



Tischler/Kocurek
Environmental Engineers

Memo

To: Sarah Garza, Port of Corpus Christi Authority
From: Lial Tischler, P.E., B.C.E.E.
C: Earnest Wotring, John Muir, Esqs; Baker Wotring, LLP
Date: June 24, 2021
Re: Harbor Island Desalination Plant – Effluent Diffuser Conceptual Design

This memorandum report presents the conceptual design of the high-rate diffuser that will discharge effluent from the proposed Harbor Island Desalination Plant that will be constructed by the Port of Corpus Christi Authority (PCCA). The report provides the necessary design and operation data that is required by the Texas Commission on Environmental Quality (TCEQ) to support the issuance of a TPDES discharge permit for the desalination plant.

This report provides the data and information for the diffuser that is identified in TCEQ's June 4, 2021 letter to Earnest Wotring¹ and is submitted as an attachment to the revised TPDES application cited in the letter.

Diffuser Location

The diffuser will be located on the north bank of the Corpus Christi Channel (Corpus Christi Bay, Segment 2481) approximately 300-350 meters (m) west of the confluence with the Lydia Ann Channel. This is the same geographical area as proposed in the original TPDES permit location. However, as described below, the distance of the diffuser from the North shoreline will be different than the 91.5 m (300 ft) specified in the previous design. This location is shown on Figure 1. Figure 1 also shows the bathymetry of the channel at, upstream, and downstream of the diffuser location using the data collected by Parsons Corporation in June 2021.

Diffuser Specifications

The diffuser barrel will be approximately parallel to the shoreline and will be located on the sloping north bank of the channel. The actual depth of the barrel below the water

¹ Kathy Humphreys, Staff Attorney, TCEQ

surface will be determined in the final design based on construction requirements and the side slope of the channel. The specific diffuser design conditions are provided in Table 1.

Table 1. Diffuser Specifications

Diffuser Specification	Value
Number of ports	20
Distance between risers	1.5 m
Distance between ports (one/riser)	1.5 m
Diffuser barrel length	30 m
Port diameter	0.18 m
Port angle to channel flow (flow outward to Gulf)	270°
Port angle to horizontal (water surface)	30°
Port height above bottom	7.9 m at MLT*
Depth of channel at location of discharge	27.4 m at MLT
Side slope of channel at discharge location (y/x)	~0.45

*Mean low tide

The diffuser will be located on the north slope of the eddy-generated “hole” in the channel. The channel depth at the point of discharge of 27.4 m (90 ft) is based on the bathymetry of the site as confirmed by the June 2021 study. The average depth of the water body in the 0.5-mile segments on either side of the discharge outside of the “hole” is approximately 18.3 m (60 feet).²

The ports will be affixed to risers that extend above the diffuser barrel to the design height above the bottom (Table 1). The ports will be attached to the risers with bolted flanges so that they can be blocked with a blind flange or can be changed to a different port diameter. If the initial implementation phase of the desalination plant results in an effluent flow significantly (e.g., >10%) below the design flow used in this design, the exit velocity will be increased by either blocking ports or by installing smaller diameter ports. For example, if the initial desalination plant is constructed at a capacity that is one-half the design capacity that is the basis of this diffuser design, 10 of the ports on the diffuser will be blocked and the critical effluent dilution will be the same as that for the final design capacity of the plant. Alternatively, the 20 risers can be fitted with ports with a diameter that will achieve the same exit velocity as used in this diffuser design (~8.2 m/s at the maximum monthly average discharge rate).

Effluent Characteristics

The intake for the PCCA desalination plant will be located in the Gulf of Mexico (GOM). Data from TCEQ’s Surface Water Quality Monitoring (SWQM) station 13468 (GOM at Aransas Pass) are used to characterize the desalination plant effluent for the purposes of diffuser design and water quality impact analysis. These data were provided by Parsons Corporation.

² Because of CORMIX input limitations the average channel depth used in the model is 22 m (72.2 feet)

The desalination plant water balance provided in Table 1 of the AMEC Foster Wheeler *Process Design Basis and Narrative, Port of Corpus Christi Industrial Seawater Desalination, Harbor Island* (December 2017)(AMEC)³ is used to calculate the effluent temperature, salinity, and density for the range of effluent conditions shown in Table 2. These conditions were provided by Parsons Corporation. The design effluent flow rate is 4.188 m³/s (95.6 MGD) as a maximum monthly (30-day) average, based on the water balance in the AMEC report.

Table 2. Effluent Characteristics

Season	RO Recovery (percent)	Percentile	Salinity (ppt)	Temperature (°C)	Density (kg/m ³)
Summer	50	T5, S5	53.9	26.55	1037.01
Summer	50	T5, S95	68.7	26.55	1048.15
Summer	50	T95, S5	53.9	30.71	1035.43
Summer	50	T95, S95	68.7	30.71	1046.44
Winter	50	T5, S5	41.2	11.11	1031.62
Winter	50	T5, S95	59.4	11.11	1045.79
Winter	50	T95, S5	41.2	18.33	1030.00
Winter	50	T95, S95	59.4	18.33	1043.91
Summer	40	T5, S5	46.8	26.55	1031.74
Summer	40	T5, S95	59.7	26.55	1041.42
Summer	40	T95, S5	46.8	30.71	1030.22
Summer	40	T95, S95	59.7	30.71	1039.79
Winter	40	T5, S5	35.9	11.11	1027.41
Winter	40	T5, S95	51.6	11.11	1039.73
Winter	40	T95, S5	35.9	18.33	1025.87
Winter	40	T95, S95	51.6	18.33	1037.96

*Density used for diffuser design is shaded

Receiving Water Characteristics

PCCA is conducting a field study to verify the bathymetry and current characteristics at the proposed location of the diffuser as requested in the TCEQ June 4, 2021 letter. Because of the timing of the required submittal of the revisions to the TPDES application (based on the Commission Order) and the fact that the current data will be collected over a relatively short time period (approximately one week), the currents used to model the proposed diffuser design with CORMIX are a range of 0.05 m/s to 1.2 m/s based on the long-term record from the University of Texas Marine Science Institute current meter located in Port Aransas and data obtained from the Texas Water Development Board for a Corpus Christi Bay Inflow Survey conducted on May 5-7, 2000. The field data collected at the diffuser site in June 2021 by Parsons Corporation document that this range of velocities is representative of the diffuser site. However, it is important to recognize that the maximum and minimum currents in a tidally driven environment are transient conditions that persist only for a matter of minutes and the 24-hour average current is the best measure of diffuser performance in terms of the 24-hour average

³ TPDES Permit Application (December 2019), Technical Report, Attachment 8

dilution that is achieved. The 50th percentile current in the Port Aransas database is 0.8 m/s and the dilution at this current approximates the 24-hour average dilution.

The lower end of the range modelled, 0.05 m/s, represents near slack-tide conditions and is used rather than a value of zero (0) current because of CORMIX computational limitations. Again, this a transient condition that occurs typically less than 10-15 minutes per tidal cycle.

The ambient salinity, temperature, and density data used to calculate the achievable effluent dilution with the diffuser are based on data from SWQM Station 16492 (Aransas Bay in Lydia Ann Channel). These conditions are shown in Table 3.

Table 3. Receiving Water Characteristics

Season	Percentile	Salinity (ppt)	Temperature (°C)	Density* (kg/m ³)
Summer	T5, S5	29.93	27.61	1018.75
Summer	T5, S95	40.57	27.61	1026.70
Summer	T95, S5	29.93	30.56	1017.76
Summer	T95, S95	40.57	30.56	1025.64
Winter	T5, S5	23.24	10.76	1017.83
Winter	T5, S95	33.20	10.76	1025.40
Winter	T95, S5	23.24	17.53	1016.39
Winter	T95, S95	33.20	17.53	1024.03

*Density used for diffuser design is shaded

Diffuser Performance

The effluent dilutions and predicted salinities in the Corpus Christi Channel were simulated with the CORMIX2 module of CORMIX Version 11.0GT.⁴

Two summer and two winter combinations of effluent and ambient densities that represent the greatest density differences effluent/ambient density conditions were modelled for the proposed diffuser design. These density differences represent the greatest differences between the effluent salinity and ambient salinity and result decreased mixing of effluent and ambient water at the boundaries of the effluent plume.

Table 4 presents the results of the diffuser performance modelling.

TCEQ has a consistent policy for establishing mixing zones for high-rate diffusers.⁵ TCEQ designates three categories of mixing zone; (1) the zone of initial dilution (ZID), which is the aquatic life acute mixing zone; (2) the aquatic life chronic mixing zone that is identified as the mixing zone (MZ); and (3) the human health mixing zone (HHMZ).⁶ The mixing zone policy is intended to address the specific language at 30 TAC 307.8(b), which defines the size of the ZID. The regulatory language specifies the size of the ZID

⁴ The brine module of CORMIX was evaluated for this application but the brine module limitations on the slope of the near shore bank did not permit its application to this location and diffuser design because the side slope of the channel is too steep.

⁵ TCEQ, June 2010. *Procedures to Implement the Texas Surface Water Quality Standards*, RG-194, p. 82.

⁶ *Ibid*, pp. 70-82.

and indicates that for diffusers, the ZID will have an area or volume equivalent to the size specified in the regulation.

The zone of initial dilution (ZID) and the aquatic life and human health mixing zones for a multi-port diffuser are based on an equivalent rectangular area and associated volume representing the following lateral dimensions: ZID = 50-foot radius (15.2 meters); mixing zone = 200-foot radius (60.9 m); and human health mixing zone = 400-foot radius (121.9 m). The mixing zones extend from the water surface to the bottom of the receiving water. Applying the TCEQ mixing zone policy described above, the ZID and mixing zone dimensions for the multi-port diffuser design are as follows:

- ZID: $x = 56.1$ m (measured perpendicular to the direction the ports point and centered at the center of the diffuser barrel); $y = 13$ m (centered on and measured toward the center of the channel along the length of the diffuser barrel).
- Aquatic life MZ: $x = 168.6$ m; $y = 69.3$ m using the same coordinates as the ZID.
- HHMZ: $x = 145.5$ m; $y = 321$ m using the same coordinates as the ZID.

These mixing zones are used by TCEQ for evaluation of compliance with the Texas Surface Water Quality Standards (SWQS) for the toxic constituents identified in Tables 1 and 2 of 30 Texas Administrative Code (TAC) 307.6. They are also used to determine the critical effluent dilutions used in whole effluent toxicity (WET) tests of the effluent.

These mixing zone definitions are **not** applicable to assessing the naturally occurring, inorganic chemical constituents that constitute salinity in marine waters and, in this case, the salinity of the desalination plant effluent. Therefore, the TCEQ ZID and mixing zone dimensions are used in this analysis to evaluate the effectiveness of the diffuser in achieving mixing and dilution of the plant effluent with the receiving water in the Corpus Christi Channel at the specified distances from the diffuser.

Critical Conditions

The critical conditions represent the least efficient mixing of the effluent with the ambient water and the resulting highest effluent concentrations at the plume boundaries. As shown in Table 3, the critical conditions at the ZID, mixing zone, and HHMZ in terms of the percent effluent at the edge of these zones occur at ambient currents ≥ 0.4 m/s for both the 40% recovery and 50% recovery desalination plant designs. These critical dilutions are:

- ZID – 10.7% effluent
- MZ – 4.9% effluent
- HHMZ – 3.4% effluent

The percent effluent dilution at the ZID, MZ and HHMZ are essentially identical at all ambient currents > 0.4 m/s. Therefore, the 24-hour average dilution achieved by the diffuser (at 0.8 m/s) is equivalent to the critical dilutions shown above.

