3. Model Evaluation

This section describes the re-evaluation of the previous model predictions of dispersion of the plume created by dumping fish processing wastes at sea. The previous predictions are presented in Appendix B of the FEIS (EPA, 1989) and in a supplementary study (SOS, 1990). Appendix B of the FEIS is reproduced in Appendix 8 of this report for convenience. The model re-evaluation was conducted in three phases as describe below. The three steps were:

- The existing model formulation, as described in the 1989 FEIS were used as described. The previous model was implemented as an Excel 5.0 spreadsheet and the results of the new formulation checked against the previous results. The model predictions are then used by applying the new bioassay test results presented in the previous section and this evaluation is provided in the conclusions and recommendations section of the report below.

- The input data and assumptions used in the model were examined and evaluated. Sensitivity studies were done for critical parameters, including assumed values for diffusion coefficients, initial dilution, and ambient conditions. The appropriateness and applicability of previously assumed values are discussed.

- A somewhat different approach, for the initial dilution as the waste is pumped into the propeller slipstream was developed. The objective of the new approach for initial dilution with a different model is intended to account for changes in vessel characteristics and operational methods and to develop more representative overall model predictions.

A summary of the model evaluation was provided to USEPA and ASEPA in a memorandum prepared by CH2M HILL (1995c). The descriptions below expand and further document the summary previously provided.

Previous Model Formulation

The previous model (FEIS model), based on an approach originally developed by Brooks (1960), is typically very conservative in similar applications. Other assumptions in the model are also conservative. The results of the model are presented in terms of dilution (or concentration) of fish processing waste versus distance from the initial dump site. Based on the results of the bioassay tests, the distance from the dump site where the effluent is diluted to the limiting permissible concentration (LPC) level can be determined.

The FEIS model formulation, based on the approach presented by Brooks (1960), is essentially the same basic model as CDIFF (Yearsley, 1989). The formulation developed by Brooks calculates the lateral diffusion of a discharge plume as it is advected in the longitudinal direction and does not account for longitudinal dispersion. As initially developed by Brooks, the approach does not account for vertical diffusion, does not provide for the settlement of negatively buoyant constituents in the plume, and does not account for the dispersion

of a positively buoyant plume or positively buoyant components of the discharged material. In addition the model, as implemented in the FEIS, assumes a line source of constant source strength.

The FEIS model provides for a settling velocity by redefining the longitudinal coordinate at a downward angle defined by the relationship between the longitudinal current speed and assumed vertical settling velocity such that:

$$x' = x \cdot \cos(\theta)$$

where

$$\theta = \tan(u/w_s)$$

u = ambient horizontal, longitudinal velocity

w_s = settling velocity

The FEIS model also accounts for vertical diffusion by applying a concentration reduction factor based on a Fickian diffusion coefficient (K_v). This factor is applied to the calculated centerline concentration (C_{max}) by

$$C_{max} \cdot \{(H/4) \cdot (2 \cdot K_v \cdot t + H^2/16)^{-0.5}\}$$

to calculate an adjusted value of C_{max} accounting for vertical diffusion, where H is the initial vertical plume dimension and t is travel time along the plume trajectory. The two changes described above are the only modifications made to the original Brooks formulation. The FEIS model input variables include ambient current speed, initial dilution, settling velocity, and initial plume dimensions.

Based on the descriptions in the 1989 FEIS, the existing model was reproduced and tested. We were not able to exactly reproduce the model results for all cases and believe there may be some errors, simplifications or inconsistencies in the original formulation. However, these errors are not "fatal" and generally not significant. In fact the differences noted below may be simply caused by differences in the numerical formulation between the two approaches. The maximum disagreement between results from our formulation and the initial FEIS formulation of the model are on the order of 10 percent, and typically much smaller. Tables 3.1 and 3.2 show the comparison of published predictions for the FEIS model and the CH2M HILL spreadsheet model predictions based on the same set of differential equations. Previous model predictions appear to have been reasonable, and probably conservative, for the development of the ocean dumping siting and operational procedures.

Evaluation of the Previous Model

The FEIS model is evaluated below on the basis of the assumptions and input used to develop and implement the model. These factors fall into three categories which are examined to determine the general and specific applicability of the model approach and the model formulation and implementation, respectively. The three categories considered are: [1] assumptions in-

volved in the basic formulation of the model involving the fundamental physics and mathematics used; [2] the assumptions and methodology used to chose the magnitudes of the variables describing the important physical processes; and [3] the values used for the description of ambient conditions and characteristics of the waste material. Each of these categories of model assumptions and input was examined and re-evaluated, as discussed in more detail below. In addition to the direct re-evaluation of the model assumptions and inputs, the sensitivity of the model to important variables was assessed.

The FEIS model is based on differential equations that consider lateral and vertical diffusion. Longitudinal diffusion (in the direction of the ambient current is neglected because of it's relative magnitude which is small compared to other terms. This assumption is well founded for the current patterns observed and anticipated in the disposal area. The actual equations were developed by Brooks (1960) and can be rearranged to resemble the classical error function by adding an exponential decay term. For open ocean applications the diffusivity is expressed in terms of a 4/3 power relationship, which is a widely accepted approach (see for example Fischer et al. (1979). The affect of vertical diffusion is assumed to be Fickian, an appropriate term is multiplied with the error function to predict total diffusion from both lateral and vertical components. The approach taken in the FEIS model appears reasonable for application to the farfield following the initial development of the waste plume. It is considered a conservative (underprediction of dilution) approach. It is noted that the model as reproduced by CH2M HILL on a spreadsheet application uses a numerical approximation to the error function (with an associated error of less than $2 \cdot 10^{-7}$). Differences between the FEIS model and the CH2M HILL implementation of that model described above may be explained, at least in part, by differences in the approximations used for the error function. The presented numbers (10^{-5}) do not support this statement (10^{-7})!

The vertical diffusion in the FEIS model is dependent on a coefficient of vertical diffusion which is assumed constant during the winter and depth dependent during the summer (as reflected in the results in Tables 3.1a and 3.2). The reasoning behind this approach is based on the seasonal existence of a thermocline in the summer. The vertical diffusion coefficient is the only depth varying parameter in the governing equations used in the FEIS model. Based on this formulation, all calculations within a certain range of depths should result in constant dilution depending on the value of the coefficient. However, this is not the case with the FEIS model predictions, and ? missing sentence

In the FEIS model the initial plume depth is taken to be H/4, where the dimension H is obtained from the equation,

$$U \cdot L \cdot H \cdot C_0 = Q$$

where, H = ?

U = ambient velocity,

L = a characteristic length parameter,

C_0 = the initial waste concentration (at the beginning of farfield dilution),

and

Q = the flow rate of the waste stream from the barge.

The width of the initial plume is taken to be twice the turning radius of the dumping vessel. A characteristic length of the vessel, set equal to the geometric mean of the half beam, and the draft of the vessel, is the length parameter used in the equation to calculate initial concentration. The FEIS modeling report does not clearly justify this assumption. One of the suggested modi-

fications to the model, as described below, is a better description of the initial dilution of the plume. The formulation used in the FEIS model is not particularly well founded in physics, although it appears to be quite conservative and is acceptable from a regulatory basis where any uncertainty should be on the conservative side.

The FEIS model makes several assumptions concerning the initial dumping of the waste. First, the relative velocity term that is used in the equation for calculating the initial concentration is simply the speed of the vessel (over the bottom). The assumption is made that as the ship circles in a constant ambient current, the net effect of the ocean current cancels out. In addition, the flow value used is a time average which changes in response to relative velocity. Thus, it may be considered that there is no net effect on initial concentration because the calculation of C_0 involves flow in the numerator and relative velocity in the denominator. Regardless of the rationale, the ambient current speed is at least an order of magnitude smaller than the vessel speed, thus the use of vessel speed for relative velocity is a reasonable assumption.

you need to mention that $C_0 = \frac{Q}{1.814 \pi R^2 V}$

Assumptions used, once the initial dumping has occurred, include maintaining the majority of the plume near the surface, surface waves can be disregarded, the plume does not reach the 120 fathom contour, and the pumping rate mixes the flow without altering the wake pattern of the vessel. All of these assumptions are physically reasonable or, if over-simplified, result in a conservative approach (dilution will be under predicted).

Three areas for improvement in the FEIS model have been identified as a result of the evaluation summarized above. One of these involves the modeling of the initial dilution processes which determine the plume size and initial concentration used as an initial condition in the farfield model. The other two areas involve the actual formulation of the farfield model and are discussed below. These problems with model formulation probably explain, at least in part, the differences in predictions of the FEIS model and CH2M HILL's application of that model as discussed above. No reason to significantly modify, or replace, the farfield model (essentially the FEIS model) has been identified other than to address the points discussed below. However, it is believed that a more realistic approach to initial dilution is available and has been incorporated into the overall model, as described in the following section on revised model predictions.

In the FEIS modeling report, the values given for the vertical diffusion coefficient, K_v, are based on seasonal variability. As described above winter values are held constant. Summer values are presented for depth ranges of 100 meter intervals: 0 to 100 meters, 100 to 200 meters, and below 200 meters. This is the only depth dependent variable in the model. The results shown in Appendix B of the FEIS (see page B-18) show different values of C_{MAX}/C_0 for two fall velocities of 0.1 cm/sec and 0.01 cm/sec for, and only for, the case of 0.2 knot ambient current (values are the same for the two fall velocities for other ambient currents). Since all depths are less than 100 meters for these two cases, K_v is constant and the differences are curious.

For the reason described above, CH2M HILL's implementation of the FEIS model could not replicate the results for this current speed (see Table 3.2). In addition, the CH2M HILL implementation could not reproduce the deep (fall velocity of 1 cm/sec) case within an accuracy of as much as about 10 percent (see Table 3.2). The latter discrepancy may well be related to the other problems. The original model code was not obtained, so a definitive answer concerning these problems was not available. However, the differences are not particularly troublesome, given

the conservative nature of the model to begin with, and do not compromise the results of the original study in any way. Overall agreement remains very good.

Another possible problem with the implementation of the FEIS model occurs when the two waste pumping rates are considered. The modeling report indicates that the discharge rate from the vessel is 140 gpm per knot of vessel speed, up to 10 knots. Initial concentration of waste is a function of flow divided by relative velocity. This implies that the initial concentration will remain about the same, particularly since the vessel speed is taken as the relative velocity as discussed above. However, the initial concentrations reported are 0.000222 and 0.000621, for a discharge of 500 gpm and 1400 gpm, respectively. It appears that the vessel speed was not varied with discharge rate. Again, this leads to overly conservative predictions, as the initial concentration for the higher discharge rate is over-stated.

The FEIS model was developed based on a different vessel, using a different operational mode of discharge, than currently used. CH2M HILL has considered the current vessel and operational procedures. Based on our evaluation of the existing model, including the possible errors mentioned above and the changes in discharge operation, we believe a revised model for the initial dilution process (prediction of initial concentration) is appropriate. The revisions should account for both the discharge of the material directly between the two counter rotating propellers of the FV *Tasman Sea* and a more sophisticated approach to dilution in the propeller slip stream. Subsequent dilution can then be calculated following methods similar to those used previously, and using CH2M HILL's spreadsheet formulation of the initial FEIS farfield model.

Revised Model Formulation and Predictions

An independent model was developed and used to evaluate the dispersion of waste discharged from the barge. The purpose of this model is to provide an alternative to more realistically describe the fate and transport of the discharge. The primary differences between the FEIS and the CH2M HILL model approaches are the use of initial dilutions as determined based on the dynamics of the propeller slipstream and the use of characteristics of the current dumping vessel.

The new model developed by CH2M HILL consists of three parts:

- Dumping dilution - results from the initial discharge into the propeller wash and is numerically equivalent to the propeller discharge rate plus the waste discharge rate divided by the waste discharge rate

- Nearfield Dilution - results from the entrainment of sea water into the momentum jet from the propellers which contains the waste discharge

- Farfield Dilution - results from the subsequent dilution of the plume and is essentially the same model used previously.

The formulation and predictions for each of the three parts of the model are described below.

The vessel characteristics assumed for the models are based on the known vessel characteristics as described by the vessel operator and are as follows:

Number of Propellers:	2 - counter rotating (to CL from above)
Propeller Diameter:	4 feet
Propeller Spacing:	15 feet on center
RPM/Speed:	500 rpm at slow ahead (6 knots - stabilized)
	700 rpm at 8 knots
	900 rpm at 10 to 11 knots
Draft:	12 feet (propeller CL at 10 feet)
Beam:	38 feet
Discharge Pipe:	6 in diameter to CL of propeller pair

Dumping Dilution

The dumping dilution is the immediate dilution realized as the discharge pipe releases waste at the stern of the vessel between the two counter-rotating propellers. It is calculated as the propeller discharge rate (water flow through the propeller) plus the waste discharge rate divided by the waste discharge rate. The discharge rate through the propeller can be calculated using propeller theory. The most direct calculation is based on the momentum theory of propellers and a practical explanation and description, with further references, can be found in Liou and Herbich (1976). CH2M HILL project staff have used this approach to calculate induced water speeds by ferries in Puget Sound (Washington), barges on the Cohansey River (New Jersey) to evaluate subsequent induced sediment transport.

irrelevant

The flow rate through the propeller immediately behind the vessel (V_0) is given by:

velocity ? units ?

$$V_0 = (1+b)\cdot V_A$$

where

V_A is the ship speed (knots),

and

$b = 2a = 2\cdot(1/\eta_1 - 1)$,

η_1 = ideal efficiency = $2/((1+(C_T+1)^{1/2})$.

The term C_T is the thrust loading coefficient,

$$C_T = T/(0.5\cdot\rho\cdot A_0\cdot(V_A)^2)$$

where

T = thrust developed = $K_T\cdot\rho\cdot n^2\cdot D^4/3600$
K_T = the thrust coefficient described below
ρ= density of water
A_0 = disk area of propeller
n = rpm of propeller
D = diameter of propeller

units ?

There term K_T is the thrust coefficient which is a function of the propeller-characteristic curve and is approximated as a function of the speed coefficient, J_T, as described in Liou and Herbich for a typical case as:

$$K_T = 0.48 - 0.41 \cdot J_T$$

and

$$J_T = 101.33 \cdot V_A / (n \cdot D)$$

where variables are as defined above, and n is the propeller rpm.

Application of the above relationships, using the vessel characteristics provided, results in the following immediate of dumping dilutions: 398.9:1 and 365.7:1 for discharge flows of 1400 gpm and 840 gpm, respectively, and for a single propeller stream. For the dual propellers the dumping dilutions become 796.2:1 and 731.4 for the same flows. The vessel is assumed to be traveling at 10 knots and at 6 knots for discharge rates of 1400 gpm and 840 gpm, respectively. This is the reasonable range of speeds the vessel can make in the open sea. These flows correspond to winter (June 1 through November 30) time permitted disposal rates of 140 gpm/knot with a maximum of 10 knots. The summer permitted limit is at 120 gpm/knot with a maximum of 10 knots and the dilutions would be approximately 1.17 times those listed above.

Nearfield Dilutions

The use of propeller theory to determine the immediate initial dilution replaces the initial dilution (or concentration, C_0) used in the FEIS model. As described above, CH2M HILL also applied another model between the initial dilution and the farfield method based on the Brooks method. This was done to account for the rapid mixing within the propeller slipstream. The model assumes that all of the waste discharged is entrained in the slipstream. This is considered a very good assumption, and, based on the disposal method, it is difficult to see how the situation could be otherwise.

The nearfield approach used considers conservation of momentum in a round momentum jet (the propeller slip stream). The centerline velocity, U_{CL}, and flow at any distance x from the point of discharge, Q_x, are given by:

$$U_{CL} = (1/\alpha \cdot x) \cdot [K_0/(2\pi \cdot I_2)]^{1/2}$$

and

$$Q_x = \alpha \cdot x \cdot I_1 \cdot [K_0/(2\pi \cdot I_2)]^{-1/2}$$

where

$K_0 = Q_0 \cdot V_0$ with subscript $_0$ indicating initial conditions
I_1, I_2, and α = constants

nearfield dilution at a distance x from the point of discharge is given by Q_x/Q_0. The dilution as a function of x will remain the same for various vessel speeds, since the initial flow through the propeller changes in direct response to vessel speed. The momentum theory for propellers also provides a means to calculate velocity and is given in Liou and Herbich as referenced above:

$$V(r,x) = (V_0 \cdot D_0 / x) \cdot 10^{\epsilon}$$

where

$\varepsilon = 0.79 - 33 \cdot (r/x)^2$
r = distance in the radial direction

and on the centerline (r = 0)

$$V(x) = U_{CL} = (V_0 \cdot D_0 / x) \cdot 6.17$$

As a check the calculations for velocity were done using both equations for centerline velocity and agreement was within 0.5 percent.

Table 3.3 shows the dilution for a single propeller as a function of depth. The dilution for two propellers will be twice that for a single propeller except that the dilution will be affected because of the interference between the two jets when they merge. This will result in a smaller "entrainment area" (the surface area of the plume) exposed to "clean" (ambient as opposed to the water in the second plume) water. In addition the plumes will intercept the surface and this will also reduce the entrainment area. When these results are considered, and the geometry of a round jet is maintained, the surface area available for entrainment is reduced to about 50 percent of the area of an otherwise undisturbed double plume, or approximately the same as an undisturbed single plume, past a point about 300 feet from the point of discharge. The calculation scheme and results for determining the factor by which the surface area is affected are provided in Appendix 8.

Of course the interference of side-by-side plumes and the surface will also act to change the shape of the plume, and result in increased surface area compared to the calculations above. Other factors such as concentration gradients across the plume and the actual flow filed also act to make the use of an entrainment area approach somewhat conservative. However, to maintain a good degree of conservatism, we have assumed the dilution for both slipstreams combined, once the plumes merge, will be reduced by the entrainment ratio as calculated. Thus the corrected dilutions are as shown in Table 3.3. It is assumed that the value at 1000 feet is taken as the value for the nearfield dilution in the calculations of total dilution described below. This is a conservative (under predicts dilution) approach since there will be additional dilution in the propeller stream further than this distance.

Farfield Dilutions

As mentioned above, CH2M HILL used the previously applied farfield transport model as implemented on an Excel spreadsheet. The FEIS model is described in Appendix 8 which is Appendix B of the FEIS referenced above. The physical and mathematical basis of the model is as described in Appendix 8 and that description is not reproduced here. As discussed above, when using the same input data as used in the FEIS modeling, the results are in excellent agreement, except for those cases previously indicated. The geometry and dimensions of the current vessel are used. Initial concentration is set to unity to calculate relative dilutions (or concentrations).

The two key parameters used in this model are the vertical diffusion coefficient, K_v and the horizontal dissipation parameter, A. The results are not particularly sensitive to K_v and are, as expected moderately sensitive to variations in A. Since the time of the FEIS model there is no data that would indicate that these constants should be changed from the previous values, and the same values were used. In addition, a literature survey of recommended values

for A indicate that the value used is reasonable for open ocean applications. Fischer (1979) recommends using a value between 0.0002 and 0.001; Yearsley (1989) recommends the same range; Grace (1978) recommends 0.00015 to 0.005; and Baumgartner et al.(1993) recommend 0.0002 to 0.001. These suggested ranges are generally for application to nearshore coastal and inland waters. For open ocean water, with no effects of boundaries and significant wind and wave action, the high end of the suggested range is appropriate. Thus, the value previously used in the FEIS model (0.001) has been retained. Note that units of A as discussed above are $ft^{2/3}/sec$.

As in the case of the previous modeling, the farfield dilution is seasonally dependent based on the strength and structure of the thermocline. Farfield predictions were done for the same set of conditions as done previously:

- A range of ambient ocean current speeds of 0.2 to 1.0 knots
- A range of vessel speeds of 6 and 10 knots
- Winter conditions with no change in K_v with depth
- Summer conditions with K_v dependent on depth (only the surface layer was modeled for this case because that is a worst case condition)

The results of the farfield modeling are summarized in Table 3.4 and detailed model output is provided in Appendix 10. Table 3.4 reports the farfield dilution at distances of 2.5 and 5 nautical miles from the release area corresponding to the approximate downcurrent edge of permitted dump zone and the closest point to possible land influence. (These distances are somewhat less than actual distances to the points referenced.) Ocean currents of 0.4 knots and 0.8 knots, corresponding to minimum and maximum expected ocean currents (as discussed in the FEIS) are described for vessel speeds of 6 and 10 knots. Additional cases are provided in Appendix 10.

Summary of Model Predictions

The dilutions for the range of seasonal and operational parameters are as follows:

- Dumping dilution: The immediate dilution on dumping ranges from approximately 730:1 to 930:1 depending on discharge rate (seasonal constraint) and vessel speed, assuming a maximum permitted discharge per knot of vessel speed.
- Nearfield dilution: The dilution within the propeller slipstream, for first 1000 feet, is predicted to be about 42:1.
- Farfield Dilution: Using essentially the same model as applied in the FEIS the farfield dilution is predicted to range from approximately 11:1 to 30:1 prior to reaching the edge of the dumping zone, and 24:1 to 77:1 prior to reaching the shore line or closest reef area. The farfield dilution depends on a number of environmental and operational variables and can vary from season to season and from day to day.

The dilutions described above are developed in a multiplicative fashion where the dilution is applied to the concentrations at the beginning of the individual mixing processes. Thus the overall dilution at the edge of the dumping zone is the product of the numerical values of the three dilutions described above:

Total dilution = (dumping dilution) x (nearfield dilution) x (farfield dilution)

The preliminary results of the model predict dilutions of approximately 440,000:1 to 510,000:1 at the edge of the dumping zone. These dilutions are predicted under conservative (underpredicted dilutions) and worst case conditions. The range of dilutions, and corresponding concentrations of waste are described in more detail in the following section.

please provide a graph to illustrate this result. (i.e., Dump site and spatial distribution of waste)

Table 3.1
Comparison of Original FEIS and CH2M HILL Reformulated Model Predicitions

Distance (n. mi.)	Winter Conditions			Summer Conditions		
	CH2MHILL Model	FEIS Model	Percent error	CH2M HILL Model	FEIS Model	Percent error
Cmax/Co for Current Speed of 0.2 knots and Discharge of 500gpm						
0.0	1.00000			1.00000		
0.5	0.06745			0.10016		
1.0	0.03365	0.03364	-0.03	0.05001	0.04999	-0.04
1.5	0.02044	0.02043	-0.04	0.03039	0.03038	-0.05
2.0	0.01380	0.01379	-0.07	0.02053	0.02052	-0.05
2.5	0.00997	0.00996	-0.07	0.01483	0.01482	-0.07
3.0	0.00754	0.00754	-0.06	0.01123	0.01122	-0.07
3.5	0.00591	0.00591	-0.06	0.00880	0.00880	-0.02
4.0	0.00476	0.00476	-0.04	0.00709	0.00709	0.03
Cmax/Co for Current Speed of 0.2 knots and Discharge of 1400gpm						
0.0	1.00000			1.00000		
0.5	0.06745			0.10016		
1.0	0.03365	0.03364	-0.03	0.05001	0.05000	-0.02
1.5	0.02044	0.02043	-0.04	0.03039	0.03039	-0.01
2.0	0.01380	0.01380	0.00	0.02053	0.02052	-0.05
2.5	0.00997	0.00996	-0.07	0.01483	0.01483	-0.01
3.0	0.00754	0.00754	-0.06	0.01123	0.01123	0.02
3.5	0.00591	0.00591	-0.06	0.00880	0.00880	-0.02
4.0	0.00476	0.00476	-0.04	0.00709	0.00709	0.03
Cmax/Co for Current Speed of 0.4 knots and Discharge of 500gpm						
0.0	1.00000			1.00000		
0.5	0.05648			0.08393		
1.0	0.03386	0.03385	-0.02	0.05037	0.05035	-0.04
1.5	0.02305	0.02305	-0.02	0.03431	0.03430	-0.03
2.0	0.01685	0.01684	-0.04	0.02508	0.02507	-0.03
2.5	0.01291	0.01290	-0.04	0.01921	0.01920	-0.06
3.0	0.01023	0.01022	-0.08	0.01523	0.01522	-0.04
3.5	0.00832	0.00831	-0.10	0.01238	0.01238	-0.03
4.0	0.00690	0.00690	-0.06	0.01028	0.01028	0.00
Cmax/Co for Current Speed of 0.4 knots and Discharge of 1400gpm						
0.0	1.00000			1.00000		
0.5	0.05648			0.08393		
1.0	0.03386	0.03385	-0.02	0.05037	0.05036	-0.02
1.5	0.02305	0.02305	-0.02	0.03431	0.03430	-0.03
2.0	0.01685	0.01684	-0.04	0.02508	0.02507	-0.03
2.5	0.01291	0.01290	-0.04	0.01921	0.01921	-0.01
3.0	0.01023	0.01022	-0.08	0.01523	0.01522	-0.04
3.5	0.00832	0.00832	0.02	0.01238	0.01238	-0.03
4.0	0.00690	0.00690	-0.06	0.01028	0.01028	0.00
Cmax/Co for Current Speed of 0.8 knots and Discharge of 500gpm						
0.0	1.00000			1.00000		
0.5	0.04161			0.06190		
1.0	0.02828	0.02827	-0.02	0.04209	0.04207	-0.04
1.5	0.02139	0.02138	-0.04	0.03184	0.03183	-0.04
2.0	0.01694	0.01693	-0.06	0.02522	0.02521	-0.05
2.5	0.01382	0.01382	-0.02	0.02058	0.02058	-0.01
3.0	0.01153	0.01153	-0.02	0.01717	0.01717	-0.01
3.5	0.00979	0.00979	0.01	0.01458	0.01457	-0.04
4.0	0.00843	0.00842	-0.08	0.01255	0.01254	-0.06
Cmax/Co for Current Speed of 0.8 knots and Discharge of 1400gpm						
0.0	1.00000			1.00000		
0.5	0.04161			0.06190		
1.0	0.02828	0.02827	-0.02	0.04209	0.04209	0.01
1.5	0.02139	0.02138	-0.04	0.03184	0.03184	-0.01
2.0	0.01694	0.01694	0.00	0.02522	0.02522	-0.01
2.5	0.01382	0.01382	-0.02	0.02058	0.02058	-0.01
3.0	0.01153	0.01153	-0.02	0.01717	0.01717	-0.01
3.5	0.00979	0.00979	0.01	0.01458	0.01457	-0.04
4.0	0.00843	0.00842	-0.08	0.01255	0.01254	-0.06

Table 3.2
Comparison of Original FEIS and CH2M HILL Reformulated Model Predicitions

Distance (n. mi.)	Summer Deep			Summer Mid-Depth		
	CH2MHILL Model	FEIS Model	Percent error *	CH2M HILL Model	FEIS Model	Percent error
Cmax/Co for Current Speed of 0.2 knots and Discharge of 500gpm						
0.0	1.00000			1.00000		
0.5	0.10348			0.10016		
1.0	0.05168	0.05423	4.70	0.05001	0.04999	-0.04
1.5	0.03141	0.03242	3.11	0.03039	0.03038	-0.05
2.0	0.02122	0.02172	2.31	0.02053	0.02052	-0.05
2.5	0.01533	0.01562	1.87	0.01483	0.01482	-0.07
3.0	0.01161	0.01179	1.57	0.01123	0.01133	0.90
3.5	0.00910	0.00922	1.33	0.00880	0.00947	7.06
4.0	0.00733	0.00741	1.13	0.00709	0.00805	11.95
Cmax/Co for Current Speed of 0.2 knots and Discharge of 1400gpm						
0.0	1.00000			1.00000		
0.5	0.10348			0.10016		
1.0	0.05168	0.05423	4.70	0.05001	0.05000	-0.02
1.5	0.03141	0.03242	3.11	0.03039	0.03039	-0.01
2.0	0.02122	0.02172	2.31	0.02053	0.02052	-0.05
2.5	0.01533	0.01562	1.87	0.01483	0.01483	-0.01
3.0	0.01161	0.01179	1.57	0.01123	0.01133	0.90
3.5	0.00910	0.00922	1.33	0.00880	0.00947	7.06
4.0	0.00733	0.00741	1.13	0.00709	0.00805	11.95
Cmax/Co for Current Speed of 0.4 knots and Discharge of 500gpm						
0.0	1.00000			1.00000		
0.5	0.08674			0.08393		
1.0	0.05206	0.05794	10.15	0.05037	0.05035	-0.04
1.5	0.03546	0.03798	6.63	0.03431	0.03430	-0.03
2.0	0.02592	0.02726	4.92	0.02508	0.02507	-0.03
2.5	0.01986	0.02067	3.93	0.01921	0.01920	-0.06
3.0	0.01574	0.01627	3.27	0.01523	0.01522	-0.04
3.5	0.01280	0.01317	2.80	0.01238	0.01238	-0.03
4.0	0.01063	0.01089	2.43	0.01028	0.01028	0.00
Cmax/Co for Current Speed of 0.4 knots and Discharge of 1400gpm						
0.0	1.00000			1.00000		
0.5	0.08674			0.08393		
1.0	0.05206	0.05795	10.16	0.05037	0.05036	-0.02
1.5	0.03546	0.03799	6.66	0.03431	0.03430	-0.03
2.0	0.02592	0.02727	4.95	0.02508	0.02507	-0.03
2.5	0.01986	0.02067	3.93	0.01921	0.01921	-0.01
3.0	0.01574	0.01627	3.27	0.01523	0.01522	-0.04
3.5	0.01280	0.01317	2.80	0.01238	0.01238	-0.03
4.0	0.01063	0.01089	2.43	0.01028	0.01028	0.00
Cmax/Co for Current Speed of 0.8 knots and Discharge of 500gpm						
0.0	1.00000			1.00000		
0.5	0.06398			0.06190		
1.0	0.04350	0.04207	-3.40	0.04209	0.04207	-0.04
1.5	0.03291	0.03532	6.81	0.03184	0.03183	-0.04
2.0	0.02607	0.02859	8.81	0.02522	0.02521	-0.05
2.5	0.02127	0.02287	6.98	0.02058	0.02058	-0.01
3.0	0.01775	0.01883	5.74	0.01717	0.01717	-0.01
3.5	0.01507	0.01585	4.94	0.01458	0.01457	-0.04
4.0	0.01297	0.01355	4.28	0.01255	0.01254	-0.06
Cmax/Co for Current Speed of 0.8 knots and Discharge of 1400gpm						
0.0	1.00000			1.00000		
0.5	0.06398			0.06190		
1.0	0.04350	0.04208	-3.38	0.04209	0.04208	-0.02
1.5	0.03291	0.03533	6.84	0.03184	0.03184	-0.01
2.0	0.02607	0.02859	8.81	0.02522	0.02522	-0.01
2.5	0.02127	0.02287	6.98	0.02058	0.02058	-0.01
3.0	0.01775	0.01884	5.79	0.01717	0.01717	-0.01
3.5	0.01507	0.01585	4.94	0.01458	0.01457	-0.04
4.0	0.01297	0.01355	4.28	0.01255	0.01254	-0.06

* $\frac{\text{FEIS Value} - \text{CH2MHILL Value}}{\text{FEIS Value}}$

Table 3.3
Nearfield Dilution Calculations

Distance (feet)	Centerline Plume Velocity (ft/sec)		Flow (ft^3/sec)	Dilution	Entrainment Coefficient	Adjusted Dilution
	Momentum	Propeller				
25	53.49	53.74	1394	2.04	1.00	2.04
100	13.37	13.43	5576	8.15	0.79	6.44
200	6.69	6.72	11151	16.29	0.58	9.45
300	4.46	4.48	16727	24.44	0.55	13.44
400	3.34	3.36	22302	32.58	0.53	17.27
500	2.67	2.69	27878	40.73	0.53	21.59
600	2.23	2.24	33453	48.88	0.52	25.42
700	1.91	1.92	39029	57.02	0.52	29.65
800	1.67	1.68	44604	65.17	0.52	33.89
900	1.49	1.49	50180	73.31	0.51	37.39
1000	1.34	1.34	55755	81.46	0.51	41.54

How are these calculated? I_1, I_2, α, Q_o values?

Table 3.4

Farfield Dilution Model Results

Ocean Current (knots)	Vessel Speed (knots)	Dilution	
		Winter Conditions	Summer Conditions
Dilution at 2.5 Nautical Miles Down Current			
0.4	6	29.6	20.0
	10	17.9	12.1
0.8	6	76.6	18.6
	10	16.6	11.2
Dilution at 5 Nautical Miles Down Current			
0.4	6	27.6	51.5
	10	46.6	31.5
0.8	6	59.1	39.7
	10	35.5	23.9

4. Conclusions and Recommendations

This section presents the overall conclusions drawn from the model predictions, the model limitations, and recommendations based on the results of the study.

Conclusions

Table 4.1 shows the prediction of total dilution and final concentration prior to the point where the plume reaches the edge of the dumping zone (taken as 2.5 nautical miles down current). In the table, C/C_0 is the ratio of final to initial concentration and can be applied to calculate the concentration of any known constituent in the waste. The final concentration is also given in terms of an approximate value for the whole waste in mg/l, assuming the waste is about the density of water. At the edge of the dump zone the dilution of the waste is about 0.00025 percent of a sample in the center of the plume. Reference to Table 3.1 shows that the lowest LC50 of all bioassays conducted was 0.12 percent. Therefore, the concentration at the edge of the permitted dumping zone is 0.0021·LC50.

Table 4.2 shows the same information described above for the plume prior to reaching the shoreline (taken as 5 nautical miles down current). The model was formulated and implemented in a conservative fashion and the dilutions are expected to be underpredicted (concentrations over predicted).

Limitations

Most numerical models of the type used here contain coefficients (e.g. friction factors, diffusion coefficients) that are often study site specific. Although there are generally accepted values for these coefficients, the range observed in nature is high and the models can be somewhat sensitive to the values selected. The process of calibration and verification generally uses measured values of forcing functions and responses to determine the appropriate coefficients for the model configuration at the study site. Typically a set of field data is used to determine the correct values to use for the coefficients. However, this was beyond the scope of the present study and there is little or no available and appropriate data for this task. In this case the model sensitivity determination, the use and justification of reasonable values from the literature and similar studies, and the incorporation of a prudent level of conservatism is required and was accomplished.

Recommendations

CH2M HILL project staff, on the basis of the results of the study, have no recommendations for additional studies of this type.

(at 2.5 n mi)

Table 4.1
Predicted Dilution and Concentration at the Down Current Edge of the Ocean Dumping Zone

Season	Ocean Current (knots)	Vessel Speed (knots)	Loading (gpm)	Dumping Dilution	Nearfield Dilution	Farfield Dilution	Total Dilution	Final Concentration C/Co	Final Concentration (mg/l)
Winter	0.4	6	840	796.2	41.5	29.6	978,052	0.000001022	0.001022
Winter	0.4	10	1400	731.4	41.5	17.9	543,320	0.000001841	0.001841
Winter	0.8	6	720	796.2	41.5	76.6	2,531,040	0.000000395	0.000395
Winter	0.8	10	1200	731.4	41.5	16.6	503,861	0.000001985	0.001985
Summer	0.4	6	840	931.6	41.5	20.0	773,190	0.000001293	0.001293
Summer	0.4	10	1400	855.7	41.5	12.1	429,709	0.000002327	0.002327
Summer	0.8	6	720	931.6	41.5	18.6	719,067	0.000001391	0.001391
Summer	0.8	10	1200	855.7	41.5	11.2	397,747	0.000002514	0.002514

?!

why should these values be different ?!

why is smaller than) ?!

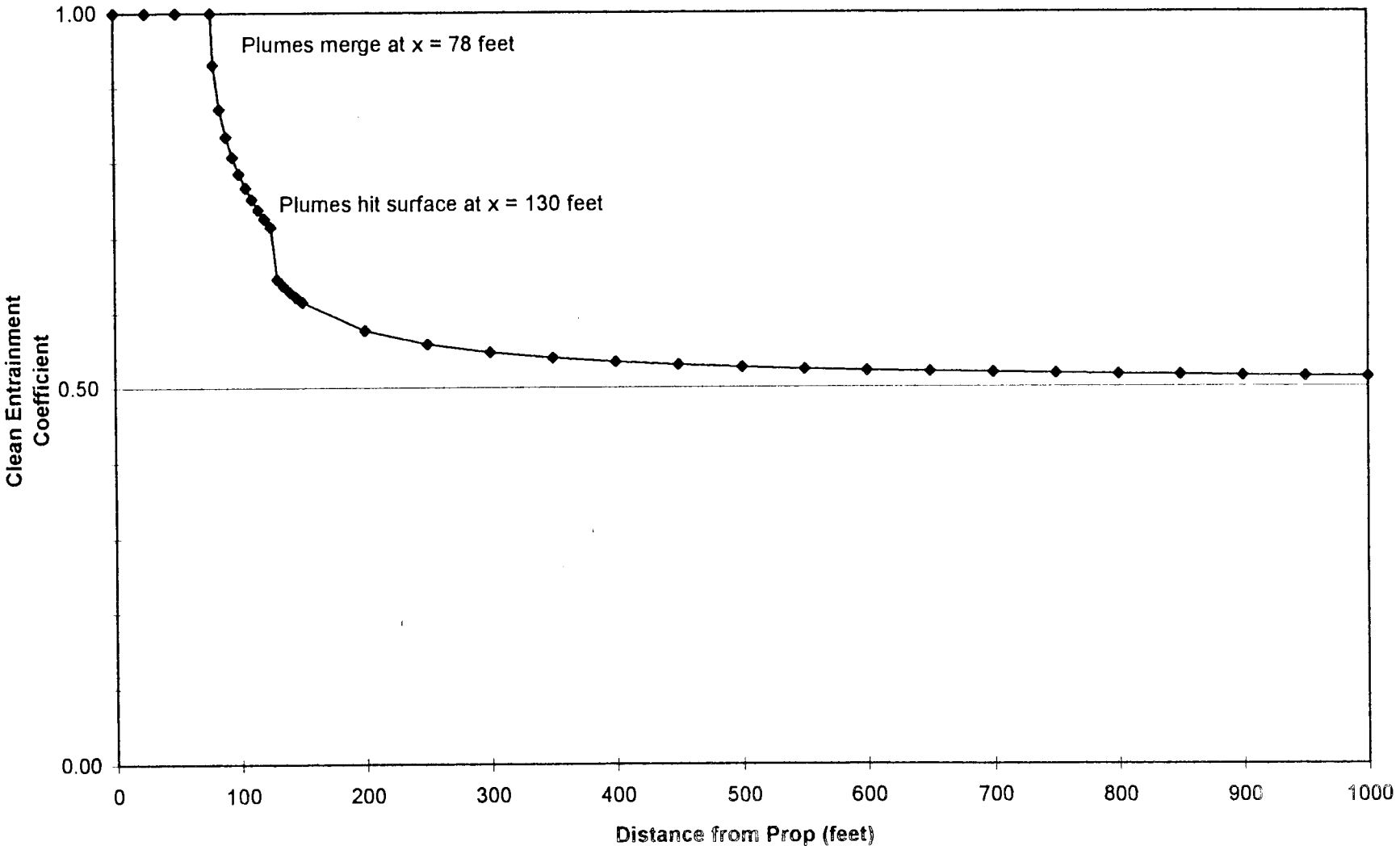
Table 4.2
Predicted Dilution and Concentration near the Closest Reefline or Shoreline (at 5 n mi)

Season	Ocean Current (knots)	Vessel Speed (knots)	Loading (gpm)	Dumping Dilution	Nearfield Dilution	Farfield Dilution	Total Dilution	Final Concentration C/Co	Final Concentration (mg/l)
Winter	0.4	6	840	796.2	41.5	27.6	911,967	0.000001097	0.001097
Winter	0.4	10	1400	731.4	41.5	46.6	1,414,454	0.000000707	0.000707
Winter	0.8	6	720	796.2	41.5	59.1	1,952,800	0.000000512	0.000512
Winter	0.8	10	1200	731.4	41.5	35.5	1,077,535	0.000000928	0.000928
Summer	0.4	6	840	931.6	41.5	51.5	1,990,964	0.000000502	0.000502
Summer	0.4	10	1400	855.7	41.5	31.1	1,104,458	0.000000905	0.000905
Summer	0.8	6	720	931.6	41.5	39.7	1,534,782	0.000000652	0.000652
Summer	0.8	10	1200	855.7	41.5	23.9	848,764	0.000001178	0.001178

Why are these values constant for various loadings?!

Appendix 9
FEIS Model Description (Appendix B of 1989 FEIS)

Clean Entrainment Coefficient vs. Distance from Ship



Calculation scheme for clean entrainment coefficient

Assumptions and Basis for Calculations

plume center horizontal separation = 15 feet
plume width b = 0.096*x
x ranges from 25 to 1000 feet
plumes merge at x = 78.125 feet
at 78.125 feet clean entrainment coefficient = 1.0
plume encounters surface at x = 130 feet

Check ?!

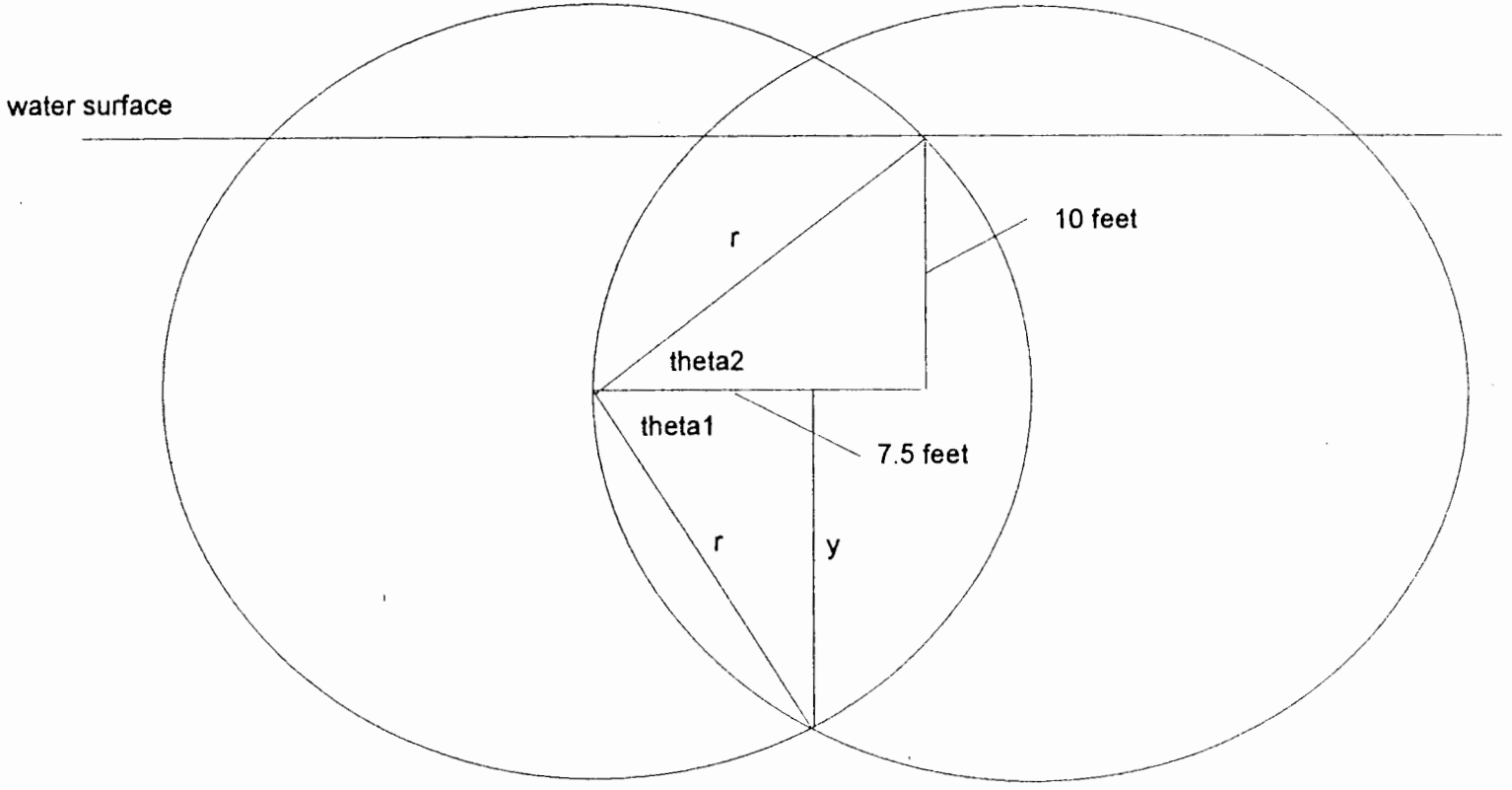
x (feet)	b (feet)	y (feet)	theta1 (rad)	theta2 (rad)	inside perimeter (feet)	clean entrainment coefficient
0	0.0					1.00
25	2.4					1.00
50	4.8					1.00
78.125	7.5	0.0	0.0		0.0	1.00
80	7.7	1.7	0.2		3.3	0.93
85	8.2	3.2	0.4		6.6	0.87
90	8.6	4.3	0.5		9.0	0.83
95	9.1	5.2	0.6		11.0	0.81
100	9.6	6.0	0.7		12.9	0.79
105	10.1	6.7	0.7		14.8	0.77
110	10.6	7.4	0.8		16.5	0.75
115	11.0	8.1	0.8		18.2	0.74
120	11.5	8.7	0.9		19.9	0.73
125	12.0	9.4	0.9		21.5	0.71
130	12.5	10.0	0.9	0.6	19.6	0.65
135	13.0	10.6	1.0	0.7	21.3	0.64
140	13.4	11.2	1.0	0.7	23.0	0.63
145	13.9	11.7	1.0	0.8	24.7	0.62
150	14.4	12.3	1.0	0.8	26.3	0.62
200	19.2	17.7	1.2	1.0	42.1	0.58
250	24.0	22.8	1.3	1.1	57.5	0.56
300	28.8	27.8	1.3	1.2	72.7	0.55
350	33.6	32.8	1.3	1.3	87.8	0.54
400	38.4	37.7	1.4	1.3	103.0	0.53
450	43.2	42.5	1.4	1.3	118.1	0.53
500	48.0	47.4	1.4	1.4	133.2	0.53
550	52.8	52.3	1.4	1.4	148.3	0.52
600	57.6	57.1	1.4	1.4	163.4	0.52
650	62.4	61.9	1.5	1.4	178.5	0.52
700	67.2	66.8	1.5	1.4	193.6	0.52
750	72.0	71.6	1.5	1.4	208.6	0.52
800	76.8	76.4	1.5	1.4	223.7	0.52
850	81.6	81.3	1.5	1.4	238.8	0.52
900	86.4	86.1	1.5	1.5	253.9	0.51
950	91.2	90.9	1.5	1.5	269.0	0.51
1000	96.0	95.7	1.5	1.5	284.1	0.51

Merging Plumes from Adjacent Propellers - with Surface Boundary

Dilution is a function of the ratio of the perimeter inside and outside the adjacent plume.

Assume entrainment is uniform over the perimeter of the plume.

Propellers located 15 feet apart and 10 feet below water surface.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NATIONAL HEALTH AND ENVIRONMENTAL EFFECTS
RESEARCH LABORATORY
ATLANTIC ECOLOGY DIVISION
27 TARZWELL DRIVE • NARRAGANSETT, RI 02882

Rcd 9/12/96

OFFICE OF
RESEARCH AND DEVELOPMENT

DATE: September 3, 1996

MEMORANDUM

SUBJECT: Technical Review of Modeling Report for EPA Region 9 - American Samoa Ocean Disposal Site for Fish Waste

FROM: Mohamed A. Abdelrhman, Research Physical Scientist
Ecosystems Analysis and Simulation Branch, AED

Mohamed A. Abdelrhman

THROUGH: Steve Schimmel, Acting Branch Chief, EAS, AED

TO: Norman Lovelace, Chief
Office of Pacific Island Programs

This technical review of the report *"Joint Cannery Ocean Dumping Studies in American Samoa"* is limited to the modeling aspects of the report namely:
Chapter 1: Introduction
Chapter 3: Model Evaluation
Chapter 4: Conclusions and Recommendations
Appendix 2: Study Plan
Appendix 8: Calculation of Entrainment Adjustment
Appendix 9: FEIS Model Description
Appendix 10: Farfield Model Output
Note: The material in Appendixes 8 and 9 are misplaced in the report, and the two appendixes are cited wrongly in the report (e.g., pages 3-1 and 3-8) .

The report describes results of bioassay testing and modeling of fish processing wastes. Overall, the approach used is based on mathematical modeling, which implements a set of mathematical equations to solve for unknown values. The information presented in the report is not adequate to reproduce any of the stated results due to one or more of the following: (1) incomplete set of mathematical equations, (2) lack of values for parameters , coefficients, or constants in some equations, and (3) unknown physical dimensions (units) of parameters , coefficients, or constants in some equations. I was able to reproduce *dumping dilution*, however, the reported values are overestimated (e.g., by 20% for discharge flow of 1400 gpm using one propeller) due to an error in velocity calculations (see below). This error will be magnified for two propellers and will be magnified further when multiplied by *nearfield* and *farfield dilutions*. I was not able to reproduce the stated dilution values for *nearfield dilution* from the givings in the report. Accordingly, the report must be completed and corrected then resubmitted for re-evaluation. The following comments point at areas which need improvement in the report. Other editorial comments are marked on the attached copied pages from the report.

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Some of the issues mentioned in the Study Plan (Appendix 2) were not covered in the report namely: (1) sensitivity analysis of model results to model parameters (e.g., lateral diffusion coefficient, A, vertical diffusion parameter, K_v), and effluent characteristics (density and settling speed); (2) validation of results so that predictions reflect reality; and (3) graphical representation of model results (contour plots, graphs, etc.). Examination of the effect of effluent characteristics was totally missing from the report.

A major inconvenience experienced while reading the report was the unsystematic presentation of modeling procedure and formulation in the main body of the report. The reader has to go back and forth between the main text and Appendix 9 for evaluation of the reproduced farfield model in Chapter 3, the farfield model formulation in Appendix 9, and the immediate and nearfield formulation in the main text in Chapter 3. The current model (CH2MHILL model) should be presented as a complete (stand-alone) model. Another inconvenience was that the report lacks graphical representations to illustrate the developed methods, formulation, important parameters, and results. Also, physical units were not mentioned for parameters, coefficients, and constants in all equations. Moreover, inconsistent units were used in different sections of the report and appendixes (e.g., m, ft; ft^3/sec, gpm; ft/sec, cm/s, knot; cm2/s). These inconveniences must be eliminated from the report.

In more than ten places (marked by !) in the report "conservative" or "conservatism" was used to indicate that the modeled dilution would be under estimated. However, no scientific justification was presented for this judgement, or where? and when? this judgement is true. My calculations (see below) indicate that the reported values were over-estimated by at least 20%. Unless proper justification is presented for the claimed conservatism it can not be accepted.

The calculation for entrainment (Appendix 8, see note above) are questionable. Plume width, b, is defined as b=0.096 x. First, this linear relationship is not mentioned or justified in any part of the report. Second, values in the theta1-column indicate the use of b as half plume width (not the whole width). Third, the effect of settling speed is ignored by the use of x instead of x', and the effect of vertical diffusion is also ignored, although these simplifications may be valid where the momentum jet from the propellers is dominant, they need to be stated. Forth, based on the presented figure, values in the theta2-column are totally wrong. Theta2 should be decreasing (not increasing) as x and b increase. Finally, the number of significant decimal digits for theta1 and theta2 are unacceptable for accurate calculations. These errors will affect values in the last two columns in the table presented in the appendix (table number and caption are missing) and the graph for Clean Entrainment vs Distance. These errors will also affect values in the last two columns (Entrainment Coefficient and Adjusted Dilution) in Table 3.3 for nearfield dilution.

The *dumping dilution* is based on the value of V_o. The presented formulation ship $[V_o = (1+b)V_A]$ indicates that the value of V_o is relative to the ship which moves at the speed V_A. However, speed of the point-source (the ship) is irrelevant to jet mixing and dilution because mixing depends on the value of jet velocity relative to the ambient fluid. Hence, the velocity of propeller flow should be relative to the ambient fluid, i.e., $V_o = bV_A$. Based on the presented relationships, units, and vessel characteristics (page 3-6) for the case of discharge rate of 1400 gpm and vessel speed 10 knots, I calculated the dilution for a single propeller as 331.17:1, which is over estimated by ~20% by the value given in the report (398.9:1). Thus, reported *dumping dilution* values must be revised as well as the relevant values reported in the last three columns in Tables 4.1 and 4.2. Other values in these two tables must also be revised as indicated on the attached copied pages from the report. *Dumping dilution* does not depend on summer or winter, why are values different for the same loading, vessel speed, and ocean currents in Table 4.1 or Table 4.2?! If the edge of the dumping zone is at 2.5 n mi and the distance to the closest reefline or shoreline is 5 n mi, how can *farfield dilution* for the latter be less than that for the former for the same conditions?! Why are *nearfield dilution* values constant for different loadings (i.e.,

different V_oD_o) in Table 4.1 or Table 4.2 ?!

What is referred to as "entrainment coefficient" or "clean entrainment coefficient" in the report represents change in plume surface area due to the encounter of water surface or the merging of two plumes. This is not the theoretically known entrainment coefficient which relates the rate of entrained mass of ambient fluid (entrainment velocity * plume surface area) into the plume to the rate of mass flowing within the plume (plume velocity * cross-section area). The coefficient is better be given a different name to avoid misconception and to reflect its true physical meaning.

The justification presented in the report for using dilution at 1000 feet as representative for "nearfield dilution" is weak. The nearfield ends where passive diffusion (of ambient fluid) is comparable to turbulent diffusion within the plume. This may happen before or after the assumed 1000 feet. A more justifiable distance should be used to define nearfield dilution. Also, the plume should have a smooth transition between the end of the nearfield to the beginning of the farfield with respect to: dimension, mass conservation, and momentum conservation. These issues were not tackled in the report. For example, does the plume width at the chosen 1000 ft distance match the previously used dimension (twice the turning radius of the ship, 370.5 m) at the beginning of the farfield? If not, what value is used for the farfield?

It is mentioned in the report that the vessel will circle in the dump site as it discharges the waste. Meanwhile plume calculations were carried to 4-5 n. mi. Would there be any overlap of the plume with itself during the discharge? What effect would this overlap have on dilution calculations?

The following concerns need to be dealt with in the report:

- Physical units of all parameters, coefficients, and constants in the equations must be mentioned
- Physical units must be consistent throughout the report
- Values of the constants I_1, I_2, and α (page 3-7) must be mentioned to allow reproduction of the calculated "nearfield dilution" in Table 3.3 column 5.
- The value of Q_o needs to be mentioned, is it the pipe discharge? Or the discharge after *dumping dilution*? If the latter is true, what is the area involved with V_o to calculate Q_o. Is V_o on page 3-7 the same as V_o on page 3-6? Calculation of dumping dilution (e.g., 398.9:1) from velocity (V_o) needs to be stated explicitly in page 3-7.
- The equation for θ on page 3-2 is incorrect, it should read $\theta=\tan^{-1}(w_s/u)$
- x and x' (page 3-2) must be defined

CC: Norm Rubinstein, Acting Director, AED
Brian Melzian, Program Operations, AED
Edward E. Dettmann, Research Environmental Scientist, AED
Allan Ota, Ocean Dumping Program, Region 9
Janet Hashimoto, Region 9

Mitch M
Pat

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

November 20, 1995

SUBJECT: Bioaassay Testing of High Strength Waste: Starkist Samoa, Inc. and VCS Samoa Packing (23 June Sampling) and Summary of Ocean Dumping Modeling Results: Starkest Samoa, Inc. and VCS Samoa Packing (NPDS0 095VSF1)
Eugenia McNaughton

FROM: Eugenia McNaughton, Ph.D., Environmental Scientist
Quality Assurance Management Section (P-3-2)

THROUGH: Vance S. Fong, P.E., Chief Rose Fong for VF
Quality Assurance Management Section (P-3-2)

TO: Pat Young, American Samoa Program Manager
Office of Pacific Island (E-4)

The subject technical memoranda, prepared by Steve Costa, CH2M Hill/SFO and Karen A. Glatzel/Glatzel & Associates and Steve Costa, CH2M Hill/SFO respectively and dated August 7, 1995, respectively, were reviewed. The review was based on discussion with the Dr. Kurt Kline, director of ABT, the subcontracted laboratory that performed the bioassays.

Bioassay Results

1. The Acute Bioassay using Mysidopsis bahia, run at 17°±2 C, should have been run at 20°±2 C. The test results do not appear to have been affected by the lower temperature, but the laboratory will run all future tests with Mysidopsis at the protocol temperature.

2. The mysid effluent tests were run with five replicates per concentration; the reference toxicant tests were run with three. The protocol for the test calls for two to four replicates. Thus, the reference toxicant replicate number is within protocol limits, is comparable to previous tests, with results falling within the expected range for the test organisms. The test itself, with five replicates, is more sensitive than is required by the protocol.

Modelling Results

1. It would be helpful if some simple diagrams accompanied the discussion of the configuration of the propellers on the new vessel and the dilution in the propeller slip stream.

Questions or comments regarding this review should be referred to Eugenia McNaughton, EPA QAMS, at (415) 744-1636.

Rec'd 8/9/95 mg

Engineers
Planners
Economists
Scientists

7 August 1995

107091.DS.MD (OPE30702)

Patricia N.N. Young
American Samoa Program Manager
Office of Pacific Islands
and Native American Programs
U.S. Environmental Protection Agency
75 Hawthorne Street (E-4)
San Francisco, California 94105

Sheila Wiegman
American Samoa
Environmental Protection Agency
American Samoa Government
Pago Pago, American Samoa 96799

Dear Pat and Sheila:

Subject: **High Strength Waste Bioassay No. 3 and Summary of Modeling Results**

Enclosed find two copies of the following: [1] A memorandum presenting the results of the third high strength waste bioassay tests with the laboratory data attached, and [2] a memorandum summarizing the preliminary results of the modeling study for the ocean dumping operations. A full study report, including all documentation and backup, is in preparation at this time and should be delivered to USEPA and ASEPA by August 31, 1995.

If you have any questions please do not hesitate to call me. I will follow up with you in late August to discuss any of your comments or concerns.

Sincerely,

CH2M HILL

Steven L. Costa
Project Manager

cc: Norman Wei/StarKist Foods
James Cox Van Camp Seafoods
Barry Mills/StarKist Samoa
Bill Perez/Samoa Packing

MEMORANDUM CH2MHILL

TO: Pat Young/USEPA

COPIES: Eugenia McNaughton/USEPA (w/ attachments)
Norman Wei/StarKist Foods (w/attachments)
James Cox/Van Camp Seafood (w/attachments)
Sheila Wiegman/American Samoa EPA (w/attachments)
Kurt Kline/ABT (w/o attachments)

FROM: Steve Costa/CH2M HILL/SFO
Karen Glatzel/Glatzel & Associates

DATE: 7 August 1995

SUBJECT: **Bioassay Testing of High Strength Waste: Starkist Samoa, Inc. and VCS Samoa Packing (23 June 1995 Sampling)**

PROJECT: 10702.DS.BT (OPE30702.DS.BT)

Three sets of bioassay tests with high strength waste (HSW) are required by Special Condition 3.3.5 of Starkist Samoa's and VCS Samoa Packing's ocean dumping permits. The results of the third set of tests are presented in the attached: "*Results of a Bioassay Conducted on Two High Strength Waste Samples from the Van Camp and Starkist Tuna Canneries in American Samoa*" prepared by Advanced Biological Testing Inc. (ABT), Tiburon, California, dated July 10, 1995 (Attachment No. 1). The third sampling was conducted on 23 June 1995. Sampling procedures were provided with the previous memorandum on the second sampling dated 26 January 1995.

Acute effluent bioassays were conducted on *Mysidopsis bahia* (mysid shrimp) juveniles and *Citharichthys stigmaeus* (speckled sanddab) juveniles using HSW collected separately from the Starkist Samoa and VCS Samoa Packing canneries in Pago Pago Harbor, American Samoa. The results of these bioassays are summarized in Table 1 below. Test results from the first set of tests (16 February 1994 sampling) and the second set of tests (20 October 1994 sampling) are included in the table for comparison. For this sampling *Mytilus edulis* (blue mussel) larvae were unavailable as the mussels were spawning. The U.S. EPA reviewed the problem of the mussel spawning and waived the requirement to conduct the bioassay test on the mussel larvae for this sampling period (Attachment No. 2).

After the first set of tests CH2M HILL and ABT recommended a number of changes to the HSW test protocol (see 26 January memo). The recommendation for reducing the maximum concentrations of the samples was accepted by U.S. EPA and after consultation between ABT and EPA new test concentrations were established for the mysid, mussel, and sanddab tests of 2.0, 1.0, 0.5, 0.25, 0.125, and 0.06% as a volume dilution in 30 ppt seawater. The recommendation for dropping the urchin test was accepted by U.S. EPA. The mussel test was continued to investigate the effects of aeration as described below.

In the first test (2/94) it was determined that due to the high oxygen demand, including a high immediate oxygen demand, of the effluent all test containers required aeration throughout the tests to maintain adequate oxygen concentrations. Aeration is standard protocol for bioassays on fish and invertebrates when oxygen levels fall below 40% of saturation, but is not standard protocol for bioassays on larval bivalves and echinoderms. Therefore, aerating the chambers containing *Mytilus edulis* may give problematic results.

In the second test (October 1994 sampling) gentle aeration was initiated on Day 0, and continued for the duration of the tests. To assess the effects of aeration, an aeration control for the mussel test was run simultaneously. No statistical differences were observed between aerated and unaerated controls. It was recommended that this type of aeration continue to be used with the mussel test to determine if a permanent change in the protocols for these samples should be made regarding aeration. Because the third test (23 June 1995 sampling) did not include the mussel test no changes in the protocol can be suggested at this time.

After review of the test results, we suggest Eugenia McNaughton contact Kurt Kline, Advanced Biological Testing Inc., directly at (415) 435-7878 to discuss any comments on the bioassay tests or the test protocols. Please contact Steve Costa, at (510) 251-2888 ext 2251, if there are any additional questions regarding this memo.

Table 1
Summary of High Strength Waste Bioassay Results.

Test Organism	Endpoint	Starkist Samoa			VCS Samoa Packing		
		2/94	10/94	6/95	2/94	10/94	6/95
Citharichthys stigmaeus (sanddab)	LC_{50}	0.27%	0.35%	0.396%	0.59%	0.37%	0.626%
	NOEC	0.20%	0.25%	0.25%	0.40%	0.25%	0.25%
	LOEC	0.40%	0.50%	0.50%	0.80%	0.50%	0.50%
Mysidopsis bahia (mysid shrimp)	LC_{50}	0.12%	1.16%	0.675%	0.59%	0.79%	0.625%
	NOEC	0.05%	0.50%	0.125%	0.05%	0.50%	0.25%
	LOEC	0.10%	1.00%	0.25%	0.10%	1.00%	0.50%
Mytilus edulis (blue mussel)	LC_{50}	>1.20%	>2.0%	[2]	>1.20%	>0.20%	[2]
	IC_{50}	<0.08%	0.10%	[2]	<0.08%	0.18%	[2]
Strongylocentrotus pupuratus (urchin)[1]	LC_{50}	1.20%	-	-	1.20%	-	-
	IC_{50}	<0.08%	-	-	0.10%	-	-

[1] Urchin test not conducted in 10/94 test period as per direction from U.S. EPA.
[2] Mussel larvae not available for test, requirement waived by U.S. EPA for this test.

ATTACHMENT 1

Laboratory Report of Bioassay Results for

High Strength Waste Sampling

23 June 1995

RESULTS OF BIOASSAYS CONDUCTED ON TWO HIGH-STRENGTH WASTE SAMPLES FROM THE VAN CAMP AND STARKIST TUNA CANNERIES IN AMERICAN SAMOA

Prepared for:

CH2M Hill California, Inc.
1111 Broadway
Oakland, CA 94607
Project # PDX 30702

Prepared by:

Advanced Biological Testing Inc.
98 Main St., # 419
Tiburon, Ca. 94920

July 10, 1995

Ref: 9309-8

1.0 INTRODUCTION

At the request of CH2M Hill (Project # PDX 30702), Advanced Biological Testing conducted acute effluent bioassay testing on *Mysidopsis bahia* and *Citharichthys stigmaeus* using high strength wastes (HSW) collected separately from the Starkist (HSW-1) and Van Camp (HSW-2) tuna canneries in American Samoa. The study was run using methods generally specified in EPA 1991 and in a Sampling and Testing Plan submitted to the EPA.

The study was conducted at the Advanced Biological Testing Laboratory in Tiburon, California, and was managed by Mr. Mark Fisler.

2.0 METHODS

2.1 EFFLUENT SAMPLING

The high strength wastes were sampled as composites on June 23, 1995 by personnel from the two canneries. Due to shipping and airline scheduling problems, frequently encountered in this region, the sample was received by the laboratory on June 26, 1995. A single gallon carboy was provided from each cannery and were labeled at ABT as HSW-1 (HSW-SKS Grab) and HSW-2 (Pipeline Sludge HS-W2, Van Camp). Samples were maintained in ice-filled coolers from the date of sampling until laboratory receipt. The samples were at 2-3°C upon receipt and were stored at 4°C until use.

2.2 SAMPLE PREPARATION AND TESTING METHODS

2.2.1 Testing on the speckled sanddab, *Citharichthys stigmaeus*

The bioassays were carried out on juvenile *Citharichthys stigmaeus*, supplied by J. Brezina and Associates in Dillon Beach, California. The animals were received at ABT on June 25, 1995. The test conditions are summarized in Table 1. Five replicates of each concentration were tested with ten juvenile fish per replicate. Water quality was monitored daily. Parameters measured included dissolved oxygen, pH, salinity, total ammonia, and temperature. In agreement with the EPA regarding the proposed testing concentrations, the high strength wastes were tested at six concentrations starting from 2.0% and dropping using a 50% dilution factor. The final concentrations were 2.0, 1.0, 0.5, 0.25, 0.125, and 0.06% as vol:vol dilutions in seawater. The diluent was filtered seawater from San Francisco Bay. The dilutions were brought up to the test temperature (17 ± 2°C) and aerated continuously. These effluents have an extremely high biological oxygen demand, therefore aeration was carried out from the beginning of the test.

A reference toxicant was run using concentrations of the toxicant Sodium Dodecyl Sulfonate (SDS) made up as a 2 grams per liter stock solution in distilled water. The tested concentrations were set at 25, 12.5, 6.25, 3.1, and 1.6 mg/L in 30 ppt seawater in a 24 hour test.

2.2.2 Testing on the mysid, *Mysidopsis bahia*

The bioassay was carried out on 3-5 day old larval *Mysidopsis bahia*, supplied by Aquatox from Hot Springs, Arkansas. The animals were received at ABT on June 27, 1994. The test conditions for this test are summarized in Table 2. Five replicates of each concentration were tested with ten larval mysids per replicate. Water quality was monitored daily as initial quality on Day 0 and final water quality on Days 1-4. Parameters measured included dissolved oxygen, pH, salinity, total ammonia, and temperature. In agreement with the EPA regarding the proposed testing concentrations, the high strength wastes were tested at six concentrations starting from 2.0% and dropping using a 50% dilution factor. The final concentrations were 2.0, 1.0, 0.5, 0.25, 0.125, and 0.06% as vol:vol dilutions in seawater. The diluent was filtered seawater from San Francisco Bay The dilutions were brought up to the test temperature ($16 \pm 2°C$) and aerated continuously.

A reference toxicant was run using concentrations of the toxicant Sodium Dodecyl Sulfonate (SDS) made up as a 2 grams per liter stock solution in distilled water. The tested concentrations were set at 40, 20, 10, 5, 2.5 and 1.25 mg/L in 30 ppt seawater in a 96 hour test.

2.3 STATISTICAL ANALYSIS

At the conclusion of the testing, the survival data were evaluated statistically using ToxCalc™ to determine ECp, NOEC, and LOEC values where appropriate. ToxCalc™ is a comprehensive statistical application that follows standard guidelines for acute and chronic toxicity data analysis. Data were evaluated statistically to estimate the LC50 values for the tests using the Linear Interpolation (Bootstrap) or Trimmed Spearman-Karber methods.

3.0 RESULTS

3.1 Initial Effluent Quality

The two High Strength Wastes were tested for basic water quality parameters upon receipt at the laboratory. HSW-1 had a dissolved oxygen level of 0.8 mg/L; a pH of 6.49; a salinity of 23 ppt; and a total ammonia level of 380 mg/L. HSW-2 had a dissolved oxygen level of 1.4 mg/L; a pH of 6.71; a salinity of 17.0 ppt; and a total ammonia level of 220 mg/L.

3.2 *Citharichthys stigmaeus*

Water quality measurements were within the acceptable limits provided in EPA 1991. Temperature was maintained at 17 ± 2°C; pH remained relatively stable, and the salinity increased slightly as would be expected in a static test. The dissolved oxygen did drop as projected after test initiation in all of the concentration even with supplemental aeration and aeration was maintained in all chambers for the duration of the test. Ammonia was measured in all replicates from each concentration daily and was a potentially significant toxic component of the test for the highest three concentrations.

The LC50 for HSW-1 was 0.396% based upon a Trimmed Spearman-Karber method. The majority of the observed toxicity again occurred in the first 24 hours. There was significant mortality at 2.0, 1.0, and 0.5% concentrations compared to the control at 96 hours. The NOEC was 0.25% and the LOEC was 0.5%.

The LC50 for HSW-2 was 0.626% based upon a Trimmed Spearman-Karber method. The majority of the observed toxicity occurred in the first 24 hours. There was significant mortality at 2.0, 1.0, and 0.5% concentrations compared to the control at 96 hours. The NOEC was 0.25%, and the LOEC was 0.5%.

The reference toxicant test required the use of the Trimmed Spearman-Karber method and generated an LC50 of 4.05 mg/L, an NOEC of 3.2 mg/L, and an LOEC of 6.25 mg/L. This is the fifth reference toxicant test on *Citharichthys* at this laboratory, and the current laboratory mean is 3.95 mg/L (SD = 0.26 mg/L). The results are within one standard deviation of the laboratory mean, indicating a normally sensitive population.

3.3 *Mysidopsis bahia*

Water quality measurements were within the acceptable limits provided in EPA 1991. Temperature was maintained at 17 ± 2°C; pH remained relatively stable, and the salinity increased slightly as would be expected in a static test. The dissolved oxygen did drop as projected after test initiation in all of the concentration even with supplemental aeration and aeration was maintained in all chambers for the duration of the test. Ammonia was measured in all replicates from each concentration daily and was a potentially significant toxic component of the test for the highest three concentrations.

The LC50 for HSW-1 was 0.675%. At 96 hours, there was significant mortality at concentrations to 0.25% compared to the control. The NOEC was 0.125% and the LOEC was 0.25%.

The LC50 for HSW-2 was 0.625%. again there was significant mortality at 96 hours in the 2.0, 1.0 and 0.5% concentrations compared to the control. The NOEC was 0.25%, and the LOEC was 0.5%.

The reference toxicant test had an LC50 of 17.18 mg/L, with an NOEC of 10 mg/L and an LOEC of 20 mg/L. This is the tenth reference toxicant test on *Mysidopsis* at this laboratory, and the current laboratory mean is 14.29 mg/L (SD = 4.11 mg/L). The results are within one standard deviation of the laboratory mean, indicating a normally sensitive population.

3.4 AMMONIA MEASUREMENTS

Total ammonia in both of the HSW samples was very high. When measured in a 25% dilution in seawater, ammonia levels ranged from 55 to 95 mg/L. When converted to the 100% concentration, the ammonia level would be from 220 - 380 mg/L. The measured amount of total ammonia in the 2.0% concentrations on Day 0 in HSW-1 was 6.61 mg/L, and in HSW-2, 4.3 mg/L. In the 1.0% concentrations the total values were 3.32 mg/L and 2.10 mg/L respectively. These levels would be consistent with observed toxicity.

TABLE 1

Bioassay Procedure And Organism Data
For the Acute Bioassay
Using *Citharichthys stigmaeus* (U.S. EPA 1991)

Parameter	Data
Sample Identification	
Sample ID(s)	950626-1(HSW-1), 950626-2 (HSW-2)
Date Sampled	6/23/95
Date Received at ABT	6/26/95
Volume Received	One gallon
Sample Storage Conditions	4°C in the dark
Test Species	*Citharichthys stigmaeus*
Supplier	J. Brezina and Associates
Collection location	Tomales Bay
Date Acquired	June 25, 1995
Acclimation Time	48 hours
Acclimation Water	34 ppt seawater
Acclimation Temperature	17 ± 2°C
Age group	Juveniles, 3-5 cm TL
Test Procedures	
Type; Duration	96 hour static acute, renewal at 48 hours
Test Dates	6/27/95 to 7/1/95
Control Water	Bodega Bay seawater
Test Temperature	17 ± 2°C
Test Photoperiod	16 L : 8 D
Initial Salinity	34 ± 2 ppt
Test Chamber	10 L polyethylene chamber
Animals/Replicate	10 animals/replicate
Exposure Volume	5 L
Replicates/Treatment	5
Feeding	None
Deviations from procedures	None

TABLE 2

Bioassay Procedure And Organism Data For the Acute Bioassay Using *Mysidopsis bahia* (U.S. EPA 1991)

Parameter	Data
Sample Identification	
Sample ID(s)	950626-1(HSW-1), 950626-2 (HSW-2)
Date Sampled	6/23/95
Date Received at ABT	6/26/95
Volume Received	One gallon
Sample Storage Conditions	4°C in the dark
Test Species	*Mysidopsis bahia*
Supplier	Aquatox, Arkansas
Date Acquired	6/27/95
Acclimation Time	None
Acclimation Water	Shipping water
Acclimation Temperature/Salinity	20 ± 2°C/30-32 ppt salinity
Age group	3-5 day old larvae
Test Procedures	
Type; Duration	Acute; static; renewal at 48 hours
Test Dates	6/27/95 to 7/1/95
Control Water	San Francisco Bay seawater
Test Temperature	17 ± 2°C
Test Photoperiod	14 L : 10 D
Salinity	34 ± 2 ppt
Test Chamber	1000 mL jars
Animals/Replicate	10 animal/replicate
Exposure Volume	500 mL
Replicates/Treatment	5
Feeding	Brine shrimp (24 hr old nauplii)
Deviations from procedures	None

TABLE 4

Summary Of Effluent Toxicity
and
Results of the Reference Toxicity Testing

Species	Sample	LC50	95% Confidence Limits
Citharichthys	HSW-1	0.3959%	0.368% -0.426%
	HSW-2	0.6262%	0.569% -0.689%
	Ref Tox (SDS)	4.057 mg/L (acceptable)	3.51-4.69 mg/L
Mysidopsis	HSW-1	0.675%	0.563% -0.764%
	HSW-2	0.625%	0.549% -0.692%
	Ref Tox (SDS)	17.18 mg/L (acceptable)	Not calculated

4.0
REFERENCES

U.S. EPA. 1991. Methods for measuring acute toxicity of effluents to freshwater and marine organisms, 4th ed. EPA 600/4-90/027, September, 1991.

APPENDIX A

ANALYTICAL DATA

APPENDIX TABLE 1

Citharichthys stigmaeus
WATER QUALITY MEASUREMENTS FOR EFFLUENT TEST
Study Dates: 6/27 - 7/1/95
HSW-1

Concentration		Day 0					Day 1					Day 2					Day 3					Day 4				
(%)	Rep	pH	DO	NH3	°C	Sal	pH	DO	NH3	°C	Sal	pH	DO	NH3	°C	Sal	pH	DO	NH3	°C	Sal	pH	DO	NH3	°C	Sal
Control	1	8.07	9.1		16.4	33	8.14	8.0	<0.01	15.8	34	8.15	7.3	0.14	18.0	34	8.15	8.6	0.24	17.9	34	8.18	7.6	0.31	18.3	35
	2						8.07	7.8	<0.01	15.7	34	8.08	7.2	0.13	17.9	34	8.08	8.4	0.22	17.8	34	8.13	7.6	0.31	18.3	35
	3						8.01	7.2	<0.01	15.7	34	7.98	6.6	0.14	17.9	34	7.96	7.6	0.22	17.8	34	7.97	6.8	0.32	18.2	35
	4						8.08	7.8	<0.01	15.6	34	8.09	7.2	0.14	17.8	34	8.11	8.4	0.22	17.7	34	8.12	7.5	0.32	18.2	36
	5						8.11	7.8	<0.01	15.6	34	8.12	7.2	0.14	17.9	34	8.12	8.4	0.21	17.9	34	8.14	7.5	0.31	18.3	35
0.06	1	8.03	9.0	0.25	16.3	34	7.88	7.2	0.17	15.7	34	7.99	6.8	0.21	17.9	34	7.92	7.6	0.32	18.0	34	7.96	7.0	0.45	18.4	37
	2						7.99	7.8	0.19	15.5	34	8.09	6.9	0.24	17.8	34	8.09	8.2	0.35	17.9	34	8.13	7.6	0.49	18.3	38
	3						7.95	7.8	0.17	15.6	34	8.08	7.1	0.20	17.9	34	8.03	8.2	0.33	18.2	34	8.06	7.3	0.50	18.6	37
	4						7.97	7.8	0.20	15.5	34	8.09	7.2	0.26	17.9	34	8.09	8.2	0.40	17.7	34	8.12	7.5	0.55	18.0	38
	5						7.92	7.4	0.18	15.5	34	8.04	7.2	0.22	17.8	34	8.02	8.2	0.32	17.7	34	8.05	7.4	0.48	18.0	37
0.125	1	7.99	9.1	0.48	16.2	34	7.80	6.6	0.29	15.5	34	8.02	6.8	0.30	17.8	34	8.04	8.2	0.41	17.8	34	8.06	7.4	0.61	18.6	37
	2						7.84	6.8	0.28	15.5	34	8.04	7.0	0.33	17.8	34	8.06	8.2	0.49	17.9	34	8.10	7.4	0.68	18.2	37
	3						7.80	6.6	0.28	15.6	34	8.02	7.0	0.31	17.9	34	8.04	8.2	0.45	17.9	34	8.07	7.5	0.63	18.4	36
	4						7.90	6.4	0.29	15.4	34	8.09	7.2	0.32	17.6	34	8.13	8.2	0.44	17.8	34	8.15	7.4	0.64	18.2	38
	5						7.75	5.4	0.30	15.5	34	7.96	6.6	0.32	17.9	34	7.96	8.2	0.46	18.2	34	8.02	6.9	0.65	18.6	37
0.25	1	7.90	9.0	0.94	16.2	34	7.68	6.6	0.52	15.8	34	8.06	6.8	0.48	18.0	34	8.03	8.0	0.57	18.0	34	8.09	7.4	0.84	18.4	37
	2						7.62	5.8	0.52	15.7	34	8.03	6.8	0.48	18.0	34	8.01	8.0	0.59	18.0	34	8.07	7.3	0.84	18.4	36
	3						7.54	4.8	0.51	15.8	34	7.97	6.6	0.46	18.0	34	7.96	7.8	0.55	18.0	34	8.00	7.2	0.83	18.4	38
	4						7.55	4.8	0.52	15.7	34	7.95	6.6	0.56	18.0	34	7.95	7.6	0.55	17.9	34	7.99	7.0	0.92	18.4	36
	5						7.57	6.0	0.51	15.7	34	8.01	6.8	0.47	17.9	34	7.99	7.8	0.58	18.0	34	8.05	7.0	0.82	18.4	36
0.5	1	7.83	9.0	1.80	16.2	34	7.54	4.4	1.20	15.7	34	7.90	6.0	1.00	18.0	34	—	—	—	—	—	—	—	—	—	—
	2						7.48	4.3	1.19	15.7	34	7.85	5.9	1.08	18.0	34	—	—	—	—	—	—	—	—	—	—
	3						7.45	4.4	1.22	15.6	34	7.88	6.0	1.02	17.9	34	—	—	—	—	—	—	—	—	—	—
	4						7.52	4.1	1.18	15.7	34	7.86	5.6	1.02	18.0	34	—	—	—	—	—	—	—	—	—	—
	5						7.56	4.0	1.20	15.6	34	7.95	6.4	0.83	17.9	34	8.03	7.9	0.93	18.0	34	8.06	7.2	1.19	18.3	37
1	1	7.52	8.8	3.42	16.2	34	7.45	2.3	2.75	15.7	34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2						7.41	0.8	2.78	15.6	34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	3						7.39	1.2	2.72	15.6	34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	4						7.40	0.4	2.73	15.1	34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	5						7.41	0.4	2.73	15.7	34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2	1	7.46	8.8	6.60	16.2	34	7.43	1.0	5.87	15.7	34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2						7.50	2.8	5.84	15.4	34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	3						7.45	0.8	5.79	15.5	34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	4						7.45	3.2	5.80	15.5	34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	5						7.52	2.4	5.88	15.6	34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Min		7.46	8.8	0.25	16.2	33	7.39	0.4	<0.01	15.1	34	7.85	5.6	0.13	17.6	34	7.92	7.6	0.21	17.7	34	7.96	6.8	0.31	18.0	35
Max		8.07	9.1	6.60	16.4	34	8.14	8.0	5.88	15.8	34	8.15	7.3	1.08	18.0	34	8.15	8.6	0.93	18.2	34	8.18	7.6	1.19	18.6	38

Note: — = All animals dead.

APPENDIX TABLE 1 (Cont'd)

Citharichthys stigmaeus
WATER QUALITY MEASUREMENTS FOR EFFLUENT TEST
Study Dates: 6/27 - 7/1/95
HSW-2

Concentration		Day 0					Day 1					Day 2					Day 3					Day 4				
(%)	Rep	pH	DO	NH3	°C	Sal	pH	DO	NH3	°C	Sal	pH	DO	NH3	°C	Sal	pH	DO	NH3	°C	Sal	pH	DO	NH3	°C	Sal
0.06	1	8.02	9.0	0.17	16.3	34	7.98	7.6	0.20	15.5	34	8.06	7.0	0.19	17.9	34	7.99	8.2	0.34	17.8	34	8.08	7.3	0.47	18.8	37
	2						8.04	7.6	0.20	15.2	34	8.13	7.2	0.19	17.7	34	8.13	8.3	0.29	17.6	34	8.17	7.4	0.42	17.9	38
	3						8.05	7.8	0.20	15.2	34	8.14	7.3	0.19	17.7	34	8.13	8.4	0.29	17.6	34	8.15	7.6	0.41	18.0	37
	4						8.00	7.6.	0.19	15.4	34	8.06	7.1	0.19	17.9	34	8.06	8.4	0.29	17.8	34	8.07	7.3	0.41	18.2	37
	5						7.94	7.6	0.18	15.3	34	8.02	6.8	0.20	17.9	34	8.01	8.2	0.37	17.9	34	8.04	7.4	0.47	18.2	37
0.125	1	8.05	9.2	0.29	16.2	34	7.98	7.6	0.29	15.4	34	8.13	7.2	0.28	17.9	34	8.11	8.2	0.42	17.9	34	8.15	7.4	0.53	18.2	38
	2						7.93	7.5	0.19	15.4	34	8.08	7.1	0.25	18.0	34	8.07	8.4	0.36	18.0	34	8.09	7.5	0.48	18.5	37
	3						7.91	6.4	0.21	15.6	34	8.09	7.2	0.25	18.3	34	8.07	8.2	0.34	18.2	34	8.10	7.4	0.45	18.6	37
	4						7.78	7.4	0.22	15.5	34	7.99	6.6	0.25	18.1	34	7.94	7.6	0.35	18.0	34	7.94	6.6	0.45	18.3	37
	5						7.88	4.5	0.22	15.5	34	8.06	7.0	0.23	18.0	34	8.04	8.2	0.34	18.0	34	8.08	7.3	0.43	18.3	36
0.25	1	7.98	9.1	0.62	16.2	34	7.74	4.8	0.38	15.5	34	8.01	6.6	0.37	18.0	34	7.94	8.2	0.52	18.0	34	8.03	7.1	0.64	18.2	36
	2						7.78	5.8	0.38	15.3	34	8.07	7.0	0.34	18.0	34	8.03	8.0	0.48	17.9	34	8.11	7.2	0.58	18.2	37
	3						7.77	5.8	0.36	15.3	34	8.05	7.0	0.35	18.0	34	8.01	8.2	0.49	17.9	34	8.06	7.2	0.60	18.2	37
	4						7.77	5.9	0.37	15.2	34	8.06	6.7	0.38	17.9	34	8.02	8.0	0.56	17.7	34	8.10	7.1	0.70	18.0	37
	5						7.83	6.6	0.38	15.2	34	8.10	7.0	0.36	17.8	34	8.07	8.2	0.55	17.6	34	8.14	7.5	0.62	17.9	37
0.5	1	7.91	9.0	1.18	16.0	34	7.79	5.6	0.78	15.2	34	8.09	7.0	0.58	17.9	34	8.07	8.2	0.74	17.7	34	8.13	7.5	0.89	18.0	38
	2						7.78	6.0	0.79	15.0	34	8.11	7.1	0.58	17.6	34	8.09	8.4	0.72	17.9	34	8.15	7.5	0.88	18.2	38
	3						7.59	6.0	0.84	15.5	34	8.06	7.0	0.61	18.1	34	8.08	8.2	0.74	18.0	34	8.12	7.4	0.88	18.3	36
	4						7.69	4.9	0.82	15.4	34	8.05	6.8	0.64	18.2	34	8.05	8.0	0.77	18.0	34	8.12	7.2	0.99	18.2	37
	5						7.73	5.3	0.81	15.3	34	8.09	6.8	0.57	18.2	34	8.07	8.0	0.75	18.0	34	8.14	7.2	0.86	18.3	37
1	1	7.63	9.0	2.21	16.0	34	7.64	1.0	1.39	15.4	34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2						7.59	1.1	1.37	15.5	34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	3						7.52	0.8	1.79	15.5	34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	4						7.48	0.6	1.70	15.4	34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	5						7.47	1.0	1.71	15.4	34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2.0	1	7.42	8.6	4.33	16.0	34	7.44	0.6	3.60	15.4	34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2						7.43	0.6	3.54	15.3	34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	3						7.45	0.4	3.39	15.2	34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	4						7.44	0.6	3.25	15.0	34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	5						7.47	0.6	3.35	15.1	34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Min		7.42	8.6	0.17	16.0	34	7.43	0.4	0.18	15.0	34	7.99	6.6	0.19	17.6	34	7.94	7.6	<0.10	17.6	34	7.94	6.6	0.41	17.9	36
Max		8.05	9.2	4.33	16.3	34	8.05	7.8	3.60	15.6	34	8.14	7.3	0.64	18.3	34	8.13	8.4	0.77	18.2	34	8.17	7.6	0.99	18.8	38

Note: — = All animals dead.

APPENDIX TABLE 2

Citharichthys stigmaeus
SURVIVAL DATA FOR EFFLUENT TEST
HSW-1

Concentration (%)	Rep	Initial Added	Day 1	Day 2	Day 3	Day 4	% Survival	Average % Survival
Control	1	10	10	9	9	9	90	
	2	10	10	10	10	10	100	
	3	10	10	10	10	10	100	
	4	10	10	10	10	10	100	
	5	10	10	10	10	10	100	98.0
0.06	1	10	10	10	10	10	100	
	2	10	10	10	10	10	100	
	3	10	10	10	10	9	90	
	4	10	10	10	10	10	100	
	5	10	10	10	10	10	100	98.0
0.125	1	10	10	10	10	10	100	
	2	10	10	10	9	9	90	
	3	10	10	10	10	10	100	
	4	10	10	10	10	10	100	
	5	10	10	10	10	10	100	98.0
0.25	1	10	10	10	10	10	100	
	2	10	9	9	9	9	90	
	3	10	10	10	10	10	100	
	4	10	10	10	10	10	100	
	5	10	10	10	10	10	100	98.0
0.5	1	10	9	0	—	—	0	
	2	10	10	0	—	—	0	
	3	10	8	0	—	—	0	
	4	10	10	0	—	—	0	
	5	10	8	8	8	8	80	16.0
1	1	10	0	—	—	—	0	
	2	10	0	—	—	—	0	
	3	10	0	—	—	—	0	
	4	10	0	—	—	—	0	
	5	10	0	—	—	—	0	0.0
2	1	10	0	—	—	—	0	
	2	10	0	—	—	—	0	
	3	10	0	—	—	—	0	
	4	10	0	—	—	—	0	
	5	10	0	—	—	—	0	0.0

Note: — = All animals dead.

APPENDIX TABLE 2 (Cont'd)

Citharichthys stigmaeus
SURVIVAL DATA FOR EFFLUENT TEST
HSW-2

Concentration (%)	Rep	Initial Added	Day 1	Day 2	Day 3	Day 4	% Survival	Average % Survival
0.06	**1**	10	10	10	9	9	90	
	2	10	10	10	10	10	100	
	3	10	10	10	10	10	100	
	4	10	10	10	10	10	100	
	5	10	10	10	10	9	90	96.0
0.125	**1**	10	10	10	10	9	90	
	2	10	10	10	10	10	100	
	3	10	10	10	10	10	100	
	4	10	10	10	10	9	90	
	5	10	9	9	9	8	80	92.0
0.25	**1**	10	10	10	10	10	100	
	2	10	10	10	10	10	100	
	3	10	10	9	9	8	80	
	4	10	9	9	9	8	80	
	5	10	9	9	9	9	90	90.0
0.5	**1**	10	10	10	10	8	80	
	2	10	10	10	10	10	100	
	3	10	10	9	9	9	90	
	4	10	10	10	10	10	100	
	5	10	9	9	9	9	90	92.0
1	**1**	10	0	—	—	—	0	
	2	10	0	—	—	—	0	
	3	10	0	—	—	—	0	
	4	10	0	—	—	—	0	
	5	10	0	—	—	—	0	0.0
2	**1**	10	0	—	—	—	0	
	2	10	0	—	—	—	0	
	3	10	0	—	—	—	0	
	4	10	0	—	—	—	0	
	5	10	0	—	—	—	0	0.0

Note: — = All animals dead.

APPENDIX TABLE 3

Citharichthys stigmaeus
WATER QUALITY MEASUREMENTS
FOR REFERENCE TOXICANT (S.D.S) TEST

Concentration		Day 0				Day 1			
(mg/L)	Rep	pH	DO	°C	Sal	pH	DO	°C	Sal
Control	**1**	8.03	9.0	16.8	34	7.55	5.0	16.2	34
	2					7.55	5.0	16.2	34
	3					7.55	5.0	16.2	34
1.6	**1**	8.03	9.0	16.9	34	7.53	4.9	16.1	34
	2					7.51	4.9	16.2	34
	3					7.53	4.8	16.2	34
3.1	**1**	8.03	8.9	17.0	34	7.49	4.8	16.2	34
	2					7.44	4.8	16.2	34
	3					7.49	4.7	16.2	34
6.25	**1**	8.04	8.8	16.7	34	7.49	4.7	16.2	34
	2					7.50	4.7	16.2	34
	3					7.57	4.7	16.2	34
12.5	**1**	8.05	8.8	16.7	34	7.44	4.5	16.2	34
	2					7.39	4.6	16.2	34
	3					7.36	4.7	16.2	34
25	**1**	8.05	8.8	16.6	34	7.33	4.8	16.2	34
	2					7.32	4.9	16.2	34
	3					7.30	4.9	16.3	34
Min		8.03	8.8	16.6	34	7.30	4.5	16.1	34
Max		8.05	9.0	17.0	34	7.57	5.0	16.3	34

APPENDIX TABLE 4

Citharichthys stigmaeus
SURVIVAL DATA
FOR REFERENCE TOXICANT (S.D.S.) TEST

Concentration (mg/L)	Rep	Initial Added	Day 1	% Survival	Average % Survival
Control	**1**	4	4	100	
	2	4	4	100	
	3	4	2	50	83.3
1.6	**1**	4	4	100	
	2	4	4	100	
	3	4	3	75	91.7
3.1	**1**	4	3	75	
	2	4	3	75	
	3	4	3	75	75.0
6.25	**1**	4	0	0	
	2	4	0	0	
	3	4	0	0	0.0
12.5	**1**	4	0	0	
	2	4	0	0	
	3	4	0	0	0.0
25	**1**	4	0	0	
	2	4	0	0	
	3	4	0	0	0.0

APPENDIX TABLE 5

Mysidopsis bahia
WATER QUALITY MEASUREMENTS FOR EFFLUENT TEST
Study Dates: 6/27 - 7/1/95
HSW-1

Concentration		Day 0					Day 1					Day 2					Day 3					Day 4				
(%)	Rep	pH	DO	NH3	°C	Sal	pH	DO	NH3	°C	Sal	pH	DO	NH3	°C	Sal	pH	DO	NH3	°C	Sal	pH	DO	NH3	°C	Sal
Control	1	8.07	9.0		17.1	34	8.11	8.0	<0.01	16.5	34	8.25	7.4		18.2	34	8.17	8.4		18.0	34	8.20	7.7		18.3	36
	2						8.14	8.0		16.3	34	8.23	7.4	0.02	18.3	34	8.18	8.6		18.0	34	8.20	7.7		18.4	36
	3						8.13	8.0		16.3	34	8.17	7.4		18.3	34	8.09	8.6	0.03	18.1	34	8.13	7.7		18.4	35
	4						8.14	8.0		16.4	34	8.22	7.4		18.3	34	8.24	8.6		18.1	34	8.20	7.6	0.06	18.5	35
	5						8.16	8.0		16.4	34	8.24	7.4		18.2	34	8.28	8.6		18.0	34	8.26	7.7		18.3	36
0.06	1	8.02	9.0	0.25	17.9	34	7.98	7.8	0.11	16.2	34	8.10	7.2		18.3	34	8.14	8.6		18.0	34	8.11	7.4		18.4	35
	2						8.06	7.8		16.1	34	8.17	7.2	0.08	18.2	34	8.18	8.6		18.0	34	8.15	7.6		18.2	36
	3						8.04	7.8		16.0	34	8.13	7.2		18.2	34	8.12	8.6	0.11	17.9	34	8.11	7.5		18.2	35
	4						8.06	7.8		16.1	34	8.18	7.2		18.2	34	8.17	8.6		17.9	34	8.15	7.5	0.14	18.2	36
	5						8.12	8.0		16.1	34	8.22	7.3		18.2	34	8.22	8.7		17.9	34	8.20	7.6		18.2	36
0.125	1	7.96	8.8	0.48	18.0	34	7.78	6.2	0.22	16.2	34	8.16	7.2		18.2	34	8.13	8.6		18.0	34	8.13	7.6		18.4	35
	2						7.73	6.2		16.2	34	7.95	5.9	0.15	18.2	34	7.90	8.6		17.9	34	8.00	6.6		18.2	35
	3						7.98	7.8		16.1	34	8.10	7.0		18.1	34	8.14	8.4	0.22	17.9	34	8.10	7.5		18.2	35
	4						8.02	7.8		16.0	34	8.18	7.2		18.2	34	8.18	8.6		17.8	34	8.17	7.5	0.26	18.2	35
	5						7.94	7.6		16.2	34	8.14	7.2		18.3	34	8.16	8.6		17.9	34	8.14	7.6		18.3	35
0.25	1	7.90	8.8	0.94	18.0	34	7.75	7.1	0.41	16.2	34	8.04	7.0		18.2	34	8.10	8.5		18.0	34	8.08	7.5		18.4	35
	2						7.82	7.5		16.2	34	8.10	7.0	0.32	18.2	34	8.14	8.4		17.9	34	8.11	7.4		18.2	35
	3						7.86	7.4		16.1	34	8.13	7.2		18.1	34	8.13	8.6	0.47	17.8	34	8.12	7.4		18.2	35
	4						7.95	7.6		16.1	34	8.20	7.4		18.2	34	8.22	8.6		17.7	34	8.20	7.5	0.51	18.2	35
	5						7.90	7.4		16.2	34	8.12	7.2		18.3	34	8.14	8.6		17.9	34	8.14	7.6		18.3	35
0.5	1	7.92	8.8	1.80	17.9	34	7.80	6.9	0.81	16.3	34	8.20	7.2		18.2	34	8.25	8.6		18.0	34	8.23	7.4		18.4	35
	2						7.82	7.3		16.2	34	8.22	7.2	0.63	18.0	34	8.28	8.6		17.9	34	8.23	7.3		18.3	35
	3						7.74	6.2		16.2	34	8.17	7.1		18.0	34	8.23	8.6	0.83	17.9	34	8.26	7.4		18.2	35
	4						7.66	5.5		16.1	34	8.20	7.2		18.2	34	8.26	8.6		17.9	34	8.21	7.4	0.93	18.3	35
	5						7.71	6.2		16.2	34	8.20	7.2		18.3	34	8.30	8.6		17.9	34	8.25	7.4		18.3	36
1	1	7.74	8.6	3.41	17.9	34	7.64	2.8	1.91	16.3	34	8.12	6.6		18.4	34	—	—		—	—	—	—		—	—
	2						7.64	3.4		16.2	34	8.14	6.6	1.32	18.4	34	8.23	8.6		18.2	34	8.24	7.3		18.5	35
	3						7.65	3.6		16.2	34	8.15	6.7		18.3	34	8.26	8.6	1.54	18.0	34	8.29	7.4		18.4	35
	4						7.63	3.2		16.3	34	8.11	6.6		18.4	34	—	—		—	—	—	—		—	—
	5						7.64	3.6		16.2	34	8.13	6.6		18.5	34	8.29	8.6		18.1	34	8.31	7.3	1.61	18.4	35
2.0	1	7.63	8.8	6.60	17.6	34	7.46	1.2	3.51	16.5	34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2						7.44	1.0		16.3	34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	3						7.45	2.0		16.2	34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	4						7.50	2.7		16.2	34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	5						7.46	0.6		16.4	34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Min		7.63	8.6	0.25	17.1	34	7.44	0.6	<0.01	16.0	34	7.95	5.9	0.02	18.0	34	7.90	8.4	0.03	17.7	34	8.00	6.6	0.06	18.2	35
Max		8.07	9.0	6.60	18.0	34	8.16	8.0	3.51	16.5	34	8.25	7.4	1.32	18.5	34	8.30	8.7	1.54	18.2	34	8.31	7.7	1.61	18.5	36

Note: — = All animals dead.

APPENDIX TABLE 5 (Cont'd)

Mysidopsis bahia
WATER QUALITY MEASUREMENTS FOR EFFLUENT TEST
Study Dates: 6/27 - 7/1/95
HSW-2

Concentration		Day 0					Day 1					Day 2					Day 3					Day 4				
(%)	Rep	pH	DO	NH3	°C	Sal	pH	DO	NH3	°C	Sal	pH	DO	NH3	°C	Sal	pH	DO	NH3	°C	Sal	pH	DO	NH3	°C	Sal
0.06	1	8.01	9.0	0.17	18.6	34	8.07	7.8	0.19	16.5	34	8.22	7.1		18.4	34	8.18	8.4		18.0	34	8.22	7.7		18.5	35
	2						8.07	7.6		16.4	34	8.18	7.2	0.09	18.4	34	8.15	8.6		18.0	34	8.16	7.6		18.4	35
	3						8.10	7.8		16.4	34	8.20	7.3		18.4	34	8.18	8.6	0.12	17.9	34	8.18	7.6		18.3	35
	4						8.12	7.8		16.3	34	8.22	7.4		18.3	34	8.20	8.6		17.9	34	8.20	7.7	0.15	18.2	35
	5						8.16	7.8		16.3	34	8.24	7.4		18.3	34	8.22	8.6		18.0	34	8.23	7.7		18.3	35
0.125	1	8.02	9.0	0.29	18.6	34	8.12	7.8	0.20	16.4	34	8.23	7.4		18.4	34	8.20	8.6		17.9	34	8.22	7.7		18.4	35
	2						8.14	7.8		16.4	34	8.25	7.3	0.12	18.3	34	8.20	8.6		17.9	34	8.25	7.8		18.3	35
	3						8.05	7.6		16.3	34	8.18	7.2		18.3	34	8.13	8.6	0.18	17.9	34	8.16	7.6		18.2	35
	4						8.09	7.8		16.2	34	8.20	7.3		18.2	34	8.20	8.6		17.9	34	8.22	7.6	0.20	18.2	35
	5						8.12	7.8		16.2	34	8.24	7.4		18.2	34	8.21	8.6		17.9	34	8.23	7.6		18.2	35
0.25	1	7.97	9.0	0.62	18.6	34	7.93	7.0	0.36	16.4	34	8.16	7.2		18.4	34	8.11	8.4		17.9	34	8.18	7.6		18.4	35
	2						7.92	7.4		16.3	34	8.17	7.2	0.25	18.3	34	8.14	8.4		17.9	34	8.22	7.6		18.2	35
	3						7.92	7.3		16.2	34	8.18	7.2		18.3	34	8.12	8.4	0.36	17.9	34	8.21	7.6		18.2	35
	4						8.02	7.4		16.2	34	8.22	7.4		18.2	34	8.12	8.5		17.9	34	8.25	7.6	0.41	18.2	35
	5						8.01	7.6		16.2	34	8.24	7.4		18.2	34	8.21	8.6		17.9	34	8.25	7.7		18.2	35
0.5	1	7.94	9.0	1.18	18.6	34	7.93	6.8	0.62	16.4	34	8.26	7.3		18.3	34	8.22	8.6		17.9	34	8.27	7.6		18.3	36
	2						7.90	6.4		16.3	34	8.25	7.3	0.51	18.3	34	8.20	8.4		17.9	34	8.27	7.6		18.2	35
	3						7.86	6.1		16.2	34	8.22	7.2		18.3	34	8.20	8.6	0.64	17.9	34	8.26	7.5		18.2	35
	4						7.80	4.8		16.3	34	8.22	7.2		18.2	34	8.18	8.5		17.9	34	8.26	7.6	0.73	18.2	35
	5						7.75	4.7		16.2	34	8.18	7.2		18.2	34	8.04	8.4		17.9	34	8.17	7.6		18.2	35
1	1	7.84	8.8	2.21	18.6	34	7.77	6.4	1.33	16.4	34	8.23	7.2		18.3	34	8.27	7.9		17.9	34	8.28	7.4		18.3	35
	2						7.66	5.0		16.3	34	8.15	7.0	1.06	18.3	34	8.26	8.3		17.9	34	8.27	7.4		18.3	35
	3						7.69	6.2		16.3	34	8.18	7.0		18.3	34	8.29	8.4	1.19	17.9	34	8.29	7.4		18.2	35
	4						7.70	5.4		16.2	34	8.20	7.0		18.2	34	8.26	8.6		17.9	34	8.24	7.2	1.36	18.2	35
	5						7.68	5.8		16.2	34	8.19	7.0		18.2	34	8.27	8.6		17.9	34	8.23	7.2		18.2	35
2.0	1	7.72	8.6	4.33	18.5	34	7.64	1.6	2.80	16.4	34	8.22	7.0		18.4	34	—	—	—	—	—	—	—	—	—	—
	2						7.60	0.6		16.3	34	8.16	6.1	2.26	18.3	34	—	—	—	—	—	—	—	—	—	—
	3						7.62	1.6		16.3	34	8.16	6.7		18.3	34	—	—	—	—	—	—	—	—	—	—
	4						7.58	0.4		16.3	34	8.12	6.4		18.3	34	—	—	—	—	—	—	—	—	—	—
	5						7.55	0.4		16.3	34	8.11	6.2		18.2	34	—	—	—	—	—	—	—	—	—	—
Min		7.72	8.6	0.17	18.5	34	7.55	0.4	0.19	16.2	34	8.11	6.1	0.09	18.2	34	8.04	7.9	0.12	17.9	34	8.16	7.2	0.15	18.2	35
Max		8.02	9.0	4.33	18.6	34	8.16	7.8	2.80	16.5	34	8.26	7.4	2.26	18.4	34	8.29	8.6	1.19	18.0	34	8.29	7.8	1.36	18.5	36

Note: — = All animals dead.

APPENDIX TABLE 6

Mysidopsis bahia
SURVIVAL DATA FOR EFFLUENT TEST
HSW-1

Concentration (%)	Rep	Initial Added	Day 1	Day 2	Day 3	Day 4	% Survival	Average % Survival
Control	1	10	9	9	9	9	90	
	2	10	10	10	10	10	100	
	3	10	10	10	10	10	100	
	4	10	10	10	10	10	100	
	5	10	10	10	10	10	100	98.0
0.06	1	10	10	10	10	10	100	
	2	10	10	10	10	10	100	
	3	10	10	10	10	10	100	
	4	10	10	10	10	10	100	
	5	10	10	10	10	10	100	100.0
0.125	1	10	9	9	9	9	90	
	2	10	10	10	10	10	100	
	3	10	10	10	10	10	100	
	4	10	10	10	10	10	100	
	5	10	9	9	9	9	90	96.0
0.25	1	10	10	*	*	7	70	
	2	10	10	*	*	10	100	
	3	10	10	*	*	8	80	
	4	10	9	*	*	6	60	
	5	10	10	*	*	10	100	82.0
0.5	1	10	*	*	*	5	50	
	2	10	*	*	*	7	70	
	3	10	*	*	*	7	70	
	4	10	*	*	*	10	100	
	5	10	*	*	*	8	80	74.0
1	1	10	*	0	—	—	0	
	2	10	*	*	*	2	20	
	3	10	*	*	*	0	0	
	4	10	*	0	—	—	0	
	5	10	*	*	*	0	0	4.0
2	1	10	0	—	—	—	0	
	2	10	0	—	—	—	0	
	3	10	0	—	—	—	0	
	4	10	0	—	—	—	0	
	5	10	0	—	—	—	0	0.0

Notes: — = All animals dead.
* Sample too turbid to do counts.

APPENDIX TABLE 6 (Cont'd)

Mysidopsis bahia
SURVIVAL DATA FOR EFFLUENT TEST
HSW-2

Concentration (%)	Rep	Initial Added	Day 1	Day 2	Day 3	Day 4	% Survival	Average % Survival
0.06	**1**	10	10	10	10	10	100	
	2	10	10	10	10	10	100	
	3	10	10	10	10	10	100	
	4	10	10	10	9	9	90	
	5	10	10	9	9	9	90	96.0
0.125	**1**	10	10	10	10	10	100	
	2	10	10	10	10	10	100	
	3	10	10	10	10	9	90	
	4	10	10	10	10	10	100	
	5	10	10	10	10	10	100	98.0
0.25	**1**	10	*	*	10	10	100	
	2	10	*	*	10	9	90	
	3	10	*	*	10	10	100	
	4	10	*	*	9	9	90	
	5	10	*	*	10	10	100	96.0
0.5	**1**	10	*	*	*	5	50	
	2	10	*	*	*	6	60	
	3	10	*	*	*	7	70	
	4	10	*	*	*	7	70	
	5	10	*	*	*	6	60	62.0
1	**1**	10	*	*	*	1	10	
	2	10	*	*	*	0	0	
	3	10	*	*	*	2	20	
	4	10	*	*	*	0	0	
	5	10	*	*	*	2	20	10.0
2	**1**	10	*	0	—	—	0	
	2	10	*	0	—	—	0	
	3	10	*	0	—	—	0	
	4	10	*	0	—	—	0	
	5	10	*	0	—	—	0	0.0

Notes: — = All animals dead.
* Sample too turbid to do counts.

APPENDIX TABLE 7

Mysidopsis bahia
WATER QUALITY MEASUREMENTS
FOR REFERENCE TOXICANT (S.D.S) TEST

Concentration		Day 0				Day 1				Day 2				Day 3				Day 4			
(mg/L)	Rep	pH	DO	°C	Sal	pH	DO	°C	Sal	pH	DO	°C	Sal	pH	DO	°C	Sal	pH	DO	°C	Sal
0.7	1	8.07	9.0	17.5	34	8.11	7.8	16.5	34	8.09	6.8	18.6	34	7.98	7.8	18.4	34	7.77	6.3	18.7	35
	2					8.10	7.8	16.3	34	8.08	6.8	18.5	34	8.00	8.0	18.2	34	7.82	6.5	18.6	35
	3					8.10	7.7	16.2	34	8.07	6.6	18.4	34	8.00	8.0	18.0	34	7.84	6.4	18.5	35
1.25	1	8.08	9.0	17.6	34	8.07	7.3	16.4	34	8.04	6.4	18.5	34	7.97	8.0	18.2	34	7.84	6.5	18.6	35
	2					8.08	7.3	16.4	34	8.05	6.6	18.5	34	7.98	7.8	18.2	34	7.85	6.4	18.6	35
	3					8.08	7.3	16.2	34	8.06	6.6	18.4	34	7.98	7.8	18.1	34	7.85	6.4	18.6	35
2.5	1	8.08	9.2	17.6	34	8.05	7.0	16.4	34	8.03	6.6	18.5	34	7.96	7.8	18.2	34	7.86	6.2	18.5	35
	2					8.04	6.8	16.3	34	8.03	6.6	18.5	34	7.97	7.8	18.1	34	7.87	6.3	18.5	35
	3					8.04	6.8	16.2	34	8.04	6.6	18.5	34	7.98	7.8	18.1	34	7.87	6.3	18.5	35
5	1	8.08	9.2	17.6	34	7.99	6.0	16.5	34	7.96	6.0	18.5	34	7.89	7.0	18.2	34	7.84	5.8	18.6	35
	2					7.98	5.8	16.4	34	7.96	6.0	18.5	34	7.90	7.1	18.1	34	7.80	5.7	18.5	35
	3					7.98	5.8	16.2	34	7.98	6.2	18.5	34	7.92	7.3	18.1	34	7.81	5.8	18.5	35
10	1	8.08	9.2	17.6	34	7.93	5.0	16.5	34	7.87	5.2	18.6	34	7.87	7.3	18.2	34	7.82	6.0	18.6	35
	2					7.92	5.1	16.3	34	7.83	5.2	18.5	34	7.86	7.3	18.1	34	7.85	6.3	18.5	35
	3					7.92	4.9	16.2	34	7.83	5.1	18.5	34	7.87	7.4	18.1	34	7.86	6.5	18.5	34
20	1	8.09	9.2	17.6	34	7.92	4.9	16.4	34	7.73	4.8	18.6	34	7.75	5.8	18.3	34	7.79	6.1	18.6	34
	2					7.93	4.9	16.4	34	7.69	4.7	18.5	34	7.70	5.3	18.2	34	7.75	6.1	18.6	34
	3					7.93	5.0	16.2	34	7.68	4.8	18.5	34	7.68	5.1	18.2	34	7.74	6.0	18.5	34
Min		8.07	9.0	17.5	34	7.92	4.9	16.2	34	7.68	4.7	18.4	34	7.68	5.1	18.0	34	7.74	5.7	18.5	34
Max		8.09	9.2	17.6	34	8.11	7.8	16.5	34	8.09	6.8	18.6	34	8.00	8.0	18.4	34	7.87	6.5	18.7	35

Note: — = All animals dead.

APPENDIX TABLE 8

Mysidopsis bahia
SURVIVAL DATA FOR REFERENCE TOXICANT (S.D.S.) TEST

Concentration (mg/L)	Rep	Initial Added	Day 1	Day 2	Day 3	Day 4	% Survival	Average % Survival
0.7	**1**	10	10	10	10	10	100	
	2	10	10	10	10	10	100	
	3	10	10	10	9	9	90	96.7
1.25	**1**	10	10	10	10	10	100	
	2	10	10	10	9	9	90	
	3	10	10	10	10	10	100	96.7
2.5	**1**	10	10	10	10	9	90	
	2	10	10	10	10	10	100	
	3	10	10	10	10	10	100	96.7
5	**1**	10	10	10	10	10	100	
	2	10	10	10	10	10	100	
	3	10	10	9	9	9	90	96.7
10	**1**	10	10	10	9	8	80	
	2	10	10	10	10	10	100	
	3	10	10	10	8	8	80	86.7
20	**1**	10	2	1	1	1	10	
	2	10	7	6	6	6	60	
	3	10	8	3	3	3	30	33.3

Note: — = All animals dead.

ATTACHMENT 2

7 July 1995 Memo from EPA

Waiving Requirements for Mussel Larvae

Bioassay Test for 23 June 1995 Sampling

OPINAP FAX TRANSMISSION
USEPA Region 9
Office of Pacific Island and Native American Programs (E-4)
75 Hawthorne Street
San Francisco, CA 94105
FAX NO: (415) 744-1604
VERIFICATION NO: (415) 744-1599

DATE: July 7, 1995 **PAGES (incl. cover): 1**

TO: Kurt Kline
Advanced Biological Testing Inc.

FAX: 415/435-7882 **Phone: 415/435-7878**

SUBJECT: Bioassay Test of Cannery Waste on Bi-valve Larvae

FROM: Pat Young, American Samoa Program Manager
USEPA Region 9
Phone: (415) 744-1594

Amy Wagner discussed with me the problems you were having with spawning the mussel larvae necessary for conducting bioassay tests on the cannery waste, and whether you should continue with the tests even though the cannery waste sample is now over 10 days old. Although the sample has been stored properly and refrigerated, we are concerned that given its high organic content and the waste's tendency to increase its ammonia content over time, no meaningful comparison or correlation of results could be made among the results of bioassay tests conducted on mussel larvae using 10-day-old cannery waste and the results obtained with the sand dab and mysid using the fresh sample. Rather than having you conduct the entire series again with the three species using new samples, and given the unrealibility of the mussel spawning, we waive the requirement to conduct the bioassay test on the mussel larvae for this round of sampling.

Should you have any questions, please feel free to call me.

cc: Steve Costa, CH2MHill
Jim Cox, Van Camp Seafoods
Norman Wei, Star-Kist Samoa
Amy Wagner, EPA Lab
Alan Ota, EPA (W-3-3)
Sheila, Wiegman, ASEPA

MATHEMATICAL/COMPUTER MODELING OF FISH WASTE DISPOSAL AT AN OCEAN DISPOSAL SITE OFF TUTUILA ISLAND, AMERICAN SAMOA

March 1990

Prepared by

SOS ENVIRONMENTAL, INC.

and

ENVIRONMENTAL & OCEAN TECHNOLOGY, INC.

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1. INTRODUCTION

At the time that the Final Environmental Impact Statement for the Designation of an Ocean Disposal Site off Tutuila Island, American Samoa for Fish Processing Wastes (FEIS, 1989) was issued on February 24, 1989, the dumpsite selected was 3 n mi in diameter, located at 14°24.00'S by 170°38.30'W. The vessel in use had a 24,000 gal capacity with a 500 gpm pumping discharge rate using a turning radius of 0.2 n mi.

Using these characteristics, computer model studies showed (FEIS, 1989, Appendix B) that the plume would be a long, narrow ellipsoid shape which under certain seasonal conditions and infrequent high current velocities, would exceed the boundary of the site before reaching the Limiting Permissible Concentration (LPC) (40 CFR 227.27-29). The theoretical capacity of the site (without current) was more than an order of magnitude greater than that required for existing dump volume, however. The model was also run using a 1400 gpm pumping rate (Appendix B, Table 3-5, page B-19) which showed that the site boundary would be exceeded more frequently.

Although the permits in effect each had a maximum daily volume of 256,900 gallons, this was never approached with the small vessel capacity.

The proposed increase in gallonage to a 200,000 gal capacity vessel caused a reevaluation of the dumpsite, testing various vessel sizes, turning radii, pumping rates and site diameters with the computer model. This special addendum documents the

results of the computer simulation using the model presented in Appendix B of FEIS(1989).

2. RESULTS OF MATHEMATICAL MODELING

The mathematical/computer model described in Appendix B of FEIS (1989) was used to simulate the fate of the discharged fish processing wastes with the available data. The data used in the simulations are first presented. Then the results are presented in terms of dilution as a function of time after discharge and as a function of distance from the discharge location. According to Fischer et al (1979), dilution usually is defined as the ratio of the total volume of a sample to the volume of effluent contained in the sample. Thus the volume fraction of effluent in a sample is equal to the reciprocal of dilution (page B-8, FEIS, 1989).

2.1 Data used for Simulations

The following input data are obtained from Soule and Oguri (1983) and monitoring data in 1988-1989:

Ambient Current Velocities	0 to 0.8 knots (drogues)	
	0.06 to 0.68 knots (waste field)	
Ambient Density Profiles	summer, winter	
Dumpsite Water Depth	greater than 1200 fathoms	
Discharge Rate	500 to 1400 gpm	
	(1.89 m3/min to 5.30 m3/min)	
Sludge Bulk Density	0.72 to 0.96 gm/ml	Star-Kist
	0.99 gm/ml	Van Camp
Sludge Tank Capacity	200,000 gallons	

The key dimensions of five ships that might be used to discharge the fish waste are shown in Table SA-1. In addition to three ships under consideration (Ships 1 to 3) that were

provided, two theoretical ships (Ship 4 and Ship 5) have been used in the calculation of the dilution results. Ship 4 has been obtained by increasing the size of Ship 1 by 50 % to represent the upper limit of the vessel size and Ship 5 has been obtained by decreasing the size of Ship 1 by 25 % to represent the lower limit of vessel size.

The maximum pumping rate of the sludge is 140 gpm per knot of vessel speed which can go up to 10 knots. Thus, for our simulation a range of discharge rates between 500 gpm and 1400 gpm is used. The discharge of the fish waste is assumed to be completed within a time period during which the current direction does not change. With a trip carrying 200,000 gallons and a discharge rate of 1400 gpm, the discharge duration is about 143 minutes.

Data of the ambient current velocity in the vicinity of the dumpsite are available from the drogue and waste plume tracking studies conducted by Soule and Oguri (1984) and permit monitoring data from 1988-1989. The range in current velocities measured by actual movement of the waste field was 0.06 to 0.68 knots with a mean of 0.34 knots. These values of the ambient current speed are in good agreement with the values (0.4 to 0.8 knots) published in the U.S. Navy Marine Climatic Atlas of the World (1979). Therefore, current speeds of 0.2, 0.4, and 0.8 knots have again been used in the simulations.

Two ambient density profiles have been used in the

simulations to account for the summer and winter seasons. Typical sea water temperature and salinity profiles for the summer and winter seasons are shown in the two tables contained in pages B-12 and B-13 of FEIS (1989).

2.2 Results of Simulations

During the performance of the computer simulations, the values of parameters such as A, Co, Kv, and L are obtained as described in Appendix B of FEIS. The width L of the initial plume is found to have significant effects on the dispersion of the waste plume. A wide range of L has been explored. The result presented herein covers the range of L from 0.4 n mi to 3.0 n mi.

The results of the simulations are presented in terms of dilution of the fish wastes as a function of the distance from the discharge location. Dilution is the reciprocal of the product of Co and Cmax/Co. This value gives an indication of the volume fraction of fish waste in the water sample after the waste plume has traveled for a certain distance from the discharge location. Since no data have been obtained for the settling velocity of the Samoa waste particles, velocities of 1, 0.1, and 0.01 cm/sec have been used in the calculations to cover the possible range of settling velocity which is a function of the density of the waste material relative to the sea water density. The group of results with settling velocities of 0.01, 0.1, and 1.0 cm/sec would correspond to the particles that are floating on the ocean surface, neutrally buoyant in sea water and heavier than sea water respectively. The behavior of the particles with

a settling velocity of 0.1 cm/sec is similar to that of neutrally buoyant particles and thus they are advected by the ambient surface and near surface currents.

The settling tank experiments reported by Soule and Oguri (1983) indicate that 30% of the fish waste being studied had a fall velocity greater than zero, 7% of the wastes had a fall velocity greater than 0.059 cm/sec and only 0.5% of the waste had a fall velocity greater than 0.24 cm/sec. Therefore the range of fall velocity used for the present study is reasonable. In fact, the fall velocity of 0.01 cm/sec would be the most representative value; thus, when discussing the simulated results, attention is directed toward the fall velocity of 0.01 cm/sec (page B-17, FEIS).

The computer model results are presented in tabular form in Tables SA-2 and SA-3 using Ship 1 as the dump vessel, in Tables SA-4 and SA-5 using Ship 2, in Tables SA-6 and SA-7 using Ship 3, in Tables SA-8 and SA-9 using Ship 4, and in Tables SA-10 and SA-11 using Ship 5. Tables SA-2, SA-4, SA-6, SA-8, and SA-10 show the results of operation in the summer months, while Tables SA-3, SA-5, SA-7, SA-9, and SA-11 show the results in the winter months. Results for different discharge rates, namely 500, 600, 700, 1000, 1200, and 1400 gpm are presented in sequence.

To interpret the results, it is fruitful to note the various items shown in each table. The first column in Table SA-2 is the time after the initial release of the waste material. The second column converts the time into distance from the discharge point.

In the third column, three diffe… knots, 0.4 knots, and 0.8 knots a… 3.1 (page B-15, FEIS), the initi… computed and presented in the fo… rate of 500 gpm Co is computed t… location of the centerline of the … fall velocity of 1 cm/sec is shown … column 6 is the concentration at t… normalized with respect to Co. … obtained as the reciprocal of the product of Co and Cmax/Co, can easily be obtained by the inverse of the value in column 4 multiplied by that in column 6. According to Soule and … (1983) and Section III.A.2.C.1 of FEIS (1989) (page III-1… limiting permissible concentration (LPC) of the waste … discharged is 0.0004 % concentration of the fish waste. … value of concentration corresponds to a dilution of 2… Therefore, for convenience the dilution ratio has been nor… with respect to 250,000 and such ratio is presented in colu… For the fall velocity of 0.1 cm/sec the corresponding results are presented in columns 8 to 10. Similarly the results for 0.01 cm/sec fall velocity are shown in columns 11 to 13. Thus, when one reads the values at columns 7, 10, and 13, a value of 1.00 implies a dilution of 250,000. A value greater than 1.0 implies a dilution greater than 250,000.

• From bioassay, recalculate LPC;
• Use LPC, density of combined waste to remodel –
– size of boat, gallons discharged not matter
– may be increase pumping rate?

LPC

The major difference between the summer months and winter months is the value of vertical diffusion. For the winter months, larger vertical diffusions were used causing more mixing

In the third column, three different current speeds, namely 0.2 knots, 0.4 knots, and 0.8 knots are included. Based on Equation 3.1 (page B-15, FEIS), the initial mean concentration, Co, is computed and presented in the fourth column. For a discharge rate of 500 gpm Co is computed to be 0.000202. The vertical location of the centerline of the plume at different times for a fall velocity of 1 cm/sec is shown in the fifth column. Shown in column 6 is the concentration at the centerline of the plume Cmax normalized with respect to Co. The dilution, which can be obtained as the reciprocal of the product of Co and Cmax/Co, can easily be obtained by the inverse of the value in column 4 multiplied by that in column 6. According to Soule and Oguri (1983) and Section III.A.2.C.1 of FEIS (1989) (page III-19), the limiting permissible concentration (LPC) of the waste being discharged is 0.0004 % concentration of the fish waste. This value of concentration corresponds to a dilution of 250,000. Therefore, for convenience the dilution ratio has been normalized with respect to 250,000 and such ratio is presented in column 7. For the fall velocity of 0.1 cm/sec the corresponding results are presented in columns 8 to 10. Similarly the results for 0.01 cm/sec fall velocity are shown in columns 11 to 13. Thus, when one reads the values at columns 7, 10, and 13, a value of 1.00 implies a dilution of 250,000. A value greater than 1.0 implies a dilution greater than 250,000.

The major difference between the summer months and winter months is the value of vertical diffusion. For the winter months, larger vertical diffusions were used causing more mixing

and thus a larger dilution (Pages B-15 and B-16, FEIS, 1989). It can be seen that a greater mixing, therefore a larger dilution, is achieved in the winter months (Tables SA-3, SA-5, SA-7, SA-9, and SA-11) in comparison with the corresponding results for that in the summer months (Tables SA-2, SA-4, SA-6, SA-8, and SA-10).

For the same season and the same discharge rate, the results of dilution (shown in columns 7, 10, and 13 of each table) obtained by using the five different ships are similar to one another. Thus, the results of dilution are not sensitive to the range of ship size studied. For instance, in the summer months, the results of dilution shown in Tables SA-2, SA-4, SA-6, SA-8, and SA-10 are similar for the same discharge rates. The same phenomenon is manifested in the results of dilution obtained for the winter months as shown in Tables SA-3, SA-5, SA-7, SA-9 and SA-11.

For the case of Ship 1, the results of dilution ratio for a fall velocity of 0.01 cm/sec (column 13 in each table) have been plotted as a function of discharge rate. The results of dilution ratio are shown in Figures SA-1, SA-2, and SA-3 at a distance of 3, 4, and 5 n mi, respectively, from the discharge point. Three curves are shown in each figure, representing ambient currents of 0.2, 0.4 and 0.8 knots. Also, each figure shows the results obtained in the summer season and that in the winter season.

2.3 Studies of Initial Plume Width

Since the width of the initial plume, L, (which is about twice the turning radius of the discharge ship for small L) is

anticipated to affect the results of dilution, the effect of the initial plume width on the dispersion of fish waste has been extensively studied. Ship 1 has been used in the sensitivity studies because the results of dilution have been shown to be insensitive to ship size. The results of calculation are shown in Tables SA-12 and SA-13 for an initial plume width of 0.8 n mi (turning radius 0.4 n mi) and in Tables SA-14 and SA-15 for a width of 1.0 n mi. The results of dilution ratio for a fall velocity of 0.01 cm/sec have been plotted in Figures SA-4 through SA-6 for the case with a plume width of 0.8 n mi and in Figures SA-7 through SA-9 for the case with a plume width of 1.0 n mi. From the results, it can be observed that the values of dilution increase with an increase in the width of the initial plume (or the turning radius). Thus, an initial plume width of 1.0 n mi has been used for the calculations of Ships 2 to 5. The results are shown in Tables SA-16 and SA-17 for Ship 2, in Tables SA-18 and SA-19 for Ship 3, in Tables SA-20 and SA-21 for Ship 4, and in Tables SA-22 and SA-23 for Ship 5. The corresponding results of dilution ratio of each ship are plotted in Figures SA-10 through SA-13. All the results shown in Figures SA-9 to SA-13 indicate that if the site were 5 n mi in diameter and if the initial plume width L=1.0 n mi then dilutions greater than 250,000 (LPC) can be achieved for all the pumping rates from 500 gpm to 1400 gpm for all seasons.

To explore the conditions under which the dispersed fish waste plume can be contained in the 3 n mi diameter site as approved, a systematic study has been performed by using a large

range of the initial plume width including a fairly large initial plume width. The objective of this systematic study is to find an initial plume width which will result in a dilution of at least 250,000 within the 3 n mi diameter dumpsite boundary. Again, Ship 1 has been used in the study. The values of the initial plume width studied range from 1.1 n mi to 3.0 n mi. The results of calculation are shown in Tables SA-24 to SA-45 for the range of initial plume widths. The results of dilution ratio for a fall velocity of 0.01 cm/sec at the boundary of the 3 n mi diameter site have been plotted in Figures SA-14, SA-15, SA-16, SA-17, and SA-18 for initial plume widths of 1.1, 1.3, 1.5, 1.7, and 2.0 n mi, respectively. From Figures SA-14 to SA-18, it can be observed that the limiting conditions occur in the summer. For the case of using a pumping rate of 1400 gpm in the winter season, a dilution ratio of one or greater than one will be attained with an initial plume width of 1.5 n mi. For a certain value of the initial plume width, Figure SA-19 shows the maximum pumping rate that can be used in the summer to achieve a dilution of at least 250,000 within the 3 n mi diameter site. It is interesting to note that the allowable pumping rate in gpm decreases for L greater than 2.5 n mi because the distance between the dump path and the 3 n mi diameter dumpsite boundary is reduced. An initial plume width of 2 n mi is chosen based on the results shown in Figure SA-19, so that a pumping rate of 1200 gpm can be used in the summer and that LPC can be reached within the 3 n mi diameter dumpsite.

For the calculations of Ships 2 to 5, the value of 2 n mi

for the initial plume width has been used. The results are shown in Tables SA-46 to SA-53. It can be seen from these tables that the results for ships 2,3,4,5 are almost identical to that for ship 1. The results of dilution ratio at the boundary of the 3 n mi diameter site are shown in Figures SA-20 to SA-23 for different ships. Again, these results are almost identical to that shown in Figure SA-18 for ship 1.

2.4 Graphical Presentation of Waste Plume Results

The results presented in Tables SA-32 and SA-33 can be plotted to provide a better picture of the extent of the waste plume following a prescribed current direction. Based on the available data, the two observed directions at the discharge site are SW and NW. The waste plume is therefore advected along these directions while experiencing a lateral mixing along the way.

To show the extent of the plume, curves containing a series of equi-dilution lines are presented in Figures SA-24 and SA-25 (based on the results presented in Table SA-32 for the summer and Table SA-33 for the winter, respectively). Only the results of Ship 1 are plotted, because the results of dilution are essentially the same for the five ships. The dilution ratios shown are the dilutions normalized with respect to 250,000 (LPC) for both the summer and winter months and for current speeds of 0.2 knots, 0.4 knots, and 0.8 knots. The discharge rate for these figures is 1200 gpm for the summer season and 1400 gpm for the winter season. The fall velocity is set at 0.01 cm/sec.

Figure SA-26 shows the equi-dilution lines in the summer months plotted on the map for a waste discharge of 1200 gpm in a current of 0.2 knots towards the SW direction. Two different equi-dilution lines are drawn: the line for 0.5 represents a dilution of 125,000, while the line for 1.0 represents a dilution of 250,000. Such a favorable current direction would continue to carry the plume away in the SW direction. Thus, the plume would not approach the shore region while undergoing a significant mixing and diffusion.

Besides the equi-dilution lines, the path of the dumping ship is shown in Figure SA-26 as dotted lines. The ship is anticipated to travel in an elliptic path. The major axis of the ellipse forms the width of the initial plume which controls the results of dilution downstream.

Figures SA-27 and SA-28 show the extent of the waste plume with a SW current of 0.4 kt and 0.8 kt, respectively. Comparing the results in Figures SA-27 and SA-28 with those in Figure SA-26, one observes that the effect of a stronger current is to advect the plume downstream in the current direction and induce more rapid mixing for this case of larger initial plume width.

Figures SA-29 to SA-31 show the corresponding pictures for the winter months using a discharge rate of 1400 gpm. By comparing these results with those presented in Figures SA-26 to SA-28, one can observe that a greater dilution is achieved in the winter months due to increased vertical diffusion.

The drogue studies conducted by Soule and Oguri (1984)

indicated a current toward the southwest (SW) direction and the data on the surface current presented in Figure III.8 of FEIS (1989) also show predominant southwest surface current. However, some 1987 current meter data detected current in the northwest (NW) direction. Some current data indicated that a longshore current was moving in the southwest direction with a magnitude of 0.25 knots outside of the 120-fathom depth contour (CH2M Hill, 1976). A sketch confirming the direction of drogue movement (along the SW direction) after CH2M Hill is shown in page B-31 of FEIS(1989). Since the coastal current normally follows the depth contour, it is reasonable to expect a worst case illustration having a NW current (0.2 knots) at the dumpsite would at first carry the plume initially in the NW direction; however, as the plume propagates toward the shore the current would gradually bend the plume in such a pattern as shown in page B-32 of FEIS (1989). The simulated plume trajectory for this worst case scenario is illustrated in Figure SA-32. In Figure SA-32 the equi-dilution lines are drawn for the summer months with a waste discharge rate at 1200 gpm in a current of 0.2 knots toward the NW direction at the dumpsite. It is seen that the dilution ratio of 1.0 (corresponds to 250,000 dilution) does not reach the indicated dumpsite boundary. That is still more than 3 n mi from the 120 fathom countour when the longshore current occurs, so there should be no occurrence of the plume approaching the shore region by using the longer dumping path (L=2.0 n mi).

3. CONCLUSION AND RECOMMENDATION

The present mathematical/computer model predicts the dilution as a function of distance and time from the point of release if the current direction is specified. The extent of the plume has also been shown under various conditions. Major conclusions may be summarized as follows:

1. Changes in vessel size, either increase or decrease, and increase in gallonage of the sludge tank capacity made little change in the projections reported in FEIS (1989).

2. An increase in the initial width of the plume (length of the dump path) will result in an increase in mixing and dilution of the waste plume thereby achieving acceptable dilution.

3. If the waste disposal ship travels in a waste discharging path that will result in an initial plume width anywhere between 1.5 n mi and 2.0 n mi, a pumping rate of 1400 gpm can be used in the winter season for the discharge of the fish waste. The plume with dilution reaching LPC will remain within the 3 n mi diameter dumpsite with currents up to 0.8 knots.

4. In the summer, the diluted plume reaching LPC will remain within the 3 n mi diameter site with current up to 0.8 knots if the waste dump path is 2.0 n mi and the pumping rate does not exceed 1200 gpm. (This would require an additional 23.8 minutes for complete dumping of the 200,000 gallons as compared with the 1400 gpm pumping rate).

5. The range of current velocities measured by actual

movement of the waste field was 0.06 to 0.68 knots with a mean of 0.34 knots. The computer simulated current covers 0.2-0.8 knots. This should cover any contingency for conditions under which the waste vessel would dump.

6. The proposed center of the dumpsite, as described in the FEIS (1989), is located at 14° 24.00'S by 170° 38.30'W as was approved. The dumpsite is a circle with a diameter of 3 n mi. To achieve the initial dump path (L) of 2.0 n mi, the path should be located at a vertical distance of 1.1 n mi up current from the center of the dumpsite.

7. Gathering of further temperature data might provide information on the range of diffusion coefficients which could perhaps allow an increase in the pumping rate for the summer at the preferred site. Winter is presently defined as June through November and summer is defined as December through May (FEIS, 1989).

8. If the dumpsite were enlarged to 5 n mi at a future date, a pumping rate of 1400 gpm could be used in winter and summer to achieve the LPC dilution at the dumpsite boundary.

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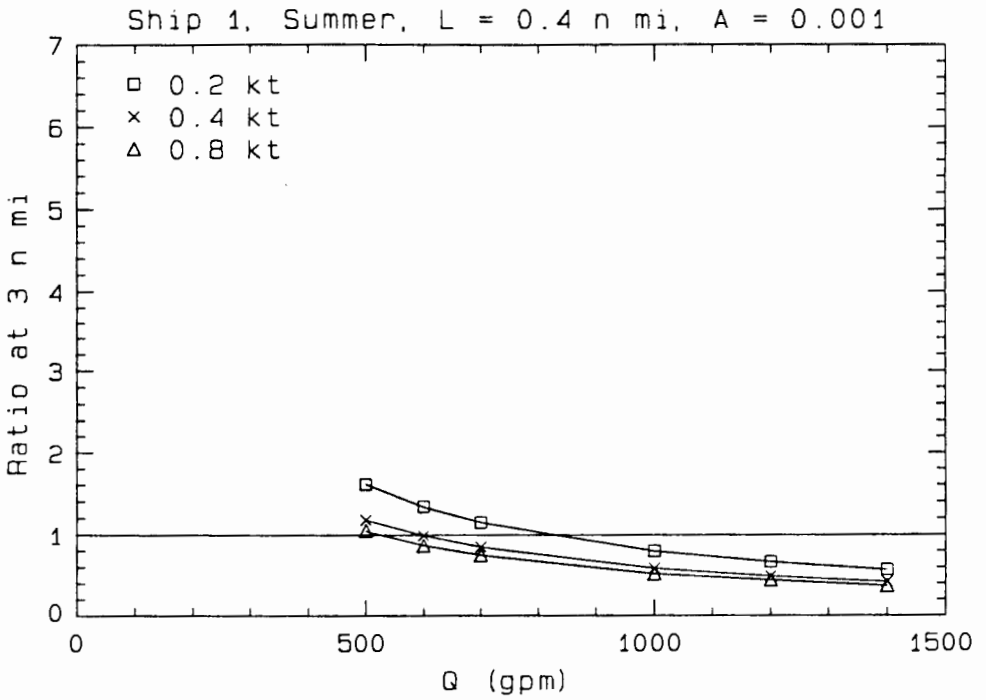


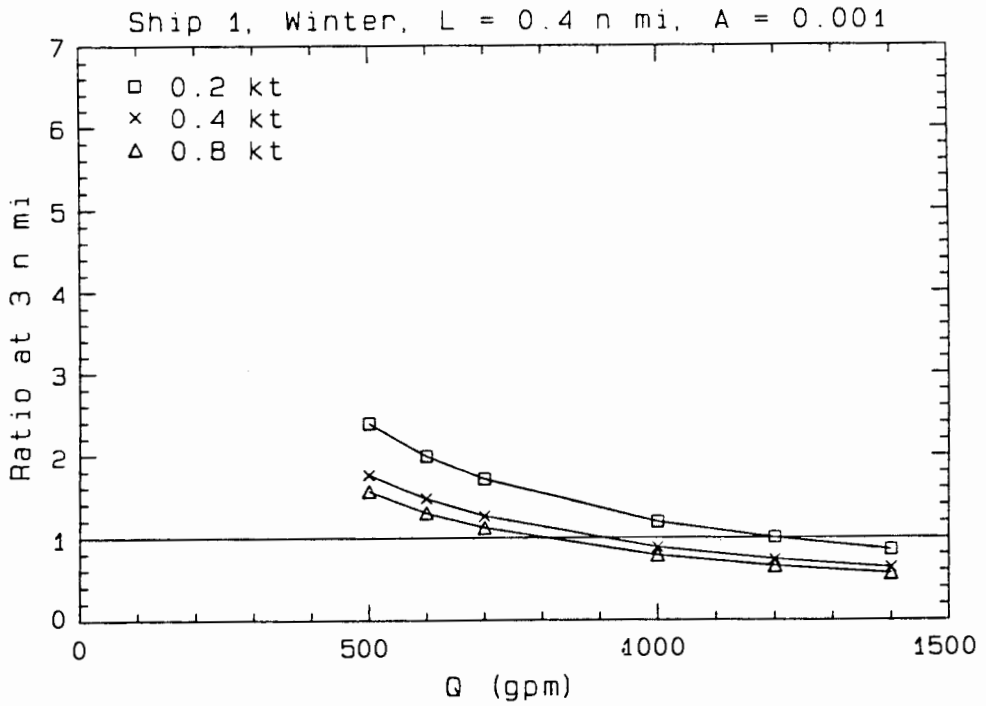
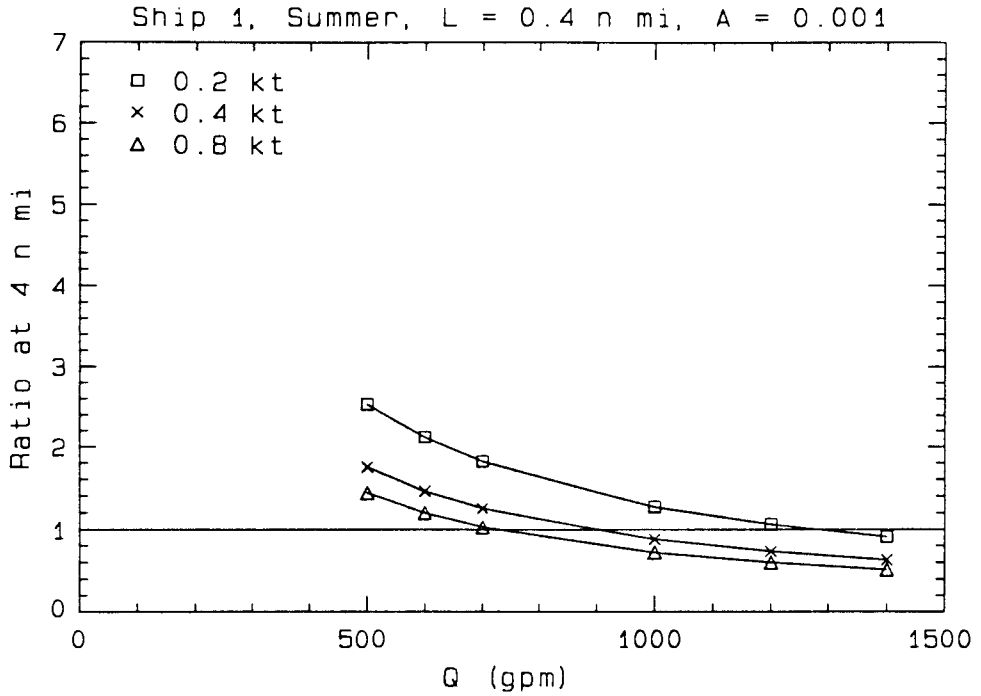


Figure SA-1. Ratio of dilution at perimeter of 3 n mi diameter disposal site, ship 1, summer & winter, L = 0.4 n mi, U_a = 0.2, 0.4, 0.8 knot (The ratio of 1 means a dilution equal to LPC; greater than 1 is dilution better than LPC.)



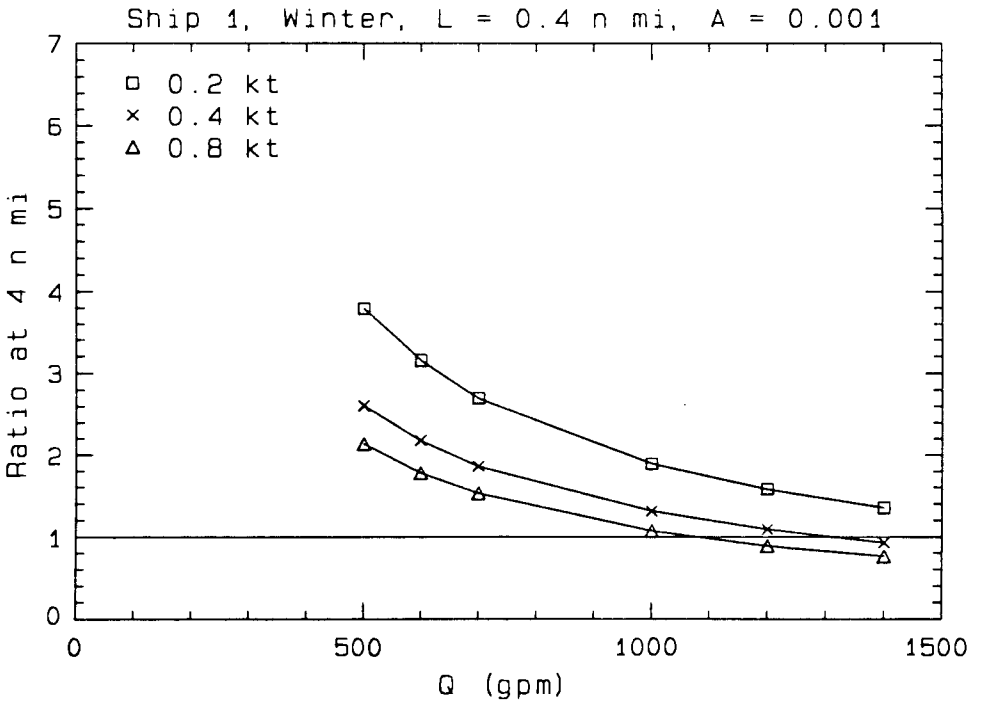
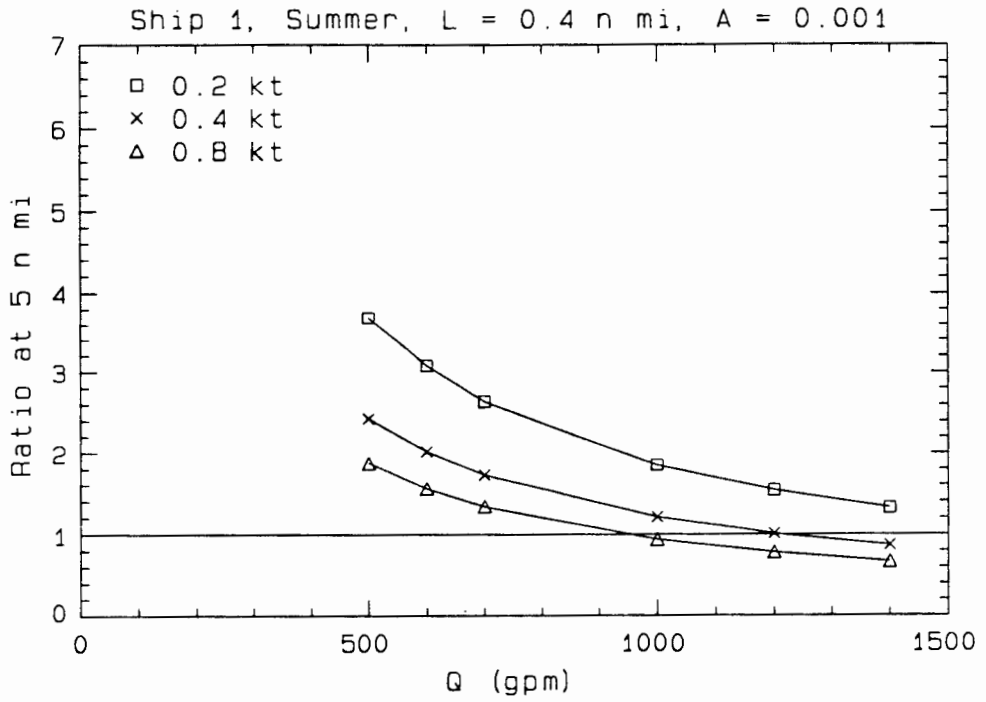


Figure SA-2. Ratio of dilution at perimeter of 4 n mi diameter circle, ship 1, summer & winter, L = 0.4 n mi, U_a = 0.2, 0.4, 0.8 knot (The ratio of 1 means a dilution equal to LPC; greater than 1 is dilution better than LPC.)



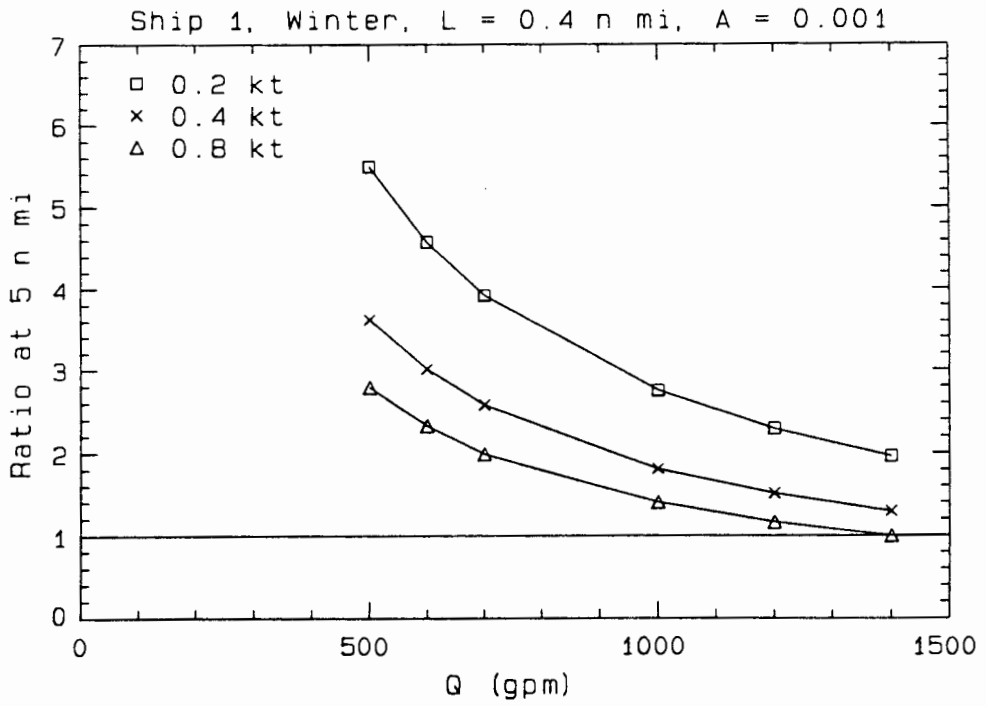
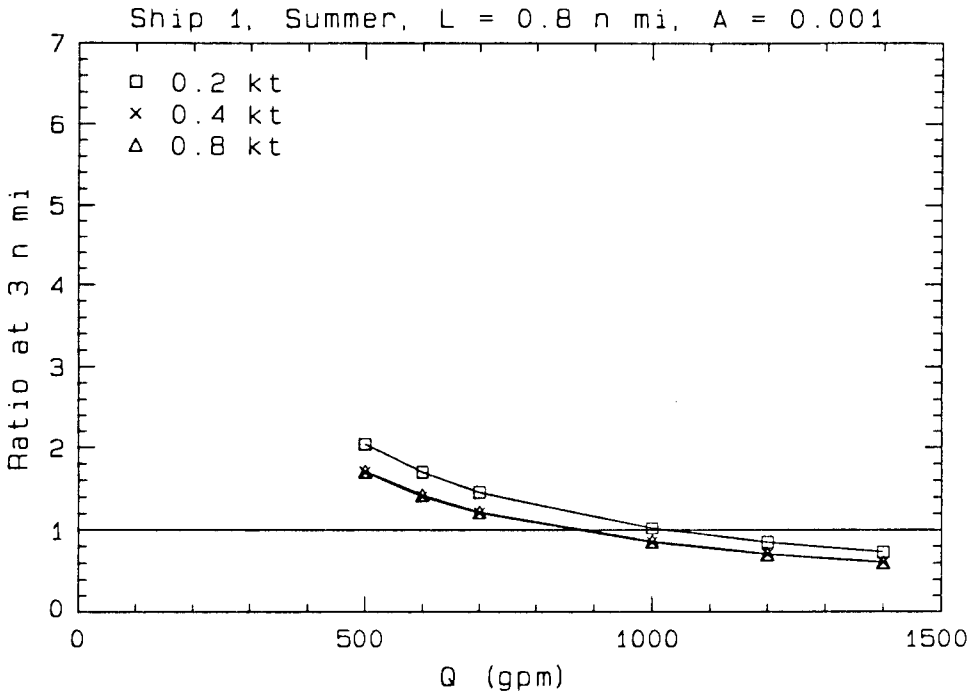


Figure SA-3. Ratio of dilution at perimeter of 5 n mi diameter circle, ship 1, summer & winter, L = 0.4 n mi, U_a = 0.2, 0.4, 0.8 knot (The ratio of 1 means a dilution equal to LPC; greater than 1 is dilution better than LPC.)



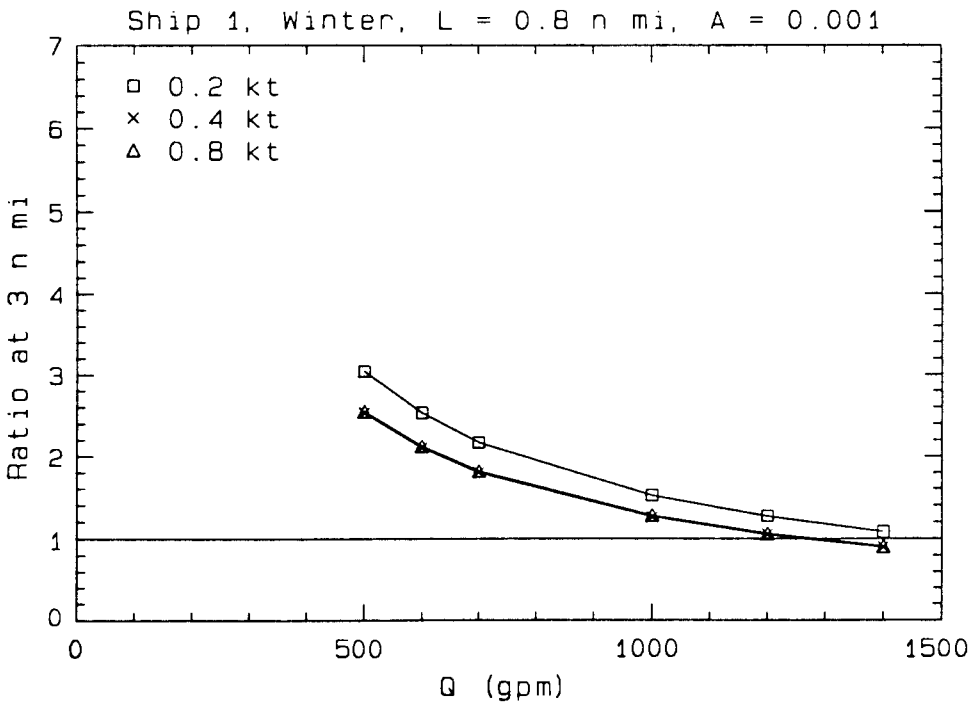


Figure SA-4. Ratio of dilution at perimeter of 3 n mi diameter disposal site, ship 1, summer & winter, L = 0.8 n mi, U_a = 0.2, 0.4, 0.8 knot (The ratio of 1 means a dilution equal to LPC; greater than 1 is dilution better than LPC.)

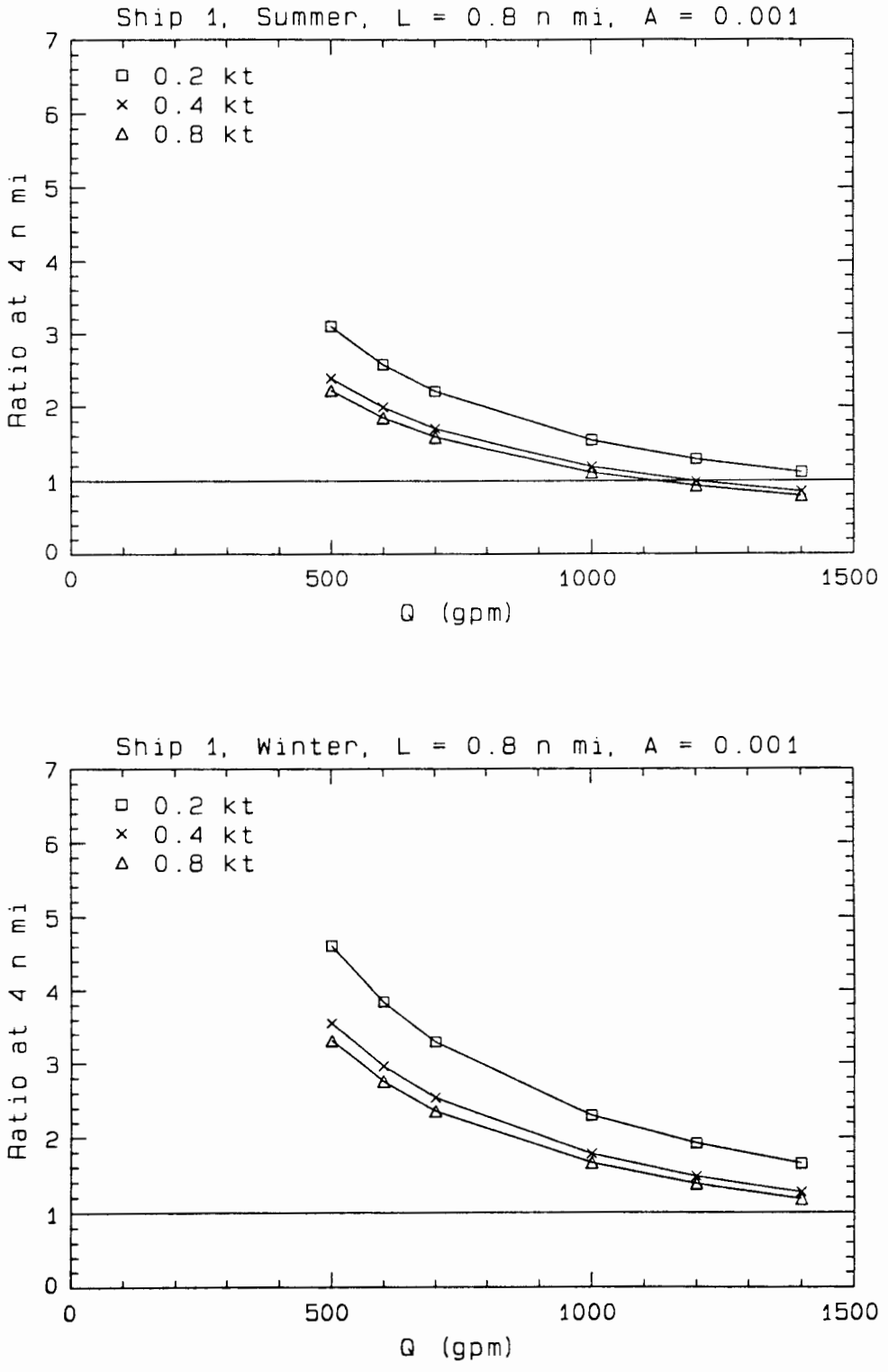


Figure SA-5. Ratio of dilution at perimeter of 4 n mi diameter circle, ship 1, summer & winter, L = 0.8 n mi, U_a = 0.2, 0.4, 0.8 knot (The ratio of 1 means a dilution equal to LPC; greater than 1 is dilution better than LPC.)

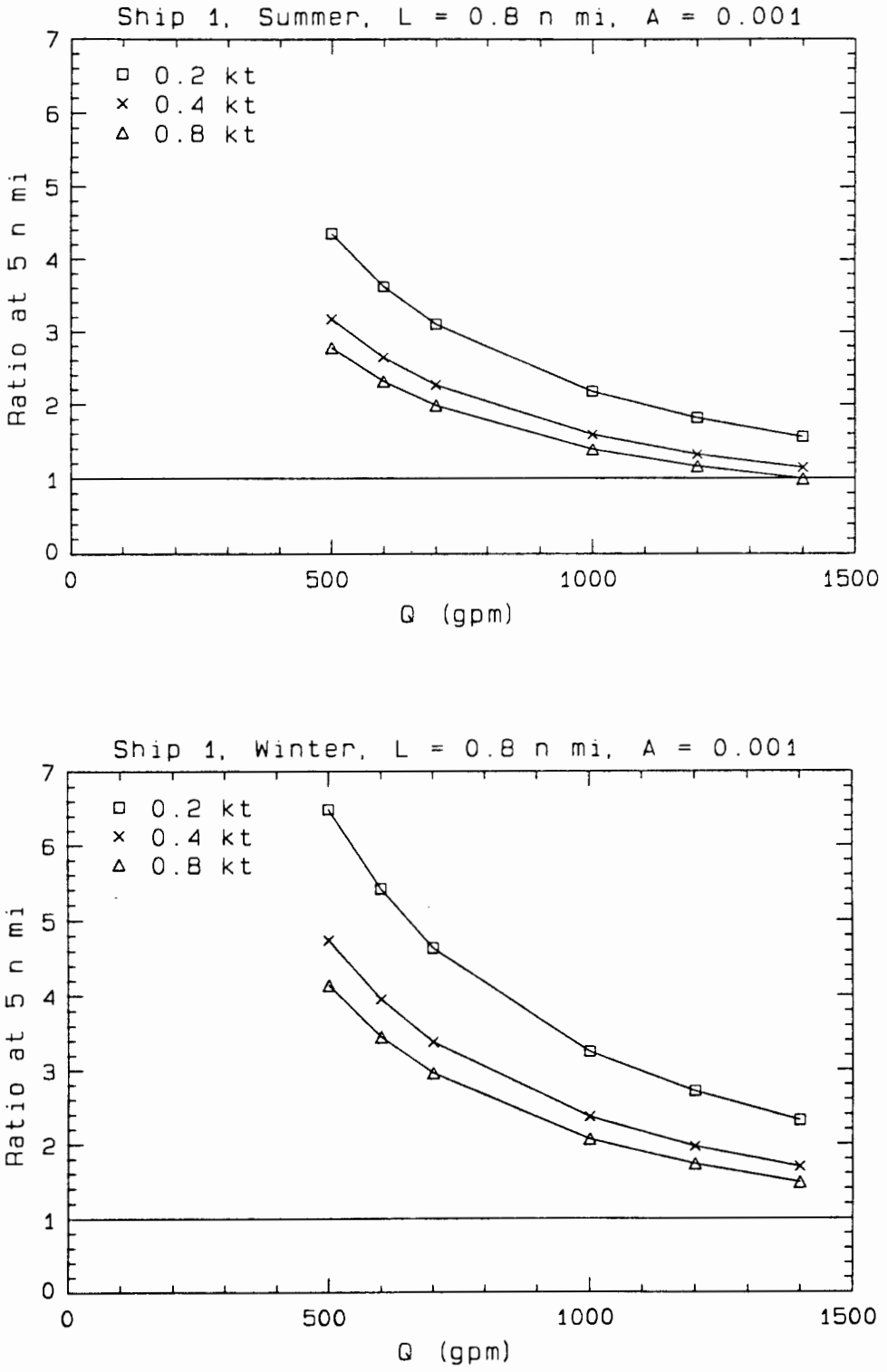
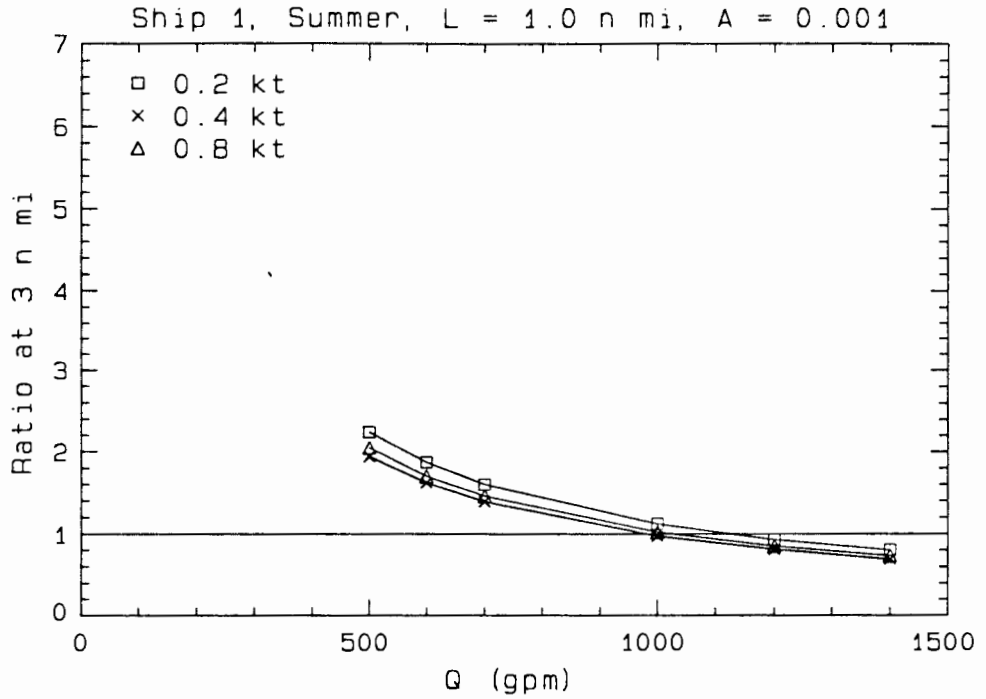


Figure SA-6. Ratio of dilution at perimeter of 5 n mi diameter circle, ship 1, summer & winter, L = 0.8 n mi, U_a = 0.2, 0.4, 0.8 knot (The ratio of 1 means a dilution equal to LPC; greater than 1 is dilution better than LPC.)



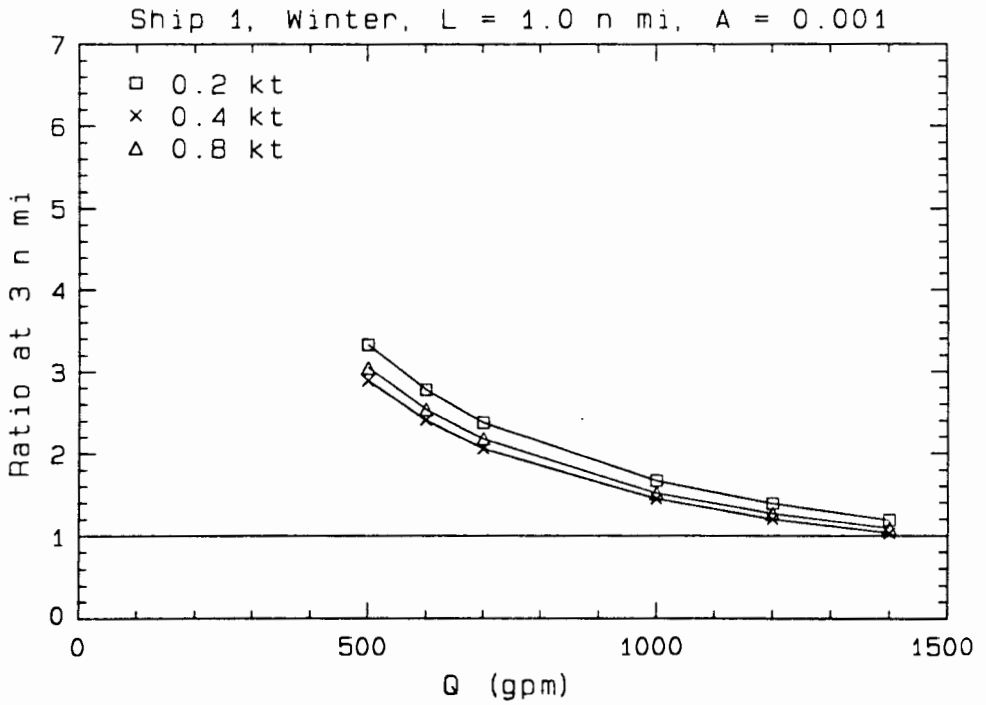


Figure SA-7. Ratio of dilution at perimeter of 3 n mi diameter disposal site, ship 1, summer & winter, L = 1.0 n mi, U_a = 0.2, 0.4, 0.8 knot (The ratio of 1 means a dilution equal to LPC; greater than 1 is dilution better than LPC.)

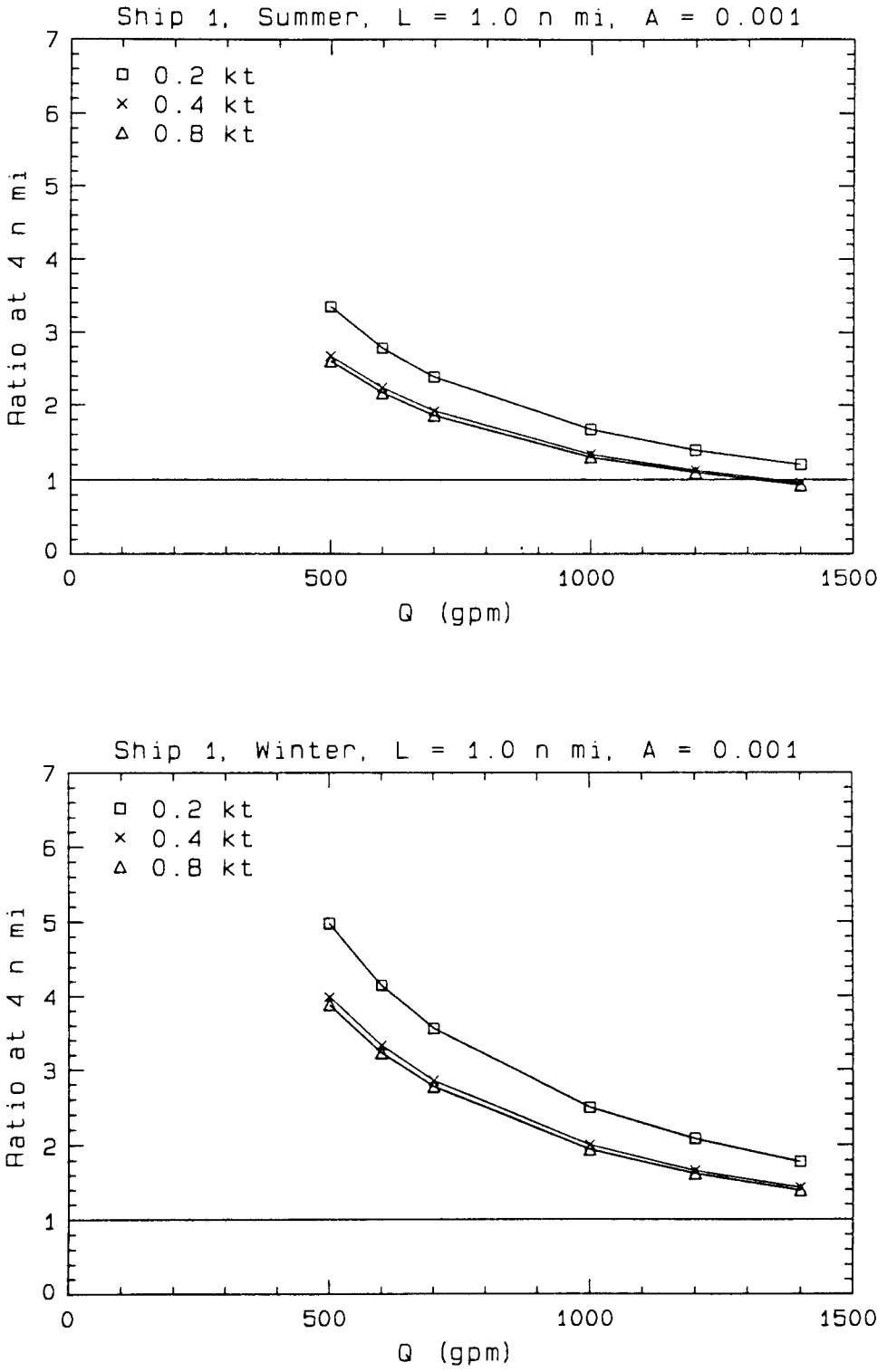
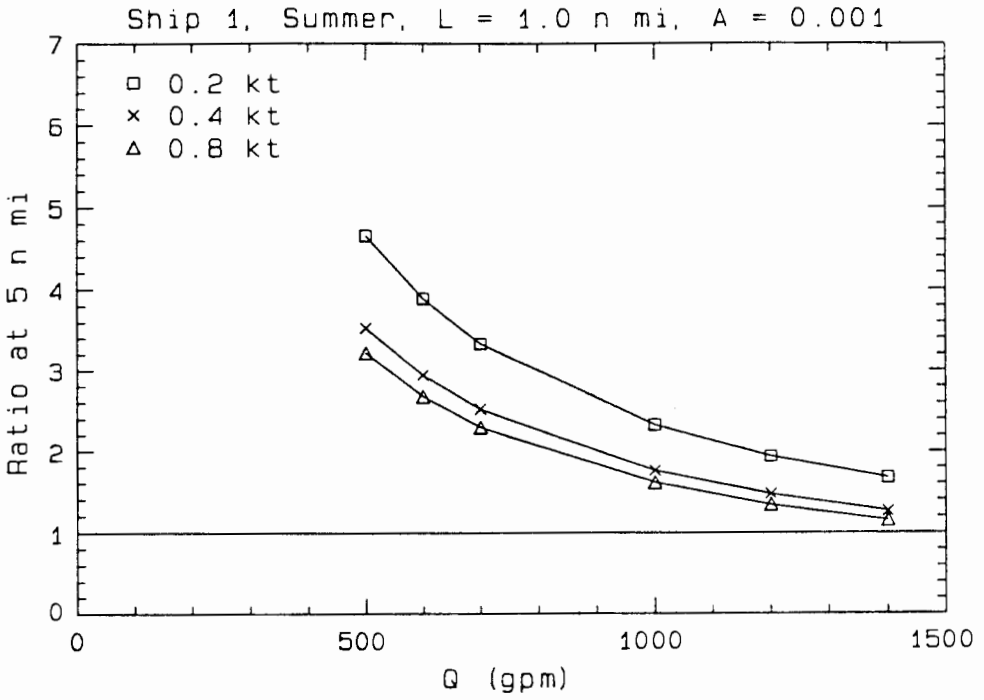


Figure SA-8. Ratio of dilution at perimeter of 4 n mi diameter circle, ship 1, summer & winter, L = 1.0 n mi, U_a = 0.2, 0.4, 0.8 knot (The ratio of 1 means a dilution equal to LPC; greater than 1 is dilution better than LPC.)



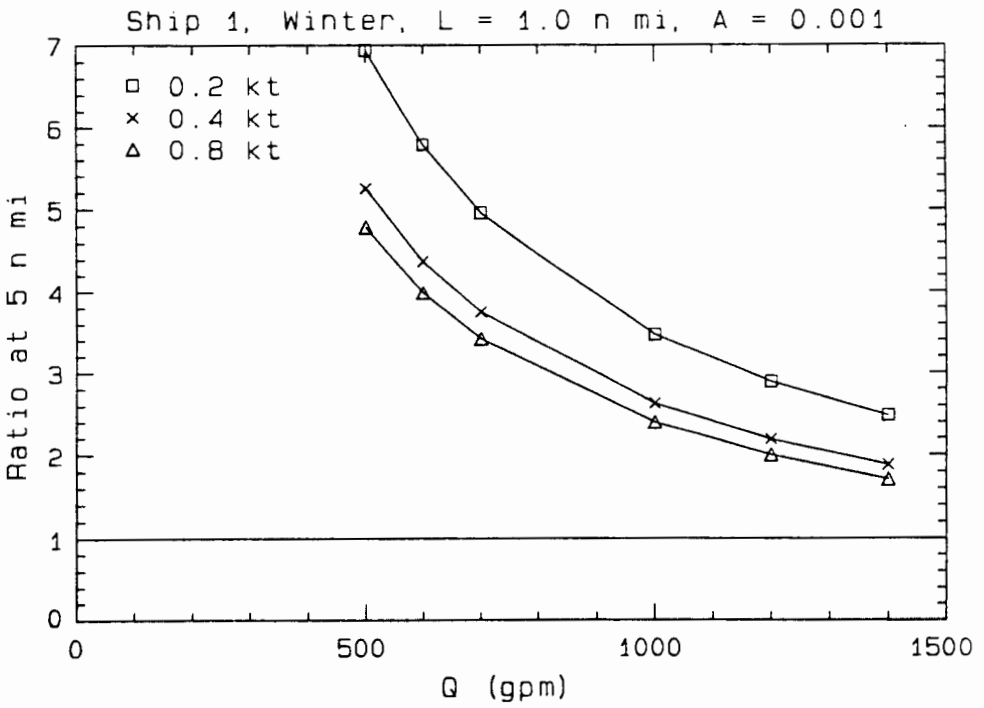
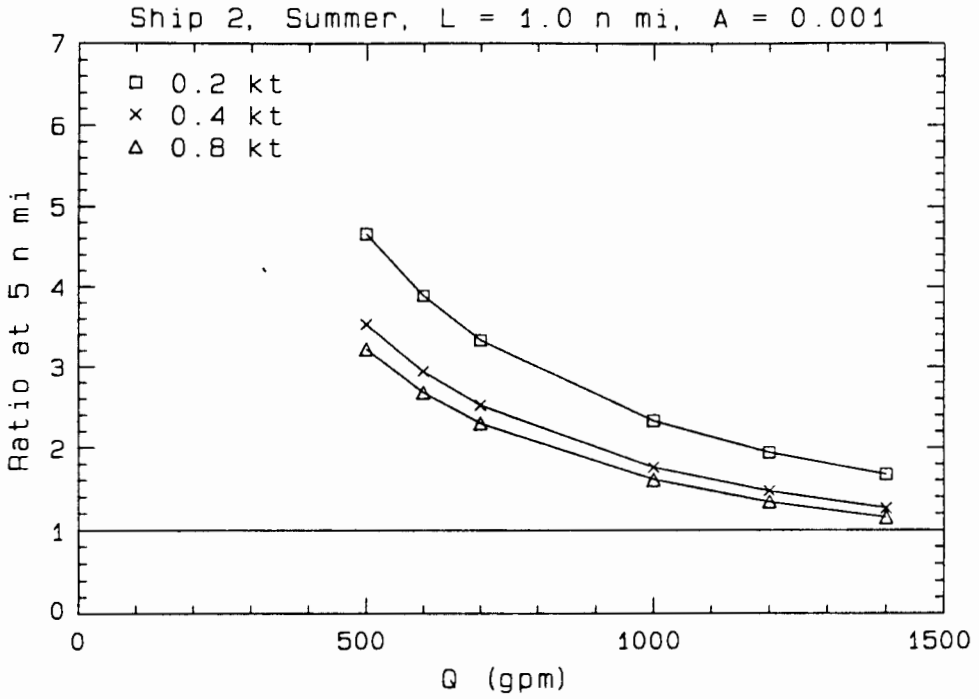


Figure SA-9. Ratio of dilution at perimeter of 5 n mi diameter circle, ship 1, summer & winter, L = 1.0 n mi, U_a = 0.2, 0.4, 0.8 knot (The ratio of 1 means a dilution equal to LPC; greater than 1 is dilution better than LPC.)



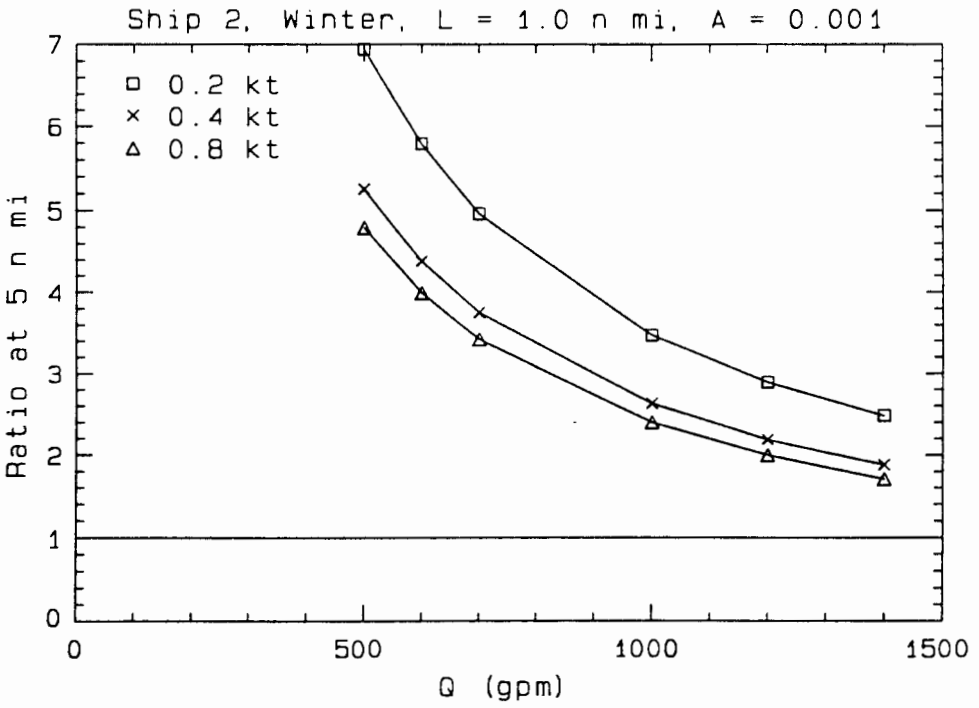
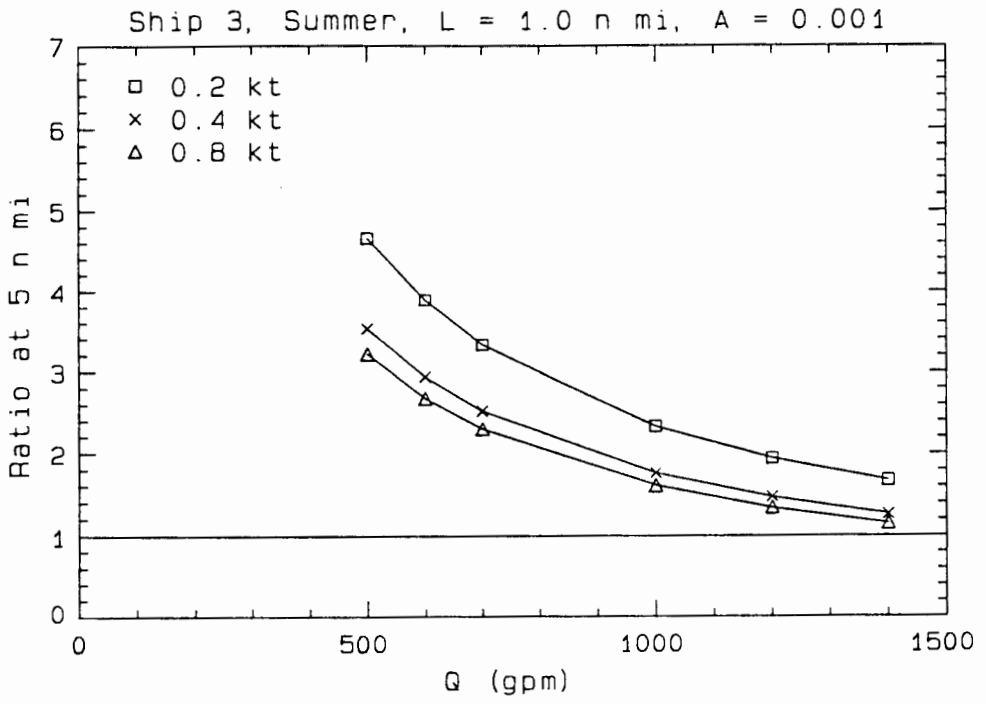


Figure SA-10. Ratio of dilution at perimeter of 5 n mi diameter circle, ship 2, summer & winter, L = 1.0 n mi, U_a = 0.2, 0.4, 0.8 knot (The ratio of 1 means a dilution equal to LPC; greater than 1 is dilution better than LPC.)



