105.66 120.90 136.14 151.38 166.62 1212.34 242.82 181.86 212.34 242.82 333.4.26	5.30 meters meters rting at Tou Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A 41.770 44.208 46.647 49.085 51.523 53.962 58.839 63.715 68.592 73.469 78.3468 83.223	m/s JET JET Vert. Vel(m/s) 2.52 2.75 3.06 3.37 3.68 3.99 4.31 4.62 4.93 4.71 4.59 4.51 4.43 4.35 4.22 4.10 3.99 3.89 3.81 3.72 3.68	feet feet	V'=Vtouch+(' V'=single pl BEFORE T Zent = Zfull + Zent=Ztouch+ Zent=Ztouch+ Single Plum Vplum=(Va), a = 0.16(z-1, 0), p=0,4(1-1). Interpolate V'=Vtouch+(' Merged Plum V=(n(Va)),	V_m - V_{touch})*(Illume values OUCHING $\begin{cases} \{[n(V^3a)_{tuli}^2 + (v_t)^2 $	if z <ztouch (vcrn)<sup="" critical="">2]-a_m)/0.16 if V_{crti}<v<sub>m (Vcrn²-Vtouch)/(Vm-Vtouch) if Vcr es Single Plume spreadsheet, y²-(6.25D-z,²])¹⁰/ a kit D²/(4V plume *a²*λ²))) S z²-Ztouch)/(Zfull²-Ztouch)</v<sub></ztouch>	VV < Top of it>Vm 20 ft Interval
Solve for Height of CASC critical vertical Find Height above Stack z _{cri} Height above Ground z _{crit} +h _s Table of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 245.4 300.0 320.0 320.0 340.0 380.0 380.0 380.0 400.0 End Merging (full/mp) = 386.1 500.0 600.0	velocity V _{crit} JET JET Velocities sta (meters) 1 above stack 43.30 47.75 53.84 59.94 66.03 72.13 78.23 68.18 105.66 120.90 136.14 151.38 166.62 121.34 242.82 213.30 303.78 334.26 334.26	5.30 meters meters rting at Tou Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A 41.770 44.208 46.647 49.085 51.523 53.962 58.839 63.715 68.592 73.469 78.346 83.223 88.099	m/s JET JET Jething Height: Vert. Vel(m/s) 2.52 2.75 3.06 3.37 3.68 3.99 4.31 4.62 4.93 4.71 4.59 4.51 4.43 4.35 4.28 4.22 4.10 3.99 3.89 3.81 3.72 3.65 3.58	feet feet	V'=Vtouch+(' V'=single pl BEFORE T Zent = Zfull + Zent=Ztouch+ Zent=Ztouch+ Single Plum Vplum=(Va), a = 0.16(z-1, 0), p=0,4(1-1). Interpolate V'=Vtouch+(' Merged Plum V=(n(Va)),	V_m - V_{touch})*(Illume values OUCHING $\begin{cases} \{[n(V^3a)_{tuli}^2 + (v_t)^2 $	if z <z<sub>touch Critical (V_{cnn})³]-a_m)/0.16 if V_{crix}<v<sub>m (V_{cnn}-V_{touch})/(V_m-V_{touch}) if V_{crix} (V_{cnn}-V_{touch})/(V_m-V_{touch}) if V_{crix} se Single Plume spreadsheet, y²-(6.25D·z_v)²]y¹²³ / a set D²/(4V_{plume}*a²² λ²))) S Z-Z_{touch})/(Z_{full}-Z_{touch})</v<sub></z<sub>	VV < Top of it>Vm 20 ft Interval
Solve for Height of CASC critical vertical Find Height above Stack z _{cri} Height above Ground z _{crit} +h _s Table of MERGED Plume-Averaged Vertical Height (feet above ground Begin Merging (touch) = 245.4 300.0 280.0 340.0 380.0 380.0 480.0 480.0 End Merging (full/mp) = 386.1 500.0 550.0 660.0 670.0 690.0 1000.0 1100.0 11200.0 1300.0 1400.0	velocity V _{crit} JET JET Velocities sta (meters) 1 above stack 43.30 1 47.75 53.84 1 59.94 1 66.03 7 72.13 7 76.23 1 84.32 1 90.42 86.18 105.66 1 120.90 1 36.14 1 551.38 1 66.62 1 212.34 1 242.82 2 73.30 3 33.78 3 34.26 3 364.74 3 395.22 1 425.70	5.30 meters meters rting at Tou Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A 41.770 44.208 46.647 49.085 51.523 53.962 58.839 63.715 68.592 73.469 78.346 83.223 88.099 92.976	m/s JET JET Jething Height: Vert.: Vel(m/s) 2.52 2.75 3.06 3.37 3.68 3.99 4.31 4.62 4.93 4.71 4.59 4.51 4.43 4.35 4.28 4.22 4.10 3.99 3.89 3.81 3.72 3.65 3.588 3.58	feet feet	V'=Vtouch+(' V'=single pl BEFORE T Zent = Zfull + Zent=Ztouch+ Zent=Ztouch+ Single Plum Vplum=(Va), a = 0.16(z-1, 0), p=0,4(1-1). Interpolate V'=Vtouch+(' Merged Plum V=(n(Va)),	V_m - V_{touch})*(Illume values OUCHING $\begin{cases} \{[n(V^3a)_{tuli}^2 + (v_t)^2 $	if z <z<sub>touch Critical (V_{cnn})³]-a_m)/0.16 if V_{crix}<v<sub>m (V_{cnn}-V_{touch})/(V_m-V_{touch}) if V_{crix} (V_{cnn}-V_{touch})/(V_m-V_{touch}) if V_{crix} se Single Plume spreadsheet, y²-(6.25D·z_v)²]y¹²³ / a set D²/(4V_{plume}*a²² λ²))) S Z-Z_{touch})/(Z_{full}-Z_{touch})</v<sub></z<sub>	VV < Top of it>Vm 20 ft Interval
Solve for Height of CASC critical vertical Find Height above Stack z _{cri} Height above Ground z _{crii} +h _i Table of MERGED Plume-Averaged Vertical Height (feet) above ground Begin Merging (touch) = 245.4 260.0 280.0 300.0 320.0 320.0 340.0 360.0 380.0 400.0 End Merging (full/mp) = 386.1 450.0 650.0 650.0 650.0 650.0 600.0 1100.0 1100.0 1200.0 1400.0	velocity V _{crit} JET JET Velocities sta (meters) 1	5.30 meters meters rting at Tou Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A 4.208 46.647 49.085 51.523 53.962 58.839 63.715 68.592 73.469 78.3469 83.223 88.099 92.976 117.360	m/s JET JET Vert. Vel(m/s) 2.52 2.75 3.06 3.37 3.68 3.99 4.31 4.62 4.93 4.71 4.59 4.51 4.43 4.35 4.22 4.10 3.99 3.89 3.81 3.72 3.65 3.58 3.52 3.25	feet feet	V'=Vtouch+(' V'=single pl BEFORE T Zent = Zfull + Zent=Ztouch+ Zent=Ztouch+ Single Plum Vplum=(Va), a = 0.16(z-1, 0), p=0,4(1-1). Interpolate V'=Vtouch+(' Merged Plum V=(n(Va)),	V_m - V_{touch})*(Illume values OUCHING $\begin{cases} \{[n(V^3a)_{tuli}^2 + (v_t)^2 $	if z <z<sub>touch Critical (V_{cnn})³]-a_m)/0.16 if V_{crix}<v<sub>m (V_{cnn}-V_{touch})/(V_m-V_{touch}) if V_{crix} (V_{cnn}-V_{touch})/(V_m-V_{touch}) if V_{crix} se Single Plume spreadsheet, y²-(6.25D·z_v)²]y¹²³ / a set D²/(4V_{plume}*a²² λ²))) S Z-Z_{touch})/(Z_{full}-Z_{touch})</v<sub></z<sub>	VV < Top of it>Vm 20 ft Interval
Solve for Height of CASC critical vertical	velocity V _{crit} JET JET Velocities sta (meters) 1 above stack 43.30 47.75 53.84 59.94 66.03 72.13 78.23 86.18 105.66 120.90 136.14 151.38 166.62 121.34 242.82 273.30 333.78 334.26 334.26 334.26 334.26 334.26 334.26 335.22	5.30 meters meters rting at Tou Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A 41.770 44.208 46.647 49.085 51.523 53.962 58.839 63.715 68.592 73.469 78.346 83.223 88.099 92.976 117.360 117.474 74.74	m/s JET JET Jething Height: Vert. Vel(m/s) 2.52 2.75 3.06 3.37 3.68 3.99 4.31 4.62 4.93 4.71 4.59 4.51 4.43 4.35 4.28 4.22 4.10 3.99 3.89 3.81 3.72 3.65 3.52 3.65 3.52	feet feet	V'=Vtouch+(' V'=single pl BEFORE T Zent = Zfull + Zent=Ztouch+ Zent=Ztouch+ Single Plum Vplum=(Va), a = 0.16(z-1, 0), p=0,4(1-1). Interpolate V'=Vtouch+(' Merged Plum V=(n(Va)),	V_m - V_{touch})*(Illume values OUCHING $\begin{cases} \{[n(V^3a)_{tuli}^2 + (v_t)^2 $	if z <z<sub>touch Critical (V_{cnn})³]-a_m)/0.16 if V_{crix}<v<sub>m (V_{cnn}-V_{touch})/(V_m-V_{touch}) if V_{crix} (V_{cnn}-V_{touch})/(V_m-V_{touch}) if V_{crix} se Single Plume spreadsheet, y²-(6.25D·z_v)²]y¹²³ / a set D²/(4V_{plume}*a²² λ²))) S Z-Z_{touch})/(Z_{full}-Z_{touch})</v<sub></z<sub>	VV < Top of it>Vm 20 ft Interval
Solve for Height of CASC critical vertical	velocity V _{crit} JET JET Velocities sta (meters) above stack 43.30 47.75 53.84 59.94 66.03 78.23 84.32 90.42 86.18 105.66 120.90 136.14 151.38 166.62 121.34 242.82 273.30 303.78 334.26 364.74 395.22 425.70 578.10 730.50 882.90	5.30 meters meters rting at Tou Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A 41.770 44.208 46.647 51.523 53.962 58.839 63.715 68.592 73.469 78.346 83.223 88.099 92.976 117.360	m/s JET JET Jething Height: Vert. Vel(m/s) 2.52 2.75 3.06 3.37 3.68 3.99 4.31 4.62 4.93 4.71 4.59 4.51 4.43 4.35 4.28 4.22 4.10 3.99 3.89 3.81 3.72 3.65 3.58 3.52 3.25 3.06 2.90	feet feet	V'=Vtouch+(' V'=single pl BEFORE T Zent = Zfull + Zent=Ztouch+ Zent=Ztouch+ Single Plum Vplum=(Va), a = 0.16(z-1, 0), p=0,4(1-1). Interpolate V'=Vtouch+(' Merged Plum V=(n(Va)),	V_m - V_{touch})*(Illume values OUCHING $\begin{cases} \{[n(V^3a)_{tuli}^2 + (v_t)^2 $	if z <z<sub>touch Critical (V_{cnn})³]-a_m)/0.16 if V_{crix}<v<sub>m (V_{cnn}-V_{touch})/(V_m-V_{touch}) if V_{crix} (V_{cnn}-V_{touch})/(V_m-V_{touch}) if V_{crix} se Single Plume spreadsheet, y²-(6.25D·z_v)²]y¹²³ / a set D²/(4V_{plume}*a²² λ²))) S Z-Z_{touch})/(Z_{full}-Z_{touch})</v<sub></z<sub>	VV < Top of 20 ft Interval
