APPENDIX 4.2.2

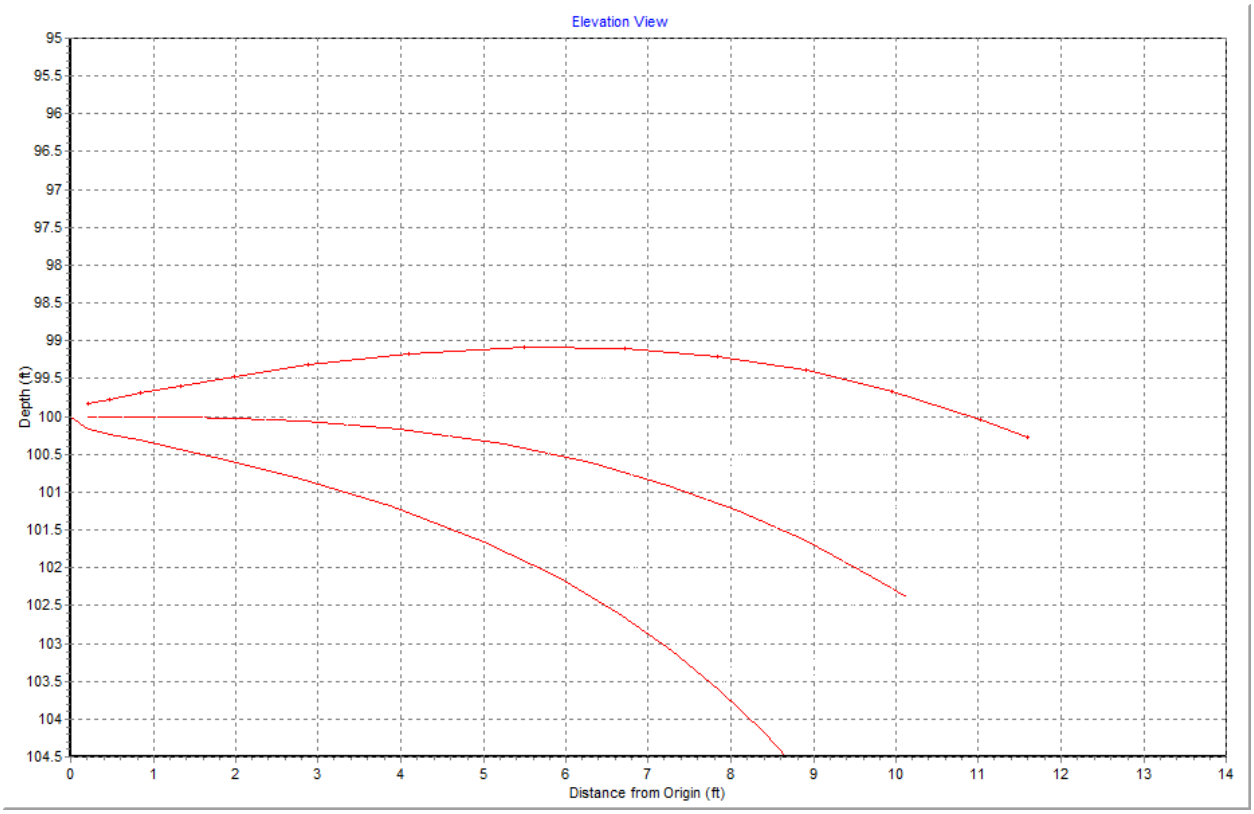
BRINE DISCHARGE ANALYSIS FOR THE FINAL EIR

APPENDIX 4.2.2

BRINE DISCHARGE ANALYSIS FOR THE FINAL EIR

Plumes 18b Modeling Assessment of Deleterious Diffuser Entrainment for the Doheny Desalination Project

By Scott A. Jenkins, Ph.D.



Submitted by:
Scott A. Jenkins, Ph.D.
Technical Manager, Coastal Sciences & Engineering
Michael Baker International

Submitted to:
Mark Donovan, PE
Senior Process Engineer
GHD
175 Technology Drive, Suite 200
Irvine CA 92618 USA

15 January 2019

ABSTRACT: Diffusers intrinsically generate strong turbulent jets in order to produce mixing and rapid dilution of effluent, and the shearing action of those turbulent jets can potentially damage or kill small delicate organisms entrained into those jets (sometimes referred to as *diffuser turbulence mortality*). The implementation section of the brine amendment to the California Ocean Plan, Section III.M.2 (b), requires that brine diffusers must minimize and mitigate for such marine life impacts, and the California State Water Resources Control Board has released newly defined protocols that require the use of a specific hydrodynamic mixing model (referred to as *Plumes 18b*) to assess those impacts. Plumes 18b is not supported by US EPA, but the State Water Board has made executable files for this model publicly available on their web site, along with a technical guidance document on how to assess deleterious entrainment from brine diffusers. These protocols using the Plumes 18b model are implemented in this study to assess potential injury or mortality to small marine organisms entrained by discharges from the diffuser of the San Juan Creek Ocean Outfall (SJCOO) that is being proposed as the discharge structure for brine by-product from the Doheny Desalination Project (DDP).

In general, Plumes 18b predicted higher *Minimum Initial Dilution*, and smaller *Zones of Initial Dilution*, ZID at deeper depths than was reported previously by DDP dilution studies using the US EPA supported Visual Plumes (UM3). Using Plumes 18b, all of the buoyant DDP discharge scenarios are found to achieve the required 101 to 1 minimum initial dilution required under the current NPDES permit for the SJCOO, (No. CA 0107417, Order No. R9-2012-0012 as amended by Order No. R9-2014-0105). For any given amount of SOCWA wastewater, the addition of any amount of DDP brine reduces both the minimum initial dilution as well as the effective (average or bulk) dilution at the maximum rise of the plume, while reducing the size of the ZID. This is not altogether a bad result, so long as there remains adequate dilution to satisfy present or future NPDES permit requirements for minimum initial dilution; which indeed appears to be the case. The reduction of buoyant effluent dilution caused by adding brine to SOCWA wastewater has a favorable effect on potentially deleterious diffuser entrainment, even though buoyant discharges appear to be exempt from requirements to assess, minimize or mitigate for diffuser turbulence mortality impacts to entrained marine organisms under the present structure of the amended Ocean Plan (SWRCB,2015). The Plumes 18b results show that for any given amount of SOCWA wastewater, the addition of any amount of DDP brine reduces the deleterious diffuser entrainment rate, thus improving upon an existing condition that is not mitigatable under present implementation practices of the Ocean Plan. Therefore, no mitigation should be required for DDP operational scenarios that result in buoyant combined discharges with SOCWA wastewater. The net turbulence mortality benefit achieved by combining DDP brine with SOCWA wastewater increases with decreasing combined discharge rate, as smaller jet velocities with larger Kolmogorov turbulent eddies occur at lower combined discharge rates.

The Plumes 18b dilution modeling results for the combinations of SOCWA wastewater and DDP brine that produce dense (negatively buoyant) discharges involve either brine-only or high-brine ratio discharges, typical of conditions anticipated during dry-weather wastewater effluent streams or future water reclamation conditions. Again, Plumes 18b has predicted higher effective dilution and shorter distances to the 2 ppt over natural background compliance threshold than was reported previously in DDP dilution studies using the US EPA supported Visual Plumes (UM3). Based on long term averages of ambient salinity records, natural background salinity at the SJCOO is 33.52 ppt, so that the compliance threshold 35.52 ppt under Appendix-A brine amendment provisions of the California Ocean Plan (SWRCB, 2015). Plumes

18b results indicate this compliance threshold is met in less than 2.5 ft. from the point of discharge by all DDP dense discharge operating conditions; whereas the Ocean Plan requires this compliance threshold is reached within 100 m from the discharge point. Thus, the DDP would be fully compliant with Ocean Plan brine discharge limits by a wide margin of safety, according to Plumes 18b dilution simulations. The jets of the SJCOO diffuser discharge parallel to the bottom and the ports are only 4.5 ft. above the bottom. Consequently the trajectories of these dense DDP discharges travel relatively short distances before reaching maximum rise or bottom hit points. This behavior, in turn, causes the Kolmogorov eddy scales in the diffuser jets to remain small (less than 0.2 mm), and presumably injurious according to the injury hypothesis advanced in the State Water Boards turbulence mortality guidance document. But these short trajectories also limit the effective (bulk or average) dilution and therefore limit the deleterious diffuser entrainment. By the literal interpretation of the State Water Board's guidance document mitigation scaling for brine diffuser turbulence mortality should only be based on the entrainment at the maximum rise of the plume, which range from 67 mgd to 729 mgd for dense DDP discharges.

Plumes 18b Modeling Assessment of Deleterious Diffuser Entrainment for the Doheny Desalination Project

By Scott A. Jenkins, Ph.D.

1) Introduction:

This is a hydrodynamic modeling analysis to assess potential injury or mortality to small marine organisms entrained by discharges from the diffuser of the San Juan Creek Ocean Outfall (SJCOO) that is being proposed as the discharge structure for brine by-product from the Doheny Desalination Project (DDP). Diffusers intrinsically generate strong turbulent jets in order to produce mixing and rapid dilution of effluent, and the shearing action of those turbulent jets can potentially damage or kill small delicate organisms entrained into those jets, phenomena referred to herein as *turbulence mortality*. The present analysis is based on newly defined protocols by the California State Water Resources Control Board as outlined in Roberts (2018a). These protocols require the use of a specific hydrodynamic mixing model referred to as *Plumes 18b*. Plumes 18b is not supported by the USEPA, but is a derivative of the *Visual Plumes (UM3)* model which USEPA does support, (cf. Frick, et al, 2003); and both models share the same principal developer, Dr. Walter Frick. The antecedent dilution modeling for the Doheny Desalination Project appearing in Jenkins (2016 & 2017) was performed using the Visual Plumes (UM3) model; but implementation of the methods in Roberts (2018) technical guidance document require that dilution be recalculated using Plumes 18b. Some differences were found between the dilution estimates originally calculated in Jenkins (2016 & 2017) using Visual Plumes (UM3) versus those calculated herein using Plumes 18b, but those differences did not change the fundamental conclusion that the 14 brine discharge scenarios in Table 1 that span the proposed operating range of the Doheny Desalination Project, are all compliant with requirements for both buoyant and dense discharges under the California Ocean Plan, (SWRCB, 2015).

A careful read of the *Appendix-A brine amendment* of the California Ocean Plan indicates that combining indicates that combining brine from desalination plants with wastewater from municipal wastewater treatment facilities, and utilizing existing treated wastewater outfalls is the preferred discharge technology, and that discharge strategy is exactly what is proposed for the Doheny Desalination Project. The implementation section of the brine amendment to the California Ocean Plan, Section III.M.2 (b), requires that:

> *Multiport diffusers shall be engineered to maximize dilution, minimize the size of the brine mixing zone, minimize suspension of benthic sediments, and mortality of all forms of marine life*

This requirement appears only in the *Appendix-A brine amendment* of the California Ocean Plan, and therefore, implicitly applies only to the dense (negatively buoyant) discharge scenarios that appear as the red or black entries in Table-1. Buoyant discharges, such as wastewater discharges are regulated under a completely different set of compliance standards found in *Appendix I* of the *California Ocean Plan*. There are no implementation provisions in Appendix-I that require diffusers discharging buoyant effluent to minimize turbulence mortality; and no wastewater

Table 1 Plumes 18b Modeling Scenarios for the Doheny Desalination Project

SOCWA Wastewater Flow Rates (MGD)	Brine Discharge Rate (MGD)	Combined Discharge Rate (MGD)	Combined Discharge Salinity (ppt)	Density Anomaly $\Delta\rho / \rho$
0	**3.0**	***3.0***	***67.0***	**-0.0268**
1.8*	***3.0***	***4.8***	***54.43***	***-0.0167***
0.0	**5.0**	**5.0**	**67.0**	**-0.0268**
0.35	**5**	**5.35**	**62.63**	**-0.0233**
0.0	**10.0**	**10.0**	**67.0**	**-0.0268**
0.0	**15.0**	**15.0**	**67.0**	**-0.0268**
8.0	**15.0**	**23.0**	**43.69**	**-0.00839**
13.0	**15.0**	**28.0**	**35.89**	**-0.00197**
8.0	**5.0**	**13.0**	**25.77**	**+0.00636**
13.0	**5.0**	**18.0**	**18.61**	**+0.01225**
18.9	**5.0**	**23.9**	**14.02**	**+0.0160**
18.9	**15.0**	**33.9**	**29.64**	**+0.0032**
31.0	**5.0**	**36.0**	**9.30**	**+0.0199**
31.0	**15.0**	**46.0**	**21.85**	**+0.0096**

Notes:
***** well water from Doheny and Capistrano beaches substituted for SOCWA wastewater
Red & Black = dense (negatively buoyant) discharges
Blue = buoyant discharges

authority or sanitation district in California has been required to assess or mitigate for deleterious entrainment by the wastewater outfall diffusers. Consequently, many readers of the Ocean Plan have inferred that turbulence mortality assessment and mitigation would not be required for blended brine/wastewater operating conditions that result in a buoyant combined effluent (such as the blue entries in Table-1). Nonetheless we will apply herein the State Water Board turbulence mortality assessment criteria outlined in Roberts (2108a) to the 6 buoyant effluent operating scenarios in Table-1; and demonstrate net incremental changes over present SOCWA wastewater-only operating conditions would be reductions in potentially deleterious entrainment due to additions of brine, and consequently the Doheny Desalination Project would have no net mitigatable impact for those combined buoyant effluent cases. For the remaining 8 dense effluent discharge cases in Table 1 (red and black entries), turbulence mortality assessment criteria are applied as outlined in Roberts (2108a), leading to results for potentially deleterious entrainment, which will be throughput to a subsequent ETM/APF (Empirical Transport Model/Area of Production Foregone) analysis in a companion study to compute the mitigation scaling for diffuser turbulent shear impact.

2) Turbulence Mortality Technical Approach:

The calculus presented in Roberts, (2018a) to assess injury or mortality to organisms entrained by brine diffuser discharges (aka, turbulence mortality) has three components:

1) *Injury Hypothesis* based on the notion that injury or mortality occurs when entrained organisms are exposed to a specific type of diffuser-induced turbulent eddy that is smaller than what is found in ambient ocean turbulence yet comparable to the size of the organism. Therefore, the smallest naturally occurring eddies in ambient ocean turbulence establish the injury threshold, which is assumed to be 1 mm.

2*) Empirical Relations* that relate the size of that specific type of diffuser-induced eddy to the distance from the point of discharge.

3) *Entrainment Calculations* based on dilution-trajectory results from the Plumes 18b that yield the entrainment rate between the point of discharge and the point where a specific type of diffuser-induced eddy becomes comparable to or larger than what is found in ambient ocean turbulence. This entrainment rate is presumed to be deleterious and is throughput to the ETM/APF (Empirical Transport Model/Area of Production Foregone) calculus to compute the mitigation scaling for diffuser turbulent shear impact. (Note the ETM/APF is not a component of the Roberts calculus)

The injury hypothesis is based on the notion that only those entrained organisms which are comparable to, or smaller than, Kolmogorov turbulence scales will suffer injury or mortality. To isolate the incremental injury and mortality due to the diffuser from what occurs naturally in ambient ocean turbulence, diffuser entrainment impacts are assumed to occur only in those regions of the diffuser discharge where the Kolmogorov scales are smaller than the natural Kolmogorov scale in the ocean water mass around the diffuser. This limits the size of the entrained organism that are assumed to be impacted by the diffuser to only the smallest, most fragile, populations in the receiving waters. However, this assumption also makes implementation of this theory reliant on a highly site-specific parameter that is extremely difficult and costly to measure, namely Kolmogorov scale ocean turbulence. Walter, et al., (2014) measured Kolmogorov scale ocean turbulence in a massive field effort that deployed Doppler velocimeters and fast-response conductivity-temperature sensors mounted on an underwater turbulence flux tower located in the far southern end of Monterey Bay, (offshore of the Hopkins Marine Station in Pacific Grove). These measurements suggest the smallest naturally occurring turbulent eddies in Monterey Bay are about 1 mm in size. No such direct measurements of Kolmogorov scale ocean turbulence exist anywhere else in California, and collecting such data would be a significant research effort. We note turbulence measurements off Vancouver Island by Grant, et al. (1962) found that Kolmogorov scale ocean turbulence was on the order of 2 cm, 20 times greater than the Monterey Bay measurements. The uncertainty of how Kolmogorov scale ocean turbulence varies throughout the coastal waters of California will radically impact the final calculations of volume of entrained water that is considered to be deleterious, because it dictates the injury threshold of the entire turbulence mortality assessment.

Nonetheless, we are compelled herein to adopt the nearest neighbor assessment of ocean Kolmogorov scales, and base our turbulence mortality assessments on the Monterey Bay measurements.

The second component in the Roberts method for turbulent mortality assessment are *empirical relations* that relate the size of a specific type of diffuser-induced eddy (the Kolmogorov scale) to the distance from the point of discharge. The Kolmogorov eddy size is calculated with a simple empirical relation derived from laboratory measurements of turbulent jet:

$$\eta_c = 0.24\, x\, \mathrm{Re}^{-3/4} \qquad (1)$$

Where η_c is the Kolmogorov eddy size along the jet centerline, x is the distance from the discharge point, $\mathrm{Re} = u\,d\,/\,\nu$ is the Reynolds number based on the discharge velocity, *u*, the jet port diameter, *d*, and the kinematic viscosity, ν = 1.17 X 10^{-6} m^2/s. However, in both Roberts (2018 a & b) the calculations of Kolmogorov eddy scales and the associated deleterious entrainment are stopped at the maximum rise height (apex) of the brine plume trajectory, even though the Kolmogorov scale eddies at the apex are still very much smaller than the injury threshold of 1 mm. The reason for this truncation of the calculation is because equation (1) is based on measurements of laboratory scale jets by Wygnanski and Fiedler (1969), which omitted buoyancy effects. Beyond the apex of a brine discharge trajectory buoyancy forces begin to exceed the inertial forces and the discharge transitions from being a jet to becoming a negatively buoyant plume. In the application to the 8 dense (negatively buoyant) discharge cases in Table 1 (red and black entries), we not only estimate deleterious entrainment from Kolmogorov eddy scales at the apex of the trajectory, but also carry the calculation all the way to the point where the Plumes 18b model finds the trajectory hits the bottom. We do so because the jets of the SJCOO diffuser discharge parallel to the bottom and the ports are only 4.5 ft. above the bottom, whence the discharge trajectory probably remains a jet at the point of contact with the bottom. The decisive issue with proceeding with the equation (1) is that the Kolmogorov scale remains less than 1 mm at either the apex of the trajectory or at the point where the trajectory makes contact with the bottom

The third component of the turbulence mortality assessment (as set forth in the Roberts (2018a) turbulent mortality guidance document) are *entrainment calculations*, most accurately made using hydrodynamic mixing models to determine dilution at the maximum rise or bottom hit points of the discharge trajectory. Until April 2018, the California State Water Resources Control Board had been following a procedure where dilution credits for ocean outfall diffusers, and other diffuser related issues were evaluated using only those models that had been fully vetted by US EPA. The last time US EPA went through this formal vetting processes was 2003 (cf. Frick et al., 2003), and only three mixing models emerged with EPA certifications: *PDSWIN*, *Visual Plumes* or *CORMIX*. However, Roberts (2018a) is recommending use of a model that US EPA has not formally vetted, namely *UM3 version 17b*, aka *Plumes 17b*. US EPA does not support Plumes 17b, and the executable files for that model were only made publicly available by the State Water Resources Control Board on their web site for a brief time in late April and early May 2018. When it was discovered that Plumes17b had programming bugs, it was replaced with Plumes 18b on the State Water Resources Control Board web site, circa 30 May 2018. There is no written documentation specific to the implementation of Plumes 18b and the "Help"

buttons in the model do not work. However, Plumes 18b has been graciously supported by Dr. Walter Frick (US EPA retired), the Plumes 17b and Plumes 18b developer, who has answered many questions by e-mails and phone calls that has allowed us to become proficient in running this model.

The key outputs of the Plumes 18b are the trajectories of discharge and the dilution calculated along those trajectories. Plumes 18b is used to find the distance to the point of maximum rise of the discharge trajectory, X_a or the distance to the point where the plume contacts the bottom, X_b; and these values are inserted in equation (1) to determine if the Kolmogorov scale eddies remain less than the injury threshold of 1 mm. Once this condition has been verified, the deleterious entrainment by the diffuser is calculated by:

$$Q_c = S_{a(x=X_a)} Q_j \qquad (2)$$

or:

$$Q_c = S_{a(x=X_b)} Q_j \qquad (3)$$

where Q_c is the deleterious entrainment rate, Q_j is the total discharge rate of all 125 jets of the SJCOO diffuser; $S_{a(x=X_a)}$ is the effective (average or bulk) dilution at the maximum rise of the discharge trajectory, and $S_{a(x=X_b)}$ is the effective (average or bulk) dilution where the discharge trajectory makes contact with the bottom. The solutions to equations (2) and (3) are then passed on to the ETM/APF model to compute the mitigation scaling for diffuser turbulent shear impact.

3) Initialization of Plumes 18b:

Plumes 18b provides data entry with three main input tabs: 1) Diffuser, 2) Ambient, and 3) Special Settings. The input fields for these three tabs are listed at the top of the text output files of each of the modeling scenarios appearing in Appendices A-C. The input fields for are listed below with applicable explanations for the input into each field:

3.1) Diffuser Input Tab: Diffuser and effluent characteristics are necessary to determine the momentum of the effluent as it enters the receiving water and the density of the effluent (which will affect its buoyancy in the receiving water).

3.1.1. Port Diameter: Plumes 18b data entry limitations only allow a single input for "Port Diameter". Thus, a single port diameter must be determined. This

was done by taking an average port size of all the ports as summarized in Table 1. Using the information contained in Table 1, one may compute the average port area (7.30 in^2) and average port diameter (3.05 inches) for the SJCOO diffuser. A port diameter of 3.05 inches was input to Plumes 18b.

3.1.2. Vertical Angle: The vertical angle is defined in the Visual Plumes manual (http://www.epa.gov/ceampubl/swater/vplume/) as the discharge angle relative to the horizontal with zero being horizontal, 90 being vertical upward, and -90 being vertically

downward. Appendix-A drawings indicate that the ports are located on the diffuser facing opposing directions, 180 degrees away from each other. A data entry limitation of Plumes 18b is that only one vertical angle may be entered. In cases where there is potential for two plumes emitted from different angles on the diffuser to merge within

the water column, the Visual Plumes manual suggests modeling the diffuser as if all ports are on one side of the diffuser and with half the spacing. In situations where the potential for plume merging is considered to be negligible, an alternative approach is to model one-half of the diffuser (i.e., one plume) and assume no cross-merging of plumes. Because the plumes from each side of the diffuser are assumed to have the potential to merge, both sides of the diffuser have been included in the simulation (i.e., all ports are treated as if they are on one side of the diffuser and with half the spacing). A single vertical angle of 0 degrees was used in all runs of the Plumes 18b model.

3.1.3. Horizontal Angle: Appendix-A drawings indicate that the ports are located on the diffuser with no horizontal deflection. Therefore a single horizontal angle of 0 degrees was used on each leg in the model.

3.1.4. Source Coordinates: these entries establish the origin of the Plumes 18b coordinate system. These were set at x-coord = 0, y-coord = 0, consistent with the values used in the Plumes 17b simulation examples appearing in Appendix-B of Roberts (2018a).

3.1.5. Number of Ports: The number of ports specified in the Appendix A drawings of the most recent NPDES permit for the SJCOO outfall (cf: RWQCB, 2014) is 125 ports. The outfall rehabilitation report indicated all obstructed ports were cleared in April and May of 2015. 125 ports was entered into the model.

3.1.6. Port Spacing: The Appendix A drawings in the most recent NPDES permit for the SJCOO outfall (cf: RWQCB, 2014) indicate that the ports were approximately 24 feet apart. Both sides of the diffuser are being modeled on one side of the diffuser; a value of 12 feet was entered into the model.

3.1.7. n/r: This entry defines the maximum run time allowed by the model. A value of 3600 s on the advice of Dr. Walter Frick, (Plumes 18b developer).

3.1.8. Mix Zone Distance: This value is not relevant to the final initial dilution calculations and has no impact on model output. The Plumes 18b software requires that a value be entered into these fields. Therefore, 1000ft was entered based on the size of the monitoring zone under the present NPDES permit (cf; RWQCB, 2014)

3.1.9. Isopleth Value: This value is not relevant to the final initial dilution calculations. A value of concent = 0 was entered, consistent with the values used in the Plumes 17b simulation examples appearing in Appendix-B of Roberts (2018a).

3.1.10. Port Depth: Appendix A and Figure 1 of the most recent NPDES permit for the SJCOO outfall (cf: RWQCB, 2014) indicate that the diffuser discharge depth is 100 feet at the inshore end of the diffuser. A value of 100 feet was used in the model.

3.1.11. Effluent Flow: These values were separately entered into the effluent flow field for each of the modeling scenarios listed in Table-1.

3.1.12. Effluent Salinity: These values were separately entered into the effluent saliity field for each of the modeling scenarios listed in Table-1.

3.1.13) Effluent Temperature: SOCWA provided average monthly temperature data from January 2014 through September 2016. The density of water is a function of temperature. Therefore, a smaller difference in temperature between the effluent and receiving waters will produce a relatively smaller difference between the densities of the effluent and receiving waters and less dilution is likely to occur. Effluent temperatures ranged from a maximum of 29.44^0C to a minimum of 21.66^0C, with a mean effluent temperature of 25.62^0C. Receiving water temperatures are significantly lower than the temperature of the effluent discharged from the SJCOO. Thus, a lower effluent temperature is likely to result in lower dilution. The lowest monthly average temperature of 71ºF (21.66 ^{0} C) was entered into the data field.

3.1.14) Effluent Concentration: This data field does not have an effect on the final initial dilution calculated. However a value must be entered into this field for the model to run, and a default value equivalent to the salinity field expressed in parts per million (ppm) was entered.

3.2 Ambient Input Tab: This tap specifies ambient profiles for neafield current speeds and directions, salinity, temperature, background concentrations, pollutant decay rates, the n/r run-time parameter, and the far-field diffusion coefficient. The tab only excepts nine depth increments to specify the ambient profiles. The current is always set to zero when running models for the Ocean Plan, and the background concentrations, pollutant decay rates, the n/r run-time parameter, and the far-field diffusion coefficients are irrelevant entries, and the values used for these entries are the same as those used in the Plumes 17b simulation examples appearing in Appendix-B of Roberts (2018a). However, the depth profiles for ambient salinity and temperature are most important as these entries define the natural stratification of the receiving waters.

The receiving water salinity/temperature profile from September 2008 was used to define worst case scenario for determination of "*the lowest average initial dilution within any single month of the year*" per Provision III.C.4.d of the Ocean Plan. This is the same profile used in the Appendix H dilution study of the most recent NPDES permit for the SJCOO outfall (cf: RWQCB, 2014). These profiles are plotted in Figure 1. While the salinity profile is fairly uniform with depth of water over the SJCOO, (with an average salinity of 33.37 ppt), the temperature is found to gradually decline with water depth, varying between 19.9 ^{0} C on the surface to 13.4^0 C at the seafloor around the outfall. Normally there is a very abrupt change in water temperature between the warm surface mixed layer and the cold bottom water; and this

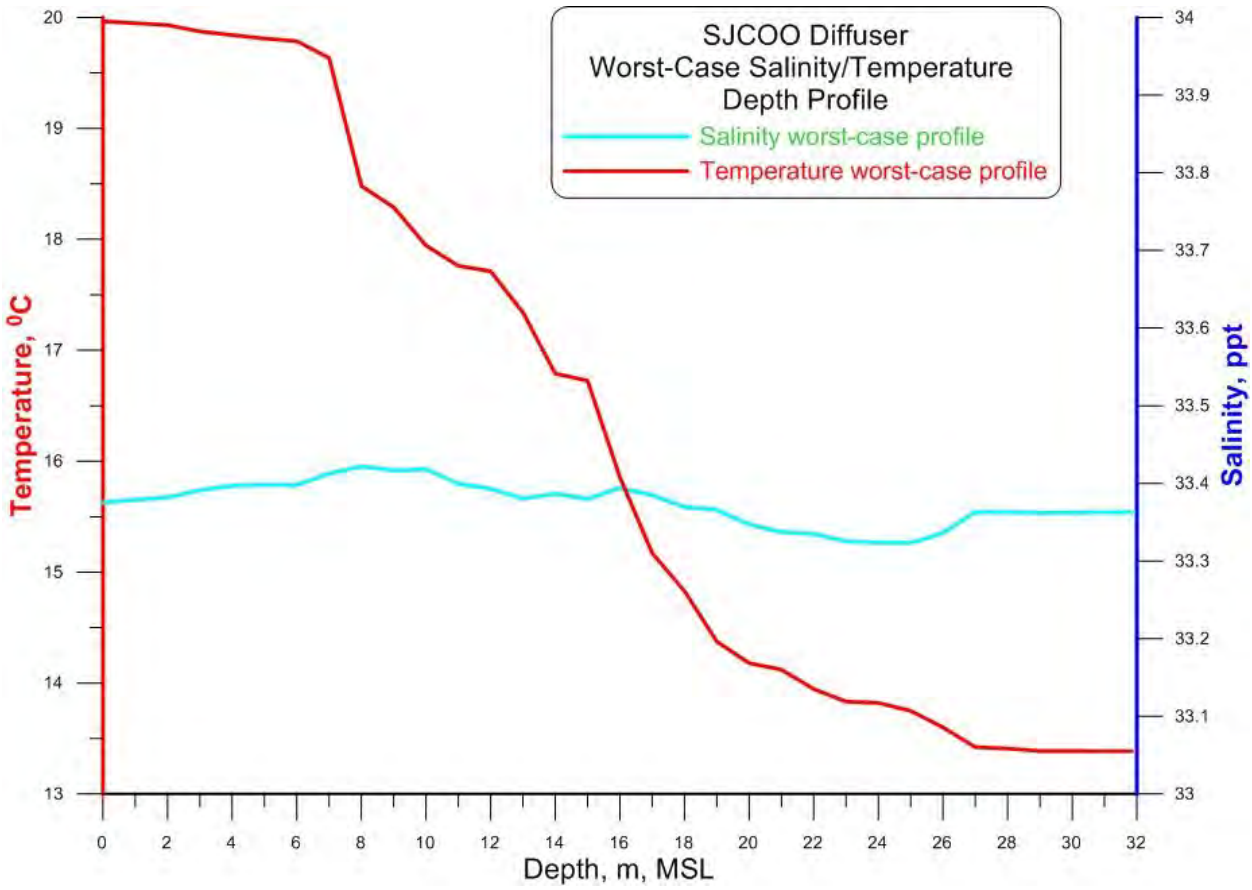


Figure 1: Worst-case temperature salinity profile as presented in Appendix-H of RWCQB (2014) for update of the diffuser performance and minimum dilution assessment of the SJCOO. Profiles based on 17 September 2008 upwelling and discharge conditions.

abrupt change referred to as a thermocline produces a trapping layer at the thermocline interface, where the partially diluted discharge plume no longer has sufficient positive buoyancy to penetrate the thermocline, and instead spreads out horizontally along the thermocline interface resulting in a trapping level beneath the sea surface. However, the temperature profile in Figure 1 varies so gradually that there is not a well-defined pycnocline and the trapping layer is poorly formed; whence the buoyant wastewater is able to rise to the sea surface, 29 m above the deepest sections of the SJCOO diffuser. As a result the ZID boundary becomes the sea surface and the distance from the point of discharge where minimum dilution is defined defaults to 29 m, in spite of the fact that the plume still has residual momentum and kinetic energy imparted to it by the discharge jets.

There is a minor difference in the particular portions of the Figure 1 ambient profile that were used for the Plumes 18b simulations of the buoyant discharge scenarios versus that used for the dense (negatively buoyant) simulations. Plumes 18b only allows 9 depth entries to specify the ambient profile, and yet there are 30 depth entries in the field data for the September 2008 ambient profile in Figure 1. Consequently, some selective judgement was used in deciding which of the 30 measured depth increments in Figure 1 ambient profile should be loaded into the

ambient input tab of Plumes 18b. It is notable that there is little variability in both the salinity or temperature profiles in Figure-1 below a depth of 28 m MSL. For the buoyant discharge scenarios in Table-1, where the discharge trajectory is essentially vertically upward from the discharge point, the last depth entry in the ambient tab was set at a depth of 29 m, about 1.5 m above the depth of the discharge ports. However, when this same ambient tab profile was used on the dense (negatively buoyant) scenarios, The Plumes 18b simulations would continue down through the bottom and beyond. (This same problem is found in the Plumes 17b simulations of the Huntington Beach diffuser in Roberts, 2018b). The seabed at the SJCOO outfall is at a depth of 104.5 ft. MSL, or 31.85 m MSL, and yet some of the negatively buoyant simulations would continue on to depths of several hundred meters. This problem arises from the fact that Plumes 18b (unlike Visual Plumes), has no data entry for the elevation of the discharge ports above the seabed, and thus the model really doesn't know where the bottom is! After consulting with Dr. Walter Frick (Plumes 18b developer), the solution to this problem was achieved by setting the last depth entry in the Plumes 18b ambient tab at precisely the depth of the seabed, and selecting "stop at bottom hit" under special settings. This insures that Plumes 18b does not generate spurious solutions that extend below the seabed. Therefore, all of the dense (negatively buoyant) scenarios from Table-1 were run with the 29 m depth entry to the ambient profile replaced with a 31.85 m depth entry.

3.2.1) Far-field Diffusion Coefficient: The Visual Plumes manual recommends the use of 0.0003 $m^{0.67}/s^2$. This value was used in the data field as a constant (not extrapolated as the ambient temperature and density were).

3.3 Special Settings:

3.3.1) Tidal Pollutant Build-up, Channel Width : This data field does not have an effect on the final initial dilution calculated. A value of 100 was entered, consistent with the values used in the Plumes 17b simulation examples appearing in Appendix-B of Roberts (2018a).

3.3.2) Diffuser Port Contraction Coefficient: The shape of the diffuser ports is specified in the Appendix-A drawings in the most recent NPDES permit for the SJCOO outfall (cf: RWQCB, 2014). Accordingly, a diffuser port contraction coefficient of 1.0 was used, consistent with the values used in the Plumes 17b simulation examples appearing in Appendix-B of Roberts (2018a).

3.3.3) Standard Light Adsorption Coefficient: The value of 0.16 is recommended in the Visual Plumes manual as a conservative value. This is not relevant to final initial dilution, and is for the Mancini bacteria model applications of the model.

3.3.4) Far-field Increment: This value controls the number of lines output by the Brooks far-field algorithm. A small value produces more lines and graphic output than large values. A value between 100 to 1000 m is recommended by the Plumes 18b manual. This field has little effect on the final calculated initial dilution; a value of 100 m was used in the data field.

3.3.5) UM3 Aspiration Coefficient: This is the rate at which ambient fluid is entrained (diluted) into the plume. The default value of 0.1 is an average that is rarely changed. A

larger value causes more rapid plume spreading and affects other characteristics, like plume rise. The default value of 0.1 was used in the data field.

3.3.6) Output Settings: Output settings were configured for "standard text output format" with a group of selected variables that included: "depth, Amb-cur, P-dia, Eff-sal, Polutnt, Dilutn, x-posn, y-posn, Iso dia". The most relevant of these variables for proceeding with the turbulence mortality assessment are "depth", "Eff-sal," "Dilutn", "x-posn" and "y-posn." In particular, the "x-posn" and "y-posn" output variables are used to quantify the distances to the maximum rise and bottom hit points of the trajectories, while the "Dilutn" output variable quantifies the effective (average or bulk) dilution at those points.

3.3.5) UM3 Options and Controls: Under the vertical reversals options, "to max rise or fall" and "allow induced currents (multiport)" were selected. For the dense (negatively buoyant) discharge scenarios, the "stop on bottom hit" setting was selected in order to prevent the simulations from running through the seabed.

4) Results

Text file and graphical output from Plumes 18b for each of the Doheny Desalination Project (DDP) modeling scenarios in Table-1 are found in Appendices A-C. The results for the buoyant discharge scenarios are found in Appendix-B, while those for the dense (negatively buoyant) discharge scenarios are in Appendix-C. In order to resolve incremental turbulence mortality impacts of the buoyant discharge scenarios, it was necessary to run a separate set of wastewater-only baseline cases using the particular flow volumes for the each wastewater increment used in the buoyant discharge scenarios. The Plumes 18b text and graphics results for these wastewater-only baseline cases are Found in Appendix-A.

4.1) Results for Buoyant DDP Discharge Scenarios: The Plumes 18b dilution modeling results for the combinations of SOCWA wastewater and DDP brine that produce buoyant discharges are summarized in Table 2, and contrasted there with wastewater-only baseline results. In general, Plumes 18b has predicted higher *Minimum Initial Dilution*, Dm, and smaller *Zones of Initial Dilution*, ZID at deeper depths than was reported previously by Jenkins (2016 & 2017) using the US EPA supported Visual Plumes (UM3). All of the buoyant DDP discharge scenarios are found to achieve the required Dm = 101 to 1 minimum initial dilution required under the current NPDES permit (No. CA 0107417, Order No. R9-2012-0012 as amended by Order No. R9-2014-0105). For any given amount of SOCWA wastewater, the addition of any amount of DDP brine reduces both the minimum initial dilution as well as the effective (average or bulk) dilution at the maximum rise of the plume, while reducing the size of the ZID. This occurs because the addition of any amount of DDP brine to SOCWA wastewater reduces the buoyancy of the discharge plume, causing it to cease rising at a lower altitude (deeper depth) in the water column, thereby reducing the amount of lateral spreading of the plume with associated reductions in dilution and the size of the ZID. This is not altogether a bad result, so long as there remains adequate dilution to satisfy present or future NPDES permit requirements for minimum initial dilution; which indeed appears to be the case. The lowest minimum initial dilutions and smallest ZIDs occur for operating conditions when the combined discharge rate is high with high proportions of brine relative to wastewater, such as the combination of 15 mgd of brine and 18.9 mgd of wastewater that resulted in a minimum initial dilution of Dm = 107.6 to 1 with a ZID = 63 m. All the other DDP operating scenarios producing buoyant combined effluent result in minimum initial

Table 2: Plumes 18b Modeling of Doheny Buoyant Discharge Scenarios

Discharge Scenario Brine + Wastewater = Total Flow Rate (MGD)	Combined Discharge Salinity (ppt)	Discharge Velocity m/sec	Densimetric Froude Number $F_r = u / \sqrt{g' d}$	Depth of 101 to 1 dilution factor (ft)	Depth of maximum rise of plume (ft)	Distance to maximum rise of plume, Z_a (m)	effective dilution at maximum rise of plume, S_a	Minimum Initial Dilution, Dm	Diameter of ZID (m)
8 mgd wastewater-only baseline	***1.25***	***0.595***	***4.231***	***86.96***	***56.35***	***13.304***	***375.5***	***383.1***	***196***
5 + 8 = 13	***25.77***	***0.967***	***12.95***	***70.89***	***62.90***	***11.308***	***130.9***	***133.9***	***78***
13 mgd wastewater-only baseline	***1.25***	***0.967***	***6.875***	***84.51***	***52.82***	***14.380***	***315.4***	***321.9***	***165***
5 + 13 = 18.0	***18.61***	***1.338***	***13.62***	***71.72***	***53.98***	***14.026***	***175.2***	***178.7***	***160***
18.9 mgd wastewater-only baseline	***1.25***	***1.405***	***9.996***	***82.69***	***50.81***	***14.992***	***273.8***	***279.5***	***143***
5 + 18.9 = 23.9	***14.02***	***1.777***	***16.02***	***71.01***	***50.90***	***14.965***	***185.4***	***189.1***	***135***
15 + 18.9 = 33.9	***29.64***	***2.521***	***43.40***	***68.94***	***68.94***	***9.467***	***105.0***	***107.6***	***63***
31 mgd wastewater-only baseline	***1.25***	***2.305***	***16.39***	***79.853***	***48.50***	***15.696***	***226.6***	***231.3***	***123.0***
5 + 31 = 36.0	***9.30***	***2.677***	***21.83***	***78.03***	***50.05***	***15.224***	***192.7***	***196.6***	***110.0***
****15 + 31 = 46.0***	***21.85***	***3.420***	***38.72***	***67.04***	***55.57***	***13.542***	***152.0***	***155.1***	***109***

Red = dry-weather
Blue = average conditions
Green = wet-weather
*Exceeds maximum permitted combined discharge rate of 38.78 mgd under NPDES permit (No. CA 0107417, Order No. R9-2012-0012 as amended by Order No. R9-2014-0105)

dilutions that exceed present NPDES permit requirements by a factor of 1.5 to 3.2 with ZIDs well over 100 m in diameter.

The reduction of buoyant effluent dilution caused by adding brine to SOCWA wastewater has a favorable effect on potentially deleterious diffuser entrainment, even though buoyant discharges appear to be exempt from requirements to assess, minimize or mitigate for turbulence mortality impacts to entrained marine organisms under the present structure of the amended Ocean Plan (SWRCB,2015). Table-3 summarizes all the parameters and results for deleterious diffuser entrainment for both the DDP buoyant discharge operating scenarios as well as the SOCWA wastewater-only baseline simulations. The results show that for any given amount of SOCWA wastewater, the addition of any amount of DDP brine reduces the deleterious diffuser entrainment rate, thus improving upon an existing condition that is presently not mitigatable under present implementation practices of the Ocean Plan. Therefore, no mitigation should be required for DDP operational scenarios that result in buoyant combined discharges with SOCWA wastewater. Inspection of Table-3 indicates that the net turbulence mortality benefit achieved by combining DDP brine with SOCWA wastewater increases with decreasing combined discharge rate, as smaller jet velocities with larger Kolmogorov turbulent eddies occur at lower combined discharge rates.

4.2) Results for Dense (Negatively Buoyant) DDP Discharge Scenarios: The Plumes 18b dilution modeling results for the combinations of SOCWA wastewater and DDP brine that produce dense (negatively buoyant) discharges are summarized in Table 4. All of the dense discharge cases in Table-4 involve either brine-only or high-brine ratio discharges, typical of conditions anticipated dry-weather wastewater effluent streams or future water reclamation conditions. Again, Plumes 18b has predicted higher effective dilution, S_a, and shorter distances to the 2 ppt over natural background compliance threshold than was reported previously by Jenkins (2016 & 2017) using the US EPA supported Visual Plumes (UM3). Based on long term averages of ambient salinity records reported in Jenkins (2016), natural background salinity at the SJCOO is 33.52 ppt, so that the compliance threshold 35.52 ppt under Appendix-A brine amendment provisions of the California Ocean Plan (SWRCB, 2015). Plumes 18b results in Table 4 indicate this compliance threshold is met in less than 2.5 ft. from the point of discharge by all DDP dense discharge operating conditions; whereas the Ocean Plan requires this compliance threshold is reached within 100 m from the discharge point. Thus the DDP would be fully compliant with Ocean Plan brine discharge limits by a wide margin of safety, according to Plumes 18b dilution simulations. As mentioned in Section 2, the jets of the SJCOO diffuser discharge parallel to the bottom and the ports are only 4.5 ft. above the bottom. Consequently, dense discharges from the SJCOO diffuser only rise a couple of feet above the discharge point (due to vertical spreading of the discharge jets by the action of turbulent mixing), before the trajectory bends downward under the action of negative buoyancy and makes contact with the bottom. By the literal interpretation of the State Water Board's guidance document (Roberts, 2018a) deleterious diffuser entrainment should only be based on the entrainment at the maximum rise of the plume. But, Table-5 indicates that the Kolmogorov eddy scales remain substantially less than the injury threshold of 1 mm all the way until the discharge trajectory makes contact with the bottom. Therefore, Table 4 includes trajectory analysis of the distances to both the

Table 3: Deleterious Diffuser Entrainment for Doheny Buoyant Discharge Scenarios

Discharge Scenario Brine + Wastewater = Total Flow Rate (MGD)	Discharge Velocity, u m/sec	*Jet Reynolds Number $\mathrm{Re} = u\,d\,/\,\nu$	Depth of maximum rise of plume (ft)	Distance to maximum rise of plume, X_a (m)	Kolmogorov scale at maximum rise of plume** (mm)	effective dilution at maximum rise of plume, S_a	Deleterious diffuser entrainment at maximum rise of plume (MGD)	Incremental Impact of Deleterious diffuser entrainment (MGD)	Diameter of ZID (m)	Incremental Impact on Diameter of ZID (m)
8 mgd wastewater-baseline	0.595	39,397.1	56.35	13.304	1.142	375.5	3,004	N/A	196	N/A
5 + 8 = 13	0.967	64,028.6	62.90	11.308	0.674	130.9	1,701.7	-1,302.3	78	-188
13 mgd wastewater-baseline	0.967	64,028.6	52.82	14.380	0.857	315.4	4,100.2	N/A	165	N/A
5 + 13 = 18.0	1.338	88,593.8	53.98	14.026	0.656	175.2	3,153.6	-946.6	160	-5
18.9 mgd wastewater-baseline	1.405	93,030.2	50.81	14.992	0.675	273.8	5,174.82	N/A	143	N/A
5 + 18.9 = 23.9	1.777	117,661.7	50.90	14.965	0.565	185.4	4,431.06	-743.76	135	-8
15 + 18.9 = 33.9	2.521	166,924.6	68.94	9.467	0.275	105.0	3,559.5	-1,615.32	63	-80
31 mgd wastewater-baseline	2.305	152,622.5	48.50	15.696	0.487	226.6	7,024.6	N/A	123.0	N/A
5 + 31 = 36.0	2.677	177,254.0	50.05	15.224	0.422	192.7	6,937.2	-87.4	110.0	-13
15 + 31 = 46.0	3.420	226,450.7	55.57	13.542	0.313	152.0	6,992	-32.6	109	-14

*****Based on jet diameter d = 3.05 in. and kinematic viscosity, ν = 1.17 X 10^{-6} m^2/s

******Based on Kolmogorov scale $\eta_c = 0.24\,X_a\,\mathrm{Re}^{-3/4}$, per equation (22) in Roberts, (2018a)

Table 4: Plumes 18b Modeling of Doheny Dense (Negatively Buoyant) Discharge Scenarios

Discharge Scenario Brine + Wastewater = Total Flow Rate (MGD)	Combined Discharge Salinity (ppt)	Discharge Velocity m/sec	Densimetric Froude Number $F_r = u / \sqrt{g' d}$	Horizontal Distance to within 2 ppt of *Natural Background (ft)	Distance to bottom hit, X_b (ft)	Depth of maximum rise of plume (ft)	Distance to maximum rise of plume, X_a (ft)	effective dilution at maximum rise of plume, $S_a(x=X_a)$	effective dilution at bottom hit, $S_a(x=X_b)$
3 + 0 = 3	***67.0***	***0.223***	***1.678***	***0.566***	***0.876***	***99.8***	***0.750***	***26.03***	***40.26***
3 + 1.8* = 4.8	***54.44***	***0.357***	***3.468***	***0.260***	***1.423***	***99.0***	***0.735***	***17.19***	***36.66***
5 + 0 = 5	***67.0***	***0.372***	***2.796***	***0.653***	***1.252***	***99.3***	***0.800***	***19.08***	***37.94***
5 + 0.35 = 5.35	***62.63***	***0.398***	***3.226***	***1.095***	***1.348***	***99.1***	***0.462***	***12.53***	***37.18***
10 + 0 = 10	***67.0***	***0.744***	***5.593***	***1.346***	***2.555***	***99.2***	***1.704***	***20.92***	***34.96***
15 + 0 = 15	***67.0***	***1.115***	***8.389***	***2.466***	***4.076***	***99.2***	***2.803***	***19.42***	***31.83***
15 + 8 = 23	***43.69***	***1.710***	***25.36***	***2.176***	***10.14***	***99.1***	***6.038***	***12.09***	***21.26***
15 + 13 = 28.0	***35.89***	***2.082***	***165.0***	***0.116***	***19.76***	***96.8***	***20.10***	***26.04***	***26.04***

Black = dry-weather with well water substituted for SOCWA wastewater
Red = dry-weather or future water reclamation conditions
*Natural background salinity at the SJCOO is 33.5 ppt.
**Fails to dilute to within 2 ppt of natural background salinity within a horizontal distance of 100 m

Table 5: Deleterious Diffuser Entrainment for Doheny Dense (Negatively Buoyant) Discharge Scenarios

Discharge Scenario Brine + Wastewater = Total Flow Rate (MGD)	Discharge Velocity, u m/sec	*Jet Reynolds Number $\mathrm{Re} = u\,d\,/\,\nu$	Distance to maximum rise of plume, X_a (ft)	Distance to plume bottom hit, X_b (ft)	Kolmogorov scale at maximum rise of plume** (mm)	Kolmogorov scale at plume bottom hit*** (mm)	effective dilution at maximum rise of plume, $S_a(x=X_a)$	effective dilution at bottom hit, $S_a(x=X_b)$	Deleterious diffuser entrainment at maximum rise of plume (MGD)	Deleterious diffuser entrainment at bottom hit of plume (MGD)
3 + 0 = 3	0.223	14,765.6	0.750	0.876	0.041	0.048	26.03	40.26	78.09	120.78
3 + 1.8[a] = 4.8	0.357	23,638.2	0.735	1.423	0.028	0.054	17.19	36.66	82.512	175.968
5 + 0 = 5	0.372	24,631.4	0.800	1.252	0.029	0.046	19.08	37.94	95.4	189.7
5 + 0.35 = 5.35	0.398	26,353.0	0.462	1.348	0.016	0.048	12.53	37.18	67.0355	198.913
10 + 0 = 10	0.744	49,262.9	1.704	2.555	0.038	0.057	20.92	34.96	209.2	349.6
15 + 0 = 15	1.115	73,828.2	2.803	4.076	0.046	0.066	19.42	31.83	291.3	477.45
15 + 8 = 23	1.710	113,225.3	6.038	10.14	0.072	0.120	12.09	21.26	278.07	488.98
15 + 13 = 28.0	2.082	137,856.8	20.10	19.76	0.21	0.202	26.04	26.04	729.12	729.12

*****Based on jet diameter d = 3.05 in. and kinematic viscosity, ν = 1.17 X 10^{-6} m^2/s

******Based on Kolmogorov scale $\eta_c = 0.24\,X_a\,\mathrm{Re}^{-3/4}$, per equation (22) in Roberts, (2018a)

******Based on Kolmogorov scale $\eta_c = 0.24\,X_b\,\mathrm{Re}^{-3/4}$, per equation (22) in Roberts, (2018a)

[a] well water substituted for SOCWA wastewater

maximum rise and bottom hit points, and the associated effective (bulk or average) dilutions at both of those points. While no clear relationships appear to emerge from Table-4 entries for effective dilution at the maximum rise points of the trajectory; effective dilution at the bottom hit points increases with decreasing salinity and flow rates of the combined brine/wastewater effluent.

Table-5 summarizes all the parameters and results for deleterious diffuser entrainment for the dense (negatively buoyant) DDP discharge operating scenarios. Because of the relatively short distances traveled by the dense discharges before reaching maximum rise or bottom hit points, the Kolmogorov eddy scales remain small (less than 0.2 mm), and presumably injurious according to the injury hypothesis advanced in the State Water Boards turbulence mortality guidance document (Roberts, 2018a). But these short trajectories also limit the effective (bulk or average) dilution and therefore limit the deleterious diffuser entrainment. Again, by the literal interpretation of the State Water Board's guidance document (Roberts, 2018a) mitigation scaling for brine diffuser turbulence mortality should only be based on the entrainment at the maximum rise of the plume, as indicated by the deleterious entrainment numbers appearing in the second to last column in Table-5 that range from 67 mgd to 729 mgd. But, the short travel distances to bottom hit points and small Kolmogorov eddy scales may deviate the assessment to the entrainment numbers at the bottom hit points, appearing in the last column of Table-5. In either case, deleterious diffuser entrainment increases with increasing combined discharge rate, (as would be expected with associated increasing discharge velocities); while the deleterious entrainment numbers at the bottom hit points are about a factor of 1.7 to 2.1 larger at the bottom hit points than at the maximum rise point of the discharge trajectories. These deleterious entrainment rates are to be throughput to the ETM/APF (Empirical Transport Model/Area of Production Foregone) calculus to compute the mitigation scaling for DDP diffuser turbulent shear impact

5) Conclusions:

Diffusers intrinsically generate strong turbulent jets in order to produce mixing and rapid dilution of effluent, and the shearing action of those turbulent jets can potentially damage or kill small delicate organisms entrained into those jets (sometimes referred to as *diffuser turbulence mortality*). The implementation section of the brine amendment to the California Ocean Plan, Section III.M.2 (b), requires that brine diffusers must minimize and mitigate for such marine life impacts, and the California State Water Resources Control Board has released newly defined protocols that require the use of a specific hydrodynamic mixing model (referred to as *Plumes 18b*) to assess those impacts. Plumes 18b is not supported by US EPA, but the State Water Board has made executable files for this model publicly available on their web site, along with a technical guidance document on how to assess deleterious entrainment from brine diffusers. These protocols using the Plumes 18b model are implemented in this study to assess potential injury or mortality to small marine organisms entrained by discharges from the diffuser of the San Juan Creek Ocean Outfall (SJCOO) that is being proposed as the discharge structure for brine by-product from the Doheny Desalination Project (DDP).

In general, Plumes 18b predicted higher *Minimum Initial Dilution*, and smaller *Zones of Initial Dilution*, ZID at deeper depths than was reported previously by DDP dilution studies using the US EPA supported Visual Plumes (UM3). Using Plumes 18b, all of the buoyant DDP discharge scenarios are found to achieve the required 101 to 1 minimum initial dilution required

under the current NPDES permit for the SJCOO, (No. CA 0107417, Order No. R9-2012-0012 as amended by Order No. R9-2014-0105). For any given amount of SOCWA wastewater, the addition of any amount of DDP brine reduces both the minimum initial dilution as well as the effective (average or bulk) dilution at the maximum rise of the plume, while reducing the size of the ZID. This is not altogether a bad result, so long as there remains adequate dilution to satisfy present or future NPDES permit requirements for minimum initial dilution; which indeed appears to be the case. The reduction of buoyant effluent dilution caused by adding brine to SOCWA wastewater has a favorable effect on potentially deleterious diffuser entrainment, even though buoyant discharges appear to be exempt from requirements to assess, minimize or mitigate for diffuser turbulence mortality impacts to entrained marine organisms under the present structure of the amended Ocean Plan (SWRCB,2015). The Plumes 18b results show that for any given amount of SOCWA wastewater, the addition of any amount of DDP brine reduces the deleterious diffuser entrainment rate, thus improving upon an existing condition that is not mitigatable under present implementation practices of the Ocean Plan. Therefore, no mitigation should be required for DDP operational scenarios that result in buoyant combined discharges with SOCWA wastewater. The net turbulence mortality benefit achieved by combining DDP brine with SOCWA wastewater increases with decreasing combined discharge rate, as smaller jet velocities with larger Kolmogorov turbulent eddies occur at lower combined discharge rates.

The Plumes 18b dilution modeling results for the combinations of SOCWA wastewater and DDP brine that produce dense (negatively buoyant) discharges involve either brine-only or high-brine ratio discharges, typical of conditions anticipated during dry-weather wastewater effluent streams or future water reclamation conditions. Again, Plumes 18b has predicted higher effective dilution and shorter distances to the 2 ppt over natural background compliance threshold than was reported previously in DDP dilution studies using the US EPA supported Visual Plumes (UM3). Based on long term averages of ambient salinity records, natural background salinity at the SJCOO is 33.52 ppt, so that the compliance threshold 35.52 ppt under Appendix-A brine amendment provisions of the California Ocean Plan (SWRCB, 2015). Plumes 18b results indicate this compliance threshold is met in less than 2.5 ft. from the point of discharge by all DDP dense discharge operating conditions; whereas the Ocean Plan requires this compliance threshold is reached within 100 m from the discharge point. Thus, the DDP would be fully compliant with Ocean Plan brine discharge limits by a wide margin of safety, according to Plumes 18b dilution simulations. The jets of the SJCOO diffuser discharge parallel to the bottom and the ports are only 4.5 ft. above the bottom. Consequently the trajectories of these dense DDP discharges travel relatively short distances before reaching maximum rise or bottom hit points. This behavior, in turn, causes the Kolmogorov eddy scales in the diffuser jets to remain small (less than 0.2 mm), and presumably injurious according to the injury hypothesis advanced in the State Water Boards turbulence mortality guidance document. But these short trajectories also limit the effective (bulk or average) dilution and therefore limit the deleterious diffuser entrainment. By the literal interpretation of the State Water Board's guidance document mitigation scaling for brine diffuser turbulence mortality should only be based on the entrainment at the maximum rise of the plume, which range from 67 mgd to 729 mgd for dense DDP discharges.

6) References and Bibliography:

Abessi, O., and Roberts, P. J. W. (2014). "Multiport Diffusers for Dense Discharges." *J.Hydraul. Eng.*, 140(8) http://dx.doi.org/10.1061/(ASCE)HY.1943-7900.0000882

Abessi, O., and Roberts, P. J. W. (2015). "Effect of nozzle orientation on dense jets in stagnant environments." J. Hydraul. Eng., 141(8).

Abessi, O., and Roberts, P. J. W. (2017). "Multiport Diffusers for Dense Discharges in Flowing Ambient Water." J. Hydraul. Eng., 143(6).

Abessi, O., Roberts, P. J. W., and Ghandi, V. (2016). "Rosette Diffusers for Dense Effluents." J. Hydraul. Eng., 143(4) 10.1061/(ASCE)HY.1943-7900.0001268

Baumgartner, D. J., Frick, W. E., and Roberts, P. J. W. (1994). "Dilution Models for Effluent Discharges (Third Edition)." U.S. Environmental Protection Agency, Office of Research and Development,.EPA/600/R-94/086

BenSaid, H., Mompean, G., and H., Naji, 2012, "On the Evaluation of Linear and Non-Linear Models Using DNS Data of Turbulent Channel Flows," *Jour. Baz. Soc. Mech. Sci. & Eng*., Vol XXXIV, No. 4, p. 462-476.

Breidenthal, R., 1981, "Structure in turbulent mixing layers and wakes using a chemical reaction", Jour. Fluid Mech., vol 109, pp 1-24.

Doneker, R. L., and Jirka, G. H. (1999). "Discussion of mixing of inclined dense jets" by Roberts, P. J. W., Ferrier, A., and Daviero, G." (1997)." J. Hydraul. Eng., 125(3), 317–319.

Doneker, R. L. and Jirka, G. H. (2017). "CORMIX User Manual." MixZon, Portland, Oregon. Updated February 2017.

Cada, G.F., J.M. Loar, L.A. Garrison, R.K. Fisher, and D. Neitzel. 2006. Efforts to Reduce Mortality to Hydroelectric Turbine-Passed Fish: Locating and Quantifying Damaging Shear Stresses. *Environmental Management* 37(6): 898-906.

Cada, G.F, L.A. Garrison, and R.K. Fisher Jr. 2007. Determining the Effects of Shear Stress on Fish Mortality during Turbine Passage. *Hydro Review*, November 2007, p 52-58.

Foster, M.S., Roberts, J.W., Cailliet, G.M., Callaway, J., Raimondi, P. and K. Mead-Vetter. 2013. "Desalination Plant Entrainment Impacts and Mitigation Mititation", Report to California State Water Resources Control Board, Sacramento, 50 pp.

Frick, W.E., Roberts, P., Davis, L., Keyes, J., Baumgartner, D., George, K., 2003, "Dilution models for effluent discharges, Forth Addition", U.S. Environmental Protection Agency, Standards and Applied Science Division Office of Science and Technology, 148 pp.

Frick, W. E. (2004). "Visual Plumes mixing zone modeling software." Environmental

Modelling & Software, 19, 645-654.

Frick, W., Ahmed, A., George, K., Laputz, A., Pelletie, G., and Roberts, P. (2010). "On Visual Plumes and Associated Applications." MWWD 2010 6th International Conference on Marine Waste Water Discharges and Coastal Environment, C. Avanzini, ed. Langkawi, Malaysia.

Frick, W. E., and Roberts, P. J. W. (2016). "Visual Plumes 2016: An Updated Public-Domain Plume Model Suite." Proc., International Symposium on Outfall Systems, ISOS2016, IWA. 10 - 13 May 2016.

Greenewelt, C., H., 1962, "Dimensional relationships for flying and swimming animals", *Smithsonian Miscellaneous Collections*, no. 144, 28 pp.

Grant, G., H., Stewert, R., W., and A. Moilliet, "Turbulence spectra from a tidal channel," *J. Fluid Mech*., vol. 12, 1962, pp.

Jenkins, S. A., 2016, "Hydrodynamic Modeling of Brine Dilution Assessment for the Doheny Desalination Project", submitted to the South Coast Water District, submitted by Michael Baker International, San Diego, 101 pp.

Jenkins, S. A., 2017, "Part II Supplemental Hydrodynamic Modeling of Brine Dilution Assessment for the Doheny Desalination Project", submitted to the South Coast Water District, submitted by Michael Baker International, San Diego, 9 pp.

Jenkins, S. A. (2017a)."Dilution Analysis Alden 3-Jet Duckbill Diffuser Retrofit at Huntington Beach Desalination Facility (HBDF)", submitted to Poseidon Resources Surfside, 7 June 2017, 33 pp.

Jenkins, S. A. (2017b). "Alternative Hydrodynamic Model Analysis of the Alden Designed 3-Port Duckbill Diffuser Retrofit at Huntington Beach Desalination Facility (HBDF)-Version 2." Michael Baker International. 29 November 2017. *Appendix KKKK3 - Michael Baker Dilution Analysis CORMIX Model Update 2017.11.29 FINAL.pdf*

Jenkins, S. A. (2017c). "Taylor Micro-Scale Methods for Estimating Injury and Mortality to Marine Organisms Entrained by a Diffuser at Huntington Beach Desalination Facility (HBDF). Michael Baker International. 7 December 2017. *Appendix WWWW - Memo - HBDF Turbulence Impact Assessment 2017.12.07 FINAL.pdf*

Jenkins, S., A., Cartamil, D., D'Spain, G., and J. Wasyl, (in press), "Hydrodynamic Impacts on Marine Life Due to Brine Dilution Strategies for Seawater Desalination with Open Ocean Intakes," Environmental Science and Technology, 15 pp.

Jessopp, M. J. (2007) The quick and the dead: larval mortality due to turbulent tidal transport. J. Mar. Biol. Ass. U.K. 87, 675-680.

Kolmogorov, A. N., 1941, *C.R. Acad. Sci., USSR*., vol 30, no.301.

Landahl, M.T. and E. Mollo-Christensen, 1992, *Turbulence and Random Processes in Fluid Mechanics*, Cambridge Press, 2ed, ISBN-13: 978-0521422130

Marcy, B.C., Jr., A.D. Beck, and R.E. Ulanowicz. 1978. Effects and Impacts of Physical Stress on Entrained Organisms. In: Schubel, J. R. and Marcy, B.C., Jr. (eds.) Power Plant Entrainment: a Biological Assessment. NY, Academic Press, pp. 135-188.

Morgan, R.P., R.E. Ulanowicz, V.J. Rasin, L.A. Noe, and G. B. Gray. 1974. Effects of Shear on Eggs and Larvae of Striped Bass, *Morone saxatilis*, and White Perch, *M. americana*. *Transactions of the American Fisheries Society* 105(1): 149-154.

Neitzel, D.A., M.C. Richmond, D.D. Dauble, R.P. Mueller, R.A. Moursund, C.S. Abernethy, G.R. Guensch, and G.F. Cada. 2000. Laboratory Studies on the Effects of Shear on Fish. U. S. Department of Energy, Idaho Operations Office, DOE/ID-10822, Idaho Falls, Idaho.

Neitzel, D.A. , D. D. Dauble , G. F. ada , M. C. Richmond , G. R. Guensch , R. P. Mueller , C. S. Abernethy & Brett Amidan, (2004) "Survival Estimates for Juvenile Fish Subjected to a Laboratory-Generated Shear Environment," *Transactions of the American Fisheries Society*, 133:2, 447-454, DOI: 10.1577/02-021

Palomar, P., Lara, J. L., and Losada, I. J. (2012). "Near field brine discharge modeling Part 2: Validation of commercial tools." Desalination, 290(0), 28-42.

Rehmann, C. R., J.A. Stoeckel, and D.W. Schneider (2003a). Effect of turbulence on the mortality of zebra mussel veligers. Can. J. Zool. 81: 1063–1069
Roberts, P. (2016) "Appendix D1 – Modeling Brine Disposal into Monterey Bay", submitted to ESA/Environmental Science Associates, July 6, 2016, 72 pp + app.

Roberts, P. (2017), "Response to Memoranda from TWB Environmental and HDR concerning Huntington Beach desalination plant", submitted to California State Lands Commission, 26 July 2017, 4 pp.

Roberts, P.J.W., 2018a, "Brine Diffusers and Shear Mortality, prepared for Eastern Research Group, April 18, 2018, 62 pp.

Roberts, P.J.W., 2018b, "Brine Diffusers and Shear Mortality: Application to Huntington Beach, prepared for Eastern Research Group, April 18, 2018, 35 pp.

RWQCB, 2014, California Regional Water Quality Control Board, San Diego Region, "ORDER NO. R9-2012-0012 as Amended by Order No. R9-2014-0105
NPDES NO. CA 0107417 WASTE DISCHARGE REQUIREMENTS FOR THE SOUTH ORANGE COUNTY WASTEWATER AUTHORITY DISCHARGE TO THE PACIFIC OCEAN THROUGH THE SAN JUAN CREEK OCEAN OUTFALL, APPENDIX-H DILUTION MODEL INFORMATION", p H-1 - p. H-9; 151 pp.

SCCWRP (2012), Jenkins, S. A., J. Paduan, P. Roberts, D. Schlenk, and J. Weis, "Management of Brine Discharges to Coastal Waters; Recommendations of a Science Advisory Panel", submitted at the request of the California Water Resources Control Board, Southern California Coastal Water Research Project, Tech. Rpt. 694, March, 2012, 56 pp. + App.

SWRCB, 2014, "DESALINATION FACILITY INTAKES, BRINE DISCHARGES, AND THE INCORPORATION OF OTHER NONSUBSTANTIVE CHANGES", Draft Staff Report Including the Draft Substitute Environmental Documentation Amendment to the Water Quality Control Plan For Ocean Waters of California, 206 pp.

SWRCB, 2015, State Water Resources Control Board. Final Staff Report Including the Final Substitute Environmental Documentation, Adopted May 6, 2017. Amendment to the Water Quality Control Plan For Ocean Waters of California Addressing: "DESALINATION FACILITY INTAKES, BRINE DISCHARGES, AND THE INCORPORATION OF OTHER NON-SUBSTANTIVE CHANGES", cf. Appendix-A: "Ocean Plan with the May 6, 2015 Final Desalination Amendment", 1303 pp.

Tennekes, H. and J. Lumley. 1972. *A First Course in Turbulence*, MIT Press, ISBN: 9780262200196, 320 pp.

Wygnanski, I., and Fiedler, H. E. (1969). "Some Measurements in the Self-Preserving Jet." J. Fluid Mech., 38(3), 577-612

Zhang, C., Xu, M., Wang, Z., Liu, W., and Yu, D. (2017). "Experimental study on the effect of turbulence in pipelines on the mortality of Limnoperna fortunei veligers." Ecological Engineering, 109(Part A), 101-118 https://doi.org/10.1016/j.ecoleng.2017.08.024.

APPENDIX-A: Wastewater Only Baseline Results

A.1: Plumes 18b Results for SJCOO discharges of 31 mgd Wastewater Only:

SJCOO discharging 31 mgd of wastewater at TDS = 1.25
ppt

Model configuration items checked:
Channel width (m) 100
Start case for graphs 1
Max detailed graphs 10 (limits plots that can overflow memory)
Elevation Projection Plane (deg) 0
Shore vector (m,deg) not checked
Bacteria model : Mancini (1978) coliform model
PDS sfc. model heat transfer : Medium
Equation of State : S, T
Similarity Profile : Default profile (k=2.0, ...)
Diffuser port contraction coefficient 1
Light absorption coefficient 0.16
Farfield increment (m) 200
UM3 aspiration coefficient 0.1
Output file: text output tab
Output each ?? steps 10
Maximum dilution reported 1000
Text output format : Standard
Max vertical reversals : to max rise or fall

/ UM3. 1/9/2019 2:49:23 PM
Case 1; ambient file C:\Plumes18\SJCOO_WW31mgd_b0mgd_T-12.001.db; Diffuser table record 1: ----------

Ambient Table:

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn	Density
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2	sigma-T
0.0	0.0	0.0	33.38	19.97	0.0	0.0	0.0	0.0	0.0003	23.55719
2.000	0.0	0.0	33.39	19.87	0.0	0.0	0.0	0.0	0.0003	23.59288
4.000	0.0	0.0	33.40	19.81	0.0	0.0	0.0	0.0	0.0003	23.61484
7.000	0.0	0.0	33.41	19.64	0.0	0.0	0.0	0.0	0.0003	23.67096
10.00	0.0	0.0	33.40	17.76	0.0	0.0	0.0	0.0	0.0003	24.12888
12.00	0.0	0.0	33.38	17.34	0.0	0.0	0.0	0.0	0.0003	24.21549
14.00	0.0	0.0	33.38	16.73	0.0	0.0	0.0	0.0	0.0003	24.35932
16.00	0.0	0.0	33.38	15.17	0.0	0.0	0.0	0.0	0.0003	24.71340
18.00	0.0	0.0	33.37	14.37	0.0	0.0	0.0	0.0	0.0003	24.87044
20.00	0.0	0.0	33.35	14.18	0.0	0.0	0.0	0.0	0.0003	24.89660
22.00	0.0	0.0	33.33	13.83	0.0	0.0	0.0	0.0	0.0003	24.95172
24.00	0.0	0.0	33.32	13.75	0.0	0.0	0.0	0.0	0.0003	24.96707
26.00	0.0	0.0	33.36	13.42	0.0	0.0	0.0	0.0	0.0003	25.06459
29.00	0.0	0.0	33.36	13.39	0.0	0.0	0.0	0.0	0.0003	25.07096

Diffuser table:

P-dia	Ver angl	H-Angle	SourceX	SourceY	Ports	Spacing	MZ-dis	Isoplth	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(in)	(deg)	(deg)	(ft)	(ft)	()	(ft)	(ft)	(concent)	(ft)	(MGD)	(psu)	(C)	(ppm)
3.0500	0.0	0.0	0.0	0.0	125.00	12.000	1000.0	0.0	100.00	31.000	1.2500	20.660	1250.0

Simulation:
Froude No: 16.39; Strat No: 1.48E-4; Spcg No: 47.21; k: 2.31E+5; eff den (sigmaT) -0.921168; eff vel 2.305(m/s);
Current is very small, flow regime may be transient.

Step	Depth (ft)	Amb-cur (m/s)	P-dia (in)	Eff-sal (psu)	Polutnt (ppm)	Dilutn ()	x-posn (m)	y-posn (m)	Iso dia (m)	
0	100.0	1.000E-5	3.050	1.250	1250.0	1.000	0.0	0.0	0.07747;	
1	100.00	0.0	3.104	2.385	1206.9	1.036	0.0219	0.0	0.07884;	bottom hit;
10	100.00	0.0	3.732	7.442	1014.0	1.233	0.112	0.0	0.09479;	
20	100.00	0.0	4.541	12.10	835.0	1.497	0.230	0.0	0.1153;	
30	100.00	0.0	5.527	15.92	687.1	1.819	0.375	0.0	0.1404;	
40	100.00	0.0	6.728	19.05	565.0	2.212	0.551	0.0	0.1709;	
50	99.99	0.0	8.193	21.62	464.5	2.691	0.766	0.0	0.2081;	
60	99.99	0.0	9.977	23.73	381.7	3.275	1.028	0.0	0.2534;	
70	99.97	0.0	12.15	25.46	313.5	3.987	1.347	0.0	0.3086;	
80	99.95	0.0	14.79	26.88	257.5	4.854	1.733	0.0	0.3757;	
90	99.90	0.0	17.99	28.05	211.4	5.912	2.198	0.0	0.4570;	
100	99.83	0.0	21.64	28.95	175.6	7.120	2.714	0.0	0.5496;	
110	99.75	0.0	25.13	29.58	150.7	8.294	3.166	0.0	0.6384;	
120	99.65	0.0	28.51	30.04	132.2	9.453	3.567	0.0	0.7242;	
130	99.54	0.0	31.82	30.41	117.7	10.62	3.931	0.0	0.8082;	
140	99.42	0.0	35.07	30.70	106.0	11.80	4.267	0.0	0.8907;	
150	99.29	0.0	38.27	30.95	96.18	13.00	4.583	0.0	0.9722;	
160	99.15	0.0	41.43	31.16	87.88	14.22	4.883	0.0	1.0523;	
170	99.00	0.0	44.53	31.34	80.73	15.48	5.172	0.0	1.1311;	
180	98.83	0.0	47.57	31.49	74.51	16.78	5.453	0.0	1.2083;	
190	98.65	0.0	50.53	31.63	69.03	18.11	5.729	0.0	1.2835;	
200	98.45	0.0	53.41	31.75	64.15	19.48	6.004	0.0	1.3565;	
210	98.22	0.0	56.19	31.86	59.78	20.91	6.280	0.0	1.4272;	
220	97.97	0.0	58.88	31.96	55.81	22.40	6.560	0.0	1.4955;	
230	97.68	0.0	61.47	32.05	52.17	23.96	6.847	0.0	1.5614;	
240	97.35	0.0	63.99	32.14	48.79	25.62	7.145	0.0	1.6253;	
250	96.97	0.0	66.45	32.22	45.61	27.41	7.456	0.0	1.6878;	
260	96.53	0.0	68.90	32.30	42.56	29.37	7.786	0.0	1.7500;	
270	96.00	0.0	71.40	32.37	39.59	31.57	8.139	0.0	1.8137;	
280	95.36	0.0	74.06	32.44	36.65	34.11	8.521	0.0	1.8812;	
290	94.57	0.0	77.02	32.52	33.67	37.13	8.940	0.0	1.9562;	
300	93.58	0.0	80.48	32.60	30.60	40.85	9.403	0.0	2.0441;	
310	92.32	0.0	84.76	32.68	27.39	45.63	9.923	0.0	2.1529;	
320	90.66	0.0	90.35	32.76	24.01	52.06	10.52	0.0	2.2950;	
330	88.40	0.0	98.05	32.85	20.43	61.18	11.20	0.0	2.4904;	
340	85.34	0.0	108.7	32.94	16.83	74.29	11.97	0.0	2.7606;	
350	81.84	0.0	121.7	33.02	13.80	90.55	12.70	0.0	3.0903;	
360	77.85	0.0	138.3	33.07	11.32	110.4	13.41	0.0	3.5138;	
363	76.54	0.0	144.2	33.09	10.67	117.1	13.62	0.0	3.6619;	merging;
370	72.54	0.0	164.5	33.12	9.290	134.6	14.23	0.0	4.1793;	
380	64.76	0.0	215.6	33.16	7.621	164.0	15.28	0.0	5.4760;	
389	56.09	0.0	298.6	33.19	6.377	196.0	16.35	0.0	7.5853;	trap level;
390	55.05	0.0	311.9	33.19	6.252	199.9	16.48	0.0	7.9222;	
398	50.15	0.0	517.9	33.21	5.726	218.3	17.17	0.0	13.156;	begin overlap;
400	49.88	0.0	565.6	33.21	5.702	219.2	17.22	0.0	14.366;	
410	49.15	0.0	765.5	33.21	5.648	221.3	17.38	0.0	19.444;	
420	48.83	0.0	952.5	33.21	5.617	222.6	17.46	0.0	24.193;	
430	48.65	0.0	1135.6	33.21	5.592	223.5	17.52	0.0	28.845;	
440	48.55	0.0	1315.7	33.21	5.571	224.4	17.56	0.0	33.418;	

```
450   48.51   0.0  1439.4  33.21  5.556  225.0  17.58   0.0  36.562;
460   48.50   0.0  1460.1  33.21  5.542  225.5  17.58   0.0  37.087;
470   48.50   0.0  1467.7  33.21  5.529  226.1  17.58   0.0  37.279;
480   48.50   0.0  1474.7  33.21  5.516  226.6  17.58   0.0  37.456; local maximum rise or fall;
487   51.72   0.0  1493.0  33.22  5.403  231.3  18.25   0.0  37.921;
Horiz plane projections in effluent direction: radius(m):     0.0; CL(m):   5.5640
Lmz(m):   5.5640
forced entrain     1    0.0   14.72   37.92   0.409
Rate sec-1         0.0 dy-1         0.0  kt:         0.0 Amb Sal      33.3818
;
2:49:24 PM. amb fills: 4
```

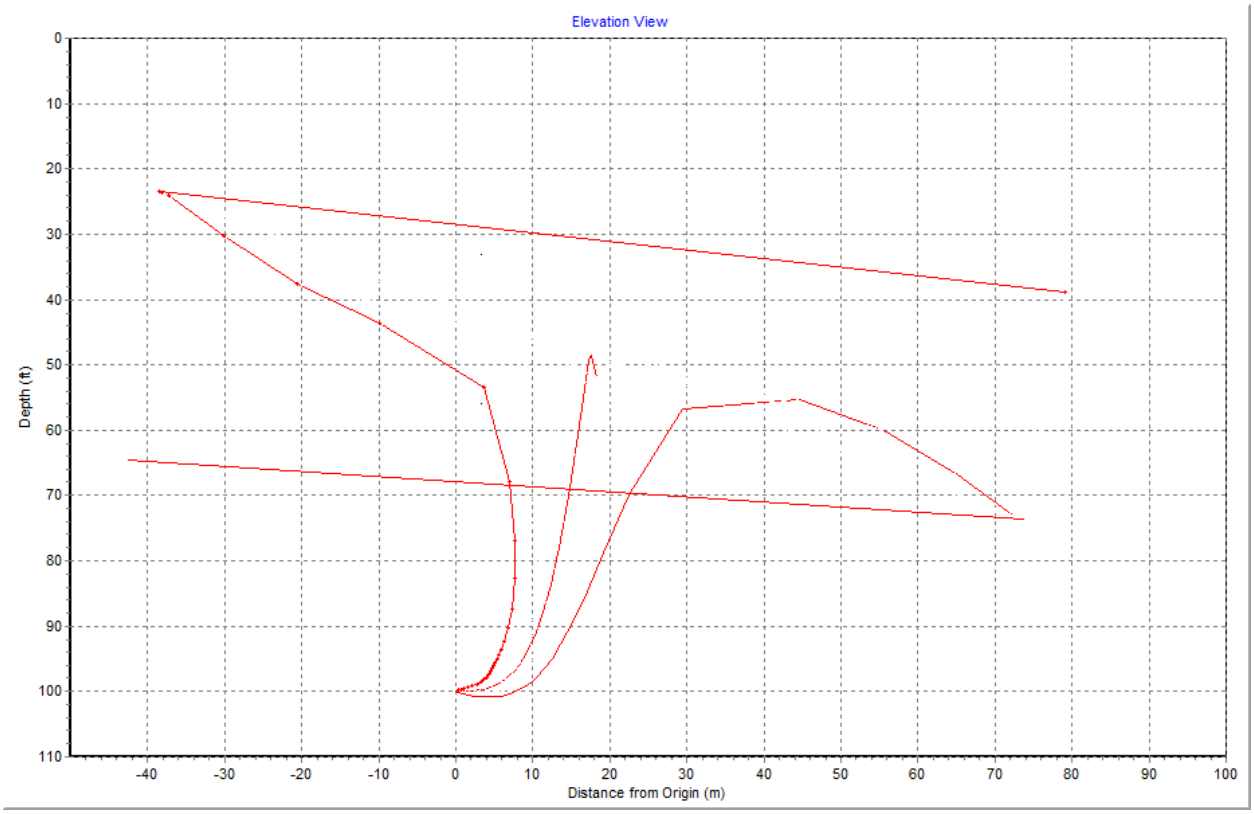


Figure A.1.1: Plumes 18b solution of discharge plume trajectories for discharges of 31 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. ZID is defined by the maximum horizontal excursion of trajectories from the origin. From the maximum horizontal spreading of the plume, the ZID extends from X = -43 m to X = +80 m so that ZID = 123 m

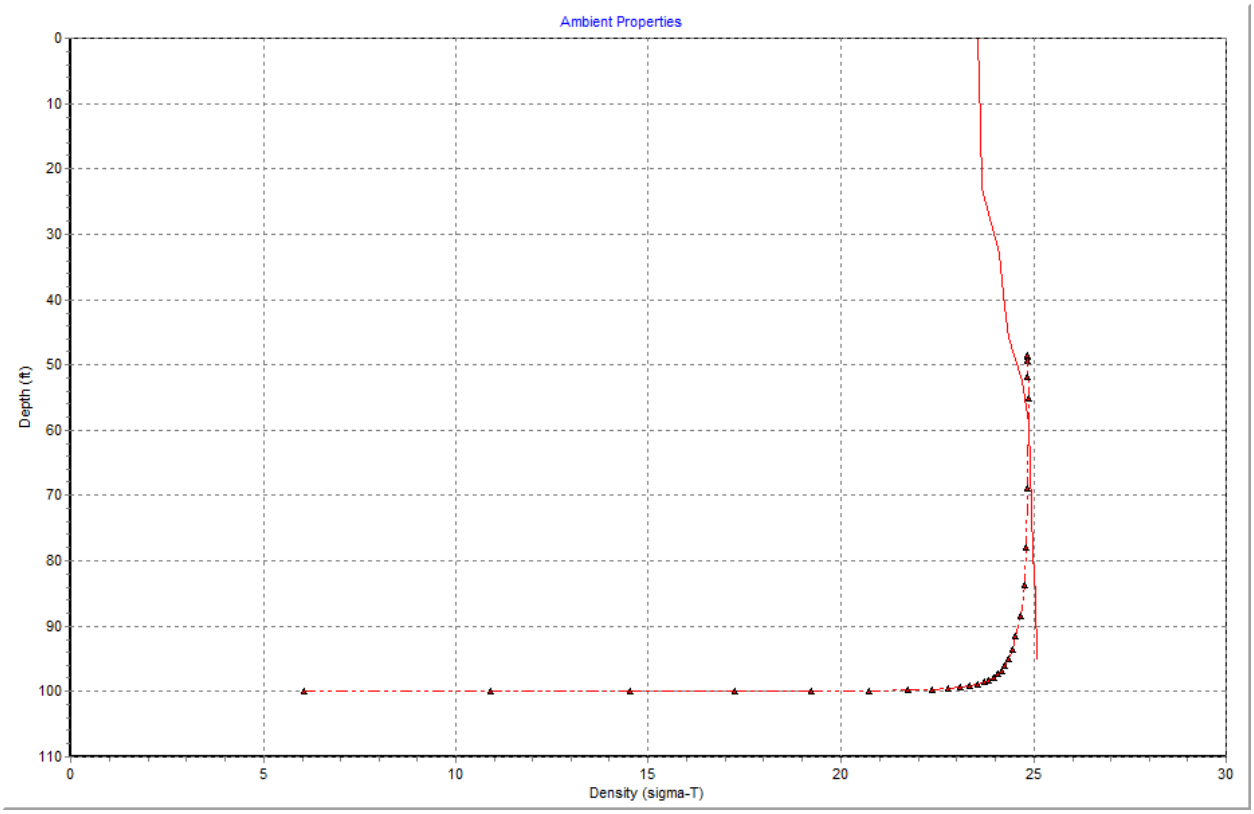


Figure A.1.2: Plumes 18b solution of vertical density profile for discharges of 31 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. Discharge effluent density shown as black triangles. Ambient water mass density profile shown as solid red line.