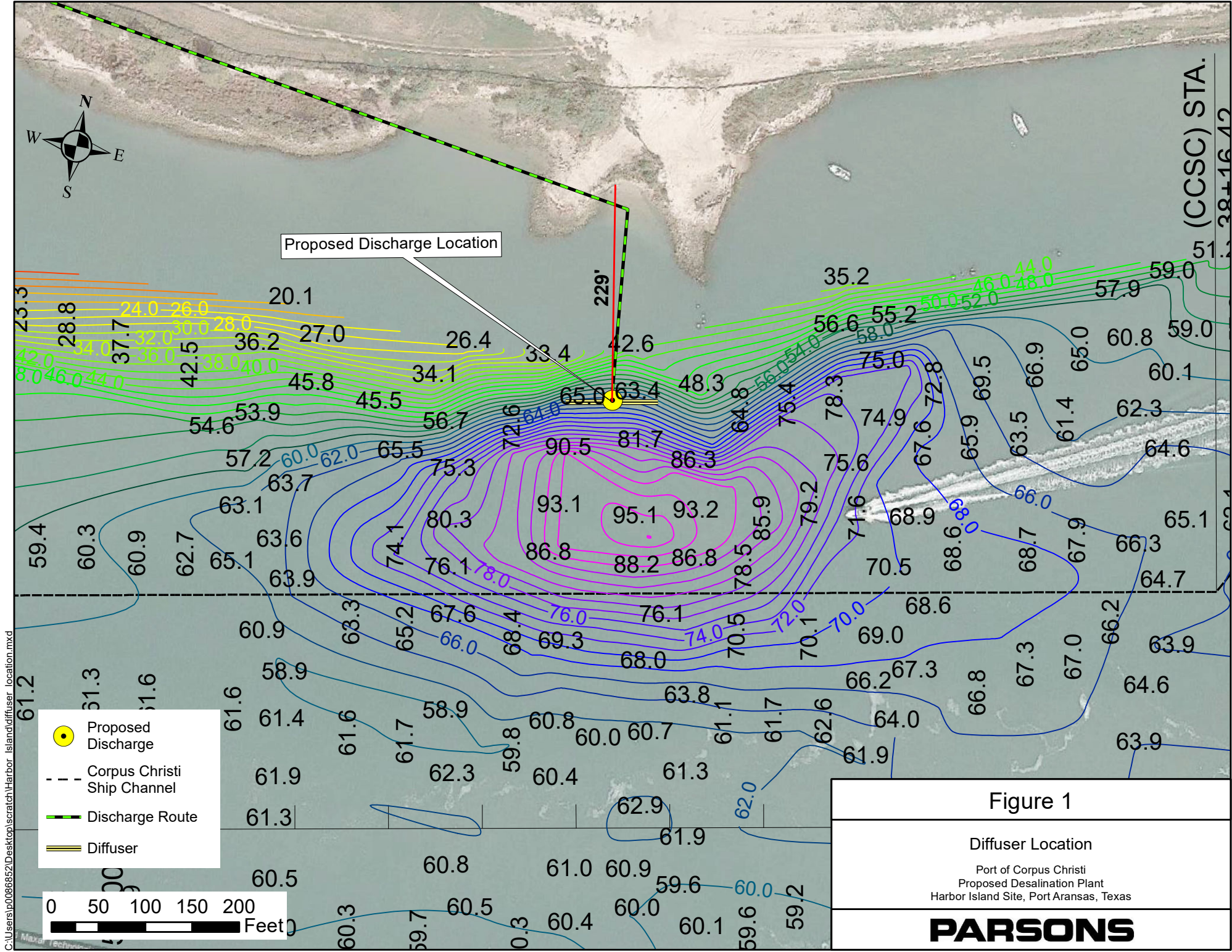
Two of the CORMIX model prediction files for the critical conditions are included in the Appendix to this report as examples. These are selected because they predict the greatest

percent difference between ambient and plume salinity at the ZID. These are the model runs designated as pcca_new_es_50_5_95(1.0) and pcca_new_ew_50_5_95(1.0). The effluent salinities are for the 50% recovery desalination efficiency, the ambient current is 1.0 m/s, the ambient temperature is the 5th percentile, and the ambient salinity is the 95th percentile, for both summer and winter conditions. All of the CORMIX prediction files will be provided on request.

Table 4. Diffuser Performance

Run No.	Season	RO Recover y (%)
pcca_new_es_40_5_95(0.0)	Summer	40
pcca_new_es_40_5_95(0.4)	Summer	40
pcca_new_es_40_5_95(1.0)	Summer	40
pcca_new_es_40_5_95(1.2)	Summer	40
pcca_new_ew_40_95_5(0.0)	Winter	40
pcca_new_ew_40_95_5(0.5)	Winter	40
pcca_new_ew_40_95_5(1.0)	Winter	40
pcca_new_es_50_5_95(0.05)	Summer	50
pcca_new_es_50_5_95(0.4)	Summer	50
pcca_new_es_50_5_95(0.8)	Summer	50
pcca_new_es_50_5_95(1.0)	Summer	50
pcca_new_es_50_5_95(1.2)	Summer	50
pcca_new_ew_50_95_5(0.0)	Winter	50
pcca_new_ew_50_95_5(0.5)	Winter	50
pcca_new_ew_50_95_5(1.0)	Winter	50





Run No.	Ambient Density	Ambient Salinity (ppt)	Effluent Density	Effluent Salinity (ppt)	Ambient Velocity (m/s)	ZID (x,y)	ZID (%) Effluent	ΔSalinity (ppt)	Salinity % Above Ambient	MZ (x,y)	MZ (%) Effluent	ΔSalinity (ppt)	Salinity % Above Ambient	HHMZ (x,y)	HHMZ (%) Effluent	ΔSalinity (ppt)	Salinity % Above Ambient
pcca_new_es_40_5_95(0.05)	1026.7	40.57	1041.42	59.7	0.05	y	4.6	0.88	2.2	y	3.3	0.63	1.6	y	2.6	0.50	1.2
pcca_new_es_40_5_95(0.4)	1026.7	40.57	1041.42	59.7	0.4	x	10.7	2.05	5.0	x	4.7	0.90	2.2	x	3.3	0.63	1.6
pcca_new_es_40_5_95(1.0)	1026.7	40.57	1041.42	59.7	1	x	10.7	2.05	5.0	x	4.6	0.88	2.2	x	3.1	0.59	1.5
pcca_new_es_40_5_95(1.2)	1026.7	40.57	1041.42	59.7	1.2	x	10.7	2.05	5.0	x	4.7	0.90	2.2	x	3.2	0.61	1.5
pcca_new_ew_40_95_5(0.05)	1016.39	23.24	1025.87	35.9	0.05	y	4.6	0.58	2.5	y	3.3	0.42	1.8	y	2.6	0.33	1.4
pcca_new_ew_40_95_5(0.5)	1016.39	23.24	1025.87	35.9	0.5	x	10.7	1.35	5.8	x	4.9	0.62	2.7	x	3.4	0.43	1.9
pcca_new_ew_40_95_5(1.0)	1016.39	23.24	1025.87	35.9	1	x	10.7	1.35	5.8	x	4.7	0.60	2.6	x	3.3	0.42	1.8
pcca_new_es_50_5_95(0.05)	1026.7	40.57	1048.15	68.7	0.05	y	4.6	1.29	3.2	y	3.3	0.93	2.3	y	2.6	0.73	1.8
pcca_new_es_50_5_95(0.4)	1026.7	40.57	1048.15	68.7	0.4	x	10.7	3.01	7.4	x	4.6	1.29	3.2	x	3.2	0.90	2.2
pcca_new_es_50_5_95(0.8)	1026.7	40.57	1048.15	68.7	0.8	x	10.7	3.01	7.4	x	4.6	1.29	3.2	x	3.1	0.87	2.1
pcca_new_es_50_5_95(1.0)	1026.7	40.57	1048.15	68.7	1	x	10.7	3.01	7.4	x	4.6	1.29	3.2	x	3.1	0.87	2.1
pcca_new_es_50_5_95(1.2)	1026.7	40.57	1048.15	68.7	1.2	x	10.7	3.01	7.4	x	4.6	1.29	3.2	x	3.1	0.87	2.1
pcca_new_ew_50_95_5(0.05)	1016.39	23.24	1030	41.2	0.05	y	4.6	0.83	3.6	y	3.3	0.59	2.6	y	2.6	0.47	2.0
pcca_new_ew_50_95_5(0.5)	1016.39	23.24	1030	41.2	0.5	x	10.7	1.92	8.3	x	4.7	0.84	3.6	x	3.3	0.59	2.6
pcca_new_ew_50_95_5(1.0)	1016.39	23.24	1030	41.2	1	x	10.7	1.92	8.3	x	4.7	0.84	3.6	x	3.2	0.57	2.5
	ZID (m)	MZ (m)	HHMZ (m)														
20-Port Diffuser	(x,y)	(x,y)	(x,y)														
30-m Length	56, 13	168.6, 69.3	321, 145.5														
Percent effluent values for ZID, MZ and HHMZ are taken from closest distance value in the CORMIX output - they are not extrapolated between distances.																	



Proposed Discharge Location

229'

(CCSC) STA. 28+16.12

-  Proposed Discharge
-  Corpus Christi Ship Channel
-  Discharge Route
-  Diffuser

0 50 100 150 200 Feet

Figure 1

Diffuser Location

Port of Corpus Christi
Proposed Desalination Plant
Harbor Island Site, Port Aransas, Texas