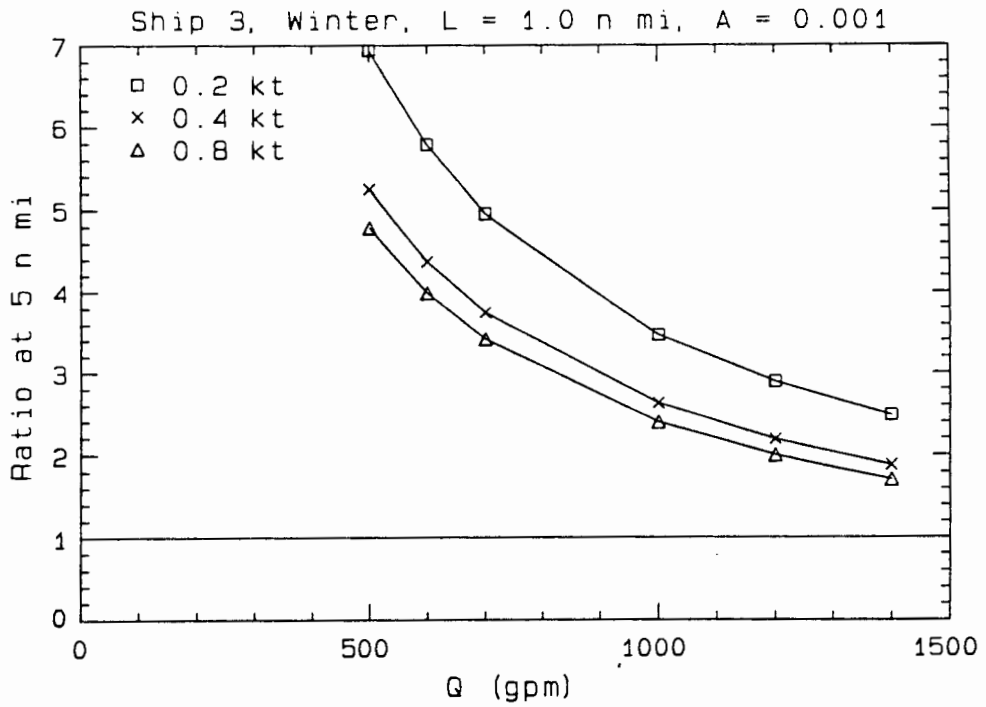
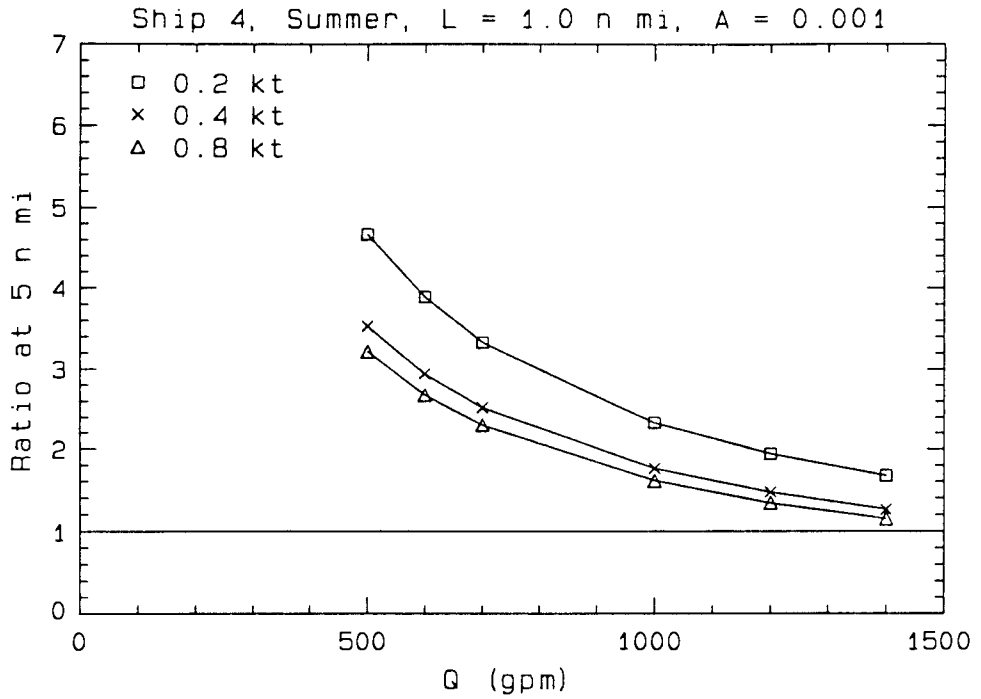


Figure SA-11. Ratio of dilution at perimeter of 5 n mi diameter circle, ship 3, summer & winter, L = 1.0 n mi, U_a = 0.2, 0.4, 0.8 knot (The ratio of 1 means a dilution equal to LPC; greater than 1 is dilution better than LPC.)



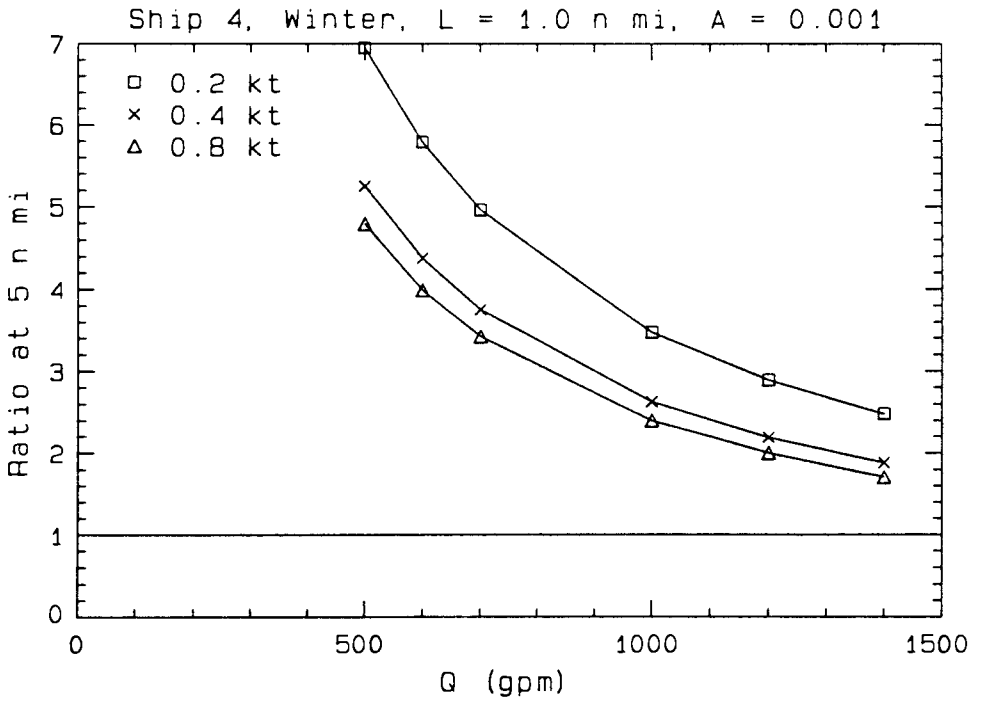


Figure SA-12. Ratio of dilution at perimeter of 5 n mi diameter circle, ship 4, summer & winter, L = 1.0 n mi, U_a = 0.2, 0.4, 0.8 knot (The ratio of 1 means a dilution equal to LPC; greater than 1 is dilution better than LPC.)

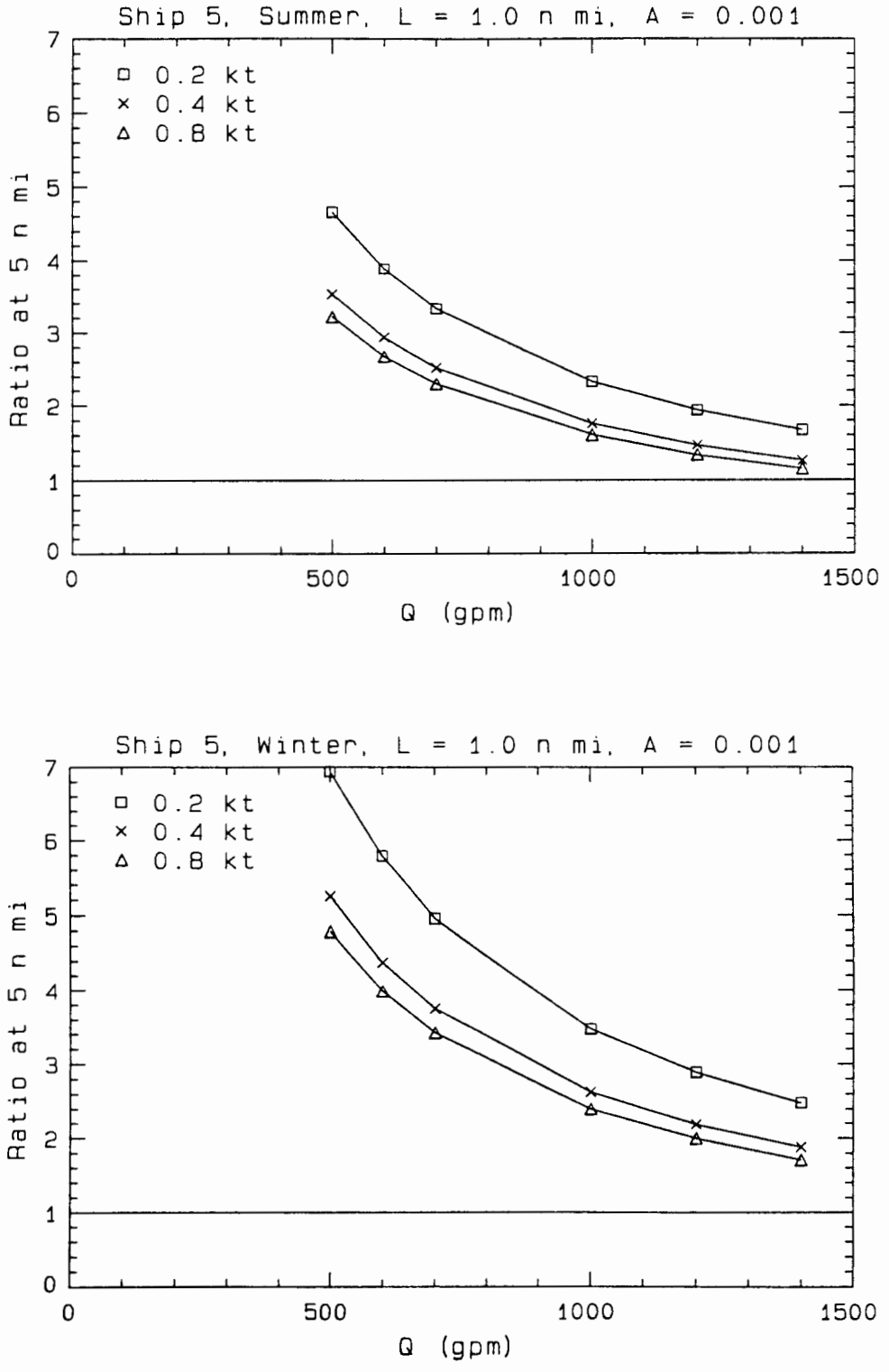
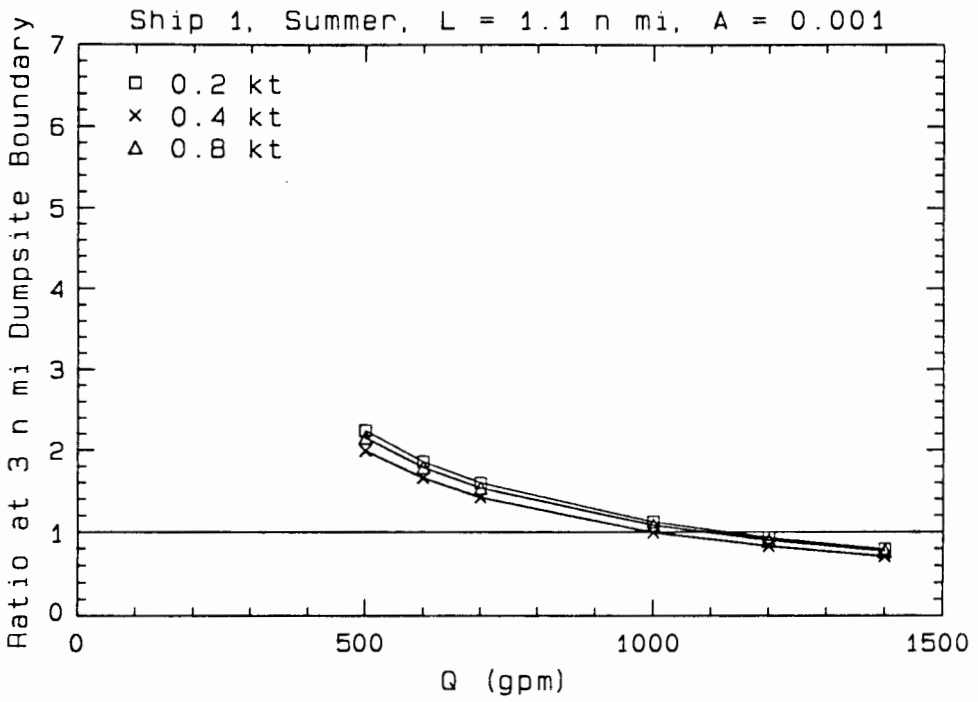


Figure SA-13. Ratio of dilution at perimeter of 5 n mi diameter circle, ship 5, summer & winter, L = 1.0 n mi, U_a = 0.2, 0.4, 0.8 knot (The ratio of 1 means a dilution equal to LPC; greater than 1 is dilution better than LPC.)



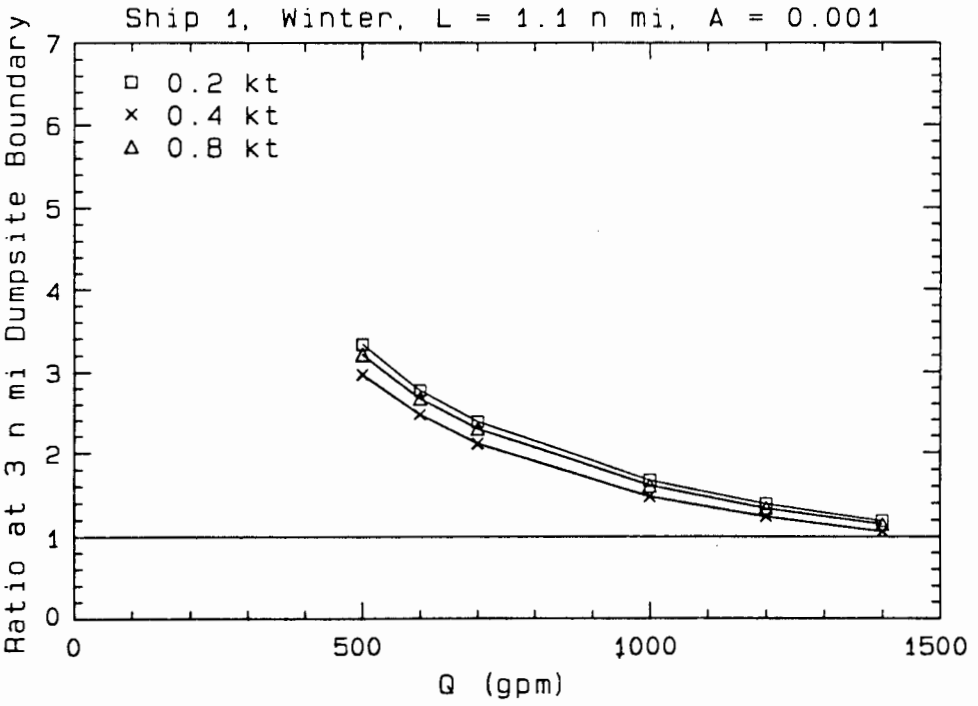
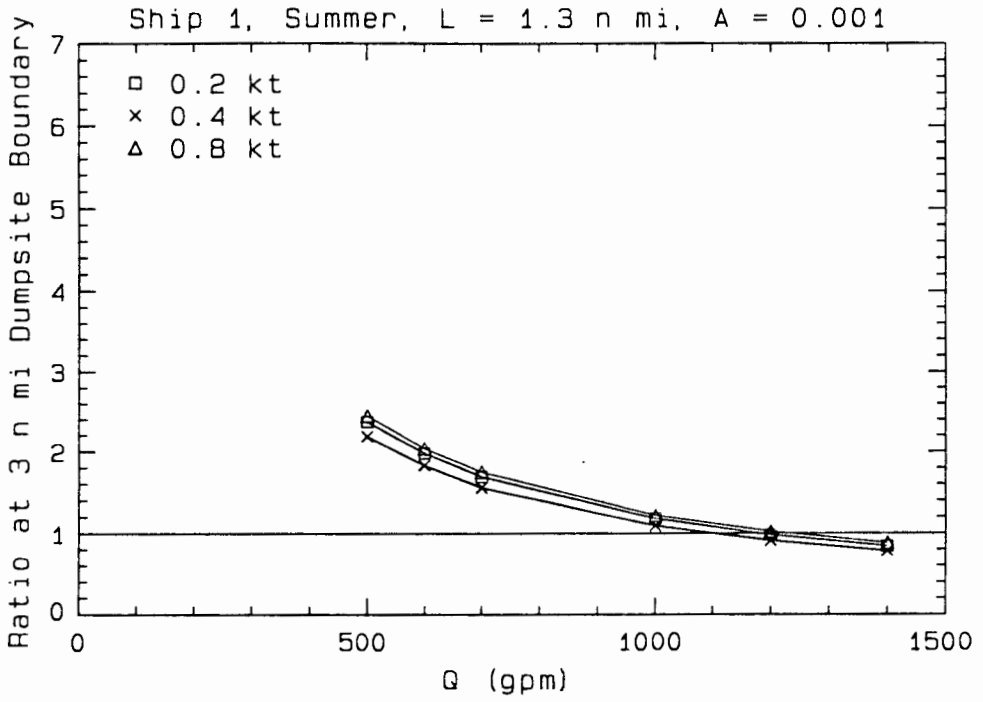


Figure SA-14. Ratio of dilution at perimeter of 3 n mi diameter disposal site, ship 1, summer & winter, L = 1.1 n mi, U_a = 0.2, 0.4, 0.8 knot (The ratio of 1 means a dilution equal to LPC; greater than 1 is dilution better than LPC.)



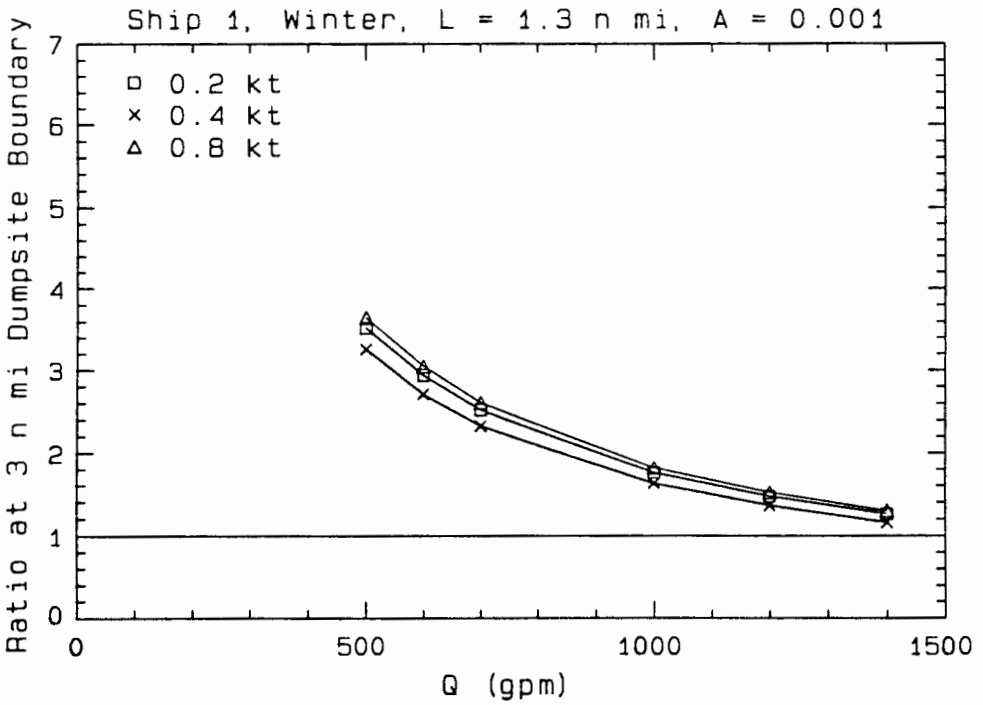
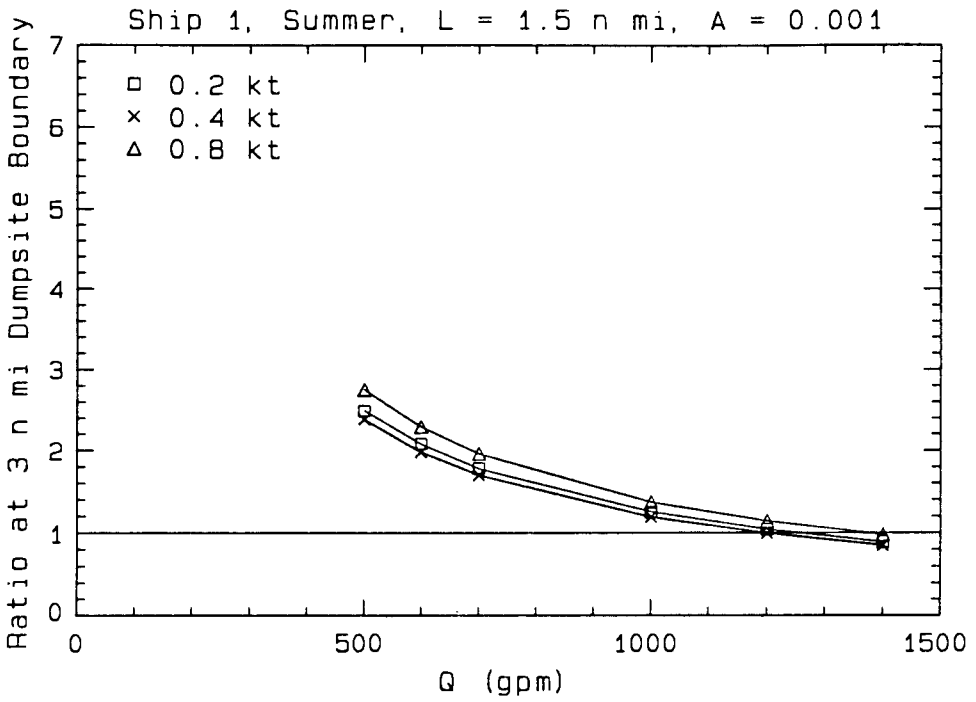


Figure SA-15. Ratio of dilution at perimeter of 3 n mi diameter disposal site, ship 1, summer & winter, L = 1.3 n mi, U_a = 0.2, 0.4, 0.8 knot (The ratio of 1 means a dilution equal to LPC; greater than 1 is dilution better than LPC.)



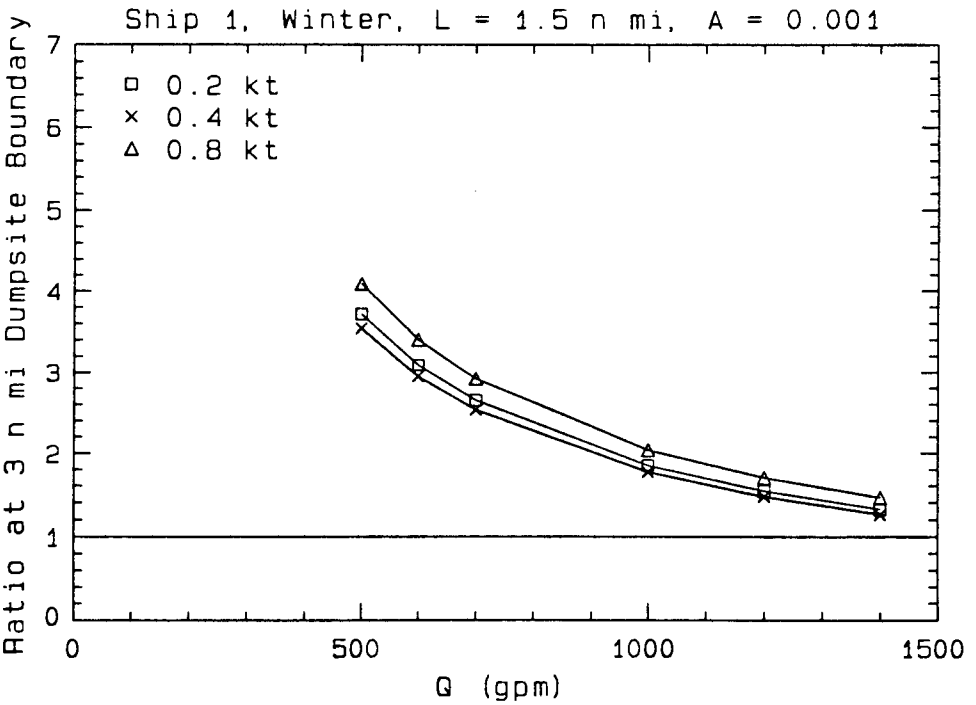
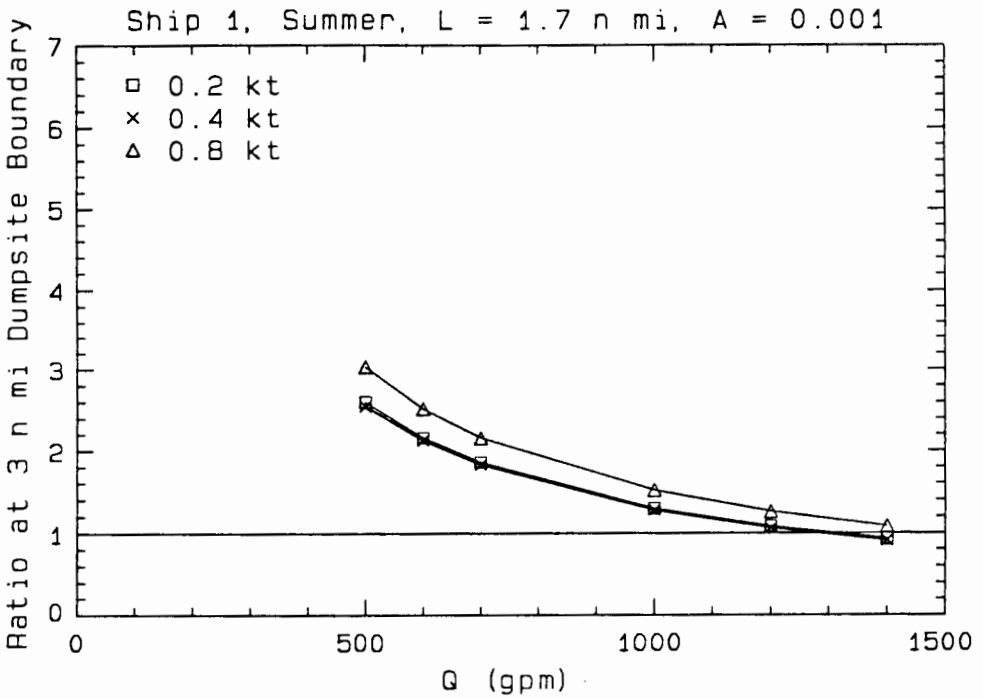


Figure SA-16. Ratio of dilution at perimeter of 3 n mi diameter disposal site, ship 1, summer & winter, L = 1.5 n mi, U_a = 0.2, 0.4, 0.8 knot (The ratio of 1 means a dilution equal to LPC; greater than 1 is dilution better than LPC.)



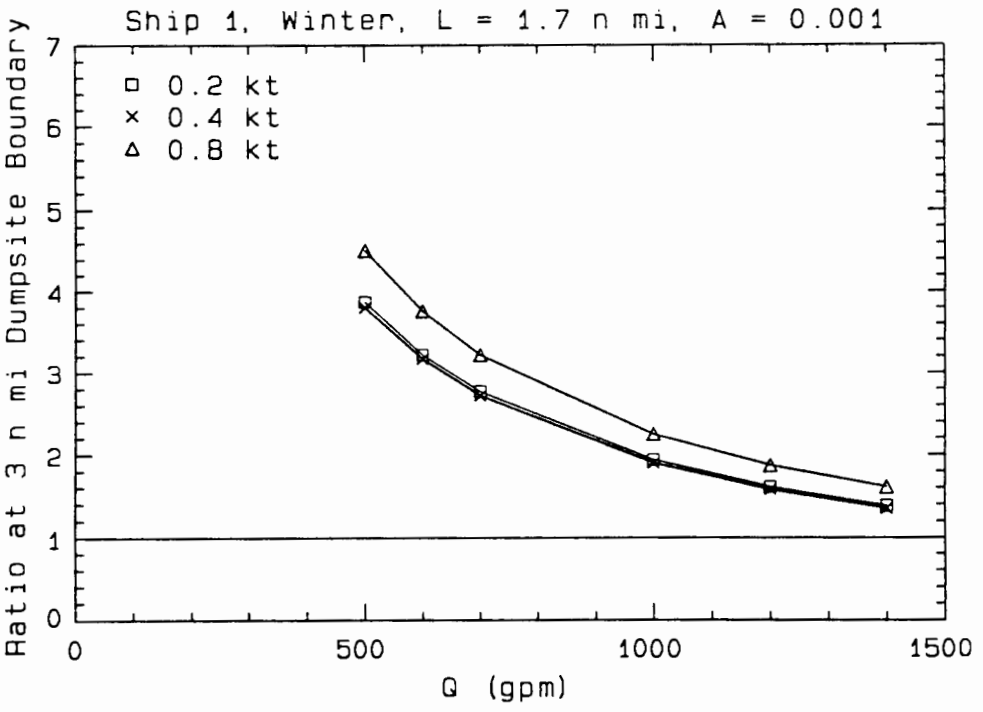
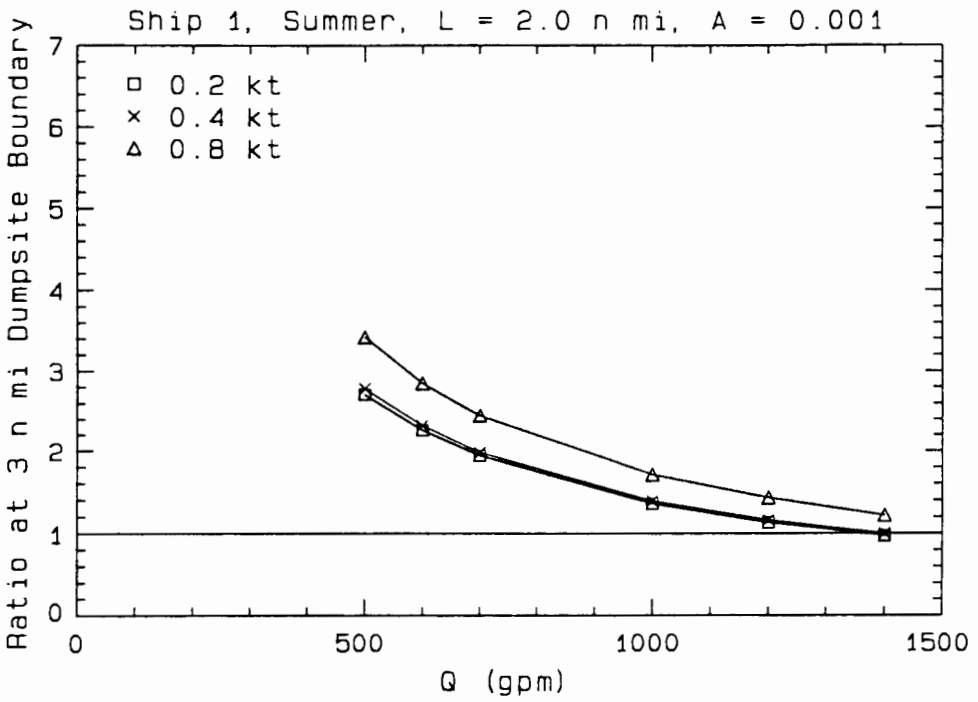


Figure SA-17. Ratio of dilution at perimeter of 3 n mi diameter disposal site, ship 1, summer & winter, L = 1.7 n mi, U_a = 0.2, 0.4, 0.8 knot (The ratio of 1 means a dilution equal to LPC; greater than 1 is dilution better than LPC.)



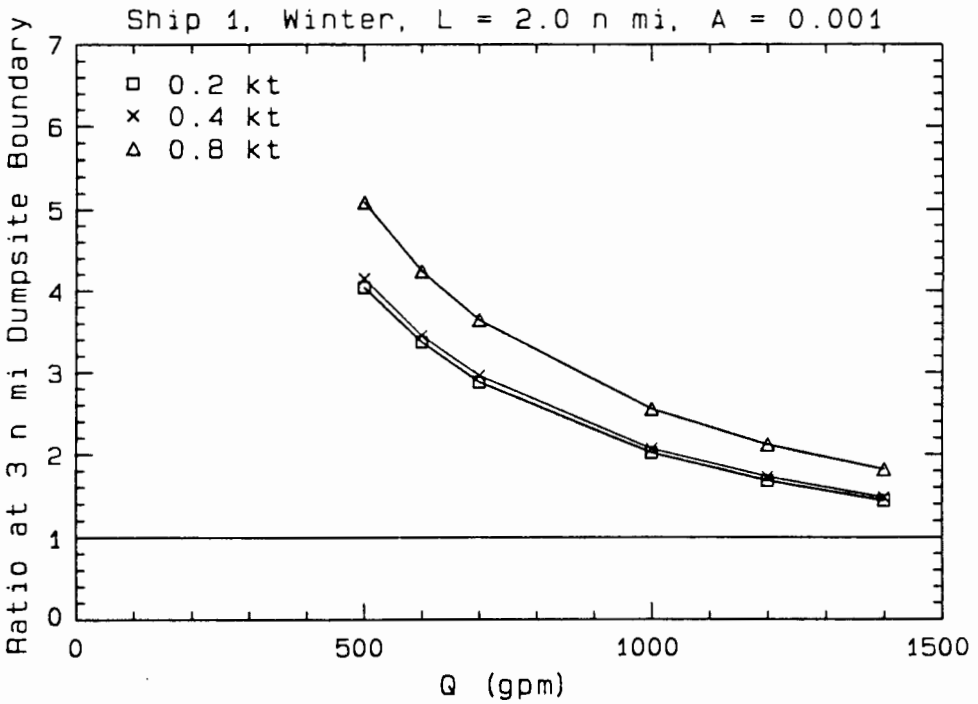


Figure SA-18. Ratio of dilution at perimeter of 3 n mi diameter disposal site, ship 1, summer & winter, L = 2.0 n mi, U_a = 0.2, 0.4, 0.8 knot (The ratio of 1 means a dilution equal to LPC; greater than 1 is dilution better than LPC.)

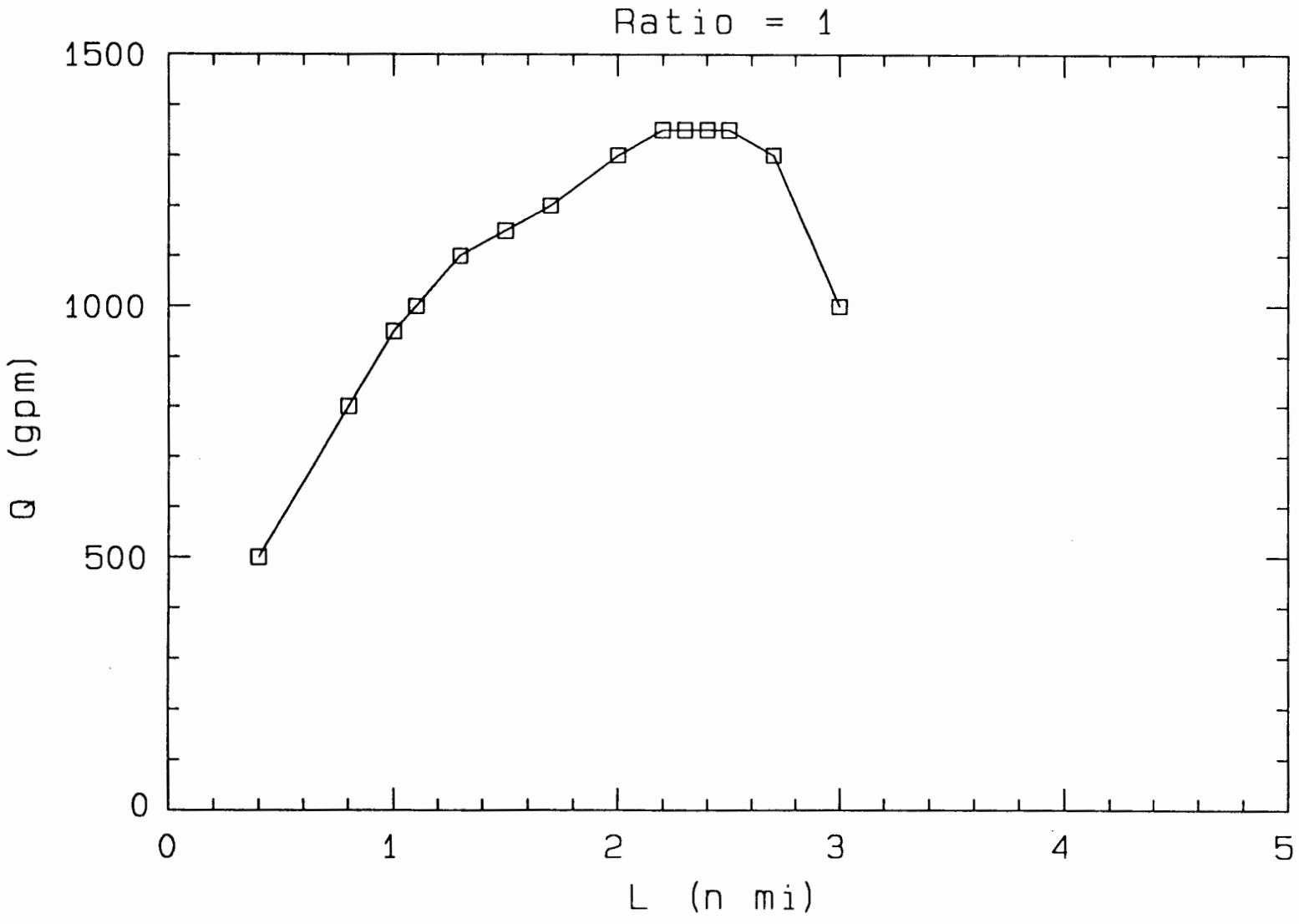
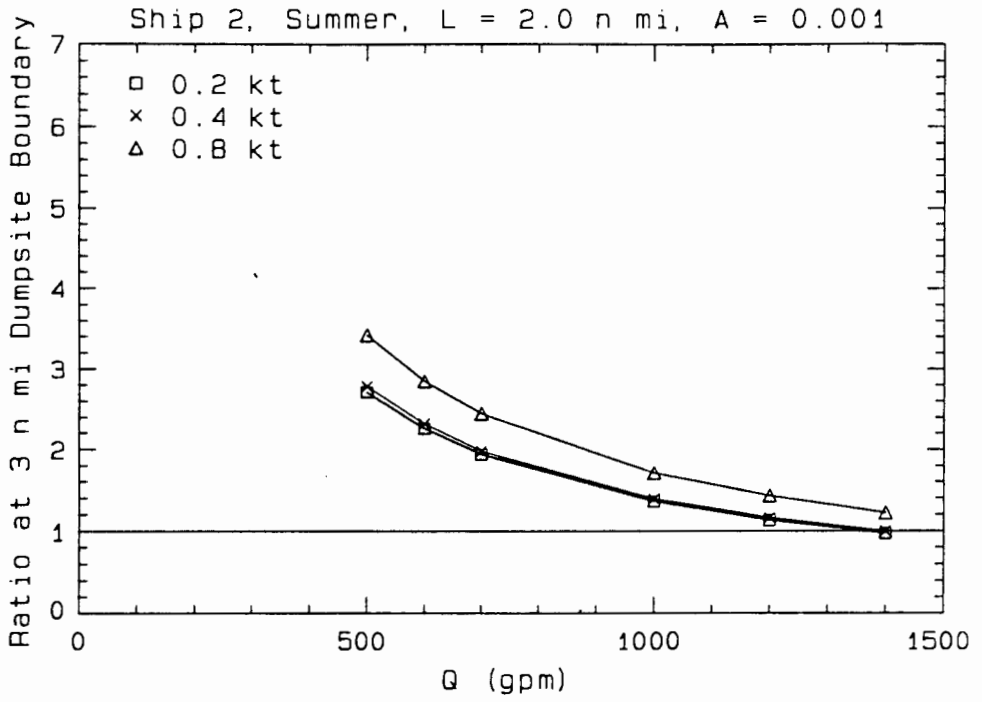


Figure SA-19. Maximum pumping rate vs initial plume width, summer, ship 1. Dilution ratio of 1 equals 1:250,000 LPC. The allowable gpm decreases after L = 2.5 n mi because the distance between the dump path L and the boundary is reduced.



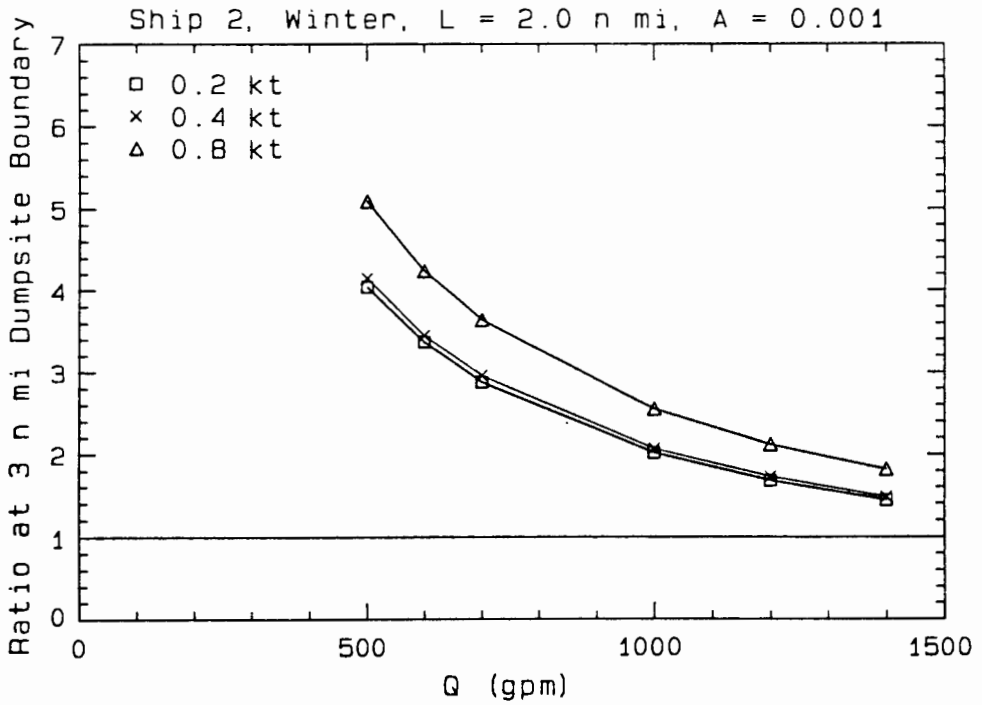
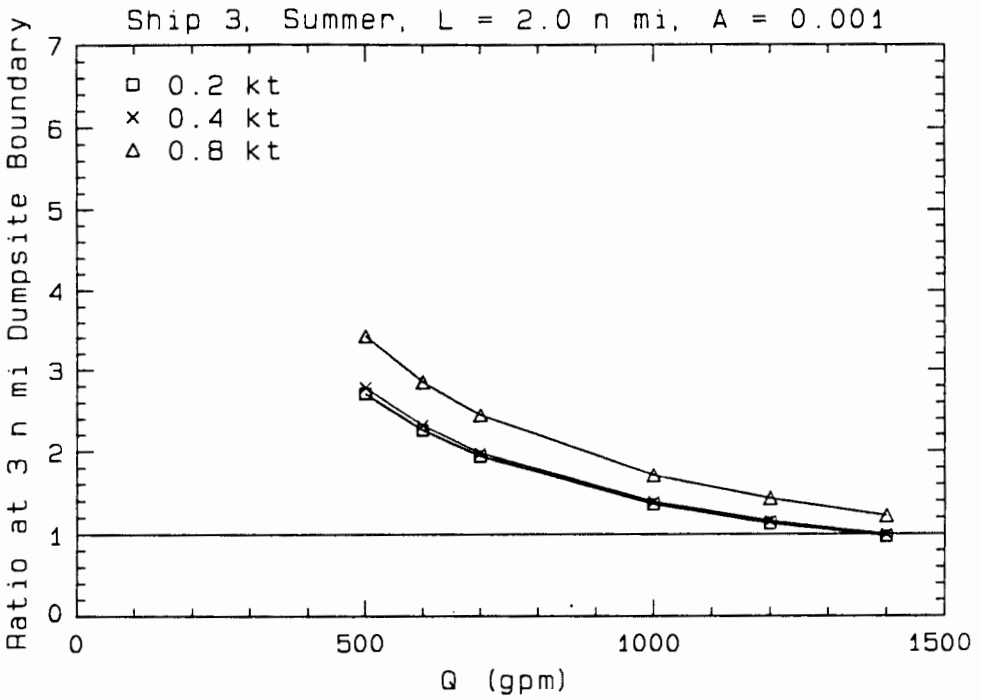


Figure SA-20. Ratio of dilution at perimeter of 3 n mi diameter disposal site, ship 2, summer & winter, L = 2.0 n mi, U_a = 0.2, 0.4, 0.8 knot (The ratio of 1 means a dilution equal to LPC; greater than 1 is dilution better than LPC.)



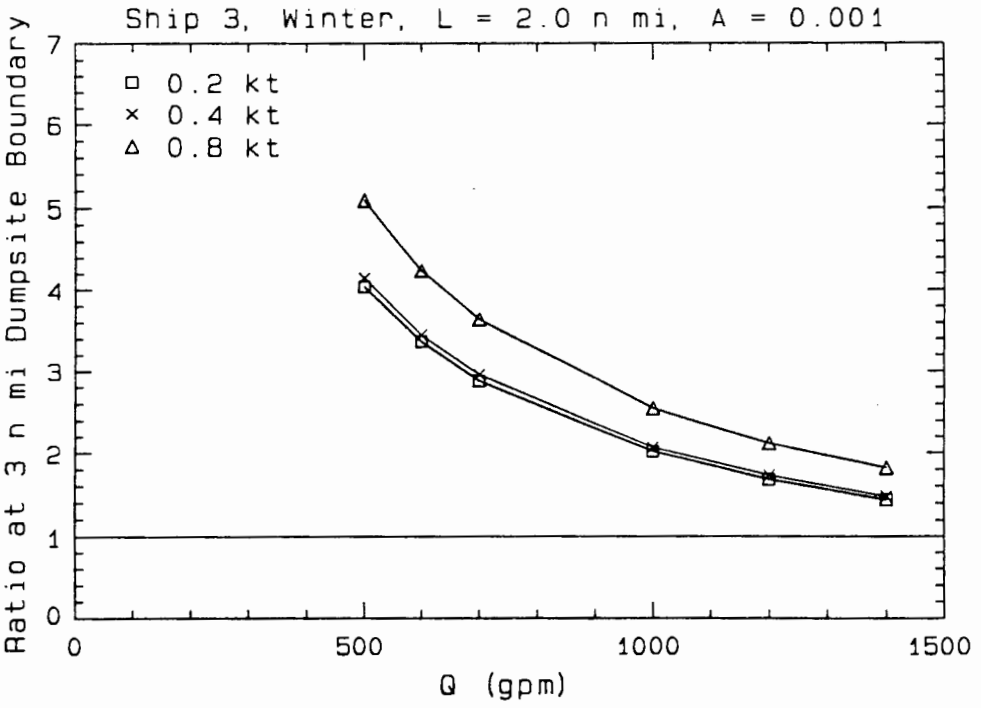
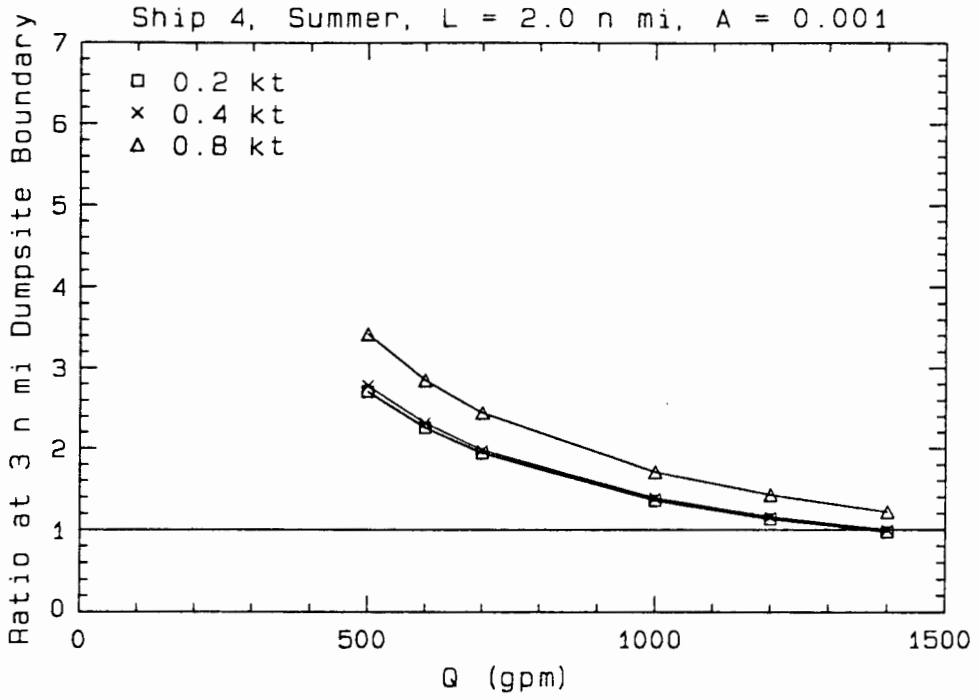


Figure SA-21. Ratio of dilution at perimeter of 3 n mi diameter disposal site, ship 3, summer & winter, L = 2.0 n mi, U_a = 0.2, 0.4, 0.8 knot (The ratio of 1 means a dilution equal to LPC; greater than 1 is dilution better than LPC.)



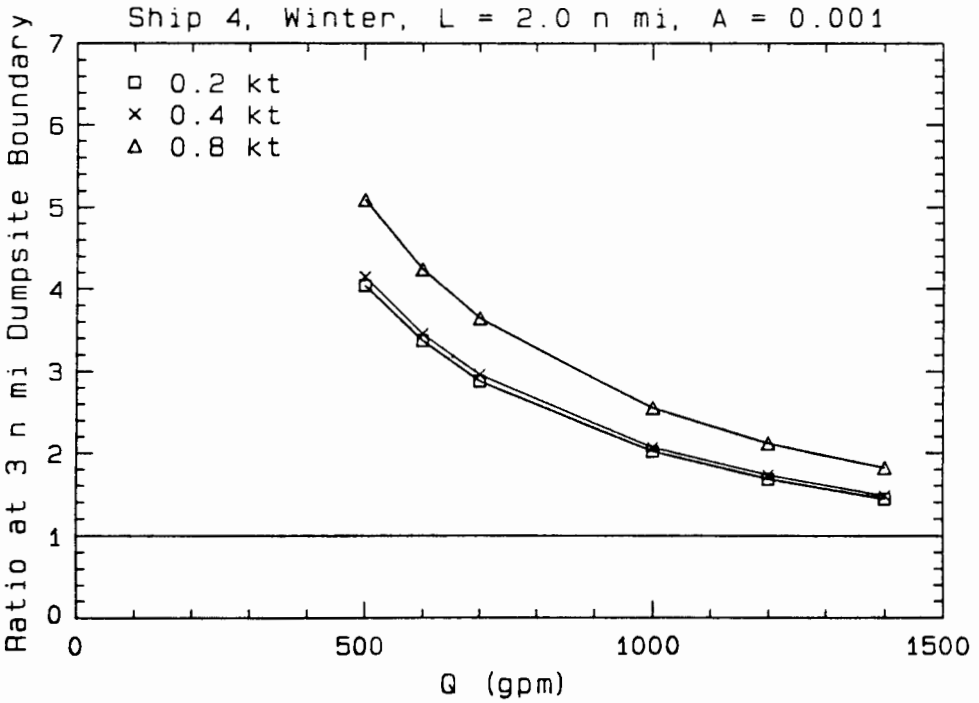
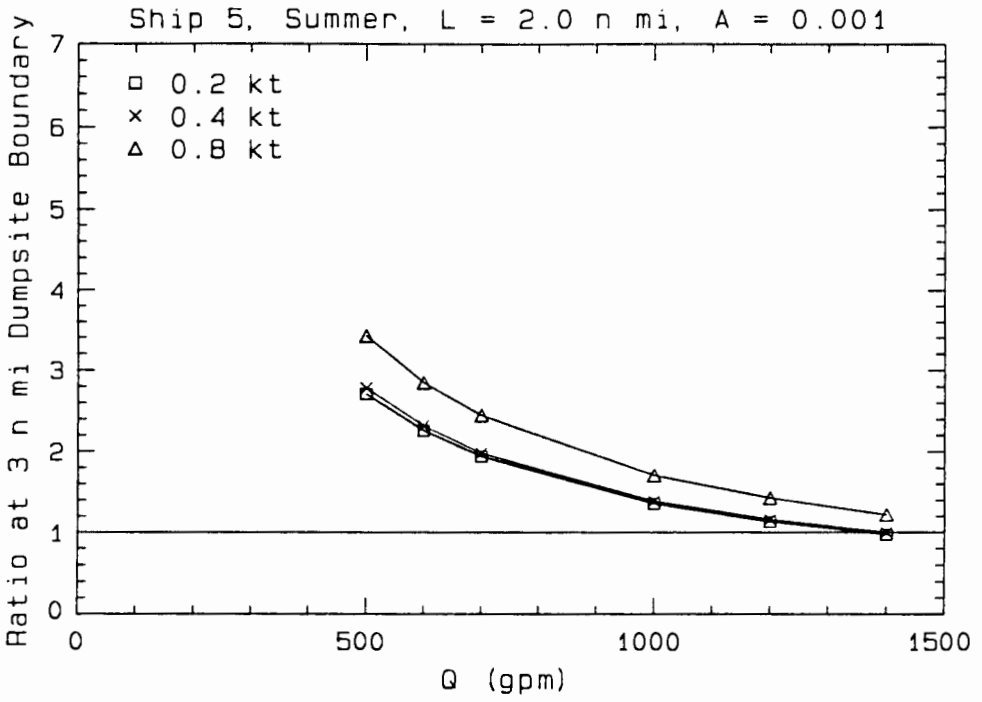


Figure SA-22. Ratio of dilution at perimeter of 3 n mi diameter disposal site, ship 4, summer & winter, L = 2.0 n mi, U_a = 0.2, 0.4, 0.8 knot (The ratio of 1 means a dilution equal to LPC; greater than 1 is dilution better than LPC.)



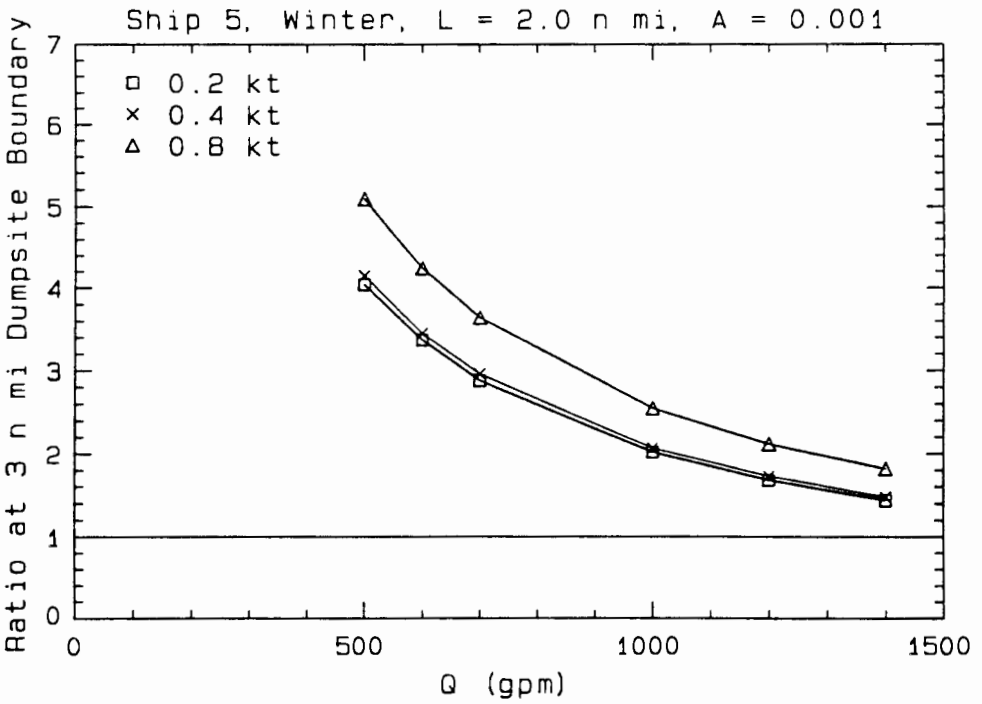


Figure SA-23. Ratio of dilution at perimeter of 3 n mi diameter disposal site, ship 5, summer & winter, L = 2.0 n mi, U_a = 0.2, 0.4, 0.8 knot (The ratio of 1 means a dilution equal to LPC; greater than 1 is dilution better than LPC.)

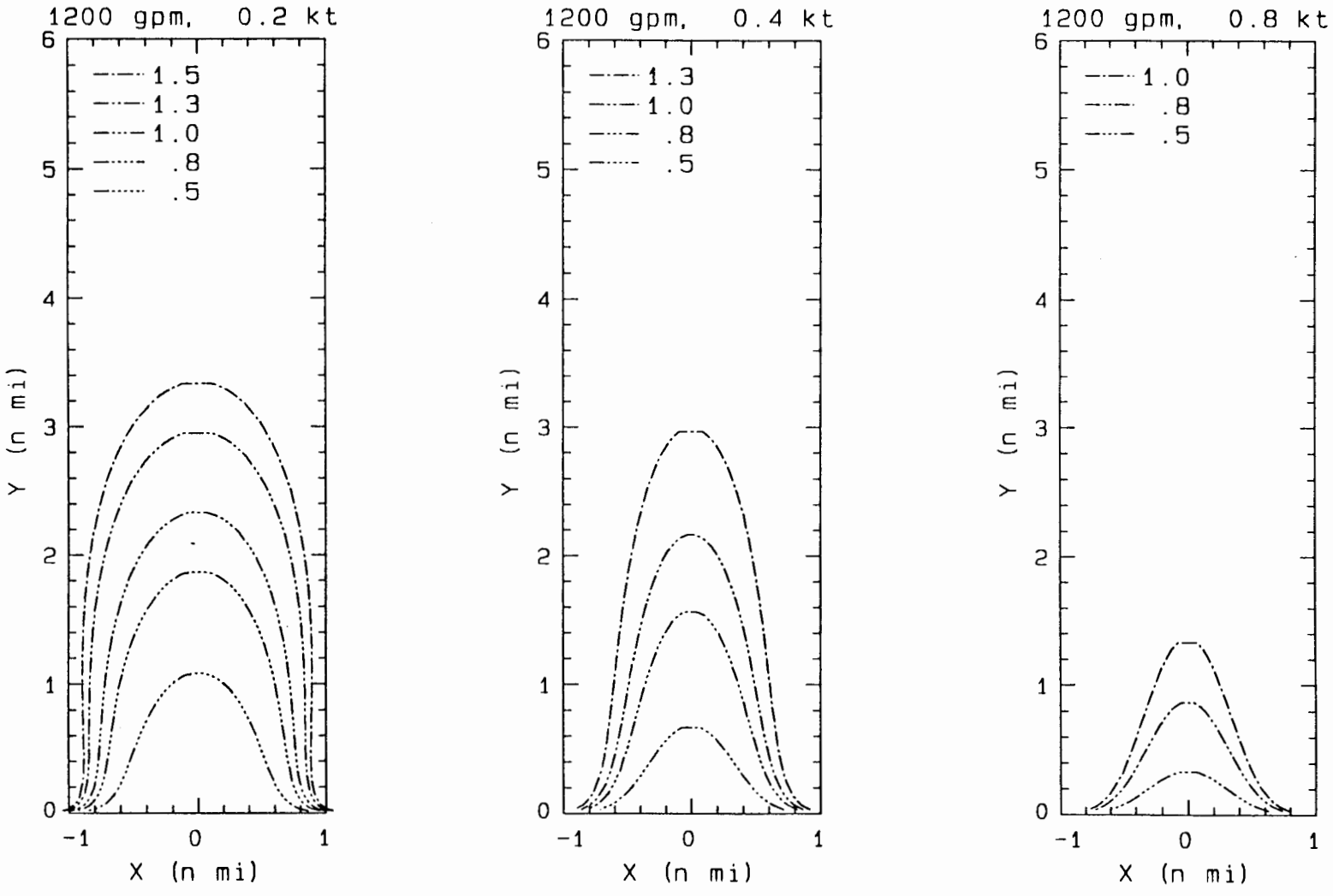


Figure SA-24. Equi-dilution lines of discharge waste plume, summer.
(Q = 1200 gpm, Vfall = 0.01 cm/s, ship 1, L = 2.0 n mi, U_a = 0.2, 0.4, 0.8 k)

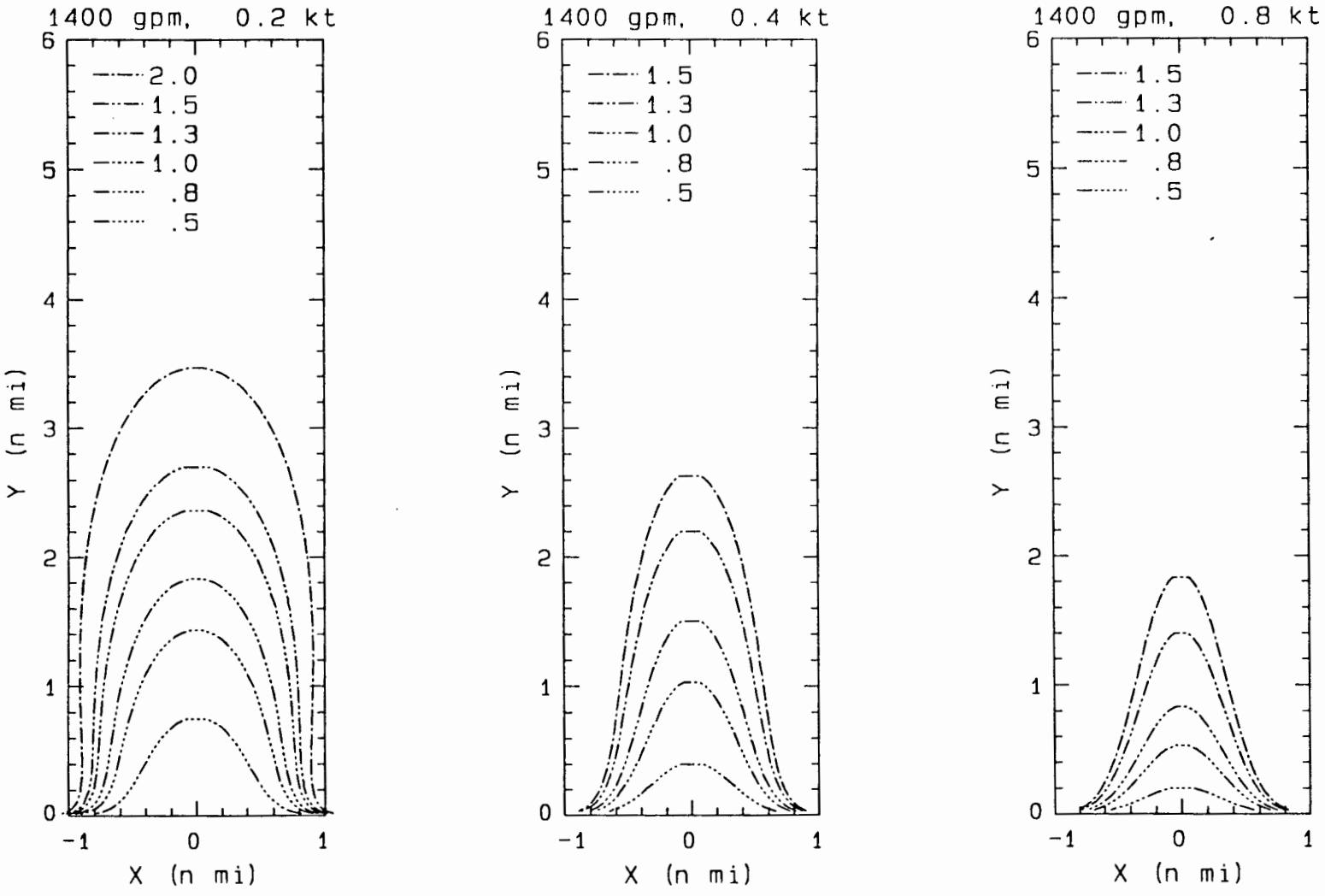


Figure SA-25. Equi-dilution lines of discharge waste plume, winter.
(Q = 1400 gpm, Vfall = 0.01 cm/s, ship 1, L = 2.0 n mi, U_a = 0.2, 0.4, 0.8 k)

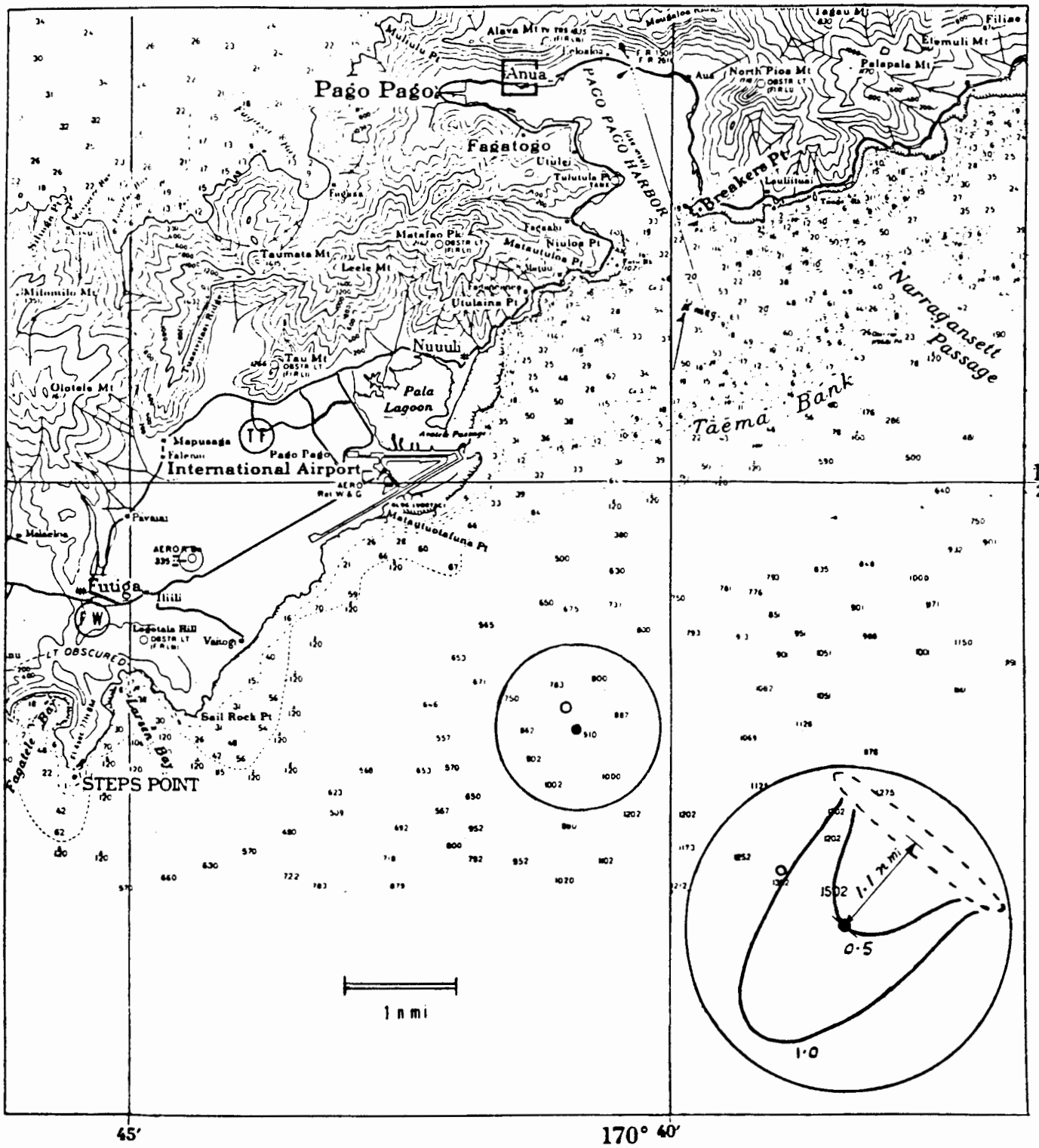


Figure SA-26. Equi-dilution lines of discharge waste plume, summer. (Q = 1200 gpm, Vfall = 0.01 cm/s, ship 1, L = 2.0 n mi, U_a = 0.2 k)

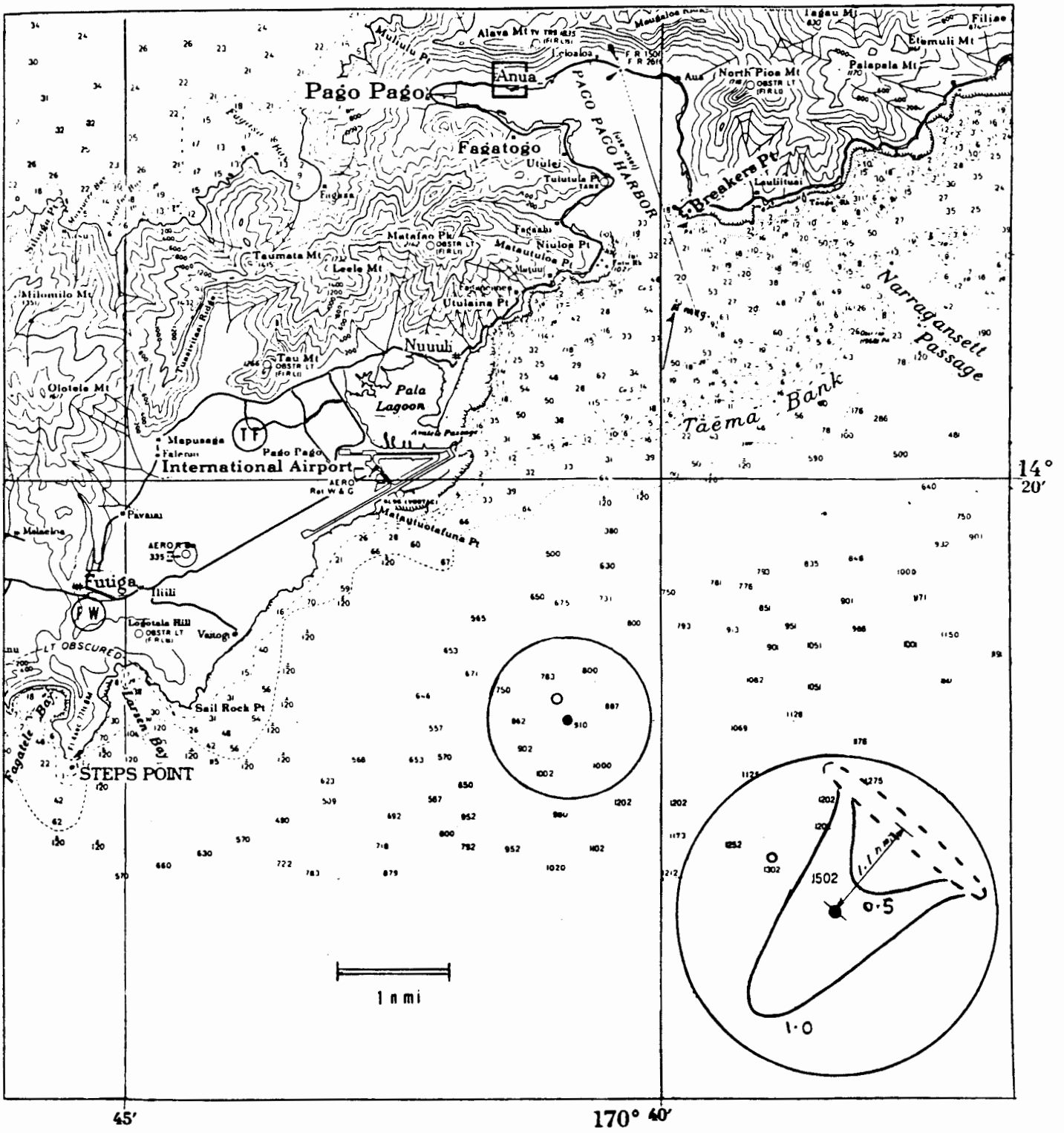


Figure SA-27. Equi-dilution lines of discharge waste plume, summer. (Q = 1200 gpm, Vfall = 0.01 cm/s, ship 1, L = 2.0 n mi, U_a = 0.4 k)

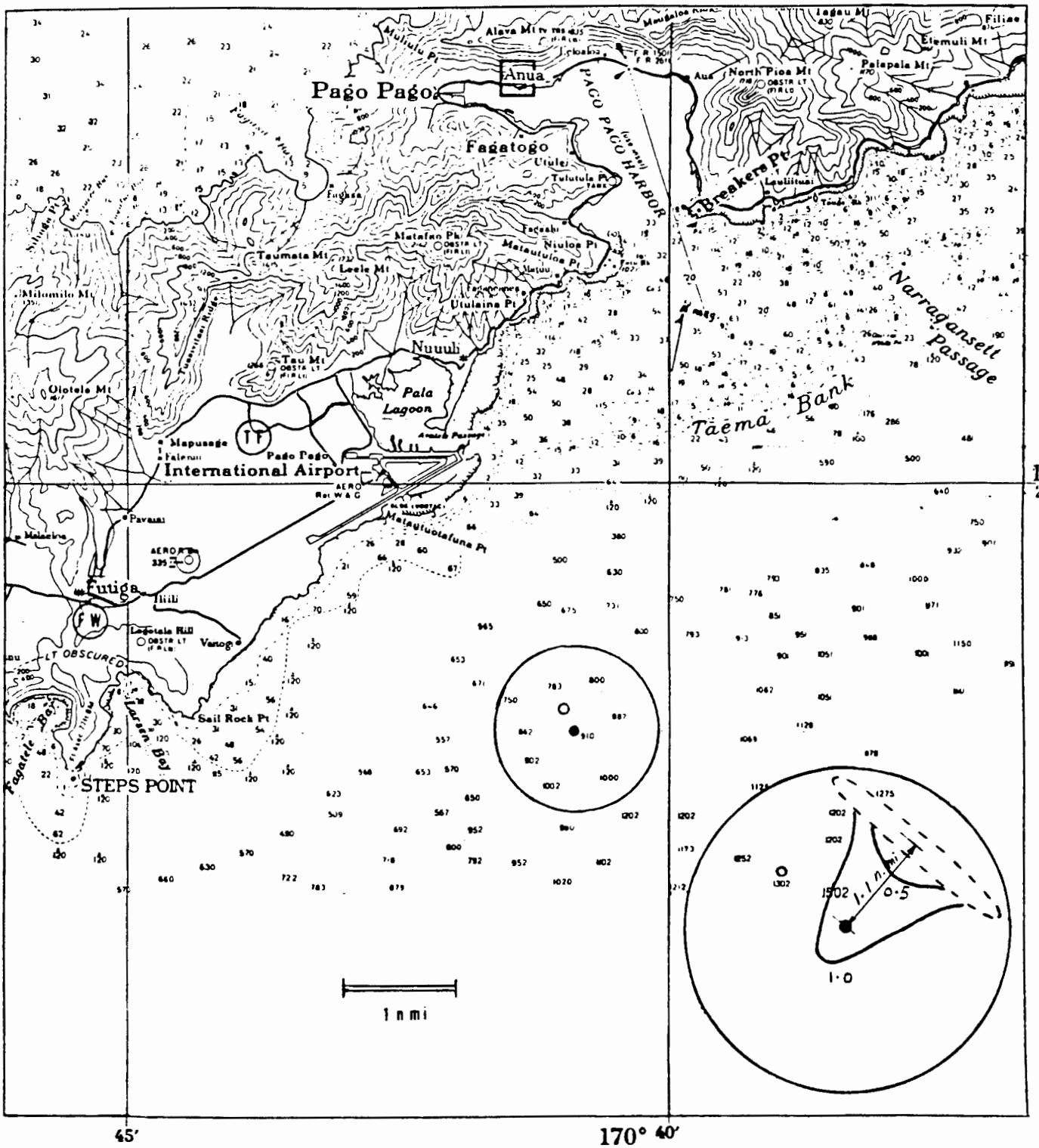


Figure SA-28. Equi-dilution lines of discharge waste plume, summer. (Q = 1200 gpm, Vfall = 0.01 cm/s, ship 1, L = 2.0 n mi, U_a = 0.8 k)

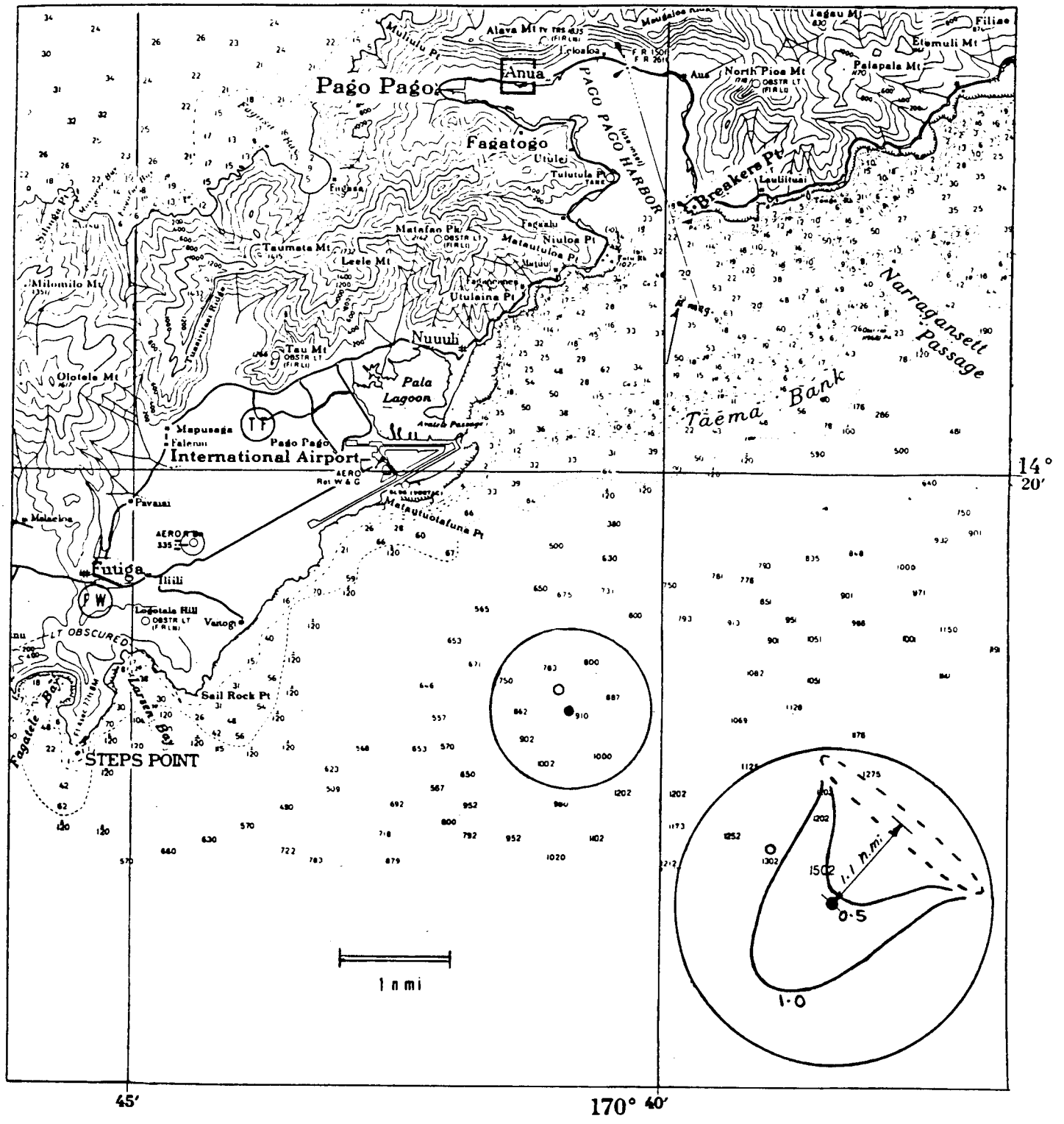


Figure SA-29. Equi-dilution lines of discharge waste plume, winter. (Q = 1400 gpm, Vfall = 0.01 cm/s, ship 1, L = 2.0 n mi, U_a = 0.2 k)

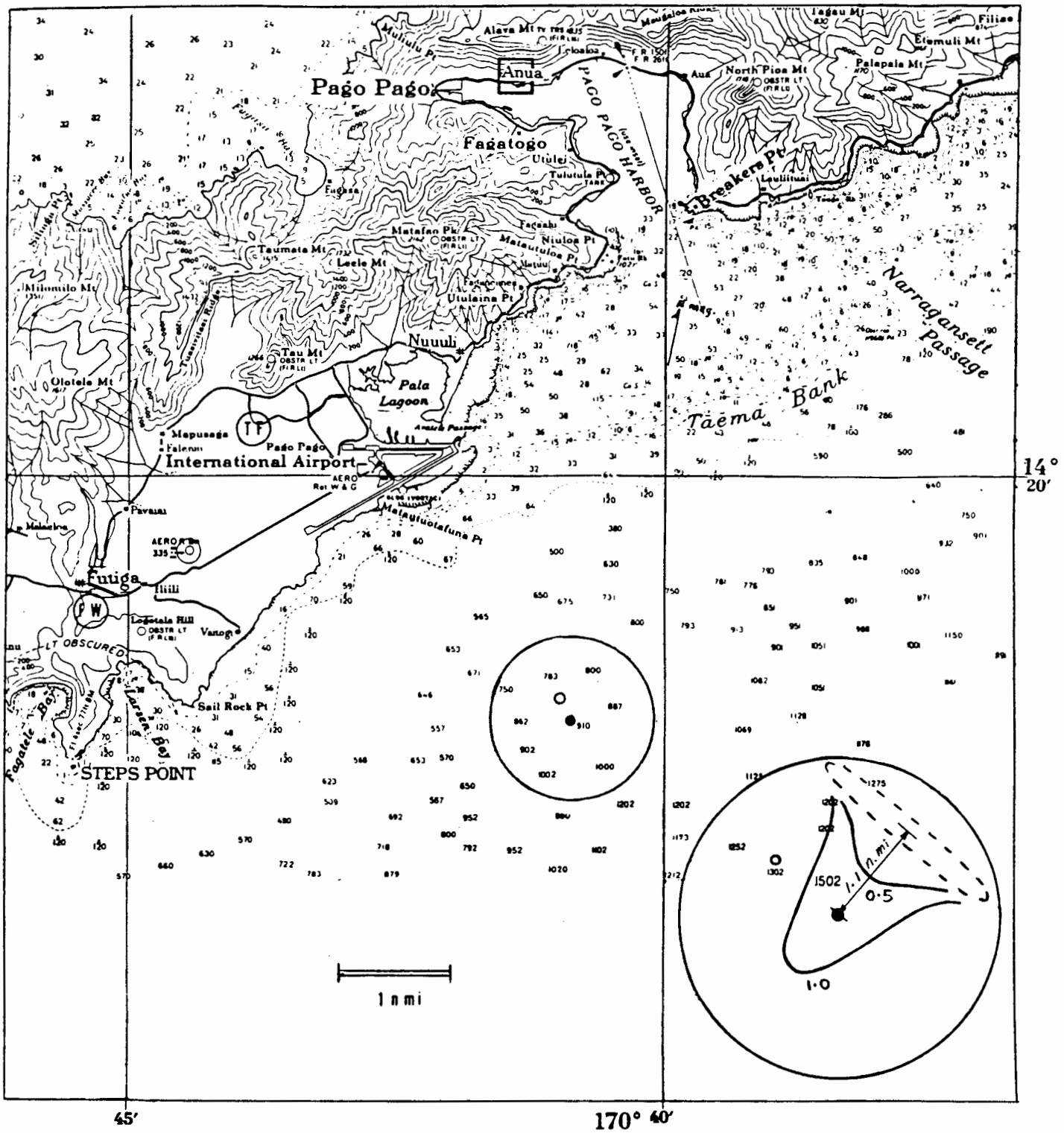


Figure SA-30. Equi-dilution lines of discharge waste plume, winter. (Q = 1400 gpm, Vfall = 0.01 cm/s, ship 1, L = 2.0 n mi, U_a = 0.4 k)

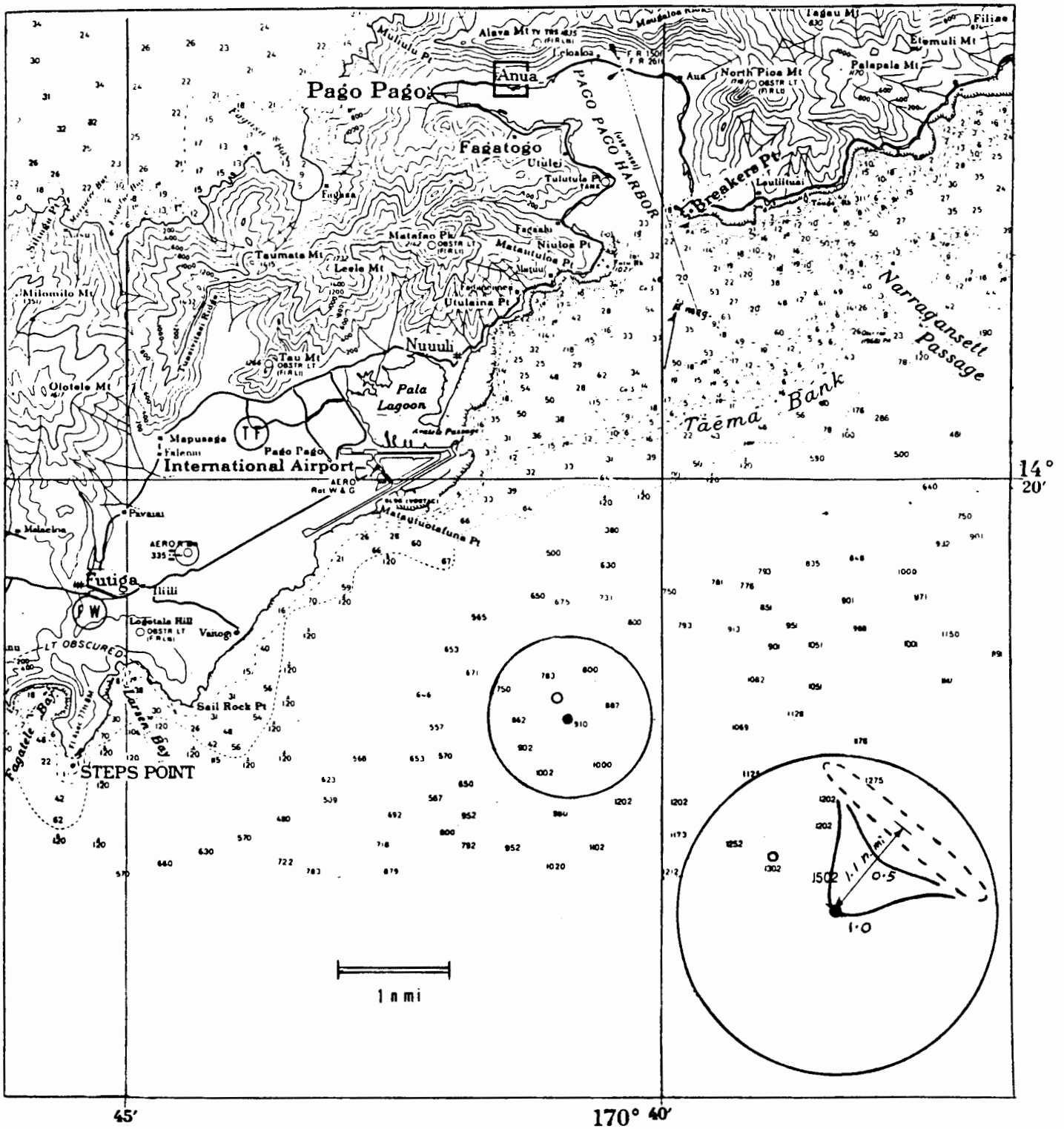


Figure SA-31. Equi-dilution lines of discharge waste plume, winter. (Q = 1400 gpm, Vfall = 0.01 cm/s, ship 1, L = 2.0 n mi, U_a = 0.8 k)

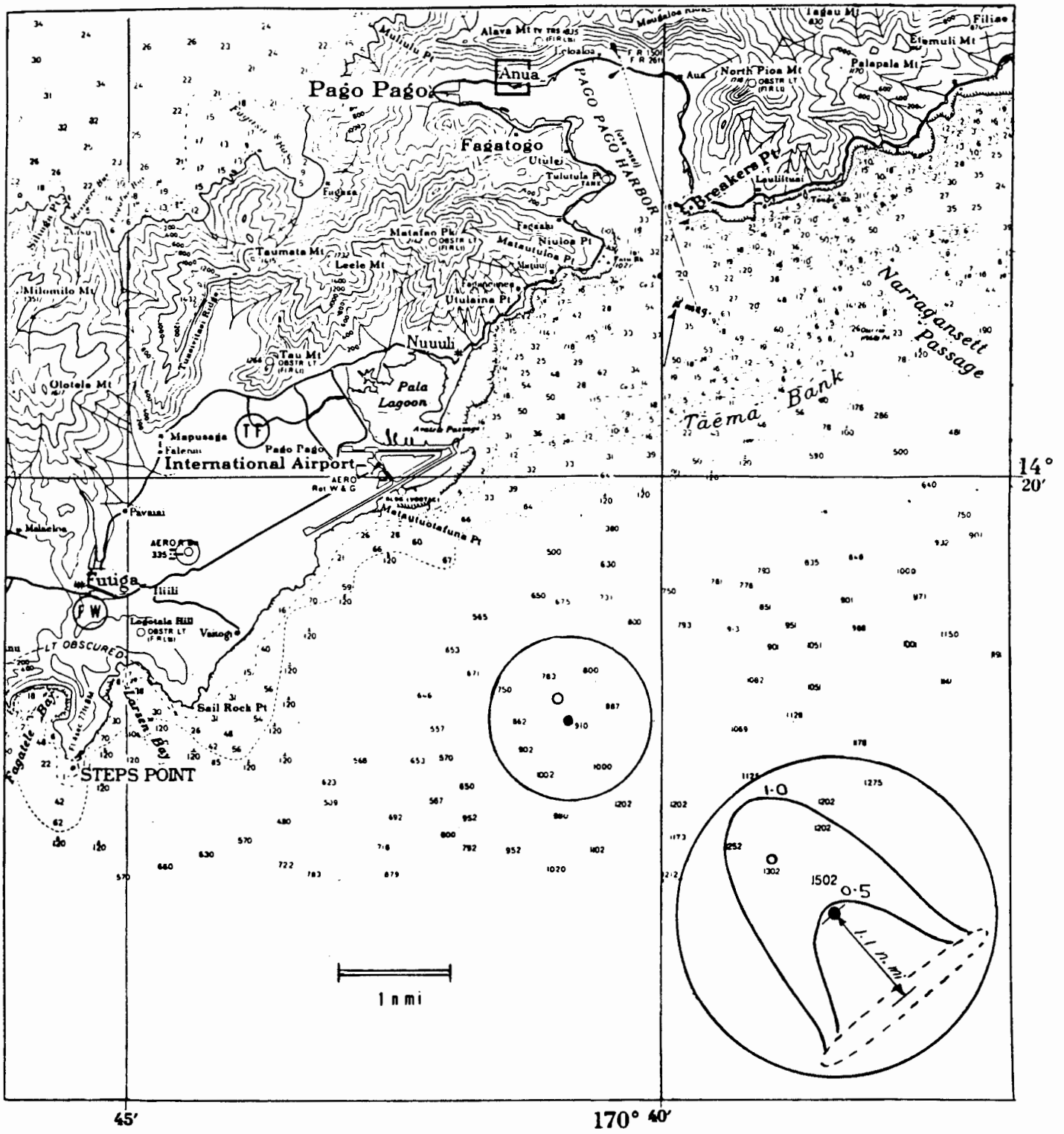


Figure SA-32. The worst-case illustration of plume direction. Equi-dilution lines of discharge waste plume, summer. (Q = 1200 gpm, Vfall = 0.01 cm/s, ship 1, L = 2.0 n mi, U_a = 0.2 k)

Table SA-1

Key Parameters of Vessels used for Dumping

Parameter	Ship 1	Ship 2	Ship 3	Ship 4 [1]	Ship 5 [2]
Length (m)	53.9	50.3	56.4	80.9	40.5
Beam (m)	10.4	11.6	11.3	15.5	7.8
Draft (m)	2.9	3.0	3.0	4.3	2.2
Capacity (gal)	250,000	233,000	288,000		
1 trip (gal/day)	200,000	200,000	200,000	200,000	200,000
2 trips (gal/day)	400,000	400,000	400,000	400,000	400,000

[1] Size of Ship 4 represents the upper limit of vessel size.

[2] Size of Ship 5 represents the lower limit of vessel size.

Table SA-2
Results of Waste Dilution - Summer - Ship 1
(L = 0.4 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 500 gpm							
5.0	1.0	.2	.000202	180.0	.06942	.28	18.0	.05478	.36	1.8	.05478	.36
7.5	1.5	.2	.000202	270.0	.04054	.49	27.0	.03330	.59	2.7	.03330	.59
10.0	2.0	.2	.000202	360.0	.02616	.76	36.0	.02250	.88	3.6	.02250	.88
12.5	2.5	.2	.000202	450.0	.01842	1.07	45.0	.01625	1.22	4.5	.01625	1.22
15.0	3.0	.2	.000202	540.0	.01372	1.44	54.0	.01231	1.61	5.4	.01231	1.61
17.5	3.5	.2	.000202	630.0	.01063	1.86	63.0	.00965	2.05	6.3	.00965	2.05
20.0	4.0	.2	.000202	720.0	.00849	2.33	72.0	.00777	2.54	7.2	.00777	2.54
22.5	4.5	.2	.000202	810.0	.00694	2.85	81.0	.00639	3.09	8.1	.00639	3.09
25.0	5.0	.2	.000202	900.0	.00578	3.42	90.0	.00535	3.69	9.0	.00535	3.69
2.5	1.0	.4	.000202	90.0	.05520	.36	9.0	.05520	.36	.9	.05520	.36
3.8	1.5	.4	.000202	135.0	.04271	.46	13.5	.03760	.53	1.4	.03760	.53
5.0	2.0	.4	.000202	180.0	.03490	.57	18.0	.02749	.72	1.8	.02749	.72
6.3	2.5	.4	.000202	225.0	.02673	.74	22.5	.02106	.94	2.3	.02106	.94
7.5	3.0	.4	.000202	270.0	.02034	.97	27.0	.01669	1.18	2.7	.01669	1.18
8.8	3.5	.4	.000202	315.0	.01610	1.23	31.5	.01357	1.46	3.1	.01357	1.46
10.0	4.0	.4	.000202	360.0	.01311	1.51	36.0	.01127	1.75	3.6	.01127	1.75
11.3	4.5	.4	.000202	405.0	.01090	1.81	40.5	.00951	2.08	4.0	.00951	2.08
12.5	5.0	.4	.000202	450.0	.00923	2.14	45.0	.00814	2.43	4.5	.00814	2.43
1.3	1.0	.8	.000202	45.0	.04613	.43	4.5	.04613	.43	.5	.04613	.43
1.9	1.5	.8	.000202	67.5	.03491	.57	6.8	.03491	.57	.7	.03491	.57
2.5	2.0	.8	.000202	90.0	.02765	.71	9.0	.02765	.71	.9	.02765	.71
3.1	2.5	.8	.000202	112.5	.02380	.83	11.3	.02256	.88	1.1	.02256	.88
3.8	3.0	.8	.000202	135.0	.02139	.92	13.5	.01882	1.05	1.4	.01882	1.05
4.4	3.5	.8	.000202	157.5	.01929	1.02	15.8	.01598	1.24	1.6	.01598	1.24
5.0	4.0	.8	.000202	180.0	.01748	1.13	18.0	.01375	1.44	1.8	.01375	1.44
5.6	4.5	.8	.000202	202.5	.01574	1.26	20.3	.01198	1.65	2.0	.01198	1.65
6.3	5.0	.8	.000202	225.0	.01344	1.47	22.5	.01054	1.88	2.3	.01054	1.88
					Q = 600 gpm							
5.0	1.0	.2	.000243	180.0	.06942	.24	18.0	.05478	.30	1.8	.05478	.30
7.5	1.5	.2	.000243	270.0	.04054	.41	27.0	.03330	.49	2.7	.03330	.49
10.0	2.0	.2	.000243	360.0	.02616	.63	36.0	.02250	.73	3.6	.02250	.73
12.5	2.5	.2	.000243	450.0	.01842	.89	45.0	.01625	1.01	4.5	.01625	1.01
15.0	3.0	.2	.000243	540.0	.01372	1.20	54.0	.01231	1.34	5.4	.01231	1.34
17.5	3.5	.2	.000243	630.0	.01063	1.55	63.0	.00965	1.71	6.3	.00965	1.71
20.0	4.0	.2	.000243	720.0	.00849	1.94	72.0	.00777	2.12	7.2	.00777	2.12
22.5	4.5	.2	.000243	810.0	.00694	2.37	81.0	.00639	2.58	8.1	.00639	2.58
25.0	5.0	.2	.000243	900.0	.00578	2.85	90.0	.00535	3.08	9.0	.00535	3.08
2.5	1.0	.4	.000243	90.0	.05520	.30	9.0	.05520	.30	.9	.05520	.30
3.8	1.5	.4	.000243	135.0	.04271	.39	13.5	.03760	.44	1.4	.03760	.44
5.0	2.0	.4	.000243	180.0	.03490	.47	18.0	.02749	.60	1.8	.02749	.60
6.3	2.5	.4	.000243	225.0	.02673	.62	22.5	.02106	.78	2.3	.02106	.78
7.5	3.0	.4	.000243	270.0	.02034	.81	27.0	.01669	.99	2.7	.01669	.99
8.8	3.5	.4	.000243	315.0	.01610	1.02	31.5	.01357	1.21	3.1	.01357	1.21
10.0	4.0	.4	.000243	360.0	.01311	1.26	36.0	.01127	1.46	3.6	.01127	1.46
11.3	4.5	.4	.000243	405.0	.01090	1.51	40.5	.00951	1.73	4.0	.00951	1.73
12.5	5.0	.4	.000243	450.0	.00923	1.78	45.0	.00814	2.02	4.5	.00814	2.02
1.3	1.0	.8	.000243	45.0	.04613	.36	4.5	.04613	.36	.5	.04613	.36
1.9	1.5	.8	.000243	67.5	.03491	.47	6.8	.03491	.47	.7	.03491	.47
2.5	2.0	.8	.000243	90.0	.02765	.60	9.0	.02765	.60	.9	.02765	.60
3.1	2.5	.8	.000243	112.5	.02380	.69	11.3	.02256	.73	1.1	.02256	.73
3.8	3.0	.8	.000243	135.0	.02139	.77	13.5	.01882	.87	1.4	.01882	.87
4.4	3.5	.8	.000243	157.5	.01929	.85	15.8	.01598	1.03	1.6	.01598	1.03
5.0	4.0	.8	.000243	180.0	.01748	.94	18.0	.01375	1.20	1.8	.01375	1.20
5.6	4.5	.8	.000243	202.5	.01574	1.05	20.3	.01198	1.37	2.0	.01198	1.37
6.3	5.0	.8	.000243	225.0	.01344	1.23	22.5	.01054	1.56	2.3	.01054	1.56

Table SA-2 (continued)
Results of Waste Dilution - Summer - Ship 1
(L = 0.4 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 700 gpm								
5.0	1.0	.2	.000283	180.0	.06942	.20	18.0	.05478	.26	1.8	.05478	.26
7.5	1.5	.2	.000283	270.0	.04054	.35	27.0	.03330	.42	2.7	.03330	.42
10.0	2.0	.2	.000283	360.0	.02616	.54	36.0	.02250	.63	3.6	.02250	.63
12.5	2.5	.2	.000283	450.0	.01842	.77	45.0	.01625	.87	4.5	.01625	.87
15.0	3.0	.2	.000283	540.0	.01372	1.03	54.0	.01231	1.15	5.4	.01231	1.15
17.5	3.5	.2	.000283	630.0	.01063	1.33	63.0	.00965	1.46	6.3	.00965	1.46
20.0	4.0	.2	.000283	720.0	.00849	1.66	72.0	.00777	1.82	7.2	.00777	1.82
22.5	4.5	.2	.000283	810.0	.00694	2.03	81.0	.00639	2.21	8.1	.00639	2.21
25.0	5.0	.2	.000283	900.0	.00578	2.44	90.0	.00535	2.64	9.0	.00535	2.64
2.5	1.0	.4	.000283	90.0	.05520	.26	9.0	.05520	.26	.9	.05520	.26
3.8	1.5	.4	.000283	135.0	.04271	.33	13.5	.03760	.38	1.4	.03760	.38
5.0	2.0	.4	.000283	180.0	.03490	.40	18.0	.02749	.51	1.8	.02749	.51
6.3	2.5	.4	.000283	225.0	.02673	.53	22.5	.02106	.67	2.3	.02106	.67
7.5	3.0	.4	.000283	270.0	.02034	.69	27.0	.01669	.85	2.7	.01669	.85
8.8	3.5	.4	.000283	315.0	.01610	.88	31.5	.01357	1.04	3.1	.01357	1.04
10.0	4.0	.4	.000283	360.0	.01311	1.08	36.0	.01127	1.25	3.6	.01127	1.25
11.3	4.5	.4	.000283	405.0	.01090	1.29	40.5	.00951	1.48	4.0	.00951	1.48
12.5	5.0	.4	.000283	450.0	.00923	1.53	45.0	.00814	1.73	4.5	.00814	1.73
1.3	1.0	.8	.000283	45.0	.04613	.31	4.5	.04613	.31	.5	.04613	.31
1.9	1.5	.8	.000283	67.5	.03491	.40	6.8	.03491	.40	.7	.03491	.40
2.5	2.0	.8	.000283	90.0	.02765	.51	9.0	.02765	.51	.9	.02765	.51
3.1	2.5	.8	.000283	112.5	.02380	.59	11.3	.02256	.63	1.1	.02256	.63
3.8	3.0	.8	.000283	135.0	.02139	.66	13.5	.01882	.75	1.4	.01882	.75
4.4	3.5	.8	.000283	157.5	.01929	.73	15.8	.01598	.88	1.6	.01598	.88
5.0	4.0	.8	.000283	180.0	.01748	.81	18.0	.01375	1.03	1.8	.01375	1.03
5.6	4.5	.8	.000283	202.5	.01574	.90	20.3	.01198	1.18	2.0	.01198	1.18
6.3	5.0	.8	.000283	225.0	.01344	1.05	22.5	.01054	1.34	2.3	.01054	1.34
				Q = 1000 gpm								
5.0	1.0	.2	.000405	180.0	.06942	.14	18.0	.05478	.18	1.8	.05478	.18
7.5	1.5	.2	.000405	270.0	.04054	.24	27.0	.03330	.30	2.7	.03330	.30
10.0	2.0	.2	.000405	360.0	.02616	.38	36.0	.02250	.44	3.6	.02250	.44
12.5	2.5	.2	.000405	450.0	.01842	.54	45.0	.01625	.61	4.5	.01625	.61
15.0	3.0	.2	.000405	540.0	.01372	.72	54.0	.01231	.80	5.4	.01231	.80
17.5	3.5	.2	.000405	630.0	.01063	.93	63.0	.00965	1.02	6.3	.00965	1.02
20.0	4.0	.2	.000405	720.0	.00849	1.16	72.0	.00777	1.27	7.2	.00777	1.27
22.5	4.5	.2	.000405	810.0	.00694	1.42	81.0	.00639	1.55	8.1	.00639	1.55
25.0	5.0	.2	.000405	900.0	.00578	1.71	90.0	.00535	1.85	9.0	.00535	1.85
2.5	1.0	.4	.000405	90.0	.05520	.18	9.0	.05520	.18	.9	.05520	.18
3.8	1.5	.4	.000405	135.0	.04271	.23	13.5	.03760	.26	1.4	.03760	.26
5.0	2.0	.4	.000405	180.0	.03490	.28	18.0	.02749	.36	1.8	.02749	.36
6.3	2.5	.4	.000405	225.0	.02673	.37	22.5	.02106	.47	2.3	.02106	.47
7.5	3.0	.4	.000405	270.0	.02034	.49	27.0	.01669	.59	2.7	.01669	.59
8.8	3.5	.4	.000405	315.0	.01610	.61	31.5	.01357	.73	3.1	.01357	.73
10.0	4.0	.4	.000405	360.0	.01311	.75	36.0	.01127	.88	3.6	.01127	.88
11.3	4.5	.4	.000405	405.0	.01090	.91	40.5	.00951	1.04	4.0	.00951	1.04
12.5	5.0	.4	.000405	450.0	.00923	1.07	45.0	.00814	1.21	4.5	.00814	1.21
1.3	1.0	.8	.000405	45.0	.04613	.21	4.5	.04613	.21	.5	.04613	.21
1.9	1.5	.8	.000405	67.5	.03491	.28	6.8	.03491	.28	.7	.03491	.28
2.5	2.0	.8	.000405	90.0	.02765	.36	9.0	.02765	.36	.9	.02765	.36
3.1	2.5	.8	.000405	112.5	.02380	.42	11.3	.02256	.44	1.1	.02256	.44
3.8	3.0	.8	.000405	135.0	.02139	.46	13.5	.01882	.52	1.4	.01882	.52
4.4	3.5	.8	.000405	157.5	.01929	.51	15.8	.01598	.62	1.6	.01598	.62
5.0	4.0	.8	.000405	180.0	.01748	.57	18.0	.01375	.72	1.8	.01375	.72
5.6	4.5	.8	.000405	202.5	.01574	.63	20.3	.01198	.82	2.0	.01198	.82
6.3	5.0	.8	.000405	225.0	.01344	.74	22.5	.01054	.94	2.3	.01054	.94

Table SA-2 (continued)
Results of Waste Dilution - Summer - Ship 1
(L = 0.4 n mi, A = 0.001 $ft^{2/3}$/sec)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 1200 gpm								
5.0	1.0	.2	.000486	180.0	.06942	.12	18.0	.05478	.15	1.8	.05478	.15
7.5	1.5	.2	.000486	270.0	.04054	.20	27.0	.03330	.25	2.7	.03330	.25
10.0	2.0	.2	.000486	360.0	.02616	.31	36.0	.02250	.37	3.6	.02250	.37
12.5	2.5	.2	.000486	450.0	.01842	.45	45.0	.01625	.51	4.5	.01625	.51
15.0	3.0	.2	.000486	540.0	.01372	.60	54.0	.01231	.67	5.4	.01231	.67
17.5	3.5	.2	.000486	630.0	.01063	.77	63.0	.00965	.85	6.3	.00965	.85
20.0	4.0	.2	.000486	720.0	.00849	.97	72.0	.00777	1.06	7.2	.00777	1.06
22.5	4.5	.2	.000486	810.0	.00694	1.19	81.0	.00639	1.29	8.1	.00639	1.29
25.0	5.0	.2	.000486	900.0	.00578	1.42	90.0	.00535	1.54	9.0	.00535	1.54
2.5	1.0	.4	.000486	90.0	.05520	.15	9.0	.05520	.15	.9	.05520	.15
3.8	1.5	.4	.000486	135.0	.04271	.19	13.5	.03760	.22	1.4	.03760	.22
5.0	2.0	.4	.000486	180.0	.03490	.24	18.0	.02749	.30	1.8	.02749	.30
6.3	2.5	.4	.000486	225.0	.02673	.31	22.5	.02106	.39	2.3	.02106	.39
7.5	3.0	.4	.000486	270.0	.02034	.40	27.0	.01669	.49	2.7	.01669	.49
8.8	3.5	.4	.000486	315.0	.01610	.51	31.5	.01357	.61	3.1	.01357	.61
10.0	4.0	.4	.000486	360.0	.01311	.63	36.0	.01127	.73	3.6	.01127	.73
11.3	4.5	.4	.000486	405.0	.01090	.76	40.5	.00951	.87	4.0	.00951	.87
12.5	5.0	.4	.000486	450.0	.00923	.89	45.0	.00814	1.01	4.5	.00814	1.01
1.3	1.0	.8	.000486	45.0	.04613	.18	4.5	.04613	.18	.5	.04613	.18
1.9	1.5	.8	.000486	67.5	.03491	.24	6.8	.03491	.24	.7	.03491	.24
2.5	2.0	.8	.000486	90.0	.02765	.30	9.0	.02765	.30	.9	.02765	.30
3.1	2.5	.8	.000486	112.5	.02380	.35	11.3	.02256	.36	1.1	.02256	.36
3.8	3.0	.8	.000486	135.0	.02139	.38	13.5	.01882	.44	1.4	.01882	.44
4.4	3.5	.8	.000486	157.5	.01929	.43	15.8	.01598	.52	1.6	.01598	.52
5.0	4.0	.8	.000486	180.0	.01748	.47	18.0	.01375	.60	1.8	.01375	.60
5.6	4.5	.8	.000486	202.5	.01574	.52	20.3	.01198	.69	2.0	.01198	.69
6.3	5.0	.8	.000486	225.0	.01344	.61	22.5	.01054	.78	2.3	.01054	.78
				Q = 1400 gpm								
5.0	1.0	.2	.000567	180.0	.06942	.10	18.0	.05478	.13	1.8	.05478	.13
7.5	1.5	.2	.000567	270.0	.04054	.17	27.0	.03330	.21	2.7	.03330	.21
10.0	2.0	.2	.000567	360.0	.02616	.27	36.0	.02250	.31	3.6	.02250	.31
12.5	2.5	.2	.000567	450.0	.01842	.38	45.0	.01625	.43	4.5	.01625	.43
15.0	3.0	.2	.000567	540.0	.01372	.51	54.0	.01231	.57	5.4	.01231	.57
17.5	3.5	.2	.000567	630.0	.01063	.66	63.0	.00965	.73	6.3	.00965	.73
20.0	4.0	.2	.000567	720.0	.00849	.83	72.0	.00777	.91	7.2	.00777	.91
22.5	4.5	.2	.000567	810.0	.00694	1.02	81.0	.00639	1.10	8.1	.00639	1.10
25.0	5.0	.2	.000567	900.0	.00578	1.22	90.0	.00535	1.32	9.0	.00535	1.32
2.5	1.0	.4	.000567	90.0	.05520	.13	9.0	.05520	.13	.9	.05520	.13
3.8	1.5	.4	.000567	135.0	.04271	.17	13.5	.03760	.19	1.4	.03760	.19
5.0	2.0	.4	.000567	180.0	.03490	.20	18.0	.02749	.26	1.8	.02749	.26
6.3	2.5	.4	.000567	225.0	.02673	.26	22.5	.02106	.34	2.3	.02106	.34
7.5	3.0	.4	.000567	270.0	.02034	.35	27.0	.01669	.42	2.7	.01669	.42
8.8	3.5	.4	.000567	315.0	.01610	.44	31.5	.01357	.52	3.1	.01357	.52
10.0	4.0	.4	.000567	360.0	.01311	.54	36.0	.01127	.63	3.6	.01127	.63
11.3	4.5	.4	.000567	405.0	.01090	.65	40.5	.00951	.74	4.0	.00951	.74
12.5	5.0	.4	.000567	450.0	.00923	.76	45.0	.00814	.87	4.5	.00814	.87
1.3	1.0	.8	.000567	45.0	.04613	.15	4.5	.04613	.15	.5	.04613	.15
1.9	1.5	.8	.000567	67.5	.03491	.20	6.8	.03491	.20	.7	.03491	.20
2.5	2.0	.8	.000567	90.0	.02765	.26	9.0	.02765	.26	.9	.02765	.26
3.1	2.5	.8	.000567	112.5	.02380	.30	11.3	.02256	.31	1.1	.02256	.31
3.8	3.0	.8	.000567	135.0	.02139	.33	13.5	.01882	.37	1.4	.01882	.37
4.4	3.5	.8	.000567	157.5	.01929	.37	15.8	.01598	.44	1.6	.01598	.44
5.0	4.0	.8	.000567	180.0	.01748	.40	18.0	.01375	.51	1.8	.01375	.51
5.6	4.5	.8	.000567	202.5	.01574	.45	20.3	.01198	.59	2.0	.01198	.59
6.3	5.0	.8	.000567	225.0	.01344	.53	22.5	.01054	.67	2.3	.01054	.67

Table SA-3
Results of Waste Dilution - Winter - Ship 1
(L = 0.4 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 500 gpm							
5.0	1.0	.2	.000202	180.0	.03688	.54	18.0	.03688	.54	1.8	.03688	.54
7.5	1.5	.2	.000202	270.0	.02240	.88	27.0	.02240	.88	2.7	.02240	.88
10.0	2.0	.2	.000202	360.0	.01512	1.31	36.0	.01512	1.31	3.6	.01512	1.31
12.5	2.5	.2	.000202	450.0	.01092	1.81	45.0	.01092	1.81	4.5	.01092	1.81
15.0	3.0	.2	.000202	540.0	.00827	2.39	54.0	.00827	2.39	5.4	.00827	2.39
17.5	3.5	.2	.000202	630.0	.00648	3.05	63.0	.00648	3.05	6.3	.00648	3.05
20.0	4.0	.2	.000202	720.0	.00522	3.79	72.0	.00522	3.79	7.2	.00522	3.79
22.5	4.5	.2	.000202	810.0	.00429	4.60	81.0	.00429	4.60	8.1	.00429	4.60
25.0	5.0	.2	.000202	900.0	.00360	5.49	90.0	.00360	5.49	9.0	.00360	5.49
2.5	1.0	.4	.000202	90.0	.03711	.53	9.0	.03711	.53	.9	.03711	.53
3.8	1.5	.4	.000202	135.0	.02527	.78	13.5	.02527	.78	1.4	.02527	.78
5.0	2.0	.4	.000202	180.0	.01847	1.07	18.0	.01847	1.07	1.8	.01847	1.07
6.3	2.5	.4	.000202	225.0	.01415	1.40	22.5	.01415	1.40	2.3	.01415	1.40
7.5	3.0	.4	.000202	270.0	.01121	1.76	27.0	.01121	1.76	2.7	.01121	1.76
8.8	3.5	.4	.000202	315.0	.00912	2.17	31.5	.00912	2.17	3.1	.00912	2.17
10.0	4.0	.4	.000202	360.0	.00757	2.61	36.0	.00757	2.61	3.6	.00757	2.61
11.3	4.5	.4	.000202	405.0	.00639	3.09	40.5	.00639	3.09	4.0	.00639	3.09
12.5	5.0	.4	.000202	450.0	.00547	3.62	45.0	.00547	3.62	4.5	.00547	3.62
1.3	1.0	.8	.000202	45.0	.03099	.64	4.5	.03099	.64	.5	.03099	.64
1.9	1.5	.8	.000202	67.5	.02345	.84	6.8	.02345	.84	.7	.02345	.84
2.5	2.0	.8	.000202	90.0	.01857	1.06	9.0	.01857	1.06	.9	.01857	1.06
3.1	2.5	.8	.000202	112.5	.01515	1.30	11.3	.01515	1.30	1.1	.01515	1.30
3.8	3.0	.8	.000202	135.0	.01264	1.56	13.5	.01264	1.56	1.4	.01264	1.56
4.4	3.5	.8	.000202	157.5	.01073	1.84	15.8	.01073	1.84	1.6	.01073	1.84
5.0	4.0	.8	.000202	180.0	.00924	2.14	18.0	.00924	2.14	1.8	.00924	2.14
5.6	4.5	.8	.000202	202.5	.00804	2.46	20.3	.00804	2.46	2.0	.00804	2.46
6.3	5.0	.8	.000202	225.0	.00708	2.79	22.5	.00708	2.79	2.3	.00708	2.79
					Q = 600 gpm							
5.0	1.0	.2	.000243	180.0	.03688	.45	18.0	.03688	.45	1.8	.03688	.45
7.5	1.5	.2	.000243	270.0	.02240	.74	27.0	.02240	.74	2.7	.02240	.74
10.0	2.0	.2	.000243	360.0	.01512	1.09	36.0	.01512	1.09	3.6	.01512	1.09
12.5	2.5	.2	.000243	450.0	.01092	1.51	45.0	.01092	1.51	4.5	.01092	1.51
15.0	3.0	.2	.000243	540.0	.00827	1.99	54.0	.00827	1.99	5.4	.00827	1.99
17.5	3.5	.2	.000243	630.0	.00648	2.54	63.0	.00648	2.54	6.3	.00648	2.54
20.0	4.0	.2	.000243	720.0	.00522	3.15	72.0	.00522	3.15	7.2	.00522	3.15
22.5	4.5	.2	.000243	810.0	.00429	3.83	81.0	.00429	3.83	8.1	.00429	3.83
25.0	5.0	.2	.000243	900.0	.00360	4.58	90.0	.00360	4.58	9.0	.00360	4.58
2.5	1.0	.4	.000243	90.0	.03711	.44	9.0	.03711	.44	.9	.03711	.44
3.8	1.5	.4	.000243	135.0	.02527	.65	13.5	.02527	.65	1.4	.02527	.65
5.0	2.0	.4	.000243	180.0	.01847	.89	18.0	.01847	.89	1.8	.01847	.89
6.3	2.5	.4	.000243	225.0	.01415	1.16	22.5	.01415	1.16	2.3	.01415	1.16
7.5	3.0	.4	.000243	270.0	.01121	1.47	27.0	.01121	1.47	2.7	.01121	1.47
8.8	3.5	.4	.000243	315.0	.00912	1.81	31.5	.00912	1.81	3.1	.00912	1.81
10.0	4.0	.4	.000243	360.0	.00757	2.18	36.0	.00757	2.18	3.6	.00757	2.18
11.3	4.5	.4	.000243	405.0	.00639	2.58	40.5	.00639	2.58	4.0	.00639	2.58
12.5	5.0	.4	.000243	450.0	.00547	3.01	45.0	.00547	3.01	4.5	.00547	3.01
1.3	1.0	.8	.000243	45.0	.03099	.53	4.5	.03099	.53	.5	.03099	.53
1.9	1.5	.8	.000243	67.5	.02345	.70	6.8	.02345	.70	.7	.02345	.70
2.5	2.0	.8	.000243	90.0	.01857	.89	9.0	.01857	.89	.9	.01857	.89
3.1	2.5	.8	.000243	112.5	.01515	1.09	11.3	.01515	1.09	1.1	.01515	1.09
3.8	3.0	.8	.000243	135.0	.01264	1.30	13.5	.01264	1.30	1.4	.01264	1.30
4.4	3.5	.8	.000243	157.5	.01073	1.53	15.8	.01073	1.53	1.6	.01073	1.53
5.0	4.0	.8	.000243	180.0	.00924	1.78	18.0	.00924	1.78	1.8	.00924	1.78
5.6	4.5	.8	.000243	202.5	.00804	2.05	20.3	.00804	2.05	2.0	.00804	2.05
6.3	5.0	.8	.000243	225.0	.00708	2.33	22.5	.00708	2.33	2.3	.00708	2.33

Table SA-3 (continued)
Results of Waste Dilution - Winter - Ship 1
(L = 0.4 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 700 gpm							
5.0	1.0	.2	.000283	180.0	.03688	.38	18.0	.03688	.38	1.8	.03688	.38
7.5	1.5	.2	.000283	270.0	.02240	.63	27.0	.02240	.63	2.7	.02240	.63
10.0	2.0	.2	.000283	360.0	.01512	.93	36.0	.01512	.93	3.6	.01512	.93
12.5	2.5	.2	.000283	450.0	.01092	1.29	45.0	.01092	1.29	4.5	.01092	1.29
15.0	3.0	.2	.000283	540.0	.00827	1.71	54.0	.00827	1.71	5.4	.00827	1.71
17.5	3.5	.2	.000283	630.0	.00648	2.18	63.0	.00648	2.18	6.3	.00648	2.18
20.0	4.0	.2	.000283	720.0	.00522	2.70	72.0	.00522	2.70	7.2	.00522	2.70
22.5	4.5	.2	.000283	810.0	.00429	3.29	81.0	.00429	3.29	8.1	.00429	3.29
25.0	5.0	.2	.000283	900.0	.00360	3.92	90.0	.00360	3.92	9.0	.00360	3.92
2.5	1.0	.4	.000283	90.0	.03711	.38	9.0	.03711	.38	.9	.03711	.38
3.8	1.5	.4	.000283	135.0	.02527	.56	13.5	.02527	.56	1.4	.02527	.56
5.0	2.0	.4	.000283	180.0	.01847	.76	18.0	.01847	.76	1.8	.01847	.76
6.3	2.5	.4	.000283	225.0	.01415	1.00	22.5	.01415	1.00	2.3	.01415	1.00
7.5	3.0	.4	.000283	270.0	.01121	1.26	27.0	.01121	1.26	2.7	.01121	1.26
8.8	3.5	.4	.000283	315.0	.00912	1.55	31.5	.00912	1.55	3.1	.00912	1.55
10.0	4.0	.4	.000283	360.0	.00757	1.86	36.0	.00757	1.86	3.6	.00757	1.86
11.3	4.5	.4	.000283	405.0	.00639	2.21	40.5	.00639	2.21	4.0	.00639	2.21
12.5	5.0	.4	.000283	450.0	.00547	2.58	45.0	.00547	2.58	4.5	.00547	2.58
1.3	1.0	.8	.000283	45.0	.03099	.46	4.5	.03099	.46	.5	.03099	.46
1.9	1.5	.8	.000283	67.5	.02345	.60	6.8	.02345	.60	.7	.02345	.60
2.5	2.0	.8	.000283	90.0	.01857	.76	9.0	.01857	.76	.9	.01857	.76
3.1	2.5	.8	.000283	112.5	.01515	.93	11.3	.01515	.93	1.1	.01515	.93
3.8	3.0	.8	.000283	135.0	.01264	1.12	13.5	.01264	1.12	1.4	.01264	1.12
4.4	3.5	.8	.000283	157.5	.01073	1.32	15.8	.01073	1.32	1.6	.01073	1.32
5.0	4.0	.8	.000283	180.0	.00924	1.53	18.0	.00924	1.53	1.8	.00924	1.53
5.6	4.5	.8	.000283	202.5	.00804	1.75	20.3	.00804	1.75	2.0	.00804	1.75
6.3	5.0	.8	.000283	225.0	.00708	1.99	22.5	.00708	1.99	2.3	.00708	1.99
					Q = 1000 gpm							
5.0	1.0	.2	.000405	180.0	.03688	.27	18.0	.03688	.27	1.8	.03688	.27
7.5	1.5	.2	.000405	270.0	.02240	.44	27.0	.02240	.44	2.7	.02240	.44
10.0	2.0	.2	.000405	360.0	.01512	.65	36.0	.01512	.65	3.6	.01512	.65
12.5	2.5	.2	.000405	450.0	.01092	.90	45.0	.01092	.90	4.5	.01092	.90
15.0	3.0	.2	.000405	540.0	.00827	1.19	54.0	.00827	1.19	5.4	.00827	1.19
17.5	3.5	.2	.000405	630.0	.00648	1.52	63.0	.00648	1.52	6.3	.00648	1.52
20.0	4.0	.2	.000405	720.0	.00522	1.89	72.0	.00522	1.89	7.2	.00522	1.89
22.5	4.5	.2	.000405	810.0	.00429	2.30	81.0	.00429	2.30	8.1	.00429	2.30
25.0	5.0	.2	.000405	900.0	.00360	2.75	90.0	.00360	2.75	9.0	.00360	2.75
2.5	1.0	.4	.000405	90.0	.03711	.27	9.0	.03711	.27	.9	.03711	.27
3.8	1.5	.4	.000405	135.0	.02527	.39	13.5	.02527	.39	1.4	.02527	.39
5.0	2.0	.4	.000405	180.0	.01847	.53	18.0	.01847	.53	1.8	.01847	.53
6.3	2.5	.4	.000405	225.0	.01415	.70	22.5	.01415	.70	2.3	.01415	.70
7.5	3.0	.4	.000405	270.0	.01121	.88	27.0	.01121	.88	2.7	.01121	.88
8.8	3.5	.4	.000405	315.0	.00912	1.08	31.5	.00912	1.08	3.1	.00912	1.08
10.0	4.0	.4	.000405	360.0	.00757	1.31	36.0	.00757	1.31	3.6	.00757	1.31
11.3	4.5	.4	.000405	405.0	.00639	1.55	40.5	.00639	1.55	4.0	.00639	1.55
12.5	5.0	.4	.000405	450.0	.00547	1.81	45.0	.00547	1.81	4.5	.00547	1.81
1.3	1.0	.8	.000405	45.0	.03099	.32	4.5	.03099	.32	.5	.03099	.32
1.9	1.5	.8	.000405	67.5	.02345	.42	6.8	.02345	.42	.7	.02345	.42
2.5	2.0	.8	.000405	90.0	.01857	.53	9.0	.01857	.53	.9	.01857	.53
3.1	2.5	.8	.000405	112.5	.01515	.65	11.3	.01515	.65	1.1	.01515	.65
3.8	3.0	.8	.000405	135.0	.01264	.78	13.5	.01264	.78	1.4	.01264	.78
4.4	3.5	.8	.000405	157.5	.01073	.92	15.8	.01073	.92	1.6	.01073	.92
5.0	4.0	.8	.000405	180.0	.00924	1.07	18.0	.00924	1.07	1.8	.00924	1.07
5.6	4.5	.8	.000405	202.5	.00804	1.23	20.3	.00804	1.23	2.0	.00804	1.23
6.3	5.0	.8	.000405	225.0	.00708	1.40	22.5	.00708	1.40	2.3	.00708	1.40

Table SA-3 (continued)
Results of Waste Dilution - Winter - Ship 1
(L = 0.4 n mi, A = 0.001 $ft^{2/3}/sec$)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
						Q = 1200 gpm						
5.0	1.0	.2	.000486	180.0	.03688	.22	18.0	.03688	.22	1.8	.03688	.22
7.5	1.5	.2	.000486	270.0	.02240	.37	27.0	.02240	.37	2.7	.02240	.37
10.0	2.0	.2	.000486	360.0	.01512	.54	36.0	.01512	.54	3.6	.01512	.54
12.5	2.5	.2	.000486	450.0	.01092	.75	45.0	.01092	.75	4.5	.01092	.75
15.0	3.0	.2	.000486	540.0	.00827	1.00	54.0	.00827	1.00	5.4	.00827	1.00
17.5	3.5	.2	.000486	630.0	.00648	1.27	63.0	.00648	1.27	6.3	.00648	1.27
20.0	4.0	.2	.000486	720.0	.00522	1.58	72.0	.00522	1.58	7.2	.00522	1.58
22.5	4.5	.2	.000486	810.0	.00429	1.92	81.0	.00429	1.92	8.1	.00429	1.92
25.0	5.0	.2	.000486	900.0	.00360	2.29	90.0	.00360	2.29	9.0	.00360	2.29
2.5	1.0	.4	.000486	90.0	.03711	.22	9.0	.03711	.22	.9	.03711	.22
3.8	1.5	.4	.000486	135.0	.02527	.33	13.5	.02527	.33	1.4	.02527	.33
5.0	2.0	.4	.000486	180.0	.01847	.45	18.0	.01847	.45	1.8	.01847	.45
6.3	2.5	.4	.000486	225.0	.01415	.58	22.5	.01415	.58	2.3	.01415	.58
7.5	3.0	.4	.000486	270.0	.01121	.73	27.0	.01121	.73	2.7	.01121	.73
8.8	3.5	.4	.000486	315.0	.00912	.90	31.5	.00912	.90	3.1	.00912	.90
10.0	4.0	.4	.000486	360.0	.00757	1.09	36.0	.00757	1.09	3.6	.00757	1.09
11.3	4.5	.4	.000486	405.0	.00639	1.29	40.5	.00639	1.29	4.0	.00639	1.29
12.5	5.0	.4	.000486	450.0	.00547	1.51	45.0	.00547	1.51	4.5	.00547	1.51
1.3	1.0	.8	.000486	45.0	.03099	.27	4.5	.03099	.27	.5	.03099	.27
1.9	1.5	.8	.000486	67.5	.02345	.35	6.8	.02345	.35	.7	.02345	.35
2.5	2.0	.8	.000486	90.0	.01857	.44	9.0	.01857	.44	.9	.01857	.44
3.1	2.5	.8	.000486	112.5	.01515	.54	11.3	.01515	.54	1.1	.01515	.54
3.8	3.0	.8	.000486	135.0	.01264	.65	13.5	.01264	.65	1.4	.01264	.65
4.4	3.5	.8	.000486	157.5	.01073	.77	15.8	.01073	.77	1.6	.01073	.77
5.0	4.0	.8	.000486	180.0	.00924	.89	18.0	.00924	.89	1.8	.00924	.89
5.6	4.5	.8	.000486	202.5	.00804	1.02	20.3	.00804	1.02	2.0	.00804	1.02
6.3	5.0	.8	.000486	225.0	.00708	1.16	22.5	.00708	1.16	2.3	.00708	1.16
						Q = 1400 gpm						
5.0	1.0	.2	.000567	180.0	.03688	.19	18.0	.03688	.19	1.8	.03688	.19
7.5	1.5	.2	.000567	270.0	.02240	.32	27.0	.02240	.32	2.7	.02240	.32
10.0	2.0	.2	.000567	360.0	.01512	.47	36.0	.01512	.47	3.6	.01512	.47
12.5	2.5	.2	.000567	450.0	.01092	.65	45.0	.01092	.65	4.5	.01092	.65
15.0	3.0	.2	.000567	540.0	.00827	.85	54.0	.00827	.85	5.4	.00827	.85
17.5	3.5	.2	.000567	630.0	.00648	1.09	63.0	.00648	1.09	6.3	.00648	1.09
20.0	4.0	.2	.000567	720.0	.00522	1.35	72.0	.00522	1.35	7.2	.00522	1.35
22.5	4.5	.2	.000567	810.0	.00429	1.64	81.0	.00429	1.64	8.1	.00429	1.64
25.0	5.0	.2	.000567	900.0	.00360	1.96	90.0	.00360	1.96	9.0	.00360	1.96
2.5	1.0	.4	.000567	90.0	.03711	.19	9.0	.03711	.19	.9	.03711	.19
3.8	1.5	.4	.000567	135.0	.02527	.28	13.5	.02527	.28	1.4	.02527	.28
5.0	2.0	.4	.000567	180.0	.01847	.38	18.0	.01847	.38	1.8	.01847	.38
6.3	2.5	.4	.000567	225.0	.01415	.50	22.5	.01415	.50	2.3	.01415	.50
7.5	3.0	.4	.000567	270.0	.01121	.63	27.0	.01121	.63	2.7	.01121	.63
8.8	3.5	.4	.000567	315.0	.00912	.77	31.5	.00912	.77	3.1	.00912	.77
10.0	4.0	.4	.000567	360.0	.00757	.93	36.0	.00757	.93	3.6	.00757	.93
11.3	4.5	.4	.000567	405.0	.00639	1.10	40.5	.00639	1.10	4.0	.00639	1.10
12.5	5.0	.4	.000567	450.0	.00547	1.29	45.0	.00547	1.29	4.5	.00547	1.29
1.3	1.0	.8	.000567	45.0	.03099	.23	4.5	.03099	.23	.5	.03099	.23
1.9	1.5	.8	.000567	67.5	.02345	.30	6.8	.02345	.30	.7	.02345	.30
2.5	2.0	.8	.000567	90.0	.01857	.38	9.0	.01857	.38	.9	.01857	.38
3.1	2.5	.8	.000567	112.5	.01515	.47	11.3	.01515	.47	1.1	.01515	.47
3.8	3.0	.8	.000567	135.0	.01264	.56	13.5	.01264	.56	1.4	.01264	.56
4.4	3.5	.8	.000567	157.5	.01073	.66	15.8	.01073	.66	1.6	.01073	.66
5.0	4.0	.8	.000567	180.0	.00924	.76	18.0	.00924	.76	1.8	.00924	.76
5.6	4.5	.8	.000567	202.5	.00804	.88	20.3	.00804	.88	2.0	.00804	.88
6.3	5.0	.8	.000567	225.0	.00708	1.00	22.5	.00708	1.00	2.3	.00708	1.00

Table SA-4
Results of Waste Dilution - Summer - Ship 2
(L = 0.4 n mi, A = 0.001 $ft^{2/3}/sec$)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 500 gpm												
5.0	1.0	.2	.000173	180.0	.08083	.29	18.0	.06385	.36	1.8	.06385	.36
7.5	1.5	.2	.000173	270.0	.04726	.49	27.0	.03884	.59	2.7	.03884	.59
10.0	2.0	.2	.000173	360.0	.03050	.76	36.0	.02624	.88	3.6	.02624	.88
12.5	2.5	.2	.000173	450.0	.02148	1.07	45.0	.01896	1.22	4.5	.01896	1.22
15.0	3.0	.2	.000173	540.0	.01600	1.44	54.0	.01436	1.61	5.4	.01436	1.61
17.5	3.5	.2	.000173	630.0	.01240	1.86	63.0	.01126	2.05	6.3	.01126	2.05
20.0	4.0	.2	.000173	720.0	.00991	2.33	72.0	.00907	2.54	7.2	.00907	2.54
22.5	4.5	.2	.000173	810.0	.00810	2.85	81.0	.00746	3.09	8.1	.00746	3.09
25.0	5.0	.2	.000173	900.0	.00675	3.42	90.0	.00625	3.69	9.0	.00625	3.69
2.5	1.0	.4	.000173	90.0	.06439	.36	9.0	.06439	.36	.9	.06439	.36
3.8	1.5	.4	.000173	135.0	.04983	.46	13.5	.04388	.53	1.4	.04388	.53
5.0	2.0	.4	.000173	180.0	.04072	.57	18.0	.03208	.72	1.8	.03208	.72
6.3	2.5	.4	.000173	225.0	.03119	.74	22.5	.02458	.94	2.3	.02458	.94
7.5	3.0	.4	.000173	270.0	.02374	.97	27.0	.01948	1.18	2.7	.01948	1.18
8.8	3.5	.4	.000173	315.0	.01879	1.23	31.5	.01584	1.46	3.1	.01584	1.46
10.0	4.0	.4	.000173	360.0	.01530	1.51	36.0	.01315	1.75	3.6	.01315	1.75
11.3	4.5	.4	.000173	405.0	.01273	1.81	40.5	.01110	2.08	4.0	.01110	2.08
12.5	5.0	.4	.000173	450.0	.01077	2.14	45.0	.00950	2.43	4.5	.00950	2.43
1.3	1.0	.8	.000173	45.0	.05383	.43	4.5	.05383	.43	.5	.05383	.43
1.9	1.5	.8	.000173	67.5	.04074	.57	6.8	.04074	.57	.7	.04074	.57
2.5	2.0	.8	.000173	90.0	.03227	.71	9.0	.03227	.71	.9	.03227	.71
3.1	2.5	.8	.000173	112.5	.02778	.83	11.3	.02634	.88	1.1	.02634	.88
3.8	3.0	.8	.000173	135.0	.02497	.92	13.5	.02197	1.05	1.4	.02197	1.05
4.4	3.5	.8	.000173	157.5	.02252	1.02	15.8	.01865	1.24	1.6	.01865	1.24
5.0	4.0	.8	.000173	180.0	.02040	1.13	18.0	.01606	1.44	1.8	.01606	1.44
5.6	4.5	.8	.000173	202.5	.01837	1.26	20.3	.01398	1.65	2.0	.01398	1.65
6.3	5.0	.8	.000173	225.0	.01568	1.47	22.5	.01230	1.88	2.3	.01230	1.88
Q = 600 gpm												
5.0	1.0	.2	.000208	180.0	.08083	.24	18.0	.06385	.30	1.8	.06385	.30
7.5	1.5	.2	.000208	270.0	.04726	.41	27.0	.03884	.50	2.7	.03884	.50
10.0	2.0	.2	.000208	360.0	.03050	.63	36.0	.02624	.73	3.6	.02624	.73
12.5	2.5	.2	.000208	450.0	.02148	.89	45.0	.01896	1.01	4.5	.01896	1.01
15.0	3.0	.2	.000208	540.0	.01600	1.20	54.0	.01436	1.34	5.4	.01436	1.34
17.5	3.5	.2	.000208	630.0	.01240	1.55	63.0	.01126	1.71	6.3	.01126	1.71
20.0	4.0	.2	.000208	720.0	.00991	1.94	72.0	.00907	2.12	7.2	.00907	2.12
22.5	4.5	.2	.000208	810.0	.00810	2.37	81.0	.00746	2.58	8.1	.00746	2.58
25.0	5.0	.2	.000208	900.0	.00675	2.85	90.0	.00625	3.08	9.0	.00625	3.08
2.5	1.0	.4	.000208	90.0	.06439	.30	9.0	.06439	.30	.9	.06439	.30
3.8	1.5	.4	.000208	135.0	.04983	.39	13.5	.04388	.44	1.4	.04388	.44
5.0	2.0	.4	.000208	180.0	.04072	.47	18.0	.03208	.60	1.8	.03208	.60
6.3	2.5	.4	.000208	225.0	.03119	.62	22.5	.02458	.78	2.3	.02458	.78
7.5	3.0	.4	.000208	270.0	.02374	.81	27.0	.01948	.99	2.7	.01948	.99
8.8	3.5	.4	.000208	315.0	.01879	1.02	31.5	.01584	1.21	3.1	.01584	1.21
10.0	4.0	.4	.000208	360.0	.01530	1.26	36.0	.01315	1.46	3.6	.01315	1.46
11.3	4.5	.4	.000208	405.0	.01273	1.51	40.5	.01110	1.73	4.0	.01110	1.73
12.5	5.0	.4	.000208	450.0	.01077	1.79	45.0	.00950	2.02	4.5	.00950	2.02
1.3	1.0	.8	.000208	45.0	.05383	.36	4.5	.05383	.36	.5	.05383	.36
1.9	1.5	.8	.000208	67.5	.04074	.47	6.8	.04074	.47	.7	.04074	.47
2.5	2.0	.8	.000208	90.0	.03227	.60	9.0	.03227	.60	.9	.03227	.60
3.1	2.5	.8	.000208	112.5	.02778	.69	11.3	.02634	.73	1.1	.02634	.73
3.8	3.0	.8	.000208	135.0	.02497	.77	13.5	.02197	.87	1.4	.02197	.87
4.4	3.5	.8	.000208	157.5	.02252	.85	15.8	.01865	1.03	1.6	.01865	1.03
5.0	4.0	.8	.000208	180.0	.02040	.94	18.0	.01606	1.20	1.8	.01606	1.20
5.6	4.5	.8	.000208	202.5	.01837	1.05	20.3	.01398	1.37	2.0	.01398	1.37
6.3	5.0	.8	.000208	225.0	.01568	1.23	22.5	.01230	1.56	2.3	.01230	1.56

Table SA-4 (continued)
Results of Waste Dilution - Summer - Ship 2
(L = 0.4 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 700 gpm							
5.0	1.0	.2	.000243	180.0	.08083	.20	18.0	.06385	.26	1.8	.06385	.26
7.5	1.5	.2	.000243	270.0	.04726	.35	27.0	.03884	.42	2.7	.03884	.42
10.0	2.0	.2	.000243	360.0	.03050	.54	36.0	.02624	.63	3.6	.02624	.63
12.5	2.5	.2	.000243	450.0	.02148	.77	45.0	.01896	.87	4.5	.01896	.87
15.0	3.0	.2	.000243	540.0	.01600	1.03	54.0	.01436	1.15	5.4	.01436	1.15
17.5	3.5	.2	.000243	630.0	.01240	1.33	63.0	.01126	1.46	6.3	.01126	1.46
20.0	4.0	.2	.000243	720.0	.00991	1.66	72.0	.00907	1.82	7.2	.00907	1.82
22.5	4.5	.2	.000243	810.0	.00810	2.03	81.0	.00746	2.21	8.1	.00746	2.21
25.0	5.0	.2	.000243	900.0	.00675	2.44	90.0	.00625	2.64	9.0	.00625	2.64
2.5	1.0	.4	.000243	90.0	.06439	.26	9.0	.06439	.26	.9	.06439	.26
3.8	1.5	.4	.000243	135.0	.04983	.33	13.5	.04388	.38	1.4	.04388	.38
5.0	2.0	.4	.000243	180.0	.04072	.40	18.0	.03208	.51	1.8	.03208	.51
6.3	2.5	.4	.000243	225.0	.03119	.53	22.5	.02458	.67	2.3	.02458	.67
7.5	3.0	.4	.000243	270.0	.02374	.69	27.0	.01948	.85	2.7	.01948	.85
8.8	3.5	.4	.000243	315.0	.01879	.88	31.5	.01584	1.04	3.1	.01584	1.04
10.0	4.0	.4	.000243	360.0	.01530	1.08	36.0	.01315	1.25	3.6	.01315	1.25
11.3	4.5	.4	.000243	405.0	.01273	1.29	40.5	.01110	1.48	4.0	.01110	1.48
12.5	5.0	.4	.000243	450.0	.01077	1.53	45.0	.00950	1.73	4.5	.00950	1.73
1.3	1.0	.8	.000243	45.0	.05383	.31	4.5	.05383	.31	.5	.05383	.31
1.9	1.5	.8	.000243	67.5	.04074	.40	6.8	.04074	.40	.7	.04074	.40
2.5	2.0	.8	.000243	90.0	.03227	.51	9.0	.03227	.51	.9	.03227	.51
3.1	2.5	.8	.000243	112.5	.02778	.59	11.3	.02634	.63	1.1	.02634	.63
3.8	3.0	.8	.000243	135.0	.02497	.66	13.5	.02197	.75	1.4	.02197	.75
4.4	3.5	.8	.000243	157.5	.02252	.73	15.8	.01865	.88	1.6	.01865	.88
5.0	4.0	.8	.000243	180.0	.02040	.81	18.0	.01606	1.03	1.8	.01606	1.03
5.6	4.5	.8	.000243	202.5	.01837	.90	20.3	.01398	1.18	2.0	.01398	1.18
6.3	5.0	.8	.000243	225.0	.01568	1.05	22.5	.01230	1.34	2.3	.01230	1.34
					Q = 1000 gpm							
5.0	1.0	.2	.000347	180.0	.08083	.14	18.0	.06385	.18	1.8	.06385	.18
7.5	1.5	.2	.000347	270.0	.04726	.24	27.0	.03884	.30	2.7	.03884	.30
10.0	2.0	.2	.000347	360.0	.03050	.38	36.0	.02624	.44	3.6	.02624	.44
12.5	2.5	.2	.000347	450.0	.02148	.54	45.0	.01896	.61	4.5	.01896	.61
15.0	3.0	.2	.000347	540.0	.01600	.72	54.0	.01436	.80	5.4	.01436	.80
17.5	3.5	.2	.000347	630.0	.01240	.93	63.0	.01126	1.02	6.3	.01126	1.02
20.0	4.0	.2	.000347	720.0	.00991	1.16	72.0	.00907	1.27	7.2	.00907	1.27
22.5	4.5	.2	.000347	810.0	.00810	1.42	81.0	.00746	1.55	8.1	.00746	1.55
25.0	5.0	.2	.000347	900.0	.00675	1.71	90.0	.00625	1.85	9.0	.00625	1.85
2.5	1.0	.4	.000347	90.0	.06439	.18	9.0	.06439	.18	.9	.06439	.18
3.8	1.5	.4	.000347	135.0	.04983	.23	13.5	.04388	.26	1.4	.04388	.26
5.0	2.0	.4	.000347	180.0	.04072	.28	18.0	.03208	.36	1.8	.03208	.36
6.3	2.5	.4	.000347	225.0	.03119	.37	22.5	.02458	.47	2.3	.02458	.47
7.5	3.0	.4	.000347	270.0	.02374	.49	27.0	.01948	.59	2.7	.01948	.59
8.8	3.5	.4	.000347	315.0	.01879	.61	31.5	.01584	.73	3.1	.01584	.73
10.0	4.0	.4	.000347	360.0	.01530	.75	36.0	.01315	.88	3.6	.01315	.88
11.3	4.5	.4	.000347	405.0	.01273	.91	40.5	.01110	1.04	4.0	.01110	1.04
12.5	5.0	.4	.000347	450.0	.01077	1.07	45.0	.00950	1.21	4.5	.00950	1.21
1.3	1.0	.8	.000347	45.0	.05383	.21	4.5	.05383	.21	.5	.05383	.21
1.9	1.5	.8	.000347	67.5	.04074	.28	6.8	.04074	.28	.7	.04074	.28
2.5	2.0	.8	.000347	90.0	.03227	.36	9.0	.03227	.36	.9	.03227	.36
3.1	2.5	.8	.000347	112.5	.02778	.42	11.3	.02634	.44	1.1	.02634	.44
3.8	3.0	.8	.000347	135.0	.02497	.46	13.5	.02197	.52	1.4	.02197	.52
4.4	3.5	.8	.000347	157.5	.02252	.51	15.8	.01865	.62	1.6	.01865	.62
5.0	4.0	.8	.000347	180.0	.02040	.57	18.0	.01606	.72	1.8	.01606	.72
5.6	4.5	.8	.000347	202.5	.01837	.63	20.3	.01398	.82	2.0	.01398	.82
6.3	5.0	.8	.000347	225.0	.01568	.74	22.5	.01230	.94	2.3	.01230	.94

Table SA-4 (continued)
Results of Waste Dilution - Summer - Ship 2
(L = 0.4 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 1200 gpm							
5.0	1.0	.2	.000416	180.0	.08083	.12	18.0	.06385	.15	1.8	.06385	.15
7.5	1.5	.2	.000416	270.0	.04726	.20	27.0	.03884	.25	2.7	.03884	.25
10.0	2.0	.2	.000416	360.0	.03050	.32	36.0	.02624	.37	3.6	.02624	.37
12.5	2.5	.2	.000416	450.0	.02148	.45	45.0	.01896	.51	4.5	.01896	.51
15.0	3.0	.2	.000416	540.0	.01600	.60	54.0	.01436	.67	5.4	.01436	.67
17.5	3.5	.2	.000416	630.0	.01240	.77	63.0	.01126	.85	6.3	.01126	.85
20.0	4.0	.2	.000416	720.0	.00991	.97	72.0	.00907	1.06	7.2	.00907	1.06
22.5	4.5	.2	.000416	810.0	.00810	1.19	81.0	.00746	1.29	8.1	.00746	1.29
25.0	5.0	.2	.000416	900.0	.00675	1.42	90.0	.00625	1.54	9.0	.00625	1.54
2.5	1.0	.4	.000416	90.0	.06439	.15	9.0	.06439	.15	.9	.06439	.15
3.8	1.5	.4	.000416	135.0	.04983	.19	13.5	.04388	.22	1.4	.04388	.22
5.0	2.0	.4	.000416	180.0	.04072	.24	18.0	.03208	.30	1.8	.03208	.30
6.3	2.5	.4	.000416	225.0	.03119	.31	22.5	.02458	.39	2.3	.02458	.39
7.5	3.0	.4	.000416	270.0	.02374	.40	27.0	.01948	.49	2.7	.01948	.49
8.8	3.5	.4	.000416	315.0	.01879	.51	31.5	.01584	.61	3.1	.01584	.61
10.0	4.0	.4	.000416	360.0	.01530	.63	36.0	.01315	.73	3.6	.01315	.73
11.3	4.5	.4	.000416	405.0	.01273	.76	40.5	.01110	.87	4.0	.01110	.87
12.5	5.0	.4	.000416	450.0	.01077	.89	45.0	.00950	1.01	4.5	.00950	1.01
1.3	1.0	.8	.000416	45.0	.05383	.18	4.5	.05383	.18	.5	.05383	.18
1.9	1.5	.8	.000416	67.5	.04074	.24	6.8	.04074	.24	.7	.04074	.24
2.5	2.0	.8	.000416	90.0	.03227	.30	9.0	.03227	.30	.9	.03227	.30
3.1	2.5	.8	.000416	112.5	.02778	.35	11.3	.02634	.36	1.1	.02634	.36
3.8	3.0	.8	.000416	135.0	.02497	.39	13.5	.02197	.44	1.4	.02197	.44
4.4	3.5	.8	.000416	157.5	.02252	.43	15.8	.01865	.52	1.6	.01865	.52
5.0	4.0	.8	.000416	180.0	.02040	.47	18.0	.01606	.60	1.8	.01606	.60
5.6	4.5	.8	.000416	202.5	.01837	.52	20.3	.01398	.69	2.0	.01398	.69
6.3	5.0	.8	.000416	225.0	.01568	.61	22.5	.01230	.78	2.3	.01230	.78
					Q = 1400 gpm							
5.0	1.0	.2	.000486	180.0	.08083	.10	18.0	.06385	.13	1.8	.06385	.13
7.5	1.5	.2	.000486	270.0	.04726	.17	27.0	.03884	.21	2.7	.03884	.21
10.0	2.0	.2	.000486	360.0	.03050	.27	36.0	.02624	.31	3.6	.02624	.31
12.5	2.5	.2	.000486	450.0	.02148	.38	45.0	.01896	.43	4.5	.01896	.43
15.0	3.0	.2	.000486	540.0	.01600	.51	54.0	.01436	.57	5.4	.01436	.57
17.5	3.5	.2	.000486	630.0	.01240	.66	63.0	.01126	.73	6.3	.01126	.73
20.0	4.0	.2	.000486	720.0	.00991	.83	72.0	.00907	.91	7.2	.00907	.91
22.5	4.5	.2	.000486	810.0	.00810	1.02	81.0	.00746	1.10	8.1	.00746	1.10
25.0	5.0	.2	.000486	900.0	.00675	1.22	90.0	.00625	1.32	9.0	.00625	1.32
2.5	1.0	.4	.000486	90.0	.06439	.13	9.0	.06439	.13	.9	.06439	.13
3.8	1.5	.4	.000486	135.0	.04983	.17	13.5	.04388	.19	1.4	.04388	.19
5.0	2.0	.4	.000486	180.0	.04072	.20	18.0	.03208	.26	1.8	.03208	.26
6.3	2.5	.4	.000486	225.0	.03119	.26	22.5	.02458	.34	2.3	.02458	.34
7.5	3.0	.4	.000486	270.0	.02374	.35	27.0	.01948	.42	2.7	.01948	.42
8.8	3.5	.4	.000486	315.0	.01879	.44	31.5	.01584	.52	3.1	.01584	.52
10.0	4.0	.4	.000486	360.0	.01530	.54	36.0	.01315	.63	3.6	.01315	.63
11.3	4.5	.4	.000486	405.0	.01273	.65	40.5	.01110	.74	4.0	.01110	.74
12.5	5.0	.4	.000486	450.0	.01077	.77	45.0	.00950	.87	4.5	.00950	.87
1.3	1.0	.8	.000486	45.0	.05383	.15	4.5	.05383	.15	.5	.05383	.15
1.9	1.5	.8	.000486	67.5	.04074	.20	6.8	.04074	.20	.7	.04074	.20
2.5	2.0	.8	.000486	90.0	.03227	.26	9.0	.03227	.26	.9	.03227	.26
3.1	2.5	.8	.000486	112.5	.02778	.30	11.3	.02634	.31	1.1	.02634	.31
3.8	3.0	.8	.000486	135.0	.02497	.33	13.5	.02197	.37	1.4	.02197	.37
4.4	3.5	.8	.000486	157.5	.02252	.37	15.8	.01865	.44	1.6	.01865	.44
5.0	4.0	.8	.000486	180.0	.02040	.40	18.0	.01606	.51	1.8	.01606	.51
5.6	4.5	.8	.000486	202.5	.01837	.45	20.3	.01398	.59	2.0	.01398	.59
6.3	5.0	.8	.000486	225.0	.01568	.53	22.5	.01230	.67	2.3	.01230	.67

Table SA-5
Results of Waste Dilution - Winter - Ship 2
(L = 0.4 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 500 gpm								
5.0	1.0	.2	.000173	180.0	.04302	.54	18.0	.04302	.54	1.8	.04302	.54
7.5	1.5	.2	.000173	270.0	.02614	.88	27.0	.02614	.88	2.7	.02614	.88
10.0	2.0	.2	.000173	360.0	.01765	1.31	36.0	.01765	1.31	3.6	.01765	1.31
12.5	2.5	.2	.000173	450.0	.01275	1.81	45.0	.01275	1.81	4.5	.01275	1.81
15.0	3.0	.2	.000173	540.0	.00965	2.39	54.0	.00965	2.39	5.4	.00965	2.39
17.5	3.5	.2	.000173	630.0	.00757	3.05	63.0	.00757	3.05	6.3	.00757	3.05
20.0	4.0	.2	.000173	720.0	.00609	3.79	72.0	.00609	3.79	7.2	.00609	3.79
22.5	4.5	.2	.000173	810.0	.00501	4.60	81.0	.00501	4.60	8.1	.00501	4.60
25.0	5.0	.2	.000173	900.0	.00420	5.50	90.0	.00420	5.50	9.0	.00420	5.50
2.5	1.0	.4	.000173	90.0	.04331	.53	9.0	.04331	.53	.9	.04331	.53
3.8	1.5	.4	.000173	135.0	.02950	.78	13.5	.02950	.78	1.4	.02950	.78
5.0	2.0	.4	.000173	180.0	.02156	1.07	18.0	.02156	1.07	1.8	.02156	1.07
6.3	2.5	.4	.000173	225.0	.01651	1.40	22.5	.01651	1.40	2.3	.01651	1.40
7.5	3.0	.4	.000173	270.0	.01309	1.76	27.0	.01309	1.76	2.7	.01309	1.76
8.8	3.5	.4	.000173	315.0	.01064	2.17	31.5	.01064	2.17	3.1	.01064	2.17
10.0	4.0	.4	.000173	360.0	.00884	2.61	36.0	.00884	2.61	3.6	.00884	2.61
11.3	4.5	.4	.000173	405.0	.00746	3.09	40.5	.00746	3.09	4.0	.00746	3.09
12.5	5.0	.4	.000173	450.0	.00638	3.62	45.0	.00638	3.62	4.5	.00638	3.62
1.3	1.0	.8	.000173	45.0	.03618	.64	4.5	.03618	.64	.5	.03618	.64
1.9	1.5	.8	.000173	67.5	.02737	.84	6.8	.02737	.84	.7	.02737	.84
2.5	2.0	.8	.000173	90.0	.02168	1.06	9.0	.02168	1.06	.9	.02168	1.06
3.1	2.5	.8	.000173	112.5	.01769	1.30	11.3	.01769	1.30	1.1	.01769	1.30
3.8	3.0	.8	.000173	135.0	.01476	1.56	13.5	.01476	1.56	1.4	.01476	1.56
4.4	3.5	.8	.000173	157.5	.01253	1.84	15.8	.01253	1.84	1.6	.01253	1.84
5.0	4.0	.8	.000173	180.0	.01078	2.14	18.0	.01078	2.14	1.8	.01078	2.14
5.6	4.5	.8	.000173	202.5	.00939	2.46	20.3	.00939	2.46	2.0	.00939	2.46
6.3	5.0	.8	.000173	225.0	.00826	2.79	22.5	.00826	2.79	2.3	.00826	2.79
				Q = 600 gpm								
5.0	1.0	.2	.000208	180.0	.04302	.45	18.0	.04302	.45	1.8	.04302	.45
7.5	1.5	.2	.000208	270.0	.02614	.74	27.0	.02614	.74	2.7	.02614	.74
10.0	2.0	.2	.000208	360.0	.01765	1.09	36.0	.01765	1.09	3.6	.01765	1.09
12.5	2.5	.2	.000208	450.0	.01275	1.51	45.0	.01275	1.51	4.5	.01275	1.51
15.0	3.0	.2	.000208	540.0	.00965	1.99	54.0	.00965	1.99	5.4	.00965	1.99
17.5	3.5	.2	.000208	630.0	.00757	2.54	63.0	.00757	2.54	6.3	.00757	2.54
20.0	4.0	.2	.000208	720.0	.00609	3.15	72.0	.00609	3.15	7.2	.00609	3.15
22.5	4.5	.2	.000208	810.0	.00501	3.83	81.0	.00501	3.83	8.1	.00501	3.83
25.0	5.0	.2	.000208	900.0	.00420	4.58	90.0	.00420	4.58	9.0	.00420	4.58
2.5	1.0	.4	.000208	90.0	.04331	.44	9.0	.04331	.44	.9	.04331	.44
3.8	1.5	.4	.000208	135.0	.02950	.65	13.5	.02950	.65	1.4	.02950	.65
5.0	2.0	.4	.000208	180.0	.02156	.89	18.0	.02156	.89	1.8	.02156	.89
6.3	2.5	.4	.000208	225.0	.01651	1.16	22.5	.01651	1.16	2.3	.01651	1.16
7.5	3.0	.4	.000208	270.0	.01309	1.47	27.0	.01309	1.47	2.7	.01309	1.47
8.8	3.5	.4	.000208	315.0	.01064	1.81	31.5	.01064	1.81	3.1	.01064	1.81
10.0	4.0	.4	.000208	360.0	.00884	2.18	36.0	.00884	2.18	3.6	.00884	2.18
11.3	4.5	.4	.000208	405.0	.00746	2.58	40.5	.00746	2.58	4.0	.00746	2.58
12.5	5.0	.4	.000208	450.0	.00638	3.01	45.0	.00638	3.01	4.5	.00638	3.01
1.3	1.0	.8	.000208	45.0	.03618	.53	4.5	.03618	.53	.5	.03618	.53
1.9	1.5	.8	.000208	67.5	.02737	.70	6.8	.02737	.70	.7	.02737	.70
2.5	2.0	.8	.000208	90.0	.02168	.89	9.0	.02168	.89	.9	.02168	.89
3.1	2.5	.8	.000208	112.5	.01769	1.09	11.3	.01769	1.09	1.1	.01769	1.09
3.8	3.0	.8	.000208	135.0	.01476	1.30	13.5	.01476	1.30	1.4	.01476	1.30
4.4	3.5	.8	.000208	157.5	.01253	1.53	15.8	.01253	1.53	1.6	.01253	1.53
5.0	4.0	.8	.000208	180.0	.01078	1.78	18.0	.01078	1.78	1.8	.01078	1.78
5.6	4.5	.8	.000208	202.5	.00939	2.05	20.3	.00939	2.05	2.0	.00939	2.05
6.3	5.0	.8	.000208	225.0	.00826	2.33	22.5	.00826	2.33	2.3	.00826	2.33

Table SA-5 (continued)
Results of Waste Dilution - Winter - Ship 2
(L = 0.4 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 700 gpm								
5.0	1.0	.2	.000243	180.0	.04302	.38	18.0	.04302	.38	1.8	.04302	.38
7.5	1.5	.2	.000243	270.0	.02614	.63	27.0	.02614	.63	2.7	.02614	.63
10.0	2.0	.2	.000243	360.0	.01765	.93	36.0	.01765	.93	3.6	.01765	.93
12.5	2.5	.2	.000243	450.0	.01275	1.29	45.0	.01275	1.29	4.5	.01275	1.29
15.0	3.0	.2	.000243	540.0	.00965	1.71	54.0	.00965	1.71	5.4	.00965	1.71
17.5	3.5	.2	.000243	630.0	.00757	2.18	63.0	.00757	2.18	6.3	.00757	2.18
20.0	4.0	.2	.000243	720.0	.00609	2.70	72.0	.00609	2.70	7.2	.00609	2.70
22.5	4.5	.2	.000243	810.0	.00501	3.29	81.0	.00501	3.29	8.1	.00501	3.29
25.0	5.0	.2	.000243	900.0	.00420	3.93	90.0	.00420	3.93	9.0	.00420	3.93
2.5	1.0	.4	.000243	90.0	.04331	.38	9.0	.04331	.38	.9	.04331	.38
3.8	1.5	.4	.000243	135.0	.02950	.56	13.5	.02950	.56	1.4	.02950	.56
5.0	2.0	.4	.000243	180.0	.02156	.76	18.0	.02156	.76	1.8	.02156	.76
6.3	2.5	.4	.000243	225.0	.01651	1.00	22.5	.01651	1.00	2.3	.01651	1.00
7.5	3.0	.4	.000243	270.0	.01309	1.26	27.0	.01309	1.26	2.7	.01309	1.26
8.8	3.5	.4	.000243	315.0	.01064	1.55	31.5	.01064	1.55	3.1	.01064	1.55
10.0	4.0	.4	.000243	360.0	.00884	1.87	36.0	.00884	1.87	3.6	.00884	1.87
11.3	4.5	.4	.000243	405.0	.00746	2.21	40.5	.00746	2.21	4.0	.00746	2.21
12.5	5.0	.4	.000243	450.0	.00638	2.58	45.0	.00638	2.58	4.5	.00638	2.58
1.3	1.0	.8	.000243	45.0	.03618	.46	4.5	.03618	.46	.5	.03618	.46
1.9	1.5	.8	.000243	67.5	.02737	.60	6.8	.02737	.60	.7	.02737	.60
2.5	2.0	.8	.000243	90.0	.02168	.76	9.0	.02168	.76	.9	.02168	.76
3.1	2.5	.8	.000243	112.5	.01769	.93	11.3	.01769	.93	1.1	.01769	.93
3.8	3.0	.8	.000243	135.0	.01476	1.12	13.5	.01476	1.12	1.4	.01476	1.12
4.4	3.5	.8	.000243	157.5	.01253	1.32	15.8	.01253	1.32	1.6	.01253	1.32
5.0	4.0	.8	.000243	180.0	.01078	1.53	18.0	.01078	1.53	1.8	.01078	1.53
5.6	4.5	.8	.000243	202.5	.00939	1.75	20.3	.00939	1.75	2.0	.00939	1.75
6.3	5.0	.8	.000243	225.0	.00826	1.99	22.5	.00826	1.99	2.3	.00826	1.99
				Q = 1000 gpm								
5.0	1.0	.2	.000347	180.0	.04302	.27	18.0	.04302	.27	1.8	.04302	.27
7.5	1.5	.2	.000347	270.0	.02614	.44	27.0	.02614	.44	2.7	.02614	.44
10.0	2.0	.2	.000347	360.0	.01765	.65	36.0	.01765	.65	3.6	.01765	.65
12.5	2.5	.2	.000347	450.0	.01275	.90	45.0	.01275	.90	4.5	.01275	.90
15.0	3.0	.2	.000347	540.0	.00965	1.19	54.0	.00965	1.19	5.4	.00965	1.19
17.5	3.5	.2	.000347	630.0	.00757	1.52	63.0	.00757	1.52	6.3	.00757	1.52
20.0	4.0	.2	.000347	720.0	.00609	1.89	72.0	.00609	1.89	7.2	.00609	1.89
22.5	4.5	.2	.000347	810.0	.00501	2.30	81.0	.00501	2.30	8.1	.00501	2.30
25.0	5.0	.2	.000347	900.0	.00420	2.75	90.0	.00420	2.75	9.0	.00420	2.75
2.5	1.0	.4	.000347	90.0	.04331	.27	9.0	.04331	.27	.9	.04331	.27
3.8	1.5	.4	.000347	135.0	.02950	.39	13.5	.02950	.39	1.4	.02950	.39
5.0	2.0	.4	.000347	180.0	.02156	.54	18.0	.02156	.54	1.8	.02156	.54
6.3	2.5	.4	.000347	225.0	.01651	.70	22.5	.01651	.70	2.3	.01651	.70
7.5	3.0	.4	.000347	270.0	.01309	.88	27.0	.01309	.88	2.7	.01309	.88
8.8	3.5	.4	.000347	315.0	.01064	1.08	31.5	.01064	1.08	3.1	.01064	1.08
10.0	4.0	.4	.000347	360.0	.00884	1.31	36.0	.00884	1.31	3.6	.00884	1.31
11.3	4.5	.4	.000347	405.0	.00746	1.55	40.5	.00746	1.55	4.0	.00746	1.55
12.5	5.0	.4	.000347	450.0	.00638	1.81	45.0	.00638	1.81	4.5	.00638	1.81
1.3	1.0	.8	.000347	45.0	.03618	.32	4.5	.03618	.32	.5	.03618	.32
1.9	1.5	.8	.000347	67.5	.02737	.42	6.8	.02737	.42	.7	.02737	.42
2.5	2.0	.8	.000347	90.0	.02168	.53	9.0	.02168	.53	.9	.02168	.53
3.1	2.5	.8	.000347	112.5	.01769	.65	11.3	.01769	.65	1.1	.01769	.65
3.8	3.0	.8	.000347	135.0	.01476	.78	13.5	.01476	.78	1.4	.01476	.78
4.4	3.5	.8	.000347	157.5	.01253	.92	15.8	.01253	.92	1.6	.01253	.92
5.0	4.0	.8	.000347	180.0	.01078	1.07	18.0	.01078	1.07	1.8	.01078	1.07
5.6	4.5	.8	.000347	202.5	.00939	1.23	20.3	.00939	1.23	2.0	.00939	1.23
6.3	5.0	.8	.000347	225.0	.00826	1.40	22.5	.00826	1.40	2.3	.00826	1.40

Table SA-5 (continued)
Results of Waste Dilution - Winter - Ship 2
(L = 0.4 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 1200 gpm							
5.0	1.0	.2	.000416	180.0	.04302	.22	18.0	.04302	.22	1.8	.04302	.22
7.5	1.5	.2	.000416	270.0	.02614	.37	27.0	.02614	.37	2.7	.02614	.37
10.0	2.0	.2	.000416	360.0	.01765	.54	36.0	.01765	.54	3.6	.01765	.54
12.5	2.5	.2	.000416	450.0	.01275	.75	45.0	.01275	.75	4.5	.01275	.75
15.0	3.0	.2	.000416	540.0	.00965	1.00	54.0	.00965	1.00	5.4	.00965	1.00
17.5	3.5	.2	.000416	630.0	.00757	1.27	63.0	.00757	1.27	6.3	.00757	1.27
20.0	4.0	.2	.000416	720.0	.00609	1.58	72.0	.00609	1.58	7.2	.00609	1.58
22.5	4.5	.2	.000416	810.0	.00501	1.92	81.0	.00501	1.92	8.1	.00501	1.92
25.0	5.0	.2	.000416	900.0	.00420	2.29	90.0	.00420	2.29	9.0	.00420	2.29
2.5	1.0	.4	.000416	90.0	.04331	.22	9.0	.04331	.22	.9	.04331	.22
3.8	1.5	.4	.000416	135.0	.02950	.33	13.5	.02950	.33	1.4	.02950	.33
5.0	2.0	.4	.000416	180.0	.02156	.45	18.0	.02156	.45	1.8	.02156	.45
6.3	2.5	.4	.000416	225.0	.01651	.58	22.5	.01651	.58	2.3	.01651	.58
7.5	3.0	.4	.000416	270.0	.01309	.73	27.0	.01309	.73	2.7	.01309	.73
8.8	3.5	.4	.000416	315.0	.01064	.90	31.5	.01064	.90	3.1	.01064	.90
10.0	4.0	.4	.000416	360.0	.00884	1.09	36.0	.00884	1.09	3.6	.00884	1.09
11.3	4.5	.4	.000416	405.0	.00746	1.29	40.5	.00746	1.29	4.0	.00746	1.29
12.5	5.0	.4	.000416	450.0	.00638	1.51	45.0	.00638	1.51	4.5	.00638	1.51
1.3	1.0	.8	.000416	45.0	.03618	.27	4.5	.03618	.27	.5	.03618	.27
1.9	1.5	.8	.000416	67.5	.02737	.35	6.8	.02737	.35	.7	.02737	.35
2.5	2.0	.8	.000416	90.0	.02168	.44	9.0	.02168	.44	.9	.02168	.44
3.1	2.5	.8	.000416	112.5	.01769	.54	11.3	.01769	.54	1.1	.01769	.54
3.8	3.0	.8	.000416	135.0	.01476	.65	13.5	.01476	.65	1.4	.01476	.65
4.4	3.5	.8	.000416	157.5	.01253	.77	15.8	.01253	.77	1.6	.01253	.77
5.0	4.0	.8	.000416	180.0	.01078	.89	18.0	.01078	.89	1.8	.01078	.89
5.6	4.5	.8	.000416	202.5	.00939	1.02	20.3	.00939	1.02	2.0	.00939	1.02
6.3	5.0	.8	.000416	225.0	.00826	1.16	22.5	.00826	1.16	2.3	.00826	1.16
					Q = 1400 gpm							
5.0	1.0	.2	.000486	180.0	.04302	.19	18.0	.04302	.19	1.8	.04302	.19
7.5	1.5	.2	.000486	270.0	.02614	.32	27.0	.02614	.32	2.7	.02614	.32
10.0	2.0	.2	.000486	360.0	.01765	.47	36.0	.01765	.47	3.6	.01765	.47
12.5	2.5	.2	.000486	450.0	.01275	.65	45.0	.01275	.65	4.5	.01275	.65
15.0	3.0	.2	.000486	540.0	.00965	.85	54.0	.00965	.85	5.4	.00965	.85
17.5	3.5	.2	.000486	630.0	.00757	1.09	63.0	.00757	1.09	6.3	.00757	1.09
20.0	4.0	.2	.000486	720.0	.00609	1.35	72.0	.00609	1.35	7.2	.00609	1.35
22.5	4.5	.2	.000486	810.0	.00501	1.64	81.0	.00501	1.64	8.1	.00501	1.64
25.0	5.0	.2	.000486	900.0	.00420	1.96	90.0	.00420	1.96	9.0	.00420	1.96
2.5	1.0	.4	.000486	90.0	.04331	.19	9.0	.04331	.19	.9	.04331	.19
3.8	1.5	.4	.000486	135.0	.02950	.28	13.5	.02950	.28	1.4	.02950	.28
5.0	2.0	.4	.000486	180.0	.02156	.38	18.0	.02156	.38	1.8	.02156	.38
6.3	2.5	.4	.000486	225.0	.01651	.50	22.5	.01651	.50	2.3	.01651	.50
7.5	3.0	.4	.000486	270.0	.01309	.63	27.0	.01309	.63	2.7	.01309	.63
8.8	3.5	.4	.000486	315.0	.01064	.77	31.5	.01064	.77	3.1	.01064	.77
10.0	4.0	.4	.000486	360.0	.00884	.93	36.0	.00884	.93	3.6	.00884	.93
11.3	4.5	.4	.000486	405.0	.00746	1.10	40.5	.00746	1.10	4.0	.00746	1.10
12.5	5.0	.4	.000486	450.0	.00638	1.29	45.0	.00638	1.29	4.5	.00638	1.29
1.3	1.0	.8	.000486	45.0	.03618	.23	4.5	.03618	.23	.5	.03618	.23
1.9	1.5	.8	.000486	67.5	.02737	.30	6.8	.02737	.30	.7	.02737	.30
2.5	2.0	.8	.000486	90.0	.02168	.38	9.0	.02168	.38	.9	.02168	.38
3.1	2.5	.8	.000486	112.5	.01769	.47	11.3	.01769	.47	1.1	.01769	.47
3.8	3.0	.8	.000486	135.0	.01476	.56	13.5	.01476	.56	1.4	.01476	.56
4.4	3.5	.8	.000486	157.5	.01253	.66	15.8	.01253	.66	1.6	.01253	.66
5.0	4.0	.8	.000486	180.0	.01078	.76	18.0	.01078	.76	1.8	.01078	.76
5.6	4.5	.8	.000486	202.5	.00939	.88	20.3	.00939	.88	2.0	.00939	.88
6.3	5.0	.8	.000486	225.0	.00826	1.00	22.5	.00826	1.00	2.3	.00826	1.00

Table SA-6
Results of Waste Dilution - Summer - Ship 3
(L = 0.4 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 500 gpm												
5.0	1.0	.2	.000175	180.0	.08000	.29	18.0	.06319	.36	1.8	.06319	.36
7.5	1.5	.2	.000175	270.0	.04677	.49	27.0	.03843	.59	2.7	.03843	.59
10.0	2.0	.2	.000175	360.0	.03019	.76	36.0	.02597	.88	3.6	.02597	.88
12.5	2.5	.2	.000175	450.0	.02126	1.07	45.0	.01876	1.22	4.5	.01876	1.22
15.0	3.0	.2	.000175	540.0	.01584	1.44	54.0	.01421	1.61	5.4	.01421	1.61
17.5	3.5	.2	.000175	630.0	.01227	1.86	63.0	.01114	2.05	6.3	.01114	2.05
20.0	4.0	.2	.000175	720.0	.00980	2.33	72.0	.00897	2.54	7.2	.00897	2.54
22.5	4.5	.2	.000175	810.0	.00801	2.85	81.0	.00738	3.09	8.1	.00738	3.09
25.0	5.0	.2	.000175	900.0	.00668	3.42	90.0	.00618	3.69	9.0	.00618	3.69
2.5	1.0	.4	.000175	90.0	.06372	.36	9.0	.06372	.36	.9	.06372	.36
3.8	1.5	.4	.000175	135.0	.04931	.46	13.5	.04342	.53	1.4	.04342	.53
5.0	2.0	.4	.000175	180.0	.04030	.57	18.0	.03174	.72	1.8	.03174	.72
6.3	2.5	.4	.000175	225.0	.03086	.74	22.5	.02432	.94	2.3	.02432	.94
7.5	3.0	.4	.000175	270.0	.02349	.97	27.0	.01928	1.18	2.7	.01928	1.18
8.8	3.5	.4	.000175	315.0	.01860	1.23	31.5	.01568	1.46	3.1	.01568	1.46
10.0	4.0	.4	.000175	360.0	.01514	1.51	36.0	.01301	1.75	3.6	.01301	1.75
11.3	4.5	.4	.000175	405.0	.01259	1.81	40.5	.01098	2.08	4.0	.01098	2.08
12.5	5.0	.4	.000175	450.0	.01066	2.14	45.0	.00940	2.43	4.5	.00940	2.43
1.3	1.0	.8	.000175	45.0	.05327	.43	4.5	.05327	.43	.5	.05327	.43
1.9	1.5	.8	.000175	67.5	.04031	.57	6.8	.04031	.57	.7	.04031	.57
2.5	2.0	.8	.000175	90.0	.03193	.71	9.0	.03193	.71	.9	.03193	.71
3.1	2.5	.8	.000175	112.5	.02749	.83	11.3	.02606	.88	1.1	.02606	.88
3.8	3.0	.8	.000175	135.0	.02470	.92	13.5	.02174	1.05	1.4	.02174	1.05
4.4	3.5	.8	.000175	157.5	.02228	1.02	15.8	.01846	1.24	1.6	.01846	1.24
5.0	4.0	.8	.000175	180.0	.02019	1.13	18.0	.01589	1.44	1.8	.01589	1.44
5.6	4.5	.8	.000175	202.5	.01818	1.26	20.3	.01384	1.65	2.0	.01384	1.65
6.3	5.0	.8	.000175	225.0	.01552	1.47	22.5	.01217	1.88	2.3	.01217	1.88
Q = 600 gpm												
5.0	1.0	.2	.000210	180.0	.08000	.24	18.0	.06319	.30	1.8	.06319	.30
7.5	1.5	.2	.000210	270.0	.04677	.41	27.0	.03843	.49	2.7	.03843	.49
10.0	2.0	.2	.000210	360.0	.03019	.63	36.0	.02597	.73	3.6	.02597	.73
12.5	2.5	.2	.000210	450.0	.02126	.89	45.0	.01876	1.01	4.5	.01876	1.01
15.0	3.0	.2	.000210	540.0	.01584	1.20	54.0	.01421	1.34	5.4	.01421	1.34
17.5	3.5	.2	.000210	630.0	.01227	1.55	63.0	.01114	1.71	6.3	.01114	1.71
20.0	4.0	.2	.000210	720.0	.00980	1.94	72.0	.00897	2.12	7.2	.00897	2.12
22.5	4.5	.2	.000210	810.0	.00801	2.37	81.0	.00738	2.58	8.1	.00738	2.58
25.0	5.0	.2	.000210	900.0	.00668	2.85	90.0	.00618	3.08	9.0	.00618	3.08
2.5	1.0	.4	.000210	90.0	.06372	.30	9.0	.06372	.30	.9	.06372	.30
3.8	1.5	.4	.000210	135.0	.04931	.39	13.5	.04342	.44	1.4	.04342	.44
5.0	2.0	.4	.000210	180.0	.04030	.47	18.0	.03174	.60	1.8	.03174	.60
6.3	2.5	.4	.000210	225.0	.03086	.62	22.5	.02432	.78	2.3	.02432	.78
7.5	3.0	.4	.000210	270.0	.02349	.81	27.0	.01928	.99	2.7	.01928	.99
8.8	3.5	.4	.000210	315.0	.01860	1.02	31.5	.01568	1.21	3.1	.01568	1.21
10.0	4.0	.4	.000210	360.0	.01514	1.26	36.0	.01301	1.46	3.6	.01301	1.46
11.3	4.5	.4	.000210	405.0	.01259	1.51	40.5	.01098	1.73	4.0	.01098	1.73
12.5	5.0	.4	.000210	450.0	.01066	1.79	45.0	.00940	2.02	4.5	.00940	2.02
1.3	1.0	.8	.000210	45.0	.05327	.36	4.5	.05327	.36	.5	.05327	.36
1.9	1.5	.8	.000210	67.5	.04031	.47	6.8	.04031	.47	.7	.04031	.47
2.5	2.0	.8	.000210	90.0	.03193	.60	9.0	.03193	.60	.9	.03193	.60
3.1	2.5	.8	.000210	112.5	.02749	.69	11.3	.02606	.73	1.1	.02606	.73
3.8	3.0	.8	.000210	135.0	.02470	.77	13.5	.02174	.87	1.4	.02174	.87
4.4	3.5	.8	.000210	157.5	.02228	.85	15.8	.01846	1.03	1.6	.01846	1.03
5.0	4.0	.8	.000210	180.0	.02019	.94	18.0	.01589	1.20	1.8	.01589	1.20
5.6	4.5	.8	.000210	202.5	.01818	1.05	20.3	.01384	1.37	2.0	.01384	1.37
6.3	5.0	.8	.000210	225.0	.01552	1.23	22.5	.01217	1.56	2.3	.01217	1.56