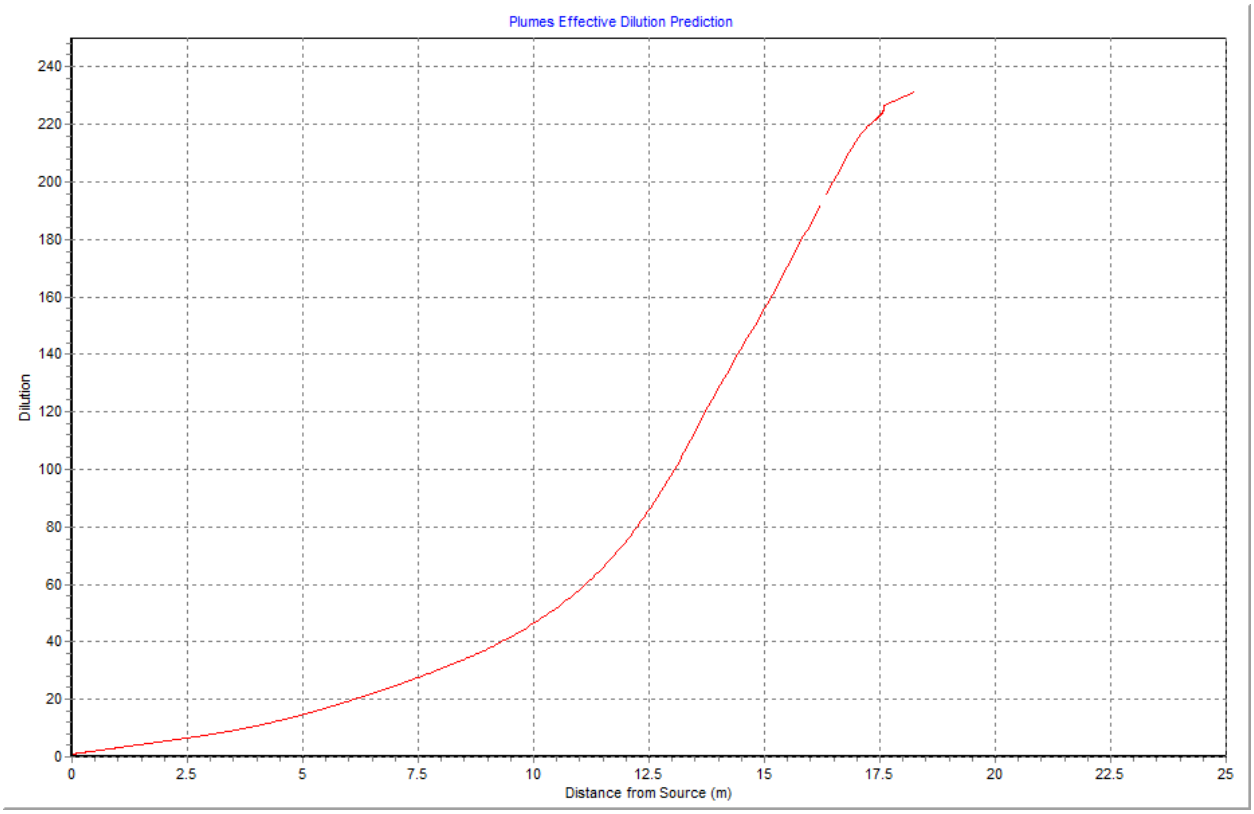


Figure A.1.3: Plumes 18b solution of effective (bulk average) dilution as a function of vertical distance from the point of discharge for discharges of 31 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt.

A.2: Plumes 18b Results for SJCOO discharges of 18.9 mgd Wastewater Only:

SJCOO discharging 18.9 mgd of wastewater at TDS = 1.25
ppt

Model configuration items checked:
Channel width (m) 100
Start case for graphs 1
Max detailed graphs 10 (limits plots that can overflow memory)
Elevation Projection Plane (deg) 0
Shore vector (m,deg) not checked
Bacteria model : Mancini (1978) coliform model
PDS sfc. model heat transfer : Medium
Equation of State : S, T
Similarity Profile : Default profile (k=2.0, ...)
Diffuser port contraction coefficient 1
Light absorption coefficient 0.16
Farfield increment (m) 200
UM3 aspiration coefficient 0.1
Output file: text output tab
Output each ?? steps 10
Maximum dilution reported 1000
Text output format : Standard
Max vertical reversals : to max rise or fall

/ UM3. 1/9/2019 3:16:57 PM
Case 1; ambient file C:\Plumes18\SJCOO_WW18.9mgd_b0mgd_T-1.001.db; Diffuser table record 1: ----------
----

Ambient Table:

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn	Density
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2	sigma-T
0.0	0.0	0.0	33.38	19.97	0.0	0.0	0.0	0.0	0.0003	23.55719
2.000	0.0	0.0	33.39	19.87	0.0	0.0	0.0	0.0	0.0003	23.59288
4.000	0.0	0.0	33.40	19.81	0.0	0.0	0.0	0.0	0.0003	23.61484
7.000	0.0	0.0	33.41	19.64	0.0	0.0	0.0	0.0	0.0003	23.67096
10.00	0.0	0.0	33.40	17.76	0.0	0.0	0.0	0.0	0.0003	24.12888
12.00	0.0	0.0	33.38	17.34	0.0	0.0	0.0	0.0	0.0003	24.21549
14.00	0.0	0.0	33.38	16.73	0.0	0.0	0.0	0.0	0.0003	24.35932
16.00	0.0	0.0	33.38	15.17	0.0	0.0	0.0	0.0	0.0003	24.71340
18.00	0.0	0.0	33.37	14.37	0.0	0.0	0.0	0.0	0.0003	24.87044
20.00	0.0	0.0	33.35	14.18	0.0	0.0	0.0	0.0	0.0003	24.89660
22.00	0.0	0.0	33.33	13.83	0.0	0.0	0.0	0.0	0.0003	24.95172
24.00	0.0	0.0	33.32	13.75	0.0	0.0	0.0	0.0	0.0003	24.96707
26.00	0.0	0.0	33.36	13.42	0.0	0.0	0.0	0.0	0.0003	25.06459
29.00	0.0	0.0	33.36	13.39	0.0	0.0	0.0	0.0	0.0003	25.07096

Diffuser table:

P-dia	Ver angl	H-Angle	SourceX	SourceY	Ports	Spacing	MZ-dis	Isoplth	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(in)	(deg)	(deg)	(ft)	(ft)	()	(ft)	(ft)(concent)		(ft)	(MGD)	(psu)	(C)	(ppm)
3.0500	0.0	0.0	0.0	0.0	125.00	12.000	1000.0	0.0	100.00	18.900	1.2500	20.660	1250.0

Simulation:

Froude No: 9.996; Strat No: 1.48E-4; Spcg No: 47.21; k: 1.41E+5; eff den (sigmaT) -0.921168; eff vel 1.405(m/s);
Current is very small, flow regime may be transient.

Step	Depth (ft)	Amb-cur (m/s)	P-dia (in)	Eff-sal (psu)	Polutnt (ppm)	Dilutn ()	x-posn (m)	y-posn (m)	Iso dia (m)	
0	100.0	1.000E-5	3.050	1.250	1250.0	1.000	0.0	0.0	0.07747;	
1	100.00	0.0	3.083	1.952	1223.4	1.022	0.0135	0.0	0.07831;	bottom hit;
10	100.00	0.0	3.681	7.079	1027.9	1.216	0.0809	0.0	0.0935;	
20	100.00	0.0	4.479	11.80	846.4	1.477	0.166	0.0	0.1138;	
30	100.00	0.0	5.451	15.67	696.5	1.795	0.271	0.0	0.1385;	
40	100.00	0.0	6.635	18.85	572.9	2.182	0.400	0.0	0.1685;	
50	99.99	0.0	8.078	21.46	470.9	2.654	0.556	0.0	0.2052;	
60	99.98	0.0	9.834	23.60	387.0	3.230	0.747	0.0	0.2498;	
70	99.96	0.0	11.96	25.35	317.9	3.932	0.978	0.0	0.3039;	
80	99.93	0.0	14.50	26.77	262.0	4.770	1.250	0.0	0.3682;	
90	99.89	0.0	17.09	27.79	221.7	5.638	1.497	0.0	0.4342;	
100	99.84	0.0	19.71	28.55	191.4	6.530	1.713	0.0	0.5007;	
110	99.79	0.0	22.38	29.15	167.7	7.455	1.905	0.0	0.5683;	
120	99.73	0.0	25.09	29.63	148.5	8.420	2.079	0.0	0.6372;	
130	99.67	0.0	27.84	30.03	132.6	9.426	2.240	0.0	0.7071;	
140	99.60	0.0	30.62	30.37	119.3	10.48	2.390	0.0	0.7777;	
150	99.53	0.0	33.40	30.65	108.1	11.57	2.532	0.0	0.8484;	
160	99.45	0.0	36.16	30.89	98.48	12.69	2.668	0.0	0.9186;	
167	99.39	0.0	38.07	31.04	92.57	13.50	2.761	0.0	0.9670;	begin overlap;
170	99.37	0.0	38.87	31.10	90.25	13.85	2.800	0.0	0.9873;	
180	99.27	0.0	41.37	31.27	83.38	14.99	2.929	0.0	1.0507;	
190	99.17	0.0	43.67	31.42	77.50	16.13	3.059	0.0	1.1091;	
200	99.06	0.0	45.82	31.55	72.32	17.28	3.189	0.0	1.1638;	
210	98.93	0.0	47.87	31.67	67.63	18.48	3.322	0.0	1.2158;	
219	98.80	0.0	49.66	31.76	63.70	19.62	3.446	0.0	1.2613;	end overlap;
220	98.78	0.0	49.85	31.78	63.28	19.75	3.460	0.0	1.2662;	
230	98.61	0.0	51.68	31.87	59.33	21.07	3.604	0.0	1.3127;	
240	98.42	0.0	53.32	31.96	55.72	22.43	3.756	0.0	1.3544;	
250	98.18	0.0	54.79	32.05	52.37	23.87	3.920	0.0	1.3916;	
260	97.89	0.0	56.11	32.13	49.18	25.42	4.098	0.0	1.4253;	
270	97.54	0.0	57.37	32.21	46.05	27.14	4.295	0.0	1.4571;	
280	97.09	0.0	58.66	32.29	42.88	29.15	4.516	0.0	1.4899;	
290	96.51	0.0	60.15	32.37	39.55	31.60	4.768	0.0	1.5278;	
300	95.74	0.0	62.10	32.46	35.93	34.79	5.060	0.0	1.5774;	
310	94.66	0.0	64.93	32.56	31.89	39.20	5.405	0.0	1.6493;	
320	93.13	0.0	69.35	32.68	27.32	45.76	5.819	0.0	1.7616;	
330	90.97	0.0	76.09	32.80	22.49	55.58	6.293	0.0	1.9328;	
340	88.52	0.0	84.34	32.90	18.45	67.75	6.733	0.0	2.1423;	
350	85.78	0.0	94.01	32.98	15.14	82.58	7.142	0.0	2.3878;	
360	82.69	0.0	105.4	33.05	12.42	100.7	7.527	0.0	2.6770;	
370	79.20	0.0	119.8	33.10	10.19	122.7	7.902	0.0	3.0441;	
380	75.20	0.0	138.1	33.14	8.357	149.6	8.283	0.0	3.5083;	
383	73.88	0.0	144.2	33.15	7.875	158.7	8.400	0.0	3.6615;	merging;
390	69.82	0.0	165.8	33.18	6.856	182.3	8.736	0.0	4.2112;	
400	61.78	0.0	231.8	33.21	5.624	222.3	9.349	0.0	5.8881;	trap level;
410	52.59	0.0	428.0	33.23	4.707	265.6	10.10	0.0	10.872;	
413	51.93	0.0	546.2	33.23	4.655	268.5	10.18	0.0	13.874;	begin overlap;
420	51.33	0.0	768.8	33.23	4.625	270.2	10.27	0.0	19.527;	
430	51.03	0.0	1051.1	33.23	4.608	271.3	10.32	0.0	26.699;	
440	50.89	0.0	1324.1	33.24	4.595	272.0	10.36	0.0	33.633;	
450	50.82	0.0	1588.6	33.24	4.585	272.6	10.38	0.0	40.351;	

460	50.81	0.0	1690.5	33.24	4.578	273.0	10.38	0.0	42.938;
470	50.81	0.0	1699.5	33.24	4.571	273.4	10.38	0.0	43.167;
480	50.81	0.0	1704.4	33.24	4.565	273.8	10.38	0.0	43.293; local maximum rise or fall;
485	57.56	0.0	1723.7	33.24	4.473	279.5	10.91	0.0	43.782;

Horiz plane projections in effluent direction: radius(m): 0.0; CL(m): 3.3248
Lmz(m): 3.3248
forced entrain 1 0.0 12.94 43.78 0.323
Rate sec-1 0.0 dy-1 0.0 kt: 0.0 Amb Sal 33.3837
;
3:16:57 PM. amb fills: 4

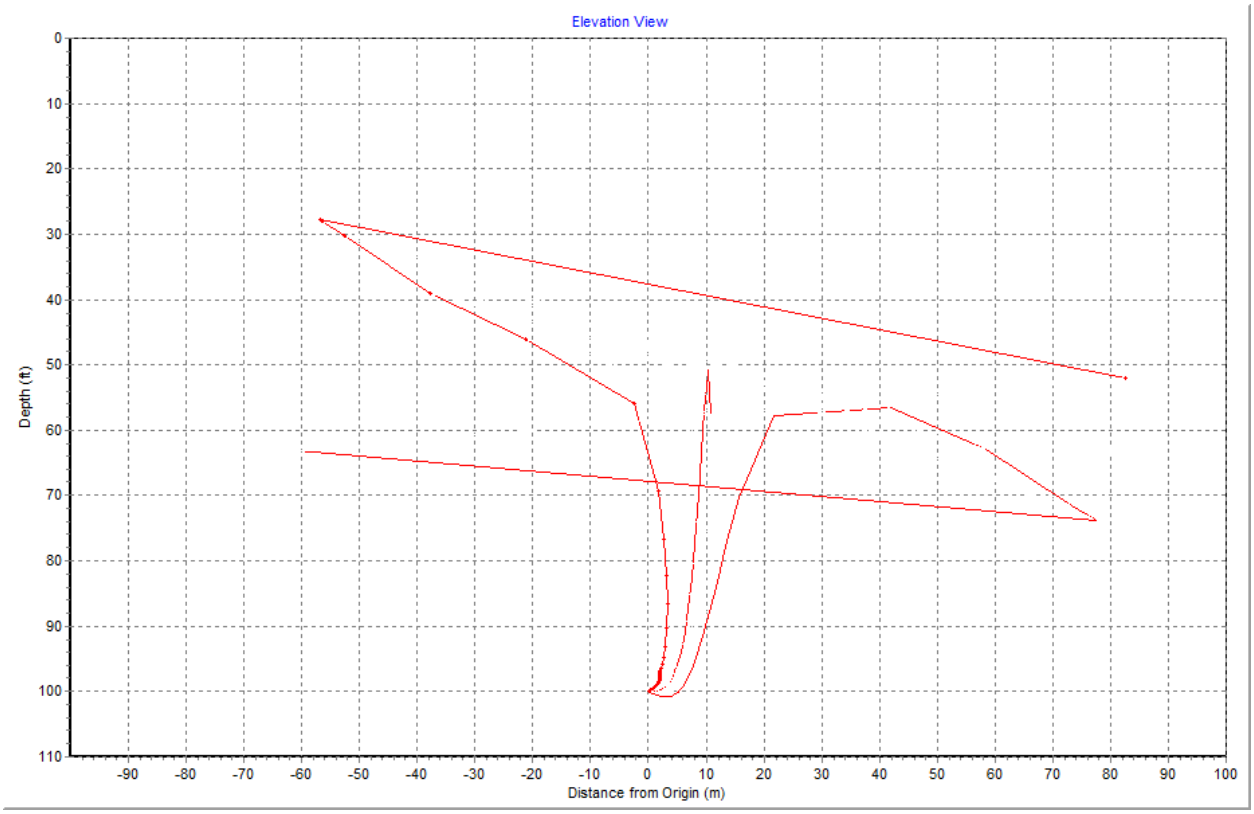


Figure A.2.1: Plumes 18b solution of discharge plume trajectories for discharges of 18.9 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. ZID is defined by the maximum horizontal excursion of trajectories from the origin. From the maximum horizontal spreading of the plume, the ZID extends from X = -60 m to X = +83 m so that ZID = 143 m

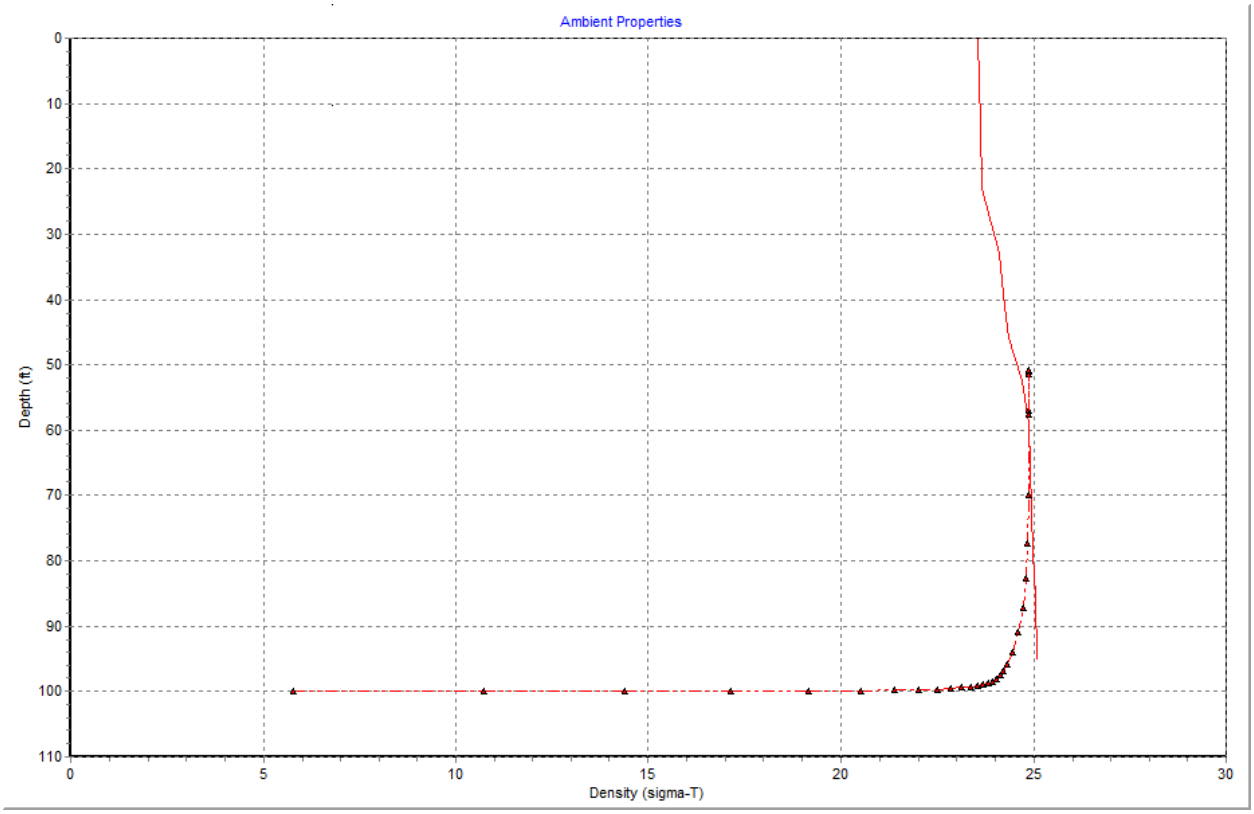


Figure A.2.2: Plumes 18b solution of vertical density profile for discharges of 18.9 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. Discharge effluent density shown as black triangles. Ambient water mass density profile shown as solid red line.

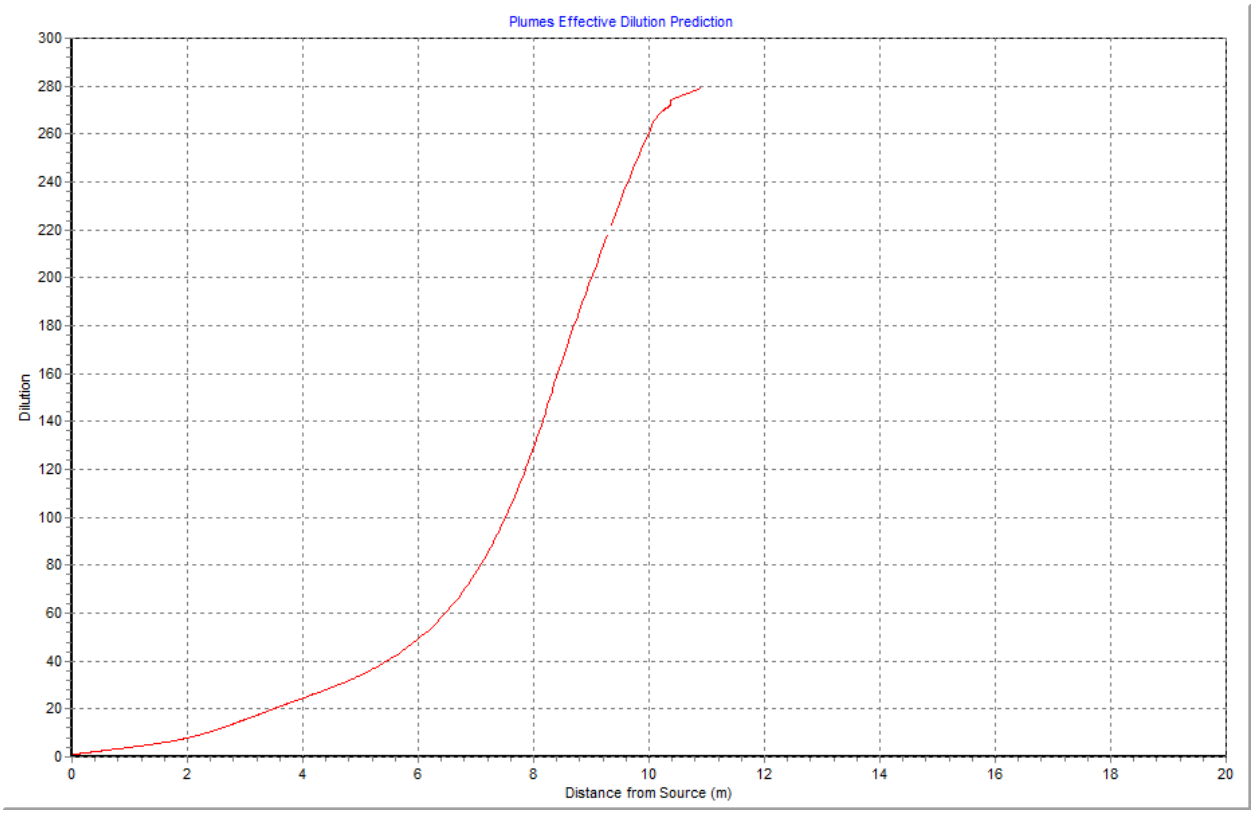


Figure A.2.3: Plumes 18b solution of effective (bulk average) dilution as a function of vertical distance from the point of discharge for discharges of 18.9 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt.

A.3: Plumes 18b Results for SJCOO discharges of 13 mgd Wastewater Only:

SJCOO discharging 13 mgd of wastewater at TDS = 1.25
ppt

Model configuration items checked:
Channel width (m) 100
Start case for graphs 1
Max detailed graphs 10 (limits plots that can overflow memory)
Elevation Projection Plane (deg) 0
Shore vector (m,deg) not checked
Bacteria model : Mancini (1978) coliform model
PDS sfc. model heat transfer : Medium
Equation of State : S, T
Similarity Profile : Default profile (k=2.0, ...)
Diffuser port contraction coefficient 1
Light absorption coefficient 0.16
Farfield increment (m) 200
UM3 aspiration coefficient 0.1
Output file: text output tab
Output each ?? steps 10
Maximum dilution reported 1000
Text output format : Standard
Max vertical reversals : to max rise or fall

/ UM3. 1/10/2019 10:42:10 AM
Case 1; ambient file C:\Plumes18\SJCOO_WW13mgd_b0mgd_T-2.001.db; Diffuser table record 1: ----------

Ambient Table:

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn	Density
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2	sigma-T
0.0	0.0	0.0	33.38	19.97	0.0	0.0	0.0	0.0	0.0003	23.55719
2.000	0.0	0.0	33.39	19.87	0.0	0.0	0.0	0.0	0.0003	23.59288
4.000	0.0	0.0	33.40	19.81	0.0	0.0	0.0	0.0	0.0003	23.61484
7.000	0.0	0.0	33.41	19.64	0.0	0.0	0.0	0.0	0.0003	23.67096
10.00	0.0	0.0	33.40	17.76	0.0	0.0	0.0	0.0	0.0003	24.12888
12.00	0.0	0.0	33.38	17.34	0.0	0.0	0.0	0.0	0.0003	24.21549
14.00	0.0	0.0	33.38	16.73	0.0	0.0	0.0	0.0	0.0003	24.35932
16.00	0.0	0.0	33.38	15.17	0.0	0.0	0.0	0.0	0.0003	24.71340
18.00	0.0	0.0	33.37	14.37	0.0	0.0	0.0	0.0	0.0003	24.87044
20.00	0.0	0.0	33.35	14.18	0.0	0.0	0.0	0.0	0.0003	24.89660
22.00	0.0	0.0	33.33	13.83	0.0	0.0	0.0	0.0	0.0003	24.95172
24.00	0.0	0.0	33.32	13.75	0.0	0.0	0.0	0.0	0.0003	24.96707
26.00	0.0	0.0	33.36	13.42	0.0	0.0	0.0	0.0	0.0003	25.06459
29.00	0.0	0.0	33.36	13.39	0.0	0.0	0.0	0.0	0.0003	25.07096

Diffuser table:

P-dia	Ver angl	H-Angle	SourceX	SourceY	Ports	Spacing	MZ-dis	Isoplth	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(in)	(deg)	(deg)	(ft)	(ft)	()	(ft)	(ft)(concent)		(ft)	(MGD)	(psu)	(C)	(ppm)
3.0500	0.0	0.0	0.0	0.0	125.00	12.000	1000.0		0.0	100.00	13.000	1.2500	20.660	1250.0

Simulation:
Froude No: 6.875; Strat No: 1.48E-4; Spcg No: 47.21; k: 96666.1; eff den (sigmaT) -0.921168; eff vel 0.967(m/s);

Current is very small, flow regime may be transient.

Step	Depth (ft)	Amb-cur (m/s)	P-dia (in)	Eff-sal (psu)	Polutnt (ppm)	Dilutn ()	x-posn (m)	y-posn (m)	Iso dia (m)	
0	100.0	1.000E-5	3.050	1.250	1250.0	1.000	0.0	0.0	0.07747;	
1	100.00	0.0	3.073	1.736	1231.6	1.015	0.00937	0.0	0.07805;	bottom hit;
10	100.00	0.0	3.656	6.899	1034.8	1.208	0.053	0.0	0.09287;	
20	100.00	0.0	4.448	11.65	852.2	1.467	0.103	0.0	0.1130;	
30	100.00	0.0	5.414	15.55	701.3	1.783	0.164	0.0	0.1375;	
40	100.00	0.0	6.590	18.75	576.7	2.167	0.239	0.0	0.1674;	
50	99.99	0.0	8.022	21.38	474.1	2.636	0.331	0.0	0.2038;	
60	99.99	0.0	9.762	23.53	389.6	3.208	0.444	0.0	0.2480;	
70	99.97	0.0	11.87	25.30	320.1	3.905	0.582	0.0	0.3015;	
80	99.95	0.0	14.22	26.65	266.8	4.686	0.723	0.0	0.3611;	
90	99.93	0.0	16.71	27.67	226.1	5.528	0.844	0.0	0.4245;	
100	99.90	0.0	19.38	28.49	194.0	6.444	0.949	0.0	0.4922;	
110	99.87	0.0	22.22	29.14	168.0	7.439	1.042	0.0	0.5644;	
112	99.87	0.0	22.81	29.26	163.5	7.647	1.059	0.0	0.5794;	begin overlap;
120	99.84	0.0	25.00	29.64	148.3	8.429	1.126	0.0	0.6350;	
130	99.81	0.0	27.40	30.00	134.1	9.324	1.204	0.0	0.6960;	
140	99.77	0.0	29.53	30.27	123.0	10.16	1.278	0.0	0.7502;	
150	99.74	0.0	31.45	30.50	114.1	10.96	1.350	0.0	0.7989;	
160	99.69	0.0	33.20	30.69	106.5	11.73	1.421	0.0	0.8433;	
170	99.64	0.0	34.80	30.85	99.99	12.50	1.492	0.0	0.8840;	
180	99.59	0.0	36.28	31.00	94.19	13.27	1.563	0.0	0.9215;	
190	99.53	0.0	37.65	31.13	88.95	14.05	1.636	0.0	0.9563;	
200	99.46	0.0	38.93	31.25	84.13	14.86	1.710	0.0	0.9888;	
210	99.38	0.0	40.14	31.37	79.60	15.70	1.788	0.0	1.0195;	
220	99.29	0.0	41.29	31.47	75.29	16.60	1.870	0.0	1.0488;	
230	99.18	0.0	42.42	31.58	71.10	17.58	1.957	0.0	1.0776;	
240	99.06	0.0	43.57	31.68	66.94	18.67	2.049	0.0	1.1068;	
248	98.94	0.0	44.54	31.77	63.59	19.66	2.129	0.0	1.1314;	end overlap;
250	98.90	0.0	44.77	31.79	62.78	19.91	2.150	0.0	1.1373;	
260	98.72	0.0	45.81	31.89	58.89	21.23	2.259	0.0	1.1635;	
270	98.48	0.0	46.65	31.98	55.22	22.64	2.382	0.0	1.1848;	
280	98.18	0.0	47.38	32.07	51.60	24.22	2.522	0.0	1.2034;	
290	97.77	0.0	48.14	32.16	47.84	26.13	2.685	0.0	1.2227;	
300	97.22	0.0	49.16	32.27	43.72	28.59	2.878	0.0	1.2487;	
310	96.42	0.0	50.83	32.39	38.97	32.08	3.112	0.0	1.2911;	
320	95.22	0.0	53.83	32.53	33.34	37.49	3.403	0.0	1.3673;	
330	93.53	0.0	58.72	32.68	27.39	45.63	3.730	0.0	1.4915;	
340	91.64	0.0	64.84	32.80	22.47	55.62	4.028	0.0	1.6469;	
350	89.53	0.0	72.10	32.90	18.44	67.80	4.302	0.0	1.8314;	
360	87.17	0.0	80.54	32.98	15.13	82.64	4.558	0.0	2.0457;	
370	84.51	0.0	90.23	33.05	12.41	100.7	4.800	0.0	2.2918;	
380	81.53	0.0	102.0	33.11	10.18	122.8	5.033	0.0	2.5900;	
390	78.12	0.0	117.0	33.15	8.352	149.7	5.265	0.0	2.9726;	
400	74.18	0.0	135.7	33.18	6.851	182.4	5.506	0.0	3.4465;	
405	71.98	0.0	146.1	33.19	6.205	201.4	5.631	0.0	3.7107;	merging;
410	69.06	0.0	162.8	33.20	5.620	222.4	5.789	0.0	4.1340;	
416	64.56	0.0	199.7	33.22	4.991	250.5	6.022	0.0	5.0723;	trap level;
420	61.00	0.0	241.4	33.23	4.611	271.1	6.209	0.0	6.1323;	
430	53.65	0.0	568.5	33.25	4.011	311.7	6.682	0.0	14.439;	begin overlap;
440	53.08	0.0	982.9	33.25	3.991	313.2	6.753	0.0	24.965;	
450	52.92	0.0	1354.7	33.25	3.982	313.9	6.783	0.0	34.410;	
460	52.84	0.0	1716.3	33.25	3.975	314.5	6.801	0.0	43.594;	
470	52.82	0.0	1953.0	33.25	3.970	314.8	6.807	0.0	49.607;	

480 52.82 0.0 1973.2 33.25 3.967 315.1 6.807 0.0 50.119;
490 52.82 0.0 1977.2 33.25 3.963 315.4 6.807 0.0 50.221; local maximum rise or fall;
497 63.67 0.0 1999.3 33.25 3.883 321.9 7.268 0.0 50.782;
Horiz plane projections in effluent direction: radius(m): 0.0; CL(m): 2.2154
Lmz(m): 2.2154
forced entrain 1 0.0 11.07 50.78 0.283
Rate sec-1 0.0 dy-1 0.0 kt: 0.0 Amb Sal 33.3841
;
10:42:10 AM. amb fills: 4

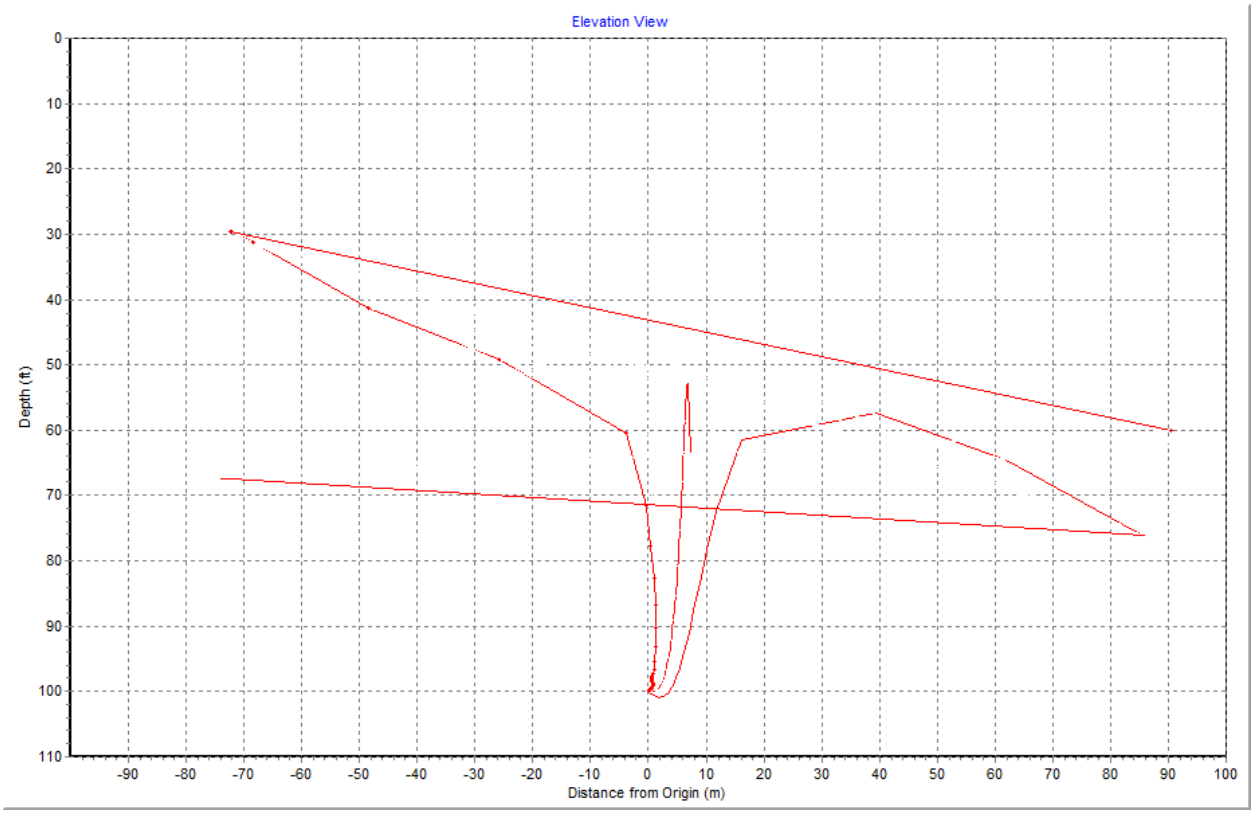


Figure A.3.1: Plumes 18b solution of discharge plume trajectories for discharges of 13 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. ZID is defined by the maximum horizontal excursion of trajectories from the origin. From the maximum horizontal spreading of the plume, the ZID extends from X = -74 m to X = +91 m so that ZID = 165 m

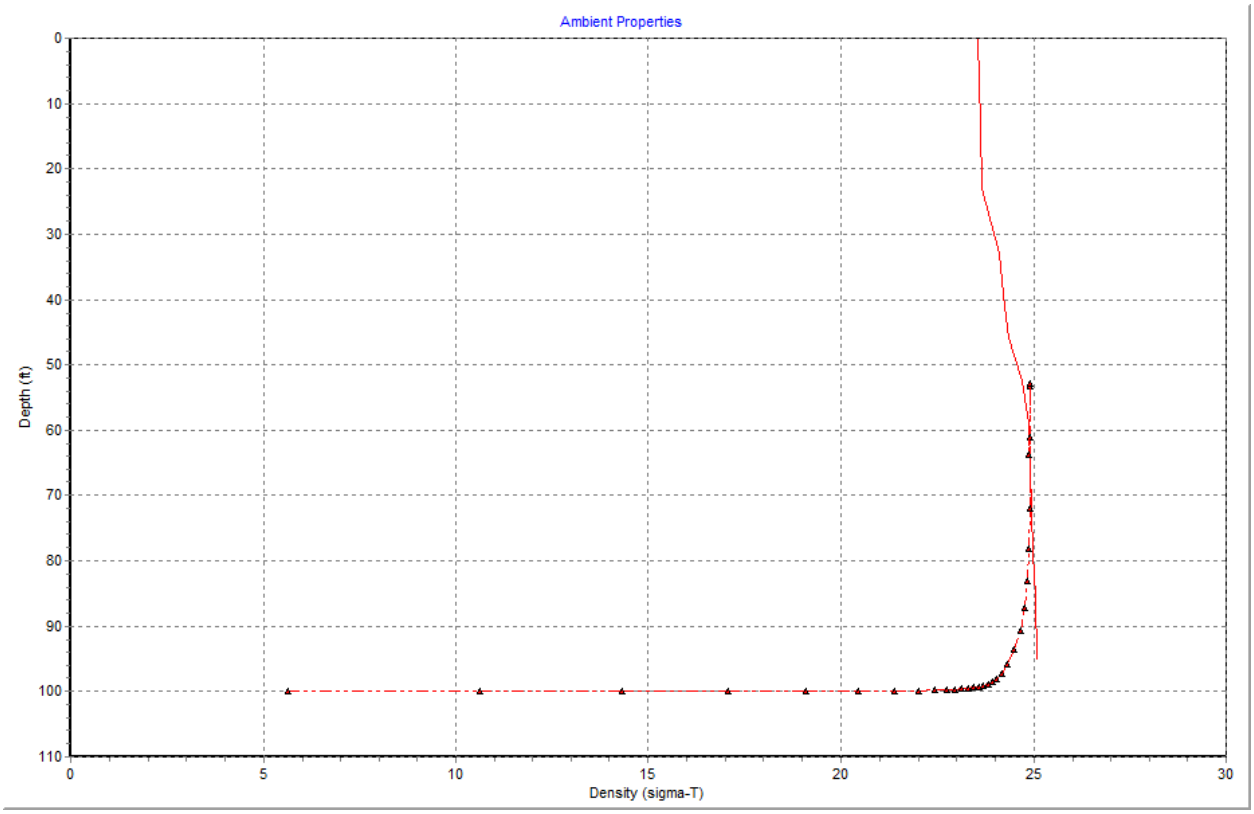


Figure A.3.2: Plumes 18b solution of vertical density profile for discharges of 13 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. Discharge effluent density shown as black triangles. Ambient water mass density profile shown as solid red line.

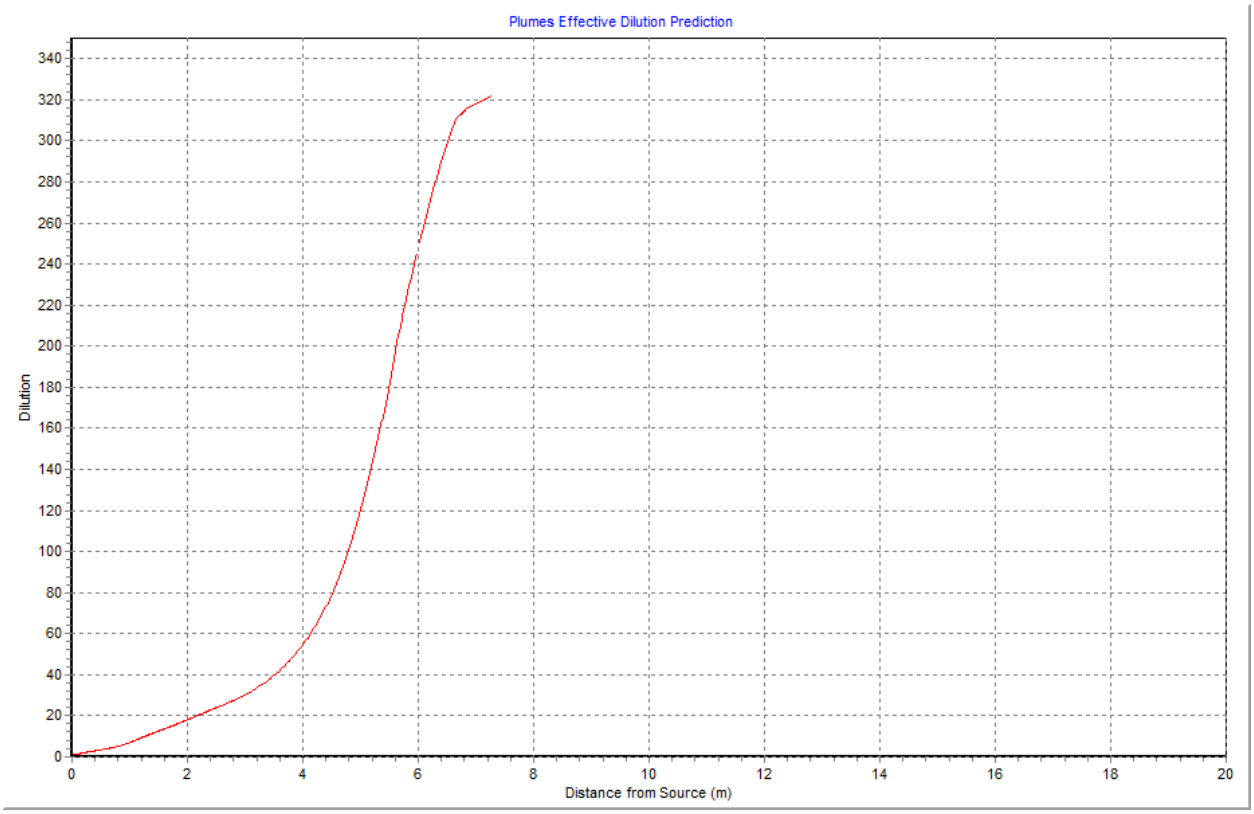


Figure A.3.3: Plumes 18b solution of effective (bulk average) dilution as a function of vertical distance from the point of discharge for discharges of 13 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt.

A.4: Plumes 18b Results for SJCOO discharges of 8 mgd Wastewater Only:

SJCOO discharging 8 mgd of wastewater at TDS = 1.25 ppt

Model configuration items checked:
Channel width (m) 100
Start case for graphs 1
Max detailed graphs 10 (limits plots that can overflow memory)
Elevation Projection Plane (deg) 0
Shore vector (m,deg) not checked
Bacteria model : Mancini (1978) coliform model
PDS sfc. model heat transfer : Medium
Equation of State : S, T
Similarity Profile : Default profile (k=2.0, ...)
Diffuser port contraction coefficient 1
Light absorption coefficient 0.16
Farfield increment (m) 200
UM3 aspiration coefficient 0.1
Output file: text output tab
Output each ?? steps 10
Maximum dilution reported 1000
Text output format : Standard
Max vertical reversals : to max rise or fall

/ UM3. 1/10/2019 11:08:09 AM
Case 1; ambient file C:\Plumes18\SJCOO_WW8mgd_b0mgd_T-1.001.db; Diffuser table record 1: ----------

Ambient Table:

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn	Density
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2	sigma-T
0.0	0.0	0.0	33.38	19.97	0.0	0.0	0.0	0.0	0.0003	23.55719
2.000	0.0	0.0	33.39	19.87	0.0	0.0	0.0	0.0	0.0003	23.59288
4.000	0.0	0.0	33.40	19.81	0.0	0.0	0.0	0.0	0.0003	23.61484
7.000	0.0	0.0	33.41	19.64	0.0	0.0	0.0	0.0	0.0003	23.67096
10.00	0.0	0.0	33.40	17.76	0.0	0.0	0.0	0.0	0.0003	24.12888
12.00	0.0	0.0	33.38	17.34	0.0	0.0	0.0	0.0	0.0003	24.21549
14.00	0.0	0.0	33.38	16.73	0.0	0.0	0.0	0.0	0.0003	24.35932
16.00	0.0	0.0	33.38	15.17	0.0	0.0	0.0	0.0	0.0003	24.71340
18.00	0.0	0.0	33.37	14.37	0.0	0.0	0.0	0.0	0.0003	24.87044
20.00	0.0	0.0	33.35	14.18	0.0	0.0	0.0	0.0	0.0003	24.89660
22.00	0.0	0.0	33.33	13.83	0.0	0.0	0.0	0.0	0.0003	24.95172
24.00	0.0	0.0	33.32	13.75	0.0	0.0	0.0	0.0	0.0003	24.96707
26.00	0.0	0.0	33.36	13.42	0.0	0.0	0.0	0.0	0.0003	25.06459
29.00	0.0	0.0	33.36	13.39	0.0	0.0	0.0	0.0	0.0003	25.07096

Diffuser table:

P-dia	Ver angl	H-Angle	SourceX	SourceY	Ports	Spacing	MZ-dis	Isoplth	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(in)	(deg)	(deg)	(ft)	(ft)	()	(ft)	(ft)	(concent)	(ft)	(MGD)	(psu)	(C)	(ppm)
3.0500	0.0	0.0	0.0	0.0	125.00	12.000	1000.0	0.0	100.00	8.0000	1.2500	20.660	1250.0

Simulation:
Froude No: 4.231; Strat No: 1.48E-4; Spcg No: 47.21; k: 59486.8; eff den (sigmaT) -0.921168; eff vel 0.595(m/s);

Current is very small, flow regime may be transient.

Step	Depth (ft)	Amb-cur (m/s)	P-dia (in)	Eff-sal (psu)	Polutnt (ppm)	Dilutn ()	x-posn (m)	y-posn (m)	Iso dia (m)	
0	100.0	1.000E-5	3.050	1.250	1250.0	1.000	0.0	0.0	0.07747;	
1	100.00	0.0	3.064	1.551	1238.6	1.009	0.0058	0.0	0.07783;	bottom hit;
10	100.00	0.0	3.635	6.744	1040.8	1.201	0.0201	0.0	0.09233;	
20	100.00	0.0	4.423	11.53	857.1	1.458	0.0234	0.0	0.1123;	
30	100.00	0.0	5.383	15.45	705.3	1.772	0.0244	0.0	0.1367;	
40	100.00	0.0	6.553	18.67	580.1	2.155	0.0248	0.0	0.1665;	
50	100.00	0.0	7.980	21.31	476.9	2.621	0.025	0.0	0.2027;	
60	100.00	0.0	9.719	23.47	391.9	3.190	0.0251	0.0	0.2469;	
70	100.00	0.0	11.84	25.25	321.9	3.883	0.0251	0.0	0.3007;	
76	100.00	0.0	13.32	26.15	286.2	4.367	0.0251	0.0	0.3384;	begin overlap;
80	100.00	0.0	14.31	26.64	267.0	4.682	0.0251	0.0	0.3634;	
90	100.00	0.0	16.50	27.53	232.0	5.388	0.0251	0.0	0.4192;	
100	100.00	0.0	18.44	28.13	208.0	6.010	0.0251	0.0	0.4683;	
110	100.00	0.0	20.18	28.58	190.2	6.572	0.0251	0.0	0.5126;	
120	100.00	0.0	21.79	28.93	176.3	7.090	0.0251	0.0	0.5534;	
130	100.00	0.0	23.27	29.21	165.2	7.567	0.0251	0.0	0.5910;	
140	100.00	0.0	24.73	29.46	155.5	8.038	0.0251	0.0	0.6282;	
150	99.98	0.0	25.95	29.68	146.5	8.530	0.140	0.0	0.6591;	
160	99.97	0.0	27.18	29.86	139.3	8.972	0.160	0.0	0.6905;	
170	99.97	0.0	28.39	30.03	132.9	9.405	0.176	0.0	0.7210;	
180	99.96	0.0	29.54	30.17	127.1	9.832	0.192	0.0	0.7502;	
190	99.96	0.0	30.61	30.30	121.9	10.26	0.213	0.0	0.7775;	
200	99.95	0.0	31.53	30.42	117.2	10.67	0.238	0.0	0.8009;	
210	99.93	0.0	32.37	30.53	112.9	11.07	0.263	0.0	0.8222;	
220	99.92	0.0	33.13	30.63	108.9	11.48	0.288	0.0	0.8416;	
230	99.91	0.0	33.83	30.72	105.1	11.89	0.314	0.0	0.8593;	
240	99.89	0.0	34.46	30.81	101.6	12.31	0.340	0.0	0.8753;	
250	99.87	0.0	35.02	30.90	98.17	12.73	0.367	0.0	0.8896;	
260	99.85	0.0	35.52	30.98	94.90	13.17	0.396	0.0	0.9022;	
270	99.82	0.0	35.95	31.06	91.73	13.63	0.426	0.0	0.9132;	
280	99.79	0.0	36.32	31.14	88.62	14.10	0.457	0.0	0.9226;	
290	99.75	0.0	36.64	31.22	85.56	14.61	0.491	0.0	0.9306;	
300	99.71	0.0	36.89	31.29	82.49	15.15	0.528	0.0	0.9371;	
310	99.65	0.0	37.11	31.37	79.40	15.74	0.568	0.0	0.9425;	
320	99.59	0.0	37.29	31.45	76.21	16.40	0.612	0.0	0.9471;	
330	99.51	0.0	37.46	31.53	72.86	17.16	0.661	0.0	0.9515;	
340	99.40	0.0	37.68	31.63	69.24	18.05	0.716	0.0	0.9571;	
350	99.27	0.0	38.04	31.73	65.19	19.17	0.779	0.0	0.9661;	end overlap;
360	99.09	0.0	38.30	31.83	61.14	20.45	0.853	0.0	0.9729;	
370	98.85	0.0	38.38	31.93	57.11	21.89	0.941	0.0	0.9749;	
380	98.50	0.0	38.47	32.04	52.73	23.71	1.050	0.0	0.9772;	
390	97.95	0.0	38.93	32.17	47.47	26.33	1.189	0.0	0.9889;	
400	97.05	0.0	40.47	32.34	40.68	30.73	1.372	0.0	1.0278;	
410	95.78	0.0	43.60	32.53	33.38	37.44	1.575	0.0	1.1075;	
420	94.38	0.0	47.83	32.68	27.39	45.64	1.753	0.0	1.2150;	
430	92.82	0.0	53.00	32.80	22.47	55.63	1.915	0.0	1.3462;	
440	91.09	0.0	59.06	32.90	18.44	67.80	2.066	0.0	1.5002;	
450	89.14	0.0	66.07	32.98	15.12	82.65	2.207	0.0	1.6781;	
460	86.96	0.0	74.08	33.05	12.41	100.7	2.341	0.0	1.8817;	
470	84.50	0.0	83.22	33.11	10.18	122.8	2.469	0.0	2.1138;	
480	81.73	0.0	94.33	33.15	8.351	149.7	2.592	0.0	2.3960;	
490	78.57	0.0	108.7	33.18	6.851	182.5	2.717	0.0	2.7621;	
500	74.89	0.0	127.3	33.21	5.620	222.4	2.849	0.0	3.2327;	

508	71.50	0.0	144.5	33.23	4.797	260.6	2.963	0.0	3.6706; merging;
510	70.49	0.0	149.8	33.23	4.610	271.1	2.995	0.0	3.8059;
515	67.29	0.0	174.0	33.24	4.176	299.3	3.097	0.0	4.4204; trap level;
520	63.22	0.0	224.9	33.25	3.782	330.5	3.233	0.0	5.7134;
529	56.84	0.0	640.9	33.26	3.348	373.4	3.537	0.0	16.278; begin overlap;
530	56.76	0.0	717.8	33.26	3.346	373.6	3.544	0.0	18.232;
540	56.46	0.0	1308.9	33.26	3.339	374.3	3.578	0.0	33.246;
550	56.38	0.0	1837.7	33.26	3.336	374.7	3.592	0.0	46.677;
560	56.35	0.0	2290.4	33.26	3.333	375.1	3.598	0.0	58.177;
570	56.35	0.0	2354.0	33.26	3.331	375.3	3.599	0.0	59.791;
580	56.35	0.0	2357.4	33.26	3.329	375.5	3.599	0.0	59.877; local maximum rise or fall;
587	76.20	0.0	2382.9	33.27	3.263	383.1	3.988	0.0	60.525;

Horiz plane projections in effluent direction: radius(m): 0.0; CL(m): 1.2157
Lmz(m): 1.2157
forced entrain 1 0.0 7.253 60.52 0.238
Rate sec-1 0.0 dy-1 0.0 kt: 0.0 Amb Sal 33.3739
;
11:08:09 AM. amb fills: 4

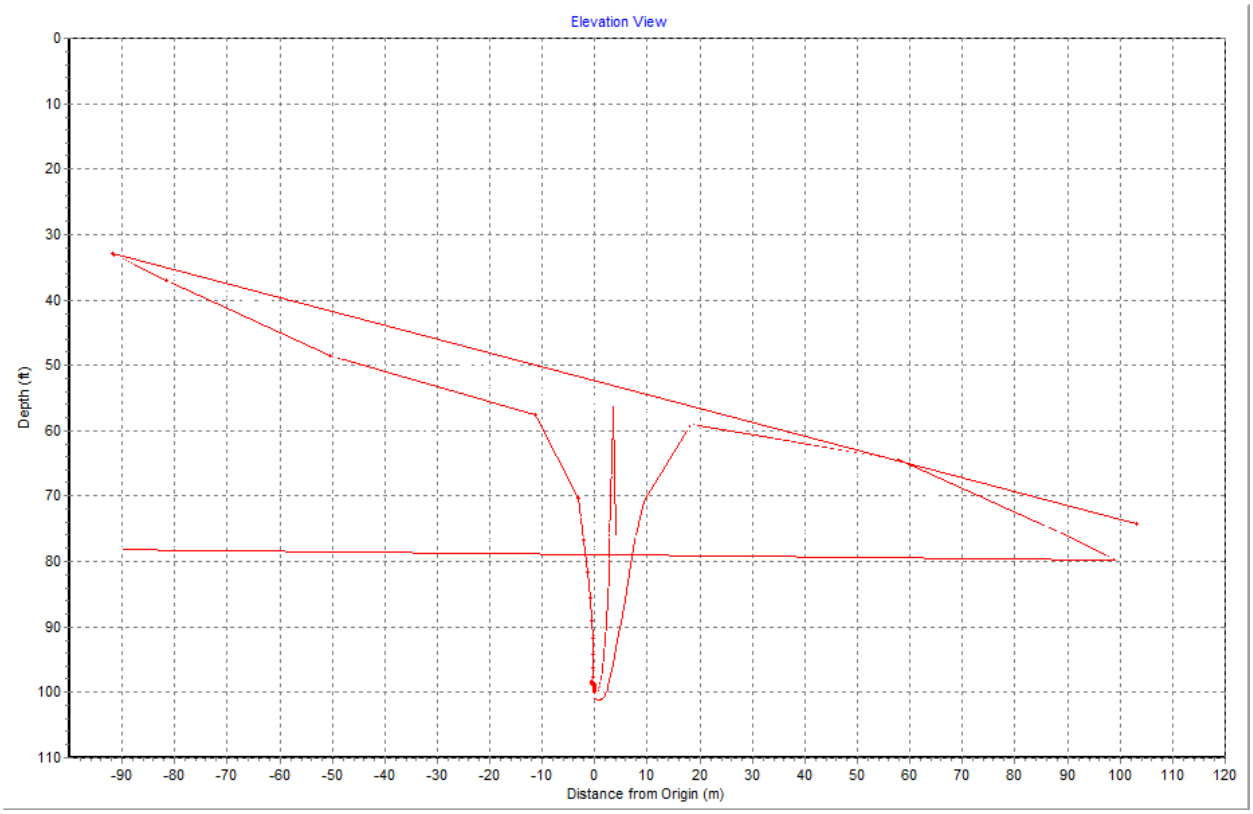


Figure A.4.1: Plumes 18b solution of discharge plume trajectories for discharges of 8 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. ZID is defined by the maximum horizontal excursion of trajectories from the origin. From the maximum horizontal spreading of the plume, the ZID extends from X = -92 m to X = +104 m so that ZID = 196 m

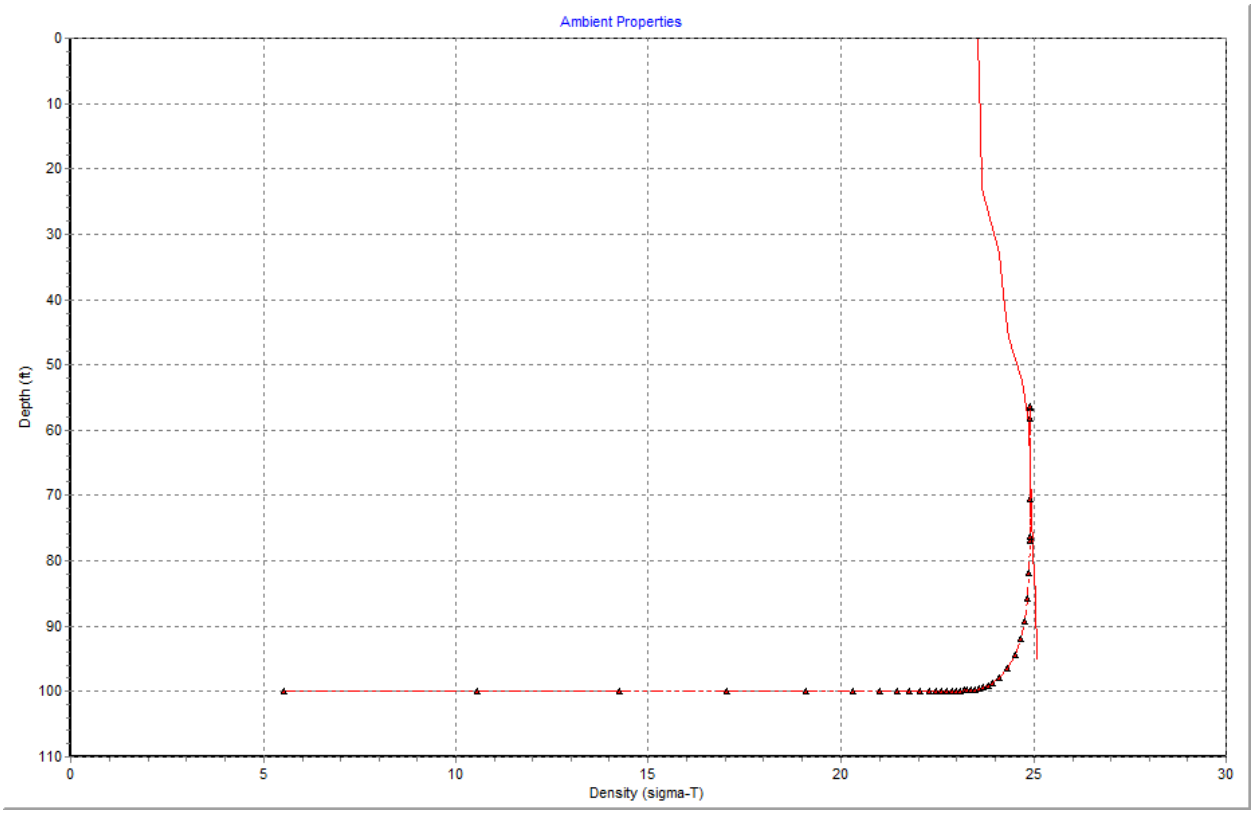


Figure A.4.2: Plumes 18b solution of vertical density profile for discharges of 8 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. Discharge effluent density shown as black triangles. Ambient water mass density profile shown as solid red line.

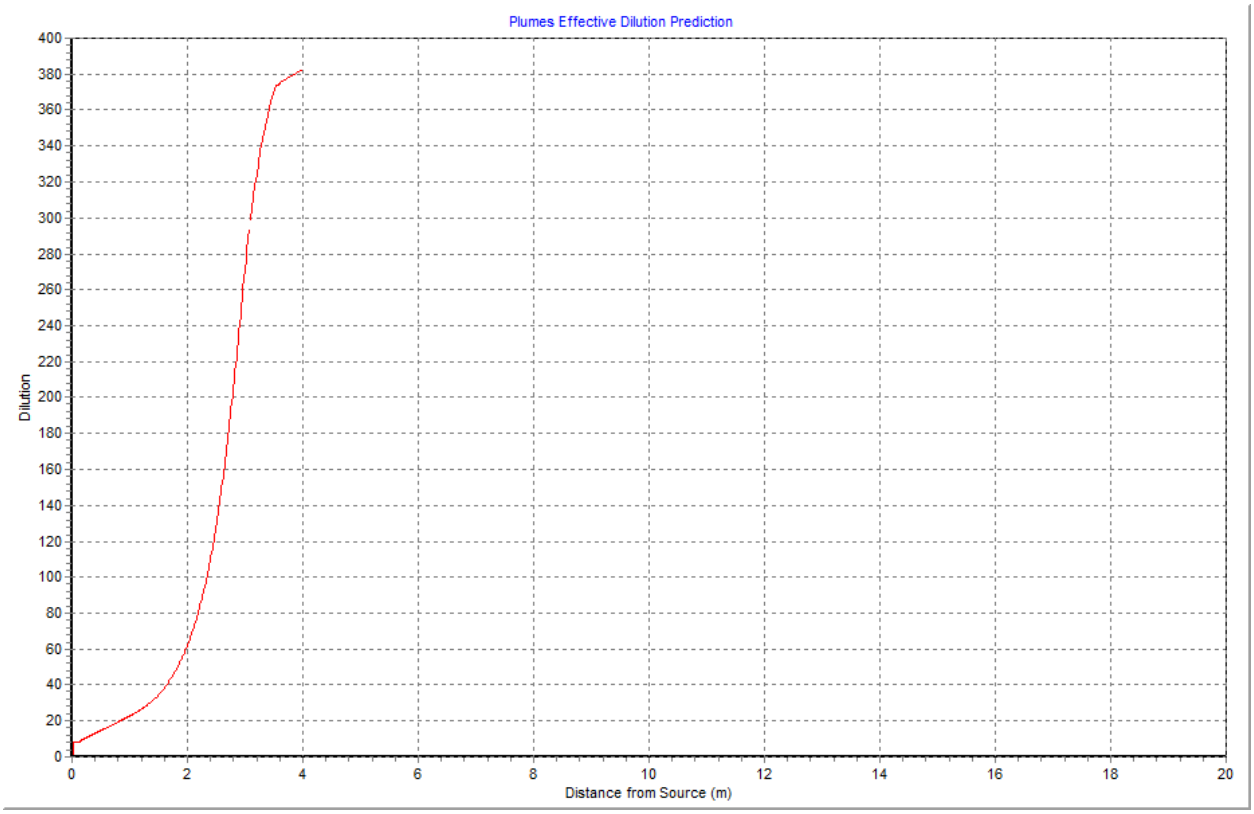


Figure A.4.3: Plumes 18b solution of effective (bulk average) dilution as a function of vertical distance from the point of discharge for discharges of 8 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt.

A.5: Plumes 18b Results for SJCOO discharges of 0.35 mgd Wastewater Only:

SJCOO discharging 0.35 mgd of wastewater at TDS = 1.25
ppt

Model configuration items checked:
Channel width (m) 100
Start case for graphs 1
Max detailed graphs 10 (limits plots that can overflow memory)
Elevation Projection Plane (deg) 0
Shore vector (m,deg) not checked
Bacteria model : Mancini (1978) coliform model
PDS sfc. model heat transfer : Medium
Equation of State : S, T
Similarity Profile : Default profile (k=2.0, ...)
Diffuser port contraction coefficient 1
Light absorption coefficient 0.16
Farfield increment (m) 200
UM3 aspiration coefficient 0.1
Output file: text output tab
Output each ?? steps 10
Maximum dilution reported 1000
Text output format : Standard
Max vertical reversals : to max rise or fall

/ UM3. 1/10/2019 11:27:04 AM
Case 1; ambient file C:\Plumes18\SJCOO_WW0.35mgd_b0mgd_T-2.001.db; Diffuser table record 1: ----------
----

Ambient Table:

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn	Density
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2	sigma-T
0.0	0.0	0.0	33.38	19.97	0.0	0.0	0.0	0.0	0.0003	23.55719
2.000	0.0	0.0	33.39	19.87	0.0	0.0	0.0	0.0	0.0003	23.59288
4.000	0.0	0.0	33.40	19.81	0.0	0.0	0.0	0.0	0.0003	23.61484
7.000	0.0	0.0	33.41	19.64	0.0	0.0	0.0	0.0	0.0003	23.67096
10.00	0.0	0.0	33.40	17.76	0.0	0.0	0.0	0.0	0.0003	24.12888
12.00	0.0	0.0	33.38	17.34	0.0	0.0	0.0	0.0	0.0003	24.21549
14.00	0.0	0.0	33.38	16.73	0.0	0.0	0.0	0.0	0.0003	24.35932
16.00	0.0	0.0	33.38	15.17	0.0	0.0	0.0	0.0	0.0003	24.71340
18.00	0.0	0.0	33.37	14.37	0.0	0.0	0.0	0.0	0.0003	24.87044
20.00	0.0	0.0	33.35	14.18	0.0	0.0	0.0	0.0	0.0003	24.89660
22.00	0.0	0.0	33.33	13.83	0.0	0.0	0.0	0.0	0.0003	24.95172
24.00	0.0	0.0	33.32	13.75	0.0	0.0	0.0	0.0	0.0003	24.96707
26.00	0.0	0.0	33.36	13.42	0.0	0.0	0.0	0.0	0.0003	25.06459
29.00	0.0	0.0	33.36	13.39	0.0	0.0	0.0	0.0	0.0003	25.07096

Diffuser table:

P-dia	Ver angl	H-Angle	SourceX	SourceY	Ports	Spacing	MZ-dis	Isoplth	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(in)	(deg)	(deg)	(ft)	(ft)	()	(ft)	(ft)	(concent)	(ft)	(MGD)	(psu)	(C)	(ppm)
3.0500	0.0	0.0	0.0	0.0	125.00	12.000	1000.0	0.0	100.00	0.3500	1.2500	20.660	1250.0

Simulation:

Froude No: 0.185; Strat No: 1.48E-4; Spcg No: 47.21; k: 2602.5; eff den (sigmaT) -0.921168; eff vel 0.026(m/s);
Current is very small, flow regime may be transient.
Absolute value Froude No. < 1, possible intrusion and/or plume diameter reduction

Step	Depth (ft)	Amb-cur (m/s)	P-dia (in)	Eff-sal (psu)	Polutnt (ppm)	Dilutn ()	x-posn (m)	y-posn (m)	Iso dia (m)
0	100.0	1.000E-5	3.050	1.250	1250.0	1.000	0.0	0.0	0.07747;
1	100.00	0.0	3.051	1.263	1249.5	1.000	0.000256	0.0	0.07749; bottom hit;
2	100.00	0.0	3.052	1.285	1248.7	1.001	0.000266	0.0	0.07751; begin overlap;
10	99.98	0.0	2.365	2.302	1210.1	1.033	0.0124	0.0	0.06008;
20	99.97	0.0	2.263	4.671	1119.9	1.116	0.0169	0.0	0.05747;
30	99.96	0.0	2.323	7.904	996.3	1.255	0.0205	0.0	0.0590;
40	99.95	0.0	2.438	11.12	872.5	1.433	0.0238	0.0	0.06193;
50	99.95	0.0	2.872	14.54	740.4	1.688	0.0239	0.0	0.07295;
57	99.94	0.0	2.896	16.44	666.8	1.875	0.0273	0.0	0.07355; end overlap;
60	99.94	0.0	3.058	17.42	628.8	1.988	0.0274	0.0	0.07766;
62	99.94	0.0	3.177	18.03	604.8	2.067	0.0275	0.0	0.0807; begin overlap;
70	99.94	0.0	3.637	19.96	529.8	2.360	0.0275	0.0	0.09237;
80	99.94	0.0	4.143	21.58	466.2	2.681	0.0275	0.0	0.1052;
85	99.92	0.0	3.876	22.41	433.7	2.882	0.0316	0.0	0.09844; end overlap;
90	99.91	0.0	4.114	23.44	393.2	3.179	0.0329	0.0	0.1045;
100	99.89	0.0	4.330	25.09	328.0	3.810	0.0374	0.0	0.1100;
110	99.81	0.0	4.227	26.44	274.8	4.549	0.0452	0.0	0.1074;
120	99.70	0.0	4.281	27.69	225.6	5.540	0.0534	0.0	0.1087;
130	99.57	0.0	4.556	28.71	185.2	6.748	0.0603	0.0	0.1157;
140	99.43	0.0	4.961	29.54	152.1	8.220	0.0663	0.0	0.1260;
150	99.27	0.0	5.469	30.23	124.8	10.01	0.0717	0.0	0.1389;
160	99.09	0.0	6.074	30.79	102.4	12.20	0.0767	0.0	0.1543;
170	98.89	0.0	6.777	31.25	84.06	14.87	0.0814	0.0	0.1721;
180	98.67	0.0	7.584	31.63	68.98	18.12	0.0858	0.0	0.1926;
190	98.42	0.0	8.503	31.94	56.60	22.08	0.090	0.0	0.2160;
200	98.14	0.0	9.546	32.20	46.44	26.91	0.094	0.0	0.2425;
210	97.82	0.0	10.73	32.41	38.11	32.80	0.0978	0.0	0.2725;
220	97.47	0.0	12.06	32.58	31.27	39.98	0.102	0.0	0.3064;
230	97.07	0.0	13.57	32.72	25.65	48.73	0.105	0.0	0.3447;
240	96.62	0.0	15.27	32.83	21.04	59.40	0.108	0.0	0.3879;
250	96.11	0.0	17.19	32.93	17.27	72.40	0.112	0.0	0.4367;
260	95.54	0.0	19.35	33.01	14.16	88.25	0.115	0.0	0.4916;
270	94.89	0.0	21.79	33.07	11.62	107.6	0.118	0.0	0.5536;
280	94.16	0.0	24.54	33.12	9.533	131.1	0.121	0.0	0.6234;
290	93.35	0.0	27.65	33.17	7.821	159.8	0.123	0.0	0.7022;
300	92.43	0.0	31.14	33.20	6.416	194.8	0.126	0.0	0.7911;
310	91.39	0.0	35.09	33.23	5.263	237.5	0.129	0.0	0.8913;
320	90.22	0.0	39.55	33.25	4.318	289.5	0.131	0.0	1.0046;
330	88.90	0.0	44.59	33.27	3.542	352.9	0.133	0.0	1.1326;
340	87.41	0.0	50.29	33.29	2.906	430.2	0.136	0.0	1.2775;
350	85.74	0.0	56.76	33.30	2.384	524.4	0.138	0.0	1.4418;
360	83.84	0.0	64.53	33.31	1.956	639.2	0.140	0.0	1.6390;
367	82.35	0.0	72.65	33.32	1.703	734.2	0.142	0.0	1.8453; trap level;
370	81.65	0.0	77.39	33.32	1.604	779.2	0.142	0.0	1.9658;
380	78.93	0.0	114.5	33.32	1.316	949.8	0.146	0.0	2.9083;
382	78.49	0.0	152.0	33.32	1.265	988.2	0.148	0.0	3.8607; merging;
383	78.61	0.0	293.5	33.32	1.263	990.0	0.149	0.0	7.4546; local maximum rise or fall;

Horiz plane projections in effluent direction: radius(m): 0.0; CL(m): 0.0454
Lmz(m): 0.0454
forced entrain 1 0.0 6.520 7.455 0.00893

Rate sec-1 0.0 dy-1 0.0 kt: 0.0 Amb Sal 33.3233
;
11:27:04 AM. amb fills: 4

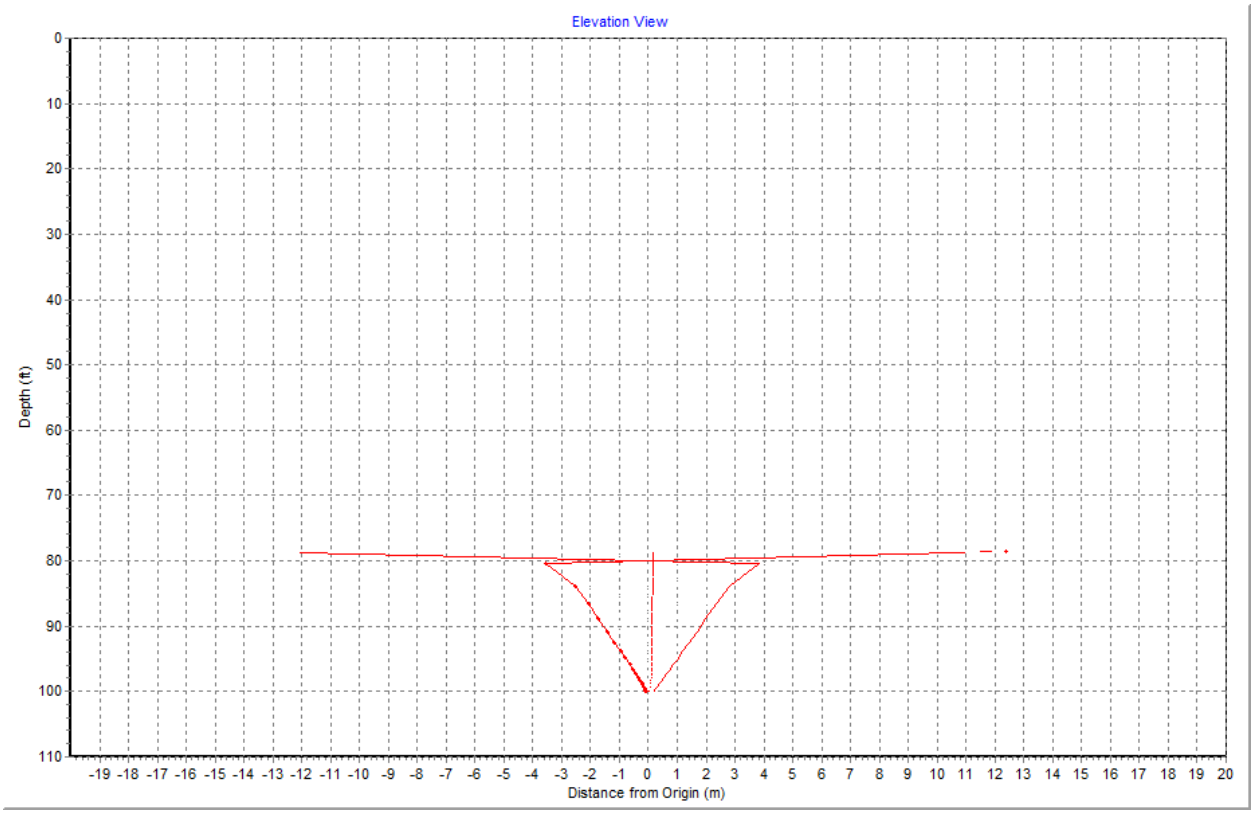


Figure A.5.1: Plumes 18b solution of discharge plume trajectories for discharges of 0.35 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. ZID is defined by the maximum horizontal excursion of trajectories from the origin. From the maximum horizontal spreading of the plume, the ZID extends from X = -12 m to X = +12.5 m so that ZID = 24.5 m

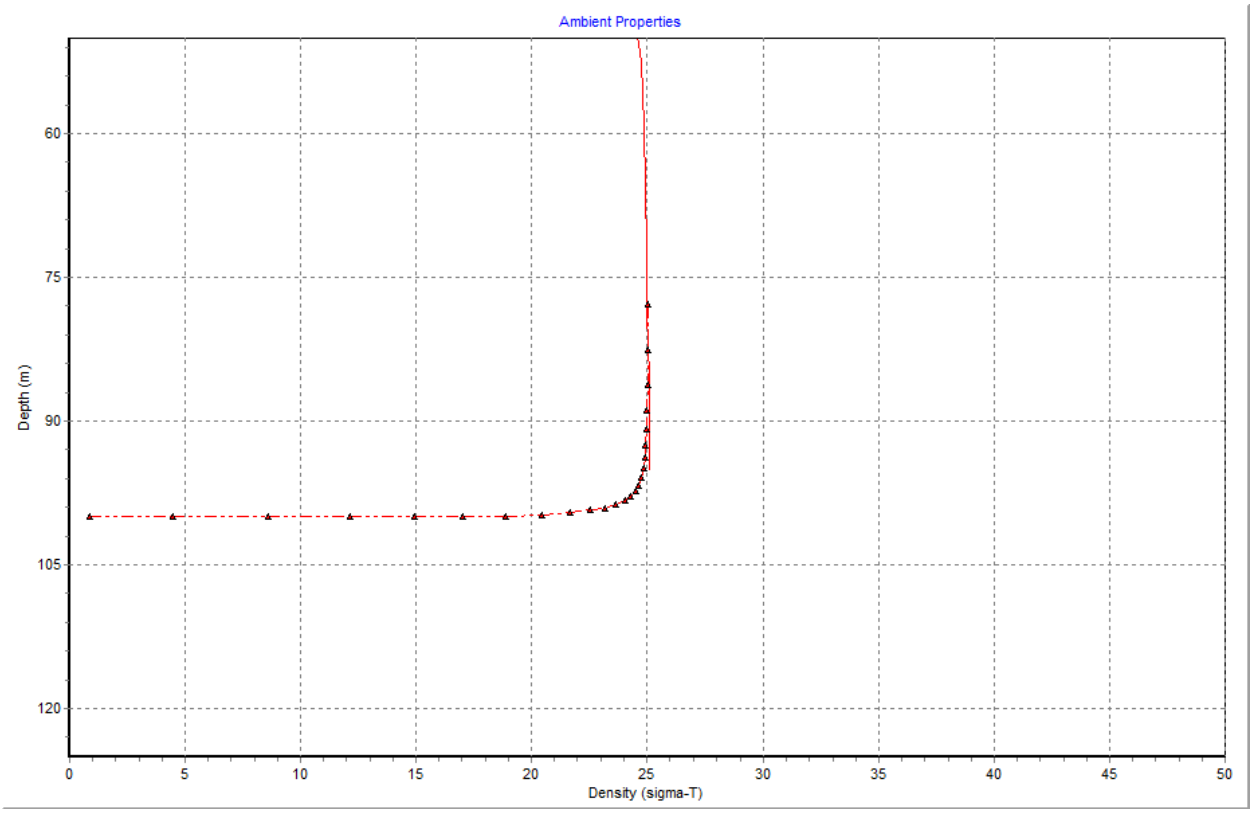


Figure A.5.2: Plumes 18b solution of vertical density profile for discharges of 0.35 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. Discharge effluent density shown as black triangles. Ambient water mass density profile shown as solid red line.