PARSONS

C:\Users\p0068652\Desktop\scratch\Harbor_Island\diffuser_location.mxd

Appendix
Example CORMIX Prediction Files – Critical Conditions

1.52	-0.01	7.84	2.4	0.422E+02	0.32	14.86	.15200E+01
3.04	-0.01	7.77	2.9	0.341E+02	0.62	14.72	.30400E+01
4.56	-0.02	7.71	3.4	0.297E+02	0.92	14.58	.45600E+01
6.08	-0.03	7.64	3.7	0.267E+02	1.23	14.44	.60800E+01
7.60	-0.03	7.58	4.1	0.246E+02	1.53	14.31	.76000E+01
9.12	-0.04	7.51	4.4	0.230E+02	1.84	14.17	.91200E+01
10.64	-0.04	7.45	4.6	0.216E+02	2.14	14.03	.10640E+02
12.16	-0.05	7.39	4.9	0.205E+02	2.44	13.89	.12160E+02
13.68	-0.06	7.32	5.1	0.196E+02	2.75	13.75	.13680E+02
15.20	-0.06	7.26	5.3	0.188E+02	3.05	13.61	.15200E+02
16.72	-0.07	7.19	5.5	0.180E+02	3.36	13.47	.16720E+02
18.24	-0.08	7.13	5.7	0.174E+02	3.66	13.33	.18240E+02
19.76	-0.08	7.06	5.9	0.168E+02	3.96	13.20	.19760E+02
21.28	-0.09	7.00	6.1	0.163E+02	4.27	13.06	.21280E+02
22.80	-0.09	6.93	6.3	0.159E+02	4.57	12.92	.22800E+02
24.32	-0.10	6.87	6.5	0.154E+02	4.87	12.78	.24320E+02
25.84	-0.11	6.81	6.6	0.150E+02	5.18	12.64	.25840E+02
27.36	-0.11	6.74	6.8	0.147E+02	5.48	12.50	.27360E+02
28.88	-0.12	6.68	7.0	0.144E+02	5.79	12.36	.28880E+02
30.40	-0.13	6.61	7.1	0.140E+02	6.09	12.22	.30400E+02
31.92	-0.13	6.55	7.3	0.137E+02	6.39	12.09	.31920E+02
33.44	-0.14	6.48	7.4	0.135E+02	6.70	11.95	.33440E+02
34.96	-0.14	6.42	7.6	0.132E+02	7.00	11.81	.34960E+02
36.48	-0.15	6.36	7.7	0.130E+02	7.31	11.67	.36480E+02
38.00	-0.16	6.29	7.8	0.127E+02	7.61	11.53	.38000E+02
39.52	-0.16	6.23	8.0	0.125E+02	7.91	11.39	.39520E+02
41.04	-0.17	6.16	8.1	0.123E+02	8.22	11.25	.41040E+02
42.56	-0.18	6.10	8.2	0.121E+02	8.52	11.11	.42560E+02
44.08	-0.18	6.03	8.4	0.119E+02	8.82	10.98	.44080E+02
45.60	-0.19	5.97	8.5	0.118E+02	9.13	10.84	.45600E+02
47.12	-0.19	5.91	8.6	0.116E+02	9.43	10.70	.47120E+02
48.64	-0.20	5.84	8.7	0.114E+02	9.74	10.56	.48640E+02
50.16	-0.21	5.78	8.9	0.113E+02	10.04	10.42	.50160E+02
51.68	-0.21	5.71	9.0	0.111E+02	10.34	10.28	.51680E+02
53.20	-0.22	5.65	9.1	0.110E+02	10.65	10.14	.53200E+02
54.72	-0.23	5.58	9.2	0.109E+02	10.95	10.00	.54720E+02
56.24	-0.23	5.52	9.3	0.107E+02	11.26	9.87	.56240E+02
57.76	-0.24	5.45	9.4	0.106E+02	11.56	9.73	.57760E+02
59.28	-0.25	5.39	9.6	0.105E+02	11.86	9.59	.59280E+02
60.80	-0.25	5.33	9.7	0.104E+02	12.17	9.45	.60800E+02
62.32	-0.26	5.26	9.8	0.102E+02	12.47	9.31	.62320E+02
63.84	-0.26	5.20	9.9	0.101E+02	12.77	9.17	.63840E+02
65.36	-0.27	5.13	10.0	0.100E+02	13.08	9.03	.65360E+02
66.88	-0.28	5.07	10.1	0.992E+01	13.38	8.89	.66880E+02
68.40	-0.28	5.00	10.2	0.982E+01	13.69	8.76	.68400E+02
69.92	-0.29	4.94	10.3	0.972E+01	13.99	8.62	.69920E+02
71.44	-0.30	4.88	10.4	0.963E+01	14.29	8.48	.71440E+02
72.96	-0.30	4.81	10.5	0.954E+01	14.60	8.34	.72960E+02
74.48	-0.31	4.75	10.6	0.945E+01	14.90	8.20	.74480E+02
76.00	-0.31	4.68	10.7	0.936E+01	15.21	8.06	.76000E+02
77.52	-0.32	4.62	10.8	0.928E+01	15.51	7.92	.77520E+02
79.04	-0.33	4.55	10.9	0.920E+01	15.81	7.78	.79040E+02
80.56	-0.33	4.49	11.0	0.912E+01	16.12	7.65	.80560E+02
82.08	-0.34	4.43	11.1	0.904E+01	16.42	7.51	.82080E+02
83.60	-0.35	4.36	11.2	0.897E+01	16.73	7.37	.83600E+02
85.12	-0.35	4.30	11.2	0.889E+01	17.03	7.23	.85120E+02
86.64	-0.36	4.23	11.3	0.882E+01	17.33	7.09	.86640E+02

Tischler/Kocurek
107 South Mays
Round Rock, Texas 78664
512.244.9058
512.388.3409 FAX

88.16	-0.36	4.17	11.4	0.875E+01	17.64	6.95	.88160E+02
89.68	-0.37	4.10	11.5	0.868E+01	17.94	6.81	.89680E+02
91.20	-0.38	4.04	11.6	0.862E+01	18.24	6.67	.91200E+02
92.72	-0.38	3.97	11.7	0.855E+01	18.55	6.53	.92720E+02
94.24	-0.39	3.91	11.8	0.849E+01	18.85	6.40	.94240E+02
95.76	-0.40	3.85	11.9	0.843E+01	19.16	6.26	.95760E+02
97.28	-0.40	3.78	12.0	0.837E+01	19.46	6.12	.97280E+02
98.80	-0.41	3.72	12.0	0.831E+01	19.76	5.98	.98800E+02
100.32	-0.42	3.65	12.1	0.825E+01	20.07	5.84	.10032E+03
101.84	-0.42	3.59	12.2	0.819E+01	20.37	5.70	.10184E+03
103.36	-0.43	3.52	12.3	0.814E+01	20.68	5.56	.10336E+03
104.88	-0.43	3.46	12.4	0.808E+01	20.98	5.42	.10488E+03
106.40	-0.44	3.40	12.5	0.803E+01	21.28	5.29	.10640E+03
107.92	-0.45	3.33	12.5	0.798E+01	21.59	5.15	.10792E+03
109.44	-0.45	3.27	12.6	0.793E+01	21.89	5.01	.10944E+03
110.96	-0.46	3.20	12.7	0.787E+01	22.19	4.87	.11096E+03
112.48	-0.47	3.14	12.8	0.783E+01	22.50	4.73	.11248E+03
114.00	-0.47	3.07	12.9	0.778E+01	22.80	4.59	.11400E+03
115.52	-0.48	3.01	12.9	0.773E+01	23.11	4.45	.11552E+03
117.04	-0.48	2.95	13.0	0.768E+01	23.41	4.31	.11704E+03
118.56	-0.49	2.88	13.1	0.764E+01	23.71	4.18	.11856E+03
120.08	-0.50	2.82	13.2	0.759E+01	24.02	4.04	.12008E+03
121.60	-0.50	2.75	13.2	0.755E+01	24.32	3.90	.12160E+03
123.12	-0.51	2.69	13.3	0.751E+01	24.63	3.76	.12312E+03
124.64	-0.52	2.62	13.4	0.746E+01	24.93	3.62	.12464E+03
126.16	-0.52	2.56	13.5	0.742E+01	25.23	3.48	.12616E+03
127.68	-0.53	2.49	13.5	0.738E+01	25.54	3.34	.12768E+03
129.20	-0.53	2.43	13.6	0.734E+01	25.84	3.20	.12920E+03
130.72	-0.54	2.37	13.7	0.730E+01	26.14	3.07	.13072E+03
132.24	-0.55	2.30	13.8	0.726E+01	26.45	2.93	.13224E+03
133.76	-0.55	2.24	13.8	0.722E+01	26.75	2.79	.13376E+03
135.28	-0.56	2.17	13.9	0.719E+01	27.06	2.65	.13528E+03
136.80	-0.57	2.11	14.0	0.715E+01	27.36	2.51	.13680E+03
138.32	-0.57	2.04	14.1	0.711E+01	27.40	2.37	.13832E+03
139.84	-0.58	1.98	14.1	0.708E+01	27.40	2.23	.13984E+03
141.36	-0.58	1.92	14.2	0.704E+01	27.40	2.09	.14136E+03
142.88	-0.59	1.85	14.3	0.701E+01	27.40	1.96	.14288E+03
144.40	-0.60	1.79	14.3	0.697E+01	27.40	1.82	.14440E+03
145.92	-0.60	1.72	14.4	0.694E+01	27.40	1.68	.14592E+03
147.44	-0.61	1.66	14.5	0.690E+01	27.40	1.54	.14744E+03
148.96	-0.62	1.59	14.6	0.687E+01	27.40	1.40	.14896E+03
150.48	-0.62	1.53	14.6	0.684E+01	27.40	1.26	.15048E+03
152.00	-0.63	1.46	14.7	0.681E+01	27.40	1.12	.15200E+03

Cumulative travel time = 152.0000 sec (0.04 hrs)

Plume centerline may exhibit slight discontinuities in transition
to subsequent far-field module.

END OF MOD273: UNIDIRECTIONAL CROSS-FLOWING DIFFUSER (TEE) IN STRONG CURRENT

** End of NEAR-FIELD REGION (NFR) **

BEGIN MOD241: BUOYANT AMBIENT SPREADING

Profile definitions:

BV = top-hat thickness, measured vertically

BH = top-hat half-width, measured horizontally in y-direction

ZU = upper plume boundary (Z-coordinate)

Tischler/Kocurek
107 South Mays
Round Rock, Texas 78664
512.244.9058
512.388.3409 FAX

ZL = lower plume boundary (Z-coordinate)
 S = hydrodynamic average (bulk) dilution
 C = average (bulk) concentration (includes reaction effects, if any)
 TT = Cumulative travel time

Plume Stage 1 (not bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
152.00	-0.63	0.00	14.7	0.681E+01	27.40	1.12	27.40	0.00	.15200E+03
161.09	-0.63	0.00	20.0	0.501E+01	10.91	3.83	10.91	0.00	.16109E+03
170.18	-0.63	0.00	22.1	0.452E+01	8.05	5.75	8.05	0.00	.17018E+03
179.27	-0.63	0.00	23.5	0.425E+01	6.67	7.39	6.67	0.00	.17927E+03
188.36	-0.63	0.00	24.6	0.406E+01	5.82	8.86	5.82	0.00	.18836E+03
197.45	-0.63	0.00	25.5	0.391E+01	5.23	10.22	5.23	0.00	.19745E+03
206.54	-0.63	0.00	26.3	0.380E+01	4.80	11.49	4.80	0.00	.20654E+03
215.63	-0.63	0.00	27.0	0.371E+01	4.45	12.69	4.45	0.00	.21563E+03
224.72	-0.63	0.00	27.6	0.362E+01	4.18	13.83	4.18	0.00	.22472E+03
233.81	-0.63	0.00	28.1	0.355E+01	3.95	14.93	3.95	0.00	.23381E+03
242.90	-0.63	0.00	28.7	0.349E+01	3.75	15.98	3.75	0.00	.24290E+03
251.99	-0.63	0.00	29.1	0.343E+01	3.59	17.01	3.59	0.00	.25199E+03
261.08	-0.63	0.00	29.6	0.338E+01	3.44	18.00	3.44	0.00	.26108E+03
270.17	-0.63	0.00	30.0	0.333E+01	3.31	18.96	3.31	0.00	.27017E+03
279.26	-0.63	0.00	30.4	0.329E+01	3.20	19.89	3.20	0.00	.27926E+03
288.35	-0.63	0.00	30.8	0.325E+01	3.10	20.81	3.10	0.00	.28835E+03
297.44	-0.63	0.00	31.1	0.321E+01	3.01	21.70	3.01	0.00	.29744E+03
306.53	-0.63	0.00	31.5	0.317E+01	2.92	22.57	2.92	0.00	.30653E+03
315.62	-0.63	0.00	31.8	0.314E+01	2.85	23.43	2.85	0.00	.31562E+03
324.72	-0.63	0.00	32.2	0.311E+01	2.78	24.26	2.78	0.00	.32472E+03
333.81	-0.63	0.00	32.5	0.308E+01	2.71	25.09	2.71	0.00	.33381E+03
342.90	-0.63	0.00	32.8	0.305E+01	2.65	25.89	2.65	0.00	.34290E+03
351.99	-0.63	0.00	33.1	0.302E+01	2.60	26.69	2.60	0.00	.35199E+03
361.08	-0.63	0.00	33.4	0.299E+01	2.55	27.47	2.55	0.00	.36108E+03
370.17	-0.63	0.00	33.8	0.296E+01	2.50	28.24	2.50	0.00	.37017E+03
379.26	-0.63	0.00	34.1	0.294E+01	2.46	29.00	2.46	0.00	.37926E+03
388.35	-0.63	0.00	34.4	0.291E+01	2.42	29.74	2.42	0.00	.38835E+03
397.44	-0.63	0.00	34.6	0.289E+01	2.38	30.48	2.38	0.00	.39744E+03
406.53	-0.63	0.00	34.9	0.286E+01	2.35	31.20	2.35	0.00	.40653E+03
415.62	-0.63	0.00	35.2	0.284E+01	2.31	31.92	2.31	0.00	.41562E+03
424.71	-0.63	0.00	35.5	0.281E+01	2.28	32.63	2.28	0.00	.42471E+03
433.80	-0.63	0.00	35.8	0.279E+01	2.25	33.33	2.25	0.00	.43380E+03
442.89	-0.63	0.00	36.1	0.277E+01	2.22	34.02	2.22	0.00	.44289E+03
451.98	-0.63	0.00	36.4	0.275E+01	2.20	34.70	2.20	0.00	.45198E+03
461.07	-0.63	0.00	36.7	0.273E+01	2.17	35.37	2.17	0.00	.46107E+03
470.16	-0.63	0.00	37.0	0.270E+01	2.15	36.04	2.15	0.00	.47016E+03
479.25	-0.63	0.00	37.3	0.268E+01	2.13	36.70	2.13	0.00	.47925E+03
488.34	-0.63	0.00	37.6	0.266E+01	2.11	37.36	2.11	0.00	.48834E+03
497.43	-0.63	0.00	37.9	0.264E+01	2.09	38.00	2.09	0.00	.49743E+03
506.52	-0.63	0.00	38.2	0.262E+01	2.07	38.64	2.07	0.00	.50652E+03
515.61	-0.63	0.00	38.5	0.260E+01	2.05	39.28	2.05	0.00	.51561E+03
524.70	-0.63	0.00	38.8	0.258E+01	2.03	39.90	2.03	0.00	.52470E+03
533.79	-0.63	0.00	39.1	0.256E+01	2.02	40.53	2.02	0.00	.53379E+03
542.88	-0.63	0.00	39.4	0.254E+01	2.00	41.14	2.00	0.00	.54288E+03
551.97	-0.63	0.00	39.7	0.252E+01	1.99	41.76	1.99	0.00	.55197E+03
561.06	-0.63	0.00	40.0	0.250E+01	1.98	42.36	1.98	0.00	.56106E+03
570.15	-0.63	0.00	40.3	0.248E+01	1.96	42.96	1.96	0.00	.57015E+03
579.24	-0.63	0.00	40.6	0.246E+01	1.95	43.56	1.95	0.00	.57924E+03
588.33	-0.63	0.00	40.9	0.244E+01	1.94	44.15	1.94	0.00	.58833E+03
597.42	-0.63	0.00	41.3	0.242E+01	1.93	44.74	1.93	0.00	.59742E+03