Table SA-6 (continued)
Results of Waste Dilution - Summer - Ship 3
(L = 0.4 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 700 gpm							
5.0	1.0	.2	.000245	180.0	.08000	.20	18.0	.06319	.26	1.8	.06319	.26
7.5	1.5	.2	.000245	270.0	.04677	.35	27.0	.03843	.42	2.7	.03843	.42
10.0	2.0	.2	.000245	360.0	.03019	.54	36.0	.02597	.63	3.6	.02597	.63
12.5	2.5	.2	.000245	450.0	.02126	.77	45.0	.01876	.87	4.5	.01876	.87
15.0	3.0	.2	.000245	540.0	.01584	1.03	54.0	.01421	1.15	5.4	.01421	1.15
17.5	3.5	.2	.000245	630.0	.01227	1.33	63.0	.01114	1.46	6.3	.01114	1.46
20.0	4.0	.2	.000245	720.0	.00980	1.66	72.0	.00897	1.82	7.2	.00897	1.82
22.5	4.5	.2	.000245	810.0	.00801	2.03	81.0	.00738	2.21	8.1	.00738	2.21
25.0	5.0	.2	.000245	900.0	.00668	2.44	90.0	.00618	2.64	9.0	.00618	2.64
2.5	1.0	.4	.000245	90.0	.06372	.26	9.0	.06372	.26	.9	.06372	.26
3.8	1.5	.4	.000245	135.0	.04931	.33	13.5	.04342	.38	1.4	.04342	.38
5.0	2.0	.4	.000245	180.0	.04030	.40	18.0	.03174	.51	1.8	.03174	.51
6.3	2.5	.4	.000245	225.0	.03086	.53	22.5	.02432	.67	2.3	.02432	.67
7.5	3.0	.4	.000245	270.0	.02349	.69	27.0	.01928	.85	2.7	.01928	.85
8.8	3.5	.4	.000245	315.0	.01860	.88	31.5	.01568	1.04	3.1	.01568	1.04
10.0	4.0	.4	.000245	360.0	.01514	1.08	36.0	.01301	1.25	3.6	.01301	1.25
11.3	4.5	.4	.000245	405.0	.01259	1.29	40.5	.01098	1.48	4.0	.01098	1.48
12.5	5.0	.4	.000245	450.0	.01066	1.53	45.0	.00940	1.73	4.5	.00940	1.73
1.3	1.0	.8	.000245	45.0	.05327	.31	4.5	.05327	.31	.5	.05327	.31
1.9	1.5	.8	.000245	67.5	.04031	.40	6.8	.04031	.40	.7	.04031	.40
2.5	2.0	.8	.000245	90.0	.03193	.51	9.0	.03193	.51	.9	.03193	.51
3.1	2.5	.8	.000245	112.5	.02749	.59	11.3	.02606	.63	1.1	.02606	.63
3.8	3.0	.8	.000245	135.0	.02470	.66	13.5	.02174	.75	1.4	.02174	.75
4.4	3.5	.8	.000245	157.5	.02228	.73	15.8	.01846	.88	1.6	.01846	.88
5.0	4.0	.8	.000245	180.0	.02019	.81	18.0	.01589	1.03	1.8	.01589	1.03
5.6	4.5	.8	.000245	202.5	.01818	.90	20.3	.01384	1.18	2.0	.01384	1.18
6.3	5.0	.8	.000245	225.0	.01552	1.05	22.5	.01217	1.34	2.3	.01217	1.34
					Q = 1000 gpm							
5.0	1.0	.2	.000350	180.0	.08000	.14	18.0	.06319	.18	1.8	.06319	.18
7.5	1.5	.2	.000350	270.0	.04677	.24	27.0	.03843	.30	2.7	.03843	.30
10.0	2.0	.2	.000350	360.0	.03019	.38	36.0	.02597	.44	3.6	.02597	.44
12.5	2.5	.2	.000350	450.0	.02126	.54	45.0	.01876	.61	4.5	.01876	.61
15.0	3.0	.2	.000350	540.0	.01584	.72	54.0	.01421	.80	5.4	.01421	.80
17.5	3.5	.2	.000350	630.0	.01227	.93	63.0	.01114	1.02	6.3	.01114	1.02
20.0	4.0	.2	.000350	720.0	.00980	1.16	72.0	.00897	1.27	7.2	.00897	1.27
22.5	4.5	.2	.000350	810.0	.00801	1.42	81.0	.00738	1.55	8.1	.00738	1.55
25.0	5.0	.2	.000350	900.0	.00668	1.71	90.0	.00618	1.85	9.0	.00618	1.85
2.5	1.0	.4	.000350	90.0	.06372	.18	9.0	.06372	.18	.9	.06372	.18
3.8	1.5	.4	.000350	135.0	.04931	.23	13.5	.04342	.26	1.4	.04342	.26
5.0	2.0	.4	.000350	180.0	.04030	.28	18.0	.03174	.36	1.8	.03174	.36
6.3	2.5	.4	.000350	225.0	.03086	.37	22.5	.02432	.47	2.3	.02432	.47
7.5	3.0	.4	.000350	270.0	.02349	.49	27.0	.01928	.59	2.7	.01928	.59
8.8	3.5	.4	.000350	315.0	.01860	.61	31.5	.01568	.73	3.1	.01568	.73
10.0	4.0	.4	.000350	360.0	.01514	.75	36.0	.01301	.88	3.6	.01301	.88
11.3	4.5	.4	.000350	405.0	.01259	.91	40.5	.01098	1.04	4.0	.01098	1.04
12.5	5.0	.4	.000350	450.0	.01066	1.07	45.0	.00940	1.21	4.5	.00940	1.21
1.3	1.0	.8	.000350	45.0	.05327	.21	4.5	.05327	.21	.5	.05327	.21
1.9	1.5	.8	.000350	67.5	.04031	.28	6.8	.04031	.28	.7	.04031	.28
2.5	2.0	.8	.000350	90.0	.03193	.36	9.0	.03193	.36	.9	.03193	.36
3.1	2.5	.8	.000350	112.5	.02749	.42	11.3	.02606	.44	1.1	.02606	.44
3.8	3.0	.8	.000350	135.0	.02470	.46	13.5	.02174	.52	1.4	.02174	.52
4.4	3.5	.8	.000350	157.5	.02228	.51	15.8	.01846	.62	1.6	.01846	.62
5.0	4.0	.8	.000350	180.0	.02019	.57	18.0	.01589	.72	1.8	.01589	.72
5.6	4.5	.8	.000350	202.5	.01818	.63	20.3	.01384	.82	2.0	.01384	.82
6.3	5.0	.8	.000350	225.0	.01552	.74	22.5	.01217	.94	2.3	.01217	.94

Table SA-6 (continued)
Results of Waste Dilution - Summer - Ship 3
(L = 0.4 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 1200 gpm							
5.0	1.0	.2	.000421	180.0	.08000	.12	18.0	.06319	.15	1.8	.06319	.15
7.5	1.5	.2	.000421	270.0	.04677	.20	27.0	.03843	.25	2.7	.03843	.25
10.0	2.0	.2	.000421	360.0	.03019	.32	36.0	.02597	.37	3.6	.02597	.37
12.5	2.5	.2	.000421	450.0	.02126	.45	45.0	.01876	.51	4.5	.01876	.51
15.0	3.0	.2	.000421	540.0	.01584	.60	54.0	.01421	.67	5.4	.01421	.67
17.5	3.5	.2	.000421	630.0	.01227	.77	63.0	.01114	.85	6.3	.01114	.85
20.0	4.0	.2	.000421	720.0	.00980	.97	72.0	.00897	1.06	7.2	.00897	1.06
22.5	4.5	.2	.000421	810.0	.00801	1.19	81.0	.00738	1.29	8.1	.00738	1.29
25.0	5.0	.2	.000421	900.0	.00668	1.42	90.0	.00618	1.54	9.0	.00618	1.54
2.5	1.0	.4	.000421	90.0	.06372	.15	9.0	.06372	.15	.9	.06372	.15
3.8	1.5	.4	.000421	135.0	.04931	.19	13.5	.04342	.22	1.4	.04342	.22
5.0	2.0	.4	.000421	180.0	.04030	.24	18.0	.03174	.30	1.8	.03174	.30
6.3	2.5	.4	.000421	225.0	.03086	.31	22.5	.02432	.39	2.3	.02432	.39
7.5	3.0	.4	.000421	270.0	.02349	.40	27.0	.01928	.49	2.7	.01928	.49
8.8	3.5	.4	.000421	315.0	.01860	.51	31.5	.01568	.61	3.1	.01568	.61
10.0	4.0	.4	.000421	360.0	.01514	.63	36.0	.01301	.73	3.6	.01301	.73
11.3	4.5	.4	.000421	405.0	.01259	.76	40.5	.01098	.87	4.0	.01098	.87
12.5	5.0	.4	.000421	450.0	.01066	.89	45.0	.00940	1.01	4.5	.00940	1.01
1.3	1.0	.8	.000421	45.0	.05327	.18	4.5	.05327	.18	.5	.05327	.18
1.9	1.5	.8	.000421	67.5	.04031	.24	6.8	.04031	.24	.7	.04031	.24
2.5	2.0	.8	.000421	90.0	.03193	.30	9.0	.03193	.30	.9	.03193	.30
3.1	2.5	.8	.000421	112.5	.02749	.35	11.3	.02606	.36	1.1	.02606	.36
3.8	3.0	.8	.000421	135.0	.02470	.38	13.5	.02174	.44	1.4	.02174	.44
4.4	3.5	.8	.000421	157.5	.02228	.43	15.8	.01846	.52	1.6	.01846	.52
5.0	4.0	.8	.000421	180.0	.02019	.47	18.0	.01589	.60	1.8	.01589	.60
5.6	4.5	.8	.000421	202.5	.01818	.52	20.3	.01384	.69	2.0	.01384	.69
6.3	5.0	.8	.000421	225.0	.01552	.61	22.5	.01217	.78	2.3	.01217	.78
					Q = 1400 gpm							
5.0	1.0	.2	.000491	180.0	.08000	.10	18.0	.06319	.13	1.8	.06319	.13
7.5	1.5	.2	.000491	270.0	.04677	.17	27.0	.03843	.21	2.7	.03843	.21
10.0	2.0	.2	.000491	360.0	.03019	.27	36.0	.02597	.31	3.6	.02597	.31
12.5	2.5	.2	.000491	450.0	.02126	.38	45.0	.01876	.43	4.5	.01876	.43
15.0	3.0	.2	.000491	540.0	.01584	.51	54.0	.01421	.57	5.4	.01421	.57
17.5	3.5	.2	.000491	630.0	.01227	.66	63.0	.01114	.73	6.3	.01114	.73
20.0	4.0	.2	.000491	720.0	.00980	.83	72.0	.00897	.91	7.2	.00897	.91
22.5	4.5	.2	.000491	810.0	.00801	1.02	81.0	.00738	1.10	8.1	.00738	1.10
25.0	5.0	.2	.000491	900.0	.00668	1.22	90.0	.00618	1.32	9.0	.00618	1.32
2.5	1.0	.4	.000491	90.0	.06372	.13	9.0	.06372	.13	.9	.06372	.13
3.8	1.5	.4	.000491	135.0	.04931	.17	13.5	.04342	.19	1.4	.04342	.19
5.0	2.0	.4	.000491	180.0	.04030	.20	18.0	.03174	.26	1.8	.03174	.26
6.3	2.5	.4	.000491	225.0	.03086	.26	22.5	.02432	.34	2.3	.02432	.34
7.5	3.0	.4	.000491	270.0	.02349	.35	27.0	.01928	.42	2.7	.01928	.42
8.8	3.5	.4	.000491	315.0	.01860	.44	31.5	.01568	.52	3.1	.01568	.52
10.0	4.0	.4	.000491	360.0	.01514	.54	36.0	.01301	.63	3.6	.01301	.63
11.3	4.5	.4	.000491	405.0	.01259	.65	40.5	.01098	.74	4.0	.01098	.74
12.5	5.0	.4	.000491	450.0	.01066	.77	45.0	.00940	.87	4.5	.00940	.87
1.3	1.0	.8	.000491	45.0	.05327	.15	4.5	.05327	.15	.5	.05327	.15
1.9	1.5	.8	.000491	67.5	.04031	.20	6.8	.04031	.20	.7	.04031	.20
2.5	2.0	.8	.000491	90.0	.03193	.26	9.0	.03193	.26	.9	.03193	.26
3.1	2.5	.8	.000491	112.5	.02749	.30	11.3	.02606	.31	1.1	.02606	.31
3.8	3.0	.8	.000491	135.0	.02470	.33	13.5	.02174	.37	1.4	.02174	.37
4.4	3.5	.8	.000491	157.5	.02228	.37	15.8	.01846	.44	1.6	.01846	.44
5.0	4.0	.8	.000491	180.0	.02019	.40	18.0	.01589	.51	1.8	.01589	.51
5.6	4.5	.8	.000491	202.5	.01818	.45	20.3	.01384	.59	2.0	.01384	.59
6.3	5.0	.8	.000491	225.0	.01552	.53	22.5	.01217	.67	2.3	.01217	.67

Table SA-7
Results of Waste Dilution - Winter - Ship 3
(L = 0.4 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 500 gpm								
5.0	1.0	.2	.000175	180.0	.04257	.54	18.0	.04257	.54	1.8	.04257	.54
7.5	1.5	.2	.000175	270.0	.02586	.88	27.0	.02586	.88	2.7	.02586	.88
10.0	2.0	.2	.000175	360.0	.01747	1.31	36.0	.01747	1.31	3.6	.01747	1.31
12.5	2.5	.2	.000175	450.0	.01262	1.81	45.0	.01262	1.81	4.5	.01262	1.81
15.0	3.0	.2	.000175	540.0	.00955	2.39	54.0	.00955	2.39	5.4	.00955	2.39
17.5	3.5	.2	.000175	630.0	.00749	3.05	63.0	.00749	3.05	6.3	.00749	3.05
20.0	4.0	.2	.000175	720.0	.00603	3.79	72.0	.00603	3.79	7.2	.00603	3.79
22.5	4.5	.2	.000175	810.0	.00496	4.60	81.0	.00496	4.60	8.1	.00496	4.60
25.0	5.0	.2	.000175	900.0	.00415	5.50	90.0	.00415	5.50	9.0	.00415	5.50
2.5	1.0	.4	.000175	90.0	.04286	.53	9.0	.04286	.53	.9	.04286	.53
3.8	1.5	.4	.000175	135.0	.02919	.78	13.5	.02919	.78	1.4	.02919	.78
5.0	2.0	.4	.000175	180.0	.02133	1.07	18.0	.02133	1.07	1.8	.02133	1.07
6.3	2.5	.4	.000175	225.0	.01634	1.40	22.5	.01634	1.40	2.3	.01634	1.40
7.5	3.0	.4	.000175	270.0	.01295	1.76	27.0	.01295	1.76	2.7	.01295	1.76
8.8	3.5	.4	.000175	315.0	.01053	2.17	31.5	.01053	2.17	3.1	.01053	2.17
10.0	4.0	.4	.000175	360.0	.00874	2.61	36.0	.00874	2.61	3.6	.00874	2.61
11.3	4.5	.4	.000175	405.0	.00738	3.09	40.5	.00738	3.09	4.0	.00738	3.09
12.5	5.0	.4	.000175	450.0	.00631	3.62	45.0	.00631	3.62	4.5	.00631	3.62
1.3	1.0	.8	.000175	45.0	.03580	.64	4.5	.03580	.64	.5	.03580	.64
1.9	1.5	.8	.000175	67.5	.02708	.84	6.8	.02708	.84	.7	.02708	.84
2.5	2.0	.8	.000175	90.0	.02145	1.06	9.0	.02145	1.06	.9	.02145	1.06
3.1	2.5	.8	.000175	112.5	.01750	1.30	11.3	.01750	1.30	1.1	.01750	1.30
3.8	3.0	.8	.000175	135.0	.01460	1.56	13.5	.01460	1.56	1.4	.01460	1.56
4.4	3.5	.8	.000175	157.5	.01240	1.84	15.8	.01240	1.84	1.6	.01240	1.84
5.0	4.0	.8	.000175	180.0	.01067	2.14	18.0	.01067	2.14	1.8	.01067	2.14
5.6	4.5	.8	.000175	202.5	.00929	2.46	20.3	.00929	2.46	2.0	.00929	2.46
6.3	5.0	.8	.000175	225.0	.00817	2.79	22.5	.00817	2.79	2.3	.00817	2.79
				Q = 600 gpm								
5.0	1.0	.2	.000210	180.0	.04257	.45	18.0	.04257	.45	1.8	.04257	.45
7.5	1.5	.2	.000210	270.0	.02586	.74	27.0	.02586	.74	2.7	.02586	.74
10.0	2.0	.2	.000210	360.0	.01747	1.09	36.0	.01747	1.09	3.6	.01747	1.09
12.5	2.5	.2	.000210	450.0	.01262	1.51	45.0	.01262	1.51	4.5	.01262	1.51
15.0	3.0	.2	.000210	540.0	.00955	1.99	54.0	.00955	1.99	5.4	.00955	1.99
17.5	3.5	.2	.000210	630.0	.00749	2.54	63.0	.00749	2.54	6.3	.00749	2.54
20.0	4.0	.2	.000210	720.0	.00603	3.15	72.0	.00603	3.15	7.2	.00603	3.15
22.5	4.5	.2	.000210	810.0	.00496	3.83	81.0	.00496	3.83	8.1	.00496	3.83
25.0	5.0	.2	.000210	900.0	.00415	4.58	90.0	.00415	4.58	9.0	.00415	4.58
2.5	1.0	.4	.000210	90.0	.04286	.44	9.0	.04286	.44	.9	.04286	.44
3.8	1.5	.4	.000210	135.0	.02919	.65	13.5	.02919	.65	1.4	.02919	.65
5.0	2.0	.4	.000210	180.0	.02133	.89	18.0	.02133	.89	1.8	.02133	.89
6.3	2.5	.4	.000210	225.0	.01634	1.16	22.5	.01634	1.16	2.3	.01634	1.16
7.5	3.0	.4	.000210	270.0	.01295	1.47	27.0	.01295	1.47	2.7	.01295	1.47
8.8	3.5	.4	.000210	315.0	.01053	1.81	31.5	.01053	1.81	3.1	.01053	1.81
10.0	4.0	.4	.000210	360.0	.00874	2.18	36.0	.00874	2.18	3.6	.00874	2.18
11.3	4.5	.4	.000210	405.0	.00738	2.58	40.5	.00738	2.58	4.0	.00738	2.58
12.5	5.0	.4	.000210	450.0	.00631	3.01	45.0	.00631	3.01	4.5	.00631	3.01
1.3	1.0	.8	.000210	45.0	.03580	.53	4.5	.03580	.53	.5	.03580	.53
1.9	1.5	.8	.000210	67.5	.02708	.70	6.8	.02708	.70	.7	.02708	.70
2.5	2.0	.8	.000210	90.0	.02145	.89	9.0	.02145	.89	.9	.02145	.89
3.1	2.5	.8	.000210	112.5	.01750	1.09	11.3	.01750	1.09	1.1	.01750	1.09
3.8	3.0	.8	.000210	135.0	.01460	1.30	13.5	.01460	1.30	1.4	.01460	1.30
4.4	3.5	.8	.000210	157.5	.01240	1.53	15.8	.01240	1.53	1.6	.01240	1.53
5.0	4.0	.8	.000210	180.0	.01067	1.78	18.0	.01067	1.78	1.8	.01067	1.78
5.6	4.5	.8	.000210	202.5	.00929	2.05	20.3	.00929	2.05	2.0	.00929	2.05
6.3	5.0	.8	.000210	225.0	.00817	2.33	22.5	.00817	2.33	2.3	.00817	2.33

Table SA-7 (continued)
Results of Waste Dilution - Winter - Ship 3
(L = 0.4 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 700 gpm							
5.0	1.0	.2	.000245	180.0	.04257	.38	18.0	.04257	.38	1.8	.04257	.38
7.5	1.5	.2	.000245	270.0	.02586	.63	27.0	.02586	.63	2.7	.02586	.63
10.0	2.0	.2	.000245	360.0	.01747	.93	36.0	.01747	.93	3.6	.01747	.93
12.5	2.5	.2	.000245	450.0	.01262	1.29	45.0	.01262	1.29	4.5	.01262	1.29
15.0	3.0	.2	.000245	540.0	.00955	1.71	54.0	.00955	1.71	5.4	.00955	1.71
17.5	3.5	.2	.000245	630.0	.00749	2.18	63.0	.00749	2.18	6.3	.00749	2.18
20.0	4.0	.2	.000245	720.0	.00603	2.70	72.0	.00603	2.70	7.2	.00603	2.70
22.5	4.5	.2	.000245	810.0	.00496	3.29	81.0	.00496	3.29	8.1	.00496	3.29
25.0	5.0	.2	.000245	900.0	.00415	3.93	90.0	.00415	3.93	9.0	.00415	3.93
2.5	1.0	.4	.000245	90.0	.04286	.38	9.0	.04286	.38	.9	.04286	.38
3.8	1.5	.4	.000245	135.0	.02919	.56	13.5	.02919	.56	1.4	.02919	.56
5.0	2.0	.4	.000245	180.0	.02133	.76	18.0	.02133	.76	1.8	.02133	.76
6.3	2.5	.4	.000245	225.0	.01634	1.00	22.5	.01634	1.00	2.3	.01634	1.00
7.5	3.0	.4	.000245	270.0	.01295	1.26	27.0	.01295	1.26	2.7	.01295	1.26
8.8	3.5	.4	.000245	315.0	.01053	1.55	31.5	.01053	1.55	3.1	.01053	1.55
10.0	4.0	.4	.000245	360.0	.00874	1.87	36.0	.00874	1.87	3.6	.00874	1.87
11.3	4.5	.4	.000245	405.0	.00738	2.21	40.5	.00738	2.21	4.0	.00738	2.21
12.5	5.0	.4	.000245	450.0	.00631	2.58	45.0	.00631	2.58	4.5	.00631	2.58
1.3	1.0	.8	.000245	45.0	.03580	.46	4.5	.03580	.46	.5	.03580	.46
1.9	1.5	.8	.000245	67.5	.02708	.60	6.8	.02708	.60	.7	.02708	.60
2.5	2.0	.8	.000245	90.0	.02145	.76	9.0	.02145	.76	.9	.02145	.76
3.1	2.5	.8	.000245	112.5	.01750	.93	11.3	.01750	.93	1.1	.01750	.93
3.8	3.0	.8	.000245	135.0	.01460	1.12	13.5	.01460	1.12	1.4	.01460	1.12
4.4	3.5	.8	.000245	157.5	.01240	1.32	15.8	.01240	1.32	1.6	.01240	1.32
5.0	4.0	.8	.000245	180.0	.01067	1.53	18.0	.01067	1.53	1.8	.01067	1.53
5.6	4.5	.8	.000245	202.5	.00929	1.75	20.3	.00929	1.75	2.0	.00929	1.75
6.3	5.0	.8	.000245	225.0	.00817	1.99	22.5	.00817	1.99	2.3	.00817	1.99
					Q = 1000 gpm							
5.0	1.0	.2	.000350	180.0	.04257	.27	18.0	.04257	.27	1.8	.04257	.27
7.5	1.5	.2	.000350	270.0	.02586	.44	27.0	.02586	.44	2.7	.02586	.44
10.0	2.0	.2	.000350	360.0	.01747	.65	36.0	.01747	.65	3.6	.01747	.65
12.5	2.5	.2	.000350	450.0	.01262	.90	45.0	.01262	.90	4.5	.01262	.90
15.0	3.0	.2	.000350	540.0	.00955	1.19	54.0	.00955	1.19	5.4	.00955	1.19
17.5	3.5	.2	.000350	630.0	.00749	1.52	63.0	.00749	1.52	6.3	.00749	1.52
20.0	4.0	.2	.000350	720.0	.00603	1.89	72.0	.00603	1.89	7.2	.00603	1.89
22.5	4.5	.2	.000350	810.0	.00496	2.30	81.0	.00496	2.30	8.1	.00496	2.30
25.0	5.0	.2	.000350	900.0	.00415	2.75	90.0	.00415	2.75	9.0	.00415	2.75
2.5	1.0	.4	.000350	90.0	.04286	.27	9.0	.04286	.27	.9	.04286	.27
3.8	1.5	.4	.000350	135.0	.02919	.39	13.5	.02919	.39	1.4	.02919	.39
5.0	2.0	.4	.000350	180.0	.02133	.54	18.0	.02133	.54	1.8	.02133	.54
6.3	2.5	.4	.000350	225.0	.01634	.70	22.5	.01634	.70	2.3	.01634	.70
7.5	3.0	.4	.000350	270.0	.01295	.88	27.0	.01295	.88	2.7	.01295	.88
8.8	3.5	.4	.000350	315.0	.01053	1.08	31.5	.01053	1.08	3.1	.01053	1.08
10.0	4.0	.4	.000350	360.0	.00874	1.31	36.0	.00874	1.31	3.6	.00874	1.31
11.3	4.5	.4	.000350	405.0	.00738	1.55	40.5	.00738	1.55	4.0	.00738	1.55
12.5	5.0	.4	.000350	450.0	.00631	1.81	45.0	.00631	1.81	4.5	.00631	1.81
1.3	1.0	.8	.000350	45.0	.03580	.32	4.5	.03580	.32	.5	.03580	.32
1.9	1.5	.8	.000350	67.5	.02708	.42	6.8	.02708	.42	.7	.02708	.42
2.5	2.0	.8	.000350	90.0	.02145	.53	9.0	.02145	.53	.9	.02145	.53
3.1	2.5	.8	.000350	112.5	.01750	.65	11.3	.01750	.65	1.1	.01750	.65
3.8	3.0	.8	.000350	135.0	.01460	.78	13.5	.01460	.78	1.4	.01460	.78
4.4	3.5	.8	.000350	157.5	.01240	.92	15.8	.01240	.92	1.6	.01240	.92
5.0	4.0	.8	.000350	180.0	.01067	1.07	18.0	.01067	1.07	1.8	.01067	1.07
5.6	4.5	.8	.000350	202.5	.00929	1.23	20.3	.00929	1.23	2.0	.00929	1.23
6.3	5.0	.8	.000350	225.0	.00817	1.40	22.5	.00817	1.40	2.3	.00817	1.40

Table SA-7 (continued)
Results of Waste Dilution - Winter - Ship 3
(L = 0.4 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 1200 gpm								
5.0	1.0	.2	.000421	180.0	.04257	.22	18.0	.04257	.22	1.8	.04257	.22
7.5	1.5	.2	.000421	270.0	.02586	.37	27.0	.02586	.37	2.7	.02586	.37
10.0	2.0	.2	.000421	360.0	.01747	.54	36.0	.01747	.54	3.6	.01747	.54
12.5	2.5	.2	.000421	450.0	.01262	.75	45.0	.01262	.75	4.5	.01262	.75
15.0	3.0	.2	.000421	540.0	.00955	1.00	54.0	.00955	1.00	5.4	.00955	1.00
17.5	3.5	.2	.000421	630.0	.00749	1.27	63.0	.00749	1.27	6.3	.00749	1.27
20.0	4.0	.2	.000421	720.0	.00603	1.58	72.0	.00603	1.58	7.2	.00603	1.58
22.5	4.5	.2	.000421	810.0	.00496	1.92	81.0	.00496	1.92	8.1	.00496	1.92
25.0	5.0	.2	.000421	900.0	.00415	2.29	90.0	.00415	2.29	9.0	.00415	2.29
2.5	1.0	.4	.000421	90.0	.04286	.22	9.0	.04286	.22	.9	.04286	.22
3.8	1.5	.4	.000421	135.0	.02919	.33	13.5	.02919	.33	1.4	.02919	.33
5.0	2.0	.4	.000421	180.0	.02133	.45	18.0	.02133	.45	1.8	.02133	.45
6.3	2.5	.4	.000421	225.0	.01634	.58	22.5	.01634	.58	2.3	.01634	.58
7.5	3.0	.4	.000421	270.0	.01295	.73	27.0	.01295	.73	2.7	.01295	.73
8.8	3.5	.4	.000421	315.0	.01053	.90	31.5	.01053	.90	3.1	.01053	.90
10.0	4.0	.4	.000421	360.0	.00874	1.09	36.0	.00874	1.09	3.6	.00874	1.09
11.3	4.5	.4	.000421	405.0	.00738	1.29	40.5	.00738	1.29	4.0	.00738	1.29
12.5	5.0	.4	.000421	450.0	.00631	1.51	45.0	.00631	1.51	4.5	.00631	1.51
1.3	1.0	.8	.000421	45.0	.03580	.27	4.5	.03580	.27	.5	.03580	.27
1.9	1.5	.8	.000421	67.5	.02708	.35	6.8	.02708	.35	.7	.02708	.35
2.5	2.0	.8	.000421	90.0	.02145	.44	9.0	.02145	.44	.9	.02145	.44
3.1	2.5	.8	.000421	112.5	.01750	.54	11.3	.01750	.54	1.1	.01750	.54
3.8	3.0	.8	.000421	135.0	.01460	.65	13.5	.01460	.65	1.4	.01460	.65
4.4	3.5	.8	.000421	157.5	.01240	.77	15.8	.01240	.77	1.6	.01240	.77
5.0	4.0	.8	.000421	180.0	.01067	.89	18.0	.01067	.89	1.8	.01067	.89
5.6	4.5	.8	.000421	202.5	.00929	1.02	20.3	.00929	1.02	2.0	.00929	1.02
6.3	5.0	.8	.000421	225.0	.00817	1.16	22.5	.00817	1.16	2.3	.00817	1.16
				Q = 1400 gpm								
5.0	1.0	.2	.000491	180.0	.04257	.19	18.0	.04257	.19	1.8	.04257	.19
7.5	1.5	.2	.000491	270.0	.02586	.32	27.0	.02586	.32	2.7	.02586	.32
10.0	2.0	.2	.000491	360.0	.01747	.47	36.0	.01747	.47	3.6	.01747	.47
12.5	2.5	.2	.000491	450.0	.01262	.65	45.0	.01262	.65	4.5	.01262	.65
15.0	3.0	.2	.000491	540.0	.00955	.85	54.0	.00955	.85	5.4	.00955	.85
17.5	3.5	.2	.000491	630.0	.00749	1.09	63.0	.00749	1.09	6.3	.00749	1.09
20.0	4.0	.2	.000491	720.0	.00603	1.35	72.0	.00603	1.35	7.2	.00603	1.35
22.5	4.5	.2	.000491	810.0	.00496	1.64	81.0	.00496	1.64	8.1	.00496	1.64
25.0	5.0	.2	.000491	900.0	.00415	1.96	90.0	.00415	1.96	9.0	.00415	1.96
2.5	1.0	.4	.000491	90.0	.04286	.19	9.0	.04286	.19	.9	.04286	.19
3.8	1.5	.4	.000491	135.0	.02919	.28	13.5	.02919	.28	1.4	.02919	.28
5.0	2.0	.4	.000491	180.0	.02133	.38	18.0	.02133	.38	1.8	.02133	.38
6.3	2.5	.4	.000491	225.0	.01634	.50	22.5	.01634	.50	2.3	.01634	.50
7.5	3.0	.4	.000491	270.0	.01295	.63	27.0	.01295	.63	2.7	.01295	.63
8.8	3.5	.4	.000491	315.0	.01053	.77	31.5	.01053	.77	3.1	.01053	.77
10.0	4.0	.4	.000491	360.0	.00874	.93	36.0	.00874	.93	3.6	.00874	.93
11.3	4.5	.4	.000491	405.0	.00738	1.10	40.5	.00738	1.10	4.0	.00738	1.10
12.5	5.0	.4	.000491	450.0	.00631	1.29	45.0	.00631	1.29	4.5	.00631	1.29
1.3	1.0	.8	.000491	45.0	.03580	.23	4.5	.03580	.23	.5	.03580	.23
1.9	1.5	.8	.000491	67.5	.02708	.30	6.8	.02708	.30	.7	.02708	.30
2.5	2.0	.8	.000491	90.0	.02145	.38	9.0	.02145	.38	.9	.02145	.38
3.1	2.5	.8	.000491	112.5	.01750	.47	11.3	.01750	.47	1.1	.01750	.47
3.8	3.0	.8	.000491	135.0	.01460	.56	13.5	.01460	.56	1.4	.01460	.56
4.4	3.5	.8	.000491	157.5	.01240	.66	15.8	.01240	.66	1.6	.01240	.66
5.0	4.0	.8	.000491	180.0	.01067	.76	18.0	.01067	.76	1.8	.01067	.76
5.6	4.5	.8	.000491	202.5	.00929	.88	20.3	.00929	.88	2.0	.00929	.88
6.3	5.0	.8	.000491	225.0	.00817	1.00	22.5	.00817	1.00	2.3	.00817	1.00

Table SA-8
Results of Waste Dilution - Summer - Ship 4
(L = 0.4 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 500 gpm							
5.0	1.0	.2	.000090	180.0	.15170	.29	18.0	.12102	.37	1.8	.12102	.37
7.5	1.5	.2	.000090	270.0	.08958	.50	27.0	.07401	.60	2.7	.07401	.60
10.0	2.0	.2	.000090	360.0	.05812	.76	36.0	.05015	.89	3.6	.05015	.89
12.5	2.5	.2	.000090	450.0	.04104	1.08	45.0	.03630	1.22	4.5	.03630	1.22
15.0	3.0	.2	.000090	540.0	.03062	1.45	54.0	.02752	1.62	5.4	.02752	1.62
17.5	3.5	.2	.000090	630.0	.02376	1.87	63.0	.02159	2.06	6.3	.02159	2.06
20.0	4.0	.2	.000090	720.0	.01899	2.34	72.0	.01740	2.56	7.2	.01740	2.56
22.5	4.5	.2	.000090	810.0	.01554	2.86	81.0	.01432	3.10	8.1	.01432	3.10
25.0	5.0	.2	.000090	900.0	.01295	3.43	90.0	.01200	3.71	9.0	.01200	3.71
2.5	1.0	.4	.000090	90.0	.12305	.36	9.0	.12305	.36	.9	.12305	.36
3.8	1.5	.4	.000090	135.0	.09534	.47	13.5	.08408	.53	1.4	.08408	.53
5.0	2.0	.4	.000090	180.0	.07794	.57	18.0	.06155	.72	1.8	.06155	.72
6.3	2.5	.4	.000090	225.0	.05978	.74	22.5	.04720	.94	2.3	.04720	.94
7.5	3.0	.4	.000090	270.0	.04556	.98	27.0	.03743	1.19	2.7	.03743	1.19
8.8	3.5	.4	.000090	315.0	.03609	1.23	31.5	.03046	1.46	3.1	.03046	1.46
10.0	4.0	.4	.000090	360.0	.02940	1.51	36.0	.02529	1.76	3.6	.02529	1.76
11.3	4.5	.4	.000090	405.0	.02447	1.82	40.5	.02135	2.08	4.0	.02135	2.08
12.5	5.0	.4	.000090	450.0	.02071	2.15	45.0	.01828	2.43	4.5	.01828	2.43
1.3	1.0	.8	.000090	45.0	.10331	.43	4.5	.10331	.43	.5	.10331	.43
1.9	1.5	.8	.000090	67.5	.07829	.57	6.8	.07829	.57	.7	.07829	.57
2.5	2.0	.8	.000090	90.0	.06206	.72	9.0	.06206	.72	.9	.06206	.72
3.1	2.5	.8	.000090	112.5	.05344	.83	11.3	.05067	.88	1.1	.05067	.88
3.8	3.0	.8	.000090	135.0	.04803	.93	13.5	.04229	1.05	1.4	.04229	1.05
4.4	3.5	.8	.000090	157.5	.04332	1.03	15.8	.03590	1.24	1.6	.03590	1.24
5.0	4.0	.8	.000090	180.0	.03925	1.13	18.0	.03091	1.44	1.8	.03091	1.44
5.6	4.5	.8	.000090	202.5	.03535	1.26	20.3	.02693	1.65	2.0	.02693	1.65
6.3	5.0	.8	.000090	225.0	.03018	1.47	22.5	.02368	1.88	2.3	.02368	1.88
					Q = 600 gpm							
5.0	1.0	.2	.000108	180.0	.15170	.24	18.0	.12102	.31	1.8	.12102	.31
7.5	1.5	.2	.000108	270.0	.08958	.41	27.0	.07401	.50	2.7	.07401	.50
10.0	2.0	.2	.000108	360.0	.05812	.64	36.0	.05015	.74	3.6	.05015	.74
12.5	2.5	.2	.000108	450.0	.04104	.90	45.0	.03630	1.02	4.5	.03630	1.02
15.0	3.0	.2	.000108	540.0	.03062	1.21	54.0	.02752	1.35	5.4	.02752	1.35
17.5	3.5	.2	.000108	630.0	.02376	1.56	63.0	.02159	1.72	6.3	.02159	1.72
20.0	4.0	.2	.000108	720.0	.01899	1.95	72.0	.01740	2.13	7.2	.01740	2.13
22.5	4.5	.2	.000108	810.0	.01554	2.38	81.0	.01432	2.59	8.1	.01432	2.59
25.0	5.0	.2	.000108	900.0	.01295	2.86	90.0	.01200	3.09	9.0	.01200	3.09
2.5	1.0	.4	.000108	90.0	.12305	.30	9.0	.12305	.30	.9	.12305	.30
3.8	1.5	.4	.000108	135.0	.09534	.39	13.5	.08408	.44	1.4	.08408	.44
5.0	2.0	.4	.000108	180.0	.07794	.48	18.0	.06155	.60	1.8	.06155	.60
6.3	2.5	.4	.000108	225.0	.05978	.62	22.5	.04720	.78	2.3	.04720	.78
7.5	3.0	.4	.000108	270.0	.04556	.81	27.0	.03743	.99	2.7	.03743	.99
8.8	3.5	.4	.000108	315.0	.03609	1.03	31.5	.03046	1.22	3.1	.03046	1.22
10.0	4.0	.4	.000108	360.0	.02940	1.26	36.0	.02529	1.46	3.6	.02529	1.46
11.3	4.5	.4	.000108	405.0	.02447	1.51	40.5	.02135	1.74	4.0	.02135	1.74
12.5	5.0	.4	.000108	450.0	.02071	1.79	45.0	.01828	2.03	4.5	.01828	2.03
1.3	1.0	.8	.000108	45.0	.10331	.36	4.5	.10331	.36	.5	.10331	.36
1.9	1.5	.8	.000108	67.5	.07829	.47	6.8	.07829	.47	.7	.07829	.47
2.5	2.0	.8	.000108	90.0	.06206	.60	9.0	.06206	.60	.9	.06206	.60
3.1	2.5	.8	.000108	112.5	.05344	.69	11.3	.05067	.73	1.1	.05067	.73
3.8	3.0	.8	.000108	135.0	.04803	.77	13.5	.04229	.88	1.4	.04229	.88
4.4	3.5	.8	.000108	157.5	.04332	.86	15.8	.03590	1.03	1.6	.03590	1.03
5.0	4.0	.8	.000108	180.0	.03925	.94	18.0	.03091	1.20	1.8	.03091	1.20
5.6	4.5	.8	.000108	202.5	.03535	1.05	20.3	.02693	1.38	2.0	.02693	1.38
6.3	5.0	.8	.000108	225.0	.03018	1.23	22.5	.02368	1.56	2.3	.02368	1.56

Table SA-8 (continued)
Results of Waste Dilution - Summer - Ship 4
(L = 0.4 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 700 gpm								
5.0	1.0	.2	.000126	180.0	.15170	.21	18.0	.12102	.26	1.8	.12102	.26
7.5	1.5	.2	.000126	270.0	.08958	.35	27.0	.07401	.43	2.7	.07401	.43
10.0	2.0	.2	.000126	360.0	.05812	.55	36.0	.05015	.63	3.6	.05015	.63
12.5	2.5	.2	.000126	450.0	.04104	.77	45.0	.03630	.87	4.5	.03630	.87
15.0	3.0	.2	.000126	540.0	.03062	1.04	54.0	.02752	1.15	5.4	.02752	1.15
17.5	3.5	.2	.000126	630.0	.02376	1.34	63.0	.02159	1.47	6.3	.02159	1.47
20.0	4.0	.2	.000126	720.0	.01899	1.67	72.0	.01740	1.83	7.2	.01740	1.83
22.5	4.5	.2	.000126	810.0	.01554	2.04	81.0	.01432	2.22	8.1	.01432	2.22
25.0	5.0	.2	.000126	900.0	.01295	2.45	90.0	.01200	2.65	9.0	.01200	2.65
2.5	1.0	.4	.000126	90.0	.12305	.26	9.0	.12305	.26	.9	.12305	.26
3.8	1.5	.4	.000126	135.0	.09534	.33	13.5	.08408	.38	1.4	.08408	.38
5.0	2.0	.4	.000126	180.0	.07794	.41	18.0	.06155	.52	1.8	.06155	.52
6.3	2.5	.4	.000126	225.0	.05978	.53	22.5	.04720	.67	2.3	.04720	.67
7.5	3.0	.4	.000126	270.0	.04556	.70	27.0	.03743	.85	2.7	.03743	.85
8.8	3.5	.4	.000126	315.0	.03609	.88	31.5	.03046	1.04	3.1	.03046	1.04
10.0	4.0	.4	.000126	360.0	.02940	1.08	36.0	.02529	1.26	3.6	.02529	1.26
11.3	4.5	.4	.000126	405.0	.02447	1.30	40.5	.02135	1.49	4.0	.02135	1.49
12.5	5.0	.4	.000126	450.0	.02071	1.53	45.0	.01828	1.74	4.5	.01828	1.74
1.3	1.0	.8	.000126	45.0	.10331	.31	4.5	.10331	.31	.5	.10331	.31
1.9	1.5	.8	.000126	67.5	.07829	.41	6.8	.07829	.41	.7	.07829	.41
2.5	2.0	.8	.000126	90.0	.06206	.51	9.0	.06206	.51	.9	.06206	.51
3.1	2.5	.8	.000126	112.5	.05344	.59	11.3	.05067	.63	1.1	.05067	.63
3.8	3.0	.8	.000126	135.0	.04803	.66	13.5	.04229	.75	1.4	.04229	.75
4.4	3.5	.8	.000126	157.5	.04332	.73	15.8	.03590	.88	1.6	.03590	.88
5.0	4.0	.8	.000126	180.0	.03925	.81	18.0	.03091	1.03	1.8	.03091	1.03
5.6	4.5	.8	.000126	202.5	.03535	.90	20.3	.02693	1.18	2.0	.02693	1.18
6.3	5.0	.8	.000126	225.0	.03018	1.05	22.5	.02368	1.34	2.3	.02368	1.34
				Q = 1000 gpm								
5.0	1.0	.2	.000180	180.0	.15170	.15	18.0	.12102	.18	1.8	.12102	.18
7.5	1.5	.2	.000180	270.0	.08958	.25	27.0	.07401	.30	2.7	.07401	.30
10.0	2.0	.2	.000180	360.0	.05812	.38	36.0	.05015	.44	3.6	.05015	.44
12.5	2.5	.2	.000180	450.0	.04104	.54	45.0	.03630	.61	4.5	.03630	.61
15.0	3.0	.2	.000180	540.0	.03062	.73	54.0	.02752	.81	5.4	.02752	.81
17.5	3.5	.2	.000180	630.0	.02376	.94	63.0	.02159	1.03	6.3	.02159	1.03
20.0	4.0	.2	.000180	720.0	.01899	1.17	72.0	.01740	1.28	7.2	.01740	1.28
22.5	4.5	.2	.000180	810.0	.01554	1.43	81.0	.01432	1.55	8.1	.01432	1.55
25.0	5.0	.2	.000180	900.0	.01295	1.72	90.0	.01200	1.85	9.0	.01200	1.85
2.5	1.0	.4	.000180	90.0	.12305	.18	9.0	.12305	.18	.9	.12305	.18
3.8	1.5	.4	.000180	135.0	.09534	.23	13.5	.08408	.26	1.4	.08408	.26
5.0	2.0	.4	.000180	180.0	.07794	.29	18.0	.06155	.36	1.8	.06155	.36
6.3	2.5	.4	.000180	225.0	.05978	.37	22.5	.04720	.47	2.3	.04720	.47
7.5	3.0	.4	.000180	270.0	.04556	.49	27.0	.03743	.59	2.7	.03743	.59
8.8	3.5	.4	.000180	315.0	.03609	.62	31.5	.03046	.73	3.1	.03046	.73
10.0	4.0	.4	.000180	360.0	.02940	.76	36.0	.02529	.88	3.6	.02529	.88
11.3	4.5	.4	.000180	405.0	.02447	.91	40.5	.02135	1.04	4.0	.02135	1.04
12.5	5.0	.4	.000180	450.0	.02071	1.07	45.0	.01828	1.22	4.5	.01828	1.22
1.3	1.0	.8	.000180	45.0	.10331	.22	4.5	.10331	.22	.5	.10331	.22
1.9	1.5	.8	.000180	67.5	.07829	.28	6.8	.07829	.28	.7	.07829	.28
2.5	2.0	.8	.000180	90.0	.06206	.36	9.0	.06206	.36	.9	.06206	.36
3.1	2.5	.8	.000180	112.5	.05344	.42	11.3	.05067	.44	1.1	.05067	.44
3.8	3.0	.8	.000180	135.0	.04803	.46	13.5	.04229	.53	1.4	.04229	.53
4.4	3.5	.8	.000180	157.5	.04332	.51	15.8	.03590	.62	1.6	.03590	.62
5.0	4.0	.8	.000180	180.0	.03925	.57	18.0	.03091	.72	1.8	.03091	.72
5.6	4.5	.8	.000180	202.5	.03535	.63	20.3	.02693	.83	2.0	.02693	.83
6.3	5.0	.8	.000180	225.0	.03018	.74	22.5	.02368	.94	2.3	.02368	.94

Table SA-8 (continued)
Results of Waste Dilution - Summer - Ship 4
(L = 0.4 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 1200 gpm							
5.0	1.0	.2	.000216	180.0	.15170	.12	18.0	.12102	.15	1.8	.12102	.15
7.5	1.5	.2	.000216	270.0	.08958	.21	27.0	.07401	.25	2.7	.07401	.25
10.0	2.0	.2	.000216	360.0	.05812	.32	36.0	.05015	.37	3.6	.05015	.37
12.5	2.5	.2	.000216	450.0	.04104	.45	45.0	.03630	.51	4.5	.03630	.51
15.0	3.0	.2	.000216	540.0	.03062	.60	54.0	.02752	.67	5.4	.02752	.67
17.5	3.5	.2	.000216	630.0	.02376	.78	63.0	.02159	.86	6.3	.02159	.86
20.0	4.0	.2	.000216	720.0	.01899	.98	72.0	.01740	1.06	7.2	.01740	1.06
22.5	4.5	.2	.000216	810.0	.01554	1.19	81.0	.01432	1.29	8.1	.01432	1.29
25.0	5.0	.2	.000216	900.0	.01295	1.43	90.0	.01200	1.54	9.0	.01200	1.54
2.5	1.0	.4	.000216	90.0	.12305	.15	9.0	.12305	.15	.9	.12305	.15
3.8	1.5	.4	.000216	135.0	.09534	.19	13.5	.08408	.22	1.4	.08408	.22
5.0	2.0	.4	.000216	180.0	.07794	.24	18.0	.06155	.30	1.8	.06155	.30
6.3	2.5	.4	.000216	225.0	.05978	.31	22.5	.04720	.39	2.3	.04720	.39
7.5	3.0	.4	.000216	270.0	.04556	.41	27.0	.03743	.49	2.7	.03743	.49
8.8	3.5	.4	.000216	315.0	.03609	.51	31.5	.03046	.61	3.1	.03046	.61
10.0	4.0	.4	.000216	360.0	.02940	.63	36.0	.02529	.73	3.6	.02529	.73
11.3	4.5	.4	.000216	405.0	.02447	.76	40.5	.02135	.87	4.0	.02135	.87
12.5	5.0	.4	.000216	450.0	.02071	.89	45.0	.01828	1.01	4.5	.01828	1.01
1.3	1.0	.8	.000216	45.0	.10331	.18	4.5	.10331	.18	.5	.10331	.18
1.9	1.5	.8	.000216	67.5	.07829	.24	6.8	.07829	.24	.7	.07829	.24
2.5	2.0	.8	.000216	90.0	.06206	.30	9.0	.06206	.30	.9	.06206	.30
3.1	2.5	.8	.000216	112.5	.05344	.35	11.3	.05067	.37	1.1	.05067	.37
3.8	3.0	.8	.000216	135.0	.04803	.39	13.5	.04229	.44	1.4	.04229	.44
4.4	3.5	.8	.000216	157.5	.04332	.43	15.8	.03590	.52	1.6	.03590	.52
5.0	4.0	.8	.000216	180.0	.03925	.47	18.0	.03091	.60	1.8	.03091	.60
5.6	4.5	.8	.000216	202.5	.03535	.52	20.3	.02693	.69	2.0	.02693	.69
6.3	5.0	.8	.000216	225.0	.03018	.61	22.5	.02368	.78	2.3	.02368	.78
					Q = 1400 gpm							
5.0	1.0	.2	.000252	180.0	.15170	.10	18.0	.12102	.13	1.8	.12102	.13
7.5	1.5	.2	.000252	270.0	.08958	.18	27.0	.07401	.21	2.7	.07401	.21
10.0	2.0	.2	.000252	360.0	.05812	.27	36.0	.05015	.32	3.6	.05015	.32
12.5	2.5	.2	.000252	450.0	.04104	.39	45.0	.03630	.44	4.5	.03630	.44
15.0	3.0	.2	.000252	540.0	.03062	.52	54.0	.02752	.58	5.4	.02752	.58
17.5	3.5	.2	.000252	630.0	.02376	.67	63.0	.02159	.74	6.3	.02159	.74
20.0	4.0	.2	.000252	720.0	.01899	.84	72.0	.01740	.91	7.2	.01740	.91
22.5	4.5	.2	.000252	810.0	.01554	1.02	81.0	.01432	1.11	8.1	.01432	1.11
25.0	5.0	.2	.000252	900.0	.01295	1.23	90.0	.01200	1.32	9.0	.01200	1.32
2.5	1.0	.4	.000252	90.0	.12305	.13	9.0	.12305	.13	.9	.12305	.13
3.8	1.5	.4	.000252	135.0	.09534	.17	13.5	.08408	.19	1.4	.08408	.19
5.0	2.0	.4	.000252	180.0	.07794	.20	18.0	.06155	.26	1.8	.06155	.26
6.3	2.5	.4	.000252	225.0	.05978	.27	22.5	.04720	.34	2.3	.04720	.34
7.5	3.0	.4	.000252	270.0	.04556	.35	27.0	.03743	.42	2.7	.03743	.42
8.8	3.5	.4	.000252	315.0	.03609	.44	31.5	.03046	.52	3.1	.03046	.52
10.0	4.0	.4	.000252	360.0	.02940	.54	36.0	.02529	.63	3.6	.02529	.63
11.3	4.5	.4	.000252	405.0	.02447	.65	40.5	.02135	.74	4.0	.02135	.74
12.5	5.0	.4	.000252	450.0	.02071	.77	45.0	.01828	.87	4.5	.01828	.87
1.3	1.0	.8	.000252	45.0	.10331	.15	4.5	.10331	.15	.5	.10331	.15
1.9	1.5	.8	.000252	67.5	.07829	.20	6.8	.07829	.20	.7	.07829	.20
2.5	2.0	.8	.000252	90.0	.06206	.26	9.0	.06206	.26	.9	.06206	.26
3.1	2.5	.8	.000252	112.5	.05344	.30	11.3	.05067	.31	1.1	.05067	.31
3.8	3.0	.8	.000252	135.0	.04803	.33	13.5	.04229	.38	1.4	.04229	.38
4.4	3.5	.8	.000252	157.5	.04332	.37	15.8	.03590	.44	1.6	.03590	.44
5.0	4.0	.8	.000252	180.0	.03925	.40	18.0	.03091	.51	1.8	.03091	.51
5.6	4.5	.8	.000252	202.5	.03535	.45	20.3	.02693	.59	2.0	.02693	.59
6.3	5.0	.8	.000252	225.0	.03018	.53	22.5	.02368	.67	2.3	.02368	.67

Table SA-9
Results of Waste Dilution - Winter - Ship 4
(L = 0.4 n mi, A = 0.001 $ft^{2/3}$/sec)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 500 gpm												
5.0	1.0	.2	.000090	180.0	.08228	.54	18.0	.08228	.54	1.8	.08228	.54
7.5	1.5	.2	.000090	270.0	.05011	.89	27.0	.05011	.89	2.7	.05011	.89
10.0	2.0	.2	.000090	360.0	.03389	1.31	36.0	.03389	1.31	3.6	.03389	1.31
12.5	2.5	.2	.000090	450.0	.02450	1.81	45.0	.02450	1.81	4.5	.02450	1.81
15.0	3.0	.2	.000090	540.0	.01856	2.40	54.0	.01856	2.40	5.4	.01856	2.40
17.5	3.5	.2	.000090	630.0	.01455	3.06	63.0	.01455	3.06	6.3	.01455	3.06
20.0	4.0	.2	.000090	720.0	.01172	3.79	72.0	.01172	3.79	7.2	.01172	3.79
22.5	4.5	.2	.000090	810.0	.00965	4.61	81.0	.00965	4.61	8.1	.00965	4.61
25.0	5.0	.2	.000090	900.0	.00808	5.50	90.0	.00808	5.50	9.0	.00808	5.50
2.5	1.0	.4	.000090	90.0	.08315	.53	9.0	.08315	.53	.9	.08315	.53
3.8	1.5	.4	.000090	135.0	.05670	.78	13.5	.05670	.78	1.4	.05670	.78
5.0	2.0	.4	.000090	180.0	.04146	1.07	18.0	.04146	1.07	1.8	.04146	1.07
6.3	2.5	.4	.000090	225.0	.03178	1.40	22.5	.03178	1.40	2.3	.03178	1.40
7.5	3.0	.4	.000090	270.0	.02519	1.76	27.0	.02519	1.76	2.7	.02519	1.76
8.8	3.5	.4	.000090	315.0	.02049	2.17	31.5	.02049	2.17	3.1	.02049	2.17
10.0	4.0	.4	.000090	360.0	.01701	2.61	36.0	.01701	2.61	3.6	.01701	2.61
11.3	4.5	.4	.000090	405.0	.01436	3.10	40.5	.01436	3.10	4.0	.01436	3.10
12.5	5.0	.4	.000090	450.0	.01229	3.62	45.0	.01229	3.62	4.5	.01229	3.62
1.3	1.0	.8	.000090	45.0	.06959	.64	4.5	.06959	.64	.5	.06959	.64
1.9	1.5	.8	.000090	67.5	.05268	.84	6.8	.05268	.84	.7	.05268	.84
2.5	2.0	.8	.000090	90.0	.04174	1.07	9.0	.04174	1.07	.9	.04174	1.07
3.1	2.5	.8	.000090	112.5	.03407	1.31	11.3	.03407	1.31	1.1	.03407	1.31
3.8	3.0	.8	.000090	135.0	.02842	1.56	13.5	.02842	1.56	1.4	.02842	1.56
4.4	3.5	.8	.000090	157.5	.02413	1.84	15.8	.02413	1.84	1.6	.02413	1.84
5.0	4.0	.8	.000090	180.0	.02077	2.14	18.0	.02077	2.14	1.8	.02077	2.14
5.6	4.5	.8	.000090	202.5	.01809	2.46	20.3	.01809	2.46	2.0	.01809	2.46
6.3	5.0	.8	.000090	225.0	.01591	2.79	22.5	.01591	2.79	2.3	.01591	2.79
Q = 600 gpm												
5.0	1.0	.2	.000108	180.0	.08228	.45	18.0	.08228	.45	1.8	.08228	.45
7.5	1.5	.2	.000108	270.0	.05011	.74	27.0	.05011	.74	2.7	.05011	.74
10.0	2.0	.2	.000108	360.0	.03389	1.09	36.0	.03389	1.09	3.6	.03389	1.09
12.5	2.5	.2	.000108	450.0	.02450	1.51	45.0	.02450	1.51	4.5	.02450	1.51
15.0	3.0	.2	.000108	540.0	.01856	2.00	54.0	.01856	2.00	5.4	.01856	2.00
17.5	3.5	.2	.000108	630.0	.01455	2.55	63.0	.01455	2.55	6.3	.01455	2.55
20.0	4.0	.2	.000108	720.0	.01172	3.16	72.0	.01172	3.16	7.2	.01172	3.16
22.5	4.5	.2	.000108	810.0	.00965	3.84	81.0	.00965	3.84	8.1	.00965	3.84
25.0	5.0	.2	.000108	900.0	.00808	4.59	90.0	.00808	4.59	9.0	.00808	4.59
2.5	1.0	.4	.000108	90.0	.08315	.45	9.0	.08315	.45	.9	.08315	.45
3.8	1.5	.4	.000108	135.0	.05670	.65	13.5	.05670	.65	1.4	.05670	.65
5.0	2.0	.4	.000108	180.0	.04146	.89	18.0	.04146	.89	1.8	.04146	.89
6.3	2.5	.4	.000108	225.0	.03178	1.17	22.5	.03178	1.17	2.3	.03178	1.17
7.5	3.0	.4	.000108	270.0	.02519	1.47	27.0	.02519	1.47	2.7	.02519	1.47
8.8	3.5	.4	.000108	315.0	.02049	1.81	31.5	.02049	1.81	3.1	.02049	1.81
10.0	4.0	.4	.000108	360.0	.01701	2.18	36.0	.01701	2.18	3.6	.01701	2.18
11.3	4.5	.4	.000108	405.0	.01436	2.58	40.5	.01436	2.58	4.0	.01436	2.58
12.5	5.0	.4	.000108	450.0	.01229	3.02	45.0	.01229	3.02	4.5	.01229	3.02
1.3	1.0	.8	.000108	45.0	.06959	.53	4.5	.06959	.53	.5	.06959	.53
1.9	1.5	.8	.000108	67.5	.05268	.70	6.8	.05268	.70	.7	.05268	.70
2.5	2.0	.8	.000108	90.0	.04174	.89	9.0	.04174	.89	.9	.04174	.89
3.1	2.5	.8	.000108	112.5	.03407	1.09	11.3	.03407	1.09	1.1	.03407	1.09
3.8	3.0	.8	.000108	135.0	.02842	1.30	13.5	.02842	1.30	1.4	.02842	1.30
4.4	3.5	.8	.000108	157.5	.02413	1.54	15.8	.02413	1.54	1.6	.02413	1.54
5.0	4.0	.8	.000108	180.0	.02077	1.78	18.0	.02077	1.78	1.8	.02077	1.78
5.6	4.5	.8	.000108	202.5	.01809	2.05	20.3	.01809	2.05	2.0	.01809	2.05
6.3	5.0	.8	.000108	225.0	.01591	2.33	22.5	.01591	2.33	2.3	.01591	2.33

Table SA-9 (continued)
Results of Waste Dilution - Winter - Ship 4
(L = 0.4 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 700 gpm							
5.0	1.0	.2	.000126	180.0	.08228	.39	18.0	.08228	.39	1.8	.08228	.39
7.5	1.5	.2	.000126	270.0	.05011	.63	27.0	.05011	.63	2.7	.05011	.63
10.0	2.0	.2	.000126	360.0	.03389	.94	36.0	.03389	.94	3.6	.03389	.94
12.5	2.5	.2	.000126	450.0	.02450	1.30	45.0	.02450	1.30	4.5	.02450	1.30
15.0	3.0	.2	.000126	540.0	.01856	1.71	54.0	.01856	1.71	5.4	.01856	1.71
17.5	3.5	.2	.000126	630.0	.01455	2.18	63.0	.01455	2.18	6.3	.01455	2.18
20.0	4.0	.2	.000126	720.0	.01172	2.71	72.0	.01172	2.71	7.2	.01172	2.71
22.5	4.5	.2	.000126	810.0	.00965	3.29	81.0	.00965	3.29	8.1	.00965	3.29
25.0	5.0	.2	.000126	900.0	.00808	3.93	90.0	.00808	3.93	9.0	.00808	3.93
2.5	1.0	.4	.000126	90.0	.08315	.38	9.0	.08315	.38	.9	.08315	.38
3.8	1.5	.4	.000126	135.0	.05670	.56	13.5	.05670	.56	1.4	.05670	.56
5.0	2.0	.4	.000126	180.0	.04146	.77	18.0	.04146	.77	1.8	.04146	.77
6.3	2.5	.4	.000126	225.0	.03178	1.00	22.5	.03178	1.00	2.3	.03178	1.00
7.5	3.0	.4	.000126	270.0	.02519	1.26	27.0	.02519	1.26	2.7	.02519	1.26
8.8	3.5	.4	.000126	315.0	.02049	1.55	31.5	.02049	1.55	3.1	.02049	1.55
10.0	4.0	.4	.000126	360.0	.01701	1.87	36.0	.01701	1.87	3.6	.01701	1.87
11.3	4.5	.4	.000126	405.0	.01436	2.21	40.5	.01436	2.21	4.0	.01436	2.21
12.5	5.0	.4	.000126	450.0	.01229	2.58	45.0	.01229	2.58	4.5	.01229	2.58
1.3	1.0	.8	.000126	45.0	.06959	.46	4.5	.06959	.46	.5	.06959	.46
1.9	1.5	.8	.000126	67.5	.05268	.60	6.8	.05268	.60	.7	.05268	.60
2.5	2.0	.8	.000126	90.0	.04174	.76	9.0	.04174	.76	.9	.04174	.76
3.1	2.5	.8	.000126	112.5	.03407	.93	11.3	.03407	.93	1.1	.03407	.93
3.8	3.0	.8	.000126	135.0	.02842	1.12	13.5	.02842	1.12	1.4	.02842	1.12
4.4	3.5	.8	.000126	157.5	.02413	1.32	15.8	.02413	1.32	1.6	.02413	1.32
5.0	4.0	.8	.000126	180.0	.02077	1.53	18.0	.02077	1.53	1.8	.02077	1.53
5.6	4.5	.8	.000126	202.5	.01809	1.76	20.3	.01809	1.76	2.0	.01809	1.76
6.3	5.0	.8	.000126	225.0	.01591	2.00	22.5	.01591	2.00	2.3	.01591	2.00
					Q = 1000 gpm							
5.0	1.0	.2	.000180	180.0	.08228	.27	18.0	.08228	.27	1.8	.08228	.27
7.5	1.5	.2	.000180	270.0	.05011	.44	27.0	.05011	.44	2.7	.05011	.44
10.0	2.0	.2	.000180	360.0	.03389	.66	36.0	.03389	.66	3.6	.03389	.66
12.5	2.5	.2	.000180	450.0	.02450	.91	45.0	.02450	.91	4.5	.02450	.91
15.0	3.0	.2	.000180	540.0	.01856	1.20	54.0	.01856	1.20	5.4	.01856	1.20
17.5	3.5	.2	.000180	630.0	.01455	1.53	63.0	.01455	1.53	6.3	.01455	1.53
20.0	4.0	.2	.000180	720.0	.01172	1.90	72.0	.01172	1.90	7.2	.01172	1.90
22.5	4.5	.2	.000180	810.0	.00965	2.30	81.0	.00965	2.30	8.1	.00965	2.30
25.0	5.0	.2	.000180	900.0	.00808	2.75	90.0	.00808	2.75	9.0	.00808	2.75
2.5	1.0	.4	.000180	90.0	.08315	.27	9.0	.08315	.27	.9	.08315	.27
3.8	1.5	.4	.000180	135.0	.05670	.39	13.5	.05670	.39	1.4	.05670	.39
5.0	2.0	.4	.000180	180.0	.04146	.54	18.0	.04146	.54	1.8	.04146	.54
6.3	2.5	.4	.000180	225.0	.03178	.70	22.5	.03178	.70	2.3	.03178	.70
7.5	3.0	.4	.000180	270.0	.02519	.88	27.0	.02519	.88	2.7	.02519	.88
8.8	3.5	.4	.000180	315.0	.02049	1.08	31.5	.02049	1.08	3.1	.02049	1.08
10.0	4.0	.4	.000180	360.0	.01701	1.31	36.0	.01701	1.31	3.6	.01701	1.31
11.3	4.5	.4	.000180	405.0	.01436	1.55	40.5	.01436	1.55	4.0	.01436	1.55
12.5	5.0	.4	.000180	450.0	.01229	1.81	45.0	.01229	1.81	4.5	.01229	1.81
1.3	1.0	.8	.000180	45.0	.06959	.32	4.5	.06959	.32	.5	.06959	.32
1.9	1.5	.8	.000180	67.5	.05268	.42	6.8	.05268	.42	.7	.05268	.42
2.5	2.0	.8	.000180	90.0	.04174	.53	9.0	.04174	.53	.9	.04174	.53
3.1	2.5	.8	.000180	112.5	.03407	.65	11.3	.03407	.65	1.1	.03407	.65
3.8	3.0	.8	.000180	135.0	.02842	.78	13.5	.02842	.78	1.4	.02842	.78
4.4	3.5	.8	.000180	157.5	.02413	.92	15.8	.02413	.92	1.6	.02413	.92
5.0	4.0	.8	.000180	180.0	.02077	1.07	18.0	.02077	1.07	1.8	.02077	1.07
5.6	4.5	.8	.000180	202.5	.01809	1.23	20.3	.01809	1.23	2.0	.01809	1.23
6.3	5.0	.8	.000180	225.0	.01591	1.40	22.5	.01591	1.40	2.3	.01591	1.40

Table SA-9 (continued)
Results of Waste Dilution - Winter - Ship 4
(L = 0.4 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 1200 gpm							
5.0	1.0	.2	.000216	180.0	.08228	.23	18.0	.08228	.23	1.8	.08228	.23
7.5	1.5	.2	.000216	270.0	.05011	.37	27.0	.05011	.37	2.7	.05011	.37
10.0	2.0	.2	.000216	360.0	.03389	.55	36.0	.03389	.55	3.6	.03389	.55
12.5	2.5	.2	.000216	450.0	.02450	.76	45.0	.02450	.76	4.5	.02450	.76
15.0	3.0	.2	.000216	540.0	.01856	1.00	54.0	.01856	1.00	5.4	.01856	1.00
17.5	3.5	.2	.000216	630.0	.01455	1.27	63.0	.01455	1.27	6.3	.01455	1.27
20.0	4.0	.2	.000216	720.0	.01172	1.58	72.0	.01172	1.58	7.2	.01172	1.58
22.5	4.5	.2	.000216	810.0	.00965	1.92	81.0	.00965	1.92	8.1	.00965	1.92
25.0	5.0	.2	.000216	900.0	.00808	2.29	90.0	.00808	2.29	9.0	.00808	2.29
2.5	1.0	.4	.000216	90.0	.08315	.22	9.0	.08315	.22	.9	.08315	.22
3.8	1.5	.4	.000216	135.0	.05670	.33	13.5	.05670	.33	1.4	.05670	.33
5.0	2.0	.4	.000216	180.0	.04146	.45	18.0	.04146	.45	1.8	.04146	.45
6.3	2.5	.4	.000216	225.0	.03178	.58	22.5	.03178	.58	2.3	.03178	.58
7.5	3.0	.4	.000216	270.0	.02519	.74	27.0	.02519	.74	2.7	.02519	.74
8.8	3.5	.4	.000216	315.0	.02049	.90	31.5	.02049	.90	3.1	.02049	.90
10.0	4.0	.4	.000216	360.0	.01701	1.09	36.0	.01701	1.09	3.6	.01701	1.09
11.3	4.5	.4	.000216	405.0	.01436	1.29	40.5	.01436	1.29	4.0	.01436	1.29
12.5	5.0	.4	.000216	450.0	.01229	1.51	45.0	.01229	1.51	4.5	.01229	1.51
1.3	1.0	.8	.000216	45.0	.06959	.27	4.5	.06959	.27	.5	.06959	.27
1.9	1.5	.8	.000216	67.5	.05268	.35	6.8	.05268	.35	.7	.05268	.35
2.5	2.0	.8	.000216	90.0	.04174	.44	9.0	.04174	.44	.9	.04174	.44
3.1	2.5	.8	.000216	112.5	.03407	.54	11.3	.03407	.54	1.1	.03407	.54
3.8	3.0	.8	.000216	135.0	.02842	.65	13.5	.02842	.65	1.4	.02842	.65
4.4	3.5	.8	.000216	157.5	.02413	.77	15.8	.02413	.77	1.6	.02413	.77
5.0	4.0	.8	.000216	180.0	.02077	.89	18.0	.02077	.89	1.8	.02077	.89
5.6	4.5	.8	.000216	202.5	.01809	1.02	20.3	.01809	1.02	2.0	.01809	1.02
6.3	5.0	.8	.000216	225.0	.01591	1.16	22.5	.01591	1.16	2.3	.01591	1.16
					Q = 1400 gpm							
5.0	1.0	.2	.000252	180.0	.08228	.19	18.0	.08228	.19	1.8	.08228	.19
7.5	1.5	.2	.000252	270.0	.05011	.32	27.0	.05011	.32	2.7	.05011	.32
10.0	2.0	.2	.000252	360.0	.03389	.47	36.0	.03389	.47	3.6	.03389	.47
12.5	2.5	.2	.000252	450.0	.02450	.65	45.0	.02450	.65	4.5	.02450	.65
15.0	3.0	.2	.000252	540.0	.01856	.86	54.0	.01856	.86	5.4	.01856	.86
17.5	3.5	.2	.000252	630.0	.01455	1.09	63.0	.01455	1.09	6.3	.01455	1.09
20.0	4.0	.2	.000252	720.0	.01172	1.35	72.0	.01172	1.35	7.2	.01172	1.35
22.5	4.5	.2	.000252	810.0	.00965	1.65	81.0	.00965	1.65	8.1	.00965	1.65
25.0	5.0	.2	.000252	900.0	.00808	1.97	90.0	.00808	1.97	9.0	.00808	1.97
2.5	1.0	.4	.000252	90.0	.08315	.19	9.0	.08315	.19	.9	.08315	.19
3.8	1.5	.4	.000252	135.0	.05670	.28	13.5	.05670	.28	1.4	.05670	.28
5.0	2.0	.4	.000252	180.0	.04146	.38	18.0	.04146	.38	1.8	.04146	.38
6.3	2.5	.4	.000252	225.0	.03178	.50	22.5	.03178	.50	2.3	.03178	.50
7.5	3.0	.4	.000252	270.0	.02519	.63	27.0	.02519	.63	2.7	.02519	.63
8.8	3.5	.4	.000252	315.0	.02049	.77	31.5	.02049	.77	3.1	.02049	.77
10.0	4.0	.4	.000252	360.0	.01701	.93	36.0	.01701	.93	3.6	.01701	.93
11.3	4.5	.4	.000252	405.0	.01436	1.11	40.5	.01436	1.11	4.0	.01436	1.11
12.5	5.0	.4	.000252	450.0	.01229	1.29	45.0	.01229	1.29	4.5	.01229	1.29
1.3	1.0	.8	.000252	45.0	.06959	.23	4.5	.06959	.23	.5	.06959	.23
1.9	1.5	.8	.000252	67.5	.05268	.30	6.8	.05268	.30	.7	.05268	.30
2.5	2.0	.8	.000252	90.0	.04174	.38	9.0	.04174	.38	.9	.04174	.38
3.1	2.5	.8	.000252	112.5	.03407	.47	11.3	.03407	.47	1.1	.03407	.47
3.8	3.0	.8	.000252	135.0	.02842	.56	13.5	.02842	.56	1.4	.02842	.56
4.4	3.5	.8	.000252	157.5	.02413	.66	15.8	.02413	.66	1.6	.02413	.66
5.0	4.0	.8	.000252	180.0	.02077	.76	18.0	.02077	.76	1.8	.02077	.76
5.6	4.5	.8	.000252	202.5	.01809	.88	20.3	.01809	.88	2.0	.01809	.88
6.3	5.0	.8	.000252	225.0	.01591	1.00	22.5	.01591	1.00	2.3	.01591	1.00

Table SA-10
Results of Waste Dilution - Summer - Ship 5
(L = 0.4 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 500 gpm							
5.0	1.0	.2	.000360	180.0	.03925	.28	18.0	.03091	.36	1.8	.03091	.36
7.5	1.5	.2	.000360	270.0	.02288	.49	27.0	.01877	.59	2.7	.01877	.59
10.0	2.0	.2	.000360	360.0	.01475	.75	36.0	.01267	.88	3.6	.01267	.88
12.5	2.5	.2	.000360	450.0	.01038	1.07	45.0	.00915	1.21	4.5	.00915	1.21
15.0	3.0	.2	.000360	540.0	.00773	1.44	54.0	.00693	1.60	5.4	.00693	1.60
17.5	3.5	.2	.000360	630.0	.00599	1.86	63.0	.00543	2.05	6.3	.00543	2.05
20.0	4.0	.2	.000360	720.0	.00478	2.33	72.0	.00437	2.54	7.2	.00437	2.54
22.5	4.5	.2	.000360	810.0	.00391	2.84	81.0	.00360	3.09	8.1	.00360	3.09
25.0	5.0	.2	.000360	900.0	.00325	3.42	90.0	.00301	3.69	9.0	.00301	3.69
2.5	1.0	.4	.000360	90.0	.03110	.36	9.0	.03110	.36	.9	.03110	.36
3.8	1.5	.4	.000360	135.0	.02406	.46	13.5	.02117	.52	1.4	.02117	.52
5.0	2.0	.4	.000360	180.0	.01966	.57	18.0	.01547	.72	1.8	.01547	.72
6.3	2.5	.4	.000360	225.0	.01505	.74	22.5	.01185	.94	2.3	.01185	.94
7.5	3.0	.4	.000360	270.0	.01145	.97	27.0	.00939	1.18	2.7	.00939	1.18
8.8	3.5	.4	.000360	315.0	.00906	1.23	31.5	.00764	1.46	3.1	.00764	1.46
10.0	4.0	.4	.000360	360.0	.00738	1.51	36.0	.00634	1.75	3.6	.00634	1.75
11.3	4.5	.4	.000360	405.0	.00614	1.81	40.5	.00535	2.08	4.0	.00535	2.08
12.5	5.0	.4	.000360	450.0	.00519	2.14	45.0	.00458	2.43	4.5	.00458	2.43
1.3	1.0	.8	.000360	45.0	.02597	.43	4.5	.02597	.43	.5	.02597	.43
1.9	1.5	.8	.000360	67.5	.01964	.57	6.8	.01964	.57	.7	.01964	.57
2.5	2.0	.8	.000360	90.0	.01556	.71	9.0	.01556	.71	.9	.01556	.71
3.1	2.5	.8	.000360	112.5	.01339	.83	11.3	.01270	.88	1.1	.01270	.88
3.8	3.0	.8	.000360	135.0	.01204	.92	13.5	.01059	1.05	1.4	.01059	1.05
4.4	3.5	.8	.000360	157.5	.01086	1.02	15.8	.00899	1.24	1.6	.00899	1.24
5.0	4.0	.8	.000360	180.0	.00983	1.13	18.0	.00774	1.44	1.8	.00774	1.44
5.6	4.5	.8	.000360	202.5	.00886	1.26	20.3	.00674	1.65	2.0	.00674	1.65
6.3	5.0	.8	.000360	225.0	.00756	1.47	22.5	.00593	1.88	2.3	.00593	1.88
					Q = 600 gpm							
5.0	1.0	.2	.000432	180.0	.03925	.24	18.0	.03091	.30	1.8	.03091	.30
7.5	1.5	.2	.000432	270.0	.02288	.40	27.0	.01877	.49	2.7	.01877	.49
10.0	2.0	.2	.000432	360.0	.01475	.63	36.0	.01267	.73	3.6	.01267	.73
12.5	2.5	.2	.000432	450.0	.01038	.89	45.0	.00915	1.01	4.5	.00915	1.01
15.0	3.0	.2	.000432	540.0	.00773	1.20	54.0	.00693	1.34	5.4	.00693	1.34
17.5	3.5	.2	.000432	630.0	.00599	1.55	63.0	.00543	1.71	6.3	.00543	1.71
20.0	4.0	.2	.000432	720.0	.00478	1.94	72.0	.00437	2.12	7.2	.00437	2.12
22.5	4.5	.2	.000432	810.0	.00391	2.37	81.0	.00360	2.57	8.1	.00360	2.57
25.0	5.0	.2	.000432	900.0	.00325	2.85	90.0	.00301	3.07	9.0	.00301	3.07
2.5	1.0	.4	.000432	90.0	.03110	.30	9.0	.03110	.30	.9	.03110	.30
3.8	1.5	.4	.000432	135.0	.02406	.38	13.5	.02117	.44	1.4	.02117	.44
5.0	2.0	.4	.000432	180.0	.01966	.47	18.0	.01547	.60	1.8	.01547	.60
6.3	2.5	.4	.000432	225.0	.01505	.62	22.5	.01185	.78	2.3	.01185	.78
7.5	3.0	.4	.000432	270.0	.01145	.81	27.0	.00939	.99	2.7	.00939	.99
8.8	3.5	.4	.000432	315.0	.00906	1.02	31.5	.00764	1.21	3.1	.00764	1.21
10.0	4.0	.4	.000432	360.0	.00738	1.26	36.0	.00634	1.46	3.6	.00634	1.46
11.3	4.5	.4	.000432	405.0	.00614	1.51	40.5	.00535	1.73	4.0	.00535	1.73
12.5	5.0	.4	.000432	450.0	.00519	1.78	45.0	.00458	2.02	4.5	.00458	2.02
1.3	1.0	.8	.000432	45.0	.02597	.36	4.5	.02597	.36	.5	.02597	.36
1.9	1.5	.8	.000432	67.5	.01964	.47	6.8	.01964	.47	.7	.01964	.47
2.5	2.0	.8	.000432	90.0	.01556	.60	9.0	.01556	.60	.9	.01556	.60
3.1	2.5	.8	.000432	112.5	.01339	.69	11.3	.01270	.73	1.1	.01270	.73
3.8	3.0	.8	.000432	135.0	.01204	.77	13.5	.01059	.87	1.4	.01059	.87
4.4	3.5	.8	.000432	157.5	.01086	.85	15.8	.00899	1.03	1.6	.00899	1.03
5.0	4.0	.8	.000432	180.0	.00983	.94	18.0	.00774	1.20	1.8	.00774	1.20
5.6	4.5	.8	.000432	202.5	.00886	1.05	20.3	.00674	1.37	2.0	.00674	1.37
6.3	5.0	.8	.000432	225.0	.00756	1.23	22.5	.00593	1.56	2.3	.00593	1.56

Table SA-10 (continued)
Results of Waste Dilution - Summer - Ship 5
(L = 0.4 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 700 gpm							
5.0	1.0	.2	.000504	180.0	.03925	.20	18.0	.03091	.26	1.8	.03091	.26
7.5	1.5	.2	.000504	270.0	.02288	.35	27.0	.01877	.42	2.7	.01877	.42
10.0	2.0	.2	.000504	360.0	.01475	.54	36.0	.01267	.63	3.6	.01267	.63
12.5	2.5	.2	.000504	450.0	.01038	.77	45.0	.00915	.87	4.5	.00915	.87
15.0	3.0	.2	.000504	540.0	.00773	1.03	54.0	.00693	1.15	5.4	.00693	1.15
17.5	3.5	.2	.000504	630.0	.00599	1.33	63.0	.00543	1.46	6.3	.00543	1.46
20.0	4.0	.2	.000504	720.0	.00478	1.66	72.0	.00437	1.82	7.2	.00437	1.82
22.5	4.5	.2	.000504	810.0	.00391	2.03	81.0	.00360	2.21	8.1	.00360	2.21
25.0	5.0	.2	.000504	900.0	.00325	2.44	90.0	.00301	2.63	9.0	.00301	2.63
2.5	1.0	.4	.000504	90.0	.03110	.26	9.0	.03110	.26	.9	.03110	.26
3.8	1.5	.4	.000504	135.0	.02406	.33	13.5	.02117	.37	1.4	.02117	.37
5.0	2.0	.4	.000504	180.0	.01966	.40	18.0	.01547	.51	1.8	.01547	.51
6.3	2.5	.4	.000504	225.0	.01505	.53	22.5	.01185	.67	2.3	.01185	.67
7.5	3.0	.4	.000504	270.0	.01145	.69	27.0	.00939	.85	2.7	.00939	.85
8.8	3.5	.4	.000504	315.0	.00906	.88	31.5	.00764	1.04	3.1	.00764	1.04
10.0	4.0	.4	.000504	360.0	.00738	1.08	36.0	.00634	1.25	3.6	.00634	1.25
11.3	4.5	.4	.000504	405.0	.00614	1.29	40.5	.00535	1.48	4.0	.00535	1.48
12.5	5.0	.4	.000504	450.0	.00519	1.53	45.0	.00458	1.73	4.5	.00458	1.73
1.3	1.0	.8	.000504	45.0	.02597	.31	4.5	.02597	.31	.5	.02597	.31
1.9	1.5	.8	.000504	67.5	.01964	.40	6.8	.01964	.40	.7	.01964	.40
2.5	2.0	.8	.000504	90.0	.01556	.51	9.0	.01556	.51	.9	.01556	.51
3.1	2.5	.8	.000504	112.5	.01339	.59	11.3	.01270	.63	1.1	.01270	.63
3.8	3.0	.8	.000504	135.0	.01204	.66	13.5	.01059	.75	1.4	.01059	.75
4.4	3.5	.8	.000504	157.5	.01086	.73	15.8	.00899	.88	1.6	.00899	.88
5.0	4.0	.8	.000504	180.0	.00983	.81	18.0	.00774	1.03	1.8	.00774	1.03
5.6	4.5	.8	.000504	202.5	.00886	.90	20.3	.00674	1.18	2.0	.00674	1.18
6.3	5.0	.8	.000504	225.0	.00756	1.05	22.5	.00593	1.34	2.3	.00593	1.34
					Q = 1000 gpm							
5.0	1.0	.2	.000720	180.0	.03925	.14	18.0	.03091	.18	1.8	.03091	.18
7.5	1.5	.2	.000720	270.0	.02288	.24	27.0	.01877	.30	2.7	.01877	.30
10.0	2.0	.2	.000720	360.0	.01475	.38	36.0	.01267	.44	3.6	.01267	.44
12.5	2.5	.2	.000720	450.0	.01038	.54	45.0	.00915	.61	4.5	.00915	.61
15.0	3.0	.2	.000720	540.0	.00773	.72	54.0	.00693	.80	5.4	.00693	.80
17.5	3.5	.2	.000720	630.0	.00599	.93	63.0	.00543	1.02	6.3	.00543	1.02
20.0	4.0	.2	.000720	720.0	.00478	1.16	72.0	.00437	1.27	7.2	.00437	1.27
22.5	4.5	.2	.000720	810.0	.00391	1.42	81.0	.00360	1.54	8.1	.00360	1.54
25.0	5.0	.2	.000720	900.0	.00325	1.71	90.0	.00301	1.84	9.0	.00301	1.84
2.5	1.0	.4	.000720	90.0	.03110	.18	9.0	.03110	.18	.9	.03110	.18
3.8	1.5	.4	.000720	135.0	.02406	.23	13.5	.02117	.26	1.4	.02117	.26
5.0	2.0	.4	.000720	180.0	.01966	.28	18.0	.01547	.36	1.8	.01547	.36
6.3	2.5	.4	.000720	225.0	.01505	.37	22.5	.01185	.47	2.3	.01185	.47
7.5	3.0	.4	.000720	270.0	.01145	.49	27.0	.00939	.59	2.7	.00939	.59
8.8	3.5	.4	.000720	315.0	.00906	.61	31.5	.00764	.73	3.1	.00764	.73
10.0	4.0	.4	.000720	360.0	.00738	.75	36.0	.00634	.88	3.6	.00634	.88
11.3	4.5	.4	.000720	405.0	.00614	.91	40.5	.00535	1.04	4.0	.00535	1.04
12.5	5.0	.4	.000720	450.0	.00519	1.07	45.0	.00458	1.21	4.5	.00458	1.21
1.3	1.0	.8	.000720	45.0	.02597	.21	4.5	.02597	.21	.5	.02597	.21
1.9	1.5	.8	.000720	67.5	.01964	.28	6.8	.01964	.28	.7	.01964	.28
2.5	2.0	.8	.000720	90.0	.01556	.36	9.0	.01556	.36	.9	.01556	.36
3.1	2.5	.8	.000720	112.5	.01339	.41	11.3	.01270	.44	1.1	.01270	.44
3.8	3.0	.8	.000720	135.0	.01204	.46	13.5	.01059	.52	1.4	.01059	.52
4.4	3.5	.8	.000720	157.5	.01086	.51	15.8	.00899	.62	1.6	.00899	.62
5.0	4.0	.8	.000720	180.0	.00983	.57	18.0	.00774	.72	1.8	.00774	.72
5.6	4.5	.8	.000720	202.5	.00886	.63	20.3	.00674	.82	2.0	.00674	.82
6.3	5.0	.8	.000720	225.0	.00756	.74	22.5	.00593	.94	2.3	.00593	.94

Table SA-10 (continued)
Results of Waste Dilution - Summer - Ship 5
(L = 0.4 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 1200 gpm							
5.0	1.0	.2	.000864	180.0	.03925	.12	18.0	.03091	.15	1.8	.03091	.15
7.5	1.5	.2	.000864	270.0	.02288	.20	27.0	.01877	.25	2.7	.01877	.25
10.0	2.0	.2	.000864	360.0	.01475	.31	36.0	.01267	.37	3.6	.01267	.37
12.5	2.5	.2	.000864	450.0	.01038	.45	45.0	.00915	.51	4.5	.00915	.51
15.0	3.0	.2	.000864	540.0	.00773	.60	54.0	.00693	.67	5.4	.00693	.67
17.5	3.5	.2	.000864	630.0	.00599	.77	63.0	.00543	.85	6.3	.00543	.85
20.0	4.0	.2	.000864	720.0	.00478	.97	72.0	.00437	1.06	7.2	.00437	1.06
22.5	4.5	.2	.000864	810.0	.00391	1.19	81.0	.00360	1.29	8.1	.00360	1.29
25.0	5.0	.2	.000864	900.0	.00325	1.42	90.0	.00301	1.54	9.0	.00301	1.54
2.5	1.0	.4	.000864	90.0	.03110	.15	9.0	.03110	.15	.9	.03110	.15
3.8	1.5	.4	.000864	135.0	.02406	.19	13.5	.02117	.22	1.4	.02117	.22
5.0	2.0	.4	.000864	180.0	.01966	.24	18.0	.01547	.30	1.8	.01547	.30
6.3	2.5	.4	.000864	225.0	.01505	.31	22.5	.01185	.39	2.3	.01185	.39
7.5	3.0	.4	.000864	270.0	.01145	.40	27.0	.00939	.49	2.7	.00939	.49
8.8	3.5	.4	.000864	315.0	.00906	.51	31.5	.00764	.61	3.1	.00764	.61
10.0	4.0	.4	.000864	360.0	.00738	.63	36.0	.00634	.73	3.6	.00634	.73
11.3	4.5	.4	.000864	405.0	.00614	.75	40.5	.00535	.87	4.0	.00535	.87
12.5	5.0	.4	.000864	450.0	.00519	.89	45.0	.00458	1.01	4.5	.00458	1.01
1.3	1.0	.8	.000864	45.0	.02597	.18	4.5	.02597	.18	.5	.02597	.18
1.9	1.5	.8	.000864	67.5	.01964	.24	6.8	.01964	.24	.7	.01964	.24
2.5	2.0	.8	.000864	90.0	.01556	.30	9.0	.01556	.30	.9	.01556	.30
3.1	2.5	.8	.000864	112.5	.01339	.35	11.3	.01270	.36	1.1	.01270	.36
3.8	3.0	.8	.000864	135.0	.01204	.38	13.5	.01059	.44	1.4	.01059	.44
4.4	3.5	.8	.000864	157.5	.01086	.43	15.8	.00899	.52	1.6	.00899	.52
5.0	4.0	.8	.000864	180.0	.00983	.47	18.0	.00774	.60	1.8	.00774	.60
5.6	4.5	.8	.000864	202.5	.00886	.52	20.3	.00674	.69	2.0	.00674	.69
6.3	5.0	.8	.000864	225.0	.00756	.61	22.5	.00593	.78	2.3	.00593	.78
					Q = 1400 gpm							
5.0	1.0	.2	.001008	180.0	.03925	.10	18.0	.03091	.13	1.8	.03091	.13
7.5	1.5	.2	.001008	270.0	.02288	.17	27.0	.01877	.21	2.7	.01877	.21
10.0	2.0	.2	.001008	360.0	.01475	.27	36.0	.01267	.31	3.6	.01267	.31
12.5	2.5	.2	.001008	450.0	.01038	.38	45.0	.00915	.43	4.5	.00915	.43
15.0	3.0	.2	.001008	540.0	.00773	.51	54.0	.00693	.57	5.4	.00693	.57
17.5	3.5	.2	.001008	630.0	.00599	.66	63.0	.00543	.73	6.3	.00543	.73
20.0	4.0	.2	.001008	720.0	.00478	.83	72.0	.00437	.91	7.2	.00437	.91
22.5	4.5	.2	.001008	810.0	.00391	1.02	81.0	.00360	1.10	8.1	.00360	1.10
25.0	5.0	.2	.001008	900.0	.00325	1.22	90.0	.00301	1.32	9.0	.00301	1.32
2.5	1.0	.4	.001008	90.0	.03110	.13	9.0	.03110	.13	.9	.03110	.13
3.8	1.5	.4	.001008	135.0	.02406	.16	13.5	.02117	.19	1.4	.02117	.19
5.0	2.0	.4	.001008	180.0	.01966	.20	18.0	.01547	.26	1.8	.01547	.26
6.3	2.5	.4	.001008	225.0	.01505	.26	22.5	.01185	.33	2.3	.01185	.33
7.5	3.0	.4	.001008	270.0	.01145	.35	27.0	.00939	.42	2.7	.00939	.42
8.8	3.5	.4	.001008	315.0	.00906	.44	31.5	.00764	.52	3.1	.00764	.52
10.0	4.0	.4	.001008	360.0	.00738	.54	36.0	.00634	.63	3.6	.00634	.63
11.3	4.5	.4	.001008	405.0	.00614	.65	40.5	.00535	.74	4.0	.00535	.74
12.5	5.0	.4	.001008	450.0	.00519	.76	45.0	.00458	.87	4.5	.00458	.87
1.3	1.0	.8	.001008	45.0	.02597	.15	4.5	.02597	.15	.5	.02597	.15
1.9	1.5	.8	.001008	67.5	.01964	.20	6.8	.01964	.20	.7	.01964	.20
2.5	2.0	.8	.001008	90.0	.01556	.26	9.0	.01556	.26	.9	.01556	.26
3.1	2.5	.8	.001008	112.5	.01339	.30	11.3	.01270	.31	1.1	.01270	.31
3.8	3.0	.8	.001008	135.0	.01204	.33	13.5	.01059	.37	1.4	.01059	.37
4.4	3.5	.8	.001008	157.5	.01086	.37	15.8	.00899	.44	1.6	.00899	.44
5.0	4.0	.8	.001008	180.0	.00983	.40	18.0	.00774	.51	1.8	.00774	.51
5.6	4.5	.8	.001008	202.5	.00886	.45	20.3	.00674	.59	2.0	.00674	.59
6.3	5.0	.8	.001008	225.0	.00756	.53	22.5	.00593	.67	2.3	.00593	.67

Table SA-11
Results of Waste Dilution - Winter - Ship 5
(L = 0.4 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 500 gpm												
5.0	1.0	.2	.000360	180.0	.02077	.54	18.0	.02077	.54	1.8	.02077	.54
7.5	1.5	.2	.000360	270.0	.01261	.88	27.0	.01261	.88	2.7	.01261	.88
10.0	2.0	.2	.000360	360.0	.00851	1.31	36.0	.00851	1.31	3.6	.00851	1.31
12.5	2.5	.2	.000360	450.0	.00615	1.81	45.0	.00615	1.81	4.5	.00615	1.81
15.0	3.0	.2	.000360	540.0	.00465	2.39	54.0	.00465	2.39	5.4	.00465	2.39
17.5	3.5	.2	.000360	630.0	.00365	3.05	63.0	.00365	3.05	6.3	.00365	3.05
20.0	4.0	.2	.000360	720.0	.00294	3.78	72.0	.00294	3.78	7.2	.00294	3.78
22.5	4.5	.2	.000360	810.0	.00242	4.60	81.0	.00242	4.60	8.1	.00242	4.60
25.0	5.0	.2	.000360	900.0	.00202	5.49	90.0	.00202	5.49	9.0	.00202	5.49
2.5	1.0	.4	.000360	90.0	.02089	.53	9.0	.02089	.53	.9	.02089	.53
3.8	1.5	.4	.000360	135.0	.01422	.78	13.5	.01422	.78	1.4	.01422	.78
5.0	2.0	.4	.000360	180.0	.01039	1.07	18.0	.01039	1.07	1.8	.01039	1.07
6.3	2.5	.4	.000360	225.0	.00796	1.40	22.5	.00796	1.40	2.3	.00796	1.40
7.5	3.0	.4	.000360	270.0	.00631	1.76	27.0	.00631	1.76	2.7	.00631	1.76
8.8	3.5	.4	.000360	315.0	.00513	2.17	31.5	.00513	2.17	3.1	.00513	2.17
10.0	4.0	.4	.000360	360.0	.00426	2.61	36.0	.00426	2.61	3.6	.00426	2.61
11.3	4.5	.4	.000360	405.0	.00359	3.09	40.5	.00359	3.09	4.0	.00359	3.09
12.5	5.0	.4	.000360	450.0	.00307	3.61	45.0	.00307	3.61	4.5	.00307	3.61
1.3	1.0	.8	.000360	45.0	.01744	.64	4.5	.01744	.64	.5	.01744	.64
1.9	1.5	.8	.000360	67.5	.01319	.84	6.8	.01319	.84	.7	.01319	.84
2.5	2.0	.8	.000360	90.0	.01045	1.06	9.0	.01045	1.06	.9	.01045	1.06
3.1	2.5	.8	.000360	112.5	.00853	1.30	11.3	.00853	1.30	1.1	.00853	1.30
3.8	3.0	.8	.000360	135.0	.00711	1.56	13.5	.00711	1.56	1.4	.00711	1.56
4.4	3.5	.8	.000360	157.5	.00604	1.84	15.8	.00604	1.84	1.6	.00604	1.84
5.0	4.0	.8	.000360	180.0	.00520	2.14	18.0	.00520	2.14	1.8	.00520	2.14
5.6	4.5	.8	.000360	202.5	.00453	2.46	20.3	.00453	2.46	2.0	.00453	2.46
6.3	5.0	.8	.000360	225.0	.00398	2.79	22.5	.00398	2.79	2.3	.00398	2.79
Q = 600 gpm												
5.0	1.0	.2	.000432	180.0	.02077	.45	18.0	.02077	.45	1.8	.02077	.45
7.5	1.5	.2	.000432	270.0	.01261	.73	27.0	.01261	.73	2.7	.01261	.73
10.0	2.0	.2	.000432	360.0	.00851	1.09	36.0	.00851	1.09	3.6	.00851	1.09
12.5	2.5	.2	.000432	450.0	.00615	1.51	45.0	.00615	1.51	4.5	.00615	1.51
15.0	3.0	.2	.000432	540.0	.00465	1.99	54.0	.00465	1.99	5.4	.00465	1.99
17.5	3.5	.2	.000432	630.0	.00365	2.54	63.0	.00365	2.54	6.3	.00365	2.54
20.0	4.0	.2	.000432	720.0	.00294	3.15	72.0	.00294	3.15	7.2	.00294	3.15
22.5	4.5	.2	.000432	810.0	.00242	3.83	81.0	.00242	3.83	8.1	.00242	3.83
25.0	5.0	.2	.000432	900.0	.00202	4.58	90.0	.00202	4.58	9.0	.00202	4.58
2.5	1.0	.4	.000432	90.0	.02089	.44	9.0	.02089	.44	.9	.02089	.44
3.8	1.5	.4	.000432	135.0	.01422	.65	13.5	.01422	.65	1.4	.01422	.65
5.0	2.0	.4	.000432	180.0	.01039	.89	18.0	.01039	.89	1.8	.01039	.89
6.3	2.5	.4	.000432	225.0	.00796	1.16	22.5	.00796	1.16	2.3	.00796	1.16
7.5	3.0	.4	.000432	270.0	.00631	1.47	27.0	.00631	1.47	2.7	.00631	1.47
8.8	3.5	.4	.000432	315.0	.00513	1.81	31.5	.00513	1.81	3.1	.00513	1.81
10.0	4.0	.4	.000432	360.0	.00426	2.18	36.0	.00426	2.18	3.6	.00426	2.18
11.3	4.5	.4	.000432	405.0	.00359	2.58	40.5	.00359	2.58	4.0	.00359	2.58
12.5	5.0	.4	.000432	450.0	.00307	3.01	45.0	.00307	3.01	4.5	.00307	3.01
1.3	1.0	.8	.000432	45.0	.01744	.53	4.5	.01744	.53	.5	.01744	.53
1.9	1.5	.8	.000432	67.5	.01319	.70	6.8	.01319	.70	.7	.01319	.70
2.5	2.0	.8	.000432	90.0	.01045	.89	9.0	.01045	.89	.9	.01045	.89
3.1	2.5	.8	.000432	112.5	.00853	1.09	11.3	.00853	1.09	1.1	.00853	1.09
3.8	3.0	.8	.000432	135.0	.00711	1.30	13.5	.00711	1.30	1.4	.00711	1.30
4.4	3.5	.8	.000432	157.5	.00604	1.53	15.8	.00604	1.53	1.6	.00604	1.53
5.0	4.0	.8	.000432	180.0	.00520	1.78	18.0	.00520	1.78	1.8	.00520	1.78
5.6	4.5	.8	.000432	202.5	.00453	2.05	20.3	.00453	2.05	2.0	.00453	2.05
6.3	5.0	.8	.000432	225.0	.00398	2.33	22.5	.00398	2.33	2.3	.00398	2.33

Table SA-11 (continued)
Results of Waste Dilution - Winter - Ship 5
(L = 0.4 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 700 gpm							
5.0	1.0	.2	.000504	180.0	.02077	.38	18.0	.02077	.38	1.8	.02077	.38
7.5	1.5	.2	.000504	270.0	.01261	.63	27.0	.01261	.63	2.7	.01261	.63
10.0	2.0	.2	.000504	360.0	.00851	.93	36.0	.00851	.93	3.6	.00851	.93
12.5	2.5	.2	.000504	450.0	.00615	1.29	45.0	.00615	1.29	4.5	.00615	1.29
15.0	3.0	.2	.000504	540.0	.00465	1.71	54.0	.00465	1.71	5.4	.00465	1.71
17.5	3.5	.2	.000504	630.0	.00365	2.18	63.0	.00365	2.18	6.3	.00365	2.18
20.0	4.0	.2	.000504	720.0	.00294	2.70	72.0	.00294	2.70	7.2	.00294	2.70
22.5	4.5	.2	.000504	810.0	.00242	3.29	81.0	.00242	3.29	8.1	.00242	3.29
25.0	5.0	.2	.000504	900.0	.00202	3.92	90.0	.00202	3.92	9.0	.00202	3.92
2.5	1.0	.4	.000504	90.0	.02089	.38	9.0	.02089	.38	.9	.02089	.38
3.8	1.5	.4	.000504	135.0	.01422	.56	13.5	.01422	.56	1.4	.01422	.56
5.0	2.0	.4	.000504	180.0	.01039	.76	18.0	.01039	.76	1.8	.01039	.76
6.3	2.5	.4	.000504	225.0	.00796	1.00	22.5	.00796	1.00	2.3	.00796	1.00
7.5	3.0	.4	.000504	270.0	.00631	1.26	27.0	.00631	1.26	2.7	.00631	1.26
8.8	3.5	.4	.000504	315.0	.00513	1.55	31.5	.00513	1.55	3.1	.00513	1.55
10.0	4.0	.4	.000504	360.0	.00426	1.86	36.0	.00426	1.86	3.6	.00426	1.86
11.3	4.5	.4	.000504	405.0	.00359	2.21	40.5	.00359	2.21	4.0	.00359	2.21
12.5	5.0	.4	.000504	450.0	.00307	2.58	45.0	.00307	2.58	4.5	.00307	2.58
1.3	1.0	.8	.000504	45.0	.01744	.46	4.5	.01744	.46	.5	.01744	.46
1.9	1.5	.8	.000504	67.5	.01319	.60	6.8	.01319	.60	.7	.01319	.60
2.5	2.0	.8	.000504	90.0	.01045	.76	9.0	.01045	.76	.9	.01045	.76
3.1	2.5	.8	.000504	112.5	.00853	.93	11.3	.00853	.93	1.1	.00853	.93
3.8	3.0	.8	.000504	135.0	.00711	1.12	13.5	.00711	1.12	1.4	.00711	1.12
4.4	3.5	.8	.000504	157.5	.00604	1.32	15.8	.00604	1.32	1.6	.00604	1.32
5.0	4.0	.8	.000504	180.0	.00520	1.53	18.0	.00520	1.53	1.8	.00520	1.53
5.6	4.5	.8	.000504	202.5	.00453	1.75	20.3	.00453	1.75	2.0	.00453	1.75
6.3	5.0	.8	.000504	225.0	.00398	1.99	22.5	.00398	1.99	2.3	.00398	1.99
					Q = 1000 gpm							
5.0	1.0	.2	.000720	180.0	.02077	.27	18.0	.02077	.27	1.8	.02077	.27
7.5	1.5	.2	.000720	270.0	.01261	.44	27.0	.01261	.44	2.7	.01261	.44
10.0	2.0	.2	.000720	360.0	.00851	.65	36.0	.00851	.65	3.6	.00851	.65
12.5	2.5	.2	.000720	450.0	.00615	.90	45.0	.00615	.90	4.5	.00615	.90
15.0	3.0	.2	.000720	540.0	.00465	1.19	54.0	.00465	1.19	5.4	.00465	1.19
17.5	3.5	.2	.000720	630.0	.00365	1.52	63.0	.00365	1.52	6.3	.00365	1.52
20.0	4.0	.2	.000720	720.0	.00294	1.89	72.0	.00294	1.89	7.2	.00294	1.89
22.5	4.5	.2	.000720	810.0	.00242	2.30	81.0	.00242	2.30	8.1	.00242	2.30
25.0	5.0	.2	.000720	900.0	.00202	2.75	90.0	.00202	2.75	9.0	.00202	2.75
2.5	1.0	.4	.000720	90.0	.02089	.27	9.0	.02089	.27	.9	.02089	.27
3.8	1.5	.4	.000720	135.0	.01422	.39	13.5	.01422	.39	1.4	.01422	.39
5.0	2.0	.4	.000720	180.0	.01039	.53	18.0	.01039	.53	1.8	.01039	.53
6.3	2.5	.4	.000720	225.0	.00796	.70	22.5	.00796	.70	2.3	.00796	.70
7.5	3.0	.4	.000720	270.0	.00631	.88	27.0	.00631	.88	2.7	.00631	.88
8.8	3.5	.4	.000720	315.0	.00513	1.08	31.5	.00513	1.08	3.1	.00513	1.08
10.0	4.0	.4	.000720	360.0	.00426	1.31	36.0	.00426	1.31	3.6	.00426	1.31
11.3	4.5	.4	.000720	405.0	.00359	1.55	40.5	.00359	1.55	4.0	.00359	1.55
12.5	5.0	.4	.000720	450.0	.00307	1.81	45.0	.00307	1.81	4.5	.00307	1.81
1.3	1.0	.8	.000720	45.0	.01744	.32	4.5	.01744	.32	.5	.01744	.32
1.9	1.5	.8	.000720	67.5	.01319	.42	6.8	.01319	.42	.7	.01319	.42
2.5	2.0	.8	.000720	90.0	.01045	.53	9.0	.01045	.53	.9	.01045	.53
3.1	2.5	.8	.000720	112.5	.00853	.65	11.3	.00853	.65	1.1	.00853	.65
3.8	3.0	.8	.000720	135.0	.00711	.78	13.5	.00711	.78	1.4	.00711	.78
4.4	3.5	.8	.000720	157.5	.00604	.92	15.8	.00604	.92	1.6	.00604	.92
5.0	4.0	.8	.000720	180.0	.00520	1.07	18.0	.00520	1.07	1.8	.00520	1.07
5.6	4.5	.8	.000720	202.5	.00453	1.23	20.3	.00453	1.23	2.0	.00453	1.23
6.3	5.0	.8	.000720	225.0	.00398	1.40	22.5	.00398	1.40	2.3	.00398	1.40

Table SA-11 (continued)
Results of Waste Dilution - Winter - Ship 5
(L = 0.4 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 1200 gpm							
5.0	1.0	.2	.000864	180.0	.02077	.22	18.0	.02077	.22	1.8	.02077	.22
7.5	1.5	.2	.000864	270.0	.01261	.37	27.0	.01261	.37	2.7	.01261	.37
10.0	2.0	.2	.000864	360.0	.00851	.54	36.0	.00851	.54	3.6	.00851	.54
12.5	2.5	.2	.000864	450.0	.00615	.75	45.0	.00615	.75	4.5	.00615	.75
15.0	3.0	.2	.000864	540.0	.00465	1.00	54.0	.00465	1.00	5.4	.00465	1.00
17.5	3.5	.2	.000864	630.0	.00365	1.27	63.0	.00365	1.27	6.3	.00365	1.27
20.0	4.0	.2	.000864	720.0	.00294	1.58	72.0	.00294	1.58	7.2	.00294	1.58
22.5	4.5	.2	.000864	810.0	.00242	1.92	81.0	.00242	1.92	8.1	.00242	1.92
25.0	5.0	.2	.000864	900.0	.00202	2.29	90.0	.00202	2.29	9.0	.00202	2.29
2.5	1.0	.4	.000864	90.0	.02089	.22	9.0	.02089	.22	.9	.02089	.22
3.8	1.5	.4	.000864	135.0	.01422	.33	13.5	.01422	.33	1.4	.01422	.33
5.0	2.0	.4	.000864	180.0	.01039	.45	18.0	.01039	.45	1.8	.01039	.45
6.3	2.5	.4	.000864	225.0	.00796	.58	22.5	.00796	.58	2.3	.00796	.58
7.5	3.0	.4	.000864	270.0	.00631	.73	27.0	.00631	.73	2.7	.00631	.73
8.8	3.5	.4	.000864	315.0	.00513	.90	31.5	.00513	.90	3.1	.00513	.90
10.0	4.0	.4	.000864	360.0	.00426	1.09	36.0	.00426	1.09	3.6	.00426	1.09
11.3	4.5	.4	.000864	405.0	.00359	1.29	40.5	.00359	1.29	4.0	.00359	1.29
12.5	5.0	.4	.000864	450.0	.00307	1.51	45.0	.00307	1.51	4.5	.00307	1.51
1.3	1.0	.8	.000864	45.0	.01744	.27	4.5	.01744	.27	.5	.01744	.27
1.9	1.5	.8	.000864	67.5	.01319	.35	6.8	.01319	.35	.7	.01319	.35
2.5	2.0	.8	.000864	90.0	.01045	.44	9.0	.01045	.44	.9	.01045	.44
3.1	2.5	.8	.000864	112.5	.00853	.54	11.3	.00853	.54	1.1	.00853	.54
3.8	3.0	.8	.000864	135.0	.00711	.65	13.5	.00711	.65	1.4	.00711	.65
4.4	3.5	.8	.000864	157.5	.00604	.77	15.8	.00604	.77	1.6	.00604	.77
5.0	4.0	.8	.000864	180.0	.00520	.89	18.0	.00520	.89	1.8	.00520	.89
5.6	4.5	.8	.000864	202.5	.00453	1.02	20.3	.00453	1.02	2.0	.00453	1.02
6.3	5.0	.8	.000864	225.0	.00398	1.16	22.5	.00398	1.16	2.3	.00398	1.16
					Q = 1400 gpm							
5.0	1.0	.2	.001008	180.0	.02077	.19	18.0	.02077	.19	1.8	.02077	.19
7.5	1.5	.2	.001008	270.0	.01261	.31	27.0	.01261	.31	2.7	.01261	.31
10.0	2.0	.2	.001008	360.0	.00851	.47	36.0	.00851	.47	3.6	.00851	.47
12.5	2.5	.2	.001008	450.0	.00615	.65	45.0	.00615	.65	4.5	.00615	.65
15.0	3.0	.2	.001008	540.0	.00465	.85	54.0	.00465	.85	5.4	.00465	.85
17.5	3.5	.2	.001008	630.0	.00365	1.09	63.0	.00365	1.09	6.3	.00365	1.09
20.0	4.0	.2	.001008	720.0	.00294	1.35	72.0	.00294	1.35	7.2	.00294	1.35
22.5	4.5	.2	.001008	810.0	.00242	1.64	81.0	.00242	1.64	8.1	.00242	1.64
25.0	5.0	.2	.001008	900.0	.00202	1.96	90.0	.00202	1.96	9.0	.00202	1.96
2.5	1.0	.4	.001008	90.0	.02089	.19	9.0	.02089	.19	.9	.02089	.19
3.8	1.5	.4	.001008	135.0	.01422	.28	13.5	.01422	.28	1.4	.01422	.28
5.0	2.0	.4	.001008	180.0	.01039	.38	18.0	.01039	.38	1.8	.01039	.38
6.3	2.5	.4	.001008	225.0	.00796	.50	22.5	.00796	.50	2.3	.00796	.50
7.5	3.0	.4	.001008	270.0	.00631	.63	27.0	.00631	.63	2.7	.00631	.63
8.8	3.5	.4	.001008	315.0	.00513	.77	31.5	.00513	.77	3.1	.00513	.77
10.0	4.0	.4	.001008	360.0	.00426	.93	36.0	.00426	.93	3.6	.00426	.93
11.3	4.5	.4	.001008	405.0	.00359	1.10	40.5	.00359	1.10	4.0	.00359	1.10
12.5	5.0	.4	.001008	450.0	.00307	1.29	45.0	.00307	1.29	4.5	.00307	1.29
1.3	1.0	.8	.001008	45.0	.01744	.23	4.5	.01744	.23	.5	.01744	.23
1.9	1.5	.8	.001008	67.5	.01319	.30	6.8	.01319	.30	.7	.01319	.30
2.5	2.0	.8	.001008	90.0	.01045	.38	9.0	.01045	.38	.9	.01045	.38
3.1	2.5	.8	.001008	112.5	.00853	.47	11.3	.00853	.47	1.1	.00853	.47
3.8	3.0	.8	.001008	135.0	.00711	.56	13.5	.00711	.56	1.4	.00711	.56
4.4	3.5	.8	.001008	157.5	.00604	.66	15.8	.00604	.66	1.6	.00604	.66
5.0	4.0	.8	.001008	180.0	.00520	.76	18.0	.00520	.76	1.8	.00520	.76
5.6	4.5	.8	.001008	202.5	.00453	.88	20.3	.00453	.88	2.0	.00453	.88
6.3	5.0	.8	.001008	225.0	.00398	1.00	22.5	.00398	1.00	2.3	.00398	1.00

Table SA-12
Results of Waste Dilution - Summer - Ship 1
(L = 0.8 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 500 gpm							
5.0	1.0	.2	.000202	180.0	.04511	.44	18.0	.03552	.56	1.8	.03552	.56
7.5	1.5	.2	.000202	270.0	.02837	.70	27.0	.02328	.85	2.7	.02328	.85
10.0	2.0	.2	.000202	360.0	.01926	1.03	36.0	.01656	1.19	3.6	.01656	1.19
12.5	2.5	.2	.000202	450.0	.01408	1.40	45.0	.01242	1.59	4.5	.01242	1.59
15.0	3.0	.2	.000202	540.0	.01080	1.83	54.0	.00969	2.04	5.4	.00969	2.04
17.5	3.5	.2	.000202	630.0	.00857	2.31	63.0	.00778	2.54	6.3	.00778	2.54
20.0	4.0	.2	.000202	720.0	.00698	2.83	72.0	.00638	3.10	7.2	.00638	3.10
22.5	4.5	.2	.000202	810.0	.00580	3.41	81.0	.00534	3.70	8.1	.00534	3.70
25.0	5.0	.2	.000202	900.0	.00489	4.04	90.0	.00453	4.36	9.0	.00453	4.36
2.5	1.0	.4	.000202	90.0	.03145	.63	9.0	.03145	.63	.9	.03145	.63
3.8	1.5	.4	.000202	135.0	.02618	.75	13.5	.02304	.86	1.4	.02304	.86
5.0	2.0	.4	.000202	180.0	.02258	.87	18.0	.01778	1.11	1.8	.01778	1.11
6.3	2.5	.4	.000202	225.0	.01804	1.10	22.5	.01420	1.39	2.3	.01420	1.39
7.5	3.0	.4	.000202	270.0	.01420	1.39	27.0	.01165	1.70	2.7	.01165	1.70
8.8	3.5	.4	.000202	315.0	.01156	1.71	31.5	.00974	2.03	3.1	.00974	2.03
10.0	4.0	.4	.000202	360.0	.00964	2.05	36.0	.00828	2.39	3.6	.00828	2.39
11.3	4.5	.4	.000202	405.0	.00818	2.42	40.5	.00713	2.77	4.0	.00713	2.77
12.5	5.0	.4	.000202	450.0	.00705	2.80	45.0	.00621	3.18	4.5	.00621	3.18
1.3	1.0	.8	.000202	45.0	.02390	.83	4.5	.02390	.83	.5	.02390	.83
1.9	1.5	.8	.000202	67.5	.01898	1.04	6.8	.01898	1.04	.7	.01898	1.04
2.5	2.0	.8	.000202	90.0	.01573	1.26	9.0	.01573	1.26	.9	.01573	1.26
3.1	2.5	.8	.000202	112.5	.01409	1.40	11.3	.01335	1.48	1.1	.01335	1.48
3.8	3.0	.8	.000202	135.0	.01309	1.51	13.5	.01152	1.71	1.4	.01152	1.71
4.4	3.5	.8	.000202	157.5	.01216	1.63	15.8	.01007	1.96	1.6	.01007	1.96
5.0	4.0	.8	.000202	180.0	.01130	1.75	18.0	.00889	2.22	1.8	.00889	2.22
5.6	4.5	.8	.000202	202.5	.01040	1.90	20.3	.00792	2.50	2.0	.00792	2.50
6.3	5.0	.8	.000202	225.0	.00906	2.18	22.5	.00710	2.78	2.3	.00710	2.78
					Q = 600 gpm							
5.0	1.0	.2	.000243	180.0	.04511	.37	18.0	.03552	.46	1.8	.03552	.46
7.5	1.5	.2	.000243	270.0	.02837	.58	27.0	.02328	.71	2.7	.02328	.71
10.0	2.0	.2	.000243	360.0	.01926	.85	36.0	.01656	.99	3.6	.01656	.99
12.5	2.5	.2	.000243	450.0	.01408	1.17	45.0	.01242	1.33	4.5	.01242	1.33
15.0	3.0	.2	.000243	540.0	.01080	1.52	54.0	.00969	1.70	5.4	.00969	1.70
17.5	3.5	.2	.000243	630.0	.00857	1.92	63.0	.00778	2.12	6.3	.00778	2.12
20.0	4.0	.2	.000243	720.0	.00698	2.36	72.0	.00638	2.58	7.2	.00638	2.58
22.5	4.5	.2	.000243	810.0	.00580	2.84	81.0	.00534	3.08	8.1	.00534	3.08
25.0	5.0	.2	.000243	900.0	.00489	3.36	90.0	.00453	3.63	9.0	.00453	3.63
2.5	1.0	.4	.000243	90.0	.03145	.52	9.0	.03145	.52	.9	.03145	.52
3.8	1.5	.4	.000243	135.0	.02618	.63	13.5	.02304	.71	1.4	.02304	.71
5.0	2.0	.4	.000243	180.0	.02258	.73	18.0	.01778	.93	1.8	.01778	.93
6.3	2.5	.4	.000243	225.0	.01804	.91	22.5	.01420	1.16	2.3	.01420	1.16
7.5	3.0	.4	.000243	270.0	.01420	1.16	27.0	.01165	1.41	2.7	.01165	1.41
8.8	3.5	.4	.000243	315.0	.01156	1.42	31.5	.00974	1.69	3.1	.00974	1.69
10.0	4.0	.4	.000243	360.0	.00964	1.71	36.0	.00828	1.99	3.6	.00828	1.99
11.3	4.5	.4	.000243	405.0	.00818	2.01	40.5	.00713	2.31	4.0	.00713	2.31
12.5	5.0	.4	.000243	450.0	.00705	2.34	45.0	.00621	2.65	4.5	.00621	2.65
1.3	1.0	.8	.000243	45.0	.02390	.69	4.5	.02390	.69	.5	.02390	.69
1.9	1.5	.8	.000243	67.5	.01898	.87	6.8	.01898	.87	.7	.01898	.87
2.5	2.0	.8	.000243	90.0	.01573	1.05	9.0	.01573	1.05	.9	.01573	1.05
3.1	2.5	.8	.000243	112.5	.01409	1.17	11.3	.01335	1.23	1.1	.01335	1.23
3.8	3.0	.8	.000243	135.0	.01309	1.26	13.5	.01152	1.43	1.4	.01152	1.43
4.4	3.5	.8	.000243	157.5	.01216	1.35	15.8	.01007	1.64	1.6	.01007	1.64
5.0	4.0	.8	.000243	180.0	.01130	1.46	18.0	.00889	1.85	1.8	.00889	1.85
5.6	4.5	.8	.000243	202.5	.01040	1.58	20.3	.00792	2.08	2.0	.00792	2.08
6.3	5.0	.8	.000243	225.0	.00906	1.82	22.5	.00710	2.32	2.3	.00710	2.32

Table SA-12 (continued)
Results of Waste Dilution - Summer - Ship 1
(L = 0.8 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 700 gpm							
5.0	1.0	.2	.000283	180.0	.04511	.31	18.0	.03552	.40	1.8	.03552	.40
7.5	1.5	.2	.000283	270.0	.02837	.50	27.0	.02328	.61	2.7	.02328	.61
10.0	2.0	.2	.000283	360.0	.01926	.73	36.0	.01656	.85	3.6	.01656	.85
12.5	2.5	.2	.000283	450.0	.01408	1.00	45.0	.01242	1.14	4.5	.01242	1.14
15.0	3.0	.2	.000283	540.0	.01080	1.31	54.0	.00969	1.46	5.4	.00969	1.46
17.5	3.5	.2	.000283	630.0	.00857	1.65	63.0	.00778	1.82	6.3	.00778	1.82
20.0	4.0	.2	.000283	720.0	.00698	2.02	72.0	.00638	2.21	7.2	.00638	2.21
22.5	4.5	.2	.000283	810.0	.00580	2.44	81.0	.00534	2.64	8.1	.00534	2.64
25.0	5.0	.2	.000283	900.0	.00489	2.88	90.0	.00453	3.11	9.0	.00453	3.11
2.5	1.0	.4	.000283	90.0	.03145	.45	9.0	.03145	.45	.9	.03145	.45
3.8	1.5	.4	.000283	135.0	.02618	.54	13.5	.02304	.61	1.4	.02304	.61
5.0	2.0	.4	.000283	180.0	.02258	.62	18.0	.01778	.79	1.8	.01778	.79
6.3	2.5	.4	.000283	225.0	.01804	.78	22.5	.01420	.99	2.3	.01420	.99
7.5	3.0	.4	.000283	270.0	.01420	.99	27.0	.01165	1.21	2.7	.01165	1.21
8.8	3.5	.4	.000283	315.0	.01156	1.22	31.5	.00974	1.45	3.1	.00974	1.45
10.0	4.0	.4	.000283	360.0	.00964	1.46	36.0	.00828	1.70	3.6	.00828	1.70
11.3	4.5	.4	.000283	405.0	.00818	1.73	40.5	.00713	1.98	4.0	.00713	1.98
12.5	5.0	.4	.000283	450.0	.00705	2.00	45.0	.00621	2.27	4.5	.00621	2.27
1.3	1.0	.8	.000283	45.0	.02390	.59	4.5	.02390	.59	.5	.02390	.59
1.9	1.5	.8	.000283	67.5	.01898	.74	6.8	.01898	.74	.7	.01898	.74
2.5	2.0	.8	.000283	90.0	.01573	.90	9.0	.01573	.90	.9	.01573	.90
3.1	2.5	.8	.000283	112.5	.01409	1.00	11.3	.01335	1.06	1.1	.01335	1.06
3.8	3.0	.8	.000283	135.0	.01309	1.08	13.5	.01152	1.22	1.4	.01152	1.22
4.4	3.5	.8	.000283	157.5	.01216	1.16	15.8	.01007	1.40	1.6	.01007	1.40
5.0	4.0	.8	.000283	180.0	.01130	1.25	18.0	.00889	1.59	1.8	.00889	1.59
5.6	4.5	.8	.000283	202.5	.01040	1.36	20.3	.00792	1.78	2.0	.00792	1.78
6.3	5.0	.8	.000283	225.0	.00906	1.56	22.5	.00710	1.99	2.3	.00710	1.99
					Q = 1000 gpm							
5.0	1.0	.2	.000405	180.0	.04511	.22	18.0	.03552	.28	1.8	.03552	.28
7.5	1.5	.2	.000405	270.0	.02837	.35	27.0	.02328	.42	2.7	.02328	.42
10.0	2.0	.2	.000405	360.0	.01926	.51	36.0	.01656	.60	3.6	.01656	.60
12.5	2.5	.2	.000405	450.0	.01408	.70	45.0	.01242	.80	4.5	.01242	.80
15.0	3.0	.2	.000405	540.0	.01080	.91	54.0	.00969	1.02	5.4	.00969	1.02
17.5	3.5	.2	.000405	630.0	.00857	1.15	63.0	.00778	1.27	6.3	.00778	1.27
20.0	4.0	.2	.000405	720.0	.00698	1.42	72.0	.00638	1.55	7.2	.00638	1.55
22.5	4.5	.2	.000405	810.0	.00580	1.70	81.0	.00534	1.85	8.1	.00534	1.85
25.0	5.0	.2	.000405	900.0	.00489	2.02	90.0	.00453	2.18	9.0	.00453	2.18
2.5	1.0	.4	.000405	90.0	.03145	.31	9.0	.03145	.31	.9	.03145	.31
3.8	1.5	.4	.000405	135.0	.02618	.38	13.5	.02304	.43	1.4	.02304	.43
5.0	2.0	.4	.000405	180.0	.02258	.44	18.0	.01778	.56	1.8	.01778	.56
6.3	2.5	.4	.000405	225.0	.01804	.55	22.5	.01420	.70	2.3	.01420	.70
7.5	3.0	.4	.000405	270.0	.01420	.70	27.0	.01165	.85	2.7	.01165	.85
8.8	3.5	.4	.000405	315.0	.01156	.85	31.5	.00974	1.01	3.1	.00974	1.01
10.0	4.0	.4	.000405	360.0	.00964	1.03	36.0	.00828	1.19	3.6	.00828	1.19
11.3	4.5	.4	.000405	405.0	.00818	1.21	40.5	.00713	1.38	4.0	.00713	1.38
12.5	5.0	.4	.000405	450.0	.00705	1.40	45.0	.00621	1.59	4.5	.00621	1.59
1.3	1.0	.8	.000405	45.0	.02390	.41	4.5	.02390	.41	.5	.02390	.41
1.9	1.5	.8	.000405	67.5	.01898	.52	6.8	.01898	.52	.7	.01898	.52
2.5	2.0	.8	.000405	90.0	.01573	.63	9.0	.01573	.63	.9	.01573	.63
3.1	2.5	.8	.000405	112.5	.01409	.70	11.3	.01335	.74	1.1	.01335	.74
3.8	3.0	.8	.000405	135.0	.01309	.75	13.5	.01152	.86	1.4	.01152	.86
4.4	3.5	.8	.000405	157.5	.01216	.81	15.8	.01007	.98	1.6	.01007	.98
5.0	4.0	.8	.000405	180.0	.01130	.87	18.0	.00889	1.11	1.8	.00889	1.11
5.6	4.5	.8	.000405	202.5	.01040	.95	20.3	.00792	1.25	2.0	.00792	1.25
6.3	5.0	.8	.000405	225.0	.00906	1.09	22.5	.00710	1.39	2.3	.00710	1.39

Table SA-12 (continued)
Results of Waste Dilution - Summer - Ship 1
(L = 0.8 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 1200 gpm							
5.0	1.0	.2	.000486	180.0	.04511	.18	18.0	.03552	.23	1.8	.03552	.23
7.5	1.5	.2	.000486	270.0	.02837	.29	27.0	.02328	.35	2.7	.02328	.35
10.0	2.0	.2	.000486	360.0	.01926	.43	36.0	.01656	.50	3.6	.01656	.50
12.5	2.5	.2	.000486	450.0	.01408	.58	45.0	.01242	.66	4.5	.01242	.66
15.0	3.0	.2	.000486	540.0	.01080	.76	54.0	.00969	.85	5.4	.00969	.85
17.5	3.5	.2	.000486	630.0	.00857	.96	63.0	.00778	1.06	6.3	.00778	1.06
20.0	4.0	.2	.000486	720.0	.00698	1.18	72.0	.00638	1.29	7.2	.00638	1.29
22.5	4.5	.2	.000486	810.0	.00580	1.42	81.0	.00534	1.54	8.1	.00534	1.54
25.0	5.0	.2	.000486	900.0	.00489	1.68	90.0	.00453	1.82	9.0	.00453	1.82
2.5	1.0	.4	.000486	90.0	.03145	.26	9.0	.03145	.26	.9	.03145	.26
3.8	1.5	.4	.000486	135.0	.02618	.31	13.5	.02304	.36	1.4	.02304	.36
5.0	2.0	.4	.000486	180.0	.02258	.36	18.0	.01778	.46	1.8	.01778	.46
6.3	2.5	.4	.000486	225.0	.01804	.46	22.5	.01420	.58	2.3	.01420	.58
7.5	3.0	.4	.000486	270.0	.01420	.58	27.0	.01165	.71	2.7	.01165	.71
8.8	3.5	.4	.000486	315.0	.01156	.71	31.5	.00974	.85	3.1	.00974	.85
10.0	4.0	.4	.000486	360.0	.00964	.85	36.0	.00828	.99	3.6	.00828	.99
11.3	4.5	.4	.000486	405.0	.00818	1.01	40.5	.00713	1.15	4.0	.00713	1.15
12.5	5.0	.4	.000486	450.0	.00705	1.17	45.0	.00621	1.32	4.5	.00621	1.32
1.3	1.0	.8	.000486	45.0	.02390	.34	4.5	.02390	.34	.5	.02390	.34
1.9	1.5	.8	.000486	67.5	.01898	.43	6.8	.01898	.43	.7	.01898	.43
2.5	2.0	.8	.000486	90.0	.01573	.52	9.0	.01573	.52	.9	.01573	.52
3.1	2.5	.8	.000486	112.5	.01409	.58	11.3	.01335	.62	1.1	.01335	.62
3.8	3.0	.8	.000486	135.0	.01309	.63	13.5	.01152	.71	1.4	.01152	.71
4.4	3.5	.8	.000486	157.5	.01216	.68	15.8	.01007	.82	1.6	.01007	.82
5.0	4.0	.8	.000486	180.0	.01130	.73	18.0	.00889	.93	1.8	.00889	.93
5.6	4.5	.8	.000486	202.5	.01040	.79	20.3	.00792	1.04	2.0	.00792	1.04
6.3	5.0	.8	.000486	225.0	.00906	.91	22.5	.00710	1.16	2.3	.00710	1.16
					Q = 1400 gpm							
5.0	1.0	.2	.000567	180.0	.04511	.16	18.0	.03552	.20	1.8	.03552	.20
7.5	1.5	.2	.000567	270.0	.02837	.25	27.0	.02328	.30	2.7	.02328	.30
10.0	2.0	.2	.000567	360.0	.01926	.37	36.0	.01656	.43	3.6	.01656	.43
12.5	2.5	.2	.000567	450.0	.01408	.50	45.0	.01242	.57	4.5	.01242	.57
15.0	3.0	.2	.000567	540.0	.01080	.65	54.0	.00969	.73	5.4	.00969	.73
17.5	3.5	.2	.000567	630.0	.00857	.82	63.0	.00778	.91	6.3	.00778	.91
20.0	4.0	.2	.000567	720.0	.00698	1.01	72.0	.00638	1.11	7.2	.00638	1.11
22.5	4.5	.2	.000567	810.0	.00580	1.22	81.0	.00534	1.32	8.1	.00534	1.32
25.0	5.0	.2	.000567	900.0	.00489	1.44	90.0	.00453	1.56	9.0	.00453	1.56
2.5	1.0	.4	.000567	90.0	.03145	.22	9.0	.03145	.22	.9	.03145	.22
3.8	1.5	.4	.000567	135.0	.02618	.27	13.5	.02304	.31	1.4	.02304	.31
5.0	2.0	.4	.000567	180.0	.02258	.31	18.0	.01778	.40	1.8	.01778	.40
6.3	2.5	.4	.000567	225.0	.01804	.39	22.5	.01420	.50	2.3	.01420	.50
7.5	3.0	.4	.000567	270.0	.01420	.50	27.0	.01165	.61	2.7	.01165	.61
8.8	3.5	.4	.000567	315.0	.01156	.61	31.5	.00974	.72	3.1	.00974	.72
10.0	4.0	.4	.000567	360.0	.00964	.73	36.0	.00828	.85	3.6	.00828	.85
11.3	4.5	.4	.000567	405.0	.00818	.86	40.5	.00713	.99	4.0	.00713	.99
12.5	5.0	.4	.000567	450.0	.00705	1.00	45.0	.00621	1.14	4.5	.00621	1.14
1.3	1.0	.8	.000567	45.0	.02390	.30	4.5	.02390	.30	.5	.02390	.30
1.9	1.5	.8	.000567	67.5	.01898	.37	6.8	.01898	.37	.7	.01898	.37
2.5	2.0	.8	.000567	90.0	.01573	.45	9.0	.01573	.45	.9	.01573	.45
3.1	2.5	.8	.000567	112.5	.01409	.50	11.3	.01335	.53	1.1	.01335	.53
3.8	3.0	.8	.000567	135.0	.01309	.54	13.5	.01152	.61	1.4	.01152	.61
4.4	3.5	.8	.000567	157.5	.01216	.58	15.8	.01007	.70	1.6	.01007	.70
5.0	4.0	.8	.000567	180.0	.01130	.62	18.0	.00889	.79	1.8	.00889	.79
5.6	4.5	.8	.000567	202.5	.01040	.68	20.3	.00792	.89	2.0	.00792	.89
6.3	5.0	.8	.000567	225.0	.00906	.78	22.5	.00710	.99	2.3	.00710	.99

Table SA-13
Results of Waste Dilution - Winter - Ship 1
(L = 0.8 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 500 gpm								
5.0	1.0	.2	.000202	180.0	.02387	.83	18.0	.02387	.83	1.8	.02387	.83
7.5	1.5	.2	.000202	270.0	.01564	1.26	27.0	.01564	1.26	2.7	.01564	1.26
10.0	2.0	.2	.000202	360.0	.01112	1.78	36.0	.01112	1.78	3.6	.01112	1.78
12.5	2.5	.2	.000202	450.0	.00834	2.37	45.0	.00834	2.37	4.5	.00834	2.37
15.0	3.0	.2	.000202	540.0	.00651	3.04	54.0	.00651	3.04	5.4	.00651	3.04
17.5	3.5	.2	.000202	630.0	.00522	3.78	63.0	.00522	3.78	6.3	.00522	3.78
20.0	4.0	.2	.000202	720.0	.00429	4.61	72.0	.00429	4.61	7.2	.00429	4.61
22.5	4.5	.2	.000202	810.0	.00358	5.51	81.0	.00358	5.51	8.1	.00358	5.51
25.0	5.0	.2	.000202	900.0	.00304	6.49	90.0	.00304	6.49	9.0	.00304	6.49
2.5	1.0	.4	.000202	90.0	.02113	.94	9.0	.02113	.94	.9	.02113	.94
3.8	1.5	.4	.000202	135.0	.01547	1.28	13.5	.01547	1.28	1.4	.01547	1.28
5.0	2.0	.4	.000202	180.0	.01194	1.66	18.0	.01194	1.66	1.8	.01194	1.66
6.3	2.5	.4	.000202	225.0	.00954	2.07	22.5	.00954	2.07	2.3	.00954	2.07
7.5	3.0	.4	.000202	270.0	.00782	2.53	27.0	.00782	2.53	2.7	.00782	2.53
8.8	3.5	.4	.000202	315.0	.00654	3.02	31.5	.00654	3.02	3.1	.00654	3.02
10.0	4.0	.4	.000202	360.0	.00556	3.55	36.0	.00556	3.55	3.6	.00556	3.55
11.3	4.5	.4	.000202	405.0	.00479	4.12	40.5	.00479	4.12	4.0	.00479	4.12
12.5	5.0	.4	.000202	450.0	.00417	4.74	45.0	.00417	4.74	4.5	.00417	4.74
1.3	1.0	.8	.000202	45.0	.01605	1.23	4.5	.01605	1.23	.5	.01605	1.23
1.9	1.5	.8	.000202	67.5	.01274	1.55	6.8	.01274	1.55	.7	.01274	1.55
2.5	2.0	.8	.000202	90.0	.01056	1.87	9.0	.01056	1.87	.9	.01056	1.87
3.1	2.5	.8	.000202	112.5	.00897	2.20	11.3	.00897	2.20	1.1	.00897	2.20
3.8	3.0	.8	.000202	135.0	.00774	2.55	13.5	.00774	2.55	1.4	.00774	2.55
4.4	3.5	.8	.000202	157.5	.00676	2.92	15.8	.00676	2.92	1.6	.00676	2.92
5.0	4.0	.8	.000202	180.0	.00597	3.31	18.0	.00597	3.31	1.8	.00597	3.31
5.6	4.5	.8	.000202	202.5	.00532	3.72	20.3	.00532	3.72	2.0	.00532	3.72
6.3	5.0	.8	.000202	225.0	.00477	4.14	22.5	.00477	4.14	2.3	.00477	4.14
				Q = 600 gpm								
5.0	1.0	.2	.000243	180.0	.02387	.69	18.0	.02387	.69	1.8	.02387	.69
7.5	1.5	.2	.000243	270.0	.01564	1.05	27.0	.01564	1.05	2.7	.01564	1.05
10.0	2.0	.2	.000243	360.0	.01112	1.48	36.0	.01112	1.48	3.6	.01112	1.48
12.5	2.5	.2	.000243	450.0	.00834	1.97	45.0	.00834	1.97	4.5	.00834	1.97
15.0	3.0	.2	.000243	540.0	.00651	2.53	54.0	.00651	2.53	5.4	.00651	2.53
17.5	3.5	.2	.000243	630.0	.00522	3.15	63.0	.00522	3.15	6.3	.00522	3.15
20.0	4.0	.2	.000243	720.0	.00429	3.84	72.0	.00429	3.84	7.2	.00429	3.84
22.5	4.5	.2	.000243	810.0	.00358	4.59	81.0	.00358	4.59	8.1	.00358	4.59
25.0	5.0	.2	.000243	900.0	.00304	5.41	90.0	.00304	5.41	9.0	.00304	5.41
2.5	1.0	.4	.000243	90.0	.02113	.78	9.0	.02113	.78	.9	.02113	.78
3.8	1.5	.4	.000243	135.0	.01547	1.06	13.5	.01547	1.06	1.4	.01547	1.06
5.0	2.0	.4	.000243	180.0	.01194	1.38	18.0	.01194	1.38	1.8	.01194	1.38
6.3	2.5	.4	.000243	225.0	.00954	1.73	22.5	.00954	1.73	2.3	.00954	1.73
7.5	3.0	.4	.000243	270.0	.00782	2.11	27.0	.00782	2.11	2.7	.00782	2.11
8.8	3.5	.4	.000243	315.0	.00654	2.52	31.5	.00654	2.52	3.1	.00654	2.52
10.0	4.0	.4	.000243	360.0	.00556	2.96	36.0	.00556	2.96	3.6	.00556	2.96
11.3	4.5	.4	.000243	405.0	.00479	3.44	40.5	.00479	3.44	4.0	.00479	3.44
12.5	5.0	.4	.000243	450.0	.00417	3.95	45.0	.00417	3.95	4.5	.00417	3.95
1.3	1.0	.8	.000243	45.0	.01605	1.03	4.5	.01605	1.03	.5	.01605	1.03
1.9	1.5	.8	.000243	67.5	.01274	1.29	6.8	.01274	1.29	.7	.01274	1.29
2.5	2.0	.8	.000243	90.0	.01056	1.56	9.0	.01056	1.56	.9	.01056	1.56
3.1	2.5	.8	.000243	112.5	.00897	1.84	11.3	.00897	1.84	1.1	.00897	1.84
3.8	3.0	.8	.000243	135.0	.00774	2.13	13.5	.00774	2.13	1.4	.00774	2.13
4.4	3.5	.8	.000243	157.5	.00676	2.44	15.8	.00676	2.44	1.6	.00676	2.44
5.0	4.0	.8	.000243	180.0	.00597	2.76	18.0	.00597	2.76	1.8	.00597	2.76
5.6	4.5	.8	.000243	202.5	.00532	3.10	20.3	.00532	3.10	2.0	.00532	3.10
6.3	5.0	.8	.000243	225.0	.00477	3.45	22.5	.00477	3.45	2.3	.00477	3.45

Table SA-13 (continued)
Results of Waste Dilution - Winter - Ship 1
(L = 0.8 n mi, A = 0.001 $ft^{2/3}/sec$)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 700 gpm								
5.0	1.0	.2	.000283	180.0	.02387	.59	18.0	.02387	.59	1.8	.02387	.59
7.5	1.5	.2	.000283	270.0	.01564	.90	27.0	.01564	.90	2.7	.01564	.90
10.0	2.0	.2	.000283	360.0	.01112	1.27	36.0	.01112	1.27	3.6	.01112	1.27
12.5	2.5	.2	.000283	450.0	.00834	1.69	45.0	.00834	1.69	4.5	.00834	1.69
15.0	3.0	.2	.000283	540.0	.00651	2.17	54.0	.00651	2.17	5.4	.00651	2.17
17.5	3.5	.2	.000283	630.0	.00522	2.70	63.0	.00522	2.70	6.3	.00522	2.70
20.0	4.0	.2	.000283	720.0	.00429	3.29	72.0	.00429	3.29	7.2	.00429	3.29
22.5	4.5	.2	.000283	810.0	.00358	3.94	81.0	.00358	3.94	8.1	.00358	3.94
25.0	5.0	.2	.000283	900.0	.00304	4.64	90.0	.00304	4.64	9.0	.00304	4.64
2.5	1.0	.4	.000283	90.0	.02113	.67	9.0	.02113	.67	.9	.02113	.67
3.8	1.5	.4	.000283	135.0	.01547	.91	13.5	.01547	.91	1.4	.01547	.91
5.0	2.0	.4	.000283	180.0	.01194	1.18	18.0	.01194	1.18	1.8	.01194	1.18
6.3	2.5	.4	.000283	225.0	.00954	1.48	22.5	.00954	1.48	2.3	.00954	1.48
7.5	3.0	.4	.000283	270.0	.00782	1.80	27.0	.00782	1.80	2.7	.00782	1.80
8.8	3.5	.4	.000283	315.0	.00654	2.16	31.5	.00654	2.16	3.1	.00654	2.16
10.0	4.0	.4	.000283	360.0	.00556	2.54	36.0	.00556	2.54	3.6	.00556	2.54
11.3	4.5	.4	.000283	405.0	.00479	2.95	40.5	.00479	2.95	4.0	.00479	2.95
12.5	5.0	.4	.000283	450.0	.00417	3.38	45.0	.00417	3.38	4.5	.00417	3.38
1.3	1.0	.8	.000283	45.0	.01605	.88	4.5	.01605	.88	.5	.01605	.88
1.9	1.5	.8	.000283	67.5	.01274	1.11	6.8	.01274	1.11	.7	.01274	1.11
2.5	2.0	.8	.000283	90.0	.01056	1.34	9.0	.01056	1.34	.9	.01056	1.34
3.1	2.5	.8	.000283	112.5	.00897	1.57	11.3	.00897	1.57	1.1	.00897	1.57
3.8	3.0	.8	.000283	135.0	.00774	1.82	13.5	.00774	1.82	1.4	.00774	1.82
4.4	3.5	.8	.000283	157.5	.00676	2.09	15.8	.00676	2.09	1.6	.00676	2.09
5.0	4.0	.8	.000283	180.0	.00597	2.36	18.0	.00597	2.36	1.8	.00597	2.36
5.6	4.5	.8	.000283	202.5	.00532	2.65	20.3	.00532	2.65	2.0	.00532	2.65
6.3	5.0	.8	.000283	225.0	.00477	2.96	22.5	.00477	2.96	2.3	.00477	2.96
				Q = 1000 gpm								
5.0	1.0	.2	.000405	180.0	.02387	.41	18.0	.02387	.41	1.8	.02387	.41
7.5	1.5	.2	.000405	270.0	.01564	.63	27.0	.01564	.63	2.7	.01564	.63
10.0	2.0	.2	.000405	360.0	.01112	.89	36.0	.01112	.89	3.6	.01112	.89
12.5	2.5	.2	.000405	450.0	.00834	1.18	45.0	.00834	1.18	4.5	.00834	1.18
15.0	3.0	.2	.000405	540.0	.00651	1.52	54.0	.00651	1.52	5.4	.00651	1.52
17.5	3.5	.2	.000405	630.0	.00522	1.89	63.0	.00522	1.89	6.3	.00522	1.89
20.0	4.0	.2	.000405	720.0	.00429	2.30	72.0	.00429	2.30	7.2	.00429	2.30
22.5	4.5	.2	.000405	810.0	.00358	2.76	81.0	.00358	2.76	8.1	.00358	2.76
25.0	5.0	.2	.000405	900.0	.00304	3.25	90.0	.00304	3.25	9.0	.00304	3.25
2.5	1.0	.4	.000405	90.0	.02113	.47	9.0	.02113	.47	.9	.02113	.47
3.8	1.5	.4	.000405	135.0	.01547	.64	13.5	.01547	.64	1.4	.01547	.64
5.0	2.0	.4	.000405	180.0	.01194	.83	18.0	.01194	.83	1.8	.01194	.83
6.3	2.5	.4	.000405	225.0	.00954	1.04	22.5	.00954	1.04	2.3	.00954	1.04
7.5	3.0	.4	.000405	270.0	.00782	1.26	27.0	.00782	1.26	2.7	.00782	1.26
8.8	3.5	.4	.000405	315.0	.00654	1.51	31.5	.00654	1.51	3.1	.00654	1.51
10.0	4.0	.4	.000405	360.0	.00556	1.78	36.0	.00556	1.78	3.6	.00556	1.78
11.3	4.5	.4	.000405	405.0	.00479	2.06	40.5	.00479	2.06	4.0	.00479	2.06
12.5	5.0	.4	.000405	450.0	.00417	2.37	45.0	.00417	2.37	4.5	.00417	2.37
1.3	1.0	.8	.000405	45.0	.01605	.62	4.5	.01605	.62	.5	.01605	.62
1.9	1.5	.8	.000405	67.5	.01274	.78	6.8	.01274	.78	.7	.01274	.78
2.5	2.0	.8	.000405	90.0	.01056	.94	9.0	.01056	.94	.9	.01056	.94
3.1	2.5	.8	.000405	112.5	.00897	1.10	11.3	.00897	1.10	1.1	.00897	1.10
3.8	3.0	.8	.000405	135.0	.00774	1.28	13.5	.00774	1.28	1.4	.00774	1.28
4.4	3.5	.8	.000405	157.5	.00676	1.46	15.8	.00676	1.46	1.6	.00676	1.46
5.0	4.0	.8	.000405	180.0	.00597	1.66	18.0	.00597	1.66	1.8	.00597	1.66
5.6	4.5	.8	.000405	202.5	.00532	1.86	20.3	.00532	1.86	2.0	.00532	1.86
6.3	5.0	.8	.000405	225.0	.00477	2.07	22.5	.00477	2.07	2.3	.00477	2.07

Table SA-13 (continued)
Results of Waste Dilution - Winter - Ship 1
(L = 0.8 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 1200 gpm							
5.0	1.0	.2	.000486	180.0	.02387	.34	18.0	.02387	.34	1.8	.02387	.34
7.5	1.5	.2	.000486	270.0	.01564	.53	27.0	.01564	.53	2.7	.01564	.53
10.0	2.0	.2	.000486	360.0	.01112	.74	36.0	.01112	.74	3.6	.01112	.74
12.5	2.5	.2	.000486	450.0	.00834	.99	45.0	.00834	.99	4.5	.00834	.99
15.0	3.0	.2	.000486	540.0	.00651	1.27	54.0	.00651	1.27	5.4	.00651	1.27
17.5	3.5	.2	.000486	630.0	.00522	1.58	63.0	.00522	1.58	6.3	.00522	1.58
20.0	4.0	.2	.000486	720.0	.00429	1.92	72.0	.00429	1.92	7.2	.00429	1.92
22.5	4.5	.2	.000486	810.0	.00358	2.30	81.0	.00358	2.30	8.1	.00358	2.30
25.0	5.0	.2	.000486	900.0	.00304	2.71	90.0	.00304	2.71	9.0	.00304	2.71
2.5	1.0	.4	.000486	90.0	.02113	.39	9.0	.02113	.39	.9	.02113	.39
3.8	1.5	.4	.000486	135.0	.01547	.53	13.5	.01547	.53	1.4	.01547	.53
5.0	2.0	.4	.000486	180.0	.01194	.69	18.0	.01194	.69	1.8	.01194	.69
6.3	2.5	.4	.000486	225.0	.00954	.86	22.5	.00954	.86	2.3	.00954	.86
7.5	3.0	.4	.000486	270.0	.00782	1.05	27.0	.00782	1.05	2.7	.00782	1.05
8.8	3.5	.4	.000486	315.0	.00654	1.26	31.5	.00654	1.26	3.1	.00654	1.26
10.0	4.0	.4	.000486	360.0	.00556	1.48	36.0	.00556	1.48	3.6	.00556	1.48
11.3	4.5	.4	.000486	405.0	.00479	1.72	40.5	.00479	1.72	4.0	.00479	1.72
12.5	5.0	.4	.000486	450.0	.00417	1.97	45.0	.00417	1.97	4.5	.00417	1.97
1.3	1.0	.8	.000486	45.0	.01605	.51	4.5	.01605	.51	.5	.01605	.51
1.9	1.5	.8	.000486	67.5	.01274	.65	6.8	.01274	.65	.7	.01274	.65
2.5	2.0	.8	.000486	90.0	.01056	.78	9.0	.01056	.78	.9	.01056	.78
3.1	2.5	.8	.000486	112.5	.00897	.92	11.3	.00897	.92	1.1	.00897	.92
3.8	3.0	.8	.000486	135.0	.00774	1.06	13.5	.00774	1.06	1.4	.00774	1.06
4.4	3.5	.8	.000486	157.5	.00676	1.22	15.8	.00676	1.22	1.6	.00676	1.22
5.0	4.0	.8	.000486	180.0	.00597	1.38	18.0	.00597	1.38	1.8	.00597	1.38
5.6	4.5	.8	.000486	202.5	.00532	1.55	20.3	.00532	1.55	2.0	.00532	1.55
6.3	5.0	.8	.000486	225.0	.00477	1.73	22.5	.00477	1.73	2.3	.00477	1.73
					Q = 1400 gpm							
5.0	1.0	.2	.000567	180.0	.02387	.30	18.0	.02387	.30	1.8	.02387	.30
7.5	1.5	.2	.000567	270.0	.01564	.45	27.0	.01564	.45	2.7	.01564	.45
10.0	2.0	.2	.000567	360.0	.01112	.63	36.0	.01112	.63	3.6	.01112	.63
12.5	2.5	.2	.000567	450.0	.00834	.85	45.0	.00834	.85	4.5	.00834	.85
15.0	3.0	.2	.000567	540.0	.00651	1.08	54.0	.00651	1.08	5.4	.00651	1.08
17.5	3.5	.2	.000567	630.0	.00522	1.35	63.0	.00522	1.35	6.3	.00522	1.35
20.0	4.0	.2	.000567	720.0	.00429	1.65	72.0	.00429	1.65	7.2	.00429	1.65
22.5	4.5	.2	.000567	810.0	.00358	1.97	81.0	.00358	1.97	8.1	.00358	1.97
25.0	5.0	.2	.000567	900.0	.00304	2.32	90.0	.00304	2.32	9.0	.00304	2.32
2.5	1.0	.4	.000567	90.0	.02113	.33	9.0	.02113	.33	.9	.02113	.33
3.8	1.5	.4	.000567	135.0	.01547	.46	13.5	.01547	.46	1.4	.01547	.46
5.0	2.0	.4	.000567	180.0	.01194	.59	18.0	.01194	.59	1.8	.01194	.59
6.3	2.5	.4	.000567	225.0	.00954	.74	22.5	.00954	.74	2.3	.00954	.74
7.5	3.0	.4	.000567	270.0	.00782	.90	27.0	.00782	.90	2.7	.00782	.90
8.8	3.5	.4	.000567	315.0	.00654	1.08	31.5	.00654	1.08	3.1	.00654	1.08
10.0	4.0	.4	.000567	360.0	.00556	1.27	36.0	.00556	1.27	3.6	.00556	1.27
11.3	4.5	.4	.000567	405.0	.00479	1.47	40.5	.00479	1.47	4.0	.00479	1.47
12.5	5.0	.4	.000567	450.0	.00417	1.69	45.0	.00417	1.69	4.5	.00417	1.69
1.3	1.0	.8	.000567	45.0	.01605	.44	4.5	.01605	.44	.5	.01605	.44
1.9	1.5	.8	.000567	67.5	.01274	.55	6.8	.01274	.55	.7	.01274	.55
2.5	2.0	.8	.000567	90.0	.01056	.67	9.0	.01056	.67	.9	.01056	.67
3.1	2.5	.8	.000567	112.5	.00897	.79	11.3	.00897	.79	1.1	.00897	.79
3.8	3.0	.8	.000567	135.0	.00774	.91	13.5	.00774	.91	1.4	.00774	.91
4.4	3.5	.8	.000567	157.5	.00676	1.04	15.8	.00676	1.04	1.6	.00676	1.04
5.0	4.0	.8	.000567	180.0	.00597	1.18	18.0	.00597	1.18	1.8	.00597	1.18
5.6	4.5	.8	.000567	202.5	.00532	1.33	20.3	.00532	1.33	2.0	.00532	1.33
6.3	5.0	.8	.000567	225.0	.00477	1.48	22.5	.00477	1.48	2.3	.00477	1.48

Table SA-14
Results of Waste Dilution - Summer - Ship 1
(L = 1.0 n mi, A = 0.001 $ft^{2/3}/sec$)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 500 gpm												
5.0	1.0	.2	.000202	180.0	.03849	.51	18.0	.03030	.65	1.8	.03030	.65
7.5	1.5	.2	.000202	270.0	.02481	.80	27.0	.02035	.97	2.7	.02035	.97
10.0	2.0	.2	.000202	360.0	.01714	1.15	36.0	.01473	1.34	3.6	.01473	1.34
12.5	2.5	.2	.000202	450.0	.01270	1.56	45.0	.01120	1.76	4.5	.01120	1.76
15.0	3.0	.2	.000202	540.0	.00984	2.01	54.0	.00882	2.24	5.4	.00882	2.24
17.5	3.5	.2	.000202	630.0	.00787	2.51	63.0	.00714	2.77	6.3	.00714	2.77
20.0	4.0	.2	.000202	720.0	.00645	3.06	72.0	.00590	3.35	7.2	.00590	3.35
22.5	4.5	.2	.000202	810.0	.00539	3.66	81.0	.00497	3.98	8.1	.00497	3.98
25.0	5.0	.2	.000202	900.0	.00458	4.32	90.0	.00424	4.66	9.0	.00424	4.66
2.5	1.0	.4	.000202	90.0	.02582	.77	9.0	.02582	.77	.9	.02582	.77
3.8	1.5	.4	.000202	135.0	.02195	.90	13.5	.01932	1.02	1.4	.01932	1.02
5.0	2.0	.4	.000202	180.0	.01926	1.03	18.0	.01516	1.30	1.8	.01516	1.30
6.3	2.5	.4	.000202	225.0	.01559	1.27	22.5	.01228	1.61	2.3	.01228	1.61
7.5	3.0	.4	.000202	270.0	.01241	1.59	27.0	.01018	1.94	2.7	.01018	1.94
8.8	3.5	.4	.000202	315.0	.01020	1.94	31.5	.00860	2.30	3.1	.00860	2.30
10.0	4.0	.4	.000202	360.0	.00857	2.31	36.0	.00737	2.68	3.6	.00737	2.68
11.3	4.5	.4	.000202	405.0	.00733	2.70	40.5	.00639	3.09	4.0	.00639	3.09
12.5	5.0	.4	.000202	450.0	.00635	3.11	45.0	.00560	3.53	4.5	.00560	3.53
1.3	1.0	.8	.000202	45.0	.01920	1.03	4.5	.01920	1.03	.5	.01920	1.03
1.9	1.5	.8	.000202	67.5	.01540	1.28	6.8	.01540	1.28	.7	.01540	1.28
2.5	2.0	.8	.000202	90.0	.01291	1.53	9.0	.01291	1.53	.9	.01291	1.53
3.1	2.5	.8	.000202	112.5	.01169	1.69	11.3	.01108	1.78	1.1	.01108	1.78
3.8	3.0	.8	.000202	135.0	.01098	1.80	13.5	.00966	2.05	1.4	.00966	2.05
4.4	3.5	.8	.000202	157.5	.01029	1.92	15.8	.00852	2.32	1.6	.00852	2.32
5.0	4.0	.8	.000202	180.0	.00963	2.05	18.0	.00758	2.61	1.8	.00758	2.61
5.6	4.5	.8	.000202	202.5	.00894	2.21	20.3	.00680	2.91	2.0	.00680	2.91
6.3	5.0	.8	.000202	225.0	.00783	2.52	22.5	.00614	3.22	2.3	.00614	3.22
Q = 600 gpm												
5.0	1.0	.2	.000243	180.0	.03849	.43	18.0	.03030	.54	1.8	.03030	.54
7.5	1.5	.2	.000243	270.0	.02481	.66	27.0	.02035	.81	2.7	.02035	.81
10.0	2.0	.2	.000243	360.0	.01714	.96	36.0	.01473	1.12	3.6	.01473	1.12
12.5	2.5	.2	.000243	450.0	.01270	1.30	45.0	.01120	1.47	4.5	.01120	1.47
15.0	3.0	.2	.000243	540.0	.00984	1.67	54.0	.00882	1.87	5.4	.00882	1.87
17.5	3.5	.2	.000243	630.0	.00787	2.09	63.0	.00714	2.31	6.3	.00714	2.31
20.0	4.0	.2	.000243	720.0	.00645	2.55	72.0	.00590	2.79	7.2	.00590	2.79
22.5	4.5	.2	.000243	810.0	.00539	3.05	81.0	.00497	3.32	8.1	.00497	3.32
25.0	5.0	.2	.000243	900.0	.00458	3.60	90.0	.00424	3.89	9.0	.00424	3.89
2.5	1.0	.4	.000243	90.0	.02582	.64	9.0	.02582	.64	.9	.02582	.64
3.8	1.5	.4	.000243	135.0	.02195	.75	13.5	.01932	.85	1.4	.01932	.85
5.0	2.0	.4	.000243	180.0	.01926	.85	18.0	.01516	1.09	1.8	.01516	1.09
6.3	2.5	.4	.000243	225.0	.01559	1.06	22.5	.01228	1.34	2.3	.01228	1.34
7.5	3.0	.4	.000243	270.0	.01241	1.33	27.0	.01018	1.62	2.7	.01018	1.62
8.8	3.5	.4	.000243	315.0	.01020	1.61	31.5	.00860	1.92	3.1	.00860	1.92
10.0	4.0	.4	.000243	360.0	.00857	1.92	36.0	.00737	2.24	3.6	.00737	2.24
11.3	4.5	.4	.000243	405.0	.00733	2.25	40.5	.00639	2.58	4.0	.00639	2.58
12.5	5.0	.4	.000243	450.0	.00635	2.59	45.0	.00560	2.94	4.5	.00560	2.94
1.3	1.0	.8	.000243	45.0	.01920	.86	4.5	.01920	.86	.5	.01920	.86
1.9	1.5	.8	.000243	67.5	.01540	1.07	6.8	.01540	1.07	.7	.01540	1.07
2.5	2.0	.8	.000243	90.0	.01291	1.28	9.0	.01291	1.28	.9	.01291	1.28
3.1	2.5	.8	.000243	112.5	.01169	1.41	11.3	.01108	1.49	1.1	.01108	1.49
3.8	3.0	.8	.000243	135.0	.01098	1.50	13.5	.00966	1.70	1.4	.00966	1.70
4.4	3.5	.8	.000243	157.5	.01029	1.60	15.8	.00852	1.93	1.6	.00852	1.93
5.0	4.0	.8	.000243	180.0	.00963	1.71	18.0	.00758	2.17	1.8	.00758	2.17
5.6	4.5	.8	.000243	202.5	.00894	1.84	20.3	.00680	2.42	2.0	.00680	2.42
6.3	5.0	.8	.000243	225.0	.00783	2.10	22.5	.00614	2.68	2.3	.00614	2.68

Table SA-14 (continued)
Results of Waste Dilution - Summer - Ship 1
(L = 1.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 700 gpm							
5.0	1.0	.2	.000283	180.0	.03849	.37	18.0	.03030	.47	1.8	.03030	.47
7.5	1.5	.2	.000283	270.0	.02481	.57	27.0	.02035	.69	2.7	.02035	.69
10.0	2.0	.2	.000283	360.0	.01714	.82	36.0	.01473	.96	3.6	.01473	.96
12.5	2.5	.2	.000283	450.0	.01270	1.11	45.0	.01120	1.26	4.5	.01120	1.26
15.0	3.0	.2	.000283	540.0	.00984	1.43	54.0	.00882	1.60	5.4	.00882	1.60
17.5	3.5	.2	.000283	630.0	.00787	1.79	63.0	.00714	1.98	6.3	.00714	1.98
20.0	4.0	.2	.000283	720.0	.00645	2.19	72.0	.00590	2.39	7.2	.00590	2.39
22.5	4.5	.2	.000283	810.0	.00539	2.62	81.0	.00497	2.84	8.1	.00497	2.84
25.0	5.0	.2	.000283	900.0	.00458	3.08	90.0	.00424	3.33	9.0	.00424	3.33
2.5	1.0	.4	.000283	90.0	.02582	.55	9.0	.02582	.55	.9	.02582	.55
3.8	1.5	.4	.000283	135.0	.02195	.64	13.5	.01932	.73	1.4	.01932	.73
5.0	2.0	.4	.000283	180.0	.01926	.73	18.0	.01516	.93	1.8	.01516	.93
6.3	2.5	.4	.000283	225.0	.01559	.91	22.5	.01228	1.15	2.3	.01228	1.15
7.5	3.0	.4	.000283	270.0	.01241	1.14	27.0	.01018	1.39	2.7	.01018	1.39
8.8	3.5	.4	.000283	315.0	.01020	1.38	31.5	.00860	1.64	3.1	.00860	1.64
10.0	4.0	.4	.000283	360.0	.00857	1.65	36.0	.00737	1.92	3.6	.00737	1.92
11.3	4.5	.4	.000283	405.0	.00733	1.93	40.5	.00639	2.21	4.0	.00639	2.21
12.5	5.0	.4	.000283	450.0	.00635	2.22	45.0	.00560	2.52	4.5	.00560	2.52
1.3	1.0	.8	.000283	45.0	.01920	.74	4.5	.01920	.74	.5	.01920	.74
1.9	1.5	.8	.000283	67.5	.01540	.92	6.8	.01540	.92	.7	.01540	.92
2.5	2.0	.8	.000283	90.0	.01291	1.09	9.0	.01291	1.09	.9	.01291	1.09
3.1	2.5	.8	.000283	112.5	.01169	1.21	11.3	.01108	1.27	1.1	.01108	1.27
3.8	3.0	.8	.000283	135.0	.01098	1.29	13.5	.00966	1.46	1.4	.00966	1.46
4.4	3.5	.8	.000283	157.5	.01029	1.37	15.8	.00852	1.66	1.6	.00852	1.66
5.0	4.0	.8	.000283	180.0	.00963	1.47	18.0	.00758	1.86	1.8	.00758	1.86
5.6	4.5	.8	.000283	202.5	.00894	1.58	20.3	.00680	2.08	2.0	.00680	2.08
6.3	5.0	.8	.000283	225.0	.00783	1.80	22.5	.00614	2.30	2.3	.00614	2.30
					Q = 1000 gpm							
5.0	1.0	.2	.000405	180.0	.03849	.26	18.0	.03030	.33	1.8	.03030	.33
7.5	1.5	.2	.000405	270.0	.02481	.40	27.0	.02035	.49	2.7	.02035	.49
10.0	2.0	.2	.000405	360.0	.01714	.58	36.0	.01473	.67	3.6	.01473	.67
12.5	2.5	.2	.000405	450.0	.01270	.78	45.0	.01120	.88	4.5	.01120	.88
15.0	3.0	.2	.000405	540.0	.00984	1.00	54.0	.00882	1.12	5.4	.00882	1.12
17.5	3.5	.2	.000405	630.0	.00787	1.26	63.0	.00714	1.38	6.3	.00714	1.38
20.0	4.0	.2	.000405	720.0	.00645	1.53	72.0	.00590	1.67	7.2	.00590	1.67
22.5	4.5	.2	.000405	810.0	.00539	1.83	81.0	.00497	1.99	8.1	.00497	1.99
25.0	5.0	.2	.000405	900.0	.00458	2.16	90.0	.00424	2.33	9.0	.00424	2.33
2.5	1.0	.4	.000405	90.0	.02582	.38	9.0	.02582	.38	.9	.02582	.38
3.8	1.5	.4	.000405	135.0	.02195	.45	13.5	.01932	.51	1.4	.01932	.51
5.0	2.0	.4	.000405	180.0	.01926	.51	18.0	.01516	.65	1.8	.01516	.65
6.3	2.5	.4	.000405	225.0	.01559	.63	22.5	.01228	.80	2.3	.01228	.80
7.5	3.0	.4	.000405	270.0	.01241	.80	27.0	.01018	.97	2.7	.01018	.97
8.8	3.5	.4	.000405	315.0	.01020	.97	31.5	.00860	1.15	3.1	.00860	1.15
10.0	4.0	.4	.000405	360.0	.00857	1.15	36.0	.00737	1.34	3.6	.00737	1.34
11.3	4.5	.4	.000405	405.0	.00733	1.35	40.5	.00639	1.55	4.0	.00639	1.55
12.5	5.0	.4	.000405	450.0	.00635	1.56	45.0	.00560	1.76	4.5	.00560	1.76
1.3	1.0	.8	.000405	45.0	.01920	.51	4.5	.01920	.51	.5	.01920	.51
1.9	1.5	.8	.000405	67.5	.01540	.64	6.8	.01540	.64	.7	.01540	.64
2.5	2.0	.8	.000405	90.0	.01291	.77	9.0	.01291	.77	.9	.01291	.77
3.1	2.5	.8	.000405	112.5	.01169	.84	11.3	.01108	.89	1.1	.01108	.89
3.8	3.0	.8	.000405	135.0	.01098	.90	13.5	.00966	1.02	1.4	.00966	1.02
4.4	3.5	.8	.000405	157.5	.01029	.96	15.8	.00852	1.16	1.6	.00852	1.16
5.0	4.0	.8	.000405	180.0	.00963	1.03	18.0	.00758	1.30	1.8	.00758	1.30
5.6	4.5	.8	.000405	202.5	.00894	1.11	20.3	.00680	1.45	2.0	.00680	1.45
6.3	5.0	.8	.000405	225.0	.00783	1.26	22.5	.00614	1.61	2.3	.00614	1.61

Table SA-14 (continued)
Results of Waste Dilution - Summer - Ship 1
(L = 1.0 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 1200 gpm								
5.0	1.0	.2	.000486	180.0	.03849	.21	18.0	.03030	.27	1.8	.03030	.27
7.5	1.5	.2	.000486	270.0	.02481	.33	27.0	.02035	.40	2.7	.02035	.40
10.0	2.0	.2	.000486	360.0	.01714	.48	36.0	.01473	.56	3.6	.01473	.56
12.5	2.5	.2	.000486	450.0	.01270	.65	45.0	.01120	.74	4.5	.01120	.74
15.0	3.0	.2	.000486	540.0	.00984	.84	54.0	.00882	.93	5.4	.00882	.93
17.5	3.5	.2	.000486	630.0	.00787	1.05	63.0	.00714	1.15	6.3	.00714	1.15
20.0	4.0	.2	.000486	720.0	.00645	1.28	72.0	.00590	1.39	7.2	.00590	1.39
22.5	4.5	.2	.000486	810.0	.00539	1.53	81.0	.00497	1.66	8.1	.00497	1.66
25.0	5.0	.2	.000486	900.0	.00458	1.80	90.0	.00424	1.94	9.0	.00424	1.94
2.5	1.0	.4	.000486	90.0	.02582	.32	9.0	.02582	.32	.9	.02582	.32
3.8	1.5	.4	.000486	135.0	.02195	.38	13.5	.01932	.43	1.4	.01932	.43
5.0	2.0	.4	.000486	180.0	.01926	.43	18.0	.01516	.54	1.8	.01516	.54
6.3	2.5	.4	.000486	225.0	.01559	.53	22.5	.01228	.67	2.3	.01228	.67
7.5	3.0	.4	.000486	270.0	.01241	.66	27.0	.01018	.81	2.7	.01018	.81
8.8	3.5	.4	.000486	315.0	.01020	.81	31.5	.00860	.96	3.1	.00860	.96
10.0	4.0	.4	.000486	360.0	.00857	.96	36.0	.00737	1.12	3.6	.00737	1.12
11.3	4.5	.4	.000486	405.0	.00733	1.12	40.5	.00639	1.29	4.0	.00639	1.29
12.5	5.0	.4	.000486	450.0	.00635	1.30	45.0	.00560	1.47	4.5	.00560	1.47
1.3	1.0	.8	.000486	45.0	.01920	.43	4.5	.01920	.43	.5	.01920	.43
1.9	1.5	.8	.000486	67.5	.01540	.53	6.8	.01540	.53	.7	.01540	.53
2.5	2.0	.8	.000486	90.0	.01291	.64	9.0	.01291	.64	.9	.01291	.64
3.1	2.5	.8	.000486	112.5	.01169	.70	11.3	.01108	.74	1.1	.01108	.74
3.8	3.0	.8	.000486	135.0	.01098	.75	13.5	.00966	.85	1.4	.00966	.85
4.4	3.5	.8	.000486	157.5	.01029	.80	15.8	.00852	.97	1.6	.00852	.97
5.0	4.0	.8	.000486	180.0	.00963	.85	18.0	.00758	1.09	1.8	.00758	1.09
5.6	4.5	.8	.000486	202.5	.00894	.92	20.3	.00680	1.21	2.0	.00680	1.21
6.3	5.0	.8	.000486	225.0	.00783	1.05	22.5	.00614	1.34	2.3	.00614	1.34
				Q = 1400 gpm								
5.0	1.0	.2	.000567	180.0	.03849	.18	18.0	.03030	.23	1.8	.03030	.23
7.5	1.5	.2	.000567	270.0	.02481	.28	27.0	.02035	.35	2.7	.02035	.35
10.0	2.0	.2	.000567	360.0	.01714	.41	36.0	.01473	.48	3.6	.01473	.48
12.5	2.5	.2	.000567	450.0	.01270	.56	45.0	.01120	.63	4.5	.01120	.63
15.0	3.0	.2	.000567	540.0	.00984	.72	54.0	.00882	.80	5.4	.00882	.80
17.5	3.5	.2	.000567	630.0	.00787	.90	63.0	.00714	.99	6.3	.00714	.99
20.0	4.0	.2	.000567	720.0	.00645	1.09	72.0	.00590	1.20	7.2	.00590	1.20
22.5	4.5	.2	.000567	810.0	.00539	1.31	81.0	.00497	1.42	8.1	.00497	1.42
25.0	5.0	.2	.000567	900.0	.00458	1.54	90.0	.00424	1.67	9.0	.00424	1.67
2.5	1.0	.4	.000567	90.0	.02582	.27	9.0	.02582	.27	.9	.02582	.27
3.8	1.5	.4	.000567	135.0	.02195	.32	13.5	.01932	.37	1.4	.01932	.37
5.0	2.0	.4	.000567	180.0	.01926	.37	18.0	.01516	.47	1.8	.01516	.47
6.3	2.5	.4	.000567	225.0	.01559	.45	22.5	.01228	.57	2.3	.01228	.57
7.5	3.0	.4	.000567	270.0	.01241	.57	27.0	.01018	.69	2.7	.01018	.69
8.8	3.5	.4	.000567	315.0	.01020	.69	31.5	.00860	.82	3.1	.00860	.82
10.0	4.0	.4	.000567	360.0	.00857	.82	36.0	.00737	.96	3.6	.00737	.96
11.3	4.5	.4	.000567	405.0	.00733	.96	40.5	.00639	1.10	4.0	.00639	1.10
12.5	5.0	.4	.000567	450.0	.00635	1.11	45.0	.00560	1.26	4.5	.00560	1.26
1.3	1.0	.8	.000567	45.0	.01920	.37	4.5	.01920	.37	.5	.01920	.37
1.9	1.5	.8	.000567	67.5	.01540	.46	6.8	.01540	.46	.7	.01540	.46
2.5	2.0	.8	.000567	90.0	.01291	.55	9.0	.01291	.55	.9	.01291	.55
3.1	2.5	.8	.000567	112.5	.01169	.60	11.3	.01108	.64	1.1	.01108	.64
3.8	3.0	.8	.000567	135.0	.01098	.64	13.5	.00966	.73	1.4	.00966	.73
4.4	3.5	.8	.000567	157.5	.01029	.69	15.8	.00852	.83	1.6	.00852	.83
5.0	4.0	.8	.000567	180.0	.00963	.73	18.0	.00758	.93	1.8	.00758	.93
5.6	4.5	.8	.000567	202.5	.00894	.79	20.3	.00680	1.04	2.0	.00680	1.04
6.3	5.0	.8	.000567	225.0	.00783	.90	22.5	.00614	1.15	2.3	.00614	1.15

Table SA-15
Results of Waste Dilution - Winter - Ship 1
(L = 1.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 500 gpm							
5.0	1.0	.2	.000202	180.0	.02036	.97	18.0	.02036	.97	1.8	.02036	.97
7.5	1.5	.2	.000202	270.0	.01367	1.45	27.0	.01367	1.45	2.7	.01367	1.45
10.0	2.0	.2	.000202	360.0	.00989	2.00	36.0	.00989	2.00	3.6	.00989	2.00
12.5	2.5	.2	.000202	450.0	.00752	2.63	45.0	.00752	2.63	4.5	.00752	2.63
15.0	3.0	.2	.000202	540.0	.00593	3.33	54.0	.00593	3.33	5.4	.00593	3.33
17.5	3.5	.2	.000202	630.0	.00480	4.12	63.0	.00480	4.12	6.3	.00480	4.12
20.0	4.0	.2	.000202	720.0	.00397	4.98	72.0	.00397	4.98	7.2	.00397	4.98
22.5	4.5	.2	.000202	810.0	.00334	5.92	81.0	.00334	5.92	8.1	.00334	5.92
25.0	5.0	.2	.000202	900.0	.00285	6.94	90.0	.00285	6.94	9.0	.00285	6.94
2.5	1.0	.4	.000202	90.0	.01734	1.14	9.0	.01734	1.14	.9	.01734	1.14
3.8	1.5	.4	.000202	135.0	.01297	1.52	13.5	.01297	1.52	1.4	.01297	1.52
5.0	2.0	.4	.000202	180.0	.01018	1.94	18.0	.01018	1.94	1.8	.01018	1.94
6.3	2.5	.4	.000202	225.0	.00825	2.40	22.5	.00825	2.40	2.3	.00825	2.40
7.5	3.0	.4	.000202	270.0	.00684	2.89	27.0	.00684	2.89	2.7	.00684	2.89
8.8	3.5	.4	.000202	315.0	.00577	3.42	31.5	.00577	3.42	3.1	.00577	3.42
10.0	4.0	.4	.000202	360.0	.00495	3.99	36.0	.00495	3.99	3.6	.00495	3.99
11.3	4.5	.4	.000202	405.0	.00429	4.60	40.5	.00429	4.60	4.0	.00429	4.60
12.5	5.0	.4	.000202	450.0	.00376	5.25	45.0	.00376	5.25	4.5	.00376	5.25
1.3	1.0	.8	.000202	45.0	.01289	1.53	4.5	.01289	1.53	.5	.01289	1.53
1.9	1.5	.8	.000202	67.5	.01034	1.91	6.8	.01034	1.91	.7	.01034	1.91
2.5	2.0	.8	.000202	90.0	.00867	2.28	9.0	.00867	2.28	.9	.00867	2.28
3.1	2.5	.8	.000202	112.5	.00744	2.65	11.3	.00744	2.65	1.1	.00744	2.65
3.8	3.0	.8	.000202	135.0	.00649	3.05	13.5	.00649	3.05	1.4	.00649	3.05
4.4	3.5	.8	.000202	157.5	.00572	3.45	15.8	.00572	3.45	1.6	.00572	3.45
5.0	4.0	.8	.000202	180.0	.00509	3.88	18.0	.00509	3.88	1.8	.00509	3.88
5.6	4.5	.8	.000202	202.5	.00457	4.33	20.3	.00457	4.33	2.0	.00457	4.33
6.3	5.0	.8	.000202	225.0	.00412	4.79	22.5	.00412	4.79	2.3	.00412	4.79
					Q = 600 gpm							
5.0	1.0	.2	.000243	180.0	.02036	.81	18.0	.02036	.81	1.8	.02036	.81
7.5	1.5	.2	.000243	270.0	.01367	1.20	27.0	.01367	1.20	2.7	.01367	1.20
10.0	2.0	.2	.000243	360.0	.00989	1.66	36.0	.00989	1.66	3.6	.00989	1.66
12.5	2.5	.2	.000243	450.0	.00752	2.19	45.0	.00752	2.19	4.5	.00752	2.19
15.0	3.0	.2	.000243	540.0	.00593	2.78	54.0	.00593	2.78	5.4	.00593	2.78
17.5	3.5	.2	.000243	630.0	.00480	3.43	63.0	.00480	3.43	6.3	.00480	3.43
20.0	4.0	.2	.000243	720.0	.00397	4.15	72.0	.00397	4.15	7.2	.00397	4.15
22.5	4.5	.2	.000243	810.0	.00334	4.94	81.0	.00334	4.94	8.1	.00334	4.94
25.0	5.0	.2	.000243	900.0	.00285	5.79	90.0	.00285	5.79	9.0	.00285	5.79
2.5	1.0	.4	.000243	90.0	.01734	.95	9.0	.01734	.95	.9	.01734	.95
3.8	1.5	.4	.000243	135.0	.01297	1.27	13.5	.01297	1.27	1.4	.01297	1.27
5.0	2.0	.4	.000243	180.0	.01018	1.62	18.0	.01018	1.62	1.8	.01018	1.62
6.3	2.5	.4	.000243	225.0	.00825	2.00	22.5	.00825	2.00	2.3	.00825	2.00
7.5	3.0	.4	.000243	270.0	.00684	2.41	27.0	.00684	2.41	2.7	.00684	2.41
8.8	3.5	.4	.000243	315.0	.00577	2.85	31.5	.00577	2.85	3.1	.00577	2.85
10.0	4.0	.4	.000243	360.0	.00495	3.33	36.0	.00495	3.33	3.6	.00495	3.33
11.3	4.5	.4	.000243	405.0	.00429	3.84	40.5	.00429	3.84	4.0	.00429	3.84
12.5	5.0	.4	.000243	450.0	.00376	4.38	45.0	.00376	4.38	4.5	.00376	4.38
1.3	1.0	.8	.000243	45.0	.01289	1.28	4.5	.01289	1.28	.5	.01289	1.28
1.9	1.5	.8	.000243	67.5	.01034	1.59	6.8	.01034	1.59	.7	.01034	1.59
2.5	2.0	.8	.000243	90.0	.00867	1.90	9.0	.00867	1.90	.9	.00867	1.90
3.1	2.5	.8	.000243	112.5	.00744	2.21	11.3	.00744	2.21	1.1	.00744	2.21
3.8	3.0	.8	.000243	135.0	.00649	2.54	13.5	.00649	2.54	1.4	.00649	2.54
4.4	3.5	.8	.000243	157.5	.00572	2.88	15.8	.00572	2.88	1.6	.00572	2.88
5.0	4.0	.8	.000243	180.0	.00509	3.23	18.0	.00509	3.23	1.8	.00509	3.23
5.6	4.5	.8	.000243	202.5	.00457	3.61	20.3	.00457	3.61	2.0	.00457	3.61
6.3	5.0	.8	.000243	225.0	.00412	3.99	22.5	.00412	3.99	2.3	.00412	3.99

Table SA-15 (continued)
Results of Waste Dilution - Winter - Ship 1
(L = 1.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 700 gpm							
5.0	1.0	.2	.000283	180.0	.02036	.69	18.0	.02036	.69	1.8	.02036	.69
7.5	1.5	.2	.000283	270.0	.01367	1.03	27.0	.01367	1.03	2.7	.01367	1.03
10.0	2.0	.2	.000283	360.0	.00989	1.43	36.0	.00989	1.43	3.6	.00989	1.43
12.5	2.5	.2	.000283	450.0	.00752	1.88	45.0	.00752	1.88	4.5	.00752	1.88
15.0	3.0	.2	.000283	540.0	.00593	2.38	54.0	.00593	2.38	5.4	.00593	2.38
17.5	3.5	.2	.000283	630.0	.00480	2.94	63.0	.00480	2.94	6.3	.00480	2.94
20.0	4.0	.2	.000283	720.0	.00397	3.56	72.0	.00397	3.56	7.2	.00397	3.56
22.5	4.5	.2	.000283	810.0	.00334	4.23	81.0	.00334	4.23	8.1	.00334	4.23
25.0	5.0	.2	.000283	900.0	.00285	4.96	90.0	.00285	4.96	9.0	.00285	4.96
2.5	1.0	.4	.000283	90.0	.01734	.81	9.0	.01734	.81	.9	.01734	.81
3.8	1.5	.4	.000283	135.0	.01297	1.09	13.5	.01297	1.09	1.4	.01297	1.09
5.0	2.0	.4	.000283	180.0	.01018	1.39	18.0	.01018	1.39	1.8	.01018	1.39
6.3	2.5	.4	.000283	225.0	.00825	1.71	22.5	.00825	1.71	2.3	.00825	1.71
7.5	3.0	.4	.000283	270.0	.00684	2.06	27.0	.00684	2.06	2.7	.00684	2.06
8.8	3.5	.4	.000283	315.0	.00577	2.45	31.5	.00577	2.45	3.1	.00577	2.45
10.0	4.0	.4	.000283	360.0	.00495	2.85	36.0	.00495	2.85	3.6	.00495	2.85
11.3	4.5	.4	.000283	405.0	.00429	3.29	40.5	.00429	3.29	4.0	.00429	3.29
12.5	5.0	.4	.000283	450.0	.00376	3.75	45.0	.00376	3.75	4.5	.00376	3.75
1.3	1.0	.8	.000283	45.0	.01289	1.09	4.5	.01289	1.09	.5	.01289	1.09
1.9	1.5	.8	.000283	67.5	.01034	1.37	6.8	.01034	1.37	.7	.01034	1.37
2.5	2.0	.8	.000283	90.0	.00867	1.63	9.0	.00867	1.63	.9	.00867	1.63
3.1	2.5	.8	.000283	112.5	.00744	1.90	11.3	.00744	1.90	1.1	.00744	1.90
3.8	3.0	.8	.000283	135.0	.00649	2.18	13.5	.00649	2.18	1.4	.00649	2.18
4.4	3.5	.8	.000283	157.5	.00572	2.47	15.8	.00572	2.47	1.6	.00572	2.47
5.0	4.0	.8	.000283	180.0	.00509	2.77	18.0	.00509	2.77	1.8	.00509	2.77
5.6	4.5	.8	.000283	202.5	.00457	3.09	20.3	.00457	3.09	2.0	.00457	3.09
6.3	5.0	.8	.000283	225.0	.00412	3.42	22.5	.00412	3.42	2.3	.00412	3.42
					Q = 1000 gpm							
5.0	1.0	.2	.000405	180.0	.02036	.49	18.0	.02036	.49	1.8	.02036	.49
7.5	1.5	.2	.000405	270.0	.01367	.72	27.0	.01367	.72	2.7	.01367	.72
10.0	2.0	.2	.000405	360.0	.00989	1.00	36.0	.00989	1.00	3.6	.00989	1.00
12.5	2.5	.2	.000405	450.0	.00752	1.31	45.0	.00752	1.31	4.5	.00752	1.31
15.0	3.0	.2	.000405	540.0	.00593	1.67	54.0	.00593	1.67	5.4	.00593	1.67
17.5	3.5	.2	.000405	630.0	.00480	2.06	63.0	.00480	2.06	6.3	.00480	2.06
20.0	4.0	.2	.000405	720.0	.00397	2.49	72.0	.00397	2.49	7.2	.00397	2.49
22.5	4.5	.2	.000405	810.0	.00334	2.96	81.0	.00334	2.96	8.1	.00334	2.96
25.0	5.0	.2	.000405	900.0	.00285	3.47	90.0	.00285	3.47	9.0	.00285	3.47
2.5	1.0	.4	.000405	90.0	.01734	.57	9.0	.01734	.57	.9	.01734	.57
3.8	1.5	.4	.000405	135.0	.01297	.76	13.5	.01297	.76	1.4	.01297	.76
5.0	2.0	.4	.000405	180.0	.01018	.97	18.0	.01018	.97	1.8	.01018	.97
6.3	2.5	.4	.000405	225.0	.00825	1.20	22.5	.00825	1.20	2.3	.00825	1.20
7.5	3.0	.4	.000405	270.0	.00684	1.45	27.0	.00684	1.45	2.7	.00684	1.45
8.8	3.5	.4	.000405	315.0	.00577	1.71	31.5	.00577	1.71	3.1	.00577	1.71
10.0	4.0	.4	.000405	360.0	.00495	2.00	36.0	.00495	2.00	3.6	.00495	2.00
11.3	4.5	.4	.000405	405.0	.00429	2.30	40.5	.00429	2.30	4.0	.00429	2.30
12.5	5.0	.4	.000405	450.0	.00376	2.63	45.0	.00376	2.63	4.5	.00376	2.63
1.3	1.0	.8	.000405	45.0	.01289	.77	4.5	.01289	.77	.5	.01289	.77
1.9	1.5	.8	.000405	67.5	.01034	.96	6.8	.01034	.96	.7	.01034	.96
2.5	2.0	.8	.000405	90.0	.00867	1.14	9.0	.00867	1.14	.9	.00867	1.14
3.1	2.5	.8	.000405	112.5	.00744	1.33	11.3	.00744	1.33	1.1	.00744	1.33
3.8	3.0	.8	.000405	135.0	.00649	1.52	13.5	.00649	1.52	1.4	.00649	1.52
4.4	3.5	.8	.000405	157.5	.00572	1.73	15.8	.00572	1.73	1.6	.00572	1.73
5.0	4.0	.8	.000405	180.0	.00509	1.94	18.0	.00509	1.94	1.8	.00509	1.94
5.6	4.5	.8	.000405	202.5	.00457	2.16	20.3	.00457	2.16	2.0	.00457	2.16
6.3	5.0	.8	.000405	225.0	.00412	2.40	22.5	.00412	2.40	2.3	.00412	2.40