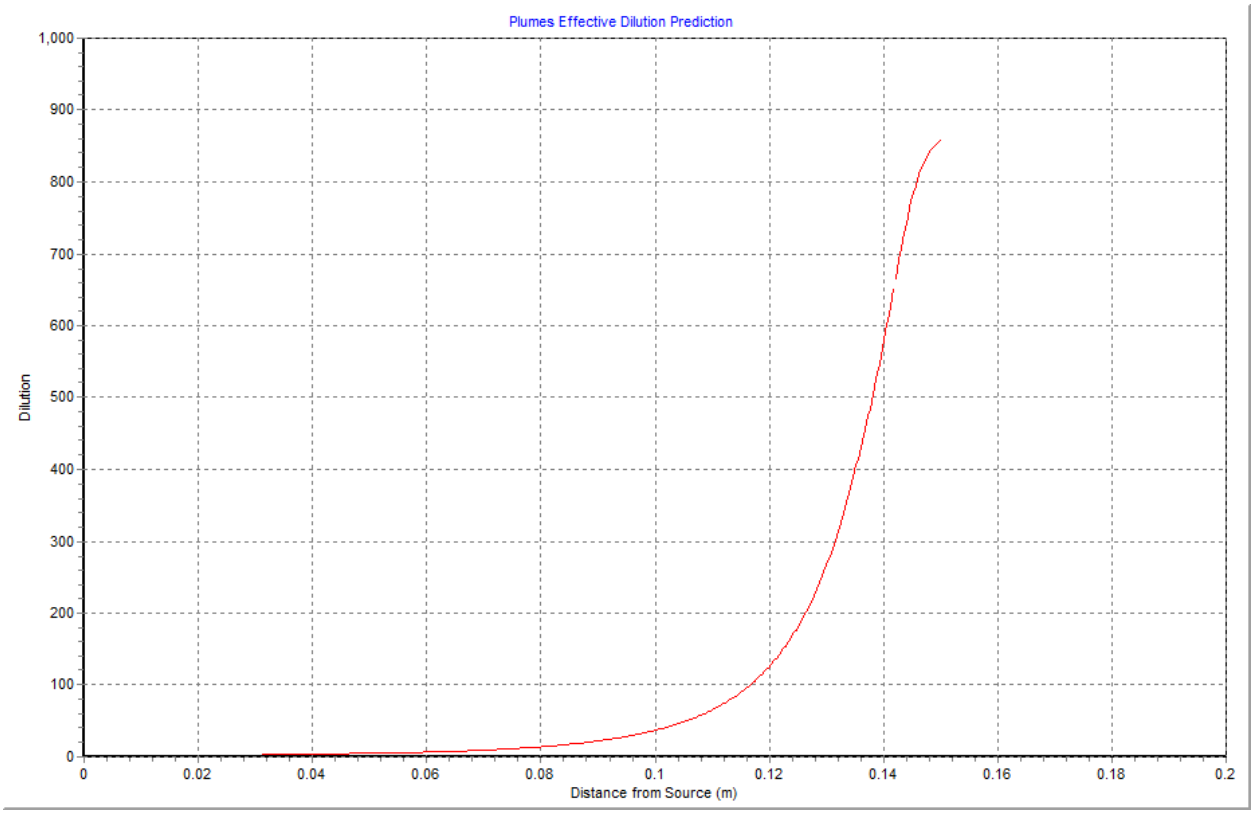


Figure A.5.3: Plumes 18b solution of effective (bulk average) dilution as a function of vertical distance from the point of discharge for discharges of 0.35 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt.

APPENDIX-B: Results for Buoyant Combined Discharges of Brine and Wastewater

B.1: Plumes 18b Results for SJCOO discharges of 31 mgd Wastewater and 5 mgd Brine:

Project "C:\Plumes18\SJCOO_WW31mgd_b5mgd_T-3"
memo
SJCOO discharging 31 mgd wastewater and 5 mgd brine

Model configuration items checked:
Channel width (m) 100
Start case for graphs 1
Max detailed graphs 10 (limits plots that can overflow memory)
Elevation Projection Plane (deg) 0
Shore vector (m,deg) not checked
Bacteria model : Mancini (1978) coliform model
PDS sfc. model heat transfer : Medium
Equation of State : S, T
Similarity Profile : Default profile (k=2.0, ...)
Diffuser port contraction coefficient 1
Light absorption coefficient 0.16
Farfield increment (m) 200
UM3 aspiration coefficient 0.1
Output file: text output tab
Output each ?? steps 10
Maximum dilution reported 1000
Text output format : Standard
Max vertical reversals : to max rise or fall

/ UM3. 1/10/2019 11:52:37 AM
Case 1; ambient file C:\Plumes18\SJCOO_WW31mgd_b5mgd_T-3.001.db; Diffuser table record 1: ----------

Ambient Table:

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn	Density
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2	sigma-T
0.0	0.0	0.0	33.38	19.97	0.0	0.0	0.0	0.0	0.0003	23.55719
2.000	0.0	0.0	33.39	19.87	0.0	0.0	0.0	0.0	0.0003	23.59288
4.000	0.0	0.0	33.40	19.81	0.0	0.0	0.0	0.0	0.0003	23.61484
7.000	0.0	0.0	33.41	19.64	0.0	0.0	0.0	0.0	0.0003	23.67096
10.00	0.0	0.0	33.40	17.76	0.0	0.0	0.0	0.0	0.0003	24.12888
12.00	0.0	0.0	33.38	17.34	0.0	0.0	0.0	0.0	0.0003	24.21549
14.00	0.0	0.0	33.38	16.73	0.0	0.0	0.0	0.0	0.0003	24.35932
16.00	0.0	0.0	33.38	15.17	0.0	0.0	0.0	0.0	0.0003	24.71340
18.00	0.0	0.0	33.37	14.37	0.0	0.0	0.0	0.0	0.0003	24.87044
20.00	0.0	0.0	33.35	14.18	0.0	0.0	0.0	0.0	0.0003	24.89660
22.00	0.0	0.0	33.33	13.83	0.0	0.0	0.0	0.0	0.0003	24.95172
24.00	0.0	0.0	33.32	13.75	0.0	0.0	0.0	0.0	0.0003	24.96707
26.00	0.0	0.0	33.36	13.42	0.0	0.0	0.0	0.0	0.0003	25.06459
29.00	0.0	0.0	33.36	13.39	0.0	0.0	0.0	0.0	0.0003	25.07096

Diffuser table:

P-dia	Ver angl	H-Angle	SourceX	SourceY	Ports	Spacing	MZ-dis	Isoplth	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(in)	(deg)	(deg)	(ft)	(ft)	()	(ft)	(ft)(concent)		(ft)	(MGD)	(psu)	(C)	(ppm)
3.0500	0.0	0.0	0.0	0.0	125.00	12.000	1000.0	0.0	100.00	36.000	9.3000	20.660	9300.0

Simulation:
Froude No: 21.83; Strat No: 1.94E-4; Spcg No: 47.21; k: 2.68E+5; eff den (sigmaT) 5.178451; eff vel 2.677(m/s);
Current is very small, flow regime may be transient.

Step	Depth (ft)	Amb-cur (m/s)	P-dia (in)	Eff-sal (psu)	Polutnt (ppm)	Dilutn ()	x-posn (m)	y-posn (m)	Iso dia (m)
0	100.0	1.000E-5	3.050	9.300	9300.0	1.000	0.0	0.0	0.07747;
1	100.00	0.0	3.113	10.28	8929.9	1.041	0.0253	0.0	0.07906; bottom hit;
10	100.00	0.0	3.754	14.04	7495.2	1.241	0.129	0.0	0.09536;
20	100.00	0.0	4.570	17.52	6166.1	1.508	0.265	0.0	0.1161;
30	100.00	0.0	5.565	20.36	5070.1	1.834	0.432	0.0	0.1413;
40	100.00	0.0	6.777	22.70	4167.2	2.232	0.635	0.0	0.1721;
50	99.99	0.0	8.254	24.61	3423.8	2.716	0.883	0.0	0.2097;
60	99.99	0.0	10.05	26.18	2812.3	3.307	1.185	0.0	0.2554;
70	99.98	0.0	12.25	27.47	2309.5	4.027	1.552	0.0	0.3111;
80	99.96	0.0	14.92	28.53	1896.2	4.904	1.998	0.0	0.3790;
90	99.93	0.0	18.17	29.40	1556.7	5.974	2.538	0.0	0.4615;
100	99.87	0.0	22.11	30.11	1277.7	7.278	3.189	0.0	0.5615;
110	99.77	0.0	26.64	30.67	1058.7	8.784	3.923	0.0	0.6766;
120	99.64	0.0	30.91	31.05	910.0	10.22	4.573	0.0	0.7851;
130	99.51	0.0	34.93	31.32	801.4	11.60	5.151	0.0	0.8873;
140	99.35	0.0	38.79	31.54	717.2	12.97	5.679	0.0	0.9852;
150	99.18	0.0	42.51	31.71	649.2	14.33	6.169	0.0	1.0799;
160	98.99	0.0	46.14	31.86	592.5	15.70	6.631	0.0	1.1720;
170	98.79	0.0	49.69	31.98	544.2	17.09	7.073	0.0	1.2620;
180	98.56	0.0	53.15	32.09	502.4	18.51	7.500	0.0	1.3500;
190	98.32	0.0	56.54	32.18	465.6	19.97	7.917	0.0	1.4361;
200	98.05	0.0	59.86	32.26	432.8	21.49	8.329	0.0	1.5204;
210	97.74	0.0	63.11	32.34	403.2	23.06	8.740	0.0	1.6031;
220	97.41	0.0	66.31	32.41	376.3	24.72	9.153	0.0	1.6843;
230	97.03	0.0	69.47	32.47	351.4	26.47	9.572	0.0	1.7645;
240	96.60	0.0	72.61	32.53	328.1	28.34	10.00	0.0	1.8442;
250	96.11	0.0	75.75	32.58	306.2	30.37	10.45	0.0	1.9242;
260	95.55	0.0	78.96	32.64	285.2	32.61	10.91	0.0	2.0056;
270	94.90	0.0	82.29	32.69	264.8	35.12	11.40	0.0	2.0903;
280	94.12	0.0	85.85	32.74	244.8	38.00	11.92	0.0	2.1805;
290	93.19	0.0	89.75	32.79	224.8	41.37	12.48	0.0	2.2797;
300	92.06	0.0	94.20	32.84	204.7	45.44	13.08	0.0	2.3926;
310	90.66	0.0	99.46	32.89	184.2	50.50	13.75	0.0	2.5262;
320	88.88	0.0	105.9	32.95	163.1	57.03	14.49	0.0	2.6908;
330	86.57	0.0	114.3	33.00	141.3	65.80	15.32	0.0	2.9024;
340	83.44	0.0	125.6	33.06	118.8	78.29	16.27	0.0	3.1913;
350	79.39	0.0	142.1	33.11	97.46	95.43	17.32	0.0	3.6105;
351	78.96	0.0	144.1	33.12	95.55	97.34	17.42	0.0	3.6596; merging;
360	73.60	0.0	174.1	33.15	79.95	116.3	18.61	0.0	4.4226;
370	65.40	0.0	232.9	33.18	65.59	141.8	20.21	0.0	5.9165;
375	60.57	0.0	281.7	33.20	59.40	156.6	21.10	0.0	7.1559; trap level;
380	55.25	0.0	353.2	33.21	53.80	172.8	22.10	0.0	8.9724;
387	52.25	0.0	505.5	33.22	51.00	182.4	22.75	0.0	12.839; begin overlap;
390	51.81	0.0	554.7	33.22	50.63	183.7	22.86	0.0	14.090;
400	51.01	0.0	696.1	33.23	50.08	185.7	23.09	0.0	17.680;
410	50.61	0.0	827.2	33.23	49.76	186.9	23.23	0.0	21.012;
420	50.38	0.0	955.2	33.23	49.50	187.9	23.32	0.0	24.262;
430	50.23	0.0	1080.8	33.23	49.28	188.7	23.39	0.0	27.451;
440	50.12	0.0	1203.9	33.23	49.09	189.5	23.45	0.0	30.578;

450	50.06	0.0	1313.3	33.23	48.92	190.1	23.48	0.0	33.358;
460	50.05	0.0	1349.8	33.23	48.78	190.6	23.49	0.0	34.285;
470	50.05	0.0	1359.6	33.23	48.65	191.1	23.49	0.0	34.534;
480	50.05	0.0	1367.0	33.23	48.53	191.7	23.49	0.0	34.722;
490	50.05	0.0	1374.2	33.23	48.40	192.2	23.49	0.0	34.905;
500	50.05	0.0	1382.3	33.23	48.26	192.7	23.49	0.0	35.111; local maximum rise or fall;
502	52.48	0.0	1396.7	33.23	47.32	196.6	24.42	0.0	35.475;

Horiz plane projections in effluent direction: radius(m): 0.0; CL(m): 7.4435
Lmz(m): 7.4435
forced entrain 1 0.0 14.49 35.48 0.533
Rate sec-1 0.0 dy-1 0.0 kt: 0.0 Amb Sal 33.3831
;
11:52:38 AM. amb fills: 4

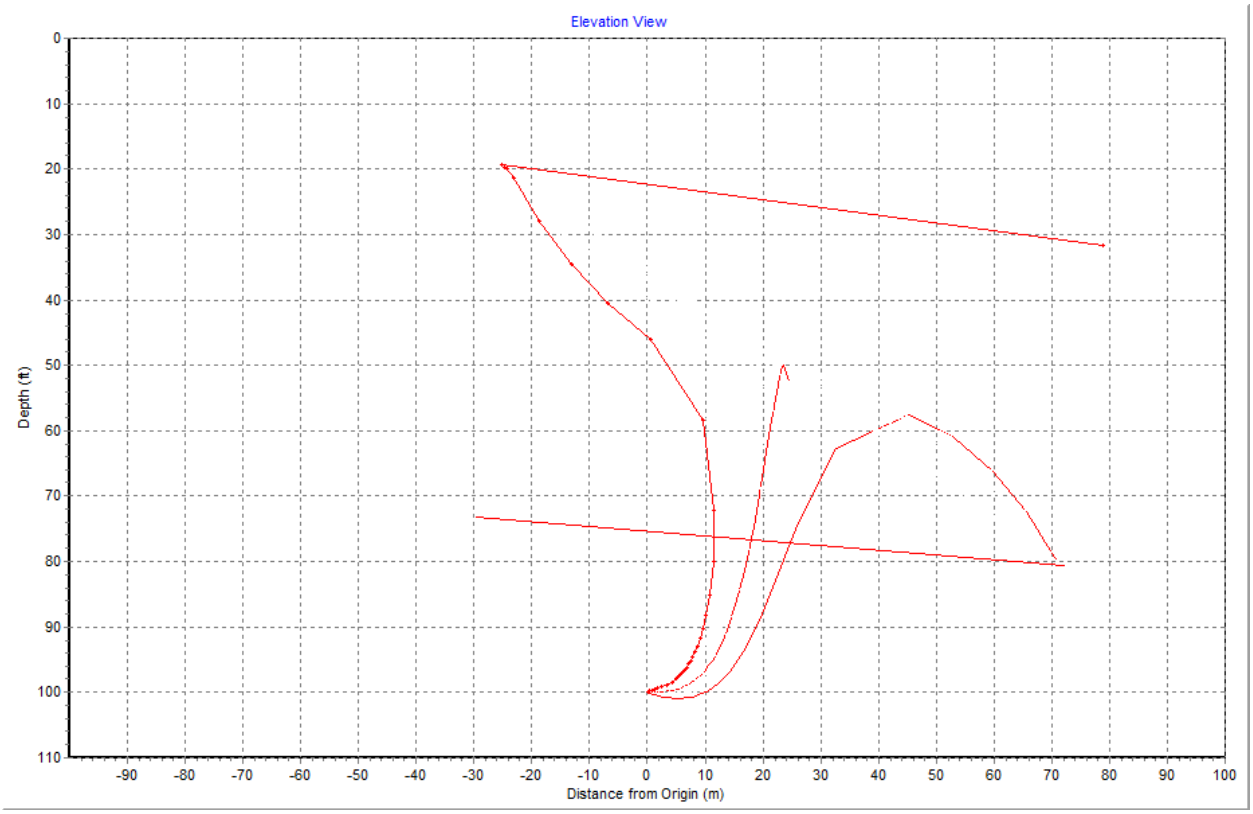


Figure B.1.1: Plumes 18b solution of discharge plume trajectories for discharges of 31 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt., and 5 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. ZID is defined by the maximum horizontal excursion of trajectories from the origin. From the maximum horizontal spreading of the plume, the ZID extends from X = -30 m to X = +80 m so that ZID = 110 m

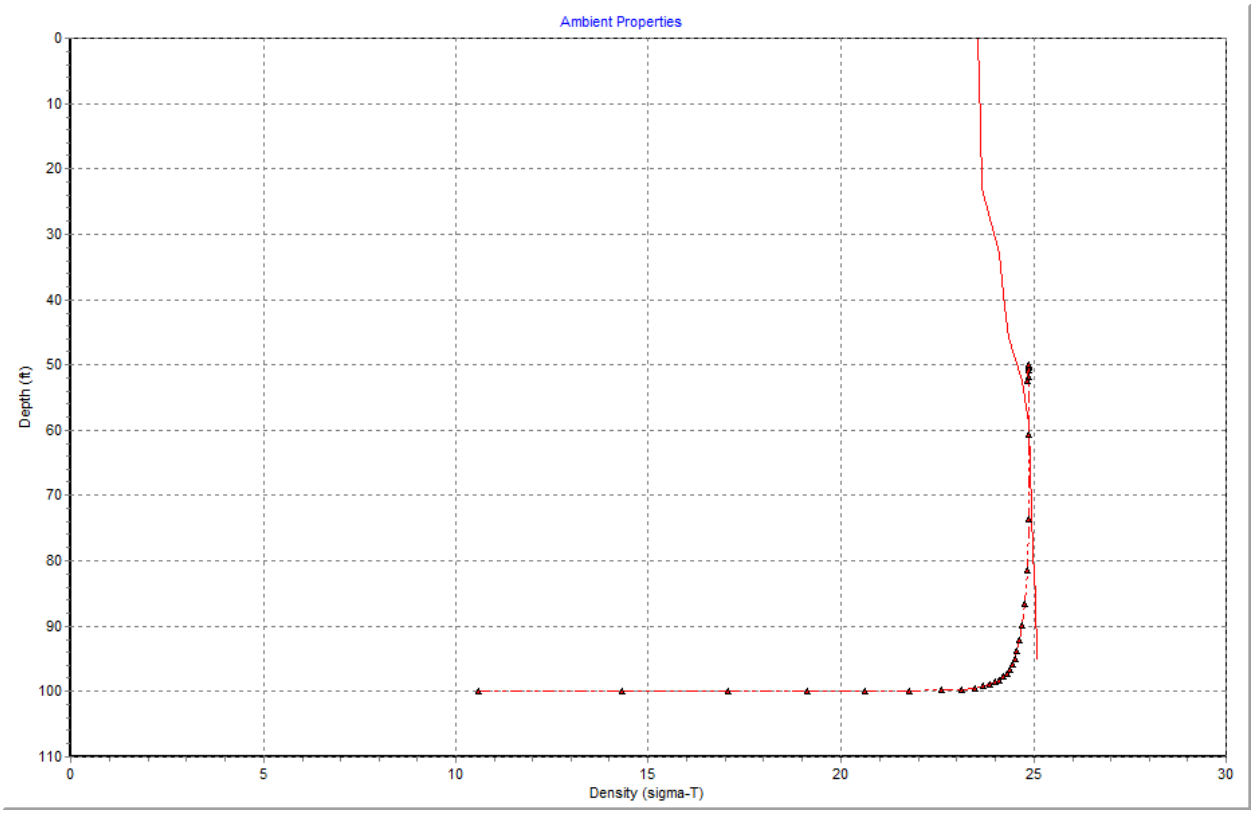


Figure B.1.2: Plumes 18b solution of vertical density profile for discharges of 31 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. and 5 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Discharge effluent density shown as black triangles. Ambient water mass density profile shown as solid red line.

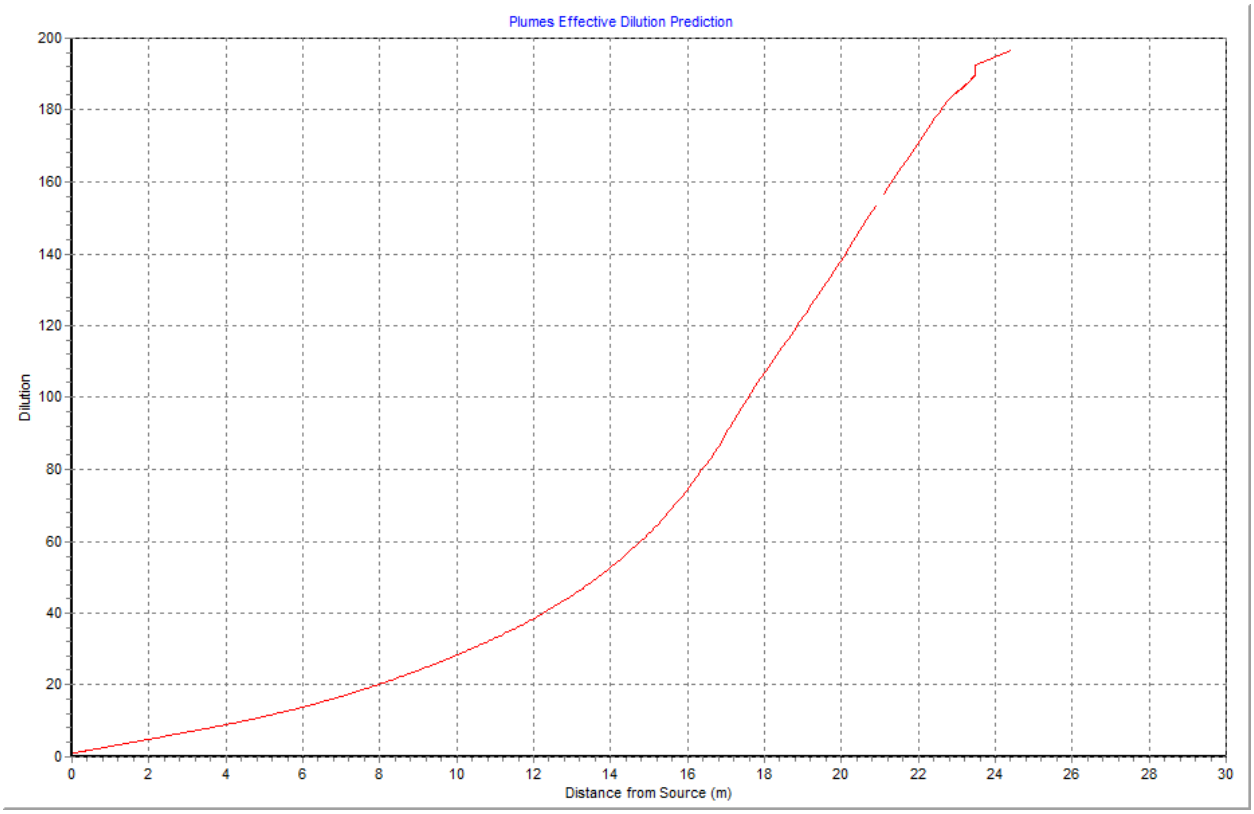


Figure B.1.3: Plumes 18b solution of effective (bulk average) dilution as a function of vertical distance from the point of discharge for discharges of 31 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. and 5 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt.

B.2: Plumes 18b Results for SJCOO discharges of 31 mgd Wastewater and 15 mgd Brine:

Contents of the memo box (may not be current and must be updated manually)
Project "C:\Plumes18\SJCOO_WW31mgd_b15mgd_T-1"
memo
SJCOO discharging 31 mgd wastewater and 15 mgd brine

Model configuration items checked:
Channel width (m) 100
Start case for graphs 1
Max detailed graphs 10 (limits plots that can overflow memory)
Elevation Projection Plane (deg) 0
Shore vector (m,deg) not checked
Bacteria model : Mancini (1978) coliform model
PDS sfc. model heat transfer : Medium
Equation of State : S, T
Similarity Profile : Default profile (k=2.0, ...)
Diffuser port contraction coefficient 1
Light absorption coefficient 0.16
Farfield increment (m) 200
UM3 aspiration coefficient 0.1
Output file: text output tab
Output each ?? steps 10
Maximum dilution reported 1000
Text output format : Standard
Max vertical reversals : to max rise or fall

/ UM3. 1/10/2019 12:20:30 PM
Case 1; ambient file C:\Plumes18\SJCOO_WW31mgd_b15mgd_T-1.001.db; Diffuser table record 1: ----------

Ambient Table:

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn	Density
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2	sigma-T
0.0	0.0	0.0	33.38	19.97	0.0	0.0	0.0	0.0	0.0003	23.55719
2.000	0.0	0.0	33.39	19.87	0.0	0.0	0.0	0.0	0.0003	23.59288
4.000	0.0	0.0	33.40	19.81	0.0	0.0	0.0	0.0	0.0003	23.61484
7.000	0.0	0.0	33.41	19.64	0.0	0.0	0.0	0.0	0.0003	23.67096
10.00	0.0	0.0	33.40	17.76	0.0	0.0	0.0	0.0	0.0003	24.12888
12.00	0.0	0.0	33.38	17.34	0.0	0.0	0.0	0.0	0.0003	24.21549
14.00	0.0	0.0	33.38	16.73	0.0	0.0	0.0	0.0	0.0003	24.35932
16.00	0.0	0.0	33.38	15.17	0.0	0.0	0.0	0.0	0.0003	24.71340
18.00	0.0	0.0	33.37	14.37	0.0	0.0	0.0	0.0	0.0003	24.87044
20.00	0.0	0.0	33.35	14.18	0.0	0.0	0.0	0.0	0.0003	24.89660
22.00	0.0	0.0	33.33	13.83	0.0	0.0	0.0	0.0	0.0003	24.95172
24.00	0.0	0.0	33.32	13.75	0.0	0.0	0.0	0.0	0.0003	24.96707
26.00	0.0	0.0	33.36	13.42	0.0	0.0	0.0	0.0	0.0003	25.06459
29.00	0.0	0.0	33.36	13.39	0.0	0.0	0.0	0.0	0.0003	25.07096

Diffuser table:

P-dia	Ver angl	H-Angle	SourceX	SourceY	Ports	MZ-dis	Isoplth	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(in)	(deg)	(deg)	(ft)	(ft)	()	(ft)	(concent)	(ft)	(MGD)	(psu)	(C)	(ppm)
3.0500	0.0	0.0	0.0	0.0	125.00	1000.0	0.0	100.00	46.000	21.850	20.660	21850.0

Simulation:
Froude No: 38.72; Strat No: 3.70E-4; Spcg No: 14.39; k: 3.42E+5; eff den (sigmaT) 14.65328; eff vel 3.420(m/s);
Current is very small, flow regime may be transient.

Step	Depth (ft)	Amb-cur (m/s)	P-dia (in)	Eff-sal (psu)	Polutnt (ppm)	Dilutn ()	x-posn (m)	y-posn (m)	Iso dia (m)
0	100.0	1.000E-5	3.050	21.85	21850.0	1.000	0.0	0.0	0.07747;
1	100.00	0.0	3.130	22.43	20750.8	1.053	0.032	0.0	0.0795; bottom hit;
10	100.00	0.0	3.798	24.22	17391.1	1.256	0.151	0.0	0.09648;
20	100.00	0.0	4.627	25.86	14287.7	1.529	0.310	0.0	0.1175;
30	100.00	0.0	5.637	27.21	11734.9	1.862	0.503	0.0	0.1432;
40	100.00	0.0	6.867	28.31	9636.2	2.267	0.739	0.0	0.1744;
50	100.00	0.0	8.368	29.22	7911.4	2.762	1.027	0.0	0.2125;
60	100.00	0.0	10.20	29.96	6494.3	3.364	1.378	0.0	0.2590;
70	99.99	0.0	12.43	30.57	5330.5	4.099	1.806	0.0	0.3156;
80	99.98	0.0	15.14	31.08	4374.8	4.995	2.326	0.0	0.3847;
90	99.97	0.0	18.46	31.49	3590.1	6.086	2.958	0.0	0.4688;
100	99.94	0.0	22.49	31.82	2946.0	7.417	3.727	0.0	0.5712;
110	99.89	0.0	27.40	32.10	2417.4	9.039	4.658	0.0	0.6959;
120	99.81	0.0	33.36	32.33	1983.5	11.02	5.782	0.0	0.8473;
130	99.65	0.0	40.57	32.51	1627.6	13.42	7.130	0.0	1.0304;
135	99.55	0.0	44.35	32.58	1488.1	14.68	7.820	0.0	1.1266; merging;
140	99.44	0.0	47.81	32.64	1387.2	15.75	8.463	0.0	1.2144;
150	99.18	0.0	54.23	32.71	1241.0	17.61	9.655	0.0	1.3776;
160	98.89	0.0	60.48	32.77	1131.6	19.31	10.76	0.0	1.5363;
170	98.55	0.0	66.79	32.82	1042.9	20.95	11.80	0.0	1.6965;
180	98.17	0.0	73.29	32.86	967.2	22.59	12.80	0.0	1.8617;
190	97.75	0.0	80.09	32.89	900.8	24.26	13.77	0.0	2.0342;
200	97.29	0.0	87.24	32.92	841.2	25.98	14.71	0.0	2.2160;
210	96.77	0.0	94.84	32.95	786.7	27.77	15.64	0.0	2.4089;
220	96.19	0.0	102.9	32.98	736.4	29.67	16.57	0.0	2.6144;
230	95.54	0.0	111.6	33.00	689.5	31.69	17.49	0.0	2.8342;
240	94.82	0.0	120.9	33.03	645.3	33.86	18.42	0.0	3.0698;
250	94.01	0.0	130.8	33.05	603.6	36.20	19.36	0.0	3.3234;
260	93.10	0.0	141.6	33.07	563.8	38.75	20.33	0.0	3.5971;
270	92.06	0.0	153.3	33.09	525.7	41.56	21.32	0.0	3.8945;
280	90.87	0.0	166.1	33.11	488.9	44.69	22.35	0.0	4.2200;
290	89.48	0.0	180.4	33.13	453.2	48.21	23.44	0.0	4.5810;
300	87.85	0.0	196.4	33.14	418.1	52.26	24.59	0.0	4.9883;
310	85.92	0.0	214.9	33.16	383.4	56.99	25.81	0.0	5.4594;
320	83.53	0.0	237.6	33.18	348.1	62.77	27.17	0.0	6.0361;
330	79.75	0.0	276.0	33.20	305.5	71.52	29.07	0.0	7.0103;
340	73.12	0.0	367.9	33.22	251.4	86.90	32.09	0.0	9.3445;
347	67.93	0.0	466.2	33.24	218.9	99.82	34.32	0.0	11.842; trap level;
350	65.60	0.0	525.6	33.24	206.3	105.9	35.32	0.0	13.350;
360	60.46	0.0	788.2	33.26	179.6	121.7	37.70	0.0	20.021;
361	60.18	0.0	812.7	33.26	177.9	122.8	37.84	0.0	20.643; begin overlap;
370	58.29	0.0	1001.1	33.26	169.1	129.2	38.85	0.0	25.428;
380	57.30	0.0	1163.5	33.27	164.6	132.8	39.44	0.0	29.552;
390	56.74	0.0	1314.1	33.27	161.1	135.6	39.82	0.0	33.379;
400	56.46	0.0	1442.8	33.27	158.4	137.9	40.03	0.0	36.646;
410	56.43	0.0	1500.7	33.27	156.3	139.8	40.06	0.0	38.119;
420	56.42	0.0	1540.9	33.27	154.3	141.6	40.06	0.0	39.140;
430	56.42	0.0	1579.5	33.27	152.4	143.3	40.06	0.0	40.118;
440	56.42	0.0	1621.8	33.27	150.4	145.2	40.06	0.0	41.194;

442	55.79	0.0	1834.6	33.28	147.5	148.2	40.77	0.0	46.599; surface;
450	55.78	0.0	2082.0	33.28	147.0	148.7	40.78	0.0	52.884;
460	55.57	0.0	2818.3	33.28	143.8	152.0	41.80	0.0	71.584; local maximum rise or fall;
465	66.22	0.0	2875.3	33.28	140.9	155.1	45.81	0.0	73.033;

Horiz plane projections in effluent direction: radius(m): 0.0; CL(m): 13.963
Lmz(m): 13.963
forced entrain 1 0.0 10.30 73.03 0.981
Rate sec-1 0.0 dy-1 0.0 kt: 0.0 Amb Sal 33.3761
;
12:20:30 PM. amb fills: 4

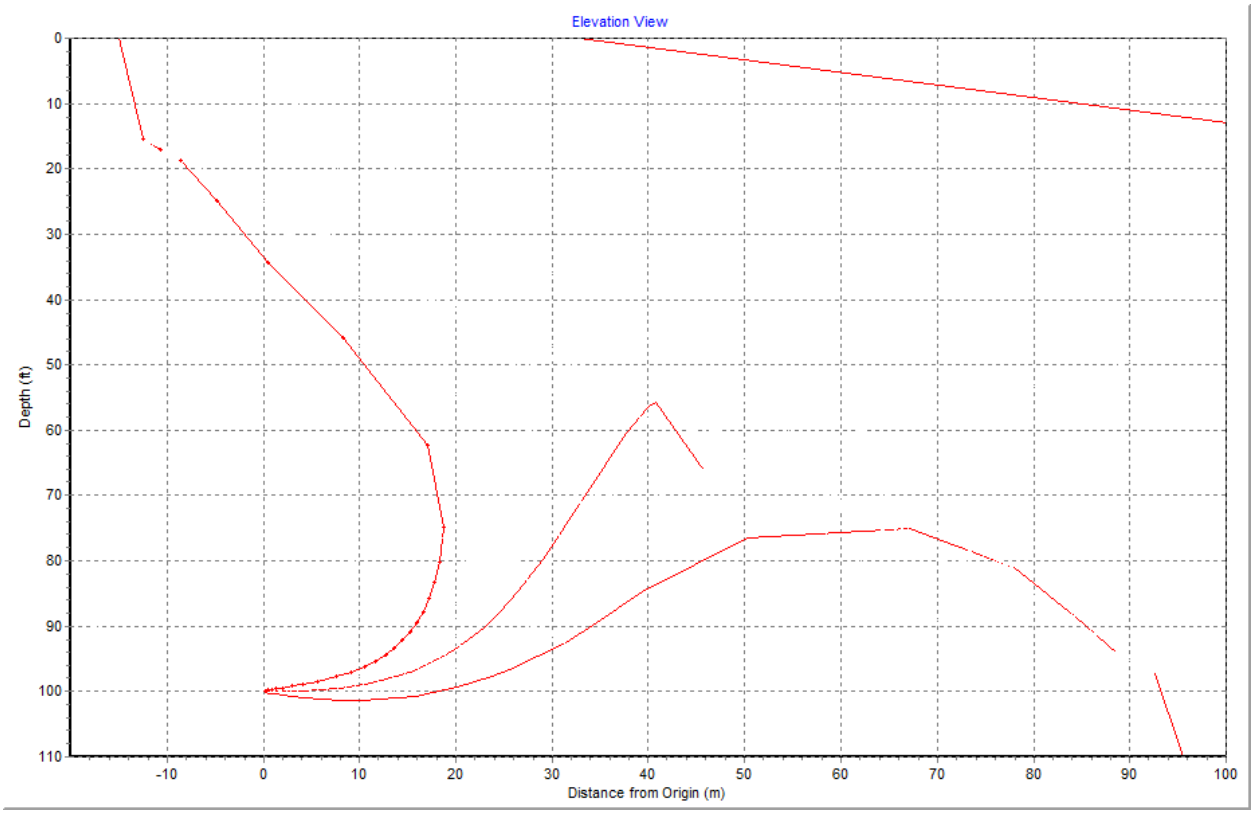


Figure B.2.1: Plumes 18b solution of discharge plume trajectories for discharges of 31 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt., and 15 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. ZID is defined by the maximum horizontal excursion of trajectories from the origin. From the maximum horizontal spreading of the plume, the ZID extends from X = -15 m to X = +94 m so that ZID = 109 m

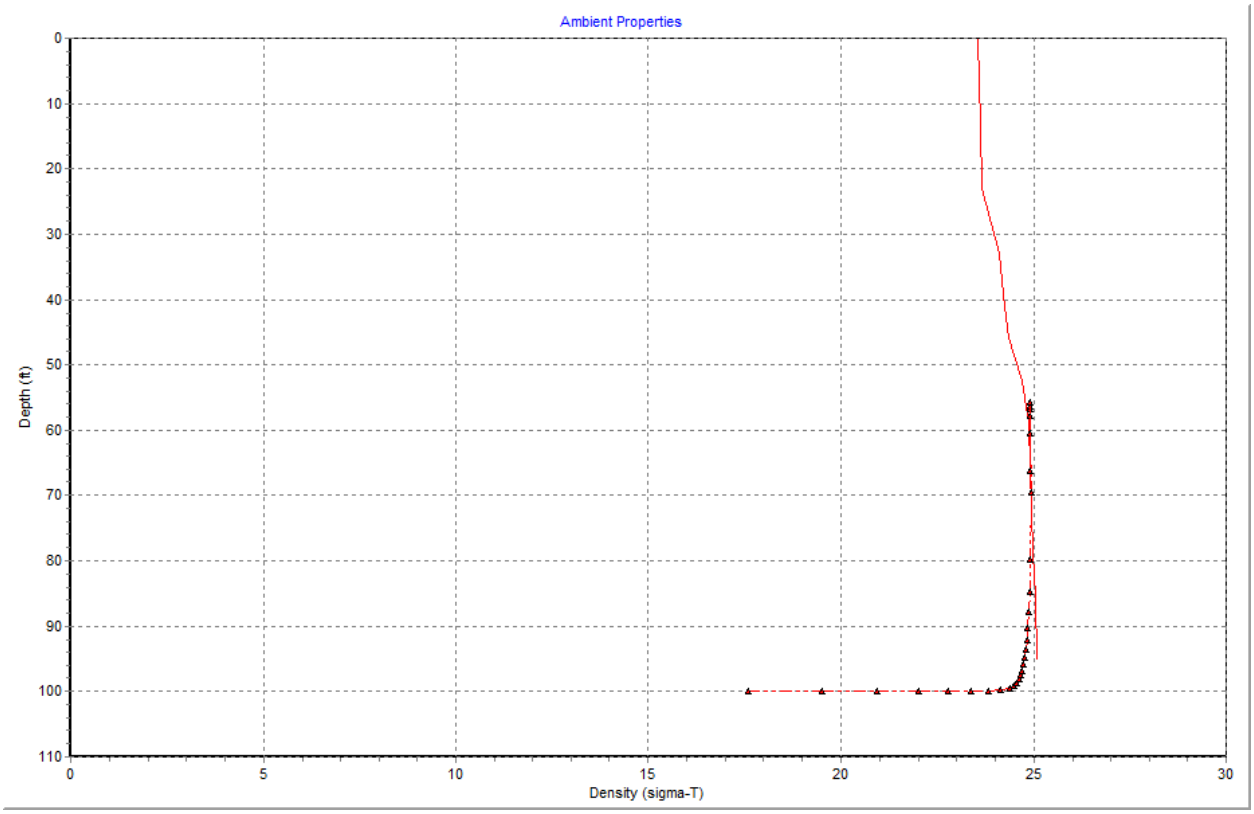


Figure B.2.2: Plumes 18b solution of vertical density profile for discharges of 31 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. and 15 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Discharge effluent density shown as black triangles. Ambient water mass density profile shown as solid red line.

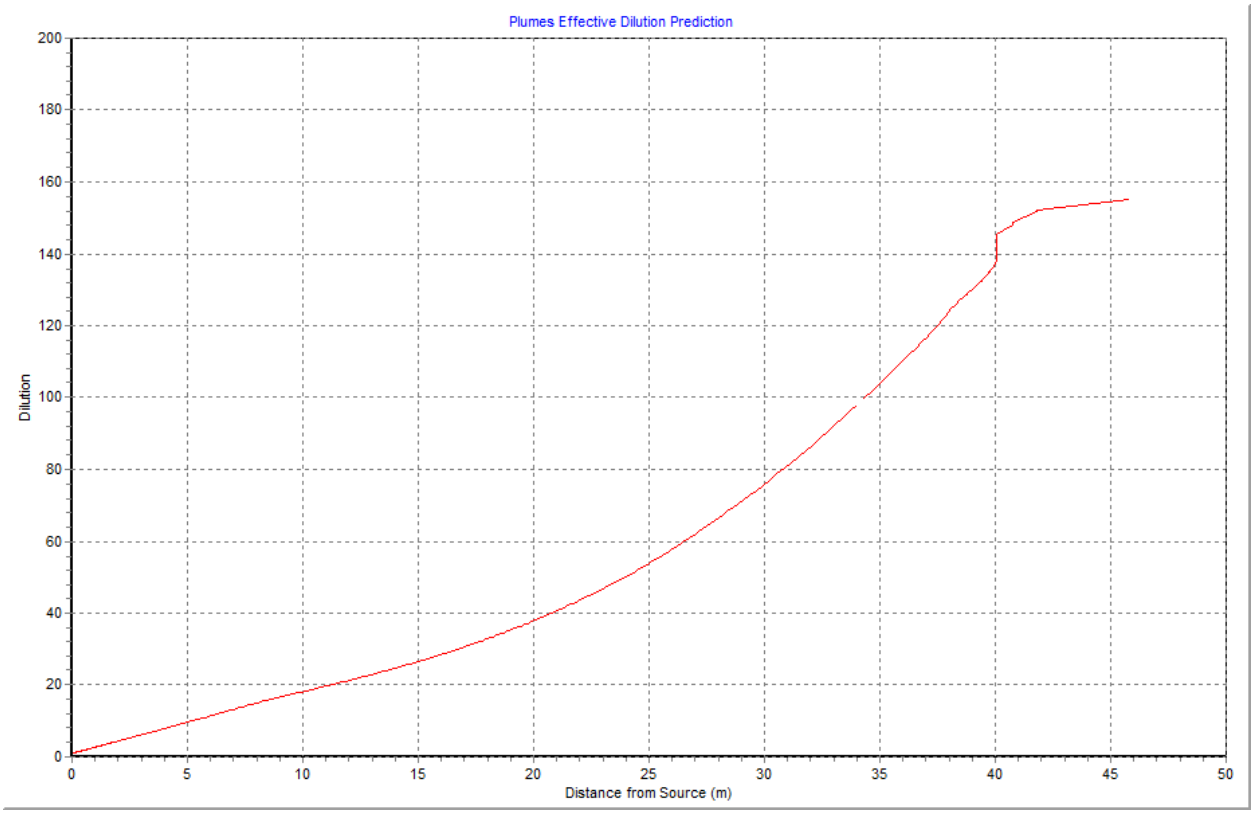


Figure B.2.3: Plumes 18b solution of effective (bulk average) dilution as a function of vertical distance from the point of discharge for discharges of 31 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. and 15 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt.

B.3: Plumes 18b Results for SJCOO discharges of 18.9 mgd Wastewater and 5 mgd Brine:

Contents of the memo box (may not be current and must be updated manually)
Project "C:\Plumes18\SJCOO_WW18.9mgd_b5mgd_T-1"
memo
SJCOO discharging 18.9 mgd wastewater and 5 mgd brine

Model configuration items checked:
Channel width (m) 100
Start case for graphs 1
Max detailed graphs 10 (limits plots that can overflow memory)
Elevation Projection Plane (deg) 0
Shore vector (m,deg) not checked
Bacteria model : Mancini (1978) coliform model
PDS sfc. model heat transfer : Medium
Equation of State : S, T
Similarity Profile : Default profile (k=2.0, ...)
Diffuser port contraction coefficient 1
Light absorption coefficient 0.16
Farfield increment (m) 200
UM3 aspiration coefficient 0.1
Output file: text output tab
Output each ?? steps 10
Maximum dilution reported 1000
Text output format : Standard
Max vertical reversals : to max rise or fall

/ UM3. 1/10/2019 12:59:47 PM
Case 1; ambient file C:\Plumes18\SJCOO_WW18.9mgd_b5mgd_T-1.001.db; Diffuser table record 1: ----------

Ambient Table:

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn	Density
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2	sigma-T
0.0	0.0	0.0	33.38	19.97	0.0	0.0	0.0	0.0	0.0003	23.55719
2.000	0.0	0.0	33.39	19.87	0.0	0.0	0.0	0.0	0.0003	23.59288
4.000	0.0	0.0	33.40	19.81	0.0	0.0	0.0	0.0	0.0003	23.61484
7.000	0.0	0.0	33.41	19.64	0.0	0.0	0.0	0.0	0.0003	23.67096
10.00	0.0	0.0	33.40	17.76	0.0	0.0	0.0	0.0	0.0003	24.12888
12.00	0.0	0.0	33.38	17.34	0.0	0.0	0.0	0.0	0.0003	24.21549
14.00	0.0	0.0	33.38	16.73	0.0	0.0	0.0	0.0	0.0003	24.35932
16.00	0.0	0.0	33.38	15.17	0.0	0.0	0.0	0.0	0.0003	24.71340
18.00	0.0	0.0	33.37	14.37	0.0	0.0	0.0	0.0	0.0003	24.87044
20.00	0.0	0.0	33.35	14.18	0.0	0.0	0.0	0.0	0.0003	24.89660
22.00	0.0	0.0	33.33	13.83	0.0	0.0	0.0	0.0	0.0003	24.95172
24.00	0.0	0.0	33.32	13.75	0.0	0.0	0.0	0.0	0.0003	24.96707
26.00	0.0	0.0	33.36	13.42	0.0	0.0	0.0	0.0	0.0003	25.06459
29.00	0.0	0.0	33.36	13.39	0.0	0.0	0.0	0.0	0.0003	25.07096

Diffuser table:

P-dia	Ver angl	H-Angle	SourceX	SourceY	Ports	MZ-dis	Isoplth	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(in)	(deg)	(deg)	(ft)	(ft)	()	(ft)	(concent)	(ft)	(MGD)	(psu)	(C)	(ppm)
3.0500	0.0	0.0	0.0	0.0	125.00	1000.0	0.0	100.00	23.900	14.020	20.660	14020.0

Simulation:

Froude No: 16.02; Strat No: 2.36E-4; Spcg No: 14.39; k: 1.78E+5; eff den (sigmaT) 8.743853; eff vel 1.777(m/s);
Current is very small, flow regime may be transient.

Step	Depth (ft)	Amb-cur (m/s)	P-dia (in)	Eff-sal (psu)	Polutnt (ppm)	Dilutn ()	x-posn (m)	y-posn (m)	Iso dia (m)
0	100.0	1.000E-5	3.050	14.02	14020.0	1.000	0.0	0.0	0.07747;
1	100.00	0.0	3.092	14.55	13644.5	1.028	0.017	0.0	0.07853; bottom hit;
10	100.00	0.0	3.705	17.62	11446.4	1.225	0.113	0.0	0.09409;
20	100.00	0.0	4.510	20.45	9412.2	1.490	0.241	0.0	0.1146;
30	100.00	0.0	5.493	22.77	7736.2	1.812	0.397	0.0	0.1395;
40	100.00	0.0	6.690	24.67	6356.4	2.206	0.587	0.0	0.1699;
50	99.99	0.0	8.149	26.23	5221.2	2.685	0.818	0.0	0.2070;
60	99.98	0.0	9.927	27.51	4287.7	3.270	1.100	0.0	0.2522;
70	99.97	0.0	12.09	28.56	3520.5	3.982	1.441	0.0	0.3071;
80	99.94	0.0	14.72	29.43	2890.1	4.851	1.854	0.0	0.3739;
90	99.89	0.0	17.90	30.13	2372.3	5.910	2.352	0.0	0.4547;
100	99.81	0.0	21.31	30.65	1990.2	7.044	2.861	0.0	0.5413;
110	99.72	0.0	24.50	31.02	1724.7	8.129	3.304	0.0	0.6224;
120	99.62	0.0	27.57	31.29	1525.1	9.193	3.701	0.0	0.7002;
130	99.50	0.0	30.54	31.50	1367.3	10.25	4.065	0.0	0.7756;
140	99.38	0.0	33.44	31.68	1238.2	11.32	4.403	0.0	0.8493;
150	99.24	0.0	36.28	31.83	1130.0	12.41	4.724	0.0	0.9214;
160	99.09	0.0	39.06	31.95	1037.5	13.51	5.030	0.0	0.9921;
170	98.93	0.0	41.79	32.06	957.2	14.65	5.327	0.0	1.0614;
178	98.79	0.0	43.92	32.14	900.0	15.58	5.560	0.0	1.1157; merging;
180	98.75	0.0	44.45	32.16	886.8	15.81	5.618	0.0	1.1291;
190	98.56	0.0	47.09	32.24	826.7	16.96	5.906	0.0	1.1961;
200	98.34	0.0	49.76	32.31	773.1	18.13	6.194	0.0	1.2638;
210	98.09	0.0	52.44	32.38	724.4	19.35	6.486	0.0	1.3321;
220	97.81	0.0	55.15	32.44	679.5	20.63	6.785	0.0	1.4009;
230	97.50	0.0	57.87	32.50	637.7	21.98	7.094	0.0	1.4700;
240	97.13	0.0	60.60	32.55	598.5	23.42	7.415	0.0	1.5393;
250	96.70	0.0	63.35	32.60	561.4	24.97	7.755	0.0	1.6091;
260	96.20	0.0	66.13	32.65	525.7	26.67	8.116	0.0	1.6798;
270	95.60	0.0	69.01	32.69	490.8	28.56	8.506	0.0	1.7529;
280	94.86	0.0	72.09	32.74	456.3	30.73	8.932	0.0	1.8310;
290	93.95	0.0	75.53	32.79	421.3	33.28	9.404	0.0	1.9185;
300	92.78	0.0	79.65	32.84	385.1	36.41	9.932	0.0	2.0230;
310	91.26	0.0	84.92	32.89	347.0	40.40	10.53	0.0	2.1571;
320	89.22	0.0	92.23	32.95	306.3	45.78	11.23	0.0	2.3427;
330	86.36	0.0	103.2	33.01	262.3	53.45	12.05	0.0	2.6210;
340	82.32	0.0	120.9	33.07	216.5	64.76	13.01	0.0	3.0701;
350	77.55	0.0	149.4	33.12	177.6	78.94	13.96	0.0	3.7946;
360	72.06	0.0	192.2	33.15	145.7	96.22	14.93	0.0	4.8807;
370	65.85	0.0	254.3	33.19	119.5	117.3	15.90	0.0	6.4600;
378	60.31	0.0	336.5	33.21	102.0	137.4	16.73	0.0	8.5480; trap level;
380	58.84	0.0	363.7	33.22	98.06	143.0	16.95	0.0	9.2392;
390	52.96	0.0	618.0	33.24	83.72	167.5	17.91	0.0	15.697; begin overlap;
400	51.76	0.0	876.1	33.24	81.02	173.0	18.17	0.0	22.253;
410	51.31	0.0	1107.1	33.25	79.66	176.0	18.30	0.0	28.121;
420	51.19	0.0	1255.4	33.25	78.79	177.9	18.34	0.0	31.887;
430	51.19	0.0	1286.0	33.25	78.09	179.5	18.34	0.0	32.665;
440	51.19	0.0	1308.8	33.25	77.41	181.1	18.34	0.0	33.244;
446	50.90	0.0	2033.2	33.25	75.64	185.3	18.63	0.0	51.643; surface;
450	50.90	0.0	3055.0	33.25	75.63	185.4	18.63	0.0	77.598; local maximum rise or fall;
453	56.95	0.0	3160.3	33.26	74.15	189.1	19.60	0.0	80.271;

Horiz plane projections in effluent direction: radius(m): 0.0; CL(m): 5.9730
Lmz(m): 5.9730
forced entrain 1 0.0 13.12 80.27 0.724
Rate sec-1 0.0 dy-1 0.0 kt: 0.0 Amb Sal 33.3837
;
12:59:47 PM. amb fills: 4

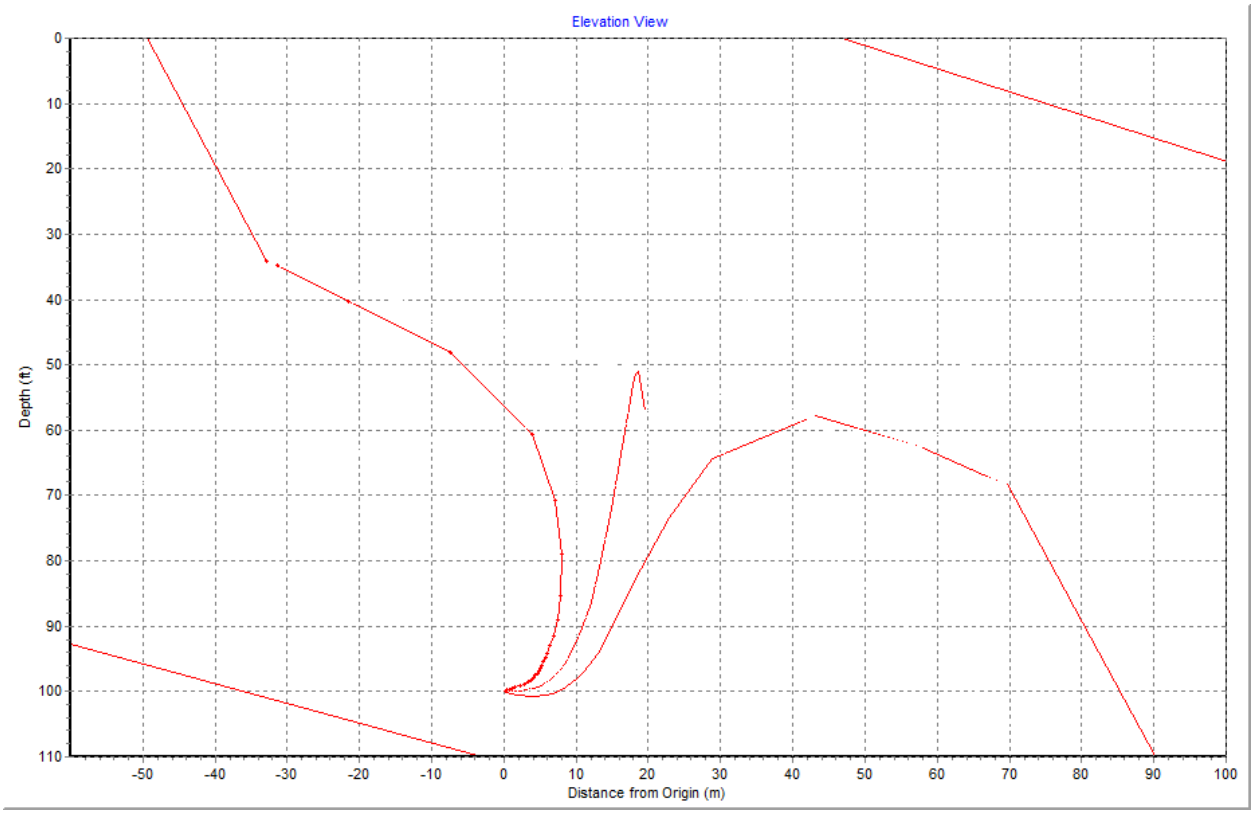


Figure B.3.1: Plumes 18b solution of discharge plume trajectories for discharges of 18.9 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt., and 5 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. ZID is defined by the maximum horizontal excursion of trajectories from the origin. From the maximum horizontal spreading of the plume, the ZID extends from X = -50 m to X = +85 m so that ZID = 135 m

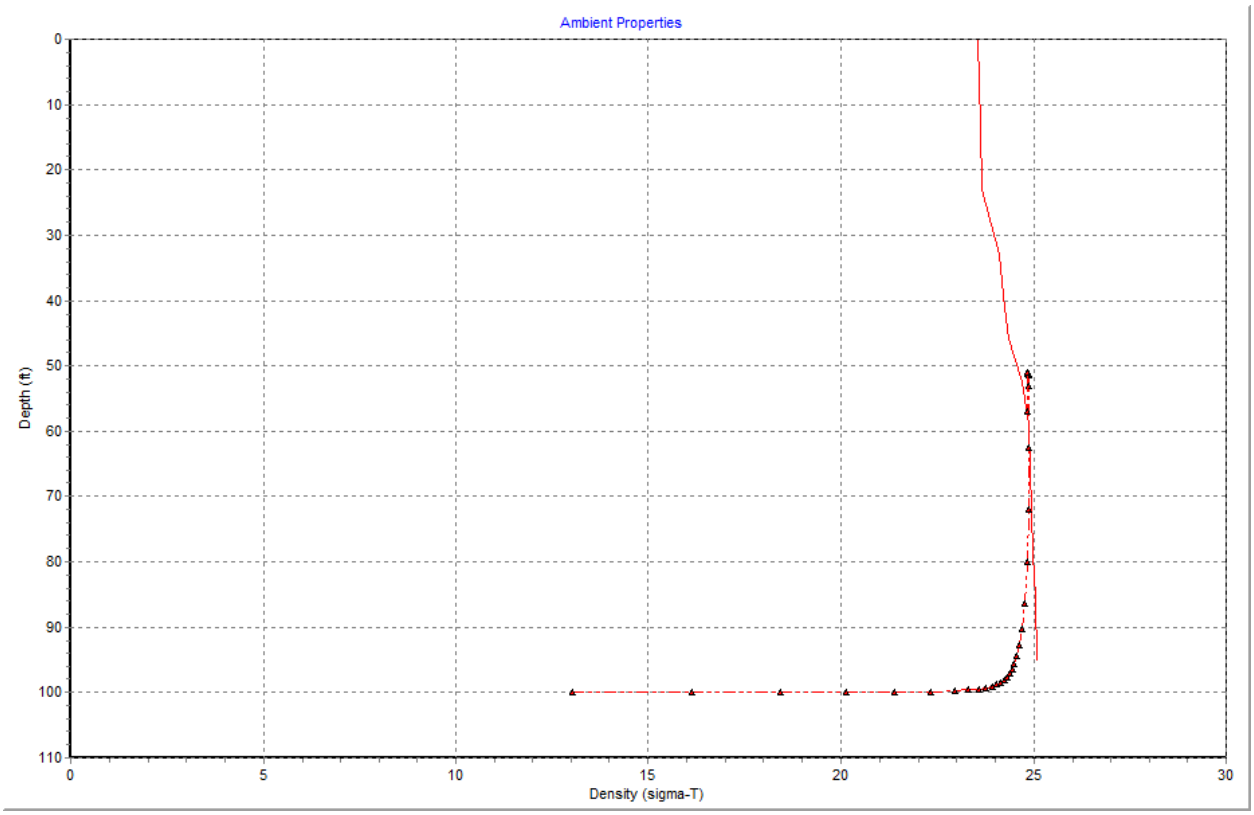


Figure B.3.2: Plumes 18b solution of vertical density profile for discharges of 18.9 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. and 5 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Discharge effluent density shown as black triangles. Ambient water mass density profile shown as solid red line.

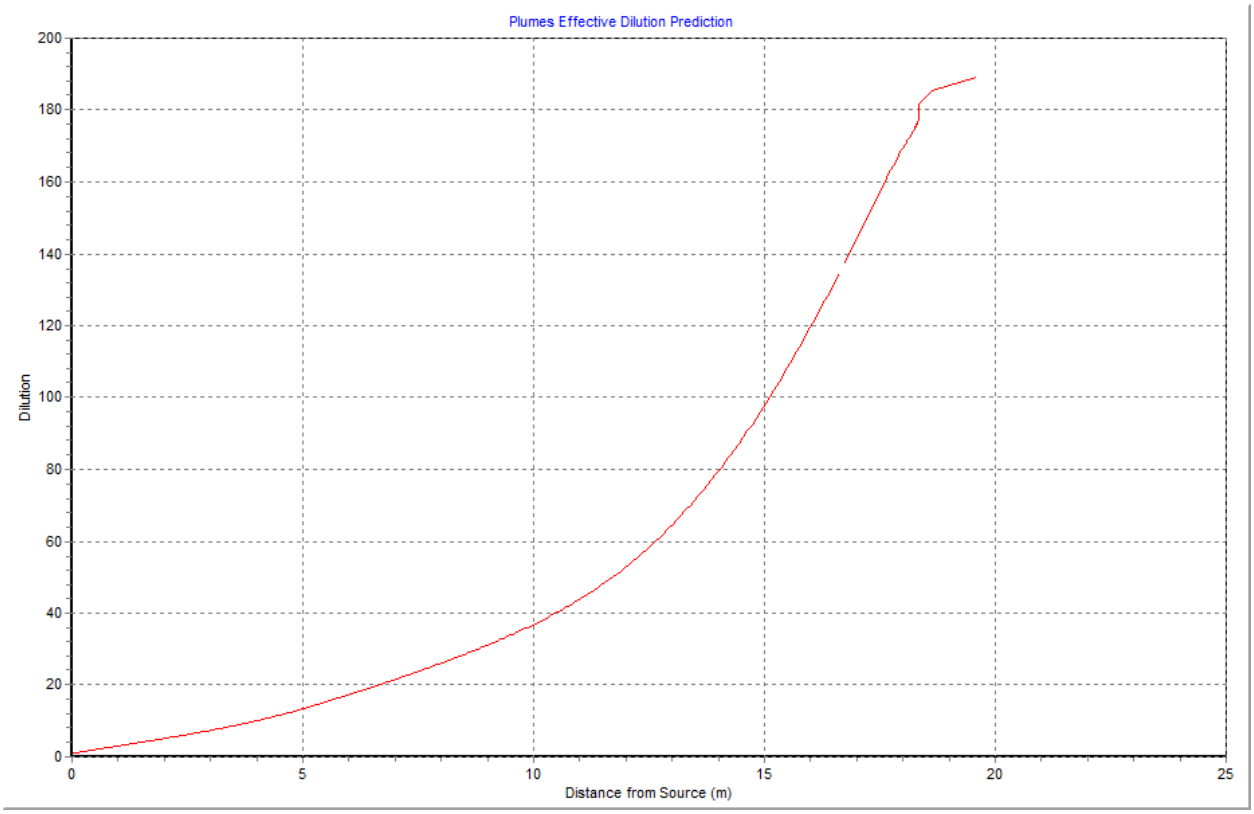


Figure B.3.3: Plumes 18b solution of effective (bulk average) dilution as a function of vertical distance from the point of discharge for discharges of 18.9 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. and 5 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt.

B.4: Plumes 18b Results for SJCOO discharges of 18.9 mgd Wastewater and 15 mgd Brine:

Contents of the memo box (may not be current and must be updated manually)
Project "C:\Plumes18\SJCOO_WW18.9mgd_b15mgd_T-1"
memo
SJCOO discharging 18.9 mgd wastewater and 15 mgd brine

Model configuration items checked:
Channel width (m) 100
Start case for graphs 1
Max detailed graphs 10 (limits plots that can overflow memory)
Elevation Projection Plane (deg) 0
Shore vector (m,deg) not checked
Bacteria model : Mancini (1978) coliform model
PDS sfc. model heat transfer : Medium
Equation of State : S, T
Similarity Profile : Default profile (k=2.0, ...)
Diffuser port contraction coefficient 1
Light absorption coefficient 0.16
Farfield increment (m) 200
UM3 aspiration coefficient 0.1
Output file: text output tab
Output each ?? steps 10
Maximum dilution reported 1000
Text output format : Standard
Max vertical reversals : to max rise or fall

/ UM3. 1/10/2019 1:29:39 PM
Case 1; ambient file C:\Plumes18\SJCOO_WW18.9mgd_b15mgd_T-1.001.db; Diffuser table record 1: ----------
----

Ambient Table:

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn	Density
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2	sigma-T
0.0	0.0	0.0	33.38	19.97	0.0	0.0	0.0	0.0	0.0003	23.55719
2.000	0.0	0.0	33.39	19.87	0.0	0.0	0.0	0.0	0.0003	23.59288
4.000	0.0	0.0	33.40	19.81	0.0	0.0	0.0	0.0	0.0003	23.61484
7.000	0.0	0.0	33.41	19.64	0.0	0.0	0.0	0.0	0.0003	23.67096
10.00	0.0	0.0	33.40	17.76	0.0	0.0	0.0	0.0	0.0003	24.12888
12.00	0.0	0.0	33.38	17.34	0.0	0.0	0.0	0.0	0.0003	24.21549
14.00	0.0	0.0	33.38	16.73	0.0	0.0	0.0	0.0	0.0003	24.35932
16.00	0.0	0.0	33.38	15.17	0.0	0.0	0.0	0.0	0.0003	24.71340
18.00	0.0	0.0	33.37	14.37	0.0	0.0	0.0	0.0	0.0003	24.87044
20.00	0.0	0.0	33.35	14.18	0.0	0.0	0.0	0.0	0.0003	24.89660
22.00	0.0	0.0	33.33	13.83	0.0	0.0	0.0	0.0	0.0003	24.95172
24.00	0.0	0.0	33.32	13.75	0.0	0.0	0.0	0.0	0.0003	24.96707
26.00	0.0	0.0	33.36	13.42	0.0	0.0	0.0	0.0	0.0003	25.06459
29.00	0.0	0.0	33.36	13.39	0.0	0.0	0.0	0.0	0.0003	25.07096

Diffuser table:

P-dia	Ver angl	H-Angle	SourceX	SourceY	Ports	MZ-dis	Isoplth	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(in)	(deg)	(deg)	(ft)	(ft)	()	(ft)	(concent)	(ft)	(MGD)	(psu)	(C)	(ppm)
3.0500	0.0	0.0	0.0	0.0	125.00	1000.0	0.0	100.00	33.900	29.640	20.660	29640.0

Simulation:

Froude No: 43.40; Strat No: 8.51E-4; Spcg No: 14.39; k: 2.52E+5; eff den (sigmaT) 20.54180; eff vel 2.521(m/s);
Current is very small, flow regime may be transient.

Step	Depth (ft)	Amb-cur (m/s)	P-dia (in)	Eff-sal (psu)	Polutnt (ppm)	Dilutn ()	x-posn (m)	y-posn (m)	Iso dia (m)	
0	100.0	1.000E-5	3.050	29.64	29640.0	1.000	0.0	0.0	0.07747;	
1	100.00	0.0	3.109	29.78	28526.4	1.039	0.0239	0.0	0.07897;	bottom hit;
10	100.00	0.0	3.749	30.37	23886.8	1.241	0.146	0.0	0.09522;	
20	100.00	0.0	4.569	30.90	19608.3	1.512	0.308	0.0	0.1160;	
30	100.00	0.0	5.568	31.34	16094.2	1.842	0.507	0.0	0.1414;	
40	100.00	0.0	6.785	31.71	13208.5	2.244	0.749	0.0	0.1723;	
50	100.00	0.0	8.270	32.00	10839.4	2.734	1.044	0.0	0.2101;	
60	100.00	0.0	10.08	32.25	8894.6	3.332	1.404	0.0	0.2560;	
70	99.99	0.0	12.29	32.45	7298.4	4.061	1.842	0.0	0.3120;	
80	99.99	0.0	14.97	32.61	5988.4	4.950	2.376	0.0	0.3803;	
90	99.97	0.0	18.25	32.75	4913.3	6.033	3.025	0.0	0.4636;	
100	99.95	0.0	22.24	32.86	4031.1	7.353	3.814	0.0	0.5650;	
110	99.91	0.0	27.10	32.95	3307.3	8.962	4.771	0.0	0.6884;	
120	99.84	0.0	33.02	33.02	2713.4	10.92	5.930	0.0	0.8386;	
130	99.72	0.0	40.19	33.08	2226.1	13.32	7.326	0.0	1.0208;	
135	99.62	0.0	44.32	33.11	2016.3	14.70	8.124	0.0	1.1257;	merging;
140	99.50	0.0	48.45	33.13	1856.9	15.96	8.945	0.0	1.2307;	
150	99.23	0.0	55.90	33.16	1642.4	18.05	10.45	0.0	1.4199;	
160	98.91	0.0	62.94	33.18	1490.7	19.88	11.82	0.0	1.5988;	
170	98.54	0.0	69.90	33.19	1371.7	21.61	13.12	0.0	1.7755;	
180	98.11	0.0	76.94	33.20	1272.6	23.29	14.35	0.0	1.9542;	
190	97.64	0.0	84.16	33.21	1186.9	24.97	15.55	0.0	2.1378;	
200	97.10	0.0	91.68	33.22	1110.7	26.69	16.72	0.0	2.3286;	
210	96.50	0.0	99.55	33.23	1041.5	28.46	17.86	0.0	2.5286;	
220	95.84	0.0	107.9	33.24	977.7	30.32	19.00	0.0	2.7397;	
230	95.09	0.0	116.7	33.25	918.1	32.28	20.15	0.0	2.9642;	
240	94.26	0.0	126.2	33.25	861.8	34.39	21.30	0.0	3.2045;	
250	93.31	0.0	136.4	33.26	808.1	36.68	22.46	0.0	3.4637;	
260	92.25	0.0	147.5	33.27	756.6	39.18	23.66	0.0	3.7458;	
270	91.03	0.0	159.7	33.27	706.6	41.95	24.89	0.0	4.0564;	
280	89.64	0.0	173.3	33.28	657.8	45.06	26.18	0.0	4.4030;	
290	88.03	0.0	188.9	33.29	609.7	48.62	27.52	0.0	4.7970;	
300	86.13	0.0	206.9	33.29	562.0	52.74	28.95	0.0	5.2551;	
310	83.81	0.0	229.1	33.30	513.0	57.78	30.52	0.0	5.8200;	
319	79.50	0.0	277.7	33.30	444.6	66.66	33.18	0.0	7.0529;	trap level;
320	78.85	0.0	287.9	33.30	435.9	68.00	33.57	0.0	7.3118;	
330	75.07	0.0	400.7	33.31	387.5	76.48	36.01	0.0	10.177;	
340	73.17	0.0	496.5	33.31	361.5	81.98	37.40	0.0	12.612;	begin overlap;
350	71.91	0.0	583.6	33.31	345.5	85.79	38.42	0.0	14.822;	
360	71.06	0.0	657.2	33.31	335.8	88.27	39.18	0.0	16.692;	
370	70.48	0.0	724.0	33.31	328.6	90.21	39.75	0.0	18.389;	
380	70.06	0.0	787.9	33.31	322.5	91.89	40.22	0.0	20.013;	
390	69.74	0.0	850.1	33.31	317.2	93.44	40.62	0.0	21.593;	
400	69.48	0.0	910.9	33.31	312.4	94.88	40.96	0.0	23.137;	
410	69.28	0.0	970.3	33.31	307.9	96.26	41.26	0.0	24.646;	
420	69.12	0.0	1028.2	33.31	303.7	97.58	41.53	0.0	26.117;	
430	69.00	0.0	1083.3	33.31	299.9	98.83	41.76	0.0	27.516;	
440	68.95	0.0	1124.0	33.31	296.6	99.94	41.87	0.0	28.549;	
450	68.94	0.0	1152.3	33.31	293.5	101.0	41.90	0.0	29.267;	
460	68.93	0.0	1176.6	33.31	290.5	102.0	41.90	0.0	29.886;	
470	68.93	0.0	1200.0	33.31	287.7	103.0	41.90	0.0	30.479;	

480 68.93 0.0 1223.0 33.31 285.0 104.0 41.90 0.0 31.065;
490 68.93 0.0 1245.8 33.31 282.4 105.0 41.90 0.0 31.643; local maximum rise or fall;
498 68.99 0.0 1274.4 33.31 275.3 107.6 43.60 0.0 32.371;
Horiz plane projections in effluent direction: radius(m): 0.0; CL(m): 13.290
Lmz(m): 13.290
forced entrain 1 0.0 9.452 32.37 0.908
Rate sec-1 0.0 dy-1 0.0 kt: 0.0 Amb Sal 33.3361
;
1:29:39 PM. amb fills: 4

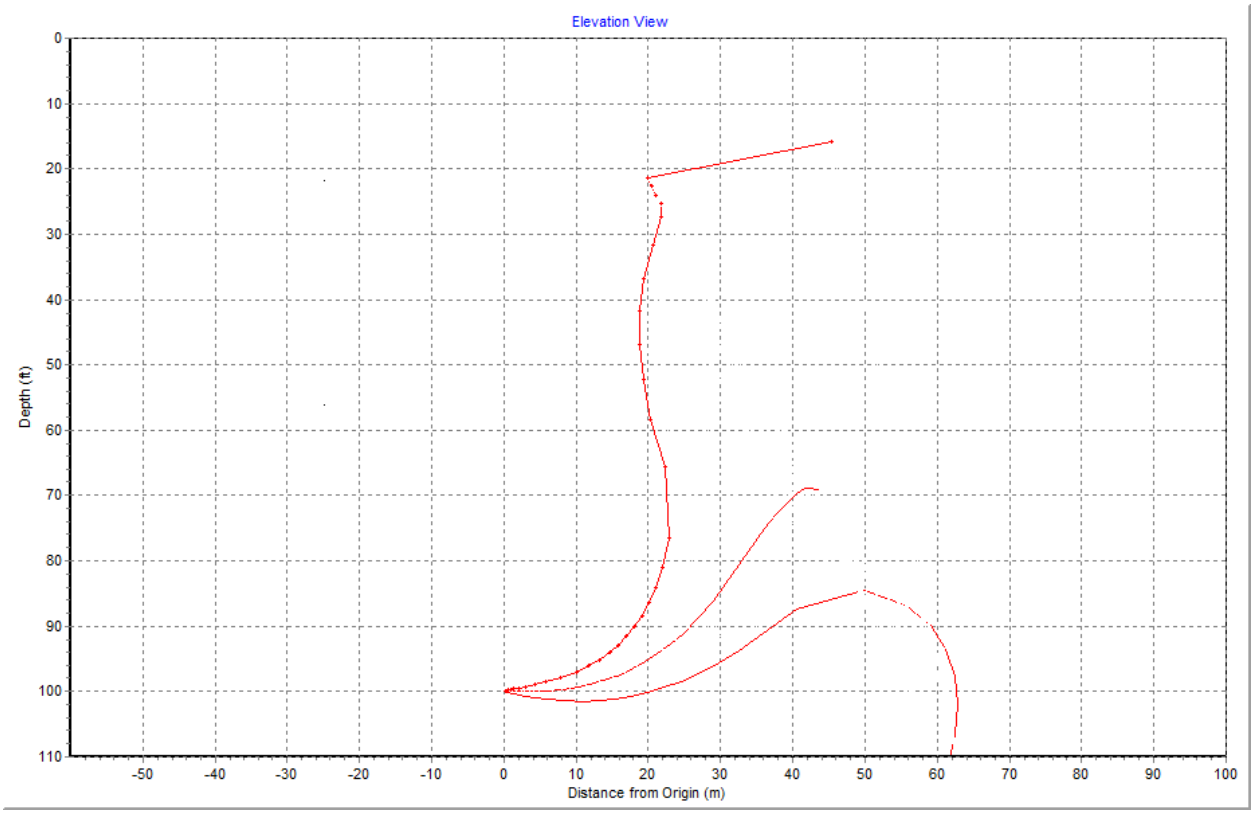


Figure B.4.1: Plumes 18b solution of discharge plume trajectories for discharges of 18.9 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt., and 15 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. ZID is defined by the maximum horizontal excursion of trajectories from the origin. From the maximum horizontal spreading of the plume, the ZID extends from X = -0 m to X = +63 m so that ZID = 63 m

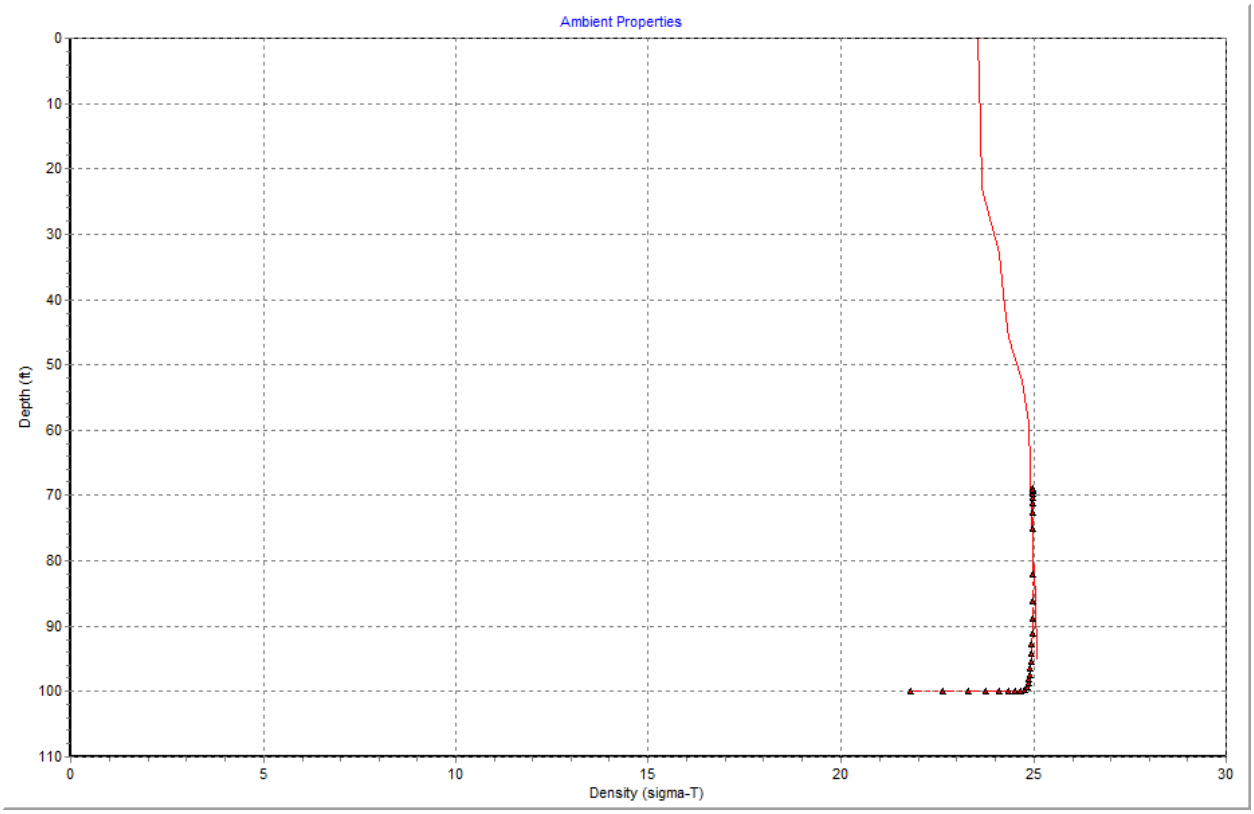


Figure B.4.2: Plumes 18b solution of vertical density profile for discharges of 18.9 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. and 15 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Discharge effluent density shown as black triangles. Ambient water mass density profile shown as solid red line.

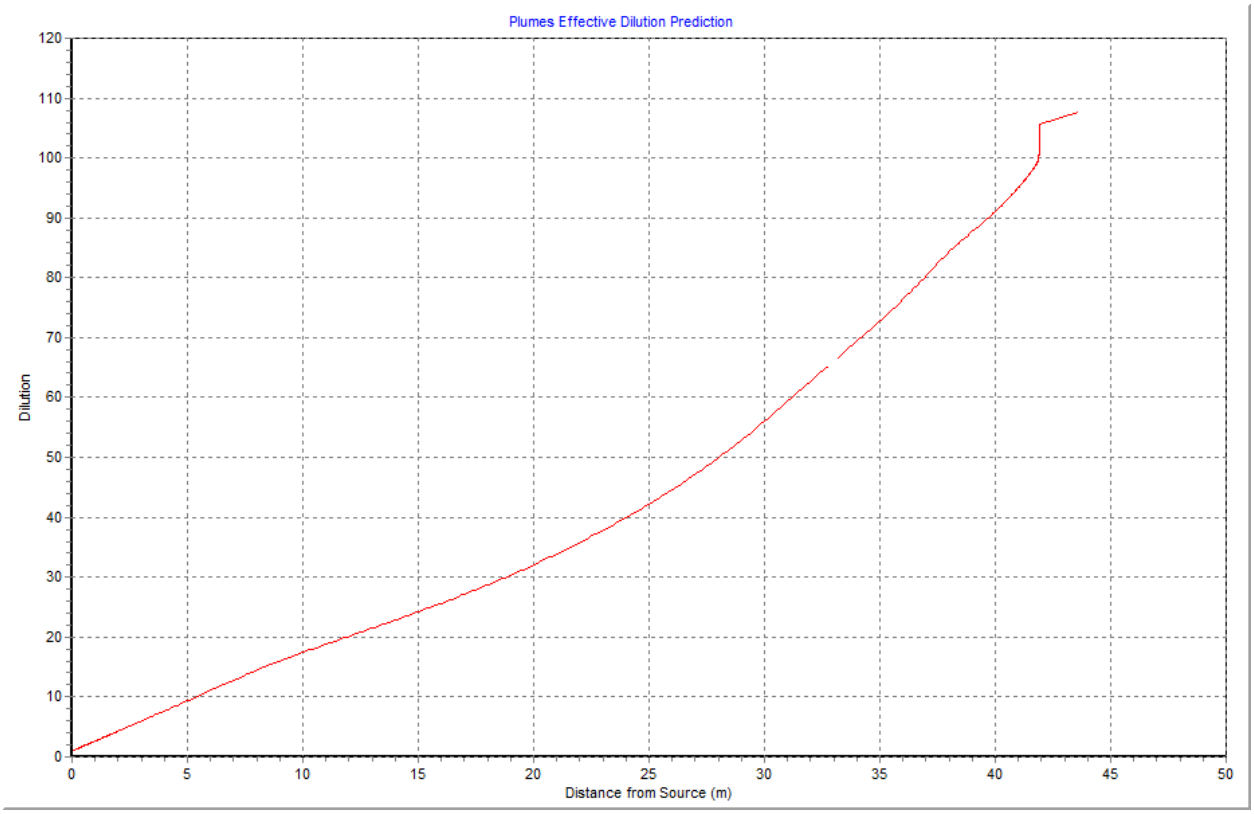


Figure B.4.3: Plumes 18b solution of effective (bulk average) dilution as a function of vertical distance from the point of discharge for discharges of 18.9 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. and 15 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt.