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 512.244.9058
 512.388.3409 FAX

606.51	-0.63	0.00	41.6	0.240E+01	1.92	45.32	1.92	0.00	.60651E+03
615.60	-0.63	0.00	41.9	0.239E+01	1.91	45.90	1.91	0.00	.61560E+03
624.69	-0.63	0.00	42.2	0.237E+01	1.90	46.47	1.90	0.00	.62469E+03
633.78	-0.63	0.00	42.6	0.235E+01	1.90	47.04	1.90	0.00	.63378E+03
642.87	-0.63	0.00	42.9	0.233E+01	1.89	47.60	1.89	0.00	.64287E+03
651.97	-0.63	0.00	43.3	0.231E+01	1.88	48.17	1.88	0.00	.65197E+03
661.06	-0.63	0.00	43.6	0.229E+01	1.87	48.72	1.87	0.00	.66106E+03
670.15	-0.63	0.00	43.9	0.228E+01	1.87	49.28	1.87	0.00	.67015E+03
679.24	-0.63	0.00	44.3	0.226E+01	1.86	49.83	1.86	0.00	.67924E+03
688.33	-0.63	0.00	44.7	0.224E+01	1.86	50.37	1.86	0.00	.68833E+03
697.42	-0.63	0.00	45.0	0.222E+01	1.85	50.91	1.85	0.00	.69742E+03
706.51	-0.63	0.00	45.4	0.220E+01	1.85	51.45	1.85	0.00	.70651E+03
715.60	-0.63	0.00	45.8	0.219E+01	1.84	51.99	1.84	0.00	.71560E+03
724.69	-0.63	0.00	46.1	0.217E+01	1.84	52.52	1.84	0.00	.72469E+03
733.78	-0.63	0.00	46.5	0.215E+01	1.84	53.05	1.84	0.00	.73378E+03
742.87	-0.63	0.00	46.9	0.213E+01	1.83	53.58	1.83	0.00	.74287E+03
751.96	-0.63	0.00	47.3	0.212E+01	1.83	54.10	1.83	0.00	.75196E+03
761.05	-0.63	0.00	47.7	0.210E+01	1.83	54.62	1.83	0.00	.76105E+03
770.14	-0.63	0.00	48.1	0.208E+01	1.83	55.14	1.83	0.00	.77014E+03
779.23	-0.63	0.00	48.5	0.206E+01	1.82	55.65	1.82	0.00	.77923E+03
788.32	-0.63	0.00	48.9	0.205E+01	1.82	56.16	1.82	0.00	.78832E+03
797.41	-0.63	0.00	49.3	0.203E+01	1.82	56.67	1.82	0.00	.79741E+03
806.50	-0.63	0.00	49.7	0.201E+01	1.82	57.18	1.82	0.00	.80650E+03
815.59	-0.63	0.00	50.1	0.200E+01	1.82	57.68	1.82	0.00	.81559E+03
824.68	-0.63	0.00	50.5	0.198E+01	1.82	58.18	1.82	0.00	.82468E+03
833.77	-0.63	0.00	51.0	0.196E+01	1.82	58.68	1.82	0.00	.83377E+03
842.86	-0.63	0.00	51.4	0.195E+01	1.82	59.17	1.82	0.00	.84286E+03
851.95	-0.63	0.00	51.8	0.193E+01	1.82	59.67	1.82	0.00	.85195E+03
861.04	-0.63	0.00	52.3	0.191E+01	1.82	60.16	1.82	0.00	.86104E+03
870.13	-0.63	0.00	52.7	0.190E+01	1.82	60.65	1.82	0.00	.87013E+03
879.22	-0.63	0.00	53.2	0.188E+01	1.82	61.13	1.82	0.00	.87922E+03
888.31	-0.63	0.00	53.6	0.186E+01	1.82	61.62	1.82	0.00	.88831E+03
897.40	-0.63	0.00	54.1	0.185E+01	1.82	62.10	1.82	0.00	.89740E+03
906.49	-0.63	0.00	54.6	0.183E+01	1.83	62.58	1.83	0.00	.90649E+03
915.58	-0.63	0.00	55.0	0.182E+01	1.83	63.06	1.83	0.00	.91558E+03
924.67	-0.63	0.00	55.5	0.180E+01	1.83	63.53	1.83	0.00	.92467E+03
933.76	-0.63	0.00	56.0	0.179E+01	1.83	64.00	1.83	0.00	.93376E+03
942.85	-0.63	0.00	56.5	0.177E+01	1.83	64.48	1.83	0.00	.94285E+03
951.94	-0.63	0.00	57.0	0.175E+01	1.84	64.95	1.84	0.00	.95194E+03
961.03	-0.63	0.00	57.5	0.174E+01	1.84	65.41	1.84	0.00	.96103E+03
970.12	-0.63	0.00	58.0	0.172E+01	1.84	65.88	1.84	0.00	.97012E+03
979.21	-0.63	0.00	58.5	0.171E+01	1.85	66.34	1.85	0.00	.97921E+03
988.31	-0.63	0.00	59.0	0.169E+01	1.85	66.80	1.85	0.00	.98831E+03
997.40	-0.63	0.00	59.5	0.168E+01	1.85	67.26	1.85	0.00	.99740E+03
1006.49	-0.63	0.00	60.1	0.166E+01	1.86	67.72	1.86	0.00	.10065E+04
1015.58	-0.63	0.00	60.6	0.165E+01	1.86	68.18	1.86	0.00	.10156E+04
1024.67	-0.63	0.00	61.2	0.164E+01	1.87	68.63	1.87	0.00	.10247E+04
1033.76	-0.63	0.00	61.7	0.162E+01	1.87	69.08	1.87	0.00	.10338E+04
1042.85	-0.63	0.00	62.2	0.161E+01	1.87	69.54	1.87	0.00	.10428E+04
1051.94	-0.63	0.00	62.8	0.159E+01	1.88	69.99	1.88	0.00	.10519E+04
1061.03	-0.63	0.00	63.4	0.158E+01	1.88	70.43	1.88	0.00	.10610E+04

Cumulative travel time = 1061.0280 sec (0.29 hrs)

Plume is ATTACHED to LEFT bank/shore.

Plume width is now determined from LEFT bank/shore.

Tischler/Kocurek
107 South Mays
Round Rock, Texas 78664
512.244.9058
512.388.3409 FAX