Table SA-15 (continued)
Results of Waste Dilution - Winter - Ship 1
(L = 1.0 n mi, A = 0.001 $ft^{2/3}/sec$)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
						Q = 1200 gpm						
5.0	1.0	.2	.000486	180.0	.02036	.40	18.0	.02036	.40	1.8	.02036	.40
7.5	1.5	.2	.000486	270.0	.01367	.60	27.0	.01367	.60	2.7	.01367	.60
10.0	2.0	.2	.000486	360.0	.00989	.83	36.0	.00989	.83	3.6	.00989	.83
12.5	2.5	.2	.000486	450.0	.00752	1.09	45.0	.00752	1.09	4.5	.00752	1.09
15.0	3.0	.2	.000486	540.0	.00593	1.39	54.0	.00593	1.39	5.4	.00593	1.39
17.5	3.5	.2	.000486	630.0	.00480	1.72	63.0	.00480	1.72	6.3	.00480	1.72
20.0	4.0	.2	.000486	720.0	.00397	2.08	72.0	.00397	2.08	7.2	.00397	2.08
22.5	4.5	.2	.000486	810.0	.00334	2.47	81.0	.00334	2.47	8.1	.00334	2.47
25.0	5.0	.2	.000486	900.0	.00285	2.89	90.0	.00285	2.89	9.0	.00285	2.89
2.5	1.0	.4	.000486	90.0	.01734	.47	9.0	.01734	.47	.9	.01734	.47
3.8	1.5	.4	.000486	135.0	.01297	.63	13.5	.01297	.63	1.4	.01297	.63
5.0	2.0	.4	.000486	180.0	.01018	.81	18.0	.01018	.81	1.8	.01018	.81
6.3	2.5	.4	.000486	225.0	.00825	1.00	22.5	.00825	1.00	2.3	.00825	1.00
7.5	3.0	.4	.000486	270.0	.00684	1.20	27.0	.00684	1.20	2.7	.00684	1.20
8.8	3.5	.4	.000486	315.0	.00577	1.43	31.5	.00577	1.43	3.1	.00577	1.43
10.0	4.0	.4	.000486	360.0	.00495	1.66	36.0	.00495	1.66	3.6	.00495	1.66
11.3	4.5	.4	.000486	405.0	.00429	1.92	40.5	.00429	1.92	4.0	.00429	1.92
12.5	5.0	.4	.000486	450.0	.00376	2.19	45.0	.00376	2.19	4.5	.00376	2.19
1.3	1.0	.8	.000486	45.0	.01289	.64	4.5	.01289	.64	.5	.01289	.64
1.9	1.5	.8	.000486	67.5	.01034	.80	6.8	.01034	.80	.7	.01034	.80
2.5	2.0	.8	.000486	90.0	.00867	.95	9.0	.00867	.95	.9	.00867	.95
3.1	2.5	.8	.000486	112.5	.00744	1.11	11.3	.00744	1.11	1.1	.00744	1.11
3.8	3.0	.8	.000486	135.0	.00649	1.27	13.5	.00649	1.27	1.4	.00649	1.27
4.4	3.5	.8	.000486	157.5	.00572	1.44	15.8	.00572	1.44	1.6	.00572	1.44
5.0	4.0	.8	.000486	180.0	.00509	1.62	18.0	.00509	1.62	1.8	.00509	1.62
5.6	4.5	.8	.000486	202.5	.00457	1.80	20.3	.00457	1.80	2.0	.00457	1.80
6.3	5.0	.8	.000486	225.0	.00412	2.00	22.5	.00412	2.00	2.3	.00412	2.00
						Q = 1400 gpm						
5.0	1.0	.2	.000567	180.0	.02036	.35	18.0	.02036	.35	1.8	.02036	.35
7.5	1.5	.2	.000567	270.0	.01367	.52	27.0	.01367	.52	2.7	.01367	.52
10.0	2.0	.2	.000567	360.0	.00989	.71	36.0	.00989	.71	3.6	.00989	.71
12.5	2.5	.2	.000567	450.0	.00752	.94	45.0	.00752	.94	4.5	.00752	.94
15.0	3.0	.2	.000567	540.0	.00593	1.19	54.0	.00593	1.19	5.4	.00593	1.19
17.5	3.5	.2	.000567	630.0	.00480	1.47	63.0	.00480	1.47	6.3	.00480	1.47
20.0	4.0	.2	.000567	720.0	.00397	1.78	72.0	.00397	1.78	7.2	.00397	1.78
22.5	4.5	.2	.000567	810.0	.00334	2.12	81.0	.00334	2.12	8.1	.00334	2.12
25.0	5.0	.2	.000567	900.0	.00285	2.48	90.0	.00285	2.48	9.0	.00285	2.48
2.5	1.0	.4	.000567	90.0	.01734	.41	9.0	.01734	.41	.9	.01734	.41
3.8	1.5	.4	.000567	135.0	.01297	.54	13.5	.01297	.54	1.4	.01297	.54
5.0	2.0	.4	.000567	180.0	.01018	.69	18.0	.01018	.69	1.8	.01018	.69
6.3	2.5	.4	.000567	225.0	.00825	.86	22.5	.00825	.86	2.3	.00825	.86
7.5	3.0	.4	.000567	270.0	.00684	1.03	27.0	.00684	1.03	2.7	.00684	1.03
8.8	3.5	.4	.000567	315.0	.00577	1.22	31.5	.00577	1.22	3.1	.00577	1.22
10.0	4.0	.4	.000567	360.0	.00495	1.43	36.0	.00495	1.43	3.6	.00495	1.43
11.3	4.5	.4	.000567	405.0	.00429	1.64	40.5	.00429	1.64	4.0	.00429	1.64
12.5	5.0	.4	.000567	450.0	.00376	1.88	45.0	.00376	1.88	4.5	.00376	1.88
1.3	1.0	.8	.000567	45.0	.01289	.55	4.5	.01289	.55	.5	.01289	.55
1.9	1.5	.8	.000567	67.5	.01034	.68	6.8	.01034	.68	.7	.01034	.68
2.5	2.0	.8	.000567	90.0	.00867	.81	9.0	.00867	.81	.9	.00867	.81
3.1	2.5	.8	.000567	112.5	.00744	.95	11.3	.00744	.95	1.1	.00744	.95
3.8	3.0	.8	.000567	135.0	.00649	1.09	13.5	.00649	1.09	1.4	.00649	1.09
4.4	3.5	.8	.000567	157.5	.00572	1.23	15.8	.00572	1.23	1.6	.00572	1.23
5.0	4.0	.8	.000567	180.0	.00509	1.39	18.0	.00509	1.39	1.8	.00509	1.39
5.6	4.5	.8	.000567	202.5	.00457	1.55	20.3	.00457	1.55	2.0	.00457	1.55
6.3	5.0	.8	.000567	225.0	.00412	1.71	22.5	.00412	1.71	2.3	.00412	1.71

Table SA-16
Results of Waste Dilution - Summer - Ship 2
(L = 1.0 n mi, A = 0.001 $ft^{2/3}/sec$)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 500 gpm												
5.0	1.0	.2	.000173	180.0	.04492	.51	18.0	.03537	.65	1.8	.03537	.65
7.5	1.5	.2	.000173	270.0	.02896	.80	27.0	.02376	.97	2.7	.02376	.97
10.0	2.0	.2	.000173	360.0	.02000	1.15	36.0	.01719	1.34	3.6	.01719	1.34
12.5	2.5	.2	.000173	450.0	.01482	1.56	45.0	.01307	1.76	4.5	.01307	1.76
15.0	3.0	.2	.000173	540.0	.01149	2.01	54.0	.01030	2.24	5.4	.01030	2.24
17.5	3.5	.2	.000173	630.0	.00919	2.51	63.0	.00834	2.77	6.3	.00834	2.77
20.0	4.0	.2	.000173	720.0	.00753	3.06	72.0	.00689	3.35	7.2	.00689	3.35
22.5	4.5	.2	.000173	810.0	.00630	3.66	81.0	.00580	3.98	8.1	.00580	3.98
25.0	5.0	.2	.000173	900.0	.00534	4.32	90.0	.00495	4.66	9.0	.00495	4.66
2.5	1.0	.4	.000173	90.0	.03014	.77	9.0	.03014	.77	.9	.03014	.77
3.8	1.5	.4	.000173	135.0	.02562	.90	13.5	.02255	1.02	1.4	.02255	1.02
5.0	2.0	.4	.000173	180.0	.02249	1.03	18.0	.01770	1.30	1.8	.01770	1.30
6.3	2.5	.4	.000173	225.0	.01820	1.27	22.5	.01433	1.61	2.3	.01433	1.61
7.5	3.0	.4	.000173	270.0	.01449	1.59	27.0	.01188	1.94	2.7	.01188	1.94
8.8	3.5	.4	.000173	315.0	.01191	1.94	31.5	.01004	2.30	3.1	.01004	2.30
10.0	4.0	.4	.000173	360.0	.01001	2.31	36.0	.00860	2.68	3.6	.00860	2.68
11.3	4.5	.4	.000173	405.0	.00856	2.70	40.5	.00746	3.09	4.0	.00746	3.09
12.5	5.0	.4	.000173	450.0	.00741	3.11	45.0	.00654	3.53	4.5	.00654	3.53
1.3	1.0	.8	.000173	45.0	.02241	1.03	4.5	.02241	1.03	.5	.02241	1.03
1.9	1.5	.8	.000173	67.5	.01797	1.28	6.8	.01797	1.28	.7	.01797	1.28
2.5	2.0	.8	.000173	90.0	.01508	1.53	9.0	.01508	1.53	.9	.01508	1.53
3.1	2.5	.8	.000173	112.5	.01365	1.69	11.3	.01294	1.78	1.1	.01294	1.78
3.8	3.0	.8	.000173	135.0	.01282	1.80	13.5	.01128	2.05	1.4	.01128	2.05
4.4	3.5	.8	.000173	157.5	.01201	1.92	15.8	.00994	2.32	1.6	.00994	2.32
5.0	4.0	.8	.000173	180.0	.01125	2.05	18.0	.00885	2.61	1.8	.00885	2.61
5.6	4.5	.8	.000173	202.5	.01043	2.21	20.3	.00794	2.91	2.0	.00794	2.91
6.3	5.0	.8	.000173	225.0	.00914	2.52	22.5	.00717	3.22	2.3	.00717	3.22
Q = 600 gpm												
5.0	1.0	.2	.000208	180.0	.04492	.43	18.0	.03537	.54	1.8	.03537	.54
7.5	1.5	.2	.000208	270.0	.02896	.66	27.0	.02376	.81	2.7	.02376	.81
10.0	2.0	.2	.000208	360.0	.02000	.96	36.0	.01719	1.12	3.6	.01719	1.12
12.5	2.5	.2	.000208	450.0	.01482	1.30	45.0	.01307	1.47	4.5	.01307	1.47
15.0	3.0	.2	.000208	540.0	.01149	1.67	54.0	.01030	1.87	5.4	.01030	1.87
17.5	3.5	.2	.000208	630.0	.00919	2.09	63.0	.00834	2.31	6.3	.00834	2.31
20.0	4.0	.2	.000208	720.0	.00753	2.55	72.0	.00689	2.79	7.2	.00689	2.79
22.5	4.5	.2	.000208	810.0	.00630	3.05	81.0	.00580	3.32	8.1	.00580	3.32
25.0	5.0	.2	.000208	900.0	.00534	3.60	90.0	.00495	3.89	9.0	.00495	3.89
2.5	1.0	.4	.000208	90.0	.03014	.64	9.0	.03014	.64	.9	.03014	.64
3.8	1.5	.4	.000208	135.0	.02562	.75	13.5	.02255	.85	1.4	.02255	.85
5.0	2.0	.4	.000208	180.0	.02249	.85	18.0	.01770	1.09	1.8	.01770	1.09
6.3	2.5	.4	.000208	225.0	.01820	1.06	22.5	.01433	1.34	2.3	.01433	1.34
7.5	3.0	.4	.000208	270.0	.01449	1.33	27.0	.01188	1.62	2.7	.01188	1.62
8.8	3.5	.4	.000208	315.0	.01191	1.61	31.5	.01004	1.92	3.1	.01004	1.92
10.0	4.0	.4	.000208	360.0	.01001	1.92	36.0	.00860	2.24	3.6	.00860	2.24
11.3	4.5	.4	.000208	405.0	.00856	2.25	40.5	.00746	2.58	4.0	.00746	2.58
12.5	5.0	.4	.000208	450.0	.00741	2.59	45.0	.00654	2.94	4.5	.00654	2.94
1.3	1.0	.8	.000208	45.0	.02241	.86	4.5	.02241	.86	.5	.02241	.86
1.9	1.5	.8	.000208	67.5	.01797	1.07	6.8	.01797	1.07	.7	.01797	1.07
2.5	2.0	.8	.000208	90.0	.01508	1.28	9.0	.01508	1.28	.9	.01508	1.28
3.1	2.5	.8	.000208	112.5	.01365	1.41	11.3	.01294	1.49	1.1	.01294	1.49
3.8	3.0	.8	.000208	135.0	.01282	1.50	13.5	.01128	1.70	1.4	.01128	1.70
4.4	3.5	.8	.000208	157.5	.01201	1.60	15.8	.00994	1.93	1.6	.00994	1.93
5.0	4.0	.8	.000208	180.0	.01125	1.71	18.0	.00885	2.17	1.8	.00885	2.17
5.6	4.5	.8	.000208	202.5	.01043	1.84	20.3	.00794	2.42	2.0	.00794	2.42
6.3	5.0	.8	.000208	225.0	.00914	2.10	22.5	.00717	2.68	2.3	.00717	2.68

Table SA-16 (continued)
Results of Waste Dilution - Summer - Ship 2
(L = 1.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 700 gpm												
5.0	1.0	.2	.000243	180.0	.04492	.37	18.0	.03537	.47	1.8	.03537	.47
7.5	1.5	.2	.000243	270.0	.02896	.57	27.0	.02376	.69	2.7	.02376	.69
10.0	2.0	.2	.000243	360.0	.02000	.82	36.0	.01719	.96	3.6	.01719	.96
12.5	2.5	.2	.000243	450.0	.01482	1.11	45.0	.01307	1.26	4.5	.01307	1.26
15.0	3.0	.2	.000243	540.0	.01149	1.43	54.0	.01030	1.60	5.4	.01030	1.60
17.5	3.5	.2	.000243	630.0	.00919	1.79	63.0	.00834	1.98	6.3	.00834	1.98
20.0	4.0	.2	.000243	720.0	.00753	2.19	72.0	.00689	2.39	7.2	.00689	2.39
22.5	4.5	.2	.000243	810.0	.00630	2.62	81.0	.00580	2.84	8.1	.00580	2.84
25.0	5.0	.2	.000243	900.0	.00534	3.08	90.0	.00495	3.33	9.0	.00495	3.33
2.5	1.0	.4	.000243	90.0	.03014	.55	9.0	.03014	.55	.9	.03014	.55
3.8	1.5	.4	.000243	135.0	.02562	.64	13.5	.02255	.73	1.4	.02255	.73
5.0	2.0	.4	.000243	180.0	.02249	.73	18.0	.01770	.93	1.8	.01770	.93
6.3	2.5	.4	.000243	225.0	.01820	.91	22.5	.01433	1.15	2.3	.01433	1.15
7.5	3.0	.4	.000243	270.0	.01449	1.14	27.0	.01188	1.39	2.7	.01188	1.39
8.8	3.5	.4	.000243	315.0	.01191	1.38	31.5	.01004	1.64	3.1	.01004	1.64
10.0	4.0	.4	.000243	360.0	.01001	1.65	36.0	.00860	1.92	3.6	.00860	1.92
11.3	4.5	.4	.000243	405.0	.00856	1.93	40.5	.00746	2.21	4.0	.00746	2.21
12.5	5.0	.4	.000243	450.0	.00741	2.22	45.0	.00654	2.52	4.5	.00654	2.52
1.3	1.0	.8	.000243	45.0	.02241	.74	4.5	.02241	.74	.5	.02241	.74
1.9	1.5	.8	.000243	67.5	.01797	.92	6.8	.01797	.92	.7	.01797	.92
2.5	2.0	.8	.000243	90.0	.01508	1.09	9.0	.01508	1.09	.9	.01508	1.09
3.1	2.5	.8	.000243	112.5	.01365	1.21	11.3	.01294	1.27	1.1	.01294	1.27
3.8	3.0	.8	.000243	135.0	.01282	1.29	13.5	.01128	1.46	1.4	.01128	1.46
4.4	3.5	.8	.000243	157.5	.01201	1.37	15.8	.00994	1.66	1.6	.00994	1.66
5.0	4.0	.8	.000243	180.0	.01125	1.47	18.0	.00885	1.86	1.8	.00885	1.86
5.6	4.5	.8	.000243	202.5	.01043	1.58	20.3	.00794	2.08	2.0	.00794	2.08
6.3	5.0	.8	.000243	225.0	.00914	1.80	22.5	.00717	2.30	2.3	.00717	2.30
Q = 1000 gpm												
5.0	1.0	.2	.000347	180.0	.04492	.26	18.0	.03537	.33	1.8	.03537	.33
7.5	1.5	.2	.000347	270.0	.02896	.40	27.0	.02376	.49	2.7	.02376	.49
10.0	2.0	.2	.000347	360.0	.02000	.58	36.0	.01719	.67	3.6	.01719	.67
12.5	2.5	.2	.000347	450.0	.01482	.78	45.0	.01307	.88	4.5	.01307	.88
15.0	3.0	.2	.000347	540.0	.01149	1.00	54.0	.01030	1.12	5.4	.01030	1.12
17.5	3.5	.2	.000347	630.0	.00919	1.26	63.0	.00834	1.38	6.3	.00834	1.38
20.0	4.0	.2	.000347	720.0	.00753	1.53	72.0	.00689	1.67	7.2	.00689	1.67
22.5	4.5	.2	.000347	810.0	.00630	1.83	81.0	.00580	1.99	8.1	.00580	1.99
25.0	5.0	.2	.000347	900.0	.00534	2.16	90.0	.00495	2.33	9.0	.00495	2.33
2.5	1.0	.4	.000347	90.0	.03014	.38	9.0	.03014	.38	.9	.03014	.38
3.8	1.5	.4	.000347	135.0	.02562	.45	13.5	.02255	.51	1.4	.02255	.51
5.0	2.0	.4	.000347	180.0	.02249	.51	18.0	.01770	.65	1.8	.01770	.65
6.3	2.5	.4	.000347	225.0	.01820	.63	22.5	.01433	.80	2.3	.01433	.80
7.5	3.0	.4	.000347	270.0	.01449	.80	27.0	.01188	.97	2.7	.01188	.97
8.8	3.5	.4	.000347	315.0	.01191	.97	31.5	.01004	1.15	3.1	.01004	1.15
10.0	4.0	.4	.000347	360.0	.01001	1.15	36.0	.00860	1.34	3.6	.00860	1.34
11.3	4.5	.4	.000347	405.0	.00856	1.35	40.5	.00746	1.55	4.0	.00746	1.55
12.5	5.0	.4	.000347	450.0	.00741	1.56	45.0	.00654	1.76	4.5	.00654	1.76
1.3	1.0	.8	.000347	45.0	.02241	.51	4.5	.02241	.51	.5	.02241	.51
1.9	1.5	.8	.000347	67.5	.01797	.64	6.8	.01797	.64	.7	.01797	.64
2.5	2.0	.8	.000347	90.0	.01508	.77	9.0	.01508	.77	.9	.01508	.77
3.1	2.5	.8	.000347	112.5	.01365	.84	11.3	.01294	.89	1.1	.01294	.89
3.8	3.0	.8	.000347	135.0	.01282	.90	13.5	.01128	1.02	1.4	.01128	1.02
4.4	3.5	.8	.000347	157.5	.01201	.96	15.8	.00994	1.16	1.6	.00994	1.16
5.0	4.0	.8	.000347	180.0	.01125	1.03	18.0	.00885	1.30	1.8	.00885	1.30
5.6	4.5	.8	.000347	202.5	.01043	1.11	20.3	.00794	1.45	2.0	.00794	1.45
6.3	5.0	.8	.000347	225.0	.00914	1.26	22.5	.00717	1.61	2.3	.00717	1.61

Table SA-16 (continued)
Results of Waste Dilution - Summer - Ship 2
(L = 1.0 n mi, A = 0.001 $ft^{2/3}/sec$)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 1200 gpm								
5.0	1.0	.2	.000416	180.0	.04492	.21	18.0	.03537	.27	1.8	.03537	.27
7.5	1.5	.2	.000416	270.0	.02896	.33	27.0	.02376	.40	2.7	.02376	.40
10.0	2.0	.2	.000416	360.0	.02000	.48	36.0	.01719	.56	3.6	.01719	.56
12.5	2.5	.2	.000416	450.0	.01482	.65	45.0	.01307	.74	4.5	.01307	.74
15.0	3.0	.2	.000416	540.0	.01149	.84	54.0	.01030	.93	5.4	.01030	.93
17.5	3.5	.2	.000416	630.0	.00919	1.05	63.0	.00834	1.15	6.3	.00834	1.15
20.0	4.0	.2	.000416	720.0	.00753	1.28	72.0	.00689	1.39	7.2	.00689	1.39
22.5	4.5	.2	.000416	810.0	.00630	1.53	81.0	.00580	1.66	8.1	.00580	1.66
25.0	5.0	.2	.000416	900.0	.00534	1.80	90.0	.00495	1.94	9.0	.00495	1.94
2.5	1.0	.4	.000416	90.0	.03014	.32	9.0	.03014	.32	.9	.03014	.32
3.8	1.5	.4	.000416	135.0	.02562	.38	13.5	.02255	.43	1.4	.02255	.43
5.0	2.0	.4	.000416	180.0	.02249	.43	18.0	.01770	.54	1.8	.01770	.54
6.3	2.5	.4	.000416	225.0	.01820	.53	22.5	.01433	.67	2.3	.01433	.67
7.5	3.0	.4	.000416	270.0	.01449	.66	27.0	.01188	.81	2.7	.01188	.81
8.8	3.5	.4	.000416	315.0	.01191	.81	31.5	.01004	.96	3.1	.01004	.96
10.0	4.0	.4	.000416	360.0	.01001	.96	36.0	.00860	1.12	3.6	.00860	1.12
11.3	4.5	.4	.000416	405.0	.00856	1.12	40.5	.00746	1.29	4.0	.00746	1.29
12.5	5.0	.4	.000416	450.0	.00741	1.30	45.0	.00654	1.47	4.5	.00654	1.47
1.3	1.0	.8	.000416	45.0	.02241	.43	4.5	.02241	.43	.5	.02241	.43
1.9	1.5	.8	.000416	67.5	.01797	.53	6.8	.01797	.53	.7	.01797	.53
2.5	2.0	.8	.000416	90.0	.01508	.64	9.0	.01508	.64	.9	.01508	.64
3.1	2.5	.8	.000416	112.5	.01365	.70	11.3	.01294	.74	1.1	.01294	.74
3.8	3.0	.8	.000416	135.0	.01282	.75	13.5	.01128	.85	1.4	.01128	.85
4.4	3.5	.8	.000416	157.5	.01201	.80	15.8	.00994	.97	1.6	.00994	.97
5.0	4.0	.8	.000416	180.0	.01125	.85	18.0	.00885	1.09	1.8	.00885	1.09
5.6	4.5	.8	.000416	202.5	.01043	.92	20.3	.00794	1.21	2.0	.00794	1.21
6.3	5.0	.8	.000416	225.0	.00914	1.05	22.5	.00717	1.34	2.3	.00717	1.34
				Q = 1400 gpm								
5.0	1.0	.2	.000486	180.0	.04492	.18	18.0	.03537	.23	1.8	.03537	.23
7.5	1.5	.2	.000486	270.0	.02896	.28	27.0	.02376	.35	2.7	.02376	.35
10.0	2.0	.2	.000486	360.0	.02000	.41	36.0	.01719	.48	3.6	.01719	.48
12.5	2.5	.2	.000486	450.0	.01482	.56	45.0	.01307	.63	4.5	.01307	.63
15.0	3.0	.2	.000486	540.0	.01149	.72	54.0	.01030	.80	5.4	.01030	.80
17.5	3.5	.2	.000486	630.0	.00919	.90	63.0	.00834	.99	6.3	.00834	.99
20.0	4.0	.2	.000486	720.0	.00753	1.09	72.0	.00689	1.20	7.2	.00689	1.20
22.5	4.5	.2	.000486	810.0	.00630	1.31	81.0	.00580	1.42	8.1	.00580	1.42
25.0	5.0	.2	.000486	900.0	.00534	1.54	90.0	.00495	1.67	9.0	.00495	1.67
2.5	1.0	.4	.000486	90.0	.03014	.27	9.0	.03014	.27	.9	.03014	.27
3.8	1.5	.4	.000486	135.0	.02562	.32	13.5	.02255	.37	1.4	.02255	.37
5.0	2.0	.4	.000486	180.0	.02249	.37	18.0	.01770	.47	1.8	.01770	.47
6.3	2.5	.4	.000486	225.0	.01820	.45	22.5	.01433	.57	2.3	.01433	.57
7.5	3.0	.4	.000486	270.0	.01449	.57	27.0	.01188	.69	2.7	.01188	.69
8.8	3.5	.4	.000486	315.0	.01191	.69	31.5	.01004	.82	3.1	.01004	.82
10.0	4.0	.4	.000486	360.0	.01001	.82	36.0	.00860	.96	3.6	.00860	.96
11.3	4.5	.4	.000486	405.0	.00856	.96	40.5	.00746	1.10	4.0	.00746	1.10
12.5	5.0	.4	.000486	450.0	.00741	1.11	45.0	.00654	1.26	4.5	.00654	1.26
1.3	1.0	.8	.000486	45.0	.02241	.37	4.5	.02241	.37	.5	.02241	.37
1.9	1.5	.8	.000486	67.5	.01797	.46	6.8	.01797	.46	.7	.01797	.46
2.5	2.0	.8	.000486	90.0	.01508	.55	9.0	.01508	.55	.9	.01508	.55
3.1	2.5	.8	.000486	112.5	.01365	.60	11.3	.01294	.64	1.1	.01294	.64
3.8	3.0	.8	.000486	135.0	.01282	.64	13.5	.01128	.73	1.4	.01128	.73
4.4	3.5	.8	.000486	157.5	.01201	.69	15.8	.00994	.83	1.6	.00994	.83
5.0	4.0	.8	.000486	180.0	.01125	.73	18.0	.00885	.93	1.8	.00885	.93
5.6	4.5	.8	.000486	202.5	.01043	.79	20.3	.00794	1.04	2.0	.00794	1.04
6.3	5.0	.8	.000486	225.0	.00914	.90	22.5	.00717	1.15	2.3	.00717	1.15

Table SA-17
Results of Waste Dilution - Winter - Ship 2
(L = 1.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 500 gpm								
5.0	1.0	.2	.000173	180.0	.02376	.97	18.0	.02376	.97	1.8	.02376	.97
7.5	1.5	.2	.000173	270.0	.01596	1.45	27.0	.01596	1.45	2.7	.01596	1.45
10.0	2.0	.2	.000173	360.0	.01155	2.00	36.0	.01155	2.00	3.6	.01155	2.00
12.5	2.5	.2	.000173	450.0	.00878	2.63	45.0	.00878	2.63	4.5	.00878	2.63
15.0	3.0	.2	.000173	540.0	.00692	3.33	54.0	.00692	3.33	5.4	.00692	3.33
17.5	3.5	.2	.000173	630.0	.00560	4.12	63.0	.00560	4.12	6.3	.00560	4.12
20.0	4.0	.2	.000173	720.0	.00463	4.98	72.0	.00463	4.98	7.2	.00463	4.98
22.5	4.5	.2	.000173	810.0	.00389	5.93	81.0	.00389	5.93	8.1	.00389	5.93
25.0	5.0	.2	.000173	900.0	.00332	6.94	90.0	.00332	6.94	9.0	.00332	6.94
2.5	1.0	.4	.000173	90.0	.02024	1.14	9.0	.02024	1.14	.9	.02024	1.14
3.8	1.5	.4	.000173	135.0	.01514	1.52	13.5	.01514	1.52	1.4	.01514	1.52
5.0	2.0	.4	.000173	180.0	.01188	1.94	18.0	.01188	1.94	1.8	.01188	1.94
6.3	2.5	.4	.000173	225.0	.00963	2.40	22.5	.00963	2.40	2.3	.00963	2.40
7.5	3.0	.4	.000173	270.0	.00798	2.89	27.0	.00798	2.89	2.7	.00798	2.89
8.8	3.5	.4	.000173	315.0	.00674	3.42	31.5	.00674	3.42	3.1	.00674	3.42
10.0	4.0	.4	.000173	360.0	.00578	3.99	36.0	.00578	3.99	3.6	.00578	3.99
11.3	4.5	.4	.000173	405.0	.00501	4.60	40.5	.00501	4.60	4.0	.00501	4.60
12.5	5.0	.4	.000173	450.0	.00439	5.25	45.0	.00439	5.25	4.5	.00439	5.25
1.3	1.0	.8	.000173	45.0	.01505	1.53	4.5	.01505	1.53	.5	.01505	1.53
1.9	1.5	.8	.000173	67.5	.01207	1.91	6.8	.01207	1.91	.7	.01207	1.91
2.5	2.0	.8	.000173	90.0	.01012	2.28	9.0	.01012	2.28	.9	.01012	2.28
3.1	2.5	.8	.000173	112.5	.00869	2.65	11.3	.00869	2.65	1.1	.00869	2.65
3.8	3.0	.8	.000173	135.0	.00757	3.05	13.5	.00757	3.05	1.4	.00757	3.05
4.4	3.5	.8	.000173	157.5	.00668	3.45	15.8	.00668	3.45	1.6	.00668	3.45
5.0	4.0	.8	.000173	180.0	.00594	3.88	18.0	.00594	3.88	1.8	.00594	3.88
5.6	4.5	.8	.000173	202.5	.00533	4.33	20.3	.00533	4.33	2.0	.00533	4.33
6.3	5.0	.8	.000173	225.0	.00481	4.79	22.5	.00481	4.79	2.3	.00481	4.79
				Q = 600 gpm								
5.0	1.0	.2	.000208	180.0	.02376	.81	18.0	.02376	.81	1.8	.02376	.81
7.5	1.5	.2	.000208	270.0	.01596	1.20	27.0	.01596	1.20	2.7	.01596	1.20
10.0	2.0	.2	.000208	360.0	.01155	1.66	36.0	.01155	1.66	3.6	.01155	1.66
12.5	2.5	.2	.000208	450.0	.00878	2.19	45.0	.00878	2.19	4.5	.00878	2.19
15.0	3.0	.2	.000208	540.0	.00692	2.78	54.0	.00692	2.78	5.4	.00692	2.78
17.5	3.5	.2	.000208	630.0	.00560	3.43	63.0	.00560	3.43	6.3	.00560	3.43
20.0	4.0	.2	.000208	720.0	.00463	4.15	72.0	.00463	4.15	7.2	.00463	4.15
22.5	4.5	.2	.000208	810.0	.00389	4.94	81.0	.00389	4.94	8.1	.00389	4.94
25.0	5.0	.2	.000208	900.0	.00332	5.79	90.0	.00332	5.79	9.0	.00332	5.79
2.5	1.0	.4	.000208	90.0	.02024	.95	9.0	.02024	.95	.9	.02024	.95
3.8	1.5	.4	.000208	135.0	.01514	1.27	13.5	.01514	1.27	1.4	.01514	1.27
5.0	2.0	.4	.000208	180.0	.01188	1.62	18.0	.01188	1.62	1.8	.01188	1.62
6.3	2.5	.4	.000208	225.0	.00963	2.00	22.5	.00963	2.00	2.3	.00963	2.00
7.5	3.0	.4	.000208	270.0	.00798	2.41	27.0	.00798	2.41	2.7	.00798	2.41
8.8	3.5	.4	.000208	315.0	.00674	2.85	31.5	.00674	2.85	3.1	.00674	2.85
10.0	4.0	.4	.000208	360.0	.00578	3.33	36.0	.00578	3.33	3.6	.00578	3.33
11.3	4.5	.4	.000208	405.0	.00501	3.84	40.5	.00501	3.84	4.0	.00501	3.84
12.5	5.0	.4	.000208	450.0	.00439	4.38	45.0	.00439	4.38	4.5	.00439	4.38
1.3	1.0	.8	.000208	45.0	.01505	1.28	4.5	.01505	1.28	.5	.01505	1.28
1.9	1.5	.8	.000208	67.5	.01207	1.59	6.8	.01207	1.59	.7	.01207	1.59
2.5	2.0	.8	.000208	90.0	.01012	1.90	9.0	.01012	1.90	.9	.01012	1.90
3.1	2.5	.8	.000208	112.5	.00869	2.21	11.3	.00869	2.21	1.1	.00869	2.21
3.8	3.0	.8	.000208	135.0	.00757	2.54	13.5	.00757	2.54	1.4	.00757	2.54
4.4	3.5	.8	.000208	157.5	.00668	2.88	15.8	.00668	2.88	1.6	.00668	2.88
5.0	4.0	.8	.000208	180.0	.00594	3.23	18.0	.00594	3.23	1.8	.00594	3.23
5.6	4.5	.8	.000208	202.5	.00533	3.61	20.3	.00533	3.61	2.0	.00533	3.61
6.3	5.0	.8	.000208	225.0	.00481	3.99	22.5	.00481	3.99	2.3	.00481	3.99

Table SA-17 (continued)
Results of Waste Dilution - Winter - Ship 2
(L = 1.0 n mi, A = 0.001 $ft^{2/3}/sec$)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
						Q = 700 gpm						
5.0	1.0	.2	.000243	180.0	.02376	.69	18.0	.02376	.69	1.8	.02376	.69
7.5	1.5	.2	.000243	270.0	.01596	1.03	27.0	.01596	1.03	2.7	.01596	1.03
10.0	2.0	.2	.000243	360.0	.01155	1.43	36.0	.01155	1.43	3.6	.01155	1.43
12.5	2.5	.2	.000243	450.0	.00878	1.88	45.0	.00878	1.88	4.5	.00878	1.88
15.0	3.0	.2	.000243	540.0	.00692	2.38	54.0	.00692	2.38	5.4	.00692	2.38
17.5	3.5	.2	.000243	630.0	.00560	2.94	63.0	.00560	2.94	6.3	.00560	2.94
20.0	4.0	.2	.000243	720.0	.00463	3.56	72.0	.00463	3.56	7.2	.00463	3.56
22.5	4.5	.2	.000243	810.0	.00389	4.23	81.0	.00389	4.23	8.1	.00389	4.23
25.0	5.0	.2	.000243	900.0	.00332	4.96	90.0	.00332	4.96	9.0	.00332	4.96
2.5	1.0	.4	.000243	90.0	.02024	.81	9.0	.02024	.81	.9	.02024	.81
3.8	1.5	.4	.000243	135.0	.01514	1.09	13.5	.01514	1.09	1.4	.01514	1.09
5.0	2.0	.4	.000243	180.0	.01188	1.39	18.0	.01188	1.39	1.8	.01188	1.39
6.3	2.5	.4	.000243	225.0	.00963	1.71	22.5	.00963	1.71	2.3	.00963	1.71
7.5	3.0	.4	.000243	270.0	.00798	2.06	27.0	.00798	2.06	2.7	.00798	2.06
8.8	3.5	.4	.000243	315.0	.00674	2.45	31.5	.00674	2.45	3.1	.00674	2.45
10.0	4.0	.4	.000243	360.0	.00578	2.85	36.0	.00578	2.85	3.6	.00578	2.85
11.3	4.5	.4	.000243	405.0	.00501	3.29	40.5	.00501	3.29	4.0	.00501	3.29
12.5	5.0	.4	.000243	450.0	.00439	3.75	45.0	.00439	3.75	4.5	.00439	3.75
1.3	1.0	.8	.000243	45.0	.01505	1.09	4.5	.01505	1.09	.5	.01505	1.09
1.9	1.5	.8	.000243	67.5	.01207	1.37	6.8	.01207	1.37	.7	.01207	1.37
2.5	2.0	.8	.000243	90.0	.01012	1.63	9.0	.01012	1.63	.9	.01012	1.63
3.1	2.5	.8	.000243	112.5	.00869	1.90	11.3	.00869	1.90	1.1	.00869	1.90
3.8	3.0	.8	.000243	135.0	.00757	2.18	13.5	.00757	2.18	1.4	.00757	2.18
4.4	3.5	.8	.000243	157.5	.00668	2.47	15.8	.00668	2.47	1.6	.00668	2.47
5.0	4.0	.8	.000243	180.0	.00594	2.77	18.0	.00594	2.77	1.8	.00594	2.77
5.6	4.5	.8	.000243	202.5	.00533	3.09	20.3	.00533	3.09	2.0	.00533	3.09
6.3	5.0	.8	.000243	225.0	.00481	3.42	22.5	.00481	3.42	2.3	.00481	3.42
						Q = 1000 gpm						
5.0	1.0	.2	.000347	180.0	.02376	.49	18.0	.02376	.49	1.8	.02376	.49
7.5	1.5	.2	.000347	270.0	.01596	.72	27.0	.01596	.72	2.7	.01596	.72
10.0	2.0	.2	.000347	360.0	.01155	1.00	36.0	.01155	1.00	3.6	.01155	1.00
12.5	2.5	.2	.000347	450.0	.00878	1.31	45.0	.00878	1.31	4.5	.00878	1.31
15.0	3.0	.2	.000347	540.0	.00692	1.67	54.0	.00692	1.67	5.4	.00692	1.67
17.5	3.5	.2	.000347	630.0	.00560	2.06	63.0	.00560	2.06	6.3	.00560	2.06
20.0	4.0	.2	.000347	720.0	.00463	2.49	72.0	.00463	2.49	7.2	.00463	2.49
22.5	4.5	.2	.000347	810.0	.00389	2.96	81.0	.00389	2.96	8.1	.00389	2.96
25.0	5.0	.2	.000347	900.0	.00332	3.47	90.0	.00332	3.47	9.0	.00332	3.47
2.5	1.0	.4	.000347	90.0	.02024	.57	9.0	.02024	.57	.9	.02024	.57
3.8	1.5	.4	.000347	135.0	.01514	.76	13.5	.01514	.76	1.4	.01514	.76
5.0	2.0	.4	.000347	180.0	.01188	.97	18.0	.01188	.97	1.8	.01188	.97
6.3	2.5	.4	.000347	225.0	.00963	1.20	22.5	.00963	1.20	2.3	.00963	1.20
7.5	3.0	.4	.000347	270.0	.00798	1.45	27.0	.00798	1.45	2.7	.00798	1.45
8.8	3.5	.4	.000347	315.0	.00674	1.71	31.5	.00674	1.71	3.1	.00674	1.71
10.0	4.0	.4	.000347	360.0	.00578	2.00	36.0	.00578	2.00	3.6	.00578	2.00
11.3	4.5	.4	.000347	405.0	.00501	2.30	40.5	.00501	2.30	4.0	.00501	2.30
12.5	5.0	.4	.000347	450.0	.00439	2.63	45.0	.00439	2.63	4.5	.00439	2.63
1.3	1.0	.8	.000347	45.0	.01505	.77	4.5	.01505	.77	.5	.01505	.77
1.9	1.5	.8	.000347	67.5	.01207	.96	6.8	.01207	.96	.7	.01207	.96
2.5	2.0	.8	.000347	90.0	.01012	1.14	9.0	.01012	1.14	.9	.01012	1.14
3.1	2.5	.8	.000347	112.5	.00869	1.33	11.3	.00869	1.33	1.1	.00869	1.33
3.8	3.0	.8	.000347	135.0	.00757	1.52	13.5	.00757	1.52	1.4	.00757	1.52
4.4	3.5	.8	.000347	157.5	.00668	1.73	15.8	.00668	1.73	1.6	.00668	1.73
5.0	4.0	.8	.000347	180.0	.00594	1.94	18.0	.00594	1.94	1.8	.00594	1.94
5.6	4.5	.8	.000347	202.5	.00533	2.16	20.3	.00533	2.16	2.0	.00533	2.16
6.3	5.0	.8	.000347	225.0	.00481	2.40	22.5	.00481	2.40	2.3	.00481	2.40

Table SA-17 (continued)
Results of Waste Dilution - Winter - Ship 2
(L = 1.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 1200 gpm								
5.0	1.0	.2	.000416	180.0	.02376	.40	18.0	.02376	.40	1.8	.02376	.40
7.5	1.5	.2	.000416	270.0	.01596	.60	27.0	.01596	.60	2.7	.01596	.60
10.0	2.0	.2	.000416	360.0	.01155	.83	36.0	.01155	.83	3.6	.01155	.83
12.5	2.5	.2	.000416	450.0	.00878	1.09	45.0	.00878	1.09	4.5	.00878	1.09
15.0	3.0	.2	.000416	540.0	.00692	1.39	54.0	.00692	1.39	5.4	.00692	1.39
17.5	3.5	.2	.000416	630.0	.00560	1.72	63.0	.00560	1.72	6.3	.00560	1.72
20.0	4.0	.2	.000416	720.0	.00463	2.08	72.0	.00463	2.08	7.2	.00463	2.08
22.5	4.5	.2	.000416	810.0	.00389	2.47	81.0	.00389	2.47	8.1	.00389	2.47
25.0	5.0	.2	.000416	900.0	.00332	2.89	90.0	.00332	2.89	9.0	.00332	2.89
2.5	1.0	.4	.000416	90.0	.02024	.47	9.0	.02024	.47	.9	.02024	.47
3.8	1.5	.4	.000416	135.0	.01514	.63	13.5	.01514	.63	1.4	.01514	.63
5.0	2.0	.4	.000416	180.0	.01188	.81	18.0	.01188	.81	1.8	.01188	.81
6.3	2.5	.4	.000416	225.0	.00963	1.00	22.5	.00963	1.00	2.3	.00963	1.00
7.5	3.0	.4	.000416	270.0	.00798	1.20	27.0	.00798	1.20	2.7	.00798	1.20
8.8	3.5	.4	.000416	315.0	.00674	1.43	31.5	.00674	1.43	3.1	.00674	1.43
10.0	4.0	.4	.000416	360.0	.00578	1.66	36.0	.00578	1.66	3.6	.00578	1.66
11.3	4.5	.4	.000416	405.0	.00501	1.92	40.5	.00501	1.92	4.0	.00501	1.92
12.5	5.0	.4	.000416	450.0	.00439	2.19	45.0	.00439	2.19	4.5	.00439	2.19
1.3	1.0	.8	.000416	45.0	.01505	.64	4.5	.01505	.64	.5	.01505	.64
1.9	1.5	.8	.000416	67.5	.01207	.80	6.8	.01207	.80	.7	.01207	.80
2.5	2.0	.8	.000416	90.0	.01012	.95	9.0	.01012	.95	.9	.01012	.95
3.1	2.5	.8	.000416	112.5	.00869	1.11	11.3	.00869	1.11	1.1	.00869	1.11
3.8	3.0	.8	.000416	135.0	.00757	1.27	13.5	.00757	1.27	1.4	.00757	1.27
4.4	3.5	.8	.000416	157.5	.00668	1.44	15.8	.00668	1.44	1.6	.00668	1.44
5.0	4.0	.8	.000416	180.0	.00594	1.62	18.0	.00594	1.62	1.8	.00594	1.62
5.6	4.5	.8	.000416	202.5	.00533	1.80	20.3	.00533	1.80	2.0	.00533	1.80
6.3	5.0	.8	.000416	225.0	.00481	2.00	22.5	.00481	2.00	2.3	.00481	2.00
				Q = 1400 gpm								
5.0	1.0	.2	.000486	180.0	.02376	.35	18.0	.02376	.35	1.8	.02376	.35
7.5	1.5	.2	.000486	270.0	.01596	.52	27.0	.01596	.52	2.7	.01596	.52
10.0	2.0	.2	.000486	360.0	.01155	.71	36.0	.01155	.71	3.6	.01155	.71
12.5	2.5	.2	.000486	450.0	.00878	.94	45.0	.00878	.94	4.5	.00878	.94
15.0	3.0	.2	.000486	540.0	.00692	1.19	54.0	.00692	1.19	5.4	.00692	1.19
17.5	3.5	.2	.000486	630.0	.00560	1.47	63.0	.00560	1.47	6.3	.00560	1.47
20.0	4.0	.2	.000486	720.0	.00463	1.78	72.0	.00463	1.78	7.2	.00463	1.78
22.5	4.5	.2	.000486	810.0	.00389	2.12	81.0	.00389	2.12	8.1	.00389	2.12
25.0	5.0	.2	.000486	900.0	.00332	2.48	90.0	.00332	2.48	9.0	.00332	2.48
2.5	1.0	.4	.000486	90.0	.02024	.41	9.0	.02024	.41	.9	.02024	.41
3.8	1.5	.4	.000486	135.0	.01514	.54	13.5	.01514	.54	1.4	.01514	.54
5.0	2.0	.4	.000486	180.0	.01188	.69	18.0	.01188	.69	1.8	.01188	.69
6.3	2.5	.4	.000486	225.0	.00963	.86	22.5	.00963	.86	2.3	.00963	.86
7.5	3.0	.4	.000486	270.0	.00798	1.03	27.0	.00798	1.03	2.7	.00798	1.03
8.8	3.5	.4	.000486	315.0	.00674	1.22	31.5	.00674	1.22	3.1	.00674	1.22
10.0	4.0	.4	.000486	360.0	.00578	1.43	36.0	.00578	1.43	3.6	.00578	1.43
11.3	4.5	.4	.000486	405.0	.00501	1.64	40.5	.00501	1.64	4.0	.00501	1.64
12.5	5.0	.4	.000486	450.0	.00439	1.88	45.0	.00439	1.88	4.5	.00439	1.88
1.3	1.0	.8	.000486	45.0	.01505	.55	4.5	.01505	.55	.5	.01505	.55
1.9	1.5	.8	.000486	67.5	.01207	.68	6.8	.01207	.68	.7	.01207	.68
2.5	2.0	.8	.000486	90.0	.01012	.81	9.0	.01012	.81	.9	.01012	.81
3.1	2.5	.8	.000486	112.5	.00869	.95	11.3	.00869	.95	1.1	.00869	.95
3.8	3.0	.8	.000486	135.0	.00757	1.09	13.5	.00757	1.09	1.4	.00757	1.09
4.4	3.5	.8	.000486	157.5	.00668	1.23	15.8	.00668	1.23	1.6	.00668	1.23
5.0	4.0	.8	.000486	180.0	.00594	1.39	18.0	.00594	1.39	1.8	.00594	1.39
5.6	4.5	.8	.000486	202.5	.00533	1.55	20.3	.00533	1.55	2.0	.00533	1.55
6.3	5.0	.8	.000486	225.0	.00481	1.71	22.5	.00481	1.71	2.3	.00481	1.71

Table SA-18
Results of Waste Dilution - Summer - Ship 3
(L = 1.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 500 gpm							
5.0	1.0	.2	.000175	180.0	.04445	.51	18.0	.03500	.65	1.8	.03500	.65
7.5	1.5	.2	.000175	270.0	.02865	.80	27.0	.02351	.97	2.7	.02351	.97
10.0	2.0	.2	.000175	360.0	.01980	1.15	36.0	.01701	1.34	3.6	.01701	1.34
12.5	2.5	.2	.000175	450.0	.01467	1.56	45.0	.01294	1.76	4.5	.01294	1.76
15.0	3.0	.2	.000175	540.0	.01136	2.01	54.0	.01019	2.24	5.4	.01019	2.24
17.5	3.5	.2	.000175	630.0	.00909	2.51	63.0	.00825	2.77	6.3	.00825	2.77
20.0	4.0	.2	.000175	720.0	.00745	3.06	72.0	.00682	3.35	7.2	.00682	3.35
22.5	4.5	.2	.000175	810.0	.00623	3.66	81.0	.00574	3.98	8.1	.00574	3.98
25.0	5.0	.2	.000175	900.0	.00529	4.32	90.0	.00489	4.66	9.0	.00489	4.66
2.5	1.0	.4	.000175	90.0	.02982	.77	9.0	.02982	.77	.9	.02982	.77
3.8	1.5	.4	.000175	135.0	.02536	.90	13.5	.02231	1.02	1.4	.02231	1.02
5.0	2.0	.4	.000175	180.0	.02225	1.03	18.0	.01751	1.30	1.8	.01751	1.30
6.3	2.5	.4	.000175	225.0	.01801	1.27	22.5	.01418	1.61	2.3	.01418	1.61
7.5	3.0	.4	.000175	270.0	.01434	1.59	27.0	.01176	1.94	2.7	.01176	1.94
8.8	3.5	.4	.000175	315.0	.01178	1.94	31.5	.00993	2.30	3.1	.00993	2.30
10.0	4.0	.4	.000175	360.0	.00990	2.31	36.0	.00851	2.68	3.6	.00851	2.68
11.3	4.5	.4	.000175	405.0	.00847	2.70	40.5	.00738	3.09	4.0	.00738	3.09
12.5	5.0	.4	.000175	450.0	.00734	3.11	45.0	.00647	3.53	4.5	.00647	3.53
1.3	1.0	.8	.000175	45.0	.02218	1.03	4.5	.02218	1.03	.5	.02218	1.03
1.9	1.5	.8	.000175	67.5	.01779	1.28	6.8	.01779	1.28	.7	.01779	1.28
2.5	2.0	.8	.000175	90.0	.01492	1.53	9.0	.01492	1.53	.9	.01492	1.53
3.1	2.5	.8	.000175	112.5	.01351	1.69	11.3	.01280	1.78	1.1	.01280	1.78
3.8	3.0	.8	.000175	135.0	.01268	1.80	13.5	.01116	2.05	1.4	.01116	2.05
4.4	3.5	.8	.000175	157.5	.01188	1.92	15.8	.00984	2.32	1.6	.00984	2.32
5.0	4.0	.8	.000175	180.0	.01113	2.05	18.0	.00876	2.61	1.8	.00876	2.61
5.6	4.5	.8	.000175	202.5	.01032	2.21	20.3	.00786	2.91	2.0	.00786	2.91
6.3	5.0	.8	.000175	225.0	.00905	2.52	22.5	.00709	3.22	2.3	.00709	3.22
					Q = 600 gpm							
5.0	1.0	.2	.000210	180.0	.04445	.43	18.0	.03500	.54	1.8	.03500	.54
7.5	1.5	.2	.000210	270.0	.02865	.66	27.0	.02351	.81	2.7	.02351	.81
10.0	2.0	.2	.000210	360.0	.01980	.96	36.0	.01701	1.12	3.6	.01701	1.12
12.5	2.5	.2	.000210	450.0	.01467	1.30	45.0	.01294	1.47	4.5	.01294	1.47
15.0	3.0	.2	.000210	540.0	.01136	1.67	54.0	.01019	1.87	5.4	.01019	1.87
17.5	3.5	.2	.000210	630.0	.00909	2.09	63.0	.00825	2.31	6.3	.00825	2.31
20.0	4.0	.2	.000210	720.0	.00745	2.55	72.0	.00682	2.79	7.2	.00682	2.79
22.5	4.5	.2	.000210	810.0	.00623	3.05	81.0	.00574	3.32	8.1	.00574	3.32
25.0	5.0	.2	.000210	900.0	.00529	3.60	90.0	.00489	3.89	9.0	.00489	3.89
2.5	1.0	.4	.000210	90.0	.02982	.64	9.0	.02982	.64	.9	.02982	.64
3.8	1.5	.4	.000210	135.0	.02536	.75	13.5	.02231	.85	1.4	.02231	.85
5.0	2.0	.4	.000210	180.0	.02225	.85	18.0	.01751	1.09	1.8	.01751	1.09
6.3	2.5	.4	.000210	225.0	.01801	1.06	22.5	.01418	1.34	2.3	.01418	1.34
7.5	3.0	.4	.000210	270.0	.01434	1.33	27.0	.01176	1.62	2.7	.01176	1.62
8.8	3.5	.4	.000210	315.0	.01178	1.61	31.5	.00993	1.92	3.1	.00993	1.92
10.0	4.0	.4	.000210	360.0	.00990	1.92	36.0	.00851	2.24	3.6	.00851	2.24
11.3	4.5	.4	.000210	405.0	.00847	2.25	40.5	.00738	2.58	4.0	.00738	2.58
12.5	5.0	.4	.000210	450.0	.00734	2.59	45.0	.00647	2.94	4.5	.00647	2.94
1.3	1.0	.8	.000210	45.0	.02218	.86	4.5	.02218	.86	.5	.02218	.86
1.9	1.5	.8	.000210	67.5	.01779	1.07	6.8	.01779	1.07	.7	.01779	1.07
2.5	2.0	.8	.000210	90.0	.01492	1.28	9.0	.01492	1.28	.9	.01492	1.28
3.1	2.5	.8	.000210	112.5	.01351	1.41	11.3	.01280	1.49	1.1	.01280	1.49
3.8	3.0	.8	.000210	135.0	.01268	1.50	13.5	.01116	1.70	1.4	.01116	1.70
4.4	3.5	.8	.000210	157.5	.01188	1.60	15.8	.00984	1.93	1.6	.00984	1.93
5.0	4.0	.8	.000210	180.0	.01113	1.71	18.0	.00876	2.17	1.8	.00876	2.17
5.6	4.5	.8	.000210	202.5	.01032	1.84	20.3	.00786	2.42	2.0	.00786	2.42
6.3	5.0	.8	.000210	225.0	.00905	2.10	22.5	.00709	2.68	2.3	.00709	2.68

Table SA-18 (continued)
Results of Waste Dilution - Summer - Ship 3
(L = 1.0 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 700 gpm							
5.0	1.0	.2	.000245	180.0	.04445	.37	18.0	.03500	.47	1.8	.03500	.47
7.5	1.5	.2	.000245	270.0	.02865	.57	27.0	.02351	.69	2.7	.02351	.69
10.0	2.0	.2	.000245	360.0	.01980	.82	36.0	.01701	.96	3.6	.01701	.96
12.5	2.5	.2	.000245	450.0	.01467	1.11	45.0	.01294	1.26	4.5	.01294	1.26
15.0	3.0	.2	.000245	540.0	.01136	1.43	54.0	.01019	1.60	5.4	.01019	1.60
17.5	3.5	.2	.000245	630.0	.00909	1.79	63.0	.00825	1.98	6.3	.00825	1.98
20.0	4.0	.2	.000245	720.0	.00745	2.19	72.0	.00682	2.39	7.2	.00682	2.39
22.5	4.5	.2	.000245	810.0	.00623	2.62	81.0	.00574	2.84	8.1	.00574	2.84
25.0	5.0	.2	.000245	900.0	.00529	3.08	90.0	.00489	3.33	9.0	.00489	3.33
2.5	1.0	.4	.000245	90.0	.02982	.55	9.0	.02982	.55	.9	.02982	.55
3.8	1.5	.4	.000245	135.0	.02536	.64	13.5	.02231	.73	1.4	.02231	.73
5.0	2.0	.4	.000245	180.0	.02225	.73	18.0	.01751	.93	1.8	.01751	.93
6.3	2.5	.4	.000245	225.0	.01801	.91	22.5	.01418	1.15	2.3	.01418	1.15
7.5	3.0	.4	.000245	270.0	.01434	1.14	27.0	.01176	1.39	2.7	.01176	1.39
8.8	3.5	.4	.000245	315.0	.01178	1.38	31.5	.00993	1.64	3.1	.00993	1.64
10.0	4.0	.4	.000245	360.0	.00990	1.65	36.0	.00851	1.92	3.6	.00851	1.92
11.3	4.5	.4	.000245	405.0	.00847	1.93	40.5	.00738	2.21	4.0	.00738	2.21
12.5	5.0	.4	.000245	450.0	.00734	2.22	45.0	.00647	2.52	4.5	.00647	2.52
1.3	1.0	.8	.000245	45.0	.02218	.74	4.5	.02218	.74	.5	.02218	.74
1.9	1.5	.8	.000245	67.5	.01779	.92	6.8	.01779	.92	.7	.01779	.92
2.5	2.0	.8	.000245	90.0	.01492	1.09	9.0	.01492	1.09	.9	.01492	1.09
3.1	2.5	.8	.000245	112.5	.01351	1.21	11.3	.01280	1.27	1.1	.01280	1.27
3.8	3.0	.8	.000245	135.0	.01268	1.29	13.5	.01116	1.46	1.4	.01116	1.46
4.4	3.5	.8	.000245	157.5	.01188	1.37	15.8	.00984	1.66	1.6	.00984	1.66
5.0	4.0	.8	.000245	180.0	.01113	1.47	18.0	.00876	1.86	1.8	.00876	1.86
5.6	4.5	.8	.000245	202.5	.01032	1.58	20.3	.00786	2.08	2.0	.00786	2.08
6.3	5.0	.8	.000245	225.0	.00905	1.80	22.5	.00709	2.30	2.3	.00709	2.30
					Q = 1000 gpm							
5.0	1.0	.2	.000350	180.0	.04445	.26	18.0	.03500	.33	1.8	.03500	.33
7.5	1.5	.2	.000350	270.0	.02865	.40	27.0	.02351	.49	2.7	.02351	.49
10.0	2.0	.2	.000350	360.0	.01980	.58	36.0	.01701	.67	3.6	.01701	.67
12.5	2.5	.2	.000350	450.0	.01467	.78	45.0	.01294	.88	4.5	.01294	.88
15.0	3.0	.2	.000350	540.0	.01136	1.00	54.0	.01019	1.12	5.4	.01019	1.12
17.5	3.5	.2	.000350	630.0	.00909	1.26	63.0	.00825	1.38	6.3	.00825	1.38
20.0	4.0	.2	.000350	720.0	.00745	1.53	72.0	.00682	1.67	7.2	.00682	1.67
22.5	4.5	.2	.000350	810.0	.00623	1.83	81.0	.00574	1.99	8.1	.00574	1.99
25.0	5.0	.2	.000350	900.0	.00529	2.16	90.0	.00489	2.33	9.0	.00489	2.33
2.5	1.0	.4	.000350	90.0	.02982	.38	9.0	.02982	.38	.9	.02982	.38
3.8	1.5	.4	.000350	135.0	.02536	.45	13.5	.02231	.51	1.4	.02231	.51
5.0	2.0	.4	.000350	180.0	.02225	.51	18.0	.01751	.65	1.8	.01751	.65
6.3	2.5	.4	.000350	225.0	.01801	.63	22.5	.01418	.80	2.3	.01418	.80
7.5	3.0	.4	.000350	270.0	.01434	.80	27.0	.01176	.97	2.7	.01176	.97
8.8	3.5	.4	.000350	315.0	.01178	.97	31.5	.00993	1.15	3.1	.00993	1.15
10.0	4.0	.4	.000350	360.0	.00990	1.15	36.0	.00851	1.34	3.6	.00851	1.34
11.3	4.5	.4	.000350	405.0	.00847	1.35	40.5	.00738	1.55	4.0	.00738	1.55
12.5	5.0	.4	.000350	450.0	.00734	1.56	45.0	.00647	1.76	4.5	.00647	1.76
1.3	1.0	.8	.000350	45.0	.02218	.51	4.5	.02218	.51	.5	.02218	.51
1.9	1.5	.8	.000350	67.5	.01779	.64	6.8	.01779	.64	.7	.01779	.64
2.5	2.0	.8	.000350	90.0	.01492	.77	9.0	.01492	.77	.9	.01492	.77
3.1	2.5	.8	.000350	112.5	.01351	.84	11.3	.01280	.89	1.1	.01280	.89
3.8	3.0	.8	.000350	135.0	.01268	.90	13.5	.01116	1.02	1.4	.01116	1.02
4.4	3.5	.8	.000350	157.5	.01188	.96	15.8	.00984	1.16	1.6	.00984	1.16
5.0	4.0	.8	.000350	180.0	.01113	1.03	18.0	.00876	1.30	1.8	.00876	1.30
5.6	4.5	.8	.000350	202.5	.01032	1.11	20.3	.00786	1.45	2.0	.00786	1.45
6.3	5.0	.8	.000350	225.0	.00905	1.26	22.5	.00709	1.61	2.3	.00709	1.61

Table SA-18 (continued)
Results of Waste Dilution - Summer - Ship 3
(L = 1.0 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 1200 gpm								
5.0	1.0	.2	.000421	180.0	.04445	.21	18.0	.03500	.27	1.8	.03500	.27
7.5	1.5	.2	.000421	270.0	.02865	.33	27.0	.02351	.40	2.7	.02351	.40
10.0	2.0	.2	.000421	360.0	.01980	.48	36.0	.01701	.56	3.6	.01701	.56
12.5	2.5	.2	.000421	450.0	.01467	.65	45.0	.01294	.74	4.5	.01294	.74
15.0	3.0	.2	.000421	540.0	.01136	.84	54.0	.01019	.93	5.4	.01019	.93
17.5	3.5	.2	.000421	630.0	.00909	1.05	63.0	.00825	1.15	6.3	.00825	1.15
20.0	4.0	.2	.000421	720.0	.00745	1.28	72.0	.00682	1.39	7.2	.00682	1.39
22.5	4.5	.2	.000421	810.0	.00623	1.53	81.0	.00574	1.66	8.1	.00574	1.66
25.0	5.0	.2	.000421	900.0	.00529	1.80	90.0	.00489	1.94	9.0	.00489	1.94
2.5	1.0	.4	.000421	90.0	.02982	.32	9.0	.02982	.32	.9	.02982	.32
3.8	1.5	.4	.000421	135.0	.02536	.38	13.5	.02231	.43	1.4	.02231	.43
5.0	2.0	.4	.000421	180.0	.02225	.43	18.0	.01751	.54	1.8	.01751	.54
6.3	2.5	.4	.000421	225.0	.01801	.53	22.5	.01418	.67	2.3	.01418	.67
7.5	3.0	.4	.000421	270.0	.01434	.66	27.0	.01176	.81	2.7	.01176	.81
8.8	3.5	.4	.000421	315.0	.01178	.81	31.5	.00993	.96	3.1	.00993	.96
10.0	4.0	.4	.000421	360.0	.00990	.96	36.0	.00851	1.12	3.6	.00851	1.12
11.3	4.5	.4	.000421	405.0	.00847	1.12	40.5	.00738	1.29	4.0	.00738	1.29
12.5	5.0	.4	.000421	450.0	.00734	1.30	45.0	.00647	1.47	4.5	.00647	1.47
1.3	1.0	.8	.000421	45.0	.02218	.43	4.5	.02218	.43	.5	.02218	.43
1.9	1.5	.8	.000421	67.5	.01779	.53	6.8	.01779	.53	.7	.01779	.53
2.5	2.0	.8	.000421	90.0	.01492	.64	9.0	.01492	.64	.9	.01492	.64
3.1	2.5	.8	.000421	112.5	.01351	.70	11.3	.01280	.74	1.1	.01280	.74
3.8	3.0	.8	.000421	135.0	.01268	.75	13.5	.01116	.85	1.4	.01116	.85
4.4	3.5	.8	.000421	157.5	.01188	.80	15.8	.00984	.97	1.6	.00984	.97
5.0	4.0	.8	.000421	180.0	.01113	.85	18.0	.00876	1.09	1.8	.00876	1.09
5.6	4.5	.8	.000421	202.5	.01032	.92	20.3	.00786	1.21	2.0	.00786	1.21
6.3	5.0	.8	.000421	225.0	.00905	1.05	22.5	.00709	1.34	2.3	.00709	1.34
				Q = 1400 gpm								
5.0	1.0	.2	.000491	180.0	.04445	.18	18.0	.03500	.23	1.8	.03500	.23
7.5	1.5	.2	.000491	270.0	.02865	.28	27.0	.02351	.35	2.7	.02351	.35
10.0	2.0	.2	.000491	360.0	.01980	.41	36.0	.01701	.48	3.6	.01701	.48
12.5	2.5	.2	.000491	450.0	.01467	.56	45.0	.01294	.63	4.5	.01294	.63
15.0	3.0	.2	.000491	540.0	.01136	.72	54.0	.01019	.80	5.4	.01019	.80
17.5	3.5	.2	.000491	630.0	.00909	.90	63.0	.00825	.99	6.3	.00825	.99
20.0	4.0	.2	.000491	720.0	.00745	1.09	72.0	.00682	1.20	7.2	.00682	1.20
22.5	4.5	.2	.000491	810.0	.00623	1.31	81.0	.00574	1.42	8.1	.00574	1.42
25.0	5.0	.2	.000491	900.0	.00529	1.54	90.0	.00489	1.67	9.0	.00489	1.67
2.5	1.0	.4	.000491	90.0	.02982	.27	9.0	.02982	.27	.9	.02982	.27
3.8	1.5	.4	.000491	135.0	.02536	.32	13.5	.02231	.37	1.4	.02231	.37
5.0	2.0	.4	.000491	180.0	.02225	.37	18.0	.01751	.47	1.8	.01751	.47
6.3	2.5	.4	.000491	225.0	.01801	.45	22.5	.01418	.57	2.3	.01418	.57
7.5	3.0	.4	.000491	270.0	.01434	.57	27.0	.01176	.69	2.7	.01176	.69
8.8	3.5	.4	.000491	315.0	.01178	.69	31.5	.00993	.82	3.1	.00993	.82
10.0	4.0	.4	.000491	360.0	.00990	.82	36.0	.00851	.96	3.6	.00851	.96
11.3	4.5	.4	.000491	405.0	.00847	.96	40.5	.00738	1.10	4.0	.00738	1.10
12.5	5.0	.4	.000491	450.0	.00734	1.11	45.0	.00647	1.26	4.5	.00647	1.26
1.3	1.0	.8	.000491	45.0	.02218	.37	4.5	.02218	.37	.5	.02218	.37
1.9	1.5	.8	.000491	67.5	.01779	.46	6.8	.01779	.46	.7	.01779	.46
2.5	2.0	.8	.000491	90.0	.01492	.55	9.0	.01492	.55	.9	.01492	.55
3.1	2.5	.8	.000491	112.5	.01351	.60	11.3	.01280	.64	1.1	.01280	.64
3.8	3.0	.8	.000491	135.0	.01268	.64	13.5	.01116	.73	1.4	.01116	.73
4.4	3.5	.8	.000491	157.5	.01188	.69	15.8	.00984	.83	1.6	.00984	.83
5.0	4.0	.8	.000491	180.0	.01113	.73	18.0	.00876	.93	1.8	.00876	.93
5.6	4.5	.8	.000491	202.5	.01032	.79	20.3	.00786	1.04	2.0	.00786	1.04
6.3	5.0	.8	.000491	225.0	.00905	.90	22.5	.00709	1.15	2.3	.00709	1.15

Table SA-19
Results of Waste Dilution - Winter - Ship 3
(L = 1.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 500 gpm							
5.0	1.0	.2	.000175	180.0	.02351	.97	18.0	.02351	.97	1.8	.02351	.97
7.5	1.5	.2	.000175	270.0	.01579	1.45	27.0	.01579	1.45	2.7	.01579	1.45
10.0	2.0	.2	.000175	360.0	.01143	2.00	36.0	.01143	2.00	3.6	.01143	2.00
12.5	2.5	.2	.000175	450.0	.00869	2.63	45.0	.00869	2.63	4.5	.00869	2.63
15.0	3.0	.2	.000175	540.0	.00685	3.33	54.0	.00685	3.33	5.4	.00685	3.33
17.5	3.5	.2	.000175	630.0	.00554	4.12	63.0	.00554	4.12	6.3	.00554	4.12
20.0	4.0	.2	.000175	720.0	.00458	4.98	72.0	.00458	4.98	7.2	.00458	4.98
22.5	4.5	.2	.000175	810.0	.00385	5.93	81.0	.00385	5.93	8.1	.00385	5.93
25.0	5.0	.2	.000175	900.0	.00329	6.94	90.0	.00329	6.94	9.0	.00329	6.94
2.5	1.0	.4	.000175	90.0	.02003	1.14	9.0	.02003	1.14	.9	.02003	1.14
3.8	1.5	.4	.000175	135.0	.01499	1.52	13.5	.01499	1.52	1.4	.01499	1.52
5.0	2.0	.4	.000175	180.0	.01176	1.94	18.0	.01176	1.94	1.8	.01176	1.94
6.3	2.5	.4	.000175	225.0	.00953	2.40	22.5	.00953	2.40	2.3	.00953	2.40
7.5	3.0	.4	.000175	270.0	.00790	2.89	27.0	.00790	2.89	2.7	.00790	2.89
8.8	3.5	.4	.000175	315.0	.00667	3.42	31.5	.00667	3.42	3.1	.00667	3.42
10.0	4.0	.4	.000175	360.0	.00571	3.99	36.0	.00571	3.99	3.6	.00571	3.99
11.3	4.5	.4	.000175	405.0	.00496	4.60	40.5	.00496	4.60	4.0	.00496	4.60
12.5	5.0	.4	.000175	450.0	.00434	5.25	45.0	.00434	5.25	4.5	.00434	5.25
1.3	1.0	.8	.000175	45.0	.01489	1.53	4.5	.01489	1.53	.5	.01489	1.53
1.9	1.5	.8	.000175	67.5	.01194	1.91	6.8	.01194	1.91	.7	.01194	1.91
2.5	2.0	.8	.000175	90.0	.01002	2.28	9.0	.01002	2.28	.9	.01002	2.28
3.1	2.5	.8	.000175	112.5	.00860	2.65	11.3	.00860	2.65	1.1	.00860	2.65
3.8	3.0	.8	.000175	135.0	.00749	3.05	13.5	.00749	3.05	1.4	.00749	3.05
4.4	3.5	.8	.000175	157.5	.00661	3.45	15.8	.00661	3.45	1.6	.00661	3.45
5.0	4.0	.8	.000175	180.0	.00588	3.88	18.0	.00588	3.88	1.8	.00588	3.88
5.6	4.5	.8	.000175	202.5	.00527	4.33	20.3	.00527	4.33	2.0	.00527	4.33
6.3	5.0	.8	.000175	225.0	.00476	4.79	22.5	.00476	4.79	2.3	.00476	4.79
					Q = 600 gpm							
5.0	1.0	.2	.000210	180.0	.02351	.81	18.0	.02351	.81	1.8	.02351	.81
7.5	1.5	.2	.000210	270.0	.01579	1.20	27.0	.01579	1.20	2.7	.01579	1.20
10.0	2.0	.2	.000210	360.0	.01143	1.66	36.0	.01143	1.66	3.6	.01143	1.66
12.5	2.5	.2	.000210	450.0	.00869	2.19	45.0	.00869	2.19	4.5	.00869	2.19
15.0	3.0	.2	.000210	540.0	.00685	2.78	54.0	.00685	2.78	5.4	.00685	2.78
17.5	3.5	.2	.000210	630.0	.00554	3.43	63.0	.00554	3.43	6.3	.00554	3.43
20.0	4.0	.2	.000210	720.0	.00458	4.15	72.0	.00458	4.15	7.2	.00458	4.15
22.5	4.5	.2	.000210	810.0	.00385	4.94	81.0	.00385	4.94	8.1	.00385	4.94
25.0	5.0	.2	.000210	900.0	.00329	5.79	90.0	.00329	5.79	9.0	.00329	5.79
2.5	1.0	.4	.000210	90.0	.02003	.95	9.0	.02003	.95	.9	.02003	.95
3.8	1.5	.4	.000210	135.0	.01499	1.27	13.5	.01499	1.27	1.4	.01499	1.27
5.0	2.0	.4	.000210	180.0	.01176	1.62	18.0	.01176	1.62	1.8	.01176	1.62
6.3	2.5	.4	.000210	225.0	.00953	2.00	22.5	.00953	2.00	2.3	.00953	2.00
7.5	3.0	.4	.000210	270.0	.00790	2.41	27.0	.00790	2.41	2.7	.00790	2.41
8.8	3.5	.4	.000210	315.0	.00667	2.85	31.5	.00667	2.85	3.1	.00667	2.85
10.0	4.0	.4	.000210	360.0	.00571	3.33	36.0	.00571	3.33	3.6	.00571	3.33
11.3	4.5	.4	.000210	405.0	.00496	3.84	40.5	.00496	3.84	4.0	.00496	3.84
12.5	5.0	.4	.000210	450.0	.00434	4.38	45.0	.00434	4.38	4.5	.00434	4.38
1.3	1.0	.8	.000210	45.0	.01489	1.28	4.5	.01489	1.28	.5	.01489	1.28
1.9	1.5	.8	.000210	67.5	.01194	1.59	6.8	.01194	1.59	.7	.01194	1.59
2.5	2.0	.8	.000210	90.0	.01002	1.90	9.0	.01002	1.90	.9	.01002	1.90
3.1	2.5	.8	.000210	112.5	.00860	2.21	11.3	.00860	2.21	1.1	.00860	2.21
3.8	3.0	.8	.000210	135.0	.00749	2.54	13.5	.00749	2.54	1.4	.00749	2.54
4.4	3.5	.8	.000210	157.5	.00661	2.88	15.8	.00661	2.88	1.6	.00661	2.88
5.0	4.0	.8	.000210	180.0	.00588	3.23	18.0	.00588	3.23	1.8	.00588	3.23
5.6	4.5	.8	.000210	202.5	.00527	3.61	20.3	.00527	3.61	2.0	.00527	3.61
6.3	5.0	.8	.000210	225.0	.00476	3.99	22.5	.00476	3.99	2.3	.00476	3.99

Table SA-19 (continued)
Results of Waste Dilution - Winter - Ship 3
(L = 1.0 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 700 gpm							
5.0	1.0	.2	.000245	180.0	.02351	.69	18.0	.02351	.69	1.8	.02351	.69
7.5	1.5	.2	.000245	270.0	.01579	1.03	27.0	.01579	1.03	2.7	.01579	1.03
10.0	2.0	.2	.000245	360.0	.01143	1.43	36.0	.01143	1.43	3.6	.01143	1.43
12.5	2.5	.2	.000245	450.0	.00869	1.88	45.0	.00869	1.88	4.5	.00869	1.88
15.0	3.0	.2	.000245	540.0	.00685	2.38	54.0	.00685	2.38	5.4	.00685	2.38
17.5	3.5	.2	.000245	630.0	.00554	2.94	63.0	.00554	2.94	6.3	.00554	2.94
20.0	4.0	.2	.000245	720.0	.00458	3.56	72.0	.00458	3.56	7.2	.00458	3.56
22.5	4.5	.2	.000245	810.0	.00385	4.23	81.0	.00385	4.23	8.1	.00385	4.23
25.0	5.0	.2	.000245	900.0	.00329	4.96	90.0	.00329	4.96	9.0	.00329	4.96
2.5	1.0	.4	.000245	90.0	.02003	.81	9.0	.02003	.81	.9	.02003	.81
3.8	1.5	.4	.000245	135.0	.01499	1.09	13.5	.01499	1.09	1.4	.01499	1.09
5.0	2.0	.4	.000245	180.0	.01176	1.39	18.0	.01176	1.39	1.8	.01176	1.39
6.3	2.5	.4	.000245	225.0	.00953	1.71	22.5	.00953	1.71	2.3	.00953	1.71
7.5	3.0	.4	.000245	270.0	.00790	2.06	27.0	.00790	2.06	2.7	.00790	2.06
8.8	3.5	.4	.000245	315.0	.00667	2.45	31.5	.00667	2.45	3.1	.00667	2.45
10.0	4.0	.4	.000245	360.0	.00571	2.85	36.0	.00571	2.85	3.6	.00571	2.85
11.3	4.5	.4	.000245	405.0	.00496	3.29	40.5	.00496	3.29	4.0	.00496	3.29
12.5	5.0	.4	.000245	450.0	.00434	3.75	45.0	.00434	3.75	4.5	.00434	3.75
1.3	1.0	.8	.000245	45.0	.01489	1.09	4.5	.01489	1.09	.5	.01489	1.09
1.9	1.5	.8	.000245	67.5	.01194	1.37	6.8	.01194	1.37	.7	.01194	1.37
2.5	2.0	.8	.000245	90.0	.01002	1.63	9.0	.01002	1.63	.9	.01002	1.63
3.1	2.5	.8	.000245	112.5	.00860	1.90	11.3	.00860	1.90	1.1	.00860	1.90
3.8	3.0	.8	.000245	135.0	.00749	2.18	13.5	.00749	2.18	1.4	.00749	2.18
4.4	3.5	.8	.000245	157.5	.00661	2.47	15.8	.00661	2.47	1.6	.00661	2.47
5.0	4.0	.8	.000245	180.0	.00588	2.77	18.0	.00588	2.77	1.8	.00588	2.77
5.6	4.5	.8	.000245	202.5	.00527	3.09	20.3	.00527	3.09	2.0	.00527	3.09
6.3	5.0	.8	.000245	225.0	.00476	3.42	22.5	.00476	3.42	2.3	.00476	3.42
					Q = 1000 gpm							
5.0	1.0	.2	.000350	180.0	.02351	.49	18.0	.02351	.49	1.8	.02351	.49
7.5	1.5	.2	.000350	270.0	.01579	.72	27.0	.01579	.72	2.7	.01579	.72
10.0	2.0	.2	.000350	360.0	.01143	1.00	36.0	.01143	1.00	3.6	.01143	1.00
12.5	2.5	.2	.000350	450.0	.00869	1.31	45.0	.00869	1.31	4.5	.00869	1.31
15.0	3.0	.2	.000350	540.0	.00685	1.67	54.0	.00685	1.67	5.4	.00685	1.67
17.5	3.5	.2	.000350	630.0	.00554	2.06	63.0	.00554	2.06	6.3	.00554	2.06
20.0	4.0	.2	.000350	720.0	.00458	2.49	72.0	.00458	2.49	7.2	.00458	2.49
22.5	4.5	.2	.000350	810.0	.00385	2.96	81.0	.00385	2.96	8.1	.00385	2.96
25.0	5.0	.2	.000350	900.0	.00329	3.47	90.0	.00329	3.47	9.0	.00329	3.47
2.5	1.0	.4	.000350	90.0	.02003	.57	9.0	.02003	.57	.9	.02003	.57
3.8	1.5	.4	.000350	135.0	.01499	.76	13.5	.01499	.76	1.4	.01499	.76
5.0	2.0	.4	.000350	180.0	.01176	.97	18.0	.01176	.97	1.8	.01176	.97
6.3	2.5	.4	.000350	225.0	.00953	1.20	22.5	.00953	1.20	2.3	.00953	1.20
7.5	3.0	.4	.000350	270.0	.00790	1.45	27.0	.00790	1.45	2.7	.00790	1.45
8.8	3.5	.4	.000350	315.0	.00667	1.71	31.5	.00667	1.71	3.1	.00667	1.71
10.0	4.0	.4	.000350	360.0	.00571	2.00	36.0	.00571	2.00	3.6	.00571	2.00
11.3	4.5	.4	.000350	405.0	.00496	2.30	40.5	.00496	2.30	4.0	.00496	2.30
12.5	5.0	.4	.000350	450.0	.00434	2.63	45.0	.00434	2.63	4.5	.00434	2.63
1.3	1.0	.8	.000350	45.0	.01489	.77	4.5	.01489	.77	.5	.01489	.77
1.9	1.5	.8	.000350	67.5	.01194	.96	6.8	.01194	.96	.7	.01194	.96
2.5	2.0	.8	.000350	90.0	.01002	1.14	9.0	.01002	1.14	.9	.01002	1.14
3.1	2.5	.8	.000350	112.5	.00860	1.33	11.3	.00860	1.33	1.1	.00860	1.33
3.8	3.0	.8	.000350	135.0	.00749	1.52	13.5	.00749	1.52	1.4	.00749	1.52
4.4	3.5	.8	.000350	157.5	.00661	1.73	15.8	.00661	1.73	1.6	.00661	1.73
5.0	4.0	.8	.000350	180.0	.00588	1.94	18.0	.00588	1.94	1.8	.00588	1.94
5.6	4.5	.8	.000350	202.5	.00527	2.16	20.3	.00527	2.16	2.0	.00527	2.16
6.3	5.0	.8	.000350	225.0	.00476	2.40	22.5	.00476	2.40	2.3	.00476	2.40

Table SA-19 (continued)
Results of Waste Dilution - Winter - Ship 3
(L = 1.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 1200 gpm							
5.0	1.0	.2	.000421	180.0	.02351	.40	18.0	.02351	.40	1.8	.02351	.40
7.5	1.5	.2	.000421	270.0	.01579	.60	27.0	.01579	.60	2.7	.01579	.60
10.0	2.0	.2	.000421	360.0	.01143	.83	36.0	.01143	.83	3.6	.01143	.83
12.5	2.5	.2	.000421	450.0	.00869	1.09	45.0	.00869	1.09	4.5	.00869	1.09
15.0	3.0	.2	.000421	540.0	.00685	1.39	54.0	.00685	1.39	5.4	.00685	1.39
17.5	3.5	.2	.000421	630.0	.00554	1.72	63.0	.00554	1.72	6.3	.00554	1.72
20.0	4.0	.2	.000421	720.0	.00458	2.08	72.0	.00458	2.08	7.2	.00458	2.08
22.5	4.5	.2	.000421	810.0	.00385	2.47	81.0	.00385	2.47	8.1	.00385	2.47
25.0	5.0	.2	.000421	900.0	.00329	2.89	90.0	.00329	2.89	9.0	.00329	2.89
2.5	1.0	.4	.000421	90.0	.02003	.47	9.0	.02003	.47	.9	.02003	.47
3.8	1.5	.4	.000421	135.0	.01499	.63	13.5	.01499	.63	1.4	.01499	.63
5.0	2.0	.4	.000421	180.0	.01176	.81	18.0	.01176	.81	1.8	.01176	.81
6.3	2.5	.4	.000421	225.0	.00953	1.00	22.5	.00953	1.00	2.3	.00953	1.00
7.5	3.0	.4	.000421	270.0	.00790	1.20	27.0	.00790	1.20	2.7	.00790	1.20
8.8	3.5	.4	.000421	315.0	.00667	1.43	31.5	.00667	1.43	3.1	.00667	1.43
10.0	4.0	.4	.000421	360.0	.00571	1.66	36.0	.00571	1.66	3.6	.00571	1.66
11.3	4.5	.4	.000421	405.0	.00496	1.92	40.5	.00496	1.92	4.0	.00496	1.92
12.5	5.0	.4	.000421	450.0	.00434	2.19	45.0	.00434	2.19	4.5	.00434	2.19
1.3	1.0	.8	.000421	45.0	.01489	.64	4.5	.01489	.64	.5	.01489	.64
1.9	1.5	.8	.000421	67.5	.01194	.80	6.8	.01194	.80	.7	.01194	.80
2.5	2.0	.8	.000421	90.0	.01002	.95	9.0	.01002	.95	.9	.01002	.95
3.1	2.5	.8	.000421	112.5	.00860	1.11	11.3	.00860	1.11	1.1	.00860	1.11
3.8	3.0	.8	.000421	135.0	.00749	1.27	13.5	.00749	1.27	1.4	.00749	1.27
4.4	3.5	.8	.000421	157.5	.00661	1.44	15.8	.00661	1.44	1.6	.00661	1.44
5.0	4.0	.8	.000421	180.0	.00588	1.62	18.0	.00588	1.62	1.8	.00588	1.62
5.6	4.5	.8	.000421	202.5	.00527	1.80	20.3	.00527	1.80	2.0	.00527	1.80
6.3	5.0	.8	.000421	225.0	.00476	2.00	22.5	.00476	2.00	2.3	.00476	2.00
					Q = 1400 gpm							
5.0	1.0	.2	.000491	180.0	.02351	.35	18.0	.02351	.35	1.8	.02351	.35
7.5	1.5	.2	.000491	270.0	.01579	.52	27.0	.01579	.52	2.7	.01579	.52
10.0	2.0	.2	.000491	360.0	.01143	.71	36.0	.01143	.71	3.6	.01143	.71
12.5	2.5	.2	.000491	450.0	.00869	.94	45.0	.00869	.94	4.5	.00869	.94
15.0	3.0	.2	.000491	540.0	.00685	1.19	54.0	.00685	1.19	5.4	.00685	1.19
17.5	3.5	.2	.000491	630.0	.00554	1.47	63.0	.00554	1.47	6.3	.00554	1.47
20.0	4.0	.2	.000491	720.0	.00458	1.78	72.0	.00458	1.78	7.2	.00458	1.78
22.5	4.5	.2	.000491	810.0	.00385	2.12	81.0	.00385	2.12	8.1	.00385	2.12
25.0	5.0	.2	.000491	900.0	.00329	2.48	90.0	.00329	2.48	9.0	.00329	2.48
2.5	1.0	.4	.000491	90.0	.02003	.41	9.0	.02003	.41	.9	.02003	.41
3.8	1.5	.4	.000491	135.0	.01499	.54	13.5	.01499	.54	1.4	.01499	.54
5.0	2.0	.4	.000491	180.0	.01176	.69	18.0	.01176	.69	1.8	.01176	.69
6.3	2.5	.4	.000491	225.0	.00953	.86	22.5	.00953	.86	2.3	.00953	.86
7.5	3.0	.4	.000491	270.0	.00790	1.03	27.0	.00790	1.03	2.7	.00790	1.03
8.8	3.5	.4	.000491	315.0	.00667	1.22	31.5	.00667	1.22	3.1	.00667	1.22
10.0	4.0	.4	.000491	360.0	.00571	1.43	36.0	.00571	1.43	3.6	.00571	1.43
11.3	4.5	.4	.000491	405.0	.00496	1.64	40.5	.00496	1.64	4.0	.00496	1.64
12.5	5.0	.4	.000491	450.0	.00434	1.88	45.0	.00434	1.88	4.5	.00434	1.88
1.3	1.0	.8	.000491	45.0	.01489	.55	4.5	.01489	.55	.5	.01489	.55
1.9	1.5	.8	.000491	67.5	.01194	.68	6.8	.01194	.68	.7	.01194	.68
2.5	2.0	.8	.000491	90.0	.01002	.81	9.0	.01002	.81	.9	.01002	.81
3.1	2.5	.8	.000491	112.5	.00860	.95	11.3	.00860	.95	1.1	.00860	.95
3.8	3.0	.8	.000491	135.0	.00749	1.09	13.5	.00749	1.09	1.4	.00749	1.09
4.4	3.5	.8	.000491	157.5	.00661	1.23	15.8	.00661	1.23	1.6	.00661	1.23
5.0	4.0	.8	.000491	180.0	.00588	1.39	18.0	.00588	1.39	1.8	.00588	1.39
5.6	4.5	.8	.000491	202.5	.00527	1.55	20.3	.00527	1.55	2.0	.00527	1.55
6.3	5.0	.8	.000491	225.0	.00476	1.71	22.5	.00476	1.71	2.3	.00476	1.71

Table SA-20
Results of Waste Dilution - Summer - Ship 4
(L = 1.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 500 gpm							
5.0	1.0	.2	.000090	180.0	.08619	.52	18.0	.06798	.65	1.8	.06798	.65
7.5	1.5	.2	.000090	270.0	.05566	.80	27.0	.04570	.97	2.7	.04570	.97
10.0	2.0	.2	.000090	360.0	.03848	1.16	36.0	.03309	1.34	3.6	.03309	1.34
12.5	2.5	.2	.000090	450.0	.02852	1.56	45.0	.02517	1.77	4.5	.02517	1.77
15.0	3.0	.2	.000090	540.0	.02211	2.01	54.0	.01983	2.24	5.4	.01983	2.24
17.5	3.5	.2	.000090	630.0	.01769	2.51	63.0	.01606	2.77	6.3	.01606	2.77
20.0	4.0	.2	.000090	720.0	.01451	3.06	72.0	.01328	3.35	7.2	.01328	3.35
22.5	4.5	.2	.000090	810.0	.01212	3.67	81.0	.01117	3.98	8.1	.01117	3.98
25.0	5.0	.2	.000090	900.0	.01029	4.32	90.0	.00953	4.67	9.0	.00953	4.67
2.5	1.0	.4	.000090	90.0	.05800	.77	9.0	.05800	.77	.9	.05800	.77
3.8	1.5	.4	.000090	135.0	.04933	.90	13.5	.04342	1.02	1.4	.04342	1.02
5.0	2.0	.4	.000090	180.0	.04329	1.03	18.0	.03408	1.30	1.8	.03408	1.30
6.3	2.5	.4	.000090	225.0	.03505	1.27	22.5	.02761	1.61	2.3	.02761	1.61
7.5	3.0	.4	.000090	270.0	.02791	1.59	27.0	.02289	1.94	2.7	.02289	1.94
8.8	3.5	.4	.000090	315.0	.02294	1.94	31.5	.01933	2.30	3.1	.01933	2.30
10.0	4.0	.4	.000090	360.0	.01928	2.31	36.0	.01657	2.68	3.6	.01657	2.68
11.3	4.5	.4	.000090	405.0	.01648	2.70	40.5	.01437	3.09	4.0	.01437	3.09
12.5	5.0	.4	.000090	450.0	.01428	3.11	45.0	.01260	3.53	4.5	.01260	3.53
1.3	1.0	.8	.000090	45.0	.04317	1.03	4.5	.04317	1.03	.5	.04317	1.03
1.9	1.5	.8	.000090	67.5	.03462	1.28	6.8	.03462	1.28	.7	.03462	1.28
2.5	2.0	.8	.000090	90.0	.02904	1.53	9.0	.02904	1.53	.9	.02904	1.53
3.1	2.5	.8	.000090	112.5	.02630	1.69	11.3	.02493	1.78	1.1	.02493	1.78
3.8	3.0	.8	.000090	135.0	.02469	1.80	13.5	.02173	2.05	1.4	.02173	2.05
4.4	3.5	.8	.000090	157.5	.02314	1.92	15.8	.01916	2.32	1.6	.01916	2.32
5.0	4.0	.8	.000090	180.0	.02167	2.05	18.0	.01705	2.61	1.8	.01705	2.61
5.6	4.5	.8	.000090	202.5	.02010	2.21	20.3	.01530	2.91	2.0	.01530	2.91
6.3	5.0	.8	.000090	225.0	.01761	2.52	22.5	.01381	3.22	2.3	.01381	3.22
					Q = 600 gpm							
5.0	1.0	.2	.000108	180.0	.08619	.43	18.0	.06798	.55	1.8	.06798	.55
7.5	1.5	.2	.000108	270.0	.05566	.67	27.0	.04570	.81	2.7	.04570	.81
10.0	2.0	.2	.000108	360.0	.03848	.96	36.0	.03309	1.12	3.6	.03309	1.12
12.5	2.5	.2	.000108	450.0	.02852	1.30	45.0	.02517	1.47	4.5	.02517	1.47
15.0	3.0	.2	.000108	540.0	.02211	1.68	54.0	.01983	1.87	5.4	.01983	1.87
17.5	3.5	.2	.000108	630.0	.01769	2.09	63.0	.01606	2.31	6.3	.01606	2.31
20.0	4.0	.2	.000108	720.0	.01451	2.55	72.0	.01328	2.79	7.2	.01328	2.79
22.5	4.5	.2	.000108	810.0	.01212	3.06	81.0	.01117	3.32	8.1	.01117	3.32
25.0	5.0	.2	.000108	900.0	.01029	3.60	90.0	.00953	3.89	9.0	.00953	3.89
2.5	1.0	.4	.000108	90.0	.05800	.64	9.0	.05800	.64	.9	.05800	.64
3.8	1.5	.4	.000108	135.0	.04933	.75	13.5	.04342	.85	1.4	.04342	.85
5.0	2.0	.4	.000108	180.0	.04329	.86	18.0	.03408	1.09	1.8	.03408	1.09
6.3	2.5	.4	.000108	225.0	.03505	1.06	22.5	.02761	1.34	2.3	.02761	1.34
7.5	3.0	.4	.000108	270.0	.02791	1.33	27.0	.02289	1.62	2.7	.02289	1.62
8.8	3.5	.4	.000108	315.0	.02294	1.62	31.5	.01933	1.92	3.1	.01933	1.92
10.0	4.0	.4	.000108	360.0	.01928	1.92	36.0	.01657	2.24	3.6	.01657	2.24
11.3	4.5	.4	.000108	405.0	.01648	2.25	40.5	.01437	2.58	4.0	.01437	2.58
12.5	5.0	.4	.000108	450.0	.01428	2.59	45.0	.01260	2.94	4.5	.01260	2.94
1.3	1.0	.8	.000108	45.0	.04317	.86	4.5	.04317	.86	.5	.04317	.86
1.9	1.5	.8	.000108	67.5	.03462	1.07	6.8	.03462	1.07	.7	.03462	1.07
2.5	2.0	.8	.000108	90.0	.02904	1.28	9.0	.02904	1.28	.9	.02904	1.28
3.1	2.5	.8	.000108	112.5	.02630	1.41	11.3	.02493	1.49	1.1	.02493	1.49
3.8	3.0	.8	.000108	135.0	.02469	1.50	13.5	.02173	1.70	1.4	.02173	1.70
4.4	3.5	.8	.000108	157.5	.02314	1.60	15.8	.01916	1.93	1.6	.01916	1.93
5.0	4.0	.8	.000108	180.0	.02167	1.71	18.0	.01705	2.17	1.8	.01705	2.17
5.6	4.5	.8	.000108	202.5	.02010	1.84	20.3	.01530	2.42	2.0	.01530	2.42
6.3	5.0	.8	.000108	225.0	.01761	2.10	22.5	.01381	2.68	2.3	.01381	2.68

Table SA-20 (continued)
Results of Waste Dilution - Summer - Ship 4
(L = 1.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 700 gpm							
5.0	1.0	.2	.000126	180.0	.08619	.37	18.0	.06798	.47	1.8	.06798	.47
7.5	1.5	.2	.000126	270.0	.05566	.57	27.0	.04570	.69	2.7	.04570	.69
10.0	2.0	.2	.000126	360.0	.03848	.83	36.0	.03309	.96	3.6	.03309	.96
12.5	2.5	.2	.000126	450.0	.02852	1.11	45.0	.02517	1.26	4.5	.02517	1.26
15.0	3.0	.2	.000126	540.0	.02211	1.44	54.0	.01983	1.60	5.4	.01983	1.60
17.5	3.5	.2	.000126	630.0	.01769	1.79	63.0	.01606	1.98	6.3	.01606	1.98
20.0	4.0	.2	.000126	720.0	.01451	2.19	72.0	.01328	2.39	7.2	.01328	2.39
22.5	4.5	.2	.000126	810.0	.01212	2.62	81.0	.01117	2.84	8.1	.01117	2.84
25.0	5.0	.2	.000126	900.0	.01029	3.09	90.0	.00953	3.33	9.0	.00953	3.33
2.5	1.0	.4	.000126	90.0	.05800	.55	9.0	.05800	.55	.9	.05800	.55
3.8	1.5	.4	.000126	135.0	.04933	.64	13.5	.04342	.73	1.4	.04342	.73
5.0	2.0	.4	.000126	180.0	.04329	.73	18.0	.03408	.93	1.8	.03408	.93
6.3	2.5	.4	.000126	225.0	.03505	.91	22.5	.02761	1.15	2.3	.02761	1.15
7.5	3.0	.4	.000126	270.0	.02791	1.14	27.0	.02289	1.39	2.7	.02289	1.39
8.8	3.5	.4	.000126	315.0	.02294	1.38	31.5	.01933	1.64	3.1	.01933	1.64
10.0	4.0	.4	.000126	360.0	.01928	1.65	36.0	.01657	1.92	3.6	.01657	1.92
11.3	4.5	.4	.000126	405.0	.01648	1.93	40.5	.01437	2.21	4.0	.01437	2.21
12.5	5.0	.4	.000126	450.0	.01428	2.22	45.0	.01260	2.52	4.5	.01260	2.52
1.3	1.0	.8	.000126	45.0	.04317	.74	4.5	.04317	.74	.5	.04317	.74
1.9	1.5	.8	.000126	67.5	.03462	.92	6.8	.03462	.92	.7	.03462	.92
2.5	2.0	.8	.000126	90.0	.02904	1.09	9.0	.02904	1.09	.9	.02904	1.09
3.1	2.5	.8	.000126	112.5	.02630	1.21	11.3	.02493	1.27	1.1	.02493	1.27
3.8	3.0	.8	.000126	135.0	.02469	1.29	13.5	.02173	1.46	1.4	.02173	1.46
4.4	3.5	.8	.000126	157.5	.02314	1.37	15.8	.01916	1.66	1.6	.01916	1.66
5.0	4.0	.8	.000126	180.0	.02167	1.47	18.0	.01705	1.86	1.8	.01705	1.86
5.6	4.5	.8	.000126	202.5	.02010	1.58	20.3	.01530	2.08	2.0	.01530	2.08
6.3	5.0	.8	.000126	225.0	.01761	1.80	22.5	.01381	2.30	2.3	.01381	2.30
					Q = 1000 gpm							
5.0	1.0	.2	.000180	180.0	.08619	.26	18.0	.06798	.33	1.8	.06798	.33
7.5	1.5	.2	.000180	270.0	.05566	.40	27.0	.04570	.49	2.7	.04570	.49
10.0	2.0	.2	.000180	360.0	.03848	.58	36.0	.03309	.67	3.6	.03309	.67
12.5	2.5	.2	.000180	450.0	.02852	.78	45.0	.02517	.88	4.5	.02517	.88
15.0	3.0	.2	.000180	540.0	.02211	1.01	54.0	.01983	1.12	5.4	.01983	1.12
17.5	3.5	.2	.000180	630.0	.01769	1.26	63.0	.01606	1.38	6.3	.01606	1.38
20.0	4.0	.2	.000180	720.0	.01451	1.53	72.0	.01328	1.67	7.2	.01328	1.67
22.5	4.5	.2	.000180	810.0	.01212	1.83	81.0	.01117	1.99	8.1	.01117	1.99
25.0	5.0	.2	.000180	900.0	.01029	2.16	90.0	.00953	2.33	9.0	.00953	2.33
2.5	1.0	.4	.000180	90.0	.05800	.38	9.0	.05800	.38	.9	.05800	.38
3.8	1.5	.4	.000180	135.0	.04933	.45	13.5	.04342	.51	1.4	.04342	.51
5.0	2.0	.4	.000180	180.0	.04329	.51	18.0	.03408	.65	1.8	.03408	.65
6.3	2.5	.4	.000180	225.0	.03505	.63	22.5	.02761	.81	2.3	.02761	.81
7.5	3.0	.4	.000180	270.0	.02791	.80	27.0	.02289	.97	2.7	.02289	.97
8.8	3.5	.4	.000180	315.0	.02294	.97	31.5	.01933	1.15	3.1	.01933	1.15
10.0	4.0	.4	.000180	360.0	.01928	1.15	36.0	.01657	1.34	3.6	.01657	1.34
11.3	4.5	.4	.000180	405.0	.01648	1.35	40.5	.01437	1.55	4.0	.01437	1.55
12.5	5.0	.4	.000180	450.0	.01428	1.56	45.0	.01260	1.76	4.5	.01260	1.76
1.3	1.0	.8	.000180	45.0	.04317	.51	4.5	.04317	.51	.5	.04317	.51
1.9	1.5	.8	.000180	67.5	.03462	.64	6.8	.03462	.64	.7	.03462	.64
2.5	2.0	.8	.000180	90.0	.02904	.77	9.0	.02904	.77	.9	.02904	.77
3.1	2.5	.8	.000180	112.5	.02630	.85	11.3	.02493	.89	1.1	.02493	.89
3.8	3.0	.8	.000180	135.0	.02469	.90	13.5	.02173	1.02	1.4	.02173	1.02
4.4	3.5	.8	.000180	157.5	.02314	.96	15.8	.01916	1.16	1.6	.01916	1.16
5.0	4.0	.8	.000180	180.0	.02167	1.03	18.0	.01705	1.30	1.8	.01705	1.30
5.6	4.5	.8	.000180	202.5	.02010	1.11	20.3	.01530	1.45	2.0	.01530	1.45
6.3	5.0	.8	.000180	225.0	.01761	1.26	22.5	.01381	1.61	2.3	.01381	1.61

Table SA-20 (continued)
Results of Waste Dilution - Summer - Ship 4
(L = 1.0 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 1200 gpm							
5.0	1.0	.2	.000216	180.0	.08619	.21	18.0	.06798	.27	1.8	.06798	.27
7.5	1.5	.2	.000216	270.0	.05566	.33	27.0	.04570	.41	2.7	.04570	.41
10.0	2.0	.2	.000216	360.0	.03848	.48	36.0	.03309	.56	3.6	.03309	.56
12.5	2.5	.2	.000216	450.0	.02852	.65	45.0	.02517	.74	4.5	.02517	.74
15.0	3.0	.2	.000216	540.0	.02211	.84	54.0	.01983	.93	5.4	.01983	.93
17.5	3.5	.2	.000216	630.0	.01769	1.05	63.0	.01606	1.15	6.3	.01606	1.15
20.0	4.0	.2	.000216	720.0	.01451	1.28	72.0	.01328	1.40	7.2	.01328	1.40
22.5	4.5	.2	.000216	810.0	.01212	1.53	81.0	.01117	1.66	8.1	.01117	1.66
25.0	5.0	.2	.000216	900.0	.01029	1.80	90.0	.00953	1.94	9.0	.00953	1.94
2.5	1.0	.4	.000216	90.0	.05800	.32	9.0	.05800	.32	.9	.05800	.32
3.8	1.5	.4	.000216	135.0	.04933	.38	13.5	.04342	.43	1.4	.04342	.43
5.0	2.0	.4	.000216	180.0	.04329	.43	18.0	.03408	.54	1.8	.03408	.54
6.3	2.5	.4	.000216	225.0	.03505	.53	22.5	.02761	.67	2.3	.02761	.67
7.5	3.0	.4	.000216	270.0	.02791	.66	27.0	.02289	.81	2.7	.02289	.81
8.8	3.5	.4	.000216	315.0	.02294	.81	31.5	.01933	.96	3.1	.01933	.96
10.0	4.0	.4	.000216	360.0	.01928	.96	36.0	.01657	1.12	3.6	.01657	1.12
11.3	4.5	.4	.000216	405.0	.01648	1.12	40.5	.01437	1.29	4.0	.01437	1.29
12.5	5.0	.4	.000216	450.0	.01428	1.30	45.0	.01260	1.47	4.5	.01260	1.47
1.3	1.0	.8	.000216	45.0	.04317	.43	4.5	.04317	.43	.5	.04317	.43
1.9	1.5	.8	.000216	67.5	.03462	.54	6.8	.03462	.54	.7	.03462	.54
2.5	2.0	.8	.000216	90.0	.02904	.64	9.0	.02904	.64	.9	.02904	.64
3.1	2.5	.8	.000216	112.5	.02630	.70	11.3	.02493	.74	1.1	.02493	.74
3.8	3.0	.8	.000216	135.0	.02469	.75	13.5	.02173	.85	1.4	.02173	.85
4.4	3.5	.8	.000216	157.5	.02314	.80	15.8	.01916	.97	1.6	.01916	.97
5.0	4.0	.8	.000216	180.0	.02167	.85	18.0	.01705	1.09	1.8	.01705	1.09
5.6	4.5	.8	.000216	202.5	.02010	.92	20.3	.01530	1.21	2.0	.01530	1.21
6.3	5.0	.8	.000216	225.0	.01761	1.05	22.5	.01381	1.34	2.3	.01381	1.34
					Q = 1400 gpm							
5.0	1.0	.2	.000252	180.0	.08619	.18	18.0	.06798	.23	1.8	.06798	.23
7.5	1.5	.2	.000252	270.0	.05566	.29	27.0	.04570	.35	2.7	.04570	.35
10.0	2.0	.2	.000252	360.0	.03848	.41	36.0	.03309	.48	3.6	.03309	.48
12.5	2.5	.2	.000252	450.0	.02852	.56	45.0	.02517	.63	4.5	.02517	.63
15.0	3.0	.2	.000252	540.0	.02211	.72	54.0	.01983	.80	5.4	.01983	.80
17.5	3.5	.2	.000252	630.0	.01769	.90	63.0	.01606	.99	6.3	.01606	.99
20.0	4.0	.2	.000252	720.0	.01451	1.09	72.0	.01328	1.20	7.2	.01328	1.20
22.5	4.5	.2	.000252	810.0	.01212	1.31	81.0	.01117	1.42	8.1	.01117	1.42
25.0	5.0	.2	.000252	900.0	.01029	1.54	90.0	.00953	1.67	9.0	.00953	1.67
2.5	1.0	.4	.000252	90.0	.05800	.27	9.0	.05800	.27	.9	.05800	.27
3.8	1.5	.4	.000252	135.0	.04933	.32	13.5	.04342	.37	1.4	.04342	.37
5.0	2.0	.4	.000252	180.0	.04329	.37	18.0	.03408	.47	1.8	.03408	.47
6.3	2.5	.4	.000252	225.0	.03505	.45	22.5	.02761	.58	2.3	.02761	.58
7.5	3.0	.4	.000252	270.0	.02791	.57	27.0	.02289	.69	2.7	.02289	.69
8.8	3.5	.4	.000252	315.0	.02294	.69	31.5	.01933	.82	3.1	.01933	.82
10.0	4.0	.4	.000252	360.0	.01928	.82	36.0	.01657	.96	3.6	.01657	.96
11.3	4.5	.4	.000252	405.0	.01648	.96	40.5	.01437	1.10	4.0	.01437	1.10
12.5	5.0	.4	.000252	450.0	.01428	1.11	45.0	.01260	1.26	4.5	.01260	1.26
1.3	1.0	.8	.000252	45.0	.04317	.37	4.5	.04317	.37	.5	.04317	.37
1.9	1.5	.8	.000252	67.5	.03462	.46	6.8	.03462	.46	.7	.03462	.46
2.5	2.0	.8	.000252	90.0	.02904	.55	9.0	.02904	.55	.9	.02904	.55
3.1	2.5	.8	.000252	112.5	.02630	.60	11.3	.02493	.64	1.1	.02493	.64
3.8	3.0	.8	.000252	135.0	.02469	.64	13.5	.02173	.73	1.4	.02173	.73
4.4	3.5	.8	.000252	157.5	.02314	.69	15.8	.01916	.83	1.6	.01916	.83
5.0	4.0	.8	.000252	180.0	.02167	.73	18.0	.01705	.93	1.8	.01705	.93
5.6	4.5	.8	.000252	202.5	.02010	.79	20.3	.01530	1.04	2.0	.01530	1.04
6.3	5.0	.8	.000252	225.0	.01761	.90	22.5	.01381	1.15	2.3	.01381	1.15

Table SA-21
Results of Waste Dilution - Winter - Ship 4
(L = 1.0 n mi, A = 0.001 $ft^{2/3}/sec$)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
						Q = 500 gpm						
5.0	1.0	.2	.000090	180.0	.04574	.97	18.0	.04574	.97	1.8	.04574	.97
7.5	1.5	.2	.000090	270.0	.03073	1.45	27.0	.03073	1.45	2.7	.03073	1.45
10.0	2.0	.2	.000090	360.0	.02224	2.00	36.0	.02224	2.00	3.6	.02224	2.00
12.5	2.5	.2	.000090	450.0	.01691	2.63	45.0	.01691	2.63	4.5	.01691	2.63
15.0	3.0	.2	.000090	540.0	.01333	3.34	54.0	.01333	3.34	5.4	.01333	3.34
17.5	3.5	.2	.000090	630.0	.01079	4.12	63.0	.01079	4.12	6.3	.01079	4.12
20.0	4.0	.2	.000090	720.0	.00892	4.99	72.0	.00892	4.99	7.2	.00892	4.99
22.5	4.5	.2	.000090	810.0	.00750	5.93	81.0	.00750	5.93	8.1	.00750	5.93
25.0	5.0	.2	.000090	900.0	.00640	6.95	90.0	.00640	6.95	9.0	.00640	6.95
2.5	1.0	.4	.000090	90.0	.03899	1.14	9.0	.03899	1.14	.9	.03899	1.14
3.8	1.5	.4	.000090	135.0	.02918	1.52	13.5	.02918	1.52	1.4	.02918	1.52
5.0	2.0	.4	.000090	180.0	.02290	1.94	18.0	.02290	1.94	1.8	.02290	1.94
6.3	2.5	.4	.000090	225.0	.01855	2.40	22.5	.01855	2.40	2.3	.01855	2.40
7.5	3.0	.4	.000090	270.0	.01538	2.89	27.0	.01538	2.89	2.7	.01538	2.89
8.8	3.5	.4	.000090	315.0	.01299	3.42	31.5	.01299	3.42	3.1	.01299	3.42
10.0	4.0	.4	.000090	360.0	.01113	4.00	36.0	.01113	4.00	3.6	.01113	4.00
11.3	4.5	.4	.000090	405.0	.00965	4.61	40.5	.00965	4.61	4.0	.00965	4.61
12.5	5.0	.4	.000090	450.0	.00846	5.25	45.0	.00846	5.25	4.5	.00846	5.25
1.3	1.0	.8	.000090	45.0	.02900	1.53	4.5	.02900	1.53	.5	.02900	1.53
1.9	1.5	.8	.000090	67.5	.02326	1.91	6.8	.02326	1.91	.7	.02326	1.91
2.5	2.0	.8	.000090	90.0	.01951	2.28	9.0	.01951	2.28	.9	.01951	2.28
3.1	2.5	.8	.000090	112.5	.01674	2.66	11.3	.01674	2.66	1.1	.01674	2.66
3.8	3.0	.8	.000090	135.0	.01459	3.05	13.5	.01459	3.05	1.4	.01459	3.05
4.4	3.5	.8	.000090	157.5	.01287	3.45	15.8	.01287	3.45	1.6	.01287	3.45
5.0	4.0	.8	.000090	180.0	.01145	3.88	18.0	.01145	3.88	1.8	.01145	3.88
5.6	4.5	.8	.000090	202.5	.01027	4.33	20.3	.01027	4.33	2.0	.01027	4.33
6.3	5.0	.8	.000090	225.0	.00928	4.79	22.5	.00928	4.79	2.3	.00928	4.79
						Q = 600 gpm						
5.0	1.0	.2	.000108	180.0	.04574	.81	18.0	.04574	.81	1.8	.04574	.81
7.5	1.5	.2	.000108	270.0	.03073	1.21	27.0	.03073	1.21	2.7	.03073	1.21
10.0	2.0	.2	.000108	360.0	.02224	1.67	36.0	.02224	1.67	3.6	.02224	1.67
12.5	2.5	.2	.000108	450.0	.01691	2.19	45.0	.01691	2.19	4.5	.01691	2.19
15.0	3.0	.2	.000108	540.0	.01333	2.78	54.0	.01333	2.78	5.4	.01333	2.78
17.5	3.5	.2	.000108	630.0	.01079	3.43	63.0	.01079	3.43	6.3	.01079	3.43
20.0	4.0	.2	.000108	720.0	.00892	4.15	72.0	.00892	4.15	7.2	.00892	4.15
22.5	4.5	.2	.000108	810.0	.00750	4.94	81.0	.00750	4.94	8.1	.00750	4.94
25.0	5.0	.2	.000108	900.0	.00640	5.79	90.0	.00640	5.79	9.0	.00640	5.79
2.5	1.0	.4	.000108	90.0	.03899	.95	9.0	.03899	.95	.9	.03899	.95
3.8	1.5	.4	.000108	135.0	.02918	1.27	13.5	.02918	1.27	1.4	.02918	1.27
5.0	2.0	.4	.000108	180.0	.02290	1.62	18.0	.02290	1.62	1.8	.02290	1.62
6.3	2.5	.4	.000108	225.0	.01855	2.00	22.5	.01855	2.00	2.3	.01855	2.00
7.5	3.0	.4	.000108	270.0	.01538	2.41	27.0	.01538	2.41	2.7	.01538	2.41
8.8	3.5	.4	.000108	315.0	.01299	2.85	31.5	.01299	2.85	3.1	.01299	2.85
10.0	4.0	.4	.000108	360.0	.01113	3.33	36.0	.01113	3.33	3.6	.01113	3.33
11.3	4.5	.4	.000108	405.0	.00965	3.84	40.5	.00965	3.84	4.0	.00965	3.84
12.5	5.0	.4	.000108	450.0	.00846	4.38	45.0	.00846	4.38	4.5	.00846	4.38
1.3	1.0	.8	.000108	45.0	.02900	1.28	4.5	.02900	1.28	.5	.02900	1.28
1.9	1.5	.8	.000108	67.5	.02326	1.59	6.8	.02326	1.59	.7	.02326	1.59
2.5	2.0	.8	.000108	90.0	.01951	1.90	9.0	.01951	1.90	.9	.01951	1.90
3.1	2.5	.8	.000108	112.5	.01674	2.21	11.3	.01674	2.21	1.1	.01674	2.21
3.8	3.0	.8	.000108	135.0	.01459	2.54	13.5	.01459	2.54	1.4	.01459	2.54
4.4	3.5	.8	.000108	157.5	.01287	2.88	15.8	.01287	2.88	1.6	.01287	2.88
5.0	4.0	.8	.000108	180.0	.01145	3.24	18.0	.01145	3.24	1.8	.01145	3.24
5.6	4.5	.8	.000108	202.5	.01027	3.61	20.3	.01027	3.61	2.0	.01027	3.61
6.3	5.0	.8	.000108	225.0	.00928	3.99	22.5	.00928	3.99	2.3	.00928	3.99

Table SA-21 (continued)
Results of Waste Dilution - Winter - Ship 4
(L = 1.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 700 gpm								
5.0	1.0	.2	.000126	180.0	.04574	.69	18.0	.04574	.69	1.8	.04574	.69
7.5	1.5	.2	.000126	270.0	.03073	1.03	27.0	.03073	1.03	2.7	.03073	1.03
10.0	2.0	.2	.000126	360.0	.02224	1.43	36.0	.02224	1.43	3.6	.02224	1.43
12.5	2.5	.2	.000126	450.0	.01691	1.88	45.0	.01691	1.88	4.5	.01691	1.88
15.0	3.0	.2	.000126	540.0	.01333	2.38	54.0	.01333	2.38	5.4	.01333	2.38
17.5	3.5	.2	.000126	630.0	.01079	2.94	63.0	.01079	2.94	6.3	.01079	2.94
20.0	4.0	.2	.000126	720.0	.00892	3.56	72.0	.00892	3.56	7.2	.00892	3.56
22.5	4.5	.2	.000126	810.0	.00750	4.23	81.0	.00750	4.23	8.1	.00750	4.23
25.0	5.0	.2	.000126	900.0	.00640	4.96	90.0	.00640	4.96	9.0	.00640	4.96
2.5	1.0	.4	.000126	90.0	.03899	.81	9.0	.03899	.81	.9	.03899	.81
3.8	1.5	.4	.000126	135.0	.02918	1.09	13.5	.02918	1.09	1.4	.02918	1.09
5.0	2.0	.4	.000126	180.0	.02290	1.39	18.0	.02290	1.39	1.8	.02290	1.39
6.3	2.5	.4	.000126	225.0	.01855	1.71	22.5	.01855	1.71	2.3	.01855	1.71
7.5	3.0	.4	.000126	270.0	.01538	2.07	27.0	.01538	2.07	2.7	.01538	2.07
8.8	3.5	.4	.000126	315.0	.01299	2.45	31.5	.01299	2.45	3.1	.01299	2.45
10.0	4.0	.4	.000126	360.0	.01113	2.85	36.0	.01113	2.85	3.6	.01113	2.85
11.3	4.5	.4	.000126	405.0	.00965	3.29	40.5	.00965	3.29	4.0	.00965	3.29
12.5	5.0	.4	.000126	450.0	.00846	3.75	45.0	.00846	3.75	4.5	.00846	3.75
1.3	1.0	.8	.000126	45.0	.02900	1.10	4.5	.02900	1.10	.5	.02900	1.10
1.9	1.5	.8	.000126	67.5	.02326	1.37	6.8	.02326	1.37	.7	.02326	1.37
2.5	2.0	.8	.000126	90.0	.01951	1.63	9.0	.01951	1.63	.9	.01951	1.63
3.1	2.5	.8	.000126	112.5	.01674	1.90	11.3	.01674	1.90	1.1	.01674	1.90
3.8	3.0	.8	.000126	135.0	.01459	2.18	13.5	.01459	2.18	1.4	.01459	2.18
4.4	3.5	.8	.000126	157.5	.01287	2.47	15.8	.01287	2.47	1.6	.01287	2.47
5.0	4.0	.8	.000126	180.0	.01145	2.77	18.0	.01145	2.77	1.8	.01145	2.77
5.6	4.5	.8	.000126	202.5	.01027	3.09	20.3	.01027	3.09	2.0	.01027	3.09
6.3	5.0	.8	.000126	225.0	.00928	3.42	22.5	.00928	3.42	2.3	.00928	3.42
				Q = 1000 gpm								
5.0	1.0	.2	.000180	180.0	.04574	.49	18.0	.04574	.49	1.8	.04574	.49
7.5	1.5	.2	.000180	270.0	.03073	.72	27.0	.03073	.72	2.7	.03073	.72
10.0	2.0	.2	.000180	360.0	.02224	1.00	36.0	.02224	1.00	3.6	.02224	1.00
12.5	2.5	.2	.000180	450.0	.01691	1.31	45.0	.01691	1.31	4.5	.01691	1.31
15.0	3.0	.2	.000180	540.0	.01333	1.67	54.0	.01333	1.67	5.4	.01333	1.67
17.5	3.5	.2	.000180	630.0	.01079	2.06	63.0	.01079	2.06	6.3	.01079	2.06
20.0	4.0	.2	.000180	720.0	.00892	2.49	72.0	.00892	2.49	7.2	.00892	2.49
22.5	4.5	.2	.000180	810.0	.00750	2.96	81.0	.00750	2.96	8.1	.00750	2.96
25.0	5.0	.2	.000180	900.0	.00640	3.47	90.0	.00640	3.47	9.0	.00640	3.47
2.5	1.0	.4	.000180	90.0	.03899	.57	9.0	.03899	.57	.9	.03899	.57
3.8	1.5	.4	.000180	135.0	.02918	.76	13.5	.02918	.76	1.4	.02918	.76
5.0	2.0	.4	.000180	180.0	.02290	.97	18.0	.02290	.97	1.8	.02290	.97
6.3	2.5	.4	.000180	225.0	.01855	1.20	22.5	.01855	1.20	2.3	.01855	1.20
7.5	3.0	.4	.000180	270.0	.01538	1.45	27.0	.01538	1.45	2.7	.01538	1.45
8.8	3.5	.4	.000180	315.0	.01299	1.71	31.5	.01299	1.71	3.1	.01299	1.71
10.0	4.0	.4	.000180	360.0	.01113	2.00	36.0	.01113	2.00	3.6	.01113	2.00
11.3	4.5	.4	.000180	405.0	.00965	2.30	40.5	.00965	2.30	4.0	.00965	2.30
12.5	5.0	.4	.000180	450.0	.00846	2.63	45.0	.00846	2.63	4.5	.00846	2.63
1.3	1.0	.8	.000180	45.0	.02900	.77	4.5	.02900	.77	.5	.02900	.77
1.9	1.5	.8	.000180	67.5	.02326	.96	6.8	.02326	.96	.7	.02326	.96
2.5	2.0	.8	.000180	90.0	.01951	1.14	9.0	.01951	1.14	.9	.01951	1.14
3.1	2.5	.8	.000180	112.5	.01674	1.33	11.3	.01674	1.33	1.1	.01674	1.33
3.8	3.0	.8	.000180	135.0	.01459	1.52	13.5	.01459	1.52	1.4	.01459	1.52
4.4	3.5	.8	.000180	157.5	.01287	1.73	15.8	.01287	1.73	1.6	.01287	1.73
5.0	4.0	.8	.000180	180.0	.01145	1.94	18.0	.01145	1.94	1.8	.01145	1.94
5.6	4.5	.8	.000180	202.5	.01027	2.16	20.3	.01027	2.16	2.0	.01027	2.16
6.3	5.0	.8	.000180	225.0	.00928	2.40	22.5	.00928	2.40	2.3	.00928	2.40

Table SA-21 (continued)
Results of Waste Dilution - Winter - Ship 4
(L = 1.0 n mi, A = 0.001 $ft^{2/3}/sec$)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 1200 gpm												
5.0	1.0	.2	.000216	180.0	.04574	.41	18.0	.04574	.41	1.8	.04574	.41
7.5	1.5	.2	.000216	270.0	.03073	.60	27.0	.03073	.60	2.7	.03073	.60
10.0	2.0	.2	.000216	360.0	.02224	.83	36.0	.02224	.83	3.6	.02224	.83
12.5	2.5	.2	.000216	450.0	.01691	1.10	45.0	.01691	1.10	4.5	.01691	1.10
15.0	3.0	.2	.000216	540.0	.01333	1.39	54.0	.01333	1.39	5.4	.01333	1.39
17.5	3.5	.2	.000216	630.0	.01079	1.72	63.0	.01079	1.72	6.3	.01079	1.72
20.0	4.0	.2	.000216	720.0	.00892	2.08	72.0	.00892	2.08	7.2	.00892	2.08
22.5	4.5	.2	.000216	810.0	.00750	2.47	81.0	.00750	2.47	8.1	.00750	2.47
25.0	5.0	.2	.000216	900.0	.00640	2.89	90.0	.00640	2.89	9.0	.00640	2.89
2.5	1.0	.4	.000216	90.0	.03899	.48	9.0	.03899	.48	.9	.03899	.48
3.8	1.5	.4	.000216	135.0	.02918	.63	13.5	.02918	.63	1.4	.02918	.63
5.0	2.0	.4	.000216	180.0	.02290	.81	18.0	.02290	.81	1.8	.02290	.81
6.3	2.5	.4	.000216	225.0	.01855	1.00	22.5	.01855	1.00	2.3	.01855	1.00
7.5	3.0	.4	.000216	270.0	.01538	1.20	27.0	.01538	1.20	2.7	.01538	1.20
8.8	3.5	.4	.000216	315.0	.01299	1.43	31.5	.01299	1.43	3.1	.01299	1.43
10.0	4.0	.4	.000216	360.0	.01113	1.66	36.0	.01113	1.66	3.6	.01113	1.66
11.3	4.5	.4	.000216	405.0	.00965	1.92	40.5	.00965	1.92	4.0	.00965	1.92
12.5	5.0	.4	.000216	450.0	.00846	2.19	45.0	.00846	2.19	4.5	.00846	2.19
1.3	1.0	.8	.000216	45.0	.02900	.64	4.5	.02900	.64	.5	.02900	.64
1.9	1.5	.8	.000216	67.5	.02326	.80	6.8	.02326	.80	.7	.02326	.80
2.5	2.0	.8	.000216	90.0	.01951	.95	9.0	.01951	.95	.9	.01951	.95
3.1	2.5	.8	.000216	112.5	.01674	1.11	11.3	.01674	1.11	1.1	.01674	1.11
3.8	3.0	.8	.000216	135.0	.01459	1.27	13.5	.01459	1.27	1.4	.01459	1.27
4.4	3.5	.8	.000216	157.5	.01287	1.44	15.8	.01287	1.44	1.6	.01287	1.44
5.0	4.0	.8	.000216	180.0	.01145	1.62	18.0	.01145	1.62	1.8	.01145	1.62
5.6	4.5	.8	.000216	202.5	.01027	1.80	20.3	.01027	1.80	2.0	.01027	1.80
6.3	5.0	.8	.000216	225.0	.00928	2.00	22.5	.00928	2.00	2.3	.00928	2.00
Q = 1400 gpm												
5.0	1.0	.2	.000252	180.0	.04574	.35	18.0	.04574	.35	1.8	.04574	.35
7.5	1.5	.2	.000252	270.0	.03073	.52	27.0	.03073	.52	2.7	.03073	.52
10.0	2.0	.2	.000252	360.0	.02224	.71	36.0	.02224	.71	3.6	.02224	.71
12.5	2.5	.2	.000252	450.0	.01691	.94	45.0	.01691	.94	4.5	.01691	.94
15.0	3.0	.2	.000252	540.0	.01333	1.19	54.0	.01333	1.19	5.4	.01333	1.19
17.5	3.5	.2	.000252	630.0	.01079	1.47	63.0	.01079	1.47	6.3	.01079	1.47
20.0	4.0	.2	.000252	720.0	.00892	1.78	72.0	.00892	1.78	7.2	.00892	1.78
22.5	4.5	.2	.000252	810.0	.00750	2.12	81.0	.00750	2.12	8.1	.00750	2.12
25.0	5.0	.2	.000252	900.0	.00640	2.48	90.0	.00640	2.48	9.0	.00640	2.48
2.5	1.0	.4	.000252	90.0	.03899	.41	9.0	.03899	.41	.9	.03899	.41
3.8	1.5	.4	.000252	135.0	.02918	.54	13.5	.02918	.54	1.4	.02918	.54
5.0	2.0	.4	.000252	180.0	.02290	.69	18.0	.02290	.69	1.8	.02290	.69
6.3	2.5	.4	.000252	225.0	.01855	.86	22.5	.01855	.86	2.3	.01855	.86
7.5	3.0	.4	.000252	270.0	.01538	1.03	27.0	.01538	1.03	2.7	.01538	1.03
8.8	3.5	.4	.000252	315.0	.01299	1.22	31.5	.01299	1.22	3.1	.01299	1.22
10.0	4.0	.4	.000252	360.0	.01113	1.43	36.0	.01113	1.43	3.6	.01113	1.43
11.3	4.5	.4	.000252	405.0	.00965	1.64	40.5	.00965	1.64	4.0	.00965	1.64
12.5	5.0	.4	.000252	450.0	.00846	1.88	45.0	.00846	1.88	4.5	.00846	1.88
1.3	1.0	.8	.000252	45.0	.02900	.55	4.5	.02900	.55	.5	.02900	.55
1.9	1.5	.8	.000252	67.5	.02326	.68	6.8	.02326	.68	.7	.02326	.68
2.5	2.0	.8	.000252	90.0	.01951	.81	9.0	.01951	.81	.9	.01951	.81
3.1	2.5	.8	.000252	112.5	.01674	.95	11.3	.01674	.95	1.1	.01674	.95
3.8	3.0	.8	.000252	135.0	.01459	1.09	13.5	.01459	1.09	1.4	.01459	1.09
4.4	3.5	.8	.000252	157.5	.01287	1.23	15.8	.01287	1.23	1.6	.01287	1.23
5.0	4.0	.8	.000252	180.0	.01145	1.39	18.0	.01145	1.39	1.8	.01145	1.39
5.6	4.5	.8	.000252	202.5	.01027	1.55	20.3	.01027	1.55	2.0	.01027	1.55
6.3	5.0	.8	.000252	225.0	.00928	1.71	22.5	.00928	1.71	2.3	.00928	1.71

Table SA-22
Results of Waste Dilution - Summer - Ship 5
(L = 1.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 500 gpm							
5.0	1.0	.2	.000360	180.0	.02167	.51	18.0	.01705	.65	1.8	.01705	.65
7.5	1.5	.2	.000360	270.0	.01396	.80	27.0	.01145	.97	2.7	.01145	.97
10.0	2.0	.2	.000360	360.0	.00964	1.15	36.0	.00829	1.34	3.6	.00829	1.34
12.5	2.5	.2	.000360	450.0	.00714	1.56	45.0	.00630	1.76	4.5	.00630	1.76
15.0	3.0	.2	.000360	540.0	.00554	2.01	54.0	.00496	2.24	5.4	.00496	2.24
17.5	3.5	.2	.000360	630.0	.00443	2.51	63.0	.00402	2.77	6.3	.00402	2.77
20.0	4.0	.2	.000360	720.0	.00363	3.06	72.0	.00332	3.35	7.2	.00332	3.35
22.5	4.5	.2	.000360	810.0	.00303	3.66	81.0	.00279	3.98	8.1	.00279	3.98
25.0	5.0	.2	.000360	900.0	.00257	4.32	90.0	.00238	4.66	9.0	.00238	4.66
2.5	1.0	.4	.000360	90.0	.01453	.77	9.0	.01453	.77	.9	.01453	.77
3.8	1.5	.4	.000360	135.0	.01235	.90	13.5	.01087	1.02	1.4	.01087	1.02
5.0	2.0	.4	.000360	180.0	.01084	1.03	18.0	.00853	1.30	1.8	.00853	1.30
6.3	2.5	.4	.000360	225.0	.00877	1.27	22.5	.00691	1.61	2.3	.00691	1.61
7.5	3.0	.4	.000360	270.0	.00698	1.59	27.0	.00573	1.94	2.7	.00573	1.94
8.8	3.5	.4	.000360	315.0	.00574	1.94	31.5	.00484	2.30	3.1	.00484	2.30
10.0	4.0	.4	.000360	360.0	.00482	2.30	36.0	.00414	2.68	3.6	.00414	2.68
11.3	4.5	.4	.000360	405.0	.00412	2.70	40.5	.00359	3.09	4.0	.00359	3.09
12.5	5.0	.4	.000360	450.0	.00357	3.11	45.0	.00315	3.53	4.5	.00315	3.53
1.3	1.0	.8	.000360	45.0	.01080	1.03	4.5	.01080	1.03	.5	.01080	1.03
1.9	1.5	.8	.000360	67.5	.00866	1.28	6.8	.00866	1.28	.7	.00866	1.28
2.5	2.0	.8	.000360	90.0	.00726	1.53	9.0	.00726	1.53	.9	.00726	1.53
3.1	2.5	.8	.000360	112.5	.00658	1.69	11.3	.00623	1.78	1.1	.00623	1.78
3.8	3.0	.8	.000360	135.0	.00618	1.80	13.5	.00543	2.05	1.4	.00543	2.05
4.4	3.5	.8	.000360	157.5	.00579	1.92	15.8	.00479	2.32	1.6	.00479	2.32
5.0	4.0	.8	.000360	180.0	.00542	2.05	18.0	.00426	2.61	1.8	.00426	2.61
5.6	4.5	.8	.000360	202.5	.00503	2.21	20.3	.00382	2.91	2.0	.00382	2.91
6.3	5.0	.8	.000360	225.0	.00440	2.52	22.5	.00345	3.22	2.3	.00345	3.22
					Q = 600 gpm							
5.0	1.0	.2	.000432	180.0	.02167	.43	18.0	.01705	.54	1.8	.01705	.54
7.5	1.5	.2	.000432	270.0	.01396	.66	27.0	.01145	.81	2.7	.01145	.81
10.0	2.0	.2	.000432	360.0	.00964	.96	36.0	.00829	1.12	3.6	.00829	1.12
12.5	2.5	.2	.000432	450.0	.00714	1.30	45.0	.00630	1.47	4.5	.00630	1.47
15.0	3.0	.2	.000432	540.0	.00554	1.67	54.0	.00496	1.87	5.4	.00496	1.87
17.5	3.5	.2	.000432	630.0	.00443	2.09	63.0	.00402	2.31	6.3	.00402	2.31
20.0	4.0	.2	.000432	720.0	.00363	2.55	72.0	.00332	2.79	7.2	.00332	2.79
22.5	4.5	.2	.000432	810.0	.00303	3.05	81.0	.00279	3.32	8.1	.00279	3.32
25.0	5.0	.2	.000432	900.0	.00257	3.60	90.0	.00238	3.89	9.0	.00238	3.89
2.5	1.0	.4	.000432	90.0	.01453	.64	9.0	.01453	.64	.9	.01453	.64
3.8	1.5	.4	.000432	135.0	.01235	.75	13.5	.01087	.85	1.4	.01087	.85
5.0	2.0	.4	.000432	180.0	.01084	.85	18.0	.00853	1.09	1.8	.00853	1.09
6.3	2.5	.4	.000432	225.0	.00877	1.06	22.5	.00691	1.34	2.3	.00691	1.34
7.5	3.0	.4	.000432	270.0	.00698	1.33	27.0	.00573	1.62	2.7	.00573	1.62
8.8	3.5	.4	.000432	315.0	.00574	1.61	31.5	.00484	1.92	3.1	.00484	1.92
10.0	4.0	.4	.000432	360.0	.00482	1.92	36.0	.00414	2.24	3.6	.00414	2.24
11.3	4.5	.4	.000432	405.0	.00412	2.25	40.5	.00359	2.58	4.0	.00359	2.58
12.5	5.0	.4	.000432	450.0	.00357	2.59	45.0	.00315	2.94	4.5	.00315	2.94
1.3	1.0	.8	.000432	45.0	.01080	.86	4.5	.01080	.86	.5	.01080	.86
1.9	1.5	.8	.000432	67.5	.00866	1.07	6.8	.00866	1.07	.7	.00866	1.07
2.5	2.0	.8	.000432	90.0	.00726	1.28	9.0	.00726	1.28	.9	.00726	1.28
3.1	2.5	.8	.000432	112.5	.00658	1.41	11.3	.00623	1.49	1.1	.00623	1.49
3.8	3.0	.8	.000432	135.0	.00618	1.50	13.5	.00543	1.70	1.4	.00543	1.70
4.4	3.5	.8	.000432	157.5	.00579	1.60	15.8	.00479	1.93	1.6	.00479	1.93
5.0	4.0	.8	.000432	180.0	.00542	1.71	18.0	.00426	2.17	1.8	.00426	2.17
5.6	4.5	.8	.000432	202.5	.00503	1.84	20.3	.00382	2.42	2.0	.00382	2.42
6.3	5.0	.8	.000432	225.0	.00440	2.10	22.5	.00345	2.68	2.3	.00345	2.68

Table SA-22 (continued)
Results of Waste Dilution - Summer - Ship 5
(L = 1.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 700 gpm							
5.0	1.0	.2	.000504	180.0	.02167	.37	18.0	.01705	.47	1.8	.01705	.47
7.5	1.5	.2	.000504	270.0	.01396	.57	27.0	.01145	.69	2.7	.01145	.69
10.0	2.0	.2	.000504	360.0	.00964	.82	36.0	.00829	.96	3.6	.00829	.96
12.5	2.5	.2	.000504	450.0	.00714	1.11	45.0	.00630	1.26	4.5	.00630	1.26
15.0	3.0	.2	.000504	540.0	.00554	1.43	54.0	.00496	1.60	5.4	.00496	1.60
17.5	3.5	.2	.000504	630.0	.00443	1.79	63.0	.00402	1.98	6.3	.00402	1.98
20.0	4.0	.2	.000504	720.0	.00363	2.19	72.0	.00332	2.39	7.2	.00332	2.39
22.5	4.5	.2	.000504	810.0	.00303	2.62	81.0	.00279	2.84	8.1	.00279	2.84
25.0	5.0	.2	.000504	900.0	.00257	3.08	90.0	.00238	3.33	9.0	.00238	3.33
2.5	1.0	.4	.000504	90.0	.01453	.55	9.0	.01453	.55	.9	.01453	.55
3.8	1.5	.4	.000504	135.0	.01235	.64	13.5	.01087	.73	1.4	.01087	.73
5.0	2.0	.4	.000504	180.0	.01084	.73	18.0	.00853	.93	1.8	.00853	.93
6.3	2.5	.4	.000504	225.0	.00877	.91	22.5	.00691	1.15	2.3	.00691	1.15
7.5	3.0	.4	.000504	270.0	.00698	1.14	27.0	.00573	1.39	2.7	.00573	1.39
8.8	3.5	.4	.000504	315.0	.00574	1.38	31.5	.00484	1.64	3.1	.00484	1.64
10.0	4.0	.4	.000504	360.0	.00482	1.65	36.0	.00414	1.92	3.6	.00414	1.92
11.3	4.5	.4	.000504	405.0	.00412	1.93	40.5	.00359	2.21	4.0	.00359	2.21
12.5	5.0	.4	.000504	450.0	.00357	2.22	45.0	.00315	2.52	4.5	.00315	2.52
1.3	1.0	.8	.000504	45.0	.01080	.74	4.5	.01080	.74	.5	.01080	.74
1.9	1.5	.8	.000504	67.5	.00866	.92	6.8	.00866	.92	.7	.00866	.92
2.5	2.0	.8	.000504	90.0	.00726	1.09	9.0	.00726	1.09	.9	.00726	1.09
3.1	2.5	.8	.000504	112.5	.00658	1.21	11.3	.00623	1.27	1.1	.00623	1.27
3.8	3.0	.8	.000504	135.0	.00618	1.29	13.5	.00543	1.46	1.4	.00543	1.46
4.4	3.5	.8	.000504	157.5	.00579	1.37	15.8	.00479	1.66	1.6	.00479	1.66
5.0	4.0	.8	.000504	180.0	.00542	1.47	18.0	.00426	1.86	1.8	.00426	1.86
5.6	4.5	.8	.000504	202.5	.00503	1.58	20.3	.00382	2.08	2.0	.00382	2.08
6.3	5.0	.8	.000504	225.0	.00440	1.80	22.5	.00345	2.30	2.3	.00345	2.30
					Q = 1000 gpm							
5.0	1.0	.2	.000720	180.0	.02167	.26	18.0	.01705	.33	1.8	.01705	.33
7.5	1.5	.2	.000720	270.0	.01396	.40	27.0	.01145	.49	2.7	.01145	.49
10.0	2.0	.2	.000720	360.0	.00964	.58	36.0	.00829	.67	3.6	.00829	.67
12.5	2.5	.2	.000720	450.0	.00714	.78	45.0	.00630	.88	4.5	.00630	.88
15.0	3.0	.2	.000720	540.0	.00554	1.00	54.0	.00496	1.12	5.4	.00496	1.12
17.5	3.5	.2	.000720	630.0	.00443	1.25	63.0	.00402	1.38	6.3	.00402	1.38
20.0	4.0	.2	.000720	720.0	.00363	1.53	72.0	.00332	1.67	7.2	.00332	1.67
22.5	4.5	.2	.000720	810.0	.00303	1.83	81.0	.00279	1.99	8.1	.00279	1.99
25.0	5.0	.2	.000720	900.0	.00257	2.16	90.0	.00238	2.33	9.0	.00238	2.33
2.5	1.0	.4	.000720	90.0	.01453	.38	9.0	.01453	.38	.9	.01453	.38
3.8	1.5	.4	.000720	135.0	.01235	.45	13.5	.01087	.51	1.4	.01087	.51
5.0	2.0	.4	.000720	180.0	.01084	.51	18.0	.00853	.65	1.8	.00853	.65
6.3	2.5	.4	.000720	225.0	.00877	.63	22.5	.00691	.80	2.3	.00691	.80
7.5	3.0	.4	.000720	270.0	.00698	.80	27.0	.00573	.97	2.7	.00573	.97
8.8	3.5	.4	.000720	315.0	.00574	.97	31.5	.00484	1.15	3.1	.00484	1.15
10.0	4.0	.4	.000720	360.0	.00482	1.15	36.0	.00414	1.34	3.6	.00414	1.34
11.3	4.5	.4	.000720	405.0	.00412	1.35	40.5	.00359	1.55	4.0	.00359	1.55
12.5	5.0	.4	.000720	450.0	.00357	1.56	45.0	.00315	1.76	4.5	.00315	1.76
1.3	1.0	.8	.000720	45.0	.01080	.51	4.5	.01080	.51	.5	.01080	.51
1.9	1.5	.8	.000720	67.5	.00866	.64	6.8	.00866	.64	.7	.00866	.64
2.5	2.0	.8	.000720	90.0	.00726	.77	9.0	.00726	.77	.9	.00726	.77
3.1	2.5	.8	.000720	112.5	.00658	.84	11.3	.00623	.89	1.1	.00623	.89
3.8	3.0	.8	.000720	135.0	.00618	.90	13.5	.00543	1.02	1.4	.00543	1.02
4.4	3.5	.8	.000720	157.5	.00579	.96	15.8	.00479	1.16	1.6	.00479	1.16
5.0	4.0	.8	.000720	180.0	.00542	1.03	18.0	.00426	1.30	1.8	.00426	1.30
5.6	4.5	.8	.000720	202.5	.00503	1.11	20.3	.00382	1.45	2.0	.00382	1.45
6.3	5.0	.8	.000720	225.0	.00440	1.26	22.5	.00345	1.61	2.3	.00345	1.61

Table SA-22 (continued)
Results of Waste Dilution - Summer - Ship 5
(L = 1.0 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 1200 gpm								
5.0	1.0	.2	.000864	180.0	.02167	.21	18.0	.01705	.27	1.8	.01705	.27
7.5	1.5	.2	.000864	270.0	.01396	.33	27.0	.01145	.40	2.7	.01145	.40
10.0	2.0	.2	.000864	360.0	.00964	.48	36.0	.00829	.56	3.6	.00829	.56
12.5	2.5	.2	.000864	450.0	.00714	.65	45.0	.00630	.73	4.5	.00630	.73
15.0	3.0	.2	.000864	540.0	.00554	.84	54.0	.00496	.93	5.4	.00496	.93
17.5	3.5	.2	.000864	630.0	.00443	1.05	63.0	.00402	1.15	6.3	.00402	1.15
20.0	4.0	.2	.000864	720.0	.00363	1.28	72.0	.00332	1.39	7.2	.00332	1.39
22.5	4.5	.2	.000864	810.0	.00303	1.53	81.0	.00279	1.66	8.1	.00279	1.66
25.0	5.0	.2	.000864	900.0	.00257	1.80	90.0	.00238	1.94	9.0	.00238	1.94
2.5	1.0	.4	.000864	90.0	.01453	.32	9.0	.01453	.32	.9	.01453	.32
3.8	1.5	.4	.000864	135.0	.01235	.37	13.5	.01087	.43	1.4	.01087	.43
5.0	2.0	.4	.000864	180.0	.01084	.43	18.0	.00853	.54	1.8	.00853	.54
6.3	2.5	.4	.000864	225.0	.00877	.53	22.5	.00691	.67	2.3	.00691	.67
7.5	3.0	.4	.000864	270.0	.00698	.66	27.0	.00573	.81	2.7	.00573	.81
8.8	3.5	.4	.000864	315.0	.00574	.81	31.5	.00484	.96	3.1	.00484	.96
10.0	4.0	.4	.000864	360.0	.00482	.96	36.0	.00414	1.12	3.6	.00414	1.12
11.3	4.5	.4	.000864	405.0	.00412	1.12	40.5	.00359	1.29	4.0	.00359	1.29
12.5	5.0	.4	.000864	450.0	.00357	1.30	45.0	.00315	1.47	4.5	.00315	1.47
1.3	1.0	.8	.000864	45.0	.01080	.43	4.5	.01080	.43	.5	.01080	.43
1.9	1.5	.8	.000864	67.5	.00866	.53	6.8	.00866	.53	.7	.00866	.53
2.5	2.0	.8	.000864	90.0	.00726	.64	9.0	.00726	.64	.9	.00726	.64
3.1	2.5	.8	.000864	112.5	.00658	.70	11.3	.00623	.74	1.1	.00623	.74
3.8	3.0	.8	.000864	135.0	.00618	.75	13.5	.00543	.85	1.4	.00543	.85
4.4	3.5	.8	.000864	157.5	.00579	.80	15.8	.00479	.97	1.6	.00479	.97
5.0	4.0	.8	.000864	180.0	.00542	.85	18.0	.00426	1.09	1.8	.00426	1.09
5.6	4.5	.8	.000864	202.5	.00503	.92	20.3	.00382	1.21	2.0	.00382	1.21
6.3	5.0	.8	.000864	225.0	.00440	1.05	22.5	.00345	1.34	2.3	.00345	1.34
				Q = 1400 gpm								
5.0	1.0	.2	.001008	180.0	.02167	.18	18.0	.01705	.23	1.8	.01705	.23
7.5	1.5	.2	.001008	270.0	.01396	.28	27.0	.01145	.35	2.7	.01145	.35
10.0	2.0	.2	.001008	360.0	.00964	.41	36.0	.00829	.48	3.6	.00829	.48
12.5	2.5	.2	.001008	450.0	.00714	.56	45.0	.00630	.63	4.5	.00630	.63
15.0	3.0	.2	.001008	540.0	.00554	.72	54.0	.00496	.80	5.4	.00496	.80
17.5	3.5	.2	.001008	630.0	.00443	.90	63.0	.00402	.99	6.3	.00402	.99
20.0	4.0	.2	.001008	720.0	.00363	1.09	72.0	.00332	1.20	7.2	.00332	1.20
22.5	4.5	.2	.001008	810.0	.00303	1.31	81.0	.00279	1.42	8.1	.00279	1.42
25.0	5.0	.2	.001008	900.0	.00257	1.54	90.0	.00238	1.67	9.0	.00238	1.67
2.5	1.0	.4	.001008	90.0	.01453	.27	9.0	.01453	.27	.9	.01453	.27
3.8	1.5	.4	.001008	135.0	.01235	.32	13.5	.01087	.37	1.4	.01087	.37
5.0	2.0	.4	.001008	180.0	.01084	.37	18.0	.00853	.47	1.8	.00853	.47
6.3	2.5	.4	.001008	225.0	.00877	.45	22.5	.00691	.57	2.3	.00691	.57
7.5	3.0	.4	.001008	270.0	.00698	.57	27.0	.00573	.69	2.7	.00573	.69
8.8	3.5	.4	.001008	315.0	.00574	.69	31.5	.00484	.82	3.1	.00484	.82
10.0	4.0	.4	.001008	360.0	.00482	.82	36.0	.00414	.96	3.6	.00414	.96
11.3	4.5	.4	.001008	405.0	.00412	.96	40.5	.00359	1.10	4.0	.00359	1.10
12.5	5.0	.4	.001008	450.0	.00357	1.11	45.0	.00315	1.26	4.5	.00315	1.26
1.3	1.0	.8	.001008	45.0	.01080	.37	4.5	.01080	.37	.5	.01080	.37
1.9	1.5	.8	.001008	67.5	.00866	.46	6.8	.00866	.46	.7	.00866	.46
2.5	2.0	.8	.001008	90.0	.00726	.55	9.0	.00726	.55	.9	.00726	.55
3.1	2.5	.8	.001008	112.5	.00658	.60	11.3	.00623	.64	1.1	.00623	.64
3.8	3.0	.8	.001008	135.0	.00618	.64	13.5	.00543	.73	1.4	.00543	.73
4.4	3.5	.8	.001008	157.5	.00579	.69	15.8	.00479	.83	1.6	.00479	.83
5.0	4.0	.8	.001008	180.0	.00542	.73	18.0	.00426	.93	1.8	.00426	.93
5.6	4.5	.8	.001008	202.5	.00503	.79	20.3	.00382	1.04	2.0	.00382	1.04
6.3	5.0	.8	.001008	225.0	.00440	.90	22.5	.00345	1.15	2.3	.00345	1.15

Table SA-23
Results of Waste Dilution - Winter - Ship 5
(L = 1.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 500 gpm							
5.0	1.0	.2	.000360	180.0	.01145	.97	18.0	.01145	.97	1.8	.01145	.97
7.5	1.5	.2	.000360	270.0	.00769	1.45	27.0	.00769	1.45	2.7	.00769	1.45
10.0	2.0	.2	.000360	360.0	.00557	2.00	36.0	.00557	2.00	3.6	.00557	2.00
12.5	2.5	.2	.000360	450.0	.00423	2.63	45.0	.00423	2.63	4.5	.00423	2.63
15.0	3.0	.2	.000360	540.0	.00333	3.33	54.0	.00333	3.33	5.4	.00333	3.33
17.5	3.5	.2	.000360	630.0	.00270	4.12	63.0	.00270	4.12	6.3	.00270	4.12
20.0	4.0	.2	.000360	720.0	.00223	4.98	72.0	.00223	4.98	7.2	.00223	4.98
22.5	4.5	.2	.000360	810.0	.00188	5.92	81.0	.00188	5.92	8.1	.00188	5.92
25.0	5.0	.2	.000360	900.0	.00160	6.94	90.0	.00160	6.94	9.0	.00160	6.94
2.5	1.0	.4	.000360	90.0	.00975	1.14	9.0	.00975	1.14	.9	.00975	1.14
3.8	1.5	.4	.000360	135.0	.00730	1.52	13.5	.00730	1.52	1.4	.00730	1.52
5.0	2.0	.4	.000360	180.0	.00573	1.94	18.0	.00573	1.94	1.8	.00573	1.94
6.3	2.5	.4	.000360	225.0	.00464	2.40	22.5	.00464	2.40	2.3	.00464	2.40
7.5	3.0	.4	.000360	270.0	.00385	2.89	27.0	.00385	2.89	2.7	.00385	2.89
8.8	3.5	.4	.000360	315.0	.00325	3.42	31.5	.00325	3.42	3.1	.00325	3.42
10.0	4.0	.4	.000360	360.0	.00278	3.99	36.0	.00278	3.99	3.6	.00278	3.99
11.3	4.5	.4	.000360	405.0	.00241	4.60	40.5	.00241	4.60	4.0	.00241	4.60
12.5	5.0	.4	.000360	450.0	.00212	5.25	45.0	.00212	5.25	4.5	.00212	5.25
1.3	1.0	.8	.000360	45.0	.00725	1.53	4.5	.00725	1.53	.5	.00725	1.53
1.9	1.5	.8	.000360	67.5	.00582	1.91	6.8	.00582	1.91	.7	.00582	1.91
2.5	2.0	.8	.000360	90.0	.00488	2.28	9.0	.00488	2.28	.9	.00488	2.28
3.1	2.5	.8	.000360	112.5	.00419	2.65	11.3	.00419	2.65	1.1	.00419	2.65
3.8	3.0	.8	.000360	135.0	.00365	3.05	13.5	.00365	3.05	1.4	.00365	3.05
4.4	3.5	.8	.000360	157.5	.00322	3.45	15.8	.00322	3.45	1.6	.00322	3.45
5.0	4.0	.8	.000360	180.0	.00286	3.88	18.0	.00286	3.88	1.8	.00286	3.88
5.6	4.5	.8	.000360	202.5	.00257	4.33	20.3	.00257	4.33	2.0	.00257	4.33
6.3	5.0	.8	.000360	225.0	.00232	4.79	22.5	.00232	4.79	2.3	.00232	4.79
					Q = 600 gpm							
5.0	1.0	.2	.000432	180.0	.01145	.81	18.0	.01145	.81	1.8	.01145	.81
7.5	1.5	.2	.000432	270.0	.00769	1.20	27.0	.00769	1.20	2.7	.00769	1.20
10.0	2.0	.2	.000432	360.0	.00557	1.66	36.0	.00557	1.66	3.6	.00557	1.66
12.5	2.5	.2	.000432	450.0	.00423	2.19	45.0	.00423	2.19	4.5	.00423	2.19
15.0	3.0	.2	.000432	540.0	.00333	2.78	54.0	.00333	2.78	5.4	.00333	2.78
17.5	3.5	.2	.000432	630.0	.00270	3.43	63.0	.00270	3.43	6.3	.00270	3.43
20.0	4.0	.2	.000432	720.0	.00223	4.15	72.0	.00223	4.15	7.2	.00223	4.15
22.5	4.5	.2	.000432	810.0	.00188	4.94	81.0	.00188	4.94	8.1	.00188	4.94
25.0	5.0	.2	.000432	900.0	.00160	5.79	90.0	.00160	5.79	9.0	.00160	5.79
2.5	1.0	.4	.000432	90.0	.00975	.95	9.0	.00975	.95	.9	.00975	.95
3.8	1.5	.4	.000432	135.0	.00730	1.27	13.5	.00730	1.27	1.4	.00730	1.27
5.0	2.0	.4	.000432	180.0	.00573	1.62	18.0	.00573	1.62	1.8	.00573	1.62
6.3	2.5	.4	.000432	225.0	.00464	2.00	22.5	.00464	2.00	2.3	.00464	2.00
7.5	3.0	.4	.000432	270.0	.00385	2.41	27.0	.00385	2.41	2.7	.00385	2.41
8.8	3.5	.4	.000432	315.0	.00325	2.85	31.5	.00325	2.85	3.1	.00325	2.85
10.0	4.0	.4	.000432	360.0	.00278	3.33	36.0	.00278	3.33	3.6	.00278	3.33
11.3	4.5	.4	.000432	405.0	.00241	3.84	40.5	.00241	3.84	4.0	.00241	3.84
12.5	5.0	.4	.000432	450.0	.00212	4.38	45.0	.00212	4.38	4.5	.00212	4.38
1.3	1.0	.8	.000432	45.0	.00725	1.28	4.5	.00725	1.28	.5	.00725	1.28
1.9	1.5	.8	.000432	67.5	.00582	1.59	6.8	.00582	1.59	.7	.00582	1.59
2.5	2.0	.8	.000432	90.0	.00488	1.90	9.0	.00488	1.90	.9	.00488	1.90
3.1	2.5	.8	.000432	112.5	.00419	2.21	11.3	.00419	2.21	1.1	.00419	2.21
3.8	3.0	.8	.000432	135.0	.00365	2.54	13.5	.00365	2.54	1.4	.00365	2.54
4.4	3.5	.8	.000432	157.5	.00322	2.88	15.8	.00322	2.88	1.6	.00322	2.88
5.0	4.0	.8	.000432	180.0	.00286	3.23	18.0	.00286	3.23	1.8	.00286	3.23
5.6	4.5	.8	.000432	202.5	.00257	3.61	20.3	.00257	3.61	2.0	.00257	3.61
6.3	5.0	.8	.000432	225.0	.00232	3.99	22.5	.00232	3.99	2.3	.00232	3.99

Table SA-23 (continued)
Results of Waste Dilution - Winter - Ship 5
(L = 1.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 700 gpm							
5.0	1.0	.2	.000504	180.0	.01145	.69	18.0	.01145	.69	1.8	.01145	.69
7.5	1.5	.2	.000504	270.0	.00769	1.03	27.0	.00769	1.03	2.7	.00769	1.03
10.0	2.0	.2	.000504	360.0	.00557	1.43	36.0	.00557	1.43	3.6	.00557	1.43
12.5	2.5	.2	.000504	450.0	.00423	1.88	45.0	.00423	1.88	4.5	.00423	1.88
15.0	3.0	.2	.000504	540.0	.00333	2.38	54.0	.00333	2.38	5.4	.00333	2.38
17.5	3.5	.2	.000504	630.0	.00270	2.94	63.0	.00270	2.94	6.3	.00270	2.94
20.0	4.0	.2	.000504	720.0	.00223	3.56	72.0	.00223	3.56	7.2	.00223	3.56
22.5	4.5	.2	.000504	810.0	.00188	4.23	81.0	.00188	4.23	8.1	.00188	4.23
25.0	5.0	.2	.000504	900.0	.00160	4.96	90.0	.00160	4.96	9.0	.00160	4.96
2.5	1.0	.4	.000504	90.0	.00975	.81	9.0	.00975	.81	.9	.00975	.81
3.8	1.5	.4	.000504	135.0	.00730	1.09	13.5	.00730	1.09	1.4	.00730	1.09
5.0	2.0	.4	.000504	180.0	.00573	1.39	18.0	.00573	1.39	1.8	.00573	1.39
6.3	2.5	.4	.000504	225.0	.00464	1.71	22.5	.00464	1.71	2.3	.00464	1.71
7.5	3.0	.4	.000504	270.0	.00385	2.06	27.0	.00385	2.06	2.7	.00385	2.06
8.8	3.5	.4	.000504	315.0	.00325	2.44	31.5	.00325	2.44	3.1	.00325	2.44
10.0	4.0	.4	.000504	360.0	.00278	2.85	36.0	.00278	2.85	3.6	.00278	2.85
11.3	4.5	.4	.000504	405.0	.00241	3.29	40.5	.00241	3.29	4.0	.00241	3.29
12.5	5.0	.4	.000504	450.0	.00212	3.75	45.0	.00212	3.75	4.5	.00212	3.75
1.3	1.0	.8	.000504	45.0	.00725	1.09	4.5	.00725	1.09	.5	.00725	1.09
1.9	1.5	.8	.000504	67.5	.00582	1.37	6.8	.00582	1.37	.7	.00582	1.37
2.5	2.0	.8	.000504	90.0	.00488	1.63	9.0	.00488	1.63	.9	.00488	1.63
3.1	2.5	.8	.000504	112.5	.00419	1.90	11.3	.00419	1.90	1.1	.00419	1.90
3.8	3.0	.8	.000504	135.0	.00365	2.18	13.5	.00365	2.18	1.4	.00365	2.18
4.4	3.5	.8	.000504	157.5	.00322	2.47	15.8	.00322	2.47	1.6	.00322	2.47
5.0	4.0	.8	.000504	180.0	.00286	2.77	18.0	.00286	2.77	1.8	.00286	2.77
5.6	4.5	.8	.000504	202.5	.00257	3.09	20.3	.00257	3.09	2.0	.00257	3.09
6.3	5.0	.8	.000504	225.0	.00232	3.42	22.5	.00232	3.42	2.3	.00232	3.42
					Q = 1000 gpm							
5.0	1.0	.2	.000720	180.0	.01145	.49	18.0	.01145	.49	1.8	.01145	.49
7.5	1.5	.2	.000720	270.0	.00769	.72	27.0	.00769	.72	2.7	.00769	.72
10.0	2.0	.2	.000720	360.0	.00557	1.00	36.0	.00557	1.00	3.6	.00557	1.00
12.5	2.5	.2	.000720	450.0	.00423	1.31	45.0	.00423	1.31	4.5	.00423	1.31
15.0	3.0	.2	.000720	540.0	.00333	1.67	54.0	.00333	1.67	5.4	.00333	1.67
17.5	3.5	.2	.000720	630.0	.00270	2.06	63.0	.00270	2.06	6.3	.00270	2.06
20.0	4.0	.2	.000720	720.0	.00223	2.49	72.0	.00223	2.49	7.2	.00223	2.49
22.5	4.5	.2	.000720	810.0	.00188	2.96	81.0	.00188	2.96	8.1	.00188	2.96
25.0	5.0	.2	.000720	900.0	.00160	3.47	90.0	.00160	3.47	9.0	.00160	3.47
2.5	1.0	.4	.000720	90.0	.00975	.57	9.0	.00975	.57	.9	.00975	.57
3.8	1.5	.4	.000720	135.0	.00730	.76	13.5	.00730	.76	1.4	.00730	.76
5.0	2.0	.4	.000720	180.0	.00573	.97	18.0	.00573	.97	1.8	.00573	.97
6.3	2.5	.4	.000720	225.0	.00464	1.20	22.5	.00464	1.20	2.3	.00464	1.20
7.5	3.0	.4	.000720	270.0	.00385	1.45	27.0	.00385	1.45	2.7	.00385	1.45
8.8	3.5	.4	.000720	315.0	.00325	1.71	31.5	.00325	1.71	3.1	.00325	1.71
10.0	4.0	.4	.000720	360.0	.00278	2.00	36.0	.00278	2.00	3.6	.00278	2.00
11.3	4.5	.4	.000720	405.0	.00241	2.30	40.5	.00241	2.30	4.0	.00241	2.30
12.5	5.0	.4	.000720	450.0	.00212	2.63	45.0	.00212	2.63	4.5	.00212	2.63
1.3	1.0	.8	.000720	45.0	.00725	.77	4.5	.00725	.77	.5	.00725	.77
1.9	1.5	.8	.000720	67.5	.00582	.96	6.8	.00582	.96	.7	.00582	.96
2.5	2.0	.8	.000720	90.0	.00488	1.14	9.0	.00488	1.14	.9	.00488	1.14
3.1	2.5	.8	.000720	112.5	.00419	1.33	11.3	.00419	1.33	1.1	.00419	1.33
3.8	3.0	.8	.000720	135.0	.00365	1.52	13.5	.00365	1.52	1.4	.00365	1.52
4.4	3.5	.8	.000720	157.5	.00322	1.73	15.8	.00322	1.73	1.6	.00322	1.73
5.0	4.0	.8	.000720	180.0	.00286	1.94	18.0	.00286	1.94	1.8	.00286	1.94
5.6	4.5	.8	.000720	202.5	.00257	2.16	20.3	.00257	2.16	2.0	.00257	2.16
6.3	5.0	.8	.000720	225.0	.00232	2.40	22.5	.00232	2.40	2.3	.00232	2.40

Table SA-23 (continued)
Results of Waste Dilution - Winter - Ship 5
(L = 1.0 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 1200 gpm							
5.0	1.0	.2	.000864	180.0	.01145	.40	18.0	.01145	.40	1.8	.01145	.40
7.5	1.5	.2	.000864	270.0	.00769	.60	27.0	.00769	.60	2.7	.00769	.60
10.0	2.0	.2	.000864	360.0	.00557	.83	36.0	.00557	.83	3.6	.00557	.83
12.5	2.5	.2	.000864	450.0	.00423	1.09	45.0	.00423	1.09	4.5	.00423	1.09
15.0	3.0	.2	.000864	540.0	.00333	1.39	54.0	.00333	1.39	5.4	.00333	1.39
17.5	3.5	.2	.000864	630.0	.00270	1.72	63.0	.00270	1.72	6.3	.00270	1.72
20.0	4.0	.2	.000864	720.0	.00223	2.08	72.0	.00223	2.08	7.2	.00223	2.08
22.5	4.5	.2	.000864	810.0	.00188	2.47	81.0	.00188	2.47	8.1	.00188	2.47
25.0	5.0	.2	.000864	900.0	.00160	2.89	90.0	.00160	2.89	9.0	.00160	2.89
2.5	1.0	.4	.000864	90.0	.00975	.47	9.0	.00975	.47	.9	.00975	.47
3.8	1.5	.4	.000864	135.0	.00730	.63	13.5	.00730	.63	1.4	.00730	.63
5.0	2.0	.4	.000864	180.0	.00573	.81	18.0	.00573	.81	1.8	.00573	.81
6.3	2.5	.4	.000864	225.0	.00464	1.00	22.5	.00464	1.00	2.3	.00464	1.00
7.5	3.0	.4	.000864	270.0	.00385	1.20	27.0	.00385	1.20	2.7	.00385	1.20
8.8	3.5	.4	.000864	315.0	.00325	1.43	31.5	.00325	1.43	3.1	.00325	1.43
10.0	4.0	.4	.000864	360.0	.00278	1.66	36.0	.00278	1.66	3.6	.00278	1.66
11.3	4.5	.4	.000864	405.0	.00241	1.92	40.5	.00241	1.92	4.0	.00241	1.92
12.5	5.0	.4	.000864	450.0	.00212	2.19	45.0	.00212	2.19	4.5	.00212	2.19
1.3	1.0	.8	.000864	45.0	.00725	.64	4.5	.00725	.64	.5	.00725	.64
1.9	1.5	.8	.000864	67.5	.00582	.80	6.8	.00582	.80	.7	.00582	.80
2.5	2.0	.8	.000864	90.0	.00488	.95	9.0	.00488	.95	.9	.00488	.95
3.1	2.5	.8	.000864	112.5	.00419	1.11	11.3	.00419	1.11	1.1	.00419	1.11
3.8	3.0	.8	.000864	135.0	.00365	1.27	13.5	.00365	1.27	1.4	.00365	1.27
4.4	3.5	.8	.000864	157.5	.00322	1.44	15.8	.00322	1.44	1.6	.00322	1.44
5.0	4.0	.8	.000864	180.0	.00286	1.62	18.0	.00286	1.62	1.8	.00286	1.62
5.6	4.5	.8	.000864	202.5	.00257	1.80	20.3	.00257	1.80	2.0	.00257	1.80
6.3	5.0	.8	.000864	225.0	.00232	2.00	22.5	.00232	2.00	2.3	.00232	2.00
					Q = 1400 gpm							
5.0	1.0	.2	.001008	180.0	.01145	.35	18.0	.01145	.35	1.8	.01145	.35
7.5	1.5	.2	.001008	270.0	.00769	.52	27.0	.00769	.52	2.7	.00769	.52
10.0	2.0	.2	.001008	360.0	.00557	.71	36.0	.00557	.71	3.6	.00557	.71
12.5	2.5	.2	.001008	450.0	.00423	.94	45.0	.00423	.94	4.5	.00423	.94
15.0	3.0	.2	.001008	540.0	.00333	1.19	54.0	.00333	1.19	5.4	.00333	1.19
17.5	3.5	.2	.001008	630.0	.00270	1.47	63.0	.00270	1.47	6.3	.00270	1.47
20.0	4.0	.2	.001008	720.0	.00223	1.78	72.0	.00223	1.78	7.2	.00223	1.78
22.5	4.5	.2	.001008	810.0	.00188	2.12	81.0	.00188	2.12	8.1	.00188	2.12
25.0	5.0	.2	.001008	900.0	.00160	2.48	90.0	.00160	2.48	9.0	.00160	2.48
2.5	1.0	.4	.001008	90.0	.00975	.41	9.0	.00975	.41	.9	.00975	.41
3.8	1.5	.4	.001008	135.0	.00730	.54	13.5	.00730	.54	1.4	.00730	.54
5.0	2.0	.4	.001008	180.0	.00573	.69	18.0	.00573	.69	1.8	.00573	.69
6.3	2.5	.4	.001008	225.0	.00464	.86	22.5	.00464	.86	2.3	.00464	.86
7.5	3.0	.4	.001008	270.0	.00385	1.03	27.0	.00385	1.03	2.7	.00385	1.03
8.8	3.5	.4	.001008	315.0	.00325	1.22	31.5	.00325	1.22	3.1	.00325	1.22
10.0	4.0	.4	.001008	360.0	.00278	1.43	36.0	.00278	1.43	3.6	.00278	1.43
11.3	4.5	.4	.001008	405.0	.00241	1.64	40.5	.00241	1.64	4.0	.00241	1.64
12.5	5.0	.4	.001008	450.0	.00212	1.88	45.0	.00212	1.88	4.5	.00212	1.88
1.3	1.0	.8	.001008	45.0	.00725	.55	4.5	.00725	.55	.5	.00725	.55
1.9	1.5	.8	.001008	67.5	.00582	.68	6.8	.00582	.68	.7	.00582	.68
2.5	2.0	.8	.001008	90.0	.00488	.81	9.0	.00488	.81	.9	.00488	.81
3.1	2.5	.8	.001008	112.5	.00419	.95	11.3	.00419	.95	1.1	.00419	.95
3.8	3.0	.8	.001008	135.0	.00365	1.09	13.5	.00365	1.09	1.4	.00365	1.09
4.4	3.5	.8	.001008	157.5	.00322	1.23	15.8	.00322	1.23	1.6	.00322	1.23
5.0	4.0	.8	.001008	180.0	.00286	1.39	18.0	.00286	1.39	1.8	.00286	1.39
5.6	4.5	.8	.001008	202.5	.00257	1.55	20.3	.00257	1.55	2.0	.00257	1.55
6.3	5.0	.8	.001008	225.0	.00232	1.71	22.5	.00232	1.71	2.3	.00232	1.71

Table SA-24
Results of Waste Dilution - Summer - Ship 1
(L = 1.1 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 500 gpm							
5.0	1.0	.2	.000202	180.0	.03587	.55	18.0	.02824	.70	1.8	.02824	.70
7.5	1.5	.2	.000202	270.0	.02336	.85	27.0	.01917	1.03	2.7	.01917	1.03
10.0	2.0	.2	.000202	360.0	.01626	1.22	36.0	.01397	1.41	3.6	.01397	1.41
12.5	2.5	.2	.000202	450.0	.01211	1.63	45.0	.01069	1.85	4.5	.01069	1.85
15.0	3.0	.2	.000202	540.0	.00943	2.10	54.0	.00846	2.34	5.4	.00846	2.34
17.5	3.5	.2	.000202	630.0	.00757	2.61	63.0	.00687	2.88	6.3	.00687	2.88
20.0	4.0	.2	.000202	720.0	.00623	3.17	72.0	.00570	3.47	7.2	.00570	3.47
22.5	4.5	.2	.000202	810.0	.00522	3.79	81.0	.00480	4.11	8.1	.00480	4.11
25.0	5.0	.2	.000202	900.0	.00444	4.45	90.0	.00411	4.81	9.0	.00411	4.81
2.5	1.0	.4	.000202	90.0	.02368	.83	9.0	.02368	.83	.9	.02368	.83
3.8	1.5	.4	.000202	135.0	.02031	.97	13.5	.01787	1.11	1.4	.01787	1.11
5.0	2.0	.4	.000202	180.0	.01795	1.10	18.0	.01412	1.40	1.8	.01412	1.40
6.3	2.5	.4	.000202	225.0	.01461	1.35	22.5	.01151	1.72	2.3	.01151	1.72
7.5	3.0	.4	.000202	270.0	.01169	1.69	27.0	.00959	2.06	2.7	.00959	2.06
8.8	3.5	.4	.000202	315.0	.00964	2.05	31.5	.00813	2.43	3.1	.00813	2.43
10.0	4.0	.4	.000202	360.0	.00813	2.43	36.0	.00699	2.83	3.6	.00699	2.83
11.3	4.5	.4	.000202	405.0	.00697	2.83	40.5	.00608	3.25	4.0	.00608	3.25
12.5	5.0	.4	.000202	450.0	.00606	3.26	45.0	.00534	3.70	4.5	.00534	3.70
1.3	1.0	.8	.000202	45.0	.01747	1.13	4.5	.01747	1.13	.5	.01747	1.13
1.9	1.5	.8	.000202	67.5	.01406	1.41	6.8	.01406	1.41	.7	.01406	1.41
2.5	2.0	.8	.000202	90.0	.01184	1.67	9.0	.01184	1.67	.9	.01184	1.67
3.1	2.5	.8	.000202	112.5	.01077	1.83	11.3	.01021	1.93	1.1	.01021	1.93
3.8	3.0	.8	.000202	135.0	.01016	1.95	13.5	.00894	2.21	1.4	.00894	2.21
4.4	3.5	.8	.000202	157.5	.00955	2.07	15.8	.00791	2.50	1.6	.00791	2.50
5.0	4.0	.8	.000202	180.0	.00898	2.20	18.0	.00706	2.80	1.8	.00706	2.80
5.6	4.5	.8	.000202	202.5	.00835	2.37	20.3	.00635	3.11	2.0	.00635	3.11
6.3	5.0	.8	.000202	225.0	.00734	2.69	22.5	.00575	3.43	2.3	.00575	3.43
					Q = 600 gpm							
5.0	1.0	.2	.000243	180.0	.03587	.46	18.0	.02824	.58	1.8	.02824	.58
7.5	1.5	.2	.000243	270.0	.02336	.70	27.0	.01917	.86	2.7	.01917	.86
10.0	2.0	.2	.000243	360.0	.01626	1.01	36.0	.01397	1.18	3.6	.01397	1.18
12.5	2.5	.2	.000243	450.0	.01211	1.36	45.0	.01069	1.54	4.5	.01069	1.54
15.0	3.0	.2	.000243	540.0	.00943	1.75	54.0	.00846	1.95	5.4	.00846	1.95
17.5	3.5	.2	.000243	630.0	.00757	2.17	63.0	.00687	2.40	6.3	.00687	2.40
20.0	4.0	.2	.000243	720.0	.00623	2.64	72.0	.00570	2.89	7.2	.00570	2.89
22.5	4.5	.2	.000243	810.0	.00522	3.16	81.0	.00480	3.43	8.1	.00480	3.43
25.0	5.0	.2	.000243	900.0	.00444	3.71	90.0	.00411	4.01	9.0	.00411	4.01
2.5	1.0	.4	.000243	90.0	.02368	.70	9.0	.02368	.70	.9	.02368	.70
3.8	1.5	.4	.000243	135.0	.02031	.81	13.5	.01787	.92	1.4	.01787	.92
5.0	2.0	.4	.000243	180.0	.01795	.92	18.0	.01412	1.17	1.8	.01412	1.17
6.3	2.5	.4	.000243	225.0	.01461	1.13	22.5	.01151	1.43	2.3	.01151	1.43
7.5	3.0	.4	.000243	270.0	.01169	1.41	27.0	.00959	1.72	2.7	.00959	1.72
8.8	3.5	.4	.000243	315.0	.00964	1.71	31.5	.00813	2.03	3.1	.00813	2.03
10.0	4.0	.4	.000243	360.0	.00813	2.02	36.0	.00699	2.36	3.6	.00699	2.36
11.3	4.5	.4	.000243	405.0	.00697	2.36	40.5	.00608	2.71	4.0	.00608	2.71
12.5	5.0	.4	.000243	450.0	.00606	2.72	45.0	.00534	3.08	4.5	.00534	3.08
1.3	1.0	.8	.000243	45.0	.01747	.94	4.5	.01747	.94	.5	.01747	.94
1.9	1.5	.8	.000243	67.5	.01406	1.17	6.8	.01406	1.17	.7	.01406	1.17
2.5	2.0	.8	.000243	90.0	.01184	1.39	9.0	.01184	1.39	.9	.01184	1.39
3.1	2.5	.8	.000243	112.5	.01077	1.53	11.3	.01021	1.61	1.1	.01021	1.61
3.8	3.0	.8	.000243	135.0	.01016	1.62	13.5	.00894	1.84	1.4	.00894	1.84
4.4	3.5	.8	.000243	157.5	.00955	1.72	15.8	.00791	2.08	1.6	.00791	2.08
5.0	4.0	.8	.000243	180.0	.00898	1.83	18.0	.00706	2.33	1.8	.00706	2.33
5.6	4.5	.8	.000243	202.5	.00835	1.97	20.3	.00635	2.59	2.0	.00635	2.59
6.3	5.0	.8	.000243	225.0	.00734	2.24	22.5	.00575	2.86	2.3	.00575	2.86

Table SA-24 (continued)
Results of Waste Dilution - Summer - Ship 1
(L = 1.1 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 700 gpm							
5.0	1.0	.2	.000283	180.0	.03587	.39	18.0	.02824	.50	1.8	.02824	.50
7.5	1.5	.2	.000283	270.0	.02336	.60	27.0	.01917	.74	2.7	.01917	.74
10.0	2.0	.2	.000283	360.0	.01626	.87	36.0	.01397	1.01	3.6	.01397	1.01
12.5	2.5	.2	.000283	450.0	.01211	1.17	45.0	.01069	1.32	4.5	.01069	1.32
15.0	3.0	.2	.000283	540.0	.00943	1.50	54.0	.00846	1.67	5.4	.00846	1.67
17.5	3.5	.2	.000283	630.0	.00757	1.86	63.0	.00687	2.05	6.3	.00687	2.05
20.0	4.0	.2	.000283	720.0	.00623	2.27	72.0	.00570	2.48	7.2	.00570	2.48
22.5	4.5	.2	.000283	810.0	.00522	2.71	81.0	.00480	2.94	8.1	.00480	2.94
25.0	5.0	.2	.000283	900.0	.00444	3.18	90.0	.00411	3.44	9.0	.00411	3.44
2.5	1.0	.4	.000283	90.0	.02368	.60	9.0	.02368	.60	.9	.02368	.60
3.8	1.5	.4	.000283	135.0	.02031	.69	13.5	.01787	.79	1.4	.01787	.79
5.0	2.0	.4	.000283	180.0	.01795	.79	18.0	.01412	1.00	1.8	.01412	1.00
6.3	2.5	.4	.000283	225.0	.01461	.97	22.5	.01151	1.23	2.3	.01151	1.23
7.5	3.0	.4	.000283	270.0	.01169	1.21	27.0	.00959	1.47	2.7	.00959	1.47
8.8	3.5	.4	.000283	315.0	.00964	1.46	31.5	.00813	1.74	3.1	.00813	1.74
10.0	4.0	.4	.000283	360.0	.00813	1.74	36.0	.00699	2.02	3.6	.00699	2.02
11.3	4.5	.4	.000283	405.0	.00697	2.02	40.5	.00608	2.32	4.0	.00608	2.32
12.5	5.0	.4	.000283	450.0	.00606	2.33	45.0	.00534	2.64	4.5	.00534	2.64
1.3	1.0	.8	.000283	45.0	.01747	.81	4.5	.01747	.81	.5	.01747	.81
1.9	1.5	.8	.000283	67.5	.01406	1.00	6.8	.01406	1.00	.7	.01406	1.00
2.5	2.0	.8	.000283	90.0	.01184	1.19	9.0	.01184	1.19	.9	.01184	1.19
3.1	2.5	.8	.000283	112.5	.01077	1.31	11.3	.01021	1.38	1.1	.01021	1.38
3.8	3.0	.8	.000283	135.0	.01016	1.39	13.5	.00894	1.58	1.4	.00894	1.58
4.4	3.5	.8	.000283	157.5	.00955	1.48	15.8	.00791	1.78	1.6	.00791	1.78
5.0	4.0	.8	.000283	180.0	.00898	1.57	18.0	.00706	2.00	1.8	.00706	2.00
5.6	4.5	.8	.000283	202.5	.00835	1.69	20.3	.00635	2.22	2.0	.00635	2.22
6.3	5.0	.8	.000283	225.0	.00734	1.92	22.5	.00575	2.45	2.3	.00575	2.45
					Q = 1000 gpm							
5.0	1.0	.2	.000405	180.0	.03587	.28	18.0	.02824	.35	1.8	.02824	.35
7.5	1.5	.2	.000405	270.0	.02336	.42	27.0	.01917	.52	2.7	.01917	.52
10.0	2.0	.2	.000405	360.0	.01626	.61	36.0	.01397	.71	3.6	.01397	.71
12.5	2.5	.2	.000405	450.0	.01211	.82	45.0	.01069	.92	4.5	.01069	.92
15.0	3.0	.2	.000405	540.0	.00943	1.05	54.0	.00846	1.17	5.4	.00846	1.17
17.5	3.5	.2	.000405	630.0	.00757	1.30	63.0	.00687	1.44	6.3	.00687	1.44
20.0	4.0	.2	.000405	720.0	.00623	1.59	72.0	.00570	1.73	7.2	.00570	1.73
22.5	4.5	.2	.000405	810.0	.00522	1.89	81.0	.00480	2.06	8.1	.00480	2.06
25.0	5.0	.2	.000405	900.0	.00444	2.23	90.0	.00411	2.40	9.0	.00411	2.40
2.5	1.0	.4	.000405	90.0	.02368	.42	9.0	.02368	.42	.9	.02368	.42
3.8	1.5	.4	.000405	135.0	.02031	.49	13.5	.01787	.55	1.4	.01787	.55
5.0	2.0	.4	.000405	180.0	.01795	.55	18.0	.01412	.70	1.8	.01412	.70
6.3	2.5	.4	.000405	225.0	.01461	.68	22.5	.01151	.86	2.3	.01151	.86
7.5	3.0	.4	.000405	270.0	.01169	.85	27.0	.00959	1.03	2.7	.00959	1.03
8.8	3.5	.4	.000405	315.0	.00964	1.02	31.5	.00813	1.22	3.1	.00813	1.22
10.0	4.0	.4	.000405	360.0	.00813	1.21	36.0	.00699	1.41	3.6	.00699	1.41
11.3	4.5	.4	.000405	405.0	.00697	1.42	40.5	.00608	1.62	4.0	.00608	1.62
12.5	5.0	.4	.000405	450.0	.00606	1.63	45.0	.00534	1.85	4.5	.00534	1.85
1.3	1.0	.8	.000405	45.0	.01747	.57	4.5	.01747	.57	.5	.01747	.57
1.9	1.5	.8	.000405	67.5	.01406	.70	6.8	.01406	.70	.7	.01406	.70
2.5	2.0	.8	.000405	90.0	.01184	.83	9.0	.01184	.83	.9	.01184	.83
3.1	2.5	.8	.000405	112.5	.01077	.92	11.3	.01021	.97	1.1	.01021	.97
3.8	3.0	.8	.000405	135.0	.01016	.97	13.5	.00894	1.11	1.4	.00894	1.11
4.4	3.5	.8	.000405	157.5	.00955	1.03	15.8	.00791	1.25	1.6	.00791	1.25
5.0	4.0	.8	.000405	180.0	.00898	1.10	18.0	.00706	1.40	1.8	.00706	1.40
5.6	4.5	.8	.000405	202.5	.00835	1.18	20.3	.00635	1.55	2.0	.00635	1.55
6.3	5.0	.8	.000405	225.0	.00734	1.35	22.5	.00575	1.72	2.3	.00575	1.72