Solve for Height of CASC critical vertical	velocity V _{crit} JET JET Velocities sta (meters) 1	5.30 meters meters rting at Tou Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A 41.770 44.208 46.647 49.085 51.523 53.962 58.839 63.715 68.592 73.469 78.3469 83.223 88.099 92.976 117.360 141.744 166.128	m/s JET JET Vert. Vel(m/s) 2.52 2.75 3.06 3.37 3.68 3.99 4.31 4.62 4.93 4.71 4.59 4.51 4.43 4.35 4.22 4.10 3.99 3.89 3.81 3.72 3.65 3.58 3.52 3.25 3.06 2.90 2.77	feet feet	V'=Vtouch+(' V'=single pl BEFORE T Zent = Zfutl + Zent=Ztouch+ Zent=Ztouch+ Single Plum Vplum=(Va), a = 0.16(z-1, p0,=9a(+1-1). Interpolate V'=Vtouch+(' Merged Plum V=(n(Va))a)t	V_m - V_{touch})*(Illume values OUCHING $\begin{cases} \{[n(V^3a)_{tuli}^2 + (v_t)^2 $	if z <z<sub>touch Critical (V_{cnn})³]-a_m)/0.16 if V_{crix}<v<sub>m (V_{cnn}-V_{touch})/(V_m-V_{touch}) if V_{crix} (V_{cnn}-V_{touch})/(V_m-V_{touch}) if V_{crix} se Single Plume spreadsheet, y²-(6.25D·z_v)²]y¹²³ / a set D²/(4V_{plume}*a²² λ²))) S Z-Z_{touch})/(Z_{full}-Z_{touch})</v<sub></z<sub>	VV < Top of 20 ft Interval
Solve for Height of CASC critical vertical	velocity V _{crit} JET JET Velocities sta (meters) 43.30 47.75 58.44 59.94 66.03 72.13 78.23 86.18 105.66 120.90 136.14 151.38 166.62 1212.34 242.82 273.30 333.426 334.26 334.26 335.22 425.70 578.10 730.50 882.90 105.50	5.30 meters meters rting at Tou Plume Radius(m) 6.860 #N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	m/s JET JET Jething Height: Vert. Vel(m/s) 2.52 2.75 3.06 3.37 3.68 3.99 4.31 4.62 4.93 4.71 4.59 4.51 4.43 4.35 4.28 4.22 4.10 3.99 3.89 3.81 3.72 3.65 3.58 3.52 3.25 3.06 2.90	feet feet	V'=Vtouch+(' V'=single pl BEFORE T Zent = Zfutl + Zent=Ztouch+ Zent=Ztouch+ Single Plum Vplum=(Va), a = 0.16(z-1, p0,=9a(+1-1). Interpolate V'=Vtouch+(' Merged Plum V=(n(Va))a)t	V_m - V_{touch})*(Illume values OUCHING $\begin{cases} \{[n(V^3a)_{tuli}^2 + (v_t)^2 $	if z <z<sub>touch Critical (V_{cnn})³]-a_m)/0.16 if V_{crix}<v<sub>m (V_{cnn}-V_{touch})/(V_m-V_{touch}) if V_{crix} (V_{cnn}-V_{touch})/(V_m-V_{touch}) if V_{crix} se Single Plume spreadsheet, y²-(6.25D·z_v)²]y¹²³ / a set D²/(4V_{plume}*a²² λ²))) S Z-Z_{touch})/(Z_{full}-Z_{touch})</v<sub></z<sub>	VV < Top of . nt>Vm



MERGED (along width) Plume Average Ve			oyant Plumes					
						ditions at \	│ /arious Heights in the Merg	ed
	ine Evalua						, Queensland, Australia ," [
Ambient Conditions:		7.4					eutral conditions (dθ/dz=0 or	
Ambient Potential Temp	θ, 302.2	Kelvins	84.3				meters/feet	-a -e/
Plume Exit Conditions:					Gravity g		m/s ²	
Stack Height	h _e 31.50	meters	103.35	feet	λ	1.11		
Individual Stack Diamete		meters		inches	λο			
Stack Velocity V		6 m/s		ft/sec	4Vol/(60πD			
Individual Volumetric FI		cu.m/sec	200,110		$\pi V_{exit} D^2/4$,		Sect.2/¶1
Stack Potential Temp		2 Kelvins	104.3		II V exit D / 4			060t.25 1
Initial Stack Buoyancy Flux		m ⁴ /s ³		ΔT(°F)	aV D2/16	2 /0 //4 = //	ol.Flow(g/π)(1-θ _a /θ _s)	Sect.2/¶1
			20.0	Δ1(Γ)			,θ _p at plume height (see belo	
Plume Buoyancy Flux		m ⁴ /s ³			Λ gva (1-θε	_a /⊎ _p) for a, ∨	, ep at plume neight (see belo	W)
Total Number of Stacks			00.0	44	0-1 1	-11011	e plume treatment in Peter Be	B
Average Adjacent Stack Separation		meters	20.0	reet				
Number of Stacks along Orientation	N 2						ised by N ^{0.25} at the height when	
					fully merge	d (interp. be	low ht, single merged stack a	bove ht)
Conditions at End (Top) of Jet Phase:								
Height above Stack	J=	meters*	79.2		$z_{jet} = 6.25D$), meters*=	meters above stack top	Sect.3/¶1
Height above Ground z _{jet} -		meters	182.5					- :
Vertical Velocity		I m/s		ft/sec	$V_{jet} = 0.5V_e$	exit = Vexit/2		
Plume Top-Hat Diameter 2	a _{jet} 7.72	1 meters	25.3	feet	$2a_{jet} = 2D$		Conservation of momentum	
Spillane Methodology - Analytical Solution	ns for Calm Co	nditions for	Plume Height	s above Je	t and Merg	ing Phase:	S	
Single Plume-averaged Vertical Velo								
Single Plume Values: Plume Top-Hat Radius			Merging Onl	у			r increase with height	Sect.2/Eq.6
Virtual Source Height	z _v 0.43	meters*	1.4	feet*	$z_v = 6.25D$	$[1-(\theta_e/\theta_s)^{1/2}]$, meters*=meters above stack top	
Height above Ground z _v -	-h _s 31.93	meters	104.8	feet			where $(\theta_a/\theta_s)^{1/2} = (\theta_e/\theta_s)^{1/2}$ =	0.9821
Single Plume Values: Vertical Velocity		ed in Plume	Merging Onl	у	${(Va)_o}^3 + 0.$	12F _o [(z-z ₁	,) ² - (6.25D-z _v) ²]} ^(1/3) / a	Sect.2.1(6)
Product (V	a) _o 15.28	m ² /s			V _{exit} (D/2)(θ _e			
,								
Plume Merging - Based on Single Plume	Calculations w	nere:						Sect.3/¶3
Begin Merging Plume Top-Hat Diameter 2ato		meters	20.0	feet	2a _{touch} =d, (or atouch=d/	2)	
Height above Stack z _{to}		meters*	64.0				meters*=meters above stack	top
Height above Ground z _{touch} -		meters	167.3		touchVT		above states	
Vertical Velocity V _{to}		3 m/s	-	ft/sec	V = {(V	$(a)_{a}^{3} + 0.12$	F _o [(z-z _v) ² - (6.25D-z _v) ²]} ^(1/3)	/ a
Total Merging Plume Top-Hat Diameter 2a		meters	400.3				all=d(N-1)/2) FOR 2 STACKS,	
Height above Stack z		meters*	1252.2				meters*=meters above stack	
Height above Ground z _{full} -		meters	1355.6		Zfull - Zv+Z	G/(2 0.10),	Ineters =meters above stack	тор
		1 m/s		ft/sec) (O(-)	3 . 0 405	$(z_{\text{full}}-z_v)^2 - (6.25D-z_v)^2]^{(1/3)}$	17-
Vertical Velocity V			3.1	π/sec	Vfull = {(Va)) _o + 0.12F _o	[(Zfull-Z _V) - (6.25D-Z _V)]}	/ a _{full}
Product (V ³ a		m ⁴ /s ³						
Conditions at End (Top) of Merging Phase				ed Plume c				
Merged Plume Values: Plume Diameter			Table Below				z _{full})), or linear increase with I	height
Revised Merged Plume Radius		meters	563.8				here Total Merging Occurs	
Revised Merged Plume Velocity		m/s	8.64	ft/sec	and V =	: n ^{0.25} V₁ w	here Total Merging Occurs	
Revised Virtual Source Height z								
		meters*	1252.2	feet*	Height abov	ve stack wh	ere Total Merging Occurs (sh	
Revised Vertical Velocity			1252.2 Tables Below	feet*	Height abov	ve stack wh		
Revised Vertical Velocity				feet*	Height abov	ve stack wh ull/a} ^{1/3} for he	ere Total Merging Occurs (sh	
				feet*	Height abov	ve stack wh ull/a} ^{1/3} for he	ere Total Merging Occurs (sheights above total merging ele	evation
	· v .	iolutions in	Tables Below		Height abov	ve stack who who we stack who who who who we will be stack who	ere Total Merging Occurs (sheights above total merging electroch)/(Zfull*Ztouch) for heights below total merging	evation
Multiple Plume Calculations	√ Solocity at heigh	iolutions in	Tables Below	304.8	Height above V={n(V³a)fu V=V _{touch} +(V) meters above	ve stack who will a sta	ere Total Merging Occurs (sheights above total merging electroch)/(Zfull*Ztouch) for heights below total merging	evation ng elevation
Multiple Plume Calculations Solve for plume-averaged vertical ve	locity at heigh	t 1,000.0	Tables Below feet	304.8 feet*	Height above V={n(V³a)fu V=V _{touch} +(V) meters above	ve stack wh ull/a) ^{1/3} for he V _m -V _{touch})*(: ve ground (: N TOP OF	ere Total Merging Occurs (sheights above total merging ele z-z _{touch})/(z _{full} -z _{touch}) for heights below total mergi z+h _s) MERGING PHASE-INTERPO	evation ng elevation