B.5: Plumes 18b Results for SJCOO discharges of 13 mgd Wastewater and 5 mgd Brine:

Contents of the memo box (may not be current and must be updated manually)
Project "C:\Plumes18\SJCOO_WW13mgd_b5mgd_T-1"
memo
SJCOO discharging 13 mgd wastewater and 5 mgd brine

Model configuration items checked:
Channel width (m) 100
Start case for graphs 1
Max detailed graphs 10 (limits plots that can overflow memory)
Elevation Projection Plane (deg) 0
Shore vector (m,deg) not checked
Bacteria model : Mancini (1978) coliform model
PDS sfc. model heat transfer : Medium
Equation of State : S, T
Similarity Profile : Default profile (k=2.0, ...)
Diffuser port contraction coefficient 1
Light absorption coefficient 0.16
Farfield increment (m) 200
UM3 aspiration coefficient 0.1
Output file: text output tab
Output each ?? steps 10
Maximum dilution reported 1000
Text output format : Standard
Max vertical reversals : to max rise or fall

/ UM3. 1/10/2019 1:51:56 PM
Case 1; ambient file C:\Plumes18\SJCOO_WW13mgd_b5mgd_T-1.001.db; Diffuser table record 1: ----------
---

Ambient Table:

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn	Density
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2	sigma-T
0.0	0.0	0.0	33.38	19.97	0.0	0.0	0.0	0.0	0.0003	23.55719
2.000	0.0	0.0	33.39	19.87	0.0	0.0	0.0	0.0	0.0003	23.59288
4.000	0.0	0.0	33.40	19.81	0.0	0.0	0.0	0.0	0.0003	23.61484
7.000	0.0	0.0	33.41	19.64	0.0	0.0	0.0	0.0	0.0003	23.67096
10.00	0.0	0.0	33.40	17.76	0.0	0.0	0.0	0.0	0.0003	24.12888
12.00	0.0	0.0	33.38	17.34	0.0	0.0	0.0	0.0	0.0003	24.21549
14.00	0.0	0.0	33.38	16.73	0.0	0.0	0.0	0.0	0.0003	24.35932
16.00	0.0	0.0	33.38	15.17	0.0	0.0	0.0	0.0	0.0003	24.71340
18.00	0.0	0.0	33.37	14.37	0.0	0.0	0.0	0.0	0.0003	24.87044
20.00	0.0	0.0	33.35	14.18	0.0	0.0	0.0	0.0	0.0003	24.89660
22.00	0.0	0.0	33.33	13.83	0.0	0.0	0.0	0.0	0.0003	24.95172
24.00	0.0	0.0	33.32	13.75	0.0	0.0	0.0	0.0	0.0003	24.96707
26.00	0.0	0.0	33.36	13.42	0.0	0.0	0.0	0.0	0.0003	25.06459
29.00	0.0	0.0	33.36	13.39	0.0	0.0	0.0	0.0	0.0003	25.07096

Diffuser table:

P-dia	Ver angl	H-Angle	SourceX	SourceY	Ports	MZ-dis	Isoplth	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(in)	(deg)	(deg)	(ft)	(ft)	()	(ft)	(concent)	(ft)	(MGD)	(psu)	(C)	(ppm)
3.0500	0.0	0.0	0.0	0.0	125.00	1000.0	0.0	100.00	18.000	18.610	20.660	18610.0

Simulation:
Froude No: 13.62; Strat No: 3.00E-4; Spcg No: 14.39; k: 1.34E+5; eff den (sigmaT) 12.20791; eff vel 1.338(m/s);
Current is very small, flow regime may be transient.

Step	Depth (ft)	Amb-cur (m/s)	P-dia (in)	Eff-sal (psu)	Polutnt (ppm)	Dilutn ()	x-posn (m)	y-posn (m)	Iso dia (m)	
0	100.0	1.000E-5	3.050	18.61	18610.0	1.000	0.0	0.0	0.07747;	
1	100.00	0.0	3.081	18.91	18232.1	1.021	0.0129	0.0	0.07827;	bottom hit;
10	100.00	0.0	3.681	21.27	15286.9	1.217	0.107	0.0	0.09349;	
20	100.00	0.0	4.482	23.44	12564.0	1.481	0.233	0.0	0.1139;	
30	100.00	0.0	5.460	25.23	10322.6	1.803	0.386	0.0	0.1387;	
40	99.99	0.0	6.651	26.69	8478.7	2.195	0.573	0.0	0.1689;	
50	99.99	0.0	8.102	27.89	6962.6	2.673	0.800	0.0	0.2058;	
60	99.98	0.0	9.869	28.87	5716.6	3.255	1.076	0.0	0.2507;	
70	99.96	0.0	12.02	29.68	4692.8	3.966	1.409	0.0	0.3052;	
80	99.92	0.0	14.62	30.34	3851.9	4.831	1.812	0.0	0.3714;	
90	99.86	0.0	17.56	30.85	3202.8	5.811	2.253	0.0	0.4460;	
100	99.78	0.0	20.34	31.20	2757.0	6.750	2.639	0.0	0.5166;	
110	99.70	0.0	23.00	31.46	2426.4	7.670	2.983	0.0	0.5841;	
120	99.61	0.0	25.58	31.66	2167.7	8.585	3.296	0.0	0.6496;	
130	99.51	0.0	28.09	31.83	1957.6	9.507	3.587	0.0	0.7136;	
140	99.39	0.0	30.56	31.96	1782.4	10.44	3.860	0.0	0.7763;	
150	99.27	0.0	32.98	32.08	1633.4	11.39	4.121	0.0	0.8378;	
160	99.14	0.0	35.36	32.18	1504.5	12.37	4.373	0.0	0.8981;	
170	98.99	0.0	37.68	32.27	1391.7	13.37	4.618	0.0	0.9570;	
180	98.83	0.0	39.95	32.35	1291.8	14.41	4.861	0.0	1.0146;	
190	98.65	0.0	42.16	32.42	1202.3	15.48	5.102	0.0	1.0708;	
199	98.47	0.0	44.10	32.48	1129.1	16.48	5.320	0.0	1.1200;	merging;
200	98.45	0.0	44.31	32.48	1121.5	16.59	5.344	0.0	1.1254;	
210	98.23	0.0	46.40	32.54	1050.7	17.71	5.591	0.0	1.1786;	
220	97.98	0.0	48.47	32.59	986.2	18.87	5.845	0.0	1.2311;	
230	97.68	0.0	50.51	32.64	926.2	20.09	6.109	0.0	1.2831;	
240	97.34	0.0	52.56	32.68	869.6	21.40	6.387	0.0	1.3349;	
250	96.94	0.0	54.61	32.72	815.2	22.83	6.683	0.0	1.3872;	
260	96.47	0.0	56.73	32.76	762.3	24.41	7.001	0.0	1.4409;	
270	95.89	0.0	58.97	32.81	709.8	26.22	7.347	0.0	1.4979;	
280	95.17	0.0	61.46	32.85	656.8	28.34	7.729	0.0	1.5612;	
290	94.26	0.0	64.40	32.89	602.1	30.91	8.156	0.0	1.6358;	
300	93.08	0.0	68.10	32.94	544.8	34.16	8.640	0.0	1.7298;	
310	91.52	0.0	73.09	32.98	483.8	38.47	9.198	0.0	1.8565;	
320	89.35	0.0	80.34	33.03	418.3	44.49	9.852	0.0	2.0406;	
330	86.22	0.0	91.68	33.09	348.3	53.43	10.63	0.0	2.3286;	
340	82.35	0.0	108.2	33.14	285.7	65.13	11.42	0.0	2.7478;	
350	77.85	0.0	134.5	33.17	234.4	79.39	12.21	0.0	3.4160;	
360	72.61	0.0	175.6	33.20	192.3	96.77	13.03	0.0	4.4605;	
370	66.57	0.0	237.5	33.22	157.8	118.0	13.89	0.0	6.0325;	
371	65.92	0.0	246.1	33.23	154.7	120.3	13.98	0.0	6.2519;	trap level;
380	59.69	0.0	365.8	33.25	129.4	143.8	14.90	0.0	9.2922;	
388	55.64	0.0	587.5	33.26	116.0	160.4	15.59	0.0	14.923;	begin overlap;
390	55.38	0.0	637.5	33.26	115.2	161.5	15.64	0.0	16.192;	
400	54.63	0.0	846.1	33.26	113.0	164.7	15.82	0.0	21.491;	
410	54.28	0.0	1044.1	33.26	111.6	166.8	15.93	0.0	26.521;	
420	54.13	0.0	1206.9	33.26	110.6	168.3	15.98	0.0	30.656;	
430	54.12	0.0	1244.3	33.27	109.8	169.5	15.98	0.0	31.606;	
440	54.12	0.0	1261.9	33.27	109.1	170.6	15.98	0.0	32.052;	
450	54.12	0.0	1278.7	33.27	108.4	171.7	15.98	0.0	32.479;	

453 53.98 0.0 2141.7 33.27 106.2 175.2 16.30 0.0 54.400; surface; local maximum rise or fall;
459 87.41 0.0 3571.6 33.27 104.1 178.7 18.45 0.0 90.719;
Horiz plane projections in effluent direction: radius(m): 0.0; CL(m): 5.6237
Lmz(m): 5.6237
forced entrain 1 0.0 3.837 90.72 0.923
Rate sec-1 0.0 dy-1 0.0 kt: 0.0 Amb Sal 33.3807
;
1:51:56 PM. amb fills: 4

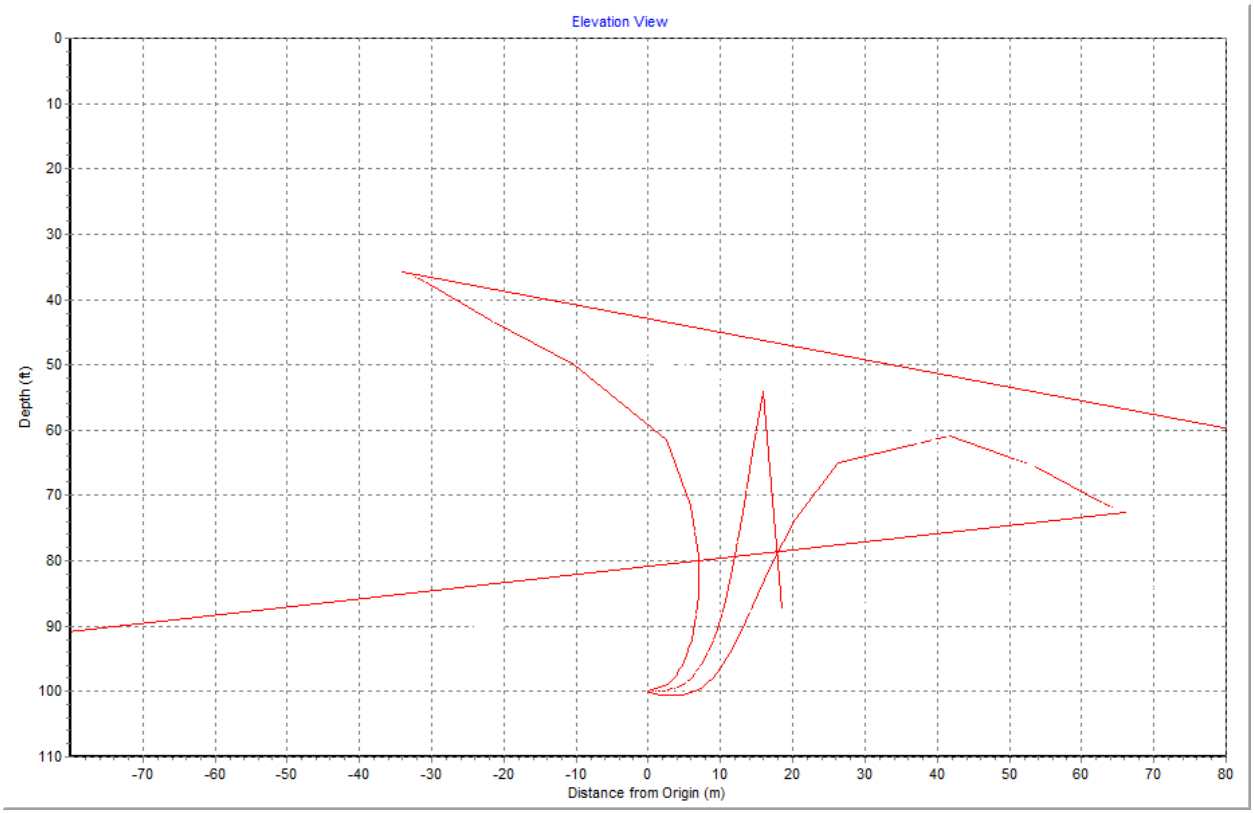


Figure B.5.1: Plumes 18b solution of discharge plume trajectories for discharges of 13 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt., and 5 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. ZID is defined by the maximum horizontal excursion of trajectories from the origin. From the maximum horizontal spreading of the plume, the ZID extends from X = -80 m to X = +80 m so that ZID = 160 m

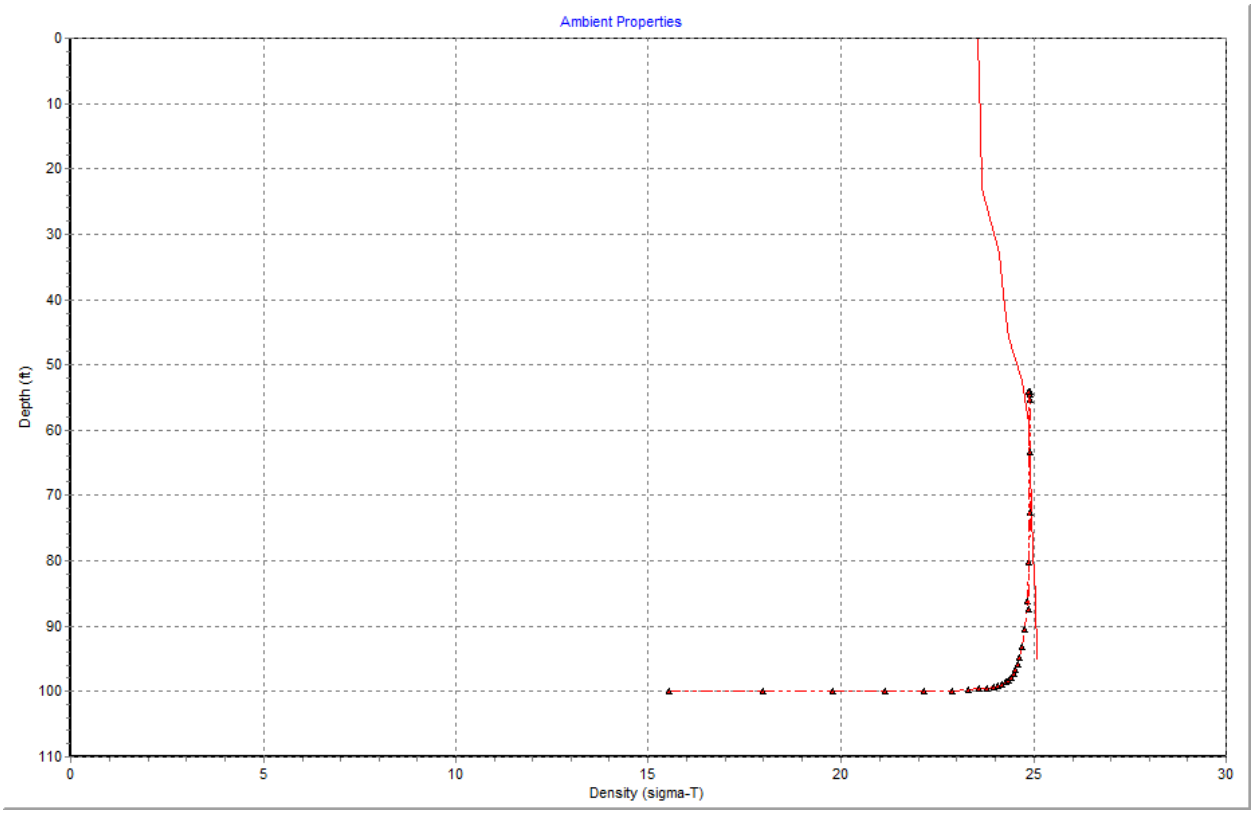


Figure B.5.2: Plumes 18b solution of vertical density profile for discharges of 13 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. and 5 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Discharge effluent density shown as black triangles. Ambient water mass density profile shown as solid red line.

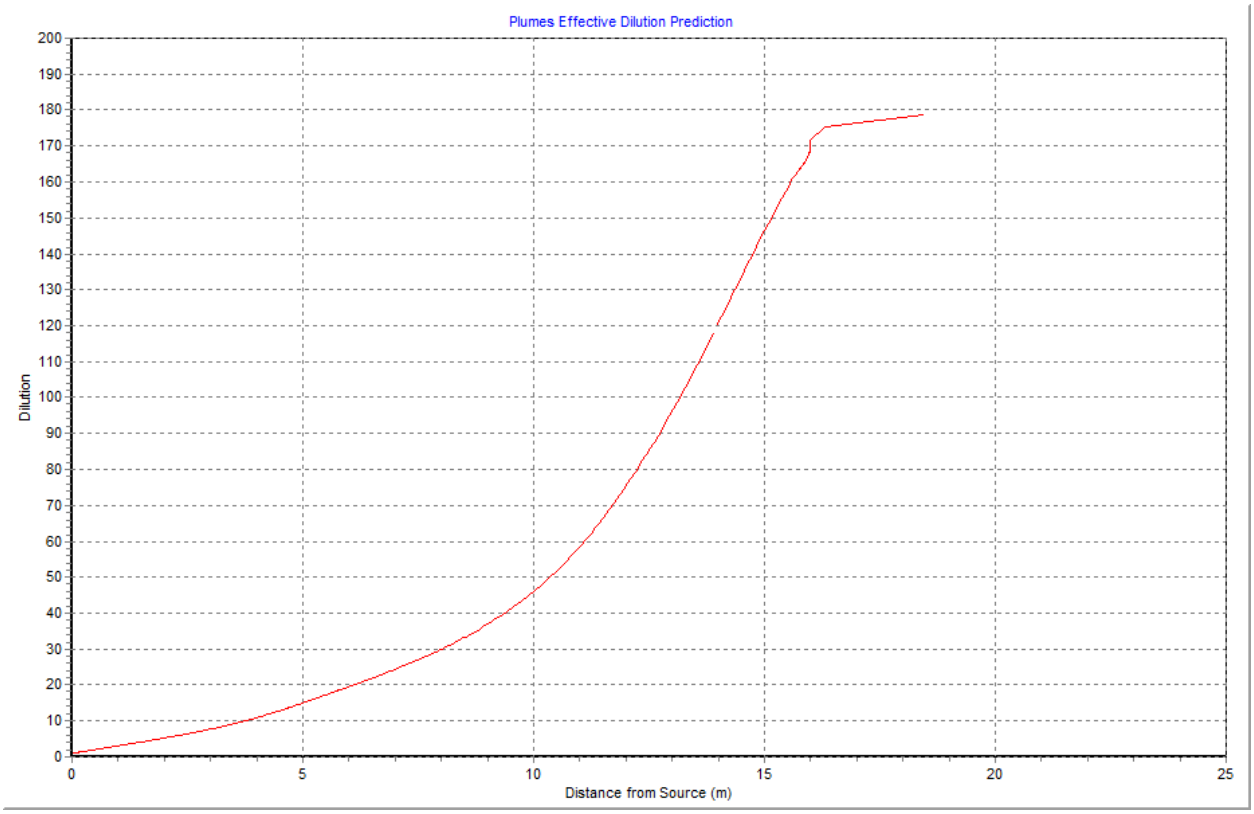


Figure B.5.3: Plumes 18b solution of effective (bulk average) dilution as a function of vertical distance from the point of discharge for discharges of 13 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. and 5 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt.

B.6: Plumes 18b Results for SJCOO discharges of 13 mgd Wastewater and 5 mgd Brine:

Contents of the memo box (may not be current and must be updated manually)
Project "C:\Plumes18\SJCOO_WW8mgd_b5mgd_T-1"
memo
SJCOO discharging 8 mgd wastewater and 5 mgd brine

Model configuration items checked:
Channel width (m) 100
Start case for graphs 1
Max detailed graphs 10 (limits plots that can overflow memory)
Elevation Projection Plane (deg) 0
Shore vector (m,deg) not checked
Bacteria model : Mancini (1978) coliform model
PDS sfc. model heat transfer : Medium
Equation of State : S, T
Similarity Profile : Default profile (k=2.0, ...)
Diffuser port contraction coefficient 1
Light absorption coefficient 0.16
Farfield increment (m) 200
UM3 aspiration coefficient 0.1
Output file: text output tab
Output each ?? steps 10
Maximum dilution reported 1000
Text output format : Standard
Max vertical reversals : to max rise or fall

/ UM3. 1/10/2019 2:20:30 PM
Case 1; ambient file C:\Plumes18\SJCOO_WW8mgd_b5mgd_T-1.001.db; Diffuser table record 1: ----------

Ambient Table:

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn	Density
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2	sigma-T
0.0	0.0	0.0	33.38	19.97	0.0	0.0	0.0	0.0	0.0003	23.55719
2.000	0.0	0.0	33.39	19.87	0.0	0.0	0.0	0.0	0.0003	23.59288
4.000	0.0	0.0	33.40	19.81	0.0	0.0	0.0	0.0	0.0003	23.61484
7.000	0.0	0.0	33.41	19.64	0.0	0.0	0.0	0.0	0.0003	23.67096
10.00	0.0	0.0	33.40	17.76	0.0	0.0	0.0	0.0	0.0003	24.12888
12.00	0.0	0.0	33.38	17.34	0.0	0.0	0.0	0.0	0.0003	24.21549
14.00	0.0	0.0	33.38	16.73	0.0	0.0	0.0	0.0	0.0003	24.35932
16.00	0.0	0.0	33.38	15.17	0.0	0.0	0.0	0.0	0.0003	24.71340
18.00	0.0	0.0	33.37	14.37	0.0	0.0	0.0	0.0	0.0003	24.87044
20.00	0.0	0.0	33.35	14.18	0.0	0.0	0.0	0.0	0.0003	24.89660
22.00	0.0	0.0	33.33	13.83	0.0	0.0	0.0	0.0	0.0003	24.95172
24.00	0.0	0.0	33.32	13.75	0.0	0.0	0.0	0.0	0.0003	24.96707
26.00	0.0	0.0	33.36	13.42	0.0	0.0	0.0	0.0	0.0003	25.06459
29.00	0.0	0.0	33.36	13.39	0.0	0.0	0.0	0.0	0.0003	25.07096

Diffuser table:

P-dia	Ver angl	H-Angle	SourceX	SourceY	Ports	MZ-dis	Isoplth	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(in)	(deg)	(deg)	(ft)	(ft)	()	(ft)	(concent)	(ft)	(MGD)	(psu)	(C)	(ppm)
3.0500	0.0	0.0	0.0	0.0	125.00	1000.0	0.0	100.00	13.000	25.770	20.660	25770.0

Simulation:
Froude No: 12.95; Strat No: 5.17E-4; Spcg No: 14.39; k: 96666.1; eff den (sigmaT) 17.61415; eff vel 0.967(m/s);
Current is very small, flow regime may be transient.

Step	Depth (ft)	Amb-cur (m/s)	P-dia (in)	Eff-sal (psu)	Polutnt (ppm)	Dilutn ()	x-posn (m)	y-posn (m)	Iso dia (m)	
0	100.0	1.000E-5	3.050	25.77	25770.0	1.000	0.0	0.0	0.07747;	
1	100.00	0.0	3.073	25.88	25389.9	1.015	0.00937	0.0	0.07805;	bottom hit;
10	100.00	0.0	3.661	27.10	21270.5	1.212	0.109	0.0	0.09299;	
20	100.00	0.0	4.460	28.23	17468.3	1.475	0.243	0.0	0.1133;	
30	100.00	0.0	5.435	29.15	14342.9	1.797	0.406	0.0	0.1380;	
40	99.99	0.0	6.622	29.91	11774.7	2.189	0.604	0.0	0.1682;	
50	99.99	0.0	8.068	30.53	9665.1	2.666	0.845	0.0	0.2049;	
60	99.97	0.0	9.828	31.04	7932.6	3.249	1.138	0.0	0.2496;	
70	99.95	0.0	11.97	31.45	6510.1	3.958	1.492	0.0	0.3040;	
80	99.90	0.0	14.55	31.80	5343.5	4.823	1.917	0.0	0.3696;	
90	99.83	0.0	17.21	32.04	4510.5	5.713	2.334	0.0	0.4372;	
100	99.76	0.0	19.69	32.21	3928.3	6.560	2.699	0.0	0.5002;	
110	99.67	0.0	22.05	32.34	3488.9	7.386	3.028	0.0	0.5601;	
120	99.58	0.0	24.32	32.44	3140.6	8.206	3.330	0.0	0.6178;	
130	99.47	0.0	26.53	32.53	2854.6	9.028	3.614	0.0	0.6739;	
140	99.36	0.0	28.69	32.60	2613.7	9.860	3.883	0.0	0.7286;	
150	99.23	0.0	30.79	32.66	2406.7	10.71	4.142	0.0	0.7821;	
160	99.09	0.0	32.85	32.71	2226.1	11.58	4.393	0.0	0.8344;	
170	98.94	0.0	34.87	32.76	2066.2	12.47	4.640	0.0	0.8856;	
180	98.77	0.0	36.84	32.80	1922.9	13.40	4.885	0.0	0.9357;	
190	98.58	0.0	38.78	32.84	1793.1	14.37	5.129	0.0	0.9849;	
200	98.37	0.0	40.68	32.87	1674.1	15.39	5.377	0.0	1.0333;	
210	98.13	0.0	42.57	32.90	1563.8	16.48	5.629	0.0	1.0812;	
218	97.92	0.0	44.07	32.93	1480.6	17.41	5.836	0.0	1.1193;	merging;
220	97.86	0.0	44.44	32.93	1461.0	17.64	5.888	0.0	1.1287;	
230	97.55	0.0	46.26	32.96	1368.5	18.83	6.158	0.0	1.1749;	
240	97.19	0.0	48.08	32.99	1281.5	20.11	6.443	0.0	1.2213;	
250	96.77	0.0	49.97	33.01	1197.5	21.52	6.746	0.0	1.2692;	
260	96.26	0.0	51.98	33.04	1114.8	23.12	7.073	0.0	1.3202;	
270	95.64	0.0	54.19	33.06	1032.1	24.97	7.430	0.0	1.3765;	
280	94.86	0.0	56.76	33.08	947.8	27.19	7.823	0.0	1.4417;	
290	93.88	0.0	59.89	33.11	860.7	29.94	8.263	0.0	1.5213;	
300	92.61	0.0	63.94	33.14	769.6	33.48	8.763	0.0	1.6241;	
310	90.89	0.0	69.51	33.16	673.5	38.26	9.339	0.0	1.7654;	
320	88.49	0.0	77.70	33.19	571.8	45.07	10.02	0.0	1.9736;	
330	85.18	0.0	90.09	33.22	470.2	54.81	10.79	0.0	2.2883;	
340	81.30	0.0	108.3	33.25	385.7	66.81	11.54	0.0	2.7506;	
350	76.70	0.0	142.8	33.26	316.4	81.44	12.34	0.0	3.6277;	
353	75.14	0.0	158.3	33.27	298.2	86.42	12.61	0.0	4.0211;	trap level;
360	71.13	0.0	205.9	33.27	259.6	99.27	13.30	0.0	5.2296;	
370	65.96	0.0	341.8	33.28	221.3	116.5	14.29	0.0	8.6817;	
375	65.09	0.0	413.3	33.28	215.0	119.9	14.50	0.0	10.497;	begin overlap;
380	64.53	0.0	476.2	33.29	211.6	121.8	14.64	0.0	12.096;	
390	63.85	0.0	590.2	33.29	208.0	123.9	14.85	0.0	14.990;	
400	63.46	0.0	699.5	33.29	205.6	125.3	15.00	0.0	17.766;	
410	63.21	0.0	807.2	33.29	203.8	126.5	15.10	0.0	20.503;	
420	63.04	0.0	913.8	33.29	202.2	127.5	15.18	0.0	23.210;	
430	62.93	0.0	1016.2	33.29	200.8	128.3	15.25	0.0	25.812;	
440	62.90	0.0	1064.4	33.29	199.8	129.0	15.26	0.0	27.037;	
450	62.90	0.0	1078.8	33.29	198.8	129.6	15.26	0.0	27.401;	

460 62.90 0.0 1089.5 33.29 197.9 130.2 15.26 0.0 27.672;
470 62.90 0.0 1099.9 33.29 196.9 130.9 15.26 0.0 27.936; local maximum rise or fall;
477 62.96 0.0 1118.2 33.29 192.5 133.9 15.78 0.0 28.401;
Horiz plane projections in effluent direction: radius(m): 0.0; CL(m): 4.8084
Lmz(m): 4.8084
forced entrain 1 0.0 11.29 28.40 0.513
Rate sec-1 0.0 dy-1 0.0 kt: 0.0 Amb Sal 33.3550
;
2:20:30 PM. amb fills: 4

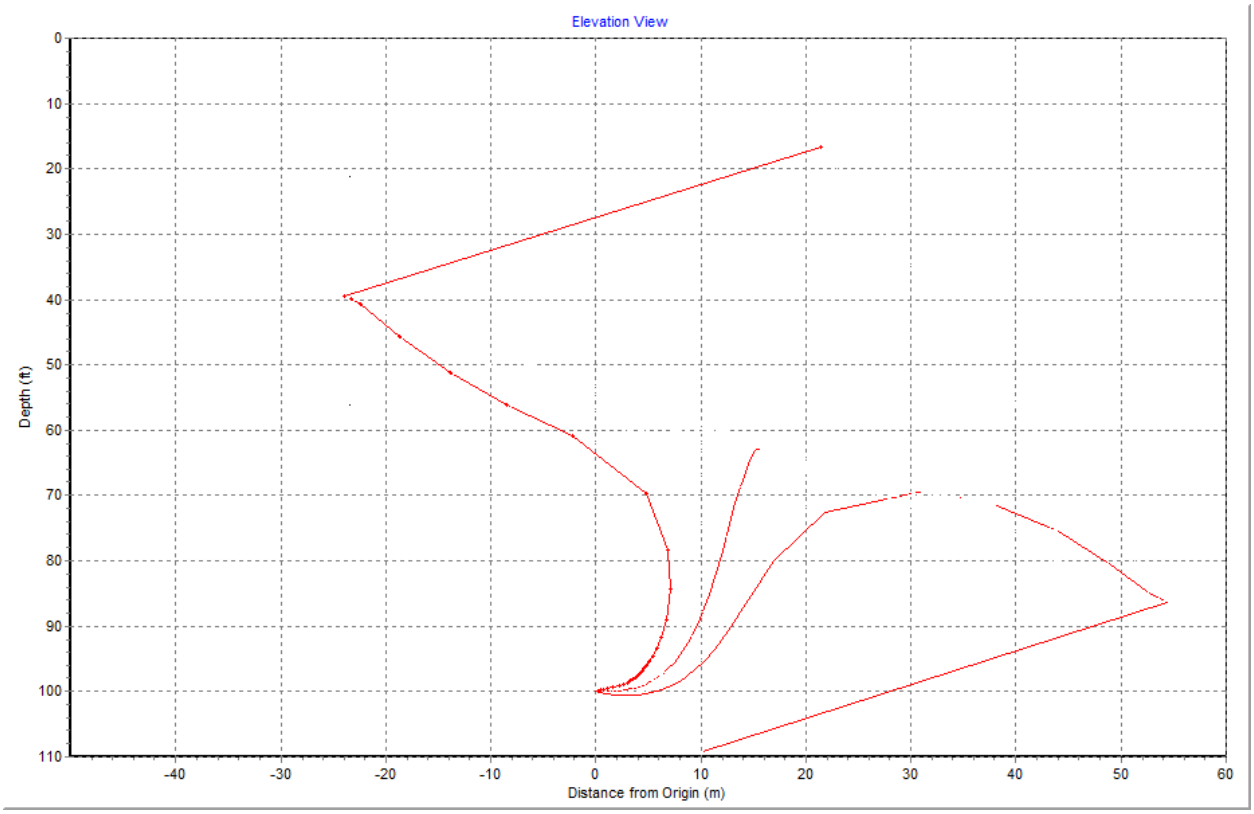


Figure B.6.1: Plumes 18b solution of discharge plume trajectories for discharges of 8 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt., and 5 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. ZID is defined by the maximum horizontal excursion of trajectories from the origin. From the maximum horizontal spreading of the plume, the ZID extends from X = -24 m to X = +54 m so that ZID = 78 m

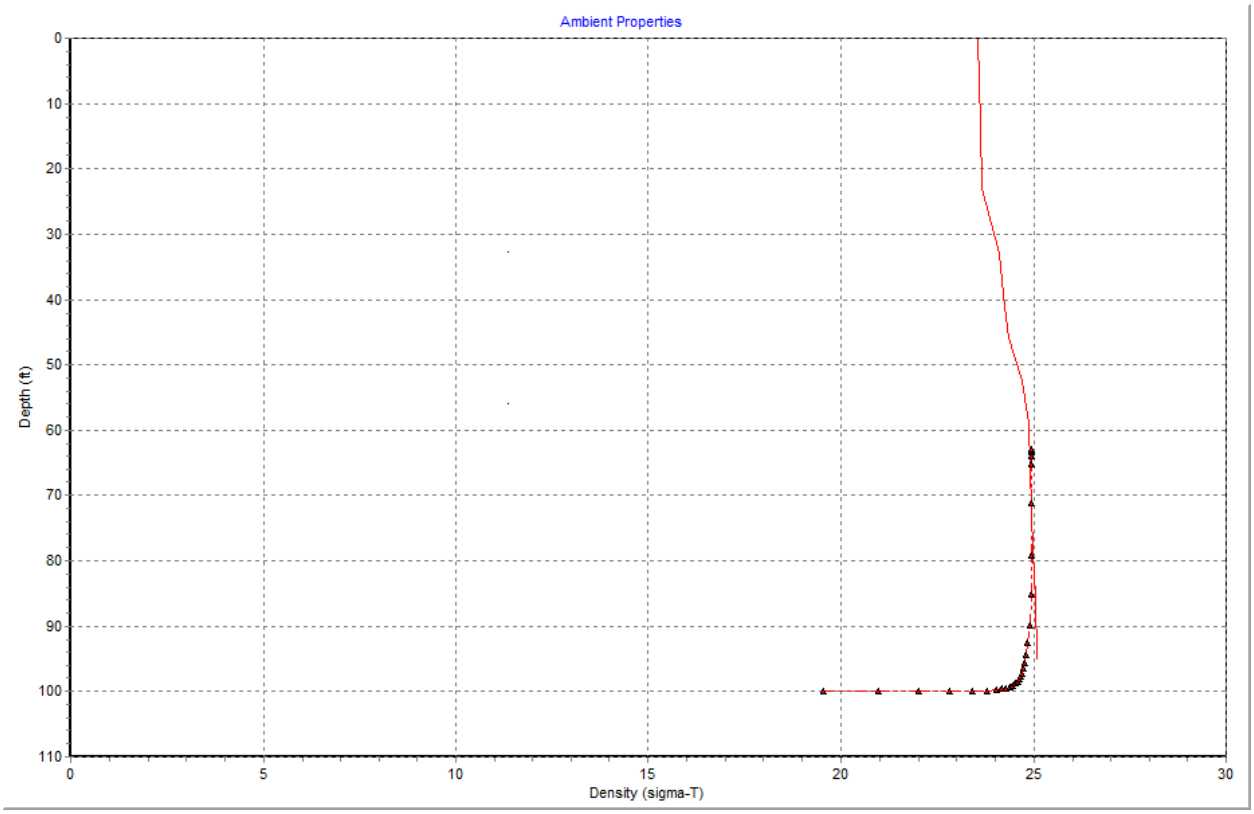


Figure B.6.2: Plumes 18b solution of vertical density profile for discharges of 8 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. and 5 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Discharge effluent density shown as black triangles. Ambient water mass density profile shown as solid red line.

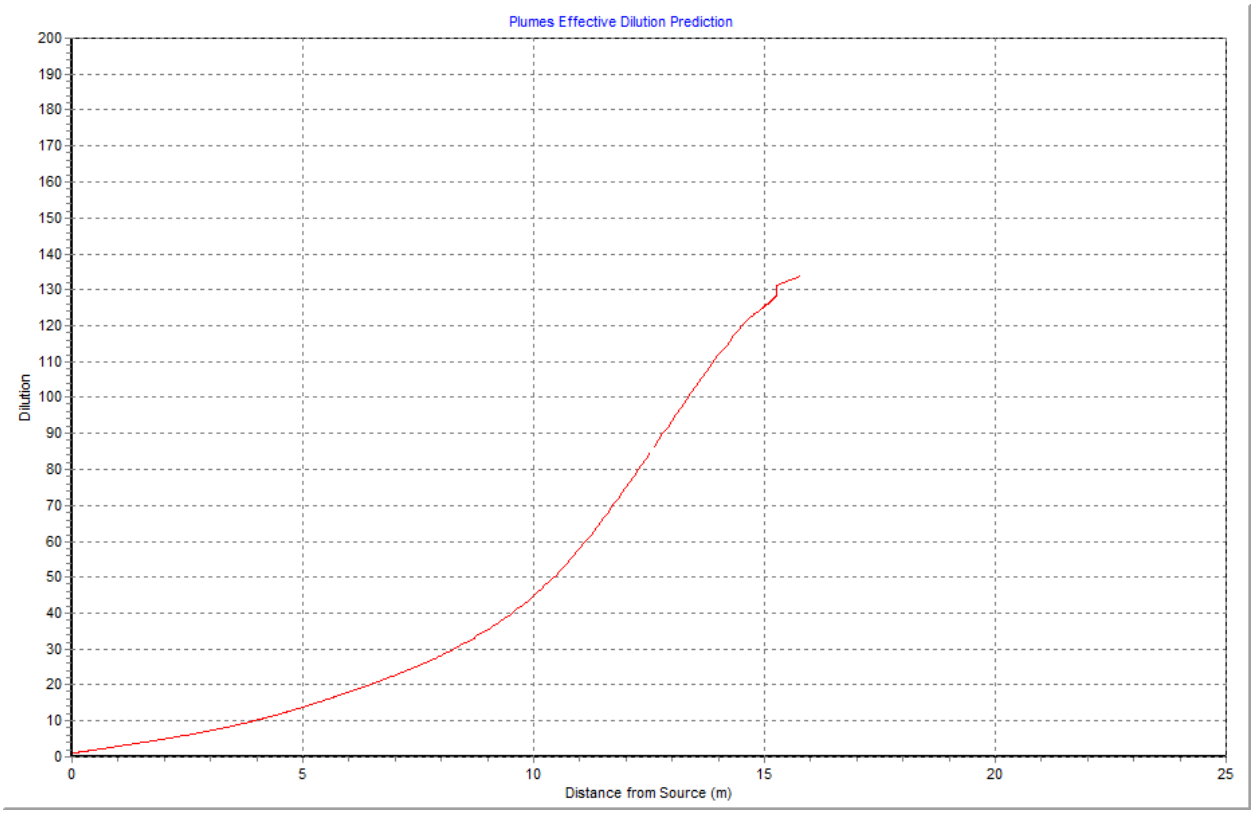


Figure B.6.3: Plumes 18b solution of effective (bulk average) dilution as a function of vertical distance from the point of discharge for discharges of 8 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. and 5 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt.

APPENDIX-C: Results for Dense (Negatively Buoyant) Combined Discharges of Brine and Wastewater

C.1: Plumes 18b Results for SJCOO discharges of 13 mgd Wastewater and 15 mgd Brine:

Contents of the memo box (may not be current and must be updated manually)
Project "C:\Plumes18\SJCOO_WW13mgd_b15mgd_T-4"
memomemomemo
SJCOO discharging 13 mgd wastewater and 15 mgd brine

Model configuration items checked:
Channel width (m) 100
Start case for graphs 1
Max detailed graphs 10 (limits plots that can overflow memory)
Elevation Projection Plane (deg) 0
Shore vector (m,deg) not checked
Bacteria model : Mancini (1978) coliform model
PDS sfc. model heat transfer : Medium
Equation of State : S, T
Similarity Profile : Default profile (k=2.0, ...)
Diffuser port contraction coefficient 1
Light absorption coefficient 0.16
Farfield increment (m) 200
UM3 aspiration coefficient 0.1
Output file: text output tab
Output each ?? steps 1
Maximum dilution reported 1000
Text output format : Standard
Max vertical reversals : to max rise or fall

/ UM3. 1/14/2019 11:25:09 AM
Case 1; ambient file C:\Plumes18\SJCOO_WW13mgd_b15mgd_T-4.001.db; Diffuser table record 1: ----------

Ambient Table:

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn	Density
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2	sigma-T
0.0	0.0	0.0	33.38	19.97	0.0	0.0	0.0	0.0	0.0003	23.55719
2.000	0.0	0.0	33.39	19.87	0.0	0.0	0.0	0.0	0.0003	23.59288
4.000	0.0	0.0	33.40	19.81	0.0	0.0	0.0	0.0	0.0003	23.61484
7.000	0.0	0.0	33.41	19.64	0.0	0.0	0.0	0.0	0.0003	23.67096
10.00	0.0	0.0	33.40	17.76	0.0	0.0	0.0	0.0	0.0003	24.12888
12.00	0.0	0.0	33.38	17.34	0.0	0.0	0.0	0.0	0.0003	24.21549
14.00	0.0	0.0	33.38	16.73	0.0	0.0	0.0	0.0	0.0003	24.35932
16.00	0.0	0.0	33.38	15.17	0.0	0.0	0.0	0.0	0.0003	24.71340
18.00	0.0	0.0	33.37	14.37	0.0	0.0	0.0	0.0	0.0003	24.87044
20.00	0.0	0.0	33.35	14.18	0.0	0.0	0.0	0.0	0.0003	24.89660
22.00	0.0	0.0	33.33	13.83	0.0	0.0	0.0	0.0	0.0003	24.95172
24.00	0.0	0.0	33.32	13.75	0.0	0.0	0.0	0.0	0.0003	24.96707
26.00	0.0	0.0	33.36	13.42	0.0	0.0	0.0	0.0	0.0003	25.06459
31.85	0.0	0.0	33.36	13.39	0.0	0.0	0.0	0.0	0.0003	25.07201

Diffuser table:

P-diaVer	angl	H-Angle	SourceX	SourceY	Ports	MZ-dis	Isoplth	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt

(in)	(deg)	(deg)	(ft)	(ft)	()	(ft)	(concent)	(ft)	(MGD)	(psu)	(C)	(ppm)
3.0500	0.0	0.0	0.0	0.0	125.00	1000.0	0.0	100.00	28.000	35.890	20.660	35890.0

Simulation:
Froude No: -165.0; Strat No:-0.01789; Spcg No: 14.39; k: 2.08E+5; eff den (sigmaT) 25.28520; eff vel 2.082(m/s);
Current is very small, flow regime may be transient.

Step	Depth (ft)	Amb-cur (m/s)	P-dia (in)	Eff-sal (psu)	Polutnt (ppm)	Dilutn ()	x-posn (ft)	y-posn (ft)	Iso dia (m)
0	100.0	1.000E-5	3.050	35.89	35890.0	1.000	0.0	0.0	0.07747;
1	100.0	0.0	3.099	35.81	34769.0	1.032	0.0199	0.0	0.07871;
2	100.0	0.0	3.180	35.76	34087.2	1.053	0.0329	0.0	0.08076;
3	100.0	0.0	3.243	35.72	33418.9	1.074	0.0461	0.0	0.08238;
4	100.0	0.0	3.308	35.67	32763.6	1.095	0.0596	0.0	0.08403;
5	100.0	0.0	3.374	35.62	32121.2	1.117	0.0733	0.0	0.08571;
6	100.0	0.0	3.442	35.58	31491.3	1.140	0.0874	0.0	0.08742;
7	100.0	0.0	3.511	35.54	30873.8	1.162	0.102	0.0	0.08917;
8	100.0	0.0	3.581	35.49	30268.4	1.186	0.116	0.0	0.09095;
9	100.0	0.0	3.652	35.45	29674.9	1.209	0.131	0.0	0.09277;
10	100.0	0.0	3.725	35.41	29093.0	1.234	0.146	0.0	0.09463;
11	100.0	0.0	3.800	35.37	28522.6	1.258	0.162	0.0	0.09652;
12	100.0	0.0	3.876	35.33	27963.3	1.283	0.178	0.0	0.09845;
13	100.0	0.0	3.954	35.29	27414.9	1.309	0.194	0.0	0.1004;
14	100.0	0.0	4.033	35.26	26877.4	1.335	0.210	0.0	0.1024;
15	100.0	0.0	4.113	35.22	26350.3	1.362	0.227	0.0	0.1045;
16	100.0	0.0	4.196	35.18	25833.6	1.389	0.244	0.0	0.1066;
17	100.0	0.0	4.279	35.15	25327.0	1.417	0.261	0.0	0.1087;
18	100.0	0.0	4.365	35.11	24830.4	1.445	0.279	0.0	0.1109;
19	100.0	0.0	4.452	35.08	24343.5	1.474	0.297	0.0	0.1131;
20	100.0	0.0	4.541	35.04	23866.1	1.504	0.316	0.0	0.1154;
21	100.0	0.0	4.632	35.01	23398.1	1.534	0.335	0.0	0.1177;
22	100.0	0.0	4.725	34.98	22939.3	1.565	0.354	0.0	0.1200;
23	100.0	0.0	4.819	34.95	22489.5	1.596	0.373	0.0	0.1224;
24	100.0	0.0	4.916	34.92	22048.5	1.628	0.393	0.0	0.1249;
25	100.0	0.0	5.014	34.89	21616.1	1.660	0.414	0.0	0.1274;
26	100.0	0.0	5.114	34.86	21192.2	1.694	0.435	0.0	0.1299;
27	100.0	0.0	5.217	34.83	20776.6	1.727	0.456	0.0	0.1325;
28	100.0	0.0	5.321	34.80	20369.2	1.762	0.478	0.0	0.1352;
29	100.0	0.0	5.427	34.77	19969.8	1.797	0.500	0.0	0.1379;
30	100.0	0.0	5.536	34.74	19578.2	1.833	0.522	0.0	0.1406;
31	100.0	0.0	5.647	34.71	19194.3	1.870	0.545	0.0	0.1434;
32	100.0	0.0	5.760	34.69	18817.9	1.907	0.569	0.0	0.1463;
33	100.0	0.0	5.875	34.66	18448.8	1.945	0.592	0.0	0.1492;
34	100.0	0.0	5.992	34.64	18087.1	1.984	0.617	0.0	0.1522;
35	100.0	0.0	6.112	34.61	17732.4	2.024	0.642	0.0	0.1552;
36	100.0	0.0	6.234	34.59	17384.7	2.064	0.667	0.0	0.1584;
37	100.0	0.0	6.359	34.56	17043.7	2.106	0.693	0.0	0.1615;
38	100.0	0.0	6.486	34.54	16709.5	2.148	0.719	0.0	0.1648;
39	100.0	0.0	6.616	34.52	16381.8	2.191	0.746	0.0	0.1680;
40	100.0	0.0	6.748	34.49	16060.6	2.235	0.774	0.0	0.1714;
41	100.0	0.0	6.883	34.47	15745.7	2.279	0.802	0.0	0.1748;
42	100.0	0.0	7.021	34.45	15436.9	2.325	0.830	0.0	0.1783;
43	100.0	0.0	7.161	34.43	15134.2	2.371	0.859	0.0	0.1819;
44	100.0	0.0	7.305	34.41	14837.4	2.419	0.889	0.0	0.1855;
45	100.0	0.0	7.451	34.39	14546.4	2.467	0.919	0.0	0.1893;
46	100.0	0.0	7.600	34.37	14261.2	2.517	0.950	0.0	0.1930;

47	100.0	0.0	7.752	34.35	13981.5	2.567	0.982	0.0	0.1969;
48	100.0	0.0	7.907	34.33	13707.3	2.618	1.014	0.0	0.2008;
49	100.0	0.0	8.065	34.31	13438.5	2.671	1.047	0.0	0.2049;
50	100.0	0.0	8.226	34.29	13175.0	2.724	1.080	0.0	0.2089;
51	100.0	0.0	8.391	34.27	12916.7	2.779	1.114	0.0	0.2131;
52	100.0	0.0	8.559	34.25	12663.4	2.834	1.149	0.0	0.2174;
53	100.0	0.0	8.730	34.24	12415.0	2.891	1.185	0.0	0.2217;
54	100.0	0.0	8.904	34.22	12171.6	2.949	1.221	0.0	0.2262;
55	100.0	0.0	9.083	34.20	11932.9	3.008	1.258	0.0	0.2307;
56	100.0	0.0	9.264	34.19	11698.9	3.068	1.295	0.0	0.2353;
57	100.0	0.0	9.450	34.17	11469.5	3.129	1.334	0.0	0.2400;
58	100.0	0.0	9.639	34.15	11244.6	3.192	1.373	0.0	0.2448;
59	100.0	0.0	9.831	34.14	11024.1	3.256	1.413	0.0	0.2497;
60	100.0	0.0	10.03	34.12	10807.9	3.321	1.454	0.0	0.2547;
61	100.0	0.0	10.23	34.11	10596.0	3.387	1.495	0.0	0.2598;
62	100.0	0.0	10.43	34.09	10388.2	3.455	1.538	0.0	0.2650;
63	100.0	0.0	10.64	34.08	10184.5	3.524	1.581	0.0	0.2703;
64	100.0	0.0	10.85	34.07	9984.8	3.594	1.625	0.0	0.2757;
65	100.0	0.0	11.07	34.05	9789.0	3.666	1.670	0.0	0.2812;
66	100.0	0.0	11.29	34.04	9597.0	3.740	1.716	0.0	0.2868;
67	100.0	0.0	11.52	34.03	9408.8	3.815	1.763	0.0	0.2926;
68	100.0	0.0	11.75	34.01	9224.3	3.891	1.811	0.0	0.2984;
69	100.0	0.0	11.98	34.00	9043.4	3.969	1.859	0.0	0.3044;
70	100.0	0.0	12.22	33.99	8866.1	4.048	1.909	0.0	0.3105;
71	100.0	0.0	12.47	33.98	8692.2	4.129	1.960	0.0	0.3167;
72	100.0	0.0	12.72	33.96	8521.8	4.212	2.011	0.0	0.3230;
73	100.0	0.0	12.97	33.95	8354.7	4.296	2.064	0.0	0.3295;
74	100.0	0.0	13.23	33.94	8190.8	4.382	2.118	0.0	0.3361;
75	100.0	0.0	13.50	33.93	8030.2	4.469	2.173	0.0	0.3428;
76	100.0	0.0	13.77	33.92	7872.8	4.559	2.229	0.0	0.3497;
77	100.0	0.0	14.04	33.91	7718.4	4.650	2.286	0.0	0.3567;
78	100.0	0.0	14.32	33.90	7567.0	4.743	2.344	0.0	0.3638;
79	100.0	0.0	14.61	33.89	7418.6	4.838	2.403	0.0	0.3711;
80	100.0	0.0	14.90	33.88	7273.2	4.935	2.464	0.0	0.3785;
81	100.0	0.0	15.20	33.87	7130.5	5.033	2.525	0.0	0.3861;
82	100.0	0.0	15.50	33.86	6990.7	5.134	2.588	0.0	0.3938;
83	100.0	0.0	15.81	33.85	6853.6	5.237	2.653	0.0	0.4017;
84	100.0	0.0	16.13	33.84	6719.2	5.341	2.718	0.0	0.4097;
85	100.0	0.0	16.45	33.83	6587.5	5.448	2.785	0.0	0.4179;
86	100.0	0.0	16.78	33.82	6458.3	5.557	2.853	0.0	0.4262;
87	100.0	0.0	17.12	33.81	6331.7	5.668	2.923	0.0	0.4348;
88	100.0	0.0	17.46	33.80	6207.5	5.782	2.993	0.0	0.4435;
89	100.0	0.0	17.81	33.79	6085.8	5.897	3.066	0.0	0.4523;
90	100.0	0.0	18.16	33.78	5966.4	6.015	3.140	0.0	0.4614;
91	100.0	0.0	18.53	33.78	5849.4	6.136	3.215	0.0	0.4706;
92	100.0	0.0	18.90	33.77	5734.7	6.258	3.291	0.0	0.4800;
93	100.0	0.0	19.28	33.76	5622.3	6.384	3.370	0.0	0.4896;
94	100.0	0.0	19.66	33.75	5512.0	6.511	3.450	0.0	0.4994;
95	100.0	0.0	20.06	33.74	5404.0	6.641	3.531	0.0	0.5094;
96	100.0	0.0	20.46	33.74	5298.0	6.774	3.614	0.0	0.5196;
97	100.0	0.0	20.87	33.73	5194.1	6.910	3.699	0.0	0.5300;
98	100.0	0.0	21.28	33.72	5092.3	7.048	3.785	0.0	0.5406;
99	100.0	0.0	21.71	33.71	4992.4	7.189	3.873	0.0	0.5514;
100	100.0	0.0	22.14	33.71	4894.5	7.333	3.963	0.0	0.5624;
101	100.0	0.0	22.59	33.70	4798.5	7.479	4.055	0.0	0.5737;
102	100.0	0.0	23.04	33.69	4704.4	7.629	4.148	0.0	0.5851;

103	100.0	0.0	23.50	33.69	4612.2	7.782	4.243	0.0	0.5968;
104	100.0	0.0	23.97	33.68	4521.7	7.937	4.341	0.0	0.6088;
105	100.0	0.0	24.45	33.68	4433.1	8.096	4.440	0.0	0.6210;
106	100.0	0.0	24.94	33.67	4346.2	8.258	4.541	0.0	0.6334;
107	100.0	0.0	25.43	33.66	4260.9	8.423	4.644	0.0	0.6460;
108	100.0	0.0	25.94	33.66	4177.4	8.592	4.749	0.0	0.6590;
109	100.0	0.0	26.46	33.65	4095.5	8.763	4.856	0.0	0.6721;
110	100.0	0.0	26.99	33.65	4015.2	8.939	4.966	0.0	0.6856;
111	100.0	0.0	27.53	33.64	3936.4	9.117	5.077	0.0	0.6993;
112	100.0	0.0	28.08	33.63	3859.2	9.300	5.191	0.0	0.7133;
113	100.0	0.0	28.64	33.63	3783.6	9.486	5.307	0.0	0.7276;
114	100.0	0.0	29.22	33.62	3709.4	9.675	5.426	0.0	0.7421;
115	100.0	0.0	29.80	33.62	3636.6	9.869	5.547	0.0	0.7569;
116	100.0	0.0	30.40	33.61	3565.3	10.07	5.670	0.0	0.7721;
117	100.0	0.0	31.00	33.61	3495.4	10.27	5.795	0.0	0.7875;
118	100.0	0.0	31.62	33.60	3426.9	10.47	5.923	0.0	0.8033;
119	100.0	0.0	32.26	33.60	3359.7	10.68	6.054	0.0	0.8193;
120	100.0	0.0	32.90	33.60	3293.8	10.90	6.187	0.0	0.8357;
121	100.0	0.0	33.56	33.59	3229.2	11.11	6.323	0.0	0.8524;
122	100.0	0.0	34.23	33.59	3165.9	11.34	6.462	0.0	0.8695;
123	100.0	0.0	34.92	33.58	3103.8	11.56	6.603	0.0	0.8869;
124	100.0	0.0	35.61	33.58	3043.0	11.79	6.747	0.0	0.9046;
125	100.0	0.0	36.33	33.57	2983.3	12.03	6.894	0.0	0.9227;
126	100.0	0.0	37.05	33.57	2924.8	12.27	7.044	0.0	0.9411;
127	100.0	0.0	37.79	33.57	2867.4	12.52	7.197	0.0	0.9600;
128	100.0	0.0	38.55	33.56	2811.2	12.77	7.352	0.0	0.9792;
129	100.0	0.0	39.32	33.56	2756.1	13.02	7.511	0.0	0.9987;
130	100.0	0.0	40.11	33.55	2702.0	13.28	7.673	0.0	1.0187;
131	100.0	0.0	40.91	33.55	2649.1	13.55	7.839	0.0	1.0391;
132	100.1	0.0	41.73	33.55	2597.1	13.82	8.007	0.0	1.0599;
133	100.1	0.0	42.56	33.54	2546.2	14.10	8.179	0.0	1.0810;
134	100.1	0.0	43.41	33.54	2496.3	14.38	8.354	0.0	1.1027;
135	100.1	0.0	44.28	33.54	2447.3	14.67	8.533	0.0	1.1247; merging;
136	100.1	0.0	45.17	33.53	2399.3	14.96	8.727	0.0	1.1474;
137	100.1	0.0	46.12	33.53	2352.3	15.26	8.937	0.0	1.1716;
138	100.1	0.0	47.12	33.53	2306.2	15.56	9.159	0.0	1.1968;
139	100.1	0.0	48.16	33.52	2260.9	15.87	9.394	0.0	1.2232;
140	100.1	0.0	49.24	33.52	2216.6	16.19	9.640	0.0	1.2507;
141	100.1	0.0	50.36	33.52	2173.1	16.52	9.899	0.0	1.2792;
142	100.1	0.0	51.53	33.51	2130.5	16.85	10.17	0.0	1.3088;
143	100.1	0.0	52.74	33.51	2088.8	17.18	10.45	0.0	1.3397;
144	100.1	0.0	54.00	33.51	2047.8	17.53	10.75	0.0	1.3717;
145	100.1	0.0	55.31	33.50	2007.6	17.88	11.05	0.0	1.4049;
146	100.1	0.0	56.67	33.50	1968.3	18.23	11.37	0.0	1.4394;
147	100.2	0.0	58.08	33.50	1929.7	18.60	11.71	0.0	1.4753;
148	100.2	0.0	59.55	33.50	1891.8	18.97	12.05	0.0	1.5126;
149	100.2	0.0	61.08	33.49	1854.7	19.35	12.42	0.0	1.5513;
150	100.2	0.0	62.66	33.49	1818.4	19.74	12.79	0.0	1.5916;
151	100.2	0.0	64.31	33.49	1782.7	20.13	13.18	0.0	1.6335;
152	100.2	0.0	66.02	33.49	1747.8	20.53	13.58	0.0	1.6770;
153	100.3	0.0	67.80	33.48	1713.5	20.95	14.00	0.0	1.7222;
154	100.3	0.0	69.66	33.48	1679.9	21.36	14.44	0.0	1.7693;
155	100.3	0.0	71.59	33.48	1647.0	21.79	14.89	0.0	1.8183;
156	100.3	0.0	73.59	33.48	1614.7	22.23	15.36	0.0	1.8693;
157	100.4	0.0	75.68	33.47	1583.0	22.67	15.85	0.0	1.9223;
158	100.4	0.0	77.86	33.47	1552.0	23.13	16.35	0.0	1.9776;

159	100.4	0.0	80.12	33.47	1521.5	23.59	16.87	0.0	2.0350;
160	100.5	0.0	82.48	33.47	1491.7	24.06	17.41	0.0	2.0949;
161	100.5	0.0	84.93	33.47	1462.4	24.54	17.97	0.0	2.1572;
162	100.6	0.0	87.48	33.46	1433.8	25.03	18.55	0.0	2.2221;
163	100.6	0.0	90.14	33.46	1405.7	25.53	19.14	0.0	2.2897;
164	100.7	0.0	92.91	33.46	1378.2	26.04	19.76	0.0	2.3599; bottom hit;

Horiz plane projections in effluent direction: radius(m): 0.0; CL(m): 6.0215
Lmz(m): 6.0215
forced entrain 1 0.0 -0.209 2.360 0.996
Rate sec-1 0.0 dy-1 0.0 kt: 0.0 Amb Sal 33.3632
;
11:25:10 AM. amb fills: 4

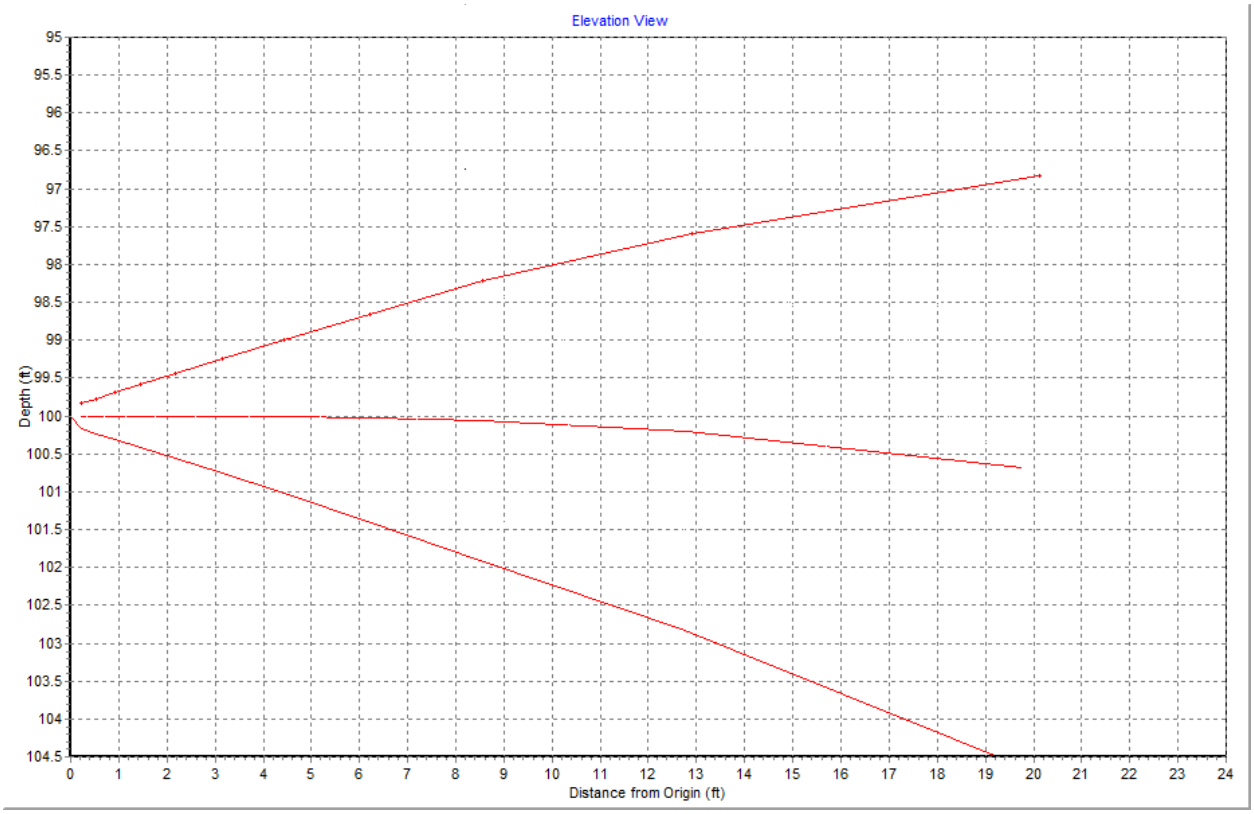


Figure C.1.1: Plumes 18b solution of discharge plume trajectories for discharges of 13 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt., and 15 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Depth of maximum rise of the plume is Z = 96.8 ft. at X_a = 20.1 ft from the point of discharge. The centerline of the plume is at an average distance of X_b = 19.76 ft from the point of discharge as the plume begins to impact the bottom at a depth of Z = 104.5 ft.

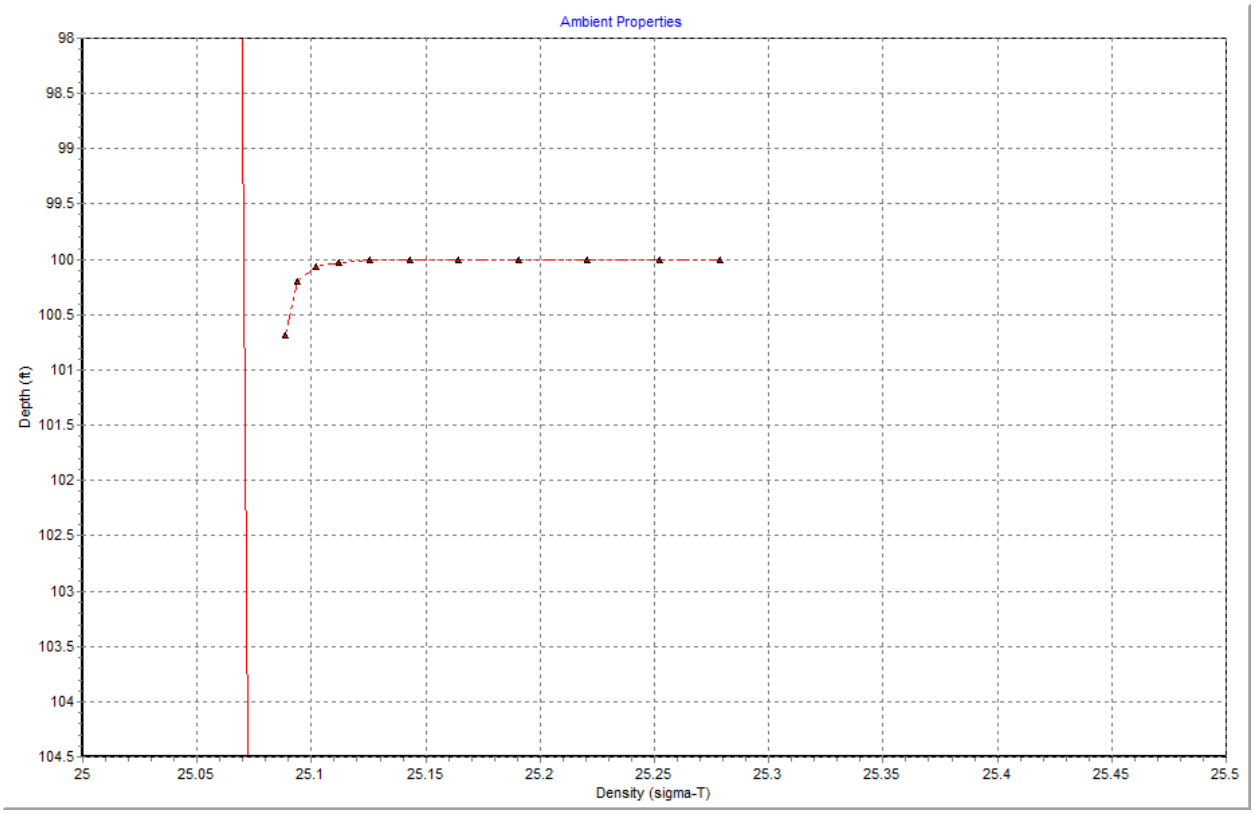


Figure C.1.2: Plumes 18b solution of vertical density profile for discharges of 13 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. and 15 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Discharge effluent density shown as black triangles. Ambient water mass density profile shown as solid red line.

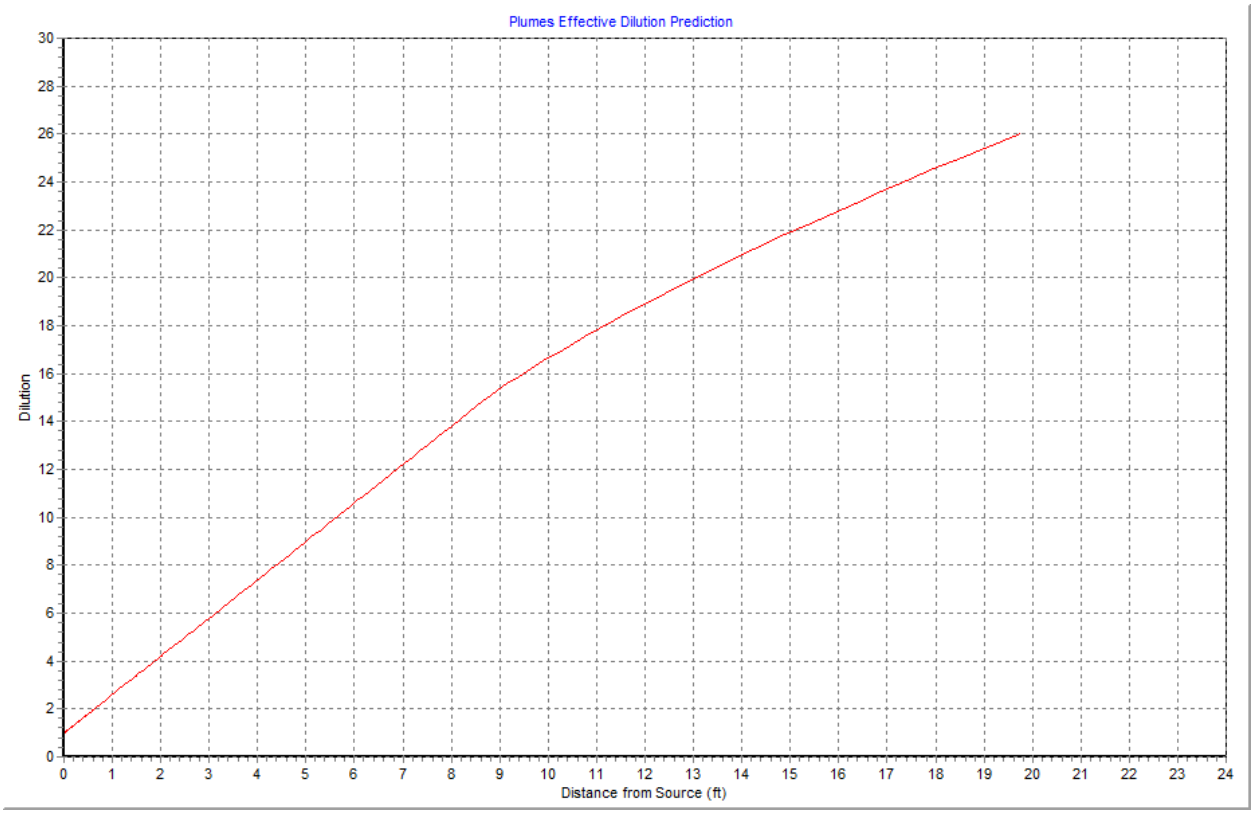


Figure C.1.3: Plumes 18b solution of effective (bulk average) dilution as a function of vertical distance from the point of discharge for discharges of 13 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. and 15 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. As the plume begins to impact the bottom, the plume centerline is at a distance of X_b = 19.76 ft from the point of discharge, where the effective dilution reaches S_a = 26.04.

C.2: Plumes 18b Results for SJCOO discharges of 8 mgd Wastewater and 15 mgd Brine:

Contents of the memo box (may not be current and must be updated manually)
Project "C:\Plumes18\SJCOO_WW8mgd_b15mgd_D-1"
memo
SJCOO discharging 8 mgd wastewater and 15 mgd brine

Model configuration items checked:
Channel width (m) 100
Start case for graphs 1
Max detailed graphs 10 (limits plots that can overflow memory)
Elevation Projection Plane (deg) 0
Shore vector (m,deg) not checked
Bacteria model : Mancini (1978) coliform model
PDS sfc. model heat transfer : Medium
Equation of State : S, T
Similarity Profile : Default profile (k=2.0, ...)
Diffuser port contraction coefficient 1
Light absorption coefficient 0.16
Farfield increment (m) 200
UM3 aspiration coefficient 0.1
Output file: text output tab
Output each ?? steps 1
Maximum dilution reported 1000
Text output format : Standard
Max vertical reversals : to max rise or fall

/ UM3. 1/14/2019 1:05:33 PM
Case 1; ambient file C:\Plumes18\SJCOO_WW8mgd_b15mgd_D-1.001.db; Diffuser table record 1: --------
---

Ambient Table:

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn	Density
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2	sigma-T
0.0	0.0	0.0	33.38	19.97	0.0	0.0	0.0	0.0	0.0003	23.55719
2.000	0.0	0.0	33.39	19.87	0.0	0.0	0.0	0.0	0.0003	23.59288
4.000	0.0	0.0	33.40	19.81	0.0	0.0	0.0	0.0	0.0003	23.61484
7.000	0.0	0.0	33.41	19.64	0.0	0.0	0.0	0.0	0.0003	23.67096
10.00	0.0	0.0	33.40	17.76	0.0	0.0	0.0	0.0	0.0003	24.12888
12.00	0.0	0.0	33.38	17.34	0.0	0.0	0.0	0.0	0.0003	24.21549
14.00	0.0	0.0	33.38	16.73	0.0	0.0	0.0	0.0	0.0003	24.35932
16.00	0.0	0.0	33.38	15.17	0.0	0.0	0.0	0.0	0.0003	24.71340
18.00	0.0	0.0	33.37	14.37	0.0	0.0	0.0	0.0	0.0003	24.87044
20.00	0.0	0.0	33.35	14.18	0.0	0.0	0.0	0.0	0.0003	24.89660
22.00	0.0	0.0	33.33	13.83	0.0	0.0	0.0	0.0	0.0003	24.95172
24.00	0.0	0.0	33.32	13.75	0.0	0.0	0.0	0.0	0.0003	24.96707
26.00	0.0	0.0	33.36	13.42	0.0	0.0	0.0	0.0	0.0003	25.06459
31.85	0.0	0.0	33.36	13.39	0.0	0.0	0.0	0.0	0.0003	25.07201

Diffuser table:

P-dia	Ver angl	H-Angle	SourceX	SourceY	Ports	MZ-dis	Isoplth	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(in)	(deg)	(deg)	(ft)	(ft)	()	(ft)	(concent)	(ft)	(MGD)	(psu)	(C)	(ppm)
3.0500	0.0	0.0	0.0	0.0	125.00	1000.0	0.0	100.00	23.000	43.690	20.660	43690.0

Simulation:

Froude No: -25.36; Strat No:-6.23E-4; Spcg No: 14.39; k: 1.71E+5; eff den (sigmaT) 31.24414; eff vel 1.710(m/s);
Current is very small, flow regime may be transient.