Plume Stage 2 (bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
1061.03	69.80	0.00	63.4	0.158E+01	1.88	140.87	1.88	0.00	.10610E+04
1065.42	69.80	0.00	63.6	0.157E+01	1.89	141.05	1.89	0.00	.10654E+04
1069.81	69.80	0.00	63.9	0.157E+01	1.89	141.23	1.89	0.00	.10698E+04
1074.20	69.80	0.00	64.1	0.156E+01	1.90	141.42	1.90	0.00	.10742E+04
1078.59	69.80	0.00	64.4	0.155E+01	1.90	141.60	1.90	0.00	.10786E+04
1082.98	69.80	0.00	64.6	0.155E+01	1.91	141.78	1.91	0.00	.10830E+04
1087.37	69.80	0.00	64.9	0.154E+01	1.91	141.96	1.91	0.00	.10874E+04
1091.76	69.80	0.00	65.1	0.154E+01	1.92	142.15	1.92	0.00	.10918E+04
1096.15	69.80	0.00	65.3	0.153E+01	1.92	142.33	1.92	0.00	.10961E+04
1100.54	69.80	0.00	65.6	0.152E+01	1.93	142.51	1.93	0.00	.11005E+04
1104.93	69.80	0.00	65.9	0.152E+01	1.93	142.69	1.93	0.00	.11049E+04
1109.31	69.80	0.00	66.1	0.151E+01	1.94	142.88	1.94	0.00	.11093E+04
1113.70	69.80	0.00	66.4	0.151E+01	1.94	143.06	1.94	0.00	.11137E+04
1118.09	69.80	0.00	66.6	0.150E+01	1.95	143.24	1.95	0.00	.11181E+04
1122.48	69.80	0.00	66.9	0.150E+01	1.95	143.42	1.95	0.00	.11225E+04
1126.87	69.80	0.00	67.1	0.149E+01	1.96	143.60	1.96	0.00	.11269E+04
1131.26	69.80	0.00	67.4	0.148E+01	1.96	143.79	1.96	0.00	.11313E+04
1135.65	69.80	0.00	67.6	0.148E+01	1.97	143.97	1.97	0.00	.11357E+04
1140.04	69.80	0.00	67.9	0.147E+01	1.97	144.15	1.97	0.00	.11400E+04
1144.43	69.80	0.00	68.1	0.147E+01	1.98	144.33	1.98	0.00	.11444E+04
1148.82	69.80	0.00	68.4	0.146E+01	1.98	144.51	1.98	0.00	.11488E+04
1153.21	69.80	0.00	68.7	0.146E+01	1.99	144.70	1.99	0.00	.11532E+04
1157.60	69.80	0.00	68.9	0.145E+01	1.99	144.88	1.99	0.00	.11576E+04
1161.99	69.80	0.00	69.2	0.145E+01	2.00	145.06	2.00	0.00	.11620E+04
1166.38	69.80	0.00	69.4	0.144E+01	2.00	145.24	2.00	0.00	.11664E+04
1170.77	69.80	0.00	69.7	0.143E+01	2.01	145.42	2.01	0.00	.11708E+04
1175.16	69.80	0.00	70.0	0.143E+01	2.01	145.60	2.01	0.00	.11752E+04
1179.55	69.80	0.00	70.2	0.142E+01	2.02	145.78	2.02	0.00	.11796E+04
1183.94	69.80	0.00	70.5	0.142E+01	2.02	145.97	2.02	0.00	.11839E+04
1188.33	69.80	0.00	70.7	0.141E+01	2.03	146.15	2.03	0.00	.11883E+04
1192.72	69.80	0.00	71.0	0.141E+01	2.03	146.33	2.03	0.00	.11927E+04
1197.11	69.80	0.00	71.3	0.140E+01	2.04	146.51	2.04	0.00	.11971E+04
1201.50	69.80	0.00	71.5	0.140E+01	2.04	146.69	2.04	0.00	.12015E+04
1205.89	69.80	0.00	71.8	0.139E+01	2.05	146.87	2.05	0.00	.12059E+04
1210.28	69.80	0.00	72.1	0.139E+01	2.05	147.05	2.05	0.00	.12103E+04
1214.67	69.80	0.00	72.3	0.138E+01	2.06	147.23	2.06	0.00	.12147E+04
1219.06	69.80	0.00	72.6	0.138E+01	2.06	147.41	2.06	0.00	.12191E+04
1223.45	69.80	0.00	72.9	0.137E+01	2.07	147.59	2.07	0.00	.12234E+04
1227.84	69.80	0.00	73.1	0.137E+01	2.07	147.77	2.07	0.00	.12278E+04
1232.23	69.80	0.00	73.4	0.136E+01	2.08	147.95	2.08	0.00	.12322E+04
1236.62	69.80	0.00	73.7	0.136E+01	2.08	148.13	2.08	0.00	.12366E+04
1241.01	69.80	0.00	74.0	0.135E+01	2.09	148.32	2.09	0.00	.12410E+04
1245.40	69.80	0.00	74.2	0.135E+01	2.09	148.50	2.09	0.00	.12454E+04
1249.79	69.80	0.00	74.5	0.134E+01	2.10	148.68	2.10	0.00	.12498E+04
1254.18	69.80	0.00	74.8	0.134E+01	2.10	148.86	2.10	0.00	.12542E+04
1258.57	69.80	0.00	75.0	0.133E+01	2.11	149.04	2.11	0.00	.12586E+04
1262.96	69.80	0.00	75.3	0.133E+01	2.11	149.22	2.11	0.00	.12630E+04
1267.35	69.80	0.00	75.6	0.132E+01	2.12	149.40	2.12	0.00	.12673E+04
1271.74	69.80	0.00	75.9	0.132E+01	2.12	149.58	2.12	0.00	.12717E+04
1276.13	69.80	0.00	76.1	0.131E+01	2.13	149.76	2.13	0.00	.12761E+04
1280.52	69.80	0.00	76.4	0.131E+01	2.13	149.94	2.13	0.00	.12805E+04
1284.91	69.80	0.00	76.7	0.130E+01	2.14	150.12	2.14	0.00	.12849E+04
1289.30	69.80	0.00	77.0	0.130E+01	2.14	150.30	2.14	0.00	.12893E+04
1293.69	69.80	0.00	77.3	0.129E+01	2.15	150.47	2.15	0.00	.12937E+04
1298.08	69.80	0.00	77.5	0.129E+01	2.16	150.65	2.16	0.00	.12981E+04

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1302.46	69.80	0.00	77.8	0.129E+01	2.16	150.83	2.16	0.00	.13025E+04
1306.85	69.80	0.00	78.1	0.128E+01	2.17	151.01	2.17	0.00	.13069E+04
1311.24	69.80	0.00	78.4	0.128E+01	2.17	151.19	2.17	0.00	.13112E+04
1315.63	69.80	0.00	78.7	0.127E+01	2.18	151.37	2.18	0.00	.13156E+04
1320.02	69.80	0.00	78.9	0.127E+01	2.18	151.55	2.18	0.00	.13200E+04
1324.41	69.80	0.00	79.2	0.126E+01	2.19	151.73	2.19	0.00	.13244E+04
1328.80	69.80	0.00	79.5	0.126E+01	2.19	151.91	2.19	0.00	.13288E+04
1333.19	69.80	0.00	79.8	0.125E+01	2.20	152.09	2.20	0.00	.13332E+04
1337.58	69.80	0.00	80.1	0.125E+01	2.20	152.27	2.20	0.00	.13376E+04
1341.97	69.80	0.00	80.4	0.124E+01	2.21	152.45	2.21	0.00	.13420E+04
1346.36	69.80	0.00	80.7	0.124E+01	2.21	152.63	2.21	0.00	.13464E+04
1350.75	69.80	0.00	80.9	0.124E+01	2.22	152.80	2.22	0.00	.13508E+04
1355.14	69.80	0.00	81.2	0.123E+01	2.22	152.98	2.22	0.00	.13551E+04
1359.53	69.80	0.00	81.5	0.123E+01	2.23	153.16	2.23	0.00	.13595E+04
1363.92	69.80	0.00	81.8	0.122E+01	2.23	153.34	2.23	0.00	.13639E+04
1368.31	69.80	0.00	82.1	0.122E+01	2.24	153.52	2.24	0.00	.13683E+04
1372.70	69.80	0.00	82.4	0.121E+01	2.24	153.70	2.24	0.00	.13727E+04
1377.09	69.80	0.00	82.7	0.121E+01	2.25	153.88	2.25	0.00	.13771E+04
1381.48	69.80	0.00	83.0	0.121E+01	2.26	154.05	2.26	0.00	.13815E+04
1385.87	69.80	0.00	83.3	0.120E+01	2.26	154.23	2.26	0.00	.13859E+04
1390.26	69.80	0.00	83.6	0.120E+01	2.27	154.41	2.27	0.00	.13903E+04
1394.65	69.80	0.00	83.8	0.119E+01	2.27	154.59	2.27	0.00	.13947E+04
1399.04	69.80	0.00	84.1	0.119E+01	2.28	154.77	2.28	0.00	.13990E+04
1403.43	69.80	0.00	84.4	0.118E+01	2.28	154.95	2.28	0.00	.14034E+04
1407.82	69.80	0.00	84.7	0.118E+01	2.29	155.12	2.29	0.00	.14078E+04
1412.21	69.80	0.00	85.0	0.118E+01	2.29	155.30	2.29	0.00	.14122E+04
1416.60	69.80	0.00	85.3	0.117E+01	2.30	155.48	2.30	0.00	.14166E+04
1420.99	69.80	0.00	85.6	0.117E+01	2.30	155.66	2.30	0.00	.14210E+04
1425.38	69.80	0.00	85.9	0.116E+01	2.31	155.83	2.31	0.00	.14254E+04
1429.77	69.80	0.00	86.2	0.116E+01	2.31	156.01	2.31	0.00	.14298E+04
1434.16	69.80	0.00	86.5	0.116E+01	2.32	156.19	2.32	0.00	.14342E+04
1438.55	69.80	0.00	86.8	0.115E+01	2.33	156.37	2.33	0.00	.14385E+04
1442.94	69.80	0.00	87.1	0.115E+01	2.33	156.55	2.33	0.00	.14429E+04
1447.33	69.80	0.00	87.4	0.114E+01	2.34	156.72	2.34	0.00	.14473E+04
1451.72	69.80	0.00	87.7	0.114E+01	2.34	156.90	2.34	0.00	.14517E+04
1456.11	69.80	0.00	88.0	0.114E+01	2.35	157.08	2.35	0.00	.14561E+04
1460.50	69.80	0.00	88.3	0.113E+01	2.35	157.26	2.35	0.00	.14605E+04
1464.89	69.80	0.00	88.6	0.113E+01	2.36	157.43	2.36	0.00	.14649E+04
1469.28	69.80	0.00	89.0	0.112E+01	2.36	157.61	2.36	0.00	.14693E+04
1473.67	69.80	0.00	89.3	0.112E+01	2.37	157.79	2.37	0.00	.14737E+04
1478.06	69.80	0.00	89.6	0.112E+01	2.37	157.96	2.37	0.00	.14781E+04
1482.45	69.80	0.00	89.9	0.111E+01	2.38	158.14	2.38	0.00	.14824E+04
1486.84	69.80	0.00	90.2	0.111E+01	2.39	158.32	2.39	0.00	.14868E+04
1491.22	69.80	0.00	90.5	0.111E+01	2.39	158.50	2.39	0.00	.14912E+04
1495.61	69.80	0.00	90.8	0.110E+01	2.40	158.67	2.40	0.00	.14956E+04
1500.00	69.80	0.00	91.1	0.110E+01	2.40	158.85	2.40	0.00	.15000E+04

Cumulative travel time = 1500.0000 sec (0.42 hrs)

Simulation limit based on maximum specified distance = 1500.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD241: BUOYANT AMBIENT SPREADING

CORMIX2: Multiport Diffuser Discharges End of Prediction File
222

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CORMIX2 PREDICTION FILE:

22

CORMIX MIXING ZONE EXPERT SYSTEM
Subsystem CORMIX2: Multiport Diffuser Discharges
CORMIX Version 11.0GTD
HYDRO2 Version 11.0.1.0 August 2019

CASE DESCRIPTION

Site name/label: PCCA Harbor Island
Design case: pcca_ew50_95_5(1.0)
FILE NAME: C:\Projects\pcca 2021\pcca_new_ew50_95_5(1.0).prd
Time stamp: 06/23/2021--12:04:54

ENVIRONMENT PARAMETERS (metric units)

Unbounded section
HA = 22.00 HD = 27.40
UA = 1.000 F = 0.009 USTAR =0.3425E-01
UW = 2.000 UWSTAR=0.2198E-02
Uniform density environment
STRCND= U RHOAM = 1016.3900

DIFFUSER DISCHARGE PARAMETERS (metric units)

Diffuser type: DITYPE= unidirectional_parallel
BANK = LEFT DISTB = 69.80 YB1 = 69.80 YB2 = 69.80
LD = 30.00 NOPEN = 20 NRISER= 20 SPAC = 1.58 NPPERR = 1
D0 = 0.180 A0 = 0.025 H0 = 7.90 SUB0 = 19.50
D0INP = 0.180 CR0 = 1.000 B0 =0.1612E-01
Nozzle/port arrangement: unidirectional_without_fanning
GAMMA = 0.00 THETA = 30.00 SIGMA = 270.00 BETA = 90.00
U0 = 8.229 Q0 = 4.188 Q0A =0.4188E+01
RHO0 = 1030.0000 DRHO0 =-.1361E+02 GP0 =-.1313E+00
C0 =0.1000E+03 CUNITS= %
IPOLL = 1 KS =0.0000E+00 KD =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)

q0 =0.1396E+00 SIGNJ0= -1.0
m0 =U0^2*B0 =0.1091E+01 j0 =U0*GP0*B0 =-.1742E-01 (based on slot width B0)
m0 =U0*q0 =0.1149E+01 j0 =q0*GP0 =-.1833E-01 (based on volume flux q0)
Associated 2-d length scales (meters)
lQ=B = 0.017 lM = 16.20 lm = 1.15
lmp = 99999.00 lbp = 99999.00 la = 99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)