Table SA-24 (continued)
Results of Waste Dilution - Summer - Ship 1
(L = 1.1 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 1200 gpm								
5.0	1.0	.2	.000486	180.0	.03587	.23	18.0	.02824	.29	1.8	.02824	.29
7.5	1.5	.2	.000486	270.0	.02336	.35	27.0	.01917	.43	2.7	.01917	.43
10.0	2.0	.2	.000486	360.0	.01626	.51	36.0	.01397	.59	3.6	.01397	.59
12.5	2.5	.2	.000486	450.0	.01211	.68	45.0	.01069	.77	4.5	.01069	.77
15.0	3.0	.2	.000486	540.0	.00943	.87	54.0	.00846	.97	5.4	.00846	.97
17.5	3.5	.2	.000486	630.0	.00757	1.09	63.0	.00687	1.20	6.3	.00687	1.20
20.0	4.0	.2	.000486	720.0	.00623	1.32	72.0	.00570	1.45	7.2	.00570	1.45
22.5	4.5	.2	.000486	810.0	.00522	1.58	81.0	.00480	1.71	8.1	.00480	1.71
25.0	5.0	.2	.000486	900.0	.00444	1.86	90.0	.00411	2.00	9.0	.00411	2.00
2.5	1.0	.4	.000486	90.0	.02368	.35	9.0	.02368	.35	.9	.02368	.35
3.8	1.5	.4	.000486	135.0	.02031	.41	13.5	.01787	.46	1.4	.01787	.46
5.0	2.0	.4	.000486	180.0	.01795	.46	18.0	.01412	.58	1.8	.01412	.58
6.3	2.5	.4	.000486	225.0	.01461	.56	22.5	.01151	.72	2.3	.01151	.72
7.5	3.0	.4	.000486	270.0	.01169	.70	27.0	.00959	.86	2.7	.00959	.86
8.8	3.5	.4	.000486	315.0	.00964	.85	31.5	.00813	1.01	3.1	.00813	1.01
10.0	4.0	.4	.000486	360.0	.00813	1.01	36.0	.00699	1.18	3.6	.00699	1.18
11.3	4.5	.4	.000486	405.0	.00697	1.18	40.5	.00608	1.35	4.0	.00608	1.35
12.5	5.0	.4	.000486	450.0	.00606	1.36	45.0	.00534	1.54	4.5	.00534	1.54
1.3	1.0	.8	.000486	45.0	.01747	.47	4.5	.01747	.47	.5	.01747	.47
1.9	1.5	.8	.000486	67.5	.01406	.59	6.8	.01406	.59	.7	.01406	.59
2.5	2.0	.8	.000486	90.0	.01184	.70	9.0	.01184	.70	.9	.01184	.70
3.1	2.5	.8	.000486	112.5	.01077	.76	11.3	.01021	.81	1.1	.01021	.81
3.8	3.0	.8	.000486	135.0	.01016	.81	13.5	.00894	.92	1.4	.00894	.92
4.4	3.5	.8	.000486	157.5	.00955	.86	15.8	.00791	1.04	1.6	.00791	1.04
5.0	4.0	.8	.000486	180.0	.00898	.92	18.0	.00706	1.17	1.8	.00706	1.17
5.6	4.5	.8	.000486	202.5	.00835	.99	20.3	.00635	1.30	2.0	.00635	1.30
6.3	5.0	.8	.000486	225.0	.00734	1.12	22.5	.00575	1.43	2.3	.00575	1.43
				Q = 1400 gpm								
5.0	1.0	.2	.000567	180.0	.03587	.20	18.0	.02824	.25	1.8	.02824	.25
7.5	1.5	.2	.000567	270.0	.02336	.30	27.0	.01917	.37	2.7	.01917	.37
10.0	2.0	.2	.000567	360.0	.01626	.43	36.0	.01397	.51	3.6	.01397	.51
12.5	2.5	.2	.000567	450.0	.01211	.58	45.0	.01069	.66	4.5	.01069	.66
15.0	3.0	.2	.000567	540.0	.00943	.75	54.0	.00846	.83	5.4	.00846	.83
17.5	3.5	.2	.000567	630.0	.00757	.93	63.0	.00687	1.03	6.3	.00687	1.03
20.0	4.0	.2	.000567	720.0	.00623	1.13	72.0	.00570	1.24	7.2	.00570	1.24
22.5	4.5	.2	.000567	810.0	.00522	1.35	81.0	.00480	1.47	8.1	.00480	1.47
25.0	5.0	.2	.000567	900.0	.00444	1.59	90.0	.00411	1.72	9.0	.00411	1.72
2.5	1.0	.4	.000567	90.0	.02368	.30	9.0	.02368	.30	.9	.02368	.30
3.8	1.5	.4	.000567	135.0	.02031	.35	13.5	.01787	.39	1.4	.01787	.39
5.0	2.0	.4	.000567	180.0	.01795	.39	18.0	.01412	.50	1.8	.01412	.50
6.3	2.5	.4	.000567	225.0	.01461	.48	22.5	.01151	.61	2.3	.01151	.61
7.5	3.0	.4	.000567	270.0	.01169	.60	27.0	.00959	.74	2.7	.00959	.74
8.8	3.5	.4	.000567	315.0	.00964	.73	31.5	.00813	.87	3.1	.00813	.87
10.0	4.0	.4	.000567	360.0	.00813	.87	36.0	.00699	1.01	3.6	.00699	1.01
11.3	4.5	.4	.000567	405.0	.00697	1.01	40.5	.00608	1.16	4.0	.00608	1.16
12.5	5.0	.4	.000567	450.0	.00606	1.16	45.0	.00534	1.32	4.5	.00534	1.32
1.3	1.0	.8	.000567	45.0	.01747	.40	4.5	.01747	.40	.5	.01747	.40
1.9	1.5	.8	.000567	67.5	.01406	.50	6.8	.01406	.50	.7	.01406	.50
2.5	2.0	.8	.000567	90.0	.01184	.60	9.0	.01184	.60	.9	.01184	.60
3.1	2.5	.8	.000567	112.5	.01077	.66	11.3	.01021	.69	1.1	.01021	.69
3.8	3.0	.8	.000567	135.0	.01016	.69	13.5	.00894	.79	1.4	.00894	.79
4.4	3.5	.8	.000567	157.5	.00955	.74	15.8	.00791	.89	1.6	.00791	.89
5.0	4.0	.8	.000567	180.0	.00898	.79	18.0	.00706	1.00	1.8	.00706	1.00
5.6	4.5	.8	.000567	202.5	.00835	.85	20.3	.00635	1.11	2.0	.00635	1.11
6.3	5.0	.8	.000567	225.0	.00734	.96	22.5	.00575	1.23	2.3	.00575	1.23

Table SA-25
Results of Waste Dilution - Winter - Ship 1
(L = 1.1 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 500 gpm								
5.0	1.0	.2	.000202	180.0	.01897	1.04	18.0	.01897	1.04	1.8	.01897	1.04
7.5	1.5	.2	.000202	270.0	.01287	1.54	27.0	.01287	1.54	2.7	.01287	1.54
10.0	2.0	.2	.000202	360.0	.00938	2.11	36.0	.00938	2.11	3.6	.00938	2.11
12.5	2.5	.2	.000202	450.0	.00718	2.75	45.0	.00718	2.75	4.5	.00718	2.75
15.0	3.0	.2	.000202	540.0	.00568	3.48	54.0	.00568	3.48	5.4	.00568	3.48
17.5	3.5	.2	.000202	630.0	.00461	4.28	63.0	.00461	4.28	6.3	.00461	4.28
20.0	4.0	.2	.000202	720.0	.00383	5.16	72.0	.00383	5.16	7.2	.00383	5.16
22.5	4.5	.2	.000202	810.0	.00323	6.12	81.0	.00323	6.12	8.1	.00323	6.12
25.0	5.0	.2	.000202	900.0	.00276	7.16	90.0	.00276	7.16	9.0	.00276	7.16
2.5	1.0	.4	.000202	90.0	.01591	1.24	9.0	.01591	1.24	.9	.01591	1.24
3.8	1.5	.4	.000202	135.0	.01200	1.65	13.5	.01200	1.65	1.4	.01200	1.65
5.0	2.0	.4	.000202	180.0	.00949	2.08	18.0	.00949	2.08	1.8	.00949	2.08
6.3	2.5	.4	.000202	225.0	.00773	2.56	22.5	.00773	2.56	2.3	.00773	2.56
7.5	3.0	.4	.000202	270.0	.00644	3.07	27.0	.00644	3.07	2.7	.00644	3.07
8.8	3.5	.4	.000202	315.0	.00546	3.62	31.5	.00546	3.62	3.1	.00546	3.62
10.0	4.0	.4	.000202	360.0	.00469	4.21	36.0	.00469	4.21	3.6	.00469	4.21
11.3	4.5	.4	.000202	405.0	.00408	4.84	40.5	.00408	4.84	4.0	.00408	4.84
12.5	5.0	.4	.000202	450.0	.00359	5.51	45.0	.00359	5.51	4.5	.00359	5.51
1.3	1.0	.8	.000202	45.0	.01173	1.68	4.5	.01173	1.68	.5	.01173	1.68
1.9	1.5	.8	.000202	67.5	.00944	2.09	6.8	.00944	2.09	.7	.00944	2.09
2.5	2.0	.8	.000202	90.0	.00795	2.48	9.0	.00795	2.48	.9	.00795	2.48
3.1	2.5	.8	.000202	112.5	.00686	2.88	11.3	.00686	2.88	1.1	.00686	2.88
3.8	3.0	.8	.000202	135.0	.00600	3.29	13.5	.00600	3.29	1.4	.00600	3.29
4.4	3.5	.8	.000202	157.5	.00531	3.72	15.8	.00531	3.72	1.6	.00531	3.72
5.0	4.0	.8	.000202	180.0	.00474	4.17	18.0	.00474	4.17	1.8	.00474	4.17
5.6	4.5	.8	.000202	202.5	.00427	4.63	20.3	.00427	4.63	2.0	.00427	4.63
6.3	5.0	.8	.000202	225.0	.00386	5.11	22.5	.00386	5.11	2.3	.00386	5.11
				Q = 600 gpm								
5.0	1.0	.2	.000243	180.0	.01897	.87	18.0	.01897	.87	1.8	.01897	.87
7.5	1.5	.2	.000243	270.0	.01287	1.28	27.0	.01287	1.28	2.7	.01287	1.28
10.0	2.0	.2	.000243	360.0	.00938	1.75	36.0	.00938	1.75	3.6	.00938	1.75
12.5	2.5	.2	.000243	450.0	.00718	2.29	45.0	.00718	2.29	4.5	.00718	2.29
15.0	3.0	.2	.000243	540.0	.00568	2.90	54.0	.00568	2.90	5.4	.00568	2.90
17.5	3.5	.2	.000243	630.0	.00461	3.57	63.0	.00461	3.57	6.3	.00461	3.57
20.0	4.0	.2	.000243	720.0	.00383	4.30	72.0	.00383	4.30	7.2	.00383	4.30
22.5	4.5	.2	.000243	810.0	.00323	5.10	81.0	.00323	5.10	8.1	.00323	5.10
25.0	5.0	.2	.000243	900.0	.00276	5.97	90.0	.00276	5.97	9.0	.00276	5.97
2.5	1.0	.4	.000243	90.0	.01591	1.04	9.0	.01591	1.04	.9	.01591	1.04
3.8	1.5	.4	.000243	135.0	.01200	1.37	13.5	.01200	1.37	1.4	.01200	1.37
5.0	2.0	.4	.000243	180.0	.00949	1.74	18.0	.00949	1.74	1.8	.00949	1.74
6.3	2.5	.4	.000243	225.0	.00773	2.13	22.5	.00773	2.13	2.3	.00773	2.13
7.5	3.0	.4	.000243	270.0	.00644	2.56	27.0	.00644	2.56	2.7	.00644	2.56
8.8	3.5	.4	.000243	315.0	.00546	3.02	31.5	.00546	3.02	3.1	.00546	3.02
10.0	4.0	.4	.000243	360.0	.00469	3.51	36.0	.00469	3.51	3.6	.00469	3.51
11.3	4.5	.4	.000243	405.0	.00408	4.03	40.5	.00408	4.03	4.0	.00408	4.03
12.5	5.0	.4	.000243	450.0	.00359	4.59	45.0	.00359	4.59	4.5	.00359	4.59
1.3	1.0	.8	.000243	45.0	.01173	1.40	4.5	.01173	1.40	.5	.01173	1.40
1.9	1.5	.8	.000243	67.5	.00944	1.74	6.8	.00944	1.74	.7	.00944	1.74
2.5	2.0	.8	.000243	90.0	.00795	2.07	9.0	.00795	2.07	.9	.00795	2.07
3.1	2.5	.8	.000243	112.5	.00686	2.40	11.3	.00686	2.40	1.1	.00686	2.40
3.8	3.0	.8	.000243	135.0	.00600	2.74	13.5	.00600	2.74	1.4	.00600	2.74
4.4	3.5	.8	.000243	157.5	.00531	3.10	15.8	.00531	3.10	1.6	.00531	3.10
5.0	4.0	.8	.000243	180.0	.00474	3.47	18.0	.00474	3.47	1.8	.00474	3.47
5.6	4.5	.8	.000243	202.5	.00427	3.86	20.3	.00427	3.86	2.0	.00427	3.86
6.3	5.0	.8	.000243	225.0	.00386	4.26	22.5	.00386	4.26	2.3	.00386	4.26

Table SA-25 (continued)
Results of Waste Dilution - Winter - Ship 1
(L = 1.1 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 700 gpm							
5.0	1.0	.2	.000283	180.0	.01897	.74	18.0	.01897	.74	1.8	.01897	.74
7.5	1.5	.2	.000283	270.0	.01287	1.10	27.0	.01287	1.10	2.7	.01287	1.10
10.0	2.0	.2	.000283	360.0	.00938	1.50	36.0	.00938	1.50	3.6	.00938	1.50
12.5	2.5	.2	.000283	450.0	.00718	1.97	45.0	.00718	1.97	4.5	.00718	1.97
15.0	3.0	.2	.000283	540.0	.00568	2.49	54.0	.00568	2.49	5.4	.00568	2.49
17.5	3.5	.2	.000283	630.0	.00461	3.06	63.0	.00461	3.06	6.3	.00461	3.06
20.0	4.0	.2	.000283	720.0	.00383	3.69	72.0	.00383	3.69	7.2	.00383	3.69
22.5	4.5	.2	.000283	810.0	.00323	4.37	81.0	.00323	4.37	8.1	.00323	4.37
25.0	5.0	.2	.000283	900.0	.00276	5.12	90.0	.00276	5.12	9.0	.00276	5.12
2.5	1.0	.4	.000283	90.0	.01591	.89	9.0	.01591	.89	.9	.01591	.89
3.8	1.5	.4	.000283	135.0	.01200	1.18	13.5	.01200	1.18	1.4	.01200	1.18
5.0	2.0	.4	.000283	180.0	.00949	1.49	18.0	.00949	1.49	1.8	.00949	1.49
6.3	2.5	.4	.000283	225.0	.00773	1.83	22.5	.00773	1.83	2.3	.00773	1.83
7.5	3.0	.4	.000283	270.0	.00644	2.19	27.0	.00644	2.19	2.7	.00644	2.19
8.8	3.5	.4	.000283	315.0	.00546	2.59	31.5	.00546	2.59	3.1	.00546	2.59
10.0	4.0	.4	.000283	360.0	.00469	3.01	36.0	.00469	3.01	3.6	.00469	3.01
11.3	4.5	.4	.000283	405.0	.00408	3.46	40.5	.00408	3.46	4.0	.00408	3.46
12.5	5.0	.4	.000283	450.0	.00359	3.93	45.0	.00359	3.93	4.5	.00359	3.93
1.3	1.0	.8	.000283	45.0	.01173	1.20	4.5	.01173	1.20	.5	.01173	1.20
1.9	1.5	.8	.000283	67.5	.00944	1.49	6.8	.00944	1.49	.7	.00944	1.49
2.5	2.0	.8	.000283	90.0	.00795	1.77	9.0	.00795	1.77	.9	.00795	1.77
3.1	2.5	.8	.000283	112.5	.00686	2.06	11.3	.00686	2.06	1.1	.00686	2.06
3.8	3.0	.8	.000283	135.0	.00600	2.35	13.5	.00600	2.35	1.4	.00600	2.35
4.4	3.5	.8	.000283	157.5	.00531	2.66	15.8	.00531	2.66	1.6	.00531	2.66
5.0	4.0	.8	.000283	180.0	.00474	2.98	18.0	.00474	2.98	1.8	.00474	2.98
5.6	4.5	.8	.000283	202.5	.00427	3.31	20.3	.00427	3.31	2.0	.00427	3.31
6.3	5.0	.8	.000283	225.0	.00386	3.65	22.5	.00386	3.65	2.3	.00386	3.65
					Q = 1000 gpm							
5.0	1.0	.2	.000405	180.0	.01897	.52	18.0	.01897	.52	1.8	.01897	.52
7.5	1.5	.2	.000405	270.0	.01287	.77	27.0	.01287	.77	2.7	.01287	.77
10.0	2.0	.2	.000405	360.0	.00938	1.05	36.0	.00938	1.05	3.6	.00938	1.05
12.5	2.5	.2	.000405	450.0	.00718	1.38	45.0	.00718	1.38	4.5	.00718	1.38
15.0	3.0	.2	.000405	540.0	.00568	1.74	54.0	.00568	1.74	5.4	.00568	1.74
17.5	3.5	.2	.000405	630.0	.00461	2.14	63.0	.00461	2.14	6.3	.00461	2.14
20.0	4.0	.2	.000405	720.0	.00383	2.58	72.0	.00383	2.58	7.2	.00383	2.58
22.5	4.5	.2	.000405	810.0	.00323	3.06	81.0	.00323	3.06	8.1	.00323	3.06
25.0	5.0	.2	.000405	900.0	.00276	3.58	90.0	.00276	3.58	9.0	.00276	3.58
2.5	1.0	.4	.000405	90.0	.01591	.62	9.0	.01591	.62	.9	.01591	.62
3.8	1.5	.4	.000405	135.0	.01200	.82	13.5	.01200	.82	1.4	.01200	.82
5.0	2.0	.4	.000405	180.0	.00949	1.04	18.0	.00949	1.04	1.8	.00949	1.04
6.3	2.5	.4	.000405	225.0	.00773	1.28	22.5	.00773	1.28	2.3	.00773	1.28
7.5	3.0	.4	.000405	270.0	.00644	1.53	27.0	.00644	1.53	2.7	.00644	1.53
8.8	3.5	.4	.000405	315.0	.00546	1.81	31.5	.00546	1.81	3.1	.00546	1.81
10.0	4.0	.4	.000405	360.0	.00469	2.11	36.0	.00469	2.11	3.6	.00469	2.11
11.3	4.5	.4	.000405	405.0	.00408	2.42	40.5	.00408	2.42	4.0	.00408	2.42
12.5	5.0	.4	.000405	450.0	.00359	2.75	45.0	.00359	2.75	4.5	.00359	2.75
1.3	1.0	.8	.000405	45.0	.01173	.84	4.5	.01173	.84	.5	.01173	.84
1.9	1.5	.8	.000405	67.5	.00944	1.05	6.8	.00944	1.05	.7	.00944	1.05
2.5	2.0	.8	.000405	90.0	.00795	1.24	9.0	.00795	1.24	.9	.00795	1.24
3.1	2.5	.8	.000405	112.5	.00686	1.44	11.3	.00686	1.44	1.1	.00686	1.44
3.8	3.0	.8	.000405	135.0	.00600	1.65	13.5	.00600	1.65	1.4	.00600	1.65
4.4	3.5	.8	.000405	157.5	.00531	1.86	15.8	.00531	1.86	1.6	.00531	1.86
5.0	4.0	.8	.000405	180.0	.00474	2.08	18.0	.00474	2.08	1.8	.00474	2.08
5.6	4.5	.8	.000405	202.5	.00427	2.32	20.3	.00427	2.32	2.0	.00427	2.32
6.3	5.0	.8	.000405	225.0	.00386	2.56	22.5	.00386	2.56	2.3	.00386	2.56

Table SA-25 (continued)
Results of Waste Dilution - Winter - Ship 1
(L = 1.1 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 1200 gpm							
5.0	1.0	.2	.000486	180.0	.01897	.43	18.0	.01897	.43	1.8	.01897	.43
7.5	1.5	.2	.000486	270.0	.01287	.64	27.0	.01287	.64	2.7	.01287	.64
10.0	2.0	.2	.000486	360.0	.00938	.88	36.0	.00938	.88	3.6	.00938	.88
12.5	2.5	.2	.000486	450.0	.00718	1.15	45.0	.00718	1.15	4.5	.00718	1.15
15.0	3.0	.2	.000486	540.0	.00568	1.45	54.0	.00568	1.45	5.4	.00568	1.45
17.5	3.5	.2	.000486	630.0	.00461	1.78	63.0	.00461	1.78	6.3	.00461	1.78
20.0	4.0	.2	.000486	720.0	.00383	2.15	72.0	.00383	2.15	7.2	.00383	2.15
22.5	4.5	.2	.000486	810.0	.00323	2.55	81.0	.00323	2.55	8.1	.00323	2.55
25.0	5.0	.2	.000486	900.0	.00276	2.98	90.0	.00276	2.98	9.0	.00276	2.98
2.5	1.0	.4	.000486	90.0	.01591	.52	9.0	.01591	.52	.9	.01591	.52
3.8	1.5	.4	.000486	135.0	.01200	.69	13.5	.01200	.69	1.4	.01200	.69
5.0	2.0	.4	.000486	180.0	.00949	.87	18.0	.00949	.87	1.8	.00949	.87
6.3	2.5	.4	.000486	225.0	.00773	1.07	22.5	.00773	1.07	2.3	.00773	1.07
7.5	3.0	.4	.000486	270.0	.00644	1.28	27.0	.00644	1.28	2.7	.00644	1.28
8.8	3.5	.4	.000486	315.0	.00546	1.51	31.5	.00546	1.51	3.1	.00546	1.51
10.0	4.0	.4	.000486	360.0	.00469	1.75	36.0	.00469	1.75	3.6	.00469	1.75
11.3	4.5	.4	.000486	405.0	.00408	2.02	40.5	.00408	2.02	4.0	.00408	2.02
12.5	5.0	.4	.000486	450.0	.00359	2.29	45.0	.00359	2.29	4.5	.00359	2.29
1.3	1.0	.8	.000486	45.0	.01173	.70	4.5	.01173	.70	.5	.01173	.70
1.9	1.5	.8	.000486	67.5	.00944	.87	6.8	.00944	.87	.7	.00944	.87
2.5	2.0	.8	.000486	90.0	.00795	1.04	9.0	.00795	1.04	.9	.00795	1.04
3.1	2.5	.8	.000486	112.5	.00686	1.20	11.3	.00686	1.20	1.1	.00686	1.20
3.8	3.0	.8	.000486	135.0	.00600	1.37	13.5	.00600	1.37	1.4	.00600	1.37
4.4	3.5	.8	.000486	157.5	.00531	1.55	15.8	.00531	1.55	1.6	.00531	1.55
5.0	4.0	.8	.000486	180.0	.00474	1.74	18.0	.00474	1.74	1.8	.00474	1.74
5.6	4.5	.8	.000486	202.5	.00427	1.93	20.3	.00427	1.93	2.0	.00427	1.93
6.3	5.0	.8	.000486	225.0	.00386	2.13	22.5	.00386	2.13	2.3	.00386	2.13
					Q = 1400 gpm							
5.0	1.0	.2	.000567	180.0	.01897	.37	18.0	.01897	.37	1.8	.01897	.37
7.5	1.5	.2	.000567	270.0	.01287	.55	27.0	.01287	.55	2.7	.01287	.55
10.0	2.0	.2	.000567	360.0	.00938	.75	36.0	.00938	.75	3.6	.00938	.75
12.5	2.5	.2	.000567	450.0	.00718	.98	45.0	.00718	.98	4.5	.00718	.98
15.0	3.0	.2	.000567	540.0	.00568	1.24	54.0	.00568	1.24	5.4	.00568	1.24
17.5	3.5	.2	.000567	630.0	.00461	1.53	63.0	.00461	1.53	6.3	.00461	1.53
20.0	4.0	.2	.000567	720.0	.00383	1.84	72.0	.00383	1.84	7.2	.00383	1.84
22.5	4.5	.2	.000567	810.0	.00323	2.19	81.0	.00323	2.19	8.1	.00323	2.19
25.0	5.0	.2	.000567	900.0	.00276	2.56	90.0	.00276	2.56	9.0	.00276	2.56
2.5	1.0	.4	.000567	90.0	.01591	.44	9.0	.01591	.44	.9	.01591	.44
3.8	1.5	.4	.000567	135.0	.01200	.59	13.5	.01200	.59	1.4	.01200	.59
5.0	2.0	.4	.000567	180.0	.00949	.74	18.0	.00949	.74	1.8	.00949	.74
6.3	2.5	.4	.000567	225.0	.00773	.91	22.5	.00773	.91	2.3	.00773	.91
7.5	3.0	.4	.000567	270.0	.00644	1.10	27.0	.00644	1.10	2.7	.00644	1.10
8.8	3.5	.4	.000567	315.0	.00546	1.29	31.5	.00546	1.29	3.1	.00546	1.29
10.0	4.0	.4	.000567	360.0	.00469	1.50	36.0	.00469	1.50	3.6	.00469	1.50
11.3	4.5	.4	.000567	405.0	.00408	1.73	40.5	.00408	1.73	4.0	.00408	1.73
12.5	5.0	.4	.000567	450.0	.00359	1.97	45.0	.00359	1.97	4.5	.00359	1.97
1.3	1.0	.8	.000567	45.0	.01173	.60	4.5	.01173	.60	.5	.01173	.60
1.9	1.5	.8	.000567	67.5	.00944	.75	6.8	.00944	.75	.7	.00944	.75
2.5	2.0	.8	.000567	90.0	.00795	.89	9.0	.00795	.89	.9	.00795	.89
3.1	2.5	.8	.000567	112.5	.00686	1.03	11.3	.00686	1.03	1.1	.00686	1.03
3.8	3.0	.8	.000567	135.0	.00600	1.18	13.5	.00600	1.18	1.4	.00600	1.18
4.4	3.5	.8	.000567	157.5	.00531	1.33	15.8	.00531	1.33	1.6	.00531	1.33
5.0	4.0	.8	.000567	180.0	.00474	1.49	18.0	.00474	1.49	1.8	.00474	1.49
5.6	4.5	.8	.000567	202.5	.00427	1.65	20.3	.00427	1.65	2.0	.00427	1.65
6.3	5.0	.8	.000567	225.0	.00386	1.83	22.5	.00386	1.83	2.3	.00386	1.83

Table SA-26
Results of Waste Dilution - Summer - Ship 1
(L = 1.3 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 500 gpm												
5.0	1.0	.2	.000202	180.0	.03157	.63	18.0	.02485	.80	1.8	.02485	.80
7.5	1.5	.2	.000202	270.0	.02094	.94	27.0	.01718	1.15	2.7	.01718	1.15
10.0	2.0	.2	.000202	360.0	.01477	1.34	36.0	.01269	1.56	3.6	.01269	1.56
12.5	2.5	.2	.000202	450.0	.01111	1.78	45.0	.00980	2.02	4.5	.00980	2.02
15.0	3.0	.2	.000202	540.0	.00872	2.27	54.0	.00782	2.53	5.4	.00782	2.53
17.5	3.5	.2	.000202	630.0	.00705	2.80	63.0	.00640	3.09	6.3	.00640	3.09
20.0	4.0	.2	.000202	720.0	.00583	3.39	72.0	.00533	3.71	7.2	.00533	3.71
22.5	4.5	.2	.000202	810.0	.00491	4.03	81.0	.00452	4.37	8.1	.00452	4.37
25.0	5.0	.2	.000202	900.0	.00419	4.72	90.0	.00388	5.09	9.0	.00388	5.09
2.5	1.0	.4	.000202	90.0	.02030	.97	9.0	.02030	.97	.9	.02030	.97
3.8	1.5	.4	.000202	135.0	.01766	1.12	13.5	.01554	1.27	1.4	.01554	1.27
5.0	2.0	.4	.000202	180.0	.01579	1.25	18.0	.01243	1.59	1.8	.01243	1.59
6.3	2.5	.4	.000202	225.0	.01299	1.52	22.5	.01023	1.93	2.3	.01023	1.93
7.5	3.0	.4	.000202	270.0	.01047	1.89	27.0	.00859	2.30	2.7	.00859	2.30
8.8	3.5	.4	.000202	315.0	.00870	2.27	31.5	.00734	2.69	3.1	.00734	2.69
10.0	4.0	.4	.000202	360.0	.00739	2.68	36.0	.00635	3.11	3.6	.00635	3.11
11.3	4.5	.4	.000202	405.0	.00637	3.10	40.5	.00555	3.56	4.0	.00555	3.56
12.5	5.0	.4	.000202	450.0	.00556	3.56	45.0	.00490	4.03	4.5	.00490	4.03
1.3	1.0	.8	.000202	45.0	.01480	1.33	4.5	.01480	1.33	.5	.01480	1.33
1.9	1.5	.8	.000202	67.5	.01197	1.65	6.8	.01197	1.65	.7	.01197	1.65
2.5	2.0	.8	.000202	90.0	.01015	1.95	9.0	.01015	1.95	.9	.01015	1.95
3.1	2.5	.8	.000202	112.5	.00930	2.12	11.3	.00882	2.24	1.1	.00882	2.24
3.8	3.0	.8	.000202	135.0	.00883	2.24	13.5	.00777	2.54	1.4	.00777	2.54
4.4	3.5	.8	.000202	157.5	.00836	2.36	15.8	.00692	2.86	1.6	.00692	2.86
5.0	4.0	.8	.000202	180.0	.00790	2.50	18.0	.00622	3.18	1.8	.00622	3.18
5.6	4.5	.8	.000202	202.5	.00739	2.68	20.3	.00562	3.52	2.0	.00562	3.52
6.3	5.0	.8	.000202	225.0	.00652	3.03	22.5	.00511	3.86	2.3	.00511	3.86
Q = 600 gpm												
5.0	1.0	.2	.000243	180.0	.03157	.52	18.0	.02485	.66	1.8	.02485	.66
7.5	1.5	.2	.000243	270.0	.02094	.79	27.0	.01718	.96	2.7	.01718	.96
10.0	2.0	.2	.000243	360.0	.01477	1.12	36.0	.01269	1.30	3.6	.01269	1.30
12.5	2.5	.2	.000243	450.0	.01111	1.48	45.0	.00980	1.68	4.5	.00980	1.68
15.0	3.0	.2	.000243	540.0	.00872	1.89	54.0	.00782	2.11	5.4	.00782	2.11
17.5	3.5	.2	.000243	630.0	.00705	2.34	63.0	.00640	2.57	6.3	.00640	2.57
20.0	4.0	.2	.000243	720.0	.00583	2.83	72.0	.00533	3.09	7.2	.00533	3.09
22.5	4.5	.2	.000243	810.0	.00491	3.36	81.0	.00452	3.64	8.1	.00452	3.64
25.0	5.0	.2	.000243	900.0	.00419	3.93	90.0	.00388	4.24	9.0	.00388	4.24
2.5	1.0	.4	.000243	90.0	.02030	.81	9.0	.02030	.81	.9	.02030	.81
3.8	1.5	.4	.000243	135.0	.01766	.93	13.5	.01554	1.06	1.4	.01554	1.06
5.0	2.0	.4	.000243	180.0	.01579	1.04	18.0	.01243	1.32	1.8	.01243	1.32
6.3	2.5	.4	.000243	225.0	.01299	1.27	22.5	.01023	1.61	2.3	.01023	1.61
7.5	3.0	.4	.000243	270.0	.01047	1.57	27.0	.00859	1.92	2.7	.00859	1.92
8.8	3.5	.4	.000243	315.0	.00870	1.89	31.5	.00734	2.24	3.1	.00734	2.24
10.0	4.0	.4	.000243	360.0	.00739	2.23	36.0	.00635	2.59	3.6	.00635	2.59
11.3	4.5	.4	.000243	405.0	.00637	2.59	40.5	.00555	2.97	4.0	.00555	2.97
12.5	5.0	.4	.000243	450.0	.00556	2.96	45.0	.00490	3.36	4.5	.00490	3.36
1.3	1.0	.8	.000243	45.0	.01480	1.11	4.5	.01480	1.11	.5	.01480	1.11
1.9	1.5	.8	.000243	67.5	.01197	1.38	6.8	.01197	1.38	.7	.01197	1.38
2.5	2.0	.8	.000243	90.0	.01015	1.62	9.0	.01015	1.62	.9	.01015	1.62
3.1	2.5	.8	.000243	112.5	.00930	1.77	11.3	.00882	1.87	1.1	.00882	1.87
3.8	3.0	.8	.000243	135.0	.00883	1.86	13.5	.00777	2.12	1.4	.00777	2.12
4.4	3.5	.8	.000243	157.5	.00836	1.97	15.8	.00692	2.38	1.6	.00692	2.38
5.0	4.0	.8	.000243	180.0	.00790	2.08	18.0	.00622	2.65	1.8	.00622	2.65
5.6	4.5	.8	.000243	202.5	.00739	2.23	20.3	.00562	2.93	2.0	.00562	2.93
6.3	5.0	.8	.000243	225.0	.00652	2.52	22.5	.00511	3.22	2.3	.00511	3.22

Table SA-26 (continued)
Results of Waste Dilution - Summer - Ship 1
(L = 1.3 n mi, A = 0.001 $ft^{2/3}/sec$)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 700 gpm												
5.0	1.0	.2	.000283	180.0	.03157	.45	18.0	.02485	.57	1.8	.02485	.57
7.5	1.5	.2	.000283	270.0	.02094	.67	27.0	.01718	.82	2.7	.01718	.82
10.0	2.0	.2	.000283	360.0	.01477	.96	36.0	.01269	1.11	3.6	.01269	1.11
12.5	2.5	.2	.000283	450.0	.01111	1.27	45.0	.00980	1.44	4.5	.00980	1.44
15.0	3.0	.2	.000283	540.0	.00872	1.62	54.0	.00782	1.80	5.4	.00782	1.80
17.5	3.5	.2	.000283	630.0	.00705	2.00	63.0	.00640	2.21	6.3	.00640	2.21
20.0	4.0	.2	.000283	720.0	.00583	2.42	72.0	.00533	2.65	7.2	.00533	2.65
22.5	4.5	.2	.000283	810.0	.00491	2.88	81.0	.00452	3.12	8.1	.00452	3.12
25.0	5.0	.2	.000283	900.0	.00419	3.37	90.0	.00388	3.64	9.0	.00388	3.64
2.5	1.0	.4	.000283	90.0	.02030	.70	9.0	.02030	.70	.9	.02030	.70
3.8	1.5	.4	.000283	135.0	.01766	.80	13.5	.01554	.91	1.4	.01554	.91
5.0	2.0	.4	.000283	180.0	.01579	.89	18.0	.01243	1.14	1.8	.01243	1.14
6.3	2.5	.4	.000283	225.0	.01299	1.09	22.5	.01023	1.38	2.3	.01023	1.38
7.5	3.0	.4	.000283	270.0	.01047	1.35	27.0	.00859	1.64	2.7	.00859	1.64
8.8	3.5	.4	.000283	315.0	.00870	1.62	31.5	.00734	1.92	3.1	.00734	1.92
10.0	4.0	.4	.000283	360.0	.00739	1.91	36.0	.00635	2.22	3.6	.00635	2.22
11.3	4.5	.4	.000283	405.0	.00637	2.22	40.5	.00555	2.54	4.0	.00555	2.54
12.5	5.0	.4	.000283	450.0	.00556	2.54	45.0	.00490	2.88	4.5	.00490	2.88
1.3	1.0	.8	.000283	45.0	.01480	.95	4.5	.01480	.95	.5	.01480	.95
1.9	1.5	.8	.000283	67.5	.01197	1.18	6.8	.01197	1.18	.7	.01197	1.18
2.5	2.0	.8	.000283	90.0	.01015	1.39	9.0	.01015	1.39	.9	.01015	1.39
3.1	2.5	.8	.000283	112.5	.00930	1.52	11.3	.00882	1.60	1.1	.00882	1.60
3.8	3.0	.8	.000283	135.0	.00883	1.60	13.5	.00777	1.82	1.4	.00777	1.82
4.4	3.5	.8	.000283	157.5	.00836	1.69	15.8	.00692	2.04	1.6	.00692	2.04
5.0	4.0	.8	.000283	180.0	.00790	1.79	18.0	.00622	2.27	1.8	.00622	2.27
5.6	4.5	.8	.000283	202.5	.00739	1.91	20.3	.00562	2.51	2.0	.00562	2.51
6.3	5.0	.8	.000283	225.0	.00652	2.16	22.5	.00511	2.76	2.3	.00511	2.76
Q = 1000 gpm												
5.0	1.0	.2	.000405	180.0	.03157	.31	18.0	.02485	.40	1.8	.02485	.40
7.5	1.5	.2	.000405	270.0	.02094	.47	27.0	.01718	.58	2.7	.01718	.58
10.0	2.0	.2	.000405	360.0	.01477	.67	36.0	.01269	.78	3.6	.01269	.78
12.5	2.5	.2	.000405	450.0	.01111	.89	45.0	.00980	1.01	4.5	.00980	1.01
15.0	3.0	.2	.000405	540.0	.00872	1.13	54.0	.00782	1.26	5.4	.00782	1.26
17.5	3.5	.2	.000405	630.0	.00705	1.40	63.0	.00640	1.54	6.3	.00640	1.54
20.0	4.0	.2	.000405	720.0	.00583	1.70	72.0	.00533	1.85	7.2	.00533	1.85
22.5	4.5	.2	.000405	810.0	.00491	2.01	81.0	.00452	2.19	8.1	.00452	2.19
25.0	5.0	.2	.000405	900.0	.00419	2.36	90.0	.00388	2.55	9.0	.00388	2.55
2.5	1.0	.4	.000405	90.0	.02030	.49	9.0	.02030	.49	.9	.02030	.49
3.8	1.5	.4	.000405	135.0	.01766	.56	13.5	.01554	.64	1.4	.01554	.64
5.0	2.0	.4	.000405	180.0	.01579	.63	18.0	.01243	.79	1.8	.01243	.79
6.3	2.5	.4	.000405	225.0	.01299	.76	22.5	.01023	.97	2.3	.01023	.97
7.5	3.0	.4	.000405	270.0	.01047	.94	27.0	.00859	1.15	2.7	.00859	1.15
8.8	3.5	.4	.000405	315.0	.00870	1.14	31.5	.00734	1.35	3.1	.00734	1.35
10.0	4.0	.4	.000405	360.0	.00739	1.34	36.0	.00635	1.56	3.6	.00635	1.56
11.3	4.5	.4	.000405	405.0	.00637	1.55	40.5	.00555	1.78	4.0	.00555	1.78
12.5	5.0	.4	.000405	450.0	.00556	1.78	45.0	.00490	2.02	4.5	.00490	2.02
1.3	1.0	.8	.000405	45.0	.01480	.67	4.5	.01480	.67	.5	.01480	.67
1.9	1.5	.8	.000405	67.5	.01197	.83	6.8	.01197	.83	.7	.01197	.83
2.5	2.0	.8	.000405	90.0	.01015	.97	9.0	.01015	.97	.9	.01015	.97
3.1	2.5	.8	.000405	112.5	.00930	1.06	11.3	.00882	1.12	1.1	.00882	1.12
3.8	3.0	.8	.000405	135.0	.00883	1.12	13.5	.00777	1.27	1.4	.00777	1.27
4.4	3.5	.8	.000405	157.5	.00836	1.18	15.8	.00692	1.43	1.6	.00692	1.43
5.0	4.0	.8	.000405	180.0	.00790	1.25	18.0	.00622	1.59	1.8	.00622	1.59
5.6	4.5	.8	.000405	202.5	.00739	1.34	20.3	.00562	1.76	2.0	.00562	1.76
6.3	5.0	.8	.000405	225.0	.00652	1.51	22.5	.00511	1.93	2.3	.00511	1.93

Table SA-26 (continued)
Results of Waste Dilution - Summer - Ship 1
(L = 1.3 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 1200 gpm							
5.0	1.0	.2	.000486	180.0	.03157	.26	18.0	.02485	.33	1.8	.02485	.33
7.5	1.5	.2	.000486	270.0	.02094	.39	27.0	.01718	.48	2.7	.01718	.48
10.0	2.0	.2	.000486	360.0	.01477	.56	36.0	.01269	.65	3.6	.01269	.65
12.5	2.5	.2	.000486	450.0	.01111	.74	45.0	.00980	.84	4.5	.00980	.84
15.0	3.0	.2	.000486	540.0	.00872	.94	54.0	.00782	1.05	5.4	.00782	1.05
17.5	3.5	.2	.000486	630.0	.00705	1.17	63.0	.00640	1.29	6.3	.00640	1.29
20.0	4.0	.2	.000486	720.0	.00583	1.41	72.0	.00533	1.54	7.2	.00533	1.54
22.5	4.5	.2	.000486	810.0	.00491	1.68	81.0	.00452	1.82	8.1	.00452	1.82
25.0	5.0	.2	.000486	900.0	.00419	1.96	90.0	.00388	2.12	9.0	.00388	2.12
2.5	1.0	.4	.000486	90.0	.02030	.41	9.0	.02030	.41	.9	.02030	.41
3.8	1.5	.4	.000486	135.0	.01766	.47	13.5	.01554	.53	1.4	.01554	.53
5.0	2.0	.4	.000486	180.0	.01579	.52	18.0	.01243	.66	1.8	.01243	.66
6.3	2.5	.4	.000486	225.0	.01299	.63	22.5	.01023	.81	2.3	.01023	.81
7.5	3.0	.4	.000486	270.0	.01047	.79	27.0	.00859	.96	2.7	.00859	.96
8.8	3.5	.4	.000486	315.0	.00870	.95	31.5	.00734	1.12	3.1	.00734	1.12
10.0	4.0	.4	.000486	360.0	.00739	1.11	36.0	.00635	1.30	3.6	.00635	1.30
11.3	4.5	.4	.000486	405.0	.00637	1.29	40.5	.00555	1.48	4.0	.00555	1.48
12.5	5.0	.4	.000486	450.0	.00556	1.48	45.0	.00490	1.68	4.5	.00490	1.68
1.3	1.0	.8	.000486	45.0	.01480	.56	4.5	.01480	.56	.5	.01480	.56
1.9	1.5	.8	.000486	67.5	.01197	.69	6.8	.01197	.69	.7	.01197	.69
2.5	2.0	.8	.000486	90.0	.01015	.81	9.0	.01015	.81	.9	.01015	.81
3.1	2.5	.8	.000486	112.5	.00930	.89	11.3	.00882	.93	1.1	.00882	.93
3.8	3.0	.8	.000486	135.0	.00883	.93	13.5	.00777	1.06	1.4	.00777	1.06
4.4	3.5	.8	.000486	157.5	.00836	.99	15.8	.00692	1.19	1.6	.00692	1.19
5.0	4.0	.8	.000486	180.0	.00790	1.04	18.0	.00622	1.32	1.8	.00622	1.32
5.6	4.5	.8	.000486	202.5	.00739	1.11	20.3	.00562	1.46	2.0	.00562	1.46
6.3	5.0	.8	.000486	225.0	.00652	1.26	22.5	.00511	1.61	2.3	.00511	1.61
					Q = 1400 gpm							
5.0	1.0	.2	.000567	180.0	.03157	.22	18.0	.02485	.28	1.8	.02485	.28
7.5	1.5	.2	.000567	270.0	.02094	.34	27.0	.01718	.41	2.7	.01718	.41
10.0	2.0	.2	.000567	360.0	.01477	.48	36.0	.01269	.56	3.6	.01269	.56
12.5	2.5	.2	.000567	450.0	.01111	.64	45.0	.00980	.72	4.5	.00980	.72
15.0	3.0	.2	.000567	540.0	.00872	.81	54.0	.00782	.90	5.4	.00782	.90
17.5	3.5	.2	.000567	630.0	.00705	1.00	63.0	.00640	1.10	6.3	.00640	1.10
20.0	4.0	.2	.000567	720.0	.00583	1.21	72.0	.00533	1.32	7.2	.00533	1.32
22.5	4.5	.2	.000567	810.0	.00491	1.44	81.0	.00452	1.56	8.1	.00452	1.56
25.0	5.0	.2	.000567	900.0	.00419	1.68	90.0	.00388	1.82	9.0	.00388	1.82
2.5	1.0	.4	.000567	90.0	.02030	.35	9.0	.02030	.35	.9	.02030	.35
3.8	1.5	.4	.000567	135.0	.01766	.40	13.5	.01554	.45	1.4	.01554	.45
5.0	2.0	.4	.000567	180.0	.01579	.45	18.0	.01243	.57	1.8	.01243	.57
6.3	2.5	.4	.000567	225.0	.01299	.54	22.5	.01023	.69	2.3	.01023	.69
7.5	3.0	.4	.000567	270.0	.01047	.67	27.0	.00859	.82	2.7	.00859	.82
8.8	3.5	.4	.000567	315.0	.00870	.81	31.5	.00734	.96	3.1	.00734	.96
10.0	4.0	.4	.000567	360.0	.00739	.96	36.0	.00635	1.11	3.6	.00635	1.11
11.3	4.5	.4	.000567	405.0	.00637	1.11	40.5	.00555	1.27	4.0	.00555	1.27
12.5	5.0	.4	.000567	450.0	.00556	1.27	45.0	.00490	1.44	4.5	.00490	1.44
1.3	1.0	.8	.000567	45.0	.01480	.48	4.5	.01480	.48	.5	.01480	.48
1.9	1.5	.8	.000567	67.5	.01197	.59	6.8	.01197	.59	.7	.01197	.59
2.5	2.0	.8	.000567	90.0	.01015	.70	9.0	.01015	.70	.9	.01015	.70
3.1	2.5	.8	.000567	112.5	.00930	.76	11.3	.00882	.80	1.1	.00882	.80
3.8	3.0	.8	.000567	135.0	.00883	.80	13.5	.00777	.91	1.4	.00777	.91
4.4	3.5	.8	.000567	157.5	.00836	.84	15.8	.00692	1.02	1.6	.00692	1.02
5.0	4.0	.8	.000567	180.0	.00790	.89	18.0	.00622	1.14	1.8	.00622	1.14
5.6	4.5	.8	.000567	202.5	.00739	.96	20.3	.00562	1.26	2.0	.00562	1.26
6.3	5.0	.8	.000567	225.0	.00652	1.08	22.5	.00511	1.38	2.3	.00511	1.38

Table SA-27
Results of Waste Dilution - Winter - Ship 1
(L = 1.3 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 500 gpm								
5.0	1.0	.2	.000202	180.0	.01669	1.18	18.0	.01669	1.18	1.8	.01669	1.18
7.5	1.5	.2	.000202	270.0	.01154	1.71	27.0	.01154	1.71	2.7	.01154	1.71
10.0	2.0	.2	.000202	360.0	.00852	2.32	36.0	.00852	2.32	3.6	.00852	2.32
12.5	2.5	.2	.000202	450.0	.00658	3.00	45.0	.00658	3.00	4.5	.00658	3.00
15.0	3.0	.2	.000202	540.0	.00525	3.76	54.0	.00525	3.76	5.4	.00525	3.76
17.5	3.5	.2	.000202	630.0	.00429	4.60	63.0	.00429	4.60	6.3	.00429	4.60
20.0	4.0	.2	.000202	720.0	.00358	5.52	72.0	.00358	5.52	7.2	.00358	5.52
22.5	4.5	.2	.000202	810.0	.00303	6.51	81.0	.00303	6.51	8.1	.00303	6.51
25.0	5.0	.2	.000202	900.0	.00261	7.59	90.0	.00261	7.59	9.0	.00261	7.59
2.5	1.0	.4	.000202	90.0	.01363	1.45	9.0	.01363	1.45	.9	.01363	1.45
3.8	1.5	.4	.000202	135.0	.01043	1.89	13.5	.01043	1.89	1.4	.01043	1.89
5.0	2.0	.4	.000202	180.0	.00835	2.37	18.0	.00835	2.37	1.8	.00835	2.37
6.3	2.5	.4	.000202	225.0	.00687	2.88	22.5	.00687	2.88	2.3	.00687	2.88
7.5	3.0	.4	.000202	270.0	.00577	3.43	27.0	.00577	3.43	2.7	.00577	3.43
8.8	3.5	.4	.000202	315.0	.00493	4.01	31.5	.00493	4.01	3.1	.00493	4.01
10.0	4.0	.4	.000202	360.0	.00426	4.64	36.0	.00426	4.64	3.6	.00426	4.64
11.3	4.5	.4	.000202	405.0	.00373	5.30	40.5	.00373	5.30	4.0	.00373	5.30
12.5	5.0	.4	.000202	450.0	.00329	6.00	45.0	.00329	6.00	4.5	.00329	6.00
1.3	1.0	.8	.000202	45.0	.00994	1.99	4.5	.00994	1.99	.5	.00994	1.99
1.9	1.5	.8	.000202	67.5	.00804	2.46	6.8	.00804	2.46	.7	.00804	2.46
2.5	2.0	.8	.000202	90.0	.00682	2.90	9.0	.00682	2.90	.9	.00682	2.90
3.1	2.5	.8	.000202	112.5	.00592	3.34	11.3	.00592	3.34	1.1	.00592	3.34
3.8	3.0	.8	.000202	135.0	.00522	3.79	13.5	.00522	3.79	1.4	.00522	3.79
4.4	3.5	.8	.000202	157.5	.00465	4.25	15.8	.00465	4.25	1.6	.00465	4.25
5.0	4.0	.8	.000202	180.0	.00417	4.73	18.0	.00417	4.73	1.8	.00417	4.73
5.6	4.5	.8	.000202	202.5	.00377	5.24	20.3	.00377	5.24	2.0	.00377	5.24
6.3	5.0	.8	.000202	225.0	.00343	5.75	22.5	.00343	5.75	2.3	.00343	5.75
				Q = 600 gpm								
5.0	1.0	.2	.000243	180.0	.01669	.99	18.0	.01669	.99	1.8	.01669	.99
7.5	1.5	.2	.000243	270.0	.01154	1.43	27.0	.01154	1.43	2.7	.01154	1.43
10.0	2.0	.2	.000243	360.0	.00852	1.93	36.0	.00852	1.93	3.6	.00852	1.93
12.5	2.5	.2	.000243	450.0	.00658	2.50	45.0	.00658	2.50	4.5	.00658	2.50
15.0	3.0	.2	.000243	540.0	.00525	3.14	54.0	.00525	3.14	5.4	.00525	3.14
17.5	3.5	.2	.000243	630.0	.00429	3.83	63.0	.00429	3.83	6.3	.00429	3.83
20.0	4.0	.2	.000243	720.0	.00358	4.60	72.0	.00358	4.60	7.2	.00358	4.60
22.5	4.5	.2	.000243	810.0	.00303	5.43	81.0	.00303	5.43	8.1	.00303	5.43
25.0	5.0	.2	.000243	900.0	.00261	6.32	90.0	.00261	6.32	9.0	.00261	6.32
2.5	1.0	.4	.000243	90.0	.01363	1.21	9.0	.01363	1.21	.9	.01363	1.21
3.8	1.5	.4	.000243	135.0	.01043	1.58	13.5	.01043	1.58	1.4	.01043	1.58
5.0	2.0	.4	.000243	180.0	.00835	1.97	18.0	.00835	1.97	1.8	.00835	1.97
6.3	2.5	.4	.000243	225.0	.00687	2.40	22.5	.00687	2.40	2.3	.00687	2.40
7.5	3.0	.4	.000243	270.0	.00577	2.85	27.0	.00577	2.85	2.7	.00577	2.85
8.8	3.5	.4	.000243	315.0	.00493	3.34	31.5	.00493	3.34	3.1	.00493	3.34
10.0	4.0	.4	.000243	360.0	.00426	3.86	36.0	.00426	3.86	3.6	.00426	3.86
11.3	4.5	.4	.000243	405.0	.00373	4.42	40.5	.00373	4.42	4.0	.00373	4.42
12.5	5.0	.4	.000243	450.0	.00329	5.00	45.0	.00329	5.00	4.5	.00329	5.00
1.3	1.0	.8	.000243	45.0	.00994	1.66	4.5	.00994	1.66	.5	.00994	1.66
1.9	1.5	.8	.000243	67.5	.00804	2.05	6.8	.00804	2.05	.7	.00804	2.05
2.5	2.0	.8	.000243	90.0	.00682	2.42	9.0	.00682	2.42	.9	.00682	2.42
3.1	2.5	.8	.000243	112.5	.00592	2.78	11.3	.00592	2.78	1.1	.00592	2.78
3.8	3.0	.8	.000243	135.0	.00522	3.16	13.5	.00522	3.16	1.4	.00522	3.16
4.4	3.5	.8	.000243	157.5	.00465	3.54	15.8	.00465	3.54	1.6	.00465	3.54
5.0	4.0	.8	.000243	180.0	.00417	3.95	18.0	.00417	3.95	1.8	.00417	3.95
5.6	4.5	.8	.000243	202.5	.00377	4.36	20.3	.00377	4.36	2.0	.00377	4.36
6.3	5.0	.8	.000243	225.0	.00343	4.80	22.5	.00343	4.80	2.3	.00343	4.80

Table SA-27 (continued)
Results of Waste Dilution - Winter - Ship 1
(L = 1.3 n mi, A = 0.001 $ft^{2/3}/sec$)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 700 gpm								
5.0	1.0	.2	.000283	180.0	.01669	.85	18.0	.01669	.85	1.8	.01669	.85
7.5	1.5	.2	.000283	270.0	.01154	1.22	27.0	.01154	1.22	2.7	.01154	1.22
10.0	2.0	.2	.000283	360.0	.00852	1.66	36.0	.00852	1.66	3.6	.00852	1.66
12.5	2.5	.2	.000283	450.0	.00658	2.14	45.0	.00658	2.14	4.5	.00658	2.14
15.0	3.0	.2	.000283	540.0	.00525	2.69	54.0	.00525	2.69	5.4	.00525	2.69
17.5	3.5	.2	.000283	630.0	.00429	3.29	63.0	.00429	3.29	6.3	.00429	3.29
20.0	4.0	.2	.000283	720.0	.00358	3.94	72.0	.00358	3.94	7.2	.00358	3.94
22.5	4.5	.2	.000283	810.0	.00303	4.65	81.0	.00303	4.65	8.1	.00303	4.65
25.0	5.0	.2	.000283	900.0	.00261	5.42	90.0	.00261	5.42	9.0	.00261	5.42
2.5	1.0	.4	.000283	90.0	.01363	1.04	9.0	.01363	1.04	.9	.01363	1.04
3.8	1.5	.4	.000283	135.0	.01043	1.35	13.5	.01043	1.35	1.4	.01043	1.35
5.0	2.0	.4	.000283	180.0	.00835	1.69	18.0	.00835	1.69	1.8	.00835	1.69
6.3	2.5	.4	.000283	225.0	.00687	2.06	22.5	.00687	2.06	2.3	.00687	2.06
7.5	3.0	.4	.000283	270.0	.00577	2.45	27.0	.00577	2.45	2.7	.00577	2.45
8.8	3.5	.4	.000283	315.0	.00493	2.87	31.5	.00493	2.87	3.1	.00493	2.87
10.0	4.0	.4	.000283	360.0	.00426	3.31	36.0	.00426	3.31	3.6	.00426	3.31
11.3	4.5	.4	.000283	405.0	.00373	3.79	40.5	.00373	3.79	4.0	.00373	3.79
12.5	5.0	.4	.000283	450.0	.00329	4.29	45.0	.00329	4.29	4.5	.00329	4.29
1.3	1.0	.8	.000283	45.0	.00994	1.42	4.5	.00994	1.42	.5	.00994	1.42
1.9	1.5	.8	.000283	67.5	.00804	1.76	6.8	.00804	1.76	.7	.00804	1.76
2.5	2.0	.8	.000283	90.0	.00682	2.07	9.0	.00682	2.07	.9	.00682	2.07
3.1	2.5	.8	.000283	112.5	.00592	2.38	11.3	.00592	2.38	1.1	.00592	2.38
3.8	3.0	.8	.000283	135.0	.00522	2.71	13.5	.00522	2.71	1.4	.00522	2.71
4.4	3.5	.8	.000283	157.5	.00465	3.04	15.8	.00465	3.04	1.6	.00465	3.04
5.0	4.0	.8	.000283	180.0	.00417	3.38	18.0	.00417	3.38	1.8	.00417	3.38
5.6	4.5	.8	.000283	202.5	.00377	3.74	20.3	.00377	3.74	2.0	.00377	3.74
6.3	5.0	.8	.000283	225.0	.00343	4.11	22.5	.00343	4.11	2.3	.00343	4.11
				Q = 1000 gpm								
5.0	1.0	.2	.000405	180.0	.01669	.59	18.0	.01669	.59	1.8	.01669	.59
7.5	1.5	.2	.000405	270.0	.01154	.86	27.0	.01154	.86	2.7	.01154	.86
10.0	2.0	.2	.000405	360.0	.00852	1.16	36.0	.00852	1.16	3.6	.00852	1.16
12.5	2.5	.2	.000405	450.0	.00658	1.50	45.0	.00658	1.50	4.5	.00658	1.50
15.0	3.0	.2	.000405	540.0	.00525	1.88	54.0	.00525	1.88	5.4	.00525	1.88
17.5	3.5	.2	.000405	630.0	.00429	2.30	63.0	.00429	2.30	6.3	.00429	2.30
20.0	4.0	.2	.000405	720.0	.00358	2.76	72.0	.00358	2.76	7.2	.00358	2.76
22.5	4.5	.2	.000405	810.0	.00303	3.26	81.0	.00303	3.26	8.1	.00303	3.26
25.0	5.0	.2	.000405	900.0	.00261	3.79	90.0	.00261	3.79	9.0	.00261	3.79
2.5	1.0	.4	.000405	90.0	.01363	.72	9.0	.01363	.72	.9	.01363	.72
3.8	1.5	.4	.000405	135.0	.01043	.95	13.5	.01043	.95	1.4	.01043	.95
5.0	2.0	.4	.000405	180.0	.00835	1.18	18.0	.00835	1.18	1.8	.00835	1.18
6.3	2.5	.4	.000405	225.0	.00687	1.44	22.5	.00687	1.44	2.3	.00687	1.44
7.5	3.0	.4	.000405	270.0	.00577	1.71	27.0	.00577	1.71	2.7	.00577	1.71
8.8	3.5	.4	.000405	315.0	.00493	2.01	31.5	.00493	2.01	3.1	.00493	2.01
10.0	4.0	.4	.000405	360.0	.00426	2.32	36.0	.00426	2.32	3.6	.00426	2.32
11.3	4.5	.4	.000405	405.0	.00373	2.65	40.5	.00373	2.65	4.0	.00373	2.65
12.5	5.0	.4	.000405	450.0	.00329	3.00	45.0	.00329	3.00	4.5	.00329	3.00
1.3	1.0	.8	.000405	45.0	.00994	.99	4.5	.00994	.99	.5	.00994	.99
1.9	1.5	.8	.000405	67.5	.00804	1.23	6.8	.00804	1.23	.7	.00804	1.23
2.5	2.0	.8	.000405	90.0	.00682	1.45	9.0	.00682	1.45	.9	.00682	1.45
3.1	2.5	.8	.000405	112.5	.00592	1.67	11.3	.00592	1.67	1.1	.00592	1.67
3.8	3.0	.8	.000405	135.0	.00522	1.89	13.5	.00522	1.89	1.4	.00522	1.89
4.4	3.5	.8	.000405	157.5	.00465	2.13	15.8	.00465	2.13	1.6	.00465	2.13
5.0	4.0	.8	.000405	180.0	.00417	2.37	18.0	.00417	2.37	1.8	.00417	2.37
5.6	4.5	.8	.000405	202.5	.00377	2.62	20.3	.00377	2.62	2.0	.00377	2.62
6.3	5.0	.8	.000405	225.0	.00343	2.88	22.5	.00343	2.88	2.3	.00343	2.88

Table SA-27 (continued)
Results of Waste Dilution - Winter - Ship 1
(L = 1.3 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 1200 gpm								
5.0	1.0	.2	.000486	180.0	.01669	.49	18.0	.01669	.49	1.8	.01669	.49
7.5	1.5	.2	.000486	270.0	.01154	.71	27.0	.01154	.71	2.7	.01154	.71
10.0	2.0	.2	.000486	360.0	.00852	.97	36.0	.00852	.97	3.6	.00852	.97
12.5	2.5	.2	.000486	450.0	.00658	1.25	45.0	.00658	1.25	4.5	.00658	1.25
15.0	3.0	.2	.000486	540.0	.00525	1.57	54.0	.00525	1.57	5.4	.00525	1.57
17.5	3.5	.2	.000486	630.0	.00429	1.92	63.0	.00429	1.92	6.3	.00429	1.92
20.0	4.0	.2	.000486	720.0	.00358	2.30	72.0	.00358	2.30	7.2	.00358	2.30
22.5	4.5	.2	.000486	810.0	.00303	2.71	81.0	.00303	2.71	8.1	.00303	2.71
25.0	5.0	.2	.000486	900.0	.00261	3.16	90.0	.00261	3.16	9.0	.00261	3.16
2.5	1.0	.4	.000486	90.0	.01363	.60	9.0	.01363	.60	.9	.01363	.60
3.8	1.5	.4	.000486	135.0	.01043	.79	13.5	.01043	.79	1.4	.01043	.79
5.0	2.0	.4	.000486	180.0	.00835	.99	18.0	.00835	.99	1.8	.00835	.99
6.3	2.5	.4	.000486	225.0	.00687	1.20	22.5	.00687	1.20	2.3	.00687	1.20
7.5	3.0	.4	.000486	270.0	.00577	1.43	27.0	.00577	1.43	2.7	.00577	1.43
8.8	3.5	.4	.000486	315.0	.00493	1.67	31.5	.00493	1.67	3.1	.00493	1.67
10.0	4.0	.4	.000486	360.0	.00426	1.93	36.0	.00426	1.93	3.6	.00426	1.93
11.3	4.5	.4	.000486	405.0	.00373	2.21	40.5	.00373	2.21	4.0	.00373	2.21
12.5	5.0	.4	.000486	450.0	.00329	2.50	45.0	.00329	2.50	4.5	.00329	2.50
1.3	1.0	.8	.000486	45.0	.00994	.83	4.5	.00994	.83	.5	.00994	.83
1.9	1.5	.8	.000486	67.5	.00804	1.02	6.8	.00804	1.02	.7	.00804	1.02
2.5	2.0	.8	.000486	90.0	.00682	1.21	9.0	.00682	1.21	.9	.00682	1.21
3.1	2.5	.8	.000486	112.5	.00592	1.39	11.3	.00592	1.39	1.1	.00592	1.39
3.8	3.0	.8	.000486	135.0	.00522	1.58	13.5	.00522	1.58	1.4	.00522	1.58
4.4	3.5	.8	.000486	157.5	.00465	1.77	15.8	.00465	1.77	1.6	.00465	1.77
5.0	4.0	.8	.000486	180.0	.00417	1.97	18.0	.00417	1.97	1.8	.00417	1.97
5.6	4.5	.8	.000486	202.5	.00377	2.18	20.3	.00377	2.18	2.0	.00377	2.18
6.3	5.0	.8	.000486	225.0	.00343	2.40	22.5	.00343	2.40	2.3	.00343	2.40
				Q = 1400 gpm								
5.0	1.0	.2	.000567	180.0	.01669	.42	18.0	.01669	.42	1.8	.01669	.42
7.5	1.5	.2	.000567	270.0	.01154	.61	27.0	.01154	.61	2.7	.01154	.61
10.0	2.0	.2	.000567	360.0	.00852	.83	36.0	.00852	.83	3.6	.00852	.83
12.5	2.5	.2	.000567	450.0	.00658	1.07	45.0	.00658	1.07	4.5	.00658	1.07
15.0	3.0	.2	.000567	540.0	.00525	1.34	54.0	.00525	1.34	5.4	.00525	1.34
17.5	3.5	.2	.000567	630.0	.00429	1.64	63.0	.00429	1.64	6.3	.00429	1.64
20.0	4.0	.2	.000567	720.0	.00358	1.97	72.0	.00358	1.97	7.2	.00358	1.97
22.5	4.5	.2	.000567	810.0	.00303	2.33	81.0	.00303	2.33	8.1	.00303	2.33
25.0	5.0	.2	.000567	900.0	.00261	2.71	90.0	.00261	2.71	9.0	.00261	2.71
2.5	1.0	.4	.000567	90.0	.01363	.52	9.0	.01363	.52	.9	.01363	.52
3.8	1.5	.4	.000567	135.0	.01043	.68	13.5	.01043	.68	1.4	.01043	.68
5.0	2.0	.4	.000567	180.0	.00835	.85	18.0	.00835	.85	1.8	.00835	.85
6.3	2.5	.4	.000567	225.0	.00687	1.03	22.5	.00687	1.03	2.3	.00687	1.03
7.5	3.0	.4	.000567	270.0	.00577	1.22	27.0	.00577	1.22	2.7	.00577	1.22
8.8	3.5	.4	.000567	315.0	.00493	1.43	31.5	.00493	1.43	3.1	.00493	1.43
10.0	4.0	.4	.000567	360.0	.00426	1.66	36.0	.00426	1.66	3.6	.00426	1.66
11.3	4.5	.4	.000567	405.0	.00373	1.89	40.5	.00373	1.89	4.0	.00373	1.89
12.5	5.0	.4	.000567	450.0	.00329	2.14	45.0	.00329	2.14	4.5	.00329	2.14
1.3	1.0	.8	.000567	45.0	.00994	.71	4.5	.00994	.71	.5	.00994	.71
1.9	1.5	.8	.000567	67.5	.00804	.88	6.8	.00804	.88	.7	.00804	.88
2.5	2.0	.8	.000567	90.0	.00682	1.04	9.0	.00682	1.04	.9	.00682	1.04
3.1	2.5	.8	.000567	112.5	.00592	1.19	11.3	.00592	1.19	1.1	.00592	1.19
3.8	3.0	.8	.000567	135.0	.00522	1.35	13.5	.00522	1.35	1.4	.00522	1.35
4.4	3.5	.8	.000567	157.5	.00465	1.52	15.8	.00465	1.52	1.6	.00465	1.52
5.0	4.0	.8	.000567	180.0	.00417	1.69	18.0	.00417	1.69	1.8	.00417	1.69
5.6	4.5	.8	.000567	202.5	.00377	1.87	20.3	.00377	1.87	2.0	.00377	1.87
6.3	5.0	.8	.000567	225.0	.00343	2.06	22.5	.00343	2.06	2.3	.00343	2.06

Table SA-28
Results of Waste Dilution - Summer - Ship 1
(L = 1.5 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 500 gpm							
5.0	1.0	.2	.000202	180.0	.02820	.70	18.0	.02219	.89	1.8	.02219	.89
7.5	1.5	.2	.000202	270.0	.01899	1.04	27.0	.01558	1.27	2.7	.01558	1.27
10.0	2.0	.2	.000202	360.0	.01354	1.46	36.0	.01164	1.70	3.6	.01164	1.70
12.5	2.5	.2	.000202	450.0	.01028	1.92	45.0	.00907	2.18	4.5	.00907	2.18
15.0	3.0	.2	.000202	540.0	.00812	2.43	54.0	.00729	2.71	5.4	.00729	2.71
17.5	3.5	.2	.000202	630.0	.00660	2.99	63.0	.00599	3.30	6.3	.00599	3.30
20.0	4.0	.2	.000202	720.0	.00549	3.60	72.0	.00502	3.94	7.2	.00502	3.94
22.5	4.5	.2	.000202	810.0	.00464	4.26	81.0	.00427	4.63	8.1	.00427	4.63
25.0	5.0	.2	.000202	900.0	.00398	4.97	90.0	.00368	5.37	9.0	.00368	5.37
2.5	1.0	.4	.000202	90.0	.01775	1.11	9.0	.01775	1.11	.9	.01775	1.11
3.8	1.5	.4	.000202	135.0	.01561	1.27	13.5	.01374	1.44	1.4	.01374	1.44
5.0	2.0	.4	.000202	180.0	.01410	1.40	18.0	.01110	1.78	1.8	.01110	1.78
6.3	2.5	.4	.000202	225.0	.01169	1.69	22.5	.00921	2.15	2.3	.00921	2.15
7.5	3.0	.4	.000202	270.0	.00950	2.08	27.0	.00779	2.54	2.7	.00779	2.54
8.8	3.5	.4	.000202	315.0	.00794	2.49	31.5	.00669	2.95	3.1	.00669	2.95
10.0	4.0	.4	.000202	360.0	.00677	2.92	36.0	.00582	3.39	3.6	.00582	3.39
11.3	4.5	.4	.000202	405.0	.00587	3.37	40.5	.00511	3.86	4.0	.00511	3.86
12.5	5.0	.4	.000202	450.0	.00514	3.84	45.0	.00453	4.36	4.5	.00453	4.36
1.3	1.0	.8	.000202	45.0	.01284	1.54	4.5	.01284	1.54	.5	.01284	1.54
1.9	1.5	.8	.000202	67.5	.01041	1.90	6.8	.01041	1.90	.7	.01041	1.90
2.5	2.0	.8	.000202	90.0	.00888	2.23	9.0	.00888	2.23	.9	.00888	2.23
3.1	2.5	.8	.000202	112.5	.00818	2.42	11.3	.00775	2.55	1.1	.00775	2.55
3.8	3.0	.8	.000202	135.0	.00781	2.53	13.5	.00687	2.88	1.4	.00687	2.88
4.4	3.5	.8	.000202	157.5	.00743	2.66	15.8	.00615	3.21	1.6	.00615	3.21
5.0	4.0	.8	.000202	180.0	.00705	2.80	18.0	.00555	3.56	1.8	.00555	3.56
5.6	4.5	.8	.000202	202.5	.00662	2.98	20.3	.00504	3.92	2.0	.00504	3.92
6.3	5.0	.8	.000202	225.0	.00587	3.36	22.5	.00460	4.29	2.3	.00460	4.29
					Q = 600 gpm							
5.0	1.0	.2	.000243	180.0	.02820	.58	18.0	.02219	.74	1.8	.02219	.74
7.5	1.5	.2	.000243	270.0	.01899	.87	27.0	.01558	1.06	2.7	.01558	1.06
10.0	2.0	.2	.000243	360.0	.01354	1.22	36.0	.01164	1.41	3.6	.01164	1.41
12.5	2.5	.2	.000243	450.0	.01028	1.60	45.0	.00907	1.82	4.5	.00907	1.82
15.0	3.0	.2	.000243	540.0	.00812	2.03	54.0	.00729	2.26	5.4	.00729	2.26
17.5	3.5	.2	.000243	630.0	.00660	2.49	63.0	.00599	2.75	6.3	.00599	2.75
20.0	4.0	.2	.000243	720.0	.00549	3.00	72.0	.00502	3.28	7.2	.00502	3.28
22.5	4.5	.2	.000243	810.0	.00464	3.55	81.0	.00427	3.85	8.1	.00427	3.85
25.0	5.0	.2	.000243	900.0	.00398	4.14	90.0	.00368	4.47	9.0	.00368	4.47
2.5	1.0	.4	.000243	90.0	.01775	.93	9.0	.01775	.93	.9	.01775	.93
3.8	1.5	.4	.000243	135.0	.01561	1.05	13.5	.01374	1.20	1.4	.01374	1.20
5.0	2.0	.4	.000243	180.0	.01410	1.17	18.0	.01110	1.48	1.8	.01110	1.48
6.3	2.5	.4	.000243	225.0	.01169	1.41	22.5	.00921	1.79	2.3	.00921	1.79
7.5	3.0	.4	.000243	270.0	.00950	1.73	27.0	.00779	2.11	2.7	.00779	2.11
8.8	3.5	.4	.000243	315.0	.00794	2.07	31.5	.00669	2.46	3.1	.00669	2.46
10.0	4.0	.4	.000243	360.0	.00677	2.43	36.0	.00582	2.83	3.6	.00582	2.83
11.3	4.5	.4	.000243	405.0	.00587	2.81	40.5	.00511	3.22	4.0	.00511	3.22
12.5	5.0	.4	.000243	450.0	.00514	3.20	45.0	.00453	3.63	4.5	.00453	3.63
1.3	1.0	.8	.000243	45.0	.01284	1.28	4.5	.01284	1.28	.5	.01284	1.28
1.9	1.5	.8	.000243	67.5	.01041	1.58	6.8	.01041	1.58	.7	.01041	1.58
2.5	2.0	.8	.000243	90.0	.00888	1.85	9.0	.00888	1.85	.9	.00888	1.85
3.1	2.5	.8	.000243	112.5	.00818	2.01	11.3	.00775	2.12	1.1	.00775	2.12
3.8	3.0	.8	.000243	135.0	.00781	2.11	13.5	.00687	2.40	1.4	.00687	2.40
4.4	3.5	.8	.000243	157.5	.00743	2.22	15.8	.00615	2.68	1.6	.00615	2.68
5.0	4.0	.8	.000243	180.0	.00705	2.33	18.0	.00555	2.97	1.8	.00555	2.97
5.6	4.5	.8	.000243	202.5	.00662	2.49	20.3	.00504	3.27	2.0	.00504	3.27
6.3	5.0	.8	.000243	225.0	.00587	2.80	22.5	.00460	3.58	2.3	.00460	3.58

Table SA-28 (continued)
Results of Waste Dilution - Summer - Ship 1
(L = 1.5 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 700 gpm								
5.0	1.0	.2	.000283	180.0	.02820	.50	18.0	.02219	.64	1.8	.02219	.64
7.5	1.5	.2	.000283	270.0	.01899	.74	27.0	.01558	.91	2.7	.01558	.91
10.0	2.0	.2	.000283	360.0	.01354	1.04	36.0	.01164	1.21	3.6	.01164	1.21
12.5	2.5	.2	.000283	450.0	.01028	1.37	45.0	.00907	1.56	4.5	.00907	1.56
15.0	3.0	.2	.000283	540.0	.00812	1.74	54.0	.00729	1.94	5.4	.00729	1.94
17.5	3.5	.2	.000283	630.0	.00660	2.14	63.0	.00599	2.36	6.3	.00599	2.36
20.0	4.0	.2	.000283	720.0	.00549	2.57	72.0	.00502	2.81	7.2	.00502	2.81
22.5	4.5	.2	.000283	810.0	.00464	3.04	81.0	.00427	3.30	8.1	.00427	3.30
25.0	5.0	.2	.000283	900.0	.00398	3.55	90.0	.00368	3.83	9.0	.00368	3.83
2.5	1.0	.4	.000283	90.0	.01775	.80	9.0	.01775	.80	.9	.01775	.80
3.8	1.5	.4	.000283	135.0	.01561	.90	13.5	.01374	1.03	1.4	.01374	1.03
5.0	2.0	.4	.000283	180.0	.01410	1.00	18.0	.01110	1.27	1.8	.01110	1.27
6.3	2.5	.4	.000283	225.0	.01169	1.21	22.5	.00921	1.53	2.3	.00921	1.53
7.5	3.0	.4	.000283	270.0	.00950	1.49	27.0	.00779	1.81	2.7	.00779	1.81
8.8	3.5	.4	.000283	315.0	.00794	1.78	31.5	.00669	2.11	3.1	.00669	2.11
10.0	4.0	.4	.000283	360.0	.00677	2.08	36.0	.00582	2.42	3.6	.00582	2.42
11.3	4.5	.4	.000283	405.0	.00587	2.41	40.5	.00511	2.76	4.0	.00511	2.76
12.5	5.0	.4	.000283	450.0	.00514	2.75	45.0	.00453	3.11	4.5	.00453	3.11
1.3	1.0	.8	.000283	45.0	.01284	1.10	4.5	.01284	1.10	.5	.01284	1.10
1.9	1.5	.8	.000283	67.5	.01041	1.36	6.8	.01041	1.36	.7	.01041	1.36
2.5	2.0	.8	.000283	90.0	.00888	1.59	9.0	.00888	1.59	.9	.00888	1.59
3.1	2.5	.8	.000283	112.5	.00818	1.73	11.3	.00775	1.82	1.1	.00775	1.82
3.8	3.0	.8	.000283	135.0	.00781	1.81	13.5	.00687	2.05	1.4	.00687	2.05
4.4	3.5	.8	.000283	157.5	.00743	1.90	15.8	.00615	2.30	1.6	.00615	2.30
5.0	4.0	.8	.000283	180.0	.00705	2.00	18.0	.00555	2.54	1.8	.00555	2.54
5.6	4.5	.8	.000283	202.5	.00662	2.13	20.3	.00504	2.80	2.0	.00504	2.80
6.3	5.0	.8	.000283	225.0	.00587	2.40	22.5	.00460	3.07	2.3	.00460	3.07
				Q = 1000 gpm								
5.0	1.0	.2	.000405	180.0	.02820	.35	18.0	.02219	.45	1.8	.02219	.45
7.5	1.5	.2	.000405	270.0	.01899	.52	27.0	.01558	.63	2.7	.01558	.63
10.0	2.0	.2	.000405	360.0	.01354	.73	36.0	.01164	.85	3.6	.01164	.85
12.5	2.5	.2	.000405	450.0	.01028	.96	45.0	.00907	1.09	4.5	.00907	1.09
15.0	3.0	.2	.000405	540.0	.00812	1.22	54.0	.00729	1.36	5.4	.00729	1.36
17.5	3.5	.2	.000405	630.0	.00660	1.50	63.0	.00599	1.65	6.3	.00599	1.65
20.0	4.0	.2	.000405	720.0	.00549	1.80	72.0	.00502	1.97	7.2	.00502	1.97
22.5	4.5	.2	.000405	810.0	.00464	2.13	81.0	.00427	2.31	8.1	.00427	2.31
25.0	5.0	.2	.000405	900.0	.00398	2.48	90.0	.00368	2.68	9.0	.00368	2.68
2.5	1.0	.4	.000405	90.0	.01775	.56	9.0	.01775	.56	.9	.01775	.56
3.8	1.5	.4	.000405	135.0	.01561	.63	13.5	.01374	.72	1.4	.01374	.72
5.0	2.0	.4	.000405	180.0	.01410	.70	18.0	.01110	.89	1.8	.01110	.89
6.3	2.5	.4	.000405	225.0	.01169	.84	22.5	.00921	1.07	2.3	.00921	1.07
7.5	3.0	.4	.000405	270.0	.00950	1.04	27.0	.00779	1.27	2.7	.00779	1.27
8.8	3.5	.4	.000405	315.0	.00794	1.24	31.5	.00669	1.48	3.1	.00669	1.48
10.0	4.0	.4	.000405	360.0	.00677	1.46	36.0	.00582	1.70	3.6	.00582	1.70
11.3	4.5	.4	.000405	405.0	.00587	1.68	40.5	.00511	1.93	4.0	.00511	1.93
12.5	5.0	.4	.000405	450.0	.00514	1.92	45.0	.00453	2.18	4.5	.00453	2.18
1.3	1.0	.8	.000405	45.0	.01284	.77	4.5	.01284	.77	.5	.01284	.77
1.9	1.5	.8	.000405	67.5	.01041	.95	6.8	.01041	.95	.7	.01041	.95
2.5	2.0	.8	.000405	90.0	.00888	1.11	9.0	.00888	1.11	.9	.00888	1.11
3.1	2.5	.8	.000405	112.5	.00818	1.21	11.3	.00775	1.27	1.1	.00775	1.27
3.8	3.0	.8	.000405	135.0	.00781	1.27	13.5	.00687	1.44	1.4	.00687	1.44
4.4	3.5	.8	.000405	157.5	.00743	1.33	15.8	.00615	1.61	1.6	.00615	1.61
5.0	4.0	.8	.000405	180.0	.00705	1.40	18.0	.00555	1.78	1.8	.00555	1.78
5.6	4.5	.8	.000405	202.5	.00662	1.49	20.3	.00504	1.96	2.0	.00504	1.96
6.3	5.0	.8	.000405	225.0	.00587	1.68	22.5	.00460	2.15	2.3	.00460	2.15

Table SA-28 (continued)
Results of Waste Dilution - Summer - Ship 1
(L = 1.5 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 1200 gpm							
5.0	1.0	.2	.000486	180.0	.02820	.29	18.0	.02219	.37	1.8	.02219	.37
7.5	1.5	.2	.000486	270.0	.01899	.43	27.0	.01558	.53	2.7	.01558	.53
10.0	2.0	.2	.000486	360.0	.01354	.61	36.0	.01164	.71	3.6	.01164	.71
12.5	2.5	.2	.000486	450.0	.01028	.80	45.0	.00907	.91	4.5	.00907	.91
15.0	3.0	.2	.000486	540.0	.00812	1.01	54.0	.00729	1.13	5.4	.00729	1.13
17.5	3.5	.2	.000486	630.0	.00660	1.25	63.0	.00599	1.37	6.3	.00599	1.37
20.0	4.0	.2	.000486	720.0	.00549	1.50	72.0	.00502	1.64	7.2	.00502	1.64
22.5	4.5	.2	.000486	810.0	.00464	1.77	81.0	.00427	1.93	8.1	.00427	1.93
25.0	5.0	.2	.000486	900.0	.00398	2.07	90.0	.00368	2.24	9.0	.00368	2.24
2.5	1.0	.4	.000486	90.0	.01775	.46	9.0	.01775	.46	.9	.01775	.46
3.8	1.5	.4	.000486	135.0	.01561	.53	13.5	.01374	.60	1.4	.01374	.60
5.0	2.0	.4	.000486	180.0	.01410	.58	18.0	.01110	.74	1.8	.01110	.74
6.3	2.5	.4	.000486	225.0	.01169	.70	22.5	.00921	.89	2.3	.00921	.89
7.5	3.0	.4	.000486	270.0	.00950	.87	27.0	.00779	1.06	2.7	.00779	1.06
8.8	3.5	.4	.000486	315.0	.00794	1.04	31.5	.00669	1.23	3.1	.00669	1.23
10.0	4.0	.4	.000486	360.0	.00677	1.22	36.0	.00582	1.41	3.6	.00582	1.41
11.3	4.5	.4	.000486	405.0	.00587	1.40	40.5	.00511	1.61	4.0	.00511	1.61
12.5	5.0	.4	.000486	450.0	.00514	1.60	45.0	.00453	1.82	4.5	.00453	1.82
1.3	1.0	.8	.000486	45.0	.01284	.64	4.5	.01284	.64	.5	.01284	.64
1.9	1.5	.8	.000486	67.5	.01041	.79	6.8	.01041	.79	.7	.01041	.79
2.5	2.0	.8	.000486	90.0	.00888	.93	9.0	.00888	.93	.9	.00888	.93
3.1	2.5	.8	.000486	112.5	.00818	1.01	11.3	.00775	1.06	1.1	.00775	1.06
3.8	3.0	.8	.000486	135.0	.00781	1.05	13.5	.00687	1.20	1.4	.00687	1.20
4.4	3.5	.8	.000486	157.5	.00743	1.11	15.8	.00615	1.34	1.6	.00615	1.34
5.0	4.0	.8	.000486	180.0	.00705	1.17	18.0	.00555	1.48	1.8	.00555	1.48
5.6	4.5	.8	.000486	202.5	.00662	1.24	20.3	.00504	1.63	2.0	.00504	1.63
6.3	5.0	.8	.000486	225.0	.00587	1.40	22.5	.00460	1.79	2.3	.00460	1.79
					Q = 1400 gpm							
5.0	1.0	.2	.000567	180.0	.02820	.25	18.0	.02219	.32	1.8	.02219	.32
7.5	1.5	.2	.000567	270.0	.01899	.37	27.0	.01558	.45	2.7	.01558	.45
10.0	2.0	.2	.000567	360.0	.01354	.52	36.0	.01164	.61	3.6	.01164	.61
12.5	2.5	.2	.000567	450.0	.01028	.69	45.0	.00907	.78	4.5	.00907	.78
15.0	3.0	.2	.000567	540.0	.00812	.87	54.0	.00729	.97	5.4	.00729	.97
17.5	3.5	.2	.000567	630.0	.00660	1.07	63.0	.00599	1.18	6.3	.00599	1.18
20.0	4.0	.2	.000567	720.0	.00549	1.29	72.0	.00502	1.41	7.2	.00502	1.41
22.5	4.5	.2	.000567	810.0	.00464	1.52	81.0	.00427	1.65	8.1	.00427	1.65
25.0	5.0	.2	.000567	900.0	.00398	1.77	90.0	.00368	1.92	9.0	.00368	1.92
2.5	1.0	.4	.000567	90.0	.01775	.40	9.0	.01775	.40	.9	.01775	.40
3.8	1.5	.4	.000567	135.0	.01561	.45	13.5	.01374	.51	1.4	.01374	.51
5.0	2.0	.4	.000567	180.0	.01410	.50	18.0	.01110	.64	1.8	.01110	.64
6.3	2.5	.4	.000567	225.0	.01169	.60	22.5	.00921	.77	2.3	.00921	.77
7.5	3.0	.4	.000567	270.0	.00950	.74	27.0	.00779	.91	2.7	.00779	.91
8.8	3.5	.4	.000567	315.0	.00794	.89	31.5	.00669	1.05	3.1	.00669	1.05
10.0	4.0	.4	.000567	360.0	.00677	1.04	36.0	.00582	1.21	3.6	.00582	1.21
11.3	4.5	.4	.000567	405.0	.00587	1.20	40.5	.00511	1.38	4.0	.00511	1.38
12.5	5.0	.4	.000567	450.0	.00514	1.37	45.0	.00453	1.56	4.5	.00453	1.56
1.3	1.0	.8	.000567	45.0	.01284	.55	4.5	.01284	.55	.5	.01284	.55
1.9	1.5	.8	.000567	67.5	.01041	.68	6.8	.01041	.68	.7	.01041	.68
2.5	2.0	.8	.000567	90.0	.00888	.79	9.0	.00888	.79	.9	.00888	.79
3.1	2.5	.8	.000567	112.5	.00818	.86	11.3	.00775	.91	1.1	.00775	.91
3.8	3.0	.8	.000567	135.0	.00781	.90	13.5	.00687	1.03	1.4	.00687	1.03
4.4	3.5	.8	.000567	157.5	.00743	.95	15.8	.00615	1.15	1.6	.00615	1.15
5.0	4.0	.8	.000567	180.0	.00705	1.00	18.0	.00555	1.27	1.8	.00555	1.27
5.6	4.5	.8	.000567	202.5	.00662	1.07	20.3	.00504	1.40	2.0	.00504	1.40
6.3	5.0	.8	.000567	225.0	.00587	1.20	22.5	.00460	1.53	2.3	.00460	1.53

Table SA-29
Results of Waste Dilution - Winter - Ship 1
(L = 1.5 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 500 gpm												
5.0	1.0	.2	.000202	180.0	.01490	1.33	18.0	.01490	1.33	1.8	.01490	1.33
7.5	1.5	.2	.000202	270.0	.01046	1.89	27.0	.01046	1.89	2.7	.01046	1.89
10.0	2.0	.2	.000202	360.0	.00782	2.53	36.0	.00782	2.53	3.6	.00782	2.53
12.5	2.5	.2	.000202	450.0	.00609	3.24	45.0	.00609	3.24	4.5	.00609	3.24
15.0	3.0	.2	.000202	540.0	.00489	4.04	54.0	.00489	4.04	5.4	.00489	4.04
17.5	3.5	.2	.000202	630.0	.00402	4.91	63.0	.00402	4.91	6.3	.00402	4.91
20.0	4.0	.2	.000202	720.0	.00337	5.86	72.0	.00337	5.86	7.2	.00337	5.86
22.5	4.5	.2	.000202	810.0	.00287	6.89	81.0	.00287	6.89	8.1	.00287	6.89
25.0	5.0	.2	.000202	900.0	.00247	7.99	90.0	.00247	7.99	9.0	.00247	7.99
2.5	1.0	.4	.000202	90.0	.01192	1.66	9.0	.01192	1.66	.9	.01192	1.66
3.8	1.5	.4	.000202	135.0	.00922	2.14	13.5	.00922	2.14	1.4	.00922	2.14
5.0	2.0	.4	.000202	180.0	.00745	2.65	18.0	.00745	2.65	1.8	.00745	2.65
6.3	2.5	.4	.000202	225.0	.00618	3.20	22.5	.00618	3.20	2.3	.00618	3.20
7.5	3.0	.4	.000202	270.0	.00523	3.78	27.0	.00523	3.78	2.7	.00523	3.78
8.8	3.5	.4	.000202	315.0	.00449	4.40	31.5	.00449	4.40	3.1	.00449	4.40
10.0	4.0	.4	.000202	360.0	.00391	5.06	36.0	.00391	5.06	3.6	.00391	5.06
11.3	4.5	.4	.000202	405.0	.00343	5.75	40.5	.00343	5.75	4.0	.00343	5.75
12.5	5.0	.4	.000202	450.0	.00305	6.49	45.0	.00305	6.49	4.5	.00305	6.49
1.3	1.0	.8	.000202	45.0	.00862	2.29	4.5	.00862	2.29	.5	.00862	2.29
1.9	1.5	.8	.000202	67.5	.00699	2.83	6.8	.00699	2.83	.7	.00699	2.83
2.5	2.0	.8	.000202	90.0	.00596	3.31	9.0	.00596	3.31	.9	.00596	3.31
3.1	2.5	.8	.000202	112.5	.00521	3.80	11.3	.00521	3.80	1.1	.00521	3.80
3.8	3.0	.8	.000202	135.0	.00461	4.28	13.5	.00461	4.28	1.4	.00461	4.28
4.4	3.5	.8	.000202	157.5	.00413	4.79	15.8	.00413	4.79	1.6	.00413	4.79
5.0	4.0	.8	.000202	180.0	.00373	5.30	18.0	.00373	5.30	1.8	.00373	5.30
5.6	4.5	.8	.000202	202.5	.00338	5.84	20.3	.00338	5.84	2.0	.00338	5.84
6.3	5.0	.8	.000202	225.0	.00309	6.39	22.5	.00309	6.39	2.3	.00309	6.39
Q = 600 gpm												
5.0	1.0	.2	.000243	180.0	.01490	1.10	18.0	.01490	1.10	1.8	.01490	1.10
7.5	1.5	.2	.000243	270.0	.01046	1.57	27.0	.01046	1.57	2.7	.01046	1.57
10.0	2.0	.2	.000243	360.0	.00782	2.11	36.0	.00782	2.11	3.6	.00782	2.11
12.5	2.5	.2	.000243	450.0	.00609	2.70	45.0	.00609	2.70	4.5	.00609	2.70
15.0	3.0	.2	.000243	540.0	.00489	3.37	54.0	.00489	3.37	5.4	.00489	3.37
17.5	3.5	.2	.000243	630.0	.00402	4.09	63.0	.00402	4.09	6.3	.00402	4.09
20.0	4.0	.2	.000243	720.0	.00337	4.88	72.0	.00337	4.88	7.2	.00337	4.88
22.5	4.5	.2	.000243	810.0	.00287	5.74	81.0	.00287	5.74	8.1	.00287	5.74
25.0	5.0	.2	.000243	900.0	.00247	6.66	90.0	.00247	6.66	9.0	.00247	6.66
2.5	1.0	.4	.000243	90.0	.01192	1.38	9.0	.01192	1.38	.9	.01192	1.38
3.8	1.5	.4	.000243	135.0	.00922	1.78	13.5	.00922	1.78	1.4	.00922	1.78
5.0	2.0	.4	.000243	180.0	.00745	2.21	18.0	.00745	2.21	1.8	.00745	2.21
6.3	2.5	.4	.000243	225.0	.00618	2.66	22.5	.00618	2.66	2.3	.00618	2.66
7.5	3.0	.4	.000243	270.0	.00523	3.15	27.0	.00523	3.15	2.7	.00523	3.15
8.8	3.5	.4	.000243	315.0	.00449	3.66	31.5	.00449	3.66	3.1	.00449	3.66
10.0	4.0	.4	.000243	360.0	.00391	4.21	36.0	.00391	4.21	3.6	.00391	4.21
11.3	4.5	.4	.000243	405.0	.00343	4.79	40.5	.00343	4.79	4.0	.00343	4.79
12.5	5.0	.4	.000243	450.0	.00305	5.41	45.0	.00305	5.41	4.5	.00305	5.41
1.3	1.0	.8	.000243	45.0	.00862	1.91	4.5	.00862	1.91	.5	.00862	1.91
1.9	1.5	.8	.000243	67.5	.00699	2.35	6.8	.00699	2.35	.7	.00699	2.35
2.5	2.0	.8	.000243	90.0	.00596	2.76	9.0	.00596	2.76	.9	.00596	2.76
3.1	2.5	.8	.000243	112.5	.00521	3.16	11.3	.00521	3.16	1.1	.00521	3.16
3.8	3.0	.8	.000243	135.0	.00461	3.57	13.5	.00461	3.57	1.4	.00461	3.57
4.4	3.5	.8	.000243	157.5	.00413	3.99	15.8	.00413	3.99	1.6	.00413	3.99
5.0	4.0	.8	.000243	180.0	.00373	4.42	18.0	.00373	4.42	1.8	.00373	4.42
5.6	4.5	.8	.000243	202.5	.00338	4.86	20.3	.00338	4.86	2.0	.00338	4.86
6.3	5.0	.8	.000243	225.0	.00309	5.33	22.5	.00309	5.33	2.3	.00309	5.33

Table SA-29 (continued)
Results of Waste Dilution - Winter - Ship 1
(L = 1.5 n mi, A = 0.001 $ft^{2/3}/sec$)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 700 gpm												
5.0	1.0	.2	.000283	180.0	.01490	.95	18.0	.01490	.95	1.8	.01490	.95
7.5	1.5	.2	.000283	270.0	.01046	1.35	27.0	.01046	1.35	2.7	.01046	1.35
10.0	2.0	.2	.000283	360.0	.00782	1.81	36.0	.00782	1.81	3.6	.00782	1.81
12.5	2.5	.2	.000283	450.0	.00609	2.32	45.0	.00609	2.32	4.5	.00609	2.32
15.0	3.0	.2	.000283	540.0	.00489	2.88	54.0	.00489	2.88	5.4	.00489	2.88
17.5	3.5	.2	.000283	630.0	.00402	3.51	63.0	.00402	3.51	6.3	.00402	3.51
20.0	4.0	.2	.000283	720.0	.00337	4.19	72.0	.00337	4.19	7.2	.00337	4.19
22.5	4.5	.2	.000283	810.0	.00287	4.92	81.0	.00287	4.92	8.1	.00287	4.92
25.0	5.0	.2	.000283	900.0	.00247	5.71	90.0	.00247	5.71	9.0	.00247	5.71
2.5	1.0	.4	.000283	90.0	.01192	1.18	9.0	.01192	1.18	.9	.01192	1.18
3.8	1.5	.4	.000283	135.0	.00922	1.53	13.5	.00922	1.53	1.4	.00922	1.53
5.0	2.0	.4	.000283	180.0	.00745	1.89	18.0	.00745	1.89	1.8	.00745	1.89
6.3	2.5	.4	.000283	225.0	.00618	2.28	22.5	.00618	2.28	2.3	.00618	2.28
7.5	3.0	.4	.000283	270.0	.00523	2.70	27.0	.00523	2.70	2.7	.00523	2.70
8.8	3.5	.4	.000283	315.0	.00449	3.14	31.5	.00449	3.14	3.1	.00449	3.14
10.0	4.0	.4	.000283	360.0	.00391	3.61	36.0	.00391	3.61	3.6	.00391	3.61
11.3	4.5	.4	.000283	405.0	.00343	4.11	40.5	.00343	4.11	4.0	.00343	4.11
12.5	5.0	.4	.000283	450.0	.00305	4.64	45.0	.00305	4.64	4.5	.00305	4.64
1.3	1.0	.8	.000283	45.0	.00862	1.64	4.5	.00862	1.64	.5	.00862	1.64
1.9	1.5	.8	.000283	67.5	.00699	2.02	6.8	.00699	2.02	.7	.00699	2.02
2.5	2.0	.8	.000283	90.0	.00596	2.37	9.0	.00596	2.37	.9	.00596	2.37
3.1	2.5	.8	.000283	112.5	.00521	2.71	11.3	.00521	2.71	1.1	.00521	2.71
3.8	3.0	.8	.000283	135.0	.00461	3.06	13.5	.00461	3.06	1.4	.00461	3.06
4.4	3.5	.8	.000283	157.5	.00413	3.42	15.8	.00413	3.42	1.6	.00413	3.42
5.0	4.0	.8	.000283	180.0	.00373	3.79	18.0	.00373	3.79	1.8	.00373	3.79
5.6	4.5	.8	.000283	202.5	.00338	4.17	20.3	.00338	4.17	2.0	.00338	4.17
6.3	5.0	.8	.000283	225.0	.00309	4.57	22.5	.00309	4.57	2.3	.00309	4.57
Q = 1000 gpm												
5.0	1.0	.2	.000405	180.0	.01490	.66	18.0	.01490	.66	1.8	.01490	.66
7.5	1.5	.2	.000405	270.0	.01046	.94	27.0	.01046	.94	2.7	.01046	.94
10.0	2.0	.2	.000405	360.0	.00782	1.26	36.0	.00782	1.26	3.6	.00782	1.26
12.5	2.5	.2	.000405	450.0	.00609	1.62	45.0	.00609	1.62	4.5	.00609	1.62
15.0	3.0	.2	.000405	540.0	.00489	2.02	54.0	.00489	2.02	5.4	.00489	2.02
17.5	3.5	.2	.000405	630.0	.00402	2.46	63.0	.00402	2.46	6.3	.00402	2.46
20.0	4.0	.2	.000405	720.0	.00337	2.93	72.0	.00337	2.93	7.2	.00337	2.93
22.5	4.5	.2	.000405	810.0	.00287	3.44	81.0	.00287	3.44	8.1	.00287	3.44
25.0	5.0	.2	.000405	900.0	.00247	4.00	90.0	.00247	4.00	9.0	.00247	4.00
2.5	1.0	.4	.000405	90.0	.01192	.83	9.0	.01192	.83	.9	.01192	.83
3.8	1.5	.4	.000405	135.0	.00922	1.07	13.5	.00922	1.07	1.4	.00922	1.07
5.0	2.0	.4	.000405	180.0	.00745	1.33	18.0	.00745	1.33	1.8	.00745	1.33
6.3	2.5	.4	.000405	225.0	.00618	1.60	22.5	.00618	1.60	2.3	.00618	1.60
7.5	3.0	.4	.000405	270.0	.00523	1.89	27.0	.00523	1.89	2.7	.00523	1.89
8.8	3.5	.4	.000405	315.0	.00449	2.20	31.5	.00449	2.20	3.1	.00449	2.20
10.0	4.0	.4	.000405	360.0	.00391	2.53	36.0	.00391	2.53	3.6	.00391	2.53
11.3	4.5	.4	.000405	405.0	.00343	2.88	40.5	.00343	2.88	4.0	.00343	2.88
12.5	5.0	.4	.000405	450.0	.00305	3.24	45.0	.00305	3.24	4.5	.00305	3.24
1.3	1.0	.8	.000405	45.0	.00862	1.15	4.5	.00862	1.15	.5	.00862	1.15
1.9	1.5	.8	.000405	67.5	.00699	1.41	6.8	.00699	1.41	.7	.00699	1.41
2.5	2.0	.8	.000405	90.0	.00596	1.66	9.0	.00596	1.66	.9	.00596	1.66
3.1	2.5	.8	.000405	112.5	.00521	1.90	11.3	.00521	1.90	1.1	.00521	1.90
3.8	3.0	.8	.000405	135.0	.00461	2.14	13.5	.00461	2.14	1.4	.00461	2.14
4.4	3.5	.8	.000405	157.5	.00413	2.39	15.8	.00413	2.39	1.6	.00413	2.39
5.0	4.0	.8	.000405	180.0	.00373	2.65	18.0	.00373	2.65	1.8	.00373	2.65
5.6	4.5	.8	.000405	202.5	.00338	2.92	20.3	.00338	2.92	2.0	.00338	2.92
6.3	5.0	.8	.000405	225.0	.00309	3.20	22.5	.00309	3.20	2.3	.00309	3.20

Table SA-29 (continued)
Results of Waste Dilution - Winter - Ship 1
(L = 1.5 n mi, A = 0.001 $ft^{2/3}/sec$)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 1200 gpm												
5.0	1.0	.2	.000486	180.0	.01490	.55	18.0	.01490	.55	1.8	.01490	.55
7.5	1.5	.2	.000486	270.0	.01046	.79	27.0	.01046	.79	2.7	.01046	.79
10.0	2.0	.2	.000486	360.0	.00782	1.05	36.0	.00782	1.05	3.6	.00782	1.05
12.5	2.5	.2	.000486	450.0	.00609	1.35	45.0	.00609	1.35	4.5	.00609	1.35
15.0	3.0	.2	.000486	540.0	.00489	1.68	54.0	.00489	1.68	5.4	.00489	1.68
17.5	3.5	.2	.000486	630.0	.00402	2.05	63.0	.00402	2.05	6.3	.00402	2.05
20.0	4.0	.2	.000486	720.0	.00337	2.44	72.0	.00337	2.44	7.2	.00337	2.44
22.5	4.5	.2	.000486	810.0	.00287	2.87	81.0	.00287	2.87	8.1	.00287	2.87
25.0	5.0	.2	.000486	900.0	.00247	3.33	90.0	.00247	3.33	9.0	.00247	3.33
2.5	1.0	.4	.000486	90.0	.01192	.69	9.0	.01192	.69	.9	.01192	.69
3.8	1.5	.4	.000486	135.0	.00922	.89	13.5	.00922	.89	1.4	.00922	.89
5.0	2.0	.4	.000486	180.0	.00745	1.10	18.0	.00745	1.10	1.8	.00745	1.10
6.3	2.5	.4	.000486	225.0	.00618	1.33	22.5	.00618	1.33	2.3	.00618	1.33
7.5	3.0	.4	.000486	270.0	.00523	1.57	27.0	.00523	1.57	2.7	.00523	1.57
8.8	3.5	.4	.000486	315.0	.00449	1.83	31.5	.00449	1.83	3.1	.00449	1.83
10.0	4.0	.4	.000486	360.0	.00391	2.11	36.0	.00391	2.11	3.6	.00391	2.11
11.3	4.5	.4	.000486	405.0	.00343	2.40	40.5	.00343	2.40	4.0	.00343	2.40
12.5	5.0	.4	.000486	450.0	.00305	2.70	45.0	.00305	2.70	4.5	.00305	2.70
1.3	1.0	.8	.000486	45.0	.00862	.95	4.5	.00862	.95	.5	.00862	.95
1.9	1.5	.8	.000486	67.5	.00699	1.18	6.8	.00699	1.18	.7	.00699	1.18
2.5	2.0	.8	.000486	90.0	.00596	1.38	9.0	.00596	1.38	.9	.00596	1.38
3.1	2.5	.8	.000486	112.5	.00521	1.58	11.3	.00521	1.58	1.1	.00521	1.58
3.8	3.0	.8	.000486	135.0	.00461	1.78	13.5	.00461	1.78	1.4	.00461	1.78
4.4	3.5	.8	.000486	157.5	.00413	1.99	15.8	.00413	1.99	1.6	.00413	1.99
5.0	4.0	.8	.000486	180.0	.00373	2.21	18.0	.00373	2.21	1.8	.00373	2.21
5.6	4.5	.8	.000486	202.5	.00338	2.43	20.3	.00338	2.43	2.0	.00338	2.43
6.3	5.0	.8	.000486	225.0	.00309	2.66	22.5	.00309	2.66	2.3	.00309	2.66
Q = 1400 gpm												
5.0	1.0	.2	.000567	180.0	.01490	.47	18.0	.01490	.47	1.8	.01490	.47
7.5	1.5	.2	.000567	270.0	.01046	.67	27.0	.01046	.67	2.7	.01046	.67
10.0	2.0	.2	.000567	360.0	.00782	.90	36.0	.00782	.90	3.6	.00782	.90
12.5	2.5	.2	.000567	450.0	.00609	1.16	45.0	.00609	1.16	4.5	.00609	1.16
15.0	3.0	.2	.000567	540.0	.00489	1.44	54.0	.00489	1.44	5.4	.00489	1.44
17.5	3.5	.2	.000567	630.0	.00402	1.75	63.0	.00402	1.75	6.3	.00402	1.75
20.0	4.0	.2	.000567	720.0	.00337	2.09	72.0	.00337	2.09	7.2	.00337	2.09
22.5	4.5	.2	.000567	810.0	.00287	2.46	81.0	.00287	2.46	8.1	.00287	2.46
25.0	5.0	.2	.000567	900.0	.00247	2.86	90.0	.00247	2.86	9.0	.00247	2.86
2.5	1.0	.4	.000567	90.0	.01192	.59	9.0	.01192	.59	.9	.01192	.59
3.8	1.5	.4	.000567	135.0	.00922	.76	13.5	.00922	.76	1.4	.00922	.76
5.0	2.0	.4	.000567	180.0	.00745	.95	18.0	.00745	.95	1.8	.00745	.95
6.3	2.5	.4	.000567	225.0	.00618	1.14	22.5	.00618	1.14	2.3	.00618	1.14
7.5	3.0	.4	.000567	270.0	.00523	1.35	27.0	.00523	1.35	2.7	.00523	1.35
8.8	3.5	.4	.000567	315.0	.00449	1.57	31.5	.00449	1.57	3.1	.00449	1.57
10.0	4.0	.4	.000567	360.0	.00391	1.81	36.0	.00391	1.81	3.6	.00391	1.81
11.3	4.5	.4	.000567	405.0	.00343	2.05	40.5	.00343	2.05	4.0	.00343	2.05
12.5	5.0	.4	.000567	450.0	.00305	2.32	45.0	.00305	2.32	4.5	.00305	2.32
1.3	1.0	.8	.000567	45.0	.00862	.82	4.5	.00862	.82	.5	.00862	.82
1.9	1.5	.8	.000567	67.5	.00699	1.01	6.8	.00699	1.01	.7	.00699	1.01
2.5	2.0	.8	.000567	90.0	.00596	1.18	9.0	.00596	1.18	.9	.00596	1.18
3.1	2.5	.8	.000567	112.5	.00521	1.36	11.3	.00521	1.36	1.1	.00521	1.36
3.8	3.0	.8	.000567	135.0	.00461	1.53	13.5	.00461	1.53	1.4	.00461	1.53
4.4	3.5	.8	.000567	157.5	.00413	1.71	15.8	.00413	1.71	1.6	.00413	1.71
5.0	4.0	.8	.000567	180.0	.00373	1.89	18.0	.00373	1.89	1.8	.00373	1.89
5.6	4.5	.8	.000567	202.5	.00338	2.08	20.3	.00338	2.08	2.0	.00338	2.08
6.3	5.0	.8	.000567	225.0	.00309	2.28	22.5	.00309	2.28	2.3	.00309	2.28

Table SA-30
Results of Waste Dilution - Summer - Ship 1
(L = 1.7 n mi, A = 0.001 $ft^{2/3}/sec$)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 500 gpm												
5.0	1.0	.2	.000202	180.0	.02546	.78	18.0	.02004	.99	1.8	.02004	.99
7.5	1.5	.2	.000202	270.0	.01738	1.14	27.0	.01426	1.39	2.7	.01426	1.39
10.0	2.0	.2	.000202	360.0	.01252	1.58	36.0	.01076	1.84	3.6	.01076	1.84
12.5	2.5	.2	.000202	450.0	.00958	2.06	45.0	.00845	2.34	4.5	.00845	2.34
15.0	3.0	.2	.000202	540.0	.00761	2.60	54.0	.00683	2.89	5.4	.00683	2.89
17.5	3.5	.2	.000202	630.0	.00622	3.18	63.0	.00564	3.50	6.3	.00564	3.50
20.0	4.0	.2	.000202	720.0	.00519	3.81	72.0	.00475	4.16	7.2	.00475	4.16
22.5	4.5	.2	.000202	810.0	.00440	4.49	81.0	.00406	4.87	8.1	.00406	4.87
25.0	5.0	.2	.000202	900.0	.00379	5.22	90.0	.00351	5.64	9.0	.00351	5.64
2.5	1.0	.4	.000202	90.0	.01576	1.25	9.0	.01576	1.25	.9	.01576	1.25
3.8	1.5	.4	.000202	135.0	.01398	1.41	13.5	.01230	1.61	1.4	.01230	1.61
5.0	2.0	.4	.000202	180.0	.01274	1.55	18.0	.01002	1.97	1.8	.01002	1.97
6.3	2.5	.4	.000202	225.0	.01064	1.86	22.5	.00838	2.36	2.3	.00838	2.36
7.5	3.0	.4	.000202	270.0	.00869	2.27	27.0	.00713	2.77	2.7	.00713	2.77
8.8	3.5	.4	.000202	315.0	.00730	2.71	31.5	.00616	3.21	3.1	.00616	3.21
10.0	4.0	.4	.000202	360.0	.00626	3.16	36.0	.00538	3.67	3.6	.00538	3.67
11.3	4.5	.4	.000202	405.0	.00544	3.63	40.5	.00475	4.16	4.0	.00475	4.16
12.5	5.0	.4	.000202	450.0	.00479	4.13	45.0	.00422	4.68	4.5	.00422	4.68
1.3	1.0	.8	.000202	45.0	.01133	1.74	4.5	.01133	1.74	.5	.01133	1.74
1.9	1.5	.8	.000202	67.5	.00921	2.15	6.8	.00921	2.15	.7	.00921	2.15
2.5	2.0	.8	.000202	90.0	.00788	2.51	9.0	.00788	2.51	.9	.00788	2.51
3.1	2.5	.8	.000202	112.5	.00729	2.71	11.3	.00691	2.86	1.1	.00691	2.86
3.8	3.0	.8	.000202	135.0	.00699	2.83	13.5	.00615	3.21	1.4	.00615	3.21
4.4	3.5	.8	.000202	157.5	.00668	2.96	15.8	.00553	3.57	1.6	.00553	3.57
5.0	4.0	.8	.000202	180.0	.00637	3.10	18.0	.00501	3.94	1.8	.00501	3.94
5.6	4.5	.8	.000202	202.5	.00600	3.29	20.3	.00457	4.32	2.0	.00457	4.32
6.3	5.0	.8	.000202	225.0	.00534	3.70	22.5	.00419	4.72	2.3	.00419	4.72
Q = 600 gpm												
5.0	1.0	.2	.000243	180.0	.02546	.65	18.0	.02004	.82	1.8	.02004	.82
7.5	1.5	.2	.000243	270.0	.01738	.95	27.0	.01426	1.15	2.7	.01426	1.15
10.0	2.0	.2	.000243	360.0	.01252	1.32	36.0	.01076	1.53	3.6	.01076	1.53
12.5	2.5	.2	.000243	450.0	.00958	1.72	45.0	.00845	1.95	4.5	.00845	1.95
15.0	3.0	.2	.000243	540.0	.00761	2.16	54.0	.00683	2.41	5.4	.00683	2.41
17.5	3.5	.2	.000243	630.0	.00622	2.65	63.0	.00564	2.92	6.3	.00564	2.92
20.0	4.0	.2	.000243	720.0	.00519	3.17	72.0	.00475	3.47	7.2	.00475	3.47
22.5	4.5	.2	.000243	810.0	.00440	3.74	81.0	.00406	4.06	8.1	.00406	4.06
25.0	5.0	.2	.000243	900.0	.00379	4.35	90.0	.00351	4.70	9.0	.00351	4.70
2.5	1.0	.4	.000243	90.0	.01576	1.04	9.0	.01576	1.04	.9	.01576	1.04
3.8	1.5	.4	.000243	135.0	.01398	1.18	13.5	.01230	1.34	1.4	.01230	1.34
5.0	2.0	.4	.000243	180.0	.01274	1.29	18.0	.01002	1.64	1.8	.01002	1.64
6.3	2.5	.4	.000243	225.0	.01064	1.55	22.5	.00838	1.97	2.3	.00838	1.97
7.5	3.0	.4	.000243	270.0	.00869	1.89	27.0	.00713	2.31	2.7	.00713	2.31
8.8	3.5	.4	.000243	315.0	.00730	2.25	31.5	.00616	2.67	3.1	.00616	2.67
10.0	4.0	.4	.000243	360.0	.00626	2.63	36.0	.00538	3.06	3.6	.00538	3.06
11.3	4.5	.4	.000243	405.0	.00544	3.03	40.5	.00475	3.47	4.0	.00475	3.47
12.5	5.0	.4	.000243	450.0	.00479	3.44	45.0	.00422	3.90	4.5	.00422	3.90
1.3	1.0	.8	.000243	45.0	.01133	1.45	4.5	.01133	1.45	.5	.01133	1.45
1.9	1.5	.8	.000243	67.5	.00921	1.79	6.8	.00921	1.79	.7	.00921	1.79
2.5	2.0	.8	.000243	90.0	.00788	2.09	9.0	.00788	2.09	.9	.00788	2.09
3.1	2.5	.8	.000243	112.5	.00729	2.26	11.3	.00691	2.38	1.1	.00691	2.38
3.8	3.0	.8	.000243	135.0	.00699	2.36	13.5	.00615	2.68	1.4	.00615	2.68
4.4	3.5	.8	.000243	157.5	.00668	2.47	15.8	.00553	2.98	1.6	.00553	2.98
5.0	4.0	.8	.000243	180.0	.00637	2.59	18.0	.00501	3.29	1.8	.00501	3.29
5.6	4.5	.8	.000243	202.5	.00600	2.74	20.3	.00457	3.60	2.0	.00457	3.60
6.3	5.0	.8	.000243	225.0	.00534	3.08	22.5	.00419	3.93	2.3	.00419	3.93

Table SA-30 (continued)
Results of Waste Dilution - Summer - Ship 1
(L = 1.7 n mi, A = 0.001 $ft^{2/3}/sec$)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 700 gpm												
5.0	1.0	.2	.000283	180.0	.02546	.55	18.0	.02004	.70	1.8	.02004	.70
7.5	1.5	.2	.000283	270.0	.01738	.81	27.0	.01426	.99	2.7	.01426	.99
10.0	2.0	.2	.000283	360.0	.01252	1.13	36.0	.01076	1.31	3.6	.01076	1.31
12.5	2.5	.2	.000283	450.0	.00958	1.47	45.0	.00845	1.67	4.5	.00845	1.67
15.0	3.0	.2	.000283	540.0	.00761	1.85	54.0	.00683	2.07	5.4	.00683	2.07
17.5	3.5	.2	.000283	630.0	.00622	2.27	63.0	.00564	2.50	6.3	.00564	2.50
20.0	4.0	.2	.000283	720.0	.00519	2.72	72.0	.00475	2.97	7.2	.00475	2.97
22.5	4.5	.2	.000283	810.0	.00440	3.20	81.0	.00406	3.48	8.1	.00406	3.48
25.0	5.0	.2	.000283	900.0	.00379	3.73	90.0	.00351	4.03	9.0	.00351	4.03
2.5	1.0	.4	.000283	90.0	.01576	.90	9.0	.01576	.90	.9	.01576	.90
3.8	1.5	.4	.000283	135.0	.01398	1.01	13.5	.01230	1.15	1.4	.01230	1.15
5.0	2.0	.4	.000283	180.0	.01274	1.11	18.0	.01002	1.41	1.8	.01002	1.41
6.3	2.5	.4	.000283	225.0	.01064	1.33	22.5	.00838	1.69	2.3	.00838	1.69
7.5	3.0	.4	.000283	270.0	.00869	1.62	27.0	.00713	1.98	2.7	.00713	1.98
8.8	3.5	.4	.000283	315.0	.00730	1.93	31.5	.00616	2.29	3.1	.00616	2.29
10.0	4.0	.4	.000283	360.0	.00626	2.25	36.0	.00538	2.62	3.6	.00538	2.62
11.3	4.5	.4	.000283	405.0	.00544	2.59	40.5	.00475	2.97	4.0	.00475	2.97
12.5	5.0	.4	.000283	450.0	.00479	2.95	45.0	.00422	3.34	4.5	.00422	3.34
1.3	1.0	.8	.000283	45.0	.01133	1.25	4.5	.01133	1.25	.5	.01133	1.25
1.9	1.5	.8	.000283	67.5	.00921	1.53	6.8	.00921	1.53	.7	.00921	1.53
2.5	2.0	.8	.000283	90.0	.00788	1.79	9.0	.00788	1.79	.9	.00788	1.79
3.1	2.5	.8	.000283	112.5	.00729	1.94	11.3	.00691	2.04	1.1	.00691	2.04
3.8	3.0	.8	.000283	135.0	.00699	2.02	13.5	.00615	2.29	1.4	.00615	2.29
4.4	3.5	.8	.000283	157.5	.00668	2.11	15.8	.00553	2.55	1.6	.00553	2.55
5.0	4.0	.8	.000283	180.0	.00637	2.22	18.0	.00501	2.82	1.8	.00501	2.82
5.6	4.5	.8	.000283	202.5	.00600	2.35	20.3	.00457	3.09	2.0	.00457	3.09
6.3	5.0	.8	.000283	225.0	.00534	2.64	22.5	.00419	3.37	2.3	.00419	3.37
Q = 1000 gpm												
5.0	1.0	.2	.000405	180.0	.02546	.39	18.0	.02004	.49	1.8	.02004	.49
7.5	1.5	.2	.000405	270.0	.01738	.57	27.0	.01426	.69	2.7	.01426	.69
10.0	2.0	.2	.000405	360.0	.01252	.79	36.0	.01076	.92	3.6	.01076	.92
12.5	2.5	.2	.000405	450.0	.00958	1.03	45.0	.00845	1.17	4.5	.00845	1.17
15.0	3.0	.2	.000405	540.0	.00761	1.30	54.0	.00683	1.45	5.4	.00683	1.45
17.5	3.5	.2	.000405	630.0	.00622	1.59	63.0	.00564	1.75	6.3	.00564	1.75
20.0	4.0	.2	.000405	720.0	.00519	1.90	72.0	.00475	2.08	7.2	.00475	2.08
22.5	4.5	.2	.000405	810.0	.00440	2.24	81.0	.00406	2.44	8.1	.00406	2.44
25.0	5.0	.2	.000405	900.0	.00379	2.61	90.0	.00351	2.82	9.0	.00351	2.82
2.5	1.0	.4	.000405	90.0	.01576	.63	9.0	.01576	.63	.9	.01576	.63
3.8	1.5	.4	.000405	135.0	.01398	.71	13.5	.01230	.80	1.4	.01230	.80
5.0	2.0	.4	.000405	180.0	.01274	.78	18.0	.01002	.99	1.8	.01002	.99
6.3	2.5	.4	.000405	225.0	.01064	.93	22.5	.00838	1.18	2.3	.00838	1.18
7.5	3.0	.4	.000405	270.0	.00869	1.14	27.0	.00713	1.39	2.7	.00713	1.39
8.8	3.5	.4	.000405	315.0	.00730	1.35	31.5	.00616	1.60	3.1	.00616	1.60
10.0	4.0	.4	.000405	360.0	.00626	1.58	36.0	.00538	1.84	3.6	.00538	1.84
11.3	4.5	.4	.000405	405.0	.00544	1.82	40.5	.00475	2.08	4.0	.00475	2.08
12.5	5.0	.4	.000405	450.0	.00479	2.06	45.0	.00422	2.34	4.5	.00422	2.34
1.3	1.0	.8	.000405	45.0	.01133	.87	4.5	.01133	.87	.5	.01133	.87
1.9	1.5	.8	.000405	67.5	.00921	1.07	6.8	.00921	1.07	.7	.00921	1.07
2.5	2.0	.8	.000405	90.0	.00788	1.25	9.0	.00788	1.25	.9	.00788	1.25
3.1	2.5	.8	.000405	112.5	.00729	1.35	11.3	.00691	1.43	1.1	.00691	1.43
3.8	3.0	.8	.000405	135.0	.00699	1.41	13.5	.00615	1.61	1.4	.00615	1.61
4.4	3.5	.8	.000405	157.5	.00668	1.48	15.8	.00553	1.79	1.6	.00553	1.79
5.0	4.0	.8	.000405	180.0	.00637	1.55	18.0	.00501	1.97	1.8	.00501	1.97
5.6	4.5	.8	.000405	202.5	.00600	1.65	20.3	.00457	2.16	2.0	.00457	2.16
6.3	5.0	.8	.000405	225.0	.00534	1.85	22.5	.00419	2.36	2.3	.00419	2.36

Table SA-30 (continued)
Results of Waste Dilution - Summer - Ship 1
(L = 1.7 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 1200 gpm								
5.0	1.0	.2	.000486	180.0	.02546	.32	18.0	.02004	.41	1.8	.02004	.41
7.5	1.5	.2	.000486	270.0	.01738	.47	27.0	.01426	.58	2.7	.01426	.58
10.0	2.0	.2	.000486	360.0	.01252	.66	36.0	.01076	.77	3.6	.01076	.77
12.5	2.5	.2	.000486	450.0	.00958	.86	45.0	.00845	.97	4.5	.00845	.97
15.0	3.0	.2	.000486	540.0	.00761	1.08	54.0	.00683	1.21	5.4	.00683	1.21
17.5	3.5	.2	.000486	630.0	.00622	1.32	63.0	.00564	1.46	6.3	.00564	1.46
20.0	4.0	.2	.000486	720.0	.00519	1.59	72.0	.00475	1.73	7.2	.00475	1.73
22.5	4.5	.2	.000486	810.0	.00440	1.87	81.0	.00406	2.03	8.1	.00406	2.03
25.0	5.0	.2	.000486	900.0	.00379	2.17	90.0	.00351	2.35	9.0	.00351	2.35
2.5	1.0	.4	.000486	90.0	.01576	.52	9.0	.01576	.52	.9	.01576	.52
3.8	1.5	.4	.000486	135.0	.01398	.59	13.5	.01230	.67	1.4	.01230	.67
5.0	2.0	.4	.000486	180.0	.01274	.65	18.0	.01002	.82	1.8	.01002	.82
6.3	2.5	.4	.000486	225.0	.01064	.77	22.5	.00838	.98	2.3	.00838	.98
7.5	3.0	.4	.000486	270.0	.00869	.95	27.0	.00713	1.15	2.7	.00713	1.15
8.8	3.5	.4	.000486	315.0	.00730	1.13	31.5	.00616	1.34	3.1	.00616	1.34
10.0	4.0	.4	.000486	360.0	.00626	1.32	36.0	.00538	1.53	3.6	.00538	1.53
11.3	4.5	.4	.000486	405.0	.00544	1.51	40.5	.00475	1.73	4.0	.00475	1.73
12.5	5.0	.4	.000486	450.0	.00479	1.72	45.0	.00422	1.95	4.5	.00422	1.95
1.3	1.0	.8	.000486	45.0	.01133	.73	4.5	.01133	.73	.5	.01133	.73
1.9	1.5	.8	.000486	67.5	.00921	.89	6.8	.00921	.89	.7	.00921	.89
2.5	2.0	.8	.000486	90.0	.00788	1.04	9.0	.00788	1.04	.9	.00788	1.04
3.1	2.5	.8	.000486	112.5	.00729	1.13	11.3	.00691	1.19	1.1	.00691	1.19
3.8	3.0	.8	.000486	135.0	.00699	1.18	13.5	.00615	1.34	1.4	.00615	1.34
4.4	3.5	.8	.000486	157.5	.00668	1.23	15.8	.00553	1.49	1.6	.00553	1.49
5.0	4.0	.8	.000486	180.0	.00637	1.29	18.0	.00501	1.64	1.8	.00501	1.64
5.6	4.5	.8	.000486	202.5	.00600	1.37	20.3	.00457	1.80	2.0	.00457	1.80
6.3	5.0	.8	.000486	225.0	.00534	1.54	22.5	.00419	1.97	2.3	.00419	1.97
				Q = 1400 gpm								
5.0	1.0	.2	.000567	180.0	.02546	.28	18.0	.02004	.35	1.8	.02004	.35
7.5	1.5	.2	.000567	270.0	.01738	.41	27.0	.01426	.49	2.7	.01426	.49
10.0	2.0	.2	.000567	360.0	.01252	.56	36.0	.01076	.66	3.6	.01076	.66
12.5	2.5	.2	.000567	450.0	.00958	.74	45.0	.00845	.84	4.5	.00845	.84
15.0	3.0	.2	.000567	540.0	.00761	.93	54.0	.00683	1.03	5.4	.00683	1.03
17.5	3.5	.2	.000567	630.0	.00622	1.13	63.0	.00564	1.25	6.3	.00564	1.25
20.0	4.0	.2	.000567	720.0	.00519	1.36	72.0	.00475	1.49	7.2	.00475	1.49
22.5	4.5	.2	.000567	810.0	.00440	1.60	81.0	.00406	1.74	8.1	.00406	1.74
25.0	5.0	.2	.000567	900.0	.00379	1.86	90.0	.00351	2.01	9.0	.00351	2.01
2.5	1.0	.4	.000567	90.0	.01576	.45	9.0	.01576	.45	.9	.01576	.45
3.8	1.5	.4	.000567	135.0	.01398	.50	13.5	.01230	.57	1.4	.01230	.57
5.0	2.0	.4	.000567	180.0	.01274	.55	18.0	.01002	.70	1.8	.01002	.70
6.3	2.5	.4	.000567	225.0	.01064	.66	22.5	.00838	.84	2.3	.00838	.84
7.5	3.0	.4	.000567	270.0	.00869	.81	27.0	.00713	.99	2.7	.00713	.99
8.8	3.5	.4	.000567	315.0	.00730	.97	31.5	.00616	1.15	3.1	.00616	1.15
10.0	4.0	.4	.000567	360.0	.00626	1.13	36.0	.00538	1.31	3.6	.00538	1.31
11.3	4.5	.4	.000567	405.0	.00544	1.30	40.5	.00475	1.49	4.0	.00475	1.49
12.5	5.0	.4	.000567	450.0	.00479	1.47	45.0	.00422	1.67	4.5	.00422	1.67
1.3	1.0	.8	.000567	45.0	.01133	.62	4.5	.01133	.62	.5	.01133	.62
1.9	1.5	.8	.000567	67.5	.00921	.77	6.8	.00921	.77	.7	.00921	.77
2.5	2.0	.8	.000567	90.0	.00788	.90	9.0	.00788	.90	.9	.00788	.90
3.1	2.5	.8	.000567	112.5	.00729	.97	11.3	.00691	1.02	1.1	.00691	1.02
3.8	3.0	.8	.000567	135.0	.00699	1.01	13.5	.00615	1.15	1.4	.00615	1.15
4.4	3.5	.8	.000567	157.5	.00668	1.06	15.8	.00553	1.28	1.6	.00553	1.28
5.0	4.0	.8	.000567	180.0	.00637	1.11	18.0	.00501	1.41	1.8	.00501	1.41
5.6	4.5	.8	.000567	202.5	.00600	1.18	20.3	.00457	1.54	2.0	.00457	1.54
6.3	5.0	.8	.000567	225.0	.00534	1.32	22.5	.00419	1.69	2.3	.00419	1.69

Table SA-31
Results of Waste Dilution - Winter - Ship 1
(L = 1.7 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 500 gpm								
5.0	1.0	.2	.000202	180.0	.01346	1.47	18.0	.01346	1.47	1.8	.01346	1.47
7.5	1.5	.2	.000202	270.0	.00957	2.06	27.0	.00957	2.06	2.7	.00957	2.06
10.0	2.0	.2	.000202	360.0	.00722	2.74	36.0	.00722	2.74	3.6	.00722	2.74
12.5	2.5	.2	.000202	450.0	.00567	3.48	45.0	.00567	3.48	4.5	.00567	3.48
15.0	3.0	.2	.000202	540.0	.00458	4.31	54.0	.00458	4.31	5.4	.00458	4.31
17.5	3.5	.2	.000202	630.0	.00379	5.21	63.0	.00379	5.21	6.3	.00379	5.21
20.0	4.0	.2	.000202	720.0	.00319	6.20	72.0	.00319	6.20	7.2	.00319	6.20
22.5	4.5	.2	.000202	810.0	.00272	7.26	81.0	.00272	7.26	8.1	.00272	7.26
25.0	5.0	.2	.000202	900.0	.00235	8.39	90.0	.00235	8.39	9.0	.00235	8.39
2.5	1.0	.4	.000202	90.0	.01058	1.87	9.0	.01058	1.87	.9	.01058	1.87
3.8	1.5	.4	.000202	135.0	.00826	2.39	13.5	.00826	2.39	1.4	.00826	2.39
5.0	2.0	.4	.000202	180.0	.00673	2.94	18.0	.00673	2.94	1.8	.00673	2.94
6.3	2.5	.4	.000202	225.0	.00562	3.51	22.5	.00562	3.51	2.3	.00562	3.51
7.5	3.0	.4	.000202	270.0	.00479	4.13	27.0	.00479	4.13	2.7	.00479	4.13
8.8	3.5	.4	.000202	315.0	.00413	4.78	31.5	.00413	4.78	3.1	.00413	4.78
10.0	4.0	.4	.000202	360.0	.00361	5.47	36.0	.00361	5.47	3.6	.00361	5.47
11.3	4.5	.4	.000202	405.0	.00319	6.20	40.5	.00319	6.20	4.0	.00319	6.20
12.5	5.0	.4	.000202	450.0	.00284	6.97	45.0	.00284	6.97	4.5	.00284	6.97
1.3	1.0	.8	.000202	45.0	.00761	2.60	4.5	.00761	2.60	.5	.00761	2.60
1.9	1.5	.8	.000202	67.5	.00619	3.19	6.8	.00619	3.19	.7	.00619	3.19
2.5	2.0	.8	.000202	90.0	.00529	3.73	9.0	.00529	3.73	.9	.00529	3.73
3.1	2.5	.8	.000202	112.5	.00464	4.26	11.3	.00464	4.26	1.1	.00464	4.26
3.8	3.0	.8	.000202	135.0	.00413	4.78	13.5	.00413	4.78	1.4	.00413	4.78
4.4	3.5	.8	.000202	157.5	.00371	5.32	15.8	.00371	5.32	1.6	.00371	5.32
5.0	4.0	.8	.000202	180.0	.00337	5.87	18.0	.00337	5.87	1.8	.00337	5.87
5.6	4.5	.8	.000202	202.5	.00307	6.44	20.3	.00307	6.44	2.0	.00307	6.44
6.3	5.0	.8	.000202	225.0	.00281	7.03	22.5	.00281	7.03	2.3	.00281	7.03
				Q = 600 gpm								
5.0	1.0	.2	.000243	180.0	.01346	1.22	18.0	.01346	1.22	1.8	.01346	1.22
7.5	1.5	.2	.000243	270.0	.00957	1.72	27.0	.00957	1.72	2.7	.00957	1.72
10.0	2.0	.2	.000243	360.0	.00722	2.28	36.0	.00722	2.28	3.6	.00722	2.28
12.5	2.5	.2	.000243	450.0	.00567	2.90	45.0	.00567	2.90	4.5	.00567	2.90
15.0	3.0	.2	.000243	540.0	.00458	3.59	54.0	.00458	3.59	5.4	.00458	3.59
17.5	3.5	.2	.000243	630.0	.00379	4.35	63.0	.00379	4.35	6.3	.00379	4.35
20.0	4.0	.2	.000243	720.0	.00319	5.16	72.0	.00319	5.16	7.2	.00319	5.16
22.5	4.5	.2	.000243	810.0	.00272	6.05	81.0	.00272	6.05	8.1	.00272	6.05
25.0	5.0	.2	.000243	900.0	.00235	6.99	90.0	.00235	6.99	9.0	.00235	6.99
2.5	1.0	.4	.000243	90.0	.01058	1.56	9.0	.01058	1.56	.9	.01058	1.56
3.8	1.5	.4	.000243	135.0	.00826	1.99	13.5	.00826	1.99	1.4	.00826	1.99
5.0	2.0	.4	.000243	180.0	.00673	2.45	18.0	.00673	2.45	1.8	.00673	2.45
6.3	2.5	.4	.000243	225.0	.00562	2.93	22.5	.00562	2.93	2.3	.00562	2.93
7.5	3.0	.4	.000243	270.0	.00479	3.44	27.0	.00479	3.44	2.7	.00479	3.44
8.8	3.5	.4	.000243	315.0	.00413	3.98	31.5	.00413	3.98	3.1	.00413	3.98
10.0	4.0	.4	.000243	360.0	.00361	4.56	36.0	.00361	4.56	3.6	.00361	4.56
11.3	4.5	.4	.000243	405.0	.00319	5.17	40.5	.00319	5.17	4.0	.00319	5.17
12.5	5.0	.4	.000243	450.0	.00284	5.81	45.0	.00284	5.81	4.5	.00284	5.81
1.3	1.0	.8	.000243	45.0	.00761	2.16	4.5	.00761	2.16	.5	.00761	2.16
1.9	1.5	.8	.000243	67.5	.00619	2.66	6.8	.00619	2.66	.7	.00619	2.66
2.5	2.0	.8	.000243	90.0	.00529	3.11	9.0	.00529	3.11	.9	.00529	3.11
3.1	2.5	.8	.000243	112.5	.00464	3.55	11.3	.00464	3.55	1.1	.00464	3.55
3.8	3.0	.8	.000243	135.0	.00413	3.99	13.5	.00413	3.99	1.4	.00413	3.99
4.4	3.5	.8	.000243	157.5	.00371	4.43	15.8	.00371	4.43	1.6	.00371	4.43
5.0	4.0	.8	.000243	180.0	.00337	4.89	18.0	.00337	4.89	1.8	.00337	4.89
5.6	4.5	.8	.000243	202.5	.00307	5.37	20.3	.00307	5.37	2.0	.00307	5.37
6.3	5.0	.8	.000243	225.0	.00281	5.86	22.5	.00281	5.86	2.3	.00281	5.86

Table SA-31 (continued)
Results of Waste Dilution - Winter - Ship 1
(L = 1.7 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 700 gpm								
5.0	1.0	.2	.000283	180.0	.01346	1.05	18.0	.01346	1.05	1.8	.01346	1.05
7.5	1.5	.2	.000283	270.0	.00957	1.47	27.0	.00957	1.47	2.7	.00957	1.47
10.0	2.0	.2	.000283	360.0	.00722	1.95	36.0	.00722	1.95	3.6	.00722	1.95
12.5	2.5	.2	.000283	450.0	.00567	2.49	45.0	.00567	2.49	4.5	.00567	2.49
15.0	3.0	.2	.000283	540.0	.00458	3.08	54.0	.00458	3.08	5.4	.00458	3.08
17.5	3.5	.2	.000283	630.0	.00379	3.72	63.0	.00379	3.72	6.3	.00379	3.72
20.0	4.0	.2	.000283	720.0	.00319	4.43	72.0	.00319	4.43	7.2	.00319	4.43
22.5	4.5	.2	.000283	810.0	.00272	5.18	81.0	.00272	5.18	8.1	.00272	5.18
25.0	5.0	.2	.000283	900.0	.00235	5.99	90.0	.00235	5.99	9.0	.00235	5.99
2.5	1.0	.4	.000283	90.0	.01058	1.33	9.0	.01058	1.33	.9	.01058	1.33
3.8	1.5	.4	.000283	135.0	.00826	1.71	13.5	.00826	1.71	1.4	.00826	1.71
5.0	2.0	.4	.000283	180.0	.00673	2.10	18.0	.00673	2.10	1.8	.00673	2.10
6.3	2.5	.4	.000283	225.0	.00562	2.51	22.5	.00562	2.51	2.3	.00562	2.51
7.5	3.0	.4	.000283	270.0	.00479	2.95	27.0	.00479	2.95	2.7	.00479	2.95
8.8	3.5	.4	.000283	315.0	.00413	3.41	31.5	.00413	3.41	3.1	.00413	3.41
10.0	4.0	.4	.000283	360.0	.00361	3.91	36.0	.00361	3.91	3.6	.00361	3.91
11.3	4.5	.4	.000283	405.0	.00319	4.43	40.5	.00319	4.43	4.0	.00319	4.43
12.5	5.0	.4	.000283	450.0	.00284	4.98	45.0	.00284	4.98	4.5	.00284	4.98
1.3	1.0	.8	.000283	45.0	.00761	1.85	4.5	.00761	1.85	.5	.00761	1.85
1.9	1.5	.8	.000283	67.5	.00619	2.28	6.8	.00619	2.28	.7	.00619	2.28
2.5	2.0	.8	.000283	90.0	.00529	2.67	9.0	.00529	2.67	.9	.00529	2.67
3.1	2.5	.8	.000283	112.5	.00464	3.04	11.3	.00464	3.04	1.1	.00464	3.04
3.8	3.0	.8	.000283	135.0	.00413	3.42	13.5	.00413	3.42	1.4	.00413	3.42
4.4	3.5	.8	.000283	157.5	.00371	3.80	15.8	.00371	3.80	1.6	.00371	3.80
5.0	4.0	.8	.000283	180.0	.00337	4.19	18.0	.00337	4.19	1.8	.00337	4.19
5.6	4.5	.8	.000283	202.5	.00307	4.60	20.3	.00307	4.60	2.0	.00307	4.60
6.3	5.0	.8	.000283	225.0	.00281	5.02	22.5	.00281	5.02	2.3	.00281	5.02
				Q = 1000 gpm								
5.0	1.0	.2	.000405	180.0	.01346	.73	18.0	.01346	.73	1.8	.01346	.73
7.5	1.5	.2	.000405	270.0	.00957	1.03	27.0	.00957	1.03	2.7	.00957	1.03
10.0	2.0	.2	.000405	360.0	.00722	1.37	36.0	.00722	1.37	3.6	.00722	1.37
12.5	2.5	.2	.000405	450.0	.00567	1.74	45.0	.00567	1.74	4.5	.00567	1.74
15.0	3.0	.2	.000405	540.0	.00458	2.16	54.0	.00458	2.16	5.4	.00458	2.16
17.5	3.5	.2	.000405	630.0	.00379	2.61	63.0	.00379	2.61	6.3	.00379	2.61
20.0	4.0	.2	.000405	720.0	.00319	3.10	72.0	.00319	3.10	7.2	.00319	3.10
22.5	4.5	.2	.000405	810.0	.00272	3.63	81.0	.00272	3.63	8.1	.00272	3.63
25.0	5.0	.2	.000405	900.0	.00235	4.20	90.0	.00235	4.20	9.0	.00235	4.20
2.5	1.0	.4	.000405	90.0	.01058	.93	9.0	.01058	.93	.9	.01058	.93
3.8	1.5	.4	.000405	135.0	.00826	1.20	13.5	.00826	1.20	1.4	.00826	1.20
5.0	2.0	.4	.000405	180.0	.00673	1.47	18.0	.00673	1.47	1.8	.00673	1.47
6.3	2.5	.4	.000405	225.0	.00562	1.76	22.5	.00562	1.76	2.3	.00562	1.76
7.5	3.0	.4	.000405	270.0	.00479	2.06	27.0	.00479	2.06	2.7	.00479	2.06
8.8	3.5	.4	.000405	315.0	.00413	2.39	31.5	.00413	2.39	3.1	.00413	2.39
10.0	4.0	.4	.000405	360.0	.00361	2.74	36.0	.00361	2.74	3.6	.00361	2.74
11.3	4.5	.4	.000405	405.0	.00319	3.10	40.5	.00319	3.10	4.0	.00319	3.10
12.5	5.0	.4	.000405	450.0	.00284	3.48	45.0	.00284	3.48	4.5	.00284	3.48
1.3	1.0	.8	.000405	45.0	.00761	1.30	4.5	.00761	1.30	.5	.00761	1.30
1.9	1.5	.8	.000405	67.5	.00619	1.60	6.8	.00619	1.60	.7	.00619	1.60
2.5	2.0	.8	.000405	90.0	.00529	1.87	9.0	.00529	1.87	.9	.00529	1.87
3.1	2.5	.8	.000405	112.5	.00464	2.13	11.3	.00464	2.13	1.1	.00464	2.13
3.8	3.0	.8	.000405	135.0	.00413	2.39	13.5	.00413	2.39	1.4	.00413	2.39
4.4	3.5	.8	.000405	157.5	.00371	2.66	15.8	.00371	2.66	1.6	.00371	2.66
5.0	4.0	.8	.000405	180.0	.00337	2.94	18.0	.00337	2.94	1.8	.00337	2.94
5.6	4.5	.8	.000405	202.5	.00307	3.22	20.3	.00307	3.22	2.0	.00307	3.22
6.3	5.0	.8	.000405	225.0	.00281	3.51	22.5	.00281	3.51	2.3	.00281	3.51

Table SA-31 (continued)
Results of Waste Dilution - Winter - Ship 1
(L = 1.7 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 1200 gpm							
5.0	1.0	.2	.000486	180.0	.01346	.61	18.0	.01346	.61	1.8	.01346	.61
7.5	1.5	.2	.000486	270.0	.00957	.86	27.0	.00957	.86	2.7	.00957	.86
10.0	2.0	.2	.000486	360.0	.00722	1.14	36.0	.00722	1.14	3.6	.00722	1.14
12.5	2.5	.2	.000486	450.0	.00567	1.45	45.0	.00567	1.45	4.5	.00567	1.45
15.0	3.0	.2	.000486	540.0	.00458	1.80	54.0	.00458	1.80	5.4	.00458	1.80
17.5	3.5	.2	.000486	630.0	.00379	2.17	63.0	.00379	2.17	6.3	.00379	2.17
20.0	4.0	.2	.000486	720.0	.00319	2.58	72.0	.00319	2.58	7.2	.00319	2.58
22.5	4.5	.2	.000486	810.0	.00272	3.02	81.0	.00272	3.02	8.1	.00272	3.02
25.0	5.0	.2	.000486	900.0	.00235	3.50	90.0	.00235	3.50	9.0	.00235	3.50
2.5	1.0	.4	.000486	90.0	.01058	.78	9.0	.01058	.78	.9	.01058	.78
3.8	1.5	.4	.000486	135.0	.00826	1.00	13.5	.00826	1.00	1.4	.00826	1.00
5.0	2.0	.4	.000486	180.0	.00673	1.22	18.0	.00673	1.22	1.8	.00673	1.22
6.3	2.5	.4	.000486	225.0	.00562	1.46	22.5	.00562	1.46	2.3	.00562	1.46
7.5	3.0	.4	.000486	270.0	.00479	1.72	27.0	.00479	1.72	2.7	.00479	1.72
8.8	3.5	.4	.000486	315.0	.00413	1.99	31.5	.00413	1.99	3.1	.00413	1.99
10.0	4.0	.4	.000486	360.0	.00361	2.28	36.0	.00361	2.28	3.6	.00361	2.28
11.3	4.5	.4	.000486	405.0	.00319	2.58	40.5	.00319	2.58	4.0	.00319	2.58
12.5	5.0	.4	.000486	450.0	.00284	2.90	45.0	.00284	2.90	4.5	.00284	2.90
1.3	1.0	.8	.000486	45.0	.00761	1.08	4.5	.00761	1.08	.5	.00761	1.08
1.9	1.5	.8	.000486	67.5	.00619	1.33	6.8	.00619	1.33	.7	.00619	1.33
2.5	2.0	.8	.000486	90.0	.00529	1.56	9.0	.00529	1.56	.9	.00529	1.56
3.1	2.5	.8	.000486	112.5	.00464	1.77	11.3	.00464	1.77	1.1	.00464	1.77
3.8	3.0	.8	.000486	135.0	.00413	1.99	13.5	.00413	1.99	1.4	.00413	1.99
4.4	3.5	.8	.000486	157.5	.00371	2.22	15.8	.00371	2.22	1.6	.00371	2.22
5.0	4.0	.8	.000486	180.0	.00337	2.45	18.0	.00337	2.45	1.8	.00337	2.45
5.6	4.5	.8	.000486	202.5	.00307	2.68	20.3	.00307	2.68	2.0	.00307	2.68
6.3	5.0	.8	.000486	225.0	.00281	2.93	22.5	.00281	2.93	2.3	.00281	2.93
					Q = 1400 gpm							
5.0	1.0	.2	.000567	180.0	.01346	.52	18.0	.01346	.52	1.8	.01346	.52
7.5	1.5	.2	.000567	270.0	.00957	.74	27.0	.00957	.74	2.7	.00957	.74
10.0	2.0	.2	.000567	360.0	.00722	.98	36.0	.00722	.98	3.6	.00722	.98
12.5	2.5	.2	.000567	450.0	.00567	1.24	45.0	.00567	1.24	4.5	.00567	1.24
15.0	3.0	.2	.000567	540.0	.00458	1.54	54.0	.00458	1.54	5.4	.00458	1.54
17.5	3.5	.2	.000567	630.0	.00379	1.86	63.0	.00379	1.86	6.3	.00379	1.86
20.0	4.0	.2	.000567	720.0	.00319	2.21	72.0	.00319	2.21	7.2	.00319	2.21
22.5	4.5	.2	.000567	810.0	.00272	2.59	81.0	.00272	2.59	8.1	.00272	2.59
25.0	5.0	.2	.000567	900.0	.00235	3.00	90.0	.00235	3.00	9.0	.00235	3.00
2.5	1.0	.4	.000567	90.0	.01058	.67	9.0	.01058	.67	.9	.01058	.67
3.8	1.5	.4	.000567	135.0	.00826	.85	13.5	.00826	.85	1.4	.00826	.85
5.0	2.0	.4	.000567	180.0	.00673	1.05	18.0	.00673	1.05	1.8	.00673	1.05
6.3	2.5	.4	.000567	225.0	.00562	1.25	22.5	.00562	1.25	2.3	.00562	1.25
7.5	3.0	.4	.000567	270.0	.00479	1.47	27.0	.00479	1.47	2.7	.00479	1.47
8.8	3.5	.4	.000567	315.0	.00413	1.71	31.5	.00413	1.71	3.1	.00413	1.71
10.0	4.0	.4	.000567	360.0	.00361	1.95	36.0	.00361	1.95	3.6	.00361	1.95
11.3	4.5	.4	.000567	405.0	.00319	2.21	40.5	.00319	2.21	4.0	.00319	2.21
12.5	5.0	.4	.000567	450.0	.00284	2.49	45.0	.00284	2.49	4.5	.00284	2.49
1.3	1.0	.8	.000567	45.0	.00761	.93	4.5	.00761	.93	.5	.00761	.93
1.9	1.5	.8	.000567	67.5	.00619	1.14	6.8	.00619	1.14	.7	.00619	1.14
2.5	2.0	.8	.000567	90.0	.00529	1.33	9.0	.00529	1.33	.9	.00529	1.33
3.1	2.5	.8	.000567	112.5	.00464	1.52	11.3	.00464	1.52	1.1	.00464	1.52
3.8	3.0	.8	.000567	135.0	.00413	1.71	13.5	.00413	1.71	1.4	.00413	1.71
4.4	3.5	.8	.000567	157.5	.00371	1.90	15.8	.00371	1.90	1.6	.00371	1.90
5.0	4.0	.8	.000567	180.0	.00337	2.10	18.0	.00337	2.10	1.8	.00337	2.10
5.6	4.5	.8	.000567	202.5	.00307	2.30	20.3	.00307	2.30	2.0	.00307	2.30
6.3	5.0	.8	.000567	225.0	.00281	2.51	22.5	.00281	2.51	2.3	.00281	2.51

Table SA-32
Results of Waste Dilution - Summer - Ship 1
(L = 2.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 500 gpm												
5.0	1.0	.2	.000202	180.0	.02223	.89	18.0	.01749	1.13	1.8	.01749	1.13
7.5	1.5	.2	.000202	270.0	.01543	1.28	27.0	.01265	1.56	2.7	.01265	1.56
10.0	2.0	.2	.000202	360.0	.01125	1.76	36.0	.00967	2.04	3.6	.00967	2.04
12.5	2.5	.2	.000202	450.0	.00869	2.27	45.0	.00767	2.58	4.5	.00767	2.58
15.0	3.0	.2	.000202	540.0	.00697	2.84	54.0	.00625	3.16	5.4	.00625	3.16
17.5	3.5	.2	.000202	630.0	.00573	3.45	63.0	.00520	3.80	6.3	.00520	3.80
20.0	4.0	.2	.000202	720.0	.00481	4.11	72.0	.00440	4.49	7.2	.00440	4.49
22.5	4.5	.2	.000202	810.0	.00410	4.82	81.0	.00378	5.23	8.1	.00378	5.23
25.0	5.0	.2	.000202	900.0	.00354	5.58	90.0	.00328	6.03	9.0	.00328	6.03
2.5	1.0	.4	.000202	90.0	.01348	1.47	9.0	.01348	1.47	.9	.01348	1.47
3.8	1.5	.4	.000202	135.0	.01208	1.64	13.5	.01063	1.86	1.4	.01063	1.86
5.0	2.0	.4	.000202	180.0	.01112	1.78	18.0	.00875	2.26	1.8	.00875	2.26
6.3	2.5	.4	.000202	225.0	.00937	2.11	22.5	.00738	2.68	2.3	.00738	2.68
7.5	3.0	.4	.000202	270.0	.00771	2.56	27.0	.00633	3.12	2.7	.00633	3.12
8.8	3.5	.4	.000202	315.0	.00653	3.03	31.5	.00550	3.59	3.1	.00550	3.59
10.0	4.0	.4	.000202	360.0	.00563	3.51	36.0	.00484	4.09	3.6	.00484	4.09
11.3	4.5	.4	.000202	405.0	.00492	4.02	40.5	.00429	4.61	4.0	.00429	4.61
12.5	5.0	.4	.000202	450.0	.00435	4.55	45.0	.00383	5.15	4.5	.00383	5.15
1.3	1.0	.8	.000202	45.0	.00964	2.05	4.5	.00964	2.05	.5	.00964	2.05
1.9	1.5	.8	.000202	67.5	.00785	2.52	6.8	.00785	2.52	.7	.00785	2.52
2.5	2.0	.8	.000202	90.0	.00674	2.93	9.0	.00674	2.93	.9	.00674	2.93
3.1	2.5	.8	.000202	112.5	.00627	3.15	11.3	.00594	3.33	1.1	.00594	3.33
3.8	3.0	.8	.000202	135.0	.00604	3.27	13.5	.00531	3.72	1.4	.00531	3.72
4.4	3.5	.8	.000202	157.5	.00580	3.41	15.8	.00480	4.11	1.6	.00480	4.11
5.0	4.0	.8	.000202	180.0	.00556	3.56	18.0	.00437	4.52	1.8	.00437	4.52
5.6	4.5	.8	.000202	202.5	.00526	3.75	20.3	.00401	4.93	2.0	.00401	4.93
6.3	5.0	.8	.000202	225.0	.00470	4.20	22.5	.00369	5.36	2.3	.00369	5.36
Q = 600 gpm												
5.0	1.0	.2	.000243	180.0	.02223	.74	18.0	.01749	.94	1.8	.01749	.94
7.5	1.5	.2	.000243	270.0	.01543	1.07	27.0	.01265	1.30	2.7	.01265	1.30
10.0	2.0	.2	.000243	360.0	.01125	1.46	36.0	.00967	1.70	3.6	.00967	1.70
12.5	2.5	.2	.000243	450.0	.00869	1.89	45.0	.00767	2.15	4.5	.00767	2.15
15.0	3.0	.2	.000243	540.0	.00697	2.36	54.0	.00625	2.64	5.4	.00625	2.64
17.5	3.5	.2	.000243	630.0	.00573	2.87	63.0	.00520	3.17	6.3	.00520	3.17
20.0	4.0	.2	.000243	720.0	.00481	3.42	72.0	.00440	3.74	7.2	.00440	3.74
22.5	4.5	.2	.000243	810.0	.00410	4.02	81.0	.00378	4.36	8.1	.00378	4.36
25.0	5.0	.2	.000243	900.0	.00354	4.65	90.0	.00328	5.02	9.0	.00328	5.02
2.5	1.0	.4	.000243	90.0	.01348	1.22	9.0	.01348	1.22	.9	.01348	1.22
3.8	1.5	.4	.000243	135.0	.01208	1.36	13.5	.01063	1.55	1.4	.01063	1.55
5.0	2.0	.4	.000243	180.0	.01112	1.48	18.0	.00875	1.88	1.8	.00875	1.88
6.3	2.5	.4	.000243	225.0	.00937	1.76	22.5	.00738	2.23	2.3	.00738	2.23
7.5	3.0	.4	.000243	270.0	.00771	2.13	27.0	.00633	2.60	2.7	.00633	2.60
8.8	3.5	.4	.000243	315.0	.00653	2.52	31.5	.00550	2.99	3.1	.00550	2.99
10.0	4.0	.4	.000243	360.0	.00563	2.93	36.0	.00484	3.41	3.6	.00484	3.41
11.3	4.5	.4	.000243	405.0	.00492	3.35	40.5	.00429	3.84	4.0	.00429	3.84
12.5	5.0	.4	.000243	450.0	.00435	3.79	45.0	.00383	4.29	4.5	.00383	4.29
1.3	1.0	.8	.000243	45.0	.00964	1.71	4.5	.00964	1.71	.5	.00964	1.71
1.9	1.5	.8	.000243	67.5	.00785	2.10	6.8	.00785	2.10	.7	.00785	2.10
2.5	2.0	.8	.000243	90.0	.00674	2.44	9.0	.00674	2.44	.9	.00674	2.44
3.1	2.5	.8	.000243	112.5	.00627	2.63	11.3	.00594	2.77	1.1	.00594	2.77
3.8	3.0	.8	.000243	135.0	.00604	2.73	13.5	.00531	3.10	1.4	.00531	3.10
4.4	3.5	.8	.000243	157.5	.00580	2.84	15.8	.00480	3.43	1.6	.00480	3.43
5.0	4.0	.8	.000243	180.0	.00556	2.96	18.0	.00437	3.76	1.8	.00437	3.76
5.6	4.5	.8	.000243	202.5	.00526	3.13	20.3	.00401	4.11	2.0	.00401	4.11
6.3	5.0	.8	.000243	225.0	.00470	3.50	22.5	.00369	4.46	2.3	.00369	4.46

Table SA-32 (continued)
Results of Waste Dilution - Summer - Ship 1
(L = 2.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 700 gpm								
5.0	1.0	.2	.000283	180.0	.02223	.64	18.0	.01749	.81	1.8	.01749	.81
7.5	1.5	.2	.000283	270.0	.01543	.91	27.0	.01265	1.12	2.7	.01265	1.12
10.0	2.0	.2	.000283	360.0	.01125	1.25	36.0	.00967	1.46	3.6	.00967	1.46
12.5	2.5	.2	.000283	450.0	.00869	1.62	45.0	.00767	1.84	4.5	.00767	1.84
15.0	3.0	.2	.000283	540.0	.00697	2.03	54.0	.00625	2.26	5.4	.00625	2.26
17.5	3.5	.2	.000283	630.0	.00573	2.46	63.0	.00520	2.71	6.3	.00520	2.71
20.0	4.0	.2	.000283	720.0	.00481	2.93	72.0	.00440	3.21	7.2	.00440	3.21
22.5	4.5	.2	.000283	810.0	.00410	3.44	81.0	.00378	3.74	8.1	.00378	3.74
25.0	5.0	.2	.000283	900.0	.00354	3.98	90.0	.00328	4.30	9.0	.00328	4.30
2.5	1.0	.4	.000283	90.0	.01348	1.05	9.0	.01348	1.05	.9	.01348	1.05
3.8	1.5	.4	.000283	135.0	.01208	1.17	13.5	.01063	1.33	1.4	.01063	1.33
5.0	2.0	.4	.000283	180.0	.01112	1.27	18.0	.00875	1.61	1.8	.00875	1.61
6.3	2.5	.4	.000283	225.0	.00937	1.51	22.5	.00738	1.91	2.3	.00738	1.91
7.5	3.0	.4	.000283	270.0	.00771	1.83	27.0	.00633	2.23	2.7	.00633	2.23
8.8	3.5	.4	.000283	315.0	.00653	2.16	31.5	.00550	2.57	3.1	.00550	2.57
10.0	4.0	.4	.000283	360.0	.00563	2.51	36.0	.00484	2.92	3.6	.00484	2.92
11.3	4.5	.4	.000283	405.0	.00492	2.87	40.5	.00429	3.29	4.0	.00429	3.29
12.5	5.0	.4	.000283	450.0	.00435	3.25	45.0	.00383	3.68	4.5	.00383	3.68
1.3	1.0	.8	.000283	45.0	.00964	1.46	4.5	.00964	1.46	.5	.00964	1.46
1.9	1.5	.8	.000283	67.5	.00785	1.80	6.8	.00785	1.80	.7	.00785	1.80
2.5	2.0	.8	.000283	90.0	.00674	2.09	9.0	.00674	2.09	.9	.00674	2.09
3.1	2.5	.8	.000283	112.5	.00627	2.25	11.3	.00594	2.38	1.1	.00594	2.38
3.8	3.0	.8	.000283	135.0	.00604	2.34	13.5	.00531	2.66	1.4	.00531	2.66
4.4	3.5	.8	.000283	157.5	.00580	2.43	15.8	.00480	2.94	1.6	.00480	2.94
5.0	4.0	.8	.000283	180.0	.00556	2.54	18.0	.00437	3.23	1.8	.00437	3.23
5.6	4.5	.8	.000283	202.5	.00526	2.68	20.3	.00401	3.52	2.0	.00401	3.52
6.3	5.0	.8	.000283	225.0	.00470	3.00	22.5	.00369	3.83	2.3	.00369	3.83
				Q = 1000 gpm								
5.0	1.0	.2	.000405	180.0	.02223	.44	18.0	.01749	.56	1.8	.01749	.56
7.5	1.5	.2	.000405	270.0	.01543	.64	27.0	.01265	.78	2.7	.01265	.78
10.0	2.0	.2	.000405	360.0	.01125	.88	36.0	.00967	1.02	3.6	.00967	1.02
12.5	2.5	.2	.000405	450.0	.00869	1.14	45.0	.00767	1.29	4.5	.00767	1.29
15.0	3.0	.2	.000405	540.0	.00697	1.42	54.0	.00625	1.58	5.4	.00625	1.58
17.5	3.5	.2	.000405	630.0	.00573	1.72	63.0	.00520	1.90	6.3	.00520	1.90
20.0	4.0	.2	.000405	720.0	.00481	2.05	72.0	.00440	2.24	7.2	.00440	2.24
22.5	4.5	.2	.000405	810.0	.00410	2.41	81.0	.00378	2.62	8.1	.00378	2.62
25.0	5.0	.2	.000405	900.0	.00354	2.79	90.0	.00328	3.01	9.0	.00328	3.01
2.5	1.0	.4	.000405	90.0	.01348	.73	9.0	.01348	.73	.9	.01348	.73
3.8	1.5	.4	.000405	135.0	.01208	.82	13.5	.01063	.93	1.4	.01063	.93
5.0	2.0	.4	.000405	180.0	.01112	.89	18.0	.00875	1.13	1.8	.00875	1.13
6.3	2.5	.4	.000405	225.0	.00937	1.05	22.5	.00738	1.34	2.3	.00738	1.34
7.5	3.0	.4	.000405	270.0	.00771	1.28	27.0	.00633	1.56	2.7	.00633	1.56
8.8	3.5	.4	.000405	315.0	.00653	1.51	31.5	.00550	1.80	3.1	.00550	1.80
10.0	4.0	.4	.000405	360.0	.00563	1.76	36.0	.00484	2.04	3.6	.00484	2.04
11.3	4.5	.4	.000405	405.0	.00492	2.01	40.5	.00429	2.30	4.0	.00429	2.30
12.5	5.0	.4	.000405	450.0	.00435	2.27	45.0	.00383	2.58	4.5	.00383	2.58
1.3	1.0	.8	.000405	45.0	.00964	1.03	4.5	.00964	1.03	.5	.00964	1.03
1.9	1.5	.8	.000405	67.5	.00785	1.26	6.8	.00785	1.26	.7	.00785	1.26
2.5	2.0	.8	.000405	90.0	.00674	1.47	9.0	.00674	1.47	.9	.00674	1.47
3.1	2.5	.8	.000405	112.5	.00627	1.58	11.3	.00594	1.66	1.1	.00594	1.66
3.8	3.0	.8	.000405	135.0	.00604	1.64	13.5	.00531	1.86	1.4	.00531	1.86
4.4	3.5	.8	.000405	157.5	.00580	1.70	15.8	.00480	2.06	1.6	.00480	2.06
5.0	4.0	.8	.000405	180.0	.00556	1.78	18.0	.00437	2.26	1.8	.00437	2.26
5.6	4.5	.8	.000405	202.5	.00526	1.88	20.3	.00401	2.47	2.0	.00401	2.47
6.3	5.0	.8	.000405	225.0	.00470	2.10	22.5	.00369	2.68	2.3	.00369	2.68

Table SA-32 (continued)
Results of Waste Dilution - Summer - Ship 1
(L = 2.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 1200 gpm							
5.0	1.0	.2	.000486	180.0	.02223	.37	18.0	.01749	.47	1.8	.01749	.47
7.5	1.5	.2	.000486	270.0	.01543	.53	27.0	.01265	.65	2.7	.01265	.65
10.0	2.0	.2	.000486	360.0	.01125	.73	36.0	.00967	.85	3.6	.00967	.85
12.5	2.5	.2	.000486	450.0	.00869	.95	45.0	.00767	1.07	4.5	.00767	1.07
15.0	3.0	.2	.000486	540.0	.00697	1.18	54.0	.00625	1.32	5.4	.00625	1.32
17.5	3.5	.2	.000486	630.0	.00573	1.44	63.0	.00520	1.58	6.3	.00520	1.58
20.0	4.0	.2	.000486	720.0	.00481	1.71	72.0	.00440	1.87	7.2	.00440	1.87
22.5	4.5	.2	.000486	810.0	.00410	2.01	81.0	.00378	2.18	8.1	.00378	2.18
25.0	5.0	.2	.000486	900.0	.00354	2.32	90.0	.00328	2.51	9.0	.00328	2.51
2.5	1.0	.4	.000486	90.0	.01348	.61	9.0	.01348	.61	.9	.01348	.61
3.8	1.5	.4	.000486	135.0	.01208	.68	13.5	.01063	.77	1.4	.01063	.77
5.0	2.0	.4	.000486	180.0	.01112	.74	18.0	.00875	.94	1.8	.00875	.94
6.3	2.5	.4	.000486	225.0	.00937	.88	22.5	.00738	1.12	2.3	.00738	1.12
7.5	3.0	.4	.000486	270.0	.00771	1.07	27.0	.00633	1.30	2.7	.00633	1.30
8.8	3.5	.4	.000486	315.0	.00653	1.26	31.5	.00550	1.50	3.1	.00550	1.50
10.0	4.0	.4	.000486	360.0	.00563	1.46	36.0	.00484	1.70	3.6	.00484	1.70
11.3	4.5	.4	.000486	405.0	.00492	1.67	40.5	.00429	1.92	4.0	.00429	1.92
12.5	5.0	.4	.000486	450.0	.00435	1.89	45.0	.00383	2.15	4.5	.00383	2.15
1.3	1.0	.8	.000486	45.0	.00964	.85	4.5	.00964	.85	.5	.00964	.85
1.9	1.5	.8	.000486	67.5	.00785	1.05	6.8	.00785	1.05	.7	.00785	1.05
2.5	2.0	.8	.000486	90.0	.00674	1.22	9.0	.00674	1.22	.9	.00674	1.22
3.1	2.5	.8	.000486	112.5	.00627	1.31	11.3	.00594	1.39	1.1	.00594	1.39
3.8	3.0	.8	.000486	135.0	.00604	1.36	13.5	.00531	1.55	1.4	.00531	1.55
4.4	3.5	.8	.000486	157.5	.00580	1.42	15.8	.00480	1.71	1.6	.00480	1.71
5.0	4.0	.8	.000486	180.0	.00556	1.48	18.0	.00437	1.88	1.8	.00437	1.88
5.6	4.5	.8	.000486	202.5	.00526	1.56	20.3	.00401	2.06	2.0	.00401	2.06
6.3	5.0	.8	.000486	225.0	.00470	1.75	22.5	.00369	2.23	2.3	.00369	2.23
					Q = 1400 gpm							
5.0	1.0	.2	.000567	180.0	.02223	.32	18.0	.01749	.40	1.8	.01749	.40
7.5	1.5	.2	.000567	270.0	.01543	.46	27.0	.01265	.56	2.7	.01265	.56
10.0	2.0	.2	.000567	360.0	.01125	.63	36.0	.00967	.73	3.6	.00967	.73
12.5	2.5	.2	.000567	450.0	.00869	.81	45.0	.00767	.92	4.5	.00767	.92
15.0	3.0	.2	.000567	540.0	.00697	1.01	54.0	.00625	1.13	5.4	.00625	1.13
17.5	3.5	.2	.000567	630.0	.00573	1.23	63.0	.00520	1.36	6.3	.00520	1.36
20.0	4.0	.2	.000567	720.0	.00481	1.47	72.0	.00440	1.60	7.2	.00440	1.60
22.5	4.5	.2	.000567	810.0	.00410	1.72	81.0	.00378	1.87	8.1	.00378	1.87
25.0	5.0	.2	.000567	900.0	.00354	1.99	90.0	.00328	2.15	9.0	.00328	2.15
2.5	1.0	.4	.000567	90.0	.01348	.52	9.0	.01348	.52	.9	.01348	.52
3.8	1.5	.4	.000567	135.0	.01208	.58	13.5	.01063	.66	1.4	.01063	.66
5.0	2.0	.4	.000567	180.0	.01112	.63	18.0	.00875	.81	1.8	.00875	.81
6.3	2.5	.4	.000567	225.0	.00937	.75	22.5	.00738	.96	2.3	.00738	.96
7.5	3.0	.4	.000567	270.0	.00771	.91	27.0	.00633	1.12	2.7	.00633	1.12
8.8	3.5	.4	.000567	315.0	.00653	1.08	31.5	.00550	1.28	3.1	.00550	1.28
10.0	4.0	.4	.000567	360.0	.00563	1.25	36.0	.00484	1.46	3.6	.00484	1.46
11.3	4.5	.4	.000567	405.0	.00492	1.43	40.5	.00429	1.65	4.0	.00429	1.65
12.5	5.0	.4	.000567	450.0	.00435	1.62	45.0	.00383	1.84	4.5	.00383	1.84
1.3	1.0	.8	.000567	45.0	.00964	.73	4.5	.00964	.73	.5	.00964	.73
1.9	1.5	.8	.000567	67.5	.00785	.90	6.8	.00785	.90	.7	.00785	.90
2.5	2.0	.8	.000567	90.0	.00674	1.05	9.0	.00674	1.05	.9	.00674	1.05
3.1	2.5	.8	.000567	112.5	.00627	1.13	11.3	.00594	1.19	1.1	.00594	1.19
3.8	3.0	.8	.000567	135.0	.00604	1.17	13.5	.00531	1.33	1.4	.00531	1.33
4.4	3.5	.8	.000567	157.5	.00580	1.22	15.8	.00480	1.47	1.6	.00480	1.47
5.0	4.0	.8	.000567	180.0	.00556	1.27	18.0	.00437	1.61	1.8	.00437	1.61
5.6	4.5	.8	.000567	202.5	.00526	1.34	20.3	.00401	1.76	2.0	.00401	1.76
6.3	5.0	.8	.000567	225.0	.00470	1.50	22.5	.00369	1.91	2.3	.00369	1.91

Table SA-33
Results of Waste Dilution - Winter - Ship 1
(L = 2.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 500 gpm							
5.0	1.0	.2	.000202	180.0	.01175	1.68	18.0	.01175	1.68	1.8	.01175	1.68
7.5	1.5	.2	.000202	270.0	.00850	2.33	27.0	.00850	2.33	2.7	.00850	2.33
10.0	2.0	.2	.000202	360.0	.00649	3.04	36.0	.00649	3.04	3.6	.00649	3.04
12.5	2.5	.2	.000202	450.0	.00515	3.84	45.0	.00515	3.84	4.5	.00515	3.84
15.0	3.0	.2	.000202	540.0	.00420	4.71	54.0	.00420	4.71	5.4	.00420	4.71
17.5	3.5	.2	.000202	630.0	.00349	5.66	63.0	.00349	5.66	6.3	.00349	5.66
20.0	4.0	.2	.000202	720.0	.00296	6.69	72.0	.00296	6.69	7.2	.00296	6.69
22.5	4.5	.2	.000202	810.0	.00254	7.79	81.0	.00254	7.79	8.1	.00254	7.79
25.0	5.0	.2	.000202	900.0	.00220	8.97	90.0	.00220	8.97	9.0	.00220	8.97
2.5	1.0	.4	.000202	90.0	.00905	2.18	9.0	.00905	2.18	.9	.00905	2.18
3.8	1.5	.4	.000202	135.0	.00714	2.77	13.5	.00714	2.77	1.4	.00714	2.77
5.0	2.0	.4	.000202	180.0	.00587	3.36	18.0	.00587	3.36	1.8	.00587	3.36
6.3	2.5	.4	.000202	225.0	.00495	3.99	22.5	.00495	3.99	2.3	.00495	3.99
7.5	3.0	.4	.000202	270.0	.00425	4.65	27.0	.00425	4.65	2.7	.00425	4.65
8.8	3.5	.4	.000202	315.0	.00369	5.35	31.5	.00369	5.35	3.1	.00369	5.35
10.0	4.0	.4	.000202	360.0	.00325	6.09	36.0	.00325	6.09	3.6	.00325	6.09
11.3	4.5	.4	.000202	405.0	.00288	6.86	40.5	.00288	6.86	4.0	.00288	6.86
12.5	5.0	.4	.000202	450.0	.00257	7.67	45.0	.00257	7.67	4.5	.00257	7.67
1.3	1.0	.8	.000202	45.0	.00647	3.05	4.5	.00647	3.05	.5	.00647	3.05
1.9	1.5	.8	.000202	67.5	.00527	3.75	6.8	.00527	3.75	.7	.00527	3.75
2.5	2.0	.8	.000202	90.0	.00453	4.37	9.0	.00453	4.37	.9	.00453	4.37
3.1	2.5	.8	.000202	112.5	.00399	4.95	11.3	.00399	4.95	1.1	.00399	4.95
3.8	3.0	.8	.000202	135.0	.00357	5.54	13.5	.00357	5.54	1.4	.00357	5.54
4.4	3.5	.8	.000202	157.5	.00323	6.13	15.8	.00323	6.13	1.6	.00323	6.13
5.0	4.0	.8	.000202	180.0	.00294	6.73	18.0	.00294	6.73	1.8	.00294	6.73
5.6	4.5	.8	.000202	202.5	.00269	7.35	20.3	.00269	7.35	2.0	.00269	7.35
6.3	5.0	.8	.000202	225.0	.00248	7.98	22.5	.00248	7.98	2.3	.00248	7.98
					Q = 600 gpm							
5.0	1.0	.2	.000243	180.0	.01175	1.40	18.0	.01175	1.40	1.8	.01175	1.40
7.5	1.5	.2	.000243	270.0	.00850	1.94	27.0	.00850	1.94	2.7	.00850	1.94
10.0	2.0	.2	.000243	360.0	.00649	2.54	36.0	.00649	2.54	3.6	.00649	2.54
12.5	2.5	.2	.000243	450.0	.00515	3.20	45.0	.00515	3.20	4.5	.00515	3.20
15.0	3.0	.2	.000243	540.0	.00420	3.92	54.0	.00420	3.92	5.4	.00420	3.92
17.5	3.5	.2	.000243	630.0	.00349	4.72	63.0	.00349	4.72	6.3	.00349	4.72
20.0	4.0	.2	.000243	720.0	.00296	5.57	72.0	.00296	5.57	7.2	.00296	5.57
22.5	4.5	.2	.000243	810.0	.00254	6.49	81.0	.00254	6.49	8.1	.00254	6.49
25.0	5.0	.2	.000243	900.0	.00220	7.48	90.0	.00220	7.48	9.0	.00220	7.48
2.5	1.0	.4	.000243	90.0	.00905	1.82	9.0	.00905	1.82	.9	.00905	1.82
3.8	1.5	.4	.000243	135.0	.00714	2.31	13.5	.00714	2.31	1.4	.00714	2.31
5.0	2.0	.4	.000243	180.0	.00587	2.80	18.0	.00587	2.80	1.8	.00587	2.80
6.3	2.5	.4	.000243	225.0	.00495	3.32	22.5	.00495	3.32	2.3	.00495	3.32
7.5	3.0	.4	.000243	270.0	.00425	3.88	27.0	.00425	3.88	2.7	.00425	3.88
8.8	3.5	.4	.000243	315.0	.00369	4.46	31.5	.00369	4.46	3.1	.00369	4.46
10.0	4.0	.4	.000243	360.0	.00325	5.07	36.0	.00325	5.07	3.6	.00325	5.07
11.3	4.5	.4	.000243	405.0	.00288	5.72	40.5	.00288	5.72	4.0	.00288	5.72
12.5	5.0	.4	.000243	450.0	.00257	6.40	45.0	.00257	6.40	4.5	.00257	6.40
1.3	1.0	.8	.000243	45.0	.00647	2.54	4.5	.00647	2.54	.5	.00647	2.54
1.9	1.5	.8	.000243	67.5	.00527	3.13	6.8	.00527	3.13	.7	.00527	3.13
2.5	2.0	.8	.000243	90.0	.00453	3.64	9.0	.00453	3.64	.9	.00453	3.64
3.1	2.5	.8	.000243	112.5	.00399	4.13	11.3	.00399	4.13	1.1	.00399	4.13
3.8	3.0	.8	.000243	135.0	.00357	4.61	13.5	.00357	4.61	1.4	.00357	4.61
4.4	3.5	.8	.000243	157.5	.00323	5.11	15.8	.00323	5.11	1.6	.00323	5.11
5.0	4.0	.8	.000243	180.0	.00294	5.61	18.0	.00294	5.61	1.8	.00294	5.61
5.6	4.5	.8	.000243	202.5	.00269	6.12	20.3	.00269	6.12	2.0	.00269	6.12
6.3	5.0	.8	.000243	225.0	.00248	6.65	22.5	.00248	6.65	2.3	.00248	6.65

Table SA-33 (continued)
Results of Waste Dilution - Winter - Ship 1
(L = 2.0 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 700 gpm							
5.0	1.0	.2	.000283	180.0	.01175	1.20	18.0	.01175	1.20	1.8	.01175	1.20
7.5	1.5	.2	.000283	270.0	.00850	1.66	27.0	.00850	1.66	2.7	.00850	1.66
10.0	2.0	.2	.000283	360.0	.00649	2.17	36.0	.00649	2.17	3.6	.00649	2.17
12.5	2.5	.2	.000283	450.0	.00515	2.74	45.0	.00515	2.74	4.5	.00515	2.74
15.0	3.0	.2	.000283	540.0	.00420	3.36	54.0	.00420	3.36	5.4	.00420	3.36
17.5	3.5	.2	.000283	630.0	.00349	4.04	63.0	.00349	4.04	6.3	.00349	4.04
20.0	4.0	.2	.000283	720.0	.00296	4.78	72.0	.00296	4.78	7.2	.00296	4.78
22.5	4.5	.2	.000283	810.0	.00254	5.57	81.0	.00254	5.57	8.1	.00254	5.57
25.0	5.0	.2	.000283	900.0	.00220	6.41	90.0	.00220	6.41	9.0	.00220	6.41
2.5	1.0	.4	.000283	90.0	.00905	1.56	9.0	.00905	1.56	.9	.00905	1.56
3.8	1.5	.4	.000283	135.0	.00714	1.98	13.5	.00714	1.98	1.4	.00714	1.98
5.0	2.0	.4	.000283	180.0	.00587	2.40	18.0	.00587	2.40	1.8	.00587	2.40
6.3	2.5	.4	.000283	225.0	.00495	2.85	22.5	.00495	2.85	2.3	.00495	2.85
7.5	3.0	.4	.000283	270.0	.00425	3.32	27.0	.00425	3.32	2.7	.00425	3.32
8.8	3.5	.4	.000283	315.0	.00369	3.82	31.5	.00369	3.82	3.1	.00369	3.82
10.0	4.0	.4	.000283	360.0	.00325	4.35	36.0	.00325	4.35	3.6	.00325	4.35
11.3	4.5	.4	.000283	405.0	.00288	4.90	40.5	.00288	4.90	4.0	.00288	4.90
12.5	5.0	.4	.000283	450.0	.00257	5.48	45.0	.00257	5.48	4.5	.00257	5.48
1.3	1.0	.8	.000283	45.0	.00647	2.18	4.5	.00647	2.18	.5	.00647	2.18
1.9	1.5	.8	.000283	67.5	.00527	2.68	6.8	.00527	2.68	.7	.00527	2.68
2.5	2.0	.8	.000283	90.0	.00453	3.12	9.0	.00453	3.12	.9	.00453	3.12
3.1	2.5	.8	.000283	112.5	.00399	3.54	11.3	.00399	3.54	1.1	.00399	3.54
3.8	3.0	.8	.000283	135.0	.00357	3.96	13.5	.00357	3.96	1.4	.00357	3.96
4.4	3.5	.8	.000283	157.5	.00323	4.38	15.8	.00323	4.38	1.6	.00323	4.38
5.0	4.0	.8	.000283	180.0	.00294	4.81	18.0	.00294	4.81	1.8	.00294	4.81
5.6	4.5	.8	.000283	202.5	.00269	5.25	20.3	.00269	5.25	2.0	.00269	5.25
6.3	5.0	.8	.000283	225.0	.00248	5.70	22.5	.00248	5.70	2.3	.00248	5.70
					Q = 1000 gpm							
5.0	1.0	.2	.000405	180.0	.01175	.84	18.0	.01175	.84	1.8	.01175	.84
7.5	1.5	.2	.000405	270.0	.00850	1.16	27.0	.00850	1.16	2.7	.00850	1.16
10.0	2.0	.2	.000405	360.0	.00649	1.52	36.0	.00649	1.52	3.6	.00649	1.52
12.5	2.5	.2	.000405	450.0	.00515	1.92	45.0	.00515	1.92	4.5	.00515	1.92
15.0	3.0	.2	.000405	540.0	.00420	2.35	54.0	.00420	2.35	5.4	.00420	2.35
17.5	3.5	.2	.000405	630.0	.00349	2.83	63.0	.00349	2.83	6.3	.00349	2.83
20.0	4.0	.2	.000405	720.0	.00296	3.34	72.0	.00296	3.34	7.2	.00296	3.34
22.5	4.5	.2	.000405	810.0	.00254	3.90	81.0	.00254	3.90	8.1	.00254	3.90
25.0	5.0	.2	.000405	900.0	.00220	4.49	90.0	.00220	4.49	9.0	.00220	4.49
2.5	1.0	.4	.000405	90.0	.00905	1.09	9.0	.00905	1.09	.9	.00905	1.09
3.8	1.5	.4	.000405	135.0	.00714	1.38	13.5	.00714	1.38	1.4	.00714	1.38
5.0	2.0	.4	.000405	180.0	.00587	1.68	18.0	.00587	1.68	1.8	.00587	1.68
6.3	2.5	.4	.000405	225.0	.00495	1.99	22.5	.00495	1.99	2.3	.00495	1.99
7.5	3.0	.4	.000405	270.0	.00425	2.33	27.0	.00425	2.33	2.7	.00425	2.33
8.8	3.5	.4	.000405	315.0	.00369	2.67	31.5	.00369	2.67	3.1	.00369	2.67
10.0	4.0	.4	.000405	360.0	.00325	3.04	36.0	.00325	3.04	3.6	.00325	3.04
11.3	4.5	.4	.000405	405.0	.00288	3.43	40.5	.00288	3.43	4.0	.00288	3.43
12.5	5.0	.4	.000405	450.0	.00257	3.84	45.0	.00257	3.84	4.5	.00257	3.84
1.3	1.0	.8	.000405	45.0	.00647	1.53	4.5	.00647	1.53	.5	.00647	1.53
1.9	1.5	.8	.000405	67.5	.00527	1.88	6.8	.00527	1.88	.7	.00527	1.88
2.5	2.0	.8	.000405	90.0	.00453	2.18	9.0	.00453	2.18	.9	.00453	2.18
3.1	2.5	.8	.000405	112.5	.00399	2.48	11.3	.00399	2.48	1.1	.00399	2.48
3.8	3.0	.8	.000405	135.0	.00357	2.77	13.5	.00357	2.77	1.4	.00357	2.77
4.4	3.5	.8	.000405	157.5	.00323	3.06	15.8	.00323	3.06	1.6	.00323	3.06
5.0	4.0	.8	.000405	180.0	.00294	3.36	18.0	.00294	3.36	1.8	.00294	3.36
5.6	4.5	.8	.000405	202.5	.00269	3.67	20.3	.00269	3.67	2.0	.00269	3.67
6.3	5.0	.8	.000405	225.0	.00248	3.99	22.5	.00248	3.99	2.3	.00248	3.99