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stack	clocity at height cz 273.29 sa #N//	t 1,000.0 meters*	feet 896.7	304.8 feet*	Height above V={n(V³a) _{fu} V=V _{touch} +(Variety above LESS THAI	ve stack who we stack who we stack who we stack who we ground (and the control of	ere Total Merging Occurs (sheights above total merging ele z-z _{touch})/(z _{tull} -z _{touch}) for heights below total merging z+h _s) MERGING PHASE-INTERPO	evation ng elevation
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stacl	clocity at height cz 273.29 sa #N//	1,000.0 meters*	feet 896.7	304.8 feet* feet	Height above $V=\{n(V^3a)_{fu}\}$ where $V=V_{touch}+(V_0)_$	ve stack who we stack who we stack who we ground (and the content of the content	ere Total Merging Occurs (sheights above total merging ele z-z _{touch})/(z _{full} -z _{touch}) for heights below total mergi z+h ₀) MERGING PHASE-INTERPC ztull	ng elevation
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stacl	clocity at height cz 273.29 sa #N//	1,000.0 meters*	feet 896.7	304.8 feet* feet	Height above V={n(V³a) _{fu} V=V _{touch} +(V) we very series above LESS THAI a=a _m +0.16 v={n(V³a) _{fu} V'=V _{touch} +(V)	ve stack whomely a stack who we ground (a stack whomely a stack whomely a stack who was a stack who who was a stack who was a	ere Total Merging Occurs (steights above total merging else z-ztouch)/(ztur-ztouch) [for heights below total merging z+h,] MERKSING PHASE-INTERPC z-ztul z-ztull z-ztouch)/(ztur-ztouch) if ztouch*	ng elevation
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stacl Plume Top-Hat Radiu Vertical Velocity	locity at height z 273.299 s a #N// V 3.309	1,000.0 meters* meters mters	feet 896.7 #N/A 10.86	304.8 feet* feet	Height above $V=\{n(V^3a)_{fu}$ $V=V_{touch}+(V_{touch}$	we stack who we stack who we stack who we ground (and the state of th	ere Total Merging Occurs (sheights above total merging ele 2-zieuch/(Zull-Zeuch) for heights below total merging 2+h ₂) MERGING PHASE-INTERPO 2-ziul Ziul Ziul Ziul Ziul Zi-zieuch/(Ziull-Zieuch) if Zieuch- if Z <zieuch (ziull-zieuch)="" if="" td="" zieuch-<=""><td>evation ng elevation DLATE</td></zieuch>	evation ng elevation DLATE
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stacl Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic	clocity at height z 273.299 s a #N// v 3.309	t 1,000.0 meters* meters mys	feet 896.7 #N/A 10.86	304.8 feet* feet ft/sec	Height above V={n(V³a) _{fu} } V=V _{touch} +(V meters above LESS THAI a=a _m +0.16i V={n(V³a) _{fu} } V'=V _{touch} +('V'=single pi	ve stack wh $_{\rm all}/a$) ^{1/3} for he $_{\rm bot}/m^{-}V_{\rm touch})^{*}(z^{-}$	ere Total Merging Occurs (sheights above total merging ele z-touch)/(2rtul=ztouch) for heights below total mergi z-th ₀ MERGING PHASE-INTERPO z-tull z-tull z-tull z-tull z-tull Critical Critical	evation ng elevation DLATE
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stacl Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertical Find Height above Stack z	colocity at height to 2 273.29 as a #N// 3.30 call velocity V _{cr}	1,000.0 meters* meters m/s 5.30	feet 896.7 #N/A 10.86 m/s JET	304.8 feet* feet ft/sec	Height above $V=\{n(V^3a)_{tu}V=V_{touch}+(N^3a)_{tu}V=V_{touch}+(N^3a)_{tu}V=V_{touch}+(N^3a)_{tu}V=V_{touch}+(N^3a)_{tu}V=V_{touch}+(N^3a)_{tu}V=V_{$	ve stack wh	ere Total Merging Occurs (steights above total merging ele z=z _{touch})/(z _{tull} -z _{touch}) [for heights below total mergi z+h _a) MERKSING PHASE-INTERPC z-z _{tull} z _{tull} z _{tull} z-z _{touch})/(z _{tull} -z _{touch}) if z _{touch} if if z <z<sub>touch (/(v_{crt})³)-3_m)/0.16 if V_{crtt}<v<sub>m</v<sub></z<sub>	evation Ing elevation LATE CZ <zfull <="" jo<="" of="" td="" top="" vv=""></zfull>
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stacl Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic	colocity at height to 2 273.29 as a #N// 3.30 call velocity V _{cr}	t 1,000.0 meters* meters mys	feet 896.7 #N/A 10.86 m/s JET	304.8 feet* feet ft/sec	Height above $V=\{n(V^3a)_{tu}V=V_{touch}+(N^3a)_{tu}V=V_{touch}+(N^3a)_{tu}V=V_{touch}+(N^3a)_{tu}V=V_{touch}+(N^3a)_{tu}V=V_{touch}+(N^3a)_{tu}V=V_{$	ve stack wh	ere Total Merging Occurs (sheights above total merging ele z-touch)/(2rtul=ztouch) for heights below total mergi z-th ₀ MERGING PHASE-INTERPO z-tull z-tull z-tull z-tull z-tull Critical Critical	evation ng elevation LATE CZ <zfull <="" j<="" of="" td="" top="" vv=""></zfull>
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stacl Plume Top-Hat Radiu Vertical Velocity Solve for Height of CASC critical vertit Find Height above Stack z Height above Ground z _{crit} -1	locity at height is a 273.295 s a #N// V 3.306 v V Grent JE*	t 1,000.0 p meters* meters m/s t 5.30 meters	feet 896.7 #N/A 10.86 m/s JET	304.8 feet* feet ft/sec feet feet	Height above $V=\{n(V^3a)_{tu}\}_{tu}$ where t_t and t_t where t_t and t_t where t_t and t_t an	we stack who we stack who was a control of the work of	ere Total Merging Occurs (steights above total merging ele z-touch)/(z-true-touch) for heights below total merging z+h ₀) for heights below total mergi z+h ₀) for heights below total mergi z+h ₀) for heights below total mergi z+h ₀ for heights below total mergi z+h ₀ for heights below total mergi z+h ₀ for heights z+h ₀ z-touch/(z-true-z-touch) if z-touch if z-touch critical (/(v-m) ³)-am/0.16 if Verit-Vm "(v-m) ³ -am/0.16 if Verit-Vm "(v-m) ⁴ -v-touch)/(v-v-touch) if Verit-Vm "(v-m) ⁴ -v-touch)/(v-v-touch) if Verit-Vm	evation ng elevation DLATE CZ <zfull <="" j="" of="" rit="" top="" vv="">V_m</zfull>
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stact Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic Find Height above Stack 2 Height above Ground Z _{ent*} . Table of MERGED Plume-Averaged Vertical	locity at height z 273.29 s s a #N/V V 3.300 s locity V creent JE* h _s JE al Velocities state velocities velocities state velocities state velocities state velocities velocities state velocities velocities velocities velocities state velocities velocit	t 1,000.0 meters* meters mys s 5.30 meters meters meters	feet 896.7 #N/A 10.86 m/s JET JET	304.8 feet* feet ft/sec feet feet	Height above $V=(n(V^3a)_{tu})$ where $V=V_{touch}+(V_t)$ meters about $V=V_{touch}+(V_t)$ meters about $V=V_{touch}+(V_t)$ where $V=V_{touch}+(V_t)$ meters about $V=V_{touch}+(V_t)$ single piece $V=V_{touch}+(V_t)$ meters about $V=V_{touch}+(V_t)$ meters $V=V_{touch}+(V_t)$ meters $V=V_{touch}+(V_t)$ meters $V=V_{tu}+(V_t)$ meters $V=V_t$ meters	we stack who we stack who we stack who we ground (control of the were ground (control of the were ground (control of the weather who we ground (control of the weather who we ground (control of the weather who we were ground the weather who we	ere Total Merging Occurs (steights above total merging ele z-z _{touch})/(ztur-z _{touch}) (for heights below total mergi z+h _a) MERGING PHASE-INTERPC z-z _{touch} /(z _{tull} -z _{touch}) if z _{touch} if z <z<sub>touch/(z_{tull}-z_{touch}) if z_{touch} if z<z<sub>touch/(z_{tull}-z_{touch}) if z_{touch} ((v_{crs})³)-a_m)/0.16 if V_{crit}-v_m "(v_{crs}-v_{touch})/(v_m-v_{touch}) if V_c se Single Plume spreadsheete</z<sub></z<sub>	evation ng elevation DLATE CZ <zfull <="" j="" of="" rit="" top="" vv="">V_m</zfull>