Q0 =0.4188E+01 M0 =0.3274E+02 J0 =-.5225E+00
Associated 3-d length scales (meters)
lQ = 0.16 LM = 18.94 Lm = 5.87 Lb = 0.55
Lmp = 99999.00 Lbp = 99999.00

NON-DIMENSIONAL PARAMETERS

FR0 = 178.87 FRD0 = 53.52 R = 8.23 PL = 140.00
(slot) (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:

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Properties of riser group with 1 ports/nozzles each:
U0 = 8.229 D0 = 0.180 A0 = 0.025 THETA = 30.00
FR0 = 178.87 FRD0 = 53.52 R = 8.23
(slot) (riser group)

FLOW CLASSIFICATION

222
2 Flow class (CORMIX2) = MNU9 2
2 Applicable layer depth HS = 27.40 2
222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS

C0 =0.1000E+03 CUNITS= %
NTOX = 0
NSTD = 0
REGMZ = 0
XINT = 1500.00 XMAX = 1500.00

X-Y-Z COORDINATE SYSTEM:

ORIGIN is located at the bottom and the diffuser mid-point:
69.80 m from the LEFT bank/shore.
X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP = 100 display intervals per module

BEGIN MOD201: DIFFUSER DISCHARGE MODULE

Due to complex near-field motions: EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

Profile definitions:

BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
BH = top-hat half-width, in horizontal plane normal to trajectory
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
Uc = Local centerline excess velocity (above ambient)
TT = Cumulative travel time

X	Y	Z	S	C	BV	BH	Uc	TT
0.00	0.00	7.90	1.0	0.100E+03	0.01	15.00	8.229	.00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE

BEGIN MOD273: UNIDIRECTIONAL CROSS-FLOWING DIFFUSER (TEE) IN STRONG CURRENT

Because of the strong ambient current the diffuser plume of this crossflowing discharge gets RAPIDLY DEFLECTED.
A near-field zone is formed that is VERTICALLY FULLY MIXED over the entire layer depth. Full mixing is achieved at a downstream distance of about five (5) layer depths.

Profile definitions:

BV = layer depth (vertically mixed)
BH = top-hat half-width, measured horizontally in Y-direction

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S = hydrodynamic average (bulk) dilution
 C = average (bulk) concentration (includes reaction effects, if any)
 TT = Cumulative travel time

X	Y	Z	S	C	BV	BH	TT
0.00	0.00	7.90	1.0	0.100E+03	0.01	15.00	.00000E+00
1.52	-0.01	7.84	2.4	0.422E+02	0.32	14.86	.15200E+01
3.04	-0.01	7.77	2.9	0.341E+02	0.62	14.72	.30400E+01
4.56	-0.02	7.71	3.4	0.297E+02	0.92	14.58	.45600E+01
6.08	-0.03	7.64	3.7	0.267E+02	1.23	14.44	.60800E+01
7.60	-0.03	7.58	4.1	0.246E+02	1.53	14.31	.76000E+01
9.12	-0.04	7.51	4.4	0.230E+02	1.84	14.17	.91200E+01
10.64	-0.04	7.45	4.6	0.216E+02	2.14	14.03	.10640E+02
12.16	-0.05	7.39	4.9	0.205E+02	2.44	13.89	.12160E+02
13.68	-0.06	7.32	5.1	0.196E+02	2.75	13.75	.13680E+02
15.20	-0.06	7.26	5.3	0.188E+02	3.05	13.61	.15200E+02
16.72	-0.07	7.19	5.5	0.180E+02	3.36	13.47	.16720E+02
18.24	-0.08	7.13	5.7	0.174E+02	3.66	13.33	.18240E+02
19.76	-0.08	7.06	5.9	0.168E+02	3.96	13.20	.19760E+02
21.28	-0.09	7.00	6.1	0.163E+02	4.27	13.06	.21280E+02
22.80	-0.09	6.93	6.3	0.159E+02	4.57	12.92	.22800E+02
24.32	-0.10	6.87	6.5	0.154E+02	4.87	12.78	.24320E+02
25.84	-0.11	6.81	6.6	0.150E+02	5.18	12.64	.25840E+02
27.36	-0.11	6.74	6.8	0.147E+02	5.48	12.50	.27360E+02
28.88	-0.12	6.68	7.0	0.144E+02	5.79	12.36	.28880E+02
30.40	-0.13	6.61	7.1	0.140E+02	6.09	12.22	.30400E+02
31.92	-0.13	6.55	7.3	0.137E+02	6.39	12.09	.31920E+02
33.44	-0.14	6.48	7.4	0.135E+02	6.70	11.95	.33440E+02
34.96	-0.14	6.42	7.6	0.132E+02	7.00	11.81	.34960E+02
36.48	-0.15	6.36	7.7	0.130E+02	7.31	11.67	.36480E+02
38.00	-0.16	6.29	7.8	0.127E+02	7.61	11.53	.38000E+02
39.52	-0.16	6.23	8.0	0.125E+02	7.91	11.39	.39520E+02
41.04	-0.17	6.16	8.1	0.123E+02	8.22	11.25	.41040E+02
42.56	-0.18	6.10	8.2	0.121E+02	8.52	11.11	.42560E+02
44.08	-0.18	6.03	8.4	0.119E+02	8.82	10.98	.44080E+02
45.60	-0.19	5.97	8.5	0.118E+02	9.13	10.84	.45600E+02
47.12	-0.19	5.91	8.6	0.116E+02	9.43	10.70	.47120E+02
48.64	-0.20	5.84	8.7	0.114E+02	9.74	10.56	.48640E+02
50.16	-0.21	5.78	8.9	0.113E+02	10.04	10.42	.50160E+02
51.68	-0.21	5.71	9.0	0.111E+02	10.34	10.28	.51680E+02
53.20	-0.22	5.65	9.1	0.110E+02	10.65	10.14	.53200E+02
54.72	-0.23	5.58	9.2	0.109E+02	10.95	10.00	.54720E+02
56.24	-0.23	5.52	9.3	0.107E+02	11.26	9.87	.56240E+02
57.76	-0.24	5.45	9.4	0.106E+02	11.56	9.73	.57760E+02
59.28	-0.25	5.39	9.6	0.105E+02	11.86	9.59	.59280E+02
60.80	-0.25	5.33	9.7	0.104E+02	12.17	9.45	.60800E+02
62.32	-0.26	5.26	9.8	0.102E+02	12.47	9.31	.62320E+02
63.84	-0.26	5.20	9.9	0.101E+02	12.77	9.17	.63840E+02
65.36	-0.27	5.13	10.0	0.100E+02	13.08	9.03	.65360E+02
66.88	-0.28	5.07	10.1	0.992E+01	13.38	8.89	.66880E+02
68.40	-0.28	5.00	10.2	0.982E+01	13.69	8.76	.68400E+02
69.92	-0.29	4.94	10.3	0.972E+01	13.99	8.62	.69920E+02
71.44	-0.30	4.88	10.4	0.963E+01	14.29	8.48	.71440E+02
72.96	-0.30	4.81	10.5	0.954E+01	14.60	8.34	.72960E+02

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 107 South Mays
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 512.244.9058
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74.48	-0.31	4.75	10.6	0.945E+01	14.90	8.20	.74480E+02
76.00	-0.31	4.68	10.7	0.936E+01	15.21	8.06	.76000E+02
77.52	-0.32	4.62	10.8	0.928E+01	15.51	7.92	.77520E+02
79.04	-0.33	4.55	10.9	0.920E+01	15.81	7.78	.79040E+02
80.56	-0.33	4.49	11.0	0.912E+01	16.12	7.65	.80560E+02
82.08	-0.34	4.43	11.1	0.904E+01	16.42	7.51	.82080E+02
83.60	-0.35	4.36	11.2	0.897E+01	16.73	7.37	.83600E+02
85.12	-0.35	4.30	11.2	0.889E+01	17.03	7.23	.85120E+02
86.64	-0.36	4.23	11.3	0.882E+01	17.33	7.09	.86640E+02
88.16	-0.36	4.17	11.4	0.875E+01	17.64	6.95	.88160E+02
89.68	-0.37	4.10	11.5	0.868E+01	17.94	6.81	.89680E+02
91.20	-0.38	4.04	11.6	0.862E+01	18.24	6.67	.91200E+02
92.72	-0.38	3.97	11.7	0.855E+01	18.55	6.53	.92720E+02
94.24	-0.39	3.91	11.8	0.849E+01	18.85	6.40	.94240E+02
95.76	-0.40	3.85	11.9	0.843E+01	19.16	6.26	.95760E+02
97.28	-0.40	3.78	12.0	0.837E+01	19.46	6.12	.97280E+02
98.80	-0.41	3.72	12.0	0.831E+01	19.76	5.98	.98800E+02
100.32	-0.42	3.65	12.1	0.825E+01	20.07	5.84	.10032E+03
101.84	-0.42	3.59	12.2	0.819E+01	20.37	5.70	.10184E+03
103.36	-0.43	3.52	12.3	0.814E+01	20.68	5.56	.10336E+03
104.88	-0.43	3.46	12.4	0.808E+01	20.98	5.42	.10488E+03
106.40	-0.44	3.40	12.5	0.803E+01	21.28	5.29	.10640E+03
107.92	-0.45	3.33	12.5	0.798E+01	21.59	5.15	.10792E+03
109.44	-0.45	3.27	12.6	0.793E+01	21.89	5.01	.10944E+03
110.96	-0.46	3.20	12.7	0.787E+01	22.19	4.87	.11096E+03
112.48	-0.47	3.14	12.8	0.783E+01	22.50	4.73	.11248E+03
114.00	-0.47	3.07	12.9	0.778E+01	22.80	4.59	.11400E+03
115.52	-0.48	3.01	12.9	0.773E+01	23.11	4.45	.11552E+03
117.04	-0.48	2.95	13.0	0.768E+01	23.41	4.31	.11704E+03
118.56	-0.49	2.88	13.1	0.764E+01	23.71	4.18	.11856E+03
120.08	-0.50	2.82	13.2	0.759E+01	24.02	4.04	.12008E+03
121.60	-0.50	2.75	13.2	0.755E+01	24.32	3.90	.12160E+03
123.12	-0.51	2.69	13.3	0.751E+01	24.63	3.76	.12312E+03
124.64	-0.52	2.62	13.4	0.746E+01	24.93	3.62	.12464E+03
126.16	-0.52	2.56	13.5	0.742E+01	25.23	3.48	.12616E+03
127.68	-0.53	2.49	13.5	0.738E+01	25.54	3.34	.12768E+03
129.20	-0.53	2.43	13.6	0.734E+01	25.84	3.20	.12920E+03
130.72	-0.54	2.37	13.7	0.730E+01	26.14	3.07	.13072E+03
132.24	-0.55	2.30	13.8	0.726E+01	26.45	2.93	.13224E+03
133.76	-0.55	2.24	13.8	0.722E+01	26.75	2.79	.13376E+03
135.28	-0.56	2.17	13.9	0.719E+01	27.06	2.65	.13528E+03
136.80	-0.57	2.11	14.0	0.715E+01	27.36	2.51	.13680E+03
138.32	-0.57	2.04	14.1	0.711E+01	27.40	2.37	.13832E+03
139.84	-0.58	1.98	14.1	0.708E+01	27.40	2.23	.13984E+03
141.36	-0.58	1.92	14.2	0.704E+01	27.40	2.09	.14136E+03
142.88	-0.59	1.85	14.3	0.701E+01	27.40	1.96	.14288E+03
144.40	-0.60	1.79	14.3	0.697E+01	27.40	1.82	.14440E+03
145.92	-0.60	1.72	14.4	0.694E+01	27.40	1.68	.14592E+03
147.44	-0.61	1.66	14.5	0.690E+01	27.40	1.54	.14744E+03
148.96	-0.62	1.59	14.6	0.687E+01	27.40	1.40	.14896E+03
150.48	-0.62	1.53	14.6	0.684E+01	27.40	1.26	.15048E+03
152.00	-0.63	1.46	14.7	0.681E+01	27.40	1.12	.15200E+03

Cumulative travel time = 152.0000 sec (0.04 hrs)

Plume centerline may exhibit slight discontinuities in transition

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512.244.9058
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to subsequent far-field module.