Step	Depth (ft)	Amb-cur (m/s)	P-dia (in)	Eff-sal (psu)	Polutnt (ppm)	Dilutn ()	x-posn (ft)	y-posn (ft)	Iso dia (m)
0	100.0	1.000E-5	3.050	43.69	43690.0	1.000	0.0	0.0	0.07747;
1	100.0	0.0	3.090	43.43	42562.8	1.026	0.0164	0.0	0.07849;
2	100.0	0.0	3.162	43.23	41723.7	1.047	0.0286	0.0	0.08031;
3	100.0	0.0	3.225	43.03	40901.2	1.068	0.0407	0.0	0.08192;
4	100.0	0.0	3.290	42.84	40095.0	1.090	0.053	0.0	0.08357;
5	100.0	0.0	3.356	42.66	39304.7	1.112	0.0656	0.0	0.08524;
6	100.0	0.0	3.423	42.48	38530.1	1.134	0.0784	0.0	0.08695;
7	100.0	0.0	3.492	42.30	37770.8	1.157	0.0914	0.0	0.08869;
8	100.0	0.0	3.562	42.12	37026.6	1.180	0.105	0.0	0.09047;
9	100.0	0.0	3.633	41.95	36297.1	1.204	0.118	0.0	0.09229;
10	100.0	0.0	3.706	41.78	35582.0	1.228	0.132	0.0	0.09414;
11	100.0	0.0	3.780	41.62	34881.1	1.253	0.146	0.0	0.09602;
12	100.0	0.0	3.856	41.46	34194.0	1.278	0.161	0.0	0.09795;
13	100.0	0.0	3.934	41.30	33520.6	1.303	0.175	0.0	0.09991;
14	100.0	0.0	4.012	41.14	32860.4	1.330	0.190	0.0	0.1019;
15	100.0	0.0	4.093	40.99	32213.3	1.356	0.206	0.0	0.1040;
16	100.0	0.0	4.175	40.84	31579.0	1.384	0.221	0.0	0.1060;
17	100.0	0.0	4.258	40.69	30957.2	1.411	0.237	0.0	0.1082;
18	100.0	0.0	4.344	40.55	30347.7	1.440	0.253	0.0	0.1103;
19	100.0	0.0	4.431	40.41	29750.3	1.469	0.270	0.0	0.1125;
20	100.0	0.0	4.520	40.27	29164.7	1.498	0.287	0.0	0.1148;
21	100.0	0.0	4.610	40.13	28590.6	1.528	0.304	0.0	0.1171;
22	100.0	0.0	4.703	40.00	28027.9	1.559	0.321	0.0	0.1194;
23	100.0	0.0	4.797	39.87	27476.3	1.590	0.339	0.0	0.1218;
24	100.0	0.0	4.893	39.74	26935.5	1.622	0.357	0.0	0.1243;
25	100.0	0.0	4.991	39.62	26405.5	1.655	0.376	0.0	0.1268;
26	100.0	0.0	5.091	39.50	25885.9	1.688	0.395	0.0	0.1293;
27	100.0	0.0	5.193	39.38	25376.6	1.722	0.414	0.0	0.1319;
28	100.0	0.0	5.297	39.26	24877.3	1.756	0.434	0.0	0.1345;
29	100.0	0.0	5.403	39.14	24387.9	1.791	0.454	0.0	0.1372;
30	100.0	0.0	5.511	39.03	23908.2	1.827	0.475	0.0	0.1400;
31	100.0	0.0	5.622	38.92	23437.9	1.864	0.496	0.0	0.1428;
32	100.0	0.0	5.734	38.81	22976.8	1.901	0.517	0.0	0.1457;
33	100.0	0.0	5.849	38.70	22524.9	1.940	0.539	0.0	0.1486;
34	100.0	0.0	5.966	38.60	22081.9	1.979	0.561	0.0	0.1515;
35	100.0	0.0	6.086	38.50	21647.7	2.018	0.583	0.0	0.1546;
36	100.0	0.0	6.208	38.39	21221.9	2.059	0.607	0.0	0.1577;
37	100.0	0.0	6.332	38.30	20804.6	2.100	0.630	0.0	0.1608;
38	100.0	0.0	6.459	38.20	20395.6	2.142	0.654	0.0	0.1641;
39	100.0	0.0	6.588	38.10	19994.5	2.185	0.678	0.0	0.1673;
40	100.0	0.0	6.720	38.01	19601.4	2.229	0.703	0.0	0.1707;
41	100.0	0.0	6.855	37.92	19216.1	2.274	0.729	0.0	0.1741;
42	100.0	0.0	6.992	37.83	18838.3	2.319	0.755	0.0	0.1776;
43	100.0	0.0	7.132	37.74	18468.0	2.366	0.781	0.0	0.1812;
44	100.0	0.0	7.275	37.66	18104.9	2.413	0.808	0.0	0.1848;
45	100.0	0.0	7.421	37.57	17749.1	2.462	0.836	0.0	0.1885;
46	100.0	0.0	7.569	37.49	17400.2	2.511	0.864	0.0	0.1923;
47	100.0	0.0	7.721	37.41	17058.2	2.561	0.892	0.0	0.1961;
48	100.0	0.0	7.875	37.33	16723.0	2.613	0.922	0.0	0.2000;
49	100.0	0.0	8.033	37.25	16394.3	2.665	0.951	0.0	0.2040;
50	100.0	0.0	8.194	37.18	16072.1	2.718	0.982	0.0	0.2081;

51	100.0	0.0	8.358	37.10	15756.3	2.773	1.013	0.0	0.2123;
52	100.0	0.0	8.525	37.03	15446.7	2.828	1.044	0.0	0.2165;
53	100.0	0.0	8.696	36.96	15143.2	2.885	1.076	0.0	0.2209;
54	100.0	0.0	8.870	36.89	14845.6	2.943	1.109	0.0	0.2253;
55	100.0	0.0	9.047	36.82	14553.9	3.002	1.143	0.0	0.2298;
56	100.0	0.0	9.229	36.75	14268.0	3.062	1.177	0.0	0.2344;
57	100.0	0.0	9.413	36.68	13987.7	3.123	1.212	0.0	0.2391;
58	100.0	0.0	9.602	36.62	13712.9	3.186	1.247	0.0	0.2439;
59	100.0	0.0	9.794	36.55	13443.5	3.250	1.283	0.0	0.2488;
60	100.0	0.0	9.990	36.49	13179.4	3.315	1.320	0.0	0.2537;
61	100.0	0.0	10.19	36.43	12920.5	3.381	1.358	0.0	0.2588;
62	100.0	0.0	10.39	36.37	12666.7	3.449	1.396	0.0	0.2640;
63	100.0	0.0	10.60	36.31	12417.9	3.518	1.435	0.0	0.2693;
64	100.0	0.0	10.81	36.25	12174.0	3.589	1.475	0.0	0.2747;
65	100.0	0.0	11.03	36.20	11934.9	3.661	1.516	0.0	0.2802;
66	100.0	0.0	11.25	36.14	11700.5	3.734	1.557	0.0	0.2858;
67	100.0	0.0	11.48	36.09	11470.7	3.809	1.599	0.0	0.2915;
68	100.0	0.0	11.71	36.03	11245.4	3.885	1.643	0.0	0.2973;
69	100.0	0.0	11.94	35.98	11024.6	3.963	1.686	0.0	0.3033;
70	100.0	0.0	12.18	35.93	10808.1	4.042	1.731	0.0	0.3093;
71	100.0	0.0	12.42	35.88	10595.8	4.123	1.777	0.0	0.3155;
72	100.0	0.0	12.67	35.83	10387.8	4.206	1.823	0.0	0.3218;
73	100.0	0.0	12.92	35.78	10183.8	4.290	1.871	0.0	0.3283;
74	100.0	0.0	13.18	35.73	9983.8	4.376	1.919	0.0	0.3348;
75	100.0	0.0	13.45	35.69	9787.8	4.464	1.969	0.0	0.3415;
76	100.0	0.0	13.71	35.64	9595.6	4.553	2.019	0.0	0.3483;
77	100.0	0.0	13.99	35.60	9407.2	4.644	2.070	0.0	0.3553;
78	100.0	0.0	14.27	35.55	9222.5	4.737	2.123	0.0	0.3624;
79	100.0	0.0	14.55	35.51	9041.5	4.832	2.176	0.0	0.3697;
80	100.0	0.0	14.84	35.47	8864.0	4.929	2.230	0.0	0.3770;
81	100.0	0.0	15.14	35.43	8689.9	5.028	2.285	0.0	0.3846;
82	100.0	0.0	15.44	35.39	8519.3	5.128	2.342	0.0	0.3923;
83	100.0	0.0	15.75	35.35	8352.1	5.231	2.399	0.0	0.4001;
84	100.0	0.0	16.07	35.31	8188.1	5.336	2.458	0.0	0.4081;
85	100.1	0.0	16.39	35.27	8027.4	5.443	2.518	0.0	0.4162;
86	100.1	0.0	16.71	35.23	7869.8	5.552	2.579	0.0	0.4245;
87	100.1	0.0	17.05	35.20	7715.3	5.663	2.641	0.0	0.4330;
88	100.1	0.0	17.39	35.16	7563.9	5.776	2.704	0.0	0.4416;
89	100.1	0.0	17.73	35.12	7415.4	5.892	2.768	0.0	0.4504;
90	100.1	0.0	18.09	35.09	7269.9	6.010	2.834	0.0	0.4594;
91	100.1	0.0	18.45	35.06	7127.2	6.130	2.901	0.0	0.4686;
92	100.1	0.0	18.82	35.02	6987.3	6.253	2.969	0.0	0.4779;
93	100.1	0.0	19.19	34.99	6850.2	6.378	3.038	0.0	0.4874;
94	100.1	0.0	19.57	34.96	6715.7	6.506	3.109	0.0	0.4971;
95	100.1	0.0	19.96	34.93	6583.9	6.636	3.181	0.0	0.5070;
96	100.1	0.0	20.36	34.90	6454.7	6.769	3.255	0.0	0.5171;
97	100.1	0.0	20.76	34.87	6328.0	6.904	3.330	0.0	0.5274;
98	100.1	0.0	21.18	34.84	6203.8	7.042	3.406	0.0	0.5379;
99	100.1	0.0	21.60	34.81	6082.1	7.183	3.483	0.0	0.5486;
100	100.1	0.0	22.03	34.78	5962.7	7.327	3.562	0.0	0.5594;
101	100.1	0.0	22.46	34.75	5845.7	7.474	3.643	0.0	0.5705;
102	100.1	0.0	22.91	34.72	5731.0	7.623	3.725	0.0	0.5819;
103	100.2	0.0	23.36	34.70	5618.5	7.776	3.808	0.0	0.5934;
104	100.2	0.0	23.82	34.67	5508.3	7.932	3.893	0.0	0.6051;
105	100.2	0.0	24.29	34.65	5400.2	8.090	3.980	0.0	0.6171;
106	100.2	0.0	24.77	34.62	5294.2	8.252	4.068	0.0	0.6293;

107	100.2	0.0	25.26	34.60	5190.3	8.418	4.157	0.0	0.6417;
108	100.2	0.0	25.76	34.57	5088.5	8.586	4.248	0.0	0.6543;
109	100.2	0.0	26.26	34.55	4990.9	8.754	4.339	0.0	0.6671;
110	100.2	0.0	26.76	34.53	4898.2	8.920	4.428	0.0	0.6797;
111	100.2	0.0	27.25	34.51	4809.9	9.083	4.516	0.0	0.6921;
112	100.3	0.0	27.73	34.49	4725.7	9.245	4.602	0.0	0.7044;
113	100.3	0.0	28.21	34.47	4645.2	9.405	4.687	0.0	0.7165;
114	100.3	0.0	28.68	34.45	4568.1	9.564	4.770	0.0	0.7284;
115	100.3	0.0	29.14	34.43	4494.2	9.721	4.852	0.0	0.7403;
116	100.3	0.0	29.61	34.41	4423.3	9.877	4.933	0.0	0.7520;
117	100.3	0.0	30.06	34.40	4355.2	10.03	5.013	0.0	0.7636;
118	100.3	0.0	30.51	34.38	4289.7	10.18	5.092	0.0	0.7750;
119	100.4	0.0	30.96	34.37	4226.6	10.34	5.170	0.0	0.7864;
120	100.4	0.0	31.40	34.35	4165.8	10.49	5.247	0.0	0.7976;
121	100.4	0.0	31.84	34.34	4107.1	10.64	5.323	0.0	0.8088;
122	100.4	0.0	32.28	34.33	4050.4	10.79	5.398	0.0	0.8198;
123	100.4	0.0	32.71	34.31	3995.5	10.93	5.472	0.0	0.8307;
124	100.4	0.0	33.13	34.30	3942.5	11.08	5.546	0.0	0.8416;
125	100.4	0.0	33.56	34.29	3891.1	11.23	5.618	0.0	0.8524;
126	100.5	0.0	33.98	34.28	3841.3	11.37	5.690	0.0	0.8631;
127	100.5	0.0	34.40	34.26	3793.0	11.52	5.761	0.0	0.8737;
128	100.5	0.0	34.81	34.25	3746.2	11.66	5.831	0.0	0.8842;
129	100.5	0.0	35.22	34.24	3700.7	11.81	5.901	0.0	0.8946;
130	100.5	0.0	35.63	34.23	3656.4	11.95	5.970	0.0	0.9050;
131	100.5	0.0	36.04	34.22	3613.4	12.09	6.038	0.0	0.9153;
132	100.6	0.0	36.44	34.21	3571.5	12.23	6.105	0.0	0.9256;
133	100.6	0.0	36.84	34.20	3530.8	12.37	6.172	0.0	0.9357;
134	100.6	0.0	37.24	34.19	3491.1	12.51	6.239	0.0	0.9459;
135	100.6	0.0	37.63	34.18	3452.4	12.66	6.305	0.0	0.9559;
136	100.6	0.0	38.03	34.17	3414.6	12.79	6.370	0.0	0.9659;
137	100.7	0.0	38.42	34.17	3377.8	12.93	6.435	0.0	0.9758;
138	100.7	0.0	38.81	34.16	3341.8	13.07	6.499	0.0	0.9857;
139	100.7	0.0	39.19	34.15	3306.7	13.21	6.563	0.0	0.9955;
140	100.7	0.0	39.58	34.14	3272.4	13.35	6.626	0.0	1.0053;
141	100.7	0.0	39.96	34.13	3238.9	13.49	6.689	0.0	1.0150;
142	100.7	0.0	40.34	34.13	3206.1	13.63	6.751	0.0	1.0247;
143	100.8	0.0	40.72	34.12	3174.0	13.76	6.813	0.0	1.0344;
144	100.8	0.0	41.10	34.11	3142.6	13.90	6.874	0.0	1.0439;
145	100.8	0.0	41.48	34.10	3111.9	14.04	6.935	0.0	1.0535;
146	100.8	0.0	41.85	34.10	3081.8	14.18	6.996	0.0	1.0630;
147	100.8	0.0	42.22	34.09	3052.3	14.31	7.056	0.0	1.0724;
148	100.9	0.0	42.59	34.08	3023.4	14.45	7.116	0.0	1.0818;
149	100.9	0.0	42.96	34.08	2995.0	14.59	7.176	0.0	1.0912;
150	100.9	0.0	43.33	34.07	2967.2	14.72	7.235	0.0	1.1005;
151	100.9	0.0	43.69	34.06	2939.9	14.86	7.294	0.0	1.1098;
152	100.9	0.0	44.06	34.06	2913.1	15.00	7.352	0.0	1.1191; merging;
153	101.0	0.0	44.42	34.05	2887.6	15.13	7.411	0.0	1.1282;
154	101.0	0.0	44.77	34.04	2863.2	15.26	7.468	0.0	1.1373;
155	101.0	0.0	45.13	34.04	2839.4	15.39	7.526	0.0	1.1463;
156	101.0	0.0	45.48	34.03	2816.3	15.51	7.583	0.0	1.1552;
157	101.1	0.0	45.83	34.03	2793.8	15.64	7.641	0.0	1.1641;
158	101.1	0.0	46.18	34.02	2771.8	15.76	7.698	0.0	1.1729;
159	101.1	0.0	46.52	34.02	2750.3	15.89	7.754	0.0	1.1817;
160	101.1	0.0	46.87	34.01	2729.3	16.01	7.811	0.0	1.1905;
161	101.1	0.0	47.22	34.01	2708.6	16.13	7.867	0.0	1.1993;
162	101.2	0.0	47.56	34.00	2688.4	16.25	7.923	0.0	1.2080;

163	101.2	0.0	47.90	34.00	2668.5	16.37	7.979	0.0	1.2167;
164	101.2	0.0	48.25	33.99	2649.0	16.49	8.035	0.0	1.2254;
165	101.2	0.0	48.59	33.99	2629.8	16.61	8.090	0.0	1.2341;
166	101.3	0.0	48.93	33.98	2610.9	16.73	8.146	0.0	1.2428;
167	101.3	0.0	49.27	33.98	2592.3	16.85	8.201	0.0	1.2515;
168	101.3	0.0	49.61	33.98	2574.1	16.97	8.256	0.0	1.2602;
169	101.3	0.0	49.95	33.97	2556.0	17.09	8.311	0.0	1.2688;
170	101.4	0.0	50.29	33.97	2538.3	17.21	8.366	0.0	1.2775;
171	101.4	0.0	50.63	33.96	2520.8	17.33	8.421	0.0	1.2861;
172	101.4	0.0	50.98	33.96	2503.5	17.45	8.475	0.0	1.2948;
173	101.5	0.0	51.32	33.95	2486.5	17.57	8.530	0.0	1.3034;
174	101.5	0.0	51.66	33.95	2469.7	17.69	8.584	0.0	1.3121;
175	101.5	0.0	52.00	33.95	2453.2	17.81	8.638	0.0	1.3208;
176	101.5	0.0	52.34	33.94	2436.8	17.93	8.692	0.0	1.3294;
177	101.6	0.0	52.68	33.94	2420.6	18.05	8.746	0.0	1.3381;
178	101.6	0.0	53.02	33.93	2404.7	18.17	8.800	0.0	1.3468;
179	101.6	0.0	53.36	33.93	2388.9	18.29	8.854	0.0	1.3555;
180	101.6	0.0	53.71	33.93	2373.3	18.41	8.908	0.0	1.3642;
181	101.7	0.0	54.05	33.92	2357.9	18.53	8.962	0.0	1.3729;
182	101.7	0.0	54.39	33.92	2342.6	18.65	9.016	0.0	1.3816;
183	101.7	0.0	54.74	33.92	2327.6	18.77	9.069	0.0	1.3903;
184	101.8	0.0	55.08	33.91	2312.6	18.89	9.123	0.0	1.3990;
185	101.8	0.0	55.42	33.91	2297.9	19.01	9.176	0.0	1.4078;
186	101.8	0.0	55.77	33.91	2283.3	19.13	9.230	0.0	1.4165;
187	101.9	0.0	56.11	33.90	2268.8	19.26	9.283	0.0	1.4253;
188	101.9	0.0	56.46	33.90	2254.5	19.38	9.337	0.0	1.4341;
189	101.9	0.0	56.81	33.90	2240.3	19.50	9.390	0.0	1.4429;
190	101.9	0.0	57.15	33.89	2226.3	19.62	9.444	0.0	1.4517;
191	102.0	0.0	57.50	33.89	2212.4	19.75	9.497	0.0	1.4605;
192	102.0	0.0	57.85	33.89	2198.6	19.87	9.550	0.0	1.4694;
193	102.0	0.0	58.20	33.88	2185.0	20.00	9.604	0.0	1.4782;
194	102.1	0.0	58.55	33.88	2171.4	20.12	9.657	0.0	1.4871;
195	102.1	0.0	58.90	33.88	2158.0	20.25	9.710	0.0	1.4960;
196	102.1	0.0	59.25	33.87	2144.7	20.37	9.763	0.0	1.5049;
197	102.2	0.0	59.60	33.87	2131.6	20.50	9.817	0.0	1.5139;
198	102.2	0.0	59.95	33.87	2118.5	20.62	9.870	0.0	1.5228;
199	102.3	0.0	60.31	33.86	2105.5	20.75	9.923	0.0	1.5318;
200	102.3	0.0	60.66	33.86	2092.7	20.88	9.977	0.0	1.5408;
201	102.3	0.0	61.02	33.86	2079.9	21.01	10.03	0.0	1.5498;
202	102.4	0.0	61.37	33.85	2067.3	21.13	10.08	0.0	1.5588;
203	102.4	0.0	61.73	33.85	2054.7	21.26	10.14	0.0	1.5679; bottom hit;

Horiz plane projections in effluent direction: radius(m): 0.0; CL(m): 3.0898
Lmz(m): 3.0898
forced entrain 1 0.0 -0.730 1.568 0.827
Rate sec-1 0.0 dy-1 0.0 kt: 0.0 Amb Sal 33.3632
;
1:05:33 PM. amb fills: 4

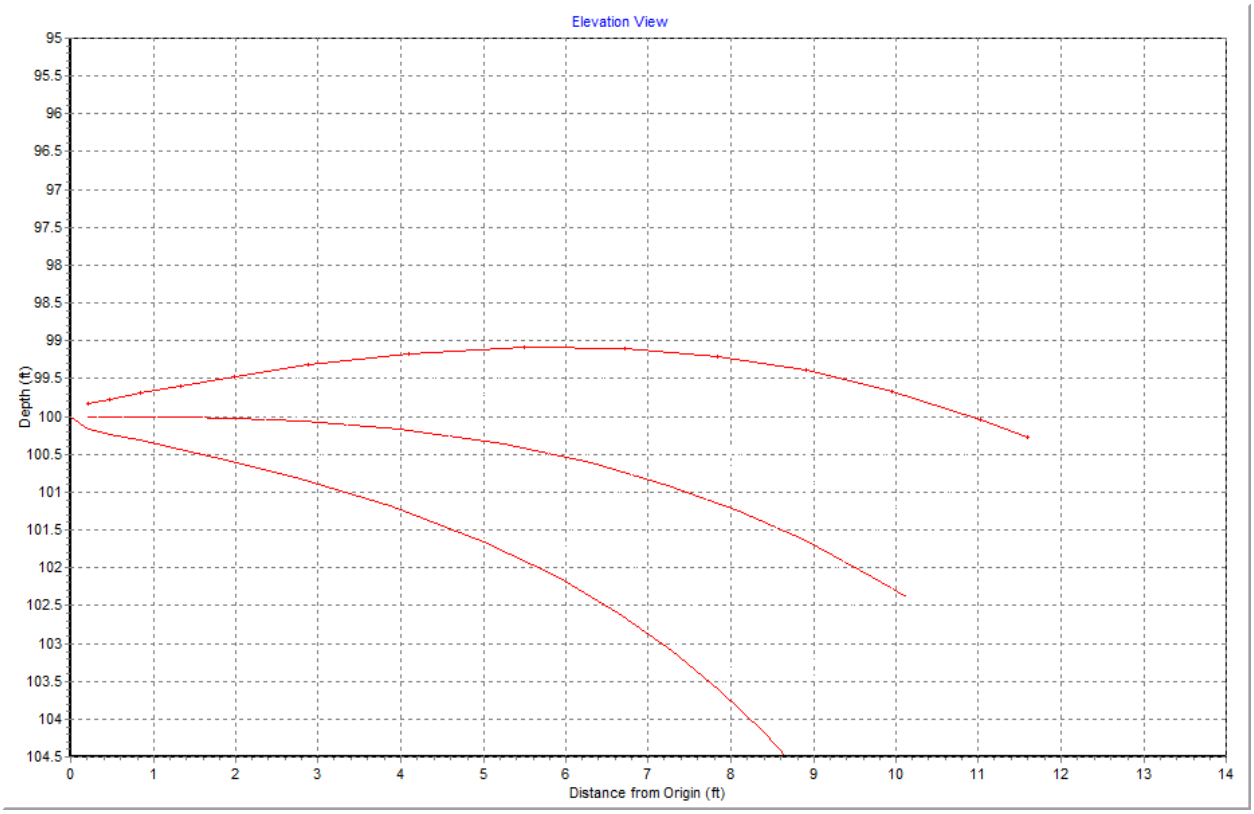


Figure C.2.1: Plumes 18b solution of discharge plume trajectories for discharges of 8 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt., and 15 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Depth of maximum rise of the plume is Z = 99.1 ft. at X_a = 6.038 ft from the point of discharge. The centerline of the plume is at an average distance of X_b = 10.14 ft from the point of discharge as the plume begins to impact the bottom at a depth of Z = 104.5 ft.

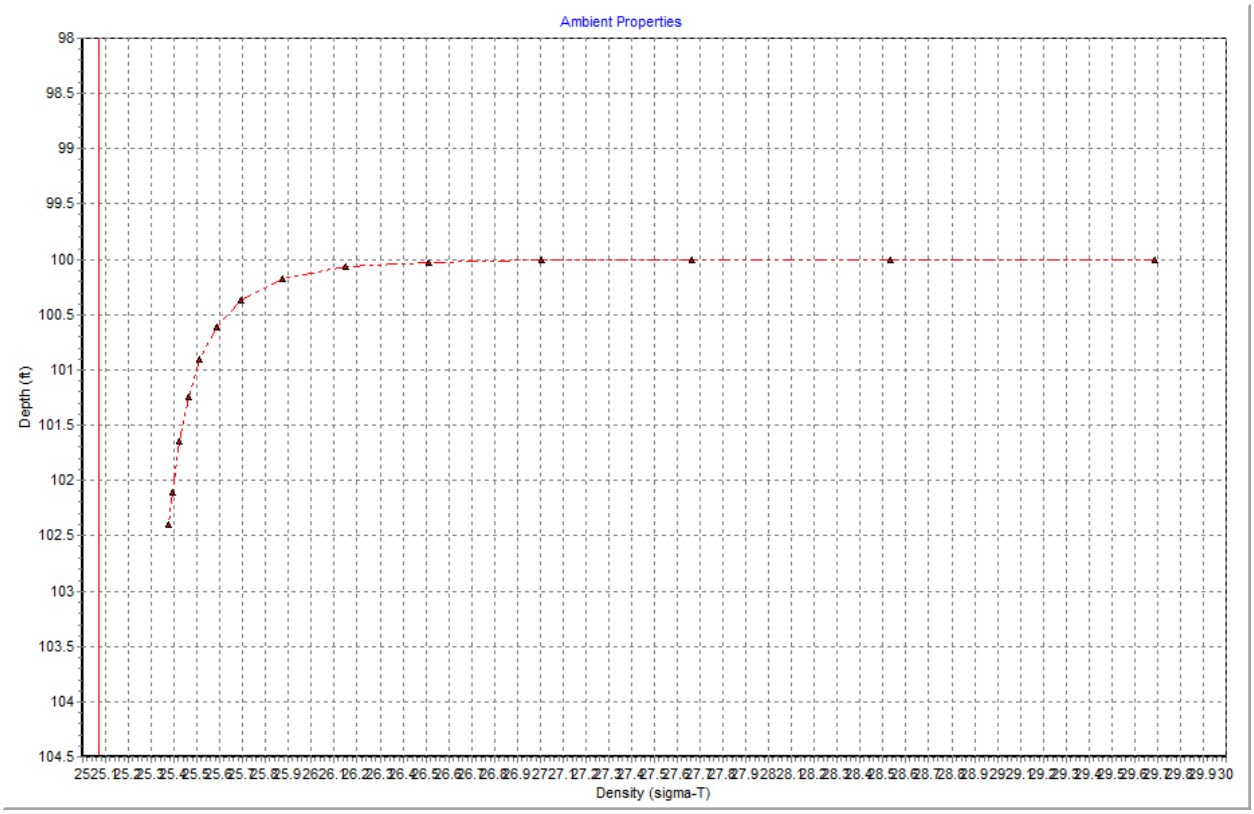


Figure C.2.2: Plumes 18b solution of vertical density profile for discharges of 8 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. and 15 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Discharge effluent density shown as black triangles. Ambient water mass density profile shown as solid red line.

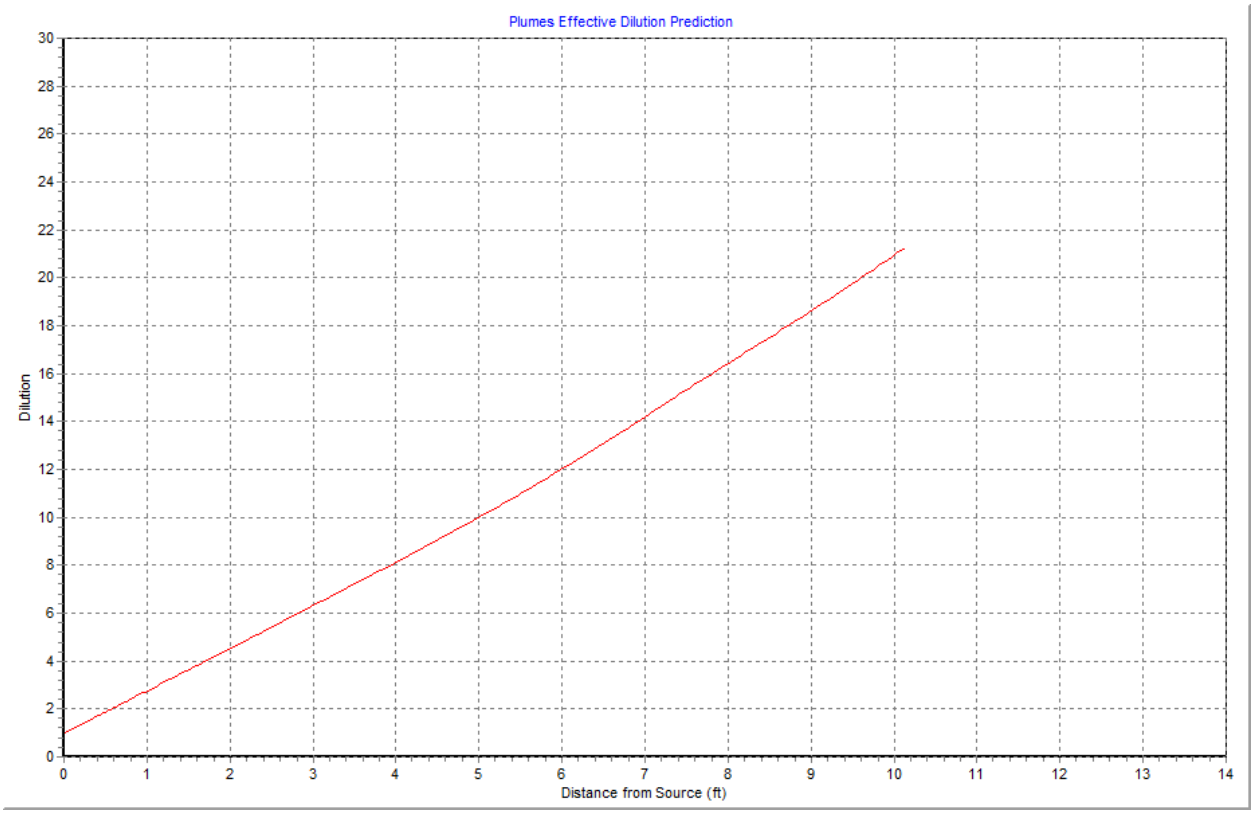


Figure C.2.3: Plumes 18b solution of effective (bulk average) dilution as a function of vertical distance from the point of discharge for discharges of 8 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. and 15 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Effective dilution is S_a = 12.09 at the maximum rise of the plume at X_a = 6.038 ft. from the point of discharge. As the plume begins to impact the bottom, the plume centerline is at a distance of X_b = 10.14 ft from the point of discharge, where the effective dilution reaches S_a = 21.26.

C.3: Plumes 18b Results for SJCOO discharges of 0 mgd Wastewater and 15 mgd Brine:

Contents of the memo box (may not be current and must be updated manually)
Project "C:\Plumes18\SJCOO_WW0mgd_b15mgd_D-1"
memo
SJCOO discharging 0 mgd wastewater and 15 mgd brine

Model configuration items checked:
Channel width (m) 100
Start case for graphs 1
Max detailed graphs 10 (limits plots that can overflow memory)
Elevation Projection Plane (deg) 0
Shore vector (m,deg) not checked
Bacteria model : Mancini (1978) coliform model
PDS sfc. model heat transfer : Medium
Equation of State : S, T
Similarity Profile : Default profile (k=2.0, ...)
Diffuser port contraction coefficient 1
Light absorption coefficient 0.16
Farfield increment (m) 200
UM3 aspiration coefficient 0.1
Output file: text output tab
Output each ?? steps 1
Maximum dilution reported 1000
Text output format : Standard
Max vertical reversals : to max rise or fall

/ UM3. 1/14/2019 1:30:39 PM
Case 1; ambient file C:\Plumes18\SJCOO_WW0mgd_b15mgd_D-1.001.db; Diffuser table record 1: ----------

Ambient Table:

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn	Density
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2	sigma-T
0.0	0.0	0.0	33.38	19.97	0.0	0.0	0.0	0.0	0.0003	23.55719
2.000	0.0	0.0	33.39	19.87	0.0	0.0	0.0	0.0	0.0003	23.59288
4.000	0.0	0.0	33.40	19.81	0.0	0.0	0.0	0.0	0.0003	23.61484
7.000	0.0	0.0	33.41	19.64	0.0	0.0	0.0	0.0	0.0003	23.67096
10.00	0.0	0.0	33.40	17.76	0.0	0.0	0.0	0.0	0.0003	24.12888
12.00	0.0	0.0	33.38	17.34	0.0	0.0	0.0	0.0	0.0003	24.21549
14.00	0.0	0.0	33.38	16.73	0.0	0.0	0.0	0.0	0.0003	24.35932
16.00	0.0	0.0	33.38	15.17	0.0	0.0	0.0	0.0	0.0003	24.71340
18.00	0.0	0.0	33.37	14.37	0.0	0.0	0.0	0.0	0.0003	24.87044
20.00	0.0	0.0	33.35	14.18	0.0	0.0	0.0	0.0	0.0003	24.89660
22.00	0.0	0.0	33.33	13.83	0.0	0.0	0.0	0.0	0.0003	24.95172
24.00	0.0	0.0	33.32	13.75	0.0	0.0	0.0	0.0	0.0003	24.96707
26.00	0.0	0.0	33.36	13.42	0.0	0.0	0.0	0.0	0.0003	25.06459
31.85	0.0	0.0	33.36	13.39	0.0	0.0	0.0	0.0	0.0003	25.07201

Diffuser table:

P-dia	Ver angl	H-Angle	SourceX	SourceY	Ports	MZ-dis	Isoplth	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(in)	(deg)	(deg)	(ft)	(ft)	()	(ft)	(concent)	(ft)	(MGD)	(psu)	(C)	(ppm)
3.0500	0.0	0.0	0.0	0.0	125.00	1000.0	0.0	100.00	15.000	67.000	20.660	67000.0

Simulation:
Froude No: -8.389; Strat No:-1.57E-4; Spcg No: 14.39; k: 1.11E+5; eff den (sigmaT) 49.48870; eff vel 1.115(m/s);
Current is very small, flow regime may be transient.

Step	Depth (ft)	Amb-cur (m/s)	P-dia (in)	Eff-sal (psu)	Polutnt (ppm)	Dilutn ()	x-posn (ft)	y-posn (ft)	Iso dia (m)
0	100.0	1.000E-5	3.050	67.00	67000.0	1.000	0.0	0.0	0.07747;
1	100.0	0.0	3.076	66.44	65862.4	1.017	0.0108	0.0	0.07814;
2	100.0	0.0	3.134	65.79	64541.7	1.038	0.0189	0.0	0.07959;
3	100.0	0.0	3.197	65.16	63248.1	1.059	0.0261	0.0	0.0812;
4	100.0	0.0	3.262	64.53	61981.0	1.081	0.0331	0.0	0.08285;
5	100.0	0.0	3.328	63.92	60739.7	1.103	0.0399	0.0	0.08452;
6	100.0	0.0	3.395	63.32	59523.8	1.126	0.0468	0.0	0.08623;
7	100.0	0.0	3.463	62.74	58332.8	1.149	0.0538	0.0	0.08797;
8	100.0	0.0	3.533	62.16	57166.1	1.172	0.0609	0.0	0.08975;
9	100.0	0.0	3.605	61.60	56023.1	1.196	0.0681	0.0	0.09156;
10	100.0	0.0	3.678	61.04	54903.4	1.220	0.0754	0.0	0.09341;
11	100.0	0.0	3.752	60.50	53806.5	1.245	0.0828	0.0	0.0953;
12	100.0	0.0	3.828	59.97	52731.9	1.271	0.0904	0.0	0.09722;
13	100.0	0.0	3.905	59.45	51679.2	1.296	0.0982	0.0	0.09918;
14	100.0	0.0	3.984	58.93	50647.8	1.323	0.106	0.0	0.1012;
15	100.0	0.0	4.064	58.43	49637.4	1.350	0.114	0.0	0.1032;
16	100.0	0.0	4.146	57.94	48647.4	1.377	0.122	0.0	0.1053;
17	100.0	0.0	4.230	57.46	47677.6	1.405	0.131	0.0	0.1074;
18	100.0	0.0	4.315	56.99	46727.3	1.434	0.139	0.0	0.1096;
19	100.0	0.0	4.402	56.52	45796.3	1.463	0.148	0.0	0.1118;
20	100.0	0.0	4.491	56.07	44884.2	1.493	0.157	0.0	0.1141;
21	100.0	0.0	4.581	55.62	43990.5	1.523	0.165	0.0	0.1164;
22	100.0	0.0	4.674	55.19	43114.8	1.554	0.175	0.0	0.1187;
23	100.0	0.0	4.768	54.76	42256.8	1.586	0.184	0.0	0.1211;
24	100.0	0.0	4.864	54.34	41416.1	1.618	0.193	0.0	0.1235;
25	100.0	0.0	4.962	53.93	40592.4	1.651	0.203	0.0	0.1260;
26	100.0	0.0	5.062	53.53	39785.3	1.684	0.213	0.0	0.1286;
27	100.0	0.0	5.163	53.13	38994.5	1.718	0.223	0.0	0.1312;
28	100.0	0.0	5.267	52.74	38219.5	1.753	0.233	0.0	0.1338;
29	100.0	0.0	5.373	52.36	37460.2	1.789	0.244	0.0	0.1365;
30	100.0	0.0	5.482	51.99	36716.2	1.825	0.254	0.0	0.1392;
31	100.0	0.0	5.592	51.62	35987.1	1.862	0.265	0.0	0.1420;
32	100.0	0.0	5.704	51.27	35272.7	1.899	0.276	0.0	0.1449;
33	100.0	0.0	5.819	50.92	34572.6	1.938	0.287	0.0	0.1478;
34	100.0	0.0	5.936	50.57	33886.5	1.977	0.299	0.0	0.1508;
35	100.0	0.0	6.055	50.23	33214.3	2.017	0.311	0.0	0.1538;
36	100.0	0.0	6.177	49.90	32555.5	2.058	0.322	0.0	0.1569;
37	100.0	0.0	6.301	49.58	31910.0	2.100	0.335	0.0	0.1601;
38	100.0	0.0	6.428	49.26	31277.3	2.142	0.347	0.0	0.1633;
39	100.0	0.0	6.557	48.95	30657.4	2.185	0.360	0.0	0.1665;
40	100.0	0.0	6.689	48.64	30049.8	2.230	0.372	0.0	0.1699;
41	100.0	0.0	6.823	48.34	29454.5	2.275	0.385	0.0	0.1733;
42	100.0	0.0	6.960	48.05	28871.0	2.321	0.399	0.0	0.1768;
43	100.0	0.0	7.100	47.76	28299.2	2.368	0.412	0.0	0.1803;
44	100.0	0.0	7.242	47.48	27738.9	2.415	0.426	0.0	0.1840;
45	100.0	0.0	7.387	47.20	27189.7	2.464	0.440	0.0	0.1876;
46	100.0	0.0	7.536	46.93	26651.5	2.514	0.455	0.0	0.1914;
47	100.0	0.0	7.687	46.67	26124.1	2.565	0.469	0.0	0.1952;
48	100.0	0.0	7.841	46.41	25607.2	2.616	0.484	0.0	0.1992;
49	100.0	0.0	7.998	46.15	25100.6	2.669	0.499	0.0	0.2031;

50	100.0	0.0	8.158	45.90	24604.1	2.723	0.515	0.0	0.2072;
51	100.0	0.0	8.321	45.65	24117.5	2.778	0.530	0.0	0.2114;
52	100.0	0.0	8.488	45.41	23640.7	2.834	0.546	0.0	0.2156;
53	100.0	0.0	8.658	45.18	23173.3	2.891	0.563	0.0	0.2199;
54	100.0	0.0	8.831	44.94	22715.2	2.950	0.579	0.0	0.2243;
55	100.0	0.0	9.008	44.72	22266.3	3.009	0.596	0.0	0.2288;
56	100.0	0.0	9.188	44.49	21826.3	3.070	0.614	0.0	0.2334;
57	100.0	0.0	9.371	44.28	21395.1	3.132	0.631	0.0	0.2380;
58	100.0	0.0	9.558	44.06	20972.4	3.195	0.649	0.0	0.2428;
59	100.0	0.0	9.749	43.85	20558.2	3.259	0.667	0.0	0.2476;
60	100.0	0.0	9.943	43.65	20152.2	3.325	0.686	0.0	0.2526;
61	100.0	0.0	10.14	43.44	19754.2	3.392	0.705	0.0	0.2576;
62	100.0	0.0	10.34	43.25	19364.2	3.460	0.724	0.0	0.2627;
63	100.0	0.0	10.55	43.05	18981.9	3.530	0.744	0.0	0.2680;
64	100.0	0.0	10.76	42.86	18607.3	3.601	0.764	0.0	0.2733;
65	100.0	0.0	10.97	42.68	18240.0	3.673	0.784	0.0	0.2787;
66	100.0	0.0	11.19	42.49	17880.1	3.747	0.805	0.0	0.2843;
67	100.0	0.0	11.41	42.32	17527.3	3.823	0.826	0.0	0.2899;
68	100.0	0.0	11.64	42.14	17181.5	3.900	0.848	0.0	0.2956;
69	100.0	0.0	11.87	41.97	16842.6	3.978	0.870	0.0	0.3015;
70	100.0	0.0	12.10	41.80	16510.4	4.058	0.892	0.0	0.3074;
71	100.0	0.0	12.34	41.64	16196.3	4.137	0.914	0.0	0.3134;
72	100.1	0.0	12.57	41.49	15893.1	4.216	0.936	0.0	0.3193;
73	100.1	0.0	12.80	41.34	15600.4	4.295	0.957	0.0	0.3252;
74	100.1	0.0	13.04	41.19	15317.3	4.374	0.978	0.0	0.3312;
75	100.1	0.0	13.27	41.05	15043.5	4.454	0.998	0.0	0.3371;
76	100.1	0.0	13.51	40.92	14778.4	4.534	1.018	0.0	0.3430;
77	100.1	0.0	13.74	40.79	14521.5	4.614	1.038	0.0	0.3490;
78	100.1	0.0	13.98	40.66	14272.5	4.694	1.058	0.0	0.3550;
79	100.1	0.0	14.21	40.54	14030.9	4.775	1.077	0.0	0.3610;
80	100.1	0.0	14.45	40.42	13796.4	4.856	1.096	0.0	0.3670;
81	100.1	0.0	14.68	40.30	13568.7	4.938	1.114	0.0	0.3730;
82	100.1	0.0	14.92	40.19	13347.4	5.020	1.133	0.0	0.3790;
83	100.1	0.0	15.16	40.08	13132.2	5.102	1.151	0.0	0.3851;
84	100.1	0.0	15.40	39.97	12922.9	5.185	1.169	0.0	0.3912;
85	100.1	0.0	15.64	39.87	12719.2	5.268	1.186	0.0	0.3972;
86	100.1	0.0	15.88	39.77	12520.9	5.351	1.204	0.0	0.4034;
87	100.1	0.0	16.12	39.67	12327.7	5.435	1.221	0.0	0.4095;
88	100.1	0.0	16.36	39.58	12139.4	5.519	1.238	0.0	0.4156;
89	100.1	0.0	16.61	39.48	11955.9	5.604	1.255	0.0	0.4218;
90	100.1	0.0	16.85	39.39	11776.9	5.689	1.271	0.0	0.4280;
91	100.1	0.0	17.10	39.30	11602.3	5.775	1.287	0.0	0.4342;
92	100.1	0.0	17.34	39.21	11431.9	5.861	1.303	0.0	0.4405;
93	100.1	0.0	17.59	39.13	11265.6	5.947	1.319	0.0	0.4467;
94	100.1	0.0	17.83	39.05	11103.2	6.034	1.335	0.0	0.4530;
95	100.1	0.0	18.08	38.97	10944.5	6.122	1.350	0.0	0.4593;
96	100.1	0.0	18.33	38.89	10789.5	6.210	1.366	0.0	0.4656;
97	100.1	0.0	18.58	38.81	10637.9	6.298	1.381	0.0	0.4720;
98	100.1	0.0	18.83	38.73	10489.8	6.387	1.396	0.0	0.4783;
99	100.1	0.0	19.08	38.66	10344.9	6.477	1.411	0.0	0.4847;
100	100.2	0.0	19.34	38.59	10203.2	6.567	1.425	0.0	0.4911;
101	100.2	0.0	19.59	38.52	10064.5	6.657	1.440	0.0	0.4976;
102	100.2	0.0	19.84	38.45	9928.9	6.748	1.454	0.0	0.5040;
103	100.2	0.0	20.10	38.38	9796.0	6.840	1.468	0.0	0.5105;
104	100.2	0.0	20.35	38.31	9666.0	6.932	1.482	0.0	0.5170;
105	100.2	0.0	20.61	38.25	9538.7	7.024	1.496	0.0	0.5235;

106	100.2	0.0	20.87	38.19	9413.9	7.117	1.510	0.0	0.5301;
107	100.2	0.0	21.13	38.12	9291.7	7.211	1.523	0.0	0.5366;
108	100.2	0.0	21.39	38.06	9172.0	7.305	1.537	0.0	0.5432;
109	100.2	0.0	21.65	38.00	9054.7	7.399	1.550	0.0	0.5498;
110	100.2	0.0	21.91	37.94	8939.7	7.495	1.563	0.0	0.5565;
111	100.2	0.0	22.17	37.89	8827.0	7.590	1.577	0.0	0.5631;
112	100.2	0.0	22.43	37.83	8716.4	7.687	1.590	0.0	0.5698;
113	100.2	0.0	22.70	37.77	8608.0	7.783	1.602	0.0	0.5765;
114	100.2	0.0	22.96	37.72	8501.7	7.881	1.615	0.0	0.5832;
115	100.2	0.0	23.23	37.67	8397.4	7.979	1.628	0.0	0.5899;
116	100.2	0.0	23.49	37.61	8295.1	8.077	1.640	0.0	0.5967;
117	100.2	0.0	23.76	37.56	8194.7	8.176	1.653	0.0	0.6035;
118	100.2	0.0	24.03	37.51	8096.1	8.276	1.665	0.0	0.6103;
119	100.2	0.0	24.29	37.46	7999.4	8.376	1.677	0.0	0.6171;
120	100.2	0.0	24.56	37.41	7904.5	8.476	1.689	0.0	0.6239;
121	100.2	0.0	24.83	37.37	7811.3	8.577	1.701	0.0	0.6307;
122	100.3	0.0	25.10	37.32	7719.8	8.679	1.713	0.0	0.6376;
123	100.3	0.0	25.37	37.27	7630.0	8.781	1.725	0.0	0.6445;
124	100.3	0.0	25.64	37.23	7541.8	8.884	1.737	0.0	0.6514;
125	100.3	0.0	25.92	37.18	7455.1	8.987	1.748	0.0	0.6583;
126	100.3	0.0	26.19	37.14	7370.0	9.091	1.760	0.0	0.6652;
127	100.3	0.0	26.46	37.10	7286.4	9.195	1.771	0.0	0.6721;
128	100.3	0.0	26.74	37.06	7204.2	9.300	1.783	0.0	0.6791;
129	100.3	0.0	27.01	37.02	7123.5	9.406	1.794	0.0	0.6860;
130	100.3	0.0	27.28	36.97	7044.2	9.511	1.805	0.0	0.6930;
131	100.3	0.0	27.56	36.93	6966.2	9.618	1.816	0.0	0.7000;
132	100.3	0.0	27.83	36.90	6889.6	9.725	1.827	0.0	0.7070;
133	100.3	0.0	28.11	36.86	6814.3	9.832	1.838	0.0	0.7140;
134	100.3	0.0	28.39	36.82	6740.3	9.940	1.849	0.0	0.7210;
135	100.3	0.0	28.66	36.78	6667.5	10.05	1.860	0.0	0.7281;
136	100.3	0.0	28.94	36.75	6596.0	10.16	1.871	0.0	0.7351;
137	100.3	0.0	29.22	36.71	6525.6	10.27	1.882	0.0	0.7421;
138	100.3	0.0	29.49	36.67	6457.2	10.38	1.892	0.0	0.7491; begin overlap;
139	100.3	0.0	29.77	36.64	6390.8	10.48	1.903	0.0	0.7561;
140	100.3	0.0	30.04	36.61	6326.2	10.59	1.914	0.0	0.7629;
141	100.3	0.0	30.30	36.58	6263.3	10.70	1.924	0.0	0.7696;
142	100.4	0.0	30.56	36.54	6202.2	10.80	1.935	0.0	0.7763;
143	100.4	0.0	30.82	36.51	6142.6	10.91	1.945	0.0	0.7828;
144	100.4	0.0	31.08	36.48	6084.5	11.01	1.955	0.0	0.7893;
145	100.4	0.0	31.33	36.45	6027.9	11.12	1.966	0.0	0.7957;
146	100.4	0.0	31.58	36.43	5972.6	11.22	1.976	0.0	0.8021;
147	100.4	0.0	31.82	36.40	5918.6	11.32	1.986	0.0	0.8083;
148	100.4	0.0	32.07	36.37	5865.9	11.42	1.997	0.0	0.8145;
149	100.4	0.0	32.31	36.35	5814.3	11.52	2.007	0.0	0.8206;
150	100.4	0.0	32.55	36.32	5763.9	11.62	2.017	0.0	0.8267;
151	100.4	0.0	32.78	36.29	5714.6	11.72	2.027	0.0	0.8327;
152	100.4	0.0	33.02	36.27	5666.4	11.82	2.037	0.0	0.8386;
153	100.4	0.0	33.25	36.25	5619.1	11.92	2.047	0.0	0.8445;
154	100.4	0.0	33.47	36.22	5572.8	12.02	2.057	0.0	0.8502;
155	100.4	0.0	33.70	36.20	5527.4	12.12	2.067	0.0	0.8560;
156	100.4	0.0	33.92	36.18	5482.9	12.22	2.077	0.0	0.8617;
157	100.4	0.0	34.15	36.15	5439.2	12.32	2.087	0.0	0.8673;
158	100.4	0.0	34.36	36.13	5396.4	12.42	2.097	0.0	0.8729;
159	100.5	0.0	34.58	36.11	5354.3	12.51	2.107	0.0	0.8784;
160	100.5	0.0	34.80	36.09	5313.0	12.61	2.117	0.0	0.8838;
161	100.5	0.0	35.01	36.07	5272.4	12.71	2.127	0.0	0.8893;

162	100.5	0.0	35.22	36.05	5232.5	12.80	2.137	0.0	0.8946;
163	100.5	0.0	35.43	36.03	5193.3	12.90	2.147	0.0	0.8999;
164	100.5	0.0	35.64	36.01	5154.7	13.00	2.157	0.0	0.9052;
165	100.5	0.0	35.84	35.99	5116.8	13.09	2.167	0.0	0.9104;
166	100.5	0.0	36.05	35.97	5079.4	13.19	2.176	0.0	0.9156;
167	100.5	0.0	36.25	35.95	5042.7	13.29	2.186	0.0	0.9207;
168	100.5	0.0	36.45	35.93	5006.5	13.38	2.196	0.0	0.9258;
169	100.5	0.0	36.65	35.91	4970.8	13.48	2.206	0.0	0.9308;
170	100.5	0.0	36.84	35.90	4935.7	13.57	2.216	0.0	0.9358;
171	100.5	0.0	37.04	35.88	4901.1	13.67	2.226	0.0	0.9408;
172	100.5	0.0	37.23	35.86	4867.0	13.77	2.236	0.0	0.9457;
173	100.6	0.0	37.43	35.84	4833.3	13.86	2.246	0.0	0.9506;
174	100.6	0.0	37.62	35.83	4800.1	13.96	2.255	0.0	0.9554;
175	100.6	0.0	37.80	35.81	4767.3	14.05	2.265	0.0	0.9602;
176	100.6	0.0	37.99	35.79	4735.0	14.15	2.275	0.0	0.9650;
177	100.6	0.0	38.18	35.78	4703.1	14.25	2.285	0.0	0.9697;
178	100.6	0.0	38.36	35.76	4671.6	14.34	2.295	0.0	0.9744;
179	100.6	0.0	38.55	35.74	4640.5	14.44	2.305	0.0	0.9791;
180	100.6	0.0	38.73	35.73	4609.7	14.53	2.315	0.0	0.9837;
181	100.6	0.0	38.91	35.71	4579.3	14.63	2.325	0.0	0.9883;
182	100.6	0.0	39.09	35.70	4549.3	14.73	2.335	0.0	0.9929;
183	100.6	0.0	39.27	35.68	4519.6	14.82	2.345	0.0	0.9974;
184	100.6	0.0	39.45	35.67	4490.2	14.92	2.355	0.0	1.0019;
185	100.6	0.0	39.62	35.65	4461.2	15.02	2.365	0.0	1.0064;
186	100.7	0.0	39.80	35.64	4432.4	15.12	2.375	0.0	1.0108;
187	100.7	0.0	39.97	35.62	4404.0	15.21	2.385	0.0	1.0153;
188	100.7	0.0	40.14	35.61	4375.8	15.31	2.395	0.0	1.0196;
189	100.7	0.0	40.31	35.59	4348.0	15.41	2.405	0.0	1.0240;
190	100.7	0.0	40.49	35.58	4320.4	15.51	2.415	0.0	1.0283;
191	100.7	0.0	40.66	35.57	4293.0	15.61	2.425	0.0	1.0326;
192	100.7	0.0	40.82	35.55	4266.0	15.71	2.435	0.0	1.0369;
193	100.7	0.0	40.99	35.54	4239.1	15.81	2.445	0.0	1.0412;
194	100.7	0.0	41.16	35.53	4212.5	15.90	2.455	0.0	1.0454;
195	100.7	0.0	41.32	35.51	4186.2	16.01	2.466	0.0	1.0496;
196	100.7	0.0	41.49	35.50	4160.0	16.11	2.476	0.0	1.0538;
197	100.8	0.0	41.65	35.48	4134.1	16.21	2.486	0.0	1.0580;
198	100.8	0.0	41.82	35.47	4108.4	16.31	2.497	0.0	1.0621;
199	100.8	0.0	41.98	35.46	4082.9	16.41	2.507	0.0	1.0663;
200	100.8	0.0	42.14	35.45	4057.5	16.51	2.517	0.0	1.0704;
201	100.8	0.0	42.30	35.43	4032.4	16.62	2.528	0.0	1.0745;
202	100.8	0.0	42.46	35.42	4007.4	16.72	2.538	0.0	1.0785;
203	100.8	0.0	42.62	35.41	3982.7	16.82	2.549	0.0	1.0826;
204	100.8	0.0	42.78	35.39	3958.0	16.93	2.559	0.0	1.0866;
205	100.8	0.0	42.94	35.38	3933.6	17.03	2.570	0.0	1.0907;
206	100.8	0.0	43.10	35.37	3909.3	17.14	2.580	0.0	1.0947;
207	100.9	0.0	43.26	35.36	3885.2	17.25	2.591	0.0	1.0987;
208	100.9	0.0	43.41	35.35	3861.2	17.35	2.602	0.0	1.1027;
209	100.9	0.0	43.57	35.33	3837.3	17.46	2.612	0.0	1.1067;
210	100.9	0.0	43.73	35.32	3813.6	17.57	2.623	0.0	1.1106;
211	100.9	0.0	43.88	35.31	3790.0	17.68	2.634	0.0	1.1146;
212	100.9	0.0	44.04	35.30	3766.5	17.79	2.645	0.0	1.1185; merging;
213	100.9	0.0	44.19	35.28	3743.3	17.90	2.656	0.0	1.1225;
214	100.9	0.0	44.35	35.27	3720.2	18.01	2.667	0.0	1.1265;
215	101.0	0.0	44.51	35.26	3697.3	18.12	2.678	0.0	1.1305;
216	101.0	0.0	44.67	35.25	3674.5	18.23	2.689	0.0	1.1345;
217	101.0	0.0	44.82	35.24	3651.8	18.35	2.700	0.0	1.1385;

218	101.0	0.0	44.98	35.23	3629.2	18.46	2.711	0.0	1.1426;
219	101.0	0.0	45.14	35.21	3606.7	18.58	2.722	0.0	1.1467;
220	101.0	0.0	45.31	35.20	3584.2	18.69	2.734	0.0	1.1508;
221	101.0	0.0	45.47	35.19	3561.9	18.81	2.745	0.0	1.1549;
222	101.0	0.0	45.63	35.18	3539.5	18.93	2.756	0.0	1.1590;
223	101.1	0.0	45.79	35.17	3517.3	19.05	2.768	0.0	1.1631;
224	101.1	0.0	45.96	35.16	3495.1	19.17	2.779	0.0	1.1673;
225	101.1	0.0	46.12	35.15	3473.0	19.29	2.791	0.0	1.1715;
226	101.1	0.0	46.29	35.13	3450.9	19.42	2.803	0.0	1.1757;
227	101.1	0.0	46.46	35.12	3428.8	19.54	2.814	0.0	1.1800;
228	101.1	0.0	46.62	35.11	3406.8	19.67	2.826	0.0	1.1843;
229	101.1	0.0	46.79	35.10	3384.9	19.79	2.838	0.0	1.1885;
230	101.2	0.0	46.96	35.09	3363.2	19.92	2.850	0.0	1.1928; end overlap;
231	101.2	0.0	47.13	35.08	3341.8	20.05	2.862	0.0	1.1970;
232	101.2	0.0	47.29	35.07	3320.6	20.18	2.874	0.0	1.2012;
233	101.2	0.0	47.45	35.06	3299.6	20.31	2.887	0.0	1.2053;
234	101.2	0.0	47.61	35.05	3278.8	20.43	2.899	0.0	1.2094;
235	101.2	0.0	47.77	35.04	3258.2	20.56	2.911	0.0	1.2134;
236	101.3	0.0	47.93	35.03	3237.7	20.69	2.924	0.0	1.2174;
237	101.3	0.0	48.08	35.02	3217.5	20.82	2.936	0.0	1.2213;
238	101.3	0.0	48.23	35.00	3197.5	20.95	2.949	0.0	1.2252;
239	101.3	0.0	48.39	34.99	3177.6	21.08	2.962	0.0	1.2290;
240	101.3	0.0	48.53	34.98	3158.0	21.22	2.975	0.0	1.2327;
241	101.4	0.0	48.68	34.97	3138.4	21.35	2.988	0.0	1.2364;
242	101.4	0.0	48.82	34.96	3119.1	21.48	3.001	0.0	1.2401;
243	101.4	0.0	48.96	34.95	3099.9	21.61	3.014	0.0	1.2437;
244	101.4	0.0	49.10	34.95	3080.9	21.75	3.027	0.0	1.2472;
245	101.4	0.0	49.24	34.94	3062.1	21.88	3.040	0.0	1.2507;
246	101.5	0.0	49.37	34.93	3043.4	22.02	3.054	0.0	1.2541;
247	101.5	0.0	49.51	34.92	3024.8	22.15	3.068	0.0	1.2575;
248	101.5	0.0	49.64	34.91	3006.4	22.29	3.081	0.0	1.2608;
249	101.5	0.0	49.76	34.90	2988.1	22.42	3.095	0.0	1.2640;
250	101.5	0.0	49.89	34.89	2970.0	22.56	3.109	0.0	1.2672;
251	101.6	0.0	50.01	34.88	2951.9	22.70	3.124	0.0	1.2703;
252	101.6	0.0	50.13	34.87	2934.0	22.84	3.138	0.0	1.2734;
253	101.6	0.0	50.25	34.86	2916.2	22.97	3.152	0.0	1.2764;
254	101.6	0.0	50.37	34.85	2898.5	23.12	3.167	0.0	1.2794;
255	101.7	0.0	50.48	34.84	2881.0	23.26	3.182	0.0	1.2823;
256	101.7	0.0	50.60	34.83	2863.5	23.40	3.197	0.0	1.2851;
257	101.7	0.0	50.71	34.82	2846.1	23.54	3.212	0.0	1.2879;
258	101.7	0.0	50.81	34.82	2828.8	23.68	3.227	0.0	1.2907;
259	101.8	0.0	50.92	34.81	2811.6	23.83	3.242	0.0	1.2934;
260	101.8	0.0	51.02	34.80	2794.4	23.98	3.258	0.0	1.2960;
261	101.8	0.0	51.12	34.79	2777.4	24.12	3.274	0.0	1.2986;
262	101.9	0.0	51.22	34.78	2760.4	24.27	3.290	0.0	1.3011;
263	101.9	0.0	51.32	34.77	2743.4	24.42	3.306	0.0	1.3036;
264	101.9	0.0	51.42	34.76	2726.5	24.57	3.322	0.0	1.3060;
265	102.0	0.0	51.51	34.75	2709.6	24.73	3.339	0.0	1.3084;
266	102.0	0.0	51.61	34.75	2692.8	24.88	3.356	0.0	1.3108;
267	102.0	0.0	51.70	34.74	2676.0	25.04	3.373	0.0	1.3131;
268	102.1	0.0	51.79	34.73	2659.3	25.19	3.390	0.0	1.3154;
269	102.1	0.0	51.87	34.72	2642.5	25.35	3.407	0.0	1.3176;
270	102.1	0.0	51.96	34.71	2625.8	25.52	3.425	0.0	1.3198;
271	102.2	0.0	52.05	34.70	2609.0	25.68	3.443	0.0	1.3220;
272	102.2	0.0	52.13	34.69	2592.3	25.85	3.461	0.0	1.3242;
273	102.2	0.0	52.22	34.69	2575.5	26.01	3.479	0.0	1.3263;

274	102.3	0.0	52.30	34.68	2558.7	26.18	3.498	0.0	1.3284;
275	102.3	0.0	52.38	34.67	2541.9	26.36	3.517	0.0	1.3305;
276	102.4	0.0	52.47	34.66	2525.1	26.53	3.536	0.0	1.3326;
277	102.4	0.0	52.55	34.65	2508.2	26.71	3.556	0.0	1.3347;
278	102.5	0.0	52.63	34.64	2491.2	26.89	3.575	0.0	1.3368;
279	102.5	0.0	52.71	34.63	2474.2	27.08	3.595	0.0	1.3389;
280	102.5	0.0	52.80	34.63	2457.1	27.27	3.616	0.0	1.3410;
281	102.6	0.0	52.88	34.62	2440.0	27.46	3.636	0.0	1.3431;
282	102.6	0.0	52.96	34.61	2422.7	27.66	3.657	0.0	1.3452;
283	102.7	0.0	53.05	34.60	2405.3	27.85	3.679	0.0	1.3474;
284	102.8	0.0	53.13	34.59	2387.8	28.06	3.701	0.0	1.3496;
285	102.8	0.0	53.22	34.58	2370.2	28.27	3.723	0.0	1.3518;
286	102.9	0.0	53.31	34.57	2352.5	28.48	3.745	0.0	1.3541;
287	102.9	0.0	53.40	34.56	2334.6	28.70	3.768	0.0	1.3564;
288	103.0	0.0	53.50	34.55	2316.6	28.92	3.791	0.0	1.3588;
289	103.0	0.0	53.59	34.54	2298.4	29.15	3.815	0.0	1.3613;
290	103.1	0.0	53.69	34.53	2280.1	29.38	3.839	0.0	1.3638;
291	103.2	0.0	53.80	34.52	2261.5	29.63	3.863	0.0	1.3664;
292	103.2	0.0	53.90	34.52	2242.8	29.87	3.888	0.0	1.3692;
293	103.3	0.0	54.02	34.51	2223.9	30.13	3.913	0.0	1.3720;
294	103.4	0.0	54.13	34.50	2204.7	30.39	3.939	0.0	1.3750;
295	103.5	0.0	54.25	34.49	2185.3	30.66	3.966	0.0	1.3780;
296	103.5	0.0	54.38	34.48	2165.7	30.94	3.992	0.0	1.3813;
297	103.6	0.0	54.51	34.47	2145.8	31.22	4.020	0.0	1.3846;
298	103.7	0.0	54.65	34.45	2125.7	31.52	4.048	0.0	1.3882;
299	103.8	0.0	54.80	34.44	2105.3	31.83	4.076	0.0	1.3919; bottom hit;

Horiz plane projections in effluent direction: radius(m): 0.0; CL(m): 1.2424
Lmz(m): 1.2424
forced entrain 1 0.0 -1.159 1.392 0.312
Rate sec-1 0.0 dy-1 0.0 kt: 0.0 Amb Sal 33.3632
;
1:30:39 PM. amb fills: 4

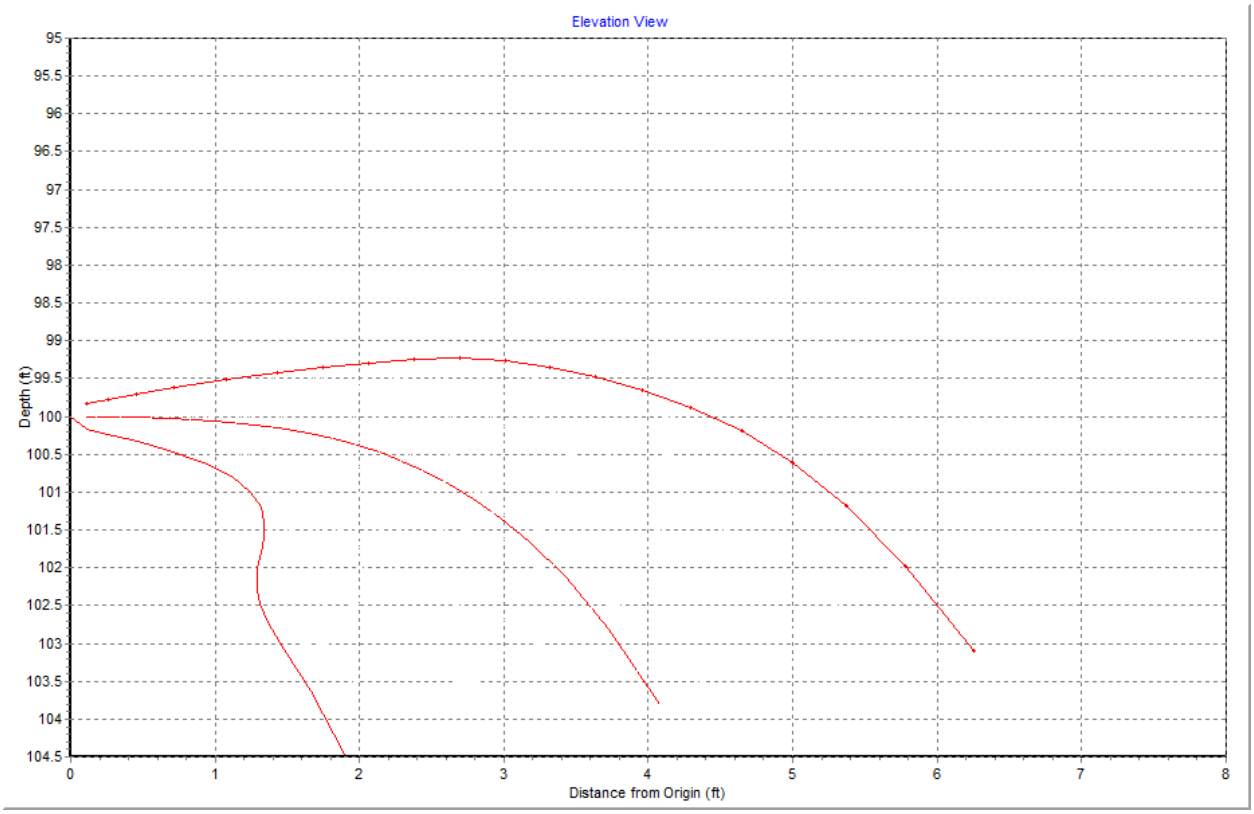


Figure C.3.1: Plumes 18b solution of discharge plume trajectories for discharges of 0 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt., and 15 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Depth of maximum rise of the plume is Z = 99.2 ft. at Xa = 2.803 ft from the point of discharge. The centerline of the plume is at an average distance of Xb = 4.076 ft from the point of discharge as the plume begins to impact the bottom at a depth of Z = 104.5 ft.

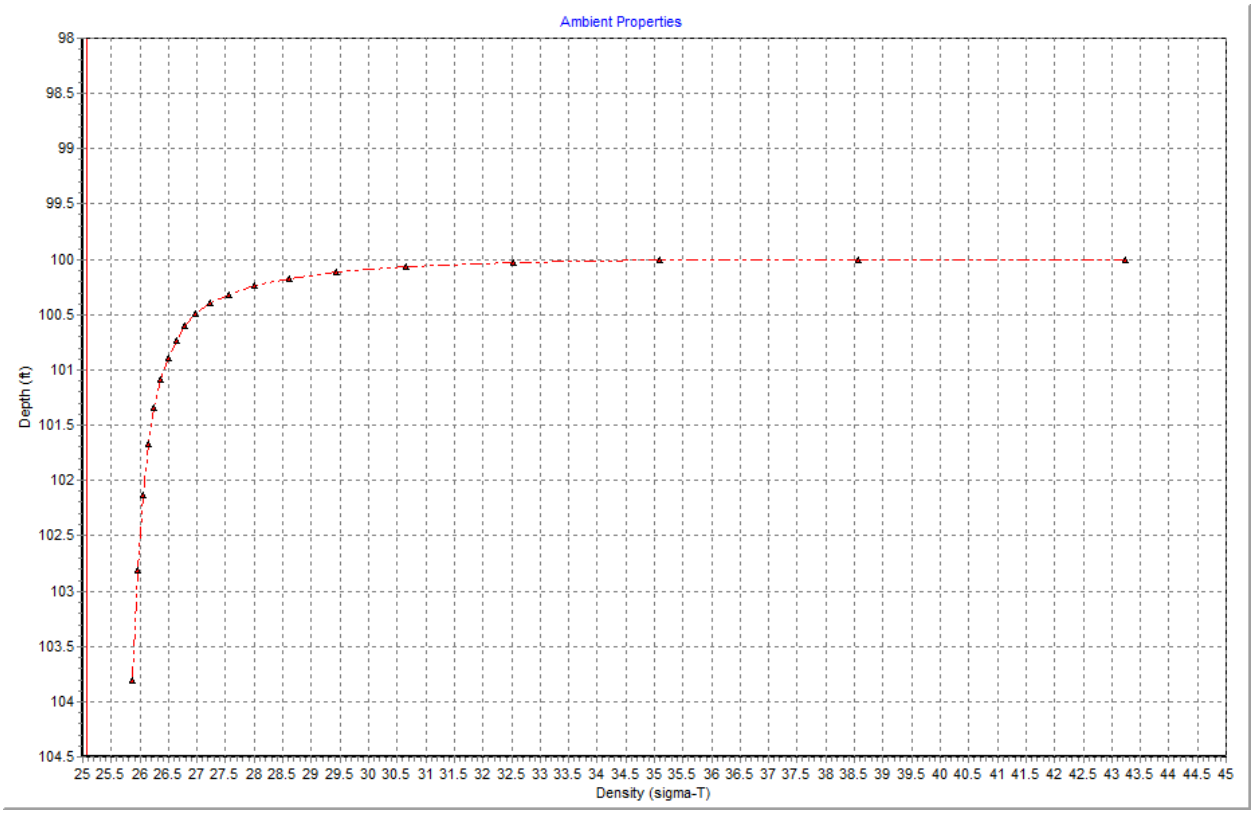


Figure C.3.2: Plumes 18b solution of vertical density profile for discharges of 0 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. and 15 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Discharge effluent density shown as black triangles. Ambient water mass density profile shown as solid red line.

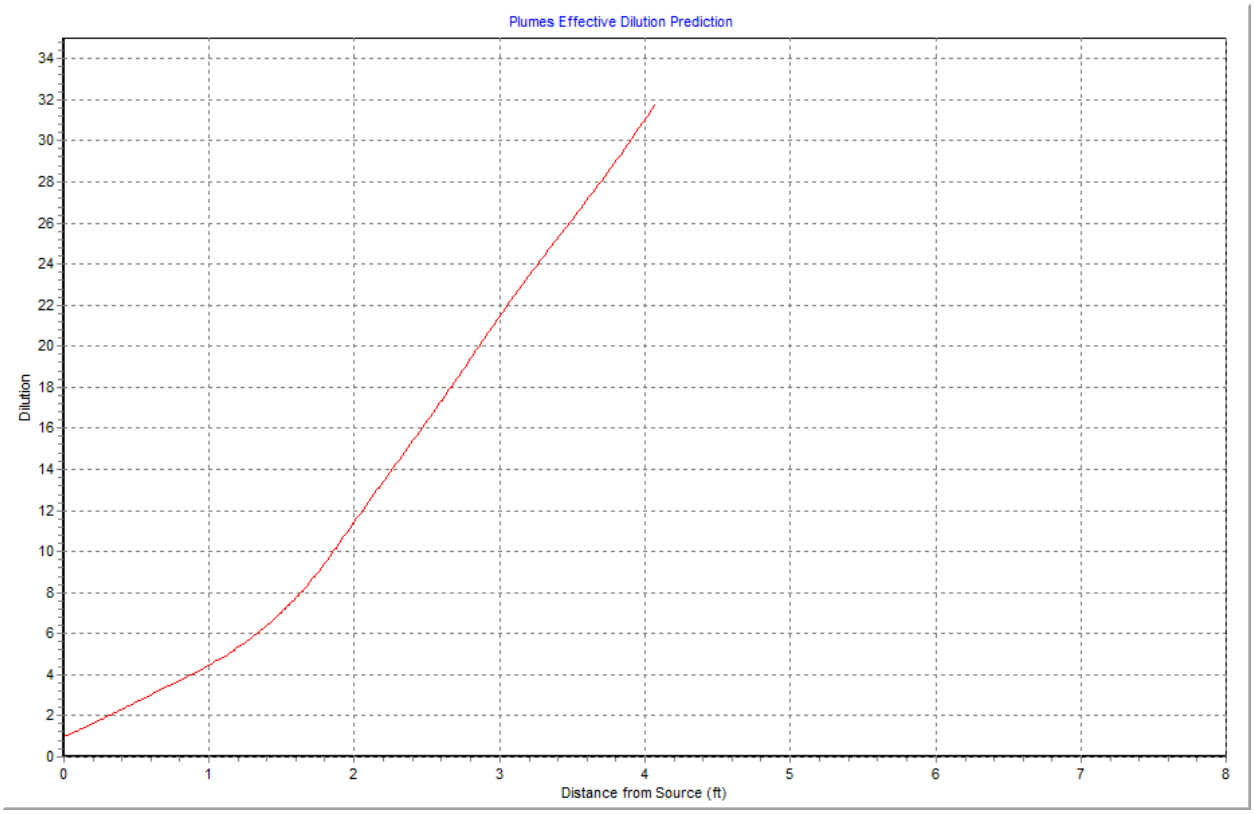


Figure C.3.3: Plumes 18b solution of effective (bulk average) dilution as a function of vertical distance from the point of discharge for discharges of 0 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. and 15 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Effective dilution is S_a = 19.42 at the maximum rise of the plume at Xa = 2.803 ft. from the point of discharge. As the plume begins to impact the bottom, the plume centerline is at a distance of Xb = 4.076 ft from the point of discharge, where the effective dilution reaches S_a = 31.83.

C.4: Plumes 18b Results for SJCOO discharges of 0 mgd Wastewater and 10 mgd Brine:

Contents of the memo box (may not be current and must be updated manually)
Project "C:\Plumes18\SJCOO_WW0mgd_b10mgd_D-1"
memomemo
SJCOO discharging 0 mgd wastewater and 10 mgd brine

Model configuration items checked:
Channel width (m) 100
Start case for graphs 1
Max detailed graphs 10 (limits plots that can overflow memory)
Elevation Projection Plane (deg) 0
Shore vector (m,deg) not checked
Bacteria model : Mancini (1978) coliform model
PDS sfc. model heat transfer : Medium
Equation of State : S, T
Similarity Profile : Default profile (k=2.0, ...)
Diffuser port contraction coefficient 1
Light absorption coefficient 0.16
Farfield increment (m) 200
UM3 aspiration coefficient 0.1
Output file: text output tab
Output each ?? steps 1
Maximum dilution reported 1000
Text output format : Standard
Max vertical reversals : to max rise or fall

/ UM3. 1/14/2019 1:47:00 PM
Case 1; ambient file C:\Plumes18\SJCOO_WW0mgd_b10mgd_D-1.001.db; Diffuser table record 1: --------
---

Ambient Table:

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn	Density
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2	sigma-T
0.0	0.0	0.0	33.38	19.97	0.0	0.0	0.0	0.0	0.0003	23.55719
2.000	0.0	0.0	33.39	19.87	0.0	0.0	0.0	0.0	0.0003	23.59288
4.000	0.0	0.0	33.40	19.81	0.0	0.0	0.0	0.0	0.0003	23.61484
7.000	0.0	0.0	33.41	19.64	0.0	0.0	0.0	0.0	0.0003	23.67096
10.00	0.0	0.0	33.40	17.76	0.0	0.0	0.0	0.0	0.0003	24.12888
12.00	0.0	0.0	33.38	17.34	0.0	0.0	0.0	0.0	0.0003	24.21549
14.00	0.0	0.0	33.38	16.73	0.0	0.0	0.0	0.0	0.0003	24.35932
16.00	0.0	0.0	33.38	15.17	0.0	0.0	0.0	0.0	0.0003	24.71340
18.00	0.0	0.0	33.37	14.37	0.0	0.0	0.0	0.0	0.0003	24.87044
20.00	0.0	0.0	33.35	14.18	0.0	0.0	0.0	0.0	0.0003	24.89660
22.00	0.0	0.0	33.33	13.83	0.0	0.0	0.0	0.0	0.0003	24.95172
24.00	0.0	0.0	33.32	13.75	0.0	0.0	0.0	0.0	0.0003	24.96707
26.00	0.0	0.0	33.36	13.42	0.0	0.0	0.0	0.0	0.0003	25.06459
31.85	0.0	0.0	33.36	13.39	0.0	0.0	0.0	0.0	0.0003	25.07201

Diffuser table:

P-dia	Ver angl	H-Angle	SourceX	SourceY	Ports	MZ-dis	Isoplth	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(in)	(deg)	(deg)	(ft)	(ft)	()	(ft)	(concent)	(ft)	(MGD)	(psu)	(C)	(ppm)
3.0500	0.0	0.0	0.0	0.0	125.00	1000.0	0.0	100.00	10.000	67.000	20.660	67000.0

Simulation:

Froude No: -5.593; Strat No:-1.57E-4; Spcg No: 14.39; k: 74358.5; eff den (sigmaT) 49.48870; eff vel 0.744(m/s);
Current is very small, flow regime may be transient.