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stacl Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic Find Height above Stack 2 Height above Ground z _{crit} . Table of MERGED Plume-Averaged Vertici	locity at height x z 273.29 s a #N// V 3.30 s a Leicht JE** cal velocity V _{cr} product the test of the	t 1,000.0 meters* meters	feet 896.7 #N/A 10.86 m/s JET JET sching Height	304.8 feet* feet ft/sec feet feet	Height above $V = (n(V^3a)_{FU}$ $V = (n(V^3a)_{FU}$ $V = V_{touch} + (V^3a)_{FU}$ $V_{touch} + (V^3a)_{FU}$	ve stack white stack white stack white stack white white stack whi	ere Total Merging Occurs (steights above total merging ele z-touch)/(z-true-touch) for heights below total merging z+h ₀) for heights below total mergi z+h ₀) for heights below total mergi z+h ₀) for heights below total mergi z+h ₀ for heights below total mergi z+h ₀ for heights below total mergi z+h ₀ for heights z+h ₀ z-touch/(z-true-z-touch) if z-touch if z-touch critical (/(v-m) ³)-am/0.16 if Verit-Vm "(v-m) ³ -am/0.16 if Verit-Vm "(v-m) ⁴ -v-touch)/(v-v-touch) if Verit-Vm "(v-m) ⁴ -v-touch)/(v-v-touch) if Verit-Vm	evation ng elevation DLATE CZ <zfull <="" j="" of="" rit="" top="" vv="">V_m</zfull>
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stact Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic Find Height above Stack a Height above Ground Z _{cm} ** Table of MERGED Plume-Averaged Vertics Height (fe above grou	locity at height at 273.29 s a #W/W v 3.30 s a #W/W v 3.30 s JE al velocity V _{cr} JE al velocities at the control of the c	t 1,000.0 meters* meters meter	feet 896.7 #N/A 10.86 m/s JET JET uching Height: Vert. Vel(m/s)	304.8 feet* feet ft/sec feet feet	Height above $V = (n(V^3a)_{tu})$ $V = (n(V^3a)_{tu})$ $V = V_{touch} + (V_{tuch} + (V_{t$	we stack wh "d/a) ^{1/3} for h V _m . V _{touch})*(; ove ground (; N TOP OF (:2-z _{1,ul}) if z ₂ "d/a) ^{1/3} if z ₂ V _m -V _{touch})*(if under allues TOUCHING + ([n(V³a) _j -ul -(z ₁ ul-z ₁ u-uch) -(z ₁ ul-z ₁ u-z ₂ u-uch) -(z ₁ ul-z ₂ u-uch)	ere Total Merging Occurs (steights above total merging elez-tenent/clurr-touch) for heights below total merging to z-thus) for heights below total merging the z-thus tot	evation ng elevation DLATE CZ <zfull <="" j="" of="" rit="" top="" vv="">V_m</zfull>
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stact Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic Find Height above Stack 2 Height above Ground Z _{ent*} . Table of MERGED Plume-Averaged Vertical Height (Height (Height)) Begin Merging (touch) = 16:	locity at height 2 273.29 at 273.29 at 4 V/V 3.330 at 273.29 at 4 V/V 4 3.30 at 273.29 at 273.20 at 273.29 at 273.20	t 1,000.0 9 meters* weekers mys t 5.30 meters meters meters meters ring at Tot p Plume c Radius(m) 3.050	feet 896.7 #N/A 10.86 m/s JET JET Uching Height: Vert. Vel(m/s) 4.89	304.8 feet* feet ft/sec feet feet	Height abox V=(n(V³a)rur V=Vrouch+(V³a)rur Meters abo LESS THAI a=am+0.16i V=(n(V³a)ru V=Vrouch+(V°a)ru V=Vrouch+(V°a)ru V=Vrouch+(V°a)ru V=Inder(V°a)ru V=Inder(V°a)ru V=Inder(V°a)ru V=Inder(V°a)rur V=Inder	we stack wh we stack who we stack who was taken with the state of the	ere Total Merging Occurs (steights above total merging ele z-z _{touch})/(z _{tull} -z _{touch}) for heights below total mergi z+h ₀) MERGING PHASE-INTERPC z-z _{tull} z-t _{ull} z-t _{ull} z-t _{ull} z-t _{ull} Critical ((v _{crit}) ³)-a _m)/0.16 if V _{crit} -V _u "(v _{crit} -V _{touch}) ((V _{url} -V _{touch}) if z _c see Single Plume spreadsheet y ² -(6.250-z,y ²)) ^{1/3} / a xrD ² /(4V _{plume} *a ² × ²)))	evation ng elevation LATE VV < Top of J rrit>Vm
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stack Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic Find Height above Stack a Height above Ground z _{crit} . Table of MERGED Plume-Averaged Vertical Height (fe above ground Begin Merging (touch) = 16:	locity at height 2 273.29 call velocity V _{cr} and velocity V _{cr} be all velocities state to (meters and above stact 19.4% call velocities 2.3 2.3 2.3 2.3 2.3 2.3 2.3 2.3 2.3 2.3	t 1,000.0 meters	feet 896.7 #N/A 10.86 m/s JET JET uching Height: Vert. Vel(m/s) 4.89 4.87	304.8 feet* feet ft/sec	Height abov $V=(n(V^3a)_{\text{tot}})$ $V=V_{\text{totch}}+(N)$ meters abov $LESS THAL$ $a=a_m+0.16l$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(N)$ $V=($	we stack whe stack whe we stack whe will also we ground ($M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$) over ground ($M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$) of $M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$) if $M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$ of $M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (For heights below total mergiz-Yapuch) (For heights Delay Total T	evation ng elevation LATE VV < Top of J rrit>Vm
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stact Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic Find Height above Stack z Height above Ground z _{cm} * Table of MERGED Plume-Averaged Vertic: Height (fe above ground Begin Merging (touch) = 16: 181	locity at height at 273.29 stal velocity V _{cr} at height V _{cr} at V and	t 1,000.0 meters	feet 896.7 #N/A 10.86 m/s JET JET sching Height: Vert Vert(m/s) 4.89 4.87 4.83	304.8 feet* feet ft/sec	Height abov $V=(n(V^3a)_{\text{tot}})$ $V=V_{\text{totch}}+(N)$ meters abov $LESS THAL$ $a=a_m+0.16l$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(N)$ $V=($	we stack whe stack whe we stack whe will also we ground ($M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$) over ground ($M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$) of $M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$) if $M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$ of $M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$	ere Total Merging Occurs (steights above total merging ele z-z _{touch})/(z _{tull} -z _{touch}) for heights below total mergi z+h ₀) MERGING PHASE-INTERPC z-z _{tull} z-t _{ull} z-t _{ull} z-t _{ull} z-t _{ull} Critical ((v _{crit}) ³)-a _m)/0.16 if V _{crit} -V _u "(v _{crit} -V _{touch}) ((V _{url} -V _{touch}) if z _c see Single Plume spreadsheet y ² -(6.250-z,y ²)) ^{1/3} / a xrD ² /(4V _{plume} *a ² × ²)))	evation ng elevation LATE VV < Top of J rit>Vm
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stack Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic Find Height above Stack 2 Height above Ground Z _{ent*} . Table of MERGED Plume-Averaged Vertical Height (fee above ground Begin Merging (touch) = 16: 188 200 201	locity at height 2 273.29 at 273.20 at 273.29 at 273.29 at 273.20	t 1,000.0 meters	feet 896.7 #N/A 10.86 m/s JET JET Vert. Vel(m/s) 4.89 4.87 4.83 4.79	304.8 feet* feet ft/sec	Height abov $V=(n(V^3a)_{\text{tot}})$ $V=V_{\text{totch}}+(N)$ meters abov $LESS THAL$ $a=a_m+0.16l$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(N)$ $V=($	we stack whe stack whe we stack whe will also we ground ($M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$) over ground ($M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$) of $M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$) if $M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$ of $M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (For heights below total mergiz-Yapuch) (For heights Delay Total T	evation ng elevation LATE VV < Top of J rit>Vm