END OF MOD273: UNIDIRECTIONAL CROSS-FLOWING DIFFUSER (TEE) IN STRONG CURRENT

** End of NEAR-FIELD REGION (NFR) **

BEGIN MOD241: BUOYANT AMBIENT SPREADING

Profile definitions:

BV = top-hat thickness, measured vertically
BH = top-hat half-width, measured horizontally in y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)
TT = Cumulative travel time

Plume Stage 1 (not bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
152.00	-0.63	0.00	14.7	0.681E+01	27.40	1.12	27.40	0.00	.15200E+03
163.25	-0.63	0.00	19.9	0.501E+01	10.95	3.81	10.95	0.00	.16325E+03
174.51	-0.63	0.00	22.1	0.453E+01	8.08	5.72	8.08	0.00	.17451E+03
185.76	-0.63	0.00	23.5	0.425E+01	6.70	7.35	6.70	0.00	.18576E+03
197.01	-0.63	0.00	24.6	0.406E+01	5.85	8.81	5.85	0.00	.19701E+03
208.27	-0.63	0.00	25.5	0.392E+01	5.26	10.16	5.26	0.00	.20827E+03
219.52	-0.63	0.00	26.3	0.380E+01	4.82	11.42	4.82	0.00	.21952E+03
230.77	-0.63	0.00	27.0	0.370E+01	4.48	12.61	4.48	0.00	.23077E+03
242.03	-0.63	0.00	27.6	0.362E+01	4.21	13.75	4.21	0.00	.24203E+03
253.28	-0.63	0.00	28.2	0.355E+01	3.98	14.84	3.98	0.00	.25328E+03
264.53	-0.63	0.00	28.7	0.348E+01	3.78	15.89	3.78	0.00	.26453E+03
275.79	-0.63	0.00	29.2	0.342E+01	3.62	16.91	3.62	0.00	.27579E+03
287.04	-0.63	0.00	29.7	0.337E+01	3.47	17.89	3.47	0.00	.28704E+03
298.29	-0.63	0.00	30.1	0.332E+01	3.35	18.85	3.35	0.00	.29829E+03
309.55	-0.63	0.00	30.6	0.327E+01	3.24	19.78	3.24	0.00	.30955E+03
320.80	-0.63	0.00	31.0	0.323E+01	3.14	20.69	3.14	0.00	.32080E+03
332.05	-0.63	0.00	31.4	0.318E+01	3.05	21.57	3.05	0.00	.33205E+03
343.31	-0.63	0.00	31.8	0.314E+01	2.97	22.44	2.97	0.00	.34331E+03
354.56	-0.63	0.00	32.2	0.311E+01	2.89	23.29	2.89	0.00	.35456E+03
365.81	-0.63	0.00	32.6	0.307E+01	2.83	24.12	2.83	0.00	.36581E+03
377.07	-0.63	0.00	33.0	0.303E+01	2.77	24.94	2.77	0.00	.37707E+03
388.32	-0.63	0.00	33.3	0.300E+01	2.71	25.75	2.71	0.00	.38832E+03
399.57	-0.63	0.00	33.7	0.297E+01	2.66	26.54	2.66	0.00	.39957E+03
410.82	-0.63	0.00	34.1	0.293E+01	2.61	27.31	2.61	0.00	.41082E+03
422.08	-0.63	0.00	34.5	0.290E+01	2.57	28.08	2.57	0.00	.42208E+03
433.33	-0.63	0.00	34.8	0.287E+01	2.53	28.83	2.53	0.00	.43333E+03
444.58	-0.63	0.00	35.2	0.284E+01	2.49	29.57	2.49	0.00	.44458E+03
455.84	-0.63	0.00	35.6	0.281E+01	2.46	30.31	2.46	0.00	.45584E+03
467.09	-0.63	0.00	36.0	0.278E+01	2.43	31.03	2.43	0.00	.46709E+03
478.34	-0.63	0.00	36.4	0.275E+01	2.40	31.74	2.40	0.00	.47834E+03
489.60	-0.63	0.00	36.8	0.272E+01	2.37	32.45	2.37	0.00	.48960E+03
500.85	-0.63	0.00	37.1	0.269E+01	2.35	33.14	2.35	0.00	.50085E+03
512.10	-0.63	0.00	37.5	0.266E+01	2.32	33.83	2.32	0.00	.51210E+03
523.36	-0.63	0.00	37.9	0.264E+01	2.30	34.51	2.30	0.00	.52336E+03
534.61	-0.63	0.00	38.3	0.261E+01	2.28	35.18	2.28	0.00	.53461E+03

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545.86	-0.63	0.00	38.8	0.258E+01	2.26	35.85	2.26	0.00	.54586E+03
557.12	-0.63	0.00	39.2	0.255E+01	2.25	36.51	2.25	0.00	.55712E+03
568.37	-0.63	0.00	39.6	0.253E+01	2.23	37.16	2.23	0.00	.56837E+03
579.62	-0.63	0.00	40.0	0.250E+01	2.22	37.80	2.22	0.00	.57962E+03
590.88	-0.63	0.00	40.4	0.247E+01	2.20	38.44	2.20	0.00	.59088E+03
602.13	-0.63	0.00	40.9	0.245E+01	2.19	39.07	2.19	0.00	.60213E+03
613.38	-0.63	0.00	41.3	0.242E+01	2.18	39.70	2.18	0.00	.61338E+03
624.64	-0.63	0.00	41.8	0.239E+01	2.17	40.32	2.17	0.00	.62464E+03
635.89	-0.63	0.00	42.2	0.237E+01	2.16	40.94	2.16	0.00	.63589E+03
647.14	-0.63	0.00	42.7	0.234E+01	2.15	41.55	2.15	0.00	.64714E+03
658.40	-0.63	0.00	43.2	0.232E+01	2.14	42.15	2.14	0.00	.65840E+03
669.65	-0.63	0.00	43.7	0.229E+01	2.14	42.75	2.14	0.00	.66965E+03
680.90	-0.63	0.00	44.1	0.227E+01	2.13	43.35	2.13	0.00	.68090E+03
692.16	-0.63	0.00	44.6	0.224E+01	2.13	43.94	2.13	0.00	.69216E+03
703.41	-0.63	0.00	45.1	0.222E+01	2.12	44.53	2.12	0.00	.70341E+03
714.66	-0.63	0.00	45.7	0.219E+01	2.12	45.11	2.12	0.00	.71466E+03
725.92	-0.63	0.00	46.2	0.217E+01	2.12	45.69	2.12	0.00	.72592E+03
737.17	-0.63	0.00	46.7	0.214E+01	2.11	46.26	2.11	0.00	.73717E+03
748.42	-0.63	0.00	47.2	0.212E+01	2.11	46.83	2.11	0.00	.74842E+03
759.68	-0.63	0.00	47.8	0.209E+01	2.11	47.40	2.11	0.00	.75968E+03
770.93	-0.63	0.00	48.3	0.207E+01	2.11	47.96	2.11	0.00	.77093E+03
782.18	-0.63	0.00	48.9	0.204E+01	2.11	48.52	2.11	0.00	.78218E+03
793.44	-0.63	0.00	49.5	0.202E+01	2.11	49.07	2.11	0.00	.79344E+03
804.69	-0.63	0.00	50.1	0.200E+01	2.11	49.62	2.11	0.00	.80469E+03
815.94	-0.63	0.00	50.6	0.197E+01	2.11	50.17	2.11	0.00	.81594E+03
827.19	-0.63	0.00	51.2	0.195E+01	2.12	50.71	2.12	0.00	.82719E+03
838.45	-0.63	0.00	51.8	0.193E+01	2.12	51.26	2.12	0.00	.83845E+03
849.70	-0.63	0.00	52.5	0.191E+01	2.12	51.79	2.12	0.00	.84970E+03
860.95	-0.63	0.00	53.1	0.188E+01	2.12	52.33	2.12	0.00	.86095E+03
872.21	-0.63	0.00	53.7	0.186E+01	2.13	52.86	2.13	0.00	.87221E+03
883.46	-0.63	0.00	54.4	0.184E+01	2.13	53.39	2.13	0.00	.88346E+03
894.71	-0.63	0.00	55.0	0.182E+01	2.14	53.91	2.14	0.00	.89471E+03
905.97	-0.63	0.00	55.7	0.180E+01	2.14	54.44	2.14	0.00	.90597E+03
917.22	-0.63	0.00	56.4	0.177E+01	2.15	54.96	2.15	0.00	.91722E+03
928.47	-0.63	0.00	57.1	0.175E+01	2.15	55.48	2.15	0.00	.92847E+03
939.73	-0.63	0.00	57.7	0.173E+01	2.16	55.99	2.16	0.00	.93973E+03
950.98	-0.63	0.00	58.5	0.171E+01	2.17	56.50	2.17	0.00	.95098E+03
962.23	-0.63	0.00	59.2	0.169E+01	2.17	57.01	2.17	0.00	.96223E+03
973.49	-0.63	0.00	59.9	0.167E+01	2.18	57.52	2.18	0.00	.97349E+03
984.74	-0.63	0.00	60.6	0.165E+01	2.19	58.02	2.19	0.00	.98474E+03
995.99	-0.63	0.00	61.4	0.163E+01	2.20	58.53	2.20	0.00	.99599E+03
1007.25	-0.63	0.00	62.1	0.161E+01	2.20	59.03	2.20	0.00	.10072E+04
1018.50	-0.63	0.00	62.9	0.159E+01	2.21	59.52	2.21	0.00	.10185E+04
1029.75	-0.63	0.00	63.7	0.157E+01	2.22	60.02	2.22	0.00	.10298E+04
1041.01	-0.63	0.00	64.5	0.155E+01	2.23	60.51	2.23	0.00	.10410E+04
1052.26	-0.63	0.00	65.3	0.153E+01	2.24	61.00	2.24	0.00	.10523E+04
1063.51	-0.63	0.00	66.1	0.151E+01	2.25	61.49	2.25	0.00	.10635E+04
1074.77	-0.63	0.00	66.9	0.149E+01	2.26	61.98	2.26	0.00	.10748E+04
1086.02	-0.63	0.00	67.7	0.148E+01	2.27	62.46	2.27	0.00	.10860E+04
1097.27	-0.63	0.00	68.6	0.146E+01	2.28	62.95	2.28	0.00	.10973E+04
1108.53	-0.63	0.00	69.4	0.144E+01	2.29	63.43	2.29	0.00	.11085E+04
1119.78	-0.63	0.00	70.3	0.142E+01	2.30	63.91	2.30	0.00	.11198E+04
1131.03	-0.63	0.00	71.2	0.141E+01	2.31	64.38	2.31	0.00	.11310E+04
1142.29	-0.63	0.00	72.1	0.139E+01	2.33	64.86	2.33	0.00	.11423E+04

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1153.54	-0.63	0.00	73.0	0.137E+01	2.34	65.33	2.34	0.00	.11535E+04
1164.79	-0.63	0.00	73.9	0.135E+01	2.35	65.80	2.35	0.00	.11648E+04
1176.05	-0.63	0.00	74.8	0.134E+01	2.36	66.27	2.36	0.00	.11760E+04
1187.30	-0.63	0.00	75.7	0.132E+01	2.38	66.74	2.38	0.00	.11873E+04
1198.55	-0.63	0.00	76.7	0.130E+01	2.39	67.21	2.39	0.00	.11986E+04
1209.81	-0.63	0.00	77.6	0.129E+01	2.40	67.67	2.40	0.00	.12098E+04
1221.06	-0.63	0.00	78.6	0.127E+01	2.42	68.14	2.42	0.00	.12211E+04
1232.31	-0.63	0.00	79.6	0.126E+01	2.43	68.60	2.43	0.00	.12323E+04
1243.57	-0.63	0.00	80.6	0.124E+01	2.44	69.06	2.44	0.00	.12436E+04
1254.82	-0.63	0.00	81.6	0.123E+01	2.46	69.52	2.46	0.00	.12548E+04
1266.07	-0.63	0.00	82.6	0.121E+01	2.47	69.97	2.47	0.00	.12661E+04
1277.33	-0.63	0.00	83.6	0.120E+01	2.49	70.43	2.49	0.00	.12773E+04

Cumulative travel time = 1277.3254 sec (0.35 hrs)

Plume is ATTACHED to LEFT bank/shore.
 Plume width is now determined from LEFT bank/shore.