Step	Depth (ft)	Amb-cur (m/s)	P-dia (in)	Eff-sal (psu)	Polutnt (ppm)	Dilutn ()	x-posn (ft)	y-posn (ft)	Iso dia (m)
0	100.0	1.000E-5	3.050	67.00	67000.0	1.000	0.0	0.0	0.07747;
1	100.0	0.0	3.068	66.63	66237.3	1.012	0.00724	0.0	0.07791;
2	100.0	0.0	3.116	65.97	64908.9	1.032	0.0127	0.0	0.07915;
3	100.0	0.0	3.179	65.33	63607.8	1.053	0.0174	0.0	0.08075;
4	100.0	0.0	3.243	64.71	62333.3	1.075	0.0215	0.0	0.08238;
5	100.0	0.0	3.309	64.09	61084.8	1.097	0.0255	0.0	0.08405;
6	100.0	0.0	3.376	63.49	59861.9	1.119	0.0292	0.0	0.08575;
7	100.0	0.0	3.444	62.90	58664.0	1.142	0.0329	0.0	0.08748;
8	100.0	0.0	3.514	62.32	57490.5	1.165	0.0364	0.0	0.08925;
9	100.0	0.0	3.585	61.75	56340.9	1.189	0.040	0.0	0.09105;
10	100.0	0.0	3.657	61.20	55214.7	1.213	0.0435	0.0	0.09289;
11	100.0	0.0	3.731	60.65	54111.5	1.238	0.0471	0.0	0.09477;
12	100.0	0.0	3.806	60.12	53030.7	1.263	0.0507	0.0	0.09668;
13	100.0	0.0	3.883	59.59	51971.9	1.289	0.0543	0.0	0.09863;
14	100.0	0.0	3.961	59.08	50934.6	1.315	0.0579	0.0	0.1006;
15	100.0	0.0	4.041	58.57	49918.3	1.342	0.0616	0.0	0.1027;
16	100.0	0.0	4.123	58.08	48922.7	1.370	0.0653	0.0	0.1047;
17	100.0	0.0	4.206	57.59	47947.2	1.397	0.0691	0.0	0.1068;
18	100.0	0.0	4.291	57.12	46991.6	1.426	0.0729	0.0	0.1090;
19	100.0	0.0	4.377	56.65	46055.2	1.455	0.0768	0.0	0.1112;
20	100.0	0.0	4.466	56.20	45137.8	1.484	0.0808	0.0	0.1134;
21	100.0	0.0	4.556	55.75	44239.0	1.515	0.0848	0.0	0.1157;
22	100.0	0.0	4.647	55.31	43358.3	1.545	0.0889	0.0	0.1180;
23	100.0	0.0	4.741	54.88	42495.4	1.577	0.093	0.0	0.1204;
24	100.0	0.0	4.837	54.46	41649.9	1.609	0.0973	0.0	0.1228;
25	100.0	0.0	4.934	54.04	40821.5	1.641	0.102	0.0	0.1253;
26	100.0	0.0	5.033	53.64	40009.7	1.675	0.106	0.0	0.1278;
27	100.0	0.0	5.135	53.24	39214.4	1.709	0.110	0.0	0.1304;
28	100.0	0.0	5.238	52.85	38435.0	1.743	0.115	0.0	0.1330;
29	100.0	0.0	5.343	52.47	37671.4	1.779	0.119	0.0	0.1357;
30	100.0	0.0	5.451	52.09	36923.1	1.815	0.124	0.0	0.1385;
31	100.0	0.0	5.561	51.73	36189.8	1.851	0.129	0.0	0.1412;
32	100.0	0.0	5.673	51.37	35471.3	1.889	0.134	0.0	0.1441;
33	100.0	0.0	5.787	51.01	34767.2	1.927	0.139	0.0	0.1470;
34	100.0	0.0	5.903	50.67	34077.3	1.966	0.144	0.0	0.1499;
35	100.0	0.0	6.022	50.33	33401.2	2.006	0.149	0.0	0.1529;
36	100.0	0.0	6.143	50.00	32738.7	2.047	0.154	0.0	0.1560;
37	100.0	0.0	6.266	49.67	32089.5	2.088	0.159	0.0	0.1592;
38	100.0	0.0	6.392	49.35	31453.3	2.130	0.165	0.0	0.1624;
39	100.0	0.0	6.520	49.04	30829.8	2.173	0.170	0.0	0.1656;
40	100.0	0.0	6.651	48.73	30218.8	2.217	0.176	0.0	0.1689;
41	100.0	0.0	6.785	48.43	29620.0	2.262	0.181	0.0	0.1723;
42	100.0	0.0	6.921	48.13	29033.3	2.308	0.187	0.0	0.1758;
43	100.0	0.0	7.060	47.84	28458.2	2.354	0.193	0.0	0.1793;
44	100.0	0.0	7.202	47.56	27894.7	2.402	0.199	0.0	0.1829;
45	100.0	0.0	7.346	47.28	27342.4	2.450	0.205	0.0	0.1866;
46	100.0	0.0	7.494	47.01	26801.2	2.500	0.211	0.0	0.1903;
47	100.0	0.0	7.644	46.74	26270.8	2.550	0.217	0.0	0.1942;
48	100.0	0.0	7.797	46.48	25750.9	2.602	0.224	0.0	0.1980;
49	100.0	0.0	7.953	46.22	25241.5	2.654	0.230	0.0	0.2020;
50	100.0	0.0	8.113	45.97	24742.2	2.708	0.237	0.0	0.2061;

```
51  100.0  0.0  8.275  45.72  24252.8  2.763  0.244  0.0  0.2102;
52  100.0  0.0  8.441  45.48  23773.3  2.818  0.251  0.0  0.2144;
53  100.0  0.0  8.610  45.24  23303.3  2.875  0.258  0.0  0.2187;
54  100.0  0.0  8.782  45.01  22842.6  2.933  0.265  0.0  0.2231;
55  100.0  0.0  8.958  44.78  22391.1  2.992  0.272  0.0  0.2275;
56  100.0  0.0  9.137  44.56  21948.7  3.053  0.279  0.0  0.2321;
57  100.0  0.0  9.319  44.34  21515.0  3.114  0.287  0.0  0.2367;
58  100.0  0.0  9.505  44.12  21089.9  3.177  0.295  0.0  0.2414;
59  100.0  0.0  9.695  43.91  20673.4  3.241  0.303  0.0  0.2463;
60  100.0  0.0  9.889  43.70  20265.1  3.306  0.310  0.0  0.2512;
61  100.0  0.0  10.09  43.50  19864.9  3.373  0.319  0.0  0.2562;
62  100.0  0.0  10.29  43.30  19472.7  3.441  0.327  0.0  0.2613;
63  100.0  0.0  10.49  43.11  19088.2  3.510  0.335  0.0  0.2665;
64  100.0  0.0  10.70  42.92  18711.5  3.581  0.344  0.0  0.2718;
65  100.0  0.0  10.91  42.73  18342.2  3.653  0.353  0.0  0.2772;
66  100.0  0.0  11.13  42.55  17980.2  3.726  0.362  0.0  0.2827;
67  100.0  0.0  11.35  42.37  17625.4  3.801  0.371  0.0  0.2883;
68  100.0  0.0  11.58  42.19  17277.7  3.878  0.380  0.0  0.2940;
69  100.0  0.0  11.81  42.02  16936.8  3.956  0.389  0.0  0.2998;
70  100.0  0.0  12.04  41.85  16602.8  4.035  0.399  0.0  0.3058;
71  100.0  0.0  12.28  41.68  16276.6  4.116  0.409  0.0  0.3118;
72  100.0  0.0  12.51  41.52  15967.8  4.196  0.418  0.0  0.3178;
73  100.0  0.0  12.75  41.37  15667.2  4.276  0.428  0.0  0.3238;
74  100.0  0.0  12.99  41.22  15374.5  4.358  0.437  0.0  0.3299;
75  100.0  0.0  13.23  41.08  15089.3  4.440  0.446  0.0  0.3360;
76  100.0  0.0  13.47  40.94  14811.3  4.524  0.455  0.0  0.3422;
77  100.0  0.0  13.72  40.80  14540.4  4.608  0.464  0.0  0.3485;
78  100.0  0.0  13.97  40.66  14276.2  4.693  0.473  0.0  0.3548;
79  100.0  0.0  14.22  40.53  14018.5  4.779  0.481  0.0  0.3611;
80  100.0  0.0  14.47  40.40  13767.1  4.867  0.490  0.0  0.3676;
81  100.0  0.0  14.73  40.28  13521.7  4.955  0.498  0.0  0.3741;
82  100.0  0.0  14.99  40.16  13282.2  5.044  0.506  0.0  0.3807;
83  100.0  0.0  15.25  40.04  13048.4  5.135  0.514  0.0  0.3873;
84  100.0  0.0  15.51  39.92  12820.1  5.226  0.522  0.0  0.3941;
85  100.0  0.0  15.78  39.81  12597.1  5.319  0.530  0.0  0.4009;
86  100.0  0.0  16.05  39.70  12379.2  5.412  0.537  0.0  0.4077;
87  100.0  0.0  16.32  39.59  12166.3  5.507  0.545  0.0  0.4146;
88  100.0  0.0  16.60  39.48  11958.2  5.603  0.552  0.0  0.4216;
89  100.0  0.0  16.88  39.38  11754.8  5.700  0.560  0.0  0.4287;
90  100.0  0.0  17.16  39.28  11556.0  5.798  0.567  0.0  0.4359;
91  100.1  0.0  17.44  39.18  11361.6  5.897  0.574  0.0  0.4431;
92  100.1  0.0  17.73  39.08  11171.4  5.997  0.581  0.0  0.4504;
93  100.1  0.0  18.02  38.99  10990.6  6.096  0.588  0.0  0.4576; begin overlap;
94  100.1  0.0  18.30  38.90  10818.5  6.193  0.594  0.0  0.4647;
95  100.1  0.0  18.57  38.82  10654.5  6.288  0.601  0.0  0.4717;
96  100.1  0.0  18.84  38.74  10497.9  6.382  0.608  0.0  0.4785;
97  100.1  0.0  19.10  38.66  10348.1  6.475  0.614  0.0  0.4852;
98  100.1  0.0  19.36  38.59  10204.7  6.566  0.621  0.0  0.4918;
99  100.1  0.0  19.62  38.52  10067.1  6.655  0.627  0.0  0.4983;
100 100.1  0.0  19.87  38.45  9934.9   6.744  0.633  0.0  0.5047;
101 100.1  0.0  20.12  38.39  9807.8   6.831  0.640  0.0  0.5109;
102 100.1  0.0  20.36  38.32  9685.5   6.918  0.646  0.0  0.5171;
103 100.1  0.0  20.60  38.26  9567.5   7.003  0.652  0.0  0.5232;
104 100.1  0.0  20.83  38.21  9453.8   7.087  0.658  0.0  0.5291;
105 100.1  0.0  21.06  38.15  9343.9   7.170  0.664  0.0  0.5350;
106 100.1  0.0  21.29  38.10  9237.7   7.253  0.670  0.0  0.5408;
```

107	100.1	0.0	21.52	38.04	9134.9	7.334	0.676	0.0	0.5465;
108	100.1	0.0	21.74	37.99	9035.4	7.415	0.682	0.0	0.5522;
109	100.1	0.0	21.96	37.94	8939.0	7.495	0.688	0.0	0.5578;
110	100.1	0.0	22.17	37.90	8845.5	7.574	0.694	0.0	0.5632;
111	100.1	0.0	22.39	37.85	8754.7	7.653	0.699	0.0	0.5687;
112	100.1	0.0	22.60	37.80	8666.6	7.731	0.705	0.0	0.5740;
113	100.1	0.0	22.81	37.76	8580.9	7.808	0.711	0.0	0.5793;
114	100.1	0.0	23.01	37.72	8497.6	7.885	0.716	0.0	0.5845;
115	100.1	0.0	23.22	37.68	8416.5	7.961	0.722	0.0	0.5897;
116	100.1	0.0	23.42	37.64	8337.5	8.036	0.728	0.0	0.5948;
117	100.1	0.0	23.61	37.60	8260.6	8.111	0.733	0.0	0.5998;
118	100.1	0.0	23.81	37.56	8185.6	8.185	0.739	0.0	0.6048;
119	100.1	0.0	24.00	37.52	8112.5	8.259	0.744	0.0	0.6097;
120	100.1	0.0	24.19	37.48	8041.1	8.332	0.750	0.0	0.6145;
121	100.1	0.0	24.38	37.45	7971.5	8.405	0.755	0.0	0.6193;
122	100.1	0.0	24.57	37.41	7903.4	8.477	0.760	0.0	0.6241;
123	100.1	0.0	24.76	37.38	7836.9	8.549	0.766	0.0	0.6288;
124	100.1	0.0	24.94	37.35	7771.9	8.621	0.771	0.0	0.6335;
125	100.1	0.0	25.12	37.31	7708.3	8.692	0.777	0.0	0.6381;
126	100.1	0.0	25.30	37.28	7646.0	8.763	0.782	0.0	0.6426;
127	100.1	0.0	25.48	37.25	7585.1	8.833	0.787	0.0	0.6471;
128	100.1	0.0	25.65	37.22	7525.5	8.903	0.792	0.0	0.6516;
129	100.1	0.0	25.83	37.19	7467.0	8.973	0.798	0.0	0.6560;
130	100.1	0.0	26.00	37.16	7409.7	9.042	0.803	0.0	0.6604;
131	100.1	0.0	26.17	37.13	7353.6	9.111	0.808	0.0	0.6647;
132	100.1	0.0	26.34	37.10	7298.5	9.180	0.813	0.0	0.6690;
133	100.1	0.0	26.51	37.08	7244.5	9.248	0.819	0.0	0.6732;
134	100.1	0.0	26.67	37.05	7191.5	9.317	0.824	0.0	0.6774;
135	100.1	0.0	26.83	37.02	7139.4	9.384	0.829	0.0	0.6816;
136	100.1	0.0	27.00	37.00	7088.3	9.452	0.834	0.0	0.6857;
137	100.1	0.0	27.16	36.97	7038.1	9.520	0.839	0.0	0.6898;
138	100.1	0.0	27.32	36.95	6988.8	9.587	0.844	0.0	0.6939;
139	100.1	0.0	27.47	36.92	6940.3	9.654	0.849	0.0	0.6979;
140	100.2	0.0	27.63	36.90	6892.6	9.721	0.855	0.0	0.7018;
141	100.2	0.0	27.79	36.87	6845.7	9.787	0.860	0.0	0.7058;
142	100.2	0.0	27.94	36.85	6799.6	9.854	0.865	0.0	0.7097;
143	100.2	0.0	28.09	36.83	6754.2	9.920	0.870	0.0	0.7135;
144	100.2	0.0	28.24	36.80	6709.6	9.986	0.875	0.0	0.7174;
145	100.2	0.0	28.39	36.78	6665.6	10.05	0.880	0.0	0.7212;
146	100.2	0.0	28.54	36.76	6622.3	10.12	0.885	0.0	0.7249;
147	100.2	0.0	28.69	36.74	6579.6	10.18	0.890	0.0	0.7286;
148	100.2	0.0	28.83	36.72	6537.6	10.25	0.895	0.0	0.7323;
149	100.2	0.0	28.98	36.69	6496.2	10.31	0.900	0.0	0.7360;
150	100.2	0.0	29.12	36.67	6455.4	10.38	0.905	0.0	0.7396;
151	100.2	0.0	29.26	36.65	6415.1	10.44	0.910	0.0	0.7432;
152	100.2	0.0	29.40	36.63	6375.5	10.51	0.915	0.0	0.7468;
153	100.2	0.0	29.54	36.61	6336.3	10.57	0.920	0.0	0.7503;
154	100.2	0.0	29.68	36.59	6297.7	10.64	0.925	0.0	0.7538;
155	100.2	0.0	29.81	36.57	6259.6	10.70	0.930	0.0	0.7573;
156	100.2	0.0	29.95	36.55	6222.0	10.77	0.935	0.0	0.7607;
157	100.2	0.0	30.08	36.54	6184.9	10.83	0.940	0.0	0.7642;
158	100.2	0.0	30.22	36.52	6148.2	10.90	0.945	0.0	0.7675;
159	100.2	0.0	30.35	36.50	6112.1	10.96	0.950	0.0	0.7709;
160	100.2	0.0	30.48	36.48	6076.3	11.03	0.956	0.0	0.7742;
161	100.2	0.0	30.61	36.46	6041.0	11.09	0.961	0.0	0.7775;
162	100.2	0.0	30.74	36.44	6006.1	11.16	0.966	0.0	0.7808;

163	100.2	0.0	30.87	36.43	5971.6	11.22	0.971	0.0	0.7841;
164	100.2	0.0	30.99	36.41	5937.5	11.28	0.976	0.0	0.7873;
165	100.2	0.0	31.12	36.39	5903.8	11.35	0.981	0.0	0.7905;
166	100.2	0.0	31.25	36.37	5870.5	11.41	0.986	0.0	0.7936;
167	100.2	0.0	31.37	36.36	5837.5	11.48	0.991	0.0	0.7968;
168	100.2	0.0	31.49	36.34	5804.9	11.54	0.996	0.0	0.7999;
169	100.2	0.0	31.61	36.32	5772.6	11.61	1.001	0.0	0.8030;
170	100.2	0.0	31.73	36.31	5740.7	11.67	1.006	0.0	0.8060;
171	100.2	0.0	31.85	36.29	5709.1	11.74	1.011	0.0	0.8091;
172	100.3	0.0	31.97	36.28	5677.9	11.80	1.016	0.0	0.8121;
173	100.3	0.0	32.09	36.26	5646.9	11.86	1.021	0.0	0.8151;
174	100.3	0.0	32.21	36.24	5616.2	11.93	1.026	0.0	0.8180;
175	100.3	0.0	32.32	36.23	5585.9	11.99	1.032	0.0	0.8210;
176	100.3	0.0	32.44	36.21	5555.8	12.06	1.037	0.0	0.8239;
177	100.3	0.0	32.55	36.20	5526.0	12.12	1.042	0.0	0.8268;
178	100.3	0.0	32.66	36.18	5496.5	12.19	1.047	0.0	0.8296;
179	100.3	0.0	32.78	36.17	5467.3	12.25	1.052	0.0	0.8325;
180	100.3	0.0	32.89	36.15	5438.3	12.32	1.057	0.0	0.8353;
181	100.3	0.0	33.00	36.14	5409.5	12.39	1.063	0.0	0.8381;
182	100.3	0.0	33.11	36.12	5381.0	12.45	1.068	0.0	0.8409;
183	100.3	0.0	33.21	36.11	5352.8	12.52	1.073	0.0	0.8437;
184	100.3	0.0	33.32	36.09	5324.8	12.58	1.078	0.0	0.8464;
185	100.3	0.0	33.43	36.08	5297.0	12.65	1.084	0.0	0.8491;
186	100.3	0.0	33.53	36.07	5269.4	12.71	1.089	0.0	0.8518;
187	100.3	0.0	33.64	36.05	5242.0	12.78	1.094	0.0	0.8545;
188	100.3	0.0	33.74	36.04	5214.9	12.85	1.099	0.0	0.8571;
189	100.3	0.0	33.85	36.02	5187.9	12.91	1.105	0.0	0.8597;
190	100.3	0.0	33.95	36.01	5161.2	12.98	1.110	0.0	0.8623;
191	100.3	0.0	34.05	36.00	5134.6	13.05	1.115	0.0	0.8649;
192	100.3	0.0	34.15	35.98	5108.3	13.12	1.121	0.0	0.8675;
193	100.3	0.0	34.25	35.97	5082.1	13.18	1.126	0.0	0.8700;
194	100.3	0.0	34.35	35.96	5056.1	13.25	1.132	0.0	0.8726;
195	100.4	0.0	34.45	35.94	5030.3	13.32	1.137	0.0	0.8751;
196	100.4	0.0	34.55	35.93	5004.6	13.39	1.142	0.0	0.8776;
197	100.4	0.0	34.65	35.92	4979.1	13.46	1.148	0.0	0.8801;
198	100.4	0.0	34.74	35.90	4953.8	13.53	1.153	0.0	0.8825;
199	100.4	0.0	34.84	35.89	4928.6	13.59	1.159	0.0	0.8849;
200	100.4	0.0	34.94	35.88	4903.5	13.66	1.165	0.0	0.8874;
201	100.4	0.0	35.03	35.87	4878.6	13.73	1.170	0.0	0.8898;
202	100.4	0.0	35.12	35.85	4853.9	13.80	1.176	0.0	0.8921;
203	100.4	0.0	35.22	35.84	4829.2	13.87	1.181	0.0	0.8945;
204	100.4	0.0	35.31	35.83	4804.7	13.94	1.187	0.0	0.8969;
205	100.4	0.0	35.40	35.82	4780.4	14.02	1.193	0.0	0.8992;
206	100.4	0.0	35.49	35.80	4756.1	14.09	1.198	0.0	0.9015;
207	100.4	0.0	35.58	35.79	4732.0	14.16	1.204	0.0	0.9038;
208	100.4	0.0	35.67	35.78	4708.0	14.23	1.210	0.0	0.9061;
209	100.4	0.0	35.76	35.77	4684.1	14.30	1.216	0.0	0.9084;
210	100.4	0.0	35.85	35.75	4660.2	14.38	1.221	0.0	0.9106;
211	100.4	0.0	35.94	35.74	4636.5	14.45	1.227	0.0	0.9129;
212	100.4	0.0	36.03	35.73	4612.9	14.52	1.233	0.0	0.9151;
213	100.5	0.0	36.12	35.72	4589.4	14.60	1.239	0.0	0.9173;
214	100.5	0.0	36.20	35.71	4566.0	14.67	1.245	0.0	0.9195;
215	100.5	0.0	36.29	35.69	4542.6	14.75	1.251	0.0	0.9217;
216	100.5	0.0	36.37	35.68	4519.4	14.83	1.257	0.0	0.9239;
217	100.5	0.0	36.46	35.67	4496.2	14.90	1.263	0.0	0.9261;
218	100.5	0.0	36.54	35.66	4473.1	14.98	1.269	0.0	0.9282;

219	100.5	0.0	36.63	35.65	4450.0	15.06	1.275	0.0	0.9304;
220	100.5	0.0	36.71	35.64	4427.0	15.13	1.282	0.0	0.9325;
221	100.5	0.0	36.80	35.62	4404.1	15.21	1.288	0.0	0.9346;
222	100.5	0.0	36.88	35.61	4381.2	15.29	1.294	0.0	0.9368;
223	100.5	0.0	36.96	35.60	4358.4	15.37	1.300	0.0	0.9389;
224	100.5	0.0	37.05	35.59	4335.6	15.45	1.307	0.0	0.9410;
225	100.5	0.0	37.13	35.58	4312.8	15.53	1.313	0.0	0.9431;
226	100.6	0.0	37.21	35.56	4290.1	15.62	1.319	0.0	0.9452;
227	100.6	0.0	37.29	35.55	4267.5	15.70	1.326	0.0	0.9472;
228	100.6	0.0	37.37	35.54	4244.8	15.78	1.332	0.0	0.9493;
229	100.6	0.0	37.46	35.53	4222.2	15.87	1.339	0.0	0.9514;
230	100.6	0.0	37.54	35.52	4199.6	15.95	1.346	0.0	0.9535;
231	100.6	0.0	37.62	35.51	4177.0	16.04	1.352	0.0	0.9555;
232	100.6	0.0	37.70	35.50	4154.5	16.13	1.359	0.0	0.9576;
233	100.6	0.0	37.78	35.48	4131.9	16.22	1.366	0.0	0.9597;
234	100.6	0.0	37.86	35.47	4109.3	16.30	1.372	0.0	0.9617;
235	100.6	0.0	37.94	35.46	4086.8	16.39	1.379	0.0	0.9638;
236	100.6	0.0	38.03	35.45	4064.2	16.49	1.386	0.0	0.9659;
237	100.6	0.0	38.11	35.44	4041.6	16.58	1.393	0.0	0.9679;
238	100.7	0.0	38.19	35.43	4019.0	16.67	1.400	0.0	0.9700;
239	100.7	0.0	38.27	35.41	3996.3	16.77	1.407	0.0	0.9721;
240	100.7	0.0	38.35	35.40	3973.7	16.86	1.414	0.0	0.9742;
241	100.7	0.0	38.44	35.39	3951.0	16.96	1.422	0.0	0.9763;
242	100.7	0.0	38.52	35.38	3928.2	17.06	1.429	0.0	0.9784;
243	100.7	0.0	38.60	35.37	3905.5	17.16	1.436	0.0	0.9805;
244	100.7	0.0	38.69	35.36	3882.6	17.26	1.444	0.0	0.9826;
245	100.7	0.0	38.77	35.34	3859.7	17.36	1.451	0.0	0.9848;
246	100.7	0.0	38.86	35.33	3836.8	17.46	1.459	0.0	0.9869;
247	100.8	0.0	38.94	35.32	3813.8	17.57	1.466	0.0	0.9891;
248	100.8	0.0	39.03	35.31	3790.7	17.67	1.474	0.0	0.9913;
249	100.8	0.0	39.11	35.30	3767.5	17.78	1.482	0.0	0.9935;
250	100.8	0.0	39.20	35.29	3744.2	17.89	1.489	0.0	0.9957;
251	100.8	0.0	39.29	35.27	3720.9	18.01	1.497	0.0	0.9980;
252	100.8	0.0	39.38	35.26	3697.4	18.12	1.505	0.0	1.0003;
253	100.8	0.0	39.47	35.25	3673.8	18.24	1.513	0.0	1.0026;
254	100.8	0.0	39.57	35.24	3650.1	18.36	1.521	0.0	1.0050;
255	100.9	0.0	39.66	35.22	3626.3	18.48	1.530	0.0	1.0074;
256	100.9	0.0	39.76	35.21	3602.4	18.60	1.538	0.0	1.0098;
257	100.9	0.0	39.85	35.20	3578.6	18.72	1.546	0.0	1.0122;
258	100.9	0.0	39.94	35.19	3555.1	18.85	1.555	0.0	1.0146; end overlap;
259	100.9	0.0	40.04	35.18	3531.8	18.97	1.563	0.0	1.0169;
260	100.9	0.0	40.12	35.16	3508.7	19.10	1.572	0.0	1.0191;
261	101.0	0.0	40.21	35.15	3485.8	19.22	1.581	0.0	1.0213;
262	101.0	0.0	40.29	35.14	3463.1	19.35	1.589	0.0	1.0234;
263	101.0	0.0	40.37	35.13	3440.6	19.47	1.598	0.0	1.0255;
264	101.0	0.0	40.45	35.12	3418.3	19.60	1.607	0.0	1.0275;
265	101.0	0.0	40.53	35.11	3396.1	19.73	1.617	0.0	1.0294;
266	101.0	0.0	40.60	35.10	3374.1	19.86	1.626	0.0	1.0313;
267	101.1	0.0	40.67	35.08	3352.3	19.99	1.635	0.0	1.0331;
268	101.1	0.0	40.74	35.07	3330.5	20.12	1.645	0.0	1.0349;
269	101.1	0.0	40.81	35.06	3308.9	20.25	1.654	0.0	1.0366;
270	101.1	0.0	40.88	35.05	3287.4	20.38	1.664	0.0	1.0383;
271	101.1	0.0	40.94	35.04	3266.0	20.51	1.674	0.0	1.0399;
272	101.2	0.0	41.00	35.03	3244.7	20.65	1.684	0.0	1.0415;
273	101.2	0.0	41.06	35.02	3223.5	20.79	1.694	0.0	1.0430;
274	101.2	0.0	41.12	35.01	3202.3	20.92	1.704	0.0	1.0445;

275	101.2	0.0	41.18	35.00	3181.2	21.06	1.715	0.0	1.0459;
276	101.2	0.0	41.23	34.99	3160.1	21.20	1.725	0.0	1.0473;
277	101.3	0.0	41.29	34.97	3139.0	21.34	1.736	0.0	1.0487;
278	101.3	0.0	41.34	34.96	3118.0	21.49	1.747	0.0	1.0501;
279	101.3	0.0	41.39	34.95	3096.9	21.63	1.758	0.0	1.0514;
280	101.3	0.0	41.45	34.94	3075.9	21.78	1.769	0.0	1.0527;
281	101.4	0.0	41.50	34.93	3054.8	21.93	1.780	0.0	1.0540;
282	101.4	0.0	41.55	34.92	3033.7	22.09	1.792	0.0	1.0553;
283	101.4	0.0	41.60	34.91	3012.5	22.24	1.804	0.0	1.0565;
284	101.5	0.0	41.64	34.90	2991.3	22.40	1.816	0.0	1.0578;
285	101.5	0.0	41.69	34.89	2969.9	22.56	1.828	0.0	1.0590;
286	101.5	0.0	41.74	34.88	2948.5	22.72	1.840	0.0	1.0603;
287	101.6	0.0	41.79	34.87	2927.0	22.89	1.853	0.0	1.0615;
288	101.6	0.0	41.84	34.85	2905.4	23.06	1.866	0.0	1.0628;
289	101.6	0.0	41.89	34.84	2883.6	23.23	1.879	0.0	1.0640;
290	101.7	0.0	41.94	34.83	2861.7	23.41	1.892	0.0	1.0653;
291	101.7	0.0	41.99	34.82	2839.6	23.60	1.905	0.0	1.0666;
292	101.7	0.0	42.05	34.81	2817.3	23.78	1.919	0.0	1.0680;
293	101.8	0.0	42.10	34.80	2794.8	23.97	1.933	0.0	1.0694;
294	101.8	0.0	42.16	34.79	2772.1	24.17	1.947	0.0	1.0708;
295	101.8	0.0	42.22	34.77	2749.1	24.37	1.962	0.0	1.0723;
296	101.9	0.0	42.28	34.76	2725.9	24.58	1.977	0.0	1.0739;
297	101.9	0.0	42.34	34.75	2702.4	24.79	1.992	0.0	1.0755;
298	102.0	0.0	42.41	34.74	2678.6	25.01	2.007	0.0	1.0772;
299	102.0	0.0	42.48	34.73	2654.5	25.24	2.023	0.0	1.0790;
300	102.1	0.0	42.55	34.71	2630.1	25.47	2.039	0.0	1.0809;
301	102.1	0.0	42.63	34.70	2605.3	25.72	2.055	0.0	1.0828;
302	102.2	0.0	42.71	34.69	2580.1	25.97	2.072	0.0	1.0849;
303	102.2	0.0	42.80	34.68	2554.6	26.23	2.089	0.0	1.0872;
304	102.3	0.0	42.90	34.66	2528.6	26.50	2.106	0.0	1.0896;
305	102.4	0.0	43.00	34.65	2502.3	26.78	2.124	0.0	1.0921;
306	102.4	0.0	43.10	34.63	2475.4	27.07	2.142	0.0	1.0948;
307	102.5	0.0	43.21	34.62	2448.1	27.37	2.161	0.0	1.0977;
308	102.6	0.0	43.34	34.61	2420.3	27.68	2.180	0.0	1.1007;
309	102.6	0.0	43.47	34.59	2392.0	28.01	2.199	0.0	1.1040;
310	102.7	0.0	43.60	34.58	2363.1	28.35	2.219	0.0	1.1075;
311	102.8	0.0	43.75	34.56	2333.7	28.71	2.239	0.0	1.1113;
312	102.9	0.0	43.91	34.55	2303.7	29.08	2.260	0.0	1.1153; merging;
313	102.9	0.0	44.08	34.53	2273.5	29.47	2.281	0.0	1.1196;
314	103.0	0.0	44.25	34.52	2243.2	29.87	2.303	0.0	1.1240;
315	103.1	0.0	44.43	34.50	2212.7	30.28	2.325	0.0	1.1285;
316	103.2	0.0	44.62	34.48	2181.8	30.71	2.348	0.0	1.1333;
317	103.3	0.0	44.82	34.47	2150.4	31.16	2.372	0.0	1.1383;
318	103.4	0.0	45.02	34.45	2118.6	31.62	2.396	0.0	1.1436;
319	103.5	0.0	45.25	34.43	2086.3	32.11	2.420	0.0	1.1493;
320	103.7	0.0	45.48	34.42	2053.5	32.63	2.446	0.0	1.1553;
321	103.8	0.0	45.74	34.40	2020.1	33.17	2.472	0.0	1.1618;
322	103.9	0.0	46.01	34.38	1986.2	33.73	2.499	0.0	1.1686;
323	104.0	0.0	46.30	34.37	1951.7	34.33	2.526	0.0	1.1760;
324	104.2	0.0	46.61	34.35	1916.5	34.96	2.555	0.0	1.1839; bottom hit;

Horiz plane projections in effluent direction: radius(m): 0.0; CL(m): 0.7787
Lmz(m): 0.7787
forced entrain 1 0.0 -1.278 1.184 0.198
Rate sec-1 0.0 dy-1 0.0 kt: 0.0 Amb Sal 33.3632
;
1:47:00 PM. amb fills: 4

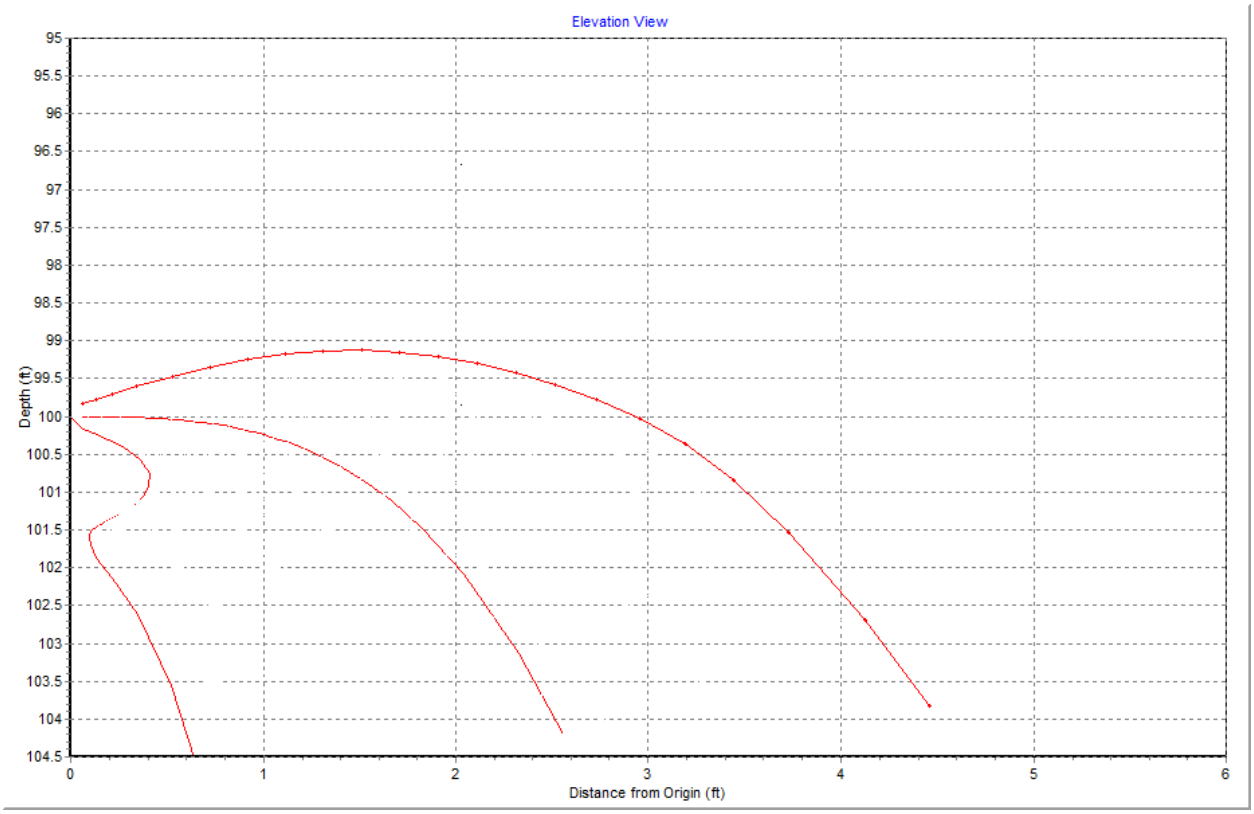


Figure C.4.1: Plumes 18b solution of discharge plume trajectories for discharges of 0 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt., and 10 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Depth of maximum rise of the plume is Z = 99.2 ft. at Xa = 1.704 ft from the point of discharge. The centerline of the plume is at an average distance of Xb = 2.555 ft from the point of discharge as the plume begins to impact the bottom at a depth of Z = 104.5 ft.

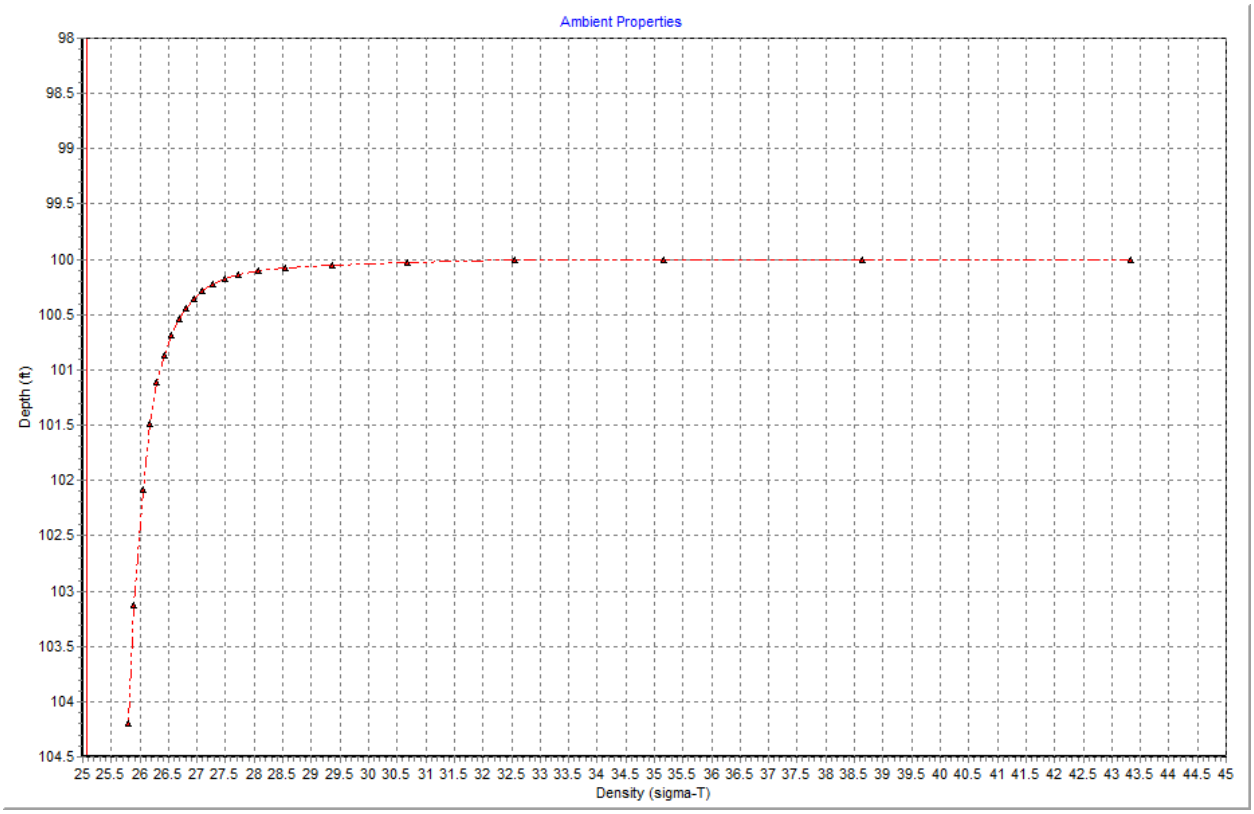


Figure C.4.2: Plumes 18b solution of vertical density profile for discharges of 0 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. and 10 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Discharge effluent density shown as black triangles. Ambient water mass density profile shown as solid red line.

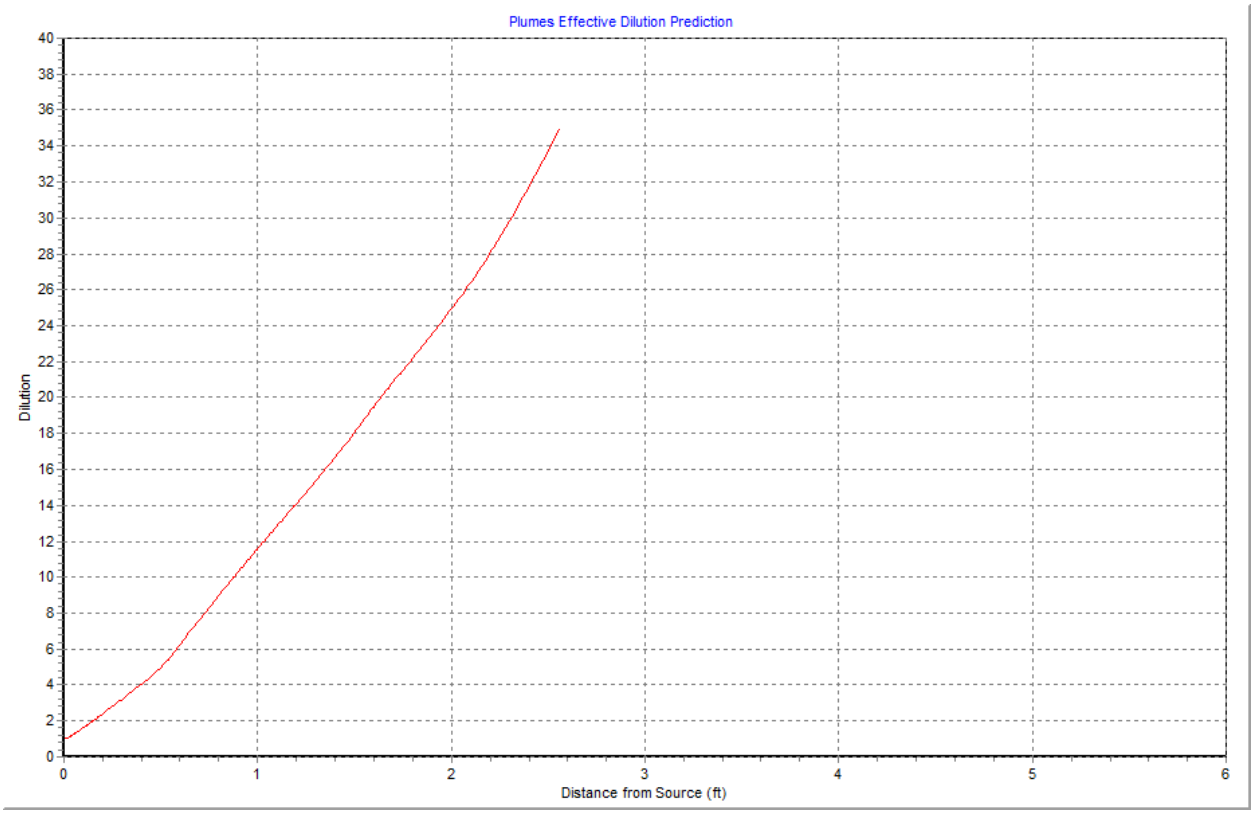


Figure C.4.3: Plumes 18b solution of effective (bulk average) dilution as a function of vertical distance from the point of discharge for discharges of 0 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. and 10 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Effective dilution is S_a = 20.92 at the maximum rise of the plume at Xa = 1.704 ft. from the point of discharge. As the plume begins to impact the bottom, the plume centerline is at a distance of Xb = 2.55 ft from the point of discharge, where the effective dilution reaches S_a = 34.96.

C.5: Plumes 18b Results for SJCOO discharges of 0 mgd Wastewater and 5 mgd Brine:

Contents of the memo box (may not be current and must be updated manually)
Project "C:\Plumes18\SJCOO_WW0mgd_b5mgd_D-1"
memo
SJCOO discharging 0 mgd wastewater and 5 mgd brine

Model configuration items checked:
Channel width (m) 100
Start case for graphs 1
Max detailed graphs 10 (limits plots that can overflow memory)
Elevation Projection Plane (deg) 0
Shore vector (m,deg) not checked
Bacteria model : Mancini (1978) coliform model
PDS sfc. model heat transfer : Medium
Equation of State : S, T
Similarity Profile : Default profile (k=2.0, ...)
Diffuser port contraction coefficient 1
Light absorption coefficient 0.16
Farfield increment (m) 200
UM3 aspiration coefficient 0.1
Output file: text output tab
Output each ?? steps 1
Maximum dilution reported 1000
Text output format : Standard
Max vertical reversals : to max rise or fall

/ UM3. 1/14/2019 2:07:00 PM
Case 1; ambient file C:\Plumes18\SJCOO_WW0mgd_b5mgd_D-1.001.db; Diffuser table record 1: ----------
---

Ambient Table:

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn	Density
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2	sigma-T
0.0	0.0	0.0	33.38	19.97	0.0	0.0	0.0	0.0	0.0003	23.55719
2.000	0.0	0.0	33.39	19.87	0.0	0.0	0.0	0.0	0.0003	23.59288
4.000	0.0	0.0	33.40	19.81	0.0	0.0	0.0	0.0	0.0003	23.61484
7.000	0.0	0.0	33.41	19.64	0.0	0.0	0.0	0.0	0.0003	23.67096
10.00	0.0	0.0	33.40	17.76	0.0	0.0	0.0	0.0	0.0003	24.12888
12.00	0.0	0.0	33.38	17.34	0.0	0.0	0.0	0.0	0.0003	24.21549
14.00	0.0	0.0	33.38	16.73	0.0	0.0	0.0	0.0	0.0003	24.35932
16.00	0.0	0.0	33.38	15.17	0.0	0.0	0.0	0.0	0.0003	24.71340
18.00	0.0	0.0	33.37	14.37	0.0	0.0	0.0	0.0	0.0003	24.87044
20.00	0.0	0.0	33.35	14.18	0.0	0.0	0.0	0.0	0.0003	24.89660
22.00	0.0	0.0	33.33	13.83	0.0	0.0	0.0	0.0	0.0003	24.95172
24.00	0.0	0.0	33.32	13.75	0.0	0.0	0.0	0.0	0.0003	24.96707
26.00	0.0	0.0	33.36	13.42	0.0	0.0	0.0	0.0	0.0003	25.06459
31.85	0.0	0.0	33.36	13.39	0.0	0.0	0.0	0.0	0.0003	25.07201

Diffuser table:

P-dia	Ver angl	H-Angle	SourceX	SourceY	Ports	MZ-dis	Isoplth	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(in)	(deg)	(deg)	(ft)	(ft)	()	(ft)	(concent)	(ft)	(MGD)	(psu)	(C)	(ppm)
3.0500	0.0	0.0	0.0	0.0	125.00	1000.0	0.0	100.00	5.0000	67.000	20.660	67000.0

Simulation:
Froude No: -2.796; Strat No:-1.57E-4; Spcg No: 14.39; k: 37179.3; eff den (sigmaT) 49.48870; eff vel 0.372(m/s);
Current is very small, flow regime may be transient.

Step	Depth (ft)	Amb-cur (m/s)	P-dia (in)	Eff-sal (psu)	Polutnt (ppm)	Dilutn ()	x-posn (ft)	y-posn (ft)	Iso dia (m)
0	100.0	1.000E-5	3.050	67.00	67000.0	1.000	0.0	0.0	0.07747;
1	100.0	0.0	3.059	66.81	66616.5	1.006	0.00364	0.0	0.07769;
2	100.0	0.0	3.099	66.16	65280.3	1.026	0.00565	0.0	0.0787;
3	100.0	0.0	3.161	65.51	63971.6	1.047	0.00684	0.0	0.0803;
4	100.0	0.0	3.225	64.88	62689.6	1.069	0.00758	0.0	0.08192;
5	100.0	0.0	3.290	64.26	61433.9	1.091	0.00804	0.0	0.08358;
6	100.0	0.0	3.357	63.66	60203.8	1.113	0.00834	0.0	0.08527;
7	100.0	0.0	3.425	63.06	58998.9	1.136	0.00853	0.0	0.08699;
8	100.0	0.0	3.494	62.48	57818.6	1.159	0.00865	0.0	0.08875;
9	100.0	0.0	3.565	61.91	56662.3	1.182	0.00873	0.0	0.09054;
10	100.0	0.0	3.637	61.35	55529.6	1.207	0.00879	0.0	0.09237;
11	100.0	0.0	3.710	60.80	54420.0	1.231	0.00882	0.0	0.09423;
12	100.0	0.0	3.785	60.26	53332.9	1.256	0.00884	0.0	0.09614;
13	100.0	0.0	3.861	59.74	52267.9	1.282	0.00885	0.0	0.09808;
14	100.0	0.0	3.939	59.22	51224.6	1.308	0.00886	0.0	0.1001;
15	100.0	0.0	4.019	58.71	50202.5	1.335	0.00887	0.0	0.1021;
16	100.0	0.0	4.100	58.22	49201.1	1.362	0.00887	0.0	0.1041;
17	100.0	0.0	4.183	57.73	48220.0	1.389	0.00888	0.0	0.1062;
18	100.0	0.0	4.267	57.25	47258.8	1.418	0.00888	0.0	0.1084;
19	100.0	0.0	4.353	56.78	46317.0	1.447	0.00888	0.0	0.1106;
20	100.0	0.0	4.441	56.32	45394.3	1.476	0.00888	0.0	0.1128;
21	100.0	0.0	4.530	55.87	44490.3	1.506	0.00888	0.0	0.1151;
22	100.0	0.0	4.622	55.43	43604.5	1.537	0.00888	0.0	0.1174;
23	100.0	0.0	4.715	55.00	42736.7	1.568	0.00888	0.0	0.1198;
24	100.0	0.0	4.810	54.57	41886.3	1.600	0.00888	0.0	0.1222;
25	100.0	0.0	4.907	54.16	41053.1	1.632	0.00888	0.0	0.1246;
26	100.0	0.0	5.005	53.75	40236.7	1.665	0.00888	0.0	0.1271;
27	100.0	0.0	5.106	53.35	39436.8	1.699	0.00888	0.0	0.1297;
28	100.0	0.0	5.209	52.96	38653.0	1.733	0.00888	0.0	0.1323;
29	100.0	0.0	5.314	52.58	37884.9	1.769	0.00888	0.0	0.1350;
30	100.0	0.0	5.421	52.20	37132.3	1.804	0.00888	0.0	0.1377;
31	100.0	0.0	5.530	51.83	36394.9	1.841	0.0317	0.0	0.1405;
32	100.0	0.0	5.618	51.61	35964.4	1.863	0.0371	0.0	0.1427;
33	100.0	0.0	5.707	51.26	35250.4	1.901	0.0401	0.0	0.1450;
34	100.0	0.0	5.822	50.90	34550.8	1.939	0.0419	0.0	0.1479;
35	100.0	0.0	5.939	50.56	33865.2	1.978	0.0429	0.0	0.1508;
36	100.0	0.0	6.058	50.22	33193.4	2.018	0.0436	0.0	0.1539;
37	100.0	0.0	6.180	49.89	32535.0	2.059	0.0441	0.0	0.1570;
38	100.0	0.0	6.304	49.57	31889.9	2.101	0.0443	0.0	0.1601;
39	100.0	0.0	6.431	49.25	31257.6	2.143	0.0445	0.0	0.1633;
40	100.0	0.0	6.560	48.94	30638.1	2.187	0.0446	0.0	0.1666;
41	100.0	0.0	6.692	48.63	30030.9	2.231	0.0447	0.0	0.1700;
42	100.0	0.0	6.827	48.33	29435.9	2.276	0.0447	0.0	0.1734;
43	100.0	0.0	6.964	48.04	28852.8	2.322	0.0447	0.0	0.1769;
44	100.0	0.0	7.104	47.75	28281.4	2.369	0.0448	0.0	0.1804;
45	100.0	0.0	7.247	47.47	27721.4	2.417	0.0448	0.0	0.1841;
46	100.0	0.0	7.392	47.19	27172.6	2.466	0.0448	0.0	0.1878;
47	100.0	0.0	7.541	46.92	26634.8	2.516	0.0448	0.0	0.1915;
48	100.0	0.0	7.692	46.66	26107.7	2.566	0.0448	0.0	0.1954;
49	100.0	0.0	7.847	46.40	25591.1	2.618	0.0448	0.0	0.1993;

50	100.0	0.0	8.005	46.14	25084.8	2.671	0.0448	0.0	0.2033;
51	100.0	0.0	8.166	45.89	24588.7	2.725	0.0448	0.0	0.2074;
52	100.0	0.0	8.330	45.65	24102.4	2.780	0.0448	0.0	0.2116;
53	100.0	0.0	8.497	45.40	23625.8	2.836	0.0448	0.0	0.2158;
54	100.0	0.0	8.667	45.17	23162.2	2.893	0.0448	0.0	0.2201; begin overlap;
55	100.0	0.0	8.836	44.95	22725.1	2.948	0.0448	0.0	0.2244;
56	100.0	0.0	9.002	44.74	22314.3	3.003	0.0448	0.0	0.2286;
57	100.0	0.0	9.163	44.55	21931.1	3.055	0.0448	0.0	0.2327;
58	100.0	0.0	9.321	44.36	21560.8	3.107	0.0448	0.0	0.2367;
59	100.0	0.0	9.484	44.17	21180.5	3.163	0.0448	0.0	0.2409;
60	100.0	0.0	9.643	44.00	20854.3	3.213	0.0448	0.0	0.2449;
61	100.0	0.0	9.782	43.86	20576.3	3.256	0.0448	0.0	0.2485;
62	100.0	0.0	9.911	43.73	20316.3	3.298	0.0448	0.0	0.2517;
63	100.0	0.0	10.01	43.66	20178.5	3.320	0.0448	0.0	0.2542;
64	100.0	0.0	10.05	43.64	20137.9	3.327	0.0448	0.0	0.2553;
65	100.0	0.0	10.16	43.44	19740.2	3.394	0.0857	0.0	0.2581;
66	100.0	0.0	10.25	43.41	19689.8	3.403	0.0886	0.0	0.2604;
67	100.0	0.0	10.33	43.27	19417.1	3.451	0.0905	0.0	0.2624;
68	100.0	0.0	10.47	43.14	19153.7	3.498	0.0916	0.0	0.2660;
69	100.0	0.0	10.61	43.01	18900.6	3.545	0.0923	0.0	0.2696;
70	100.0	0.0	10.75	42.89	18657.2	3.591	0.0928	0.0	0.2731;
71	100.0	0.0	10.89	42.77	18423.0	3.637	0.0931	0.0	0.2766;
72	100.0	0.0	11.03	42.66	18197.4	3.682	0.0933	0.0	0.2801;
73	100.0	0.0	11.16	42.55	17979.9	3.726	0.0934	0.0	0.2835;
74	100.0	0.0	11.29	42.44	17770.1	3.770	0.0935	0.0	0.2869;
75	100.0	0.0	11.42	42.34	17567.5	3.814	0.0935	0.0	0.2902;
76	100.0	0.0	11.55	42.24	17371.7	3.857	0.0936	0.0	0.2935;
77	100.0	0.0	11.68	42.14	17182.4	3.899	0.0936	0.0	0.2967;
78	100.0	0.0	11.81	42.05	16999.3	3.941	0.0936	0.0	0.3000;
79	100.0	0.0	11.94	41.96	16821.8	3.983	0.0936	0.0	0.3032;
80	100.0	0.0	12.06	41.87	16649.9	4.024	0.0936	0.0	0.3063;
81	100.0	0.0	12.18	41.79	16483.2	4.065	0.0936	0.0	0.3094;
82	100.0	0.0	12.30	41.70	16321.5	4.105	0.0936	0.0	0.3125;
83	100.0	0.0	12.42	41.62	16164.4	4.145	0.0936	0.0	0.3156;
84	100.0	0.0	12.54	41.55	16011.8	4.184	0.0936	0.0	0.3186;
85	100.0	0.0	12.66	41.47	15863.5	4.224	0.0936	0.0	0.3216;
86	100.0	0.0	12.78	41.40	15719.3	4.262	0.0936	0.0	0.3246;
87	100.0	0.0	12.89	41.33	15579.0	4.301	0.0936	0.0	0.3275;
88	100.0	0.0	13.01	41.26	15442.4	4.339	0.0936	0.0	0.3304;
89	100.0	0.0	13.12	41.19	15309.4	4.376	0.0936	0.0	0.3333;
90	100.0	0.0	13.24	41.12	15179.9	4.414	0.0936	0.0	0.3362;
91	100.0	0.0	13.35	41.06	15054.2	4.451	0.0936	0.0	0.3390;
92	100.0	0.0	13.46	41.00	14932.5	4.487	0.0936	0.0	0.3418;
93	100.0	0.0	13.56	40.94	14815.1	4.522	0.0936	0.0	0.3445;
94	100.0	0.0	13.67	40.88	14698.3	4.558	0.0936	0.0	0.3473;
95	100.0	0.0	13.79	40.81	14570.1	4.598	0.0936	0.0	0.3502;
96	100.0	0.0	13.92	40.73	14412.4	4.649	0.0936	0.0	0.3536;
97	100.0	0.0	14.05	40.68	14312.3	4.681	0.0936	0.0	0.3568;
98	100.0	0.0	14.14	40.64	14228.7	4.709	0.0936	0.0	0.3591;
99	100.0	0.0	14.32	40.50	13948.3	4.803	0.149	0.0	0.3637;
100	100.0	0.0	14.29	40.49	13938.1	4.807	0.152	0.0	0.3630;
101	100.0	0.0	14.34	40.44	13831.6	4.844	0.153	0.0	0.3643;
102	100.0	0.0	14.45	40.38	13726.8	4.881	0.154	0.0	0.3669;
103	100.0	0.0	14.55	40.33	13624.1	4.918	0.155	0.0	0.3696;
104	100.0	0.0	14.66	40.28	13523.5	4.954	0.155	0.0	0.3723;
105	100.0	0.0	14.76	40.23	13425.0	4.991	0.155	0.0	0.3750;

106	100.0	0.0	14.87	40.18	13328.6	5.027	0.156	0.0	0.3777;
107	100.0	0.0	14.97	40.13	13234.2	5.063	0.156	0.0	0.3803;
108	100.0	0.0	15.08	40.09	13141.7	5.098	0.156	0.0	0.3830;
109	100.0	0.0	15.18	40.04	13051.1	5.134	0.156	0.0	0.3857;
110	100.0	0.0	15.29	39.99	12962.4	5.169	0.156	0.0	0.3883;
111	100.0	0.0	15.39	39.95	12875.5	5.204	0.156	0.0	0.3909;
112	100.0	0.0	15.49	39.91	12790.3	5.238	0.156	0.0	0.3935;
113	100.0	0.0	15.60	39.86	12706.7	5.273	0.156	0.0	0.3961;
114	100.0	0.0	15.70	39.82	12624.8	5.307	0.156	0.0	0.3987;
115	100.0	0.0	15.80	39.78	12544.5	5.341	0.156	0.0	0.4013;
116	100.0	0.0	15.90	39.74	12465.7	5.375	0.156	0.0	0.4038;
117	100.0	0.0	16.00	39.70	12388.3	5.408	0.156	0.0	0.4064;
118	100.0	0.0	16.10	39.66	12312.4	5.442	0.156	0.0	0.4089;
119	100.0	0.0	16.20	39.63	12237.9	5.475	0.156	0.0	0.4114;
120	100.0	0.0	16.29	39.59	12164.7	5.508	0.156	0.0	0.4139;
121	100.0	0.0	16.39	39.55	12092.8	5.540	0.156	0.0	0.4163;
122	100.0	0.0	16.49	39.52	12022.2	5.573	0.156	0.0	0.4188;
123	100.0	0.0	16.58	39.48	11952.8	5.605	0.156	0.0	0.4212;
124	100.0	0.0	16.68	39.45	11884.6	5.638	0.156	0.0	0.4236;
125	100.0	0.0	16.77	39.41	11817.6	5.670	0.156	0.0	0.4261;
126	100.0	0.0	16.87	39.38	11751.7	5.701	0.156	0.0	0.4285;
127	100.0	0.0	16.96	39.34	11687.0	5.733	0.156	0.0	0.4308;
128	100.0	0.0	17.06	39.31	11623.3	5.764	0.156	0.0	0.4332;
129	100.0	0.0	17.15	39.28	11560.0	5.796	0.156	0.0	0.4356;
130	100.0	0.0	17.24	39.25	11497.8	5.827	0.156	0.0	0.4379;
131	100.0	0.0	17.33	39.22	11440.0	5.857	0.156	0.0	0.4402;
132	100.0	0.0	17.42	39.19	11382.9	5.886	0.156	0.0	0.4424;
133	100.0	0.0	17.52	39.15	11304.4	5.927	0.156	0.0	0.4451;
134	100.0	0.0	17.64	39.11	11233.6	5.964	0.156	0.0	0.4480;
135	100.0	0.0	17.74	39.08	11174.7	5.996	0.156	0.0	0.4506;
136	100.0	0.0	17.82	39.06	11133.0	6.018	0.156	0.0	0.4526;
137	100.1	0.0	18.03	38.95	10913.9	6.139	0.221	0.0	0.4580;
138	100.1	0.0	17.63	38.95	10909.7	6.141	0.223	0.0	0.4477;
139	100.1	0.0	17.66	38.92	10844.3	6.178	0.224	0.0	0.4486;
140	100.1	0.0	17.75	38.88	10779.6	6.215	0.226	0.0	0.4509;
141	100.1	0.0	17.85	38.85	10715.6	6.253	0.226	0.0	0.4533;
142	100.1	0.0	17.94	38.82	10652.5	6.290	0.227	0.0	0.4558;
143	100.1	0.0	18.04	38.79	10590.4	6.327	0.228	0.0	0.4583;
144	100.1	0.0	18.14	38.75	10529.1	6.363	0.228	0.0	0.4608;
145	100.1	0.0	18.24	38.72	10468.8	6.400	0.228	0.0	0.4633;
146	100.1	0.0	18.34	38.69	10409.4	6.436	0.229	0.0	0.4659;
147	100.1	0.0	18.44	38.66	10351.0	6.473	0.229	0.0	0.4685;
148	100.1	0.0	18.54	38.63	10293.4	6.509	0.229	0.0	0.4710;
149	100.1	0.0	18.65	38.61	10236.8	6.545	0.229	0.0	0.4736;
150	100.1	0.0	18.75	38.58	10181.1	6.581	0.229	0.0	0.4762;
151	100.1	0.0	18.85	38.55	10126.2	6.616	0.229	0.0	0.4787;
152	100.1	0.0	18.95	38.52	10072.2	6.652	0.229	0.0	0.4813;
153	100.1	0.0	19.05	38.49	10019.1	6.687	0.229	0.0	0.4838;
154	100.1	0.0	19.15	38.47	9966.7	6.722	0.229	0.0	0.4863;
155	100.1	0.0	19.25	38.44	9915.2	6.757	0.229	0.0	0.4889;
156	100.1	0.0	19.35	38.42	9864.5	6.792	0.229	0.0	0.4914;
157	100.1	0.0	19.44	38.39	9814.5	6.827	0.229	0.0	0.4939;
158	100.1	0.0	19.54	38.36	9765.3	6.861	0.230	0.0	0.4964;
159	100.1	0.0	19.64	38.34	9716.8	6.895	0.230	0.0	0.4988;
160	100.1	0.0	19.74	38.32	9669.0	6.929	0.230	0.0	0.5013;
161	100.1	0.0	19.83	38.29	9621.9	6.963	0.230	0.0	0.5038;

162	100.1	0.0	19.93	38.27	9575.5	6.997	0.230	0.0	0.5062;
163	100.1	0.0	20.03	38.24	9529.8	7.031	0.230	0.0	0.5086;
164	100.1	0.0	20.12	38.22	9484.7	7.064	0.230	0.0	0.5111;
165	100.1	0.0	20.22	38.20	9440.3	7.097	0.230	0.0	0.5135;
166	100.1	0.0	20.31	38.18	9396.5	7.130	0.230	0.0	0.5159;
167	100.1	0.0	20.40	38.15	9353.2	7.163	0.230	0.0	0.5183;
168	100.1	0.0	20.50	38.13	9310.6	7.196	0.230	0.0	0.5207;
169	100.1	0.0	20.59	38.11	9268.6	7.229	0.230	0.0	0.5230;
170	100.1	0.0	20.68	38.09	9227.1	7.261	0.230	0.0	0.5254;
171	100.1	0.0	20.78	38.07	9186.2	7.294	0.230	0.0	0.5277;
172	100.1	0.0	20.87	38.05	9145.8	7.326	0.230	0.0	0.5301;
173	100.1	0.0	20.96	38.03	9105.9	7.358	0.230	0.0	0.5324;
174	100.1	0.0	21.05	38.01	9066.6	7.390	0.230	0.0	0.5347;
175	100.1	0.0	21.14	37.99	9027.8	7.422	0.230	0.0	0.5370;
176	100.1	0.0	21.23	37.97	8989.4	7.453	0.230	0.0	0.5393;
177	100.1	0.0	21.32	37.95	8951.6	7.485	0.230	0.0	0.5416;
178	100.1	0.0	21.41	37.93	8914.2	7.516	0.230	0.0	0.5439;
179	100.1	0.0	21.50	37.91	8877.3	7.547	0.230	0.0	0.5461;
180	100.1	0.0	21.59	37.89	8840.9	7.578	0.230	0.0	0.5484;
181	100.1	0.0	21.68	37.87	8804.9	7.609	0.230	0.0	0.5506;
182	100.1	0.0	21.77	37.86	8769.4	7.640	0.230	0.0	0.5529;
183	100.1	0.0	21.85	37.84	8734.3	7.671	0.230	0.0	0.5551;
184	100.1	0.0	21.94	37.82	8699.7	7.701	0.230	0.0	0.5573;
185	100.1	0.0	22.03	37.80	8665.4	7.732	0.230	0.0	0.5595;
186	100.1	0.0	22.12	37.79	8631.5	7.762	0.230	0.0	0.5617;
187	100.1	0.0	22.20	37.77	8597.4	7.793	0.230	0.0	0.5639;
188	100.1	0.0	22.29	37.75	8564.3	7.823	0.230	0.0	0.5661;
189	100.1	0.0	22.38	37.73	8528.5	7.856	0.230	0.0	0.5684;
190	100.1	0.0	22.47	37.72	8496.4	7.886	0.230	0.0	0.5707;
191	100.1	0.0	22.55	37.70	8465.4	7.915	0.230	0.0	0.5728;
192	100.1	0.0	22.64	37.68	8431.8	7.946	0.230	0.0	0.5750;
193	100.1	0.0	22.73	37.67	8399.2	7.977	0.230	0.0	0.5772;
194	100.1	0.0	22.81	37.65	8372.3	8.003	0.230	0.0	0.5793;
195	100.1	0.0	22.89	37.64	8340.0	8.034	0.230	0.0	0.5813;
196	100.1	0.0	22.97	37.62	8313.1	8.060	0.230	0.0	0.5834;
197	100.1	0.0	23.24	37.54	8149.6	8.221	0.303	0.0	0.5902;
198	100.1	0.0	21.90	37.54	8147.5	8.223	0.305	0.0	0.5562;
199	100.1	0.0	21.92	37.52	8101.6	8.270	0.307	0.0	0.5569;
200	100.1	0.0	22.01	37.49	8055.7	8.317	0.309	0.0	0.5590;
201	100.1	0.0	22.09	37.47	8010.1	8.364	0.311	0.0	0.5611;
202	100.1	0.0	22.18	37.45	7964.6	8.412	0.313	0.0	0.5632;
203	100.1	0.0	22.26	37.42	7920.2	8.459	0.315	0.0	0.5653;
204	100.1	0.0	22.33	37.40	7877.2	8.506	0.317	0.0	0.5672;
205	100.1	0.0	22.40	37.38	7834.6	8.552	0.319	0.0	0.5691;
206	100.1	0.0	22.48	37.36	7792.3	8.598	0.321	0.0	0.5709;
207	100.1	0.0	22.55	37.34	7750.5	8.645	0.323	0.0	0.5728;
208	100.1	0.0	22.62	37.31	7709.1	8.691	0.325	0.0	0.5746;
209	100.1	0.0	22.69	37.29	7668.0	8.738	0.327	0.0	0.5764;
210	100.1	0.0	22.76	37.27	7627.2	8.784	0.329	0.0	0.5782;
211	100.1	0.0	22.83	37.25	7586.8	8.831	0.331	0.0	0.5800;
212	100.1	0.0	22.90	37.23	7546.8	8.878	0.333	0.0	0.5817;
213	100.1	0.0	22.97	37.21	7507.1	8.925	0.335	0.0	0.5834;
214	100.1	0.0	23.04	37.19	7467.7	8.972	0.337	0.0	0.5852;
215	100.1	0.0	23.10	37.17	7428.6	9.019	0.339	0.0	0.5869;
216	100.2	0.0	23.17	37.15	7389.8	9.067	0.341	0.0	0.5885;
217	100.2	0.0	23.24	37.13	7351.3	9.114	0.343	0.0	0.5902;

218	100.2	0.0	23.30	37.11	7313.1	9.162	0.345	0.0	0.5919;
219	100.2	0.0	23.37	37.09	7275.2	9.209	0.348	0.0	0.5935;
220	100.2	0.0	23.43	37.07	7237.5	9.257	0.350	0.0	0.5951;
221	100.2	0.0	23.49	37.05	7200.2	9.305	0.352	0.0	0.5967;
222	100.2	0.0	23.55	37.04	7163.1	9.354	0.354	0.0	0.5983;
223	100.2	0.0	23.62	37.02	7126.2	9.402	0.356	0.0	0.5999;
224	100.2	0.0	23.68	37.00	7089.6	9.450	0.358	0.0	0.6014;
225	100.2	0.0	23.74	36.98	7053.3	9.499	0.361	0.0	0.6029;
226	100.2	0.0	23.80	36.96	7017.1	9.548	0.363	0.0	0.6045;
227	100.2	0.0	23.86	36.94	6981.2	9.597	0.365	0.0	0.6060;
228	100.2	0.0	23.92	36.92	6945.6	9.646	0.367	0.0	0.6075;
229	100.2	0.0	23.97	36.91	6910.1	9.696	0.369	0.0	0.6089;
230	100.2	0.0	24.03	36.89	6874.9	9.746	0.372	0.0	0.6104;
231	100.2	0.0	24.09	36.87	6839.8	9.796	0.374	0.0	0.6118;
232	100.2	0.0	24.14	36.85	6805.0	9.846	0.376	0.0	0.6133;
233	100.2	0.0	24.20	36.83	6770.4	9.896	0.378	0.0	0.6147;
234	100.2	0.0	24.25	36.82	6735.9	9.947	0.381	0.0	0.6161;
235	100.2	0.0	24.31	36.80	6701.6	9.998	0.383	0.0	0.6174;
236	100.2	0.0	24.36	36.78	6667.5	10.05	0.385	0.0	0.6188;
237	100.2	0.0	24.42	36.76	6633.6	10.10	0.388	0.0	0.6202;
238	100.2	0.0	24.47	36.75	6599.9	10.15	0.390	0.0	0.6215;
239	100.2	0.0	24.52	36.73	6566.3	10.20	0.393	0.0	0.6228;
240	100.2	0.0	24.57	36.71	6532.8	10.26	0.395	0.0	0.6241;
241	100.2	0.0	24.62	36.70	6499.5	10.31	0.397	0.0	0.6254;
242	100.2	0.0	24.67	36.68	6466.4	10.36	0.400	0.0	0.6267;
243	100.2	0.0	24.72	36.66	6433.4	10.41	0.402	0.0	0.6280;
244	100.2	0.0	24.77	36.65	6400.5	10.47	0.405	0.0	0.6292;
245	100.2	0.0	24.82	36.63	6367.8	10.52	0.407	0.0	0.6304;
246	100.2	0.0	24.87	36.61	6335.1	10.58	0.410	0.0	0.6317;
247	100.2	0.0	24.92	36.60	6302.6	10.63	0.412	0.0	0.6329;
248	100.2	0.0	24.96	36.58	6270.3	10.69	0.415	0.0	0.6341;
249	100.2	0.0	25.01	36.56	6238.0	10.74	0.417	0.0	0.6353;
250	100.2	0.0	25.06	36.55	6205.8	10.80	0.420	0.0	0.6364;
251	100.2	0.0	25.10	36.53	6173.7	10.85	0.422	0.0	0.6376;
252	100.3	0.0	25.15	36.51	6141.7	10.91	0.425	0.0	0.6387;
253	100.3	0.0	25.19	36.50	6109.8	10.97	0.428	0.0	0.6399;
254	100.3	0.0	25.24	36.48	6078.0	11.02	0.430	0.0	0.6410;
255	100.3	0.0	25.28	36.46	6046.2	11.08	0.433	0.0	0.6421;
256	100.3	0.0	25.32	36.45	6014.6	11.14	0.436	0.0	0.6432;
257	100.3	0.0	25.37	36.43	5982.9	11.20	0.439	0.0	0.6443;
258	100.3	0.0	25.41	36.42	5951.4	11.26	0.441	0.0	0.6454;
259	100.3	0.0	25.45	36.40	5919.9	11.32	0.444	0.0	0.6464;
260	100.3	0.0	25.49	36.38	5888.4	11.38	0.447	0.0	0.6475;
261	100.3	0.0	25.53	36.37	5857.0	11.44	0.450	0.0	0.6485;
262	100.3	0.0	25.57	36.35	5825.6	11.50	0.453	0.0	0.6496;
263	100.3	0.0	25.61	36.34	5794.3	11.56	0.456	0.0	0.6506;
264	100.3	0.0	25.65	36.32	5762.9	11.63	0.458	0.0	0.6516;
265	100.3	0.0	25.69	36.30	5731.6	11.69	0.461	0.0	0.6526;
266	100.3	0.0	25.73	36.29	5700.3	11.75	0.464	0.0	0.6536;
267	100.3	0.0	25.77	36.27	5669.0	11.82	0.467	0.0	0.6546;
268	100.3	0.0	25.81	36.26	5637.7	11.88	0.471	0.0	0.6556;
269	100.3	0.0	25.85	36.24	5606.3	11.95	0.474	0.0	0.6566;
270	100.3	0.0	25.89	36.22	5575.0	12.02	0.477	0.0	0.6576;
271	100.3	0.0	25.93	36.21	5543.6	12.09	0.480	0.0	0.6585;
272	100.3	0.0	25.96	36.19	5512.2	12.15	0.483	0.0	0.6595;
273	100.3	0.0	26.00	36.17	5480.7	12.22	0.486	0.0	0.6605;

274	100.4	0.0	26.04	36.16	5449.2	12.30	0.490	0.0	0.6614;
275	100.4	0.0	26.08	36.14	5417.6	12.37	0.493	0.0	0.6624;
276	100.4	0.0	26.12	36.13	5386.0	12.44	0.496	0.0	0.6633;
277	100.4	0.0	26.15	36.11	5354.3	12.51	0.500	0.0	0.6643;
278	100.4	0.0	26.19	36.09	5322.5	12.59	0.503	0.0	0.6653;
279	100.4	0.0	26.23	36.08	5290.6	12.66	0.506	0.0	0.6662;
280	100.4	0.0	26.27	36.06	5258.6	12.74	0.510	0.0	0.6672;
281	100.4	0.0	26.31	36.04	5226.4	12.82	0.513	0.0	0.6682;
282	100.4	0.0	26.34	36.03	5194.2	12.90	0.517	0.0	0.6691;
283	100.4	0.0	26.38	36.01	5161.8	12.98	0.521	0.0	0.6701;
284	100.4	0.0	26.42	35.99	5129.2	13.06	0.524	0.0	0.6711;
285	100.4	0.0	26.46	35.98	5096.5	13.15	0.528	0.0	0.6721;
286	100.4	0.0	26.50	35.96	5063.6	13.23	0.532	0.0	0.6731;
287	100.4	0.0	26.54	35.94	5030.5	13.32	0.536	0.0	0.6742;
288	100.4	0.0	26.58	35.93	4997.2	13.41	0.540	0.0	0.6752;
289	100.5	0.0	26.62	35.91	4963.7	13.50	0.543	0.0	0.6763;
290	100.5	0.0	26.67	35.89	4929.9	13.59	0.547	0.0	0.6774;
291	100.5	0.0	26.71	35.88	4895.9	13.69	0.551	0.0	0.6785;
292	100.5	0.0	26.76	35.86	4861.6	13.78	0.556	0.0	0.6796;
293	100.5	0.0	26.80	35.84	4827.0	13.88	0.560	0.0	0.6808;
294	100.5	0.0	26.85	35.82	4792.1	13.98	0.564	0.0	0.6820;
295	100.5	0.0	26.90	35.80	4756.9	14.08	0.568	0.0	0.6832;
296	100.5	0.0	26.95	35.79	4721.3	14.19	0.573	0.0	0.6844;
297	100.5	0.0	27.00	35.77	4685.4	14.30	0.577	0.0	0.6858;
298	100.5	0.0	27.05	35.75	4650.0	14.41	0.581	0.0	0.6870; end overlap;
299	100.6	0.0	27.10	35.73	4615.1	14.52	0.586	0.0	0.6882;
300	100.6	0.0	27.14	35.71	4580.6	14.63	0.591	0.0	0.6894;
301	100.6	0.0	27.18	35.70	4546.5	14.74	0.595	0.0	0.6904;
302	100.6	0.0	27.22	35.68	4512.8	14.85	0.600	0.0	0.6914;
303	100.6	0.0	27.26	35.66	4479.4	14.96	0.605	0.0	0.6923;
304	100.6	0.0	27.29	35.64	4446.3	15.07	0.610	0.0	0.6931;
305	100.6	0.0	27.32	35.63	4413.5	15.18	0.615	0.0	0.6939;
306	100.6	0.0	27.35	35.61	4381.0	15.29	0.620	0.0	0.6946;
307	100.7	0.0	27.37	35.59	4348.7	15.41	0.625	0.0	0.6952;
308	100.7	0.0	27.39	35.58	4316.7	15.52	0.630	0.0	0.6958;
309	100.7	0.0	27.41	35.56	4284.8	15.64	0.636	0.0	0.6963;
310	100.7	0.0	27.43	35.55	4253.0	15.75	0.641	0.0	0.6967;
311	100.7	0.0	27.45	35.53	4221.3	15.87	0.647	0.0	0.6971;
312	100.7	0.0	27.46	35.51	4189.7	15.99	0.653	0.0	0.6975;
313	100.8	0.0	27.47	35.50	4158.1	16.11	0.659	0.0	0.6978;
314	100.8	0.0	27.48	35.48	4126.6	16.24	0.665	0.0	0.6980;
315	100.8	0.0	27.49	35.46	4095.0	16.36	0.671	0.0	0.6983;
316	100.8	0.0	27.50	35.45	4063.3	16.49	0.677	0.0	0.6985;
317	100.8	0.0	27.51	35.43	4031.6	16.62	0.683	0.0	0.6986;
318	100.9	0.0	27.51	35.42	3999.6	16.75	0.690	0.0	0.6988;
319	100.9	0.0	27.52	35.40	3967.5	16.89	0.697	0.0	0.6989;
320	100.9	0.0	27.52	35.38	3935.2	17.03	0.703	0.0	0.6990;
321	100.9	0.0	27.53	35.37	3902.6	17.17	0.710	0.0	0.6992;
322	100.9	0.0	27.53	35.35	3869.7	17.31	0.718	0.0	0.6993;
323	101.0	0.0	27.54	35.33	3836.4	17.46	0.725	0.0	0.6994;
324	101.0	0.0	27.54	35.32	3802.7	17.62	0.732	0.0	0.6996;
325	101.0	0.0	27.55	35.30	3768.5	17.78	0.740	0.0	0.6997;
326	101.1	0.0	27.56	35.28	3733.8	17.94	0.748	0.0	0.7000;
327	101.1	0.0	27.57	35.26	3698.6	18.11	0.756	0.0	0.7002;
328	101.1	0.0	27.58	35.24	3662.8	18.29	0.765	0.0	0.7005;
329	101.2	0.0	27.59	35.22	3626.2	18.48	0.773	0.0	0.7009;

330	101.2	0.0	27.61	35.21	3589.0	18.67	0.782	0.0	0.7014;
331	101.2	0.0	27.63	35.19	3550.9	18.87	0.791	0.0	0.7019;
332	101.3	0.0	27.66	35.17	3512.0	19.08	0.800	0.0	0.7026;
333	101.3	0.0	27.69	35.15	3472.2	19.30	0.810	0.0	0.7033;
334	101.4	0.0	27.73	35.12	3431.4	19.53	0.820	0.0	0.7042;
335	101.4	0.0	27.77	35.10	3389.5	19.77	0.830	0.0	0.7053;
336	101.4	0.0	27.82	35.08	3346.6	20.02	0.841	0.0	0.7065;
337	101.5	0.0	27.87	35.06	3302.4	20.29	0.852	0.0	0.7080;
338	101.6	0.0	27.94	35.04	3257.0	20.57	0.863	0.0	0.7096;
339	101.6	0.0	28.01	35.01	3210.3	20.87	0.874	0.0	0.7115;
340	101.7	0.0	28.09	34.99	3162.2	21.19	0.886	0.0	0.7136;
341	101.7	0.0	28.19	34.96	3112.7	21.53	0.898	0.0	0.7160;
342	101.8	0.0	28.30	34.94	3061.6	21.88	0.911	0.0	0.7187;
343	101.9	0.0	28.42	34.91	3008.9	22.27	0.924	0.0	0.7218;
344	102.0	0.0	28.55	34.88	2954.5	22.68	0.938	0.0	0.7253;
345	102.0	0.0	28.71	34.85	2898.4	23.12	0.952	0.0	0.7292;
346	102.1	0.0	28.87	34.82	2841.6	23.58	0.966	0.0	0.7334;
347	102.2	0.0	29.05	34.79	2785.8	24.05	0.980	0.0	0.7378;
348	102.3	0.0	29.23	34.77	2731.1	24.53	0.994	0.0	0.7425;
349	102.4	0.0	29.43	34.74	2677.5	25.02	1.007	0.0	0.7474;
350	102.5	0.0	29.63	34.71	2624.9	25.52	1.020	0.0	0.7526;
351	102.6	0.0	29.85	34.68	2573.4	26.04	1.033	0.0	0.7581;
352	102.7	0.0	30.07	34.66	2522.9	26.56	1.046	0.0	0.7638;
353	102.7	0.0	30.30	34.63	2473.4	27.09	1.059	0.0	0.7697;
354	102.8	0.0	30.54	34.61	2424.9	27.63	1.071	0.0	0.7758;
355	102.9	0.0	30.79	34.58	2377.3	28.18	1.084	0.0	0.7822;
356	103.0	0.0	31.05	34.56	2330.6	28.75	1.096	0.0	0.7887;
357	103.1	0.0	31.32	34.54	2284.9	29.32	1.108	0.0	0.7955;
358	103.2	0.0	31.59	34.51	2240.1	29.91	1.120	0.0	0.8024;
359	103.3	0.0	31.87	34.49	2196.1	30.51	1.131	0.0	0.8096;
360	103.4	0.0	32.16	34.47	2153.0	31.12	1.143	0.0	0.8169;
361	103.5	0.0	32.46	34.45	2110.8	31.74	1.154	0.0	0.8244;
362	103.6	0.0	32.76	34.43	2069.3	32.38	1.166	0.0	0.8320;
363	103.7	0.0	33.07	34.41	2028.7	33.03	1.177	0.0	0.8399;
364	103.8	0.0	33.38	34.38	1988.9	33.69	1.188	0.0	0.8479;
365	103.9	0.0	33.70	34.36	1949.9	34.36	1.199	0.0	0.8561;
366	104.0	0.0	34.03	34.35	1911.6	35.05	1.210	0.0	0.8645;
367	104.1	0.0	34.37	34.33	1874.1	35.75	1.221	0.0	0.8730;
368	104.2	0.0	34.71	34.31	1837.4	36.47	1.231	0.0	0.8817;
369	104.3	0.0	35.06	34.29	1801.3	37.20	1.242	0.0	0.8905;
370	104.5	0.0	35.42	34.27	1766.0	37.94	1.252	0.0	0.8996; bottom hit;

Horiz plane projections in effluent direction: radius(m): 0.0; CL(m): 0.3817
Lmz(m): 0.3817
forced entrain 1 0.0 -1.357 0.900 0.0978
Rate sec-1 0.0 dy-1 0.0 kt: 0.0 Amb Sal 33.3632
;
2:07:00 PM. amb fills: 4

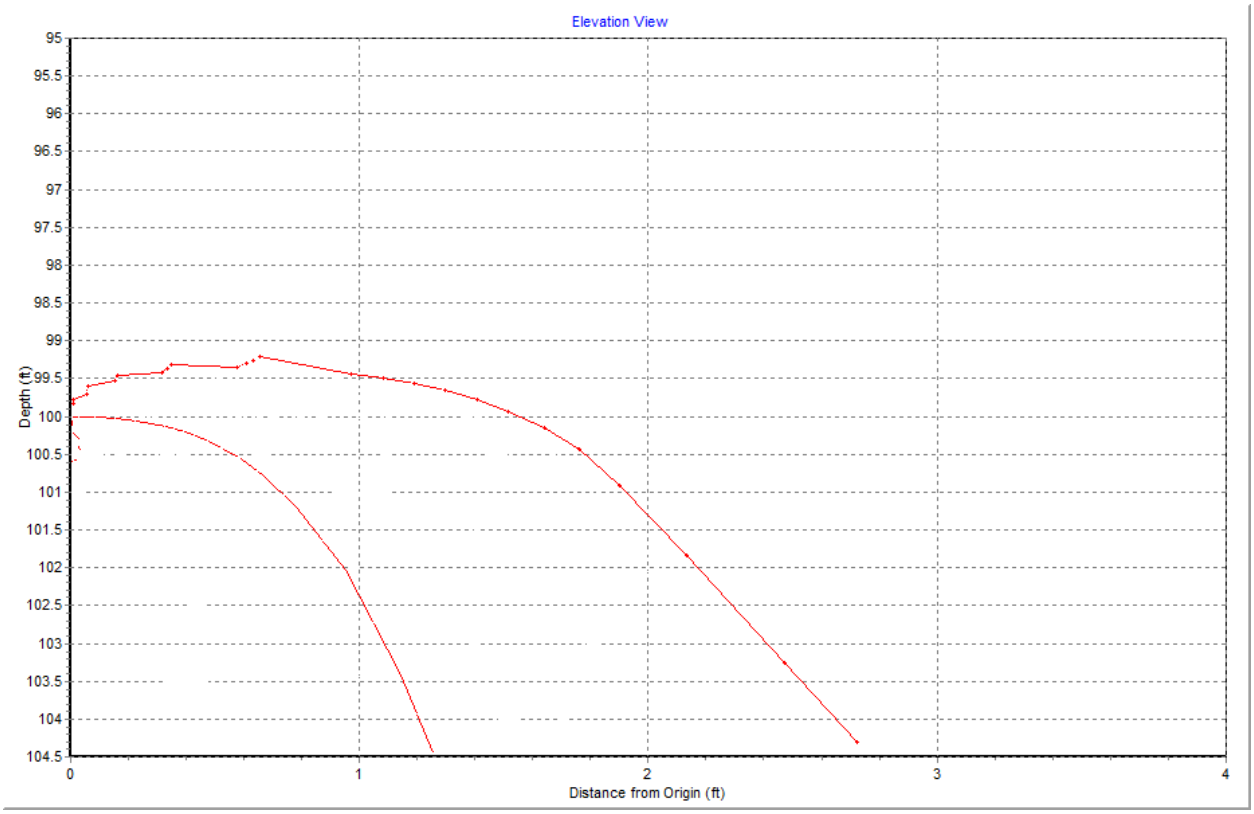


Figure C.5.1: Plumes 18b solution of discharge plume trajectories for discharges of 0 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt., and 5 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Depth of maximum rise of the plume is Z = 99.3 ft. at Xa = 0.800 ft from the point of discharge. The centerline of the plume is at an average distance of Xb = 1.252 ft from the point of discharge as the plume begins to impact the bottom at a depth of Z = 104.5 ft.

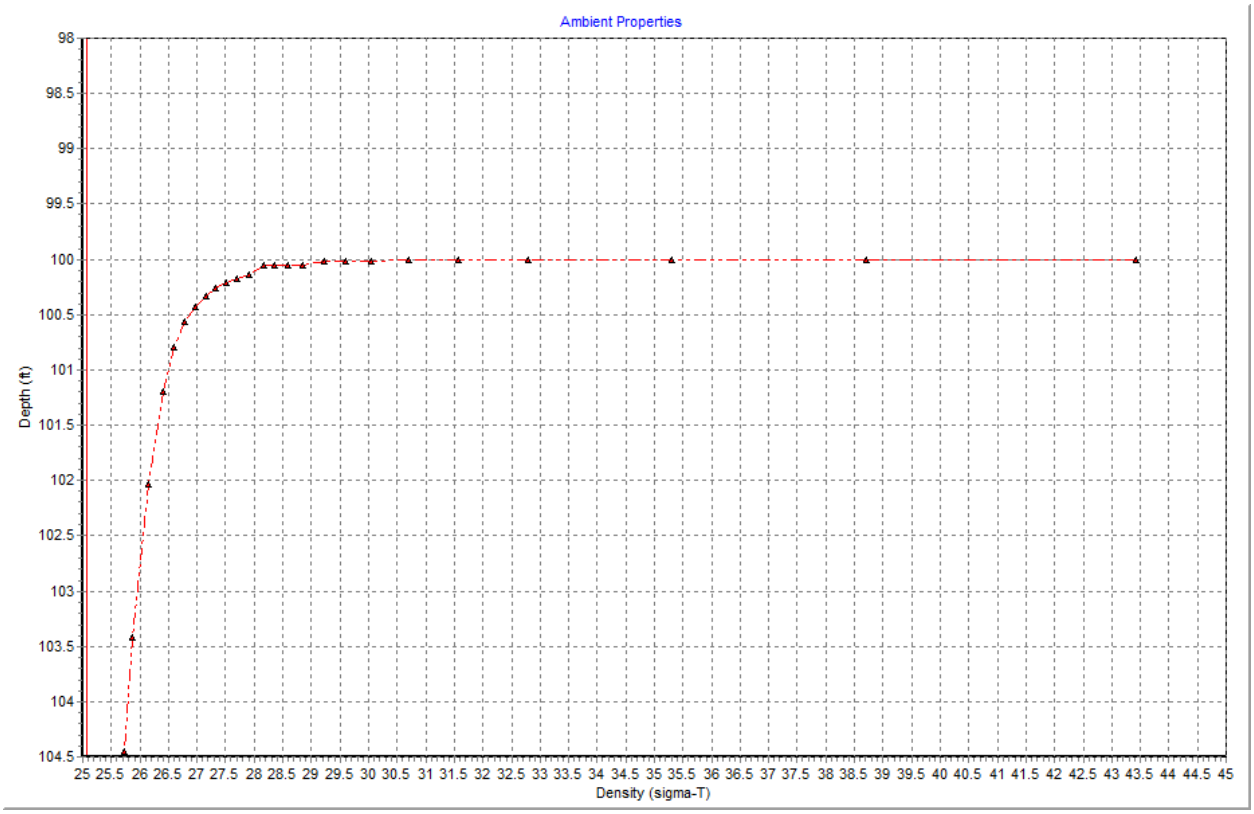


Figure C.5.2: Plumes 18b solution of vertical density profile for discharges of 0 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. and 5 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Discharge effluent density shown as black triangles. Ambient water mass density profile shown as solid red line.