Table SA-33 (continued)
Results of Waste Dilution - Winter - Ship 1
(L = 2.0 n mi, A = 0.001 $ft^{2/3}/sec$)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 1200 gpm												
5.0	1.0	.2	.000486	180.0	.01175	.70	18.0	.01175	.70	1.8	.01175	.70
7.5	1.5	.2	.000486	270.0	.00850	.97	27.0	.00850	.97	2.7	.00850	.97
10.0	2.0	.2	.000486	360.0	.00649	1.27	36.0	.00649	1.27	3.6	.00649	1.27
12.5	2.5	.2	.000486	450.0	.00515	1.60	45.0	.00515	1.60	4.5	.00515	1.60
15.0	3.0	.2	.000486	540.0	.00420	1.96	54.0	.00420	1.96	5.4	.00420	1.96
17.5	3.5	.2	.000486	630.0	.00349	2.36	63.0	.00349	2.36	6.3	.00349	2.36
20.0	4.0	.2	.000486	720.0	.00296	2.79	72.0	.00296	2.79	7.2	.00296	2.79
22.5	4.5	.2	.000486	810.0	.00254	3.25	81.0	.00254	3.25	8.1	.00254	3.25
25.0	5.0	.2	.000486	900.0	.00220	3.74	90.0	.00220	3.74	9.0	.00220	3.74
2.5	1.0	.4	.000486	90.0	.00905	.91	9.0	.00905	.91	.9	.00905	.91
3.8	1.5	.4	.000486	135.0	.00714	1.15	13.5	.00714	1.15	1.4	.00714	1.15
5.0	2.0	.4	.000486	180.0	.00587	1.40	18.0	.00587	1.40	1.8	.00587	1.40
6.3	2.5	.4	.000486	225.0	.00495	1.66	22.5	.00495	1.66	2.3	.00495	1.66
7.5	3.0	.4	.000486	270.0	.00425	1.94	27.0	.00425	1.94	2.7	.00425	1.94
8.8	3.5	.4	.000486	315.0	.00369	2.23	31.5	.00369	2.23	3.1	.00369	2.23
10.0	4.0	.4	.000486	360.0	.00325	2.54	36.0	.00325	2.54	3.6	.00325	2.54
11.3	4.5	.4	.000486	405.0	.00288	2.86	40.5	.00288	2.86	4.0	.00288	2.86
12.5	5.0	.4	.000486	450.0	.00257	3.20	45.0	.00257	3.20	4.5	.00257	3.20
1.3	1.0	.8	.000486	45.0	.00647	1.27	4.5	.00647	1.27	.5	.00647	1.27
1.9	1.5	.8	.000486	67.5	.00527	1.56	6.8	.00527	1.56	.7	.00527	1.56
2.5	2.0	.8	.000486	90.0	.00453	1.82	9.0	.00453	1.82	.9	.00453	1.82
3.1	2.5	.8	.000486	112.5	.00399	2.06	11.3	.00399	2.06	1.1	.00399	2.06
3.8	3.0	.8	.000486	135.0	.00357	2.31	13.5	.00357	2.31	1.4	.00357	2.31
4.4	3.5	.8	.000486	157.5	.00323	2.55	15.8	.00323	2.55	1.6	.00323	2.55
5.0	4.0	.8	.000486	180.0	.00294	2.80	18.0	.00294	2.80	1.8	.00294	2.80
5.6	4.5	.8	.000486	202.5	.00269	3.06	20.3	.00269	3.06	2.0	.00269	3.06
6.3	5.0	.8	.000486	225.0	.00248	3.32	22.5	.00248	3.32	2.3	.00248	3.32
Q = 1400 gpm												
5.0	1.0	.2	.000567	180.0	.01175	.60	18.0	.01175	.60	1.8	.01175	.60
7.5	1.5	.2	.000567	270.0	.00850	.83	27.0	.00850	.83	2.7	.00850	.83
10.0	2.0	.2	.000567	360.0	.00649	1.09	36.0	.00649	1.09	3.6	.00649	1.09
12.5	2.5	.2	.000567	450.0	.00515	1.37	45.0	.00515	1.37	4.5	.00515	1.37
15.0	3.0	.2	.000567	540.0	.00420	1.68	54.0	.00420	1.68	5.4	.00420	1.68
17.5	3.5	.2	.000567	630.0	.00349	2.02	63.0	.00349	2.02	6.3	.00349	2.02
20.0	4.0	.2	.000567	720.0	.00296	2.39	72.0	.00296	2.39	7.2	.00296	2.39
22.5	4.5	.2	.000567	810.0	.00254	2.78	81.0	.00254	2.78	8.1	.00254	2.78
25.0	5.0	.2	.000567	900.0	.00220	3.20	90.0	.00220	3.20	9.0	.00220	3.20
2.5	1.0	.4	.000567	90.0	.00905	.78	9.0	.00905	.78	.9	.00905	.78
3.8	1.5	.4	.000567	135.0	.00714	.99	13.5	.00714	.99	1.4	.00714	.99
5.0	2.0	.4	.000567	180.0	.00587	1.20	18.0	.00587	1.20	1.8	.00587	1.20
6.3	2.5	.4	.000567	225.0	.00495	1.42	22.5	.00495	1.42	2.3	.00495	1.42
7.5	3.0	.4	.000567	270.0	.00425	1.66	27.0	.00425	1.66	2.7	.00425	1.66
8.8	3.5	.4	.000567	315.0	.00369	1.91	31.5	.00369	1.91	3.1	.00369	1.91
10.0	4.0	.4	.000567	360.0	.00325	2.17	36.0	.00325	2.17	3.6	.00325	2.17
11.3	4.5	.4	.000567	405.0	.00288	2.45	40.5	.00288	2.45	4.0	.00288	2.45
12.5	5.0	.4	.000567	450.0	.00257	2.74	45.0	.00257	2.74	4.5	.00257	2.74
1.3	1.0	.8	.000567	45.0	.00647	1.09	4.5	.00647	1.09	.5	.00647	1.09
1.9	1.5	.8	.000567	67.5	.00527	1.34	6.8	.00527	1.34	.7	.00527	1.34
2.5	2.0	.8	.000567	90.0	.00453	1.56	9.0	.00453	1.56	.9	.00453	1.56
3.1	2.5	.8	.000567	112.5	.00399	1.77	11.3	.00399	1.77	1.1	.00399	1.77
3.8	3.0	.8	.000567	135.0	.00357	1.98	13.5	.00357	1.98	1.4	.00357	1.98
4.4	3.5	.8	.000567	157.5	.00323	2.19	15.8	.00323	2.19	1.6	.00323	2.19
5.0	4.0	.8	.000567	180.0	.00294	2.40	18.0	.00294	2.40	1.8	.00294	2.40
5.6	4.5	.8	.000567	202.5	.00269	2.62	20.3	.00269	2.62	2.0	.00269	2.62
6.3	5.0	.8	.000567	225.0	.00248	2.85	22.5	.00248	2.85	2.3	.00248	2.85

Table SA-34
Results of Waste Dilution - Summer - Ship 1
(L = 2.2 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 500 gpm							
5.0	1.0	.2	.000202	180.0	.02048	.96	18.0	.01612	1.23	1.8	.01612	1.23
7.5	1.5	.2	.000202	270.0	.01435	1.38	27.0	.01177	1.68	2.7	.01177	1.68
10.0	2.0	.2	.000202	360.0	.01055	1.87	36.0	.00906	2.18	3.6	.00906	2.18
12.5	2.5	.2	.000202	450.0	.00820	2.41	45.0	.00723	2.73	4.5	.00723	2.73
15.0	3.0	.2	.000202	540.0	.00660	2.99	54.0	.00592	3.34	5.4	.00592	3.34
17.5	3.5	.2	.000202	630.0	.00545	3.62	63.0	.00495	4.00	6.3	.00495	4.00
20.0	4.0	.2	.000202	720.0	.00459	4.30	72.0	.00420	4.70	7.2	.00420	4.70
22.5	4.5	.2	.000202	810.0	.00393	5.03	81.0	.00361	5.47	8.1	.00361	5.47
25.0	5.0	.2	.000202	900.0	.00340	5.81	90.0	.00315	6.28	9.0	.00315	6.28
2.5	1.0	.4	.000202	90.0	.01228	1.61	9.0	.01228	1.61	.9	.01228	1.61
3.8	1.5	.4	.000202	135.0	.01107	1.79	13.5	.00974	2.03	1.4	.00974	2.03
5.0	2.0	.4	.000202	180.0	.01024	1.93	18.0	.00806	2.45	1.8	.00806	2.45
6.3	2.5	.4	.000202	225.0	.00868	2.28	22.5	.00683	2.89	2.3	.00683	2.89
7.5	3.0	.4	.000202	270.0	.00718	2.75	27.0	.00589	3.36	2.7	.00589	3.36
8.8	3.5	.4	.000202	315.0	.00610	3.24	31.5	.00514	3.85	3.1	.00514	3.85
10.0	4.0	.4	.000202	360.0	.00527	3.75	36.0	.00453	4.36	3.6	.00453	4.36
11.3	4.5	.4	.000202	405.0	.00462	4.27	40.5	.00403	4.90	4.0	.00403	4.90
12.5	5.0	.4	.000202	450.0	.00410	4.82	45.0	.00361	5.47	4.5	.00361	5.47
1.3	1.0	.8	.000202	45.0	.00876	2.26	4.5	.00876	2.26	.5	.00876	2.26
1.9	1.5	.8	.000202	67.5	.00714	2.77	6.8	.00714	2.77	.7	.00714	2.77
2.5	2.0	.8	.000202	90.0	.00614	3.22	9.0	.00614	3.22	.9	.00614	3.22
3.1	2.5	.8	.000202	112.5	.00573	3.45	11.3	.00543	3.64	1.1	.00543	3.64
3.8	3.0	.8	.000202	135.0	.00553	3.57	13.5	.00487	4.06	1.4	.00487	4.06
4.4	3.5	.8	.000202	157.5	.00533	3.71	15.8	.00441	4.48	1.6	.00441	4.48
5.0	4.0	.8	.000202	180.0	.00512	3.86	18.0	.00403	4.90	1.8	.00403	4.90
5.6	4.5	.8	.000202	202.5	.00486	4.06	20.3	.00370	5.34	2.0	.00370	5.34
6.3	5.0	.8	.000202	225.0	.00436	4.54	22.5	.00342	5.78	2.3	.00342	5.78
					Q = 600 gpm							
5.0	1.0	.2	.000243	180.0	.02048	.80	18.0	.01612	1.02	1.8	.01612	1.02
7.5	1.5	.2	.000243	270.0	.01435	1.15	27.0	.01177	1.40	2.7	.01177	1.40
10.0	2.0	.2	.000243	360.0	.01055	1.56	36.0	.00906	1.82	3.6	.00906	1.82
12.5	2.5	.2	.000243	450.0	.00820	2.01	45.0	.00723	2.28	4.5	.00723	2.28
15.0	3.0	.2	.000243	540.0	.00660	2.49	54.0	.00592	2.78	5.4	.00592	2.78
17.5	3.5	.2	.000243	630.0	.00545	3.02	63.0	.00495	3.33	6.3	.00495	3.33
20.0	4.0	.2	.000243	720.0	.00459	3.59	72.0	.00420	3.92	7.2	.00420	3.92
22.5	4.5	.2	.000243	810.0	.00393	4.20	81.0	.00361	4.56	8.1	.00361	4.56
25.0	5.0	.2	.000243	900.0	.00340	4.84	90.0	.00315	5.23	9.0	.00315	5.23
2.5	1.0	.4	.000243	90.0	.01228	1.34	9.0	.01228	1.34	.9	.01228	1.34
3.8	1.5	.4	.000243	135.0	.01107	1.49	13.5	.00974	1.69	1.4	.00974	1.69
5.0	2.0	.4	.000243	180.0	.01024	1.61	18.0	.00806	2.04	1.8	.00806	2.04
6.3	2.5	.4	.000243	225.0	.00868	1.90	22.5	.00683	2.41	2.3	.00683	2.41
7.5	3.0	.4	.000243	270.0	.00718	2.29	27.0	.00589	2.80	2.7	.00589	2.80
8.8	3.5	.4	.000243	315.0	.00610	2.70	31.5	.00514	3.20	3.1	.00514	3.20
10.0	4.0	.4	.000243	360.0	.00527	3.12	36.0	.00453	3.63	3.6	.00453	3.63
11.3	4.5	.4	.000243	405.0	.00462	3.56	40.5	.00403	4.08	4.0	.00403	4.08
12.5	5.0	.4	.000243	450.0	.00410	4.02	45.0	.00361	4.56	4.5	.00361	4.56
1.3	1.0	.8	.000243	45.0	.00876	1.88	4.5	.00876	1.88	.5	.00876	1.88
1.9	1.5	.8	.000243	67.5	.00714	2.31	6.8	.00714	2.31	.7	.00714	2.31
2.5	2.0	.8	.000243	90.0	.00614	2.68	9.0	.00614	2.68	.9	.00614	2.68
3.1	2.5	.8	.000243	112.5	.00573	2.88	11.3	.00543	3.03	1.1	.00543	3.03
3.8	3.0	.8	.000243	135.0	.00553	2.98	13.5	.00487	3.38	1.4	.00487	3.38
4.4	3.5	.8	.000243	157.5	.00533	3.09	15.8	.00441	3.73	1.6	.00441	3.73
5.0	4.0	.8	.000243	180.0	.00512	3.22	18.0	.00403	4.09	1.8	.00403	4.09
5.6	4.5	.8	.000243	202.5	.00486	3.39	20.3	.00370	4.45	2.0	.00370	4.45
6.3	5.0	.8	.000243	225.0	.00436	3.78	22.5	.00342	4.82	2.3	.00342	4.82

Table SA-34 (continued)
Results of Waste Dilution - Summer - Ship 1
(L = 2.2 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 700 gpm							
5.0	1.0	.2	.000283	180.0	.02048	.69	18.0	.01612	.88	1.8	.01612	.88
7.5	1.5	.2	.000283	270.0	.01435	.98	27.0	.01177	1.20	2.7	.01177	1.20
10.0	2.0	.2	.000283	360.0	.01055	1.34	36.0	.00906	1.56	3.6	.00906	1.56
12.5	2.5	.2	.000283	450.0	.00820	1.72	45.0	.00723	1.95	4.5	.00723	1.95
15.0	3.0	.2	.000283	540.0	.00660	2.14	54.0	.00592	2.38	5.4	.00592	2.38
17.5	3.5	.2	.000283	630.0	.00545	2.59	63.0	.00495	2.85	6.3	.00495	2.85
20.0	4.0	.2	.000283	720.0	.00459	3.07	72.0	.00420	3.36	7.2	.00420	3.36
22.5	4.5	.2	.000283	810.0	.00393	3.60	81.0	.00361	3.90	8.1	.00361	3.90
25.0	5.0	.2	.000283	900.0	.00340	4.15	90.0	.00315	4.49	9.0	.00315	4.49
2.5	1.0	.4	.000283	90.0	.01228	1.15	9.0	.01228	1.15	.9	.01228	1.15
3.8	1.5	.4	.000283	135.0	.01107	1.28	13.5	.00974	1.45	1.4	.00974	1.45
5.0	2.0	.4	.000283	180.0	.01024	1.38	18.0	.00806	1.75	1.8	.00806	1.75
6.3	2.5	.4	.000283	225.0	.00868	1.63	22.5	.00683	2.07	2.3	.00683	2.07
7.5	3.0	.4	.000283	270.0	.00718	1.97	27.0	.00589	2.40	2.7	.00589	2.40
8.8	3.5	.4	.000283	315.0	.00610	2.31	31.5	.00514	2.75	3.1	.00514	2.75
10.0	4.0	.4	.000283	360.0	.00527	2.68	36.0	.00453	3.11	3.6	.00453	3.11
11.3	4.5	.4	.000283	405.0	.00462	3.05	40.5	.00403	3.50	4.0	.00403	3.50
12.5	5.0	.4	.000283	450.0	.00410	3.44	45.0	.00361	3.90	4.5	.00361	3.90
1.3	1.0	.8	.000283	45.0	.00876	1.61	4.5	.00876	1.61	.5	.00876	1.61
1.9	1.5	.8	.000283	67.5	.00714	1.98	6.8	.00714	1.98	.7	.00714	1.98
2.5	2.0	.8	.000283	90.0	.00614	2.30	9.0	.00614	2.30	.9	.00614	2.30
3.1	2.5	.8	.000283	112.5	.00573	2.46	11.3	.00543	2.60	1.1	.00543	2.60
3.8	3.0	.8	.000283	135.0	.00553	2.55	13.5	.00487	2.90	1.4	.00487	2.90
4.4	3.5	.8	.000283	157.5	.00533	2.65	15.8	.00441	3.20	1.6	.00441	3.20
5.0	4.0	.8	.000283	180.0	.00512	2.76	18.0	.00403	3.50	1.8	.00403	3.50
5.6	4.5	.8	.000283	202.5	.00486	2.90	20.3	.00370	3.81	2.0	.00370	3.81
6.3	5.0	.8	.000283	225.0	.00436	3.24	22.5	.00342	4.13	2.3	.00342	4.13
					Q = 1000 gpm							
5.0	1.0	.2	.000405	180.0	.02048	.48	18.0	.01612	.61	1.8	.01612	.61
7.5	1.5	.2	.000405	270.0	.01435	.69	27.0	.01177	.84	2.7	.01177	.84
10.0	2.0	.2	.000405	360.0	.01055	.94	36.0	.00906	1.09	3.6	.00906	1.09
12.5	2.5	.2	.000405	450.0	.00820	1.21	45.0	.00723	1.37	4.5	.00723	1.37
15.0	3.0	.2	.000405	540.0	.00660	1.50	54.0	.00592	1.67	5.4	.00592	1.67
17.5	3.5	.2	.000405	630.0	.00545	1.81	63.0	.00495	2.00	6.3	.00495	2.00
20.0	4.0	.2	.000405	720.0	.00459	2.15	72.0	.00420	2.35	7.2	.00420	2.35
22.5	4.5	.2	.000405	810.0	.00393	2.52	81.0	.00361	2.73	8.1	.00361	2.73
25.0	5.0	.2	.000405	900.0	.00340	2.91	90.0	.00315	3.14	9.0	.00315	3.14
2.5	1.0	.4	.000405	90.0	.01228	.80	9.0	.01228	.80	.9	.01228	.80
3.8	1.5	.4	.000405	135.0	.01107	.89	13.5	.00974	1.01	1.4	.00974	1.01
5.0	2.0	.4	.000405	180.0	.01024	.96	18.0	.00806	1.23	1.8	.00806	1.23
6.3	2.5	.4	.000405	225.0	.00868	1.14	22.5	.00683	1.45	2.3	.00683	1.45
7.5	3.0	.4	.000405	270.0	.00718	1.38	27.0	.00589	1.68	2.7	.00589	1.68
8.8	3.5	.4	.000405	315.0	.00610	1.62	31.5	.00514	1.92	3.1	.00514	1.92
10.0	4.0	.4	.000405	360.0	.00527	1.87	36.0	.00453	2.18	3.6	.00453	2.18
11.3	4.5	.4	.000405	405.0	.00462	2.14	40.5	.00403	2.45	4.0	.00403	2.45
12.5	5.0	.4	.000405	450.0	.00410	2.41	45.0	.00361	2.73	4.5	.00361	2.73
1.3	1.0	.8	.000405	45.0	.00876	1.13	4.5	.00876	1.13	.5	.00876	1.13
1.9	1.5	.8	.000405	67.5	.00714	1.38	6.8	.00714	1.38	.7	.00714	1.38
2.5	2.0	.8	.000405	90.0	.00614	1.61	9.0	.00614	1.61	.9	.00614	1.61
3.1	2.5	.8	.000405	112.5	.00573	1.73	11.3	.00543	1.82	1.1	.00543	1.82
3.8	3.0	.8	.000405	135.0	.00553	1.79	13.5	.00487	2.03	1.4	.00487	2.03
4.4	3.5	.8	.000405	157.5	.00533	1.85	15.8	.00441	2.24	1.6	.00441	2.24
5.0	4.0	.8	.000405	180.0	.00512	1.93	18.0	.00403	2.45	1.8	.00403	2.45
5.6	4.5	.8	.000405	202.5	.00486	2.03	20.3	.00370	2.67	2.0	.00370	2.67
6.3	5.0	.8	.000405	225.0	.00436	2.27	22.5	.00342	2.89	2.3	.00342	2.89

Table SA-34 (continued)
Results of Waste Dilution - Summer - Ship 1
(L = 2.2 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 1200 gpm							
5.0	1.0	.2	.000486	180.0	.02048	.40	18.0	.01612	.51	1.8	.01612	.51
7.5	1.5	.2	.000486	270.0	.01435	.57	27.0	.01177	.70	2.7	.01177	.70
10.0	2.0	.2	.000486	360.0	.01055	.78	36.0	.00906	.91	3.6	.00906	.91
12.5	2.5	.2	.000486	450.0	.00820	1.00	45.0	.00723	1.14	4.5	.00723	1.14
15.0	3.0	.2	.000486	540.0	.00660	1.25	54.0	.00592	1.39	5.4	.00592	1.39
17.5	3.5	.2	.000486	630.0	.00545	1.51	63.0	.00495	1.66	6.3	.00495	1.66
20.0	4.0	.2	.000486	720.0	.00459	1.79	72.0	.00420	1.96	7.2	.00420	1.96
22.5	4.5	.2	.000486	810.0	.00393	2.10	81.0	.00361	2.28	8.1	.00361	2.28
25.0	5.0	.2	.000486	900.0	.00340	2.42	90.0	.00315	2.62	9.0	.00315	2.62
2.5	1.0	.4	.000486	90.0	.01228	.67	9.0	.01228	.67	.9	.01228	.67
3.8	1.5	.4	.000486	135.0	.01107	.74	13.5	.00974	.85	1.4	.00974	.85
5.0	2.0	.4	.000486	180.0	.01024	.80	18.0	.00806	1.02	1.8	.00806	1.02
6.3	2.5	.4	.000486	225.0	.00868	.95	22.5	.00683	1.21	2.3	.00683	1.21
7.5	3.0	.4	.000486	270.0	.00718	1.15	27.0	.00589	1.40	2.7	.00589	1.40
8.8	3.5	.4	.000486	315.0	.00610	1.35	31.5	.00514	1.60	3.1	.00514	1.60
10.0	4.0	.4	.000486	360.0	.00527	1.56	36.0	.00453	1.82	3.6	.00453	1.82
11.3	4.5	.4	.000486	405.0	.00462	1.78	40.5	.00403	2.04	4.0	.00403	2.04
12.5	5.0	.4	.000486	450.0	.00410	2.01	45.0	.00361	2.28	4.5	.00361	2.28
1.3	1.0	.8	.000486	45.0	.00876	.94	4.5	.00876	.94	.5	.00876	.94
1.9	1.5	.8	.000486	67.5	.00714	1.15	6.8	.00714	1.15	.7	.00714	1.15
2.5	2.0	.8	.000486	90.0	.00614	1.34	9.0	.00614	1.34	.9	.00614	1.34
3.1	2.5	.8	.000486	112.5	.00573	1.44	11.3	.00543	1.52	1.1	.00543	1.52
3.8	3.0	.8	.000486	135.0	.00553	1.49	13.5	.00487	1.69	1.4	.00487	1.69
4.4	3.5	.8	.000486	157.5	.00533	1.54	15.8	.00441	1.87	1.6	.00441	1.87
5.0	4.0	.8	.000486	180.0	.00512	1.61	18.0	.00403	2.04	1.8	.00403	2.04
5.6	4.5	.8	.000486	202.5	.00486	1.69	20.3	.00370	2.22	2.0	.00370	2.22
6.3	5.0	.8	.000486	225.0	.00436	1.89	22.5	.00342	2.41	2.3	.00342	2.41
					Q = 1400 gpm							
5.0	1.0	.2	.000567	180.0	.02048	.34	18.0	.01612	.44	1.8	.01612	.44
7.5	1.5	.2	.000567	270.0	.01435	.49	27.0	.01177	.60	2.7	.01177	.60
10.0	2.0	.2	.000567	360.0	.01055	.67	36.0	.00906	.78	3.6	.00906	.78
12.5	2.5	.2	.000567	450.0	.00820	.86	45.0	.00723	.98	4.5	.00723	.98
15.0	3.0	.2	.000567	540.0	.00660	1.07	54.0	.00592	1.19	5.4	.00592	1.19
17.5	3.5	.2	.000567	630.0	.00545	1.29	63.0	.00495	1.43	6.3	.00495	1.43
20.0	4.0	.2	.000567	720.0	.00459	1.54	72.0	.00420	1.68	7.2	.00420	1.68
22.5	4.5	.2	.000567	810.0	.00393	1.80	81.0	.00361	1.95	8.1	.00361	1.95
25.0	5.0	.2	.000567	900.0	.00340	2.08	90.0	.00315	2.24	9.0	.00315	2.24
2.5	1.0	.4	.000567	90.0	.01228	.57	9.0	.01228	.57	.9	.01228	.57
3.8	1.5	.4	.000567	135.0	.01107	.64	13.5	.00974	.72	1.4	.00974	.72
5.0	2.0	.4	.000567	180.0	.01024	.69	18.0	.00806	.88	1.8	.00806	.88
6.3	2.5	.4	.000567	225.0	.00868	.81	22.5	.00683	1.03	2.3	.00683	1.03
7.5	3.0	.4	.000567	270.0	.00718	.98	27.0	.00589	1.20	2.7	.00589	1.20
8.8	3.5	.4	.000567	315.0	.00610	1.16	31.5	.00514	1.37	3.1	.00514	1.37
10.0	4.0	.4	.000567	360.0	.00527	1.34	36.0	.00453	1.56	3.6	.00453	1.56
11.3	4.5	.4	.000567	405.0	.00462	1.53	40.5	.00403	1.75	4.0	.00403	1.75
12.5	5.0	.4	.000567	450.0	.00410	1.72	45.0	.00361	1.95	4.5	.00361	1.95
1.3	1.0	.8	.000567	45.0	.00876	.81	4.5	.00876	.81	.5	.00876	.81
1.9	1.5	.8	.000567	67.5	.00714	.99	6.8	.00714	.99	.7	.00714	.99
2.5	2.0	.8	.000567	90.0	.00614	1.15	9.0	.00614	1.15	.9	.00614	1.15
3.1	2.5	.8	.000567	112.5	.00573	1.23	11.3	.00543	1.30	1.1	.00543	1.30
3.8	3.0	.8	.000567	135.0	.00553	1.28	13.5	.00487	1.45	1.4	.00487	1.45
4.4	3.5	.8	.000567	157.5	.00533	1.32	15.8	.00441	1.60	1.6	.00441	1.60
5.0	4.0	.8	.000567	180.0	.00512	1.38	18.0	.00403	1.75	1.8	.00403	1.75
5.6	4.5	.8	.000567	202.5	.00486	1.45	20.3	.00370	1.91	2.0	.00370	1.91
6.3	5.0	.8	.000567	225.0	.00436	1.62	22.5	.00342	2.07	2.3	.00342	2.07

Table SA-35
Results of Waste Dilution - Winter - Ship 1
(L = 2.2 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 500 gpm								
5.0	1.0	.2	.000202	180.0	.01082	1.83	18.0	.01082	1.83	1.8	.01082	1.83
7.5	1.5	.2	.000202	270.0	.00791	2.50	27.0	.00791	2.50	2.7	.00791	2.50
10.0	2.0	.2	.000202	360.0	.00609	3.25	36.0	.00609	3.25	3.6	.00609	3.25
12.5	2.5	.2	.000202	450.0	.00485	4.07	45.0	.00485	4.07	4.5	.00485	4.07
15.0	3.0	.2	.000202	540.0	.00397	4.97	54.0	.00397	4.97	5.4	.00397	4.97
17.5	3.5	.2	.000202	630.0	.00332	5.95	63.0	.00332	5.95	6.3	.00332	5.95
20.0	4.0	.2	.000202	720.0	.00282	7.01	72.0	.00282	7.01	7.2	.00282	7.01
22.5	4.5	.2	.000202	810.0	.00243	8.14	81.0	.00243	8.14	8.1	.00243	8.14
25.0	5.0	.2	.000202	900.0	.00211	9.35	90.0	.00211	9.35	9.0	.00211	9.35
2.5	1.0	.4	.000202	90.0	.00825	2.40	9.0	.00825	2.40	.9	.00825	2.40
3.8	1.5	.4	.000202	135.0	.00654	3.02	13.5	.00654	3.02	1.4	.00654	3.02
5.0	2.0	.4	.000202	180.0	.00541	3.65	18.0	.00541	3.65	1.8	.00541	3.65
6.3	2.5	.4	.000202	225.0	.00459	4.31	22.5	.00459	4.31	2.3	.00459	4.31
7.5	3.0	.4	.000202	270.0	.00395	5.00	27.0	.00395	5.00	2.7	.00395	5.00
8.8	3.5	.4	.000202	315.0	.00345	5.73	31.5	.00345	5.73	3.1	.00345	5.73
10.0	4.0	.4	.000202	360.0	.00304	6.49	36.0	.00304	6.49	3.6	.00304	6.49
11.3	4.5	.4	.000202	405.0	.00271	7.30	40.5	.00271	7.30	4.0	.00271	7.30
12.5	5.0	.4	.000202	450.0	.00243	8.14	45.0	.00243	8.14	4.5	.00243	8.14
1.3	1.0	.8	.000202	45.0	.00588	3.36	4.5	.00588	3.36	.5	.00588	3.36
1.9	1.5	.8	.000202	67.5	.00479	4.12	6.8	.00479	4.12	.7	.00479	4.12
2.5	2.0	.8	.000202	90.0	.00412	4.79	9.0	.00412	4.79	.9	.00412	4.79
3.1	2.5	.8	.000202	112.5	.00364	5.42	11.3	.00364	5.42	1.1	.00364	5.42
3.8	3.0	.8	.000202	135.0	.00327	6.04	13.5	.00327	6.04	1.4	.00327	6.04
4.4	3.5	.8	.000202	157.5	.00296	6.67	15.8	.00296	6.67	1.6	.00296	6.67
5.0	4.0	.8	.000202	180.0	.00271	7.30	18.0	.00271	7.30	1.8	.00271	7.30
5.6	4.5	.8	.000202	202.5	.00249	7.95	20.3	.00249	7.95	2.0	.00249	7.95
6.3	5.0	.8	.000202	225.0	.00229	8.61	22.5	.00229	8.61	2.3	.00229	8.61
				Q = 600 gpm								
5.0	1.0	.2	.000243	180.0	.01082	1.52	18.0	.01082	1.52	1.8	.01082	1.52
7.5	1.5	.2	.000243	270.0	.00791	2.08	27.0	.00791	2.08	2.7	.00791	2.08
10.0	2.0	.2	.000243	360.0	.00609	2.71	36.0	.00609	2.71	3.6	.00609	2.71
12.5	2.5	.2	.000243	450.0	.00485	3.39	45.0	.00485	3.39	4.5	.00485	3.39
15.0	3.0	.2	.000243	540.0	.00397	4.14	54.0	.00397	4.14	5.4	.00397	4.14
17.5	3.5	.2	.000243	630.0	.00332	4.96	63.0	.00332	4.96	6.3	.00332	4.96
20.0	4.0	.2	.000243	720.0	.00282	5.84	72.0	.00282	5.84	7.2	.00282	5.84
22.5	4.5	.2	.000243	810.0	.00243	6.78	81.0	.00243	6.78	8.1	.00243	6.78
25.0	5.0	.2	.000243	900.0	.00211	7.79	90.0	.00211	7.79	9.0	.00211	7.79
2.5	1.0	.4	.000243	90.0	.00825	2.00	9.0	.00825	2.00	.9	.00825	2.00
3.8	1.5	.4	.000243	135.0	.00654	2.52	13.5	.00654	2.52	1.4	.00654	2.52
5.0	2.0	.4	.000243	180.0	.00541	3.04	18.0	.00541	3.04	1.8	.00541	3.04
6.3	2.5	.4	.000243	225.0	.00459	3.59	22.5	.00459	3.59	2.3	.00459	3.59
7.5	3.0	.4	.000243	270.0	.00395	4.17	27.0	.00395	4.17	2.7	.00395	4.17
8.8	3.5	.4	.000243	315.0	.00345	4.77	31.5	.00345	4.77	3.1	.00345	4.77
10.0	4.0	.4	.000243	360.0	.00304	5.41	36.0	.00304	5.41	3.6	.00304	5.41
11.3	4.5	.4	.000243	405.0	.00271	6.08	40.5	.00271	6.08	4.0	.00271	6.08
12.5	5.0	.4	.000243	450.0	.00243	6.78	45.0	.00243	6.78	4.5	.00243	6.78
1.3	1.0	.8	.000243	45.0	.00588	2.80	4.5	.00588	2.80	.5	.00588	2.80
1.9	1.5	.8	.000243	67.5	.00479	3.43	6.8	.00479	3.43	.7	.00479	3.43
2.5	2.0	.8	.000243	90.0	.00412	3.99	9.0	.00412	3.99	.9	.00412	3.99
3.1	2.5	.8	.000243	112.5	.00364	4.52	11.3	.00364	4.52	1.1	.00364	4.52
3.8	3.0	.8	.000243	135.0	.00327	5.04	13.5	.00327	5.04	1.4	.00327	5.04
4.4	3.5	.8	.000243	157.5	.00296	5.56	15.8	.00296	5.56	1.6	.00296	5.56
5.0	4.0	.8	.000243	180.0	.00271	6.08	18.0	.00271	6.08	1.8	.00271	6.08
5.6	4.5	.8	.000243	202.5	.00249	6.63	20.3	.00249	6.63	2.0	.00249	6.63
6.3	5.0	.8	.000243	225.0	.00229	7.18	22.5	.00229	7.18	2.3	.00229	7.18

Table SA-35 (continued)
Results of Waste Dilution - Winter - Ship 1
(L = 2.2 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 700 gpm								
5.0	1.0	.2	.000283	180.0	.01082	1.30	18.0	.01082	1.30	1.8	.01082	1.30
7.5	1.5	.2	.000283	270.0	.00791	1.79	27.0	.00791	1.79	2.7	.00791	1.79
10.0	2.0	.2	.000283	360.0	.00609	2.32	36.0	.00609	2.32	3.6	.00609	2.32
12.5	2.5	.2	.000283	450.0	.00485	2.91	45.0	.00485	2.91	4.5	.00485	2.91
15.0	3.0	.2	.000283	540.0	.00397	3.55	54.0	.00397	3.55	5.4	.00397	3.55
17.5	3.5	.2	.000283	630.0	.00332	4.25	63.0	.00332	4.25	6.3	.00332	4.25
20.0	4.0	.2	.000283	720.0	.00282	5.00	72.0	.00282	5.00	7.2	.00282	5.00
22.5	4.5	.2	.000283	810.0	.00243	5.81	81.0	.00243	5.81	8.1	.00243	5.81
25.0	5.0	.2	.000283	900.0	.00211	6.68	90.0	.00211	6.68	9.0	.00211	6.68
2.5	1.0	.4	.000283	90.0	.00825	1.71	9.0	.00825	1.71	.9	.00825	1.71
3.8	1.5	.4	.000283	135.0	.00654	2.16	13.5	.00654	2.16	1.4	.00654	2.16
5.0	2.0	.4	.000283	180.0	.00541	2.61	18.0	.00541	2.61	1.8	.00541	2.61
6.3	2.5	.4	.000283	225.0	.00459	3.08	22.5	.00459	3.08	2.3	.00459	3.08
7.5	3.0	.4	.000283	270.0	.00395	3.57	27.0	.00395	3.57	2.7	.00395	3.57
8.8	3.5	.4	.000283	315.0	.00345	4.09	31.5	.00345	4.09	3.1	.00345	4.09
10.0	4.0	.4	.000283	360.0	.00304	4.64	36.0	.00304	4.64	3.6	.00304	4.64
11.3	4.5	.4	.000283	405.0	.00271	5.21	40.5	.00271	5.21	4.0	.00271	5.21
12.5	5.0	.4	.000283	450.0	.00243	5.81	45.0	.00243	5.81	4.5	.00243	5.81
1.3	1.0	.8	.000283	45.0	.00588	2.40	4.5	.00588	2.40	.5	.00588	2.40
1.9	1.5	.8	.000283	67.5	.00479	2.94	6.8	.00479	2.94	.7	.00479	2.94
2.5	2.0	.8	.000283	90.0	.00412	3.42	9.0	.00412	3.42	.9	.00412	3.42
3.1	2.5	.8	.000283	112.5	.00364	3.87	11.3	.00364	3.87	1.1	.00364	3.87
3.8	3.0	.8	.000283	135.0	.00327	4.32	13.5	.00327	4.32	1.4	.00327	4.32
4.4	3.5	.8	.000283	157.5	.00296	4.76	15.8	.00296	4.76	1.6	.00296	4.76
5.0	4.0	.8	.000283	180.0	.00271	5.22	18.0	.00271	5.22	1.8	.00271	5.22
5.6	4.5	.8	.000283	202.5	.00249	5.68	20.3	.00249	5.68	2.0	.00249	5.68
6.3	5.0	.8	.000283	225.0	.00229	6.15	22.5	.00229	6.15	2.3	.00229	6.15
				Q = 1000 gpm								
5.0	1.0	.2	.000405	180.0	.01082	.91	18.0	.01082	.91	1.8	.01082	.91
7.5	1.5	.2	.000405	270.0	.00791	1.25	27.0	.00791	1.25	2.7	.00791	1.25
10.0	2.0	.2	.000405	360.0	.00609	1.62	36.0	.00609	1.62	3.6	.00609	1.62
12.5	2.5	.2	.000405	450.0	.00485	2.04	45.0	.00485	2.04	4.5	.00485	2.04
15.0	3.0	.2	.000405	540.0	.00397	2.49	54.0	.00397	2.49	5.4	.00397	2.49
17.5	3.5	.2	.000405	630.0	.00332	2.98	63.0	.00332	2.98	6.3	.00332	2.98
20.0	4.0	.2	.000405	720.0	.00282	3.50	72.0	.00282	3.50	7.2	.00282	3.50
22.5	4.5	.2	.000405	810.0	.00243	4.07	81.0	.00243	4.07	8.1	.00243	4.07
25.0	5.0	.2	.000405	900.0	.00211	4.68	90.0	.00211	4.68	9.0	.00211	4.68
2.5	1.0	.4	.000405	90.0	.00825	1.20	9.0	.00825	1.20	.9	.00825	1.20
3.8	1.5	.4	.000405	135.0	.00654	1.51	13.5	.00654	1.51	1.4	.00654	1.51
5.0	2.0	.4	.000405	180.0	.00541	1.83	18.0	.00541	1.83	1.8	.00541	1.83
6.3	2.5	.4	.000405	225.0	.00459	2.15	22.5	.00459	2.15	2.3	.00459	2.15
7.5	3.0	.4	.000405	270.0	.00395	2.50	27.0	.00395	2.50	2.7	.00395	2.50
8.8	3.5	.4	.000405	315.0	.00345	2.86	31.5	.00345	2.86	3.1	.00345	2.86
10.0	4.0	.4	.000405	360.0	.00304	3.25	36.0	.00304	3.25	3.6	.00304	3.25
11.3	4.5	.4	.000405	405.0	.00271	3.65	40.5	.00271	3.65	4.0	.00271	3.65
12.5	5.0	.4	.000405	450.0	.00243	4.07	45.0	.00243	4.07	4.5	.00243	4.07
1.3	1.0	.8	.000405	45.0	.00588	1.68	4.5	.00588	1.68	.5	.00588	1.68
1.9	1.5	.8	.000405	67.5	.00479	2.06	6.8	.00479	2.06	.7	.00479	2.06
2.5	2.0	.8	.000405	90.0	.00412	2.40	9.0	.00412	2.40	.9	.00412	2.40
3.1	2.5	.8	.000405	112.5	.00364	2.71	11.3	.00364	2.71	1.1	.00364	2.71
3.8	3.0	.8	.000405	135.0	.00327	3.02	13.5	.00327	3.02	1.4	.00327	3.02
4.4	3.5	.8	.000405	157.5	.00296	3.33	15.8	.00296	3.33	1.6	.00296	3.33
5.0	4.0	.8	.000405	180.0	.00271	3.65	18.0	.00271	3.65	1.8	.00271	3.65
5.6	4.5	.8	.000405	202.5	.00249	3.98	20.3	.00249	3.98	2.0	.00249	3.98
6.3	5.0	.8	.000405	225.0	.00229	4.31	22.5	.00229	4.31	2.3	.00229	4.31

Table SA-35 (continued)
Results of Waste Dilution - Winter - Ship 1
(L = 2.2 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 1200 gpm												
5.0	1.0	.2	.000486	180.0	.01082	.76	18.0	.01082	.76	1.8	.01082	.76
7.5	1.5	.2	.000486	270.0	.00791	1.04	27.0	.00791	1.04	2.7	.00791	1.04
10.0	2.0	.2	.000486	360.0	.00609	1.35	36.0	.00609	1.35	3.6	.00609	1.35
12.5	2.5	.2	.000486	450.0	.00485	1.70	45.0	.00485	1.70	4.5	.00485	1.70
15.0	3.0	.2	.000486	540.0	.00397	2.07	54.0	.00397	2.07	5.4	.00397	2.07
17.5	3.5	.2	.000486	630.0	.00332	2.48	63.0	.00332	2.48	6.3	.00332	2.48
20.0	4.0	.2	.000486	720.0	.00282	2.92	72.0	.00282	2.92	7.2	.00282	2.92
22.5	4.5	.2	.000486	810.0	.00243	3.39	81.0	.00243	3.39	8.1	.00243	3.39
25.0	5.0	.2	.000486	900.0	.00211	3.90	90.0	.00211	3.90	9.0	.00211	3.90
2.5	1.0	.4	.000486	90.0	.00825	1.00	9.0	.00825	1.00	.9	.00825	1.00
3.8	1.5	.4	.000486	135.0	.00654	1.26	13.5	.00654	1.26	1.4	.00654	1.26
5.0	2.0	.4	.000486	180.0	.00541	1.52	18.0	.00541	1.52	1.8	.00541	1.52
6.3	2.5	.4	.000486	225.0	.00459	1.79	22.5	.00459	1.79	2.3	.00459	1.79
7.5	3.0	.4	.000486	270.0	.00395	2.08	27.0	.00395	2.08	2.7	.00395	2.08
8.8	3.5	.4	.000486	315.0	.00345	2.39	31.5	.00345	2.39	3.1	.00345	2.39
10.0	4.0	.4	.000486	360.0	.00304	2.71	36.0	.00304	2.71	3.6	.00304	2.71
11.3	4.5	.4	.000486	405.0	.00271	3.04	40.5	.00271	3.04	4.0	.00271	3.04
12.5	5.0	.4	.000486	450.0	.00243	3.39	45.0	.00243	3.39	4.5	.00243	3.39
1.3	1.0	.8	.000486	45.0	.00588	1.40	4.5	.00588	1.40	.5	.00588	1.40
1.9	1.5	.8	.000486	67.5	.00479	1.72	6.8	.00479	1.72	.7	.00479	1.72
2.5	2.0	.8	.000486	90.0	.00412	2.00	9.0	.00412	2.00	.9	.00412	2.00
3.1	2.5	.8	.000486	112.5	.00364	2.26	11.3	.00364	2.26	1.1	.00364	2.26
3.8	3.0	.8	.000486	135.0	.00327	2.52	13.5	.00327	2.52	1.4	.00327	2.52
4.4	3.5	.8	.000486	157.5	.00296	2.78	15.8	.00296	2.78	1.6	.00296	2.78
5.0	4.0	.8	.000486	180.0	.00271	3.04	18.0	.00271	3.04	1.8	.00271	3.04
5.6	4.5	.8	.000486	202.5	.00249	3.31	20.3	.00249	3.31	2.0	.00249	3.31
6.3	5.0	.8	.000486	225.0	.00229	3.59	22.5	.00229	3.59	2.3	.00229	3.59
Q = 1400 gpm												
5.0	1.0	.2	.000567	180.0	.01082	.65	18.0	.01082	.65	1.8	.01082	.65
7.5	1.5	.2	.000567	270.0	.00791	.89	27.0	.00791	.89	2.7	.00791	.89
10.0	2.0	.2	.000567	360.0	.00609	1.16	36.0	.00609	1.16	3.6	.00609	1.16
12.5	2.5	.2	.000567	450.0	.00485	1.45	45.0	.00485	1.45	4.5	.00485	1.45
15.0	3.0	.2	.000567	540.0	.00397	1.78	54.0	.00397	1.78	5.4	.00397	1.78
17.5	3.5	.2	.000567	630.0	.00332	2.13	63.0	.00332	2.13	6.3	.00332	2.13
20.0	4.0	.2	.000567	720.0	.00282	2.50	72.0	.00282	2.50	7.2	.00282	2.50
22.5	4.5	.2	.000567	810.0	.00243	2.91	81.0	.00243	2.91	8.1	.00243	2.91
25.0	5.0	.2	.000567	900.0	.00211	3.34	90.0	.00211	3.34	9.0	.00211	3.34
2.5	1.0	.4	.000567	90.0	.00825	.86	9.0	.00825	.86	.9	.00825	.86
3.8	1.5	.4	.000567	135.0	.00654	1.08	13.5	.00654	1.08	1.4	.00654	1.08
5.0	2.0	.4	.000567	180.0	.00541	1.30	18.0	.00541	1.30	1.8	.00541	1.30
6.3	2.5	.4	.000567	225.0	.00459	1.54	22.5	.00459	1.54	2.3	.00459	1.54
7.5	3.0	.4	.000567	270.0	.00395	1.79	27.0	.00395	1.79	2.7	.00395	1.79
8.8	3.5	.4	.000567	315.0	.00345	2.05	31.5	.00345	2.05	3.1	.00345	2.05
10.0	4.0	.4	.000567	360.0	.00304	2.32	36.0	.00304	2.32	3.6	.00304	2.32
11.3	4.5	.4	.000567	405.0	.00271	2.61	40.5	.00271	2.61	4.0	.00271	2.61
12.5	5.0	.4	.000567	450.0	.00243	2.91	45.0	.00243	2.91	4.5	.00243	2.91
1.3	1.0	.8	.000567	45.0	.00588	1.20	4.5	.00588	1.20	.5	.00588	1.20
1.9	1.5	.8	.000567	67.5	.00479	1.47	6.8	.00479	1.47	.7	.00479	1.47
2.5	2.0	.8	.000567	90.0	.00412	1.71	9.0	.00412	1.71	.9	.00412	1.71
3.1	2.5	.8	.000567	112.5	.00364	1.94	11.3	.00364	1.94	1.1	.00364	1.94
3.8	3.0	.8	.000567	135.0	.00327	2.16	13.5	.00327	2.16	1.4	.00327	2.16
4.4	3.5	.8	.000567	157.5	.00296	2.38	15.8	.00296	2.38	1.6	.00296	2.38
5.0	4.0	.8	.000567	180.0	.00271	2.61	18.0	.00271	2.61	1.8	.00271	2.61
5.6	4.5	.8	.000567	202.5	.00249	2.84	20.3	.00249	2.84	2.0	.00249	2.84
6.3	5.0	.8	.000567	225.0	.00229	3.08	22.5	.00229	3.08	2.3	.00229	3.08

Table SA-36
Results of Waste Dilution - Summer - Ship 1
(L = 2.3 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 500 gpm							
5.0	1.0	.2	.000202	180.0	.01971	1.00	18.0	.01551	1.27	1.8	.01551	1.27
7.5	1.5	.2	.000202	270.0	.01387	1.42	27.0	.01138	1.74	2.7	.01138	1.74
10.0	2.0	.2	.000202	360.0	.01023	1.93	36.0	.00879	2.25	3.6	.00879	2.25
12.5	2.5	.2	.000202	450.0	.00797	2.48	45.0	.00703	2.81	4.5	.00703	2.81
15.0	3.0	.2	.000202	540.0	.00643	3.07	54.0	.00577	3.43	5.4	.00577	3.43
17.5	3.5	.2	.000202	630.0	.00532	3.71	63.0	.00483	4.09	6.3	.00483	4.09
20.0	4.0	.2	.000202	720.0	.00449	4.40	72.0	.00411	4.81	7.2	.00411	4.81
22.5	4.5	.2	.000202	810.0	.00384	5.14	81.0	.00354	5.58	8.1	.00354	5.58
25.0	5.0	.2	.000202	900.0	.00333	5.93	90.0	.00308	6.41	9.0	.00308	6.41
2.5	1.0	.4	.000202	90.0	.01176	1.68	9.0	.01176	1.68	.9	.01176	1.68
3.8	1.5	.4	.000202	135.0	.01062	1.86	13.5	.00935	2.11	1.4	.00935	2.11
5.0	2.0	.4	.000202	180.0	.00985	2.01	18.0	.00776	2.55	1.8	.00776	2.55
6.3	2.5	.4	.000202	225.0	.00837	2.36	22.5	.00659	3.00	2.3	.00659	3.00
7.5	3.0	.4	.000202	270.0	.00694	2.85	27.0	.00569	3.47	2.7	.00569	3.47
8.8	3.5	.4	.000202	315.0	.00590	3.35	31.5	.00497	3.97	3.1	.00497	3.97
10.0	4.0	.4	.000202	360.0	.00511	3.86	36.0	.00439	4.50	3.6	.00439	4.50
11.3	4.5	.4	.000202	405.0	.00449	4.40	40.5	.00392	5.05	4.0	.00392	5.05
12.5	5.0	.4	.000202	450.0	.00398	4.96	45.0	.00351	5.62	4.5	.00351	5.62
1.3	1.0	.8	.000202	45.0	.00838	2.36	4.5	.00838	2.36	.5	.00838	2.36
1.9	1.5	.8	.000202	67.5	.00683	2.89	6.8	.00683	2.89	.7	.00683	2.89
2.5	2.0	.8	.000202	90.0	.00588	3.36	9.0	.00588	3.36	.9	.00588	3.36
3.1	2.5	.8	.000202	112.5	.00549	3.60	11.3	.00520	3.80	1.1	.00520	3.80
3.8	3.0	.8	.000202	135.0	.00531	3.72	13.5	.00467	4.23	1.4	.00467	4.23
4.4	3.5	.8	.000202	157.5	.00512	3.86	15.8	.00424	4.66	1.6	.00424	4.66
5.0	4.0	.8	.000202	180.0	.00493	4.01	18.0	.00388	5.10	1.8	.00388	5.10
5.6	4.5	.8	.000202	202.5	.00469	4.22	20.3	.00357	5.54	2.0	.00357	5.54
6.3	5.0	.8	.000202	225.0	.00420	4.70	22.5	.00329	6.00	2.3	.00329	6.00
					Q = 600 gpm							
5.0	1.0	.2	.000243	180.0	.01971	.84	18.0	.01551	1.06	1.8	.01551	1.06
7.5	1.5	.2	.000243	270.0	.01387	1.19	27.0	.01138	1.45	2.7	.01138	1.45
10.0	2.0	.2	.000243	360.0	.01023	1.61	36.0	.00879	1.87	3.6	.00879	1.87
12.5	2.5	.2	.000243	450.0	.00797	2.07	45.0	.00703	2.34	4.5	.00703	2.34
15.0	3.0	.2	.000243	540.0	.00643	2.56	54.0	.00577	2.85	5.4	.00577	2.85
17.5	3.5	.2	.000243	630.0	.00532	3.09	63.0	.00483	3.41	6.3	.00483	3.41
20.0	4.0	.2	.000243	720.0	.00449	3.67	72.0	.00411	4.01	7.2	.00411	4.01
22.5	4.5	.2	.000243	810.0	.00384	4.28	81.0	.00354	4.65	8.1	.00354	4.65
25.0	5.0	.2	.000243	900.0	.00333	4.94	90.0	.00308	5.34	9.0	.00308	5.34
2.5	1.0	.4	.000243	90.0	.01176	1.40	9.0	.01176	1.40	.9	.01176	1.40
3.8	1.5	.4	.000243	135.0	.01062	1.55	13.5	.00935	1.76	1.4	.00935	1.76
5.0	2.0	.4	.000243	180.0	.00985	1.67	18.0	.00776	2.12	1.8	.00776	2.12
6.3	2.5	.4	.000243	225.0	.00837	1.97	22.5	.00659	2.50	2.3	.00659	2.50
7.5	3.0	.4	.000243	270.0	.00694	2.37	27.0	.00569	2.89	2.7	.00569	2.89
8.8	3.5	.4	.000243	315.0	.00590	2.79	31.5	.00497	3.31	3.1	.00497	3.31
10.0	4.0	.4	.000243	360.0	.00511	3.22	36.0	.00439	3.75	3.6	.00439	3.75
11.3	4.5	.4	.000243	405.0	.00449	3.67	40.5	.00392	4.21	4.0	.00392	4.21
12.5	5.0	.4	.000243	450.0	.00398	4.13	45.0	.00351	4.69	4.5	.00351	4.69
1.3	1.0	.8	.000243	45.0	.00838	1.96	4.5	.00838	1.96	.5	.00838	1.96
1.9	1.5	.8	.000243	67.5	.00683	2.41	6.8	.00683	2.41	.7	.00683	2.41
2.5	2.0	.8	.000243	90.0	.00588	2.80	9.0	.00588	2.80	.9	.00588	2.80
3.1	2.5	.8	.000243	112.5	.00549	3.00	11.3	.00520	3.17	1.1	.00520	3.17
3.8	3.0	.8	.000243	135.0	.00531	3.10	13.5	.00467	3.52	1.4	.00467	3.52
4.4	3.5	.8	.000243	157.5	.00512	3.21	15.8	.00424	3.88	1.6	.00424	3.88
5.0	4.0	.8	.000243	180.0	.00493	3.34	18.0	.00388	4.25	1.8	.00388	4.25
5.6	4.5	.8	.000243	202.5	.00469	3.51	20.3	.00357	4.62	2.0	.00357	4.62
6.3	5.0	.8	.000243	225.0	.00420	3.92	22.5	.00329	5.00	2.3	.00329	5.00

Table SA-36 (continued)
Results of Waste Dilution - Summer - Ship 1
(L = 2.3 n mi, A = 0.001 $ft^{2/3}$/sec)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 700 gpm												
5.0	1.0	.2	.000283	180.0	.01971	.72	18.0	.01551	.91	1.8	.01551	.91
7.5	1.5	.2	.000283	270.0	.01387	1.02	27.0	.01138	1.24	2.7	.01138	1.24
10.0	2.0	.2	.000283	360.0	.01023	1.38	36.0	.00879	1.61	3.6	.00879	1.61
12.5	2.5	.2	.000283	450.0	.00797	1.77	45.0	.00703	2.01	4.5	.00703	2.01
15.0	3.0	.2	.000283	540.0	.00643	2.19	54.0	.00577	2.45	5.4	.00577	2.45
17.5	3.5	.2	.000283	630.0	.00532	2.65	63.0	.00483	2.92	6.3	.00483	2.92
20.0	4.0	.2	.000283	720.0	.00449	3.14	72.0	.00411	3.44	7.2	.00411	3.44
22.5	4.5	.2	.000283	810.0	.00384	3.67	81.0	.00354	3.99	8.1	.00354	3.99
25.0	5.0	.2	.000283	900.0	.00333	4.24	90.0	.00308	4.58	9.0	.00308	4.58
2.5	1.0	.4	.000283	90.0	.01176	1.20	9.0	.01176	1.20	.9	.01176	1.20
3.8	1.5	.4	.000283	135.0	.01062	1.33	13.5	.00935	1.51	1.4	.00935	1.51
5.0	2.0	.4	.000283	180.0	.00985	1.43	18.0	.00776	1.82	1.8	.00776	1.82
6.3	2.5	.4	.000283	225.0	.00837	1.69	22.5	.00659	2.14	2.3	.00659	2.14
7.5	3.0	.4	.000283	270.0	.00694	2.03	27.0	.00569	2.48	2.7	.00569	2.48
8.8	3.5	.4	.000283	315.0	.00590	2.39	31.5	.00497	2.84	3.1	.00497	2.84
10.0	4.0	.4	.000283	360.0	.00511	2.76	36.0	.00439	3.21	3.6	.00439	3.21
11.3	4.5	.4	.000283	405.0	.00449	3.14	40.5	.00392	3.60	4.0	.00392	3.60
12.5	5.0	.4	.000283	450.0	.00398	3.54	45.0	.00351	4.02	4.5	.00351	4.02
1.3	1.0	.8	.000283	45.0	.00838	1.68	4.5	.00838	1.68	.5	.00838	1.68
1.9	1.5	.8	.000283	67.5	.00683	2.07	6.8	.00683	2.07	.7	.00683	2.07
2.5	2.0	.8	.000283	90.0	.00588	2.40	9.0	.00588	2.40	.9	.00588	2.40
3.1	2.5	.8	.000283	112.5	.00549	2.57	11.3	.00520	2.71	1.1	.00520	2.71
3.8	3.0	.8	.000283	135.0	.00531	2.66	13.5	.00467	3.02	1.4	.00467	3.02
4.4	3.5	.8	.000283	157.5	.00512	2.76	15.8	.00424	3.33	1.6	.00424	3.33
5.0	4.0	.8	.000283	180.0	.00493	2.86	18.0	.00388	3.64	1.8	.00388	3.64
5.6	4.5	.8	.000283	202.5	.00469	3.01	20.3	.00357	3.96	2.0	.00357	3.96
6.3	5.0	.8	.000283	225.0	.00420	3.36	22.5	.00329	4.28	2.3	.00329	4.28
Q = 1000 gpm												
5.0	1.0	.2	.000405	180.0	.01971	.50	18.0	.01551	.64	1.8	.01551	.64
7.5	1.5	.2	.000405	270.0	.01387	.71	27.0	.01138	.87	2.7	.01138	.87
10.0	2.0	.2	.000405	360.0	.01023	.97	36.0	.00879	1.12	3.6	.00879	1.12
12.5	2.5	.2	.000405	450.0	.00797	1.24	45.0	.00703	1.41	4.5	.00703	1.41
15.0	3.0	.2	.000405	540.0	.00643	1.54	54.0	.00577	1.71	5.4	.00577	1.71
17.5	3.5	.2	.000405	630.0	.00532	1.86	63.0	.00483	2.05	6.3	.00483	2.05
20.0	4.0	.2	.000405	720.0	.00449	2.20	72.0	.00411	2.41	7.2	.00411	2.41
22.5	4.5	.2	.000405	810.0	.00384	2.57	81.0	.00354	2.79	8.1	.00354	2.79
25.0	5.0	.2	.000405	900.0	.00333	2.96	90.0	.00308	3.20	9.0	.00308	3.20
2.5	1.0	.4	.000405	90.0	.01176	.84	9.0	.01176	.84	.9	.01176	.84
3.8	1.5	.4	.000405	135.0	.01062	.93	13.5	.00935	1.06	1.4	.00935	1.06
5.0	2.0	.4	.000405	180.0	.00985	1.00	18.0	.00776	1.27	1.8	.00776	1.27
6.3	2.5	.4	.000405	225.0	.00837	1.18	22.5	.00659	1.50	2.3	.00659	1.50
7.5	3.0	.4	.000405	270.0	.00694	1.42	27.0	.00569	1.74	2.7	.00569	1.74
8.8	3.5	.4	.000405	315.0	.00590	1.67	31.5	.00497	1.99	3.1	.00497	1.99
10.0	4.0	.4	.000405	360.0	.00511	1.93	36.0	.00439	2.25	3.6	.00439	2.25
11.3	4.5	.4	.000405	405.0	.00449	2.20	40.5	.00392	2.52	4.0	.00392	2.52
12.5	5.0	.4	.000405	450.0	.00398	2.48	45.0	.00351	2.81	4.5	.00351	2.81
1.3	1.0	.8	.000405	45.0	.00838	1.18	4.5	.00838	1.18	.5	.00838	1.18
1.9	1.5	.8	.000405	67.5	.00683	1.45	6.8	.00683	1.45	.7	.00683	1.45
2.5	2.0	.8	.000405	90.0	.00588	1.68	9.0	.00588	1.68	.9	.00588	1.68
3.1	2.5	.8	.000405	112.5	.00549	1.80	11.3	.00520	1.90	1.1	.00520	1.90
3.8	3.0	.8	.000405	135.0	.00531	1.86	13.5	.00467	2.11	1.4	.00467	2.11
4.4	3.5	.8	.000405	157.5	.00512	1.93	15.8	.00424	2.33	1.6	.00424	2.33
5.0	4.0	.8	.000405	180.0	.00493	2.00	18.0	.00388	2.55	1.8	.00388	2.55
5.6	4.5	.8	.000405	202.5	.00469	2.11	20.3	.00357	2.77	2.0	.00357	2.77
6.3	5.0	.8	.000405	225.0	.00420	2.35	22.5	.00329	3.00	2.3	.00329	3.00

Table SA-36 (continued)
Results of Waste Dilution - Summer - Ship 1
(L = 2.3 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 1200 gpm							
5.0	1.0	.2	.000486	180.0	.01971	.42	18.0	.01551	.53	1.8	.01551	.53
7.5	1.5	.2	.000486	270.0	.01387	.59	27.0	.01138	.72	2.7	.01138	.72
10.0	2.0	.2	.000486	360.0	.01023	.81	36.0	.00879	.94	3.6	.00879	.94
12.5	2.5	.2	.000486	450.0	.00797	1.03	45.0	.00703	1.17	4.5	.00703	1.17
15.0	3.0	.2	.000486	540.0	.00643	1.28	54.0	.00577	1.43	5.4	.00577	1.43
17.5	3.5	.2	.000486	630.0	.00532	1.55	63.0	.00483	1.71	6.3	.00483	1.71
20.0	4.0	.2	.000486	720.0	.00449	1.83	72.0	.00411	2.00	7.2	.00411	2.00
22.5	4.5	.2	.000486	810.0	.00384	2.14	81.0	.00354	2.33	8.1	.00354	2.33
25.0	5.0	.2	.000486	900.0	.00333	2.47	90.0	.00308	2.67	9.0	.00308	2.67
2.5	1.0	.4	.000486	90.0	.01176	.70	9.0	.01176	.70	.9	.01176	.70
3.8	1.5	.4	.000486	135.0	.01062	.78	13.5	.00935	.88	1.4	.00935	.88
5.0	2.0	.4	.000486	180.0	.00985	.84	18.0	.00776	1.06	1.8	.00776	1.06
6.3	2.5	.4	.000486	225.0	.00837	.98	22.5	.00659	1.25	2.3	.00659	1.25
7.5	3.0	.4	.000486	270.0	.00694	1.19	27.0	.00569	1.45	2.7	.00569	1.45
8.8	3.5	.4	.000486	315.0	.00590	1.39	31.5	.00497	1.66	3.1	.00497	1.66
10.0	4.0	.4	.000486	360.0	.00511	1.61	36.0	.00439	1.87	3.6	.00439	1.87
11.3	4.5	.4	.000486	405.0	.00449	1.83	40.5	.00392	2.10	4.0	.00392	2.10
12.5	5.0	.4	.000486	450.0	.00398	2.07	45.0	.00351	2.34	4.5	.00351	2.34
1.3	1.0	.8	.000486	45.0	.00838	.98	4.5	.00838	.98	.5	.00838	.98
1.9	1.5	.8	.000486	67.5	.00683	1.21	6.8	.00683	1.21	.7	.00683	1.21
2.5	2.0	.8	.000486	90.0	.00588	1.40	9.0	.00588	1.40	.9	.00588	1.40
3.1	2.5	.8	.000486	112.5	.00549	1.50	11.3	.00520	1.58	1.1	.00520	1.58
3.8	3.0	.8	.000486	135.0	.00531	1.55	13.5	.00467	1.76	1.4	.00467	1.76
4.4	3.5	.8	.000486	157.5	.00512	1.61	15.8	.00424	1.94	1.6	.00424	1.94
5.0	4.0	.8	.000486	180.0	.00493	1.67	18.0	.00388	2.12	1.8	.00388	2.12
5.6	4.5	.8	.000486	202.5	.00469	1.76	20.3	.00357	2.31	2.0	.00357	2.31
6.3	5.0	.8	.000486	225.0	.00420	1.96	22.5	.00329	2.50	2.3	.00329	2.50
					Q = 1400 gpm							
5.0	1.0	.2	.000567	180.0	.01971	.36	18.0	.01551	.46	1.8	.01551	.46
7.5	1.5	.2	.000567	270.0	.01387	.51	27.0	.01138	.62	2.7	.01138	.62
10.0	2.0	.2	.000567	360.0	.01023	.69	36.0	.00879	.80	3.6	.00879	.80
12.5	2.5	.2	.000567	450.0	.00797	.89	45.0	.00703	1.00	4.5	.00703	1.00
15.0	3.0	.2	.000567	540.0	.00643	1.10	54.0	.00577	1.22	5.4	.00577	1.22
17.5	3.5	.2	.000567	630.0	.00532	1.33	63.0	.00483	1.46	6.3	.00483	1.46
20.0	4.0	.2	.000567	720.0	.00449	1.57	72.0	.00411	1.72	7.2	.00411	1.72
22.5	4.5	.2	.000567	810.0	.00384	1.84	81.0	.00354	1.99	8.1	.00354	1.99
25.0	5.0	.2	.000567	900.0	.00333	2.12	90.0	.00308	2.29	9.0	.00308	2.29
2.5	1.0	.4	.000567	90.0	.01176	.60	9.0	.01176	.60	.9	.01176	.60
3.8	1.5	.4	.000567	135.0	.01062	.66	13.5	.00935	.75	1.4	.00935	.75
5.0	2.0	.4	.000567	180.0	.00985	.72	18.0	.00776	.91	1.8	.00776	.91
6.3	2.5	.4	.000567	225.0	.00837	.84	22.5	.00659	1.07	2.3	.00659	1.07
7.5	3.0	.4	.000567	270.0	.00694	1.02	27.0	.00569	1.24	2.7	.00569	1.24
8.8	3.5	.4	.000567	315.0	.00590	1.20	31.5	.00497	1.42	3.1	.00497	1.42
10.0	4.0	.4	.000567	360.0	.00511	1.38	36.0	.00439	1.61	3.6	.00439	1.61
11.3	4.5	.4	.000567	405.0	.00449	1.57	40.5	.00392	1.80	4.0	.00392	1.80
12.5	5.0	.4	.000567	450.0	.00398	1.77	45.0	.00351	2.01	4.5	.00351	2.01
1.3	1.0	.8	.000567	45.0	.00838	.84	4.5	.00838	.84	.5	.00838	.84
1.9	1.5	.8	.000567	67.5	.00683	1.03	6.8	.00683	1.03	.7	.00683	1.03
2.5	2.0	.8	.000567	90.0	.00588	1.20	9.0	.00588	1.20	.9	.00588	1.20
3.1	2.5	.8	.000567	112.5	.00549	1.29	11.3	.00520	1.36	1.1	.00520	1.36
3.8	3.0	.8	.000567	135.0	.00531	1.33	13.5	.00467	1.51	1.4	.00467	1.51
4.4	3.5	.8	.000567	157.5	.00512	1.38	15.8	.00424	1.66	1.6	.00424	1.66
5.0	4.0	.8	.000567	180.0	.00493	1.43	18.0	.00388	1.82	1.8	.00388	1.82
5.6	4.5	.8	.000567	202.5	.00469	1.51	20.3	.00357	1.98	2.0	.00357	1.98
6.3	5.0	.8	.000567	225.0	.00420	1.68	22.5	.00329	2.14	2.3	.00329	2.14

Table SA-37
Results of Waste Dilution - Winter - Ship 1
(L = 2.3 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 500 gpm							
5.0	1.0	.2	.000202	180.0	.01041	1.90	18.0	.01041	1.90	1.8	.01041	1.90
7.5	1.5	.2	.000202	270.0	.00764	2.59	27.0	.00764	2.59	2.7	.00764	2.59
10.0	2.0	.2	.000202	360.0	.00590	3.35	36.0	.00590	3.35	3.6	.00590	3.35
12.5	2.5	.2	.000202	450.0	.00472	4.19	45.0	.00472	4.19	4.5	.00472	4.19
15.0	3.0	.2	.000202	540.0	.00387	5.10	54.0	.00387	5.10	5.4	.00387	5.10
17.5	3.5	.2	.000202	630.0	.00324	6.09	63.0	.00324	6.09	6.3	.00324	6.09
20.0	4.0	.2	.000202	720.0	.00276	7.17	72.0	.00276	7.17	7.2	.00276	7.17
22.5	4.5	.2	.000202	810.0	.00238	8.31	81.0	.00238	8.31	8.1	.00238	8.31
25.0	5.0	.2	.000202	900.0	.00207	9.54	90.0	.00207	9.54	9.0	.00207	9.54
2.5	1.0	.4	.000202	90.0	.00790	2.50	9.0	.00790	2.50	.9	.00790	2.50
3.8	1.5	.4	.000202	135.0	.00628	3.15	13.5	.00628	3.15	1.4	.00628	3.15
5.0	2.0	.4	.000202	180.0	.00521	3.79	18.0	.00521	3.79	1.8	.00521	3.79
6.3	2.5	.4	.000202	225.0	.00442	4.47	22.5	.00442	4.47	2.3	.00442	4.47
7.5	3.0	.4	.000202	270.0	.00382	5.17	27.0	.00382	5.17	2.7	.00382	5.17
8.8	3.5	.4	.000202	315.0	.00334	5.92	31.5	.00334	5.92	3.1	.00334	5.92
10.0	4.0	.4	.000202	360.0	.00295	6.70	36.0	.00295	6.70	3.6	.00295	6.70
11.3	4.5	.4	.000202	405.0	.00263	7.52	40.5	.00263	7.52	4.0	.00263	7.52
12.5	5.0	.4	.000202	450.0	.00236	8.37	45.0	.00236	8.37	4.5	.00236	8.37
1.3	1.0	.8	.000202	45.0	.00563	3.51	4.5	.00563	3.51	.5	.00563	3.51
1.9	1.5	.8	.000202	67.5	.00459	4.31	6.8	.00459	4.31	.7	.00459	4.31
2.5	2.0	.8	.000202	90.0	.00395	5.00	9.0	.00395	5.00	.9	.00395	5.00
3.1	2.5	.8	.000202	112.5	.00349	5.66	11.3	.00349	5.66	1.1	.00349	5.66
3.8	3.0	.8	.000202	135.0	.00314	6.30	13.5	.00314	6.30	1.4	.00314	6.30
4.4	3.5	.8	.000202	157.5	.00285	6.94	15.8	.00285	6.94	1.6	.00285	6.94
5.0	4.0	.8	.000202	180.0	.00260	7.59	18.0	.00260	7.59	1.8	.00260	7.59
5.6	4.5	.8	.000202	202.5	.00239	8.25	20.3	.00239	8.25	2.0	.00239	8.25
6.3	5.0	.8	.000202	225.0	.00221	8.93	22.5	.00221	8.93	2.3	.00221	8.93
					Q = 600 gpm							
5.0	1.0	.2	.000243	180.0	.01041	1.58	18.0	.01041	1.58	1.8	.01041	1.58
7.5	1.5	.2	.000243	270.0	.00764	2.16	27.0	.00764	2.16	2.7	.00764	2.16
10.0	2.0	.2	.000243	360.0	.00590	2.79	36.0	.00590	2.79	3.6	.00590	2.79
12.5	2.5	.2	.000243	450.0	.00472	3.49	45.0	.00472	3.49	4.5	.00472	3.49
15.0	3.0	.2	.000243	540.0	.00387	4.25	54.0	.00387	4.25	5.4	.00387	4.25
17.5	3.5	.2	.000243	630.0	.00324	5.08	63.0	.00324	5.08	6.3	.00324	5.08
20.0	4.0	.2	.000243	720.0	.00276	5.97	72.0	.00276	5.97	7.2	.00276	5.97
22.5	4.5	.2	.000243	810.0	.00238	6.93	81.0	.00238	6.93	8.1	.00238	6.93
25.0	5.0	.2	.000243	900.0	.00207	7.95	90.0	.00207	7.95	9.0	.00207	7.95
2.5	1.0	.4	.000243	90.0	.00790	2.08	9.0	.00790	2.08	.9	.00790	2.08
3.8	1.5	.4	.000243	135.0	.00628	2.62	13.5	.00628	2.62	1.4	.00628	2.62
5.0	2.0	.4	.000243	180.0	.00521	3.16	18.0	.00521	3.16	1.8	.00521	3.16
6.3	2.5	.4	.000243	225.0	.00442	3.72	22.5	.00442	3.72	2.3	.00442	3.72
7.5	3.0	.4	.000243	270.0	.00382	4.31	27.0	.00382	4.31	2.7	.00382	4.31
8.8	3.5	.4	.000243	315.0	.00334	4.93	31.5	.00334	4.93	3.1	.00334	4.93
10.0	4.0	.4	.000243	360.0	.00295	5.58	36.0	.00295	5.58	3.6	.00295	5.58
11.3	4.5	.4	.000243	405.0	.00263	6.26	40.5	.00263	6.26	4.0	.00263	6.26
12.5	5.0	.4	.000243	450.0	.00236	6.98	45.0	.00236	6.98	4.5	.00236	6.98
1.3	1.0	.8	.000243	45.0	.00563	2.93	4.5	.00563	2.93	.5	.00563	2.93
1.9	1.5	.8	.000243	67.5	.00459	3.59	6.8	.00459	3.59	.7	.00459	3.59
2.5	2.0	.8	.000243	90.0	.00395	4.17	9.0	.00395	4.17	.9	.00395	4.17
3.1	2.5	.8	.000243	112.5	.00349	4.71	11.3	.00349	4.71	1.1	.00349	4.71
3.8	3.0	.8	.000243	135.0	.00314	5.25	13.5	.00314	5.25	1.4	.00314	5.25
4.4	3.5	.8	.000243	157.5	.00285	5.78	15.8	.00285	5.78	1.6	.00285	5.78
5.0	4.0	.8	.000243	180.0	.00260	6.32	18.0	.00260	6.32	1.8	.00260	6.32
5.6	4.5	.8	.000243	202.5	.00239	6.88	20.3	.00239	6.88	2.0	.00239	6.88
6.3	5.0	.8	.000243	225.0	.00221	7.44	22.5	.00221	7.44	2.3	.00221	7.44

Table SA-37 (continued)
Results of Waste Dilution - Winter - Ship 1
(L = 2.3 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 700 gpm								
5.0	1.0	.2	.000283	180.0	.01041	1.36	18.0	.01041	1.36	1.8	.01041	1.36
7.5	1.5	.2	.000283	270.0	.00764	1.85	27.0	.00764	1.85	2.7	.00764	1.85
10.0	2.0	.2	.000283	360.0	.00590	2.39	36.0	.00590	2.39	3.6	.00590	2.39
12.5	2.5	.2	.000283	450.0	.00472	2.99	45.0	.00472	2.99	4.5	.00472	2.99
15.0	3.0	.2	.000283	540.0	.00387	3.64	54.0	.00387	3.64	5.4	.00387	3.64
17.5	3.5	.2	.000283	630.0	.00324	4.35	63.0	.00324	4.35	6.3	.00324	4.35
20.0	4.0	.2	.000283	720.0	.00276	5.12	72.0	.00276	5.12	7.2	.00276	5.12
22.5	4.5	.2	.000283	810.0	.00238	5.94	81.0	.00238	5.94	8.1	.00238	5.94
25.0	5.0	.2	.000283	900.0	.00207	6.81	90.0	.00207	6.81	9.0	.00207	6.81
2.5	1.0	.4	.000283	90.0	.00790	1.79	9.0	.00790	1.79	.9	.00790	1.79
3.8	1.5	.4	.000283	135.0	.00628	2.25	13.5	.00628	2.25	1.4	.00628	2.25
5.0	2.0	.4	.000283	180.0	.00521	2.71	18.0	.00521	2.71	1.8	.00521	2.71
6.3	2.5	.4	.000283	225.0	.00442	3.19	22.5	.00442	3.19	2.3	.00442	3.19
7.5	3.0	.4	.000283	270.0	.00382	3.69	27.0	.00382	3.69	2.7	.00382	3.69
8.8	3.5	.4	.000283	315.0	.00334	4.23	31.5	.00334	4.23	3.1	.00334	4.23
10.0	4.0	.4	.000283	360.0	.00295	4.78	36.0	.00295	4.78	3.6	.00295	4.78
11.3	4.5	.4	.000283	405.0	.00263	5.37	40.5	.00263	5.37	4.0	.00263	5.37
12.5	5.0	.4	.000283	450.0	.00236	5.98	45.0	.00236	5.98	4.5	.00236	5.98
1.3	1.0	.8	.000283	45.0	.00563	2.51	4.5	.00563	2.51	.5	.00563	2.51
1.9	1.5	.8	.000283	67.5	.00459	3.08	6.8	.00459	3.08	.7	.00459	3.08
2.5	2.0	.8	.000283	90.0	.00395	3.57	9.0	.00395	3.57	.9	.00395	3.57
3.1	2.5	.8	.000283	112.5	.00349	4.04	11.3	.00349	4.04	1.1	.00349	4.04
3.8	3.0	.8	.000283	135.0	.00314	4.50	13.5	.00314	4.50	1.4	.00314	4.50
4.4	3.5	.8	.000283	157.5	.00285	4.96	15.8	.00285	4.96	1.6	.00285	4.96
5.0	4.0	.8	.000283	180.0	.00260	5.42	18.0	.00260	5.42	1.8	.00260	5.42
5.6	4.5	.8	.000283	202.5	.00239	5.90	20.3	.00239	5.90	2.0	.00239	5.90
6.3	5.0	.8	.000283	225.0	.00221	6.38	22.5	.00221	6.38	2.3	.00221	6.38
				Q = 1000 gpm								
5.0	1.0	.2	.000405	180.0	.01041	.95	18.0	.01041	.95	1.8	.01041	.95
7.5	1.5	.2	.000405	270.0	.00764	1.29	27.0	.00764	1.29	2.7	.00764	1.29
10.0	2.0	.2	.000405	360.0	.00590	1.67	36.0	.00590	1.67	3.6	.00590	1.67
12.5	2.5	.2	.000405	450.0	.00472	2.09	45.0	.00472	2.09	4.5	.00472	2.09
15.0	3.0	.2	.000405	540.0	.00387	2.55	54.0	.00387	2.55	5.4	.00387	2.55
17.5	3.5	.2	.000405	630.0	.00324	3.05	63.0	.00324	3.05	6.3	.00324	3.05
20.0	4.0	.2	.000405	720.0	.00276	3.58	72.0	.00276	3.58	7.2	.00276	3.58
22.5	4.5	.2	.000405	810.0	.00238	4.16	81.0	.00238	4.16	8.1	.00238	4.16
25.0	5.0	.2	.000405	900.0	.00207	4.77	90.0	.00207	4.77	9.0	.00207	4.77
2.5	1.0	.4	.000405	90.0	.00790	1.25	9.0	.00790	1.25	.9	.00790	1.25
3.8	1.5	.4	.000405	135.0	.00628	1.57	13.5	.00628	1.57	1.4	.00628	1.57
5.0	2.0	.4	.000405	180.0	.00521	1.90	18.0	.00521	1.90	1.8	.00521	1.90
6.3	2.5	.4	.000405	225.0	.00442	2.23	22.5	.00442	2.23	2.3	.00442	2.23
7.5	3.0	.4	.000405	270.0	.00382	2.59	27.0	.00382	2.59	2.7	.00382	2.59
8.8	3.5	.4	.000405	315.0	.00334	2.96	31.5	.00334	2.96	3.1	.00334	2.96
10.0	4.0	.4	.000405	360.0	.00295	3.35	36.0	.00295	3.35	3.6	.00295	3.35
11.3	4.5	.4	.000405	405.0	.00263	3.76	40.5	.00263	3.76	4.0	.00263	3.76
12.5	5.0	.4	.000405	450.0	.00236	4.19	45.0	.00236	4.19	4.5	.00236	4.19
1.3	1.0	.8	.000405	45.0	.00563	1.76	4.5	.00563	1.76	.5	.00563	1.76
1.9	1.5	.8	.000405	67.5	.00459	2.15	6.8	.00459	2.15	.7	.00459	2.15
2.5	2.0	.8	.000405	90.0	.00395	2.50	9.0	.00395	2.50	.9	.00395	2.50
3.1	2.5	.8	.000405	112.5	.00349	2.83	11.3	.00349	2.83	1.1	.00349	2.83
3.8	3.0	.8	.000405	135.0	.00314	3.15	13.5	.00314	3.15	1.4	.00314	3.15
4.4	3.5	.8	.000405	157.5	.00285	3.47	15.8	.00285	3.47	1.6	.00285	3.47
5.0	4.0	.8	.000405	180.0	.00260	3.79	18.0	.00260	3.79	1.8	.00260	3.79
5.6	4.5	.8	.000405	202.5	.00239	4.13	20.3	.00239	4.13	2.0	.00239	4.13
6.3	5.0	.8	.000405	225.0	.00221	4.47	22.5	.00221	4.47	2.3	.00221	4.47

Table SA-37 (continued)
Results of Waste Dilution - Winter - Ship 1
(L = 2.3 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 1200 gpm												
5.0	1.0	.2	.000486	180.0	.01041	.79	18.0	.01041	.79	1.8	.01041	.79
7.5	1.5	.2	.000486	270.0	.00764	1.08	27.0	.00764	1.08	2.7	.00764	1.08
10.0	2.0	.2	.000486	360.0	.00590	1.40	36.0	.00590	1.40	3.6	.00590	1.40
12.5	2.5	.2	.000486	450.0	.00472	1.74	45.0	.00472	1.74	4.5	.00472	1.74
15.0	3.0	.2	.000486	540.0	.00387	2.13	54.0	.00387	2.13	5.4	.00387	2.13
17.5	3.5	.2	.000486	630.0	.00324	2.54	63.0	.00324	2.54	6.3	.00324	2.54
20.0	4.0	.2	.000486	720.0	.00276	2.99	72.0	.00276	2.99	7.2	.00276	2.99
22.5	4.5	.2	.000486	810.0	.00238	3.46	81.0	.00238	3.46	8.1	.00238	3.46
25.0	5.0	.2	.000486	900.0	.00207	3.97	90.0	.00207	3.97	9.0	.00207	3.97
2.5	1.0	.4	.000486	90.0	.00790	1.04	9.0	.00790	1.04	.9	.00790	1.04
3.8	1.5	.4	.000486	135.0	.00628	1.31	13.5	.00628	1.31	1.4	.00628	1.31
5.0	2.0	.4	.000486	180.0	.00521	1.58	18.0	.00521	1.58	1.8	.00521	1.58
6.3	2.5	.4	.000486	225.0	.00442	1.86	22.5	.00442	1.86	2.3	.00442	1.86
7.5	3.0	.4	.000486	270.0	.00382	2.16	27.0	.00382	2.16	2.7	.00382	2.16
8.8	3.5	.4	.000486	315.0	.00334	2.46	31.5	.00334	2.46	3.1	.00334	2.46
10.0	4.0	.4	.000486	360.0	.00295	2.79	36.0	.00295	2.79	3.6	.00295	2.79
11.3	4.5	.4	.000486	405.0	.00263	3.13	40.5	.00263	3.13	4.0	.00263	3.13
12.5	5.0	.4	.000486	450.0	.00236	3.49	45.0	.00236	3.49	4.5	.00236	3.49
1.3	1.0	.8	.000486	45.0	.00563	1.46	4.5	.00563	1.46	.5	.00563	1.46
1.9	1.5	.8	.000486	67.5	.00459	1.79	6.8	.00459	1.79	.7	.00459	1.79
2.5	2.0	.8	.000486	90.0	.00395	2.08	9.0	.00395	2.08	.9	.00395	2.08
3.1	2.5	.8	.000486	112.5	.00349	2.36	11.3	.00349	2.36	1.1	.00349	2.36
3.8	3.0	.8	.000486	135.0	.00314	2.62	13.5	.00314	2.62	1.4	.00314	2.62
4.4	3.5	.8	.000486	157.5	.00285	2.89	15.8	.00285	2.89	1.6	.00285	2.89
5.0	4.0	.8	.000486	180.0	.00260	3.16	18.0	.00260	3.16	1.8	.00260	3.16
5.6	4.5	.8	.000486	202.5	.00239	3.44	20.3	.00239	3.44	2.0	.00239	3.44
6.3	5.0	.8	.000486	225.0	.00221	3.72	22.5	.00221	3.72	2.3	.00221	3.72
Q = 1400 gpm												
5.0	1.0	.2	.000567	180.0	.01041	.68	18.0	.01041	.68	1.8	.01041	.68
7.5	1.5	.2	.000567	270.0	.00764	.92	27.0	.00764	.92	2.7	.00764	.92
10.0	2.0	.2	.000567	360.0	.00590	1.20	36.0	.00590	1.20	3.6	.00590	1.20
12.5	2.5	.2	.000567	450.0	.00472	1.50	45.0	.00472	1.50	4.5	.00472	1.50
15.0	3.0	.2	.000567	540.0	.00387	1.82	54.0	.00387	1.82	5.4	.00387	1.82
17.5	3.5	.2	.000567	630.0	.00324	2.18	63.0	.00324	2.18	6.3	.00324	2.18
20.0	4.0	.2	.000567	720.0	.00276	2.56	72.0	.00276	2.56	7.2	.00276	2.56
22.5	4.5	.2	.000567	810.0	.00238	2.97	81.0	.00238	2.97	8.1	.00238	2.97
25.0	5.0	.2	.000567	900.0	.00207	3.41	90.0	.00207	3.41	9.0	.00207	3.41
2.5	1.0	.4	.000567	90.0	.00790	.89	9.0	.00790	.89	.9	.00790	.89
3.8	1.5	.4	.000567	135.0	.00628	1.12	13.5	.00628	1.12	1.4	.00628	1.12
5.0	2.0	.4	.000567	180.0	.00521	1.36	18.0	.00521	1.36	1.8	.00521	1.36
6.3	2.5	.4	.000567	225.0	.00442	1.60	22.5	.00442	1.60	2.3	.00442	1.60
7.5	3.0	.4	.000567	270.0	.00382	1.85	27.0	.00382	1.85	2.7	.00382	1.85
8.8	3.5	.4	.000567	315.0	.00334	2.11	31.5	.00334	2.11	3.1	.00334	2.11
10.0	4.0	.4	.000567	360.0	.00295	2.39	36.0	.00295	2.39	3.6	.00295	2.39
11.3	4.5	.4	.000567	405.0	.00263	2.68	40.5	.00263	2.68	4.0	.00263	2.68
12.5	5.0	.4	.000567	450.0	.00236	2.99	45.0	.00236	2.99	4.5	.00236	2.99
1.3	1.0	.8	.000567	45.0	.00563	1.25	4.5	.00563	1.25	.5	.00563	1.25
1.9	1.5	.8	.000567	67.5	.00459	1.54	6.8	.00459	1.54	.7	.00459	1.54
2.5	2.0	.8	.000567	90.0	.00395	1.79	9.0	.00395	1.79	.9	.00395	1.79
3.1	2.5	.8	.000567	112.5	.00349	2.02	11.3	.00349	2.02	1.1	.00349	2.02
3.8	3.0	.8	.000567	135.0	.00314	2.25	13.5	.00314	2.25	1.4	.00314	2.25
4.4	3.5	.8	.000567	157.5	.00285	2.48	15.8	.00285	2.48	1.6	.00285	2.48
5.0	4.0	.8	.000567	180.0	.00260	2.71	18.0	.00260	2.71	1.8	.00260	2.71
5.6	4.5	.8	.000567	202.5	.00239	2.95	20.3	.00239	2.95	2.0	.00239	2.95
6.3	5.0	.8	.000567	225.0	.00221	3.19	22.5	.00221	3.19	2.3	.00221	3.19

Table SA-38
Results of Waste Dilution - Summer - Ship 1
(L = 2.4 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 500 gpm								
5.0	1.0	.2	.000202	180.0	.01899	1.04	18.0	.01494	1.32	1.8	.01494	1.32
7.5	1.5	.2	.000202	270.0	.01342	1.47	27.0	.01101	1.80	2.7	.01101	1.80
10.0	2.0	.2	.000202	360.0	.00993	1.99	36.0	.00853	2.32	3.6	.00853	2.32
12.5	2.5	.2	.000202	450.0	.00776	2.55	45.0	.00684	2.89	4.5	.00684	2.89
15.0	3.0	.2	.000202	540.0	.00627	3.15	54.0	.00563	3.51	5.4	.00563	3.51
17.5	3.5	.2	.000202	630.0	.00520	3.80	63.0	.00472	4.19	6.3	.00472	4.19
20.0	4.0	.2	.000202	720.0	.00439	4.50	72.0	.00402	4.92	7.2	.00402	4.92
22.5	4.5	.2	.000202	810.0	.00377	5.25	81.0	.00347	5.70	8.1	.00347	5.70
25.0	5.0	.2	.000202	900.0	.00327	6.05	90.0	.00303	6.53	9.0	.00303	6.53
2.5	1.0	.4	.000202	90.0	.01128	1.75	9.0	.01128	1.75	.9	.01128	1.75
3.8	1.5	.4	.000202	135.0	.01021	1.94	13.5	.00898	2.20	1.4	.00898	2.20
5.0	2.0	.4	.000202	180.0	.00950	2.08	18.0	.00747	2.64	1.8	.00747	2.64
6.3	2.5	.4	.000202	225.0	.00808	2.45	22.5	.00636	3.11	2.3	.00636	3.11
7.5	3.0	.4	.000202	270.0	.00671	2.94	27.0	.00550	3.59	2.7	.00550	3.59
8.8	3.5	.4	.000202	315.0	.00572	3.45	31.5	.00482	4.10	3.1	.00482	4.10
10.0	4.0	.4	.000202	360.0	.00496	3.98	36.0	.00427	4.63	3.6	.00427	4.63
11.3	4.5	.4	.000202	405.0	.00436	4.53	40.5	.00381	5.19	4.0	.00381	5.19
12.5	5.0	.4	.000202	450.0	.00388	5.10	45.0	.00342	5.78	4.5	.00342	5.78
1.3	1.0	.8	.000202	45.0	.00803	2.46	4.5	.00803	2.46	.5	.00803	2.46
1.9	1.5	.8	.000202	67.5	.00655	3.02	6.8	.00655	3.02	.7	.00655	3.02
2.5	2.0	.8	.000202	90.0	.00564	3.50	9.0	.00564	3.50	.9	.00564	3.50
3.1	2.5	.8	.000202	112.5	.00527	3.75	11.3	.00500	3.96	1.1	.00500	3.96
3.8	3.0	.8	.000202	135.0	.00511	3.87	13.5	.00449	4.40	1.4	.00449	4.40
4.4	3.5	.8	.000202	157.5	.00493	4.01	15.8	.00408	4.84	1.6	.00408	4.84
5.0	4.0	.8	.000202	180.0	.00475	4.16	18.0	.00374	5.29	1.8	.00374	5.29
5.6	4.5	.8	.000202	202.5	.00452	4.37	20.3	.00344	5.75	2.0	.00344	5.75
6.3	5.0	.8	.000202	225.0	.00406	4.87	22.5	.00318	6.21	2.3	.00318	6.21
				Q = 600 gpm								
5.0	1.0	.2	.000243	180.0	.01899	.87	18.0	.01494	1.10	1.8	.01494	1.10
7.5	1.5	.2	.000243	270.0	.01342	1.23	27.0	.01101	1.50	2.7	.01101	1.50
10.0	2.0	.2	.000243	360.0	.00993	1.66	36.0	.00853	1.93	3.6	.00853	1.93
12.5	2.5	.2	.000243	450.0	.00776	2.12	45.0	.00684	2.41	4.5	.00684	2.41
15.0	3.0	.2	.000243	540.0	.00627	2.63	54.0	.00563	2.93	5.4	.00563	2.93
17.5	3.5	.2	.000243	630.0	.00520	3.17	63.0	.00472	3.49	6.3	.00472	3.49
20.0	4.0	.2	.000243	720.0	.00439	3.75	72.0	.00402	4.10	7.2	.00402	4.10
22.5	4.5	.2	.000243	810.0	.00377	4.37	81.0	.00347	4.75	8.1	.00347	4.75
25.0	5.0	.2	.000243	900.0	.00327	5.04	90.0	.00303	5.44	9.0	.00303	5.44
2.5	1.0	.4	.000243	90.0	.01128	1.46	9.0	.01128	1.46	.9	.01128	1.46
3.8	1.5	.4	.000243	135.0	.01021	1.61	13.5	.00898	1.83	1.4	.00898	1.83
5.0	2.0	.4	.000243	180.0	.00950	1.73	18.0	.00747	2.20	1.8	.00747	2.20
6.3	2.5	.4	.000243	225.0	.00808	2.04	22.5	.00636	2.59	2.3	.00636	2.59
7.5	3.0	.4	.000243	270.0	.00671	2.45	27.0	.00550	2.99	2.7	.00550	2.99
8.8	3.5	.4	.000243	315.0	.00572	2.88	31.5	.00482	3.42	3.1	.00482	3.42
10.0	4.0	.4	.000243	360.0	.00496	3.32	36.0	.00427	3.86	3.6	.00427	3.86
11.3	4.5	.4	.000243	405.0	.00436	3.77	40.5	.00381	4.33	4.0	.00381	4.33
12.5	5.0	.4	.000243	450.0	.00388	4.25	45.0	.00342	4.81	4.5	.00342	4.81
1.3	1.0	.8	.000243	45.0	.00803	2.05	4.5	.00803	2.05	.5	.00803	2.05
1.9	1.5	.8	.000243	67.5	.00655	2.51	6.8	.00655	2.51	.7	.00655	2.51
2.5	2.0	.8	.000243	90.0	.00564	2.92	9.0	.00564	2.92	.9	.00564	2.92
3.1	2.5	.8	.000243	112.5	.00527	3.12	11.3	.00500	3.30	1.1	.00500	3.30
3.8	3.0	.8	.000243	135.0	.00511	3.23	13.5	.00449	3.67	1.4	.00449	3.67
4.4	3.5	.8	.000243	157.5	.00493	3.34	15.8	.00408	4.03	1.6	.00408	4.03
5.0	4.0	.8	.000243	180.0	.00475	3.47	18.0	.00374	4.41	1.8	.00374	4.41
5.6	4.5	.8	.000243	202.5	.00452	3.64	20.3	.00344	4.79	2.0	.00344	4.79
6.3	5.0	.8	.000243	225.0	.00406	4.06	22.5	.00318	5.18	2.3	.00318	5.18

Table SA-38 (continued)
Results of Waste Dilution - Summer - Ship 1
(L = 2.4 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 700 gpm								
5.0	1.0	.2	.000283	180.0	.01899	.74	18.0	.01494	.94	1.8	.01494	.94
7.5	1.5	.2	.000283	270.0	.01342	1.05	27.0	.01101	1.28	2.7	.01101	1.28
10.0	2.0	.2	.000283	360.0	.00993	1.42	36.0	.00853	1.65	3.6	.00853	1.65
12.5	2.5	.2	.000283	450.0	.00776	1.82	45.0	.00684	2.06	4.5	.00684	2.06
15.0	3.0	.2	.000283	540.0	.00627	2.25	54.0	.00563	2.51	5.4	.00563	2.51
17.5	3.5	.2	.000283	630.0	.00520	2.71	63.0	.00472	2.99	6.3	.00472	2.99
20.0	4.0	.2	.000283	720.0	.00439	3.21	72.0	.00402	3.51	7.2	.00402	3.51
22.5	4.5	.2	.000283	810.0	.00377	3.75	81.0	.00347	4.07	8.1	.00347	4.07
25.0	5.0	.2	.000283	900.0	.00327	4.32	90.0	.00303	4.66	9.0	.00303	4.66
2.5	1.0	.4	.000283	90.0	.01128	1.25	9.0	.01128	1.25	.9	.01128	1.25
3.8	1.5	.4	.000283	135.0	.01021	1.38	13.5	.00898	1.57	1.4	.00898	1.57
5.0	2.0	.4	.000283	180.0	.00950	1.49	18.0	.00747	1.89	1.8	.00747	1.89
6.3	2.5	.4	.000283	225.0	.00808	1.75	22.5	.00636	2.22	2.3	.00636	2.22
7.5	3.0	.4	.000283	270.0	.00671	2.10	27.0	.00550	2.56	2.7	.00550	2.56
8.8	3.5	.4	.000283	315.0	.00572	2.47	31.5	.00482	2.93	3.1	.00482	2.93
10.0	4.0	.4	.000283	360.0	.00496	2.84	36.0	.00427	3.31	3.6	.00427	3.31
11.3	4.5	.4	.000283	405.0	.00436	3.23	40.5	.00381	3.71	4.0	.00381	3.71
12.5	5.0	.4	.000283	450.0	.00388	3.64	45.0	.00342	4.13	4.5	.00342	4.13
1.3	1.0	.8	.000283	45.0	.00803	1.76	4.5	.00803	1.76	.5	.00803	1.76
1.9	1.5	.8	.000283	67.5	.00655	2.16	6.8	.00655	2.16	.7	.00655	2.16
2.5	2.0	.8	.000283	90.0	.00564	2.50	9.0	.00564	2.50	.9	.00564	2.50
3.1	2.5	.8	.000283	112.5	.00527	2.68	11.3	.00500	2.83	1.1	.00500	2.83
3.8	3.0	.8	.000283	135.0	.00511	2.76	13.5	.00449	3.14	1.4	.00449	3.14
4.4	3.5	.8	.000283	157.5	.00493	2.86	15.8	.00408	3.46	1.6	.00408	3.46
5.0	4.0	.8	.000283	180.0	.00475	2.97	18.0	.00374	3.78	1.8	.00374	3.78
5.6	4.5	.8	.000283	202.5	.00452	3.12	20.3	.00344	4.10	2.0	.00344	4.10
6.3	5.0	.8	.000283	225.0	.00406	3.48	22.5	.00318	4.44	2.3	.00318	4.44
				Q = 1000 gpm								
5.0	1.0	.2	.000405	180.0	.01899	.52	18.0	.01494	.66	1.8	.01494	.66
7.5	1.5	.2	.000405	270.0	.01342	.74	27.0	.01101	.90	2.7	.01101	.90
10.0	2.0	.2	.000405	360.0	.00993	1.00	36.0	.00853	1.16	3.6	.00853	1.16
12.5	2.5	.2	.000405	450.0	.00776	1.27	45.0	.00684	1.44	4.5	.00684	1.44
15.0	3.0	.2	.000405	540.0	.00627	1.58	54.0	.00563	1.76	5.4	.00563	1.76
17.5	3.5	.2	.000405	630.0	.00520	1.90	63.0	.00472	2.09	6.3	.00472	2.09
20.0	4.0	.2	.000405	720.0	.00439	2.25	72.0	.00402	2.46	7.2	.00402	2.46
22.5	4.5	.2	.000405	810.0	.00377	2.62	81.0	.00347	2.85	8.1	.00347	2.85
25.0	5.0	.2	.000405	900.0	.00327	3.02	90.0	.00303	3.27	9.0	.00303	3.27
2.5	1.0	.4	.000405	90.0	.01128	.88	9.0	.01128	.88	.9	.01128	.88
3.8	1.5	.4	.000405	135.0	.01021	.97	13.5	.00898	1.10	1.4	.00898	1.10
5.0	2.0	.4	.000405	180.0	.00950	1.04	18.0	.00747	1.32	1.8	.00747	1.32
6.3	2.5	.4	.000405	225.0	.00808	1.22	22.5	.00636	1.55	2.3	.00636	1.55
7.5	3.0	.4	.000405	270.0	.00671	1.47	27.0	.00550	1.80	2.7	.00550	1.80
8.8	3.5	.4	.000405	315.0	.00572	1.73	31.5	.00482	2.05	3.1	.00482	2.05
10.0	4.0	.4	.000405	360.0	.00496	1.99	36.0	.00427	2.32	3.6	.00427	2.32
11.3	4.5	.4	.000405	405.0	.00436	2.26	40.5	.00381	2.60	4.0	.00381	2.60
12.5	5.0	.4	.000405	450.0	.00388	2.55	45.0	.00342	2.89	4.5	.00342	2.89
1.3	1.0	.8	.000405	45.0	.00803	1.23	4.5	.00803	1.23	.5	.00803	1.23
1.9	1.5	.8	.000405	67.5	.00655	1.51	6.8	.00655	1.51	.7	.00655	1.51
2.5	2.0	.8	.000405	90.0	.00564	1.75	9.0	.00564	1.75	.9	.00564	1.75
3.1	2.5	.8	.000405	112.5	.00527	1.87	11.3	.00500	1.98	1.1	.00500	1.98
3.8	3.0	.8	.000405	135.0	.00511	1.94	13.5	.00449	2.20	1.4	.00449	2.20
4.4	3.5	.8	.000405	157.5	.00493	2.00	15.8	.00408	2.42	1.6	.00408	2.42
5.0	4.0	.8	.000405	180.0	.00475	2.08	18.0	.00374	2.64	1.8	.00374	2.64
5.6	4.5	.8	.000405	202.5	.00452	2.19	20.3	.00344	2.87	2.0	.00344	2.87
6.3	5.0	.8	.000405	225.0	.00406	2.44	22.5	.00318	3.11	2.3	.00318	3.11

Table SA-38 (continued)
Results of Waste Dilution - Summer - Ship 1
(L = 2.4 n mi, A = 0.001 $ft^{2/3}$/sec)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
						Q = 1200 gpm						
5.0	1.0	.2	.000486	180.0	.01899	.43	18.0	.01494	.55	1.8	.01494	.55
7.5	1.5	.2	.000486	270.0	.01342	.61	27.0	.01101	.75	2.7	.01101	.75
10.0	2.0	.2	.000486	360.0	.00993	.83	36.0	.00853	.97	3.6	.00853	.97
12.5	2.5	.2	.000486	450.0	.00776	1.06	45.0	.00684	1.20	4.5	.00684	1.20
15.0	3.0	.2	.000486	540.0	.00627	1.31	54.0	.00563	1.46	5.4	.00563	1.46
17.5	3.5	.2	.000486	630.0	.00520	1.58	63.0	.00472	1.75	6.3	.00472	1.75
20.0	4.0	.2	.000486	720.0	.00439	1.87	72.0	.00402	2.05	7.2	.00402	2.05
22.5	4.5	.2	.000486	810.0	.00377	2.19	81.0	.00347	2.37	8.1	.00347	2.37
25.0	5.0	.2	.000486	900.0	.00327	2.52	90.0	.00303	2.72	9.0	.00303	2.72
2.5	1.0	.4	.000486	90.0	.01128	.73	9.0	.01128	.73	.9	.01128	.73
3.8	1.5	.4	.000486	135.0	.01021	.81	13.5	.00898	.92	1.4	.00898	.92
5.0	2.0	.4	.000486	180.0	.00950	.87	18.0	.00747	1.10	1.8	.00747	1.10
6.3	2.5	.4	.000486	225.0	.00808	1.02	22.5	.00636	1.29	2.3	.00636	1.29
7.5	3.0	.4	.000486	270.0	.00671	1.23	27.0	.00550	1.50	2.7	.00550	1.50
8.8	3.5	.4	.000486	315.0	.00572	1.44	31.5	.00482	1.71	3.1	.00482	1.71
10.0	4.0	.4	.000486	360.0	.00496	1.66	36.0	.00427	1.93	3.6	.00427	1.93
11.3	4.5	.4	.000486	405.0	.00436	1.89	40.5	.00381	2.16	4.0	.00381	2.16
12.5	5.0	.4	.000486	450.0	.00388	2.12	45.0	.00342	2.41	4.5	.00342	2.41
1.3	1.0	.8	.000486	45.0	.00803	1.03	4.5	.00803	1.03	.5	.00803	1.03
1.9	1.5	.8	.000486	67.5	.00655	1.26	6.8	.00655	1.26	.7	.00655	1.26
2.5	2.0	.8	.000486	90.0	.00564	1.46	9.0	.00564	1.46	.9	.00564	1.46
3.1	2.5	.8	.000486	112.5	.00527	1.56	11.3	.00500	1.65	1.1	.00500	1.65
3.8	3.0	.8	.000486	135.0	.00511	1.61	13.5	.00449	1.83	1.4	.00449	1.83
4.4	3.5	.8	.000486	157.5	.00493	1.67	15.8	.00408	2.02	1.6	.00408	2.02
5.0	4.0	.8	.000486	180.0	.00475	1.73	18.0	.00374	2.20	1.8	.00374	2.20
5.6	4.5	.8	.000486	202.5	.00452	1.82	20.3	.00344	2.39	2.0	.00344	2.39
6.3	5.0	.8	.000486	225.0	.00406	2.03	22.5	.00318	2.59	2.3	.00318	2.59
						Q = 1400 gpm						
5.0	1.0	.2	.000567	180.0	.01899	.37	18.0	.01494	.47	1.8	.01494	.47
7.5	1.5	.2	.000567	270.0	.01342	.53	27.0	.01101	.64	2.7	.01101	.64
10.0	2.0	.2	.000567	360.0	.00993	.71	36.0	.00853	.83	3.6	.00853	.83
12.5	2.5	.2	.000567	450.0	.00776	.91	45.0	.00684	1.03	4.5	.00684	1.03
15.0	3.0	.2	.000567	540.0	.00627	1.13	54.0	.00563	1.25	5.4	.00563	1.25
17.5	3.5	.2	.000567	630.0	.00520	1.36	63.0	.00472	1.50	6.3	.00472	1.50
20.0	4.0	.2	.000567	720.0	.00439	1.61	72.0	.00402	1.76	7.2	.00402	1.76
22.5	4.5	.2	.000567	810.0	.00377	1.87	81.0	.00347	2.03	8.1	.00347	2.03
25.0	5.0	.2	.000567	900.0	.00327	2.16	90.0	.00303	2.33	9.0	.00303	2.33
2.5	1.0	.4	.000567	90.0	.01128	.63	9.0	.01128	.63	.9	.01128	.63
3.8	1.5	.4	.000567	135.0	.01021	.69	13.5	.00898	.79	1.4	.00898	.79
5.0	2.0	.4	.000567	180.0	.00950	.74	18.0	.00747	.94	1.8	.00747	.94
6.3	2.5	.4	.000567	225.0	.00808	.87	22.5	.00636	1.11	2.3	.00636	1.11
7.5	3.0	.4	.000567	270.0	.00671	1.05	27.0	.00550	1.28	2.7	.00550	1.28
8.8	3.5	.4	.000567	315.0	.00572	1.23	31.5	.00482	1.46	3.1	.00482	1.46
10.0	4.0	.4	.000567	360.0	.00496	1.42	36.0	.00427	1.65	3.6	.00427	1.65
11.3	4.5	.4	.000567	405.0	.00436	1.62	40.5	.00381	1.85	4.0	.00381	1.85
12.5	5.0	.4	.000567	450.0	.00388	1.82	45.0	.00342	2.06	4.5	.00342	2.06
1.3	1.0	.8	.000567	45.0	.00803	.88	4.5	.00803	.88	.5	.00803	.88
1.9	1.5	.8	.000567	67.5	.00655	1.08	6.8	.00655	1.08	.7	.00655	1.08
2.5	2.0	.8	.000567	90.0	.00564	1.25	9.0	.00564	1.25	.9	.00564	1.25
3.1	2.5	.8	.000567	112.5	.00527	1.34	11.3	.00500	1.41	1.1	.00500	1.41
3.8	3.0	.8	.000567	135.0	.00511	1.38	13.5	.00449	1.57	1.4	.00449	1.57
4.4	3.5	.8	.000567	157.5	.00493	1.43	15.8	.00408	1.73	1.6	.00408	1.73
5.0	4.0	.8	.000567	180.0	.00475	1.49	18.0	.00374	1.89	1.8	.00374	1.89
5.6	4.5	.8	.000567	202.5	.00452	1.56	20.3	.00344	2.05	2.0	.00344	2.05
6.3	5.0	.8	.000567	225.0	.00406	1.74	22.5	.00318	2.22	2.3	.00318	2.22

Table SA-39
Results of Waste Dilution - Winter - Ship 1
(L = 2.4 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 500 gpm							
5.0	1.0	.2	.000202	180.0	.01003	1.97	18.0	.01003	1.97	1.8	.01003	1.97
7.5	1.5	.2	.000202	270.0	.00739	2.67	27.0	.00739	2.67	2.7	.00739	2.67
10.0	2.0	.2	.000202	360.0	.00573	3.45	36.0	.00573	3.45	3.6	.00573	3.45
12.5	2.5	.2	.000202	450.0	.00459	4.30	45.0	.00459	4.30	4.5	.00459	4.30
15.0	3.0	.2	.000202	540.0	.00378	5.23	54.0	.00378	5.23	5.4	.00378	5.23
17.5	3.5	.2	.000202	630.0	.00317	6.24	63.0	.00317	6.24	6.3	.00317	6.24
20.0	4.0	.2	.000202	720.0	.00270	7.32	72.0	.00270	7.32	7.2	.00270	7.32
22.5	4.5	.2	.000202	810.0	.00233	8.49	81.0	.00233	8.49	8.1	.00233	8.49
25.0	5.0	.2	.000202	900.0	.00203	9.73	90.0	.00203	9.73	9.0	.00203	9.73
2.5	1.0	.4	.000202	90.0	.00758	2.61	9.0	.00758	2.61	.9	.00758	2.61
3.8	1.5	.4	.000202	135.0	.00603	3.28	13.5	.00603	3.28	1.4	.00603	3.28
5.0	2.0	.4	.000202	180.0	.00502	3.94	18.0	.00502	3.94	1.8	.00502	3.94
6.3	2.5	.4	.000202	225.0	.00427	4.63	22.5	.00427	4.63	2.3	.00427	4.63
7.5	3.0	.4	.000202	270.0	.00370	5.35	27.0	.00370	5.35	2.7	.00370	5.35
8.8	3.5	.4	.000202	315.0	.00324	6.10	31.5	.00324	6.10	3.1	.00324	6.10
10.0	4.0	.4	.000202	360.0	.00286	6.90	36.0	.00286	6.90	3.6	.00286	6.90
11.3	4.5	.4	.000202	405.0	.00256	7.73	40.5	.00256	7.73	4.0	.00256	7.73
12.5	5.0	.4	.000202	450.0	.00230	8.60	45.0	.00230	8.60	4.5	.00230	8.60
1.3	1.0	.8	.000202	45.0	.00539	3.66	4.5	.00539	3.66	.5	.00539	3.66
1.9	1.5	.8	.000202	67.5	.00440	4.49	6.8	.00440	4.49	.7	.00440	4.49
2.5	2.0	.8	.000202	90.0	.00379	5.22	9.0	.00379	5.22	.9	.00379	5.22
3.1	2.5	.8	.000202	112.5	.00335	5.89	11.3	.00335	5.89	1.1	.00335	5.89
3.8	3.0	.8	.000202	135.0	.00302	6.55	13.5	.00302	6.55	1.4	.00302	6.55
4.4	3.5	.8	.000202	157.5	.00274	7.21	15.8	.00274	7.21	1.6	.00274	7.21
5.0	4.0	.8	.000202	180.0	.00251	7.88	18.0	.00251	7.88	1.8	.00251	7.88
5.6	4.5	.8	.000202	202.5	.00231	8.56	20.3	.00231	8.56	2.0	.00231	8.56
6.3	5.0	.8	.000202	225.0	.00214	9.25	22.5	.00214	9.25	2.3	.00214	9.25
					Q = 600 gpm							
5.0	1.0	.2	.000243	180.0	.01003	1.64	18.0	.01003	1.64	1.8	.01003	1.64
7.5	1.5	.2	.000243	270.0	.00739	2.23	27.0	.00739	2.23	2.7	.00739	2.23
10.0	2.0	.2	.000243	360.0	.00573	2.87	36.0	.00573	2.87	3.6	.00573	2.87
12.5	2.5	.2	.000243	450.0	.00459	3.58	45.0	.00459	3.58	4.5	.00459	3.58
15.0	3.0	.2	.000243	540.0	.00378	4.36	54.0	.00378	4.36	5.4	.00378	4.36
17.5	3.5	.2	.000243	630.0	.00317	5.20	63.0	.00317	5.20	6.3	.00317	5.20
20.0	4.0	.2	.000243	720.0	.00270	6.10	72.0	.00270	6.10	7.2	.00270	6.10
22.5	4.5	.2	.000243	810.0	.00233	7.07	81.0	.00233	7.07	8.1	.00233	7.07
25.0	5.0	.2	.000243	900.0	.00203	8.10	90.0	.00203	8.10	9.0	.00203	8.10
2.5	1.0	.4	.000243	90.0	.00758	2.17	9.0	.00758	2.17	.9	.00758	2.17
3.8	1.5	.4	.000243	135.0	.00603	2.73	13.5	.00603	2.73	1.4	.00603	2.73
5.0	2.0	.4	.000243	180.0	.00502	3.28	18.0	.00502	3.28	1.8	.00502	3.28
6.3	2.5	.4	.000243	225.0	.00427	3.85	22.5	.00427	3.85	2.3	.00427	3.85
7.5	3.0	.4	.000243	270.0	.00370	4.46	27.0	.00370	4.46	2.7	.00370	4.46
8.8	3.5	.4	.000243	315.0	.00324	5.09	31.5	.00324	5.09	3.1	.00324	5.09
10.0	4.0	.4	.000243	360.0	.00286	5.75	36.0	.00286	5.75	3.6	.00286	5.75
11.3	4.5	.4	.000243	405.0	.00256	6.44	40.5	.00256	6.44	4.0	.00256	6.44
12.5	5.0	.4	.000243	450.0	.00230	7.17	45.0	.00230	7.17	4.5	.00230	7.17
1.3	1.0	.8	.000243	45.0	.00539	3.05	4.5	.00539	3.05	.5	.00539	3.05
1.9	1.5	.8	.000243	67.5	.00440	3.74	6.8	.00440	3.74	.7	.00440	3.74
2.5	2.0	.8	.000243	90.0	.00379	4.35	9.0	.00379	4.35	.9	.00379	4.35
3.1	2.5	.8	.000243	112.5	.00335	4.91	11.3	.00335	4.91	1.1	.00335	4.91
3.8	3.0	.8	.000243	135.0	.00302	5.46	13.5	.00302	5.46	1.4	.00302	5.46
4.4	3.5	.8	.000243	157.5	.00274	6.01	15.8	.00274	6.01	1.6	.00274	6.01
5.0	4.0	.8	.000243	180.0	.00251	6.56	18.0	.00251	6.56	1.8	.00251	6.56
5.6	4.5	.8	.000243	202.5	.00231	7.13	20.3	.00231	7.13	2.0	.00231	7.13
6.3	5.0	.8	.000243	225.0	.00214	7.71	22.5	.00214	7.71	2.3	.00214	7.71

Table SA-39 (continued)
Results of Waste Dilution - Winter - Ship 1
(L = 2.4 n mi, A = 0.001 $ft^{2/3}/sec$)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 700 gpm												
5.0	1.0	.2	.000283	180.0	.01003	1.41	18.0	.01003	1.41	1.8	.01003	1.41
7.5	1.5	.2	.000283	270.0	.00739	1.91	27.0	.00739	1.91	2.7	.00739	1.91
10.0	2.0	.2	.000283	360.0	.00573	2.46	36.0	.00573	2.46	3.6	.00573	2.46
12.5	2.5	.2	.000283	450.0	.00459	3.07	45.0	.00459	3.07	4.5	.00459	3.07
15.0	3.0	.2	.000283	540.0	.00378	3.74	54.0	.00378	3.74	5.4	.00378	3.74
17.5	3.5	.2	.000283	630.0	.00317	4.46	63.0	.00317	4.46	6.3	.00317	4.46
20.0	4.0	.2	.000283	720.0	.00270	5.23	72.0	.00270	5.23	7.2	.00270	5.23
22.5	4.5	.2	.000283	810.0	.00233	6.06	81.0	.00233	6.06	8.1	.00233	6.06
25.0	5.0	.2	.000283	900.0	.00203	6.95	90.0	.00203	6.95	9.0	.00203	6.95
2.5	1.0	.4	.000283	90.0	.00758	1.86	9.0	.00758	1.86	.9	.00758	1.86
3.8	1.5	.4	.000283	135.0	.00603	2.34	13.5	.00603	2.34	1.4	.00603	2.34
5.0	2.0	.4	.000283	180.0	.00502	2.81	18.0	.00502	2.81	1.8	.00502	2.81
6.3	2.5	.4	.000283	225.0	.00427	3.30	22.5	.00427	3.30	2.3	.00427	3.30
7.5	3.0	.4	.000283	270.0	.00370	3.82	27.0	.00370	3.82	2.7	.00370	3.82
8.8	3.5	.4	.000283	315.0	.00324	4.36	31.5	.00324	4.36	3.1	.00324	4.36
10.0	4.0	.4	.000283	360.0	.00286	4.93	36.0	.00286	4.93	3.6	.00286	4.93
11.3	4.5	.4	.000283	405.0	.00256	5.52	40.5	.00256	5.52	4.0	.00256	5.52
12.5	5.0	.4	.000283	450.0	.00230	6.15	45.0	.00230	6.15	4.5	.00230	6.15
1.3	1.0	.8	.000283	45.0	.00539	2.62	4.5	.00539	2.62	.5	.00539	2.62
1.9	1.5	.8	.000283	67.5	.00440	3.21	6.8	.00440	3.21	.7	.00440	3.21
2.5	2.0	.8	.000283	90.0	.00379	3.73	9.0	.00379	3.73	.9	.00379	3.73
3.1	2.5	.8	.000283	112.5	.00335	4.21	11.3	.00335	4.21	1.1	.00335	4.21
3.8	3.0	.8	.000283	135.0	.00302	4.68	13.5	.00302	4.68	1.4	.00302	4.68
4.4	3.5	.8	.000283	157.5	.00274	5.15	15.8	.00274	5.15	1.6	.00274	5.15
5.0	4.0	.8	.000283	180.0	.00251	5.63	18.0	.00251	5.63	1.8	.00251	5.63
5.6	4.5	.8	.000283	202.5	.00231	6.11	20.3	.00231	6.11	2.0	.00231	6.11
6.3	5.0	.8	.000283	225.0	.00214	6.61	22.5	.00214	6.61	2.3	.00214	6.61
Q = 1000 gpm												
5.0	1.0	.2	.000405	180.0	.01003	.98	18.0	.01003	.98	1.8	.01003	.98
7.5	1.5	.2	.000405	270.0	.00739	1.34	27.0	.00739	1.34	2.7	.00739	1.34
10.0	2.0	.2	.000405	360.0	.00573	1.72	36.0	.00573	1.72	3.6	.00573	1.72
12.5	2.5	.2	.000405	450.0	.00459	2.15	45.0	.00459	2.15	4.5	.00459	2.15
15.0	3.0	.2	.000405	540.0	.00378	2.62	54.0	.00378	2.62	5.4	.00378	2.62
17.5	3.5	.2	.000405	630.0	.00317	3.12	63.0	.00317	3.12	6.3	.00317	3.12
20.0	4.0	.2	.000405	720.0	.00270	3.66	72.0	.00270	3.66	7.2	.00270	3.66
22.5	4.5	.2	.000405	810.0	.00233	4.24	81.0	.00233	4.24	8.1	.00233	4.24
25.0	5.0	.2	.000405	900.0	.00203	4.86	90.0	.00203	4.86	9.0	.00203	4.86
2.5	1.0	.4	.000405	90.0	.00758	1.30	9.0	.00758	1.30	.9	.00758	1.30
3.8	1.5	.4	.000405	135.0	.00603	1.64	13.5	.00603	1.64	1.4	.00603	1.64
5.0	2.0	.4	.000405	180.0	.00502	1.97	18.0	.00502	1.97	1.8	.00502	1.97
6.3	2.5	.4	.000405	225.0	.00427	2.31	22.5	.00427	2.31	2.3	.00427	2.31
7.5	3.0	.4	.000405	270.0	.00370	2.67	27.0	.00370	2.67	2.7	.00370	2.67
8.8	3.5	.4	.000405	315.0	.00324	3.05	31.5	.00324	3.05	3.1	.00324	3.05
10.0	4.0	.4	.000405	360.0	.00286	3.45	36.0	.00286	3.45	3.6	.00286	3.45
11.3	4.5	.4	.000405	405.0	.00256	3.87	40.5	.00256	3.87	4.0	.00256	3.87
12.5	5.0	.4	.000405	450.0	.00230	4.30	45.0	.00230	4.30	4.5	.00230	4.30
1.3	1.0	.8	.000405	45.0	.00539	1.83	4.5	.00539	1.83	.5	.00539	1.83
1.9	1.5	.8	.000405	67.5	.00440	2.25	6.8	.00440	2.25	.7	.00440	2.25
2.5	2.0	.8	.000405	90.0	.00379	2.61	9.0	.00379	2.61	.9	.00379	2.61
3.1	2.5	.8	.000405	112.5	.00335	2.95	11.3	.00335	2.95	1.1	.00335	2.95
3.8	3.0	.8	.000405	135.0	.00302	3.28	13.5	.00302	3.28	1.4	.00302	3.28
4.4	3.5	.8	.000405	157.5	.00274	3.60	15.8	.00274	3.60	1.6	.00274	3.60
5.0	4.0	.8	.000405	180.0	.00251	3.94	18.0	.00251	3.94	1.8	.00251	3.94
5.6	4.5	.8	.000405	202.5	.00231	4.28	20.3	.00231	4.28	2.0	.00231	4.28
6.3	5.0	.8	.000405	225.0	.00214	4.63	22.5	.00214	4.63	2.3	.00214	4.63

Table SA-39 (continued)
Results of Waste Dilution - Winter - Ship 1
(L = 2.4 n mi, A = 0.001 $ft^{2/3}/sec$)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 1200 gpm												
5.0	1.0	.2	.000486	180.0	.01003	.82	18.0	.01003	.82	1.8	.01003	.82
7.5	1.5	.2	.000486	270.0	.00739	1.11	27.0	.00739	1.11	2.7	.00739	1.11
10.0	2.0	.2	.000486	360.0	.00573	1.44	36.0	.00573	1.44	3.6	.00573	1.44
12.5	2.5	.2	.000486	450.0	.00459	1.79	45.0	.00459	1.79	4.5	.00459	1.79
15.0	3.0	.2	.000486	540.0	.00378	2.18	54.0	.00378	2.18	5.4	.00378	2.18
17.5	3.5	.2	.000486	630.0	.00317	2.60	63.0	.00317	2.60	6.3	.00317	2.60
20.0	4.0	.2	.000486	720.0	.00270	3.05	72.0	.00270	3.05	7.2	.00270	3.05
22.5	4.5	.2	.000486	810.0	.00233	3.54	81.0	.00233	3.54	8.1	.00233	3.54
25.0	5.0	.2	.000486	900.0	.00203	4.05	90.0	.00203	4.05	9.0	.00203	4.05
2.5	1.0	.4	.000486	90.0	.00758	1.09	9.0	.00758	1.09	.9	.00758	1.09
3.8	1.5	.4	.000486	135.0	.00603	1.36	13.5	.00603	1.36	1.4	.00603	1.36
5.0	2.0	.4	.000486	180.0	.00502	1.64	18.0	.00502	1.64	1.8	.00502	1.64
6.3	2.5	.4	.000486	225.0	.00427	1.93	22.5	.00427	1.93	2.3	.00427	1.93
7.5	3.0	.4	.000486	270.0	.00370	2.23	27.0	.00370	2.23	2.7	.00370	2.23
8.8	3.5	.4	.000486	315.0	.00324	2.54	31.5	.00324	2.54	3.1	.00324	2.54
10.0	4.0	.4	.000486	360.0	.00286	2.87	36.0	.00286	2.87	3.6	.00286	2.87
11.3	4.5	.4	.000486	405.0	.00256	3.22	40.5	.00256	3.22	4.0	.00256	3.22
12.5	5.0	.4	.000486	450.0	.00230	3.58	45.0	.00230	3.58	4.5	.00230	3.58
1.3	1.0	.8	.000486	45.0	.00539	1.53	4.5	.00539	1.53	.5	.00539	1.53
1.9	1.5	.8	.000486	67.5	.00440	1.87	6.8	.00440	1.87	.7	.00440	1.87
2.5	2.0	.8	.000486	90.0	.00379	2.17	9.0	.00379	2.17	.9	.00379	2.17
3.1	2.5	.8	.000486	112.5	.00335	2.45	11.3	.00335	2.45	1.1	.00335	2.45
3.8	3.0	.8	.000486	135.0	.00302	2.73	13.5	.00302	2.73	1.4	.00302	2.73
4.4	3.5	.8	.000486	157.5	.00274	3.00	15.8	.00274	3.00	1.6	.00274	3.00
5.0	4.0	.8	.000486	180.0	.00251	3.28	18.0	.00251	3.28	1.8	.00251	3.28
5.6	4.5	.8	.000486	202.5	.00231	3.57	20.3	.00231	3.57	2.0	.00231	3.57
6.3	5.0	.8	.000486	225.0	.00214	3.85	22.5	.00214	3.85	2.3	.00214	3.85
Q = 1400 gpm												
5.0	1.0	.2	.000567	180.0	.01003	.70	18.0	.01003	.70	1.8	.01003	.70
7.5	1.5	.2	.000567	270.0	.00739	.95	27.0	.00739	.95	2.7	.00739	.95
10.0	2.0	.2	.000567	360.0	.00573	1.23	36.0	.00573	1.23	3.6	.00573	1.23
12.5	2.5	.2	.000567	450.0	.00459	1.54	45.0	.00459	1.54	4.5	.00459	1.54
15.0	3.0	.2	.000567	540.0	.00378	1.87	54.0	.00378	1.87	5.4	.00378	1.87
17.5	3.5	.2	.000567	630.0	.00317	2.23	63.0	.00317	2.23	6.3	.00317	2.23
20.0	4.0	.2	.000567	720.0	.00270	2.62	72.0	.00270	2.62	7.2	.00270	2.62
22.5	4.5	.2	.000567	810.0	.00233	3.03	81.0	.00233	3.03	8.1	.00233	3.03
25.0	5.0	.2	.000567	900.0	.00203	3.47	90.0	.00203	3.47	9.0	.00203	3.47
2.5	1.0	.4	.000567	90.0	.00758	.93	9.0	.00758	.93	.9	.00758	.93
3.8	1.5	.4	.000567	135.0	.00603	1.17	13.5	.00603	1.17	1.4	.00603	1.17
5.0	2.0	.4	.000567	180.0	.00502	1.41	18.0	.00502	1.41	1.8	.00502	1.41
6.3	2.5	.4	.000567	225.0	.00427	1.65	22.5	.00427	1.65	2.3	.00427	1.65
7.5	3.0	.4	.000567	270.0	.00370	1.91	27.0	.00370	1.91	2.7	.00370	1.91
8.8	3.5	.4	.000567	315.0	.00324	2.18	31.5	.00324	2.18	3.1	.00324	2.18
10.0	4.0	.4	.000567	360.0	.00286	2.46	36.0	.00286	2.46	3.6	.00286	2.46
11.3	4.5	.4	.000567	405.0	.00256	2.76	40.5	.00256	2.76	4.0	.00256	2.76
12.5	5.0	.4	.000567	450.0	.00230	3.07	45.0	.00230	3.07	4.5	.00230	3.07
1.3	1.0	.8	.000567	45.0	.00539	1.31	4.5	.00539	1.31	.5	.00539	1.31
1.9	1.5	.8	.000567	67.5	.00440	1.60	6.8	.00440	1.60	.7	.00440	1.60
2.5	2.0	.8	.000567	90.0	.00379	1.86	9.0	.00379	1.86	.9	.00379	1.86
3.1	2.5	.8	.000567	112.5	.00335	2.10	11.3	.00335	2.10	1.1	.00335	2.10
3.8	3.0	.8	.000567	135.0	.00302	2.34	13.5	.00302	2.34	1.4	.00302	2.34
4.4	3.5	.8	.000567	157.5	.00274	2.57	15.8	.00274	2.57	1.6	.00274	2.57
5.0	4.0	.8	.000567	180.0	.00251	2.81	18.0	.00251	2.81	1.8	.00251	2.81
5.6	4.5	.8	.000567	202.5	.00231	3.06	20.3	.00231	3.06	2.0	.00231	3.06
6.3	5.0	.8	.000567	225.0	.00214	3.30	22.5	.00214	3.30	2.3	.00214	3.30

Table SA-40
Results of Waste Dilution - Summer - Ship 1
(L = 2.5 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 500 gpm								
5.0	1.0	.2	.000202	180.0	.01832	1.08	18.0	.01442	1.37	1.8	.01442	1.37
7.5	1.5	.2	.000202	270.0	.01300	1.52	27.0	.01066	1.85	2.7	.01066	1.85
10.0	2.0	.2	.000202	360.0	.00964	2.05	36.0	.00829	2.38	3.6	.00829	2.38
12.5	2.5	.2	.000202	450.0	.00755	2.62	45.0	.00666	2.97	4.5	.00666	2.97
15.0	3.0	.2	.000202	540.0	.00612	3.23	54.0	.00549	3.60	5.4	.00549	3.60
17.5	3.5	.2	.000202	630.0	.00508	3.89	63.0	.00461	4.28	6.3	.00461	4.28
20.0	4.0	.2	.000202	720.0	.00430	4.60	72.0	.00393	5.02	7.2	.00393	5.02
22.5	4.5	.2	.000202	810.0	.00369	5.35	81.0	.00340	5.81	8.1	.00340	5.81
25.0	5.0	.2	.000202	900.0	.00321	6.16	90.0	.00297	6.65	9.0	.00297	6.65
2.5	1.0	.4	.000202	90.0	.01084	1.82	9.0	.01084	1.82	.9	.01084	1.82
3.8	1.5	.4	.000202	135.0	.00983	2.01	13.5	.00865	2.28	1.4	.00865	2.28
5.0	2.0	.4	.000202	180.0	.00916	2.16	18.0	.00721	2.74	1.8	.00721	2.74
6.3	2.5	.4	.000202	225.0	.00781	2.53	22.5	.00615	3.21	2.3	.00615	3.21
7.5	3.0	.4	.000202	270.0	.00650	3.04	27.0	.00533	3.71	2.7	.00533	3.71
8.8	3.5	.4	.000202	315.0	.00555	3.56	31.5	.00468	4.22	3.1	.00468	4.22
10.0	4.0	.4	.000202	360.0	.00482	4.10	36.0	.00414	4.77	3.6	.00414	4.77
11.3	4.5	.4	.000202	405.0	.00425	4.65	40.5	.00370	5.34	4.0	.00370	5.34
12.5	5.0	.4	.000202	450.0	.00378	5.23	45.0	.00333	5.93	4.5	.00333	5.93
1.3	1.0	.8	.000202	45.0	.00771	2.56	4.5	.00771	2.56	.5	.00771	2.56
1.9	1.5	.8	.000202	67.5	.00629	3.14	6.8	.00629	3.14	.7	.00629	3.14
2.5	2.0	.8	.000202	90.0	.00542	3.65	9.0	.00542	3.65	.9	.00542	3.65
3.1	2.5	.8	.000202	112.5	.00507	3.90	11.3	.00480	4.11	1.1	.00480	4.11
3.8	3.0	.8	.000202	135.0	.00491	4.02	13.5	.00432	4.57	1.4	.00432	4.57
4.4	3.5	.8	.000202	157.5	.00475	4.16	15.8	.00393	5.02	1.6	.00393	5.02
5.0	4.0	.8	.000202	180.0	.00458	4.31	18.0	.00360	5.48	1.8	.00360	5.48
5.6	4.5	.8	.000202	202.5	.00436	4.53	20.3	.00332	5.95	2.0	.00332	5.95
6.3	5.0	.8	.000202	225.0	.00392	5.04	22.5	.00307	6.43	2.3	.00307	6.43
				Q = 600 gpm								
5.0	1.0	.2	.000243	180.0	.01832	.90	18.0	.01442	1.14	1.8	.01442	1.14
7.5	1.5	.2	.000243	270.0	.01300	1.27	27.0	.01066	1.54	2.7	.01066	1.54
10.0	2.0	.2	.000243	360.0	.00964	1.71	36.0	.00829	1.99	3.6	.00829	1.99
12.5	2.5	.2	.000243	450.0	.00755	2.18	45.0	.00666	2.47	4.5	.00666	2.47
15.0	3.0	.2	.000243	540.0	.00612	2.69	54.0	.00549	3.00	5.4	.00549	3.00
17.5	3.5	.2	.000243	630.0	.00508	3.24	63.0	.00461	3.57	6.3	.00461	3.57
20.0	4.0	.2	.000243	720.0	.00430	3.83	72.0	.00393	4.19	7.2	.00393	4.19
22.5	4.5	.2	.000243	810.0	.00369	4.46	81.0	.00340	4.84	8.1	.00340	4.84
25.0	5.0	.2	.000243	900.0	.00321	5.13	90.0	.00297	5.55	9.0	.00297	5.55
2.5	1.0	.4	.000243	90.0	.01084	1.52	9.0	.01084	1.52	.9	.01084	1.52
3.8	1.5	.4	.000243	135.0	.00983	1.68	13.5	.00865	1.90	1.4	.00865	1.90
5.0	2.0	.4	.000243	180.0	.00916	1.80	18.0	.00721	2.28	1.8	.00721	2.28
6.3	2.5	.4	.000243	225.0	.00781	2.11	22.5	.00615	2.68	2.3	.00615	2.68
7.5	3.0	.4	.000243	270.0	.00650	2.53	27.0	.00533	3.09	2.7	.00533	3.09
8.8	3.5	.4	.000243	315.0	.00555	2.97	31.5	.00468	3.52	3.1	.00468	3.52
10.0	4.0	.4	.000243	360.0	.00482	3.41	36.0	.00414	3.97	3.6	.00414	3.97
11.3	4.5	.4	.000243	405.0	.00425	3.88	40.5	.00370	4.45	4.0	.00370	4.45
12.5	5.0	.4	.000243	450.0	.00378	4.36	45.0	.00333	4.94	4.5	.00333	4.94
1.3	1.0	.8	.000243	45.0	.00771	2.14	4.5	.00771	2.14	.5	.00771	2.14
1.9	1.5	.8	.000243	67.5	.00629	2.62	6.8	.00629	2.62	.7	.00629	2.62
2.5	2.0	.8	.000243	90.0	.00542	3.04	9.0	.00542	3.04	.9	.00542	3.04
3.1	2.5	.8	.000243	112.5	.00507	3.25	11.3	.00480	3.43	1.1	.00480	3.43
3.8	3.0	.8	.000243	135.0	.00491	3.35	13.5	.00432	3.81	1.4	.00432	3.81
4.4	3.5	.8	.000243	157.5	.00475	3.47	15.8	.00393	4.19	1.6	.00393	4.19
5.0	4.0	.8	.000243	180.0	.00458	3.60	18.0	.00360	4.57	1.8	.00360	4.57
5.6	4.5	.8	.000243	202.5	.00436	3.77	20.3	.00332	4.96	2.0	.00332	4.96
6.3	5.0	.8	.000243	225.0	.00392	4.20	22.5	.00307	5.36	2.3	.00307	5.36

Table SA-40 (continued)
Results of Waste Dilution - Summer - Ship 1
(L = 2.5 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 700 gpm							
5.0	1.0	.2	.000283	180.0	.01832	.77	18.0	.01442	.98	1.8	.01442	.98
7.5	1.5	.2	.000283	270.0	.01300	1.09	27.0	.01066	1.32	2.7	.01066	1.32
10.0	2.0	.2	.000283	360.0	.00964	1.46	36.0	.00829	1.70	3.6	.00829	1.70
12.5	2.5	.2	.000283	450.0	.00755	1.87	45.0	.00666	2.12	4.5	.00666	2.12
15.0	3.0	.2	.000283	540.0	.00612	2.31	54.0	.00549	2.57	5.4	.00549	2.57
17.5	3.5	.2	.000283	630.0	.00508	2.78	63.0	.00461	3.06	6.3	.00461	3.06
20.0	4.0	.2	.000283	720.0	.00430	3.28	72.0	.00393	3.59	7.2	.00393	3.59
22.5	4.5	.2	.000283	810.0	.00369	3.82	81.0	.00340	4.15	8.1	.00340	4.15
25.0	5.0	.2	.000283	900.0	.00321	4.40	90.0	.00297	4.75	9.0	.00297	4.75
2.5	1.0	.4	.000283	90.0	.01084	1.30	9.0	.01084	1.30	.9	.01084	1.30
3.8	1.5	.4	.000283	135.0	.00983	1.44	13.5	.00865	1.63	1.4	.00865	1.63
5.0	2.0	.4	.000283	180.0	.00916	1.54	18.0	.00721	1.96	1.8	.00721	1.96
6.3	2.5	.4	.000283	225.0	.00781	1.81	22.5	.00615	2.30	2.3	.00615	2.30
7.5	3.0	.4	.000283	270.0	.00650	2.17	27.0	.00533	2.65	2.7	.00533	2.65
8.8	3.5	.4	.000283	315.0	.00555	2.54	31.5	.00468	3.02	3.1	.00468	3.02
10.0	4.0	.4	.000283	360.0	.00482	2.93	36.0	.00414	3.41	3.6	.00414	3.41
11.3	4.5	.4	.000283	405.0	.00425	3.32	40.5	.00370	3.81	4.0	.00370	3.81
12.5	5.0	.4	.000283	450.0	.00378	3.74	45.0	.00333	4.24	4.5	.00333	4.24
1.3	1.0	.8	.000283	45.0	.00771	1.83	4.5	.00771	1.83	.5	.00771	1.83
1.9	1.5	.8	.000283	67.5	.00629	2.24	6.8	.00629	2.24	.7	.00629	2.24
2.5	2.0	.8	.000283	90.0	.00542	2.60	9.0	.00542	2.60	.9	.00542	2.60
3.1	2.5	.8	.000283	112.5	.00507	2.79	11.3	.00480	2.94	1.1	.00480	2.94
3.8	3.0	.8	.000283	135.0	.00491	2.87	13.5	.00432	3.26	1.4	.00432	3.26
4.4	3.5	.8	.000283	157.5	.00475	2.97	15.8	.00393	3.59	1.6	.00393	3.59
5.0	4.0	.8	.000283	180.0	.00458	3.08	18.0	.00360	3.92	1.8	.00360	3.92
5.6	4.5	.8	.000283	202.5	.00436	3.23	20.3	.00332	4.25	2.0	.00332	4.25
6.3	5.0	.8	.000283	225.0	.00392	3.60	22.5	.00307	4.59	2.3	.00307	4.59
					Q = 1000 gpm							
5.0	1.0	.2	.000405	180.0	.01832	.54	18.0	.01442	.69	1.8	.01442	.69
7.5	1.5	.2	.000405	270.0	.01300	.76	27.0	.01066	.93	2.7	.01066	.93
10.0	2.0	.2	.000405	360.0	.00964	1.02	36.0	.00829	1.19	3.6	.00829	1.19
12.5	2.5	.2	.000405	450.0	.00755	1.31	45.0	.00666	1.48	4.5	.00666	1.48
15.0	3.0	.2	.000405	540.0	.00612	1.61	54.0	.00549	1.80	5.4	.00549	1.80
17.5	3.5	.2	.000405	630.0	.00508	1.94	63.0	.00461	2.14	6.3	.00461	2.14
20.0	4.0	.2	.000405	720.0	.00430	2.30	72.0	.00393	2.51	7.2	.00393	2.51
22.5	4.5	.2	.000405	810.0	.00369	2.68	81.0	.00340	2.91	8.1	.00340	2.91
25.0	5.0	.2	.000405	900.0	.00321	3.08	90.0	.00297	3.33	9.0	.00297	3.33
2.5	1.0	.4	.000405	90.0	.01084	.91	9.0	.01084	.91	.9	.01084	.91
3.8	1.5	.4	.000405	135.0	.00983	1.01	13.5	.00865	1.14	1.4	.00865	1.14
5.0	2.0	.4	.000405	180.0	.00916	1.08	18.0	.00721	1.37	1.8	.00721	1.37
6.3	2.5	.4	.000405	225.0	.00781	1.27	22.5	.00615	1.61	2.3	.00615	1.61
7.5	3.0	.4	.000405	270.0	.00650	1.52	27.0	.00533	1.85	2.7	.00533	1.85
8.8	3.5	.4	.000405	315.0	.00555	1.78	31.5	.00468	2.11	3.1	.00468	2.11
10.0	4.0	.4	.000405	360.0	.00482	2.05	36.0	.00414	2.38	3.6	.00414	2.38
11.3	4.5	.4	.000405	405.0	.00425	2.33	40.5	.00370	2.67	4.0	.00370	2.67
12.5	5.0	.4	.000405	450.0	.00378	2.62	45.0	.00333	2.97	4.5	.00333	2.97
1.3	1.0	.8	.000405	45.0	.00771	1.28	4.5	.00771	1.28	.5	.00771	1.28
1.9	1.5	.8	.000405	67.5	.00629	1.57	6.8	.00629	1.57	.7	.00629	1.57
2.5	2.0	.8	.000405	90.0	.00542	1.82	9.0	.00542	1.82	.9	.00542	1.82
3.1	2.5	.8	.000405	112.5	.00507	1.95	11.3	.00480	2.06	1.1	.00480	2.06
3.8	3.0	.8	.000405	135.0	.00491	2.01	13.5	.00432	2.28	1.4	.00432	2.28
4.4	3.5	.8	.000405	157.5	.00475	2.08	15.8	.00393	2.51	1.6	.00393	2.51
5.0	4.0	.8	.000405	180.0	.00458	2.16	18.0	.00360	2.74	1.8	.00360	2.74
5.6	4.5	.8	.000405	202.5	.00436	2.26	20.3	.00332	2.97	2.0	.00332	2.97
6.3	5.0	.8	.000405	225.0	.00392	2.52	22.5	.00307	3.21	2.3	.00307	3.21

Table SA-40 (continued)
Results of Waste Dilution - Summer - Ship 1
(L = 2.5 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 1200 gpm							
5.0	1.0	.2	.000486	180.0	.01832	.45	18.0	.01442	.57	1.8	.01442	.57
7.5	1.5	.2	.000486	270.0	.01300	.63	27.0	.01066	.77	2.7	.01066	.77
10.0	2.0	.2	.000486	360.0	.00964	.85	36.0	.00829	.99	3.6	.00829	.99
12.5	2.5	.2	.000486	450.0	.00755	1.09	45.0	.00666	1.24	4.5	.00666	1.24
15.0	3.0	.2	.000486	540.0	.00612	1.34	54.0	.00549	1.50	5.4	.00549	1.50
17.5	3.5	.2	.000486	630.0	.00508	1.62	63.0	.00461	1.79	6.3	.00461	1.79
20.0	4.0	.2	.000486	720.0	.00430	1.91	72.0	.00393	2.09	7.2	.00393	2.09
22.5	4.5	.2	.000486	810.0	.00369	2.23	81.0	.00340	2.42	8.1	.00340	2.42
25.0	5.0	.2	.000486	900.0	.00321	2.57	90.0	.00297	2.77	9.0	.00297	2.77
2.5	1.0	.4	.000486	90.0	.01084	.76	9.0	.01084	.76	.9	.01084	.76
3.8	1.5	.4	.000486	135.0	.00983	.84	13.5	.00865	.95	1.4	.00865	.95
5.0	2.0	.4	.000486	180.0	.00916	.90	18.0	.00721	1.14	1.8	.00721	1.14
6.3	2.5	.4	.000486	225.0	.00781	1.05	22.5	.00615	1.34	2.3	.00615	1.34
7.5	3.0	.4	.000486	270.0	.00650	1.27	27.0	.00533	1.54	2.7	.00533	1.54
8.8	3.5	.4	.000486	315.0	.00555	1.48	31.5	.00468	1.76	3.1	.00468	1.76
10.0	4.0	.4	.000486	360.0	.00482	1.71	36.0	.00414	1.99	3.6	.00414	1.99
11.3	4.5	.4	.000486	405.0	.00425	1.94	40.5	.00370	2.22	4.0	.00370	2.22
12.5	5.0	.4	.000486	450.0	.00378	2.18	45.0	.00333	2.47	4.5	.00333	2.47
1.3	1.0	.8	.000486	45.0	.00771	1.07	4.5	.00771	1.07	.5	.00771	1.07
1.9	1.5	.8	.000486	67.5	.00629	1.31	6.8	.00629	1.31	.7	.00629	1.31
2.5	2.0	.8	.000486	90.0	.00542	1.52	9.0	.00542	1.52	.9	.00542	1.52
3.1	2.5	.8	.000486	112.5	.00507	1.62	11.3	.00480	1.71	1.1	.00480	1.71
3.8	3.0	.8	.000486	135.0	.00491	1.68	13.5	.00432	1.90	1.4	.00432	1.90
4.4	3.5	.8	.000486	157.5	.00475	1.73	15.8	.00393	2.09	1.6	.00393	2.09
5.0	4.0	.8	.000486	180.0	.00458	1.80	18.0	.00360	2.28	1.8	.00360	2.28
5.6	4.5	.8	.000486	202.5	.00436	1.89	20.3	.00332	2.48	2.0	.00332	2.48
6.3	5.0	.8	.000486	225.0	.00392	2.10	22.5	.00307	2.68	2.3	.00307	2.68
					Q = 1400 gpm							
5.0	1.0	.2	.000567	180.0	.01832	.39	18.0	.01442	.49	1.8	.01442	.49
7.5	1.5	.2	.000567	270.0	.01300	.54	27.0	.01066	.66	2.7	.01066	.66
10.0	2.0	.2	.000567	360.0	.00964	.73	36.0	.00829	.85	3.6	.00829	.85
12.5	2.5	.2	.000567	450.0	.00755	.93	45.0	.00666	1.06	4.5	.00666	1.06
15.0	3.0	.2	.000567	540.0	.00612	1.15	54.0	.00549	1.29	5.4	.00549	1.29
17.5	3.5	.2	.000567	630.0	.00508	1.39	63.0	.00461	1.53	6.3	.00461	1.53
20.0	4.0	.2	.000567	720.0	.00430	1.64	72.0	.00393	1.79	7.2	.00393	1.79
22.5	4.5	.2	.000567	810.0	.00369	1.91	81.0	.00340	2.08	8.1	.00340	2.08
25.0	5.0	.2	.000567	900.0	.00321	2.20	90.0	.00297	2.38	9.0	.00297	2.38
2.5	1.0	.4	.000567	90.0	.01084	.65	9.0	.01084	.65	.9	.01084	.65
3.8	1.5	.4	.000567	135.0	.00983	.72	13.5	.00865	.82	1.4	.00865	.82
5.0	2.0	.4	.000567	180.0	.00916	.77	18.0	.00721	.98	1.8	.00721	.98
6.3	2.5	.4	.000567	225.0	.00781	.90	22.5	.00615	1.15	2.3	.00615	1.15
7.5	3.0	.4	.000567	270.0	.00650	1.09	27.0	.00533	1.32	2.7	.00533	1.32
8.8	3.5	.4	.000567	315.0	.00555	1.27	31.5	.00468	1.51	3.1	.00468	1.51
10.0	4.0	.4	.000567	360.0	.00482	1.46	36.0	.00414	1.70	3.6	.00414	1.70
11.3	4.5	.4	.000567	405.0	.00425	1.66	40.5	.00370	1.91	4.0	.00370	1.91
12.5	5.0	.4	.000567	450.0	.00378	1.87	45.0	.00333	2.12	4.5	.00333	2.12
1.3	1.0	.8	.000567	45.0	.00771	.92	4.5	.00771	.92	.5	.00771	.92
1.9	1.5	.8	.000567	67.5	.00629	1.12	6.8	.00629	1.12	.7	.00629	1.12
2.5	2.0	.8	.000567	90.0	.00542	1.30	9.0	.00542	1.30	.9	.00542	1.30
3.1	2.5	.8	.000567	112.5	.00507	1.39	11.3	.00480	1.47	1.1	.00480	1.47
3.8	3.0	.8	.000567	135.0	.00491	1.44	13.5	.00432	1.63	1.4	.00432	1.63
4.4	3.5	.8	.000567	157.5	.00475	1.49	15.8	.00393	1.79	1.6	.00393	1.79
5.0	4.0	.8	.000567	180.0	.00458	1.54	18.0	.00360	1.96	1.8	.00360	1.96
5.6	4.5	.8	.000567	202.5	.00436	1.62	20.3	.00332	2.12	2.0	.00332	2.12
6.3	5.0	.8	.000567	225.0	.00392	1.80	22.5	.00307	2.30	2.3	.00307	2.30

Table SA-41
Results of Waste Dilution - Winter - Ship 1
(L = 2.5 n mi, A = 0.001 $ft^{2/3}$/sec)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 500 gpm												
5.0	1.0	.2	.000202	180.0	.00968	2.04	18.0	.00968	2.04	1.8	.00968	2.04
7.5	1.5	.2	.000202	270.0	.00716	2.76	27.0	.00716	2.76	2.7	.00716	2.76
10.0	2.0	.2	.000202	360.0	.00557	3.55	36.0	.00557	3.55	3.6	.00557	3.55
12.5	2.5	.2	.000202	450.0	.00447	4.42	45.0	.00447	4.42	4.5	.00447	4.42
15.0	3.0	.2	.000202	540.0	.00369	5.36	54.0	.00369	5.36	5.4	.00369	5.36
17.5	3.5	.2	.000202	630.0	.00310	6.38	63.0	.00310	6.38	6.3	.00310	6.38
20.0	4.0	.2	.000202	720.0	.00264	7.48	72.0	.00264	7.48	7.2	.00264	7.48
22.5	4.5	.2	.000202	810.0	.00228	8.66	81.0	.00228	8.66	8.1	.00228	8.66
25.0	5.0	.2	.000202	900.0	.00199	9.91	90.0	.00199	9.91	9.0	.00199	9.91
2.5	1.0	.4	.000202	90.0	.00728	2.71	9.0	.00728	2.71	.9	.00728	2.71
3.8	1.5	.4	.000202	135.0	.00581	3.40	13.5	.00581	3.40	1.4	.00581	3.40
5.0	2.0	.4	.000202	180.0	.00484	4.08	18.0	.00484	4.08	1.8	.00484	4.08
6.3	2.5	.4	.000202	225.0	.00413	4.79	22.5	.00413	4.79	2.3	.00413	4.79
7.5	3.0	.4	.000202	270.0	.00358	5.52	27.0	.00358	5.52	2.7	.00358	5.52
8.8	3.5	.4	.000202	315.0	.00314	6.29	31.5	.00314	6.29	3.1	.00314	6.29
10.0	4.0	.4	.000202	360.0	.00278	7.10	36.0	.00278	7.10	3.6	.00278	7.10
11.3	4.5	.4	.000202	405.0	.00249	7.95	40.5	.00249	7.95	4.0	.00249	7.95
12.5	5.0	.4	.000202	450.0	.00224	8.83	45.0	.00224	8.83	4.5	.00224	8.83
1.3	1.0	.8	.000202	45.0	.00518	3.82	4.5	.00518	3.82	.5	.00518	3.82
1.9	1.5	.8	.000202	67.5	.00422	4.68	6.8	.00422	4.68	.7	.00422	4.68
2.5	2.0	.8	.000202	90.0	.00364	5.43	9.0	.00364	5.43	.9	.00364	5.43
3.1	2.5	.8	.000202	112.5	.00323	6.13	11.3	.00323	6.13	1.1	.00323	6.13
3.8	3.0	.8	.000202	135.0	.00290	6.80	13.5	.00290	6.80	1.4	.00290	6.80
4.4	3.5	.8	.000202	157.5	.00264	7.48	15.8	.00264	7.48	1.6	.00264	7.48
5.0	4.0	.8	.000202	180.0	.00242	8.16	18.0	.00242	8.16	1.8	.00242	8.16
5.6	4.5	.8	.000202	202.5	.00223	8.86	20.3	.00223	8.86	2.0	.00223	8.86
6.3	5.0	.8	.000202	225.0	.00206	9.57	22.5	.00206	9.57	2.3	.00206	9.57
Q = 600 gpm												
5.0	1.0	.2	.000243	180.0	.00968	1.70	18.0	.00968	1.70	1.8	.00968	1.70
7.5	1.5	.2	.000243	270.0	.00716	2.30	27.0	.00716	2.30	2.7	.00716	2.30
10.0	2.0	.2	.000243	360.0	.00557	2.96	36.0	.00557	2.96	3.6	.00557	2.96
12.5	2.5	.2	.000243	450.0	.00447	3.68	45.0	.00447	3.68	4.5	.00447	3.68
15.0	3.0	.2	.000243	540.0	.00369	4.47	54.0	.00369	4.47	5.4	.00369	4.47
17.5	3.5	.2	.000243	630.0	.00310	5.32	63.0	.00310	5.32	6.3	.00310	5.32
20.0	4.0	.2	.000243	720.0	.00264	6.23	72.0	.00264	6.23	7.2	.00264	6.23
22.5	4.5	.2	.000243	810.0	.00228	7.21	81.0	.00228	7.21	8.1	.00228	7.21
25.0	5.0	.2	.000243	900.0	.00199	8.26	90.0	.00199	8.26	9.0	.00199	8.26
2.5	1.0	.4	.000243	90.0	.00728	2.26	9.0	.00728	2.26	.9	.00728	2.26
3.8	1.5	.4	.000243	135.0	.00581	2.84	13.5	.00581	2.84	1.4	.00581	2.84
5.0	2.0	.4	.000243	180.0	.00484	3.40	18.0	.00484	3.40	1.8	.00484	3.40
6.3	2.5	.4	.000243	225.0	.00413	3.99	22.5	.00413	3.99	2.3	.00413	3.99
7.5	3.0	.4	.000243	270.0	.00358	4.60	27.0	.00358	4.60	2.7	.00358	4.60
8.8	3.5	.4	.000243	315.0	.00314	5.24	31.5	.00314	5.24	3.1	.00314	5.24
10.0	4.0	.4	.000243	360.0	.00278	5.92	36.0	.00278	5.92	3.6	.00278	5.92
11.3	4.5	.4	.000243	405.0	.00249	6.62	40.5	.00249	6.62	4.0	.00249	6.62
12.5	5.0	.4	.000243	450.0	.00224	7.36	45.0	.00224	7.36	4.5	.00224	7.36
1.3	1.0	.8	.000243	45.0	.00518	3.18	4.5	.00518	3.18	.5	.00518	3.18
1.9	1.5	.8	.000243	67.5	.00422	3.90	6.8	.00422	3.90	.7	.00422	3.90
2.5	2.0	.8	.000243	90.0	.00364	4.52	9.0	.00364	4.52	.9	.00364	4.52
3.1	2.5	.8	.000243	112.5	.00323	5.11	11.3	.00323	5.11	1.1	.00323	5.11
3.8	3.0	.8	.000243	135.0	.00290	5.67	13.5	.00290	5.67	1.4	.00290	5.67
4.4	3.5	.8	.000243	157.5	.00264	6.23	15.8	.00264	6.23	1.6	.00264	6.23
5.0	4.0	.8	.000243	180.0	.00242	6.80	18.0	.00242	6.80	1.8	.00242	6.80
5.6	4.5	.8	.000243	202.5	.00223	7.38	20.3	.00223	7.38	2.0	.00223	7.38
6.3	5.0	.8	.000243	225.0	.00206	7.98	22.5	.00206	7.98	2.3	.00206	7.98

Table SA-41 (continued)
Results of Waste Dilution - Winter - Ship 1
(L = 2.5 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 700 gpm							
5.0	1.0	.2	.000283	180.0	.00968	1.46	18.0	.00968	1.46	1.8	.00968	1.46
7.5	1.5	.2	.000283	270.0	.00716	1.97	27.0	.00716	1.97	2.7	.00716	1.97
10.0	2.0	.2	.000283	360.0	.00557	2.54	36.0	.00557	2.54	3.6	.00557	2.54
12.5	2.5	.2	.000283	450.0	.00447	3.15	45.0	.00447	3.15	4.5	.00447	3.15
15.0	3.0	.2	.000283	540.0	.00369	3.83	54.0	.00369	3.83	5.4	.00369	3.83
17.5	3.5	.2	.000283	630.0	.00310	4.56	63.0	.00310	4.56	6.3	.00310	4.56
20.0	4.0	.2	.000283	720.0	.00264	5.34	72.0	.00264	5.34	7.2	.00264	5.34
22.5	4.5	.2	.000283	810.0	.00228	6.18	81.0	.00228	6.18	8.1	.00228	6.18
25.0	5.0	.2	.000283	900.0	.00199	7.08	90.0	.00199	7.08	9.0	.00199	7.08
2.5	1.0	.4	.000283	90.0	.00728	1.94	9.0	.00728	1.94	.9	.00728	1.94
3.8	1.5	.4	.000283	135.0	.00581	2.43	13.5	.00581	2.43	1.4	.00581	2.43
5.0	2.0	.4	.000283	180.0	.00484	2.92	18.0	.00484	2.92	1.8	.00484	2.92
6.3	2.5	.4	.000283	225.0	.00413	3.42	22.5	.00413	3.42	2.3	.00413	3.42
7.5	3.0	.4	.000283	270.0	.00358	3.94	27.0	.00358	3.94	2.7	.00358	3.94
8.8	3.5	.4	.000283	315.0	.00314	4.49	31.5	.00314	4.49	3.1	.00314	4.49
10.0	4.0	.4	.000283	360.0	.00278	5.07	36.0	.00278	5.07	3.6	.00278	5.07
11.3	4.5	.4	.000283	405.0	.00249	5.68	40.5	.00249	5.68	4.0	.00249	5.68
12.5	5.0	.4	.000283	450.0	.00224	6.31	45.0	.00224	6.31	4.5	.00224	6.31
1.3	1.0	.8	.000283	45.0	.00518	2.73	4.5	.00518	2.73	.5	.00518	2.73
1.9	1.5	.8	.000283	67.5	.00422	3.34	6.8	.00422	3.34	.7	.00422	3.34
2.5	2.0	.8	.000283	90.0	.00364	3.88	9.0	.00364	3.88	.9	.00364	3.88
3.1	2.5	.8	.000283	112.5	.00323	4.38	11.3	.00323	4.38	1.1	.00323	4.38
3.8	3.0	.8	.000283	135.0	.00290	4.86	13.5	.00290	4.86	1.4	.00290	4.86
4.4	3.5	.8	.000283	157.5	.00264	5.34	15.8	.00264	5.34	1.6	.00264	5.34
5.0	4.0	.8	.000283	180.0	.00242	5.83	18.0	.00242	5.83	1.8	.00242	5.83
5.6	4.5	.8	.000283	202.5	.00223	6.33	20.3	.00223	6.33	2.0	.00223	6.33
6.3	5.0	.8	.000283	225.0	.00206	6.84	22.5	.00206	6.84	2.3	.00206	6.84
					Q = 1000 gpm							
5.0	1.0	.2	.000405	180.0	.00968	1.02	18.0	.00968	1.02	1.8	.00968	1.02
7.5	1.5	.2	.000405	270.0	.00716	1.38	27.0	.00716	1.38	2.7	.00716	1.38
10.0	2.0	.2	.000405	360.0	.00557	1.78	36.0	.00557	1.78	3.6	.00557	1.78
12.5	2.5	.2	.000405	450.0	.00447	2.21	45.0	.00447	2.21	4.5	.00447	2.21
15.0	3.0	.2	.000405	540.0	.00369	2.68	54.0	.00369	2.68	5.4	.00369	2.68
17.5	3.5	.2	.000405	630.0	.00310	3.19	63.0	.00310	3.19	6.3	.00310	3.19
20.0	4.0	.2	.000405	720.0	.00264	3.74	72.0	.00264	3.74	7.2	.00264	3.74
22.5	4.5	.2	.000405	810.0	.00228	4.33	81.0	.00228	4.33	8.1	.00228	4.33
25.0	5.0	.2	.000405	900.0	.00199	4.95	90.0	.00199	4.95	9.0	.00199	4.95
2.5	1.0	.4	.000405	90.0	.00728	1.36	9.0	.00728	1.36	.9	.00728	1.36
3.8	1.5	.4	.000405	135.0	.00581	1.70	13.5	.00581	1.70	1.4	.00581	1.70
5.0	2.0	.4	.000405	180.0	.00484	2.04	18.0	.00484	2.04	1.8	.00484	2.04
6.3	2.5	.4	.000405	225.0	.00413	2.39	22.5	.00413	2.39	2.3	.00413	2.39
7.5	3.0	.4	.000405	270.0	.00358	2.76	27.0	.00358	2.76	2.7	.00358	2.76
8.8	3.5	.4	.000405	315.0	.00314	3.15	31.5	.00314	3.15	3.1	.00314	3.15
10.0	4.0	.4	.000405	360.0	.00278	3.55	36.0	.00278	3.55	3.6	.00278	3.55
11.3	4.5	.4	.000405	405.0	.00249	3.97	40.5	.00249	3.97	4.0	.00249	3.97
12.5	5.0	.4	.000405	450.0	.00224	4.42	45.0	.00224	4.42	4.5	.00224	4.42
1.3	1.0	.8	.000405	45.0	.00518	1.91	4.5	.00518	1.91	.5	.00518	1.91
1.9	1.5	.8	.000405	67.5	.00422	2.34	6.8	.00422	2.34	.7	.00422	2.34
2.5	2.0	.8	.000405	90.0	.00364	2.71	9.0	.00364	2.71	.9	.00364	2.71
3.1	2.5	.8	.000405	112.5	.00323	3.06	11.3	.00323	3.06	1.1	.00323	3.06
3.8	3.0	.8	.000405	135.0	.00290	3.40	13.5	.00290	3.40	1.4	.00290	3.40
4.4	3.5	.8	.000405	157.5	.00264	3.74	15.8	.00264	3.74	1.6	.00264	3.74
5.0	4.0	.8	.000405	180.0	.00242	4.08	18.0	.00242	4.08	1.8	.00242	4.08
5.6	4.5	.8	.000405	202.5	.00223	4.43	20.3	.00223	4.43	2.0	.00223	4.43
6.3	5.0	.8	.000405	225.0	.00206	4.79	22.5	.00206	4.79	2.3	.00206	4.79

Table SA-41 (continued)
Results of Waste Dilution - Winter - Ship 1
(L = 2.5 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 1200 gpm								
5.0	1.0	.2	.000486	180.0	.00968	.85	18.0	.00968	.85	1.8	.00968	.85
7.5	1.5	.2	.000486	270.0	.00716	1.15	27.0	.00716	1.15	2.7	.00716	1.15
10.0	2.0	.2	.000486	360.0	.00557	1.48	36.0	.00557	1.48	3.6	.00557	1.48
12.5	2.5	.2	.000486	450.0	.00447	1.84	45.0	.00447	1.84	4.5	.00447	1.84
15.0	3.0	.2	.000486	540.0	.00369	2.23	54.0	.00369	2.23	5.4	.00369	2.23
17.5	3.5	.2	.000486	630.0	.00310	2.66	63.0	.00310	2.66	6.3	.00310	2.66
20.0	4.0	.2	.000486	720.0	.00264	3.12	72.0	.00264	3.12	7.2	.00264	3.12
22.5	4.5	.2	.000486	810.0	.00228	3.61	81.0	.00228	3.61	8.1	.00228	3.61
25.0	5.0	.2	.000486	900.0	.00199	4.13	90.0	.00199	4.13	9.0	.00199	4.13
2.5	1.0	.4	.000486	90.0	.00728	1.13	9.0	.00728	1.13	.9	.00728	1.13
3.8	1.5	.4	.000486	135.0	.00581	1.42	13.5	.00581	1.42	1.4	.00581	1.42
5.0	2.0	.4	.000486	180.0	.00484	1.70	18.0	.00484	1.70	1.8	.00484	1.70
6.3	2.5	.4	.000486	225.0	.00413	1.99	22.5	.00413	1.99	2.3	.00413	1.99
7.5	3.0	.4	.000486	270.0	.00358	2.30	27.0	.00358	2.30	2.7	.00358	2.30
8.8	3.5	.4	.000486	315.0	.00314	2.62	31.5	.00314	2.62	3.1	.00314	2.62
10.0	4.0	.4	.000486	360.0	.00278	2.96	36.0	.00278	2.96	3.6	.00278	2.96
11.3	4.5	.4	.000486	405.0	.00249	3.31	40.5	.00249	3.31	4.0	.00249	3.31
12.5	5.0	.4	.000486	450.0	.00224	3.68	45.0	.00224	3.68	4.5	.00224	3.68
1.3	1.0	.8	.000486	45.0	.00518	1.59	4.5	.00518	1.59	.5	.00518	1.59
1.9	1.5	.8	.000486	67.5	.00422	1.95	6.8	.00422	1.95	.7	.00422	1.95
2.5	2.0	.8	.000486	90.0	.00364	2.26	9.0	.00364	2.26	.9	.00364	2.26
3.1	2.5	.8	.000486	112.5	.00323	2.55	11.3	.00323	2.55	1.1	.00323	2.55
3.8	3.0	.8	.000486	135.0	.00290	2.84	13.5	.00290	2.84	1.4	.00290	2.84
4.4	3.5	.8	.000486	157.5	.00264	3.12	15.8	.00264	3.12	1.6	.00264	3.12
5.0	4.0	.8	.000486	180.0	.00242	3.40	18.0	.00242	3.40	1.8	.00242	3.40
5.6	4.5	.8	.000486	202.5	.00223	3.69	20.3	.00223	3.69	2.0	.00223	3.69
6.3	5.0	.8	.000486	225.0	.00206	3.99	22.5	.00206	3.99	2.3	.00206	3.99
				Q = 1400 gpm								
5.0	1.0	.2	.000567	180.0	.00968	.73	18.0	.00968	.73	1.8	.00968	.73
7.5	1.5	.2	.000567	270.0	.00716	.99	27.0	.00716	.99	2.7	.00716	.99
10.0	2.0	.2	.000567	360.0	.00557	1.27	36.0	.00557	1.27	3.6	.00557	1.27
12.5	2.5	.2	.000567	450.0	.00447	1.58	45.0	.00447	1.58	4.5	.00447	1.58
15.0	3.0	.2	.000567	540.0	.00369	1.91	54.0	.00369	1.91	5.4	.00369	1.91
17.5	3.5	.2	.000567	630.0	.00310	2.28	63.0	.00310	2.28	6.3	.00310	2.28
20.0	4.0	.2	.000567	720.0	.00264	2.67	72.0	.00264	2.67	7.2	.00264	2.67
22.5	4.5	.2	.000567	810.0	.00228	3.09	81.0	.00228	3.09	8.1	.00228	3.09
25.0	5.0	.2	.000567	900.0	.00199	3.54	90.0	.00199	3.54	9.0	.00199	3.54
2.5	1.0	.4	.000567	90.0	.00728	.97	9.0	.00728	.97	.9	.00728	.97
3.8	1.5	.4	.000567	135.0	.00581	1.22	13.5	.00581	1.22	1.4	.00581	1.22
5.0	2.0	.4	.000567	180.0	.00484	1.46	18.0	.00484	1.46	1.8	.00484	1.46
6.3	2.5	.4	.000567	225.0	.00413	1.71	22.5	.00413	1.71	2.3	.00413	1.71
7.5	3.0	.4	.000567	270.0	.00358	1.97	27.0	.00358	1.97	2.7	.00358	1.97
8.8	3.5	.4	.000567	315.0	.00314	2.25	31.5	.00314	2.25	3.1	.00314	2.25
10.0	4.0	.4	.000567	360.0	.00278	2.54	36.0	.00278	2.54	3.6	.00278	2.54
11.3	4.5	.4	.000567	405.0	.00249	2.84	40.5	.00249	2.84	4.0	.00249	2.84
12.5	5.0	.4	.000567	450.0	.00224	3.15	45.0	.00224	3.15	4.5	.00224	3.15
1.3	1.0	.8	.000567	45.0	.00518	1.36	4.5	.00518	1.36	.5	.00518	1.36
1.9	1.5	.8	.000567	67.5	.00422	1.67	6.8	.00422	1.67	.7	.00422	1.67
2.5	2.0	.8	.000567	90.0	.00364	1.94	9.0	.00364	1.94	.9	.00364	1.94
3.1	2.5	.8	.000567	112.5	.00323	2.19	11.3	.00323	2.19	1.1	.00323	2.19
3.8	3.0	.8	.000567	135.0	.00290	2.43	13.5	.00290	2.43	1.4	.00290	2.43
4.4	3.5	.8	.000567	157.5	.00264	2.67	15.8	.00264	2.67	1.6	.00264	2.67
5.0	4.0	.8	.000567	180.0	.00242	2.92	18.0	.00242	2.92	1.8	.00242	2.92
5.6	4.5	.8	.000567	202.5	.00223	3.16	20.3	.00223	3.16	2.0	.00223	3.16
6.3	5.0	.8	.000567	225.0	.00206	3.42	22.5	.00206	3.42	2.3	.00206	3.42

Table SA-42
Results of Waste Dilution - Summer - Ship 1
(L = 2.7 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 500 gpm								
5.0	1.0	.2	.000202	180.0	.01711	1.16	18.0	.01346	1.47	1.8	.01346	1.47
7.5	1.5	.2	.000202	270.0	.01223	1.62	27.0	.01003	1.97	2.7	.01003	1.97
10.0	2.0	.2	.000202	360.0	.00913	2.17	36.0	.00784	2.52	3.6	.00784	2.52
12.5	2.5	.2	.000202	450.0	.00718	2.75	45.0	.00633	3.12	4.5	.00633	3.12
15.0	3.0	.2	.000202	540.0	.00584	3.38	54.0	.00524	3.77	5.4	.00524	3.77
17.5	3.5	.2	.000202	630.0	.00487	4.06	63.0	.00442	4.48	6.3	.00442	4.48
20.0	4.0	.2	.000202	720.0	.00413	4.79	72.0	.00378	5.23	7.2	.00378	5.23
22.5	4.5	.2	.000202	810.0	.00355	5.56	81.0	.00327	6.04	8.1	.00327	6.04
25.0	5.0	.2	.000202	900.0	.00309	6.39	90.0	.00286	6.90	9.0	.00286	6.90
2.5	1.0	.4	.000202	90.0	.01005	1.97	9.0	.01005	1.97	.9	.01005	1.97
3.8	1.5	.4	.000202	135.0	.00914	2.16	13.5	.00804	2.46	1.4	.00804	2.46
5.0	2.0	.4	.000202	180.0	.00855	2.31	18.0	.00673	2.94	1.8	.00673	2.94
6.3	2.5	.4	.000202	225.0	.00732	2.70	22.5	.00577	3.43	2.3	.00577	3.43
7.5	3.0	.4	.000202	270.0	.00611	3.23	27.0	.00501	3.94	2.7	.00501	3.94
8.8	3.5	.4	.000202	315.0	.00524	3.77	31.5	.00441	4.48	3.1	.00441	4.48
10.0	4.0	.4	.000202	360.0	.00456	4.33	36.0	.00392	5.04	3.6	.00392	5.04
11.3	4.5	.4	.000202	405.0	.00403	4.91	40.5	.00351	5.63	4.0	.00351	5.63
12.5	5.0	.4	.000202	450.0	.00359	5.50	45.0	.00317	6.24	4.5	.00317	6.24
1.3	1.0	.8	.000202	45.0	.00714	2.77	4.5	.00714	2.77	.5	.00714	2.77
1.9	1.5	.8	.000202	67.5	.00582	3.39	6.8	.00582	3.39	.7	.00582	3.39
2.5	2.0	.8	.000202	90.0	.00503	3.93	9.0	.00503	3.93	.9	.00503	3.93
3.1	2.5	.8	.000202	112.5	.00471	4.20	11.3	.00446	4.43	1.1	.00446	4.43
3.8	3.0	.8	.000202	135.0	.00457	4.32	13.5	.00402	4.91	1.4	.00402	4.91
4.4	3.5	.8	.000202	157.5	.00443	4.46	15.8	.00367	5.39	1.6	.00367	5.39
5.0	4.0	.8	.000202	180.0	.00428	4.62	18.0	.00337	5.87	1.8	.00337	5.87
5.6	4.5	.8	.000202	202.5	.00408	4.84	20.3	.00311	6.36	2.0	.00311	6.36
6.3	5.0	.8	.000202	225.0	.00368	5.37	22.5	.00288	6.85	2.3	.00288	6.85
				Q = 600 gpm								
5.0	1.0	.2	.000243	180.0	.01711	.96	18.0	.01346	1.22	1.8	.01346	1.22
7.5	1.5	.2	.000243	270.0	.01223	1.35	27.0	.01003	1.64	2.7	.01003	1.64
10.0	2.0	.2	.000243	360.0	.00913	1.80	36.0	.00784	2.10	3.6	.00784	2.10
12.5	2.5	.2	.000243	450.0	.00718	2.29	45.0	.00633	2.60	4.5	.00633	2.60
15.0	3.0	.2	.000243	540.0	.00584	2.82	54.0	.00524	3.14	5.4	.00524	3.14
17.5	3.5	.2	.000243	630.0	.00487	3.38	63.0	.00442	3.73	6.3	.00442	3.73
20.0	4.0	.2	.000243	720.0	.00413	3.99	72.0	.00378	4.36	7.2	.00378	4.36
22.5	4.5	.2	.000243	810.0	.00355	4.63	81.0	.00327	5.03	8.1	.00327	5.03
25.0	5.0	.2	.000243	900.0	.00309	5.32	90.0	.00286	5.75	9.0	.00286	5.75
2.5	1.0	.4	.000243	90.0	.01005	1.64	9.0	.01005	1.64	.9	.01005	1.64
3.8	1.5	.4	.000243	135.0	.00914	1.80	13.5	.00804	2.05	1.4	.00804	2.05
5.0	2.0	.4	.000243	180.0	.00855	1.92	18.0	.00673	2.45	1.8	.00673	2.45
6.3	2.5	.4	.000243	225.0	.00732	2.25	22.5	.00577	2.86	2.3	.00577	2.86
7.5	3.0	.4	.000243	270.0	.00611	2.69	27.0	.00501	3.28	2.7	.00501	3.28
8.8	3.5	.4	.000243	315.0	.00524	3.14	31.5	.00441	3.73	3.1	.00441	3.73
10.0	4.0	.4	.000243	360.0	.00456	3.61	36.0	.00392	4.20	3.6	.00392	4.20
11.3	4.5	.4	.000243	405.0	.00403	4.09	40.5	.00351	4.69	4.0	.00351	4.69
12.5	5.0	.4	.000243	450.0	.00359	4.59	45.0	.00317	5.20	4.5	.00317	5.20
1.3	1.0	.8	.000243	45.0	.00714	2.31	4.5	.00714	2.31	.5	.00714	2.31
1.9	1.5	.8	.000243	67.5	.00582	2.83	6.8	.00582	2.83	.7	.00582	2.83
2.5	2.0	.8	.000243	90.0	.00503	3.28	9.0	.00503	3.28	.9	.00503	3.28
3.1	2.5	.8	.000243	112.5	.00471	3.50	11.3	.00446	3.69	1.1	.00446	3.69
3.8	3.0	.8	.000243	135.0	.00457	3.60	13.5	.00402	4.09	1.4	.00402	4.09
4.4	3.5	.8	.000243	157.5	.00443	3.72	15.8	.00367	4.49	1.6	.00367	4.49
5.0	4.0	.8	.000243	180.0	.00428	3.85	18.0	.00337	4.89	1.8	.00337	4.89
5.6	4.5	.8	.000243	202.5	.00408	4.03	20.3	.00311	5.30	2.0	.00311	5.30
6.3	5.0	.8	.000243	225.0	.00368	4.48	22.5	.00288	5.71	2.3	.00288	5.71

Table SA-42 (continued)
Results of Waste Dilution - Summer - Ship 1
(L = 2.7 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 700 gpm							
5.0	1.0	.2	.000283	180.0	.01711	.83	18.0	.01346	1.05	1.8	.01346	1.05
7.5	1.5	.2	.000283	270.0	.01223	1.15	27.0	.01003	1.41	2.7	.01003	1.41
10.0	2.0	.2	.000283	360.0	.00913	1.55	36.0	.00784	1.80	3.6	.00784	1.80
12.5	2.5	.2	.000283	450.0	.00718	1.97	45.0	.00633	2.23	4.5	.00633	2.23
15.0	3.0	.2	.000283	540.0	.00584	2.42	54.0	.00524	2.69	5.4	.00524	2.69
17.5	3.5	.2	.000283	630.0	.00487	2.90	63.0	.00442	3.20	6.3	.00442	3.20
20.0	4.0	.2	.000283	720.0	.00413	3.42	72.0	.00378	3.74	7.2	.00378	3.74
22.5	4.5	.2	.000283	810.0	.00355	3.97	81.0	.00327	4.31	8.1	.00327	4.31
25.0	5.0	.2	.000283	900.0	.00309	4.56	90.0	.00286	4.93	9.0	.00286	4.93
2.5	1.0	.4	.000283	90.0	.01005	1.40	9.0	.01005	1.40	.9	.01005	1.40
3.8	1.5	.4	.000283	135.0	.00914	1.54	13.5	.00804	1.75	1.4	.00804	1.75
5.0	2.0	.4	.000283	180.0	.00855	1.65	18.0	.00673	2.10	1.8	.00673	2.10
6.3	2.5	.4	.000283	225.0	.00732	1.93	22.5	.00577	2.45	2.3	.00577	2.45
7.5	3.0	.4	.000283	270.0	.00611	2.31	27.0	.00501	2.81	2.7	.00501	2.81
8.8	3.5	.4	.000283	315.0	.00524	2.70	31.5	.00441	3.20	3.1	.00441	3.20
10.0	4.0	.4	.000283	360.0	.00456	3.09	36.0	.00392	3.60	3.6	.00392	3.60
11.3	4.5	.4	.000283	405.0	.00403	3.50	40.5	.00351	4.02	4.0	.00351	4.02
12.5	5.0	.4	.000283	450.0	.00359	3.93	45.0	.00317	4.46	4.5	.00317	4.46
1.3	1.0	.8	.000283	45.0	.00714	1.98	4.5	.00714	1.98	.5	.00714	1.98
1.9	1.5	.8	.000283	67.5	.00582	2.42	6.8	.00582	2.42	.7	.00582	2.42
2.5	2.0	.8	.000283	90.0	.00503	2.81	9.0	.00503	2.81	.9	.00503	2.81
3.1	2.5	.8	.000283	112.5	.00471	3.00	11.3	.00446	3.16	1.1	.00446	3.16
3.8	3.0	.8	.000283	135.0	.00457	3.09	13.5	.00402	3.51	1.4	.00402	3.51
4.4	3.5	.8	.000283	157.5	.00443	3.19	15.8	.00367	3.85	1.6	.00367	3.85
5.0	4.0	.8	.000283	180.0	.00428	3.30	18.0	.00337	4.19	1.8	.00337	4.19
5.6	4.5	.8	.000283	202.5	.00408	3.46	20.3	.00311	4.54	2.0	.00311	4.54
6.3	5.0	.8	.000283	225.0	.00368	3.84	22.5	.00288	4.90	2.3	.00288	4.90
					Q = 1000 gpm							
5.0	1.0	.2	.000405	180.0	.01711	.58	18.0	.01346	.73	1.8	.01346	.73
7.5	1.5	.2	.000405	270.0	.01223	.81	27.0	.01003	.99	2.7	.01003	.99
10.0	2.0	.2	.000405	360.0	.00913	1.08	36.0	.00784	1.26	3.6	.00784	1.26
12.5	2.5	.2	.000405	450.0	.00718	1.38	45.0	.00633	1.56	4.5	.00633	1.56
15.0	3.0	.2	.000405	540.0	.00584	1.69	54.0	.00524	1.89	5.4	.00524	1.89
17.5	3.5	.2	.000405	630.0	.00487	2.03	63.0	.00442	2.24	6.3	.00442	2.24
20.0	4.0	.2	.000405	720.0	.00413	2.39	72.0	.00378	2.62	7.2	.00378	2.62
22.5	4.5	.2	.000405	810.0	.00355	2.78	81.0	.00327	3.02	8.1	.00327	3.02
25.0	5.0	.2	.000405	900.0	.00309	3.19	90.0	.00286	3.45	9.0	.00286	3.45
2.5	1.0	.4	.000405	90.0	.01005	.98	9.0	.01005	.98	.9	.01005	.98
3.8	1.5	.4	.000405	135.0	.00914	1.08	13.5	.00804	1.23	1.4	.00804	1.23
5.0	2.0	.4	.000405	180.0	.00855	1.15	18.0	.00673	1.47	1.8	.00673	1.47
6.3	2.5	.4	.000405	225.0	.00732	1.35	22.5	.00577	1.71	2.3	.00577	1.71
7.5	3.0	.4	.000405	270.0	.00611	1.62	27.0	.00501	1.97	2.7	.00501	1.97
8.8	3.5	.4	.000405	315.0	.00524	1.89	31.5	.00441	2.24	3.1	.00441	2.24
10.0	4.0	.4	.000405	360.0	.00456	2.17	36.0	.00392	2.52	3.6	.00392	2.52
11.3	4.5	.4	.000405	405.0	.00403	2.45	40.5	.00351	2.81	4.0	.00351	2.81
12.5	5.0	.4	.000405	450.0	.00359	2.75	45.0	.00317	3.12	4.5	.00317	3.12
1.3	1.0	.8	.000405	45.0	.00714	1.38	4.5	.00714	1.38	.5	.00714	1.38
1.9	1.5	.8	.000405	67.5	.00582	1.70	6.8	.00582	1.70	.7	.00582	1.70
2.5	2.0	.8	.000405	90.0	.00503	1.97	9.0	.00503	1.97	.9	.00503	1.97
3.1	2.5	.8	.000405	112.5	.00471	2.10	11.3	.00446	2.22	1.1	.00446	2.22
3.8	3.0	.8	.000405	135.0	.00457	2.16	13.5	.00402	2.46	1.4	.00402	2.46
4.4	3.5	.8	.000405	157.5	.00443	2.23	15.8	.00367	2.69	1.6	.00367	2.69
5.0	4.0	.8	.000405	180.0	.00428	2.31	18.0	.00337	2.94	1.8	.00337	2.94
5.6	4.5	.8	.000405	202.5	.00408	2.42	20.3	.00311	3.18	2.0	.00311	3.18
6.3	5.0	.8	.000405	225.0	.00368	2.69	22.5	.00288	3.43	2.3	.00288	3.43