Plume Stage 2 (bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
1277.33	69.80	0.00	83.6	0.120E+01	2.49	140.86	2.49	0.00	.12773E+04
1279.55	69.80	0.00	83.8	0.119E+01	2.49	140.94	2.49	0.00	.12796E+04
1281.78	69.80	0.00	84.0	0.119E+01	2.49	141.01	2.49	0.00	.12818E+04
1284.01	69.80	0.00	84.2	0.119E+01	2.50	141.09	2.50	0.00	.12840E+04
1286.23	69.80	0.00	84.4	0.119E+01	2.50	141.17	2.50	0.00	.12862E+04
1288.46	69.80	0.00	84.6	0.118E+01	2.51	141.25	2.51	0.00	.12885E+04
1290.69	69.80	0.00	84.7	0.118E+01	2.51	141.33	2.51	0.00	.12907E+04
1292.91	69.80	0.00	84.9	0.118E+01	2.52	141.41	2.52	0.00	.12929E+04
1295.14	69.80	0.00	85.1	0.117E+01	2.52	141.49	2.52	0.00	.12951E+04
1297.37	69.80	0.00	85.3	0.117E+01	2.52	141.56	2.52	0.00	.12974E+04
1299.59	69.80	0.00	85.5	0.117E+01	2.53	141.64	2.53	0.00	.12996E+04
1301.82	69.80	0.00	85.7	0.117E+01	2.53	141.72	2.53	0.00	.13018E+04
1304.05	69.80	0.00	85.9	0.116E+01	2.54	141.80	2.54	0.00	.13040E+04
1306.27	69.80	0.00	86.1	0.116E+01	2.54	141.88	2.54	0.00	.13063E+04
1308.50	69.80	0.00	86.3	0.116E+01	2.55	141.96	2.55	0.00	.13085E+04
1310.73	69.80	0.00	86.5	0.116E+01	2.55	142.04	2.55	0.00	.13107E+04
1312.95	69.80	0.00	86.7	0.115E+01	2.55	142.11	2.55	0.00	.13130E+04
1315.18	69.80	0.00	86.9	0.115E+01	2.56	142.19	2.56	0.00	.13152E+04
1317.41	69.80	0.00	87.0	0.115E+01	2.56	142.27	2.56	0.00	.13174E+04
1319.63	69.80	0.00	87.2	0.115E+01	2.57	142.35	2.57	0.00	.13196E+04
1321.86	69.80	0.00	87.4	0.114E+01	2.57	142.43	2.57	0.00	.13219E+04
1324.09	69.80	0.00	87.6	0.114E+01	2.58	142.51	2.58	0.00	.13241E+04
1326.32	69.80	0.00	87.8	0.114E+01	2.58	142.58	2.58	0.00	.13263E+04
1328.54	69.80	0.00	88.0	0.114E+01	2.58	142.66	2.58	0.00	.13285E+04
1330.77	69.80	0.00	88.2	0.113E+01	2.59	142.74	2.59	0.00	.13308E+04
1333.00	69.80	0.00	88.4	0.113E+01	2.59	142.82	2.59	0.00	.13330E+04
1335.22	69.80	0.00	88.6	0.113E+01	2.60	142.90	2.60	0.00	.13352E+04
1337.45	69.80	0.00	88.8	0.113E+01	2.60	142.98	2.60	0.00	.13374E+04
1339.68	69.80	0.00	89.0	0.112E+01	2.61	143.05	2.61	0.00	.13397E+04
1341.90	69.80	0.00	89.2	0.112E+01	2.61	143.13	2.61	0.00	.13419E+04
1344.13	69.80	0.00	89.4	0.112E+01	2.61	143.21	2.61	0.00	.13441E+04
1346.36	69.80	0.00	89.6	0.112E+01	2.62	143.29	2.62	0.00	.13464E+04
1348.58	69.80	0.00	89.8	0.111E+01	2.62	143.37	2.62	0.00	.13486E+04
1350.81	69.80	0.00	90.0	0.111E+01	2.63	143.45	2.63	0.00	.13508E+04

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 107 South Mays
 Round Rock, Texas 78664
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1353.04	69.80	0.00	90.2 0.111E+01	2.63	143.52	2.63	0.00	.13530E+04
1355.26	69.80	0.00	90.4 0.111E+01	2.64	143.60	2.64	0.00	.13553E+04
1357.49	69.80	0.00	90.6 0.110E+01	2.64	143.68	2.64	0.00	.13575E+04
1359.72	69.80	0.00	90.8 0.110E+01	2.64	143.76	2.64	0.00	.13597E+04
1361.94	69.80	0.00	91.0 0.110E+01	2.65	143.84	2.65	0.00	.13619E+04
1364.17	69.80	0.00	91.2 0.110E+01	2.65	143.92	2.65	0.00	.13642E+04
1366.40	69.80	0.00	91.3 0.109E+01	2.66	143.99	2.66	0.00	.13664E+04
1368.62	69.80	0.00	91.5 0.109E+01	2.66	144.07	2.66	0.00	.13686E+04
1370.85	69.80	0.00	91.7 0.109E+01	2.67	144.15	2.67	0.00	.13709E+04
1373.08	69.80	0.00	91.9 0.109E+01	2.67	144.23	2.67	0.00	.13731E+04
1375.30	69.80	0.00	92.1 0.109E+01	2.67	144.31	2.67	0.00	.13753E+04
1377.53	69.80	0.00	92.3 0.108E+01	2.68	144.39	2.68	0.00	.13775E+04
1379.76	69.80	0.00	92.5 0.108E+01	2.68	144.46	2.68	0.00	.13798E+04
1381.99	69.80	0.00	92.7 0.108E+01	2.69	144.54	2.69	0.00	.13820E+04
1384.21	69.80	0.00	92.9 0.108E+01	2.69	144.62	2.69	0.00	.13842E+04
1386.44	69.80	0.00	93.1 0.107E+01	2.70	144.70	2.70	0.00	.13864E+04
1388.67	69.80	0.00	93.3 0.107E+01	2.70	144.78	2.70	0.00	.13887E+04
1390.89	69.80	0.00	93.5 0.107E+01	2.70	144.86	2.70	0.00	.13909E+04
1393.12	69.80	0.00	93.7 0.107E+01	2.71	144.93	2.71	0.00	.13931E+04
1395.35	69.80	0.00	93.9 0.106E+01	2.71	145.01	2.71	0.00	.13953E+04
1397.57	69.80	0.00	94.1 0.106E+01	2.72	145.09	2.72	0.00	.13976E+04
1399.80	69.80	0.00	94.3 0.106E+01	2.72	145.17	2.72	0.00	.13998E+04
1402.03	69.80	0.00	94.5 0.106E+01	2.73	145.25	2.73	0.00	.14020E+04
1404.25	69.80	0.00	94.7 0.106E+01	2.73	145.32	2.73	0.00	.14043E+04
1406.48	69.80	0.00	94.9 0.105E+01	2.73	145.40	2.73	0.00	.14065E+04
1408.71	69.80	0.00	95.2 0.105E+01	2.74	145.48	2.74	0.00	.14087E+04
1410.93	69.80	0.00	95.4 0.105E+01	2.74	145.56	2.74	0.00	.14109E+04
1413.16	69.80	0.00	95.6 0.105E+01	2.75	145.64	2.75	0.00	.14132E+04
1415.39	69.80	0.00	95.8 0.104E+01	2.75	145.72	2.75	0.00	.14154E+04
1417.61	69.80	0.00	96.0 0.104E+01	2.76	145.79	2.76	0.00	.14176E+04
1419.84	69.80	0.00	96.2 0.104E+01	2.76	145.87	2.76	0.00	.14198E+04
1422.07	69.80	0.00	96.4 0.104E+01	2.77	145.95	2.77	0.00	.14221E+04
1424.29	69.80	0.00	96.6 0.104E+01	2.77	146.03	2.77	0.00	.14243E+04
1426.52	69.80	0.00	96.8 0.103E+01	2.77	146.11	2.77	0.00	.14265E+04
1428.75	69.80	0.00	97.0 0.103E+01	2.78	146.18	2.78	0.00	.14287E+04
1430.97	69.80	0.00	97.2 0.103E+01	2.78	146.26	2.78	0.00	.14310E+04
1433.20	69.80	0.00	97.4 0.103E+01	2.79	146.34	2.79	0.00	.14332E+04
1435.43	69.80	0.00	97.6 0.102E+01	2.79	146.42	2.79	0.00	.14354E+04
1437.66	69.80	0.00	97.8 0.102E+01	2.80	146.50	2.80	0.00	.14377E+04
1439.88	69.80	0.00	98.0 0.102E+01	2.80	146.57	2.80	0.00	.14399E+04
1442.11	69.80	0.00	98.2 0.102E+01	2.80	146.65	2.80	0.00	.14421E+04
1444.34	69.80	0.00	98.4 0.102E+01	2.81	146.73	2.81	0.00	.14443E+04
1446.56	69.80	0.00	98.6 0.101E+01	2.81	146.81	2.81	0.00	.14466E+04
1448.79	69.80	0.00	98.8 0.101E+01	2.82	146.89	2.82	0.00	.14488E+04
1451.02	69.80	0.00	99.0 0.101E+01	2.82	146.96	2.82	0.00	.14510E+04
1453.24	69.80	0.00	99.2 0.101E+01	2.83	147.04	2.83	0.00	.14532E+04
1455.47	69.80	0.00	99.4 0.101E+01	2.83	147.12	2.83	0.00	.14555E+04
1457.70	69.80	0.00	99.7 0.100E+01	2.84	147.20	2.84	0.00	.14577E+04
1459.92	69.80	0.00	99.9 0.100E+01	2.84	147.28	2.84	0.00	.14599E+04
1462.15	69.80	0.00	100.1 0.999E+00	2.84	147.35	2.84	0.00	.14622E+04
1464.38	69.80	0.00	100.3 0.997E+00	2.85	147.43	2.85	0.00	.14644E+04
1466.60	69.80	0.00	100.5 0.995E+00	2.85	147.51	2.85	0.00	.14666E+04
1468.83	69.80	0.00	100.7 0.993E+00	2.86	147.59	2.86	0.00	.14688E+04
1471.06	69.80	0.00	100.9 0.991E+00	2.86	147.67	2.86	0.00	.14711E+04

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