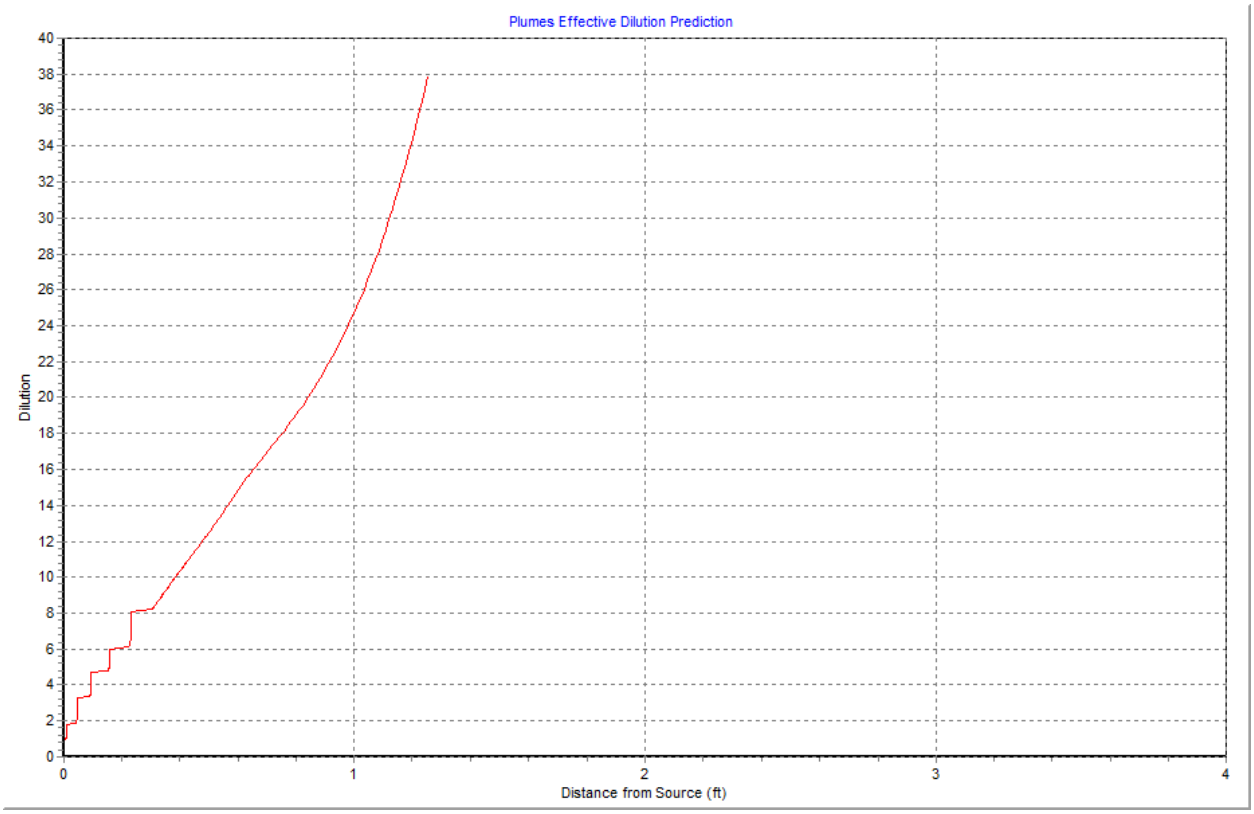


Figure C.5.3: Plumes 18b solution of effective (bulk average) dilution as a function of vertical distance from the point of discharge for discharges of 0 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. and 5 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Effective dilution is S_a = 12.09 at the maximum rise of the plume at Xa = 6.038 ft. from the point of discharge. As the plume begins to impact the bottom, the plume centerline is at a distance of Xb = 10.14 ft from the point of discharge, where the effective dilution reaches S_a = 21.26.

C.6: Plumes 18b Results for SJCOO discharges of 0 mgd Wastewater and 3 mgd Brine:

Contents of the memo box (may not be current and must be updated manually)
Project "C:\Plumes18\SJCOO_WW0mgd_b3mgd_D-1"
memo
SJCOO discharging 0 mgd wastewater and 3 mgd brine

Model configuration items checked:
Channel width (m) 100
Start case for graphs 1
Max detailed graphs 10 (limits plots that can overflow memory)
Elevation Projection Plane (deg) 0
Shore vector (m,deg) not checked
Bacteria model : Mancini (1978) coliform model
PDS sfc. model heat transfer : Medium
Equation of State : S, T
Similarity Profile : Default profile (k=2.0, ...)
Diffuser port contraction coefficient 1
Light absorption coefficient 0.16
Farfield increment (m) 200
UM3 aspiration coefficient 0.1
Output file: text output tab
Output each ?? steps 1
Maximum dilution reported 1000
Text output format : Standard
Max vertical reversals : to max rise or fall

/ UM3. 1/14/2019 2:23:04 PM
Case 1; ambient file C:\Plumes18\SJCOO_WW0mgd_b3mgd_D-1.001.db; Diffuser table record 1: ----------
---

Ambient Table:

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn	Density
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2	sigma-T
0.0	0.0	0.0	33.38	19.97	0.0	0.0	0.0	0.0	0.0003	23.55719
2.000	0.0	0.0	33.39	19.87	0.0	0.0	0.0	0.0	0.0003	23.59288
4.000	0.0	0.0	33.40	19.81	0.0	0.0	0.0	0.0	0.0003	23.61484
7.000	0.0	0.0	33.41	19.64	0.0	0.0	0.0	0.0	0.0003	23.67096
10.00	0.0	0.0	33.40	17.76	0.0	0.0	0.0	0.0	0.0003	24.12888
12.00	0.0	0.0	33.38	17.34	0.0	0.0	0.0	0.0	0.0003	24.21549
14.00	0.0	0.0	33.38	16.73	0.0	0.0	0.0	0.0	0.0003	24.35932
16.00	0.0	0.0	33.38	15.17	0.0	0.0	0.0	0.0	0.0003	24.71340
18.00	0.0	0.0	33.37	14.37	0.0	0.0	0.0	0.0	0.0003	24.87044
20.00	0.0	0.0	33.35	14.18	0.0	0.0	0.0	0.0	0.0003	24.89660
22.00	0.0	0.0	33.33	13.83	0.0	0.0	0.0	0.0	0.0003	24.95172
24.00	0.0	0.0	33.32	13.75	0.0	0.0	0.0	0.0	0.0003	24.96707
26.00	0.0	0.0	33.36	13.42	0.0	0.0	0.0	0.0	0.0003	25.06459
31.85	0.0	0.0	33.36	13.39	0.0	0.0	0.0	0.0	0.0003	25.07201

Diffuser table:

P-dia	Ver angl	H-Angle	SourceX	SourceY	Ports	MZ-dis	Isoplth	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(in)	(deg)	(deg)	(ft)	(ft)	()	(ft)	(concent)	(ft)	(MGD)	(psu)	(C)	(ppm)
3.0500	0.0	0.0	0.0	0.0	125.00	1000.0	0.0	100.00	3.0000	67.000	20.660	67000.0

Simulation:
Froude No: -1.678; Strat No:-1.57E-4; Spcg No: 14.39; k: 22307.6; eff den (sigmaT) 49.48870; eff vel 0.223(m/s);
Current is very small, flow regime may be transient.

Step	Depth (ft)	Amb-cur (m/s)	P-dia (in)	Eff-sal (psu)	Polutnt (ppm)	Dilutn ()	x-posn (ft)	y-posn (ft)	Iso dia (m)
0	100.0	1.000E-5	3.050	67.00	67000.0	1.000	0.0	0.0	0.07747;
1	100.0	0.0	3.055	66.89	66769.4	1.003	0.00219	0.0	0.0776;
2	100.0	0.0	3.092	66.23	65430.1	1.024	0.00299	0.0	0.07853;
3	100.0	0.0	3.154	65.59	64118.2	1.045	0.0033	0.0	0.08011;
4	100.0	0.0	3.218	64.95	62833.3	1.066	0.00342	0.0	0.08173;
5	100.0	0.0	3.283	64.33	61574.6	1.088	0.00347	0.0	0.08339;
6	100.0	0.0	3.349	63.73	60341.7	1.110	0.00349	0.0	0.08507;
7	100.0	0.0	3.417	63.13	59133.9	1.133	0.00349	0.0	0.08679;
8	100.0	0.0	3.486	62.55	57950.9	1.156	0.0035	0.0	0.08855;
9	100.0	0.0	3.557	61.98	56791.9	1.180	0.0035	0.0	0.09034;
10	100.0	0.0	3.628	61.41	55656.6	1.204	0.0035	0.0	0.09216;
11	100.0	0.0	3.702	60.86	54544.3	1.228	0.0035	0.0	0.09402;
12	100.0	0.0	3.776	60.33	53454.7	1.253	0.0035	0.0	0.09592;
13	100.0	0.0	3.853	59.80	52387.3	1.279	0.0035	0.0	0.09786;
14	100.0	0.0	3.930	59.28	51341.6	1.305	0.0035	0.0	0.09983;
15	100.0	0.0	4.010	58.77	50317.1	1.332	0.0035	0.0	0.1018;
16	100.0	0.0	4.091	58.27	49313.3	1.359	0.0205	0.0	0.1039;
17	100.0	0.0	4.153	58.00	48774.2	1.374	0.0231	0.0	0.1055;
18	100.0	0.0	4.217	57.52	47801.7	1.402	0.024	0.0	0.1071;
19	100.0	0.0	4.302	57.05	46849.0	1.430	0.0244	0.0	0.1093;
20	100.0	0.0	4.389	56.58	45915.5	1.459	0.0246	0.0	0.1115;
21	100.0	0.0	4.477	56.13	45000.9	1.489	0.0246	0.0	0.1137;
22	100.0	0.0	4.567	55.68	44104.9	1.519	0.0246	0.0	0.1160;
23	100.0	0.0	4.659	55.24	43226.9	1.550	0.0246	0.0	0.1183;
24	100.0	0.0	4.753	54.81	42366.6	1.581	0.0246	0.0	0.1207;
25	100.0	0.0	4.849	54.39	41523.7	1.614	0.0246	0.0	0.1232;
26	100.0	0.0	4.947	53.98	40697.9	1.646	0.0246	0.0	0.1256;
27	100.0	0.0	5.046	53.58	39888.6	1.680	0.0246	0.0	0.1282;
28	100.0	0.0	5.148	53.18	39095.7	1.714	0.0246	0.0	0.1308;
29	100.0	0.0	5.250	52.80	38341.3	1.747	0.0246	0.0	0.1334; begin overlap;
30	100.0	0.0	5.351	52.44	37623.1	1.781	0.0246	0.0	0.1359;
31	100.0	0.0	5.445	52.14	37022.9	1.810	0.0246	0.0	0.1383;
32	100.0	0.0	5.544	51.78	36287.6	1.846	0.0472	0.0	0.1408;
33	100.0	0.0	5.601	51.68	36098.3	1.856	0.0491	0.0	0.1423;
34	100.0	0.0	5.662	51.38	35493.1	1.888	0.0499	0.0	0.1438;
35	100.0	0.0	5.756	51.09	34913.6	1.919	0.0501	0.0	0.1462;
36	100.0	0.0	5.849	50.81	34361.7	1.950	0.0503	0.0	0.1486;
37	100.0	0.0	5.941	50.55	33835.4	1.980	0.0503	0.0	0.1509;
38	100.0	0.0	6.031	50.29	33332.8	2.010	0.0503	0.0	0.1532;
39	100.0	0.0	6.120	50.05	32852.2	2.039	0.0503	0.0	0.1555;
40	100.0	0.0	6.208	49.82	32392.0	2.068	0.0503	0.0	0.1577;
41	100.0	0.0	6.295	49.60	31950.9	2.097	0.0503	0.0	0.1599;
42	100.0	0.0	6.380	49.39	31527.5	2.125	0.0503	0.0	0.1620;
43	100.0	0.0	6.464	49.18	31120.7	2.153	0.0503	0.0	0.1642;
44	100.0	0.0	6.547	48.99	30729.4	2.180	0.0503	0.0	0.1663;
45	100.0	0.0	6.629	48.80	30353.0	2.207	0.0503	0.0	0.1684;
46	100.0	0.0	6.710	48.61	29980.9	2.235	0.0503	0.0	0.1704;
47	100.0	0.0	6.796	48.41	29586.9	2.265	0.0503	0.0	0.1726;
48	100.0	0.0	6.910	48.12	29000.8	2.310	0.0776	0.0	0.1755;
49	100.0	0.0	6.940	48.08	28933.6	2.316	0.0792	0.0	0.1763;

50	100.0	0.0	6.985	47.92	28604.9	2.342	0.0798	0.0	0.1774;
51	100.0	0.0	7.062	47.76	28285.2	2.369	0.0801	0.0	0.1794;
52	100.0	0.0	7.140	47.60	27975.7	2.395	0.0802	0.0	0.1814;
53	100.0	0.0	7.218	47.45	27676.2	2.421	0.0802	0.0	0.1833;
54	100.0	0.0	7.295	47.30	27386.1	2.446	0.0802	0.0	0.1853;
55	100.0	0.0	7.371	47.16	27105.0	2.472	0.0802	0.0	0.1872;
56	100.0	0.0	7.446	47.02	26832.5	2.497	0.0802	0.0	0.1891;
57	100.0	0.0	7.520	46.89	26568.1	2.522	0.0802	0.0	0.1910;
58	100.0	0.0	7.594	46.76	26311.5	2.546	0.0802	0.0	0.1929;
59	100.0	0.0	7.667	46.63	26062.1	2.571	0.0802	0.0	0.1947;
60	100.0	0.0	7.739	46.51	25819.9	2.595	0.0802	0.0	0.1966;
61	100.0	0.0	7.811	46.39	25584.2	2.619	0.0802	0.0	0.1984;
62	100.0	0.0	7.882	46.28	25353.0	2.643	0.0802	0.0	0.2002;
63	100.0	0.0	7.953	46.16	25127.0	2.666	0.0802	0.0	0.2020;
64	100.0	0.0	8.069	45.91	24630.0	2.720	0.111	0.0	0.2050;
65	100.0	0.0	8.039	45.89	24595.0	2.724	0.112	0.0	0.2042;
66	100.0	0.0	8.076	45.78	24370.2	2.749	0.113	0.0	0.2051;
67	100.0	0.0	8.147	45.67	24149.9	2.774	0.113	0.0	0.2069;
68	100.0	0.0	8.219	45.56	23935.1	2.799	0.113	0.0	0.2088;
69	100.0	0.0	8.291	45.45	23725.9	2.824	0.113	0.0	0.2106;
70	100.0	0.0	8.363	45.35	23522.0	2.848	0.113	0.0	0.2124;
71	100.0	0.0	8.435	45.25	23323.3	2.873	0.113	0.0	0.2142;
72	100.0	0.0	8.506	45.15	23129.6	2.897	0.113	0.0	0.2160;
73	100.0	0.0	8.576	45.06	22940.7	2.921	0.113	0.0	0.2178;
74	100.0	0.0	8.646	44.96	22756.3	2.944	0.113	0.0	0.2196;
75	100.0	0.0	8.715	44.87	22576.4	2.968	0.113	0.0	0.2214;
76	100.0	0.0	8.784	44.78	22400.7	2.991	0.113	0.0	0.2231;
77	100.0	0.0	8.852	44.70	22229.0	3.014	0.113	0.0	0.2248;
78	100.0	0.0	8.919	44.61	22061.3	3.037	0.113	0.0	0.2265;
79	100.0	0.0	8.987	44.53	21894.6	3.060	0.113	0.0	0.2283;
80	100.0	0.0	9.050	44.46	21753.6	3.080	0.113	0.0	0.2299;
81	100.0	0.0	9.097	44.41	21667.9	3.092	0.113	0.0	0.2311;
82	100.0	0.0	9.206	44.20	21239.8	3.154	0.145	0.0	0.2338;
83	100.0	0.0	9.076	44.19	21217.9	3.158	0.147	0.0	0.2305;
84	100.0	0.0	9.107	44.10	21044.5	3.184	0.147	0.0	0.2313;
85	100.0	0.0	9.177	44.01	20873.7	3.210	0.148	0.0	0.2331;
86	100.0	0.0	9.249	43.93	20706.6	3.236	0.148	0.0	0.2349;
87	100.0	0.0	9.321	43.84	20543.3	3.261	0.148	0.0	0.2368;
88	100.0	0.0	9.394	43.76	20383.7	3.287	0.148	0.0	0.2386;
89	100.0	0.0	9.467	43.68	20227.8	3.312	0.148	0.0	0.2405;
90	100.0	0.0	9.539	43.61	20075.4	3.337	0.148	0.0	0.2423;
91	100.0	0.0	9.610	43.53	19926.4	3.362	0.148	0.0	0.2441;
92	100.0	0.0	9.681	43.46	19780.7	3.387	0.148	0.0	0.2459;
93	100.0	0.0	9.752	43.39	19638.2	3.412	0.148	0.0	0.2477;
94	100.0	0.0	9.822	43.32	19498.7	3.436	0.148	0.0	0.2495;
95	100.0	0.0	9.891	43.25	19362.2	3.460	0.148	0.0	0.2512;
96	100.0	0.0	9.960	43.18	19228.5	3.484	0.148	0.0	0.2530;
97	100.0	0.0	10.03	43.11	19097.7	3.508	0.148	0.0	0.2547;
98	100.0	0.0	10.10	43.05	18970.7	3.532	0.148	0.0	0.2564;
99	100.0	0.0	10.16	42.99	18850.8	3.554	0.148	0.0	0.2581;
100	100.0	0.0	10.22	42.93	18738.9	3.575	0.148	0.0	0.2597;
101	100.0	0.0	10.28	42.89	18656.2	3.591	0.148	0.0	0.2610;
102	100.1	0.0	10.40	42.70	18288.0	3.664	0.181	0.0	0.2642;
103	100.1	0.0	10.13	42.69	18272.3	3.667	0.183	0.0	0.2573;
104	100.1	0.0	10.16	42.62	18126.7	3.696	0.183	0.0	0.2581;
105	100.1	0.0	10.23	42.55	17982.9	3.726	0.184	0.0	0.2599;

106	100.1	0.0	10.31	42.48	17841.9	3.755	0.184	0.0	0.2619;
107	100.1	0.0	10.39	42.41	17703.8	3.784	0.184	0.0	0.2639;
108	100.1	0.0	10.47	42.34	17568.8	3.814	0.184	0.0	0.2659;
109	100.1	0.0	10.55	42.27	17436.7	3.842	0.184	0.0	0.2679;
110	100.1	0.0	10.62	42.20	17307.5	3.871	0.184	0.0	0.2699;
111	100.1	0.0	10.70	42.14	17181.1	3.900	0.184	0.0	0.2718;
112	100.1	0.0	10.78	42.08	17057.5	3.928	0.184	0.0	0.2738;
113	100.1	0.0	10.86	42.02	16936.5	3.956	0.184	0.0	0.2758;
114	100.1	0.0	10.93	41.96	16818.1	3.984	0.184	0.0	0.2777;
115	100.1	0.0	11.01	41.90	16702.1	4.011	0.184	0.0	0.2797;
116	100.1	0.0	11.09	41.84	16588.5	4.039	0.184	0.0	0.2816;
117	100.1	0.0	11.16	41.78	16477.2	4.066	0.184	0.0	0.2835;
118	100.1	0.0	11.24	41.73	16368.1	4.093	0.184	0.0	0.2854;
119	100.1	0.0	11.31	41.67	16261.2	4.120	0.184	0.0	0.2873;
120	100.1	0.0	11.38	41.62	16156.2	4.147	0.184	0.0	0.2891;
121	100.1	0.0	11.46	41.57	16053.4	4.174	0.184	0.0	0.2910;
122	100.1	0.0	11.53	41.52	15952.6	4.200	0.184	0.0	0.2928;
123	100.1	0.0	11.60	41.47	15855.9	4.226	0.184	0.0	0.2947;
124	100.1	0.0	11.67	41.42	15755.6	4.252	0.184	0.0	0.2965;
125	100.1	0.0	11.75	41.36	15649.0	4.281	0.184	0.0	0.2984;
126	100.1	0.0	11.91	41.20	15340.5	4.368	0.218	0.0	0.3024;
127	100.1	0.0	11.44	41.20	15328.8	4.371	0.220	0.0	0.2906;
128	100.1	0.0	11.47	41.14	15203.5	4.407	0.221	0.0	0.2913;
129	100.1	0.0	11.55	41.07	15079.3	4.443	0.221	0.0	0.2933;
130	100.1	0.0	11.63	41.01	14957.2	4.479	0.222	0.0	0.2954;
131	100.1	0.0	11.72	40.95	14837.5	4.516	0.222	0.0	0.2976;
132	100.1	0.0	11.81	40.89	14720.2	4.552	0.222	0.0	0.2999;
133	100.1	0.0	11.90	40.83	14605.3	4.587	0.222	0.0	0.3021;
134	100.1	0.0	11.99	40.77	14493.0	4.623	0.222	0.0	0.3044;
135	100.1	0.0	12.08	40.72	14383.0	4.658	0.222	0.0	0.3067;
136	100.1	0.0	12.17	40.66	14275.5	4.693	0.222	0.0	0.3090;
137	100.1	0.0	12.26	40.61	14170.3	4.728	0.222	0.0	0.3113;
138	100.1	0.0	12.35	40.56	14067.3	4.763	0.223	0.0	0.3136;
139	100.1	0.0	12.43	40.51	13966.6	4.797	0.223	0.0	0.3158;
140	100.1	0.0	12.52	40.46	13868.0	4.831	0.223	0.0	0.3181;
141	100.1	0.0	12.61	40.41	13771.4	4.865	0.223	0.0	0.3203;
142	100.1	0.0	12.70	40.36	13676.8	4.899	0.223	0.0	0.3225;
143	100.1	0.0	12.79	40.31	13584.2	4.932	0.223	0.0	0.3247;
144	100.1	0.0	12.87	40.27	13493.4	4.965	0.223	0.0	0.3269;
145	100.1	0.0	12.96	40.22	13404.4	4.998	0.223	0.0	0.3291;
146	100.1	0.0	13.04	40.18	13317.2	5.031	0.223	0.0	0.3313;
147	100.1	0.0	13.13	40.13	13231.6	5.064	0.223	0.0	0.3334;
148	100.1	0.0	13.21	40.09	13147.7	5.096	0.223	0.0	0.3356;
149	100.1	0.0	13.29	40.05	13065.4	5.128	0.223	0.0	0.3377;
150	100.1	0.0	13.38	40.01	12984.6	5.160	0.223	0.0	0.3398;
151	100.1	0.0	13.46	39.97	12905.3	5.192	0.223	0.0	0.3419;
152	100.1	0.0	13.54	39.93	12827.5	5.223	0.223	0.0	0.3440;
153	100.1	0.0	13.62	39.89	12751.0	5.254	0.223	0.0	0.3460;
154	100.1	0.0	13.70	39.85	12676.0	5.286	0.223	0.0	0.3481;
155	100.1	0.0	13.79	39.81	12602.2	5.317	0.223	0.0	0.3501;
156	100.1	0.0	13.87	39.77	12529.6	5.347	0.223	0.0	0.3522;
157	100.1	0.0	13.95	39.74	12458.4	5.378	0.223	0.0	0.3542;
158	100.1	0.0	14.02	39.70	12388.7	5.408	0.223	0.0	0.3562;
159	100.1	0.0	14.10	39.67	12318.2	5.439	0.223	0.0	0.3582;
160	100.1	0.0	14.18	39.63	12249.7	5.470	0.223	0.0	0.3602;
161	100.1	0.0	14.27	39.59	12174.1	5.503	0.223	0.0	0.3624;

162	100.1	0.0	14.38	39.53	12056.1	5.557	0.223	0.0	0.3653;
163	100.1	0.0	14.49	39.50	11990.5	5.588	0.223	0.0	0.3680;
164	100.1	0.0	14.56	39.47	11938.4	5.612	0.223	0.0	0.3698;
165	100.1	0.0	14.61	39.46	11903.6	5.629	0.223	0.0	0.3712;
166	100.1	0.0	14.78	39.34	11669.2	5.742	0.259	0.0	0.3754;
167	100.1	0.0	13.88	39.33	11662.2	5.745	0.261	0.0	0.3525;
168	100.1	0.0	13.90	39.28	11565.7	5.793	0.262	0.0	0.3531;
169	100.1	0.0	13.99	39.23	11469.7	5.841	0.263	0.0	0.3553;
170	100.1	0.0	14.07	39.19	11374.5	5.890	0.264	0.0	0.3575;
171	100.1	0.0	14.16	39.14	11280.4	5.940	0.265	0.0	0.3597;
172	100.1	0.0	14.25	39.09	11187.3	5.989	0.266	0.0	0.3620;
173	100.1	0.0	14.35	39.04	11095.3	6.039	0.266	0.0	0.3644;
174	100.1	0.0	14.44	39.00	11004.5	6.088	0.267	0.0	0.3668;
175	100.1	0.0	14.53	38.95	10914.9	6.138	0.268	0.0	0.3692;
176	100.2	0.0	14.63	38.91	10826.5	6.189	0.269	0.0	0.3716;
177	100.2	0.0	14.73	38.86	10739.2	6.239	0.269	0.0	0.3740;
178	100.2	0.0	14.82	38.82	10653.1	6.289	0.270	0.0	0.3765;
179	100.2	0.0	14.92	38.77	10568.1	6.340	0.271	0.0	0.3789;
180	100.2	0.0	15.01	38.73	10484.2	6.391	0.272	0.0	0.3814;
181	100.2	0.0	15.11	38.69	10401.5	6.441	0.272	0.0	0.3838;
182	100.2	0.0	15.21	38.65	10319.8	6.492	0.273	0.0	0.3863;
183	100.2	0.0	15.30	38.61	10239.2	6.544	0.274	0.0	0.3887;
184	100.2	0.0	15.40	38.57	10159.5	6.595	0.275	0.0	0.3911;
185	100.2	0.0	15.49	38.53	10080.8	6.646	0.275	0.0	0.3935;
186	100.2	0.0	15.59	38.49	10003.0	6.698	0.276	0.0	0.3959;
187	100.2	0.0	15.68	38.45	9926.0	6.750	0.277	0.0	0.3982;
188	100.2	0.0	15.77	38.41	9849.8	6.802	0.278	0.0	0.4006;
189	100.2	0.0	15.86	38.37	9774.4	6.855	0.279	0.0	0.4029;
190	100.2	0.0	15.95	38.33	9699.6	6.907	0.280	0.0	0.4051;
191	100.2	0.0	16.04	38.29	9625.4	6.961	0.281	0.0	0.4073;
192	100.2	0.0	16.12	38.26	9551.7	7.014	0.282	0.0	0.4095;
193	100.2	0.0	16.20	38.22	9478.4	7.069	0.283	0.0	0.4116;
194	100.2	0.0	16.28	38.18	9405.5	7.124	0.284	0.0	0.4136;
195	100.2	0.0	16.36	38.14	9332.7	7.179	0.286	0.0	0.4155;
196	100.2	0.0	16.43	38.11	9263.3	7.233	0.287	0.0	0.4173;
197	100.2	0.0	16.49	38.08	9197.6	7.285	0.289	0.0	0.4189;
198	100.2	0.0	16.55	38.04	9132.4	7.337	0.290	0.0	0.4203;
199	100.2	0.0	16.61	38.01	9067.8	7.389	0.292	0.0	0.4218;
200	100.2	0.0	16.66	37.98	9003.7	7.441	0.293	0.0	0.4232;
201	100.2	0.0	16.72	37.94	8940.2	7.494	0.295	0.0	0.4246;
202	100.2	0.0	16.77	37.91	8877.2	7.547	0.297	0.0	0.4260;
203	100.2	0.0	16.83	37.88	8814.7	7.601	0.298	0.0	0.4274;
204	100.2	0.0	16.88	37.85	8752.7	7.655	0.300	0.0	0.4288;
205	100.2	0.0	16.94	37.82	8691.1	7.709	0.301	0.0	0.4302;
206	100.2	0.0	16.99	37.79	8630.0	7.764	0.303	0.0	0.4315;
207	100.2	0.0	17.04	37.75	8569.3	7.819	0.305	0.0	0.4328;
208	100.2	0.0	17.09	37.72	8509.0	7.874	0.306	0.0	0.4341;
209	100.2	0.0	17.14	37.69	8449.1	7.930	0.308	0.0	0.4354;
210	100.2	0.0	17.19	37.66	8389.5	7.986	0.310	0.0	0.4367;
211	100.2	0.0	17.24	37.63	8330.4	8.043	0.311	0.0	0.4380;
212	100.2	0.0	17.29	37.60	8271.6	8.100	0.313	0.0	0.4393;
213	100.2	0.0	17.34	37.57	8213.1	8.158	0.315	0.0	0.4405;
214	100.2	0.0	17.39	37.54	8154.9	8.216	0.317	0.0	0.4418;
215	100.2	0.0	17.44	37.51	8097.0	8.275	0.318	0.0	0.4430;
216	100.2	0.0	17.49	37.48	8039.5	8.334	0.320	0.0	0.4442;
217	100.2	0.0	17.54	37.45	7982.1	8.394	0.322	0.0	0.4454;

218	100.2	0.0	17.58	37.42	7925.1	8.454	0.324	0.0	0.4466;
219	100.2	0.0	17.63	37.40	7868.2	8.515	0.326	0.0	0.4478;
220	100.2	0.0	17.67	37.37	7811.6	8.577	0.328	0.0	0.4489;
221	100.2	0.0	17.72	37.34	7755.2	8.639	0.329	0.0	0.4501;
222	100.3	0.0	17.77	37.31	7699.0	8.702	0.331	0.0	0.4512;
223	100.3	0.0	17.81	37.28	7642.9	8.766	0.333	0.0	0.4524;
224	100.3	0.0	17.86	37.25	7587.0	8.831	0.335	0.0	0.4535;
225	100.3	0.0	17.90	37.22	7531.3	8.896	0.337	0.0	0.4546;
226	100.3	0.0	17.94	37.20	7475.6	8.962	0.339	0.0	0.4558;
227	100.3	0.0	17.99	37.17	7420.1	9.030	0.341	0.0	0.4569;
228	100.3	0.0	18.03	37.14	7364.6	9.098	0.343	0.0	0.4580;
229	100.3	0.0	18.07	37.11	7309.2	9.167	0.345	0.0	0.4591;
230	100.3	0.0	18.12	37.08	7253.8	9.237	0.348	0.0	0.4602;
231	100.3	0.0	18.16	37.05	7198.5	9.308	0.350	0.0	0.4613;
232	100.3	0.0	18.20	37.03	7143.2	9.380	0.352	0.0	0.4624;
233	100.3	0.0	18.25	37.00	7087.8	9.453	0.354	0.0	0.4635;
234	100.3	0.0	18.29	36.97	7032.4	9.527	0.356	0.0	0.4646;
235	100.3	0.0	18.33	36.94	6977.0	9.603	0.359	0.0	0.4657;
236	100.3	0.0	18.38	36.91	6921.4	9.680	0.361	0.0	0.4668;
237	100.3	0.0	18.42	36.88	6865.8	9.759	0.363	0.0	0.4679;
238	100.3	0.0	18.46	36.85	6810.0	9.838	0.366	0.0	0.4690;
239	100.3	0.0	18.51	36.83	6754.1	9.920	0.368	0.0	0.4701;
240	100.3	0.0	18.55	36.80	6698.0	10.00	0.370	0.0	0.4712;
241	100.3	0.0	18.60	36.77	6641.6	10.09	0.373	0.0	0.4724;
242	100.3	0.0	18.64	36.74	6585.1	10.17	0.375	0.0	0.4735;
243	100.4	0.0	18.69	36.71	6528.2	10.26	0.378	0.0	0.4747;
244	100.4	0.0	18.74	36.68	6471.0	10.35	0.380	0.0	0.4759;
245	100.4	0.0	18.78	36.65	6413.5	10.45	0.383	0.0	0.4771;
246	100.4	0.0	18.83	36.62	6355.6	10.54	0.386	0.0	0.4783;
247	100.4	0.0	18.88	36.59	6297.4	10.64	0.389	0.0	0.4796;
248	100.4	0.0	18.93	36.56	6240.4	10.74	0.391	0.0	0.4808; end overlap;
249	100.4	0.0	18.97	36.53	6184.4	10.83	0.394	0.0	0.4819;
250	100.4	0.0	19.02	36.51	6129.4	10.93	0.397	0.0	0.4830;
251	100.4	0.0	19.05	36.48	6075.3	11.03	0.400	0.0	0.4840;
252	100.4	0.0	19.09	36.45	6022.1	11.13	0.403	0.0	0.4848;
253	100.4	0.0	19.12	36.43	5969.8	11.22	0.406	0.0	0.4857;
254	100.4	0.0	19.15	36.40	5918.2	11.32	0.409	0.0	0.4864;
255	100.5	0.0	19.17	36.37	5867.2	11.42	0.412	0.0	0.4870;
256	100.5	0.0	19.20	36.35	5816.9	11.52	0.415	0.0	0.4876;
257	100.5	0.0	19.22	36.32	5767.2	11.62	0.419	0.0	0.4881;
258	100.5	0.0	19.23	36.30	5718.0	11.72	0.422	0.0	0.4885;
259	100.5	0.0	19.25	36.27	5669.2	11.82	0.425	0.0	0.4889;
260	100.5	0.0	19.26	36.25	5620.8	11.92	0.429	0.0	0.4892;
261	100.5	0.0	19.27	36.22	5572.7	12.02	0.433	0.0	0.4894;
262	100.5	0.0	19.28	36.20	5524.8	12.13	0.436	0.0	0.4896;
263	100.5	0.0	19.28	36.17	5477.0	12.23	0.440	0.0	0.4897;
264	100.6	0.0	19.28	36.15	5429.4	12.34	0.444	0.0	0.4898;
265	100.6	0.0	19.29	36.12	5381.8	12.45	0.448	0.0	0.4899;
266	100.6	0.0	19.29	36.10	5334.1	12.56	0.452	0.0	0.4899;
267	100.6	0.0	19.29	36.08	5286.2	12.67	0.456	0.0	0.4899;
268	100.6	0.0	19.28	36.05	5238.1	12.79	0.461	0.0	0.4898;
269	100.6	0.0	19.28	36.03	5189.7	12.91	0.465	0.0	0.4897;
270	100.7	0.0	19.28	36.00	5140.9	13.03	0.470	0.0	0.4897;
271	100.7	0.0	19.27	35.98	5091.5	13.16	0.474	0.0	0.4896;
272	100.7	0.0	19.27	35.95	5041.6	13.29	0.479	0.0	0.4895;
273	100.7	0.0	19.27	35.92	4990.9	13.42	0.484	0.0	0.4894;

274	100.7	0.0	19.27	35.90	4939.4	13.56	0.489	0.0	0.4894;
275	100.8	0.0	19.27	35.87	4886.9	13.71	0.495	0.0	0.4893;
276	100.8	0.0	19.27	35.84	4833.4	13.86	0.500	0.0	0.4894;
277	100.8	0.0	19.27	35.82	4778.8	14.02	0.506	0.0	0.4895;
278	100.9	0.0	19.28	35.79	4722.8	14.19	0.512	0.0	0.4896;
279	100.9	0.0	19.28	35.76	4665.4	14.36	0.518	0.0	0.4898;
280	100.9	0.0	19.30	35.73	4606.4	14.54	0.524	0.0	0.4902;
281	100.9	0.0	19.31	35.70	4545.7	14.74	0.530	0.0	0.4906;
282	101.0	0.0	19.34	35.66	4483.2	14.94	0.537	0.0	0.4912;
283	101.0	0.0	19.37	35.63	4418.7	15.16	0.544	0.0	0.4919;
284	101.1	0.0	19.40	35.60	4352.0	15.40	0.551	0.0	0.4928;
285	101.1	0.0	19.44	35.56	4283.0	15.64	0.559	0.0	0.4939;
286	101.2	0.0	19.50	35.52	4211.5	15.91	0.566	0.0	0.4952;
287	101.2	0.0	19.56	35.49	4137.4	16.19	0.574	0.0	0.4968;
288	101.3	0.0	19.63	35.45	4060.6	16.50	0.583	0.0	0.4987;
289	101.3	0.0	19.72	35.41	3980.8	16.83	0.592	0.0	0.5008;
290	101.4	0.0	19.81	35.37	3902.7	17.17	0.600	0.0	0.5031;
291	101.4	0.0	19.90	35.33	3826.0	17.51	0.608	0.0	0.5056;
292	101.5	0.0	20.01	35.29	3750.9	17.86	0.617	0.0	0.5083;
293	101.6	0.0	20.13	35.25	3677.3	18.22	0.625	0.0	0.5112;
294	101.6	0.0	20.25	35.21	3605.1	18.58	0.633	0.0	0.5143;
295	101.7	0.0	20.38	35.18	3534.3	18.96	0.640	0.0	0.5177;
296	101.7	0.0	20.52	35.14	3464.9	19.34	0.648	0.0	0.5212;
297	101.8	0.0	20.66	35.11	3396.9	19.72	0.655	0.0	0.5249;
298	101.9	0.0	20.82	35.07	3330.2	20.12	0.663	0.0	0.5287;
299	101.9	0.0	20.97	35.04	3264.8	20.52	0.670	0.0	0.5328;
300	102.0	0.0	21.14	35.01	3200.7	20.93	0.677	0.0	0.5369;
301	102.1	0.0	21.31	34.97	3137.9	21.35	0.684	0.0	0.5413;
302	102.1	0.0	21.49	34.94	3076.3	21.78	0.691	0.0	0.5457;
303	102.2	0.0	21.67	34.91	3015.9	22.22	0.698	0.0	0.5503;
304	102.2	0.0	21.85	34.88	2956.7	22.66	0.705	0.0	0.5551;
305	102.3	0.0	22.05	34.85	2898.7	23.11	0.712	0.0	0.5600;
306	102.4	0.0	22.24	34.82	2841.8	23.58	0.718	0.0	0.5650;
307	102.5	0.0	22.44	34.79	2786.0	24.05	0.725	0.0	0.5701;
308	102.5	0.0	22.65	34.77	2731.3	24.53	0.731	0.0	0.5754;
309	102.6	0.0	22.86	34.74	2677.7	25.02	0.738	0.0	0.5807;
310	102.7	0.0	23.08	34.71	2625.2	25.52	0.744	0.0	0.5862;
311	102.7	0.0	23.30	34.68	2573.6	26.03	0.750	0.0	0.5919;
312	102.8	0.0	23.53	34.66	2523.1	26.55	0.757	0.0	0.5976;
313	102.9	0.0	23.76	34.63	2473.6	27.09	0.763	0.0	0.6034;
314	102.9	0.0	23.99	34.61	2425.1	27.63	0.769	0.0	0.6094;
315	103.0	0.0	24.23	34.58	2377.5	28.18	0.775	0.0	0.6155;
316	103.1	0.0	24.48	34.56	2330.8	28.75	0.781	0.0	0.6217;
317	103.2	0.0	24.73	34.54	2285.1	29.32	0.787	0.0	0.6280;
318	103.3	0.0	24.98	34.51	2240.2	29.91	0.793	0.0	0.6345;
319	103.3	0.0	25.24	34.49	2196.3	30.51	0.799	0.0	0.6410;
320	103.4	0.0	25.50	34.47	2153.2	31.12	0.805	0.0	0.6476;
321	103.5	0.0	25.76	34.45	2110.9	31.74	0.810	0.0	0.6544;
322	103.6	0.0	26.04	34.43	2069.5	32.37	0.816	0.0	0.6613;
323	103.6	0.0	26.31	34.41	2028.9	33.02	0.822	0.0	0.6683;
324	103.7	0.0	26.59	34.38	1989.1	33.68	0.827	0.0	0.6754;
325	103.8	0.0	26.87	34.36	1950.1	34.36	0.833	0.0	0.6826;
326	103.9	0.0	27.16	34.35	1911.8	35.05	0.838	0.0	0.6899;
327	104.0	0.0	27.46	34.33	1874.3	35.75	0.844	0.0	0.6974;
328	104.1	0.0	27.75	34.31	1837.5	36.46	0.849	0.0	0.7049;
329	104.2	0.0	28.06	34.29	1801.4	37.19	0.855	0.0	0.7126;

```
330   104.2   0.0   28.36   34.27   1766.1   37.94   0.860   0.0   0.7204;
331   104.3   0.0   28.67   34.25   1731.5   38.70   0.866   0.0   0.7283;
332   104.4   0.0   28.99   34.24   1697.5   39.47   0.871   0.0   0.7363;
333   104.5   0.0   29.31   34.22   1664.2   40.26   0.876   0.0   0.7444; bottom hit;
Horiz plane projections in effluent direction: radius(m):      0.0; CL(m):   0.2671
Lmz(m):   0.2671
forced entrain     1     0.0  -1.375   0.744  0.0595
Rate sec-1         0.0 dy-1          0.0  kt:          0.0 Amb Sal      33.3632
 ;
2:23:05 PM. amb fills: 4
```

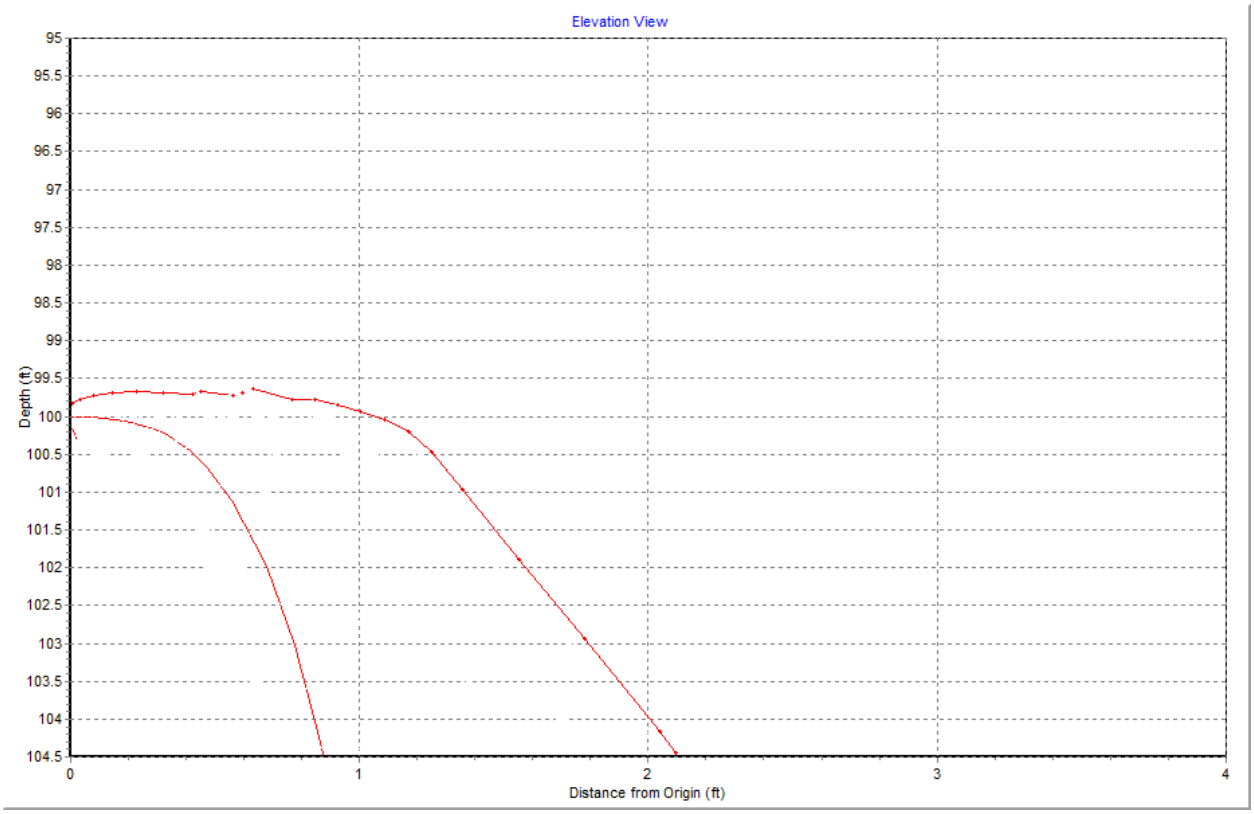


Figure C.6.1: Plumes 18b solution of discharge plume trajectories for discharges of 0 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt., and 3 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Depth of maximum rise of the plume is Z = 99.8 ft. at Xa = 0.750 ft from the point of discharge. The centerline of the plume is at an average distance of Xb = 0.876 ft from the point of discharge as the plume begins to impact the bottom at a depth of Z = 104.5 ft.

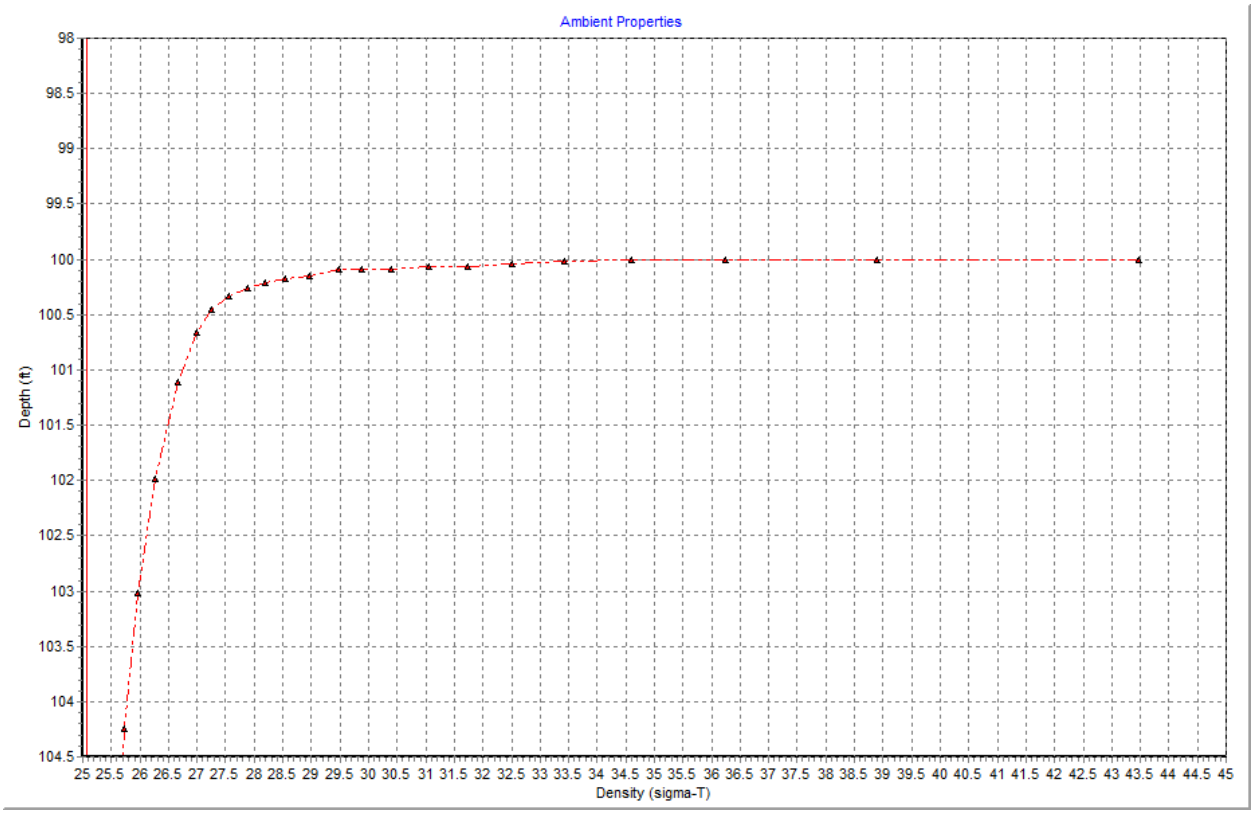


Figure C.6.2: Plumes 18b solution of vertical density profile for discharges of 0 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. and 3 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Discharge effluent density shown as black triangles. Ambient water mass density profile shown as solid red line.

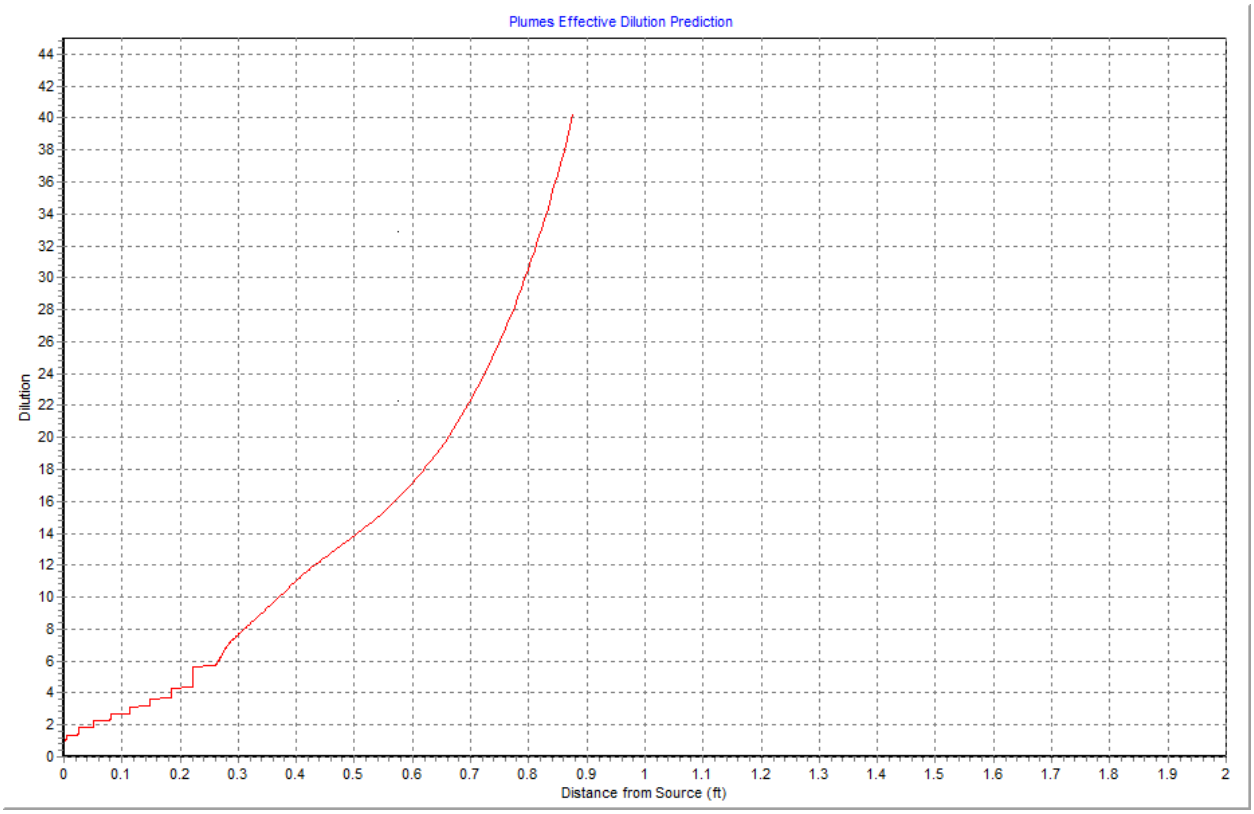


Figure C.6.3: Plumes 18b solution of effective (bulk average) dilution as a function of vertical distance from the point of discharge for discharges of 0 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. and 3 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Effective dilution is S_a = 26.03 at the maximum rise of the plume at Xa = 0.750 ft. from the point of discharge. As the plume begins to impact the bottom, the plume centerline is at a distance of Xb = 0.876 ft from the point of discharge, where the effective dilution reaches S_a = 40.26.

C.7: Plumes 18b Results for SJCOO discharges of 0.35 mgd Wastewater and 5 mgd Brine:

Contents of the memo box (may not be current and must be updated manually)
Project "C:\Plumes18\SJCOO_WW0.35mgd_b5mgd_D-1"
memo
SJCOO discharging 0.35 mgd wastewater and 5 mgd brine

Model configuration items checked:
Channel width (m) 100
Start case for graphs 1
Max detailed graphs 10 (limits plots that can overflow memory)
Elevation Projection Plane (deg) 0
Shore vector (m,deg) not checked
Bacteria model : Mancini (1978) coliform model
PDS sfc. model heat transfer : Medium
Equation of State : S, T
Similarity Profile : Default profile (k=2.0, ...)
Diffuser port contraction coefficient 1
Light absorption coefficient 0.16
Farfield increment (m) 200
UM3 aspiration coefficient 0.1
Output file: text output tab
Output each ?? steps 1
Maximum dilution reported 1000
Text output format : Standard
Max vertical reversals : to max rise or fall

/ UM3. 1/14/2019 2:50:38 PM
Case 1; ambient file C:\Plumes18\SJCOO_WW0.35mgd_b5mgd_D-1.001.db; Diffuser table record 1: ------
---

Ambient Table:

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn	Density
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2	sigma-T
0.0	0.0	0.0	33.38	19.97	0.0	0.0	0.0	0.0	0.0003	23.55719
2.000	0.0	0.0	33.39	19.87	0.0	0.0	0.0	0.0	0.0003	23.59288
4.000	0.0	0.0	33.40	19.81	0.0	0.0	0.0	0.0	0.0003	23.61484
7.000	0.0	0.0	33.41	19.64	0.0	0.0	0.0	0.0	0.0003	23.67096
10.00	0.0	0.0	33.40	17.76	0.0	0.0	0.0	0.0	0.0003	24.12888
12.00	0.0	0.0	33.38	17.34	0.0	0.0	0.0	0.0	0.0003	24.21549
14.00	0.0	0.0	33.38	16.73	0.0	0.0	0.0	0.0	0.0003	24.35932
16.00	0.0	0.0	33.38	15.17	0.0	0.0	0.0	0.0	0.0003	24.71340
18.00	0.0	0.0	33.37	14.37	0.0	0.0	0.0	0.0	0.0003	24.87044
20.00	0.0	0.0	33.35	14.18	0.0	0.0	0.0	0.0	0.0003	24.89660
22.00	0.0	0.0	33.33	13.83	0.0	0.0	0.0	0.0	0.0003	24.95172
24.00	0.0	0.0	33.32	13.75	0.0	0.0	0.0	0.0	0.0003	24.96707
26.00	0.0	0.0	33.36	13.42	0.0	0.0	0.0	0.0	0.0003	25.06459
31.85	0.0	0.0	33.36	13.39	0.0	0.0	0.0	0.0	0.0003	25.07201

Diffuser table:

P-dia	Ver angl	H-Angle	SourceX	SourceY	Ports	MZ-dis	Isoplth	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(in)	(deg)	(deg)	(ft)	(ft)	()	(ft)	(concent)	(ft)	(MGD)	(psu)	(C)	(ppm)
3.0500	0.0	0.0	0.0	0.0	125.00	1000.0	0.0	100.00	5.3500	62.630	20.660	62630.0

Simulation:
Froude No: -3.226; Strat No:-1.84E-4; Spcg No: 14.39; k: 39781.8; eff den (sigmaT) 46.00388; eff vel 0.398(m/s);
Current is very small, flow regime may be transient.

Step	Depth (ft)	Amb-cur (m/s)	P-dia (in)	Eff-sal (psu)	Polutnt (ppm)	Dilutn ()	x-posn (ft)	y-posn (ft)	Iso dia (m)
0	100.0	1.000E-5	3.050	62.63	62630.0	1.000	0.0	0.0	0.07747;
1	100.0	0.0	3.059	62.45	62246.6	1.006	0.00389	0.0	0.07771;
2	100.0	0.0	3.100	61.88	61002.2	1.027	0.00642	0.0	0.07873;
3	100.0	0.0	3.162	61.32	59783.1	1.048	0.0082	0.0	0.08032;
4	100.0	0.0	3.226	60.78	58588.9	1.069	0.0095	0.0	0.08195;
5	100.0	0.0	3.291	60.24	57418.9	1.091	0.0105	0.0	0.0836;
6	100.0	0.0	3.358	59.71	56272.7	1.113	0.0112	0.0	0.08529;
7	100.0	0.0	3.426	59.20	55149.8	1.136	0.0118	0.0	0.08701;
8	100.0	0.0	3.495	58.69	54049.7	1.159	0.0123	0.0	0.08876;
9	100.0	0.0	3.565	58.19	52971.8	1.182	0.0126	0.0	0.09055;
10	100.0	0.0	3.637	57.71	51915.9	1.206	0.0129	0.0	0.09238;
11	100.0	0.0	3.710	57.23	50881.3	1.231	0.0131	0.0	0.09424;
12	100.0	0.0	3.785	56.76	49867.6	1.256	0.0133	0.0	0.09614;
13	100.0	0.0	3.861	56.30	48874.4	1.281	0.0134	0.0	0.09808;
14	100.0	0.0	3.939	55.85	47901.3	1.307	0.0136	0.0	0.1001;
15	100.0	0.0	4.019	55.41	46947.9	1.334	0.0136	0.0	0.1021;
16	100.0	0.0	4.100	54.98	46013.7	1.361	0.0137	0.0	0.1041;
17	100.0	0.0	4.182	54.55	45098.4	1.389	0.0138	0.0	0.1062;
18	100.0	0.0	4.267	54.14	44201.5	1.417	0.0138	0.0	0.1084;
19	100.0	0.0	4.353	53.73	43322.7	1.446	0.0139	0.0	0.1106;
20	100.0	0.0	4.440	53.33	42461.6	1.475	0.0139	0.0	0.1128;
21	100.0	0.0	4.530	52.94	41617.8	1.505	0.0139	0.0	0.1151;
22	100.0	0.0	4.621	52.56	40791.0	1.535	0.0139	0.0	0.1174;
23	100.0	0.0	4.714	52.18	39980.9	1.566	0.0139	0.0	0.1197;
24	100.0	0.0	4.809	51.81	39187.0	1.598	0.014	0.0	0.1221;
25	100.0	0.0	4.905	51.45	38409.1	1.631	0.014	0.0	0.1246;
26	100.0	0.0	5.004	51.10	37646.8	1.664	0.014	0.0	0.1271;
27	100.0	0.0	5.105	50.75	36899.8	1.697	0.014	0.0	0.1297;
28	100.0	0.0	5.208	50.41	36167.8	1.732	0.014	0.0	0.1323;
29	100.0	0.0	5.312	50.07	35450.5	1.767	0.014	0.0	0.1349;
30	100.0	0.0	5.419	49.74	34747.5	1.802	0.014	0.0	0.1376;
31	100.0	0.0	5.528	49.42	34058.7	1.839	0.014	0.0	0.1404;
32	100.0	0.0	5.639	49.11	33383.6	1.876	0.014	0.0	0.1432;
33	100.0	0.0	5.753	48.80	32722.1	1.914	0.014	0.0	0.1461;
34	100.0	0.0	5.868	48.50	32073.8	1.953	0.014	0.0	0.1491;
35	100.0	0.0	5.986	48.20	31438.5	1.992	0.014	0.0	0.1521;
36	100.0	0.0	6.107	47.91	30815.9	2.032	0.014	0.0	0.1551;
37	100.0	0.0	6.230	47.62	30205.7	2.073	0.014	0.0	0.1582;
38	100.0	0.0	6.355	47.34	29607.7	2.115	0.014	0.0	0.1614;
39	100.0	0.0	6.482	47.07	29021.7	2.158	0.014	0.0	0.1647;
40	100.0	0.0	6.613	46.80	28447.4	2.202	0.014	0.0	0.1680;
41	100.0	0.0	6.746	46.54	27884.5	2.246	0.014	0.0	0.1713;
42	100.0	0.0	6.881	46.28	27332.9	2.291	0.014	0.0	0.1748;
43	100.0	0.0	7.019	46.03	26792.3	2.338	0.014	0.0	0.1783;
44	100.0	0.0	7.160	45.78	26262.4	2.385	0.014	0.0	0.1819;
45	100.0	0.0	7.304	45.53	25743.2	2.433	0.014	0.0	0.1855;
46	100.0	0.0	7.451	45.30	25234.2	2.482	0.014	0.0	0.1893;
47	100.0	0.0	7.600	45.06	24735.5	2.532	0.014	0.0	0.1931;
48	100.0	0.0	7.753	44.83	24246.6	2.583	0.014	0.0	0.1969;

49	100.0	0.0	7.909	44.61	23767.5	2.635	0.014	0.0	0.2009;
50	100.0	0.0	8.068	44.39	23297.9	2.688	0.014	0.0	0.2049;
51	100.0	0.0	8.229	44.17	22837.7	2.742	0.014	0.0	0.2090;
52	100.0	0.0	8.395	43.96	22386.6	2.798	0.014	0.0	0.2132;
53	100.0	0.0	8.563	43.75	21944.5	2.854	0.014	0.0	0.2175;
54	100.0	0.0	8.729	43.56	21542.8	2.907	0.014	0.0	0.2217; begin overlap;
55	100.0	0.0	8.865	43.44	21273.9	2.944	0.014	0.0	0.2252;
56	100.0	0.0	9.009	43.24	20853.9	3.003	0.0509	0.0	0.2288;
57	100.0	0.0	9.118	43.19	20743.5	3.019	0.0552	0.0	0.2316; end overlap;
58	100.0	0.0	9.233	42.99	20334.1	3.080	0.0584	0.0	0.2345;
59	100.0	0.0	9.417	42.81	19932.8	3.142	0.0607	0.0	0.2392;
60	100.0	0.0	9.605	42.62	19539.4	3.205	0.0625	0.0	0.2440;
61	100.0	0.0	9.797	42.44	19153.9	3.270	0.0638	0.0	0.2489;
62	100.0	0.0	9.993	42.26	18778.5	3.335	0.0649	0.0	0.2538; begin overlap;
63	100.0	0.0	10.19	42.10	18424.5	3.399	0.0657	0.0	0.2588;
64	100.0	0.0	10.38	41.94	18090.0	3.462	0.0663	0.0	0.2636;
65	100.0	0.0	10.57	41.79	17773.2	3.524	0.0668	0.0	0.2684;
66	100.0	0.0	10.75	41.65	17472.7	3.584	0.0671	0.0	0.2731;
67	100.0	0.0	10.93	41.51	17187.1	3.644	0.0674	0.0	0.2777;
68	100.0	0.0	11.11	41.38	16915.2	3.703	0.0677	0.0	0.2822;
69	100.0	0.0	11.28	41.26	16656.0	3.760	0.0679	0.0	0.2866;
70	100.0	0.0	11.46	41.14	16408.4	3.817	0.068	0.0	0.2910;
71	100.0	0.0	11.63	41.03	16171.7	3.873	0.0681	0.0	0.2953;
72	100.0	0.0	11.79	40.93	15945.1	3.928	0.0682	0.0	0.2996;
73	100.0	0.0	11.96	40.82	15727.8	3.982	0.0683	0.0	0.3037;
74	100.0	0.0	12.12	40.73	15519.2	4.036	0.0683	0.0	0.3079;
75	100.0	0.0	12.28	40.63	15318.8	4.088	0.0684	0.0	0.3119;
76	100.0	0.0	12.44	40.54	15126.1	4.141	0.0684	0.0	0.3160;
77	100.0	0.0	12.60	40.45	14940.5	4.192	0.0685	0.0	0.3199;
78	100.0	0.0	12.75	40.37	14761.7	4.243	0.0685	0.0	0.3238;
79	100.0	0.0	12.90	40.29	14589.2	4.293	0.0685	0.0	0.3277;
80	100.0	0.0	13.05	40.21	14422.6	4.342	0.0685	0.0	0.3315;
81	100.0	0.0	13.20	40.13	14261.7	4.391	0.0685	0.0	0.3353;
82	100.0	0.0	13.35	40.06	14106.1	4.440	0.0685	0.0	0.3390;
83	100.0	0.0	13.49	39.99	13955.5	4.488	0.0685	0.0	0.3427;
84	100.0	0.0	13.64	39.92	13809.7	4.535	0.0685	0.0	0.3464;
85	100.0	0.0	13.78	39.85	13668.4	4.582	0.0685	0.0	0.3500;
86	100.0	0.0	13.92	39.79	13531.4	4.628	0.0686	0.0	0.3536;
87	100.0	0.0	14.06	39.72	13398.5	4.674	0.0686	0.0	0.3571;
88	100.0	0.0	14.20	39.66	13269.4	4.720	0.0686	0.0	0.3606;
89	100.0	0.0	14.33	39.60	13144.1	4.765	0.0686	0.0	0.3641;
90	100.0	0.0	14.47	39.55	13022.2	4.809	0.0686	0.0	0.3675;
91	100.0	0.0	14.60	39.49	12903.7	4.854	0.0686	0.0	0.3709;
92	100.0	0.0	14.73	39.44	12788.4	4.897	0.0686	0.0	0.3743;
93	100.0	0.0	14.87	39.38	12676.2	4.941	0.0686	0.0	0.3776;
94	100.0	0.0	15.00	39.33	12566.9	4.984	0.0686	0.0	0.3809;
95	100.0	0.0	15.13	39.28	12460.3	5.026	0.0686	0.0	0.3842;
96	100.0	0.0	15.25	39.23	12356.5	5.069	0.0686	0.0	0.3874;
97	100.0	0.0	15.38	39.18	12255.2	5.110	0.0686	0.0	0.3907;
98	100.0	0.0	15.51	39.14	12156.4	5.152	0.0686	0.0	0.3938;
99	100.0	0.0	15.63	39.09	12060.0	5.193	0.0686	0.0	0.3970;
100	100.0	0.0	15.75	39.05	11965.9	5.234	0.0686	0.0	0.4002;
101	100.0	0.0	15.88	39.00	11873.9	5.275	0.0686	0.0	0.4033;
102	100.0	0.0	16.00	38.96	11784.0	5.315	0.0686	0.0	0.4064;
103	100.0	0.0	16.12	38.92	11696.0	5.355	0.0686	0.0	0.4094;
104	100.0	0.0	16.24	38.88	11610.1	5.394	0.0686	0.0	0.4125;

105	100.0	0.0	16.36	38.84	11525.2	5.434	0.0686	0.0	0.4155;
106	100.0	0.0	16.48	38.80	11443.4	5.473	0.0686	0.0	0.4185;
107	100.0	0.0	16.60	38.76	11362.1	5.512	0.0686	0.0	0.4215;
108	100.0	0.0	16.72	38.72	11277.9	5.553	0.0686	0.0	0.4246;
109	100.0	0.0	16.84	38.68	11194.4	5.595	0.0686	0.0	0.4278;
110	100.0	0.0	16.96	38.65	11119.8	5.632	0.0686	0.0	0.4308;
111	100.0	0.0	17.07	38.61	11048.7	5.669	0.0686	0.0	0.4336;
112	100.0	0.0	17.19	38.58	10972.9	5.708	0.0686	0.0	0.4365;
113	100.0	0.0	17.29	38.55	10910.6	5.740	0.0686	0.0	0.4393;
114	100.0	0.0	17.38	38.53	10867.6	5.763	0.0686	0.0	0.4414;
115	100.0	0.0	17.43	38.52	10846.7	5.774	0.0686	0.0	0.4427;
116	100.0	0.0	17.62	38.42	10633.2	5.890	0.138	0.0	0.4475;
117	100.0	0.0	17.60	38.41	10628.2	5.893	0.141	0.0	0.4470;
118	100.0	0.0	17.65	38.38	10558.5	5.932	0.143	0.0	0.4484;
119	100.0	0.0	17.76	38.35	10489.8	5.971	0.144	0.0	0.4511;
120	100.0	0.0	17.87	38.32	10422.2	6.009	0.145	0.0	0.4539;
121	100.0	0.0	17.98	38.28	10355.7	6.048	0.146	0.0	0.4566;
122	100.0	0.0	18.09	38.25	10290.4	6.086	0.147	0.0	0.4594;
123	100.0	0.0	18.20	38.22	10226.2	6.124	0.148	0.0	0.4622;
124	100.0	0.0	18.31	38.19	10163.0	6.163	0.148	0.0	0.4650;
125	100.0	0.0	18.42	38.16	10101.0	6.200	0.149	0.0	0.4678;
126	100.0	0.0	18.53	38.13	10040.1	6.238	0.149	0.0	0.4706;
127	100.0	0.0	18.64	38.11	9980.1	6.275	0.150	0.0	0.4734;
128	100.0	0.0	18.75	38.08	9921.3	6.313	0.150	0.0	0.4761;
129	100.0	0.0	18.85	38.05	9863.4	6.350	0.150	0.0	0.4789;
130	100.0	0.0	18.96	38.02	9806.5	6.387	0.150	0.0	0.4817;
131	100.0	0.0	19.07	38.00	9750.5	6.423	0.151	0.0	0.4844;
132	100.0	0.0	19.18	37.97	9695.5	6.460	0.151	0.0	0.4872;
133	100.0	0.0	19.29	37.95	9641.4	6.496	0.151	0.0	0.4899;
134	100.0	0.0	19.39	37.92	9588.1	6.532	0.151	0.0	0.4926;
135	100.0	0.0	19.50	37.90	9535.8	6.568	0.151	0.0	0.4953;
136	100.0	0.0	19.61	37.87	9484.3	6.604	0.151	0.0	0.4980;
137	100.0	0.0	19.71	37.85	9433.6	6.639	0.151	0.0	0.5007;
138	100.0	0.0	19.82	37.82	9383.7	6.674	0.151	0.0	0.5033;
139	100.0	0.0	19.92	37.80	9334.6	6.709	0.151	0.0	0.5060;
140	100.0	0.0	20.02	37.78	9286.2	6.744	0.151	0.0	0.5086;
141	100.0	0.0	20.13	37.75	9238.6	6.779	0.151	0.0	0.5112;
142	100.0	0.0	20.23	37.73	9191.7	6.814	0.151	0.0	0.5138;
143	100.0	0.0	20.33	37.71	9145.5	6.848	0.151	0.0	0.5164;
144	100.0	0.0	20.43	37.69	9100.1	6.882	0.151	0.0	0.5190;
145	100.0	0.0	20.54	37.67	9055.2	6.916	0.151	0.0	0.5216;
146	100.0	0.0	20.64	37.65	9011.1	6.950	0.151	0.0	0.5242;
147	100.0	0.0	20.74	37.63	8967.6	6.984	0.151	0.0	0.5267;
148	100.0	0.0	20.84	37.61	8924.7	7.018	0.151	0.0	0.5293;
149	100.0	0.0	20.94	37.59	8882.4	7.051	0.151	0.0	0.5318;
150	100.0	0.0	21.04	37.57	8840.7	7.084	0.151	0.0	0.5343;
151	100.0	0.0	21.13	37.55	8799.6	7.117	0.151	0.0	0.5368;
152	100.0	0.0	21.23	37.53	8759.1	7.150	0.151	0.0	0.5393;
153	100.0	0.0	21.33	37.51	8719.1	7.183	0.151	0.0	0.5418;
154	100.0	0.0	21.43	37.49	8679.7	7.216	0.151	0.0	0.5442;
155	100.0	0.0	21.52	37.47	8640.8	7.248	0.151	0.0	0.5467;
156	100.0	0.0	21.62	37.45	8602.4	7.280	0.151	0.0	0.5491;
157	100.0	0.0	21.72	37.44	8564.6	7.313	0.151	0.0	0.5516;
158	100.0	0.0	21.81	37.42	8527.2	7.345	0.151	0.0	0.5540;
159	100.0	0.0	21.91	37.40	8490.3	7.377	0.151	0.0	0.5564;
160	100.0	0.0	22.00	37.38	8453.9	7.408	0.151	0.0	0.5588;

161	100.0	0.0	22.09	37.37	8418.0	7.440	0.151	0.0	0.5612;
162	100.0	0.0	22.19	37.35	8382.5	7.472	0.151	0.0	0.5636;
163	100.0	0.0	22.28	37.33	8347.5	7.503	0.151	0.0	0.5660;
164	100.0	0.0	22.37	37.32	8312.9	7.534	0.151	0.0	0.5683;
165	100.0	0.0	22.47	37.30	8278.7	7.565	0.151	0.0	0.5707;
166	100.0	0.0	22.56	37.28	8245.0	7.596	0.151	0.0	0.5730;
167	100.0	0.0	22.65	37.27	8211.6	7.627	0.151	0.0	0.5754;
168	100.0	0.0	22.74	37.25	8178.7	7.658	0.151	0.0	0.5777;
169	100.0	0.0	22.83	37.24	8146.1	7.688	0.151	0.0	0.5800;
170	100.0	0.0	22.92	37.22	8114.0	7.719	0.151	0.0	0.5823;
171	100.0	0.0	23.02	37.21	8082.2	7.749	0.151	0.0	0.5846;
172	100.0	0.0	23.11	37.19	8050.8	7.779	0.151	0.0	0.5869;
173	100.0	0.0	23.19	37.18	8019.7	7.809	0.151	0.0	0.5892;
174	100.0	0.0	23.28	37.16	7989.1	7.839	0.151	0.0	0.5914;
175	100.0	0.0	23.37	37.15	7958.7	7.869	0.151	0.0	0.5937;
176	100.0	0.0	23.46	37.13	7928.7	7.899	0.151	0.0	0.5959;
177	100.0	0.0	23.55	37.12	7899.1	7.929	0.151	0.0	0.5982;
178	100.0	0.0	23.64	37.11	7869.8	7.958	0.151	0.0	0.6004;
179	100.0	0.0	23.73	37.09	7840.7	7.988	0.151	0.0	0.6026;
180	100.0	0.0	23.81	37.08	7811.9	8.017	0.151	0.0	0.6049;
181	100.0	0.0	23.90	37.07	7783.5	8.047	0.151	0.0	0.6071;
182	100.0	0.0	23.99	37.05	7755.6	8.075	0.151	0.0	0.6093;
183	100.0	0.0	24.07	37.04	7727.6	8.105	0.151	0.0	0.6115;
184	100.0	0.0	24.16	37.03	7699.9	8.134	0.151	0.0	0.6137;
185	100.0	0.0	24.24	37.01	7674.2	8.161	0.151	0.0	0.6158;
186	100.0	0.0	24.33	37.00	7644.5	8.193	0.151	0.0	0.6180;
187	100.0	0.0	24.42	36.99	7617.1	8.222	0.151	0.0	0.6203;
188	100.0	0.0	24.51	36.97	7591.5	8.250	0.151	0.0	0.6225;
189	100.0	0.0	24.59	36.96	7568.6	8.275	0.151	0.0	0.6245;
190	100.0	0.0	24.66	36.95	7547.0	8.299	0.151	0.0	0.6263;
191	100.0	0.0	24.72	36.94	7528.2	8.319	0.151	0.0	0.6280;
192	100.0	0.0	24.77	36.94	7516.7	8.332	0.151	0.0	0.6293;
193	100.1	0.0	25.04	36.87	7369.0	8.499	0.243	0.0	0.6360;
194	100.1	0.0	24.05	36.87	7367.6	8.501	0.244	0.0	0.6108;
195	100.1	0.0	24.08	36.85	7333.7	8.540	0.246	0.0	0.6115;
196	100.1	0.0	24.16	36.84	7299.9	8.580	0.248	0.0	0.6136;
197	100.1	0.0	24.24	36.82	7266.2	8.619	0.250	0.0	0.6156;
198	100.1	0.0	24.32	36.80	7232.7	8.659	0.252	0.0	0.6177;
199	100.1	0.0	24.40	36.79	7199.4	8.699	0.254	0.0	0.6197;
200	100.1	0.0	24.48	36.77	7166.2	8.740	0.256	0.0	0.6217;
201	100.1	0.0	24.55	36.76	7134.2	8.779	0.258	0.0	0.6236;
202	100.1	0.0	24.62	36.74	7102.5	8.818	0.260	0.0	0.6255;
203	100.1	0.0	24.70	36.73	7071.0	8.857	0.262	0.0	0.6273;
204	100.1	0.0	24.77	36.71	7039.8	8.897	0.264	0.0	0.6291;
205	100.1	0.0	24.84	36.70	7008.9	8.936	0.266	0.0	0.6309;
206	100.1	0.0	24.91	36.68	6978.2	8.975	0.268	0.0	0.6327;
207	100.1	0.0	24.98	36.67	6947.8	9.014	0.270	0.0	0.6345;
208	100.1	0.0	25.05	36.65	6917.6	9.054	0.272	0.0	0.6363;
209	100.1	0.0	25.12	36.64	6887.7	9.093	0.274	0.0	0.6380;
210	100.1	0.0	25.19	36.63	6858.0	9.132	0.276	0.0	0.6397;
211	100.1	0.0	25.25	36.61	6828.5	9.172	0.278	0.0	0.6414;
212	100.1	0.0	25.32	36.60	6799.2	9.211	0.280	0.0	0.6431;
213	100.1	0.0	25.39	36.58	6770.2	9.251	0.282	0.0	0.6448;
214	100.1	0.0	25.45	36.57	6741.3	9.290	0.284	0.0	0.6465;
215	100.1	0.0	25.52	36.56	6712.7	9.330	0.287	0.0	0.6481;
216	100.1	0.0	25.58	36.54	6684.3	9.370	0.289	0.0	0.6498;

217	100.1	0.0	25.64	36.53	6656.1	9.409	0.291	0.0	0.6514;
218	100.1	0.0	25.71	36.52	6628.1	9.449	0.293	0.0	0.6530;
219	100.1	0.0	25.77	36.50	6600.2	9.489	0.295	0.0	0.6546;
220	100.1	0.0	25.83	36.49	6572.6	9.529	0.297	0.0	0.6561;
221	100.1	0.0	25.89	36.48	6545.1	9.569	0.299	0.0	0.6577;
222	100.1	0.0	25.95	36.46	6517.8	9.609	0.301	0.0	0.6592;
223	100.1	0.0	26.01	36.45	6490.7	9.649	0.303	0.0	0.6608;
224	100.1	0.0	26.07	36.44	6463.8	9.689	0.305	0.0	0.6623;
225	100.1	0.0	26.13	36.43	6437.0	9.730	0.308	0.0	0.6638;
226	100.1	0.0	26.19	36.41	6410.4	9.770	0.310	0.0	0.6652;
227	100.1	0.0	26.25	36.40	6383.9	9.811	0.312	0.0	0.6667;
228	100.1	0.0	26.31	36.39	6357.6	9.851	0.314	0.0	0.6682;
229	100.1	0.0	26.36	36.38	6331.5	9.892	0.316	0.0	0.6696;
230	100.1	0.0	26.42	36.36	6305.5	9.933	0.318	0.0	0.6710;
231	100.1	0.0	26.47	36.35	6279.7	9.973	0.321	0.0	0.6724;
232	100.1	0.0	26.53	36.34	6254.0	10.01	0.323	0.0	0.6738;
233	100.1	0.0	26.58	36.33	6228.4	10.06	0.325	0.0	0.6752;
234	100.1	0.0	26.63	36.31	6203.0	10.10	0.327	0.0	0.6765;
235	100.1	0.0	26.69	36.30	6177.7	10.14	0.329	0.0	0.6779;
236	100.1	0.0	26.74	36.29	6152.5	10.18	0.332	0.0	0.6792;
237	100.1	0.0	26.79	36.28	6127.5	10.22	0.334	0.0	0.6805;
238	100.1	0.0	26.84	36.27	6102.6	10.26	0.336	0.0	0.6818;
239	100.1	0.0	26.89	36.26	6077.8	10.30	0.338	0.0	0.6831;
240	100.1	0.0	26.94	36.24	6053.1	10.35	0.341	0.0	0.6844;
241	100.1	0.0	26.99	36.23	6028.5	10.39	0.343	0.0	0.6856;
242	100.1	0.0	27.04	36.22	6004.1	10.43	0.345	0.0	0.6869;
243	100.1	0.0	27.09	36.21	5979.8	10.47	0.348	0.0	0.6881;
244	100.2	0.0	27.14	36.20	5955.5	10.52	0.350	0.0	0.6893;
245	100.2	0.0	27.19	36.19	5931.4	10.56	0.352	0.0	0.6905;
246	100.2	0.0	27.23	36.17	5907.4	10.60	0.355	0.0	0.6917;
247	100.2	0.0	27.28	36.16	5883.5	10.65	0.357	0.0	0.6929;
248	100.2	0.0	27.32	36.15	5859.6	10.69	0.359	0.0	0.6940;
249	100.2	0.0	27.37	36.14	5835.9	10.73	0.362	0.0	0.6952;
250	100.2	0.0	27.41	36.13	5812.2	10.78	0.364	0.0	0.6963;
251	100.2	0.0	27.46	36.12	5788.7	10.82	0.367	0.0	0.6974;
252	100.2	0.0	27.50	36.11	5765.2	10.86	0.369	0.0	0.6985;
253	100.2	0.0	27.54	36.10	5741.8	10.91	0.371	0.0	0.6996;
254	100.2	0.0	27.59	36.08	5718.5	10.95	0.374	0.0	0.7007;
255	100.2	0.0	27.63	36.07	5695.2	11.00	0.376	0.0	0.7017;
256	100.2	0.0	27.67	36.06	5672.1	11.04	0.379	0.0	0.7028;
257	100.2	0.0	27.71	36.05	5649.0	11.09	0.381	0.0	0.7038;
258	100.2	0.0	27.75	36.04	5625.9	11.13	0.384	0.0	0.7048;
259	100.2	0.0	27.79	36.03	5603.0	11.18	0.386	0.0	0.7058;
260	100.2	0.0	27.83	36.02	5580.1	11.22	0.389	0.0	0.7068;
261	100.2	0.0	27.87	36.01	5557.2	11.27	0.391	0.0	0.7078;
262	100.2	0.0	27.90	36.00	5534.4	11.32	0.394	0.0	0.7088;
263	100.2	0.0	27.94	35.99	5511.7	11.36	0.397	0.0	0.7097;
264	100.2	0.0	27.98	35.98	5489.0	11.41	0.399	0.0	0.7107;
265	100.2	0.0	28.02	35.97	5466.4	11.46	0.402	0.0	0.7116;
266	100.2	0.0	28.05	35.95	5443.8	11.50	0.405	0.0	0.7125;
267	100.2	0.0	28.09	35.94	5421.3	11.55	0.407	0.0	0.7134;
268	100.2	0.0	28.12	35.93	5398.8	11.60	0.410	0.0	0.7143;
269	100.2	0.0	28.16	35.92	5376.3	11.65	0.413	0.0	0.7152;
270	100.2	0.0	28.19	35.91	5353.9	11.70	0.415	0.0	0.7160;
271	100.2	0.0	28.22	35.90	5331.5	11.75	0.418	0.0	0.7169;
272	100.2	0.0	28.26	35.89	5309.1	11.80	0.421	0.0	0.7177;