Table SA-42 (continued)
Results of Waste Dilution - Summer - Ship 1
(L = 2.7 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 1200 gpm								
5.0	1.0	.2	.000486	180.0	.01711	.48	18.0	.01346	.61	1.8	.01346	.61
7.5	1.5	.2	.000486	270.0	.01223	.67	27.0	.01003	.82	2.7	.01003	.82
10.0	2.0	.2	.000486	360.0	.00913	.90	36.0	.00784	1.05	3.6	.00784	1.05
12.5	2.5	.2	.000486	450.0	.00718	1.15	45.0	.00633	1.30	4.5	.00633	1.30
15.0	3.0	.2	.000486	540.0	.00584	1.41	54.0	.00524	1.57	5.4	.00524	1.57
17.5	3.5	.2	.000486	630.0	.00487	1.69	63.0	.00442	1.86	6.3	.00442	1.86
20.0	4.0	.2	.000486	720.0	.00413	1.99	72.0	.00378	2.18	7.2	.00378	2.18
22.5	4.5	.2	.000486	810.0	.00355	2.32	81.0	.00327	2.52	8.1	.00327	2.52
25.0	5.0	.2	.000486	900.0	.00309	2.66	90.0	.00286	2.87	9.0	.00286	2.87
2.5	1.0	.4	.000486	90.0	.01005	.82	9.0	.01005	.82	.9	.01005	.82
3.8	1.5	.4	.000486	135.0	.00914	.90	13.5	.00804	1.02	1.4	.00804	1.02
5.0	2.0	.4	.000486	180.0	.00855	.96	18.0	.00673	1.22	1.8	.00673	1.22
6.3	2.5	.4	.000486	225.0	.00732	1.12	22.5	.00577	1.43	2.3	.00577	1.43
7.5	3.0	.4	.000486	270.0	.00611	1.35	27.0	.00501	1.64	2.7	.00501	1.64
8.8	3.5	.4	.000486	315.0	.00524	1.57	31.5	.00441	1.87	3.1	.00441	1.87
10.0	4.0	.4	.000486	360.0	.00456	1.80	36.0	.00392	2.10	3.6	.00392	2.10
11.3	4.5	.4	.000486	405.0	.00403	2.04	40.5	.00351	2.34	4.0	.00351	2.34
12.5	5.0	.4	.000486	450.0	.00359	2.29	45.0	.00317	2.60	4.5	.00317	2.60
1.3	1.0	.8	.000486	45.0	.00714	1.15	4.5	.00714	1.15	.5	.00714	1.15
1.9	1.5	.8	.000486	67.5	.00582	1.41	6.8	.00582	1.41	.7	.00582	1.41
2.5	2.0	.8	.000486	90.0	.00503	1.64	9.0	.00503	1.64	.9	.00503	1.64
3.1	2.5	.8	.000486	112.5	.00471	1.75	11.3	.00446	1.85	1.1	.00446	1.85
3.8	3.0	.8	.000486	135.0	.00457	1.80	13.5	.00402	2.05	1.4	.00402	2.05
4.4	3.5	.8	.000486	157.5	.00443	1.86	15.8	.00367	2.25	1.6	.00367	2.25
5.0	4.0	.8	.000486	180.0	.00428	1.92	18.0	.00337	2.45	1.8	.00337	2.45
5.6	4.5	.8	.000486	202.5	.00408	2.02	20.3	.00311	2.65	2.0	.00311	2.65
6.3	5.0	.8	.000486	225.0	.00368	2.24	22.5	.00288	2.86	2.3	.00288	2.86
				Q = 1400 gpm								
5.0	1.0	.2	.000567	180.0	.01711	.41	18.0	.01346	.52	1.8	.01346	.52
7.5	1.5	.2	.000567	270.0	.01223	.58	27.0	.01003	.70	2.7	.01003	.70
10.0	2.0	.2	.000567	360.0	.00913	.77	36.0	.00784	.90	3.6	.00784	.90
12.5	2.5	.2	.000567	450.0	.00718	.98	45.0	.00633	1.11	4.5	.00633	1.11
15.0	3.0	.2	.000567	540.0	.00584	1.21	54.0	.00524	1.35	5.4	.00524	1.35
17.5	3.5	.2	.000567	630.0	.00487	1.45	63.0	.00442	1.60	6.3	.00442	1.60
20.0	4.0	.2	.000567	720.0	.00413	1.71	72.0	.00378	1.87	7.2	.00378	1.87
22.5	4.5	.2	.000567	810.0	.00355	1.99	81.0	.00327	2.16	8.1	.00327	2.16
25.0	5.0	.2	.000567	900.0	.00309	2.28	90.0	.00286	2.46	9.0	.00286	2.46
2.5	1.0	.4	.000567	90.0	.01005	.70	9.0	.01005	.70	.9	.01005	.70
3.8	1.5	.4	.000567	135.0	.00914	.77	13.5	.00804	.88	1.4	.00804	.88
5.0	2.0	.4	.000567	180.0	.00855	.82	18.0	.00673	1.05	1.8	.00673	1.05
6.3	2.5	.4	.000567	225.0	.00732	.96	22.5	.00577	1.22	2.3	.00577	1.22
7.5	3.0	.4	.000567	270.0	.00611	1.15	27.0	.00501	1.41	2.7	.00501	1.41
8.8	3.5	.4	.000567	315.0	.00524	1.35	31.5	.00441	1.60	3.1	.00441	1.60
10.0	4.0	.4	.000567	360.0	.00456	1.55	36.0	.00392	1.80	3.6	.00392	1.80
11.3	4.5	.4	.000567	405.0	.00403	1.75	40.5	.00351	2.01	4.0	.00351	2.01
12.5	5.0	.4	.000567	450.0	.00359	1.97	45.0	.00317	2.23	4.5	.00317	2.23
1.3	1.0	.8	.000567	45.0	.00714	.99	4.5	.00714	.99	.5	.00714	.99
1.9	1.5	.8	.000567	67.5	.00582	1.21	6.8	.00582	1.21	.7	.00582	1.21
2.5	2.0	.8	.000567	90.0	.00503	1.40	9.0	.00503	1.40	.9	.00503	1.40
3.1	2.5	.8	.000567	112.5	.00471	1.50	11.3	.00446	1.58	1.1	.00446	1.58
3.8	3.0	.8	.000567	135.0	.00457	1.54	13.5	.00402	1.75	1.4	.00402	1.75
4.4	3.5	.8	.000567	157.5	.00443	1.59	15.8	.00367	1.92	1.6	.00367	1.92
5.0	4.0	.8	.000567	180.0	.00428	1.65	18.0	.00337	2.10	1.8	.00337	2.10
5.6	4.5	.8	.000567	202.5	.00408	1.73	20.3	.00311	2.27	2.0	.00311	2.27
6.3	5.0	.8	.000567	225.0	.00368	1.92	22.5	.00288	2.45	2.3	.00288	2.45

Table SA-43
Results of Waste Dilution - Winter - Ship 1
(L = 2.7 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 500 gpm							
5.0	1.0	.2	.000202	180.0	.00904	2.19	18.0	.00904	2.19	1.8	.00904	2.19
7.5	1.5	.2	.000202	270.0	.00673	2.93	27.0	.00673	2.93	2.7	.00673	2.93
10.0	2.0	.2	.000202	360.0	.00527	3.75	36.0	.00527	3.75	3.6	.00527	3.75
12.5	2.5	.2	.000202	450.0	.00425	4.65	45.0	.00425	4.65	4.5	.00425	4.65
15.0	3.0	.2	.000202	540.0	.00352	5.62	54.0	.00352	5.62	5.4	.00352	5.62
17.5	3.5	.2	.000202	630.0	.00296	6.66	63.0	.00296	6.66	6.3	.00296	6.66
20.0	4.0	.2	.000202	720.0	.00254	7.79	72.0	.00254	7.79	7.2	.00254	7.79
22.5	4.5	.2	.000202	810.0	.00220	8.99	81.0	.00220	8.99	8.1	.00220	8.99
25.0	5.0	.2	.000202	900.0	.00192	10.27	90.0	.00192	10.27	9.0	.00192	10.27
2.5	1.0	.4	.000202	90.0	.00675	2.93	9.0	.00675	2.93	.9	.00675	2.93
3.8	1.5	.4	.000202	135.0	.00540	3.66	13.5	.00540	3.66	1.4	.00540	3.66
5.0	2.0	.4	.000202	180.0	.00452	4.37	18.0	.00452	4.37	1.8	.00452	4.37
6.3	2.5	.4	.000202	225.0	.00387	5.10	22.5	.00387	5.10	2.3	.00387	5.10
7.5	3.0	.4	.000202	270.0	.00337	5.87	27.0	.00337	5.87	2.7	.00337	5.87
8.8	3.5	.4	.000202	315.0	.00296	6.67	31.5	.00296	6.67	3.1	.00296	6.67
10.0	4.0	.4	.000202	360.0	.00263	7.50	36.0	.00263	7.50	3.6	.00263	7.50
11.3	4.5	.4	.000202	405.0	.00236	8.38	40.5	.00236	8.38	4.0	.00236	8.38
12.5	5.0	.4	.000202	450.0	.00213	9.29	45.0	.00213	9.29	4.5	.00213	9.29
1.3	1.0	.8	.000202	45.0	.00479	4.12	4.5	.00479	4.12	.5	.00479	4.12
1.9	1.5	.8	.000202	67.5	.00391	5.05	6.8	.00391	5.05	.7	.00391	5.05
2.5	2.0	.8	.000202	90.0	.00337	5.86	9.0	.00337	5.86	.9	.00337	5.86
3.1	2.5	.8	.000202	112.5	.00299	6.60	11.3	.00299	6.60	1.1	.00299	6.60
3.8	3.0	.8	.000202	135.0	.00270	7.32	13.5	.00270	7.32	1.4	.00270	7.32
4.4	3.5	.8	.000202	157.5	.00246	8.03	15.8	.00246	8.03	1.6	.00246	8.03
5.0	4.0	.8	.000202	180.0	.00226	8.74	18.0	.00226	8.74	1.8	.00226	8.74
5.6	4.5	.8	.000202	202.5	.00209	9.47	20.3	.00209	9.47	2.0	.00209	9.47
6.3	5.0	.8	.000202	225.0	.00194	10.21	22.5	.00194	10.21	2.3	.00194	10.21
					Q = 600 gpm							
5.0	1.0	.2	.000243	180.0	.00904	1.82	18.0	.00904	1.82	1.8	.00904	1.82
7.5	1.5	.2	.000243	270.0	.00673	2.45	27.0	.00673	2.45	2.7	.00673	2.45
10.0	2.0	.2	.000243	360.0	.00527	3.13	36.0	.00527	3.13	3.6	.00527	3.13
12.5	2.5	.2	.000243	450.0	.00425	3.87	45.0	.00425	3.87	4.5	.00425	3.87
15.0	3.0	.2	.000243	540.0	.00352	4.68	54.0	.00352	4.68	5.4	.00352	4.68
17.5	3.5	.2	.000243	630.0	.00296	5.55	63.0	.00296	5.55	6.3	.00296	5.55
20.0	4.0	.2	.000243	720.0	.00254	6.49	72.0	.00254	6.49	7.2	.00254	6.49
22.5	4.5	.2	.000243	810.0	.00220	7.49	81.0	.00220	7.49	8.1	.00220	7.49
25.0	5.0	.2	.000243	900.0	.00192	8.56	90.0	.00192	8.56	9.0	.00192	8.56
2.5	1.0	.4	.000243	90.0	.00675	2.44	9.0	.00675	2.44	.9	.00675	2.44
3.8	1.5	.4	.000243	135.0	.00540	3.05	13.5	.00540	3.05	1.4	.00540	3.05
5.0	2.0	.4	.000243	180.0	.00452	3.64	18.0	.00452	3.64	1.8	.00452	3.64
6.3	2.5	.4	.000243	225.0	.00387	4.25	22.5	.00387	4.25	2.3	.00387	4.25
7.5	3.0	.4	.000243	270.0	.00337	4.89	27.0	.00337	4.89	2.7	.00337	4.89
8.8	3.5	.4	.000243	315.0	.00296	5.56	31.5	.00296	5.56	3.1	.00296	5.56
10.0	4.0	.4	.000243	360.0	.00263	6.25	36.0	.00263	6.25	3.6	.00263	6.25
11.3	4.5	.4	.000243	405.0	.00236	6.98	40.5	.00236	6.98	4.0	.00236	6.98
12.5	5.0	.4	.000243	450.0	.00213	7.74	45.0	.00213	7.74	4.5	.00213	7.74
1.3	1.0	.8	.000243	45.0	.00479	3.43	4.5	.00479	3.43	.5	.00479	3.43
1.9	1.5	.8	.000243	67.5	.00391	4.21	6.8	.00391	4.21	.7	.00391	4.21
2.5	2.0	.8	.000243	90.0	.00337	4.88	9.0	.00337	4.88	.9	.00337	4.88
3.1	2.5	.8	.000243	112.5	.00299	5.50	11.3	.00299	5.50	1.1	.00299	5.50
3.8	3.0	.8	.000243	135.0	.00270	6.10	13.5	.00270	6.10	1.4	.00270	6.10
4.4	3.5	.8	.000243	157.5	.00246	6.69	15.8	.00246	6.69	1.6	.00246	6.69
5.0	4.0	.8	.000243	180.0	.00226	7.29	18.0	.00226	7.29	1.8	.00226	7.29
5.6	4.5	.8	.000243	202.5	.00209	7.89	20.3	.00209	7.89	2.0	.00209	7.89
6.3	5.0	.8	.000243	225.0	.00194	8.51	22.5	.00194	8.51	2.3	.00194	8.51

Table SA-43 (continued)
Results of Waste Dilution - Winter - Ship 1
(L = 2.7 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 700 gpm								
5.0	1.0	.2	.000283	180.0	.00904	1.56	18.0	.00904	1.56	1.8	.00904	1.56
7.5	1.5	.2	.000283	270.0	.00673	2.10	27.0	.00673	2.10	2.7	.00673	2.10
10.0	2.0	.2	.000283	360.0	.00527	2.68	36.0	.00527	2.68	3.6	.00527	2.68
12.5	2.5	.2	.000283	450.0	.00425	3.32	45.0	.00425	3.32	4.5	.00425	3.32
15.0	3.0	.2	.000283	540.0	.00352	4.01	54.0	.00352	4.01	5.4	.00352	4.01
17.5	3.5	.2	.000283	630.0	.00296	4.76	63.0	.00296	4.76	6.3	.00296	4.76
20.0	4.0	.2	.000283	720.0	.00254	5.56	72.0	.00254	5.56	7.2	.00254	5.56
22.5	4.5	.2	.000283	810.0	.00220	6.42	81.0	.00220	6.42	8.1	.00220	6.42
25.0	5.0	.2	.000283	900.0	.00192	7.34	90.0	.00192	7.34	9.0	.00192	7.34
2.5	1.0	.4	.000283	90.0	.00675	2.09	9.0	.00675	2.09	.9	.00675	2.09
3.8	1.5	.4	.000283	135.0	.00540	2.61	13.5	.00540	2.61	1.4	.00540	2.61
5.0	2.0	.4	.000283	180.0	.00452	3.12	18.0	.00452	3.12	1.8	.00452	3.12
6.3	2.5	.4	.000283	225.0	.00387	3.65	22.5	.00387	3.65	2.3	.00387	3.65
7.5	3.0	.4	.000283	270.0	.00337	4.19	27.0	.00337	4.19	2.7	.00337	4.19
8.8	3.5	.4	.000283	315.0	.00296	4.76	31.5	.00296	4.76	3.1	.00296	4.76
10.0	4.0	.4	.000283	360.0	.00263	5.36	36.0	.00263	5.36	3.6	.00263	5.36
11.3	4.5	.4	.000283	405.0	.00236	5.99	40.5	.00236	5.99	4.0	.00236	5.99
12.5	5.0	.4	.000283	450.0	.00213	6.64	45.0	.00213	6.64	4.5	.00213	6.64
1.3	1.0	.8	.000283	45.0	.00479	2.94	4.5	.00479	2.94	.5	.00479	2.94
1.9	1.5	.8	.000283	67.5	.00391	3.61	6.8	.00391	3.61	.7	.00391	3.61
2.5	2.0	.8	.000283	90.0	.00337	4.18	9.0	.00337	4.18	.9	.00337	4.18
3.1	2.5	.8	.000283	112.5	.00299	4.71	11.3	.00299	4.71	1.1	.00299	4.71
3.8	3.0	.8	.000283	135.0	.00270	5.23	13.5	.00270	5.23	1.4	.00270	5.23
4.4	3.5	.8	.000283	157.5	.00246	5.73	15.8	.00246	5.73	1.6	.00246	5.73
5.0	4.0	.8	.000283	180.0	.00226	6.24	18.0	.00226	6.24	1.8	.00226	6.24
5.6	4.5	.8	.000283	202.5	.00209	6.76	20.3	.00209	6.76	2.0	.00209	6.76
6.3	5.0	.8	.000283	225.0	.00194	7.29	22.5	.00194	7.29	2.3	.00194	7.29
				Q = 1000 gpm								
5.0	1.0	.2	.000405	180.0	.00904	1.09	18.0	.00904	1.09	1.8	.00904	1.09
7.5	1.5	.2	.000405	270.0	.00673	1.47	27.0	.00673	1.47	2.7	.00673	1.47
10.0	2.0	.2	.000405	360.0	.00527	1.88	36.0	.00527	1.88	3.6	.00527	1.88
12.5	2.5	.2	.000405	450.0	.00425	2.32	45.0	.00425	2.32	4.5	.00425	2.32
15.0	3.0	.2	.000405	540.0	.00352	2.81	54.0	.00352	2.81	5.4	.00352	2.81
17.5	3.5	.2	.000405	630.0	.00296	3.33	63.0	.00296	3.33	6.3	.00296	3.33
20.0	4.0	.2	.000405	720.0	.00254	3.90	72.0	.00254	3.90	7.2	.00254	3.90
22.5	4.5	.2	.000405	810.0	.00220	4.50	81.0	.00220	4.50	8.1	.00220	4.50
25.0	5.0	.2	.000405	900.0	.00192	5.14	90.0	.00192	5.14	9.0	.00192	5.14
2.5	1.0	.4	.000405	90.0	.00675	1.46	9.0	.00675	1.46	.9	.00675	1.46
3.8	1.5	.4	.000405	135.0	.00540	1.83	13.5	.00540	1.83	1.4	.00540	1.83
5.0	2.0	.4	.000405	180.0	.00452	2.19	18.0	.00452	2.19	1.8	.00452	2.19
6.3	2.5	.4	.000405	225.0	.00387	2.55	22.5	.00387	2.55	2.3	.00387	2.55
7.5	3.0	.4	.000405	270.0	.00337	2.93	27.0	.00337	2.93	2.7	.00337	2.93
8.8	3.5	.4	.000405	315.0	.00296	3.33	31.5	.00296	3.33	3.1	.00296	3.33
10.0	4.0	.4	.000405	360.0	.00263	3.75	36.0	.00263	3.75	3.6	.00263	3.75
11.3	4.5	.4	.000405	405.0	.00236	4.19	40.5	.00236	4.19	4.0	.00236	4.19
12.5	5.0	.4	.000405	450.0	.00213	4.65	45.0	.00213	4.65	4.5	.00213	4.65
1.3	1.0	.8	.000405	45.0	.00479	2.06	4.5	.00479	2.06	.5	.00479	2.06
1.9	1.5	.8	.000405	67.5	.00391	2.53	6.8	.00391	2.53	.7	.00391	2.53
2.5	2.0	.8	.000405	90.0	.00337	2.93	9.0	.00337	2.93	.9	.00337	2.93
3.1	2.5	.8	.000405	112.5	.00299	3.30	11.3	.00299	3.30	1.1	.00299	3.30
3.8	3.0	.8	.000405	135.0	.00270	3.66	13.5	.00270	3.66	1.4	.00270	3.66
4.4	3.5	.8	.000405	157.5	.00246	4.01	15.8	.00246	4.01	1.6	.00246	4.01
5.0	4.0	.8	.000405	180.0	.00226	4.37	18.0	.00226	4.37	1.8	.00226	4.37
5.6	4.5	.8	.000405	202.5	.00209	4.73	20.3	.00209	4.73	2.0	.00209	4.73
6.3	5.0	.8	.000405	225.0	.00194	5.10	22.5	.00194	5.10	2.3	.00194	5.10

Table SA-43 (continued)
Results of Waste Dilution - Winter - Ship 1
(L = 2.7 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 1200 gpm							
5.0	1.0	.2	.000486	180.0	.00904	.91	18.0	.00904	.91	1.8	.00904	.91
7.5	1.5	.2	.000486	270.0	.00673	1.22	27.0	.00673	1.22	2.7	.00673	1.22
10.0	2.0	.2	.000486	360.0	.00527	1.56	36.0	.00527	1.56	3.6	.00527	1.56
12.5	2.5	.2	.000486	450.0	.00425	1.94	45.0	.00425	1.94	4.5	.00425	1.94
15.0	3.0	.2	.000486	540.0	.00352	2.34	54.0	.00352	2.34	5.4	.00352	2.34
17.5	3.5	.2	.000486	630.0	.00296	2.78	63.0	.00296	2.78	6.3	.00296	2.78
20.0	4.0	.2	.000486	720.0	.00254	3.25	72.0	.00254	3.25	7.2	.00254	3.25
22.5	4.5	.2	.000486	810.0	.00220	3.75	81.0	.00220	3.75	8.1	.00220	3.75
25.0	5.0	.2	.000486	900.0	.00192	4.28	90.0	.00192	4.28	9.0	.00192	4.28
2.5	1.0	.4	.000486	90.0	.00675	1.22	9.0	.00675	1.22	.9	.00675	1.22
3.8	1.5	.4	.000486	135.0	.00540	1.52	13.5	.00540	1.52	1.4	.00540	1.52
5.0	2.0	.4	.000486	180.0	.00452	1.82	18.0	.00452	1.82	1.8	.00452	1.82
6.3	2.5	.4	.000486	225.0	.00387	2.13	22.5	.00387	2.13	2.3	.00387	2.13
7.5	3.0	.4	.000486	270.0	.00337	2.45	27.0	.00337	2.45	2.7	.00337	2.45
8.8	3.5	.4	.000486	315.0	.00296	2.78	31.5	.00296	2.78	3.1	.00296	2.78
10.0	4.0	.4	.000486	360.0	.00263	3.13	36.0	.00263	3.13	3.6	.00263	3.13
11.3	4.5	.4	.000486	405.0	.00236	3.49	40.5	.00236	3.49	4.0	.00236	3.49
12.5	5.0	.4	.000486	450.0	.00213	3.87	45.0	.00213	3.87	4.5	.00213	3.87
1.3	1.0	.8	.000486	45.0	.00479	1.72	4.5	.00479	1.72	.5	.00479	1.72
1.9	1.5	.8	.000486	67.5	.00391	2.11	6.8	.00391	2.11	.7	.00391	2.11
2.5	2.0	.8	.000486	90.0	.00337	2.44	9.0	.00337	2.44	.9	.00337	2.44
3.1	2.5	.8	.000486	112.5	.00299	2.75	11.3	.00299	2.75	1.1	.00299	2.75
3.8	3.0	.8	.000486	135.0	.00270	3.05	13.5	.00270	3.05	1.4	.00270	3.05
4.4	3.5	.8	.000486	157.5	.00246	3.34	15.8	.00246	3.34	1.6	.00246	3.34
5.0	4.0	.8	.000486	180.0	.00226	3.64	18.0	.00226	3.64	1.8	.00226	3.64
5.6	4.5	.8	.000486	202.5	.00209	3.95	20.3	.00209	3.95	2.0	.00209	3.95
6.3	5.0	.8	.000486	225.0	.00194	4.25	22.5	.00194	4.25	2.3	.00194	4.25
					Q = 1400 gpm							
5.0	1.0	.2	.000567	180.0	.00904	.78	18.0	.00904	.78	1.8	.00904	.78
7.5	1.5	.2	.000567	270.0	.00673	1.05	27.0	.00673	1.05	2.7	.00673	1.05
10.0	2.0	.2	.000567	360.0	.00527	1.34	36.0	.00527	1.34	3.6	.00527	1.34
12.5	2.5	.2	.000567	450.0	.00425	1.66	45.0	.00425	1.66	4.5	.00425	1.66
15.0	3.0	.2	.000567	540.0	.00352	2.01	54.0	.00352	2.01	5.4	.00352	2.01
17.5	3.5	.2	.000567	630.0	.00296	2.38	63.0	.00296	2.38	6.3	.00296	2.38
20.0	4.0	.2	.000567	720.0	.00254	2.78	72.0	.00254	2.78	7.2	.00254	2.78
22.5	4.5	.2	.000567	810.0	.00220	3.21	81.0	.00220	3.21	8.1	.00220	3.21
25.0	5.0	.2	.000567	900.0	.00192	3.67	90.0	.00192	3.67	9.0	.00192	3.67
2.5	1.0	.4	.000567	90.0	.00675	1.05	9.0	.00675	1.05	.9	.00675	1.05
3.8	1.5	.4	.000567	135.0	.00540	1.31	13.5	.00540	1.31	1.4	.00540	1.31
5.0	2.0	.4	.000567	180.0	.00452	1.56	18.0	.00452	1.56	1.8	.00452	1.56
6.3	2.5	.4	.000567	225.0	.00387	1.82	22.5	.00387	1.82	2.3	.00387	1.82
7.5	3.0	.4	.000567	270.0	.00337	2.10	27.0	.00337	2.10	2.7	.00337	2.10
8.8	3.5	.4	.000567	315.0	.00296	2.38	31.5	.00296	2.38	3.1	.00296	2.38
10.0	4.0	.4	.000567	360.0	.00263	2.68	36.0	.00263	2.68	3.6	.00263	2.68
11.3	4.5	.4	.000567	405.0	.00236	2.99	40.5	.00236	2.99	4.0	.00236	2.99
12.5	5.0	.4	.000567	450.0	.00213	3.32	45.0	.00213	3.32	4.5	.00213	3.32
1.3	1.0	.8	.000567	45.0	.00479	1.47	4.5	.00479	1.47	.5	.00479	1.47
1.9	1.5	.8	.000567	67.5	.00391	1.80	6.8	.00391	1.80	.7	.00391	1.80
2.5	2.0	.8	.000567	90.0	.00337	2.09	9.0	.00337	2.09	.9	.00337	2.09
3.1	2.5	.8	.000567	112.5	.00299	2.36	11.3	.00299	2.36	1.1	.00299	2.36
3.8	3.0	.8	.000567	135.0	.00270	2.61	13.5	.00270	2.61	1.4	.00270	2.61
4.4	3.5	.8	.000567	157.5	.00246	2.87	15.8	.00246	2.87	1.6	.00246	2.87
5.0	4.0	.8	.000567	180.0	.00226	3.12	18.0	.00226	3.12	1.8	.00226	3.12
5.6	4.5	.8	.000567	202.5	.00209	3.38	20.3	.00209	3.38	2.0	.00209	3.38
6.3	5.0	.8	.000567	225.0	.00194	3.65	22.5	.00194	3.65	2.3	.00194	3.65

Table SA-44
Results of Waste Dilution - Summer - Ship 1
(L = 3.0 n mi, A = 0.001 $ft^{2/3}/sec$)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 500 gpm								
5.0	1.0	.2	.000202	180.0	.01556	1.27	18.0	.01224	1.61	1.8	.01224	1.61
7.5	1.5	.2	.000202	270.0	.01123	1.76	27.0	.00921	2.15	2.7	.00921	2.15
10.0	2.0	.2	.000202	360.0	.00845	2.34	36.0	.00726	2.72	3.6	.00726	2.72
12.5	2.5	.2	.000202	450.0	.00669	2.95	45.0	.00590	3.35	4.5	.00590	3.35
15.0	3.0	.2	.000202	540.0	.00547	3.61	54.0	.00491	4.03	5.4	.00491	4.03
17.5	3.5	.2	.000202	630.0	.00458	4.32	63.0	.00415	4.76	6.3	.00415	4.76
20.0	4.0	.2	.000202	720.0	.00390	5.07	72.0	.00357	5.54	7.2	.00357	5.54
22.5	4.5	.2	.000202	810.0	.00337	5.87	81.0	.00310	6.38	8.1	.00310	6.38
25.0	5.0	.2	.000202	900.0	.00294	6.72	90.0	.00272	7.26	9.0	.00272	7.26
2.5	1.0	.4	.000202	90.0	.00906	2.18	9.0	.00906	2.18	.9	.00906	2.18
3.8	1.5	.4	.000202	135.0	.00827	2.39	13.5	.00728	2.71	1.4	.00728	2.71
5.0	2.0	.4	.000202	180.0	.00778	2.54	18.0	.00612	3.23	1.8	.00612	3.23
6.3	2.5	.4	.000202	225.0	.00669	2.95	22.5	.00527	3.75	2.3	.00527	3.75
7.5	3.0	.4	.000202	270.0	.00561	3.52	27.0	.00460	4.29	2.7	.00460	4.29
8.8	3.5	.4	.000202	315.0	.00483	4.09	31.5	.00407	4.86	3.1	.00407	4.86
10.0	4.0	.4	.000202	360.0	.00422	4.68	36.0	.00363	5.44	3.6	.00363	5.44
11.3	4.5	.4	.000202	405.0	.00374	5.28	40.5	.00326	6.06	4.0	.00326	6.06
12.5	5.0	.4	.000202	450.0	.00334	5.91	45.0	.00295	6.70	4.5	.00295	6.70
1.3	1.0	.8	.000202	45.0	.00643	3.07	4.5	.00643	3.07	.5	.00643	3.07
1.9	1.5	.8	.000202	67.5	.00524	3.77	6.8	.00524	3.77	.7	.00524	3.77
2.5	2.0	.8	.000202	90.0	.00453	4.36	9.0	.00453	4.36	.9	.00453	4.36
3.1	2.5	.8	.000202	112.5	.00425	4.65	11.3	.00403	4.91	1.1	.00403	4.91
3.8	3.0	.8	.000202	135.0	.00414	4.78	13.5	.00364	5.43	1.4	.00364	5.43
4.4	3.5	.8	.000202	157.5	.00402	4.92	15.8	.00333	5.94	1.6	.00333	5.94
5.0	4.0	.8	.000202	180.0	.00389	5.08	18.0	.00306	6.45	1.8	.00306	6.45
5.6	4.5	.8	.000202	202.5	.00372	5.31	20.3	.00283	6.97	2.0	.00283	6.97
6.3	5.0	.8	.000202	225.0	.00336	5.88	22.5	.00263	7.50	2.3	.00263	7.50
				Q = 600 gpm								
5.0	1.0	.2	.000243	180.0	.01556	1.06	18.0	.01224	1.34	1.8	.01224	1.34
7.5	1.5	.2	.000243	270.0	.01123	1.47	27.0	.00921	1.79	2.7	.00921	1.79
10.0	2.0	.2	.000243	360.0	.00845	1.95	36.0	.00726	2.27	3.6	.00726	2.27
12.5	2.5	.2	.000243	450.0	.00669	2.46	45.0	.00590	2.79	4.5	.00590	2.79
15.0	3.0	.2	.000243	540.0	.00547	3.01	54.0	.00491	3.36	5.4	.00491	3.36
17.5	3.5	.2	.000243	630.0	.00458	3.60	63.0	.00415	3.97	6.3	.00415	3.97
20.0	4.0	.2	.000243	720.0	.00390	4.22	72.0	.00357	4.62	7.2	.00357	4.62
22.5	4.5	.2	.000243	810.0	.00337	4.89	81.0	.00310	5.31	8.1	.00310	5.31
25.0	5.0	.2	.000243	900.0	.00294	5.60	90.0	.00272	6.05	9.0	.00272	6.05
2.5	1.0	.4	.000243	90.0	.00906	1.82	9.0	.00906	1.82	.9	.00906	1.82
3.8	1.5	.4	.000243	135.0	.00827	1.99	13.5	.00728	2.26	1.4	.00728	2.26
5.0	2.0	.4	.000243	180.0	.00778	2.12	18.0	.00612	2.69	1.8	.00612	2.69
6.3	2.5	.4	.000243	225.0	.00669	2.46	22.5	.00527	3.12	2.3	.00527	3.12
7.5	3.0	.4	.000243	270.0	.00561	2.93	27.0	.00460	3.58	2.7	.00460	3.58
8.8	3.5	.4	.000243	315.0	.00483	3.41	31.5	.00407	4.05	3.1	.00407	4.05
10.0	4.0	.4	.000243	360.0	.00422	3.90	36.0	.00363	4.54	3.6	.00363	4.54
11.3	4.5	.4	.000243	405.0	.00374	4.40	40.5	.00326	5.05	4.0	.00326	5.05
12.5	5.0	.4	.000243	450.0	.00334	4.92	45.0	.00295	5.58	4.5	.00295	5.58
1.3	1.0	.8	.000243	45.0	.00643	2.56	4.5	.00643	2.56	.5	.00643	2.56
1.9	1.5	.8	.000243	67.5	.00524	3.14	6.8	.00524	3.14	.7	.00524	3.14
2.5	2.0	.8	.000243	90.0	.00453	3.64	9.0	.00453	3.64	.9	.00453	3.64
3.1	2.5	.8	.000243	112.5	.00425	3.88	11.3	.00403	4.09	1.1	.00403	4.09
3.8	3.0	.8	.000243	135.0	.00414	3.98	13.5	.00364	4.52	1.4	.00364	4.52
4.4	3.5	.8	.000243	157.5	.00402	4.10	15.8	.00333	4.95	1.6	.00333	4.95
5.0	4.0	.8	.000243	180.0	.00389	4.23	18.0	.00306	5.38	1.8	.00306	5.38
5.6	4.5	.8	.000243	202.5	.00372	4.42	20.3	.00283	5.81	2.0	.00283	5.81
6.3	5.0	.8	.000243	225.0	.00336	4.90	22.5	.00263	6.25	2.3	.00263	6.25

Table SA-44 (continued)
Results of Waste Dilution - Summer - Ship 1
(L = 3.0 n mi, A = 0.001 $ft^{2/3}/sec$)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 700 gpm												
5.0	1.0	.2	.000283	180.0	.01556	.91	18.0	.01224	1.15	1.8	.01224	1.15
7.5	1.5	.2	.000283	270.0	.01123	1.26	27.0	.00921	1.53	2.7	.00921	1.53
10.0	2.0	.2	.000283	360.0	.00845	1.67	36.0	.00726	1.94	3.6	.00726	1.94
12.5	2.5	.2	.000283	450.0	.00669	2.11	45.0	.00590	2.39	4.5	.00590	2.39
15.0	3.0	.2	.000283	540.0	.00547	2.58	54.0	.00491	2.88	5.4	.00491	2.88
17.5	3.5	.2	.000283	630.0	.00458	3.08	63.0	.00415	3.40	6.3	.00415	3.40
20.0	4.0	.2	.000283	720.0	.00390	3.62	72.0	.00357	3.96	7.2	.00357	3.96
22.5	4.5	.2	.000283	810.0	.00337	4.19	81.0	.00310	4.55	8.1	.00310	4.55
25.0	5.0	.2	.000283	900.0	.00294	4.80	90.0	.00272	5.19	9.0	.00272	5.19
2.5	1.0	.4	.000283	90.0	.00906	1.56	9.0	.00906	1.56	.9	.00906	1.56
3.8	1.5	.4	.000283	135.0	.00827	1.71	13.5	.00728	1.94	1.4	.00728	1.94
5.0	2.0	.4	.000283	180.0	.00778	1.81	18.0	.00612	2.31	1.8	.00612	2.31
6.3	2.5	.4	.000283	225.0	.00669	2.11	22.5	.00527	2.68	2.3	.00527	2.68
7.5	3.0	.4	.000283	270.0	.00561	2.51	27.0	.00460	3.07	2.7	.00460	3.07
8.8	3.5	.4	.000283	315.0	.00483	2.92	31.5	.00407	3.47	3.1	.00407	3.47
10.0	4.0	.4	.000283	360.0	.00422	3.34	36.0	.00363	3.89	3.6	.00363	3.89
11.3	4.5	.4	.000283	405.0	.00374	3.77	40.5	.00326	4.33	4.0	.00326	4.33
12.5	5.0	.4	.000283	450.0	.00334	4.22	45.0	.00295	4.78	4.5	.00295	4.78
1.3	1.0	.8	.000283	45.0	.00643	2.20	4.5	.00643	2.20	.5	.00643	2.20
1.9	1.5	.8	.000283	67.5	.00524	2.69	6.8	.00524	2.69	.7	.00524	2.69
2.5	2.0	.8	.000283	90.0	.00453	3.12	9.0	.00453	3.12	.9	.00453	3.12
3.1	2.5	.8	.000283	112.5	.00425	3.32	11.3	.00403	3.51	1.1	.00403	3.51
3.8	3.0	.8	.000283	135.0	.00414	3.41	13.5	.00364	3.88	1.4	.00364	3.88
4.4	3.5	.8	.000283	157.5	.00402	3.51	15.8	.00333	4.24	1.6	.00333	4.24
5.0	4.0	.8	.000283	180.0	.00389	3.63	18.0	.00306	4.61	1.8	.00306	4.61
5.6	4.5	.8	.000283	202.5	.00372	3.79	20.3	.00283	4.98	2.0	.00283	4.98
6.3	5.0	.8	.000283	225.0	.00336	4.20	22.5	.00263	5.36	2.3	.00263	5.36
Q = 1000 gpm												
5.0	1.0	.2	.000405	180.0	.01556	.64	18.0	.01224	.81	1.8	.01224	.81
7.5	1.5	.2	.000405	270.0	.01123	.88	27.0	.00921	1.07	2.7	.00921	1.07
10.0	2.0	.2	.000405	360.0	.00845	1.17	36.0	.00726	1.36	3.6	.00726	1.36
12.5	2.5	.2	.000405	450.0	.00669	1.48	45.0	.00590	1.67	4.5	.00590	1.67
15.0	3.0	.2	.000405	540.0	.00547	1.81	54.0	.00491	2.01	5.4	.00491	2.01
17.5	3.5	.2	.000405	630.0	.00458	2.16	63.0	.00415	2.38	6.3	.00415	2.38
20.0	4.0	.2	.000405	720.0	.00390	2.53	72.0	.00357	2.77	7.2	.00357	2.77
22.5	4.5	.2	.000405	810.0	.00337	2.94	81.0	.00310	3.19	8.1	.00310	3.19
25.0	5.0	.2	.000405	900.0	.00294	3.36	90.0	.00272	3.63	9.0	.00272	3.63
2.5	1.0	.4	.000405	90.0	.00906	1.09	9.0	.00906	1.09	.9	.00906	1.09
3.8	1.5	.4	.000405	135.0	.00827	1.19	13.5	.00728	1.36	1.4	.00728	1.36
5.0	2.0	.4	.000405	180.0	.00778	1.27	18.0	.00612	1.61	1.8	.00612	1.61
6.3	2.5	.4	.000405	225.0	.00669	1.48	22.5	.00527	1.87	2.3	.00527	1.87
7.5	3.0	.4	.000405	270.0	.00561	1.76	27.0	.00460	2.15	2.7	.00460	2.15
8.8	3.5	.4	.000405	315.0	.00483	2.05	31.5	.00407	2.43	3.1	.00407	2.43
10.0	4.0	.4	.000405	360.0	.00422	2.34	36.0	.00363	2.72	3.6	.00363	2.72
11.3	4.5	.4	.000405	405.0	.00374	2.64	40.5	.00326	3.03	4.0	.00326	3.03
12.5	5.0	.4	.000405	450.0	.00334	2.95	45.0	.00295	3.35	4.5	.00295	3.35
1.3	1.0	.8	.000405	45.0	.00643	1.54	4.5	.00643	1.54	.5	.00643	1.54
1.9	1.5	.8	.000405	67.5	.00524	1.88	6.8	.00524	1.88	.7	.00524	1.88
2.5	2.0	.8	.000405	90.0	.00453	2.18	9.0	.00453	2.18	.9	.00453	2.18
3.1	2.5	.8	.000405	112.5	.00425	2.33	11.3	.00403	2.45	1.1	.00403	2.45
3.8	3.0	.8	.000405	135.0	.00414	2.39	13.5	.00364	2.71	1.4	.00364	2.71
4.4	3.5	.8	.000405	157.5	.00402	2.46	15.8	.00333	2.97	1.6	.00333	2.97
5.0	4.0	.8	.000405	180.0	.00389	2.54	18.0	.00306	3.23	1.8	.00306	3.23
5.6	4.5	.8	.000405	202.5	.00372	2.65	20.3	.00283	3.49	2.0	.00283	3.49
6.3	5.0	.8	.000405	225.0	.00336	2.94	22.5	.00263	3.75	2.3	.00263	3.75

Table SA-44 (continued)
Results of Waste Dilution - Summer - Ship 1
(L = 3.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 1200 gpm							
5.0	1.0	.2	.000486	180.0	.01556	.53	18.0	.01224	.67	1.8	.01224	.67
7.5	1.5	.2	.000486	270.0	.01123	.73	27.0	.00921	.89	2.7	.00921	.89
10.0	2.0	.2	.000486	360.0	.00845	.97	36.0	.00726	1.13	3.6	.00726	1.13
12.5	2.5	.2	.000486	450.0	.00669	1.23	45.0	.00590	1.40	4.5	.00590	1.40
15.0	3.0	.2	.000486	540.0	.00547	1.51	54.0	.00491	1.68	5.4	.00491	1.68
17.5	3.5	.2	.000486	630.0	.00458	1.80	63.0	.00415	1.98	6.3	.00415	1.98
20.0	4.0	.2	.000486	720.0	.00390	2.11	72.0	.00357	2.31	7.2	.00357	2.31
22.5	4.5	.2	.000486	810.0	.00337	2.45	81.0	.00310	2.66	8.1	.00310	2.66
25.0	5.0	.2	.000486	900.0	.00294	2.80	90.0	.00272	3.03	9.0	.00272	3.03
2.5	1.0	.4	.000486	90.0	.00906	.91	9.0	.00906	.91	.9	.00906	.91
3.8	1.5	.4	.000486	135.0	.00827	1.00	13.5	.00728	1.13	1.4	.00728	1.13
5.0	2.0	.4	.000486	180.0	.00778	1.06	18.0	.00612	1.34	1.8	.00612	1.34
6.3	2.5	.4	.000486	225.0	.00669	1.23	22.5	.00527	1.56	2.3	.00527	1.56
7.5	3.0	.4	.000486	270.0	.00561	1.47	27.0	.00460	1.79	2.7	.00460	1.79
8.8	3.5	.4	.000486	315.0	.00483	1.71	31.5	.00407	2.02	3.1	.00407	2.02
10.0	4.0	.4	.000486	360.0	.00422	1.95	36.0	.00363	2.27	3.6	.00363	2.27
11.3	4.5	.4	.000486	405.0	.00374	2.20	40.5	.00326	2.52	4.0	.00326	2.52
12.5	5.0	.4	.000486	450.0	.00334	2.46	45.0	.00295	2.79	4.5	.00295	2.79
1.3	1.0	.8	.000486	45.0	.00643	1.28	4.5	.00643	1.28	.5	.00643	1.28
1.9	1.5	.8	.000486	67.5	.00524	1.57	6.8	.00524	1.57	.7	.00524	1.57
2.5	2.0	.8	.000486	90.0	.00453	1.82	9.0	.00453	1.82	.9	.00453	1.82
3.1	2.5	.8	.000486	112.5	.00425	1.94	11.3	.00403	2.04	1.1	.00403	2.04
3.8	3.0	.8	.000486	135.0	.00414	1.99	13.5	.00364	2.26	1.4	.00364	2.26
4.4	3.5	.8	.000486	157.5	.00402	2.05	15.8	.00333	2.48	1.6	.00333	2.48
5.0	4.0	.8	.000486	180.0	.00389	2.12	18.0	.00306	2.69	1.8	.00306	2.69
5.6	4.5	.8	.000486	202.5	.00372	2.21	20.3	.00283	2.91	2.0	.00283	2.91
6.3	5.0	.8	.000486	225.0	.00336	2.45	22.5	.00263	3.12	2.3	.00263	3.12
					Q = 1400 gpm							
5.0	1.0	.2	.000567	180.0	.01556	.45	18.0	.01224	.58	1.8	.01224	.58
7.5	1.5	.2	.000567	270.0	.01123	.63	27.0	.00921	.77	2.7	.00921	.77
10.0	2.0	.2	.000567	360.0	.00845	.84	36.0	.00726	.97	3.6	.00726	.97
12.5	2.5	.2	.000567	450.0	.00669	1.06	45.0	.00590	1.20	4.5	.00590	1.20
15.0	3.0	.2	.000567	540.0	.00547	1.29	54.0	.00491	1.44	5.4	.00491	1.44
17.5	3.5	.2	.000567	630.0	.00458	1.54	63.0	.00415	1.70	6.3	.00415	1.70
20.0	4.0	.2	.000567	720.0	.00390	1.81	72.0	.00357	1.98	7.2	.00357	1.98
22.5	4.5	.2	.000567	810.0	.00337	2.10	81.0	.00310	2.28	8.1	.00310	2.28
25.0	5.0	.2	.000567	900.0	.00294	2.40	90.0	.00272	2.59	9.0	.00272	2.59
2.5	1.0	.4	.000567	90.0	.00906	.78	9.0	.00906	.78	.9	.00906	.78
3.8	1.5	.4	.000567	135.0	.00827	.85	13.5	.00728	.97	1.4	.00728	.97
5.0	2.0	.4	.000567	180.0	.00778	.91	18.0	.00612	1.15	1.8	.00612	1.15
6.3	2.5	.4	.000567	225.0	.00669	1.05	22.5	.00527	1.34	2.3	.00527	1.34
7.5	3.0	.4	.000567	270.0	.00561	1.26	27.0	.00460	1.53	2.7	.00460	1.53
8.8	3.5	.4	.000567	315.0	.00483	1.46	31.5	.00407	1.73	3.1	.00407	1.73
10.0	4.0	.4	.000567	360.0	.00422	1.67	36.0	.00363	1.94	3.6	.00363	1.94
11.3	4.5	.4	.000567	405.0	.00374	1.89	40.5	.00326	2.16	4.0	.00326	2.16
12.5	5.0	.4	.000567	450.0	.00334	2.11	45.0	.00295	2.39	4.5	.00295	2.39
1.3	1.0	.8	.000567	45.0	.00643	1.10	4.5	.00643	1.10	.5	.00643	1.10
1.9	1.5	.8	.000567	67.5	.00524	1.35	6.8	.00524	1.35	.7	.00524	1.35
2.5	2.0	.8	.000567	90.0	.00453	1.56	9.0	.00453	1.56	.9	.00453	1.56
3.1	2.5	.8	.000567	112.5	.00425	1.66	11.3	.00403	1.75	1.1	.00403	1.75
3.8	3.0	.8	.000567	135.0	.00414	1.71	13.5	.00364	1.94	1.4	.00364	1.94
4.4	3.5	.8	.000567	157.5	.00402	1.76	15.8	.00333	2.12	1.6	.00333	2.12
5.0	4.0	.8	.000567	180.0	.00389	1.81	18.0	.00306	2.31	1.8	.00306	2.31
5.6	4.5	.8	.000567	202.5	.00372	1.90	20.3	.00283	2.49	2.0	.00283	2.49
6.3	5.0	.8	.000567	225.0	.00336	2.10	22.5	.00263	2.68	2.3	.00263	2.68

Table SA-45
Results of Waste Dilution - Winter - Ship 1
(L = 3.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 500 gpm							
5.0	1.0	.2	.000202	180.0	.00822	2.40	18.0	.00822	2.40	1.8	.00822	2.40
7.5	1.5	.2	.000202	270.0	.00618	3.20	27.0	.00618	3.20	2.7	.00618	3.20
10.0	2.0	.2	.000202	360.0	.00487	4.05	36.0	.00487	4.05	3.6	.00487	4.05
12.5	2.5	.2	.000202	450.0	.00396	4.99	45.0	.00396	4.99	4.5	.00396	4.99
15.0	3.0	.2	.000202	540.0	.00329	6.00	54.0	.00329	6.00	5.4	.00329	6.00
17.5	3.5	.2	.000202	630.0	.00279	7.09	63.0	.00279	7.09	6.3	.00279	7.09
20.0	4.0	.2	.000202	720.0	.00239	8.25	72.0	.00239	8.25	7.2	.00239	8.25
22.5	4.5	.2	.000202	810.0	.00208	9.49	81.0	.00208	9.49	8.1	.00208	9.49
25.0	5.0	.2	.000202	900.0	.00183	10.81	90.0	.00183	10.81	9.0	.00183	10.81
2.5	1.0	.4	.000202	90.0	.00608	3.25	9.0	.00608	3.25	.9	.00608	3.25
3.8	1.5	.4	.000202	135.0	.00489	4.04	13.5	.00489	4.04	1.4	.00489	4.04
5.0	2.0	.4	.000202	180.0	.00411	4.81	18.0	.00411	4.81	1.8	.00411	4.81
6.3	2.5	.4	.000202	225.0	.00354	5.58	22.5	.00354	5.58	2.3	.00354	5.58
7.5	3.0	.4	.000202	270.0	.00309	6.39	27.0	.00309	6.39	2.7	.00309	6.39
8.8	3.5	.4	.000202	315.0	.00273	7.23	31.5	.00273	7.23	3.1	.00273	7.23
10.0	4.0	.4	.000202	360.0	.00244	8.11	36.0	.00244	8.11	3.6	.00244	8.11
11.3	4.5	.4	.000202	405.0	.00219	9.02	40.5	.00219	9.02	4.0	.00219	9.02
12.5	5.0	.4	.000202	450.0	.00198	9.98	45.0	.00198	9.98	4.5	.00198	9.98
1.3	1.0	.8	.000202	45.0	.00431	4.58	4.5	.00431	4.58	.5	.00431	4.58
1.9	1.5	.8	.000202	67.5	.00352	5.61	6.8	.00352	5.61	.7	.00352	5.61
2.5	2.0	.8	.000202	90.0	.00304	6.50	9.0	.00304	6.50	.9	.00304	6.50
3.1	2.5	.8	.000202	112.5	.00270	7.31	11.3	.00270	7.31	1.1	.00270	7.31
3.8	3.0	.8	.000202	135.0	.00244	8.08	13.5	.00244	8.08	1.4	.00244	8.08
4.4	3.5	.8	.000202	157.5	.00223	8.85	15.8	.00223	8.85	1.6	.00223	8.85
5.0	4.0	.8	.000202	180.0	.00206	9.61	18.0	.00206	9.61	1.8	.00206	9.61
5.6	4.5	.8	.000202	202.5	.00190	10.39	20.3	.00190	10.39	2.0	.00190	10.39
6.3	5.0	.8	.000202	225.0	.00177	11.17	22.5	.00177	11.17	2.3	.00177	11.17
					Q = 600 gpm							
5.0	1.0	.2	.000243	180.0	.00822	2.00	18.0	.00822	2.00	1.8	.00822	2.00
7.5	1.5	.2	.000243	270.0	.00618	2.66	27.0	.00618	2.66	2.7	.00618	2.66
10.0	2.0	.2	.000243	360.0	.00487	3.38	36.0	.00487	3.38	3.6	.00487	3.38
12.5	2.5	.2	.000243	450.0	.00396	4.16	45.0	.00396	4.16	4.5	.00396	4.16
15.0	3.0	.2	.000243	540.0	.00329	5.00	54.0	.00329	5.00	5.4	.00329	5.00
17.5	3.5	.2	.000243	630.0	.00279	5.91	63.0	.00279	5.91	6.3	.00279	5.91
20.0	4.0	.2	.000243	720.0	.00239	6.88	72.0	.00239	6.88	7.2	.00239	6.88
22.5	4.5	.2	.000243	810.0	.00208	7.91	81.0	.00208	7.91	8.1	.00208	7.91
25.0	5.0	.2	.000243	900.0	.00183	9.01	90.0	.00183	9.01	9.0	.00183	9.01
2.5	1.0	.4	.000243	90.0	.00608	2.71	9.0	.00608	2.71	.9	.00608	2.71
3.8	1.5	.4	.000243	135.0	.00489	3.37	13.5	.00489	3.37	1.4	.00489	3.37
5.0	2.0	.4	.000243	180.0	.00411	4.01	18.0	.00411	4.01	1.8	.00411	4.01
6.3	2.5	.4	.000243	225.0	.00354	4.65	22.5	.00354	4.65	2.3	.00354	4.65
7.5	3.0	.4	.000243	270.0	.00309	5.33	27.0	.00309	5.33	2.7	.00309	5.33
8.8	3.5	.4	.000243	315.0	.00273	6.03	31.5	.00273	6.03	3.1	.00273	6.03
10.0	4.0	.4	.000243	360.0	.00244	6.76	36.0	.00244	6.76	3.6	.00244	6.76
11.3	4.5	.4	.000243	405.0	.00219	7.52	40.5	.00219	7.52	4.0	.00219	7.52
12.5	5.0	.4	.000243	450.0	.00198	8.31	45.0	.00198	8.31	4.5	.00198	8.31
1.3	1.0	.8	.000243	45.0	.00431	3.82	4.5	.00431	3.82	.5	.00431	3.82
1.9	1.5	.8	.000243	67.5	.00352	4.68	6.8	.00352	4.68	.7	.00352	4.68
2.5	2.0	.8	.000243	90.0	.00304	5.41	9.0	.00304	5.41	.9	.00304	5.41
3.1	2.5	.8	.000243	112.5	.00270	6.09	11.3	.00270	6.09	1.1	.00270	6.09
3.8	3.0	.8	.000243	135.0	.00244	6.74	13.5	.00244	6.74	1.4	.00244	6.74
4.4	3.5	.8	.000243	157.5	.00223	7.37	15.8	.00223	7.37	1.6	.00223	7.37
5.0	4.0	.8	.000243	180.0	.00206	8.01	18.0	.00206	8.01	1.8	.00206	8.01
5.6	4.5	.8	.000243	202.5	.00190	8.65	20.3	.00190	8.65	2.0	.00190	8.65
6.3	5.0	.8	.000243	225.0	.00177	9.31	22.5	.00177	9.31	2.3	.00177	9.31

Table SA-45 (continued)
Results of Waste Dilution - Winter - Ship 1
(L = 3.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 700 gpm								
5.0	1.0	.2	.000283	180.0	.00822	1.72	18.0	.00822	1.72	1.8	.00822	1.72
7.5	1.5	.2	.000283	270.0	.00618	2.28	27.0	.00618	2.28	2.7	.00618	2.28
10.0	2.0	.2	.000283	360.0	.00487	2.90	36.0	.00487	2.90	3.6	.00487	2.90
12.5	2.5	.2	.000283	450.0	.00396	3.56	45.0	.00396	3.56	4.5	.00396	3.56
15.0	3.0	.2	.000283	540.0	.00329	4.28	54.0	.00329	4.28	5.4	.00329	4.28
17.5	3.5	.2	.000283	630.0	.00279	5.06	63.0	.00279	5.06	6.3	.00279	5.06
20.0	4.0	.2	.000283	720.0	.00239	5.89	72.0	.00239	5.89	7.2	.00239	5.89
22.5	4.5	.2	.000283	810.0	.00208	6.78	81.0	.00208	6.78	8.1	.00208	6.78
25.0	5.0	.2	.000283	900.0	.00183	7.72	90.0	.00183	7.72	9.0	.00183	7.72
2.5	1.0	.4	.000283	90.0	.00608	2.32	9.0	.00608	2.32	.9	.00608	2.32
3.8	1.5	.4	.000283	135.0	.00489	2.89	13.5	.00489	2.89	1.4	.00489	2.89
5.0	2.0	.4	.000283	180.0	.00411	3.43	18.0	.00411	3.43	1.8	.00411	3.43
6.3	2.5	.4	.000283	225.0	.00354	3.99	22.5	.00354	3.99	2.3	.00354	3.99
7.5	3.0	.4	.000283	270.0	.00309	4.56	27.0	.00309	4.56	2.7	.00309	4.56
8.8	3.5	.4	.000283	315.0	.00273	5.17	31.5	.00273	5.17	3.1	.00273	5.17
10.0	4.0	.4	.000283	360.0	.00244	5.79	36.0	.00244	5.79	3.6	.00244	5.79
11.3	4.5	.4	.000283	405.0	.00219	6.45	40.5	.00219	6.45	4.0	.00219	6.45
12.5	5.0	.4	.000283	450.0	.00198	7.13	45.0	.00198	7.13	4.5	.00198	7.13
1.3	1.0	.8	.000283	45.0	.00431	3.27	4.5	.00431	3.27	.5	.00431	3.27
1.9	1.5	.8	.000283	67.5	.00352	4.01	6.8	.00352	4.01	.7	.00352	4.01
2.5	2.0	.8	.000283	90.0	.00304	4.64	9.0	.00304	4.64	.9	.00304	4.64
3.1	2.5	.8	.000283	112.5	.00270	5.22	11.3	.00270	5.22	1.1	.00270	5.22
3.8	3.0	.8	.000283	135.0	.00244	5.77	13.5	.00244	5.77	1.4	.00244	5.77
4.4	3.5	.8	.000283	157.5	.00223	6.32	15.8	.00223	6.32	1.6	.00223	6.32
5.0	4.0	.8	.000283	180.0	.00206	6.87	18.0	.00206	6.87	1.8	.00206	6.87
5.6	4.5	.8	.000283	202.5	.00190	7.42	20.3	.00190	7.42	2.0	.00190	7.42
6.3	5.0	.8	.000283	225.0	.00177	7.98	22.5	.00177	7.98	2.3	.00177	7.98
				Q = 1000 gpm								
5.0	1.0	.2	.000405	180.0	.00822	1.20	18.0	.00822	1.20	1.8	.00822	1.20
7.5	1.5	.2	.000405	270.0	.00618	1.60	27.0	.00618	1.60	2.7	.00618	1.60
10.0	2.0	.2	.000405	360.0	.00487	2.03	36.0	.00487	2.03	3.6	.00487	2.03
12.5	2.5	.2	.000405	450.0	.00396	2.49	45.0	.00396	2.49	4.5	.00396	2.49
15.0	3.0	.2	.000405	540.0	.00329	3.00	54.0	.00329	3.00	5.4	.00329	3.00
17.5	3.5	.2	.000405	630.0	.00279	3.54	63.0	.00279	3.54	6.3	.00279	3.54
20.0	4.0	.2	.000405	720.0	.00239	4.13	72.0	.00239	4.13	7.2	.00239	4.13
22.5	4.5	.2	.000405	810.0	.00208	4.75	81.0	.00208	4.75	8.1	.00208	4.75
25.0	5.0	.2	.000405	900.0	.00183	5.41	90.0	.00183	5.41	9.0	.00183	5.41
2.5	1.0	.4	.000405	90.0	.00608	1.62	9.0	.00608	1.62	.9	.00608	1.62
3.8	1.5	.4	.000405	135.0	.00489	2.02	13.5	.00489	2.02	1.4	.00489	2.02
5.0	2.0	.4	.000405	180.0	.00411	2.40	18.0	.00411	2.40	1.8	.00411	2.40
6.3	2.5	.4	.000405	225.0	.00354	2.79	22.5	.00354	2.79	2.3	.00354	2.79
7.5	3.0	.4	.000405	270.0	.00309	3.20	27.0	.00309	3.20	2.7	.00309	3.20
8.8	3.5	.4	.000405	315.0	.00273	3.62	31.5	.00273	3.62	3.1	.00273	3.62
10.0	4.0	.4	.000405	360.0	.00244	4.05	36.0	.00244	4.05	3.6	.00244	4.05
11.3	4.5	.4	.000405	405.0	.00219	4.51	40.5	.00219	4.51	4.0	.00219	4.51
12.5	5.0	.4	.000405	450.0	.00198	4.99	45.0	.00198	4.99	4.5	.00198	4.99
1.3	1.0	.8	.000405	45.0	.00431	2.29	4.5	.00431	2.29	.5	.00431	2.29
1.9	1.5	.8	.000405	67.5	.00352	2.81	6.8	.00352	2.81	.7	.00352	2.81
2.5	2.0	.8	.000405	90.0	.00304	3.25	9.0	.00304	3.25	.9	.00304	3.25
3.1	2.5	.8	.000405	112.5	.00270	3.65	11.3	.00270	3.65	1.1	.00270	3.65
3.8	3.0	.8	.000405	135.0	.00244	4.04	13.5	.00244	4.04	1.4	.00244	4.04
4.4	3.5	.8	.000405	157.5	.00223	4.42	15.8	.00223	4.42	1.6	.00223	4.42
5.0	4.0	.8	.000405	180.0	.00206	4.81	18.0	.00206	4.81	1.8	.00206	4.81
5.6	4.5	.8	.000405	202.5	.00190	5.19	20.3	.00190	5.19	2.0	.00190	5.19
6.3	5.0	.8	.000405	225.0	.00177	5.58	22.5	.00177	5.58	2.3	.00177	5.58

Table SA-45 (continued)
Results of Waste Dilution - Winter - Ship 1
(L = 3.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 1200 gpm							
5.0	1.0	.2	.000486	180.0	.00822	1.00	18.0	.00822	1.00	1.8	.00822	1.00
7.5	1.5	.2	.000486	270.0	.00618	1.33	27.0	.00618	1.33	2.7	.00618	1.33
10.0	2.0	.2	.000486	360.0	.00487	1.69	36.0	.00487	1.69	3.6	.00487	1.69
12.5	2.5	.2	.000486	450.0	.00396	2.08	45.0	.00396	2.08	4.5	.00396	2.08
15.0	3.0	.2	.000486	540.0	.00329	2.50	54.0	.00329	2.50	5.4	.00329	2.50
17.5	3.5	.2	.000486	630.0	.00279	2.95	63.0	.00279	2.95	6.3	.00279	2.95
20.0	4.0	.2	.000486	720.0	.00239	3.44	72.0	.00239	3.44	7.2	.00239	3.44
22.5	4.5	.2	.000486	810.0	.00208	3.96	81.0	.00208	3.96	8.1	.00208	3.96
25.0	5.0	.2	.000486	900.0	.00183	4.51	90.0	.00183	4.51	9.0	.00183	4.51
2.5	1.0	.4	.000486	90.0	.00608	1.35	9.0	.00608	1.35	.9	.00608	1.35
3.8	1.5	.4	.000486	135.0	.00489	1.68	13.5	.00489	1.68	1.4	.00489	1.68
5.0	2.0	.4	.000486	180.0	.00411	2.00	18.0	.00411	2.00	1.8	.00411	2.00
6.3	2.5	.4	.000486	225.0	.00354	2.33	22.5	.00354	2.33	2.3	.00354	2.33
7.5	3.0	.4	.000486	270.0	.00309	2.66	27.0	.00309	2.66	2.7	.00309	2.66
8.8	3.5	.4	.000486	315.0	.00273	3.01	31.5	.00273	3.01	3.1	.00273	3.01
10.0	4.0	.4	.000486	360.0	.00244	3.38	36.0	.00244	3.38	3.6	.00244	3.38
11.3	4.5	.4	.000486	405.0	.00219	3.76	40.5	.00219	3.76	4.0	.00219	3.76
12.5	5.0	.4	.000486	450.0	.00198	4.16	45.0	.00198	4.16	4.5	.00198	4.16
1.3	1.0	.8	.000486	45.0	.00431	1.91	4.5	.00431	1.91	.5	.00431	1.91
1.9	1.5	.8	.000486	67.5	.00352	2.34	6.8	.00352	2.34	.7	.00352	2.34
2.5	2.0	.8	.000486	90.0	.00304	2.71	9.0	.00304	2.71	.9	.00304	2.71
3.1	2.5	.8	.000486	112.5	.00270	3.05	11.3	.00270	3.05	1.1	.00270	3.05
3.8	3.0	.8	.000486	135.0	.00244	3.37	13.5	.00244	3.37	1.4	.00244	3.37
4.4	3.5	.8	.000486	157.5	.00223	3.69	15.8	.00223	3.69	1.6	.00223	3.69
5.0	4.0	.8	.000486	180.0	.00206	4.01	18.0	.00206	4.01	1.8	.00206	4.01
5.6	4.5	.8	.000486	202.5	.00190	4.33	20.3	.00190	4.33	2.0	.00190	4.33
6.3	5.0	.8	.000486	225.0	.00177	4.65	22.5	.00177	4.65	2.3	.00177	4.65
					Q = 1400 gpm							
5.0	1.0	.2	.000567	180.0	.00822	.86	18.0	.00822	.86	1.8	.00822	.86
7.5	1.5	.2	.000567	270.0	.00618	1.14	27.0	.00618	1.14	2.7	.00618	1.14
10.0	2.0	.2	.000567	360.0	.00487	1.45	36.0	.00487	1.45	3.6	.00487	1.45
12.5	2.5	.2	.000567	450.0	.00396	1.78	45.0	.00396	1.78	4.5	.00396	1.78
15.0	3.0	.2	.000567	540.0	.00329	2.14	54.0	.00329	2.14	5.4	.00329	2.14
17.5	3.5	.2	.000567	630.0	.00279	2.53	63.0	.00279	2.53	6.3	.00279	2.53
20.0	4.0	.2	.000567	720.0	.00239	2.95	72.0	.00239	2.95	7.2	.00239	2.95
22.5	4.5	.2	.000567	810.0	.00208	3.39	81.0	.00208	3.39	8.1	.00208	3.39
25.0	5.0	.2	.000567	900.0	.00183	3.86	90.0	.00183	3.86	9.0	.00183	3.86
2.5	1.0	.4	.000567	90.0	.00608	1.16	9.0	.00608	1.16	.9	.00608	1.16
3.8	1.5	.4	.000567	135.0	.00489	1.44	13.5	.00489	1.44	1.4	.00489	1.44
5.0	2.0	.4	.000567	180.0	.00411	1.72	18.0	.00411	1.72	1.8	.00411	1.72
6.3	2.5	.4	.000567	225.0	.00354	1.99	22.5	.00354	1.99	2.3	.00354	1.99
7.5	3.0	.4	.000567	270.0	.00309	2.28	27.0	.00309	2.28	2.7	.00309	2.28
8.8	3.5	.4	.000567	315.0	.00273	2.58	31.5	.00273	2.58	3.1	.00273	2.58
10.0	4.0	.4	.000567	360.0	.00244	2.90	36.0	.00244	2.90	3.6	.00244	2.90
11.3	4.5	.4	.000567	405.0	.00219	3.22	40.5	.00219	3.22	4.0	.00219	3.22
12.5	5.0	.4	.000567	450.0	.00198	3.56	45.0	.00198	3.56	4.5	.00198	3.56
1.3	1.0	.8	.000567	45.0	.00431	1.64	4.5	.00431	1.64	.5	.00431	1.64
1.9	1.5	.8	.000567	67.5	.00352	2.00	6.8	.00352	2.00	.7	.00352	2.00
2.5	2.0	.8	.000567	90.0	.00304	2.32	9.0	.00304	2.32	.9	.00304	2.32
3.1	2.5	.8	.000567	112.5	.00270	2.61	11.3	.00270	2.61	1.1	.00270	2.61
3.8	3.0	.8	.000567	135.0	.00244	2.89	13.5	.00244	2.89	1.4	.00244	2.89
4.4	3.5	.8	.000567	157.5	.00223	3.16	15.8	.00223	3.16	1.6	.00223	3.16
5.0	4.0	.8	.000567	180.0	.00206	3.43	18.0	.00206	3.43	1.8	.00206	3.43
5.6	4.5	.8	.000567	202.5	.00190	3.71	20.3	.00190	3.71	2.0	.00190	3.71
6.3	5.0	.8	.000567	225.0	.00177	3.99	22.5	.00177	3.99	2.3	.00177	3.99

Table SA-46
Results of Waste Dilution - Summer - Ship 2
(L = 2.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 500 gpm								
5.0	1.0	.2	.000173	180.0	.02595	.89	18.0	.02042	1.13	1.8	.02042	1.13
7.5	1.5	.2	.000173	270.0	.01801	1.28	27.0	.01477	1.56	2.7	.01477	1.56
10.0	2.0	.2	.000173	360.0	.01314	1.76	36.0	.01129	2.04	3.6	.01129	2.04
12.5	2.5	.2	.000173	450.0	.01015	2.27	45.0	.00895	2.58	4.5	.00895	2.58
15.0	3.0	.2	.000173	540.0	.00813	2.84	54.0	.00729	3.16	5.4	.00729	3.16
17.5	3.5	.2	.000173	630.0	.00669	3.45	63.0	.00607	3.80	6.3	.00607	3.80
20.0	4.0	.2	.000173	720.0	.00562	4.11	72.0	.00514	4.49	7.2	.00514	4.49
22.5	4.5	.2	.000173	810.0	.00479	4.82	81.0	.00441	5.23	8.1	.00441	5.23
25.0	5.0	.2	.000173	900.0	.00414	5.58	90.0	.00383	6.03	9.0	.00383	6.03
2.5	1.0	.4	.000173	90.0	.01573	1.47	9.0	.01573	1.47	.9	.01573	1.47
3.8	1.5	.4	.000173	135.0	.01410	1.64	13.5	.01241	1.86	1.4	.01241	1.86
5.0	2.0	.4	.000173	180.0	.01298	1.78	18.0	.01021	2.26	1.8	.01021	2.26
6.3	2.5	.4	.000173	225.0	.01094	2.11	22.5	.00861	2.68	2.3	.00861	2.68
7.5	3.0	.4	.000173	270.0	.00901	2.56	27.0	.00739	3.12	2.7	.00739	3.12
8.8	3.5	.4	.000173	315.0	.00762	3.03	31.5	.00642	3.59	3.1	.00642	3.59
10.0	4.0	.4	.000173	360.0	.00657	3.51	36.0	.00565	4.09	3.6	.00565	4.09
11.3	4.5	.4	.000173	405.0	.00574	4.02	40.5	.00501	4.61	4.0	.00501	4.61
12.5	5.0	.4	.000173	450.0	.00508	4.55	45.0	.00448	5.15	4.5	.00448	5.15
1.3	1.0	.8	.000173	45.0	.01125	2.05	4.5	.01125	2.05	.5	.01125	2.05
1.9	1.5	.8	.000173	67.5	.00916	2.52	6.8	.00916	2.52	.7	.00916	2.52
2.5	2.0	.8	.000173	90.0	.00787	2.93	9.0	.00787	2.93	.9	.00787	2.93
3.1	2.5	.8	.000173	112.5	.00732	3.15	11.3	.00693	3.33	1.1	.00693	3.33
3.8	3.0	.8	.000173	135.0	.00705	3.27	13.5	.00620	3.72	1.4	.00620	3.72
4.4	3.5	.8	.000173	157.5	.00677	3.41	15.8	.00561	4.11	1.6	.00561	4.11
5.0	4.0	.8	.000173	180.0	.00649	3.56	18.0	.00511	4.52	1.8	.00511	4.52
5.6	4.5	.8	.000173	202.5	.00615	3.75	20.3	.00468	4.93	2.0	.00468	4.93
6.3	5.0	.8	.000173	225.0	.00549	4.20	22.5	.00431	5.36	2.3	.00431	5.36
				Q = 600 gpm								
5.0	1.0	.2	.000208	180.0	.02595	.74	18.0	.02042	.94	1.8	.02042	.94
7.5	1.5	.2	.000208	270.0	.01801	1.07	27.0	.01477	1.30	2.7	.01477	1.30
10.0	2.0	.2	.000208	360.0	.01314	1.46	36.0	.01129	1.70	3.6	.01129	1.70
12.5	2.5	.2	.000208	450.0	.01015	1.89	45.0	.00895	2.15	4.5	.00895	2.15
15.0	3.0	.2	.000208	540.0	.00813	2.36	54.0	.00729	2.64	5.4	.00729	2.64
17.5	3.5	.2	.000208	630.0	.00669	2.87	63.0	.00607	3.17	6.3	.00607	3.17
20.0	4.0	.2	.000208	720.0	.00562	3.42	72.0	.00514	3.74	7.2	.00514	3.74
22.5	4.5	.2	.000208	810.0	.00479	4.02	81.0	.00441	4.36	8.1	.00441	4.36
25.0	5.0	.2	.000208	900.0	.00414	4.65	90.0	.00383	5.02	9.0	.00383	5.02
2.5	1.0	.4	.000208	90.0	.01573	1.22	9.0	.01573	1.22	.9	.01573	1.22
3.8	1.5	.4	.000208	135.0	.01410	1.36	13.5	.01241	1.55	1.4	.01241	1.55
5.0	2.0	.4	.000208	180.0	.01298	1.48	18.0	.01021	1.88	1.8	.01021	1.88
6.3	2.5	.4	.000208	225.0	.01094	1.76	22.5	.00861	2.23	2.3	.00861	2.23
7.5	3.0	.4	.000208	270.0	.00901	2.13	27.0	.00739	2.60	2.7	.00739	2.60
8.8	3.5	.4	.000208	315.0	.00762	2.52	31.5	.00642	2.99	3.1	.00642	2.99
10.0	4.0	.4	.000208	360.0	.00657	2.93	36.0	.00565	3.41	3.6	.00565	3.41
11.3	4.5	.4	.000208	405.0	.00574	3.35	40.5	.00501	3.84	4.0	.00501	3.84
12.5	5.0	.4	.000208	450.0	.00508	3.79	45.0	.00448	4.29	4.5	.00448	4.29
1.3	1.0	.8	.000208	45.0	.01125	1.71	4.5	.01125	1.71	.5	.01125	1.71
1.9	1.5	.8	.000208	67.5	.00916	2.10	6.8	.00916	2.10	.7	.00916	2.10
2.5	2.0	.8	.000208	90.0	.00787	2.44	9.0	.00787	2.44	.9	.00787	2.44
3.1	2.5	.8	.000208	112.5	.00732	2.63	11.3	.00693	2.77	1.1	.00693	2.77
3.8	3.0	.8	.000208	135.0	.00705	2.73	13.5	.00620	3.10	1.4	.00620	3.10
4.4	3.5	.8	.000208	157.5	.00677	2.84	15.8	.00561	3.43	1.6	.00561	3.43
5.0	4.0	.8	.000208	180.0	.00649	2.96	18.0	.00511	3.76	1.8	.00511	3.76
5.6	4.5	.8	.000208	202.5	.00615	3.13	20.3	.00468	4.11	2.0	.00468	4.11
6.3	5.0	.8	.000208	225.0	.00549	3.50	22.5	.00431	4.46	2.3	.00431	4.46

Table SA-46 (continued)
Results of Waste Dilution - Summer - Ship 2
(L = 2.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 700 gpm												
5.0	1.0	.2	.000243	180.0	.02595	.64	18.0	.02042	.81	1.8	.02042	.81
7.5	1.5	.2	.000243	270.0	.01801	.91	27.0	.01477	1.12	2.7	.01477	1.12
10.0	2.0	.2	.000243	360.0	.01314	1.25	36.0	.01129	1.46	3.6	.01129	1.46
12.5	2.5	.2	.000243	450.0	.01015	1.62	45.0	.00895	1.84	4.5	.00895	1.84
15.0	3.0	.2	.000243	540.0	.00813	2.03	54.0	.00729	2.26	5.4	.00729	2.26
17.5	3.5	.2	.000243	630.0	.00669	2.46	63.0	.00607	2.71	6.3	.00607	2.71
20.0	4.0	.2	.000243	720.0	.00562	2.93	72.0	.00514	3.21	7.2	.00514	3.21
22.5	4.5	.2	.000243	810.0	.00479	3.44	81.0	.00441	3.74	8.1	.00441	3.74
25.0	5.0	.2	.000243	900.0	.00414	3.98	90.0	.00383	4.30	9.0	.00383	4.30
2.5	1.0	.4	.000243	90.0	.01573	1.05	9.0	.01573	1.05	.9	.01573	1.05
3.8	1.5	.4	.000243	135.0	.01410	1.17	13.5	.01241	1.33	1.4	.01241	1.33
5.0	2.0	.4	.000243	180.0	.01298	1.27	18.0	.01021	1.61	1.8	.01021	1.61
6.3	2.5	.4	.000243	225.0	.01094	1.51	22.5	.00861	1.91	2.3	.00861	1.91
7.5	3.0	.4	.000243	270.0	.00901	1.83	27.0	.00739	2.23	2.7	.00739	2.23
8.8	3.5	.4	.000243	315.0	.00762	2.16	31.5	.00642	2.57	3.1	.00642	2.57
10.0	4.0	.4	.000243	360.0	.00657	2.51	36.0	.00565	2.92	3.6	.00565	2.92
11.3	4.5	.4	.000243	405.0	.00574	2.87	40.5	.00501	3.29	4.0	.00501	3.29
12.5	5.0	.4	.000243	450.0	.00508	3.25	45.0	.00448	3.68	4.5	.00448	3.68
1.3	1.0	.8	.000243	45.0	.01125	1.46	4.5	.01125	1.46	.5	.01125	1.46
1.9	1.5	.8	.000243	67.5	.00916	1.80	6.8	.00916	1.80	.7	.00916	1.80
2.5	2.0	.8	.000243	90.0	.00787	2.09	9.0	.00787	2.09	.9	.00787	2.09
3.1	2.5	.8	.000243	112.5	.00732	2.25	11.3	.00693	2.38	1.1	.00693	2.38
3.8	3.0	.8	.000243	135.0	.00705	2.34	13.5	.00620	2.66	1.4	.00620	2.66
4.4	3.5	.8	.000243	157.5	.00677	2.43	15.8	.00561	2.94	1.6	.00561	2.94
5.0	4.0	.8	.000243	180.0	.00649	2.54	18.0	.00511	3.23	1.8	.00511	3.23
5.6	4.5	.8	.000243	202.5	.00615	2.68	20.3	.00468	3.52	2.0	.00468	3.52
6.3	5.0	.8	.000243	225.0	.00549	3.00	22.5	.00431	3.83	2.3	.00431	3.83
Q = 1000 gpm												
5.0	1.0	.2	.000347	180.0	.02595	.44	18.0	.02042	.56	1.8	.02042	.56
7.5	1.5	.2	.000347	270.0	.01801	.64	27.0	.01477	.78	2.7	.01477	.78
10.0	2.0	.2	.000347	360.0	.01314	.88	36.0	.01129	1.02	3.6	.01129	1.02
12.5	2.5	.2	.000347	450.0	.01015	1.14	45.0	.00895	1.29	4.5	.00895	1.29
15.0	3.0	.2	.000347	540.0	.00813	1.42	54.0	.00729	1.58	5.4	.00729	1.58
17.5	3.5	.2	.000347	630.0	.00669	1.72	63.0	.00607	1.90	6.3	.00607	1.90
20.0	4.0	.2	.000347	720.0	.00562	2.05	72.0	.00514	2.24	7.2	.00514	2.24
22.5	4.5	.2	.000347	810.0	.00479	2.41	81.0	.00441	2.62	8.1	.00441	2.62
25.0	5.0	.2	.000347	900.0	.00414	2.79	90.0	.00383	3.01	9.0	.00383	3.01
2.5	1.0	.4	.000347	90.0	.01573	.73	9.0	.01573	.73	.9	.01573	.73
3.8	1.5	.4	.000347	135.0	.01410	.82	13.5	.01241	.93	1.4	.01241	.93
5.0	2.0	.4	.000347	180.0	.01298	.89	18.0	.01021	1.13	1.8	.01021	1.13
6.3	2.5	.4	.000347	225.0	.01094	1.05	22.5	.00861	1.34	2.3	.00861	1.34
7.5	3.0	.4	.000347	270.0	.00901	1.28	27.0	.00739	1.56	2.7	.00739	1.56
8.8	3.5	.4	.000347	315.0	.00762	1.51	31.5	.00642	1.80	3.1	.00642	1.80
10.0	4.0	.4	.000347	360.0	.00657	1.76	36.0	.00565	2.04	3.6	.00565	2.04
11.3	4.5	.4	.000347	405.0	.00574	2.01	40.5	.00501	2.30	4.0	.00501	2.30
12.5	5.0	.4	.000347	450.0	.00508	2.27	45.0	.00448	2.58	4.5	.00448	2.58
1.3	1.0	.8	.000347	45.0	.01125	1.03	4.5	.01125	1.03	.5	.01125	1.03
1.9	1.5	.8	.000347	67.5	.00916	1.26	6.8	.00916	1.26	.7	.00916	1.26
2.5	2.0	.8	.000347	90.0	.00787	1.47	9.0	.00787	1.47	.9	.00787	1.47
3.1	2.5	.8	.000347	112.5	.00732	1.58	11.3	.00693	1.66	1.1	.00693	1.66
3.8	3.0	.8	.000347	135.0	.00705	1.64	13.5	.00620	1.86	1.4	.00620	1.86
4.4	3.5	.8	.000347	157.5	.00677	1.70	15.8	.00561	2.06	1.6	.00561	2.06
5.0	4.0	.8	.000347	180.0	.00649	1.78	18.0	.00511	2.26	1.8	.00511	2.26
5.6	4.5	.8	.000347	202.5	.00615	1.88	20.3	.00468	2.47	2.0	.00468	2.47
6.3	5.0	.8	.000347	225.0	.00549	2.10	22.5	.00431	2.68	2.3	.00431	2.68

Table SA-46 (continued)
Results of Waste Dilution - Summer - Ship 2
(L = 2.0 n mi, A = 0.001 $ft^{2/3}/sec$)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 1200 gpm								
5.0	1.0	.2	.000416	180.0	.02595	.37	18.0	.02042	.47	1.8	.02042	.47
7.5	1.5	.2	.000416	270.0	.01801	.53	27.0	.01477	.65	2.7	.01477	.65
10.0	2.0	.2	.000416	360.0	.01314	.73	36.0	.01129	.85	3.6	.01129	.85
12.5	2.5	.2	.000416	450.0	.01015	.95	45.0	.00895	1.07	4.5	.00895	1.07
15.0	3.0	.2	.000416	540.0	.00813	1.18	54.0	.00729	1.32	5.4	.00729	1.32
17.5	3.5	.2	.000416	630.0	.00669	1.44	63.0	.00607	1.58	6.3	.00607	1.58
20.0	4.0	.2	.000416	720.0	.00562	1.71	72.0	.00514	1.87	7.2	.00514	1.87
22.5	4.5	.2	.000416	810.0	.00479	2.01	81.0	.00441	2.18	8.1	.00441	2.18
25.0	5.0	.2	.000416	900.0	.00414	2.32	90.0	.00383	2.51	9.0	.00383	2.51
2.5	1.0	.4	.000416	90.0	.01573	.61	9.0	.01573	.61	.9	.01573	.61
3.8	1.5	.4	.000416	135.0	.01410	.68	13.5	.01241	.77	1.4	.01241	.77
5.0	2.0	.4	.000416	180.0	.01298	.74	18.0	.01021	.94	1.8	.01021	.94
6.3	2.5	.4	.000416	225.0	.01094	.88	22.5	.00861	1.12	2.3	.00861	1.12
7.5	3.0	.4	.000416	270.0	.00901	1.07	27.0	.00739	1.30	2.7	.00739	1.30
8.8	3.5	.4	.000416	315.0	.00762	1.26	31.5	.00642	1.50	3.1	.00642	1.50
10.0	4.0	.4	.000416	360.0	.00657	1.46	36.0	.00565	1.70	3.6	.00565	1.70
11.3	4.5	.4	.000416	405.0	.00574	1.67	40.5	.00501	1.92	4.0	.00501	1.92
12.5	5.0	.4	.000416	450.0	.00508	1.89	45.0	.00448	2.15	4.5	.00448	2.15
1.3	1.0	.8	.000416	45.0	.01125	.85	4.5	.01125	.85	.5	.01125	.85
1.9	1.5	.8	.000416	67.5	.00916	1.05	6.8	.00916	1.05	.7	.00916	1.05
2.5	2.0	.8	.000416	90.0	.00787	1.22	9.0	.00787	1.22	.9	.00787	1.22
3.1	2.5	.8	.000416	112.5	.00732	1.31	11.3	.00693	1.39	1.1	.00693	1.39
3.8	3.0	.8	.000416	135.0	.00705	1.36	13.5	.00620	1.55	1.4	.00620	1.55
4.4	3.5	.8	.000416	157.5	.00677	1.42	15.8	.00561	1.71	1.6	.00561	1.71
5.0	4.0	.8	.000416	180.0	.00649	1.48	18.0	.00511	1.88	1.8	.00511	1.88
5.6	4.5	.8	.000416	202.5	.00615	1.56	20.3	.00468	2.06	2.0	.00468	2.06
6.3	5.0	.8	.000416	225.0	.00549	1.75	22.5	.00431	2.23	2.3	.00431	2.23
				Q = 1400 gpm								
5.0	1.0	.2	.000486	180.0	.02595	.32	18.0	.02042	.40	1.8	.02042	.40
7.5	1.5	.2	.000486	270.0	.01801	.46	27.0	.01477	.56	2.7	.01477	.56
10.0	2.0	.2	.000486	360.0	.01314	.63	36.0	.01129	.73	3.6	.01129	.73
12.5	2.5	.2	.000486	450.0	.01015	.81	45.0	.00895	.92	4.5	.00895	.92
15.0	3.0	.2	.000486	540.0	.00813	1.01	54.0	.00729	1.13	5.4	.00729	1.13
17.5	3.5	.2	.000486	630.0	.00669	1.23	63.0	.00607	1.36	6.3	.00607	1.36
20.0	4.0	.2	.000486	720.0	.00562	1.47	72.0	.00514	1.60	7.2	.00514	1.60
22.5	4.5	.2	.000486	810.0	.00479	1.72	81.0	.00441	1.87	8.1	.00441	1.87
25.0	5.0	.2	.000486	900.0	.00414	1.99	90.0	.00383	2.15	9.0	.00383	2.15
2.5	1.0	.4	.000486	90.0	.01573	.52	9.0	.01573	.52	.9	.01573	.52
3.8	1.5	.4	.000486	135.0	.01410	.58	13.5	.01241	.66	1.4	.01241	.66
5.0	2.0	.4	.000486	180.0	.01298	.63	18.0	.01021	.81	1.8	.01021	.81
6.3	2.5	.4	.000486	225.0	.01094	.75	22.5	.00861	.96	2.3	.00861	.96
7.5	3.0	.4	.000486	270.0	.00901	.91	27.0	.00739	1.12	2.7	.00739	1.12
8.8	3.5	.4	.000486	315.0	.00762	1.08	31.5	.00642	1.28	3.1	.00642	1.28
10.0	4.0	.4	.000486	360.0	.00657	1.25	36.0	.00565	1.46	3.6	.00565	1.46
11.3	4.5	.4	.000486	405.0	.00574	1.43	40.5	.00501	1.65	4.0	.00501	1.65
12.5	5.0	.4	.000486	450.0	.00508	1.62	45.0	.00448	1.84	4.5	.00448	1.84
1.3	1.0	.8	.000486	45.0	.01125	.73	4.5	.01125	.73	.5	.01125	.73
1.9	1.5	.8	.000486	67.5	.00916	.90	6.8	.00916	.90	.7	.00916	.90
2.5	2.0	.8	.000486	90.0	.00787	1.05	9.0	.00787	1.05	.9	.00787	1.05
3.1	2.5	.8	.000486	112.5	.00732	1.13	11.3	.00693	1.19	1.1	.00693	1.19
3.8	3.0	.8	.000486	135.0	.00705	1.17	13.5	.00620	1.33	1.4	.00620	1.33
4.4	3.5	.8	.000486	157.5	.00677	1.22	15.8	.00561	1.47	1.6	.00561	1.47
5.0	4.0	.8	.000486	180.0	.00649	1.27	18.0	.00511	1.61	1.8	.00511	1.61
5.6	4.5	.8	.000486	202.5	.00615	1.34	20.3	.00468	1.76	2.0	.00468	1.76
6.3	5.0	.8	.000486	225.0	.00549	1.50	22.5	.00431	1.91	2.3	.00431	1.91

Table SA-47
Results of Waste Dilution - Winter - Ship 2
(L = 2.0 n mi, A = 0.001 $ft^{2/3}$/sec)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 500 gpm												
5.0	1.0	.2	.000173	180.0	.01371	1.68	18.0	.01371	1.68	1.8	.01371	1.68
7.5	1.5	.2	.000173	270.0	.00992	2.33	27.0	.00992	2.33	2.7	.00992	2.33
10.0	2.0	.2	.000173	360.0	.00758	3.04	36.0	.00758	3.04	3.6	.00758	3.04
12.5	2.5	.2	.000173	450.0	.00601	3.84	45.0	.00601	3.84	4.5	.00601	3.84
15.0	3.0	.2	.000173	540.0	.00490	4.71	54.0	.00490	4.71	5.4	.00490	4.71
17.5	3.5	.2	.000173	630.0	.00408	5.66	63.0	.00408	5.66	6.3	.00408	5.66
20.0	4.0	.2	.000173	720.0	.00345	6.69	72.0	.00345	6.69	7.2	.00345	6.69
22.5	4.5	.2	.000173	810.0	.00296	7.79	81.0	.00296	7.79	8.1	.00296	7.79
25.0	5.0	.2	.000173	900.0	.00257	8.97	90.0	.00257	8.97	9.0	.00257	8.97
2.5	1.0	.4	.000173	90.0	.01057	2.18	9.0	.01057	2.18	.9	.01057	2.18
3.8	1.5	.4	.000173	135.0	.00833	2.77	13.5	.00833	2.77	1.4	.00833	2.77
5.0	2.0	.4	.000173	180.0	.00686	3.36	18.0	.00686	3.36	1.8	.00686	3.36
6.3	2.5	.4	.000173	225.0	.00578	3.99	22.5	.00578	3.99	2.3	.00578	3.99
7.5	3.0	.4	.000173	270.0	.00496	4.65	27.0	.00496	4.65	2.7	.00496	4.65
8.8	3.5	.4	.000173	315.0	.00431	5.35	31.5	.00431	5.35	3.1	.00431	5.35
10.0	4.0	.4	.000173	360.0	.00379	6.09	36.0	.00379	6.09	3.6	.00379	6.09
11.3	4.5	.4	.000173	405.0	.00336	6.86	40.5	.00336	6.86	4.0	.00336	6.86
12.5	5.0	.4	.000173	450.0	.00301	7.67	45.0	.00301	7.67	4.5	.00301	7.67
1.3	1.0	.8	.000173	45.0	.00755	3.05	4.5	.00755	3.05	.5	.00755	3.05
1.9	1.5	.8	.000173	67.5	.00615	3.75	6.8	.00615	3.75	.7	.00615	3.75
2.5	2.0	.8	.000173	90.0	.00528	4.37	9.0	.00528	4.37	.9	.00528	4.37
3.1	2.5	.8	.000173	112.5	.00466	4.95	11.3	.00466	4.95	1.1	.00466	4.95
3.8	3.0	.8	.000173	135.0	.00417	5.54	13.5	.00417	5.54	1.4	.00417	5.54
4.4	3.5	.8	.000173	157.5	.00377	6.13	15.8	.00377	6.13	1.6	.00377	6.13
5.0	4.0	.8	.000173	180.0	.00343	6.73	18.0	.00343	6.73	1.8	.00343	6.73
5.6	4.5	.8	.000173	202.5	.00314	7.35	20.3	.00314	7.35	2.0	.00314	7.35
6.3	5.0	.8	.000173	225.0	.00289	7.98	22.5	.00289	7.98	2.3	.00289	7.98
Q = 600 gpm												
5.0	1.0	.2	.000208	180.0	.01371	1.40	18.0	.01371	1.40	1.8	.01371	1.40
7.5	1.5	.2	.000208	270.0	.00992	1.94	27.0	.00992	1.94	2.7	.00992	1.94
10.0	2.0	.2	.000208	360.0	.00758	2.54	36.0	.00758	2.54	3.6	.00758	2.54
12.5	2.5	.2	.000208	450.0	.00601	3.20	45.0	.00601	3.20	4.5	.00601	3.20
15.0	3.0	.2	.000208	540.0	.00490	3.92	54.0	.00490	3.92	5.4	.00490	3.92
17.5	3.5	.2	.000208	630.0	.00408	4.72	63.0	.00408	4.72	6.3	.00408	4.72
20.0	4.0	.2	.000208	720.0	.00345	5.57	72.0	.00345	5.57	7.2	.00345	5.57
22.5	4.5	.2	.000208	810.0	.00296	6.49	81.0	.00296	6.49	8.1	.00296	6.49
25.0	5.0	.2	.000208	900.0	.00257	7.48	90.0	.00257	7.48	9.0	.00257	7.48
2.5	1.0	.4	.000208	90.0	.01057	1.82	9.0	.01057	1.82	.9	.01057	1.82
3.8	1.5	.4	.000208	135.0	.00833	2.31	13.5	.00833	2.31	1.4	.00833	2.31
5.0	2.0	.4	.000208	180.0	.00686	2.80	18.0	.00686	2.80	1.8	.00686	2.80
6.3	2.5	.4	.000208	225.0	.00578	3.32	22.5	.00578	3.32	2.3	.00578	3.32
7.5	3.0	.4	.000208	270.0	.00496	3.88	27.0	.00496	3.88	2.7	.00496	3.88
8.8	3.5	.4	.000208	315.0	.00431	4.46	31.5	.00431	4.46	3.1	.00431	4.46
10.0	4.0	.4	.000208	360.0	.00379	5.07	36.0	.00379	5.07	3.6	.00379	5.07
11.3	4.5	.4	.000208	405.0	.00336	5.72	40.5	.00336	5.72	4.0	.00336	5.72
12.5	5.0	.4	.000208	450.0	.00301	6.40	45.0	.00301	6.40	4.5	.00301	6.40
1.3	1.0	.8	.000208	45.0	.00755	2.54	4.5	.00755	2.54	.5	.00755	2.54
1.9	1.5	.8	.000208	67.5	.00615	3.13	6.8	.00615	3.13	.7	.00615	3.13
2.5	2.0	.8	.000208	90.0	.00528	3.64	9.0	.00528	3.64	.9	.00528	3.64
3.1	2.5	.8	.000208	112.5	.00466	4.13	11.3	.00466	4.13	1.1	.00466	4.13
3.8	3.0	.8	.000208	135.0	.00417	4.61	13.5	.00417	4.61	1.4	.00417	4.61
4.4	3.5	.8	.000208	157.5	.00377	5.11	15.8	.00377	5.11	1.6	.00377	5.11
5.0	4.0	.8	.000208	180.0	.00343	5.61	18.0	.00343	5.61	1.8	.00343	5.61
5.6	4.5	.8	.000208	202.5	.00314	6.12	20.3	.00314	6.12	2.0	.00314	6.12
6.3	5.0	.8	.000208	225.0	.00289	6.65	22.5	.00289	6.65	2.3	.00289	6.65

Table SA-47 (continued)
Results of Waste Dilution - Winter - Ship 2
(L = 2.0 n mi, A = 0.001 $ft^{2/3}/sec$)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 700 gpm												
5.0	1.0	.2	.000243	180.0	.01371	1.20	18.0	.01371	1.20	1.8	.01371	1.20
7.5	1.5	.2	.000243	270.0	.00992	1.66	27.0	.00992	1.66	2.7	.00992	1.66
10.0	2.0	.2	.000243	360.0	.00758	2.17	36.0	.00758	2.17	3.6	.00758	2.17
12.5	2.5	.2	.000243	450.0	.00601	2.74	45.0	.00601	2.74	4.5	.00601	2.74
15.0	3.0	.2	.000243	540.0	.00490	3.36	54.0	.00490	3.36	5.4	.00490	3.36
17.5	3.5	.2	.000243	630.0	.00408	4.04	63.0	.00408	4.04	6.3	.00408	4.04
20.0	4.0	.2	.000243	720.0	.00345	4.78	72.0	.00345	4.78	7.2	.00345	4.78
22.5	4.5	.2	.000243	810.0	.00296	5.57	81.0	.00296	5.57	8.1	.00296	5.57
25.0	5.0	.2	.000243	900.0	.00257	6.41	90.0	.00257	6.41	9.0	.00257	6.41
2.5	1.0	.4	.000243	90.0	.01057	1.56	9.0	.01057	1.56	.9	.01057	1.56
3.8	1.5	.4	.000243	135.0	.00833	1.98	13.5	.00833	1.98	1.4	.00833	1.98
5.0	2.0	.4	.000243	180.0	.00686	2.40	18.0	.00686	2.40	1.8	.00686	2.40
6.3	2.5	.4	.000243	225.0	.00578	2.85	22.5	.00578	2.85	2.3	.00578	2.85
7.5	3.0	.4	.000243	270.0	.00496	3.32	27.0	.00496	3.32	2.7	.00496	3.32
8.8	3.5	.4	.000243	315.0	.00431	3.82	31.5	.00431	3.82	3.1	.00431	3.82
10.0	4.0	.4	.000243	360.0	.00379	4.35	36.0	.00379	4.35	3.6	.00379	4.35
11.3	4.5	.4	.000243	405.0	.00336	4.90	40.5	.00336	4.90	4.0	.00336	4.90
12.5	5.0	.4	.000243	450.0	.00301	5.48	45.0	.00301	5.48	4.5	.00301	5.48
1.3	1.0	.8	.000243	45.0	.00755	2.18	4.5	.00755	2.18	.5	.00755	2.18
1.9	1.5	.8	.000243	67.5	.00615	2.68	6.8	.00615	2.68	.7	.00615	2.68
2.5	2.0	.8	.000243	90.0	.00528	3.12	9.0	.00528	3.12	.9	.00528	3.12
3.1	2.5	.8	.000243	112.5	.00466	3.54	11.3	.00466	3.54	1.1	.00466	3.54
3.8	3.0	.8	.000243	135.0	.00417	3.96	13.5	.00417	3.96	1.4	.00417	3.96
4.4	3.5	.8	.000243	157.5	.00377	4.38	15.8	.00377	4.38	1.6	.00377	4.38
5.0	4.0	.8	.000243	180.0	.00343	4.81	18.0	.00343	4.81	1.8	.00343	4.81
5.6	4.5	.8	.000243	202.5	.00314	5.25	20.3	.00314	5.25	2.0	.00314	5.25
6.3	5.0	.8	.000243	225.0	.00289	5.70	22.5	.00289	5.70	2.3	.00289	5.70
Q = 1000 gpm												
5.0	1.0	.2	.000347	180.0	.01371	.84	18.0	.01371	.84	1.8	.01371	.84
7.5	1.5	.2	.000347	270.0	.00992	1.16	27.0	.00992	1.16	2.7	.00992	1.16
10.0	2.0	.2	.000347	360.0	.00758	1.52	36.0	.00758	1.52	3.6	.00758	1.52
12.5	2.5	.2	.000347	450.0	.00601	1.92	45.0	.00601	1.92	4.5	.00601	1.92
15.0	3.0	.2	.000347	540.0	.00490	2.35	54.0	.00490	2.35	5.4	.00490	2.35
17.5	3.5	.2	.000347	630.0	.00408	2.83	63.0	.00408	2.83	6.3	.00408	2.83
20.0	4.0	.2	.000347	720.0	.00345	3.34	72.0	.00345	3.34	7.2	.00345	3.34
22.5	4.5	.2	.000347	810.0	.00296	3.90	81.0	.00296	3.90	8.1	.00296	3.90
25.0	5.0	.2	.000347	900.0	.00257	4.49	90.0	.00257	4.49	9.0	.00257	4.49
2.5	1.0	.4	.000347	90.0	.01057	1.09	9.0	.01057	1.09	.9	.01057	1.09
3.8	1.5	.4	.000347	135.0	.00833	1.38	13.5	.00833	1.38	1.4	.00833	1.38
5.0	2.0	.4	.000347	180.0	.00686	1.68	18.0	.00686	1.68	1.8	.00686	1.68
6.3	2.5	.4	.000347	225.0	.00578	1.99	22.5	.00578	1.99	2.3	.00578	1.99
7.5	3.0	.4	.000347	270.0	.00496	2.33	27.0	.00496	2.33	2.7	.00496	2.33
8.8	3.5	.4	.000347	315.0	.00431	2.67	31.5	.00431	2.67	3.1	.00431	2.67
10.0	4.0	.4	.000347	360.0	.00379	3.04	36.0	.00379	3.04	3.6	.00379	3.04
11.3	4.5	.4	.000347	405.0	.00336	3.43	40.5	.00336	3.43	4.0	.00336	3.43
12.5	5.0	.4	.000347	450.0	.00301	3.84	45.0	.00301	3.84	4.5	.00301	3.84
1.3	1.0	.8	.000347	45.0	.00755	1.53	4.5	.00755	1.53	.5	.00755	1.53
1.9	1.5	.8	.000347	67.5	.00615	1.88	6.8	.00615	1.88	.7	.00615	1.88
2.5	2.0	.8	.000347	90.0	.00528	2.18	9.0	.00528	2.18	.9	.00528	2.18
3.1	2.5	.8	.000347	112.5	.00466	2.48	11.3	.00466	2.48	1.1	.00466	2.48
3.8	3.0	.8	.000347	135.0	.00417	2.77	13.5	.00417	2.77	1.4	.00417	2.77
4.4	3.5	.8	.000347	157.5	.00377	3.06	15.8	.00377	3.06	1.6	.00377	3.06
5.0	4.0	.8	.000347	180.0	.00343	3.36	18.0	.00343	3.36	1.8	.00343	3.36
5.6	4.5	.8	.000347	202.5	.00314	3.67	20.3	.00314	3.67	2.0	.00314	3.67
6.3	5.0	.8	.000347	225.0	.00289	3.99	22.5	.00289	3.99	2.3	.00289	3.99

Table SA-47 (continued)
Results of Waste Dilution - Winter - Ship 2
(L = 2.0 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 1200 gpm								
5.0	1.0	.2	.000416	180.0	.01371	.70	18.0	.01371	.70	1.8	.01371	.70
7.5	1.5	.2	.000416	270.0	.00992	.97	27.0	.00992	.97	2.7	.00992	.97
10.0	2.0	.2	.000416	360.0	.00758	1.27	36.0	.00758	1.27	3.6	.00758	1.27
12.5	2.5	.2	.000416	450.0	.00601	1.60	45.0	.00601	1.60	4.5	.00601	1.60
15.0	3.0	.2	.000416	540.0	.00490	1.96	54.0	.00490	1.96	5.4	.00490	1.96
17.5	3.5	.2	.000416	630.0	.00408	2.36	63.0	.00408	2.36	6.3	.00408	2.36
20.0	4.0	.2	.000416	720.0	.00345	2.79	72.0	.00345	2.79	7.2	.00345	2.79
22.5	4.5	.2	.000416	810.0	.00296	3.25	81.0	.00296	3.25	8.1	.00296	3.25
25.0	5.0	.2	.000416	900.0	.00257	3.74	90.0	.00257	3.74	9.0	.00257	3.74
2.5	1.0	.4	.000416	90.0	.01057	.91	9.0	.01057	.91	.9	.01057	.91
3.8	1.5	.4	.000416	135.0	.00833	1.15	13.5	.00833	1.15	1.4	.00833	1.15
5.0	2.0	.4	.000416	180.0	.00686	1.40	18.0	.00686	1.40	1.8	.00686	1.40
6.3	2.5	.4	.000416	225.0	.00578	1.66	22.5	.00578	1.66	2.3	.00578	1.66
7.5	3.0	.4	.000416	270.0	.00496	1.94	27.0	.00496	1.94	2.7	.00496	1.94
8.8	3.5	.4	.000416	315.0	.00431	2.23	31.5	.00431	2.23	3.1	.00431	2.23
10.0	4.0	.4	.000416	360.0	.00379	2.54	36.0	.00379	2.54	3.6	.00379	2.54
11.3	4.5	.4	.000416	405.0	.00336	2.86	40.5	.00336	2.86	4.0	.00336	2.86
12.5	5.0	.4	.000416	450.0	.00301	3.20	45.0	.00301	3.20	4.5	.00301	3.20
1.3	1.0	.8	.000416	45.0	.00755	1.27	4.5	.00755	1.27	.5	.00755	1.27
1.9	1.5	.8	.000416	67.5	.00615	1.56	6.8	.00615	1.56	.7	.00615	1.56
2.5	2.0	.8	.000416	90.0	.00528	1.82	9.0	.00528	1.82	.9	.00528	1.82
3.1	2.5	.8	.000416	112.5	.00466	2.06	11.3	.00466	2.06	1.1	.00466	2.06
3.8	3.0	.8	.000416	135.0	.00417	2.31	13.5	.00417	2.31	1.4	.00417	2.31
4.4	3.5	.8	.000416	157.5	.00377	2.55	15.8	.00377	2.55	1.6	.00377	2.55
5.0	4.0	.8	.000416	180.0	.00343	2.80	18.0	.00343	2.80	1.8	.00343	2.80
5.6	4.5	.8	.000416	202.5	.00314	3.06	20.3	.00314	3.06	2.0	.00314	3.06
6.3	5.0	.8	.000416	225.0	.00289	3.32	22.5	.00289	3.32	2.3	.00289	3.32
				Q = 1400 gpm								
5.0	1.0	.2	.000486	180.0	.01371	.60	18.0	.01371	.60	1.8	.01371	.60
7.5	1.5	.2	.000486	270.0	.00992	.83	27.0	.00992	.83	2.7	.00992	.83
10.0	2.0	.2	.000486	360.0	.00758	1.09	36.0	.00758	1.09	3.6	.00758	1.09
12.5	2.5	.2	.000486	450.0	.00601	1.37	45.0	.00601	1.37	4.5	.00601	1.37
15.0	3.0	.2	.000486	540.0	.00490	1.68	54.0	.00490	1.68	5.4	.00490	1.68
17.5	3.5	.2	.000486	630.0	.00408	2.02	63.0	.00408	2.02	6.3	.00408	2.02
20.0	4.0	.2	.000486	720.0	.00345	2.39	72.0	.00345	2.39	7.2	.00345	2.39
22.5	4.5	.2	.000486	810.0	.00296	2.78	81.0	.00296	2.78	8.1	.00296	2.78
25.0	5.0	.2	.000486	900.0	.00257	3.21	90.0	.00257	3.21	9.0	.00257	3.21
2.5	1.0	.4	.000486	90.0	.01057	.78	9.0	.01057	.78	.9	.01057	.78
3.8	1.5	.4	.000486	135.0	.00833	.99	13.5	.00833	.99	1.4	.00833	.99
5.0	2.0	.4	.000486	180.0	.00686	1.20	18.0	.00686	1.20	1.8	.00686	1.20
6.3	2.5	.4	.000486	225.0	.00578	1.42	22.5	.00578	1.42	2.3	.00578	1.42
7.5	3.0	.4	.000486	270.0	.00496	1.66	27.0	.00496	1.66	2.7	.00496	1.66
8.8	3.5	.4	.000486	315.0	.00431	1.91	31.5	.00431	1.91	3.1	.00431	1.91
10.0	4.0	.4	.000486	360.0	.00379	2.17	36.0	.00379	2.17	3.6	.00379	2.17
11.3	4.5	.4	.000486	405.0	.00336	2.45	40.5	.00336	2.45	4.0	.00336	2.45
12.5	5.0	.4	.000486	450.0	.00301	2.74	45.0	.00301	2.74	4.5	.00301	2.74
1.3	1.0	.8	.000486	45.0	.00755	1.09	4.5	.00755	1.09	.5	.00755	1.09
1.9	1.5	.8	.000486	67.5	.00615	1.34	6.8	.00615	1.34	.7	.00615	1.34
2.5	2.0	.8	.000486	90.0	.00528	1.56	9.0	.00528	1.56	.9	.00528	1.56
3.1	2.5	.8	.000486	112.5	.00466	1.77	11.3	.00466	1.77	1.1	.00466	1.77
3.8	3.0	.8	.000486	135.0	.00417	1.98	13.5	.00417	1.98	1.4	.00417	1.98
4.4	3.5	.8	.000486	157.5	.00377	2.19	15.8	.00377	2.19	1.6	.00377	2.19
5.0	4.0	.8	.000486	180.0	.00343	2.40	18.0	.00343	2.40	1.8	.00343	2.40
5.6	4.5	.8	.000486	202.5	.00314	2.62	20.3	.00314	2.62	2.0	.00314	2.62
6.3	5.0	.8	.000486	225.0	.00289	2.85	22.5	.00289	2.85	2.3	.00289	2.85

Table SA-48
Results of Waste Dilution - Summer - Ship 3
(L = 2.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 500 gpm							
5.0	1.0	.2	.000175	180.0	.02567	.89	18.0	.02021	1.13	1.8	.02021	1.13
7.5	1.5	.2	.000175	270.0	.01782	1.28	27.0	.01462	1.56	2.7	.01462	1.56
10.0	2.0	.2	.000175	360.0	.01300	1.76	36.0	.01117	2.04	3.6	.01117	2.04
12.5	2.5	.2	.000175	450.0	.01004	2.27	45.0	.00886	2.58	4.5	.00886	2.58
15.0	3.0	.2	.000175	540.0	.00805	2.84	54.0	.00722	3.16	5.4	.00722	3.16
17.5	3.5	.2	.000175	630.0	.00662	3.45	63.0	.00601	3.80	6.3	.00601	3.80
20.0	4.0	.2	.000175	720.0	.00556	4.11	72.0	.00508	4.49	7.2	.00508	4.49
22.5	4.5	.2	.000175	810.0	.00474	4.82	81.0	.00436	5.23	8.1	.00436	5.23
25.0	5.0	.2	.000175	900.0	.00409	5.58	90.0	.00379	6.03	9.0	.00379	6.03
2.5	1.0	.4	.000175	90.0	.01557	1.47	9.0	.01557	1.47	.9	.01557	1.47
3.8	1.5	.4	.000175	135.0	.01395	1.64	13.5	.01228	1.86	1.4	.01228	1.86
5.0	2.0	.4	.000175	180.0	.01284	1.78	18.0	.01011	2.26	1.8	.01011	2.26
6.3	2.5	.4	.000175	225.0	.01082	2.11	22.5	.00852	2.68	2.3	.00852	2.68
7.5	3.0	.4	.000175	270.0	.00891	2.56	27.0	.00731	3.12	2.7	.00731	3.12
8.8	3.5	.4	.000175	315.0	.00754	3.03	31.5	.00636	3.59	3.1	.00636	3.59
10.0	4.0	.4	.000175	360.0	.00650	3.51	36.0	.00559	4.09	3.6	.00559	4.09
11.3	4.5	.4	.000175	405.0	.00568	4.02	40.5	.00495	4.61	4.0	.00495	4.61
12.5	5.0	.4	.000175	450.0	.00502	4.55	45.0	.00443	5.15	4.5	.00443	5.15
1.3	1.0	.8	.000175	45.0	.01113	2.05	4.5	.01113	2.05	.5	.01113	2.05
1.9	1.5	.8	.000175	67.5	.00907	2.52	6.8	.00907	2.52	.7	.00907	2.52
2.5	2.0	.8	.000175	90.0	.00779	2.93	9.0	.00779	2.93	.9	.00779	2.93
3.1	2.5	.8	.000175	112.5	.00724	3.15	11.3	.00686	3.33	1.1	.00686	3.33
3.8	3.0	.8	.000175	135.0	.00698	3.27	13.5	.00614	3.72	1.4	.00614	3.72
4.4	3.5	.8	.000175	157.5	.00670	3.41	15.8	.00555	4.11	1.6	.00555	4.11
5.0	4.0	.8	.000175	180.0	.00642	3.56	18.0	.00505	4.52	1.8	.00505	4.52
5.6	4.5	.8	.000175	202.5	.00608	3.75	20.3	.00463	4.93	2.0	.00463	4.93
6.3	5.0	.8	.000175	225.0	.00543	4.20	22.5	.00426	5.36	2.3	.00426	5.36
					Q = 600 gpm							
5.0	1.0	.2	.000210	180.0	.02567	.74	18.0	.02021	.94	1.8	.02021	.94
7.5	1.5	.2	.000210	270.0	.01782	1.07	27.0	.01462	1.30	2.7	.01462	1.30
10.0	2.0	.2	.000210	360.0	.01300	1.46	36.0	.01117	1.70	3.6	.01117	1.70
12.5	2.5	.2	.000210	450.0	.01004	1.89	45.0	.00886	2.15	4.5	.00886	2.15
15.0	3.0	.2	.000210	540.0	.00805	2.36	54.0	.00722	2.64	5.4	.00722	2.64
17.5	3.5	.2	.000210	630.0	.00662	2.87	63.0	.00601	3.17	6.3	.00601	3.17
20.0	4.0	.2	.000210	720.0	.00556	3.42	72.0	.00508	3.74	7.2	.00508	3.74
22.5	4.5	.2	.000210	810.0	.00474	4.02	81.0	.00436	4.36	8.1	.00436	4.36
25.0	5.0	.2	.000210	900.0	.00409	4.65	90.0	.00379	5.02	9.0	.00379	5.02
2.5	1.0	.4	.000210	90.0	.01557	1.22	9.0	.01557	1.22	.9	.01557	1.22
3.8	1.5	.4	.000210	135.0	.01395	1.36	13.5	.01228	1.55	1.4	.01228	1.55
5.0	2.0	.4	.000210	180.0	.01284	1.48	18.0	.01011	1.88	1.8	.01011	1.88
6.3	2.5	.4	.000210	225.0	.01082	1.76	22.5	.00852	2.23	2.3	.00852	2.23
7.5	3.0	.4	.000210	270.0	.00891	2.13	27.0	.00731	2.60	2.7	.00731	2.60
8.8	3.5	.4	.000210	315.0	.00754	2.52	31.5	.00636	2.99	3.1	.00636	2.99
10.0	4.0	.4	.000210	360.0	.00650	2.93	36.0	.00559	3.41	3.6	.00559	3.41
11.3	4.5	.4	.000210	405.0	.00568	3.35	40.5	.00495	3.84	4.0	.00495	3.84
12.5	5.0	.4	.000210	450.0	.00502	3.79	45.0	.00443	4.29	4.5	.00443	4.29
1.3	1.0	.8	.000210	45.0	.01113	1.71	4.5	.01113	1.71	.5	.01113	1.71
1.9	1.5	.8	.000210	67.5	.00907	2.10	6.8	.00907	2.10	.7	.00907	2.10
2.5	2.0	.8	.000210	90.0	.00779	2.44	9.0	.00779	2.44	.9	.00779	2.44
3.1	2.5	.8	.000210	112.5	.00724	2.63	11.3	.00686	2.77	1.1	.00686	2.77
3.8	3.0	.8	.000210	135.0	.00698	2.73	13.5	.00614	3.10	1.4	.00614	3.10
4.4	3.5	.8	.000210	157.5	.00670	2.84	15.8	.00555	3.43	1.6	.00555	3.43
5.0	4.0	.8	.000210	180.0	.00642	2.96	18.0	.00505	3.76	1.8	.00505	3.76
5.6	4.5	.8	.000210	202.5	.00608	3.13	20.3	.00463	4.11	2.0	.00463	4.11
6.3	5.0	.8	.000210	225.0	.00543	3.50	22.5	.00426	4.46	2.3	.00426	4.46

Table SA-48 (continued)
Results of Waste Dilution - Summer - Ship 3
(L = 2.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 700 gpm							
5.0	1.0	.2	.000245	180.0	.02567	.64	18.0	.02021	.81	1.8	.02021	.81
7.5	1.5	.2	.000245	270.0	.01782	.91	27.0	.01462	1.12	2.7	.01462	1.12
10.0	2.0	.2	.000245	360.0	.01300	1.25	36.0	.01117	1.46	3.6	.01117	1.46
12.5	2.5	.2	.000245	450.0	.01004	1.62	45.0	.00886	1.84	4.5	.00886	1.84
15.0	3.0	.2	.000245	540.0	.00805	2.03	54.0	.00722	2.26	5.4	.00722	2.26
17.5	3.5	.2	.000245	630.0	.00662	2.46	63.0	.00601	2.71	6.3	.00601	2.71
20.0	4.0	.2	.000245	720.0	.00556	2.93	72.0	.00508	3.21	7.2	.00508	3.21
22.5	4.5	.2	.000245	810.0	.00474	3.44	81.0	.00436	3.74	8.1	.00436	3.74
25.0	5.0	.2	.000245	900.0	.00409	3.98	90.0	.00379	4.30	9.0	.00379	4.30
2.5	1.0	.4	.000245	90.0	.01557	1.05	9.0	.01557	1.05	.9	.01557	1.05
3.8	1.5	.4	.000245	135.0	.01395	1.17	13.5	.01228	1.33	1.4	.01228	1.33
5.0	2.0	.4	.000245	180.0	.01284	1.27	18.0	.01011	1.61	1.8	.01011	1.61
6.3	2.5	.4	.000245	225.0	.01082	1.51	22.5	.00852	1.91	2.3	.00852	1.91
7.5	3.0	.4	.000245	270.0	.00891	1.83	27.0	.00731	2.23	2.7	.00731	2.23
8.8	3.5	.4	.000245	315.0	.00754	2.16	31.5	.00636	2.57	3.1	.00636	2.57
10.0	4.0	.4	.000245	360.0	.00650	2.51	36.0	.00559	2.92	3.6	.00559	2.92
11.3	4.5	.4	.000245	405.0	.00568	2.87	40.5	.00495	3.29	4.0	.00495	3.29
12.5	5.0	.4	.000245	450.0	.00502	3.25	45.0	.00443	3.68	4.5	.00443	3.68
1.3	1.0	.8	.000245	45.0	.01113	1.46	4.5	.01113	1.46	.5	.01113	1.46
1.9	1.5	.8	.000245	67.5	.00907	1.80	6.8	.00907	1.80	.7	.00907	1.80
2.5	2.0	.8	.000245	90.0	.00779	2.09	9.0	.00779	2.09	.9	.00779	2.09
3.1	2.5	.8	.000245	112.5	.00724	2.25	11.3	.00686	2.38	1.1	.00686	2.38
3.8	3.0	.8	.000245	135.0	.00698	2.34	13.5	.00614	2.66	1.4	.00614	2.66
4.4	3.5	.8	.000245	157.5	.00670	2.43	15.8	.00555	2.94	1.6	.00555	2.94
5.0	4.0	.8	.000245	180.0	.00642	2.54	18.0	.00505	3.23	1.8	.00505	3.23
5.6	4.5	.8	.000245	202.5	.00608	2.68	20.3	.00463	3.52	2.0	.00463	3.52
6.3	5.0	.8	.000245	225.0	.00543	3.00	22.5	.00426	3.83	2.3	.00426	3.83
					Q = 1000 gpm							
5.0	1.0	.2	.000350	180.0	.02567	.44	18.0	.02021	.56	1.8	.02021	.56
7.5	1.5	.2	.000350	270.0	.01782	.64	27.0	.01462	.78	2.7	.01462	.78
10.0	2.0	.2	.000350	360.0	.01300	.88	36.0	.01117	1.02	3.6	.01117	1.02
12.5	2.5	.2	.000350	450.0	.01004	1.14	45.0	.00886	1.29	4.5	.00886	1.29
15.0	3.0	.2	.000350	540.0	.00805	1.42	54.0	.00722	1.58	5.4	.00722	1.58
17.5	3.5	.2	.000350	630.0	.00662	1.72	63.0	.00601	1.90	6.3	.00601	1.90
20.0	4.0	.2	.000350	720.0	.00556	2.05	72.0	.00508	2.24	7.2	.00508	2.24
22.5	4.5	.2	.000350	810.0	.00474	2.41	81.0	.00436	2.62	8.1	.00436	2.62
25.0	5.0	.2	.000350	900.0	.00409	2.79	90.0	.00379	3.01	9.0	.00379	3.01
2.5	1.0	.4	.000350	90.0	.01557	.73	9.0	.01557	.73	.9	.01557	.73
3.8	1.5	.4	.000350	135.0	.01395	.82	13.5	.01228	.93	1.4	.01228	.93
5.0	2.0	.4	.000350	180.0	.01284	.89	18.0	.01011	1.13	1.8	.01011	1.13
6.3	2.5	.4	.000350	225.0	.01082	1.05	22.5	.00852	1.34	2.3	.00852	1.34
7.5	3.0	.4	.000350	270.0	.00891	1.28	27.0	.00731	1.56	2.7	.00731	1.56
8.8	3.5	.4	.000350	315.0	.00754	1.51	31.5	.00636	1.80	3.1	.00636	1.80
10.0	4.0	.4	.000350	360.0	.00650	1.76	36.0	.00559	2.04	3.6	.00559	2.04
11.3	4.5	.4	.000350	405.0	.00568	2.01	40.5	.00495	2.30	4.0	.00495	2.30
12.5	5.0	.4	.000350	450.0	.00502	2.27	45.0	.00443	2.58	4.5	.00443	2.58
1.3	1.0	.8	.000350	45.0	.01113	1.03	4.5	.01113	1.03	.5	.01113	1.03
1.9	1.5	.8	.000350	67.5	.00907	1.26	6.8	.00907	1.26	.7	.00907	1.26
2.5	2.0	.8	.000350	90.0	.00779	1.47	9.0	.00779	1.47	.9	.00779	1.47
3.1	2.5	.8	.000350	112.5	.00724	1.58	11.3	.00686	1.66	1.1	.00686	1.66
3.8	3.0	.8	.000350	135.0	.00698	1.64	13.5	.00614	1.86	1.4	.00614	1.86
4.4	3.5	.8	.000350	157.5	.00670	1.70	15.8	.00555	2.06	1.6	.00555	2.06
5.0	4.0	.8	.000350	180.0	.00642	1.78	18.0	.00505	2.26	1.8	.00505	2.26
5.6	4.5	.8	.000350	202.5	.00608	1.88	20.3	.00463	2.47	2.0	.00463	2.47
6.3	5.0	.8	.000350	225.0	.00543	2.10	22.5	.00426	2.68	2.3	.00426	2.68

Table SA-48 (continued)
Results of Waste Dilution - Summer - Ship 3
(L = 2.0 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 1200 gpm							
5.0	1.0	.2	.000421	180.0	.02567	.37	18.0	.02021	.47	1.8	.02021	.47
7.5	1.5	.2	.000421	270.0	.01782	.53	27.0	.01462	.65	2.7	.01462	.65
10.0	2.0	.2	.000421	360.0	.01300	.73	36.0	.01117	.85	3.6	.01117	.85
12.5	2.5	.2	.000421	450.0	.01004	.95	45.0	.00886	1.07	4.5	.00886	1.07
15.0	3.0	.2	.000421	540.0	.00805	1.18	54.0	.00722	1.32	5.4	.00722	1.32
17.5	3.5	.2	.000421	630.0	.00662	1.44	63.0	.00601	1.58	6.3	.00601	1.58
20.0	4.0	.2	.000421	720.0	.00556	1.71	72.0	.00508	1.87	7.2	.00508	1.87
22.5	4.5	.2	.000421	810.0	.00474	2.01	81.0	.00436	2.18	8.1	.00436	2.18
25.0	5.0	.2	.000421	900.0	.00409	2.32	90.0	.00379	2.51	9.0	.00379	2.51
2.5	1.0	.4	.000421	90.0	.01557	.61	9.0	.01557	.61	.9	.01557	.61
3.8	1.5	.4	.000421	135.0	.01395	.68	13.5	.01228	.77	1.4	.01228	.77
5.0	2.0	.4	.000421	180.0	.01284	.74	18.0	.01011	.94	1.8	.01011	.94
6.3	2.5	.4	.000421	225.0	.01082	.88	22.5	.00852	1.12	2.3	.00852	1.12
7.5	3.0	.4	.000421	270.0	.00891	1.07	27.0	.00731	1.30	2.7	.00731	1.30
8.8	3.5	.4	.000421	315.0	.00754	1.26	31.5	.00636	1.50	3.1	.00636	1.50
10.0	4.0	.4	.000421	360.0	.00650	1.46	36.0	.00559	1.70	3.6	.00559	1.70
11.3	4.5	.4	.000421	405.0	.00568	1.67	40.5	.00495	1.92	4.0	.00495	1.92
12.5	5.0	.4	.000421	450.0	.00502	1.89	45.0	.00443	2.15	4.5	.00443	2.15
1.3	1.0	.8	.000421	45.0	.01113	.85	4.5	.01113	.85	.5	.01113	.85
1.9	1.5	.8	.000421	67.5	.00907	1.05	6.8	.00907	1.05	.7	.00907	1.05
2.5	2.0	.8	.000421	90.0	.00779	1.22	9.0	.00779	1.22	.9	.00779	1.22
3.1	2.5	.8	.000421	112.5	.00724	1.31	11.3	.00686	1.39	1.1	.00686	1.39
3.8	3.0	.8	.000421	135.0	.00698	1.36	13.5	.00614	1.55	1.4	.00614	1.55
4.4	3.5	.8	.000421	157.5	.00670	1.42	15.8	.00555	1.71	1.6	.00555	1.71
5.0	4.0	.8	.000421	180.0	.00642	1.48	18.0	.00505	1.88	1.8	.00505	1.88
5.6	4.5	.8	.000421	202.5	.00608	1.56	20.3	.00463	2.06	2.0	.00463	2.06
6.3	5.0	.8	.000421	225.0	.00543	1.75	22.5	.00426	2.23	2.3	.00426	2.23
					Q = 1400 gpm							
5.0	1.0	.2	.000491	180.0	.02567	.32	18.0	.02021	.40	1.8	.02021	.40
7.5	1.5	.2	.000491	270.0	.01782	.46	27.0	.01462	.56	2.7	.01462	.56
10.0	2.0	.2	.000491	360.0	.01300	.63	36.0	.01117	.73	3.6	.01117	.73
12.5	2.5	.2	.000491	450.0	.01004	.81	45.0	.00886	.92	4.5	.00886	.92
15.0	3.0	.2	.000491	540.0	.00805	1.01	54.0	.00722	1.13	5.4	.00722	1.13
17.5	3.5	.2	.000491	630.0	.00662	1.23	63.0	.00601	1.36	6.3	.00601	1.36
20.0	4.0	.2	.000491	720.0	.00556	1.47	72.0	.00508	1.60	7.2	.00508	1.60
22.5	4.5	.2	.000491	810.0	.00474	1.72	81.0	.00436	1.87	8.1	.00436	1.87
25.0	5.0	.2	.000491	900.0	.00409	1.99	90.0	.00379	2.15	9.0	.00379	2.15
2.5	1.0	.4	.000491	90.0	.01557	.52	9.0	.01557	.52	.9	.01557	.52
3.8	1.5	.4	.000491	135.0	.01395	.58	13.5	.01228	.66	1.4	.01228	.66
5.0	2.0	.4	.000491	180.0	.01284	.63	18.0	.01011	.81	1.8	.01011	.81
6.3	2.5	.4	.000491	225.0	.01082	.75	22.5	.00852	.96	2.3	.00852	.96
7.5	3.0	.4	.000491	270.0	.00891	.91	27.0	.00731	1.12	2.7	.00731	1.12
8.8	3.5	.4	.000491	315.0	.00754	1.08	31.5	.00636	1.28	3.1	.00636	1.28
10.0	4.0	.4	.000491	360.0	.00650	1.25	36.0	.00559	1.46	3.6	.00559	1.46
11.3	4.5	.4	.000491	405.0	.00568	1.43	40.5	.00495	1.65	4.0	.00495	1.65
12.5	5.0	.4	.000491	450.0	.00502	1.62	45.0	.00443	1.84	4.5	.00443	1.84
1.3	1.0	.8	.000491	45.0	.01113	.73	4.5	.01113	.73	.5	.01113	.73
1.9	1.5	.8	.000491	67.5	.00907	.90	6.8	.00907	.90	.7	.00907	.90
2.5	2.0	.8	.000491	90.0	.00779	1.05	9.0	.00779	1.05	.9	.00779	1.05
3.1	2.5	.8	.000491	112.5	.00724	1.13	11.3	.00686	1.19	1.1	.00686	1.19
3.8	3.0	.8	.000491	135.0	.00698	1.17	13.5	.00614	1.33	1.4	.00614	1.33
4.4	3.5	.8	.000491	157.5	.00670	1.22	15.8	.00555	1.47	1.6	.00555	1.47
5.0	4.0	.8	.000491	180.0	.00642	1.27	18.0	.00505	1.61	1.8	.00505	1.61
5.6	4.5	.8	.000491	202.5	.00608	1.34	20.3	.00463	1.76	2.0	.00463	1.76
6.3	5.0	.8	.000491	225.0	.00543	1.50	22.5	.00426	1.91	2.3	.00426	1.91

Table SA-49
Results of Waste Dilution - Winter - Ship 3
(L = 2.0 n mi, A = 0.001 $ft^{2/3}$/sec)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 500 gpm												
5.0	1.0	.2	.000175	180.0	.01357	1.68	18.0	.01357	1.68	1.8	.01357	1.68
7.5	1.5	.2	.000175	270.0	.00982	2.33	27.0	.00982	2.33	2.7	.00982	2.33
10.0	2.0	.2	.000175	360.0	.00750	3.04	36.0	.00750	3.04	3.6	.00750	3.04
12.5	2.5	.2	.000175	450.0	.00595	3.84	45.0	.00595	3.84	4.5	.00595	3.84
15.0	3.0	.2	.000175	540.0	.00485	4.71	54.0	.00485	4.71	5.4	.00485	4.71
17.5	3.5	.2	.000175	630.0	.00403	5.66	63.0	.00403	5.66	6.3	.00403	5.66
20.0	4.0	.2	.000175	720.0	.00341	6.69	72.0	.00341	6.69	7.2	.00341	6.69
22.5	4.5	.2	.000175	810.0	.00293	7.79	81.0	.00293	7.79	8.1	.00293	7.79
25.0	5.0	.2	.000175	900.0	.00254	8.97	90.0	.00254	8.97	9.0	.00254	8.97
2.5	1.0	.4	.000175	90.0	.01045	2.18	9.0	.01045	2.18	.9	.01045	2.18
3.8	1.5	.4	.000175	135.0	.00824	2.77	13.5	.00824	2.77	1.4	.00824	2.77
5.0	2.0	.4	.000175	180.0	.00679	3.36	18.0	.00679	3.36	1.8	.00679	3.36
6.3	2.5	.4	.000175	225.0	.00572	3.99	22.5	.00572	3.99	2.3	.00572	3.99
7.5	3.0	.4	.000175	270.0	.00491	4.65	27.0	.00491	4.65	2.7	.00491	4.65
8.8	3.5	.4	.000175	315.0	.00427	5.35	31.5	.00427	5.35	3.1	.00427	5.35
10.0	4.0	.4	.000175	360.0	.00375	6.09	36.0	.00375	6.09	3.6	.00375	6.09
11.3	4.5	.4	.000175	405.0	.00333	6.86	40.5	.00333	6.86	4.0	.00333	6.86
12.5	5.0	.4	.000175	450.0	.00297	7.67	45.0	.00297	7.67	4.5	.00297	7.67
1.3	1.0	.8	.000175	45.0	.00748	3.05	4.5	.00748	3.05	.5	.00748	3.05
1.9	1.5	.8	.000175	67.5	.00609	3.75	6.8	.00609	3.75	.7	.00609	3.75
2.5	2.0	.8	.000175	90.0	.00523	4.37	9.0	.00523	4.37	.9	.00523	4.37
3.1	2.5	.8	.000175	112.5	.00461	4.95	11.3	.00461	4.95	1.1	.00461	4.95
3.8	3.0	.8	.000175	135.0	.00412	5.54	13.5	.00412	5.54	1.4	.00412	5.54
4.4	3.5	.8	.000175	157.5	.00373	6.13	15.8	.00373	6.13	1.6	.00373	6.13
5.0	4.0	.8	.000175	180.0	.00339	6.73	18.0	.00339	6.73	1.8	.00339	6.73
5.6	4.5	.8	.000175	202.5	.00311	7.35	20.3	.00311	7.35	2.0	.00311	7.35
6.3	5.0	.8	.000175	225.0	.00286	7.98	22.5	.00286	7.98	2.3	.00286	7.98
Q = 600 gpm												
5.0	1.0	.2	.000210	180.0	.01357	1.40	18.0	.01357	1.40	1.8	.01357	1.40
7.5	1.5	.2	.000210	270.0	.00982	1.94	27.0	.00982	1.94	2.7	.00982	1.94
10.0	2.0	.2	.000210	360.0	.00750	2.54	36.0	.00750	2.54	3.6	.00750	2.54
12.5	2.5	.2	.000210	450.0	.00595	3.20	45.0	.00595	3.20	4.5	.00595	3.20
15.0	3.0	.2	.000210	540.0	.00485	3.92	54.0	.00485	3.92	5.4	.00485	3.92
17.5	3.5	.2	.000210	630.0	.00403	4.72	63.0	.00403	4.72	6.3	.00403	4.72
20.0	4.0	.2	.000210	720.0	.00341	5.57	72.0	.00341	5.57	7.2	.00341	5.57
22.5	4.5	.2	.000210	810.0	.00293	6.49	81.0	.00293	6.49	8.1	.00293	6.49
25.0	5.0	.2	.000210	900.0	.00254	7.48	90.0	.00254	7.48	9.0	.00254	7.48
2.5	1.0	.4	.000210	90.0	.01045	1.82	9.0	.01045	1.82	.9	.01045	1.82
3.8	1.5	.4	.000210	135.0	.00824	2.31	13.5	.00824	2.31	1.4	.00824	2.31
5.0	2.0	.4	.000210	180.0	.00679	2.80	18.0	.00679	2.80	1.8	.00679	2.80
6.3	2.5	.4	.000210	225.0	.00572	3.32	22.5	.00572	3.32	2.3	.00572	3.32
7.5	3.0	.4	.000210	270.0	.00491	3.88	27.0	.00491	3.88	2.7	.00491	3.88
8.8	3.5	.4	.000210	315.0	.00427	4.46	31.5	.00427	4.46	3.1	.00427	4.46
10.0	4.0	.4	.000210	360.0	.00375	5.07	36.0	.00375	5.07	3.6	.00375	5.07
11.3	4.5	.4	.000210	405.0	.00333	5.72	40.5	.00333	5.72	4.0	.00333	5.72
12.5	5.0	.4	.000210	450.0	.00297	6.40	45.0	.00297	6.40	4.5	.00297	6.40
1.3	1.0	.8	.000210	45.0	.00748	2.54	4.5	.00748	2.54	.5	.00748	2.54
1.9	1.5	.8	.000210	67.5	.00609	3.13	6.8	.00609	3.13	.7	.00609	3.13
2.5	2.0	.8	.000210	90.0	.00523	3.64	9.0	.00523	3.64	.9	.00523	3.64
3.1	2.5	.8	.000210	112.5	.00461	4.13	11.3	.00461	4.13	1.1	.00461	4.13
3.8	3.0	.8	.000210	135.0	.00412	4.61	13.5	.00412	4.61	1.4	.00412	4.61
4.4	3.5	.8	.000210	157.5	.00373	5.11	15.8	.00373	5.11	1.6	.00373	5.11
5.0	4.0	.8	.000210	180.0	.00339	5.61	18.0	.00339	5.61	1.8	.00339	5.61
5.6	4.5	.8	.000210	202.5	.00311	6.12	20.3	.00311	6.12	2.0	.00311	6.12
6.3	5.0	.8	.000210	225.0	.00286	6.65	22.5	.00286	6.65	2.3	.00286	6.65

Table SA-49 (continued)
Results of Waste Dilution - Winter - Ship 3
(L = 2.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 700 gpm							
5.0	1.0	.2	.000245	180.0	.01357	1.20	18.0	.01357	1.20	1.8	.01357	1.20
7.5	1.5	.2	.000245	270.0	.00982	1.66	27.0	.00982	1.66	2.7	.00982	1.66
10.0	2.0	.2	.000245	360.0	.00750	2.17	36.0	.00750	2.17	3.6	.00750	2.17
12.5	2.5	.2	.000245	450.0	.00595	2.74	45.0	.00595	2.74	4.5	.00595	2.74
15.0	3.0	.2	.000245	540.0	.00485	3.36	54.0	.00485	3.36	5.4	.00485	3.36
17.5	3.5	.2	.000245	630.0	.00403	4.04	63.0	.00403	4.04	6.3	.00403	4.04
20.0	4.0	.2	.000245	720.0	.00341	4.78	72.0	.00341	4.78	7.2	.00341	4.78
22.5	4.5	.2	.000245	810.0	.00293	5.57	81.0	.00293	5.57	8.1	.00293	5.57
25.0	5.0	.2	.000245	900.0	.00254	6.41	90.0	.00254	6.41	9.0	.00254	6.41
2.5	1.0	.4	.000245	90.0	.01045	1.56	9.0	.01045	1.56	.9	.01045	1.56
3.8	1.5	.4	.000245	135.0	.00824	1.98	13.5	.00824	1.98	1.4	.00824	1.98
5.0	2.0	.4	.000245	180.0	.00679	2.40	18.0	.00679	2.40	1.8	.00679	2.40
6.3	2.5	.4	.000245	225.0	.00572	2.85	22.5	.00572	2.85	2.3	.00572	2.85
7.5	3.0	.4	.000245	270.0	.00491	3.32	27.0	.00491	3.32	2.7	.00491	3.32
8.8	3.5	.4	.000245	315.0	.00427	3.82	31.5	.00427	3.82	3.1	.00427	3.82
10.0	4.0	.4	.000245	360.0	.00375	4.35	36.0	.00375	4.35	3.6	.00375	4.35
11.3	4.5	.4	.000245	405.0	.00333	4.90	40.5	.00333	4.90	4.0	.00333	4.90
12.5	5.0	.4	.000245	450.0	.00297	5.48	45.0	.00297	5.48	4.5	.00297	5.48
1.3	1.0	.8	.000245	45.0	.00748	2.18	4.5	.00748	2.18	.5	.00748	2.18
1.9	1.5	.8	.000245	67.5	.00609	2.68	6.8	.00609	2.68	.7	.00609	2.68
2.5	2.0	.8	.000245	90.0	.00523	3.12	9.0	.00523	3.12	.9	.00523	3.12
3.1	2.5	.8	.000245	112.5	.00461	3.54	11.3	.00461	3.54	1.1	.00461	3.54
3.8	3.0	.8	.000245	135.0	.00412	3.96	13.5	.00412	3.96	1.4	.00412	3.96
4.4	3.5	.8	.000245	157.5	.00373	4.38	15.8	.00373	4.38	1.6	.00373	4.38
5.0	4.0	.8	.000245	180.0	.00339	4.81	18.0	.00339	4.81	1.8	.00339	4.81
5.6	4.5	.8	.000245	202.5	.00311	5.25	20.3	.00311	5.25	2.0	.00311	5.25
6.3	5.0	.8	.000245	225.0	.00286	5.70	22.5	.00286	5.70	2.3	.00286	5.70
					Q = 1000 gpm							
5.0	1.0	.2	.000350	180.0	.01357	.84	18.0	.01357	.84	1.8	.01357	.84
7.5	1.5	.2	.000350	270.0	.00982	1.16	27.0	.00982	1.16	2.7	.00982	1.16
10.0	2.0	.2	.000350	360.0	.00750	1.52	36.0	.00750	1.52	3.6	.00750	1.52
12.5	2.5	.2	.000350	450.0	.00595	1.92	45.0	.00595	1.92	4.5	.00595	1.92
15.0	3.0	.2	.000350	540.0	.00485	2.35	54.0	.00485	2.35	5.4	.00485	2.35
17.5	3.5	.2	.000350	630.0	.00403	2.83	63.0	.00403	2.83	6.3	.00403	2.83
20.0	4.0	.2	.000350	720.0	.00341	3.34	72.0	.00341	3.34	7.2	.00341	3.34
22.5	4.5	.2	.000350	810.0	.00293	3.90	81.0	.00293	3.90	8.1	.00293	3.90
25.0	5.0	.2	.000350	900.0	.00254	4.49	90.0	.00254	4.49	9.0	.00254	4.49
2.5	1.0	.4	.000350	90.0	.01045	1.09	9.0	.01045	1.09	.9	.01045	1.09
3.8	1.5	.4	.000350	135.0	.00824	1.38	13.5	.00824	1.38	1.4	.00824	1.38
5.0	2.0	.4	.000350	180.0	.00679	1.68	18.0	.00679	1.68	1.8	.00679	1.68
6.3	2.5	.4	.000350	225.0	.00572	1.99	22.5	.00572	1.99	2.3	.00572	1.99
7.5	3.0	.4	.000350	270.0	.00491	2.33	27.0	.00491	2.33	2.7	.00491	2.33
8.8	3.5	.4	.000350	315.0	.00427	2.67	31.5	.00427	2.67	3.1	.00427	2.67
10.0	4.0	.4	.000350	360.0	.00375	3.04	36.0	.00375	3.04	3.6	.00375	3.04
11.3	4.5	.4	.000350	405.0	.00333	3.43	40.5	.00333	3.43	4.0	.00333	3.43
12.5	5.0	.4	.000350	450.0	.00297	3.84	45.0	.00297	3.84	4.5	.00297	3.84
1.3	1.0	.8	.000350	45.0	.00748	1.53	4.5	.00748	1.53	.5	.00748	1.53
1.9	1.5	.8	.000350	67.5	.00609	1.88	6.8	.00609	1.88	.7	.00609	1.88
2.5	2.0	.8	.000350	90.0	.00523	2.18	9.0	.00523	2.18	.9	.00523	2.18
3.1	2.5	.8	.000350	112.5	.00461	2.48	11.3	.00461	2.48	1.1	.00461	2.48
3.8	3.0	.8	.000350	135.0	.00412	2.77	13.5	.00412	2.77	1.4	.00412	2.77
4.4	3.5	.8	.000350	157.5	.00373	3.06	15.8	.00373	3.06	1.6	.00373	3.06
5.0	4.0	.8	.000350	180.0	.00339	3.36	18.0	.00339	3.36	1.8	.00339	3.36
5.6	4.5	.8	.000350	202.5	.00311	3.67	20.3	.00311	3.67	2.0	.00311	3.67
6.3	5.0	.8	.000350	225.0	.00286	3.99	22.5	.00286	3.99	2.3	.00286	3.99

Table SA-49 (continued)
Results of Waste Dilution - Winter - Ship 3
(L = 2.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 1200 gpm							
5.0	1.0	.2	.000421	180.0	.01357	.70	18.0	.01357	.70	1.8	.01357	.70
7.5	1.5	.2	.000421	270.0	.00982	.97	27.0	.00982	.97	2.7	.00982	.97
10.0	2.0	.2	.000421	360.0	.00750	1.27	36.0	.00750	1.27	3.6	.00750	1.27
12.5	2.5	.2	.000421	450.0	.00595	1.60	45.0	.00595	1.60	4.5	.00595	1.60
15.0	3.0	.2	.000421	540.0	.00485	1.96	54.0	.00485	1.96	5.4	.00485	1.96
17.5	3.5	.2	.000421	630.0	.00403	2.36	63.0	.00403	2.36	6.3	.00403	2.36
20.0	4.0	.2	.000421	720.0	.00341	2.79	72.0	.00341	2.79	7.2	.00341	2.79
22.5	4.5	.2	.000421	810.0	.00293	3.25	81.0	.00293	3.25	8.1	.00293	3.25
25.0	5.0	.2	.000421	900.0	.00254	3.74	90.0	.00254	3.74	9.0	.00254	3.74
2.5	1.0	.4	.000421	90.0	.01045	.91	9.0	.01045	.91	.9	.01045	.91
3.8	1.5	.4	.000421	135.0	.00824	1.15	13.5	.00824	1.15	1.4	.00824	1.15
5.0	2.0	.4	.000421	180.0	.00679	1.40	18.0	.00679	1.40	1.8	.00679	1.40
6.3	2.5	.4	.000421	225.0	.00572	1.66	22.5	.00572	1.66	2.3	.00572	1.66
7.5	3.0	.4	.000421	270.0	.00491	1.94	27.0	.00491	1.94	2.7	.00491	1.94
8.8	3.5	.4	.000421	315.0	.00427	2.23	31.5	.00427	2.23	3.1	.00427	2.23
10.0	4.0	.4	.000421	360.0	.00375	2.54	36.0	.00375	2.54	3.6	.00375	2.54
11.3	4.5	.4	.000421	405.0	.00333	2.86	40.5	.00333	2.86	4.0	.00333	2.86
12.5	5.0	.4	.000421	450.0	.00297	3.20	45.0	.00297	3.20	4.5	.00297	3.20
1.3	1.0	.8	.000421	45.0	.00748	1.27	4.5	.00748	1.27	.5	.00748	1.27
1.9	1.5	.8	.000421	67.5	.00609	1.56	6.8	.00609	1.56	.7	.00609	1.56
2.5	2.0	.8	.000421	90.0	.00523	1.82	9.0	.00523	1.82	.9	.00523	1.82
3.1	2.5	.8	.000421	112.5	.00461	2.06	11.3	.00461	2.06	1.1	.00461	2.06
3.8	3.0	.8	.000421	135.0	.00412	2.31	13.5	.00412	2.31	1.4	.00412	2.31
4.4	3.5	.8	.000421	157.5	.00373	2.55	15.8	.00373	2.55	1.6	.00373	2.55
5.0	4.0	.8	.000421	180.0	.00339	2.80	18.0	.00339	2.80	1.8	.00339	2.80
5.6	4.5	.8	.000421	202.5	.00311	3.06	20.3	.00311	3.06	2.0	.00311	3.06
6.3	5.0	.8	.000421	225.0	.00286	3.32	22.5	.00286	3.32	2.3	.00286	3.32
					Q = 1400 gpm							
5.0	1.0	.2	.000491	180.0	.01357	.60	18.0	.01357	.60	1.8	.01357	.60
7.5	1.5	.2	.000491	270.0	.00982	.83	27.0	.00982	.83	2.7	.00982	.83
10.0	2.0	.2	.000491	360.0	.00750	1.09	36.0	.00750	1.09	3.6	.00750	1.09
12.5	2.5	.2	.000491	450.0	.00595	1.37	45.0	.00595	1.37	4.5	.00595	1.37
15.0	3.0	.2	.000491	540.0	.00485	1.68	54.0	.00485	1.68	5.4	.00485	1.68
17.5	3.5	.2	.000491	630.0	.00403	2.02	63.0	.00403	2.02	6.3	.00403	2.02
20.0	4.0	.2	.000491	720.0	.00341	2.39	72.0	.00341	2.39	7.2	.00341	2.39
22.5	4.5	.2	.000491	810.0	.00293	2.78	81.0	.00293	2.78	8.1	.00293	2.78
25.0	5.0	.2	.000491	900.0	.00254	3.21	90.0	.00254	3.21	9.0	.00254	3.21
2.5	1.0	.4	.000491	90.0	.01045	.78	9.0	.01045	.78	.9	.01045	.78
3.8	1.5	.4	.000491	135.0	.00824	.99	13.5	.00824	.99	1.4	.00824	.99
5.0	2.0	.4	.000491	180.0	.00679	1.20	18.0	.00679	1.20	1.8	.00679	1.20
6.3	2.5	.4	.000491	225.0	.00572	1.42	22.5	.00572	1.42	2.3	.00572	1.42
7.5	3.0	.4	.000491	270.0	.00491	1.66	27.0	.00491	1.66	2.7	.00491	1.66
8.8	3.5	.4	.000491	315.0	.00427	1.91	31.5	.00427	1.91	3.1	.00427	1.91
10.0	4.0	.4	.000491	360.0	.00375	2.17	36.0	.00375	2.17	3.6	.00375	2.17
11.3	4.5	.4	.000491	405.0	.00333	2.45	40.5	.00333	2.45	4.0	.00333	2.45
12.5	5.0	.4	.000491	450.0	.00297	2.74	45.0	.00297	2.74	4.5	.00297	2.74
1.3	1.0	.8	.000491	45.0	.00748	1.09	4.5	.00748	1.09	.5	.00748	1.09
1.9	1.5	.8	.000491	67.5	.00609	1.34	6.8	.00609	1.34	.7	.00609	1.34
2.5	2.0	.8	.000491	90.0	.00523	1.56	9.0	.00523	1.56	.9	.00523	1.56
3.1	2.5	.8	.000491	112.5	.00461	1.77	11.3	.00461	1.77	1.1	.00461	1.77
3.8	3.0	.8	.000491	135.0	.00412	1.98	13.5	.00412	1.98	1.4	.00412	1.98
4.4	3.5	.8	.000491	157.5	.00373	2.19	15.8	.00373	2.19	1.6	.00373	2.19
5.0	4.0	.8	.000491	180.0	.00339	2.40	18.0	.00339	2.40	1.8	.00339	2.40
5.6	4.5	.8	.000491	202.5	.00311	2.62	20.3	.00311	2.62	2.0	.00311	2.62
6.3	5.0	.8	.000491	225.0	.00286	2.85	22.5	.00286	2.85	2.3	.00286	2.85

Table SA-50
Results of Waste Dilution - Summer - Ship 4
(L = 2.0 n mi, A = 0.001 $ft^{2/3}/sec$)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 500 gpm								
5.0	1.0	.2	.000090	180.0	.04995	.89	18.0	.03933	1.13	1.8	.03933	1.13
7.5	1.5	.2	.000090	270.0	.03469	1.28	27.0	.02846	1.56	2.7	.02846	1.56
10.0	2.0	.2	.000090	360.0	.02530	1.76	36.0	.02175	2.04	3.6	.02175	2.04
12.5	2.5	.2	.000090	450.0	.01955	2.27	45.0	.01725	2.58	4.5	.01725	2.58
15.0	3.0	.2	.000090	540.0	.01567	2.84	54.0	.01406	3.16	5.4	.01406	3.16
17.5	3.5	.2	.000090	630.0	.01289	3.45	63.0	.01170	3.80	6.3	.01170	3.80
20.0	4.0	.2	.000090	720.0	.01082	4.11	72.0	.00990	4.49	7.2	.00990	4.49
22.5	4.5	.2	.000090	810.0	.00923	4.82	81.0	.00850	5.23	8.1	.00850	5.23
25.0	5.0	.2	.000090	900.0	.00797	5.58	90.0	.00738	6.03	9.0	.00738	6.03
2.5	1.0	.4	.000090	90.0	.03031	1.47	9.0	.03031	1.47	.9	.03031	1.47
3.8	1.5	.4	.000090	135.0	.02717	1.64	13.5	.02391	1.86	1.4	.02391	1.86
5.0	2.0	.4	.000090	180.0	.02500	1.78	18.0	.01968	2.26	1.8	.01968	2.26
6.3	2.5	.4	.000090	225.0	.02107	2.11	22.5	.01659	2.68	2.3	.01659	2.68
7.5	3.0	.4	.000090	270.0	.01736	2.56	27.0	.01424	3.12	2.7	.01424	3.12
8.8	3.5	.4	.000090	315.0	.01468	3.03	31.5	.01238	3.59	3.1	.01238	3.59
10.0	4.0	.4	.000090	360.0	.01266	3.51	36.0	.01088	4.09	3.6	.01088	4.09
11.3	4.5	.4	.000090	405.0	.01107	4.02	40.5	.00965	4.61	4.0	.00965	4.61
12.5	5.0	.4	.000090	450.0	.00978	4.55	45.0	.00863	5.15	4.5	.00863	5.15
1.3	1.0	.8	.000090	45.0	.02168	2.05	4.5	.02168	2.05	.5	.02168	2.05
1.9	1.5	.8	.000090	67.5	.01765	2.52	6.8	.01765	2.52	.7	.01765	2.52
2.5	2.0	.8	.000090	90.0	.01516	2.93	9.0	.01516	2.93	.9	.01516	2.93
3.1	2.5	.8	.000090	112.5	.01410	3.15	11.3	.01336	3.33	1.1	.01336	3.33
3.8	3.0	.8	.000090	135.0	.01359	3.27	13.5	.01196	3.72	1.4	.01196	3.72
4.4	3.5	.8	.000090	157.5	.01305	3.41	15.8	.01081	4.11	1.6	.01081	4.11
5.0	4.0	.8	.000090	180.0	.01250	3.56	18.0	.00984	4.52	1.8	.00984	4.52
5.6	4.5	.8	.000090	202.5	.01184	3.75	20.3	.00901	4.93	2.0	.00901	4.93
6.3	5.0	.8	.000090	225.0	.01058	4.20	22.5	.00830	5.36	2.3	.00830	5.36
				Q = 600 gpm								
5.0	1.0	.2	.000108	180.0	.04995	.74	18.0	.03933	.94	1.8	.03933	.94
7.5	1.5	.2	.000108	270.0	.03469	1.07	27.0	.02846	1.30	2.7	.02846	1.30
10.0	2.0	.2	.000108	360.0	.02530	1.46	36.0	.02175	1.70	3.6	.02175	1.70
12.5	2.5	.2	.000108	450.0	.01955	1.89	45.0	.01725	2.15	4.5	.01725	2.15
15.0	3.0	.2	.000108	540.0	.01567	2.36	54.0	.01406	2.64	5.4	.01406	2.64
17.5	3.5	.2	.000108	630.0	.01289	2.87	63.0	.01170	3.17	6.3	.01170	3.17
20.0	4.0	.2	.000108	720.0	.01082	3.42	72.0	.00990	3.74	7.2	.00990	3.74
22.5	4.5	.2	.000108	810.0	.00923	4.02	81.0	.00850	4.36	8.1	.00850	4.36
25.0	5.0	.2	.000108	900.0	.00797	4.65	90.0	.00738	5.02	9.0	.00738	5.02
2.5	1.0	.4	.000108	90.0	.03031	1.22	9.0	.03031	1.22	.9	.03031	1.22
3.8	1.5	.4	.000108	135.0	.02717	1.36	13.5	.02391	1.55	1.4	.02391	1.55
5.0	2.0	.4	.000108	180.0	.02500	1.48	18.0	.01968	1.88	1.8	.01968	1.88
6.3	2.5	.4	.000108	225.0	.02107	1.76	22.5	.01659	2.23	2.3	.01659	2.23
7.5	3.0	.4	.000108	270.0	.01736	2.13	27.0	.01424	2.60	2.7	.01424	2.60
8.8	3.5	.4	.000108	315.0	.01468	2.52	31.5	.01238	2.99	3.1	.01238	2.99
10.0	4.0	.4	.000108	360.0	.01266	2.93	36.0	.01088	3.41	3.6	.01088	3.41
11.3	4.5	.4	.000108	405.0	.01107	3.35	40.5	.00965	3.84	4.0	.00965	3.84
12.5	5.0	.4	.000108	450.0	.00978	3.79	45.0	.00863	4.29	4.5	.00863	4.29
1.3	1.0	.8	.000108	45.0	.02168	1.71	4.5	.02168	1.71	.5	.02168	1.71
1.9	1.5	.8	.000108	67.5	.01765	2.10	6.8	.01765	2.10	.7	.01765	2.10
2.5	2.0	.8	.000108	90.0	.01516	2.44	9.0	.01516	2.44	.9	.01516	2.44
3.1	2.5	.8	.000108	112.5	.01410	2.63	11.3	.01336	2.77	1.1	.01336	2.77
3.8	3.0	.8	.000108	135.0	.01359	2.73	13.5	.01196	3.10	1.4	.01196	3.10
4.4	3.5	.8	.000108	157.5	.01305	2.84	15.8	.01081	3.43	1.6	.01081	3.43
5.0	4.0	.8	.000108	180.0	.01250	2.96	18.0	.00984	3.76	1.8	.00984	3.76
5.6	4.5	.8	.000108	202.5	.01184	3.13	20.3	.00901	4.11	2.0	.00901	4.11
6.3	5.0	.8	.000108	225.0	.01058	3.50	22.5	.00830	4.46	2.3	.00830	4.46

Table SA-50 (continued)
Results of Waste Dilution - Summer - Ship 4
(L = 2.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 700 gpm								
5.0	1.0	.2	.000126	180.0	.04995	.64	18.0	.03933	.81	1.8	.03933	.81
7.5	1.5	.2	.000126	270.0	.03469	.92	27.0	.02846	1.12	2.7	.02846	1.12
10.0	2.0	.2	.000126	360.0	.02530	1.25	36.0	.02175	1.46	3.6	.02175	1.46
12.5	2.5	.2	.000126	450.0	.01955	1.62	45.0	.01725	1.84	4.5	.01725	1.84
15.0	3.0	.2	.000126	540.0	.01567	2.03	54.0	.01406	2.26	5.4	.01406	2.26
17.5	3.5	.2	.000126	630.0	.01289	2.46	63.0	.01170	2.71	6.3	.01170	2.71
20.0	4.0	.2	.000126	720.0	.01082	2.93	72.0	.00990	3.21	7.2	.00990	3.21
22.5	4.5	.2	.000126	810.0	.00923	3.44	81.0	.00850	3.74	8.1	.00850	3.74
25.0	5.0	.2	.000126	900.0	.00797	3.99	90.0	.00738	4.30	9.0	.00738	4.30
2.5	1.0	.4	.000126	90.0	.03031	1.05	9.0	.03031	1.05	.9	.03031	1.05
3.8	1.5	.4	.000126	135.0	.02717	1.17	13.5	.02391	1.33	1.4	.02391	1.33
5.0	2.0	.4	.000126	180.0	.02500	1.27	18.0	.01968	1.61	1.8	.01968	1.61
6.3	2.5	.4	.000126	225.0	.02107	1.51	22.5	.01659	1.91	2.3	.01659	1.91
7.5	3.0	.4	.000126	270.0	.01736	1.83	27.0	.01424	2.23	2.7	.01424	2.23
8.8	3.5	.4	.000126	315.0	.01468	2.16	31.5	.01238	2.57	3.1	.01238	2.57
10.0	4.0	.4	.000126	360.0	.01266	2.51	36.0	.01088	2.92	3.6	.01088	2.92
11.3	4.5	.4	.000126	405.0	.01107	2.87	40.5	.00965	3.29	4.0	.00965	3.29
12.5	5.0	.4	.000126	450.0	.00978	3.25	45.0	.00863	3.68	4.5	.00863	3.68
1.3	1.0	.8	.000126	45.0	.02168	1.46	4.5	.02168	1.46	.5	.02168	1.46
1.9	1.5	.8	.000126	67.5	.01765	1.80	6.8	.01765	1.80	.7	.01765	1.80
2.5	2.0	.8	.000126	90.0	.01516	2.09	9.0	.01516	2.09	.9	.01516	2.09
3.1	2.5	.8	.000126	112.5	.01410	2.25	11.3	.01336	2.38	1.1	.01336	2.38
3.8	3.0	.8	.000126	135.0	.01359	2.34	13.5	.01196	2.66	1.4	.01196	2.66
4.4	3.5	.8	.000126	157.5	.01305	2.43	15.8	.01081	2.94	1.6	.01081	2.94
5.0	4.0	.8	.000126	180.0	.01250	2.54	18.0	.00984	3.23	1.8	.00984	3.23
5.6	4.5	.8	.000126	202.5	.01184	2.68	20.3	.00901	3.52	2.0	.00901	3.52
6.3	5.0	.8	.000126	225.0	.01058	3.00	22.5	.00830	3.83	2.3	.00830	3.83
				Q = 1000 gpm								
5.0	1.0	.2	.000180	180.0	.04995	.45	18.0	.03933	.57	1.8	.03933	.57
7.5	1.5	.2	.000180	270.0	.03469	.64	27.0	.02846	.78	2.7	.02846	.78
10.0	2.0	.2	.000180	360.0	.02530	.88	36.0	.02175	1.02	3.6	.02175	1.02
12.5	2.5	.2	.000180	450.0	.01955	1.14	45.0	.01725	1.29	4.5	.01725	1.29
15.0	3.0	.2	.000180	540.0	.01567	1.42	54.0	.01406	1.58	5.4	.01406	1.58
17.5	3.5	.2	.000180	630.0	.01289	1.72	63.0	.01170	1.90	6.3	.01170	1.90
20.0	4.0	.2	.000180	720.0	.01082	2.05	72.0	.00990	2.25	7.2	.00990	2.25
22.5	4.5	.2	.000180	810.0	.00923	2.41	81.0	.00850	2.62	8.1	.00850	2.62
25.0	5.0	.2	.000180	900.0	.00797	2.79	90.0	.00738	3.01	9.0	.00738	3.01
2.5	1.0	.4	.000180	90.0	.03031	.73	9.0	.03031	.73	.9	.03031	.73
3.8	1.5	.4	.000180	135.0	.02717	.82	13.5	.02391	.93	1.4	.02391	.93
5.0	2.0	.4	.000180	180.0	.02500	.89	18.0	.01968	1.13	1.8	.01968	1.13
6.3	2.5	.4	.000180	225.0	.02107	1.05	22.5	.01659	1.34	2.3	.01659	1.34
7.5	3.0	.4	.000180	270.0	.01736	1.28	27.0	.01424	1.56	2.7	.01424	1.56
8.8	3.5	.4	.000180	315.0	.01468	1.51	31.5	.01238	1.80	3.1	.01238	1.80
10.0	4.0	.4	.000180	360.0	.01266	1.76	36.0	.01088	2.04	3.6	.01088	2.04
11.3	4.5	.4	.000180	405.0	.01107	2.01	40.5	.00965	2.30	4.0	.00965	2.30
12.5	5.0	.4	.000180	450.0	.00978	2.27	45.0	.00863	2.58	4.5	.00863	2.58
1.3	1.0	.8	.000180	45.0	.02168	1.03	4.5	.02168	1.03	.5	.02168	1.03
1.9	1.5	.8	.000180	67.5	.01765	1.26	6.8	.01765	1.26	.7	.01765	1.26
2.5	2.0	.8	.000180	90.0	.01516	1.47	9.0	.01516	1.47	.9	.01516	1.47
3.1	2.5	.8	.000180	112.5	.01410	1.58	11.3	.01336	1.66	1.1	.01336	1.66
3.8	3.0	.8	.000180	135.0	.01359	1.64	13.5	.01196	1.86	1.4	.01196	1.86
4.4	3.5	.8	.000180	157.5	.01305	1.70	15.8	.01081	2.06	1.6	.01081	2.06
5.0	4.0	.8	.000180	180.0	.01250	1.78	18.0	.00984	2.26	1.8	.00984	2.26
5.6	4.5	.8	.000180	202.5	.01184	1.88	20.3	.00901	2.47	2.0	.00901	2.47
6.3	5.0	.8	.000180	225.0	.01058	2.10	22.5	.00830	2.68	2.3	.00830	2.68

Table SA-50 (continued)
Results of Waste Dilution - Summer - Ship 4
(L = 2.0 n mi, A = 0.001 $ft^{2/3}$/sec)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 1200 gpm								
5.0	1.0	.2	.000216	180.0	.04995	.37	18.0	.03933	.47	1.8	.03933	.47
7.5	1.5	.2	.000216	270.0	.03469	.53	27.0	.02846	.65	2.7	.02846	.65
10.0	2.0	.2	.000216	360.0	.02530	.73	36.0	.02175	.85	3.6	.02175	.85
12.5	2.5	.2	.000216	450.0	.01955	.95	45.0	.01725	1.07	4.5	.01725	1.07
15.0	3.0	.2	.000216	540.0	.01567	1.18	54.0	.01406	1.32	5.4	.01406	1.32
17.5	3.5	.2	.000216	630.0	.01289	1.44	63.0	.01170	1.58	6.3	.01170	1.58
20.0	4.0	.2	.000216	720.0	.01082	1.71	72.0	.00990	1.87	7.2	.00990	1.87
22.5	4.5	.2	.000216	810.0	.00923	2.01	81.0	.00850	2.18	8.1	.00850	2.18
25.0	5.0	.2	.000216	900.0	.00797	2.32	90.0	.00738	2.51	9.0	.00738	2.51
2.5	1.0	.4	.000216	90.0	.03031	.61	9.0	.03031	.61	.9	.03031	.61
3.8	1.5	.4	.000216	135.0	.02717	.68	13.5	.02391	.77	1.4	.02391	.77
5.0	2.0	.4	.000216	180.0	.02500	.74	18.0	.01968	.94	1.8	.01968	.94
6.3	2.5	.4	.000216	225.0	.02107	.88	22.5	.01659	1.12	2.3	.01659	1.12
7.5	3.0	.4	.000216	270.0	.01736	1.07	27.0	.01424	1.30	2.7	.01424	1.30
8.8	3.5	.4	.000216	315.0	.01468	1.26	31.5	.01238	1.50	3.1	.01238	1.50
10.0	4.0	.4	.000216	360.0	.01266	1.46	36.0	.01088	1.70	3.6	.01088	1.70
11.3	4.5	.4	.000216	405.0	.01107	1.67	40.5	.00965	1.92	4.0	.00965	1.92
12.5	5.0	.4	.000216	450.0	.00978	1.89	45.0	.00863	2.15	4.5	.00863	2.15
1.3	1.0	.8	.000216	45.0	.02168	.85	4.5	.02168	.85	.5	.02168	.85
1.9	1.5	.8	.000216	67.5	.01765	1.05	6.8	.01765	1.05	.7	.01765	1.05
2.5	2.0	.8	.000216	90.0	.01516	1.22	9.0	.01516	1.22	.9	.01516	1.22
3.1	2.5	.8	.000216	112.5	.01410	1.31	11.3	.01336	1.39	1.1	.01336	1.39
3.8	3.0	.8	.000216	135.0	.01359	1.36	13.5	.01196	1.55	1.4	.01196	1.55
4.4	3.5	.8	.000216	157.5	.01305	1.42	15.8	.01081	1.71	1.6	.01081	1.71
5.0	4.0	.8	.000216	180.0	.01250	1.48	18.0	.00984	1.88	1.8	.00984	1.88
5.6	4.5	.8	.000216	202.5	.01184	1.56	20.3	.00901	2.06	2.0	.00901	2.06
6.3	5.0	.8	.000216	225.0	.01058	1.75	22.5	.00830	2.23	2.3	.00830	2.23
				Q = 1400 gpm								
5.0	1.0	.2	.000252	180.0	.04995	.32	18.0	.03933	.40	1.8	.03933	.40
7.5	1.5	.2	.000252	270.0	.03469	.46	27.0	.02846	.56	2.7	.02846	.56
10.0	2.0	.2	.000252	360.0	.02530	.63	36.0	.02175	.73	3.6	.02175	.73
12.5	2.5	.2	.000252	450.0	.01955	.81	45.0	.01725	.92	4.5	.01725	.92
15.0	3.0	.2	.000252	540.0	.01567	1.01	54.0	.01406	1.13	5.4	.01406	1.13
17.5	3.5	.2	.000252	630.0	.01289	1.23	63.0	.01170	1.36	6.3	.01170	1.36
20.0	4.0	.2	.000252	720.0	.01082	1.47	72.0	.00990	1.60	7.2	.00990	1.60
22.5	4.5	.2	.000252	810.0	.00923	1.72	81.0	.00850	1.87	8.1	.00850	1.87
25.0	5.0	.2	.000252	900.0	.00797	1.99	90.0	.00738	2.15	9.0	.00738	2.15
2.5	1.0	.4	.000252	90.0	.03031	.52	9.0	.03031	.52	.9	.03031	.52
3.8	1.5	.4	.000252	135.0	.02717	.58	13.5	.02391	.66	1.4	.02391	.66
5.0	2.0	.4	.000252	180.0	.02500	.64	18.0	.01968	.81	1.8	.01968	.81
6.3	2.5	.4	.000252	225.0	.02107	.75	22.5	.01659	.96	2.3	.01659	.96
7.5	3.0	.4	.000252	270.0	.01736	.91	27.0	.01424	1.12	2.7	.01424	1.12
8.8	3.5	.4	.000252	315.0	.01468	1.08	31.5	.01238	1.28	3.1	.01238	1.28
10.0	4.0	.4	.000252	360.0	.01266	1.25	36.0	.01088	1.46	3.6	.01088	1.46
11.3	4.5	.4	.000252	405.0	.01107	1.43	40.5	.00965	1.65	4.0	.00965	1.65
12.5	5.0	.4	.000252	450.0	.00978	1.62	45.0	.00863	1.84	4.5	.00863	1.84
1.3	1.0	.8	.000252	45.0	.02168	.73	4.5	.02168	.73	.5	.02168	.73
1.9	1.5	.8	.000252	67.5	.01765	.90	6.8	.01765	.90	.7	.01765	.90
2.5	2.0	.8	.000252	90.0	.01516	1.05	9.0	.01516	1.05	.9	.01516	1.05
3.1	2.5	.8	.000252	112.5	.01410	1.13	11.3	.01336	1.19	1.1	.01336	1.19
3.8	3.0	.8	.000252	135.0	.01359	1.17	13.5	.01196	1.33	1.4	.01196	1.33
4.4	3.5	.8	.000252	157.5	.01305	1.22	15.8	.01081	1.47	1.6	.01081	1.47
5.0	4.0	.8	.000252	180.0	.01250	1.27	18.0	.00984	1.61	1.8	.00984	1.61
5.6	4.5	.8	.000252	202.5	.01184	1.34	20.3	.00901	1.76	2.0	.00901	1.76
6.3	5.0	.8	.000252	225.0	.01058	1.50	22.5	.00830	1.91	2.3	.00830	1.91

Table SA-51
Results of Waste Dilution - Winter - Ship 4
(L = 2.0 n mi, A = 0.001 $ft^{2/3}/sec$)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 500 gpm												
5.0	1.0	.2	.000090	180.0	.02642	1.68	18.0	.02642	1.68	1.8	.02642	1.68
7.5	1.5	.2	.000090	270.0	.01911	2.33	27.0	.01911	2.33	2.7	.01911	2.33
10.0	2.0	.2	.000090	360.0	.01461	3.04	36.0	.01461	3.04	3.6	.01461	3.04
12.5	2.5	.2	.000090	450.0	.01158	3.84	45.0	.01158	3.84	4.5	.01158	3.84
15.0	3.0	.2	.000090	540.0	.00944	4.71	54.0	.00944	4.71	5.4	.00944	4.71
17.5	3.5	.2	.000090	630.0	.00786	5.66	63.0	.00786	5.66	6.3	.00786	5.66
20.0	4.0	.2	.000090	720.0	.00665	6.69	72.0	.00665	6.69	7.2	.00665	6.69
22.5	4.5	.2	.000090	810.0	.00571	7.79	81.0	.00571	7.79	8.1	.00571	7.79
25.0	5.0	.2	.000090	900.0	.00495	8.97	90.0	.00495	8.97	9.0	.00495	8.97
2.5	1.0	.4	.000090	90.0	.02036	2.18	9.0	.02036	2.18	.9	.02036	2.18
3.8	1.5	.4	.000090	135.0	.01606	2.77	13.5	.01606	2.77	1.4	.01606	2.77
5.0	2.0	.4	.000090	180.0	.01321	3.36	18.0	.01321	3.36	1.8	.01321	3.36
6.3	2.5	.4	.000090	225.0	.01114	3.99	22.5	.01114	3.99	2.3	.01114	3.99
7.5	3.0	.4	.000090	270.0	.00956	4.65	27.0	.00956	4.65	2.7	.00956	4.65
8.8	3.5	.4	.000090	315.0	.00831	5.35	31.5	.00831	5.35	3.1	.00831	5.35
10.0	4.0	.4	.000090	360.0	.00730	6.09	36.0	.00730	6.09	3.6	.00730	6.09
11.3	4.5	.4	.000090	405.0	.00648	6.86	40.5	.00648	6.86	4.0	.00648	6.86
12.5	5.0	.4	.000090	450.0	.00579	7.68	45.0	.00579	7.68	4.5	.00579	7.68
1.3	1.0	.8	.000090	45.0	.01456	3.05	4.5	.01456	3.05	.5	.01456	3.05
1.9	1.5	.8	.000090	67.5	.01185	3.75	6.8	.01185	3.75	.7	.01185	3.75
2.5	2.0	.8	.000090	90.0	.01018	4.37	9.0	.01018	4.37	.9	.01018	4.37
3.1	2.5	.8	.000090	112.5	.00897	4.95	11.3	.00897	4.95	1.1	.00897	4.95
3.8	3.0	.8	.000090	135.0	.00803	5.54	13.5	.00803	5.54	1.4	.00803	5.54
4.4	3.5	.8	.000090	157.5	.00726	6.13	15.8	.00726	6.13	1.6	.00726	6.13
5.0	4.0	.8	.000090	180.0	.00661	6.73	18.0	.00661	6.73	1.8	.00661	6.73
5.6	4.5	.8	.000090	202.5	.00605	7.35	20.3	.00605	7.35	2.0	.00605	7.35
6.3	5.0	.8	.000090	225.0	.00557	7.98	22.5	.00557	7.98	2.3	.00557	7.98
Q = 600 gpm												
5.0	1.0	.2	.000108	180.0	.02642	1.40	18.0	.02642	1.40	1.8	.02642	1.40
7.5	1.5	.2	.000108	270.0	.01911	1.94	27.0	.01911	1.94	2.7	.01911	1.94
10.0	2.0	.2	.000108	360.0	.01461	2.54	36.0	.01461	2.54	3.6	.01461	2.54
12.5	2.5	.2	.000108	450.0	.01158	3.20	45.0	.01158	3.20	4.5	.01158	3.20
15.0	3.0	.2	.000108	540.0	.00944	3.92	54.0	.00944	3.92	5.4	.00944	3.92
17.5	3.5	.2	.000108	630.0	.00786	4.72	63.0	.00786	4.72	6.3	.00786	4.72
20.0	4.0	.2	.000108	720.0	.00665	5.57	72.0	.00665	5.57	7.2	.00665	5.57
22.5	4.5	.2	.000108	810.0	.00571	6.49	81.0	.00571	6.49	8.1	.00571	6.49
25.0	5.0	.2	.000108	900.0	.00495	7.48	90.0	.00495	7.48	9.0	.00495	7.48
2.5	1.0	.4	.000108	90.0	.02036	1.82	9.0	.02036	1.82	.9	.02036	1.82
3.8	1.5	.4	.000108	135.0	.01606	2.31	13.5	.01606	2.31	1.4	.01606	2.31
5.0	2.0	.4	.000108	180.0	.01321	2.80	18.0	.01321	2.80	1.8	.01321	2.80
6.3	2.5	.4	.000108	225.0	.01114	3.32	22.5	.01114	3.32	2.3	.01114	3.32
7.5	3.0	.4	.000108	270.0	.00956	3.88	27.0	.00956	3.88	2.7	.00956	3.88
8.8	3.5	.4	.000108	315.0	.00831	4.46	31.5	.00831	4.46	3.1	.00831	4.46
10.0	4.0	.4	.000108	360.0	.00730	5.07	36.0	.00730	5.07	3.6	.00730	5.07
11.3	4.5	.4	.000108	405.0	.00648	5.72	40.5	.00648	5.72	4.0	.00648	5.72
12.5	5.0	.4	.000108	450.0	.00579	6.40	45.0	.00579	6.40	4.5	.00579	6.40
1.3	1.0	.8	.000108	45.0	.01456	2.54	4.5	.01456	2.54	.5	.01456	2.54
1.9	1.5	.8	.000108	67.5	.01185	3.13	6.8	.01185	3.13	.7	.01185	3.13
2.5	2.0	.8	.000108	90.0	.01018	3.64	9.0	.01018	3.64	.9	.01018	3.64
3.1	2.5	.8	.000108	112.5	.00897	4.13	11.3	.00897	4.13	1.1	.00897	4.13
3.8	3.0	.8	.000108	135.0	.00803	4.61	13.5	.00803	4.61	1.4	.00803	4.61
4.4	3.5	.8	.000108	157.5	.00726	5.11	15.8	.00726	5.11	1.6	.00726	5.11
5.0	4.0	.8	.000108	180.0	.00661	5.61	18.0	.00661	5.61	1.8	.00661	5.61
5.6	4.5	.8	.000108	202.5	.00605	6.12	20.3	.00605	6.12	2.0	.00605	6.12
6.3	5.0	.8	.000108	225.0	.00557	6.65	22.5	.00557	6.65	2.3	.00557	6.65

Table SA-51 (continued)
Results of Waste Dilution - Winter - Ship 4
(L = 2.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 700 gpm							
5.0	1.0	.2	.000126	180.0	.02642	1.20	18.0	.02642	1.20	1.8	.02642	1.20
7.5	1.5	.2	.000126	270.0	.01911	1.66	27.0	.01911	1.66	2.7	.01911	1.66
10.0	2.0	.2	.000126	360.0	.01461	2.17	36.0	.01461	2.17	3.6	.01461	2.17
12.5	2.5	.2	.000126	450.0	.01158	2.74	45.0	.01158	2.74	4.5	.01158	2.74
15.0	3.0	.2	.000126	540.0	.00944	3.36	54.0	.00944	3.36	5.4	.00944	3.36
17.5	3.5	.2	.000126	630.0	.00786	4.04	63.0	.00786	4.04	6.3	.00786	4.04
20.0	4.0	.2	.000126	720.0	.00665	4.78	72.0	.00665	4.78	7.2	.00665	4.78
22.5	4.5	.2	.000126	810.0	.00571	5.57	81.0	.00571	5.57	8.1	.00571	5.57
25.0	5.0	.2	.000126	900.0	.00495	6.41	90.0	.00495	6.41	9.0	.00495	6.41
2.5	1.0	.4	.000126	90.0	.02036	1.56	9.0	.02036	1.56	.9	.02036	1.56
3.8	1.5	.4	.000126	135.0	.01606	1.98	13.5	.01606	1.98	1.4	.01606	1.98
5.0	2.0	.4	.000126	180.0	.01321	2.40	18.0	.01321	2.40	1.8	.01321	2.40
6.3	2.5	.4	.000126	225.0	.01114	2.85	22.5	.01114	2.85	2.3	.01114	2.85
7.5	3.0	.4	.000126	270.0	.00956	3.32	27.0	.00956	3.32	2.7	.00956	3.32
8.8	3.5	.4	.000126	315.0	.00831	3.82	31.5	.00831	3.82	3.1	.00831	3.82
10.0	4.0	.4	.000126	360.0	.00730	4.35	36.0	.00730	4.35	3.6	.00730	4.35
11.3	4.5	.4	.000126	405.0	.00648	4.90	40.5	.00648	4.90	4.0	.00648	4.90
12.5	5.0	.4	.000126	450.0	.00579	5.48	45.0	.00579	5.48	4.5	.00579	5.48
1.3	1.0	.8	.000126	45.0	.01456	2.18	4.5	.01456	2.18	.5	.01456	2.18
1.9	1.5	.8	.000126	67.5	.01185	2.68	6.8	.01185	2.68	.7	.01185	2.68
2.5	2.0	.8	.000126	90.0	.01018	3.12	9.0	.01018	3.12	.9	.01018	3.12
3.1	2.5	.8	.000126	112.5	.00897	3.54	11.3	.00897	3.54	1.1	.00897	3.54
3.8	3.0	.8	.000126	135.0	.00803	3.96	13.5	.00803	3.96	1.4	.00803	3.96
4.4	3.5	.8	.000126	157.5	.00726	4.38	15.8	.00726	4.38	1.6	.00726	4.38
5.0	4.0	.8	.000126	180.0	.00661	4.81	18.0	.00661	4.81	1.8	.00661	4.81
5.6	4.5	.8	.000126	202.5	.00605	5.25	20.3	.00605	5.25	2.0	.00605	5.25
6.3	5.0	.8	.000126	225.0	.00557	5.70	22.5	.00557	5.70	2.3	.00557	5.70
					Q = 1000 gpm							
5.0	1.0	.2	.000180	180.0	.02642	.84	18.0	.02642	.84	1.8	.02642	.84
7.5	1.5	.2	.000180	270.0	.01911	1.16	27.0	.01911	1.16	2.7	.01911	1.16
10.0	2.0	.2	.000180	360.0	.01461	1.52	36.0	.01461	1.52	3.6	.01461	1.52
12.5	2.5	.2	.000180	450.0	.01158	1.92	45.0	.01158	1.92	4.5	.01158	1.92
15.0	3.0	.2	.000180	540.0	.00944	2.35	54.0	.00944	2.35	5.4	.00944	2.35
17.5	3.5	.2	.000180	630.0	.00786	2.83	63.0	.00786	2.83	6.3	.00786	2.83
20.0	4.0	.2	.000180	720.0	.00665	3.34	72.0	.00665	3.34	7.2	.00665	3.34
22.5	4.5	.2	.000180	810.0	.00571	3.90	81.0	.00571	3.90	8.1	.00571	3.90
25.0	5.0	.2	.000180	900.0	.00495	4.49	90.0	.00495	4.49	9.0	.00495	4.49
2.5	1.0	.4	.000180	90.0	.02036	1.09	9.0	.02036	1.09	.9	.02036	1.09
3.8	1.5	.4	.000180	135.0	.01606	1.38	13.5	.01606	1.38	1.4	.01606	1.38
5.0	2.0	.4	.000180	180.0	.01321	1.68	18.0	.01321	1.68	1.8	.01321	1.68
6.3	2.5	.4	.000180	225.0	.01114	1.99	22.5	.01114	1.99	2.3	.01114	1.99
7.5	3.0	.4	.000180	270.0	.00956	2.33	27.0	.00956	2.33	2.7	.00956	2.33
8.8	3.5	.4	.000180	315.0	.00831	2.67	31.5	.00831	2.67	3.1	.00831	2.67
10.0	4.0	.4	.000180	360.0	.00730	3.04	36.0	.00730	3.04	3.6	.00730	3.04
11.3	4.5	.4	.000180	405.0	.00648	3.43	40.5	.00648	3.43	4.0	.00648	3.43
12.5	5.0	.4	.000180	450.0	.00579	3.84	45.0	.00579	3.84	4.5	.00579	3.84
1.3	1.0	.8	.000180	45.0	.01456	1.53	4.5	.01456	1.53	.5	.01456	1.53
1.9	1.5	.8	.000180	67.5	.01185	1.88	6.8	.01185	1.88	.7	.01185	1.88
2.5	2.0	.8	.000180	90.0	.01018	2.18	9.0	.01018	2.18	.9	.01018	2.18
3.1	2.5	.8	.000180	112.5	.00897	2.48	11.3	.00897	2.48	1.1	.00897	2.48
3.8	3.0	.8	.000180	135.0	.00803	2.77	13.5	.00803	2.77	1.4	.00803	2.77
4.4	3.5	.8	.000180	157.5	.00726	3.06	15.8	.00726	3.06	1.6	.00726	3.06
5.0	4.0	.8	.000180	180.0	.00661	3.36	18.0	.00661	3.36	1.8	.00661	3.36
5.6	4.5	.8	.000180	202.5	.00605	3.67	20.3	.00605	3.67	2.0	.00605	3.67
6.3	5.0	.8	.000180	225.0	.00557	3.99	22.5	.00557	3.99	2.3	.00557	3.99