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stacl Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic Find Height above Stack a Height above Ground z _{ent} -1 Table of MERGED Plume-Averaged Vertical Height (fe above groun Begin Merging (touch) = 16: 18: 200 22: 24:	V S V S V V S V V S V C C C C C C C C C	t 1,000.0 t 1,000.0 t 1,000.0 m/s meters met	feet 896.7 #N/A 10.86 m/s JET JET sching Height: Vert. Vel(m/s) 4.89 4.87 4.83 4.79 4.76	304.8 feet* feet ft/sec	Height abov $V=(n(V^3a)_{\text{tot}})$ $V=V_{\text{totch}}+(N)$ meters abov $LESS THAL$ $a=a_m+0.16l$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(N)$ $V=($	we stack whe stack whe we stack whe will also we ground ($M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$) over ground ($M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$) of $M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$) if $M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$ of $M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (For heights below total mergiz-Yapuch) (For heights Delay Total T	evation ng elevation LATE VV < Top of J rit>Vm
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stact Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic Find Height above Stack a Height above Ground z _{ent} -1 Table of MERGED Plume-Averaged Vertical Height (fe above ground Begin Merging (touch) = 16: 181 200 221 224 224 226	locity at height at 273.29 stal velocity V _{cr} all velocity V _{cr} between JE ⁻ h _b JE ⁻ all velocities stal velocities at 0.0 23.30 stal velocities at 0.0 23.55 stal velocities at 0.0 24.40 stal velocities at 0.0 41.60 stal velocities at 0.0 41.	t 1,000.0 meters* meters meter	feet 896.7 #N/A 10.86 m/s JET JET Iching Height: Vert. Vel(m/s) 4.89 4.83 4.79 4.76 4.72	304.8 feet* feet feet feet feet	Height abov $V=(n(V^3a)_{\text{tot}})$ $V=V_{\text{totch}}+(N)$ meters abov $LESS THAL$ $a=a_m+0.16l$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(N)$ $V=($	we stack whe stack whe we stack whe will also we ground ($M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$) over ground ($M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$) of $M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$) if $M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$ of $M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (For heights below total mergiz-Yapuch) (For heights Delay Total T	evation ng elevation LATE VV < Top of J rit>Vm
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stack Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic Find Height above Stack 2 Height above Ground Z _{ent*} . Table of MERGED Plume-Averaged Vertical Height (feabove ground Begin Merging (touch) = 16: 181 200 221 244 266 268	locity at height 2 273.29 s a #N/V 3.30 s a #N/V 5.30 s a	t 1,000.0 meters* meters meters mis t 5.30 meters meters t 5.30 meters t 5.30 meters meters t 8.30 meters meters meters t 10,000.0 meters	Tables Below feet 896.7 #N/A 10.86 m/s JET JET vert. Vel(m/s) 4.89 4.87 4.83 4.79 4.76 4.72 4.68	304.8 feet* feet ft/sec	Height abov $V=(n(V^3a)_{\text{tot}})$ $V=V_{\text{totch}}+(N)$ meters abov $LESS THAL$ $a=a_m+0.16l$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(N)$ $V=($	we stack whe stack whe we stack whe will also we ground ($M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$) over ground ($M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$) of $M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$) if $M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$ of $M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (For heights below total mergiz-Yapuch) (For heights Delay Total T	evation ng elevation LATE VV < Top of J rit>Vm 20 ft Intervals
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stact Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic Find Height above Stack a Height above Ground z _{ent} -1 Table of MERGED Plume-Averaged Vertical Height (fe above ground Begin Merging (touch) = 16: 181 200 221 224 224 226	locity at height 2 273.29 s a #N/V 3.30 s a #N/V 5.30 s a	t 1,000.0 meters* meters meters mis t 5.30 meters meters t 5.30 meters t 5.30 meters meters t 8.30 meters meters meters t 10,000.0 meters	feet 896.7 #N/A 10.86 m/s JET JET Iching Height: Vert. Vel(m/s) 4.89 4.83 4.79 4.76 4.72	304.8 feet* feet ft/sec	Height abov $V=(n(V^3a)_{\text{tot}})$ $V=V_{\text{totch}}+(N)$ meters abov $LESS THAL$ $a=a_m+0.16l$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(N)$ $V=($	we stack whe stack whe we stack whe will also we ground ($M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$) over ground ($M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$) of $M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$) if $M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$ of $M_{\rm m} \sim 10^{-10} {\rm kg}^{-1}$	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (For heights below total mergiz-Yapuch) (For heights Delay Total T	evation ng elevation LATE VV < Top of J rit>Vm 20 ft Intervals
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stack Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic Find Height above Stack 2 Height above Ground Z _{ent*} . Table of MERGED Plume-Averaged Vertical Height (feabove ground Begin Merging (touch) = 16: 181 200 221 244 266 268	V S C C C C C C C C C	t 1,000.0 t 1,000.0 t 1,000.0 ms t 5.30 ms t 1,000.0 ms t 1	Tables Below feet 896.7 #N/A 10.86 m/s JET JET vert. Vel(m/s) 4.89 4.87 4.83 4.79 4.76 4.72 4.68	304.8 feet* feet ft/sec	Height abov $V=(n(V^3a)_{\text{tot}})$ $V=V_{\text{totch}}+(N)$ meters abov $LESS THAL$ $a=a_m+0.16l$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(N)$ $V=($	we stack whe stack where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ for hr $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm $	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuc	evation ng elevation LATE VV < Top of J rit>Vm 20 ft Intervals
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stack Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic Find Height above Stack a Height above Ground z _{cm} . Table of MERGED Plume-Averaged Vertical Height (fe above ground Begin Merging (touch) = 16: 18i 200 22; 244 266 28i 30	Color Colo	t 1,000.0 meters* meters meter	feet 896.7 #N/A 10.86 m/s JET JET Uching Height: Vert. Vel(m/s) 4.89 4.87 4.83 4.79 4.76 4.72 4.68 4.64 4.64	304.8 feet* feet feet feet feet	Height abov $V=(n(V^3a)_{\text{tot}})$ $V=V_{\text{totch}}+(N)$ meters abov $LESS THAL$ $a=a_m+0.16l$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(N)$ $V=($	we stack whe stack where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ for hr $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm $	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuc	evation ng elevation LATE VV < Top of J rit>Vm 20 ft Intervals
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stact Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic Find Height above Stack z Height above Ground z _{ent} - Table of MERGED Plume-Averaged Vertici Height (fe above ground Begin Merging (touch) = 16: 181 200 221 244 266 288 300 301	locity at height at 273.29 state velocity V _{cr} at welocity V _{cr} at velocity V _{cr} at velocity V _{cr} at velocity V _{cr} at Velocities state at above stack at 29.0 at 29.4 state at 29.0 at 23.3 at 29.4 state at 29.0 at 29.4 state at 29.0 at 29.5 state at 29.0	t 1,000.0 meters* meters meters meters t 5.30 meters meter	feet 896.7 #N/A 10.86 m/s JET JET Iching Height: Vert. Vel(m/s) 4.89 4.83 4.79 4.76 4.68 4.64 4.55	304.8 feet* feet ff/sec	Height abov $V=(n(V^3a)_{\text{tot}})$ $V=V_{\text{totch}}+(N)$ meters abov $LESS THAL$ $a=a_m+0.16l$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(N)$ $V=($	we stack whe stack where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ for hr $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm $	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuc	evation ng elevation LATE VV < Top of J rit>Vm 20 ft Intervals