273	100.2	0.0	28.29	35.88	5286.8	11.85	0.424	0.0	0.7186;
274	100.2	0.0	28.32	35.87	5264.5	11.90	0.427	0.0	0.7194;
275	100.2	0.0	28.35	35.86	5242.2	11.95	0.429	0.0	0.7202;
276	100.2	0.0	28.39	35.85	5219.9	12.00	0.432	0.0	0.7210;
277	100.2	0.0	28.42	35.84	5197.6	12.05	0.435	0.0	0.7218;
278	100.3	0.0	28.45	35.83	5175.4	12.10	0.438	0.0	0.7225;
279	100.3	0.0	28.48	35.82	5153.1	12.15	0.441	0.0	0.7233;
280	100.3	0.0	28.51	35.81	5130.9	12.21	0.444	0.0	0.7241;
281	100.3	0.0	28.54	35.80	5108.6	12.26	0.447	0.0	0.7248;
282	100.3	0.0	28.56	35.78	5086.4	12.31	0.450	0.0	0.7255;
283	100.3	0.0	28.59	35.77	5064.1	12.37	0.453	0.0	0.7263;
284	100.3	0.0	28.62	35.76	5041.9	12.42	0.456	0.0	0.7270;
285	100.3	0.0	28.65	35.75	5019.6	12.48	0.459	0.0	0.7277;
286	100.3	0.0	28.68	35.74	4997.3	12.53	0.462	0.0	0.7284;
287	100.3	0.0	28.70	35.73	4975.0	12.59	0.466	0.0	0.7290;
288	100.3	0.0	28.73	35.72	4952.7	12.65	0.469	0.0	0.7297;
289	100.3	0.0	28.76	35.71	4930.3	12.70	0.472	0.0	0.7304;
290	100.3	0.0	28.78	35.70	4907.9	12.76	0.475	0.0	0.7311;
291	100.3	0.0	28.81	35.69	4885.5	12.82	0.479	0.0	0.7317;
292	100.3	0.0	28.83	35.68	4863.0	12.88	0.482	0.0	0.7324;
293	100.3	0.0	28.86	35.67	4840.4	12.94	0.485	0.0	0.7330;
294	100.3	0.0	28.88	35.66	4817.9	13.00	0.489	0.0	0.7336;
295	100.3	0.0	28.91	35.65	4795.2	13.06	0.492	0.0	0.7343;
296	100.3	0.0	28.93	35.64	4772.5	13.12	0.496	0.0	0.7349;
297	100.3	0.0	28.96	35.62	4749.7	13.19	0.499	0.0	0.7355;
298	100.3	0.0	28.98	35.61	4726.9	13.25	0.503	0.0	0.7362;
299	100.4	0.0	29.01	35.60	4704.0	13.31	0.506	0.0	0.7368;
300	100.4	0.0	29.03	35.59	4681.0	13.38	0.510	0.0	0.7374;
301	100.4	0.0	29.06	35.58	4657.9	13.45	0.513	0.0	0.7380;
302	100.4	0.0	29.08	35.57	4634.7	13.51	0.517	0.0	0.7386;
303	100.4	0.0	29.10	35.56	4611.4	13.58	0.521	0.0	0.7392;
304	100.4	0.0	29.13	35.55	4588.0	13.65	0.525	0.0	0.7399;
305	100.4	0.0	29.15	35.54	4564.4	13.72	0.529	0.0	0.7405;
306	100.4	0.0	29.18	35.53	4540.8	13.79	0.532	0.0	0.7411;
307	100.4	0.0	29.20	35.51	4517.0	13.87	0.536	0.0	0.7418;
308	100.4	0.0	29.23	35.50	4493.0	13.94	0.540	0.0	0.7424;
309	100.4	0.0	29.25	35.49	4469.0	14.01	0.544	0.0	0.7431;
310	100.4	0.0	29.28	35.48	4444.7	14.09	0.548	0.0	0.7437;
311	100.4	0.0	29.31	35.47	4420.3	14.17	0.553	0.0	0.7444;
312	100.4	0.0	29.33	35.46	4395.7	14.25	0.557	0.0	0.7451;
313	100.5	0.0	29.36	35.44	4370.9	14.33	0.561	0.0	0.7458;
314	100.5	0.0	29.39	35.43	4345.9	14.41	0.565	0.0	0.7465;
315	100.5	0.0	29.42	35.42	4320.7	14.50	0.570	0.0	0.7472;
316	100.5	0.0	29.45	35.41	4295.3	14.58	0.574	0.0	0.7480;
317	100.5	0.0	29.48	35.40	4269.6	14.67	0.579	0.0	0.7487;
318	100.5	0.0	29.51	35.38	4243.7	14.76	0.583	0.0	0.7496;
319	100.5	0.0	29.54	35.37	4217.5	14.85	0.588	0.0	0.7504;
320	100.5	0.0	29.58	35.36	4191.1	14.94	0.592	0.0	0.7512;
321	100.5	0.0	29.61	35.35	4164.3	15.04	0.597	0.0	0.7521;
322	100.5	0.0	29.65	35.33	4137.3	15.14	0.602	0.0	0.7531;
323	100.5	0.0	29.69	35.32	4109.9	15.24	0.607	0.0	0.7541;
324	100.6	0.0	29.73	35.31	4082.2	15.34	0.612	0.0	0.7551;
325	100.6	0.0	29.77	35.29	4054.1	15.45	0.617	0.0	0.7561;
326	100.6	0.0	29.81	35.28	4026.2	15.56	0.622	0.0	0.7572;
327	100.6	0.0	29.85	35.27	3998.5	15.66	0.627	0.0	0.7582; end overlap;
328	100.6	0.0	29.89	35.25	3971.2	15.77	0.632	0.0	0.7592;

329	100.6	0.0	29.92	35.24	3944.1	15.88	0.638	0.0	0.7601;
330	100.6	0.0	29.96	35.23	3917.2	15.99	0.643	0.0	0.7609;
331	100.6	0.0	29.98	35.22	3890.5	16.10	0.649	0.0	0.7616;
332	100.7	0.0	30.01	35.20	3864.0	16.21	0.654	0.0	0.7623;
333	100.7	0.0	30.04	35.19	3837.7	16.32	0.660	0.0	0.7629;
334	100.7	0.0	30.06	35.18	3811.5	16.43	0.666	0.0	0.7635;
335	100.7	0.0	30.08	35.17	3785.5	16.54	0.671	0.0	0.7640;
336	100.7	0.0	30.09	35.15	3759.6	16.66	0.677	0.0	0.7644;
337	100.7	0.0	30.11	35.14	3733.7	16.77	0.684	0.0	0.7648;
338	100.8	0.0	30.12	35.13	3707.9	16.89	0.690	0.0	0.7652;
339	100.8	0.0	30.14	35.12	3682.1	17.01	0.696	0.0	0.7655;
340	100.8	0.0	30.15	35.10	3656.4	17.13	0.703	0.0	0.7657;
341	100.8	0.0	30.16	35.09	3630.6	17.25	0.709	0.0	0.7660;
342	100.8	0.0	30.16	35.08	3604.8	17.37	0.716	0.0	0.7662;
343	100.8	0.0	30.17	35.07	3578.9	17.50	0.723	0.0	0.7663;
344	100.9	0.0	30.18	35.06	3552.9	17.63	0.730	0.0	0.7665;
345	100.9	0.0	30.18	35.04	3526.8	17.76	0.737	0.0	0.7666;
346	100.9	0.0	30.19	35.03	3500.5	17.89	0.744	0.0	0.7667;
347	100.9	0.0	30.19	35.02	3474.1	18.03	0.752	0.0	0.7668;
348	101.0	0.0	30.19	35.01	3447.4	18.17	0.760	0.0	0.7669;
349	101.0	0.0	30.20	34.99	3420.5	18.31	0.767	0.0	0.7670;
350	101.0	0.0	30.20	34.98	3393.3	18.46	0.775	0.0	0.7671;
351	101.0	0.0	30.21	34.97	3365.8	18.61	0.784	0.0	0.7672;
352	101.1	0.0	30.21	34.95	3337.9	18.76	0.792	0.0	0.7674;
353	101.1	0.0	30.22	34.94	3309.7	18.92	0.801	0.0	0.7675;
354	101.1	0.0	30.23	34.93	3281.0	19.09	0.809	0.0	0.7678;
355	101.2	0.0	30.24	34.91	3251.9	19.26	0.818	0.0	0.7680;
356	101.2	0.0	30.25	34.90	3222.3	19.44	0.828	0.0	0.7683;
357	101.2	0.0	30.27	34.88	3192.1	19.62	0.837	0.0	0.7687;
358	101.3	0.0	30.28	34.87	3161.4	19.81	0.847	0.0	0.7692;
359	101.3	0.0	30.31	34.85	3130.0	20.01	0.857	0.0	0.7698;
360	101.3	0.0	30.33	34.84	3098.0	20.22	0.867	0.0	0.7704;
361	101.4	0.0	30.36	34.82	3065.2	20.43	0.878	0.0	0.7712;
362	101.4	0.0	30.40	34.81	3031.7	20.66	0.889	0.0	0.7721;
363	101.5	0.0	30.44	34.79	2997.4	20.89	0.900	0.0	0.7731;
364	101.5	0.0	30.49	34.77	2962.2	21.14	0.911	0.0	0.7743;
365	101.6	0.0	30.54	34.76	2926.1	21.40	0.923	0.0	0.7757;
366	101.6	0.0	30.60	34.74	2889.0	21.68	0.935	0.0	0.7773;
367	101.7	0.0	30.67	34.72	2850.9	21.97	0.947	0.0	0.7791;
368	101.8	0.0	30.75	34.70	2811.8	22.27	0.960	0.0	0.7811;
369	101.8	0.0	30.84	34.68	2771.6	22.60	0.974	0.0	0.7835;
370	101.9	0.0	30.95	34.66	2730.2	22.94	0.987	0.0	0.7861;
371	102.0	0.0	31.06	34.64	2687.5	23.30	1.001	0.0	0.7890;
372	102.0	0.0	31.19	34.62	2643.6	23.69	1.016	0.0	0.7922;
373	102.1	0.0	31.33	34.60	2598.4	24.10	1.031	0.0	0.7959;
374	102.2	0.0	31.49	34.58	2551.9	24.54	1.046	0.0	0.7999;
375	102.3	0.0	31.67	34.56	2503.9	25.01	1.062	0.0	0.8045;
376	102.4	0.0	31.87	34.53	2454.8	25.51	1.079	0.0	0.8094;
377	102.5	0.0	32.07	34.51	2406.6	26.02	1.095	0.0	0.8146;
378	102.6	0.0	32.28	34.49	2359.4	26.54	1.111	0.0	0.8200;
379	102.7	0.0	32.51	34.47	2313.1	27.08	1.126	0.0	0.8257;
380	102.8	0.0	32.74	34.44	2267.7	27.62	1.141	0.0	0.8317;
381	102.9	0.0	32.99	34.42	2223.2	28.17	1.156	0.0	0.8379;
382	103.0	0.0	33.24	34.40	2179.6	28.73	1.171	0.0	0.8444;
383	103.1	0.0	33.51	34.38	2136.8	29.31	1.186	0.0	0.8511;
384	103.2	0.0	33.78	34.36	2094.9	29.90	1.200	0.0	0.8580;

385	103.3	0.0	34.06	34.34	2053.8	30.49	1.215	0.0	0.8652;
386	103.4	0.0	34.36	34.32	2013.5	31.11	1.229	0.0	0.8726;
387	103.5	0.0	34.65	34.30	1974.0	31.73	1.243	0.0	0.8802;
388	103.6	0.0	34.96	34.29	1935.3	32.36	1.256	0.0	0.8881;
389	103.7	0.0	35.28	34.27	1897.3	33.01	1.270	0.0	0.8961;
390	103.8	0.0	35.60	34.25	1860.1	33.67	1.283	0.0	0.9043;
391	103.9	0.0	35.93	34.23	1823.6	34.34	1.297	0.0	0.9127;
392	104.0	0.0	36.27	34.22	1787.8	35.03	1.310	0.0	0.9213;
393	104.1	0.0	36.62	34.20	1752.7	35.73	1.323	0.0	0.9301;
394	104.3	0.0	36.97	34.18	1718.3	36.45	1.335	0.0	0.9391;
395	104.4	0.0	37.33	34.17	1684.6	37.18	1.348	0.0	0.9483; bottom hit;

Horiz plane projections in effluent direction: radius(m): 0.0; CL(m): 0.4109
Lmz(m): 0.4109
forced entrain 1 0.0 -1.333 0.948 0.113
Rate sec-1 0.0 dy-1 0.0 kt: 0.0 Amb Sal 33.3632
;
2:50:38 PM. amb fills: 4

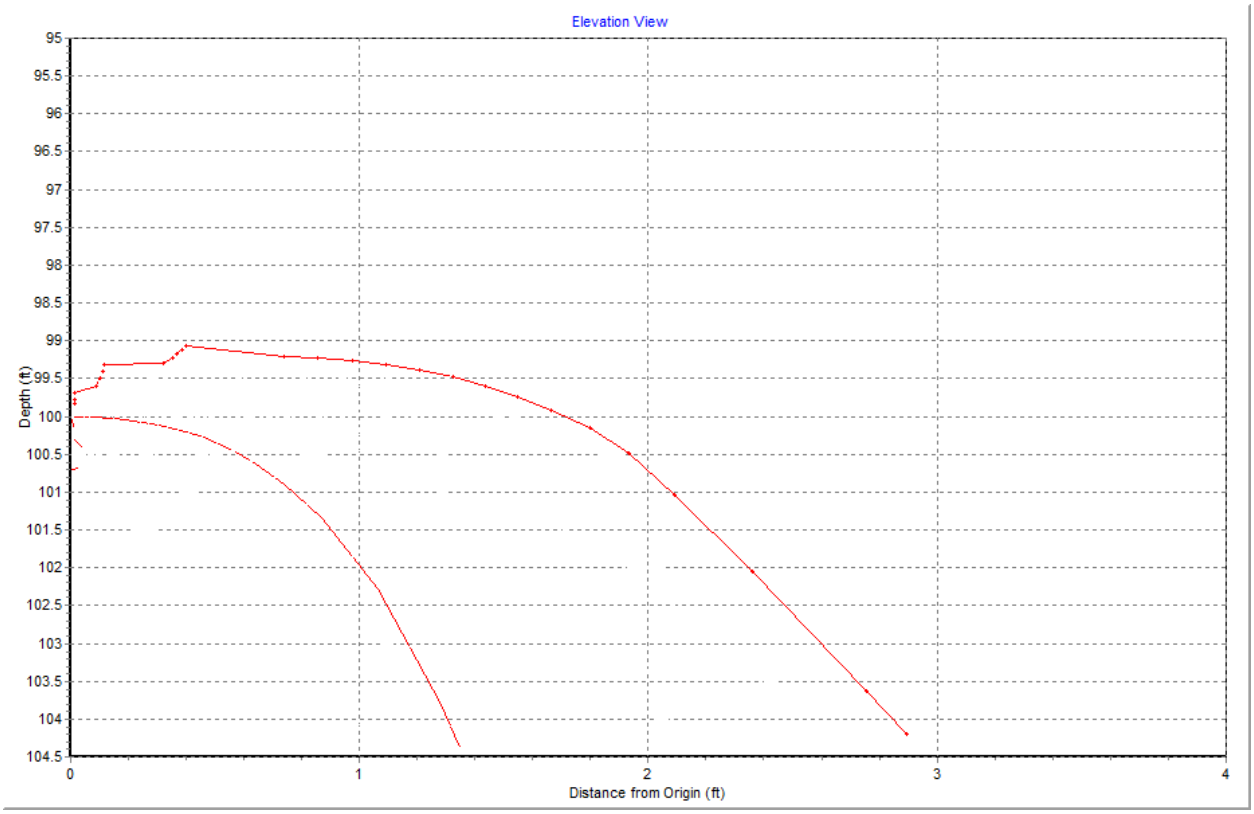


Figure C.7.1: Plumes 18b solution of discharge plume trajectories for discharges of 0.35 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt., and 5 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Depth of maximum rise of the plume is Z = 99.1 ft. at Xa = 0.462 ft from the point of discharge. The centerline of the plume is at an average distance of Xb = 1.348 ft from the point of discharge as the plume begins to impact the bottom at a depth of Z = 104.5 ft.

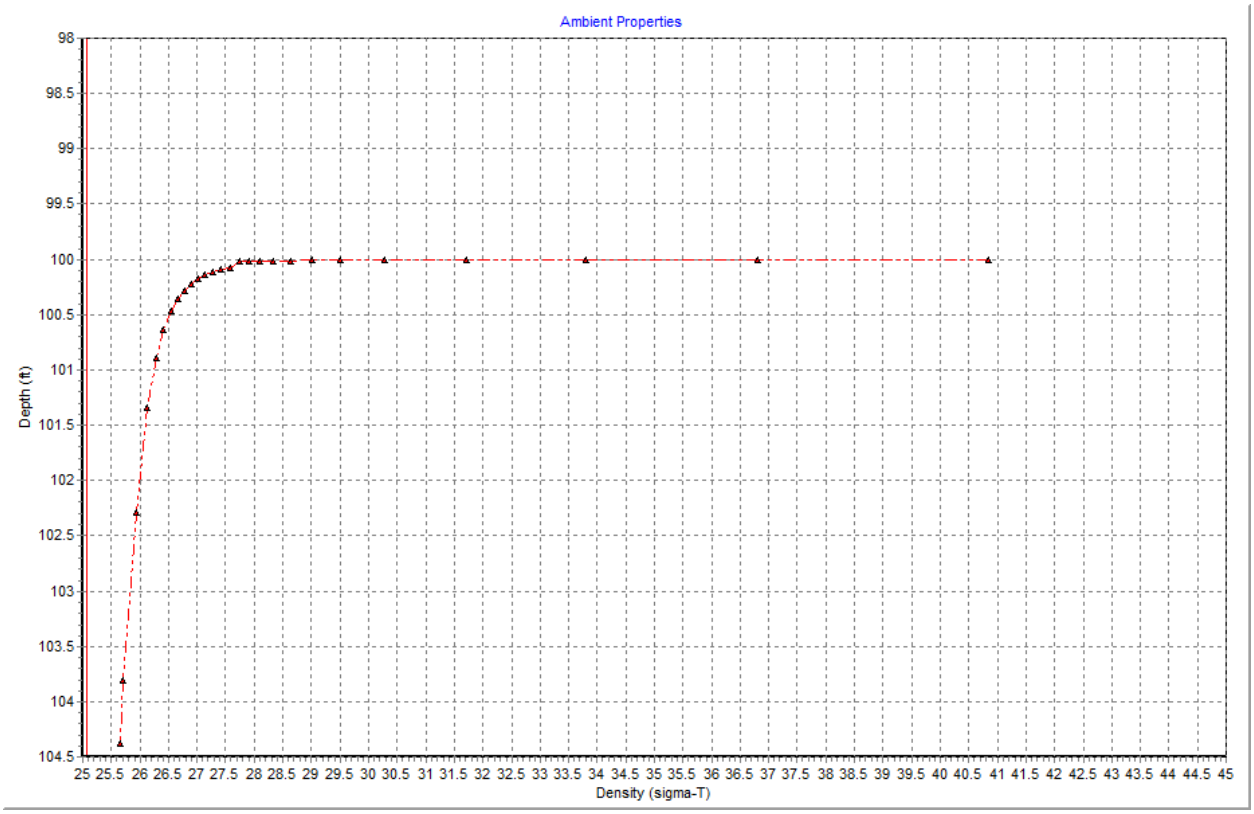


Figure C.7.2: Plumes 18b solution of vertical density profile for discharges of 0.35 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. and 5 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Discharge effluent density shown as black triangles. Ambient water mass density profile shown as solid red line.

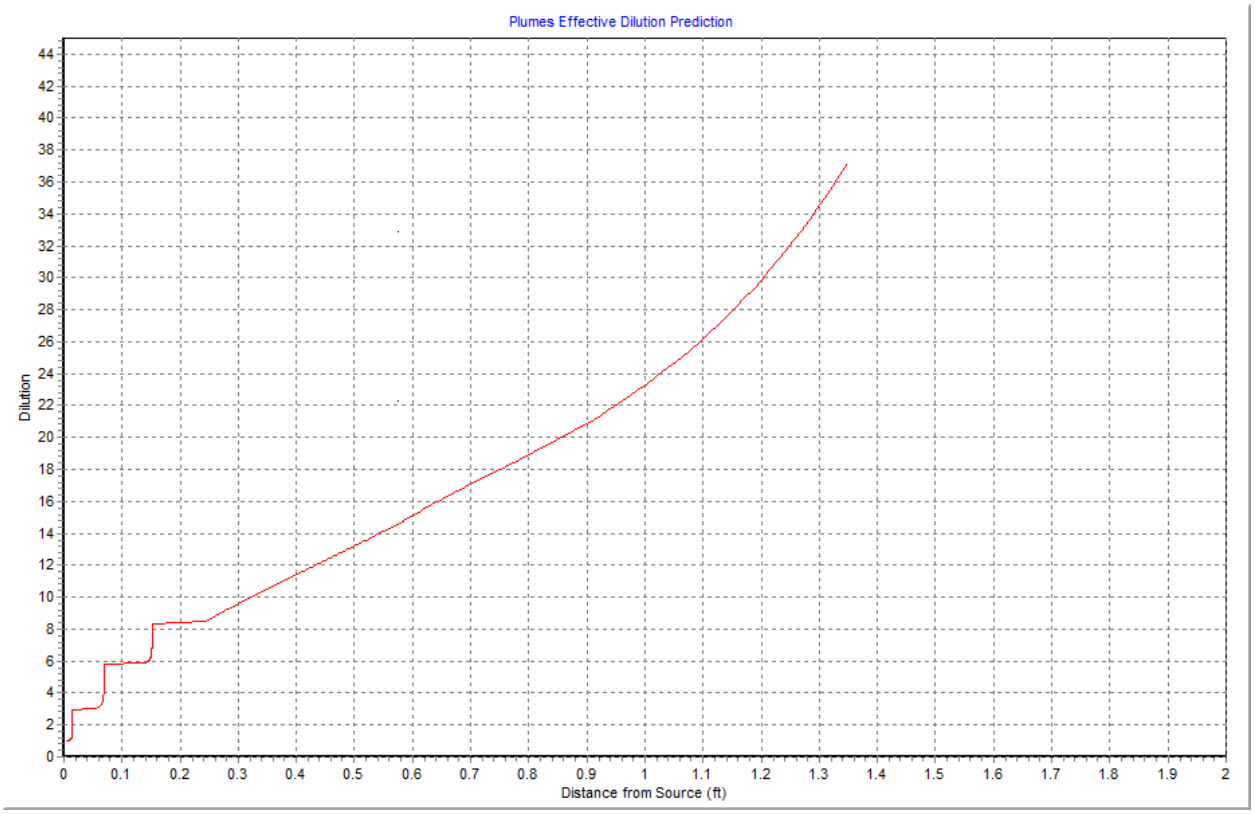


Figure C.7.3: Plumes 18b solution of effective (bulk average) dilution as a function of vertical distance from the point of discharge for discharges of 0.35 mgd of SOCWA wastewater at average annual TDS = 1.25 ppt. and 5 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Effective dilution is S_a = 12.53 at the maximum rise of the plume at Xa = 0.462 ft. from the point of discharge. As the plume begins to impact the bottom, the plume centerline is at a distance of Xb = 1.348 ft from the point of discharge, where the effective dilution reaches S_a = 37.18.

C.8: Plumes 18b Results for SJCOO discharges of 1.8 mgd Well Water and 3 mgd Brine:

ontents of the memo box (may not be current and must be updated manually)
Project "C:\Plumes18\SJCOO_WellW1.8mgd_b3mgd_D-1"
memo
SJCOO discharging 1.8 mgd well water and 3 mgd brine

Model configuration items checked:
Channel width (m) 100
Start case for graphs 1
Max detailed graphs 10 (limits plots that can overflow memory)
Elevation Projection Plane (deg) 0
Shore vector (m,deg) not checked
Bacteria model : Mancini (1978) coliform model
PDS sfc. model heat transfer : Medium
Equation of State : S, T
Similarity Profile : Default profile (k=2.0, ...)
Diffuser port contraction coefficient 1
Light absorption coefficient 0.16
Farfield increment (m) 200
UM3 aspiration coefficient 0.1
Output file: text output tab
Output each ?? steps 1
Maximum dilution reported 1000
Text output format : Standard
Max vertical reversals : to max rise or fall

/ UM3. 1/14/2019 3:07:41 PM
Case 1; ambient file C:\Plumes18\SJCOO_WellW1.8mgd_b3mgd_D-1.001.db; Diffuser table record 1: ----
---

Ambient Table:

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn	Density
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2	sigma-T
0.0	0.0	0.0	33.38	19.97	0.0	0.0	0.0	0.0	0.0003	23.55719
2.000	0.0	0.0	33.39	19.87	0.0	0.0	0.0	0.0	0.0003	23.59288
4.000	0.0	0.0	33.40	19.81	0.0	0.0	0.0	0.0	0.0003	23.61484
7.000	0.0	0.0	33.41	19.64	0.0	0.0	0.0	0.0	0.0003	23.67096
10.00	0.0	0.0	33.40	17.76	0.0	0.0	0.0	0.0	0.0003	24.12888
12.00	0.0	0.0	33.38	17.34	0.0	0.0	0.0	0.0	0.0003	24.21549
14.00	0.0	0.0	33.38	16.73	0.0	0.0	0.0	0.0	0.0003	24.35932
16.00	0.0	0.0	33.38	15.17	0.0	0.0	0.0	0.0	0.0003	24.71340
18.00	0.0	0.0	33.37	14.37	0.0	0.0	0.0	0.0	0.0003	24.87044
20.00	0.0	0.0	33.35	14.18	0.0	0.0	0.0	0.0	0.0003	24.89660
22.00	0.0	0.0	33.33	13.83	0.0	0.0	0.0	0.0	0.0003	24.95172
24.00	0.0	0.0	33.32	13.75	0.0	0.0	0.0	0.0	0.0003	24.96707
26.00	0.0	0.0	33.36	13.42	0.0	0.0	0.0	0.0	0.0003	25.06459
31.85	0.0	0.0	33.36	13.39	0.0	0.0	0.0	0.0	0.0003	25.07201

Diffuser table:

P-dia	Ver angl	H-Angle	SourceX	SourceY	Ports	MZ-dis	Isoplth	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(in)	(deg)	(deg)	(ft)	(ft)	()	(ft)	(concent)	(ft)	(MGD)	(psu)	(C)	(ppm)

3.0500 0.0 0.0 0.0 0.0 125.00 1000.0 0.0 100.00 4.8000 54.440 20.660 54440.0

Simulation:
Froude No: -3.468; Strat No:-2.65E-4; Spcg No: 14.39; k: 35692.1; eff den (sigmaT) 39.56029; eff vel 0.357(m/s);
Current is very small, flow regime may be transient.

Step	Depth (ft)	Amb-cur (m/s)	P-dia (in)	Eff-sal (psu)	Polutnt (ppm)	Dilutn ()	x-posn (ft)	y-posn (ft)	Iso dia (m)	
0	100.0	1.000E-5	3.050	54.44	54440.0	1.000	0.0	0.0	0.07747;	
1	100.0	0.0	3.058	54.33	54140.8	1.006	0.00349	0.0	0.07768;	
2	100.0	0.0	3.098	53.91	53065.0	1.026	0.00632	0.0	0.07868;	
3	100.0	0.0	3.160	53.51	52010.8	1.047	0.00871	0.0	0.08027;	
4	100.0	0.0	3.224	53.12	50977.8	1.068	0.0108	0.0	0.08188;	
5	100.0	0.0	3.289	52.73	49965.6	1.090	0.0127	0.0	0.08353;	
6	100.0	0.0	3.355	52.35	48973.7	1.112	0.0144	0.0	0.08521;	
7	100.0	0.0	3.422	51.98	48001.7	1.134	0.0159	0.0	0.08692;	
8	100.0	0.0	3.491	51.61	47049.3	1.157	0.0174	0.0	0.08867;	
9	100.0	0.0	3.561	51.25	46115.9	1.181	0.0187	0.0	0.09046;	
10	100.0	0.0	3.633	50.90	45201.3	1.204	0.020	0.0	0.09228;	
11	100.0	0.0	3.706	50.56	44305.0	1.229	0.0212	0.0	0.09413;	
12	100.0	0.0	3.781	50.22	43426.7	1.254	0.0224	0.0	0.09603;	
13	100.0	0.0	3.857	49.89	42565.9	1.279	0.0235	0.0	0.09796;	
14	100.0	0.0	3.934	49.57	41722.4	1.305	0.0246	0.0	0.09993;	
15	100.0	0.0	4.013	49.25	40895.8	1.331	0.0256	0.0	0.1019;	
16	100.0	0.0	4.094	48.94	40085.7	1.358	0.0266	0.0	0.1040;	
17	100.0	0.0	4.176	48.63	39291.8	1.386	0.0276	0.0	0.1061;	
18	100.0	0.0	4.260	48.33	38513.8	1.414	0.0285	0.0	0.1082;	
19	100.0	0.0	4.346	48.04	37751.3	1.442	0.0294	0.0	0.1104;	
20	100.0	0.0	4.433	47.75	37004.1	1.471	0.0303	0.0	0.1126;	
21	100.0	0.0	4.522	47.47	36271.7	1.501	0.0312	0.0	0.1149;	
22	100.0	0.0	4.613	47.19	35554.0	1.531	0.032	0.0	0.1172;	
23	100.0	0.0	4.706	46.92	34850.7	1.562	0.0329	0.0	0.1195;	
24	100.0	0.0	4.800	46.66	34161.3	1.594	0.0337	0.0	0.1219;	
25	100.0	0.0	4.897	46.40	33485.7	1.626	0.0345	0.0	0.1244;	
26	100.0	0.0	4.995	46.14	32823.6	1.659	0.0353	0.0	0.1269;	
27	100.0	0.0	5.095	45.89	32174.7	1.692	0.036	0.0	0.1294;	
28	100.0	0.0	5.198	45.64	31538.7	1.726	0.0368	0.0	0.1320;	
29	100.0	0.0	5.302	45.40	30915.3	1.761	0.0375	0.0	0.1347;	
30	100.0	0.0	5.408	45.17	30304.4	1.796	0.0383	0.0	0.1374;	
31	100.0	0.0	5.517	44.94	29705.6	1.833	0.039	0.0	0.1401;	
32	100.0	0.0	5.628	44.71	29118.8	1.870	0.0397	0.0	0.1429;	
33	100.0	0.0	5.741	44.49	28543.6	1.907	0.0404	0.0	0.1458;	
34	100.0	0.0	5.856	44.27	27979.9	1.946	0.0411	0.0	0.1487;	
35	100.0	0.0	5.973	44.05	27427.4	1.985	0.0418	0.0	0.1517;	
36	100.0	0.0	6.093	43.85	26885.8	2.025	0.0425	0.0	0.1548;	
37	100.0	0.0	6.215	43.64	26355.1	2.066	0.0432	0.0	0.1579;	
38	100.0	0.0	6.340	43.44	25834.8	2.107	0.0438	0.0	0.1610;	
39	100.0	0.0	6.467	43.24	25324.9	2.150	0.0445	0.0	0.1643;	
40	100.0	0.0	6.597	43.05	24825.2	2.193	0.0452	0.0	0.1676;	
41	100.0	0.0	6.729	42.86	24335.3	2.237	0.0458	0.0	0.1709;	
42	100.0	0.0	6.864	42.67	23855.2	2.282	0.0464	0.0	0.1744;	
43	100.0	0.0	7.002	42.49	23384.6	2.328	0.0471	0.0	0.1779;	
44	100.0	0.0	7.143	42.31	22923.4	2.375	0.0477	0.0	0.1814;	
45	100.0	0.0	7.286	42.13	22471.2	2.423	0.0483	0.0	0.1851;	
46	100.0	0.0	7.432	41.96	22028.1	2.471	0.0489	0.0	0.1888;	
47	100.0	0.0	7.581	41.79	21593.7	2.521	0.0496	0.0	0.1926;	

48	100.0	0.0	7.733	41.63	21168.0	2.572	0.0502	0.0	0.1964;
49	100.0	0.0	7.888	41.47	20750.7	2.624	0.0508	0.0	0.2004;
50	100.0	0.0	8.046	41.31	20341.7	2.676	0.0514	0.0	0.2044;
51	100.0	0.0	8.207	41.15	19940.7	2.730	0.052	0.0	0.2085;
52	100.0	0.0	8.372	41.00	19547.7	2.785	0.0525	0.0	0.2126;
53	100.0	0.0	8.540	40.85	19162.5	2.841	0.0531	0.0	0.2169;
54	100.0	0.0	8.711	40.70	18784.9	2.898	0.0537	0.0	0.2213;
55	100.0	0.0	8.885	40.56	18414.8	2.956	0.0543	0.0	0.2257;
56	100.0	0.0	9.063	40.42	18052.1	3.016	0.0548	0.0	0.2302;
57	100.0	0.0	9.245	40.28	17696.4	3.076	0.0554	0.0	0.2348;
58	100.0	0.0	9.430	40.14	17347.9	3.138	0.056	0.0	0.2395;
59	100.0	0.0	9.619	40.01	17006.2	3.201	0.0565	0.0	0.2443;
60	100.0	0.0	9.812	39.88	16671.3	3.265	0.0571	0.0	0.2492;
61	100.0	0.0	10.01	39.75	16343.0	3.331	0.0576	0.0	0.2542;
62	100.0	0.0	10.21	39.63	16021.2	3.398	0.0582	0.0	0.2593;
63	100.0	0.0	10.41	39.50	15705.8	3.466	0.0587	0.0	0.2645;
64	100.0	0.0	10.62	39.38	15396.6	3.536	0.0592	0.0	0.2698;
65	100.0	0.0	10.83	39.27	15103.8	3.604	0.0598	0.0	0.2751; begin overlap;
66	100.0	0.0	11.04	39.16	14827.3	3.672	0.0603	0.0	0.2803;
67	100.0	0.0	11.24	39.06	14565.6	3.738	0.0608	0.0	0.2855;
68	100.0	0.0	11.44	38.96	14317.5	3.802	0.0614	0.0	0.2905;
69	100.0	0.0	11.63	38.87	14081.8	3.866	0.0619	0.0	0.2954;
70	100.0	0.0	11.82	38.78	13857.6	3.929	0.0624	0.0	0.3003;
71	100.0	0.0	12.01	38.70	13643.8	3.990	0.0629	0.0	0.3050;
72	100.0	0.0	12.19	38.62	13439.7	4.051	0.0635	0.0	0.3097;
73	100.0	0.0	12.38	38.55	13244.6	4.110	0.064	0.0	0.3143;
74	100.0	0.0	12.55	38.47	13057.9	4.169	0.0645	0.0	0.3189;
75	100.0	0.0	12.73	38.40	12878.9	4.227	0.065	0.0	0.3234;
76	100.0	0.0	12.91	38.34	12707.1	4.284	0.0655	0.0	0.3278;
77	100.0	0.0	13.08	38.27	12542.1	4.341	0.0661	0.0	0.3322;
78	100.0	0.0	13.25	38.21	12383.4	4.396	0.0666	0.0	0.3365;
79	100.0	0.0	13.41	38.15	12230.7	4.451	0.0671	0.0	0.3407;
80	100.0	0.0	13.58	38.09	12083.5	4.505	0.0676	0.0	0.3449;
81	100.0	0.0	13.74	38.04	11941.5	4.559	0.0681	0.0	0.3490;
82	100.0	0.0	13.90	37.98	11804.4	4.612	0.0687	0.0	0.3531;
83	100.0	0.0	14.06	37.93	11672.0	4.664	0.0692	0.0	0.3572;
84	100.0	0.0	14.22	37.88	11544.0	4.716	0.0697	0.0	0.3611;
85	100.0	0.0	14.37	37.83	11420.1	4.767	0.0702	0.0	0.3651;
86	100.0	0.0	14.53	37.79	11300.1	4.818	0.0708	0.0	0.3690;
87	100.0	0.0	14.68	37.74	11183.9	4.868	0.0713	0.0	0.3729;
88	100.0	0.0	14.83	37.70	11071.2	4.917	0.0718	0.0	0.3767;
89	100.0	0.0	14.98	37.65	10961.8	4.966	0.0724	0.0	0.3805;
90	100.0	0.0	15.13	37.61	10855.7	5.015	0.0729	0.0	0.3842;
91	100.0	0.0	15.27	37.57	10752.5	5.063	0.0734	0.0	0.3879;
92	100.0	0.0	15.42	37.53	10652.3	5.111	0.074	0.0	0.3916;
93	100.0	0.0	15.56	37.50	10554.8	5.158	0.0745	0.0	0.3952;
94	100.0	0.0	15.70	37.46	10460.0	5.205	0.0751	0.0	0.3988;
95	100.0	0.0	15.84	37.42	10367.6	5.251	0.0756	0.0	0.4024;
96	100.0	0.0	15.98	37.39	10277.7	5.297	0.0762	0.0	0.4059;
97	100.0	0.0	16.12	37.35	10190.1	5.342	0.0767	0.0	0.4094;
98	100.0	0.0	16.26	37.32	10104.7	5.388	0.0773	0.0	0.4129;
99	100.0	0.0	16.39	37.29	10021.3	5.432	0.0778	0.0	0.4164;
100	100.0	0.0	16.53	37.26	9940.1	5.477	0.0784	0.0	0.4198;
101	100.0	0.0	16.66	37.22	9860.7	5.521	0.079	0.0	0.4232;
102	100.0	0.0	16.79	37.19	9783.2	5.565	0.0795	0.0	0.4265;
103	100.0	0.0	16.92	37.16	9707.6	5.608	0.0801	0.0	0.4298;

```
104   100.0   0.0   17.05   37.14   9633.6   5.651   0.0807   0.0   0.4332;
105   100.0   0.0   17.18   37.11   9561.3   5.694   0.0813   0.0   0.4364;
106   100.0   0.0   17.31   37.08   9490.6   5.736   0.0819   0.0   0.4397;
107   100.0   0.0   17.44   37.05   9421.4   5.778   0.0825   0.0   0.4429;
108   100.0   0.0   17.56   37.03   9353.7   5.820   0.0831   0.0   0.4461;
109   100.0   0.0   17.69   37.00   9287.5   5.862   0.0837   0.0   0.4493;
110   100.0   0.0   17.81   36.98   9222.6   5.903   0.0843   0.0   0.4525;
111   100.0   0.0   17.94   36.95   9159.1   5.944   0.0849   0.0   0.4556;
112   100.0   0.0   18.06   36.93   9096.8   5.985   0.0855   0.0   0.4587;
113   100.0   0.0   18.18   36.90   9035.8   6.025   0.0861   0.0   0.4618;
114   100.0   0.0   18.30   36.88   8976.0   6.065   0.0867   0.0   0.4649;
115   100.0   0.0   18.42   36.86   8917.3   6.105   0.0874   0.0   0.4679;
116   100.0   0.0   18.54   36.83   8859.8   6.145   0.088    0.0   0.4710;
117   100.0   0.0   18.66   36.81   8803.3   6.184   0.0886   0.0   0.4740;
118   100.0   0.0   18.78   36.79   8747.9   6.223   0.0893   0.0   0.4770;
119   100.0   0.0   18.90   36.77   8693.5   6.262   0.0899   0.0   0.4799;
120   100.0   0.0   19.01   36.75   8640.1   6.301   0.0906   0.0   0.4829;
121   100.0   0.0   19.13   36.73   8587.7   6.339   0.0913   0.0   0.4858;
122   100.0   0.0   19.24   36.71   8536.2   6.378   0.092    0.0   0.4887;
123   100.0   0.0   19.36   36.69   8485.6   6.416   0.0926   0.0   0.4916;
124   100.0   0.0   19.47   36.67   8435.8   6.453   0.0933   0.0   0.4945;
125   100.0   0.0   19.58   36.65   8386.9   6.491   0.094    0.0   0.4974;
126   100.0   0.0   19.69   36.63   8338.9   6.528   0.0947   0.0   0.5002;
127   100.0   0.0   19.81   36.61   8291.6   6.566   0.0954   0.0   0.5031;
128   100.0   0.0   19.92   36.59   8245.1   6.603   0.0962   0.0   0.5059;
129   100.0   0.0   20.03   36.58   8199.4   6.640   0.0969   0.0   0.5087;
130   100.0   0.0   20.14   36.56   8154.4   6.676   0.0976   0.0   0.5114;
131   100.0   0.0   20.24   36.54   8110.1   6.713   0.0984   0.0   0.5142;
132   100.0   0.0   20.35   36.52   8066.4   6.749   0.0991   0.0   0.5170;
133   100.0   0.0   20.46   36.51   8023.5   6.785   0.0999   0.0   0.5197;
134   100.0   0.0   20.57   36.49   7981.2   6.821   0.101    0.0   0.5224;
135   100.0   0.0   20.67   36.47   7939.6   6.857   0.101    0.0   0.5251;
136   100.0   0.0   20.78   36.46   7898.6   6.892   0.102    0.0   0.5278;
137   100.0   0.0   20.88   36.44   7858.2   6.928   0.103    0.0   0.5305;
138   100.0   0.0   20.99   36.43   7818.3   6.963   0.104    0.0   0.5331;
139   100.0   0.0   21.09   36.41   7779.1   6.998   0.105    0.0   0.5358;
140   100.0   0.0   21.20   36.40   7740.4   7.033   0.106    0.0   0.5384;
141   100.0   0.0   21.30   36.38   7702.2   7.068   0.106    0.0   0.5410;
142   100.0   0.0   21.40   36.37   7664.6   7.103   0.107    0.0   0.5436;
143   100.0   0.0   21.50   36.35   7627.5   7.137   0.108    0.0   0.5462;
144   100.0   0.0   21.60   36.34   7590.9   7.172   0.109    0.0   0.5488;
145   100.0   0.0   21.71   36.32   7554.8   7.206   0.110    0.0   0.5513;
146   100.0   0.0   21.81   36.31   7519.2   7.240   0.111    0.0   0.5539;
147   100.0   0.0   21.91   36.30   7484.0   7.274   0.112    0.0   0.5564;
148   100.0   0.0   22.00   36.28   7449.3   7.308   0.113    0.0   0.5589;
149   100.0   0.0   22.10   36.27   7415.0   7.342   0.114    0.0   0.5614;
150   100.0   0.0   22.20   36.26   7381.2   7.376   0.115    0.0   0.5639;
151   100.0   0.0   22.30   36.24   7347.8   7.409   0.116    0.0   0.5664;
152   100.0   0.0   22.39   36.23   7314.8   7.442   0.117    0.0   0.5688;
153   100.0   0.0   22.49   36.22   7282.2   7.476   0.118    0.0   0.5713;
154   100.0   0.0   22.59   36.20   7250.0   7.509   0.119    0.0   0.5737;
155   100.0   0.0   22.68   36.19   7218.1   7.542   0.120    0.0   0.5761;
156   100.0   0.0   22.78   36.18   7186.7   7.575   0.121    0.0   0.5785;
157   100.0   0.0   22.87   36.17   7155.6   7.608   0.123    0.0   0.5809;
158   100.0   0.0   22.97   36.16   7124.9   7.641   0.124    0.0   0.5833;
159   100.0   0.0   23.06   36.14   7094.5   7.674   0.125    0.0   0.5857;
```

160	100.0	0.0	23.15	36.13	7064.4	7.706	0.126	0.0	0.5880;
161	100.0	0.0	23.24	36.12	7034.7	7.739	0.127	0.0	0.5904;
162	100.0	0.0	23.33	36.11	7005.3	7.771	0.129	0.0	0.5927;
163	100.0	0.0	23.42	36.10	6976.1	7.804	0.130	0.0	0.5950;
164	100.0	0.0	23.51	36.09	6947.3	7.836	0.132	0.0	0.5973;
165	100.0	0.0	23.60	36.07	6918.8	7.868	0.133	0.0	0.5995;
166	100.0	0.0	23.69	36.06	6890.6	7.901	0.134	0.0	0.6018;
167	100.0	0.0	23.78	36.05	6862.6	7.933	0.136	0.0	0.6040;
168	100.0	0.0	23.87	36.04	6835.0	7.965	0.138	0.0	0.6063;
169	100.0	0.0	23.96	36.03	6807.5	7.997	0.139	0.0	0.6085;
170	100.0	0.0	24.04	36.02	6780.4	8.029	0.141	0.0	0.6107;
171	100.0	0.0	24.13	36.01	6753.4	8.061	0.143	0.0	0.6128;
172	100.0	0.0	24.21	36.00	6726.7	8.093	0.144	0.0	0.6150;
173	100.0	0.0	24.29	35.99	6700.3	8.125	0.146	0.0	0.6171;
174	100.0	0.0	24.38	35.98	6674.1	8.157	0.148	0.0	0.6192;
175	100.0	0.0	24.46	35.97	6649.1	8.188	0.150	0.0	0.6212;
176	100.0	0.0	24.53	35.96	6624.4	8.218	0.152	0.0	0.6232;
177	100.0	0.0	24.61	35.95	6599.9	8.249	0.154	0.0	0.6251;
178	100.0	0.0	24.69	35.94	6575.5	8.279	0.156	0.0	0.6271;
179	100.0	0.0	24.76	35.93	6551.5	8.310	0.158	0.0	0.6290;
180	100.0	0.0	24.84	35.92	6527.6	8.340	0.160	0.0	0.6309;
181	100.0	0.0	24.91	35.91	6503.9	8.370	0.162	0.0	0.6328;
182	100.0	0.0	24.99	35.90	6480.5	8.401	0.164	0.0	0.6346;
183	100.0	0.0	25.06	35.89	6457.2	8.431	0.165	0.0	0.6365;
184	100.0	0.0	25.13	35.89	6434.2	8.461	0.167	0.0	0.6384;
185	100.0	0.0	25.20	35.88	6411.3	8.491	0.169	0.0	0.6402;
186	100.0	0.0	25.28	35.87	6388.7	8.521	0.171	0.0	0.6420;
187	100.0	0.0	25.35	35.86	6366.2	8.551	0.173	0.0	0.6438;
188	100.0	0.0	25.42	35.85	6343.9	8.581	0.175	0.0	0.6456;
189	100.0	0.0	25.49	35.84	6321.8	8.611	0.177	0.0	0.6474;
190	100.0	0.0	25.56	35.83	6299.9	8.641	0.179	0.0	0.6491;
191	100.0	0.0	25.62	35.82	6278.1	8.671	0.181	0.0	0.6509;
192	100.0	0.0	25.69	35.82	6256.6	8.701	0.183	0.0	0.6526;
193	100.0	0.0	25.76	35.81	6235.1	8.731	0.185	0.0	0.6543;
194	100.0	0.0	25.83	35.80	6213.9	8.761	0.186	0.0	0.6560;
195	100.0	0.0	25.89	35.79	6192.8	8.791	0.188	0.0	0.6577;
196	100.0	0.0	25.96	35.78	6171.9	8.821	0.190	0.0	0.6594;
197	100.0	0.0	26.03	35.77	6151.1	8.850	0.192	0.0	0.6610;
198	100.0	0.0	26.09	35.77	6130.5	8.880	0.194	0.0	0.6627;
199	100.0	0.0	26.15	35.76	6110.0	8.910	0.196	0.0	0.6643;
200	100.0	0.0	26.22	35.75	6089.7	8.940	0.198	0.0	0.6659;
201	100.0	0.0	26.28	35.74	6069.5	8.969	0.200	0.0	0.6675;
202	100.0	0.0	26.34	35.73	6049.4	8.999	0.202	0.0	0.6691;
203	100.0	0.0	26.41	35.73	6029.5	9.029	0.204	0.0	0.6707;
204	100.0	0.0	26.47	35.72	6009.7	9.059	0.205	0.0	0.6723;
205	100.0	0.0	26.53	35.71	5990.1	9.088	0.207	0.0	0.6738;
206	100.0	0.0	26.59	35.70	5970.6	9.118	0.209	0.0	0.6754;
207	100.0	0.0	26.65	35.70	5951.2	9.148	0.211	0.0	0.6769;
208	100.0	0.0	26.71	35.69	5932.0	9.177	0.213	0.0	0.6784;
209	100.0	0.0	26.77	35.68	5912.8	9.207	0.215	0.0	0.6799;
210	100.0	0.0	26.83	35.67	5893.8	9.237	0.217	0.0	0.6814;
211	100.0	0.0	26.88	35.67	5874.9	9.267	0.219	0.0	0.6828;
212	100.0	0.0	26.94	35.66	5856.1	9.296	0.221	0.0	0.6843;
213	100.0	0.0	27.00	35.65	5837.5	9.326	0.223	0.0	0.6857;
214	100.0	0.0	27.05	35.64	5818.9	9.356	0.225	0.0	0.6872;
215	100.0	0.0	27.11	35.64	5800.5	9.385	0.226	0.0	0.6886;

216	100.0	0.0	27.16	35.63	5782.2	9.415	0.228	0.0	0.6900;
217	100.0	0.0	27.22	35.62	5763.9	9.445	0.230	0.0	0.6914;
218	100.0	0.0	27.27	35.62	5745.8	9.475	0.232	0.0	0.6927;
219	100.0	0.0	27.33	35.61	5727.8	9.505	0.234	0.0	0.6941;
220	100.0	0.0	27.38	35.60	5709.9	9.534	0.236	0.0	0.6955;
221	100.0	0.0	27.43	35.59	5692.1	9.564	0.238	0.0	0.6968;
222	100.0	0.0	27.48	35.59	5674.3	9.594	0.240	0.0	0.6981;
223	100.0	0.0	27.54	35.58	5656.7	9.624	0.242	0.0	0.6994;
224	100.0	0.0	27.59	35.57	5639.2	9.654	0.244	0.0	0.7007;
225	100.0	0.0	27.64	35.57	5621.7	9.684	0.246	0.0	0.7020;
226	100.0	0.0	27.69	35.56	5604.4	9.714	0.248	0.0	0.7033;
227	100.1	0.0	27.74	35.55	5587.1	9.744	0.250	0.0	0.7045;
228	100.1	0.0	27.79	35.55	5569.9	9.774	0.252	0.0	0.7058;
229	100.1	0.0	27.83	35.54	5552.8	9.804	0.254	0.0	0.7070;
230	100.1	0.0	27.88	35.53	5535.8	9.834	0.256	0.0	0.7082;
231	100.1	0.0	27.93	35.53	5518.9	9.864	0.258	0.0	0.7094;
232	100.1	0.0	27.98	35.52	5502.0	9.895	0.260	0.0	0.7106;
233	100.1	0.0	28.02	35.51	5485.3	9.925	0.262	0.0	0.7118;
234	100.1	0.0	28.07	35.51	5468.6	9.955	0.264	0.0	0.7129;
235	100.1	0.0	28.11	35.50	5451.9	9.985	0.266	0.0	0.7141;
236	100.1	0.0	28.16	35.49	5435.4	10.02	0.268	0.0	0.7152;
237	100.1	0.0	28.20	35.49	5418.9	10.05	0.270	0.0	0.7164;
238	100.1	0.0	28.25	35.48	5402.5	10.08	0.272	0.0	0.7175;
239	100.1	0.0	28.29	35.47	5386.1	10.11	0.274	0.0	0.7186;
240	100.1	0.0	28.33	35.47	5369.9	10.14	0.276	0.0	0.7197;
241	100.1	0.0	28.38	35.46	5353.7	10.17	0.278	0.0	0.7207;
242	100.1	0.0	28.42	35.46	5337.5	10.20	0.280	0.0	0.7218;
243	100.1	0.0	28.46	35.45	5321.4	10.23	0.282	0.0	0.7229;
244	100.1	0.0	28.50	35.44	5305.4	10.26	0.284	0.0	0.7239;
245	100.1	0.0	28.54	35.44	5289.4	10.29	0.286	0.0	0.7249;
246	100.1	0.0	28.58	35.43	5273.5	10.32	0.288	0.0	0.7259;
247	100.1	0.0	28.62	35.42	5257.7	10.35	0.290	0.0	0.7269;
248	100.1	0.0	28.66	35.42	5241.9	10.39	0.292	0.0	0.7279;
249	100.1	0.0	28.70	35.41	5226.2	10.42	0.294	0.0	0.7289;
250	100.1	0.0	28.73	35.41	5210.5	10.45	0.296	0.0	0.7298;
251	100.1	0.0	28.77	35.40	5194.9	10.48	0.299	0.0	0.7308;
252	100.1	0.0	28.81	35.39	5179.3	10.51	0.301	0.0	0.7317;
253	100.1	0.0	28.84	35.39	5163.8	10.54	0.303	0.0	0.7326;
254	100.1	0.0	28.88	35.38	5148.3	10.57	0.305	0.0	0.7336;
255	100.1	0.0	28.92	35.38	5132.9	10.61	0.307	0.0	0.7345;
256	100.1	0.0	28.95	35.37	5117.5	10.64	0.309	0.0	0.7353;
257	100.1	0.0	28.98	35.36	5102.2	10.67	0.311	0.0	0.7362;
258	100.1	0.0	29.02	35.36	5086.9	10.70	0.313	0.0	0.7371;
259	100.1	0.0	29.05	35.35	5071.6	10.73	0.316	0.0	0.7379;
260	100.1	0.0	29.08	35.35	5056.4	10.77	0.318	0.0	0.7387;
261	100.1	0.0	29.12	35.34	5041.2	10.80	0.320	0.0	0.7396;
262	100.1	0.0	29.15	35.33	5026.1	10.83	0.322	0.0	0.7404;
263	100.1	0.0	29.18	35.33	5011.0	10.86	0.324	0.0	0.7412;
264	100.1	0.0	29.21	35.32	4995.9	10.90	0.327	0.0	0.7420;
265	100.1	0.0	29.24	35.32	4980.9	10.93	0.329	0.0	0.7427;
266	100.1	0.0	29.27	35.31	4965.9	10.96	0.331	0.0	0.7435;
267	100.1	0.0	29.30	35.30	4951.0	11.00	0.333	0.0	0.7442;
268	100.1	0.0	29.33	35.30	4936.1	11.03	0.336	0.0	0.7450;
269	100.1	0.0	29.36	35.29	4921.2	11.06	0.338	0.0	0.7457;
270	100.1	0.0	29.39	35.29	4906.3	11.10	0.340	0.0	0.7464;
271	100.1	0.0	29.41	35.28	4891.5	11.13	0.343	0.0	0.7471;

272	100.1	0.0	29.44	35.28	4876.6	11.16	0.345	0.0	0.7478;
273	100.1	0.0	29.47	35.27	4861.9	11.20	0.347	0.0	0.7485;
274	100.1	0.0	29.49	35.26	4847.1	11.23	0.350	0.0	0.7491;
275	100.1	0.0	29.52	35.26	4832.4	11.27	0.352	0.0	0.7498;
276	100.1	0.0	29.54	35.25	4817.6	11.30	0.354	0.0	0.7504;
277	100.1	0.0	29.57	35.25	4802.9	11.33	0.357	0.0	0.7510;
278	100.1	0.0	29.59	35.24	4788.3	11.37	0.359	0.0	0.7516;
279	100.1	0.0	29.62	35.24	4773.6	11.40	0.362	0.0	0.7522;
280	100.1	0.0	29.64	35.23	4759.0	11.44	0.364	0.0	0.7528;
281	100.1	0.0	29.66	35.22	4744.3	11.47	0.366	0.0	0.7534;
282	100.1	0.0	29.68	35.22	4729.7	11.51	0.369	0.0	0.7540;
283	100.1	0.0	29.71	35.21	4715.1	11.55	0.371	0.0	0.7545;
284	100.1	0.0	29.73	35.21	4700.5	11.58	0.374	0.0	0.7551;
285	100.1	0.0	29.75	35.20	4685.9	11.62	0.376	0.0	0.7556;
286	100.1	0.0	29.77	35.20	4671.4	11.65	0.379	0.0	0.7561;
287	100.2	0.0	29.79	35.19	4656.8	11.69	0.381	0.0	0.7566;
288	100.2	0.0	29.81	35.18	4642.3	11.73	0.384	0.0	0.7571;
289	100.2	0.0	29.83	35.18	4627.7	11.76	0.387	0.0	0.7576;
290	100.2	0.0	29.84	35.17	4613.2	11.80	0.389	0.0	0.7580;
291	100.2	0.0	29.86	35.17	4598.6	11.84	0.392	0.0	0.7585;
292	100.2	0.0	29.88	35.16	4584.1	11.88	0.394	0.0	0.7589;
293	100.2	0.0	29.90	35.16	4569.5	11.91	0.397	0.0	0.7594;
294	100.2	0.0	29.91	35.15	4555.0	11.95	0.400	0.0	0.7598;
295	100.2	0.0	29.93	35.14	4540.4	11.99	0.402	0.0	0.7602;
296	100.2	0.0	29.95	35.14	4525.9	12.03	0.405	0.0	0.7606;
297	100.2	0.0	29.96	35.13	4511.3	12.07	0.408	0.0	0.7610;
298	100.2	0.0	29.98	35.13	4496.7	12.11	0.411	0.0	0.7614;
299	100.2	0.0	29.99	35.12	4482.2	12.15	0.413	0.0	0.7618;
300	100.2	0.0	30.00	35.12	4467.6	12.19	0.416	0.0	0.7621;
301	100.2	0.0	30.02	35.11	4453.0	12.23	0.419	0.0	0.7625;
302	100.2	0.0	30.03	35.10	4438.3	12.27	0.422	0.0	0.7628;
303	100.2	0.0	30.04	35.10	4423.7	12.31	0.425	0.0	0.7631;
304	100.2	0.0	30.06	35.09	4409.0	12.35	0.428	0.0	0.7634;
305	100.2	0.0	30.07	35.09	4394.3	12.39	0.430	0.0	0.7637;
306	100.2	0.0	30.08	35.08	4379.6	12.43	0.433	0.0	0.7640;
307	100.2	0.0	30.09	35.07	4364.9	12.47	0.436	0.0	0.7643;
308	100.2	0.0	30.10	35.07	4350.2	12.51	0.439	0.0	0.7646;
309	100.2	0.0	30.11	35.06	4335.4	12.56	0.442	0.0	0.7649;
310	100.2	0.0	30.12	35.06	4320.6	12.60	0.445	0.0	0.7651;
311	100.2	0.0	30.13	35.05	4305.7	12.64	0.448	0.0	0.7654;
312	100.2	0.0	30.14	35.05	4290.8	12.69	0.451	0.0	0.7656;
313	100.2	0.0	30.15	35.04	4275.9	12.73	0.455	0.0	0.7659;
314	100.2	0.0	30.16	35.03	4261.0	12.78	0.458	0.0	0.7661;
315	100.2	0.0	30.17	35.03	4246.0	12.82	0.461	0.0	0.7663;
316	100.2	0.0	30.18	35.02	4230.9	12.87	0.464	0.0	0.7665;
317	100.3	0.0	30.19	35.02	4215.8	12.91	0.467	0.0	0.7667;
318	100.3	0.0	30.19	35.01	4200.7	12.96	0.471	0.0	0.7669;
319	100.3	0.0	30.20	35.00	4185.5	13.01	0.474	0.0	0.7671;
320	100.3	0.0	30.21	35.00	4170.2	13.05	0.477	0.0	0.7673;
321	100.3	0.0	30.21	34.99	4154.9	13.10	0.481	0.0	0.7675;
322	100.3	0.0	30.22	34.99	4139.5	13.15	0.484	0.0	0.7676;
323	100.3	0.0	30.23	34.98	4124.1	13.20	0.487	0.0	0.7678;
324	100.3	0.0	30.23	34.97	4108.5	13.25	0.491	0.0	0.7679;
325	100.3	0.0	30.24	34.97	4092.9	13.30	0.494	0.0	0.7681;
326	100.3	0.0	30.25	34.96	4077.3	13.35	0.498	0.0	0.7683;
327	100.3	0.0	30.25	34.96	4061.5	13.40	0.502	0.0	0.7684;

328	100.3	0.0	30.26	34.95	4045.7	13.46	0.505	0.0	0.7686;
329	100.3	0.0	30.26	34.94	4029.8	13.51	0.509	0.0	0.7687;
330	100.3	0.0	30.27	34.94	4013.8	13.56	0.513	0.0	0.7688;
331	100.3	0.0	30.28	34.93	3997.7	13.62	0.516	0.0	0.7690;
332	100.3	0.0	30.28	34.92	3981.4	13.67	0.520	0.0	0.7691;
333	100.3	0.0	30.29	34.92	3965.1	13.73	0.524	0.0	0.7693;
334	100.3	0.0	30.29	34.91	3948.7	13.79	0.528	0.0	0.7694;
335	100.3	0.0	30.30	34.91	3932.1	13.84	0.532	0.0	0.7696;
336	100.4	0.0	30.30	34.90	3915.5	13.90	0.536	0.0	0.7697;
337	100.4	0.0	30.31	34.89	3898.7	13.96	0.540	0.0	0.7699;
338	100.4	0.0	30.32	34.89	3881.7	14.02	0.544	0.0	0.7700;
339	100.4	0.0	30.32	34.88	3864.6	14.09	0.548	0.0	0.7702;
340	100.4	0.0	30.33	34.87	3847.4	14.15	0.552	0.0	0.7704;
341	100.4	0.0	30.34	34.87	3830.0	14.21	0.556	0.0	0.7706;
342	100.4	0.0	30.35	34.86	3812.4	14.28	0.560	0.0	0.7708;
343	100.4	0.0	30.35	34.85	3794.7	14.35	0.565	0.0	0.7710;
344	100.4	0.0	30.36	34.84	3776.8	14.41	0.569	0.0	0.7712;
345	100.4	0.0	30.37	34.84	3758.7	14.48	0.574	0.0	0.7715;
346	100.4	0.0	30.38	34.83	3740.4	14.55	0.578	0.0	0.7717;
347	100.4	0.0	30.39	34.82	3721.9	14.63	0.583	0.0	0.7720;
348	100.4	0.0	30.41	34.82	3703.2	14.70	0.587	0.0	0.7723;
349	100.5	0.0	30.42	34.81	3684.3	14.78	0.592	0.0	0.7726;
350	100.5	0.0	30.43	34.80	3665.1	14.85	0.597	0.0	0.7730;
351	100.5	0.0	30.45	34.79	3645.7	14.93	0.601	0.0	0.7734;
352	100.5	0.0	30.46	34.79	3626.0	15.01	0.606	0.0	0.7738;
353	100.5	0.0	30.48	34.78	3606.1	15.10	0.611	0.0	0.7742;
354	100.5	0.0	30.50	34.77	3585.9	15.18	0.616	0.0	0.7747;
355	100.5	0.0	30.52	34.76	3565.3	15.27	0.621	0.0	0.7752;
356	100.5	0.0	30.54	34.75	3544.5	15.36	0.627	0.0	0.7758;
357	100.5	0.0	30.57	34.75	3523.3	15.45	0.632	0.0	0.7764;
358	100.6	0.0	30.59	34.74	3501.8	15.55	0.637	0.0	0.7771;
359	100.6	0.0	30.62	34.73	3480.2	15.64	0.642	0.0	0.7778;
360	100.6	0.0	30.65	34.72	3458.7	15.74	0.648	0.0	0.7785; end overlap;
361	100.6	0.0	30.67	34.71	3437.4	15.84	0.653	0.0	0.7791;
362	100.6	0.0	30.69	34.70	3416.2	15.94	0.659	0.0	0.7796;
363	100.6	0.0	30.71	34.70	3395.1	16.03	0.665	0.0	0.7802;
364	100.6	0.0	30.73	34.69	3374.1	16.13	0.671	0.0	0.7806;
365	100.6	0.0	30.75	34.68	3353.3	16.23	0.677	0.0	0.7810;
366	100.7	0.0	30.76	34.67	3332.5	16.34	0.683	0.0	0.7814;
367	100.7	0.0	30.78	34.66	3311.7	16.44	0.689	0.0	0.7817;
368	100.7	0.0	30.79	34.65	3291.0	16.54	0.695	0.0	0.7820;
369	100.7	0.0	30.80	34.65	3270.3	16.65	0.701	0.0	0.7822;
370	100.7	0.0	30.80	34.64	3249.6	16.75	0.708	0.0	0.7824;
371	100.7	0.0	30.81	34.63	3228.9	16.86	0.714	0.0	0.7826;
372	100.8	0.0	30.81	34.62	3208.2	16.97	0.721	0.0	0.7827;
373	100.8	0.0	30.82	34.61	3187.4	17.08	0.728	0.0	0.7828;
374	100.8	0.0	30.82	34.61	3166.6	17.19	0.735	0.0	0.7829;
375	100.8	0.0	30.82	34.60	3145.7	17.31	0.742	0.0	0.7829;
376	100.8	0.0	30.82	34.59	3124.7	17.42	0.749	0.0	0.7829;
377	100.8	0.0	30.83	34.58	3103.6	17.54	0.756	0.0	0.7830;
378	100.9	0.0	30.83	34.57	3082.3	17.66	0.764	0.0	0.7830;
379	100.9	0.0	30.83	34.56	3060.9	17.79	0.771	0.0	0.7830;
380	100.9	0.0	30.83	34.56	3039.2	17.91	0.779	0.0	0.7830;
381	100.9	0.0	30.83	34.55	3017.4	18.04	0.787	0.0	0.7830;
382	101.0	0.0	30.83	34.54	2995.3	18.17	0.795	0.0	0.7830;
383	101.0	0.0	30.83	34.53	2973.0	18.31	0.804	0.0	0.7831;

384	101.0	0.0	30.83	34.52	2950.4	18.45	0.812	0.0	0.7831;
385	101.0	0.0	30.84	34.51	2927.5	18.60	0.821	0.0	0.7832;
386	101.1	0.0	30.84	34.50	2904.3	18.74	0.830	0.0	0.7833;
387	101.1	0.0	30.85	34.49	2880.6	18.90	0.839	0.0	0.7835;
388	101.1	0.0	30.86	34.48	2856.6	19.06	0.848	0.0	0.7837;
389	101.2	0.0	30.87	34.47	2832.2	19.22	0.858	0.0	0.7840;
390	101.2	0.0	30.88	34.46	2807.4	19.39	0.868	0.0	0.7843;
391	101.2	0.0	30.90	34.45	2782.0	19.57	0.878	0.0	0.7848;
392	101.3	0.0	30.92	34.44	2756.2	19.75	0.888	0.0	0.7853;
393	101.3	0.0	30.94	34.43	2729.8	19.94	0.899	0.0	0.7859;
394	101.4	0.0	30.97	34.42	2702.8	20.14	0.909	0.0	0.7866;
395	101.4	0.0	31.00	34.41	2675.2	20.35	0.920	0.0	0.7874;
396	101.4	0.0	31.04	34.40	2646.9	20.57	0.932	0.0	0.7884;
397	101.5	0.0	31.08	34.39	2618.0	20.79	0.944	0.0	0.7895;
398	101.5	0.0	31.13	34.38	2588.4	21.03	0.956	0.0	0.7907;
399	101.6	0.0	31.19	34.37	2558.0	21.28	0.968	0.0	0.7922;
400	101.6	0.0	31.25	34.35	2526.8	21.54	0.981	0.0	0.7938;
401	101.7	0.0	31.33	34.34	2494.8	21.82	0.994	0.0	0.7957;
402	101.8	0.0	31.41	34.33	2461.9	22.11	1.007	0.0	0.7978;
403	101.8	0.0	31.50	34.32	2428.2	22.42	1.021	0.0	0.8001;
404	101.9	0.0	31.60	34.30	2393.4	22.75	1.035	0.0	0.8027;
405	102.0	0.0	31.72	34.29	2357.7	23.09	1.049	0.0	0.8056;
406	102.0	0.0	31.84	34.27	2321.0	23.46	1.064	0.0	0.8089;
407	102.1	0.0	31.99	34.26	2283.3	23.84	1.080	0.0	0.8125;
408	102.2	0.0	32.14	34.24	2244.5	24.26	1.096	0.0	0.8165;
409	102.3	0.0	32.32	34.23	2204.5	24.69	1.112	0.0	0.8209;
410	102.4	0.0	32.51	34.21	2163.4	25.16	1.129	0.0	0.8257;
411	102.5	0.0	32.72	34.20	2121.2	25.66	1.147	0.0	0.8311;
412	102.6	0.0	32.94	34.18	2079.6	26.18	1.164	0.0	0.8367;
413	102.7	0.0	33.17	34.16	2038.8	26.70	1.181	0.0	0.8425;
414	102.8	0.0	33.41	34.15	1998.8	27.24	1.198	0.0	0.8486;
415	102.9	0.0	33.66	34.13	1959.6	27.78	1.214	0.0	0.8549;
416	103.0	0.0	33.92	34.12	1921.1	28.34	1.230	0.0	0.8615;
417	103.1	0.0	34.19	34.10	1883.5	28.90	1.246	0.0	0.8684;
418	103.2	0.0	34.47	34.09	1846.5	29.48	1.262	0.0	0.8755;
419	103.3	0.0	34.76	34.07	1810.3	30.07	1.277	0.0	0.8828;
420	103.4	0.0	35.05	34.06	1774.8	30.67	1.293	0.0	0.8904;
421	103.5	0.0	35.36	34.05	1740.0	31.29	1.308	0.0	0.8982;
422	103.6	0.0	35.68	34.03	1705.8	31.91	1.323	0.0	0.9061;
423	103.7	0.0	36.00	34.02	1672.4	32.55	1.338	0.0	0.9143;
424	103.8	0.0	36.33	34.01	1639.6	33.20	1.352	0.0	0.9227;
425	104.0	0.0	36.67	33.99	1607.4	33.87	1.367	0.0	0.9313;
426	104.1	0.0	37.01	33.98	1575.9	34.55	1.381	0.0	0.9401;
427	104.2	0.0	37.37	33.97	1544.9	35.24	1.395	0.0	0.9491;
428	104.3	0.0	37.73	33.96	1514.6	35.94	1.409	0.0	0.9583;
429	104.4	0.0	38.10	33.95	1484.9	36.66	1.423	0.0	0.9677; bottom hit;

Horiz plane projections in effluent direction: radius(m): 0.0; CL(m): 0.4337
Lmz(m): 0.4337
forced entrain 1 0.0 -1.345 0.968 0.120
Rate sec-1 0.0 dy-1 0.0 kt: 0.0 Amb Sal 33.3632
;
3:07:41 PM. amb fills: 4

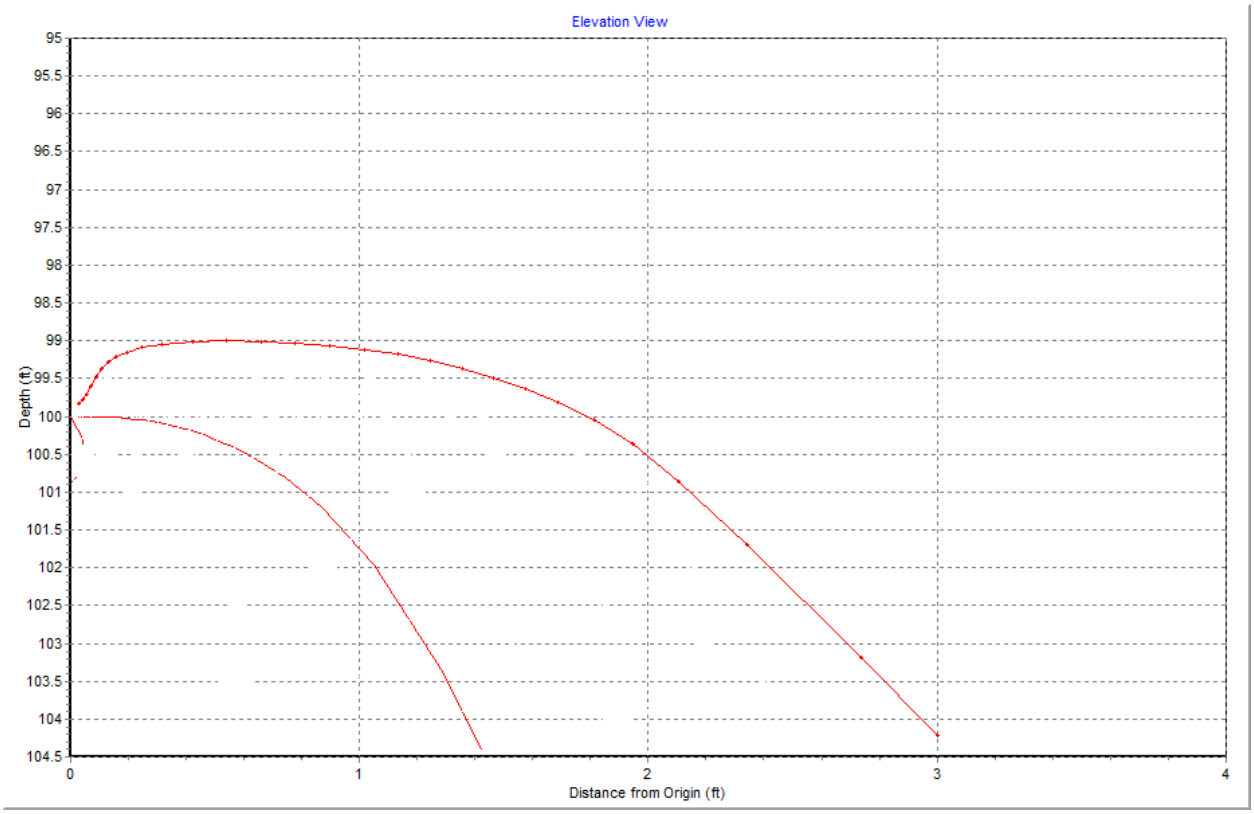


Figure C.8.1: Plumes 18b solution of discharge plume trajectories for discharges of 1.8 mgd of Doheny and Capistrano Beach well water average annual TDS = 33.5 ppt., and 3 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Depth of maximum rise of the plume is Z = 99.0 ft. at Xa = 0.735 ft from the point of discharge. The centerline of the plume is at an average distance of Xb = 1.423 ft from the point of discharge as the plume begins to impact the bottom at a depth of Z = 104.5 ft.

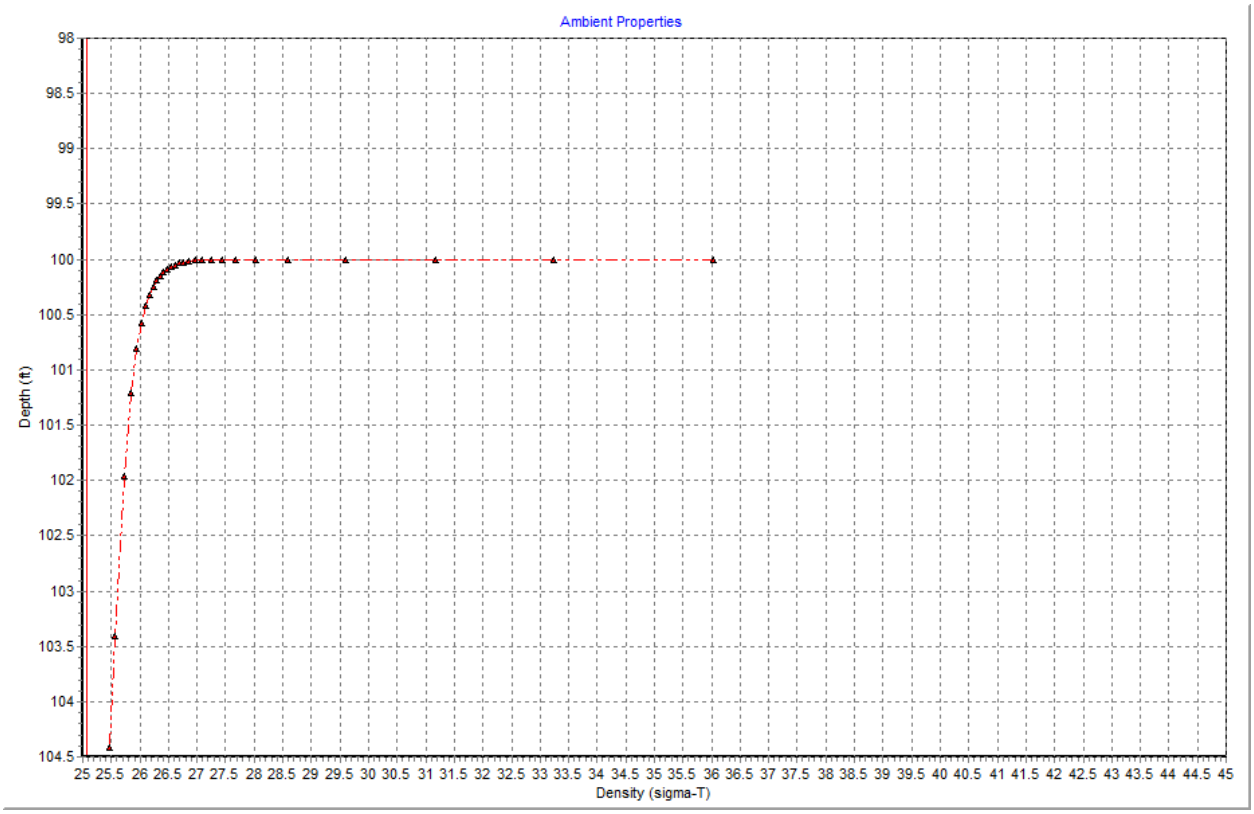


Figure C.8.2: Plumes 18b solution of vertical density profile for discharges of 1.8 mgd of Doheny and Capistrano Beach well water average annual TDS = 33.5 ppt. and 3 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Discharge effluent density shown as black triangles. Ambient water mass density profile shown as solid red line.

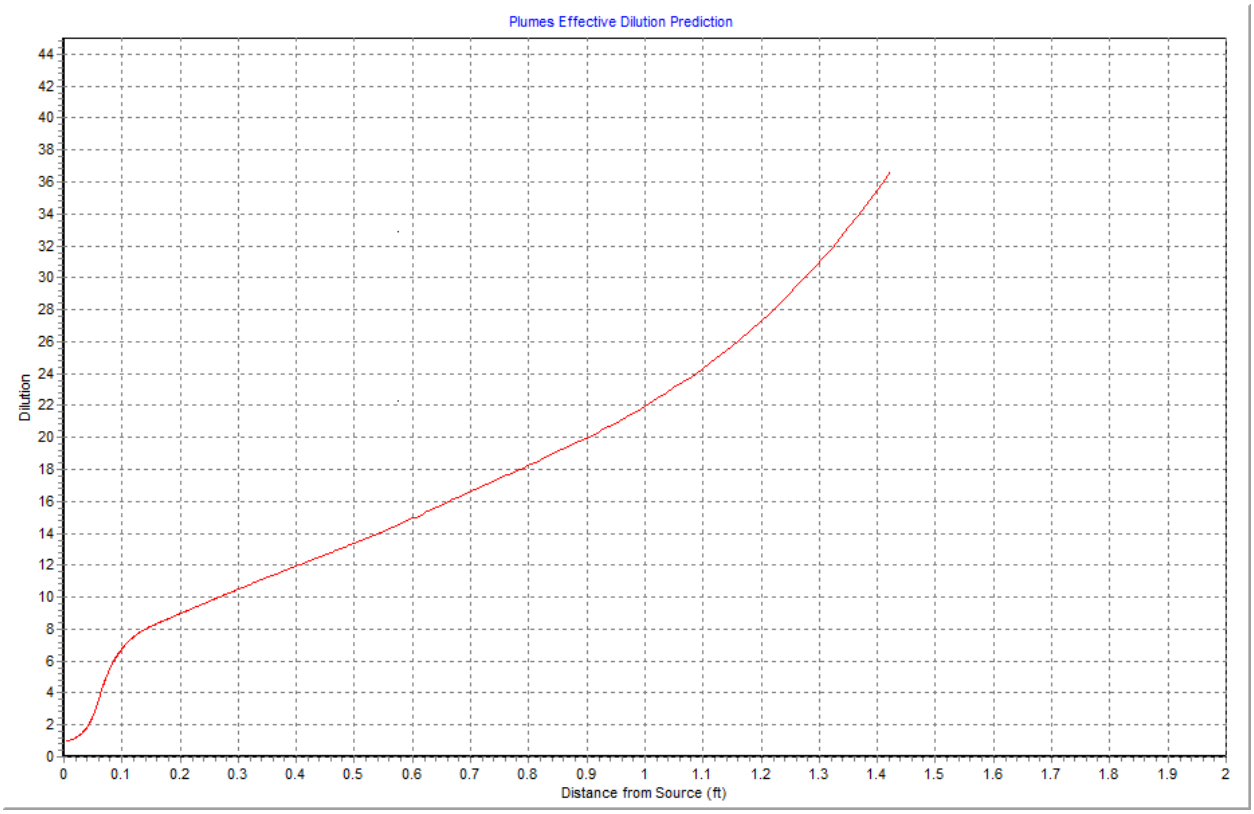


Figure C.8.3: Plumes 18b solution of effective (bulk average) dilution as a function of vertical distance from the point of discharge for discharges of 0.35 mgd of 1.8 mgd of Doheny and Capistrano Beach well water average annual TDS = 33.5 ppt and 3 mgd of brine from the Doheny Desalination Project with a brine salinity of 67 ppt. Effective dilution is S_a = 17.19 at the maximum rise of the plume at Xa = 0.735 ft. from the point of discharge. As the plume begins to impact the bottom, the plume centerline is at a distance of Xb = 1.423 ft from the point of discharge, where the effective dilution reaches S_a = 36.66.