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stack Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic Find Height above Stack 2 Height above Ground Z _{ent*} . Table of MERGED Plume-Averaged Vertical Height (fouch) = 16: Begin Merging (touch) = 16: 20: 24: 24: 26: 28: 30: 30: 30: 30: 40:	Color Colo	t 1,000.0 t 1,000.0 meters met	Tables Below feet 896.7 #N/A 10.86 m/s JET JET vert. Vel(m/s) 4.89 4.87 4.83 4.79 4.76 4.72 4.68 4.64 4.55 4.45	304.8 feet* feet ft/sec	Height abov $V=(n(V^3a)_{\text{tot}})$ $V=V_{\text{totch}}+(N)$ meters abov $LESS THAL$ $a=a_m+0.16l$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(N)$ $V=($	we stack whe stack where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ for hr $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm $	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuc	evation ng elevation LATE VV < Top of J rit>Vm 20 ft Interval:
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stact Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic Find Height above Stack a Height above Ground z _{ent} -1 Table of MERGED Plume-Averaged Vertical Height (fe above ground Begin Merging (touch) = 16: 181 200 224 244 266 288 300 355 400 455	Color Colo	tolutions in t 1,000.0 meters* meters meter	feet 896.7 #N/A 10.86 m/s JET JET vel(m/s) 4.89 4.87 4.72 4.68 4.64 4.55 4.45 4.36	304.8 feet* feet ft/sec	Height abov $V=(n(V^3a)_{\text{tot}})$ $V=V_{\text{totch}}+(N)$ meters abov $LESS THAL$ $a=a_m+0.16l$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(N)$ $V=($	we stack whe stack where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ for hr $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm $	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuc	evation ng elevation LATE VV < Top of J rit>Vm 20 ft Interval:
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stack Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic Find Height above Stack 2 Height above Ground Z _{emt} -t Height for MERGED Plume-Averaged Vertical Height (fouch) = 16: 188 200 224 244 266 289 300 355 400 455	colority at height at 273.29 stal velocity V _{cr} at help by a 3.30 stal velocity V _{cr} by a 3.30 stal velocity V _{cr} by a 3.30 stal velocity V _{cr} by a 1 Velocities star of above stacification above stacifi	t 1,000.0 meters t 1,000.0 meters t 5.30 meters m/s t 5.30 meters mis t 5.30 meters mis t 1,000.0 meters mis t 5.30 meters mis t 1,000.0 mis t	Tables Below feet 896.7 #N/A 10.86 m/s JET JET sching Height. Vert. Vel(m/s) 4.89 4.87 4.83 4.79 4.76 4.72 4.68 4.64 4.55 4.45 4.36 4.26 4.17	304.8 feet* feet ft/sec	Height abov $V=(n(V^3a)_{\text{tot}})$ $V=V_{\text{totch}}+(N)$ meters abov $LESS THAL$ $a=a_m+0.16l$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(N)$ $V=($	we stack whe stack where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ for hr $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm $	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuc	evation ng elevation LATE VV < Top of J rit>Vm 20 ft Interval:
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stack Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic Find Height above Stack a Height above Ground z _{crit} . Table of MERGED Plume-Averaged Vertical Height (such) = 16: 18: 20: 24: 24: 26: 30: 35: 40: 45: 50: 55:	Color Colo	tolutions in t 1,000.0 t 1,000.0 meters' meters' meters	feet 896.7 #N/A 10.86 m/s JET JET Vet(m/s) 4.89 4.87 4.72 4.68 4.64 4.55 4.45 4.26 4.17 4.07	304.8 feet* feet ft/sec	Height abov $V=(n(V^3a)_{\text{tot}})$ $V=V_{\text{totch}}+(N)$ meters abov $LESS THAL$ $a=a_m+0.16l$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(N)$ $V=($	we stack whe stack where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ for hr $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm $	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuc	evation ng elevation LATE VV < Top of J rit>Vm 20 ft Interval:
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stact Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic Find Height above Stack a Height above Ground Z _{ent} -1 Table of MERGED Plume-Averaged Vertical Height (fe above ground Begin Merging (touch) = 16: 18i 200 221 244 266 28i 300 355 400 456 550 556 650 656	Color Colo	tolutions in t 1,000.0 meters* meters meter	feet 896.7 #N/A 10.86 m/s JET JET Iching Height: Vert. Vert. Vert. 4.89 4.87 4.79 4.76 4.45 4.46 4.45 4.36 4.26 4.17 4.07 3.98	304.8 feet* feet feet feet feet	Height abov $V=(n(V^3a)_{\text{tot}})$ $V=V_{\text{totch}}+(N)$ meters abov $LESS THAL$ $a=a_m+0.16l$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(N)$ $V=($	we stack whe stack where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ for hr $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm $	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuc	evation ng elevation LATE VV < Top of J rit>Vm 20 ft Interval:
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stack Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic Find Height above Stack 2 Height above Ground Z _{cmt} -t Height above ground Z _{cmt} -t Height for MERGED Plume-Averaged Vertical Height (for above ground Begin Merging (touch) = 16: 188 200 221 244 266 288 300 355 400 455 556 600 557	No. State No. No	t 1,000.0 meters t 1,000.0 meters t 5.30 meters mis t 5.30 meters mis t 5.30 meters mus t 5.30 meters mus t 6.30 meters mus t 7.30 meters mus t 1.00	Tables Below feet 896.7 #N/A 10.86 m/s JET JET sching Height: Vert. Vel(m/s) 4.89 4.87 4.79 4.76 4.72 4.68 4.64 4.55 4.45 4.36 4.20 4.17 4.07 3.988 3.88	304.8 feet* feet fr/sec	Height abov $V=(n(V^3a)_{\text{tot}})$ $V=V_{\text{totch}}+(N)$ meters abov $LESS THAL$ $a=a_m+0.16l$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(N)$ $V=($	we stack whe stack where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ for hr $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm $	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuc	evation ng elevation LATE VV < Top of J rit>Vm 20 ft Interval:
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stack Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic Find Height above Stack a Height above Ground z _{crit} . Table of MERGED Plume-Averaged Vertical Height (souch) = 16: 18: 20: 24: 24: 26: 30: 35: 40: 45: 50: 60: 65:	Color Colo	t 1,000.0 t 1,000.0 t 1,000.0 meters	feet 896.7 #N/A 10.86 m/s JET JET Vet(m/s) 4.89 4.87 4.72 4.68 4.64 4.55 4.36 4.26 4.17 4.07 3.98 3.88 3.78	304.8 feet* feet ft/sec	Height abov $V=(n(V^3a)_{\text{tot}})$ $V=V_{\text{totch}}+(N)$ meters abov $LESS THAL$ $a=a_m+0.16l$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(N)$ $V=($	we stack whe stack where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ for hr $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm $	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuc	evation ng elevation LATE VV < Top of J 20 ft Interval:
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stact Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic Find Height above Stack 2 Height above Ground Zent* Table of MERGED Plume-Averaged Vertics Height (fe above ground Begin Merging (touch) = 16: 181 200 221 244 266 288 300 355 400 455 556 656 657 750 757 757 758 850	Color Colo	tolutions in t 1,000.0 meters* meters meter	Tables Below feet 896.7 #N/A 10.86 m/s JET JET sching Height: Vel(m/s) 4.89 4.87 4.68 4.72 4.68 4.64 4.55 4.45 4.36 4.26 4.17 4.07 3.98 3.88 3.78 3.69	304.8 feet* feet feet feet	Height abov $V=(n(V^3a)_{\text{tot}})$ $V=V_{\text{tot}}+(N^3a)_{\text{tot}}$ meters abov $LESS THAL$ $a=a_m+0.16l$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(N^3a)_{\text{tot}}$ $V=(N^$	we stack whe stack where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ for hr $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm $	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuc	evation ng elevation LATE VV < Top of J 20 ft Interval:
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stack Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic Find Height above Stack 2 Height above Ground Z _{em} -t Height above ground Zem-t Height for MERGED Plume-Averaged Vertical Height (for above ground Begin Merging (touch) = 16: 188 200 221 244 266 286 300 355 400 455 500 556 600 656 770 757 880	No. State No. No	t 1,000.0 meters	Tables Below feet 896.7 #N/A 10.86 m/s JET JET sching Height: Vert. Vel(m/s) 4.89 4.87 4.79 4.76 4.64 4.72 4.68 4.64 4.55 4.45 4.36 4.36 4.26 4.17 4.07 3.988 3.88 3.78 3.69 3.59	304.8 feet* feet fr/sec	Height abov $V=(n(V^3a)_{\text{tot}})$ $V=V_{\text{tot}}+(N^3a)_{\text{tot}}$ meters abov $LESS THAL$ $a=a_m+0.16l$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(N^3a)_{\text{tot}}$ $V=(N^$	we stack whe stack where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ for hr $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm $	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuc	evation ng elevation LATE VV < Top of J 20 ft Interval:
Multiple Plume Calculations Solve for plume-averaged vertical ver	Color Colo	t 1,000.0 t 1,000.0 t 1,000.0 miss t 1,000.0 miss t 1,000.0 miss t 5.30 miss t 5.30 miss t meters T me	feet 896.7 #N/A 10.86 m/s JET JET Vet(m/s) 4.89 4.87 4.76 4.72 4.68 4.64 4.55 4.36 4.26 4.17 4.07 3.98 3.88 3.78 3.69 3.59 3.59 3.50	304.8 feet* feet feet feet	Height abov $V=(n(V^3a)_{\text{tot}})$ $V=V_{\text{tot}}+(N^3a)_{\text{tot}}$ meters abov $LESS THAL$ $a=a_m+0.16l$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(N^3a)_{\text{tot}}$ $V=(N^$	we stack whe stack where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ for hr $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm $	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuc	evation ng elevation LATE VV < Top of J VV = Top of J 20 ft Intervals
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stack Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic Find Height above Stack 2 Height above Ground Z _{em} -t Height above ground Zem-t Height for MERGED Plume-Averaged Vertical Height (for above ground Begin Merging (touch) = 16: 188 200 221 244 266 286 300 355 400 455 500 556 600 656 770 757 880	Color Colo	t 1,000.0 t 1,000.0 t 1,000.0 miss t 1,000.0 miss t 1,000.0 miss t 5.30 miss t 5.30 miss t meters T me	Tables Below feet 896.7 #N/A 10.86 m/s JET JET sching Height: Vert. Vel(m/s) 4.89 4.87 4.79 4.76 4.64 4.72 4.68 4.64 4.55 4.45 4.36 4.36 4.26 4.17 4.07 3.988 3.88 3.78 3.69 3.59	304.8 feet* feet feet feet	Height abov $V=(n(V^3a)_{\text{tot}})$ $V=V_{\text{tot}}+(N^3a)_{\text{tot}}$ meters abov $LESS THAL$ $a=a_m+0.16l$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(N^3a)_{\text{tot}}$ $V=(N^$	we stack whe stack where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ for hr $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm $	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuc	evation ng elevation LATE VV < Top of J 20 ft Interval:
Multiple Plume Calculations Solve for plume-averaged vertical ver	Color Colo	t 1,000.0 meters* meters meter	feet 896.7 #N/A 10.86 m/s JET JET Vet(m/s) 4.89 4.87 4.76 4.72 4.68 4.64 4.55 4.36 4.26 4.17 4.07 3.98 3.88 3.78 3.69 3.59 3.59 3.50	304.8 feet* feet feet feet	Height abov $V=(n(V^3a)_{\text{tot}})$ $V=V_{\text{tot}}+(N^3a)_{\text{tot}}$ meters abov $LESS THAL$ $a=a_m+0.16l$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(N^3a)_{\text{tot}}$ $V=(N^$	we stack whe stack where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ for hr $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm $	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuc	evation ng elevation LATE VV < Top of J 20 ft Interval:
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stact Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic Find Height above Stack 2 Height above Ground Zent* Table of MERGED Plume-Averaged Vertics Height (fe above ground Begin Merging (touch) = 16: 181 200 221 244 266 288 300 355 400 455 656 657 757 758 850 851 851 852 853	Color Colo	t 1,000.0 meters	Tables Below feet 896.7 #N/A 10.86 m/s JET JET sching Height: Vel(m/s) 4.89 4.87 4.68 4.72 4.68 4.64 4.55 4.45 4.36 6.426 4.17 4.07 3.98 3.88 3.78 3.59 3.50 3.40	304.8 feet* feet feet	Height abov $V=(n(V^3a)_{\text{tot}})$ $V=V_{\text{tot}}+(N^3a)_{\text{tot}}$ meters abov $LESS THAL$ $a=a_m+0.16l$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(N^3a)_{\text{tot}}$ $V=(N^$	we stack whe stack where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ for hr $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm $	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuc	evation ng elevation LATE VV < Top of J 20 ft Interval:
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stack Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic Find Height above Stack 2 Height above Ground Z _{em} -t Height above ground Zem-t Height for MERGED Plume-Averaged Vertical Height (for above ground Begin Merging (touch) = 16: 181 200 221 244 266 286 300 355 400 455 500 556 600 655 700 755 800 856 800 856	Color Colo	t 1,000.0 t 1,000.0 t 1,000.0 miss t 1,000.0 miss t 1,000.0 miss t 5.30 miss t 5.30 miss t 1,000.0 t 1,000	Tables Below feet 896.7 #N/A 10.86 m/s JET JET sching Height. Veft., Ve[m/s) 4.89 4.87 4.79 4.68 4.64 4.55 4.45 4.36 4.26 4.17 4.07 3.98 3.88 3.78 3.59 3.50 3.40 3.31	304.8 feet* feet feet feet	Height abov $V=(n(V^3a)_{\text{tot}})$ $V=V_{\text{tot}}+(N^3a)_{\text{tot}}$ meters abov $LESS THAL$ $a=a_m+0.16l$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(n(V^3a)_{\text{tot}})$ $V=(N^3a)_{\text{tot}}$ $V=(N^$	we stack whe stack where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ for hr $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ where $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm mid} = 10^{10} {\rm for \ hr}$ and $M_{\rm mid} = 10^{10} {\rm for \ hr}$ had $M_{\rm $	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuc	evation ng elevation LATE VV < Top of J 20 ft Interval:
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stact Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic Find Height above Stack 2 Height above Ground Zent* Table of MERGED Plume-Averaged Vertics Height (fe above ground Begin Merging (touch) = 16: 181 200 222 244 266 288 300 355 556 600 557 600 759 759 800 859 850 951 900 951 1000 1100 1100 1100 1100 1100	Color Colo	t 1,000.0 meters* meters meter	Tables Below feet	304.8 feet* feet feet feet	Height abov V=(n(V³a)ru V=V(n(V³a)ru V=V(n(V³a)ru V=V(n(V³a)ru V=V(n(V³a)ru V=(n(V³a)ru V=	we stack who was tack who was tack who was tack who was to the was tack who was tac	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuc	evation ng elevation LATE VV < Top of J 20 ft Interval:
Multiple Plume Calculations Solve for plume-averaged vertical ver	Color Colo	t 1,000.0 t 1,000.0 m/s meters	Tables Below feet 896.7 #N/A 10.86 m/s JET JET sching Height: Vert. Vel(m/s) 4.89 4.87 4.79 4.68 4.64 4.55 4.45 4.36 4.26 4.17 4.07 3.98 3.88 3.78 3.59 3.50 3.40 3.31 3.12 2.93 2.63	304.8 feet* feet ft/sec	Height abov V=(n(V³a)ru V=V(n(V³a)ru V=V(n(V³a)ru V=V(n(V³a)ru V=(Va)ru V=(we stack who we stack who was tack who was taken with a many to the was taken with a many taken was taken with a many taken was taken wa	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuc	evation ng elevation LATE VV < Top of J VV = Top of J 20 ft Intervals
Multiple Plume Calculations Solve for plume-averaged vertical vertical Solve for plume-averaged vertical Verti	Color Colo	t 1,000.0 t 1,000.0 meters met	Tables Below feet	304.8 feet* feet feet feet	Height abov V=(n(V³a)ru V=Vrouch+(N meters abo LESS THAI a=a _m +0.16; V=(n(V³a)ru V=(n(V³a)ru V=(ne)re Single Plun Zeni = Zriua + Zeni = Zriua Zeni = Zriua + Zeni = Zriua V=(Va)ru Merged Plu V=(n(V³a)ru V=(n(V³a)ru V=(n(V³a)ru V=(n(V³a)ru	we stack wh where the state where we ground (in the property of the state where the state where we state where we ground (in the property of the state where we ground (in the property of the state where we state whe	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuc	evation ng elevation LATE VV < Top of J VV = Top of J 20 ft Intervals
Multiple Plume Calculations Solve for plume-averaged vertical ve Gives the following Height above Stact Plume Top-Hat Radius Vertical Velocity Solve for Height of CASC critical vertic Find Height above Stack 2 Height above Ground Zent* Table of MERGED Plume-Averaged Vertics Height (fe above ground Begin Merging (touch) = 16: 181 200 222 244 266 288 300 355 400 455 650 656 657 700 758 800 858 859 959 1000 End Merging (full/mp) = 135 100 End Merging (full/mp) = 135 140 150 End Merging (full/mp) = 135 140 150 150 150 150 150 150 150 150 150 15	Second S	t 1,000.0 meters* t 1,000.0 meters* meters m	Tables Below feet 896.7 #N/A 10.86 m/s JET JET sching Height: Vel(m/s) 4.89 4.87 4.68 4.79 4.76 4.72 4.68 4.44 4.55 4.45 4.45 4.36 6.26 4.17 4.07 3.98 3.88 3.78 3.59 3.50 3.40 3.31 3.12 2.93 2.63 2.63	304.8 feet* feet feet feet feet	Height abov V=(n(V³a)ru V=V(n(V³a)ru V=V(n(V³a)ru V=V(n(V³a)ru V=(Va)ru V=(we stack wh where the state where we ground (in the property of the state where the state where we state where we ground (in the property of the state where we ground (in the property of the state where we state whe	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuc	evation ng elevation LATE VV < Top of J rit>V _m 20 ft interval:
Multiple Plume Calculations Solve for plume-averaged vertical ver	Color Colo	tolutions in the transport of the transport of the transport of the transport of tr	Tables Below feet 896.7 #N/A 10.86 m/s JET JET sching Height: Vert. Vel(m/s) 4.89 4.87 4.83 4.79 4.68 4.64 4.55 4.45 4.36 4.26 4.17 4.07 3.98 3.88 3.78 3.59 3.50 3.40 3.31 3.12 2.93 2.63 2.62 2.60 2.49	304.8 feet* feet feet	Height abov V=(n(V³a)ru V=Vrouch+(N meters abo LESS THAI a=a _m +0.16; V=(n(V³a)ru V=(n(V³a)ru V=(ne)re Single Plun Zeni = Zriua + Zeni = Zriua Zeni = Zriua + Zeni = Zriua V=(Va)ru Merged Plu V=(n(V³a)ru V=(n(V³a)ru V=(n(V³a)ru V=(n(V³a)ru	we stack wh where the state where we ground (in the property of the state where the state where we state where we ground (in the property of the state where we ground (in the property of the state where we state whe	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuc	evation ng elevation LATE VV < Top of J riti>V _m 20 ft intervals 100 ft interval
Multiple Plume Calculations Solve for plume-averaged vertical Ver	Color Colo	tolutions in the control of the cont	Tables Below feet 896.7 #N/A 10.86 m/s JET JET JET JET JET Vel(m/s) 4.89 4.87 4.83 4.79 4.76 4.72 4.68 4.64 4.55 4.45 4.36 4.26 4.17 4.07 3.98 3.88 3.78 3.69 3.59 3.50 3.40 3.31 3.12 2.93 2.63 2.63 2.63 2.69 2.49	304.8 feet* feet feet feet	Height abov V=(n(V³a)ru V=Vrouch+(N meters abo LESS THAI a=a _m +0.16; V=(n(V³a)ru V=(n(V³a)ru V=(ne)re Single Plun Zeni = Zriua + Zeni = Zriua Zeni = Zriua + Zeni = Zriua V=(Va)ru Merged Plu V=(n(V³a)ru V=(n(V³a)ru V=(n(V³a)ru V=(n(V³a)ru	we stack wh where the state where we ground (in the property of the state where the state where we state where we ground (in the property of the state where we ground (in the property of the state where we state whe	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuc	evation ng elevation DLATE CZ <zfull <="" j="" of="" rit="" top="" vv="">V_m</zfull>
Multiple Plume Calculations Solve for plume-averaged vertical ver	Second S	tolutions in the control of the cont	Tables Below feet 896.7 #N/A 10.86 m/s JET JET sching Height: Vel(m/s) 4.89 4.87 4.83 4.79 4.76 4.72 4.68 4.64 4.55 4.45 4.45 4.36 6.26 4.17 4.07 3.98 3.88 3.78 3.59 3.50 3.40 3.31 3.12 2.63 2.62 2.49 2.40 2.29	304.8 feet* feet feet feet	Height abov V=(n(V³a)ru V=Vrouch+(N meters abo LESS THAI a=a _m +0.16; V=(n(V³a)ru V=(n(V³a)ru V=(ne)re Single Plun Zeni = Zriua + Zeni = Zriua Zeni = Zriua + Zeni = Zriua V=(Va)ru Merged Plu V=(n(V³a)ru V=(n(V³a)ru V=(n(V³a)ru V=(n(V³a)ru	we stack wh where the state where we ground (in the property of the state where the state where we state where we ground (in the property of the state where we ground (in the property of the state where we state whe	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuc	evation ng elevation LATE VV < Top of J riti>V _m 20 ft intervals 100 ft Intervals
Multiple Plume Calculations Solve for plume-averaged vertical ver	Color Colo	t 1,000.0 t 1,000.0 t 1,000.0 m/s t 5.30 m/s t 1,000.0 m/s t 5.30 m/s t 1,000.0 m/s	Tables Below feet 896.7 #N/A 10.86 m/s JET JET JET JET JET JET JET JE	304.8 feet* feet feet feet	Height abov V=(n(V³a)ru V=Vrouch+(N meters abo LESS THAI a=a _m +0.16; V=(n(V³a)ru V=(n(V³a)ru V=(ne)re Single Plun Zeni = Zriua + Zeni = Zriua Zeni = Zriua + Zeni = Zriua V=(Va)ru Merged Plu V=(n(V³a)ru V=(n(V³a)ru V=(n(V³a)ru V=(n(V³a)ru	we stack wh where the state where we ground (in the property of the state where the state where we state where we ground (in the property of the state where we ground (in the property of the state where we state whe	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuc	evation ng elevation LATE VV < Top of J riti>V _m 20 ft intervals 100 ft Intervals
Multiple Plume Calculations Solve for plume-averaged vertical Ver	Color Colo	t 1,000.0 t 1,000.0 t 1,000.0 m/s t 5.30 m/s t 1,000.0 m/s t 5.30 m/s t 1,000.0 m/s	Tables Below feet 896.7 #N/A 10.86 m/s JET JET JET JET JET JET JET JE	304.8 feet* feet feet feet	Height abov V=(n(V³a)ru V=Vrouch+(N meters abo LESS THAI a=a _m +0.16; V=(n(V³a)ru V=(n(V³a)ru V=(ne)re Single Plun Zeni = Zriua + Zeni = Zriua Zeni = Zriua + Zeni = Zriua V=(Va)ru Merged Plu V=(n(V³a)ru V=(n(V³a)ru V=(n(V³a)ru V=(n(V³a)ru	we stack wh where the state where we ground (in the property of the state where the state where we state where we ground (in the property of the state where we ground (in the property of the state where we state whe	ere Total Merging Occurs (steights above total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuch) (for heights below total merging elez-Yapuch) (Zull"-Zapuch) (Zull"-Zapuc	evation ng elevation LATE VV < Top of J riti>V _m 20 ft intervals 100 ft Intervals