Table SA-51 (continued)
Results of Waste Dilution - Winter - Ship 4
(L = 2.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 1200 gpm								
5.0	1.0	.2	.000216	180.0	.02642	.70	18.0	.02642	.70	1.8	.02642	.70
7.5	1.5	.2	.000216	270.0	.01911	.97	27.0	.01911	.97	2.7	.01911	.97
10.0	2.0	.2	.000216	360.0	.01461	1.27	36.0	.01461	1.27	3.6	.01461	1.27
12.5	2.5	.2	.000216	450.0	.01158	1.60	45.0	.01158	1.60	4.5	.01158	1.60
15.0	3.0	.2	.000216	540.0	.00944	1.96	54.0	.00944	1.96	5.4	.00944	1.96
17.5	3.5	.2	.000216	630.0	.00786	2.36	63.0	.00786	2.36	6.3	.00786	2.36
20.0	4.0	.2	.000216	720.0	.00665	2.79	72.0	.00665	2.79	7.2	.00665	2.79
22.5	4.5	.2	.000216	810.0	.00571	3.25	81.0	.00571	3.25	8.1	.00571	3.25
25.0	5.0	.2	.000216	900.0	.00495	3.74	90.0	.00495	3.74	9.0	.00495	3.74
2.5	1.0	.4	.000216	90.0	.02036	.91	9.0	.02036	.91	.9	.02036	.91
3.8	1.5	.4	.000216	135.0	.01606	1.15	13.5	.01606	1.15	1.4	.01606	1.15
5.0	2.0	.4	.000216	180.0	.01321	1.40	18.0	.01321	1.40	1.8	.01321	1.40
6.3	2.5	.4	.000216	225.0	.01114	1.66	22.5	.01114	1.66	2.3	.01114	1.66
7.5	3.0	.4	.000216	270.0	.00956	1.94	27.0	.00956	1.94	2.7	.00956	1.94
8.8	3.5	.4	.000216	315.0	.00831	2.23	31.5	.00831	2.23	3.1	.00831	2.23
10.0	4.0	.4	.000216	360.0	.00730	2.54	36.0	.00730	2.54	3.6	.00730	2.54
11.3	4.5	.4	.000216	405.0	.00648	2.86	40.5	.00648	2.86	4.0	.00648	2.86
12.5	5.0	.4	.000216	450.0	.00579	3.20	45.0	.00579	3.20	4.5	.00579	3.20
1.3	1.0	.8	.000216	45.0	.01456	1.27	4.5	.01456	1.27	.5	.01456	1.27
1.9	1.5	.8	.000216	67.5	.01185	1.56	6.8	.01185	1.56	.7	.01185	1.56
2.5	2.0	.8	.000216	90.0	.01018	1.82	9.0	.01018	1.82	.9	.01018	1.82
3.1	2.5	.8	.000216	112.5	.00897	2.06	11.3	.00897	2.06	1.1	.00897	2.06
3.8	3.0	.8	.000216	135.0	.00803	2.31	13.5	.00803	2.31	1.4	.00803	2.31
4.4	3.5	.8	.000216	157.5	.00726	2.55	15.8	.00726	2.55	1.6	.00726	2.55
5.0	4.0	.8	.000216	180.0	.00661	2.80	18.0	.00661	2.80	1.8	.00661	2.80
5.6	4.5	.8	.000216	202.5	.00605	3.06	20.3	.00605	3.06	2.0	.00605	3.06
6.3	5.0	.8	.000216	225.0	.00557	3.32	22.5	.00557	3.32	2.3	.00557	3.32
				Q = 1400 gpm								
5.0	1.0	.2	.000252	180.0	.02642	.60	18.0	.02642	.60	1.8	.02642	.60
7.5	1.5	.2	.000252	270.0	.01911	.83	27.0	.01911	.83	2.7	.01911	.83
10.0	2.0	.2	.000252	360.0	.01461	1.09	36.0	.01461	1.09	3.6	.01461	1.09
12.5	2.5	.2	.000252	450.0	.01158	1.37	45.0	.01158	1.37	4.5	.01158	1.37
15.0	3.0	.2	.000252	540.0	.00944	1.68	54.0	.00944	1.68	5.4	.00944	1.68
17.5	3.5	.2	.000252	630.0	.00786	2.02	63.0	.00786	2.02	6.3	.00786	2.02
20.0	4.0	.2	.000252	720.0	.00665	2.39	72.0	.00665	2.39	7.2	.00665	2.39
22.5	4.5	.2	.000252	810.0	.00571	2.78	81.0	.00571	2.78	8.1	.00571	2.78
25.0	5.0	.2	.000252	900.0	.00495	3.21	90.0	.00495	3.21	9.0	.00495	3.21
2.5	1.0	.4	.000252	90.0	.02036	.78	9.0	.02036	.78	.9	.02036	.78
3.8	1.5	.4	.000252	135.0	.01606	.99	13.5	.01606	.99	1.4	.01606	.99
5.0	2.0	.4	.000252	180.0	.01321	1.20	18.0	.01321	1.20	1.8	.01321	1.20
6.3	2.5	.4	.000252	225.0	.01114	1.42	22.5	.01114	1.42	2.3	.01114	1.42
7.5	3.0	.4	.000252	270.0	.00956	1.66	27.0	.00956	1.66	2.7	.00956	1.66
8.8	3.5	.4	.000252	315.0	.00831	1.91	31.5	.00831	1.91	3.1	.00831	1.91
10.0	4.0	.4	.000252	360.0	.00730	2.17	36.0	.00730	2.17	3.6	.00730	2.17
11.3	4.5	.4	.000252	405.0	.00648	2.45	40.5	.00648	2.45	4.0	.00648	2.45
12.5	5.0	.4	.000252	450.0	.00579	2.74	45.0	.00579	2.74	4.5	.00579	2.74
1.3	1.0	.8	.000252	45.0	.01456	1.09	4.5	.01456	1.09	.5	.01456	1.09
1.9	1.5	.8	.000252	67.5	.01185	1.34	6.8	.01185	1.34	.7	.01185	1.34
2.5	2.0	.8	.000252	90.0	.01018	1.56	9.0	.01018	1.56	.9	.01018	1.56
3.1	2.5	.8	.000252	112.5	.00897	1.77	11.3	.00897	1.77	1.1	.00897	1.77
3.8	3.0	.8	.000252	135.0	.00803	1.98	13.5	.00803	1.98	1.4	.00803	1.98
4.4	3.5	.8	.000252	157.5	.00726	2.19	15.8	.00726	2.19	1.6	.00726	2.19
5.0	4.0	.8	.000252	180.0	.00661	2.40	18.0	.00661	2.40	1.8	.00661	2.40
5.6	4.5	.8	.000252	202.5	.00605	2.62	20.3	.00605	2.62	2.0	.00605	2.62
6.3	5.0	.8	.000252	225.0	.00557	2.85	22.5	.00557	2.85	2.3	.00557	2.85

Table SA-52
Results of Waste Dilution - Summer - Ship 5
(L = 2.0 n mi, A = 0.001 $ft^{2/3}/sec$)

T(hr)	X(n mi)	U(kt)	Co	Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
				Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
Q = 500 gpm												
5.0	1.0	.2	.000360	180.0	.01250	.89	18.0	.00984	1.13	1.8	.00984	1.13
7.5	1.5	.2	.000360	270.0	.00868	1.28	27.0	.00712	1.56	2.7	.00712	1.56
10.0	2.0	.2	.000360	360.0	.00633	1.76	36.0	.00544	2.04	3.6	.00544	2.04
12.5	2.5	.2	.000360	450.0	.00489	2.27	45.0	.00431	2.58	4.5	.00431	2.58
15.0	3.0	.2	.000360	540.0	.00392	2.84	54.0	.00351	3.16	5.4	.00351	3.16
17.5	3.5	.2	.000360	630.0	.00322	3.45	63.0	.00293	3.80	6.3	.00293	3.80
20.0	4.0	.2	.000360	720.0	.00271	4.11	72.0	.00248	4.49	7.2	.00248	4.49
22.5	4.5	.2	.000360	810.0	.00231	4.82	81.0	.00212	5.23	8.1	.00212	5.23
25.0	5.0	.2	.000360	900.0	.00199	5.58	90.0	.00184	6.03	9.0	.00184	6.03
2.5	1.0	.4	.000360	90.0	.00758	1.47	9.0	.00758	1.47	.9	.00758	1.47
3.8	1.5	.4	.000360	135.0	.00679	1.64	13.5	.00598	1.86	1.4	.00598	1.86
5.0	2.0	.4	.000360	180.0	.00625	1.78	18.0	.00492	2.26	1.8	.00492	2.26
6.3	2.5	.4	.000360	225.0	.00527	2.11	22.5	.00415	2.68	2.3	.00415	2.68
7.5	3.0	.4	.000360	270.0	.00434	2.56	27.0	.00356	3.12	2.7	.00356	3.12
8.8	3.5	.4	.000360	315.0	.00367	3.03	31.5	.00309	3.59	3.1	.00309	3.59
10.0	4.0	.4	.000360	360.0	.00317	3.51	36.0	.00272	4.09	3.6	.00272	4.09
11.3	4.5	.4	.000360	405.0	.00277	4.02	40.5	.00241	4.61	4.0	.00241	4.61
12.5	5.0	.4	.000360	450.0	.00245	4.55	45.0	.00216	5.15	4.5	.00216	5.15
1.3	1.0	.8	.000360	45.0	.00542	2.05	4.5	.00542	2.05	.5	.00542	2.05
1.9	1.5	.8	.000360	67.5	.00441	2.52	6.8	.00441	2.52	.7	.00441	2.52
2.5	2.0	.8	.000360	90.0	.00379	2.93	9.0	.00379	2.93	.9	.00379	2.93
3.1	2.5	.8	.000360	112.5	.00352	3.15	11.3	.00334	3.33	1.1	.00334	3.33
3.8	3.0	.8	.000360	135.0	.00340	3.27	13.5	.00299	3.72	1.4	.00299	3.72
4.4	3.5	.8	.000360	157.5	.00326	3.41	15.8	.00270	4.11	1.6	.00270	4.11
5.0	4.0	.8	.000360	180.0	.00313	3.56	18.0	.00246	4.52	1.8	.00246	4.52
5.6	4.5	.8	.000360	202.5	.00296	3.75	20.3	.00225	4.93	2.0	.00225	4.93
6.3	5.0	.8	.000360	225.0	.00265	4.20	22.5	.00207	5.36	2.3	.00207	5.36
Q = 600 gpm												
5.0	1.0	.2	.000432	180.0	.01250	.74	18.0	.00984	.94	1.8	.00984	.94
7.5	1.5	.2	.000432	270.0	.00868	1.07	27.0	.00712	1.30	2.7	.00712	1.30
10.0	2.0	.2	.000432	360.0	.00633	1.46	36.0	.00544	1.70	3.6	.00544	1.70
12.5	2.5	.2	.000432	450.0	.00489	1.89	45.0	.00431	2.15	4.5	.00431	2.15
15.0	3.0	.2	.000432	540.0	.00392	2.36	54.0	.00351	2.64	5.4	.00351	2.64
17.5	3.5	.2	.000432	630.0	.00322	2.87	63.0	.00293	3.17	6.3	.00293	3.17
20.0	4.0	.2	.000432	720.0	.00271	3.42	72.0	.00248	3.74	7.2	.00248	3.74
22.5	4.5	.2	.000432	810.0	.00231	4.01	81.0	.00212	4.36	8.1	.00212	4.36
25.0	5.0	.2	.000432	900.0	.00199	4.65	90.0	.00184	5.02	9.0	.00184	5.02
2.5	1.0	.4	.000432	90.0	.00758	1.22	9.0	.00758	1.22	.9	.00758	1.22
3.8	1.5	.4	.000432	135.0	.00679	1.36	13.5	.00598	1.55	1.4	.00598	1.55
5.0	2.0	.4	.000432	180.0	.00625	1.48	18.0	.00492	1.88	1.8	.00492	1.88
6.3	2.5	.4	.000432	225.0	.00527	1.76	22.5	.00415	2.23	2.3	.00415	2.23
7.5	3.0	.4	.000432	270.0	.00434	2.13	27.0	.00356	2.60	2.7	.00356	2.60
8.8	3.5	.4	.000432	315.0	.00367	2.52	31.5	.00309	2.99	3.1	.00309	2.99
10.0	4.0	.4	.000432	360.0	.00317	2.93	36.0	.00272	3.41	3.6	.00272	3.41
11.3	4.5	.4	.000432	405.0	.00277	3.35	40.5	.00241	3.84	4.0	.00241	3.84
12.5	5.0	.4	.000432	450.0	.00245	3.79	45.0	.00216	4.29	4.5	.00216	4.29
1.3	1.0	.8	.000432	45.0	.00542	1.71	4.5	.00542	1.71	.5	.00542	1.71
1.9	1.5	.8	.000432	67.5	.00441	2.10	6.8	.00441	2.10	.7	.00441	2.10
2.5	2.0	.8	.000432	90.0	.00379	2.44	9.0	.00379	2.44	.9	.00379	2.44
3.1	2.5	.8	.000432	112.5	.00352	2.63	11.3	.00334	2.77	1.1	.00334	2.77
3.8	3.0	.8	.000432	135.0	.00340	2.73	13.5	.00299	3.10	1.4	.00299	3.10
4.4	3.5	.8	.000432	157.5	.00326	2.84	15.8	.00270	3.43	1.6	.00270	3.43
5.0	4.0	.8	.000432	180.0	.00313	2.96	18.0	.00246	3.76	1.8	.00246	3.76
5.6	4.5	.8	.000432	202.5	.00296	3.13	20.3	.00225	4.11	2.0	.00225	4.11
6.3	5.0	.8	.000432	225.0	.00265	3.50	22.5	.00207	4.46	2.3	.00207	4.46

Table SA-52 (continued)
Results of Waste Dilution - Summer - Ship 5
(L = 2.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 700 gpm							
5.0	1.0	.2	.000504	180.0	.01250	.63	18.0	.00984	.81	1.8	.00984	.81
7.5	1.5	.2	.000504	270.0	.00868	.91	27.0	.00712	1.12	2.7	.00712	1.12
10.0	2.0	.2	.000504	360.0	.00633	1.25	36.0	.00544	1.46	3.6	.00544	1.46
12.5	2.5	.2	.000504	450.0	.00489	1.62	45.0	.00431	1.84	4.5	.00431	1.84
15.0	3.0	.2	.000504	540.0	.00392	2.03	54.0	.00351	2.26	5.4	.00351	2.26
17.5	3.5	.2	.000504	630.0	.00322	2.46	63.0	.00293	2.71	6.3	.00293	2.71
20.0	4.0	.2	.000504	720.0	.00271	2.93	72.0	.00248	3.21	7.2	.00248	3.21
22.5	4.5	.2	.000504	810.0	.00231	3.44	81.0	.00212	3.74	8.1	.00212	3.74
25.0	5.0	.2	.000504	900.0	.00199	3.98	90.0	.00184	4.30	9.0	.00184	4.30
2.5	1.0	.4	.000504	90.0	.00758	1.05	9.0	.00758	1.05	.9	.00758	1.05
3.8	1.5	.4	.000504	135.0	.00679	1.17	13.5	.00598	1.33	1.4	.00598	1.33
5.0	2.0	.4	.000504	180.0	.00625	1.27	18.0	.00492	1.61	1.8	.00492	1.61
6.3	2.5	.4	.000504	225.0	.00527	1.51	22.5	.00415	1.91	2.3	.00415	1.91
7.5	3.0	.4	.000504	270.0	.00434	1.83	27.0	.00356	2.23	2.7	.00356	2.23
8.8	3.5	.4	.000504	315.0	.00367	2.16	31.5	.00309	2.57	3.1	.00309	2.57
10.0	4.0	.4	.000504	360.0	.00317	2.51	36.0	.00272	2.92	3.6	.00272	2.92
11.3	4.5	.4	.000504	405.0	.00277	2.87	40.5	.00241	3.29	4.0	.00241	3.29
12.5	5.0	.4	.000504	450.0	.00245	3.25	45.0	.00216	3.68	4.5	.00216	3.68
1.3	1.0	.8	.000504	45.0	.00542	1.46	4.5	.00542	1.46	.5	.00542	1.46
1.9	1.5	.8	.000504	67.5	.00441	1.80	6.8	.00441	1.80	.7	.00441	1.80
2.5	2.0	.8	.000504	90.0	.00379	2.09	9.0	.00379	2.09	.9	.00379	2.09
3.1	2.5	.8	.000504	112.5	.00352	2.25	11.3	.00334	2.38	1.1	.00334	2.38
3.8	3.0	.8	.000504	135.0	.00340	2.34	13.5	.00299	2.66	1.4	.00299	2.66
4.4	3.5	.8	.000504	157.5	.00326	2.43	15.8	.00270	2.94	1.6	.00270	2.94
5.0	4.0	.8	.000504	180.0	.00313	2.54	18.0	.00246	3.23	1.8	.00246	3.23
5.6	4.5	.8	.000504	202.5	.00296	2.68	20.3	.00225	3.52	2.0	.00225	3.52
6.3	5.0	.8	.000504	225.0	.00265	3.00	22.5	.00207	3.83	2.3	.00207	3.83
					Q = 1000 gpm							
5.0	1.0	.2	.000720	180.0	.01250	.44	18.0	.00984	.56	1.8	.00984	.56
7.5	1.5	.2	.000720	270.0	.00868	.64	27.0	.00712	.78	2.7	.00712	.78
10.0	2.0	.2	.000720	360.0	.00633	.88	36.0	.00544	1.02	3.6	.00544	1.02
12.5	2.5	.2	.000720	450.0	.00489	1.14	45.0	.00431	1.29	4.5	.00431	1.29
15.0	3.0	.2	.000720	540.0	.00392	1.42	54.0	.00351	1.58	5.4	.00351	1.58
17.5	3.5	.2	.000720	630.0	.00322	1.72	63.0	.00293	1.90	6.3	.00293	1.90
20.0	4.0	.2	.000720	720.0	.00271	2.05	72.0	.00248	2.24	7.2	.00248	2.24
22.5	4.5	.2	.000720	810.0	.00231	2.41	81.0	.00212	2.62	8.1	.00212	2.62
25.0	5.0	.2	.000720	900.0	.00199	2.79	90.0	.00184	3.01	9.0	.00184	3.01
2.5	1.0	.4	.000720	90.0	.00758	.73	9.0	.00758	.73	.9	.00758	.73
3.8	1.5	.4	.000720	135.0	.00679	.82	13.5	.00598	.93	1.4	.00598	.93
5.0	2.0	.4	.000720	180.0	.00625	.89	18.0	.00492	1.13	1.8	.00492	1.13
6.3	2.5	.4	.000720	225.0	.00527	1.05	22.5	.00415	1.34	2.3	.00415	1.34
7.5	3.0	.4	.000720	270.0	.00434	1.28	27.0	.00356	1.56	2.7	.00356	1.56
8.8	3.5	.4	.000720	315.0	.00367	1.51	31.5	.00309	1.80	3.1	.00309	1.80
10.0	4.0	.4	.000720	360.0	.00317	1.76	36.0	.00272	2.04	3.6	.00272	2.04
11.3	4.5	.4	.000720	405.0	.00277	2.01	40.5	.00241	2.30	4.0	.00241	2.30
12.5	5.0	.4	.000720	450.0	.00245	2.27	45.0	.00216	2.58	4.5	.00216	2.58
1.3	1.0	.8	.000720	45.0	.00542	1.03	4.5	.00542	1.03	.5	.00542	1.03
1.9	1.5	.8	.000720	67.5	.00441	1.26	6.8	.00441	1.26	.7	.00441	1.26
2.5	2.0	.8	.000720	90.0	.00379	1.47	9.0	.00379	1.47	.9	.00379	1.47
3.1	2.5	.8	.000720	112.5	.00352	1.58	11.3	.00334	1.66	1.1	.00334	1.66
3.8	3.0	.8	.000720	135.0	.00340	1.64	13.5	.00299	1.86	1.4	.00299	1.86
4.4	3.5	.8	.000720	157.5	.00326	1.70	15.8	.00270	2.06	1.6	.00270	2.06
5.0	4.0	.8	.000720	180.0	.00313	1.78	18.0	.00246	2.26	1.8	.00246	2.26
5.6	4.5	.8	.000720	202.5	.00296	1.88	20.3	.00225	2.47	2.0	.00225	2.47
6.3	5.0	.8	.000720	225.0	.00265	2.10	22.5	.00207	2.68	2.3	.00207	2.68

Table SA-52 (continued)
Results of Waste Dilution - Summer - Ship 5
(L = 2.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 1200 gpm								
5.0	1.0	.2	.000864	180.0	.01250	.37	18.0	.00984	.47	1.8	.00984	.47
7.5	1.5	.2	.000864	270.0	.00868	.53	27.0	.00712	.65	2.7	.00712	.65
10.0	2.0	.2	.000864	360.0	.00633	.73	36.0	.00544	.85	3.6	.00544	.85
12.5	2.5	.2	.000864	450.0	.00489	.95	45.0	.00431	1.07	4.5	.00431	1.07
15.0	3.0	.2	.000864	540.0	.00392	1.18	54.0	.00351	1.32	5.4	.00351	1.32
17.5	3.5	.2	.000864	630.0	.00322	1.44	63.0	.00293	1.58	6.3	.00293	1.58
20.0	4.0	.2	.000864	720.0	.00271	1.71	72.0	.00248	1.87	7.2	.00248	1.87
22.5	4.5	.2	.000864	810.0	.00231	2.01	81.0	.00212	2.18	8.1	.00212	2.18
25.0	5.0	.2	.000864	900.0	.00199	2.32	90.0	.00184	2.51	9.0	.00184	2.51
2.5	1.0	.4	.000864	90.0	.00758	.61	9.0	.00758	.61	.9	.00758	.61
3.8	1.5	.4	.000864	135.0	.00679	.68	13.5	.00598	.77	1.4	.00598	.77
5.0	2.0	.4	.000864	180.0	.00625	.74	18.0	.00492	.94	1.8	.00492	.94
6.3	2.5	.4	.000864	225.0	.00527	.88	22.5	.00415	1.12	2.3	.00415	1.12
7.5	3.0	.4	.000864	270.0	.00434	1.07	27.0	.00356	1.30	2.7	.00356	1.30
8.8	3.5	.4	.000864	315.0	.00367	1.26	31.5	.00309	1.50	3.1	.00309	1.50
10.0	4.0	.4	.000864	360.0	.00317	1.46	36.0	.00272	1.70	3.6	.00272	1.70
11.3	4.5	.4	.000864	405.0	.00277	1.67	40.5	.00241	1.92	4.0	.00241	1.92
12.5	5.0	.4	.000864	450.0	.00245	1.89	45.0	.00216	2.15	4.5	.00216	2.15
1.3	1.0	.8	.000864	45.0	.00542	.85	4.5	.00542	.85	.5	.00542	.85
1.9	1.5	.8	.000864	67.5	.00441	1.05	6.8	.00441	1.05	.7	.00441	1.05
2.5	2.0	.8	.000864	90.0	.00379	1.22	9.0	.00379	1.22	.9	.00379	1.22
3.1	2.5	.8	.000864	112.5	.00352	1.31	11.3	.00334	1.39	1.1	.00334	1.39
3.8	3.0	.8	.000864	135.0	.00340	1.36	13.5	.00299	1.55	1.4	.00299	1.55
4.4	3.5	.8	.000864	157.5	.00326	1.42	15.8	.00270	1.71	1.6	.00270	1.71
5.0	4.0	.8	.000864	180.0	.00313	1.48	18.0	.00246	1.88	1.8	.00246	1.88
5.6	4.5	.8	.000864	202.5	.00296	1.56	20.3	.00225	2.05	2.0	.00225	2.05
6.3	5.0	.8	.000864	225.0	.00265	1.75	22.5	.00207	2.23	2.3	.00207	2.23
				Q = 1400 gpm								
5.0	1.0	.2	.001008	180.0	.01250	.32	18.0	.00984	.40	1.8	.00984	.40
7.5	1.5	.2	.001008	270.0	.00868	.46	27.0	.00712	.56	2.7	.00712	.56
10.0	2.0	.2	.001008	360.0	.00633	.63	36.0	.00544	.73	3.6	.00544	.73
12.5	2.5	.2	.001008	450.0	.00489	.81	45.0	.00431	.92	4.5	.00431	.92
15.0	3.0	.2	.001008	540.0	.00392	1.01	54.0	.00351	1.13	5.4	.00351	1.13
17.5	3.5	.2	.001008	630.0	.00322	1.23	63.0	.00293	1.36	6.3	.00293	1.36
20.0	4.0	.2	.001008	720.0	.00271	1.47	72.0	.00248	1.60	7.2	.00248	1.60
22.5	4.5	.2	.001008	810.0	.00231	1.72	81.0	.00212	1.87	8.1	.00212	1.87
25.0	5.0	.2	.001008	900.0	.00199	1.99	90.0	.00184	2.15	9.0	.00184	2.15
2.5	1.0	.4	.001008	90.0	.00758	.52	9.0	.00758	.52	.9	.00758	.52
3.8	1.5	.4	.001008	135.0	.00679	.58	13.5	.00598	.66	1.4	.00598	.66
5.0	2.0	.4	.001008	180.0	.00625	.63	18.0	.00492	.81	1.8	.00492	.81
6.3	2.5	.4	.001008	225.0	.00527	.75	22.5	.00415	.96	2.3	.00415	.96
7.5	3.0	.4	.001008	270.0	.00434	.91	27.0	.00356	1.12	2.7	.00356	1.12
8.8	3.5	.4	.001008	315.0	.00367	1.08	31.5	.00309	1.28	3.1	.00309	1.28
10.0	4.0	.4	.001008	360.0	.00317	1.25	36.0	.00272	1.46	3.6	.00272	1.46
11.3	4.5	.4	.001008	405.0	.00277	1.43	40.5	.00241	1.65	4.0	.00241	1.65
12.5	5.0	.4	.001008	450.0	.00245	1.62	45.0	.00216	1.84	4.5	.00216	1.84
1.3	1.0	.8	.001008	45.0	.00542	.73	4.5	.00542	.73	.5	.00542	.73
1.9	1.5	.8	.001008	67.5	.00441	.90	6.8	.00441	.90	.7	.00441	.90
2.5	2.0	.8	.001008	90.0	.00379	1.05	9.0	.00379	1.05	.9	.00379	1.05
3.1	2.5	.8	.001008	112.5	.00352	1.13	11.3	.00334	1.19	1.1	.00334	1.19
3.8	3.0	.8	.001008	135.0	.00340	1.17	13.5	.00299	1.33	1.4	.00299	1.33
4.4	3.5	.8	.001008	157.5	.00326	1.22	15.8	.00270	1.47	1.6	.00270	1.47
5.0	4.0	.8	.001008	180.0	.00313	1.27	18.0	.00246	1.61	1.8	.00246	1.61
5.6	4.5	.8	.001008	202.5	.00296	1.34	20.3	.00225	1.76	2.0	.00225	1.76
6.3	5.0	.8	.001008	225.0	.00265	1.50	22.5	.00207	1.91	2.3	.00207	1.91

Table SA-53
Results of Waste Dilution - Winter - Ship 5
(L = 2.0 n mi, A = 0.001 $ft^{2/3}$/sec)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 500 gpm								
5.0	1.0	.2	.000360	180.0	.00661	1.68	18.0	.00661	1.68	1.8	.00661	1.68
7.5	1.5	.2	.000360	270.0	.00478	2.33	27.0	.00478	2.33	2.7	.00478	2.33
10.0	2.0	.2	.000360	360.0	.00365	3.04	36.0	.00365	3.04	3.6	.00365	3.04
12.5	2.5	.2	.000360	450.0	.00290	3.84	45.0	.00290	3.84	4.5	.00290	3.84
15.0	3.0	.2	.000360	540.0	.00236	4.71	54.0	.00236	4.71	5.4	.00236	4.71
17.5	3.5	.2	.000360	630.0	.00196	5.66	63.0	.00196	5.66	6.3	.00196	5.66
20.0	4.0	.2	.000360	720.0	.00166	6.69	72.0	.00166	6.69	7.2	.00166	6.69
22.5	4.5	.2	.000360	810.0	.00143	7.79	81.0	.00143	7.79	8.1	.00143	7.79
25.0	5.0	.2	.000360	900.0	.00124	8.97	90.0	.00124	8.97	9.0	.00124	8.97
2.5	1.0	.4	.000360	90.0	.00509	2.18	9.0	.00509	2.18	.9	.00509	2.18
3.8	1.5	.4	.000360	135.0	.00401	2.77	13.5	.00401	2.77	1.4	.00401	2.77
5.0	2.0	.4	.000360	180.0	.00330	3.36	18.0	.00330	3.36	1.8	.00330	3.36
6.3	2.5	.4	.000360	225.0	.00279	3.99	22.5	.00279	3.99	2.3	.00279	3.99
7.5	3.0	.4	.000360	270.0	.00239	4.65	27.0	.00239	4.65	2.7	.00239	4.65
8.8	3.5	.4	.000360	315.0	.00208	5.35	31.5	.00208	5.35	3.1	.00208	5.35
10.0	4.0	.4	.000360	360.0	.00183	6.09	36.0	.00183	6.09	3.6	.00183	6.09
11.3	4.5	.4	.000360	405.0	.00162	6.86	40.5	.00162	6.86	4.0	.00162	6.86
12.5	5.0	.4	.000360	450.0	.00145	7.67	45.0	.00145	7.67	4.5	.00145	7.67
1.3	1.0	.8	.000360	45.0	.00364	3.05	4.5	.00364	3.05	.5	.00364	3.05
1.9	1.5	.8	.000360	67.5	.00296	3.75	6.8	.00296	3.75	.7	.00296	3.75
2.5	2.0	.8	.000360	90.0	.00255	4.37	9.0	.00255	4.37	.9	.00255	4.37
3.1	2.5	.8	.000360	112.5	.00224	4.95	11.3	.00224	4.95	1.1	.00224	4.95
3.8	3.0	.8	.000360	135.0	.00201	5.54	13.5	.00201	5.54	1.4	.00201	5.54
4.4	3.5	.8	.000360	157.5	.00181	6.13	15.8	.00181	6.13	1.6	.00181	6.13
5.0	4.0	.8	.000360	180.0	.00165	6.73	18.0	.00165	6.73	1.8	.00165	6.73
5.6	4.5	.8	.000360	202.5	.00151	7.35	20.3	.00151	7.35	2.0	.00151	7.35
6.3	5.0	.8	.000360	225.0	.00139	7.98	22.5	.00139	7.98	2.3	.00139	7.98
				Q = 600 gpm								
5.0	1.0	.2	.000432	180.0	.00661	1.40	18.0	.00661	1.40	1.8	.00661	1.40
7.5	1.5	.2	.000432	270.0	.00478	1.94	27.0	.00478	1.94	2.7	.00478	1.94
10.0	2.0	.2	.000432	360.0	.00365	2.54	36.0	.00365	2.54	3.6	.00365	2.54
12.5	2.5	.2	.000432	450.0	.00290	3.20	45.0	.00290	3.20	4.5	.00290	3.20
15.0	3.0	.2	.000432	540.0	.00236	3.92	54.0	.00236	3.92	5.4	.00236	3.92
17.5	3.5	.2	.000432	630.0	.00196	4.72	63.0	.00196	4.72	6.3	.00196	4.72
20.0	4.0	.2	.000432	720.0	.00166	5.57	72.0	.00166	5.57	7.2	.00166	5.57
22.5	4.5	.2	.000432	810.0	.00143	6.49	81.0	.00143	6.49	8.1	.00143	6.49
25.0	5.0	.2	.000432	900.0	.00124	7.48	90.0	.00124	7.48	9.0	.00124	7.48
2.5	1.0	.4	.000432	90.0	.00509	1.82	9.0	.00509	1.82	.9	.00509	1.82
3.8	1.5	.4	.000432	135.0	.00401	2.31	13.5	.00401	2.31	1.4	.00401	2.31
5.0	2.0	.4	.000432	180.0	.00330	2.80	18.0	.00330	2.80	1.8	.00330	2.80
6.3	2.5	.4	.000432	225.0	.00279	3.32	22.5	.00279	3.32	2.3	.00279	3.32
7.5	3.0	.4	.000432	270.0	.00239	3.88	27.0	.00239	3.88	2.7	.00239	3.88
8.8	3.5	.4	.000432	315.0	.00208	4.46	31.5	.00208	4.46	3.1	.00208	4.46
10.0	4.0	.4	.000432	360.0	.00183	5.07	36.0	.00183	5.07	3.6	.00183	5.07
11.3	4.5	.4	.000432	405.0	.00162	5.72	40.5	.00162	5.72	4.0	.00162	5.72
12.5	5.0	.4	.000432	450.0	.00145	6.40	45.0	.00145	6.40	4.5	.00145	6.40
1.3	1.0	.8	.000432	45.0	.00364	2.54	4.5	.00364	2.54	.5	.00364	2.54
1.9	1.5	.8	.000432	67.5	.00296	3.13	6.8	.00296	3.13	.7	.00296	3.13
2.5	2.0	.8	.000432	90.0	.00255	3.64	9.0	.00255	3.64	.9	.00255	3.64
3.1	2.5	.8	.000432	112.5	.00224	4.13	11.3	.00224	4.13	1.1	.00224	4.13
3.8	3.0	.8	.000432	135.0	.00201	4.61	13.5	.00201	4.61	1.4	.00201	4.61
4.4	3.5	.8	.000432	157.5	.00181	5.11	15.8	.00181	5.11	1.6	.00181	5.11
5.0	4.0	.8	.000432	180.0	.00165	5.61	18.0	.00165	5.61	1.8	.00165	5.61
5.6	4.5	.8	.000432	202.5	.00151	6.12	20.3	.00151	6.12	2.0	.00151	6.12
6.3	5.0	.8	.000432	225.0	.00139	6.65	22.5	.00139	6.65	2.3	.00139	6.65

Table SA-53 (continued)
Results of Waste Dilution - Winter - Ship 5
(L = 2.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
					Q = 700 gpm							
5.0	1.0	.2	.000504	180.0	.00661	1.20	18.0	.00661	1.20	1.8	.00661	1.20
7.5	1.5	.2	.000504	270.0	.00478	1.66	27.0	.00478	1.66	2.7	.00478	1.66
10.0	2.0	.2	.000504	360.0	.00365	2.17	36.0	.00365	2.17	3.6	.00365	2.17
12.5	2.5	.2	.000504	450.0	.00290	2.74	45.0	.00290	2.74	4.5	.00290	2.74
15.0	3.0	.2	.000504	540.0	.00236	3.36	54.0	.00236	3.36	5.4	.00236	3.36
17.5	3.5	.2	.000504	630.0	.00196	4.04	63.0	.00196	4.04	6.3	.00196	4.04
20.0	4.0	.2	.000504	720.0	.00166	4.78	72.0	.00166	4.78	7.2	.00166	4.78
22.5	4.5	.2	.000504	810.0	.00143	5.56	81.0	.00143	5.56	8.1	.00143	5.56
25.0	5.0	.2	.000504	900.0	.00124	6.41	90.0	.00124	6.41	9.0	.00124	6.41
2.5	1.0	.4	.000504	90.0	.00509	1.56	9.0	.00509	1.56	.9	.00509	1.56
3.8	1.5	.4	.000504	135.0	.00401	1.98	13.5	.00401	1.98	1.4	.00401	1.98
5.0	2.0	.4	.000504	180.0	.00330	2.40	18.0	.00330	2.40	1.8	.00330	2.40
6.3	2.5	.4	.000504	225.0	.00279	2.85	22.5	.00279	2.85	2.3	.00279	2.85
7.5	3.0	.4	.000504	270.0	.00239	3.32	27.0	.00239	3.32	2.7	.00239	3.32
8.8	3.5	.4	.000504	315.0	.00208	3.82	31.5	.00208	3.82	3.1	.00208	3.82
10.0	4.0	.4	.000504	360.0	.00183	4.35	36.0	.00183	4.35	3.6	.00183	4.35
11.3	4.5	.4	.000504	405.0	.00162	4.90	40.5	.00162	4.90	4.0	.00162	4.90
12.5	5.0	.4	.000504	450.0	.00145	5.48	45.0	.00145	5.48	4.5	.00145	5.48
1.3	1.0	.8	.000504	45.0	.00364	2.18	4.5	.00364	2.18	.5	.00364	2.18
1.9	1.5	.8	.000504	67.5	.00296	2.68	6.8	.00296	2.68	.7	.00296	2.68
2.5	2.0	.8	.000504	90.0	.00255	3.12	9.0	.00255	3.12	.9	.00255	3.12
3.1	2.5	.8	.000504	112.5	.00224	3.54	11.3	.00224	3.54	1.1	.00224	3.54
3.8	3.0	.8	.000504	135.0	.00201	3.96	13.5	.00201	3.96	1.4	.00201	3.96
4.4	3.5	.8	.000504	157.5	.00181	4.38	15.8	.00181	4.38	1.6	.00181	4.38
5.0	4.0	.8	.000504	180.0	.00165	4.81	18.0	.00165	4.81	1.8	.00165	4.81
5.6	4.5	.8	.000504	202.5	.00151	5.25	20.3	.00151	5.25	2.0	.00151	5.25
6.3	5.0	.8	.000504	225.0	.00139	5.70	22.5	.00139	5.70	2.3	.00139	5.70
					Q = 1000 gpm							
5.0	1.0	.2	.000720	180.0	.00661	.84	18.0	.00661	.84	1.8	.00661	.84
7.5	1.5	.2	.000720	270.0	.00478	1.16	27.0	.00478	1.16	2.7	.00478	1.16
10.0	2.0	.2	.000720	360.0	.00365	1.52	36.0	.00365	1.52	3.6	.00365	1.52
12.5	2.5	.2	.000720	450.0	.00290	1.92	45.0	.00290	1.92	4.5	.00290	1.92
15.0	3.0	.2	.000720	540.0	.00236	2.35	54.0	.00236	2.35	5.4	.00236	2.35
17.5	3.5	.2	.000720	630.0	.00196	2.83	63.0	.00196	2.83	6.3	.00196	2.83
20.0	4.0	.2	.000720	720.0	.00166	3.34	72.0	.00166	3.34	7.2	.00166	3.34
22.5	4.5	.2	.000720	810.0	.00143	3.90	81.0	.00143	3.90	8.1	.00143	3.90
25.0	5.0	.2	.000720	900.0	.00124	4.49	90.0	.00124	4.49	9.0	.00124	4.49
2.5	1.0	.4	.000720	90.0	.00509	1.09	9.0	.00509	1.09	.9	.00509	1.09
3.8	1.5	.4	.000720	135.0	.00401	1.38	13.5	.00401	1.38	1.4	.00401	1.38
5.0	2.0	.4	.000720	180.0	.00330	1.68	18.0	.00330	1.68	1.8	.00330	1.68
6.3	2.5	.4	.000720	225.0	.00279	1.99	22.5	.00279	1.99	2.3	.00279	1.99
7.5	3.0	.4	.000720	270.0	.00239	2.33	27.0	.00239	2.33	2.7	.00239	2.33
8.8	3.5	.4	.000720	315.0	.00208	2.67	31.5	.00208	2.67	3.1	.00208	2.67
10.0	4.0	.4	.000720	360.0	.00183	3.04	36.0	.00183	3.04	3.6	.00183	3.04
11.3	4.5	.4	.000720	405.0	.00162	3.43	40.5	.00162	3.43	4.0	.00162	3.43
12.5	5.0	.4	.000720	450.0	.00145	3.84	45.0	.00145	3.84	4.5	.00145	3.84
1.3	1.0	.8	.000720	45.0	.00364	1.53	4.5	.00364	1.53	.5	.00364	1.53
1.9	1.5	.8	.000720	67.5	.00296	1.88	6.8	.00296	1.88	.7	.00296	1.88
2.5	2.0	.8	.000720	90.0	.00255	2.18	9.0	.00255	2.18	.9	.00255	2.18
3.1	2.5	.8	.000720	112.5	.00224	2.48	11.3	.00224	2.48	1.1	.00224	2.48
3.8	3.0	.8	.000720	135.0	.00201	2.77	13.5	.00201	2.77	1.4	.00201	2.77
4.4	3.5	.8	.000720	157.5	.00181	3.06	15.8	.00181	3.06	1.6	.00181	3.06
5.0	4.0	.8	.000720	180.0	.00165	3.36	18.0	.00165	3.36	1.8	.00165	3.36
5.6	4.5	.8	.000720	202.5	.00151	3.67	20.3	.00151	3.67	2.0	.00151	3.67
6.3	5.0	.8	.000720	225.0	.00139	3.99	22.5	.00139	3.99	2.3	.00139	3.99

Table SA-53 (continued)
Results of Waste Dilution - Winter - Ship 5
(L = 2.0 n mi, A = 0.001 $ft^{2/3}/sec$)

				Vfall = 1 cm/s			Vfall = 0.1 cm/s			Vfall = 0.01 cm/s		
T(hr)	X(n mi)	U(kt)	Co	Y1(m)	Cmax/Co	Ratio	Y2(m)	Cmax/Co	Ratio	Y3(m)	Cmax/Co	Ratio
				Q = 1200 gpm								
5.0	1.0	.2	.000864	180.0	.00661	.70	18.0	.00661	.70	1.8	.00661	.70
7.5	1.5	.2	.000864	270.0	.00478	.97	27.0	.00478	.97	2.7	.00478	.97
10.0	2.0	.2	.000864	360.0	.00365	1.27	36.0	.00365	1.27	3.6	.00365	1.27
12.5	2.5	.2	.000864	450.0	.00290	1.60	45.0	.00290	1.60	4.5	.00290	1.60
15.0	3.0	.2	.000864	540.0	.00236	1.96	54.0	.00236	1.96	5.4	.00236	1.96
17.5	3.5	.2	.000864	630.0	.00196	2.36	63.0	.00196	2.36	6.3	.00196	2.36
20.0	4.0	.2	.000864	720.0	.00166	2.79	72.0	.00166	2.79	7.2	.00166	2.79
22.5	4.5	.2	.000864	810.0	.00143	3.25	81.0	.00143	3.25	8.1	.00143	3.25
25.0	5.0	.2	.000864	900.0	.00124	3.74	90.0	.00124	3.74	9.0	.00124	3.74
2.5	1.0	.4	.000864	90.0	.00509	.91	9.0	.00509	.91	.9	.00509	.91
3.8	1.5	.4	.000864	135.0	.00401	1.15	13.5	.00401	1.15	1.4	.00401	1.15
5.0	2.0	.4	.000864	180.0	.00330	1.40	18.0	.00330	1.40	1.8	.00330	1.40
6.3	2.5	.4	.000864	225.0	.00279	1.66	22.5	.00279	1.66	2.3	.00279	1.66
7.5	3.0	.4	.000864	270.0	.00239	1.94	27.0	.00239	1.94	2.7	.00239	1.94
8.8	3.5	.4	.000864	315.0	.00208	2.23	31.5	.00208	2.23	3.1	.00208	2.23
10.0	4.0	.4	.000864	360.0	.00183	2.54	36.0	.00183	2.54	3.6	.00183	2.54
11.3	4.5	.4	.000864	405.0	.00162	2.86	40.5	.00162	2.86	4.0	.00162	2.86
12.5	5.0	.4	.000864	450.0	.00145	3.20	45.0	.00145	3.20	4.5	.00145	3.20
1.3	1.0	.8	.000864	45.0	.00364	1.27	4.5	.00364	1.27	.5	.00364	1.27
1.9	1.5	.8	.000864	67.5	.00296	1.56	6.8	.00296	1.56	.7	.00296	1.56
2.5	2.0	.8	.000864	90.0	.00255	1.82	9.0	.00255	1.82	.9	.00255	1.82
3.1	2.5	.8	.000864	112.5	.00224	2.06	11.3	.00224	2.06	1.1	.00224	2.06
3.8	3.0	.8	.000864	135.0	.00201	2.31	13.5	.00201	2.31	1.4	.00201	2.31
4.4	3.5	.8	.000864	157.5	.00181	2.55	15.8	.00181	2.55	1.6	.00181	2.55
5.0	4.0	.8	.000864	180.0	.00165	2.80	18.0	.00165	2.80	1.8	.00165	2.80
5.6	4.5	.8	.000864	202.5	.00151	3.06	20.3	.00151	3.06	2.0	.00151	3.06
6.3	5.0	.8	.000864	225.0	.00139	3.32	22.5	.00139	3.32	2.3	.00139	3.32
				Q = 1400 gpm								
5.0	1.0	.2	.001008	180.0	.00661	.60	18.0	.00661	.60	1.8	.00661	.60
7.5	1.5	.2	.001008	270.0	.00478	.83	27.0	.00478	.83	2.7	.00478	.83
10.0	2.0	.2	.001008	360.0	.00365	1.09	36.0	.00365	1.09	3.6	.00365	1.09
12.5	2.5	.2	.001008	450.0	.00290	1.37	45.0	.00290	1.37	4.5	.00290	1.37
15.0	3.0	.2	.001008	540.0	.00236	1.68	54.0	.00236	1.68	5.4	.00236	1.68
17.5	3.5	.2	.001008	630.0	.00196	2.02	63.0	.00196	2.02	6.3	.00196	2.02
20.0	4.0	.2	.001008	720.0	.00166	2.39	72.0	.00166	2.39	7.2	.00166	2.39
22.5	4.5	.2	.001008	810.0	.00143	2.78	81.0	.00143	2.78	8.1	.00143	2.78
25.0	5.0	.2	.001008	900.0	.00124	3.20	90.0	.00124	3.20	9.0	.00124	3.20
2.5	1.0	.4	.001008	90.0	.00509	.78	9.0	.00509	.78	.9	.00509	.78
3.8	1.5	.4	.001008	135.0	.00401	.99	13.5	.00401	.99	1.4	.00401	.99
5.0	2.0	.4	.001008	180.0	.00330	1.20	18.0	.00330	1.20	1.8	.00330	1.20
6.3	2.5	.4	.001008	225.0	.00279	1.42	22.5	.00279	1.42	2.3	.00279	1.42
7.5	3.0	.4	.001008	270.0	.00239	1.66	27.0	.00239	1.66	2.7	.00239	1.66
8.8	3.5	.4	.001008	315.0	.00208	1.91	31.5	.00208	1.91	3.1	.00208	1.91
10.0	4.0	.4	.001008	360.0	.00183	2.17	36.0	.00183	2.17	3.6	.00183	2.17
11.3	4.5	.4	.001008	405.0	.00162	2.45	40.5	.00162	2.45	4.0	.00162	2.45
12.5	5.0	.4	.001008	450.0	.00145	2.74	45.0	.00145	2.74	4.5	.00145	2.74
1.3	1.0	.8	.001008	45.0	.00364	1.09	4.5	.00364	1.09	.5	.00364	1.09
1.9	1.5	.8	.001008	67.5	.00296	1.34	6.8	.00296	1.34	.7	.00296	1.34
2.5	2.0	.8	.001008	90.0	.00255	1.56	9.0	.00255	1.56	.9	.00255	1.56
3.1	2.5	.8	.001008	112.5	.00224	1.77	11.3	.00224	1.77	1.1	.00224	1.77
3.8	3.0	.8	.001008	135.0	.00201	1.98	13.5	.00201	1.98	1.4	.00201	1.98
4.4	3.5	.8	.001008	157.5	.00181	2.19	15.8	.00181	2.19	1.6	.00181	2.19
5.0	4.0	.8	.001008	180.0	.00165	2.40	18.0	.00165	2.40	1.8	.00165	2.40
5.6	4.5	.8	.001008	202.5	.00151	2.62	20.3	.00151	2.62	2.0	.00151	2.62
6.3	5.0	.8	.001008	225.0	.00139	2.85	22.5	.00139	2.85	2.3	.00139	2.85

Mike - FYI. Return Pls.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105
OFFICE OF PACIFIC ISLAND PROGRAMS
FAX: 415/744-1604

DATE: 12/13/95 PAGES (incl. cover) : 3

TO: Steve Costa, CH2M Hill
FAX: 510/893-8205 Phone: 510/251-2251

FROM: Pat Young
American Samoa Program Manager
FAX: 415/744-1604 Phone: 415/744-1594

RE: Draft Comments on Cannery Model Verification Study and Recommendations

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Attached please find draft comments from Walter Frick re: use of the WASP5 model for the cannery study. (I'm sorry for the delay in response; I still have not been able to get a final memo from Wally but hope to get one soon, which I will incorporate into our "official" response.) We have no problems with recommendations 1 and 2.

Did your trip to Samoa go smoothly? I'll be on vacation from December 21 - January 5th, so if I don't talk to you soon, have a good holiday season.

Pat

FAX, 2 pages 11/20/95

To:	Janet Hashimoto	From:	Walter Frick
Phone:	415/744-1078	Phone:	503/867-4029 fax 4049
Office:	Region 9		USEPA

Janet: Wanted to get these off to you before I leave on vacation this aftn. at 2pm. Will be back the 27th or the 30th

DRAFT

Walt

November 20, 1995

MEMORANDUM

SUBJECT: Joint Cannery Outfall Model Prediction Verification Study Review

FROM: Walter Frick

TO: Janet Hashimoto
Chief, Marine Protection Section

Re your memo to Henry Lee dated September 22, 1995, which was forwarded to me after some delay, I have talked to Ed Dettmann (401/782-3039) about the issues surrounding the use of WASP5. I made the following notes of my conversation with Ed:

WASP is a suite of models ranging from one to three dimensional, i.e., it can be run at several levels of complexity ranging from DO Streeter-Phelps equations, to solving nutrient concentrations (e.g., ammonium to nitrate conversion), to, at the highest level, calculating phytoplankton biomass concentrations. In the case of the canneries, DO would be a problem.

WASP, including WASP5, must be matched with a hydrodynamic model. Within EPA the model used for this purpose is often DYNHYD, which is a one-dimensional hydrodynamic model. For three-dimensional circulation, presumably some other model or set of data would have to be used to define three-dimensional transport.

Individuals in the agency familiar with WASP are Ed Dettmann at Narragansett and Mike Marsh at Region 1 (410/742-3115).

Ed has used WASP ~~to~~ to calculate DO concentrations in a river estuary with freshwater input. There they used salinity data and a salinity driven box model to estimate transports necessary to establish the observed salinity distribution. Thus, advection and diffusion were calculated. The approach is steady state and salinity survey data must be available. It does not work without freshwater inflow to establish a salinity distribution.

From the text on page 5-6 of the Study it seems to me that the authors are looking to WASP5 to provide three-dimensional hydrodynamical data. If this is the case, my understanding is that it will not be a three-dimensional replacement for PT121.

Other than that, I have no objection to trying to understand the dynamics of eutrophycation in the Pago Pago Inner Harbor and believe that, given data on the three-dimensional circulation in the harbor, that WASP5 can be used appropriately.

cc. Henry Lee

To: David Stuart
cc:
From: Patricia Young
Date: 03/14/96 09:12:47 AM
Subject: Initial Dilution Calculations

I've looked at the assumptions Wally Frick used for calculations of Utulei's initial dilutions, as well as some of the water quality monitoring data and cannery dye study data. The salinity assumption of 34.5 seems ok. However, I would use 29.5 C as the assumed surface temperature. The temperature he used, 27.5 C, is the temperature at 100+ ft. depth. For the dye study, the current velocity at -100 ft. depth averaged about 22 cm/sec; at near bottom (-160 ft.) the current veolcity averaged 2 cm/sec.

I don't understand what he is referring to which has an inferred temperature of 16.9C. If this is the effluent, it seems very low, given that the bay water is in the 20's. Call me if you have questions or if you need a copy of Wally's memo. I'm at 4-1594.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

January 16, 1996

Steven L. Costa
Project Manager
CH2M Hill
P.O. Box 12681
Oakland, CA 94604-2681

Re: Response to Recommendations of the Model Verification Study (Report No. 1) for the Joint Cannery Outfall

Dear Steve:

We have reviewed the first report of the Model Verification Study, dated July 27, 1995 and its recommendations. Based on the recommendations made for the Receiving Water Quality Monitoring Program, we agree with the recommendations in this report and approve the following changes:

1. The study will be modified to include two further model studies, rather than the three outlined in the canneries' current NPDES permits;

2. Report No. 2 will contain: 1) an analysis of nearfield DO impacts including the effects of NBOD as well as CBOD, and, 2) an additional verification exercise of the PT121 wastefield transport model using data obtained subsequent to the data used in this report. As we have not yet received Report No. 2, we would appreciate an indication as to when this report might be submitted;

3. Report No. 3 will determine the relative importance of various sources of nutrients in the harbor following the change in the canneries' waste disposal scheme and will be submitted by December 31, 1996. However, prior to any final decision being made on the model to be used, we would appreciate your review and response to the attached comments by Walter Frick on the use of the WASP5 model.

Should you have any questions, please call Pat Young, American Samoa Program Manager at 415/744-1594.

Sincerely,

Norman L. Lovelace
Chief, Office of Pacific Island Programs

cc: Sheila Wiegman, ASEPA
Jim Cox, Van Camp Seafood Company
William Perez, Samoa Packing Company
Norman Wei, StarKist Foods
Barry Mills, StarKist Samoa

bc: Doug Liden, W-5-1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT

ENVIRONMENTAL RESEARCH LABORATORY - NARRAGANSETT
HATFIELD MARINE SCIENCE CENTER
NEWPORT, OREGON 97365

December 14, 1995

MEMORANDUM

PACIFIC ECOSYSTEMS BRANCH
TELEPHONE: (503) 867-4040

SUBJECT: Joint Cannery Outfall Model Prediction Verification Study Review

FROM: Walter Frick

TO: David Stuart

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cc. Henry Lee

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

Steven L. Costa
Project Manager
CH2M Hill
P.O. Box 12681
Oakland, CA 94604-2681

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MAIL CODE	E-4	E-4				
SURNAME	myoung	M. Lee				
DATE	1/16/96	1/16/96				

U.S. EPA CONCURRENCES OFFICIAL FILE COPY

Should you have any questions, please call Pat Young, American Samoa Program Manager at 415/744-1594.

Sincerely,

Norman L. Lovelace
Chief, Office of Pacific Island Programs

cc: Sheila Wiegman, ASEPA
Jim Cox, Van Camp Seafood Company
William Perez, Samoa Packing Company
Norman Wei, StarKist Foods
Barry Mills, StarKist Samoa

bc: Doug Liden, W-5-1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

September 22, 1995

MEMORANDUM

SUBJECT: Review of Model Prediction Verification Study for the Joint Cannery Outfall in Pago Pago Harbor

FROM: Janet Hashimoto
Chief, Environmental Assessment Section

TO: Henry Lee
Acting Coastal Ecology Branch Chief
Hatfield Marine Science Center

We have been asked by our Office of Pacific Islands and Native American Programs for a review of the attached CH2M Hill document entitled *Joint Cannery Outfall Model Prediction Verification Study*. In particular, certain recommendations for modifying the original eutrophication study include substitution of a WASP5 model for a PT121 model appplication.

As these modelling efforts are a very specialized field, we ask your help by authorizing Walter Frick's assistance in reviewing those sections of the report pertaining to models. Please ignore the CH2M Hill delivery date in the enclosed letter by Steve Costa.

If you have any questions, please contact me at 415/744-1933 or David Stuart of my staff at 415/744-1937

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Rcd 8/9/95

CH2M HILL
Engineers
Planners
Economists
Scientists

27 July 1995

107091.MD.RP (OPE30702)

Patricia N.N. Young
American Samoa Program Manager
Office of Pacific Islands
and Native American Programs
U.S. Environmental Protection Agency
75 Hawthorne Street (E-4)
San Francisco, California 94105

Sheila Wiegman
American Samoa
Environmental Protection Agency
American Samoa Government
Pago Pago, American Samoa 96799

Dear Pat and Sheila:

Subject: **Model Verification Study (Report No. 1) and Recommendations**

Enclosed find two copies of the first report for the Model Verification Study. Although the report was delayed for a variety of reasons, I believe you will find it complete and that it provides the required analyses.

I have made a number of recommendations concerning the subsequent reports. These recommendations consider three factors:

[1] The permit condition is somewhat vague (justifiably, given the nature of the study). The study plan submitted was, in turn, somewhat vague and really only addressed the first report. Based on the experience and knowledge gained from the studies done to date it seems appropriate to modify the following reports as recommended in Section 5 of the enclosed report.

[2] The data form the Receiving Water Quality Monitoring Program was not sufficient to perform the analyses as initially envisioned. However, data col-

lected in March of 1995, and possible additional data, can be used to extend the study as described in the recommendations.

[3] The recommendations in Section 5 of the enclosed report, combined with the recommendations previously made for the Receiving Water Quality Monitoring Program and those to be made through the Eutrophication Study report, provide a better overall study of the impacts of the discharge to the Harbor. This is an advantage to both the canneries and the regulatory agencies.

The recommendations made in the report are as follows:

- CH2M HILL recommends that the Model Verification Study be modified to include two further model studies (rather than the three future tasks indicated in the NPDES permits for the current permit period ending October 1997).

- Report No. 2 would present: [1] an analysis of nearfield DO impacts using a conservative approach and including the effects of NBOD as well as CBOD, and, [2] an additional verification exercise of the PT121 wastefield transport model using data recorded subsequent to the data used the attached report. The report would be submitted by 31 December 1995, and would incorporate the March 1995 water quality data collected by CH2M HILL.

- Report No. 3 would present an analyses based on a WASP5 model configuration of the harbor. This will permit the incorporation of vertical structure in the nutrient transport, and allow the inclusion of chlorophyll-a predictions. The objective will be to determine the relative importance of various sources of nutrients following the relocation of the discharge and high strength waste segregation. The report would be submitted by 31 December 1996, and would incorporate any additional water quality data and the results of the Eutrophication Study.

Detailed support for these recommendations is contained in Section 5 of the attached report. As mentioned above, these recommendations are consistent with recommendations made for changes in the Receiving Water Quality Monitoring Program to include more detail, including profiles and more sampling depths, at less frequent intervals. The recommendations above will also be consistent with the recommendations that will be made in the Eutrophication Study (Part H of the NPDES Permits). Lack of sufficient data led to the use of a modified PT121 application for the Eutrophication Study rather than WASP4. Although, the use of PT121 was an option in the study plan, it is recommended that a WASP5 model be done for the Harbor to replace the use of PT121 in the future. The Eutrophication

Study report is in preparation at this time and should be deliver to USEPA and ASEPA by August 31, 1995.

If you have any questions please do not hesitate to call me. I will follow up with you in August to discuss any of your comments or concerns. Thank you for your time and consideration of this matter,

Sincerely,

CH2M HILL

Steven L. Costa
Project Manager

cc: Norman Wei/StarKist Foods
James Cox Van Camp Seafoods
Barry Mills/StarKist Samoa
Bill Perez/Samoa Packing
David Wilson/CH2M HILL/SEA

Engineers
Planners
Economists
Scientists

Rcd 8/9/95 MY
Copy to Dave Stuart to pass to Wally Fricke 9/20/95

27 July 1995

107091.MD.RP (OPE30702)

Patricia N.N. Young
American Samoa Program Manager
Office of Pacific Islands
and Native American Programs
U.S. Environmental Protection Agency
75 Hawthorne Street (E-4)
San Francisco, California 94105

Sheila Wiegman
American Samoa
Environmental Protection Agency
American Samoa Government
Pago Pago, American Samoa 96799

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CH2M HILL

Steven L. Costa
Project Manager

cc: Norman Wei/StarKist Foods
James Cox Van Camp Seafoods
Barry Mills/StarKist Samoa
Bill Perez/Samoa Packing
David Wilson/CH2M HILL/SEA

JOINT CANNERY OUTFALL
MODEL PREDICTION VERIFICATION STUDY

Report No. 1

for

StarKist Samoa, Inc.

and

VCS Samoa Packing Company

to comply with NPDES Permits

AS0000019

AS0000027

July 1995

prepared by

CH2M HILL

JOINT CANNERY OUTFALL
MODEL PREDICTION VERIFICATION STUDY

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AS0000019

AS0000027

July 1995

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JOINT CANNERY OUTFALL
MODEL PREDICTION VERIFICATION STUDY

Report No. 1

EXECUTIVE SUMMARY

This is the first Model Verification Study report required under the NPDES permits for StarKist Samoa and VCS Samoa Packing for discharge through the joint cannery outfall (JCO) in Pago Pago Harbor, American Samoa. The objective of the study is the verification of models used to determine the permitted zone of mixing (ZOM) for the JCO. The study is divided into three separate tasks: [1] verification of initial and subsequent dilution models, [2] verification of the wastefield transport model, and [3] examination of the effects of BOD_5 in the effluent on the dissolved oxygen in the receiving waters of Pago Pago Harbor.

The verification of the plume dilution models involved running the models under the environmental conditions observed during two dye studies and comparing the results to the dilutions calculated from measured dye concentrations. The initial dilution model, UDKHDEN, was found to have predicted the initial dilution of the plume quite well. Under certain conditions, weak density gradient and bathymetric induced upwelling, care must be taken in the interpretation of the model output. The subsequent dilution model was found to be somewhat conservative (under predicts actual dilution), as expected.

Verification of the previous model predictions of long-term ambient nutrient levels for the relocated cannery discharge through the JCO was accomplished by comparison of model predicted concentrations with concentrations measured during the water quality monitoring program. The model used, PT121, was found to be somewhat conservative (over predicted concentrations). The degree of conservatism was as expected. It was not considered necessary to adjust model parameters such as diffusivity at this time.

The evaluation of BOD impacts was done with a screening level approach to determine the approximate magnitude of impacts. This approach includes the assessment of extreme worst case scenarios to estimate an upper bound to the potential impacts. The evaluation, and model simulations used, considered only the possible impacts from the JCO. The model used for the evaluation was the same model, PT121, used for the evaluation of nutrient discharges. The results of the evaluation indicate that BOD loads from the JCO, at the current discharge location, do not impair water quality in the Harbor.

The model verification elements described above, and the water quality data used in the study, were used to evaluate the definition of the ZOM. Compliance with water quality standards throughout the harbor appears to have been generally attained. The models appear to have done a good job in previous predictions and the model simulations used to develop the diffuser design, the outfall location, and the ZOM have been verified based on available data. Recommendations regarding the model verification study are presented in Section 5 of the report.

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Section 1

INTRODUCTION

This report presents the results of the initial model prediction verification study for the Joint Cannery Outfall (JCO) in Pago Pago Harbor, American Samoa. The purpose of the study, background, and general approach are presented first. The sections that follow document the model prediction verification study including descriptions of the data and methods used to evaluate previous model predictions and the results of the analyses. The study was done in three parts: initial dilution, nutrient dispersion, and BOD/DO impacts. Subsequent studies required under the NPDES permit will not include the initial dilution element, as discussed below. The report is concluded by a discussion of the results including conclusions and recommendations for incorporation into subsequent studies.

PURPOSE

This study addresses the verification of models used to determine the permitted zone of mixing (ZOM) for the JCO. The purposes of this study are to: [1] verify the previous analyses of the fate and transport of cannery effluent using field data collected after operation of the JCO was initiated, and [2] evaluate effects of the discharge on dissolved oxygen (DO) concentrations throughout Pago Pago harbor.

BACKGROUND

The JCO is an outfall operated by StarKist Samoa, Inc. (SKS) and VCS Samoa Packing Company (VCS). The outfall discharges treated wastewater from the canneries into outer Pago Pago Harbor and replaces individual outfalls that discharged effluent into the inner harbor near the canneries. The canneries moved the discharge point from the inner harbor to the outer harbor, discharging through the JCO, in February of 1992 (with approval from EPA). In addition, prior to initiating discharge through the new outfall, the canneries implemented high strength waste segregation in August 1991. The high strength waste is disposed of in a permitted ocean disposal site and does not influence the harbor.

The effects of high strength waste segregation and outfall discharge relocation on the water quality of the harbor were modeled by CH2M HILL (1991a). The size and location of the ZOM was based on environmental and engineering studies which included model predictions of the initial and subsequent dilution and the farfield transport processes (CH2M HILL, 1991a; 1991b). NPDES permits were issued (effective date of permit [EDP] of 27 October 1992) based on the approved zone of mixing.

The NPDES permits require implementation of a receiving water quality monitoring program to determine compliance with water quality standards. The monitoring program is being conducted by the American Samoa Government (ASG) through the American Samoa Environmental Protection Agency (ASEPA). The monitoring program includes monthly collection and analysis of water samples from 17 specified stations throughout the harbor. The objective of the monitoring program is to document water quality near the outfall discharge within the ZOM, at the ZOM boundaries, and at locations throughout the harbor. The permits require monitoring reports documenting the water quality data be submitted to US Environmental Protection Agency (USEPA) on a quarterly basis.

Two dye studies were also required as conditions of the permits to observe the fate and transport of the effluent plume. The first (non-tradewind season) of these dye studies was conducted on February 17, 1993 (CH2M HILL, 1993). The second (tradewind season) was conducted on October 12, 1993 (CH2M HILL, 1994).

The data collected from the water quality monitoring program and from the dye studies allow direct observation of the fate and transport of the discharged effluent. The NPDES permit requirements dictate that these data be used to verify the model predictions used in the earlier engineering studies for determining the ZOM and to evaluate the effects of BOD in the effluent on DO in the receiving water. This requirement is described in Part J of NPDES permit Numbers AS0000027 and AS0000019 as follows:

> *"Within three months after both dye studies have been completed, the permittee, cooperatively with {Star-Kist Samoa, Inc.; Samoa Packing Co.}, shall submit a study plan to USEPA and ASEPA that will discuss how the permittees will utilize the results from the monitoring data and from the dye studies to verify the models used in the determination of the mixing zones (the 30-second dilution zone, the ZID, and the ZOM). Also, the plan shall discuss how the permittee will examine the effects of BOD_5 in the effluent on Dissolved Oxygen (DO) in the receiving water, utilizing an appropriate model and one year's worth of ambient data. Upon approval of the study plan by USEPA and ASEPA, the permittee shall initiate the studies indicated and submit reports on a yearly basis. Reports shall summarize renewed predictions of dilution rates and the size, location, and movement of the plume based on the calibrated models".*

The study plan was submitted to USEPA and ASEPA on August 27, 1993 and approved by USEPA on 1 November 1993. Dr. Walter FricK of USEPA reviewed the study plan and had two comments which were included in the letter of 1 November 1993. The study plan, USEPA's approval letter, and our response to Dr. Frick's comments are included in an addendum to this report. ASEPA had no comments on the study plan (telephone conversation with Sheila Wiegman of

ASEPA, November 1993). This study is the first of the reports to be submitted to the USEPA and ASEPA in compliance with the permit conditions, and covers the first year of operation of the JCO and the two dye studies.

GENERAL APPROACH

The study is divided into three separate tasks:

1) **Model Verification - Initial and Subsequent Dilution.** The modeling procedures used to establish the mixing zone are evaluated based on data collected during the dye studies.

2) **Model Verification - Wastefield Transport.** The modeling procedures used to establish the mixing zone are evaluated based on data collected during the water quality monitoring program.

3) **BOD Impacts.** The effects of BOD_5 in the effluent on the DO in the receiving waters of Pago Pago Harbor are addressed based on the existing information and the results of the model verification elements listed above.

The basic approach used in the previous engineering study (CH2M HILL, 1991a) to determine the required mixing zone dimensions were: estimate the large-scale, long-term average ambient receiving water concentrations using a wastefield transport model, evaluate initial and subsequent (or secondary) dilution for a range of conditions, and, based on model predictions, determine the appropriate location for the discharge and the required size of the ZOM to comply with American Samoa Water Quality Standards (ASWQS).

This study evaluates this approach by re-running the models for the conditions measured during the dye studies and water quality monitoring, as appropriate, and comparing the model results with the observed field data. The ZOM location and dimensions were re-evaluated as reported in the results section (Section 5) of this report. Each of the major tasks of the study are described below.

Initial and Subsequent Dilution Models

The initial and subsequent dilution modeling procedures used to establish the mixing zone boundaries are evaluated based on the dye study results. Model input includes measured currents, temperature and salinity profiles, and effluent flows measured during each dye study. The model results are compared to the dilutions observed during the dye studies and to previous predictions. The formulation of the effluent limits for ammonia were based on predicted diffuser performance in

terms of initial dilution rate and magnitude. The predictions used for this purpose are specifically evaluated.

Wastefield Transport Model

Observed long-term average receiving water concentrations, on a harbor wide scale, for total nitrogen (TN) and total phosphorus (TP) are based on concentrations observed at each of the water quality monitoring sampling stations. Average loadings of TN and TP to the harbor from the discharge are calculated for the same period of time. The wastefield transport model was run using these average loadings and evaluated by comparing the model results to the observed water quality data.

BOD Impacts

BOD impacts on receiving water DO were evaluated using the same wastefield transport model employed for nutrients, modified to simulate simple BOD/DO kinetics. The potential impacts of cannery effluent on DO levels throughout the harbor were addressed using the verified wastefield transport model

Section 2

INITIAL AND SUBSEQUENT DILUTION

The general approach to the verification of the plume dilution models is to run the models under the environmental conditions observed in the field during the two dye studies and then compare the results to the dilutions calculated from measured dye concentrations. The initial dilution model used is UDKHDEN and the subsequent dilution model is CDIFF. These were the models used in the outfall design and definition of the ZOM. A brief background is first provided below, with references provided for more complete descriptions, and then each of the models is considered. An evaluation of the results of the model verification applied to the ZOM definition is provided in Section 5 below.

BACKGROUND

Preliminary diffuser configuration and performance for a range of potential conditions and outfall locations were investigated during the Feasibility Study (CH2M HILL, 1991a). The results of this study indicated a general location for the diffuser and provided preliminary diffuser design parameters. The final diffuser configuration was developed during final outfall design based on desired performance and selected design criteria (CH2M HILL, 1991b). The Feasibility Study employed EPA plume models UMERGE and UDKHDEN (Muellenhoff et al., 1985). The UDKHDEN model was selected for final design since it was considered more sensitive to changes in receiving water and effluent characteristics.

The jet momentum and buoyancy induced initial dilution of the plume is rapid and occurs within a limited area. The effluent and constituent concentrations depend on the initial dilution and the concentrations of the receiving water. Since the discharge is in a semi-confined area the ambient receiving water concentrations are affected by the long term loading from the discharge itself. The ambient concentrations of the receiving water were predicted using the wastefield transport model discussed in Section 3 below.

To provide a conservative estimate of required mixing zone size, a subsequent dilution model was used and results superimposed on the ambient concentrations predicted by the wastefield transport model. Subsequent dilution describes the less intense dilution of the plume, driven by relatively high concentration gradients, following the initial dilution process. Subsequent dilution was estimated using the EPA farfield plume dilution model CDIFF (Yearsley, 1987).

INITIAL DILUTION

Initial dilution depends on the diffuser configuration, effluent characteristics, and environmental conditions in the receiving water. The diffuser characteristics are as follows:

- Four (4) active ports (note: there are six ports in the diffuser but two are blocked by removable flanges)
- Port diameter is 5.065 inches (0.12865 m)
- Port spacing is 50 feet (15.24 m)
- Ports are oriented 15 degrees upward from the horizontal and 90 degrees to the diffuser barrel centerline and alternate sides along the springline of the pipe

The important effluent characteristics are effluent density and flow rate. Effluent flow rates varied during the dye studies. Table 2-1 gives the average and range of variation of flow rates for the two dye study periods. Flow rates through the outfall are not measured directly. Flow from the canneries wastewater treatment plants is measured as conveyed into surge tanks from which the effluent is pumped to the outfall. Therefore flows through the outfall during the dye studies were calculated from the initial dye concentrations. The average flow for the first dye study (non-tradewind conditions) was 2.503 mgd (0.1097 m^3/sec) and for the second dye study (tradewind conditions) was 3.063 mgd (0.1342 m^3/sec).

Effluent density is a function of effluent temperature (at the diffuser port) and effluent salinity. Both of these parameters vary and temperature at the diffuser port is not easily measured. However, previous sensitivity studies (CH2M HILL, 1991b) indicate that the model predicted dilution is not very sensitive to effluent temperature (a change of 5 °F results in a change in dilution of about 2-percent). Given the expected range of effluent temperature (85 to 90 °F), an assumed value of 85 °F at the diffuser port is considered a reasonable value to use.

Effluent salinity varies because SKS uses sea water for thaw water and cooling water. Approximately 0.6 mgd of sea water is used by SKS for thaw water. During the second dye study the effluent salinity of the combined discharges was determined and is shown in Table 2-2. The average quantity of sea water in the combined discharge was 1.13 mgd, representing an average fraction of 37-percent of the total effluent flow (Table 2-2). The sea water portion of the flow ranged from 0.69 to 1.64 mgd, which represented 28-percent and 36-percent of the flow at the respective measurement times. The fraction of sea water ranged from 31-percent to 59-percent. Examination of these data in more detail (Figure 2-1) indicates that the percentage of sea water is, typically, a relatively constant fraction of about 35- to 40-percent of the total effluent flow.

Table 2-1. Effluent Flow Rates During Dye Studies			
Non-Tradewind Study (17 Feb 1993)		Tradewind Study (12 Oct 1993)	
Time	Flow (gpm)	Time	Flow (gpm)
0625	3040	0700	2000
0710	2630	0800	1980
0810	1580	0830	1980
0900	1320	0900	2040
0935	1220	0920	1680
1005	1390	1000	1400
1040	1760	1030	3330
1115	2260	1100	1940
1150	1840	1120	1780
1350	1430	1150	1700
1425	1220	1200	1660
1450	1320	1300	1620
1530	1580	1310	1610
Average	1738	1335	1910
		1400	2840
		1430	3120
		1445	3040
		1500	3050
		1530	2730
		1600	1810
		1630	1860
		1715	1730
		Average	2127

Table 2-2. Effluent Density During Second Dye Study (12 Oct 93)							
Time	Sample Temp (°C)	Sample Cond (mmho/cm^2)	Sample Salinity (o/oo)	Effluent Salinity (o/oo)	Effluent Flow Rate (gpm)	Sea Water Fraction	
						mgd	%
0844	25.7	12.23	6.89	13.77	2010	1.12	40
0920	25.8	18.64	10.85	21.69	1680	1.48	63
0950	25.7	11.98	6.73	13.47	1470	0.80	39
1030	25.4	10.93	6.14	12.28	3300	1.64	36
1100	25.7	10.03	5.56	11.12	1940	0.88	32
1120	25.7	9.75	5.39	10.79	1780	0.78	31
1140	26.0	9.94	5.47	10.94	1740	0.77	32
1215	25.8	9.98	5.52	11.04	1650	0.74	32
1240	25.9	17.23	9.94	19.87	1630	1.31	57
1305	25.9	17.58	10.16	20.31	1610	1.33	59
1335	26.4	11.66	6.44	12.89	1910	1.00	37
1405	26.1	11.35	6.30	12.60	2840	1.45	36
1430	26.1	11.32	6.28	12.56	3120	1.59	36
1445	26.1	11.26	6.24	12.49	3040	1.54	36
1530	26.3	10.83	5.96	11.93	2730	1.32	35
1600	26.1	15.17	8.62	17.24	1810	1.27	50
1630	26.3	9.6	5.24	10.47	1860	0.79	30
1715	26.4	9.03	4.89	9.79	1730	0.69	28
Ave	-	-	-	-	-	1.13	37
Note: All effluent samples tested at 2:1 dilution; effluent salinity is two times the sample salinity							

The important environmental properties of the receiving water, for controlling initial dilution, are depth, density, and currents. The diffuser is located on the bottom in about 171 to 176

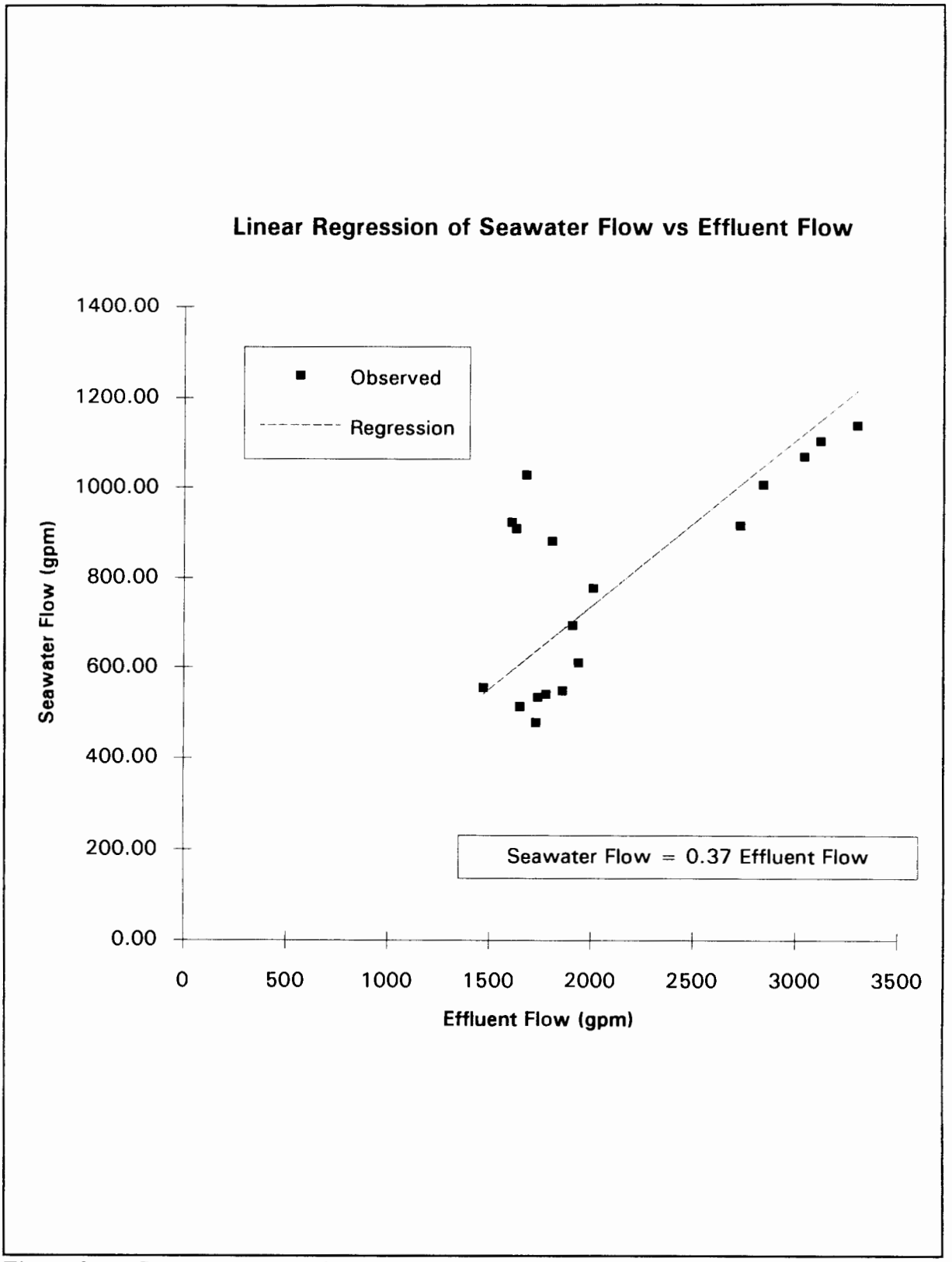


Figure 2-1. Seawater Faction in Effluent

feet of water relative to mean lower low water (MLLW). The tidal range is only about 2.5 feet. Changes in depth will have little or no influence on dilution and a nominal depth of 176 feet is used for all calculations in this study.

Background conductivity-temperature-depth (CTD) profiles were done during each of the dye studies (CH2M HILL, 1993; CH2M HILL, 1994). These data provide vertical density profiles through the water column. Figures 2-2a and 2-2b show the density profiles for the first and second dye study respectively. The figures show the data as collected in the filed and the profiles assumed for the model runs. The filed data is characterized as follows:

- The data for the first dye study displays high variability shallower than 100 feet of water depth. It is suspected that this is due to influence of the effluent plume, observed to be trapped at about this depth, or a problem with the deployment of the instrument. However, the conductivity and temperature measurements below the trapping depth are the important data for the model and these data do not show the same variability. Therefore, the problem of variability in the upper layer is not considered serious. The upper level density, shown in Figure 2-2, was inferred from the available data.

- The second dye study background profile was out of the plume influence. In addition, a pump had been installed on the CTD meter which may help provide better data.

The density was higher and the density gradient below 100 feet was stronger for the non-tradewind (first) study conditions. During the tradewind conditions (second study) there was a very weak gradient except for the surface layer which was a layer of cooler but lower salinity water.

Current speed and direction were measured at two depths (near bottom and mid-depth) during both dye studies. Current profiles were inferred from these measurements. Current directions varied with depth and with time during both dye studies. The current conditions are summarized in Table 2-3. However, the effect of current direction on dilution is relatively small over the range of directions observed. Based on an examination of the data, a current direction 45° to the axis of the diffuser barrel is considered a good overall representation of the prevailing conditions.

The results of the UDKHDEN model simulations are shown in Table 2-4. The model was used for five conditions for each dye study: average, minimum, and maximum effluent flows for each of the dye study periods and a runs for lower effluent temperature and lower effluent density to investigate sensitivity to this parameter as discussed above. The lower effluent temperature runs were done for 80 °F and the lower effluent density runs were done assuming that the effluent included 0.6 mgd of sea water. The model simulation results for the non-tradewind period (Dye Study No. 1, February 1993) quite are consistent with the observed values. The model simulation results for the tradewind period (Dye Study No. 2,

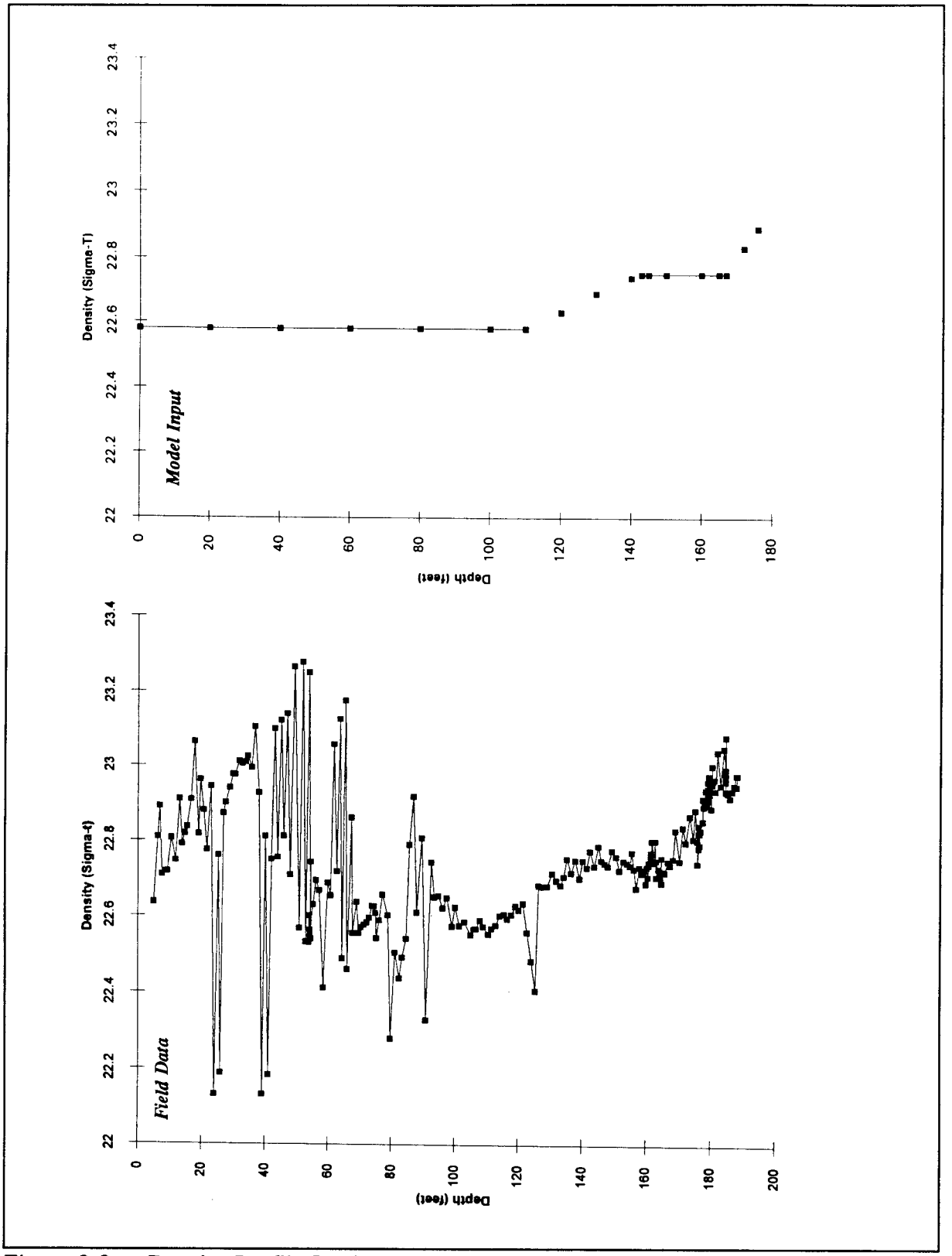


Figure 2-2a. Density Profile During First Dye Study

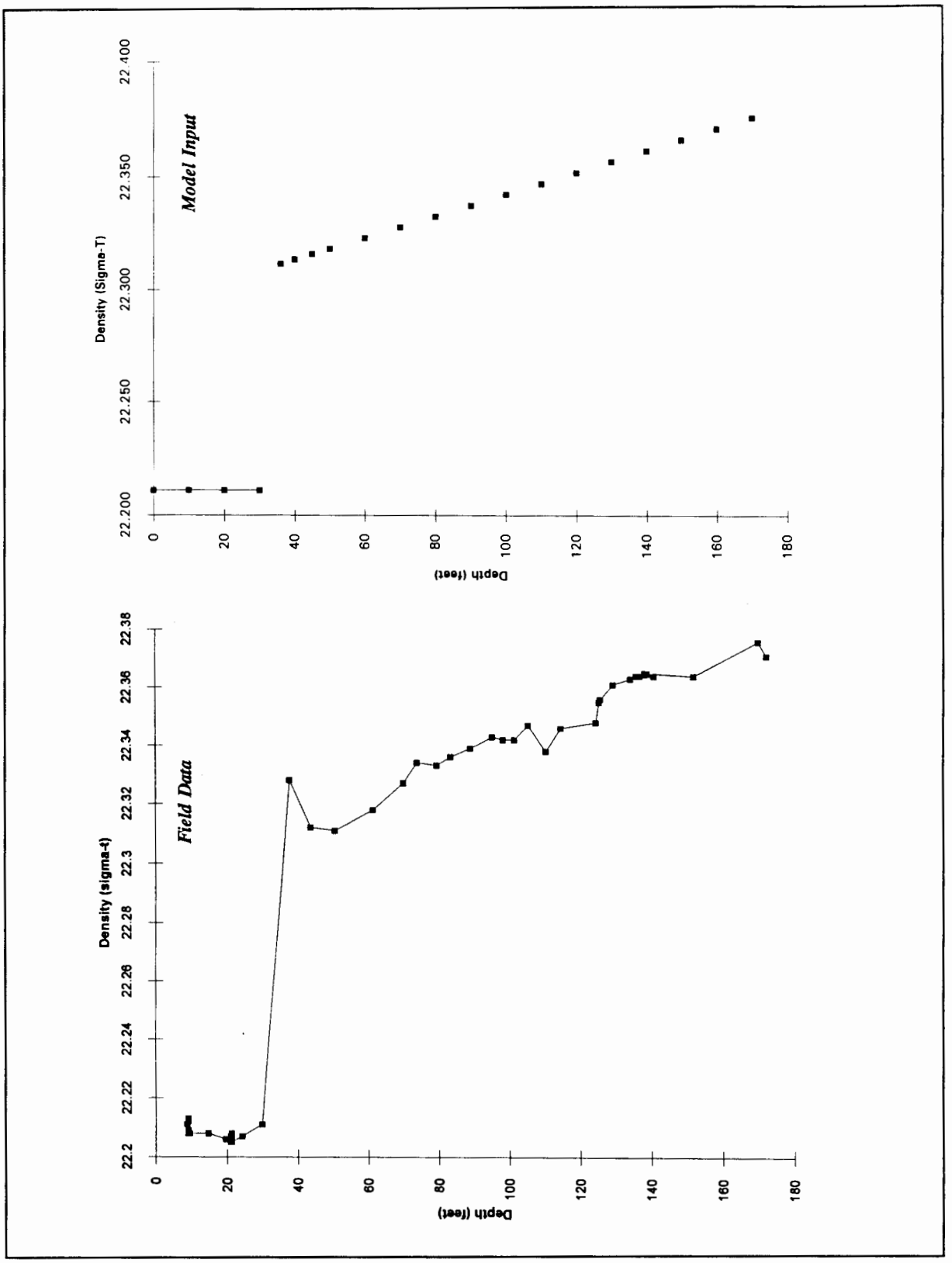


Figure 2-2b. Density Profile During Second Dye Study

Table 2-3. Current Observations			
Time	Meter Depth (ft)	Average Speed (cm/sec)	Predominant Direction (°magnetic)
DYE STUDY No. 1 - NONTRADEWIND CONDITIONS February 17, 1993			
08:00 - 10:30	100	15 - 20	145 - 155
10:30 - 17:00	100	15 - 20	255 - 285
08:00 - 08:30	170	≈2.5	30 -60
08:30 - 11:00	170	2 - 4	300 -330
≈11:00	170	1 - 2	≈270
11:30 - 14:00	170	1 - 2	60 - 90
14:30 - 17:00	170	2 -5	120 - 150
DYE STUDY No. 2 - TRADEWIND CONDITIONS October 12, 1993			
08:00 - 11:00	100	18 - 24	260 - 290
11:00 - 14:00	100	18 - 24	215 - 240
14:00 - 17:00	100	18 - 24	260 - 280
08:00 - 15:00	170	1 - 3	150 - 210
15:00 - 17:00	170	1 - 2	80 - 150

October 1993) appear to be consistent for predicted dilution but are not consistent with observed plume trapping levels.

Detailed UDKHDEN model input and output is provided in Appendix I. The results, and implications for model verification and ZOM definition, are discussed in more detail in Section 5 below. General comparisons of the initial dilution model predications and observations are as follows:

- **For the nontradewind dye study**: the model indicates that an <u>average</u> dilution of between 400:1 and 500:1 is expected (Table 2-3). These dilutions

Table 2-4. Results of UDKHDEN Predictions

CASE	Flow (mgd) [m^3/sec]	Effluent Density (g/cm^3)	Dilution	Trapping Depth (m)	Plume Width (m)
DYE STUDY No. 1					
Mean Flow	2.503 [0.0197]	1.00467	485	41.2	13.9
Max Flow	4.377 [0.1918]	1.00467	393	40.3	16.0
Min Flow	1.753 [0.0768]	1.00467	519	42.2	12.3
Low Temp	2.503 [0.0197]	1.00635	460	41.5	13.6
Low Density	2.503 [0.0197]	1.00128	523	40.6	14.1
DYE STUDY No. 2					
Mean Flow	3.062 [0.1342]	1.00467	403	42.3	13.1
Max Flow	4.792 [0.2101]	1.00467	381	41.1	15.2
Min Flow	2.015 [0.0883]	1.00467	425	43.3	11.5
Low Temp	3.062 [0.1342]	1.00635	375	42.6	12.9
Low Density	3.062 [0.1342]	1.00013	470	41.2	13.6

correspond to trapping depths of approximately 130 to 140 feet below the water surface. The dye study data (CH2M HILL, 1993) generally agree with the model predictions for both dilution and trapping depth, although dilutions observed were typically higher than predicted by the model (the model appears somewhat conservative overall by predicting lower than expected dilutions). Lower dilutions than the model predicted average dilutions were

occasionally detected during the first dye study at the plume trapping depths (Table 3-3 in CH2M HILL, 1993). However, these dilutions are considered to be representative of individual plume centerline dilutions, as described in the dye study report (CH2M HILL, 1993). Examination of the model output indicates that if centerline dilutions are considered, the model predicts lower dilutions than observed and the model is somewhat conservative for centerline dilution as well as for average dilution.

- **For the tradewind dye study:** the model predicts dilutions of about the same or slightly lower than for the nontradewind season with the effects of higher effluent flow rates and larger density differences offsetting the effects of higher ambient current speeds. Predicted trapping depths are about the same or slightly deeper than for the nontradewind conditions. The initial dilutions (average and centerline) follow the same trend as described above for the nontradewind case. The model appears to be somewhat conservative and observed initial dilutions are typically higher than those predicted. However, the trapping levels are not in agreement. During the second dye study the plume was observed to be at or near the surface. Examination of the field data and detailed model output do not directly explain this inconsistency. We attribute it to vertical advection induced by the reef wall under the prevailing circulation during the time of the study. This phenomena is discussed in more detail below.

As described above the UDKHDEN model predictions appear to be conservative except for the discrepancy in trapping depth observed during the tradewind season. This is most likely a result of vertical currents near the reef wall that is located just to the north of the diffuser. Under particular wind conditions these currents may be upwelling or downwelling. During the tradewind study upwelling currents, combined with a very weak density gradient, would explain the location of the plume higher in the water column than expected. The plume may dilute and reach a trapping level near the predicted depth. Subsequently weak vertical (upwelling) currents could move the plume upward in the water column. The water column is virtually unstratified, particularly in the upper portion, so the movement of a neutrally buoyant plume would be easily induced by even very weak upwelling currents. This appears to have been the situation during the second dye study. This behavior of the plume is supported by field observations that indicate the minimum dilutions occurring over a wide range of depths, consistent with the slow upwelling described above.

SUBSEQUENT DILUTION

The subsequent dilution model (CDIFF) was run using input based on the field data and the result of the UDKHDEN model predictions. The subsequent dilution model was run based on the initial dilution model results for the mean flow for each dye period. However, the concentration at the beginning of subsequent dilution was taken as 100-percent and the initial

dilution was input as 1:1, so that the results could be applied to any of the initial dilution cases. In addition, to investigate model sensitivity and the range of potential scenarios, the model was run under a number of assumptions for each dye study case as follows:

[1] Assuming an initial width four times the size of the individual plumes from each diffuser port and using the surface current speed

[2] Assuming an initial width of a single plume from one diffuser port and using the surface current speed

[3] Assuming an initial width four times the size of the individual plumes from each diffuser port and using the current speed at the predicted trapping depth

[4] Assuming an initial width of a single plume from one diffuser port and using the current speed at the predicted trapping depth

In all cases the plume is assumed to move parallel to the shoreline and the shoreline is assumed to be the location of the reef wall. Results of the subsequent dilution model predictions are summarized in Table 2-5. Detailed model output is given in Appendix II.

The model predicts centerline dilution which is one-half the average dilution across the plume. The most realistic of the cases stated above provide the following results:

- **For the nontradewind dye study:** the initial dilution is complete prior to plume merging (or just at the time of merging for the maximum flow case) and the plume was observed at the trapping level indicated based on field observations. Therefore, the plume behavior is best indicated by case [4] above, and case [3] would be overly conservative. Centerline subsequent dilutions for these cases are 2.1 and 4.9 at the edge of the mixing zone, for cases [3] and [4] respectively. This would correspond to total dilutions (average) of between 2000:1 and 4700:1 at the mixing zone boundary (taken to be 1300 feet from the diffuser. Field observations during the dye study indicated that dilutions of this magnitude occurred well before the mixing zone boundary. This implies that case [4] is more realistic, but still conservative.

- **For the tradewind dye study:** the initial dilution is consistently achieved before the plumes merge. Under some conditions, however, the plume is observed to approach the surface rather than remain at the trapping level predicted by the model. Therefore the behavior is best predicted by cases [2] and [4] with case [2] expected to be somewhat conservative (prediction lower than expected dilutions). Centerline subsequent dilutions for these cases are 2.3 and 4.4 at the edge of the mixing zone. This would correspond to a total

Table 2-5: Subsequent Dilution Predictions			
CASE	Distance from Diffuser (feet)	Subsequent Dilution (Average)	Total Dilution (Average Flow)
Dye Study No. 1 - Nontradewind Conditions			
[1] Mean Effluent Flow, Combined Plume, Surface Current	1300	2.8	1360
	450	2.0	970
[2] Mean Effluent Flow, Single Plume, Surface Current	1300	5.2	2520
	450	2.7	1310
[3] Mean Effluent Flow, Combined Plume, Current at Trapping Depth	1300	4.2	2040
	450	2.3	1120
[4] Mean Effluent Flow, Single Plume, Current at Trapping Depth	1300	9.8	4750
	450	3.7	1790
Dye Study No. 2 - Tradewind Conditions			
[1] Mean Effluent Flow, Combined Plume, Surface Current	1300	2.6	1050
	450	2.0	810
[2] Mean Effluent Flow, Single Plume, Surface Current	1300	4.6	1850
	450	2.5	1010
[3] Mean Effluent Flow, Combined Plume, Current at Trapping Depth	1300	3.8	1530
	450	2.3	930
[4] Mean Effluent Flow, Single Plume, Current at Trapping Depth	1300	8.8	3550
	450	3.5	1410

average dilution of between 1800:1 and 3500:1 at the mixing zone boundary. Field observations during the dye study indicate that these values are typical

of the worst cases observed and are lower than the large majority of observations.

The mixing zone is area within 1300 feet of the diffuser, except along the reef where the mixing zone boundary is defined as the 30-foot contour. The closest distance to the diffuser is about 450 feet. In the case of the surfacing plume during the tradewind dye study, the model predicts that dilutions will be between 1000:1 and 1400:1 for worst case conditions (single plume, cases [2] and [4] above). Observations during the dye study indicate that the dilutions in the vicinity of the reef are greater than these values. The model predictions appear to be conservative in all respects.

Section 3

WASTEFIELD TRANSPORT

Numerical model predictions used to define the ZOM addressed the long-term effects of the discharge on the ambient TN and TP levels throughout the harbor as well as the dilution and dispersion near the diffuser discussed above. The long-term processes determine the average levels of the effluent constituents in the ambient receiving water of the harbor. The ambient water is the diluting water for the initial and subsequent dilution process. For an enclosed bay, such as Pago Pago harbor, the ambient concentrations are affected by the effluent discharge levels. Therefore, ambient levels as a function of discharge loading must be accounted for to calculate constituent concentrations resulting from the initial and subsequent dilution processes. Ambient levels must also be used to determine, or predict, compliance with american Samoa Water Quality Standards (ASWQS: [ASG, 1989]) throughout the harbor.

Verification of the previous model predictions includes verifying predictions of long-term ambient constituent levels for the relocated cannery discharge through the JCO. Model predictions are verified by comparison of model predicted concentrations with concentrations measured during the water quality monitoring program. If the model is not adequately verified, new predictions must be developed based on recalibrated models.

The applications of the model that were conducted to verify previous predictions, and comply with the NPDES permit conditions, are described below. The overall approach to predict ambient concentrations, a description of the TN and TP loadings used in the model, a summary of model results, and an evaluation of the model verification are presented below. Brief descriptions of the wastefield transport model used are included in the discussions below with references provided for more detailed technical.

PREDICTED AMBIENT CONCENTRATIONS

Previous predictions of ambient conditions in Pago Pago Harbor due to the operation of the JCO used a wastefield transport model (PT121). This model is described in more detail in the study plan (an addendum to this report) and in the feasibility study (CH2M HILL, 1991a). The model, developed by CH2M HILL, was based on a model originally developed by HRI (1989) for a wasteload allocation study of Pago Pago Harbor. The results were presented as a series of contour plots of TN and TP concentrations for a range of discharge loadings and alternative outfall sites (CH2M HILL, 1991a).

Since the time the outfall became operational, water quality data have been collected by ASG. Effluent chemistry and flow data have been collected by each of the canneries. These data are used below to verify the ambient concentrations predicted using PT121. The effluent chemistry and flow data provided by the canneries are used for input to the same model developed for, and used in, the previous studies. Long-term average TN and TP loadings from the canneries are calculated based on approximately one year (13 months) of recorded flow and effluent chemistry data. The results of these model runs are compared to the long-term average concentrations obtained from the ASG water quality data for the same time period.

TN AND TP LOADINGS

The effluent flow and chemistry data provided by StarKist and VCS which were used to generate long-term average loadings are included as Appendix III. The long-term average TN and TP loadings were based on records made between May 1992 and June 1993. These data correspond to the period of available water quality data collected by ASG following the beginning of operation of the JCO. A start data of May 1992 is appropriate as the JCO started operation in February 1992. The three month period should be sufficient to allow the ambient TN and TP concentrations to come to equilibrium with the new discharge location. The average flows and loadings for each cannery as well as the combined averages for the JCO are shown below in Table 3-1.

Table 3-1. Long-Term Average Loadings from the JCO.

Facility	Flow (mgd)	Total Nitrogen (kg/day)	Total Phosphorus (kg/day)
Starkist Samoa, Inc.	1.24	368	25
VCS-Samoa Packing	0.56	308	62
JCO (combined)	1.80	676	87

MODEL RUNS

Figure 3-1 shows the PT121 model grid used for modeling TN and TP concentrations in Pago Pago harbor. The model grid shown is the same as used in the initial predictions for the feasibility study as described above. Detailed technical descriptions of the model can be found Appendix C of the feasibility

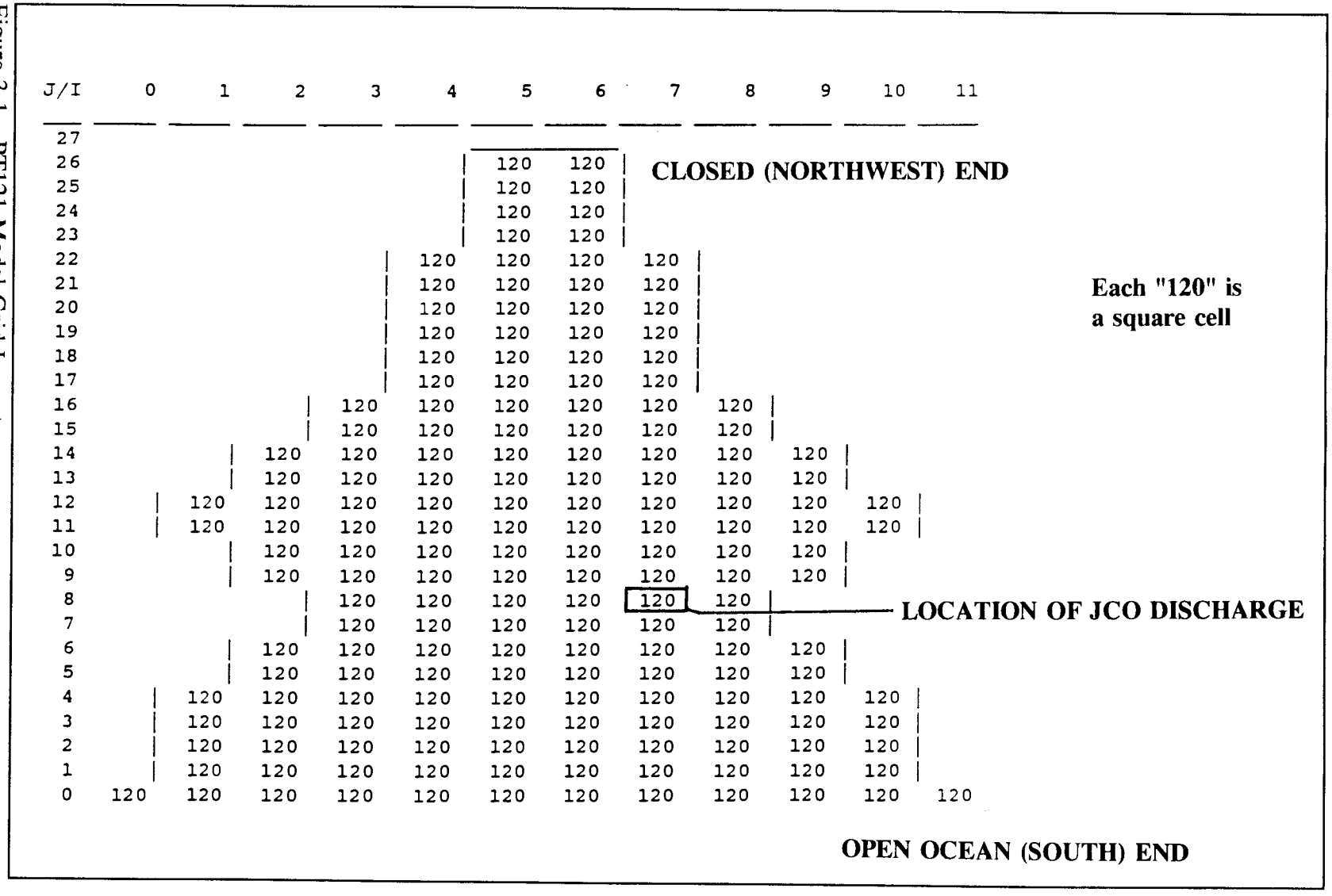


Figure 3-1. PT121 Model Grid Layout

study (CH2M HILL, 1991a). Modifications were made to the PT121 input files used in the feasibility study only for the following reasons:

- To reflect the measured loadings from the JCO for the time period of May 1992 through June 1993,
- To reflect the location of the JCO diffuser in the outer harbor (cell [7,8] in Figure 3-1), and
- To account for variability in background levels from those used in the previous study.

The TN and TP loadings used in the previous study were replaced with the average flow and loads shown in Table 1. The location of the discharge point was as shown on Figure 3-1. Background levels for TN (120 mg/m^3) and TP (13 mg/m^3) as used in the original feasibility study, were used for the model runs described below. However, additional model runs were made using background concentrations of 100 mg/m^3 for TN and 14 mg/m^3 for TP. These levels were representative of average levels measured outside the harbor (Station 5 in Figure 3-4) during the recent harbor water quality measurements described below.

Appendix IV presents model output for each of the cases run. The output presented includes initial conditions and conditions at the end of each model run. The model was run to a steady state condition to reflect long term average conditions. Figures 3-2 and 3-3 present contour plots of the calculated long-term concentrations for TN and TP for the original and revised background concentrations, respectively.

MODEL VERIFICATION

The water quality data for Pago Pago Harbor used in this study was collected during eight sampling events between May 5, 1992 and June 22, 1993. For each event, two samples were collected at each station: one at a depth of 3 feet and the other at a depth of 60 feet. Figure 3-4 shows the locations of the ASG water quality monitoring stations used to verify the model results. The stations shown in Figure 3-4 (Stations 5 through 13) are the original monitoring stations where data have been collected since 1984 (the pre-JCO data were summarized by CH2M HILL [1991a, 1991c]). Additional stations (Stations 14 through 18) were established near the boundaries of, and within, the ZOM by the existing NPDES permits and have been monitored since shortly after discharge through the JCO began. The additional stations are discussed in more detail below in Section 5. The water quality data for the period considered for this report are tabulated and included as Appendix V.

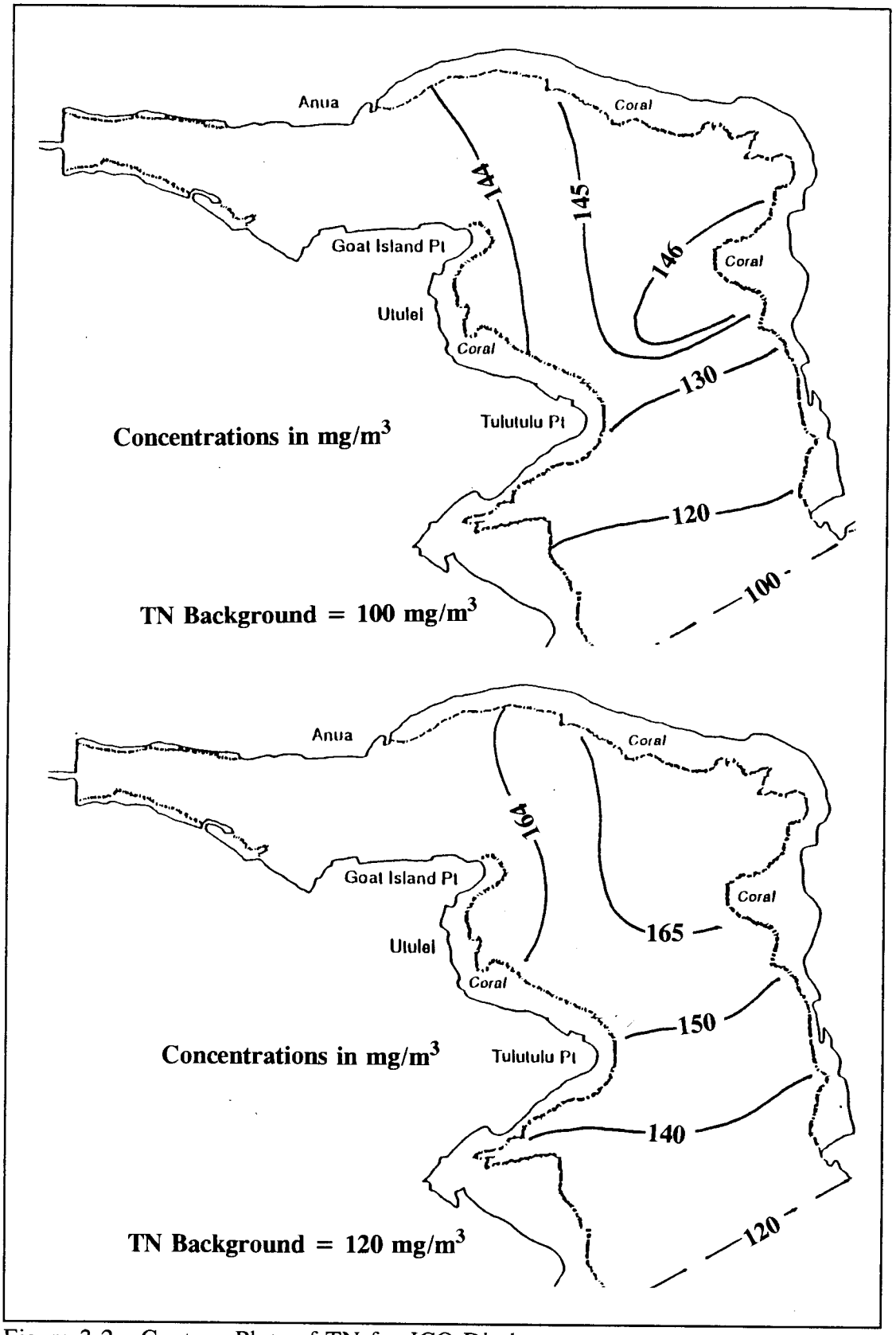


Figure 3-2. Contour Plots of TN for JCO Discharge.

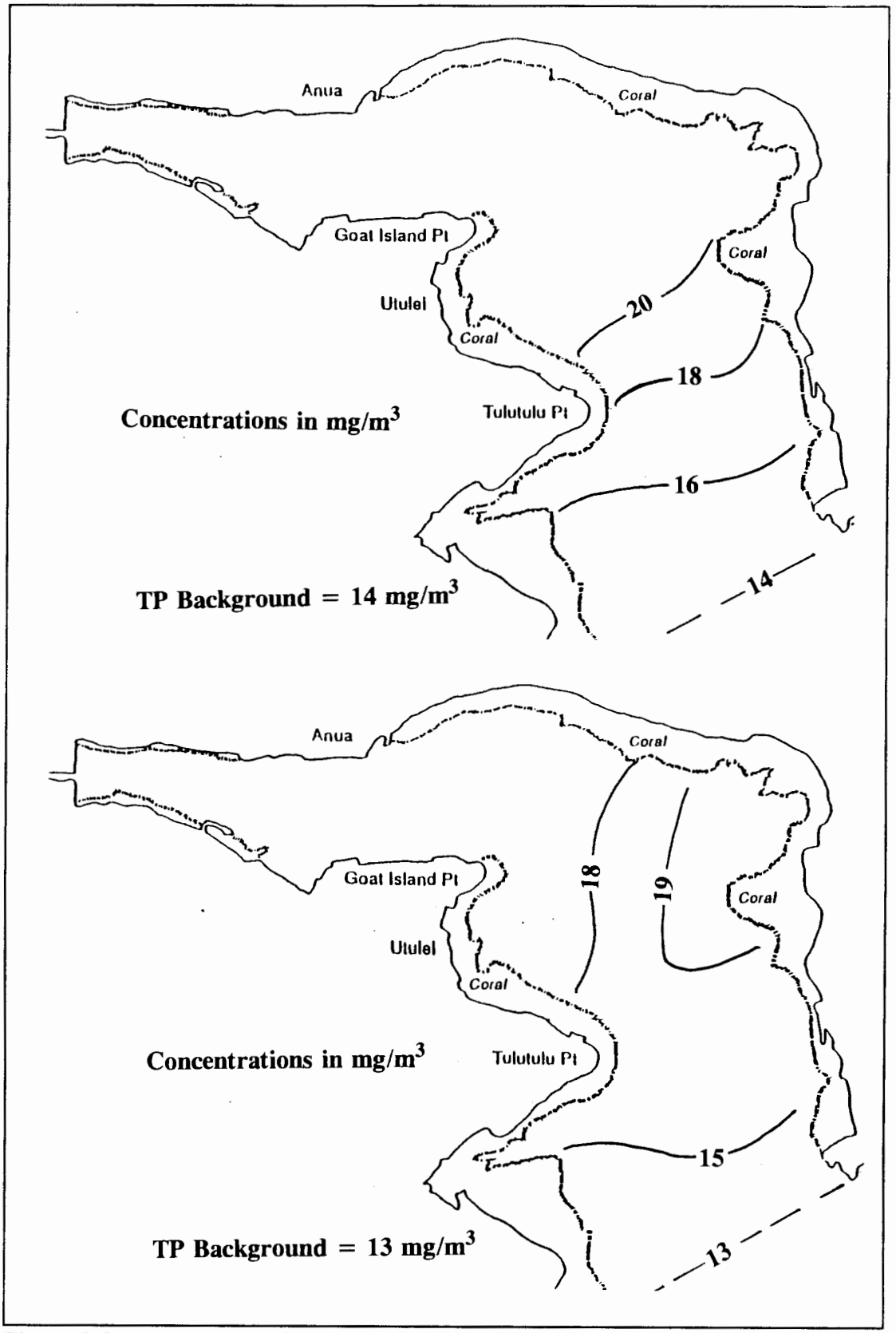


Figure 3-3. Contour Plots of TP for JCO Discharge

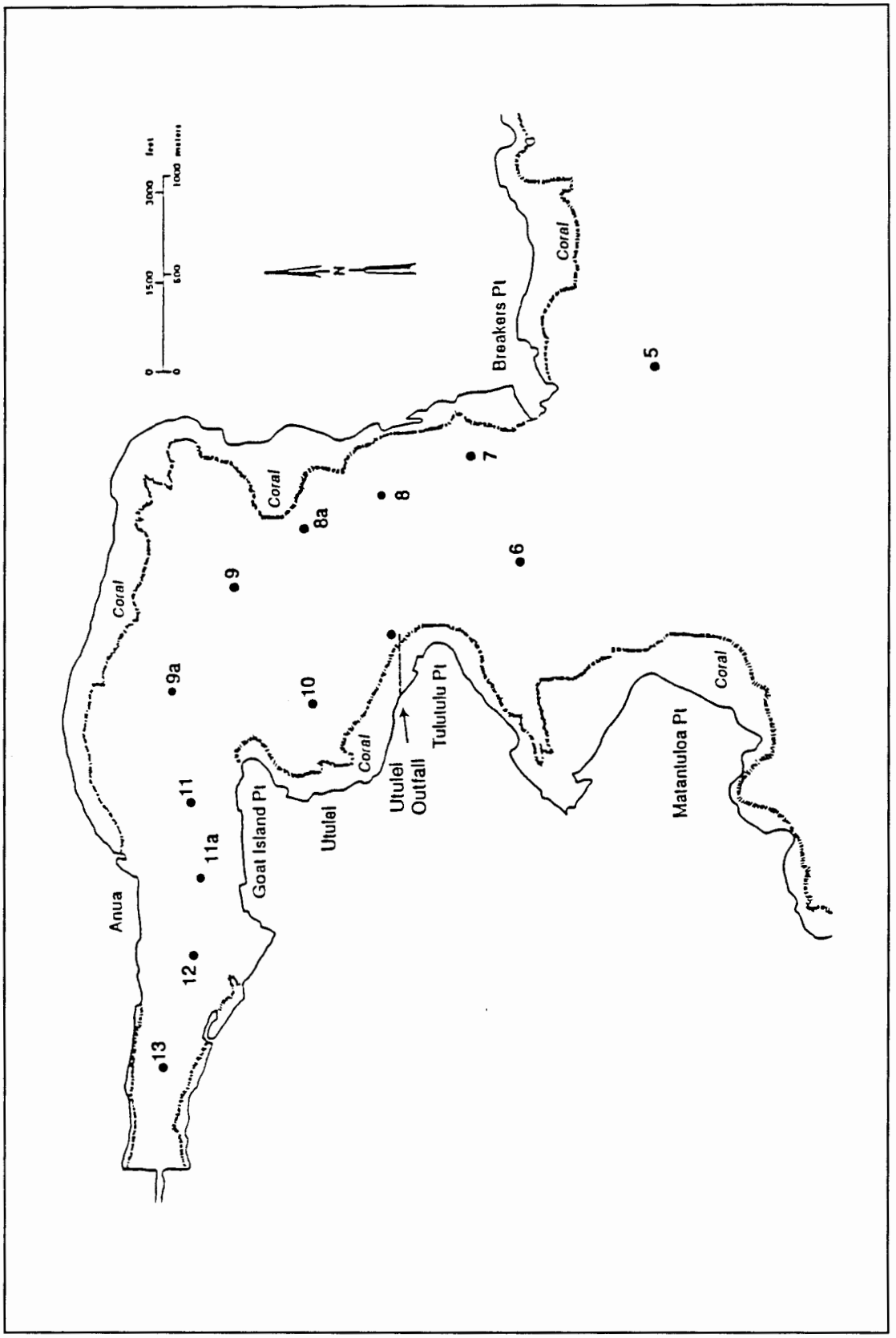


Figure 3-4. Locations of ASG Water Quality Sampling Points

The average TN and TP concentrations predicted by the model, and the concentrations measured by ASG during the study period, are presented in Tables 3-2 and 3-3, respectively. Figures 3-5 and 3-6 show measured and predicted concentrations plotted as a function of distance from the mouth of the harbor. The figures include observed data for the ZOM stations (Stations 14 through 18). The tables include only comparisons for observations outside the ZOM, since it is data from these stations that were used to develop the model. The complete data set is provided in Appendices IV and V.

Examination of the water quality data indicates that the values for TP for the August 1992 monitoring included some unusually high values at Stations 14 and 16 (within the ZOM). If the observed data for the August 1992 monitoring is removed from the averages for each station shown in Figures 3-5 and 3-6: the predictions for TP is noticeably improved and, the prediction for TN is slightly worse. As shown in the tables and figures the model adequately reproduces the observed levels of both nitrogen and phosphorus as described below.

Table 3-2. Modeling Results vs. Measured Values, Total Nitrogen.

Sampling Station Number	PT121 Model Grid Numbers		Measured TN (mg/m^3)			Model Results	
	Row	Cell	Max.	Min.	Average	0.100 mg/m^3 Background	0.120 mg/m^3 Background
5	---	---	0.162	0.048	0.103	---	---
6	5	5	0.192	0.038	0.118	0.129	0.146
7	6	8	0.165	0.073	0.127	0.131	0.162
8	7	7	0.187	0.038	0.120	0.142	0.162
8a	9	7	0.214	0.100	0.145	0.149	0.159
9	12	8	0.180	0.086	0.131	0.145	0.158
9a	14	6	0.193	0.080	0.126	0.145	0.157
10	11	3	0.259	0.058	0.131	0.144	0.157
11	17	5	0.237	0.095	0.146	0.144	0.157
11a	19	5	0.221	0.065	0.137	0.144	0.157
12	21	6	0.229	0.062	0.151	0.143	0.156
13	24	6	0.302	0.071	0.188	0.143	0.155

Table 3-3. Modeling Results vs. Measured Values, Total Phosphorus.

Sampling Station Number	PT121 Model Grid Numbers		Measured TP (mg/m^3)			Model Results	
	Row	Cell	Max	Min.	Average	0.013 mg/m^3 Background	0.014 mg/m^3 Background
5	---	---	0.025	0.006	0.014	---	---
6	5	5	0.027	0.002	0.014	0.016	0.018
7	6	8	0.027	0.008	0.015	0.018	0.018
8	7	7	0.026	0.010	0.017	0.018	0.02
8a	9	7	0.034	0.009	0.019	0.018	0.02
9	12	8	0.031	0.011	0.018	0.018	0.02
9a	14	6	0.029	0.009	0.016	0.018	0.02
10	11	3	0.028	0.009	0.014	0.018	0.02
11	17	5	0.031	0.009	0.018	0.018	0.02
11a	19	5	0.046	0.008	0.018	0.018	0.02
12	21	6	0.028	0.007	0.018	0.018	0.02
13	24	6	0.058	0.008	0.028	0.017	0.02

Total Nitrogen (Outside ZOM). Using the concentration values at the entrance to the harbor based on the observations for the period of interest (100 mg/m^3), the model somewhat over predicts the concentrations of TN throughout the harbor, except for the two stations in the far inner harbor. We attribute the underprediction at the inner harbor stations (Stations 12 and 13 in Figure 3-4) to a source of nitrogen in the inner harbor not accounted for by the model. This source is probably from runoff delivered by streamflow into the inner harbor. This conclusion is supported by examination of the observed nitrogen concentrations. It is physically impossible for the reversal in concentration gradient in the inner harbor to be caused by discharge from the JCO. An inner harbor source is the only reasonable explanation. Therefore, we conclude that the model is conservative (over predicts the concentrations resulting from the JCO discharge).

Total Phosphorus (Outside ZOM). Using the values at the entrance to the harbor based on the observations for the period of interest (14 mg/m^3), the model over predicts the concentrations of TP throughout the harbor except for the innermost station. As in the case of TN described above, we attribute the underprediction at the inner harbor stations (Station 13 in Figure 3-4) to a source of phosphorus in the

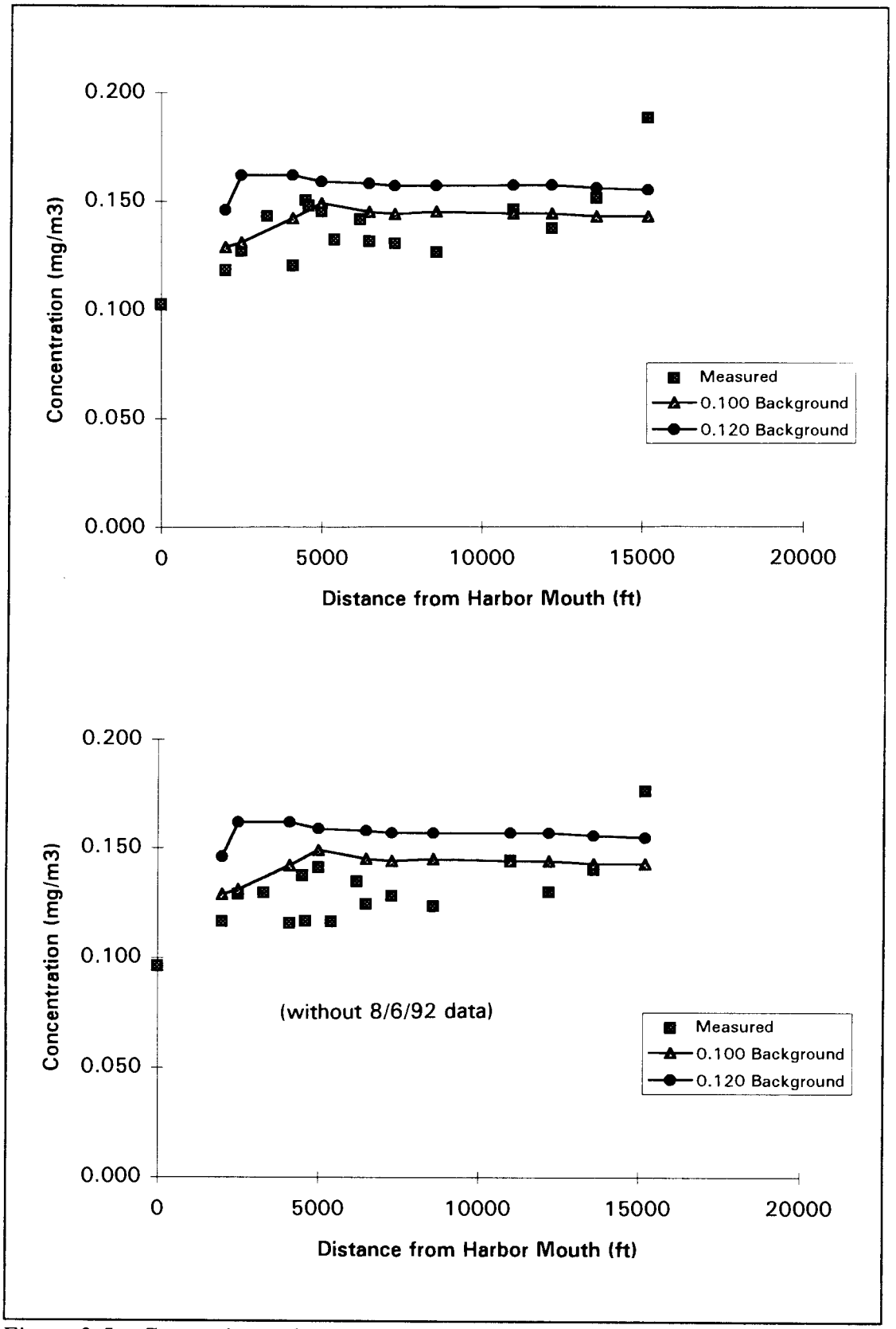


Figure 3-5. Comparison of Model Predictions and Observations for TN

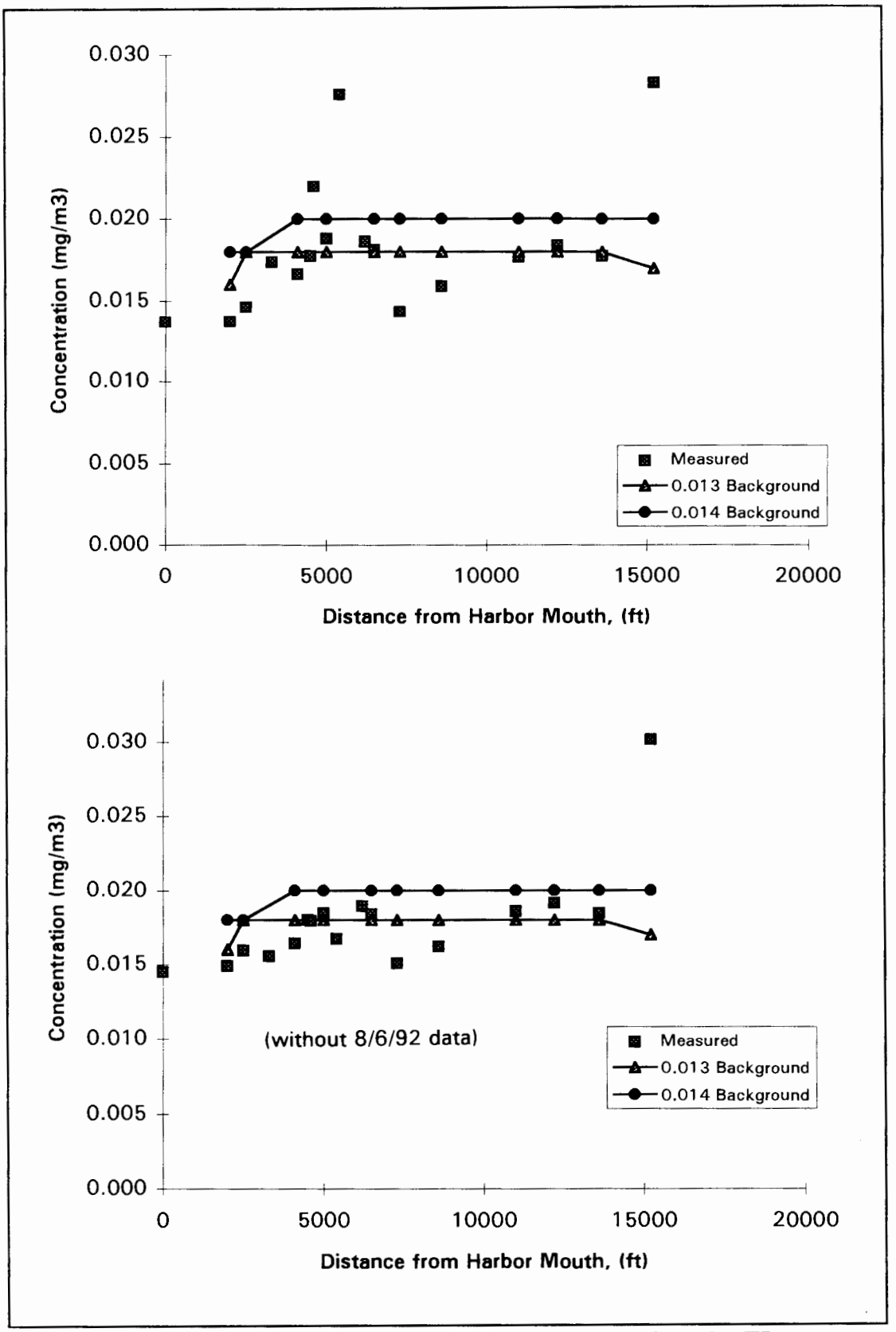


Figure 3-6. Comparison of Model Predictions and Observations for TP

inner harbor not associated with the JCO discharge. Therefore , as in the case of nitrogen, we conclude that the model is conservative (over predicts the concentrations resulting from the JCO discharge).

TN and TP Inside ZOM. The wastefield transport model results within the mixing zone are used as the ambient concentrations on which the initial and subsequent dilution model results were superimposed to develop the ZOM dimensions. The wastefield transport model results within the ZOM are included in the model output (Appendix IV). An evaluation of the mixing zone is provided in the Results section (Section 5) below. The intent of the model verification exercise, described above, was to examine model predictions throughout the harbor. It is clear from the data presented that the model is somewhat conservative and performs as expected.

Section 4

BOD IMPACTS

This section addresses the impacts of BOD discharge from the Joint Cannery Outfall on the dissolved oxygen concentrations in Pago Pago Harbor. The available data are not adequate to fully calibrate a model and perform a simulation that is predictive on small time and space scales. However, the available data are adequate to do a detailed screening level evaluation of the impacts. Therefore, the evaluation conducted and presented below addresses long term average impacts for major sections of the harbor. This evaluation was conducted in a conservative fashion to determine if there was any basis for concern about BOD impacts in the Harbor. More detailed model verification studies can be done for the subsequent model verification study reports, as described in the Results and Conclusion Section (Section 5) below.

APPROACH

The approach used for the evaluation of BOD impacts, as indicated above, was to do a screening level approach to determine the approximate magnitude of impacts. This approach includes the assessment of extreme worst case scenarios to estimate an upper bound to the potential impacts. The evaluation, and model simulations used, considered only the possible impacts from the JCO.

The model used for the evaluation was the same model, PT121, described above and used for the evaluation of nutrient discharges from JCO. Based on the descriptions in the Wastefield Transport Section (Section 3) above, the model has been verified for application to Pago Pago Harbor and the JCO discharge for conservative substances. For the evaluation of BOD impacts, the model is used to account for the nonconservative decay of BOD as a first order decay process. The model code was modified to account for the reduction in DO concentration as a result of the decay of BOD. In addition, a reaeration routine was added to the model for use in DO calculations. The basic model was described above and in more detail in the original feasibility study (CH2M HILL, 1991a). The primary changes made to the model for the BOD-DO evaluation include:

- An additional model control flag was added to indicate when BOD-DO simulations were to be executed

- The calculation scheme was modified so that, when BOD-DO simulations are executed, the model makes two calculations passes through the spatial grid at each time step: [1] the first pass calculates changes in BOD concentration in each cell as a result of cell volume

change, advection, diffusion, input (via point source and non-point source discharges), and decay; [2] The second pass calculates the changes in DO concentration as a result of cell volume changes, advection, diffusion, input (via point source discharges), input (via reaeration), and decay (via BOD exertion).

- Input of a reaeration coefficient, a point source DO loading (DO of effluent), and a representative DO saturation value were added to the model water quality parameter input file.

- Output of both BOD and DO concentrations is done when the BOD-DO simulation is executed.

The revised mode source code is provided in Appendix VI. The model does not account for DO production or demand from any other sources (discharges, runoff, or biological processes). The evaluation using the model is done only to estimate the impact of JCO discharge of BOD. Therefore, the model is not a predictor of DO concentrations but only a predictor of changes in DO that are attributable to the discharge. Therefore, there is no additional rigorous calibration procedure for the model when run in the BOD-DO mode. Of course, the model has been calibrated, and verified, as adequately representing the transport (advective and diffusive) processed for TN and TP as described earlier. This means that there is a good degree of confidence in the ability of the model to provide, at least, screening level predictions of BOD impacts of the JCO discharge. The results of the model were compared to DO field measurements to determine if the results appear reasonable.

PARAMETER SELECTION

The use of the wastefield transport model for evaluation of BOD impacts requires the selection of values for a number of parameters. These include the loadings to be used, the initial conditions, the open boundary conditions, and the additional input parameters added to the model for BOD-DO simulations as described above. All other model parameters and variables are the same as previously described for the simulation of TN and TP loadings. The values used for each of the parameters required is described below.

BOD Decay Rate

The decay rate of BOD, which is also used as the BOD exertion on DO, can be measured directly or based on typical values. The approach for this study was to use typical values. This will provide a reasonable estimate and the worst case analysis describe below will provide the additional confidence in the screening level estimates of BOD impacts. The available data is in terms of five day BOD (BOD_5).

The ultimate BOD (BOD_U) was calculated as $1.46(BOD_5)$. This is a typical and accepted value for wastewater. The decay of BOD was taken as a first order decay process described by:

$$R_O = k \cdot C_B$$

where:

R_O = the rate of deoxygenation (rate of decrease of BOD and DO),
k = the first order reaction-rate constant,
C_B = the concentration of BOD.

The integrated form of this equation is the familiar express for first order decay

$$C_B = (C_B)_{t=0} \cdot \exp(-kt)$$

where:

$(C_B)_{t=0}$ = the initial concentration of BOD (at time(t) = 0).

The reaction-rate is a function of temperature, typically expressed as:

$$k = k_{20} \cdot (\theta_T)^{T-20}$$

where:

k_{20} = the reaction-rate constant at 20 °C = 0.23/day,
θ_T = the temperature coefficient = 1.047,
T = temperature in °C.

A range of values of k_{20} and θ_T are reported in the literature. For wastewater, typical values are as given as in the definitions above (Tchobanoglous, 1987). Using these values, at a worst case (high) harbor water temperature of 30 °C, yields a BOD reaction-rate constant of 0.364 per day. This is the value used in the model.

The approach described above assumes that the BOD reaction-rate constant is indeed constant. It is known from previous experiments with the effluent (CH2M HILL, 1994b) that there is an immediate dissolved oxygen demand (IDOD) that appears to peak rapidly at about 10 to 14 hours after discharge. This phenomenum is seen in the laboratory (and bioassay procedures must account for it) but it is not known whether it would appear in the natural environment. However, the rapid initial and subsequent dilution of the discharge plume will tend to mask any effect of the IDOD in the receiving waters (CH2M HILL, 1994b). The use of a constant reaction-rate constant is considered appropriate and sufficient for the modeling described below.

Dissolved Oxygen Reaeration

The dissolved oxygen is input to the harbor by photosynthesis and removed by respiration of the organisms in the harbor. As described above, these processes are ignored here since only the impact of BOD from the outfall is being considered. In addition, these process vary diurnally, which is on a time scale not considered by the model. However, DO is also input to the harbor by reaeration (atmospheric exchange), which is considered in the model. The rate of oxygen input is estimated by:

$$R_R = k_R \cdot (C_S - C_O)$$

where:

R_R = the rate of reaeration (oxygenation) (rate of increase of O_2),
k_R = the first order reaeration-rate constant,
C_O = the concentration of DO.
C_S = saturation value of oxygen

An integrated form of this equation is similar in form to that given above for BOD decay. The reaeration rate is a function of temperature expressed as:

$$k_R = k_{R@20} \cdot (\theta_T)^{T-20}$$

where:

$k_{R@20}$ = the reaction-rate at 20 °C,
θ_T = the temperature coefficient = 1.024,
T = temperature in °C.

A range of values of k_{20} and θ_T are reported in the literature (Tchobanoglous, 1987). For wastewater, a typical value for θ_T ia as given as in the definition above. The value of $k_{R@20}$ varies depending on a number of physical factors including wind speed, current speed, and other factors that particularly relate to turbulence and mixing at and near the air water interface. Values for surface waters range from 0.1/day or smaller for small stagnant ponds to greater than 1.15/day for rapids and waterfalls. Typical values for estuaries are often in the range of 0.2 to 0.6 per day. A value of 0.29/day for Pago Pago Harbor is considered conservative and is used in some of the model runs described below (at 30 °C this is equivalent to 0.368/day).

As described above, the reaeration rate is limited by the saturation value of DO, which is in turn a function of temperature and salinity. DO saturation is inversely proportional to both temperature and salinity. A worst case is representative of 35 ppt salinity and 30 °C, since these values represent the approximate upper bound of

both parameters. The value of DO at saturation used, consistent with the worst case, was 6.22 mg/l.

Effluent DO

Dissolved oxygen levels in the effluent discharge were assumed to be zero for the model input. The DO levels are known to be very low, therefore the use of zero is a good approximation.

Initial and Boundary Conditions

Initial conditions include the concentrations of BOD and DO in the harbor at the beginning of the model simulation. Initial conditions set in the model are simply a convenient starting point and the final model results, at steady state, will be the same regardless of the initial conditions. The model results of interest are the concentrations achieved at steady state (for a constant input) and the selection of initial conditions close to the steady state value will reduce the model run time needed. Therefore, based on preliminary model tests and review of the available data, and initial condition of 6.0 mg/l of DO was selected. Since, the model simulations are intended to look only at the effect of cannery discharge, the initial conditions of BOD throughout the harbor were set at 0 mg/l. This is consistent with the boundary conditions described below.

The boundary conditions for DO and BOD concentrations at the open (ocean) boundary are important parameters. As described above, to look at the effect of BOD loadings from the canneries only, a boundary condition of zero BOD at the ocean boundary is appropriate. Otherwise, oxygen demand from other sources is introduced. This boundary condition (BOD = 0) results in predictions of steady state BOD concentration throughout the harbor that are attributable only to the canneries discharge.

The boundary condition for DO at the ocean boundary was set at 6.0 mg/l (just below saturation). The available data for Station 5 (see Figure 3-4) indicate that the DO is generally saturated at the surface and very close to saturation at depth. Although there is only limited data for the deeper portions of the water column at the harbor entrance, the depth is within the normal range of the mixed layer in the open ocean and the DO levels are expected to be at or near saturation.

BOD Loadings

The time frame of the BOD impact evaluation is selected as the same used for the TN and TP model verification (May 1992 through June 1993). This provides a high level of confidence that the model is simulating the physical processes (diffusion and advection) in the harbor accurately. Complete records of BOD loadings from the

canneries for the time frame used in the wastefield transport verification (Section 3) were not available. However, given the range of conditions used for the model simulations described below, only a reasonable estimate is required. The basis for the estimate is given in Appendix III. Table 4-1 summarizes the BOD loadings used as the nominal case for the model simulations.

Table 4-1. Summary of BOD Loadings for Nominal Case Model Simulation

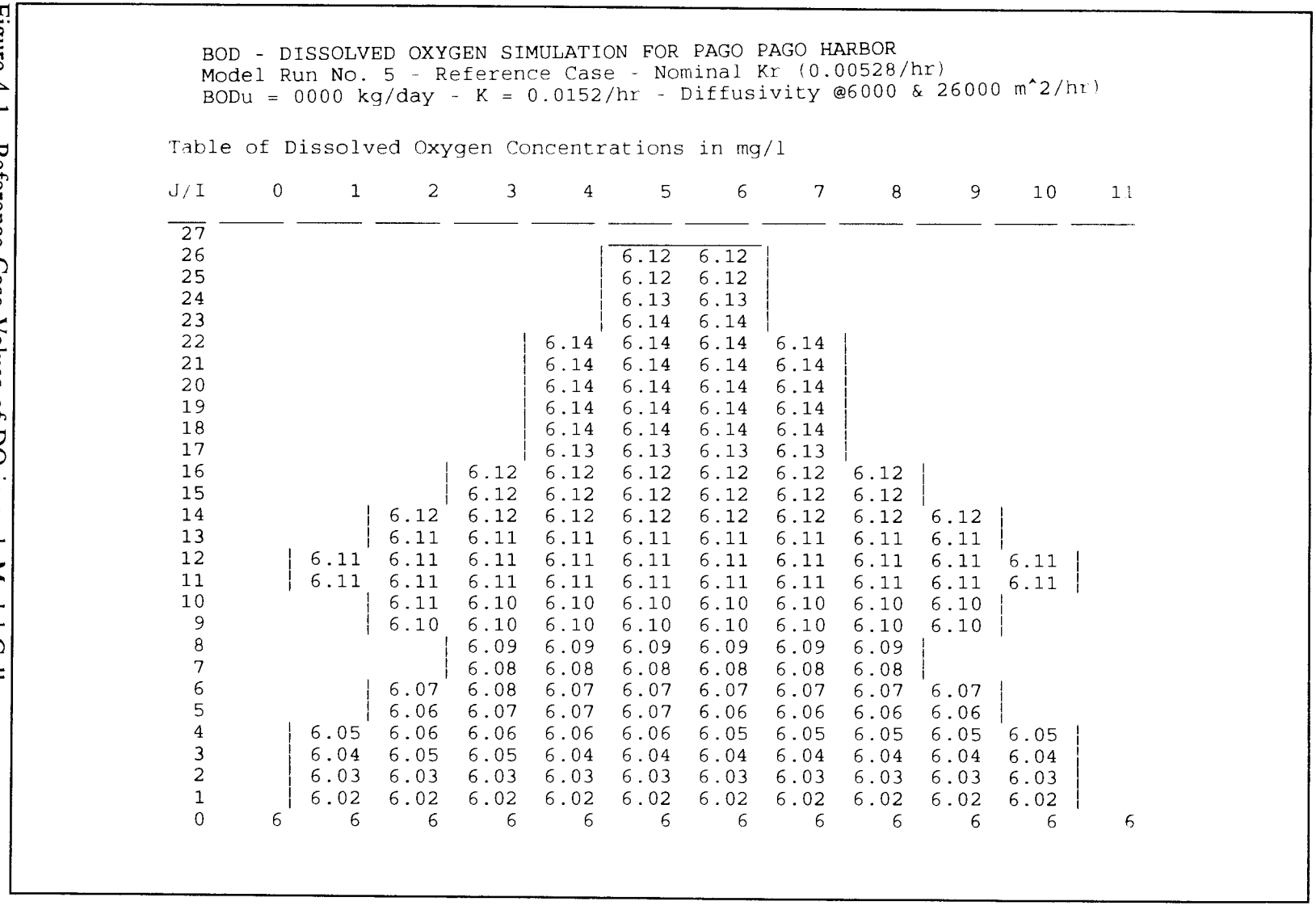
Source	BOD_5 Concentration (mg/l)	Average Flow (mgd)	BOD_u Loading kg/day
Samoa Packing	1,487	0.56	4,600
StarKist Samoa	304	1.24	2083
TOTAL			6684

PREDICTED IMPACTS

The investigation of potential BOD impacts was done in three steps: model simulation of the nominal discharge case as defined above, model simulation of extreme worst case scenarios, and comparison of model simulations to available filed data during the same time period. Each of these steps in the evaluation is described below. In addition, the limitations of the approach used were considered and are discussed below. The results and conclusions based on the evaluation are discussed in more detail in Section 5 below (Results and Conclusions).

Physical and geometric data were identical to that used for the Wastefield Transport verification described in Section 3 and is the same as used for the original Feasibility Study to select the outfall location (CH2M HILL, 1991a). If there were no discharge of BOD the model, as set up and executed, would eventually predict DO levels somewhere between saturation (maximum possible) and the boundary condition (minimum possible). These levels of DO concentration are shown in Figure 4-1, for each cell of the model grid, and provide a reference value with which to compare the results from other simulations.

In all cases the simulation was run to steady state. Preliminary runs indicated that steady state is achieved within 30 to 50 days. Simulations were run for at least this



BOD - DISSOLVED OXYGEN SIMULATION FOR PAGO PAGO HARBOR
Model Run No. 5 - Reference Case - Nominal Kr (0.00528/hr)
BODu = 0000 kg/day - K = 0.0152/hr - Diffusivity @6000 & 26000 m^2/hr)

Table of Dissolved Oxygen Concentrations in mg/l

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						6.12	6.12					
25						6.12	6.12					
24						6.13	6.13					
23						6.14	6.14					
22					6.14	6.14	6.14	6.14				
21					6.14	6.14	6.14	6.14				
20					6.14	6.14	6.14	6.14				
19					6.14	6.14	6.14	6.14				
18					6.14	6.14	6.14	6.14				
17					6.13	6.13	6.13	6.13				
16				6.12	6.12	6.12	6.12	6.12	6.12			
15				6.12	6.12	6.12	6.12	6.12	6.12			
14			6.12	6.12	6.12	6.12	6.12	6.12	6.12	6.12		
13			6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11		
12		6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	
11		6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	
10			6.11	6.10	6.10	6.10	6.10	6.10	6.10	6.10		
9			6.10	6.10	6.10	6.10	6.10	6.10	6.10	6.10		
8				6.09	6.09	6.09	6.09	6.09	6.09			
7				6.08	6.08	6.08	6.08	6.08	6.08			
6			6.07	6.08	6.07	6.07	6.07	6.07	6.07	6.07		
5			6.06	6.07	6.07	6.07	6.06	6.06	6.06	6.06		
4		6.05	6.06	6.06	6.06	6.06	6.05	6.05	6.05	6.05	6.05	
3		6.04	6.05	6.05	6.04	6.04	6.04	6.04	6.04	6.04	6.04	
2		6.03	6.03	6.03	6.03	6.03	6.03	6.03	6.03	6.03	6.03	
1		6.02	6.02	6.02	6.02	6.02	6.02	6.02	6.02	6.02	6.02	
0	6	6	6	6	6	6	6	6	6	6	6	6

Figure 4-1. Reference Case Values of DO in each Model Cell

long. Preliminary runs were made for over 100 days. Tidal variations in BOD varied by 10 to 20 percent in the shallow cells and only 1 to 2 percent in most of the harbor. Tidal variations in DO were found to be quite small (a few percent) and were not considered in presentation of the results below.

The nominal case uses the variables and parameters as described above for reaction-rate constants and saturation values of DO. This is a conservative evaluation since the reaeration reaction-rate coefficient is probably less than the expected natural value in the harbor. The results of the nominal case run indicate that the impact of BOD loadings representative of the cannery wastewater as described above are on the same order as tidal variations throughout the harbor. This level of impact probably cannot be measured with typical field instruments. A more conservative nominal case with a $K_{R@20} = 0.1$ was also run. This case results in a predicted impact (decrease) of about 0.1 mg/l in the inner harbor and less in the outer harbor. The results for these cases are summarized in Table 4.2 and BOD and DO concentrations in each model cell are provided in Appendix VII.

Two extreme worst cases were considered to determine the sensitivity of the system and to place a limit on the magnitudes of impacts that could reasonably be expected. These cases were: [1] a reduction of the reaeration reaction-rate coefficient (k_R) to zero with other parameters held the same as for the nominal case, and [2] an increase of BOD loading to 20,000 kg/day with other parameters held the same as for the nominal case. Both of these worst case scenarios are unrealistically conservative. However, these case provide a basis for examination of the sensitivity of the system to assumptions used in the screen model. The results, in terms of DO and BOD concentrations at each model cell are given in Appendix VII. The results are summarized in Table 4-2.

The case with zero reaeration indicates that the impact of the BOD discharge is on the order of 0.3 to 0.5 mg/l reduction in DO. This sets a limit on the impacts that could be expected from the loading input used. The effects would not be any greater than this. The case with the loadings at about three times the nominal indicates a decrease in DO levels throughout the harbor of about 0.15 mg/l.

The existing field data for DO during the time period of interest is presented in Table 4-3. This data was collected by ASEPA and represents DO values only for the surface layer. However, the data does appear to be in agreement with the model results that indicate little impact of the BOD discharge.

LIMITATIONS

As described in above, the evaluation for BOD impacts was done at a screening level. The model used was the most appropriate for the available data. The results

Table 4-2. Results of BOD Impact Simulations[1]					
Simulation Case	Reaeration Coefficient (k_R/day)	BOD Loading (kg/day)	Dissolved Oxygen Range (mg/l)		
			Inner Harbor	Middle Harbor	Outer Harbor
Reference	0	0	6.12-6.14	6.10-6.12	6.02-6.09
Nominal	0.368	6684	6.13-6.15	6.09-6.12	6.02-6.00
Nominal with Reduced k^R	0.126	6684	6.00-6.03	5.98-5.99	5.99-6.00
Extreme k_R	0	6684	5.65-5.53	5.65-5.73	5.78-5.79
Extreme BOD Loading	0.368	20000	6.01-6.10	5.96-5.99	5.97-6.00
[1] Impact is defined as the difference between the reference case and the simulation of interest.					

indicate that the BOD discharge from the JCO has minimal impacts on DO in the Harbor for the existing outfall location. Impacts were probably of concern prior to high strength waste segregation when the discharge was in the inner harbor. For a realistic scenario, under present discharge conditions, it is likely that the impacts are probably not measurable. There are some limitations on the model that preclude exact quantitative descriptions of the impacts. These limitations include:

- The model is depth averaged. This means that vertical structure of DO cannot be evaluated. Since each cell is completely mixed at each time step, DO depressions at depth may be suppressed in the model but exist in the Harbor. Conversely, DO at the surface may be underestimated by the model for the same reason.

- The model is a farfield model and cannot predict or account for the behavior of DO in the plume. However, the initial dilution is so rapid, and is large enough, that any effect is probably small.

- The model has not been rigorously calibrated for BOD-DO simulations in terms of selection of reaeration and BOD decay coefficients based on field data.

Table 4-3. Observed DO Concentrations[1]

Station[2]	Dissolved Oxygen (mg/l)		
	6 May 1992[3]	6 Oct 1992[4]	22 June 1993[5]
5	7.8	7.5	6.8
6	7.3	7.4	6.7
7	6.9	7.4	6.7
8	6.4	7.4	6.7
8A	6.0	7.0	6.6
9	5.8	6.7	6.6
9A	5.6	7.1	6.9
10	7.4	7.1	6.8
11	5.4	7.4	6.7
11A	5.1	7.0	6.6
12	4.6	7.4	6.8
13	3.4	7.6	6.7
14	6.1	7.4	6.7
15	5.9	6.9	6.8
16	6.3	7.4	6.6
17	5.8	8.0	6.7
18	7.0	7.4	6.6

[1]Data supplied by ASEPA.
[2]Station locations shown on Figure 3-4 and in Appendix VIII.
[3]Saturation values based on reported temperatures and estimated salinities are estimated to be between 6.3 and 6.6 mg/l.
[4]Saturation values based on reported temperatures and estimated salinities are estimated to be between 6.3 and 6.6 mg/l.
[5]Saturation values based on reported temperatures and estimated salinities are estimated to be between 6.4 and 6.7 mg/l.

- The model is a long term average model and does not account for diurnal variations in DO demand or input from biological sources.

The first three of the limitations listed above can not be addressed until additional data are available. Recommendations to address these points are provided in the Results and Conclusions Section (Section 5) below. The fourth point is not important in addressing the impacts of BOD, unless the DO conditions in the Harbor become impaired for reasons other than the cannery discharges, and the impact of cannery BOD loadings acts cumulatively to maintain the DO below ASWQS. This is not current the situation described by the available data.

Section 5

Results and Conclusions

This section of the report provides a brief description of the results of each of the three major modeling exercises described above and presents conclusions drawn from the results. Based on the model verification study, and the available water quality data, the location and design of the outfall and the definition of the ZOM are evaluated. Considering all of the material presented above recommendations for the following model verification studies are presented.

INITIAL AND SUBSEQUENT DILUTION MODELS

The initial dilution model, UDKHDEN, predictions agree well with the dye study observations. Care must be taken in running this model under very weak density gradients combined with bathymetric induced upwelling currents along the reef wall. Weak density gradients are likely during the tradewind season. The second dye study was done under the conditions of weak gradients and, during a portion of the dye injection period, the upwelling was observed. The model does provide accurate initial dilution calculations under these conditions, but the point of initial dilution must be determined from the detailed model output. The initial dilution number printed out by the program can not be used under these conditions.

The subsequent dilution model, CDIFF, appeared to be somewhat conservative. The initial dilution is complete prior to merging of plumes from individual ports. The individual plumes, after initial dilution is completed, do maintain integrity and the less intense subsequent mixing is described by the model.

Based on the analyses presented in Section 2, the major conclusions include:

- The initial dilution model (with the caveat described above) can be used to characterize the initial dilution process and is appropriate for determination of toxicity mixing zones.

- The subsequent dilution model can be used to estimate the concentrations of the plume after initial dilution. The use of an approach based on using concentration predicted by this model, superimposed on the long term average concentrations predicted by the wastefield transport model, to define the boundaries of the mixing zone appears to be justified.

The use of other initial and subsequent dilution models is not precluded (for example PLUMES or CORMIX). However, these models should be compared to and agree with the

results of UDKHDEN simulations for the JCO discharge and the environmental conditions found in Pago Pago Harbor.

WASTEFIELD TRANSPORT MODEL

The wastefield transport model, PT121, was initially set up and calibrated for data based on the cannery discharges in the inner harbor. The model was then used to determine the appropriate location for the new discharge point and to predict ambient concentrations of TN and TP throughout the harbor. Using data based on the discharge at the new location the model predicts the observed concentrations of TN and TP throughout the Harbor very well, and is seen to bee somewhat conservative (predicts higher concentrations than observed). Since it is prudent to maintain some conservatism, it was not considered necessary to adjust diffusion coefficients or any other model parameters to maintain agreement with observations. The primary conclusions from this portion of the verification study include:

- The wastefield transport model, used to determine the location of the new outfall discharge, predicts the transport and concentrations of TN and TP for the new location as expected. A more sophisticated model is not necessary to evaluate the overall performance of the outfall and mixing zone.

- The model is more conservative for outer harbor discharge locations than initially indicated from calibration and verification based on inner harbor discharges. Therefore, the model simulations tend to under predict the admissible loadings for a given mixing zone geometry. Loadings higher than specified in the permit would still result in compliance with the ASWQS.

The wastefield transport model does have limitations in terms of describing fine scale spatial and temporal detail. The model has done a good job of evaluation the requirements for the location and design of the ZOM. However, any refined simulations of transport characteristics in more detail for the Harbor will require a more sophisticated model.

BOD-DO MODEL

The BOD-DO impact analysis was done as a screening level analysis using the verified wastefield transport model. This analysis provides a good indication of the overall impacts of BOD on the DO concentrations in the Harbor. Extreme worst case scenarios were considered to determine if there was any cause for concern. The result indicate that the impact of the loading from the JCO alone has a very small effect on overall harbor DO levels. The available data on BOD loadings and DO structure within the harbor are not sufficient to support detailed analyses of the DO dynamics in the harbor. Therefore, the vertical structure of the DO and the cumulative effects of all DO sources and sinks could not be considered. The major conclusions from this element of the study include:

- The results indicate that BOD loads consistent with expected JCO discharge levels will not have a measurable overall impact on DO in the harbor. Diffusion of BOD out of the harbor to the ocean, diffusion of DO into the harbor from the ocean, and reaeration are sufficient to nearly balance the DO demand from the cannery BOD loadings.

- Available data indicate that model predictions are consistent with the surface layer DO levels in the Harbor. There are no impacts from the outfall BOD loadings reflected in the surface layer.

The application of the wastefield transport model does have limitations, particularly in terms of prediction of nearfield impacts and accounting for vertical structure. Any nearfield impacts are expected to be in the lower part of the water column within the defined mixing zone area. Different models and more complete data for this part of the water column are required to assess the finer scale effects in this area of the Harbor.

EVALUATION OF THE ZONE OF MIXING

The model verification study presented above addresses the suitability of the models used to establish the diffuser design, the outfall location, and the ZOM. The study is essentially a test of the models as initially used in the Feasibility Study and the Mixing Zone Application (CH2M HILL, 1991b and 1991a). Based on the study results presented above, and the water quality data used for the study, the following conclusion about the performance of the outfall and the definition, of the ZOM can be stated:

- ***Toxicity Mixing Zone for Ammonia.*** The field data from the dye studies, and the subsequent model verification analyses, indicate that the diffuser is performing as initially predicted. Therefore, there is a high degree of confidence that the mixing zone for ammonia (based on a dilution of (80:1) is achieving the limited exposure time and spatial extent initially anticipated and predicted.

- ***Mixing Zone for TN and TP.*** The field data from the Receiving Water Quality Monitoring Program and the wastefield water quality transport model analyses indicate that the model predictions on which the ZOM definition was based were accurate.

Compliance with water quality standards throughout the harbor appears to have been generally attained, with some exceptions as noted below. Compliance with water quality standards for those parameters addressed by the original model predictions is currently as follows:

- ***Nutrients (TN and TP).*** TN and TP concentrations throughout the harbor are in compliance with the water quality standards (median not to exceed 200 μg/l and 30 μg/l for TN and TP, respectively) for the time period considered in this study (May 1992 through June 1993). The conclusion of compliance is based on the available data. TN and TP data are presented in Appendix V, and an expanded set of water quality data is provided in Appendix VIII. The data in Appendix VIII indicates the values that are above the numerical criteria.

  Appendix VIII also includes graphical presentations of TN and TP as functions of distance from the Harbor entrance and as a function of time for the various monitoring stations. The only area of concern is at Station 13 where the average (but not the median) values for the time period exceed the numerical criteria. This can not be directly attributed to the cannery discharge, and is probably driven by input from stream flow loadings.

  Appendix VIII also includes the data for February and March 1992. This is the time just after the outfall was relocated and provides an indication of the transition between inner harbor and outer harbor discharges. The data show the drop in TN and TP following relocation.

- ***Chlorophyll-a.*** Chlorophyll-a data for the time period of this study is presented in Appendix VIII. The chlorophyll-a data are not as complete as the TN and TP data but do show general compliance with the water quality standard (median not to exceed 1.0 μg/l) except at the inner harbor stations (11A, 12, and 13).

- ***Dissolved Oxygen and Turbidity.*** As above, the available data for the time period considered (Table 4-3 for DO, ASG data presented in Appendix VIII for turbidity) indicates the only potential area of concern is in the inner harbor. However, the overall dissolved oxygen and turbidity in the harbor appears to be in compliance with the water quality standards. As described above nearfield effects of the JCO discharge were not considered.

- ***Light Penetration.*** Light penetration can be crudely estimated by Secchi depth readings using an approximation $\chi = \kappa/D$, where χ is the extinction coefficient for visible light, κ is a constant, and D is the Secchi depth in meters (using a 30 cm Secchi disk). The constant κ has often been taken as 1.7 based on data from the English Channel (Sverdrup et al., 1942).

  The water quality standard is to achieve light penetration (1 percent of the incident light) at 65 feet 50 percent of the time. Calculations based on the above rough approximation, the water quality standard corresponds to a

Secchi depth of 24 feet (for a 30 cm disk). Examination of the data shows that the standard appears to be met except, possibly, in the inner harbor.

- ***Ammonia and pH.*** There is no data for these constituents during the time period selected for the study. However, verification of the initial dilution model provides confidence that the water quality standards are being met.

- ***Other Constituents.*** Other constituents were not considered in the formulation of the mixing zone. Data from the priority pollutant scans and bioassay tests indicate that acute and chronic mixing zones, if required, of small size and limited exposure time could be supported by the existing diffuser design.

SUMMARY AND RECOMMENDATIONS

The results and conclusions of the model verification study indicate that the model predictions used to design the diffuser, locate the outfall, and define the ZOM were accurate and appropriate. The water quality standards appear to be met throughout the harbor with the possible exception of some portion of the inner harbor. In the inner harbor, for some constituents, and for some periods of time, ASWQS may not be fully complied with. However, the JCO discharge can not be directly responsible for the noncompliance. The contribution of the JCO discharge to the water quality of the inner harbor can not be completely determined with the existing models and the available data.

To address the questions raised during the study CH2M HILL, recommends that the Model Verification Study be modified to include two further model studies (rather than the three future tasks indicated in the NPDES permits for the current permit period ending October 1997). This is recommended for a variety of reasons including:

- There is no further need to verify the initial and subsequent dilution models since no additional dye studies will be done under the present permit.

- There is only limited need to further verify the wastefield transport model (PT121) since it has been calibrated, verified with inner harbor discharge data during the Feasibility Study (CH2M HILL, 1991b), and verified with the outer harbor discharge data as described above. One addition verification with outer harbor data may be useful but any further study would be redundant and not add any useful information.

- The use of the wastefield transport model to further investigate BOD impacts is probably not warranted. Since the model was used to investigate extreme worst case conditions, substantial additional information can not be gained by additional model runs.

- The nearfield BOD impacts have not been addressed because of lack of data. It would be useful to address this question to a limited extent using the March 1995 water quality data collected by CH2M HILL (CH2M HILL, 1995) and any other information or data that may be collected.

- The ASWQS are being complied with except in the inner harbor. The question of cause and contribution from the JCO for observations in the inner harbor will arise. To answer these questions a model that can address variations in depth and nutrient algal dynamics will be required. CH2M HILL recommends that, using additional water quality data, a refined model setup for the Harbor using the WASP5 model be produced and calibrated. Some data is available from the March 1995 water quality data referenced above, and additional data may become available if USEPA and ASEPA approve the recommendations made in an earlier report (CH2M HILL, 1995) concerning the Receiving Water Quality Monitoring Program.

Based on the observations and rationale listed above CH2M HILL recommends the two additional modelling reports be structured as follows:

- Report No. 2 would present: [1] an analysis of nearfield DO impacts using a conservative approach and including the effects of NBOD as well as CBOD, and, [2] an additional verification exercise of the PT121 wastefield transport model using data recorded subsequent to the data used this report (No. 1). The report would be submitted by 31 December 1995, and would incorporate the March 1995 water quality data collected by CH2M HILL.

- Report No. 3 would present an analyses based on a WASP5 model configuration of the harbor. This will permit the incorporation of vertical structure in the nutrient transport, and allow the inclusion of chlorophyll-a predictions. The objective will be to determine the relative importance of various sources of nutrients following the relocation of the discharge and high strength waste segregation. The report would be submitted by 31 December 1996, and would incorporate any additional water quality data and the results of the Eutrophication Study.

These recommendations are consistent with recommendations made for changes in the Receiving Water Quality Monitoring Program to include more detail, including profiles and more sampling depths, at less frequent intervals. The recommendations above will also be consistent with the recommendations that will be made in the Eutrophication Study (Part H of the NPDES Permits). Lack of sufficient data led to the use of a modified PT121 application for the Eutrophication Study rather than WASP4. Although, the use of PT121 was an option in the study plan, it is recommended that a WASP5 model be done for the Harbor to replace the use of PT121 in the future. The Eutrophication Study report is in preparation at this time.

Section 6

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ADDENDUM

TO

JOINT CANNERY OUTFALL MODEL PREDICTION VERIFICATION STUDY Report No. 1

Response to USEPA Comments on the Study Plan

with

USEPA Approval of and Comments on the Study Plan

and

The Study Plan

MEMORANDUM CH2M HILL

TO: File

COPIES: Joint Cannery Outfall Model Prediction Verification Study: Report No. 1 Addendum

FROM: Steve Costa/CH2M HILL

DATE: 22 December 1994

SUBJECT: Response to Comments on Model Prediction Verification Study Plan

PROJECT: OPE30702.MD

The purpose of this memorandum is to present our responses to comments by Walter Frick on the model prediction verification study plan. Dr. Frick's comments were presented in USEPA's letter approving the study plan dated 1 November 1993. Although USEPA found the study plan satisfactory, responses to Dr. Frick's comments were requested, in particular his comment regarding the UM model versus the UDKHDEN model. This memorandum, with USEPA's letter and the study plan attached, is being included in the addendum to the first report on the Model Prediction Verification Study to complete the record for the study plan.

Comment 1: Use of UM instead of UDKHDEN. We agree that the UM model could have had advantages for the initial feasibility study and subsequent mixing zone determination. If that model had been available at the time these studies were done we would have included it in our model selection evaluation, and may well have chosen it for application. We understand and agree that UM does have advantages of more easily extending results beyond the trapping level and more easily including the background concentrations in the necessary evaluations. However, as described in the feasibility studies and mixing zone applications we did, of course, extend the predictions beyond the trapping level and did account for background concentrations with the models employed.

We used a set of models (UDKHDEN, CDIFF, and PT121) and superimposed these models to achieve the required predictions (UM would replace UDKHDEN and CDIFF). The set of models we used provide the same degree of realism as would have been achieved by UM. The use of CDIFF is essentially the same approach as used in UM to extend the results beyond the trapping level. The inclusion of background concentrations was done using "desk top" calculations when superimposing the results of the various models.

Since the permit condition J explicitly states that the study is to "*...verify the models used in the determination of the mixing zones...*", it is our understanding that the models initially used are the ones to be verified in the study. This precludes the substitution of a different model (UM) for the model verification study. We recognize that the application of UM in

the future may be desirable but will not fulfill the requirements of the permit as stated. Therefore, we have not used the UM model in the model verification study.

Comment No. 2: Field data quality. We agree that attention to the quality of field data is quite important and recognize the sensitivity of the initial dilution models to small variations in some environmental parameters. We believe our QA/QC approach to the field data is adequate and reasonable for the recovery of good data in Pago Pago Harbor. We note the concern with density data (temperature and salinity profiles) and note that we were not satisfied with the data for the first dye study as described in the report. We took additional steps to improve these data for the second dye study, including upgrading our instrument. Fortunately, the data for the first study were not compromised in that portion of the water column where the plume initial dilution was observed, and the poor data in the upper portion of the water column data did not compromise the model verification study (more description is found in the model verification study report).

Comment No. 3: Sensitivity Analyses. In general, sensitivity analyses were conducted on the models during the feasibility and mixing zone definition studies. It is our intention to do additional sensitivity analyses only if needed to assist in interpreting or providing confidence in the verification study. For example, additional runs of the initial dilution model for variations in effluent temperature and density are appropriate. In the case of effluent temperature, the actual effluent temperature at the discharge port cannot be easily measured and it is appropriate to examine the sensitivity of the results over the probable range of temperatures. Effluent density will vary with salinity as well as to temperature, and it is appropriate to examine the sensitivity of the results over a range of salinities to provide higher confidence in the study results. Sensitivity to other factors may also be appropriate for similar reasons (for example, plume width during subsequent dilution).

We do not intend to use the sensitivity analyses to "tune" the models to agree with field measurements. The objective is to see if the original predictions of the models, as initially used, agree with field measurements. In the case of the wastefield transport model (PT121), the original calibration was based on inner harbor discharge point data. The model predictions will be evaluated using data consistent with the new outer harbor discharge point. If the original model, as calibrated, does not agree well with the new monitoring data for total nitrogen and total phosphorus, the diffusion coefficients may be adjusted so that the model can be better used for future predictions. This is the only "tuning" anticipated for previously used models. (Note: the application of a model for BOD/DO predictions is a new effort and may require the definition of additional coefficients based on available data.)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

November 1, 1993

Steven L. Costa
Project Manager
CH2M Hill
P.O. Box 12681
Oakland, CA 94604-2681

Re: Review of the Draft Joint Cannery Outfall Model Prediction Verification Study Plan

Dear Steve:

We reviewed the draft cannery outfall model prediction study plan as required by the canneries' NPDES permits and find it satisfactory. The modeling program outlined in the plan appears to address important modeling concerns: data collection, reduction and analysis; modeling; validation; calibration; and verification. Walter Frick, an expert in hydrographic modeling at EPA's Environmental Research Laboratory in Newport Oregon, also reviewed the plan, and had the following comments:

- While he thought the UDHKDEN model will give sufficiently conservative estimates of initial dilution, with the imminent publication of "Dilution Models for Effluent Discharges" (Second Edition, EPA/600/R-93/139, July 1993), he recommended the use of UM over UDKHDEN. He felt that the results would be somewhat more realistic beyond the trapping level and, as an extra benefit, it makes provisions for including background concentrations.

- Regarding the quality assurance section, he found it largely satisfactory, but cautioned that some attention should be paid to the quality of the field data, particularly salinity and temperature stratification data. He also felt that sensitivity analyses, as described, were important but that tuning should be kept to a minimum.

We would appreciate your response to Dr. Frick's comment regarding the use of the UM model. Should you have any questions regarding the UM model, you can contact Dr. Frick at (503) 867-4029.

Sincerely,

for Norman L. Lovelace, Chief
Office of Pacific Island and Native
American Programs (E-4)

cc: Jim Cox, Van Camp Seafood Company
Norman Wei, StarKist Seafood Company
Tony Tausaga, American Samoa EPA
Sheila Wiegman, American Samoa EPA

AGENCY REVIEW DRAFT

JOINT CANNERY OUTFALL MODEL PREDICTION VERIFICATION STUDY PLAN

for

StarKist Samoa, Inc.
and
VCS Samoa Packing Company

to comply with NPDES Permits

AS0000019
and
AS0000027

August 1993

prepared by

CH2M HILL

JOINT CANNERY OUTFALL MODEL PREDICTION VERIFICATION STUDY PLAN

INTRODUCTION

This study plan describes the rationale and approach of the model prediction verification study for the Joint Cannery Outfall (JCO) in Pago Pago Harbor, American Samoa. The purpose, background, and general approach to the study are presented first. Then the following section provides a detailed explanation of the approaches proposed for the various individual study tasks. Discussions of Quality Control/Quality Assurance and reporting format are then presented, followed by a list of pertinent references. A technical description of the wastefield transport model, a key element of the study, is attached to the study plan.

PURPOSE

The study addresses the verification of models used to determine the permitted zone of mixing (ZOM) for the JCO. The purpose of this study plan is to describe the proposed approaches for: [1] using field data to verify the previous analyses of the fate and transport of cannery effluent, and [2] developing an evaluation effects of the discharge on dissolved oxygen (DO) concentrations throughout Pago Pago harbor.

BACKGROUND

The JCO is a new outfall operated by StarKist Samoa, Inc. and VCS Samoa Packing Company. The outfall discharges treated wastewater from the canneries into outer Pago Pago Harbor. The JCO replaces two separate outfalls that previously discharged effluent into the inner harbor near the canneries. The canneries began discharging through the JCO in February of 1992. In addition, prior to initiating discharge through the new outfall, the canneries implemented high strength waste segregation in August 1991. The high strength waste is disposed of in a permitted ocean disposal site and does not influence the harbor.

The effects of high strength waste segregation and outfall discharge relocation on the water quality of the harbor were modeled by CH2M HILL (1991a). The size and location of the ZOM was based on environmental and engineering studies which included model predictions of the initial and subsequent dilution and the farfield transport processes (CH2M HILL, 1991a). Newly issued NPDES permits are based on the approved zone of mixing.

The NPDES permits require implementation of a receiving water quality monitoring program to determine compliance with water quality standards. The monitoring program includes analysis of water samples from 17 specified stations throughout the harbor. The objective of the monitoring program is to document water quality near the outfall discharge, near the zone of initial dilution (ZID), within the ZOM and at the ZOM boundaries, and at other locations throughout the harbor. Data collection for the monitoring program is conducted monthly by the American Samoa EPA. Monitoring reports documenting the water quality data are submitted to USEPA on a quarterly basis.

Two dye studies are also required as conditions of the permits to observe the fate and transport of the effluent plume. The first (non-tradewind season) of these dye studies was conducted on February 17, 1993. The second (tradewind season) is scheduled to be performed in September/October 1993.

The data collected from the water quality monitoring program and from the dye studies allow direct observation of the fate and transport of the discharged effluent. The NPDES permit requirements dictate that these data be used to verify the model predictions used in the earlier engineering studies for determining the ZOM and to evaluate the effects of BOD in the effluent on DO in the receiving water. This requirement is described in Part J of NPDES permit Numbers AS0000027 and AS0000019 as follows:

> *"Within three months after both dye studies have been completed, the permittee, cooperatively with {Star-Kist Samoa, Inc.; Samoa Packing Co.}, shall submit a study plan to USEPA and ASEPA that will discuss how the permittees will utilize the results from the monitoring data and from the dye studies to verify the models used in the determination of the mixing zones (the 30-second dilution zone, the ZID, and the ZOM). Also, the plan shall discuss how the permittee will examine the effects of BOD_5 in the effluent on Dissolved Oxygen (DO) in the receiving water, utilizing an appropriate model and one year's worth of ambient data. Upon*

> *approval of the study plan by USEPA and ASEPA, the permittee shall initiate the studies indicated and submit reports on a yearly basis. Reports shall summarize renewed predictions of dilution rates and the size, location, and movement of the plume based on the calibrated models*".

This study plan is being submitted to the U.S. Environmental Protection Agency (USEPA) and American Samoa Environmental Protection Agency (ASEPA) to comply with the permit conditions.

APPROACH

The study is divided into two primary tasks:

- **Model Verification.** The modeling procedures used to establish the ZOM will be evaluated based on data collected during the dye studies and the water quality monitoring program.
- **BOD Impacts.** The effects of BOD (measured BOD_5) in the effluent on DO in the receiving waters will be evaluated.

The general approach to each of the major tasks is described below. A more detailed description of the methods to be used is described in the following section on Study Methods.

Model Verification

The basic approach used in the previous engineering study to determine the required mixing zone dimensions was to: estimate the large-scale, long-term average ambient receiving water concentrations using a wastefield transport model, evaluate initial and subsequent (or secondary) dilution for a range of conditions, and, based on model predictions, determine the appropriate location for the discharge and the required size of the ZOM to comply with American Samoa Water Quality Standards (ASWQS). This approach will be evaluated by running the models for the conditions present during the dye studies and water quality monitoring, as appropriate, and comparing the model results with the observed field data. The three separate subtasks identified above include:

- **Wastefield Transport Model.** Observed long-term average receiving water concentrations, on a harbor wide scale, for total nitrogen (TN) and total phosphorus (TP) will be based on concentrations observed at each of the water quality monitoring sampling stations. Average loadings of TN and TP to the harbor from the discharge will be calculated for the same period of time. The wastefield transport model will be run using these average loadings and evaluated by comparing the model results to the observed water quality data.

- **Initial and Subsequent Dilution Models.** The initial and subsequent dilution modeling procedures used to establish the mixing zone boundaries will be evaluated based on the dye study results. Model input will include measured currents, temperature and salinity profiles, and effluent flows present during each dye study. The model results will be compared to the dilutions observed during the dye studies and to previous predictions. The formulation of the effluent limits for ammonia were based on predicted diffuser performance in terms of initial dilution rate and magnitude. The predictions used for this purpose will be specifically evaluated as a part of this subtask.

- **Zone of Mixing Location and Size.** The ZOM location and dimensions will be re-evaluated if significant discrepancies between predicted and observed TN and TP values occur. Discrepancies will be addressed by recalibration of each model to match the observed data and running the re-calibrated models for a range of conditions representative of the worst case conditions expected in the harbor.

BOD Impacts

BOD impacts on receiving water DO will be evaluated using the same wastefield transport model, or an equivalent model, used to calculate ambient TN and TP concentrations. The impacts will be addressed using the verified (and possibly recalibrated) model discussed above to calculate the potential impacts of cannery effluent on DO levels throughout the harbor. A BOD/DO routine in the model will be used to simulate effects of various BOD loadings from the canneries discharge.

SCHEDULE

Sufficient information was collected from the first dye study to allow the formulation of this study plan. Therefore, the study plan is being submitted prior to the second dye study to facilitate coordination with the eutrophication study, also required as a NPDES permit condition. Coordination of the two studies will benefit both, but particularly assist in doing the eutrophication study. The proposed schedule is to have the report for initial model study finished and delivered to USEPA and ASEPA by May 31, 1994. The first report for the modeling study will include recommendations for subsequent annual reports as required in the permit condition. This schedule is based on the assumptions that the second dye study is carried out near the end of September or beginning of October 1993, and the water quality monitoring data are available by the end of 1993.

STUDY METHODS

This section provides a more detailed description of the approach summarized above. The major features of the methods used will also be discussed. The approach is designed to maintain consistency with the previous studies done to determine the appropriate outfall location and the size of the ZOM. The same models will be used, but the input conditions may be changed to reflect the data collected during the dye studies and the water quality monitoring program. Additional technical details concerning the models and previous model results can be found in the "*Engineering and Environmental Feasibility Evaluation of Waste Disposal Alternatives*" (CH2M HILL, 1991a), the "*Site Specific Zone of Mixing Determination for the Joint Cannery Outfall Project: Pago Pago Harbor American Samoa*" (CH2M HILL, 1991c), and the "*Environmental Impact Assessment for Joint Cannery Outfall Project, Pago Pago Harbor, American Samoa*" (CH2M HILL, 1991d and e).

MODEL VERIFICATION

Numerical model predictions used as the basis for defining the ZOM for the JCO addressed both the long-term effects of the discharge on the TN and TP levels throughout the harbor and the dilution and dispersion associated with initial and subsequent mixing processes in the vicinity of the diffuser. The long-term processes determine the average levels of the effluent constituents in the ambient receiving water of the harbor. These levels must be known to calculate

constituent concentrations resulting from the initial and subsequent dilution processes. The ambient water is the diluting water for the initial dilution process and for an enclosed bay, such as Pago Pago harbor, the ambient concentrations are affected by the effluent discharge levels.

Verification of the previous model predictions will involve verifying predictions of long-term ambient constituent levels compared with levels measured during the water quality monitoring program, verifying initial and subsequent dilution predictions based on dye study results, and re-evaluation of constituent concentrations, if necessary, based on recalibrated models. Brief descriptions of the models used are included in the discussions below and more detailed technical information is referenced. Application of the various models to verify previous predictions and comply with the NPDES permit conditions are described below.

Wastefield Transport Model: Ambient Concentrations

Previous predictions of ambient conditions in Pago Pago Harbor because of the operation of the JCO used a wastefield transport model (PT121). This model is described in more detail in Attachment A and in CH2M HILL, 1991a. The model, developed by CH2M HILL, was based on a model originally developed by HRI (1989) for a wasteload allocation study of Pago Pago Harbor. The results were presented as a series of contour plots of TN and TP concentrations for a range of discharge loadings and alternative outfall sitings.

Water quality, effluent chemistry, flow data and additional oceanographic data collected since the outfall became operational will be used as input to the wastefield transport model. Long-term average TN and TP loadings from the cannery discharges will be calculated based on effluent monitoring data collected by the canneries for a period of at least one year. Loadings from other point sources (e.g. the Utulei Sewage Treatment Plant), nonpoint sources, and open ocean background (a boundary condition) will be estimated from available data. PT121, using the same geometry as used in the previous study (CH2M HILL, 1991a), and as calibrated for the previous study, will be run using the long-term average loadings.

Results will be presented in the form of contour plots of TN and TP throughout the harbor. These predicted concentrations will be compared to long-term average TN and TP levels measured at water quality monitoring stations over the same period of time. For comparison with predicted data, maximum,

minimum and long-term average ambient concentrations will be determined for each of the station locations from quarterly water quality monitoring reports.

The previous model was calibrated for a data set based on discharges in the inner harbor. Some differences between model predictions and measured concentrations of TN and TP are expected. We anticipate the previous model results to be conservative (i.e. overpredict concentrations throughout the harbor). If necessary, the model will be recalibrated for the new location based on the available data. The predictions of the wastefield transport model, recalibrated if necessary, will be used for the re-evaluation of mixing zone location and size and for the BOD/DO evaluation described below.

Initial and Subsequent Dilution Models

Initial and subsequent dilution characteristics of the outfall were previously analyzed using the USEPA models UDKHDEN (Muellenhoff et al., 1985) for initial dilution and CDIFF (Yearsley, 1987) for subsequent dilution processes. The models were used to evaluate the diffuser performance and plume behavior for a range of effluent flow conditions for typical ambient receiving water conditions. The mixing zone characteristics were based on the worst case conditions.

UDKHDEN is a fully three-dimensional model that considers variable profiles throughout the zone of flow establishment and uses a fourth-order integration routine along the centerline of the effluent plume to trace plume position and dilution over time during the rapid initial dilution processes. The model predicts dilution (in terms of mixing with ambient water) and the trapping level of the effluent plume.

CDIFF is a passive diffusion plume model that can be applied following the momentum and buoyancy driven initial dilution process. Diffusion is calculated in the lateral direction only as the plume is advected in the longitudinal direction by ambient currents. The model allows specification of one of three functional forms for the coefficient of lateral eddy diffusivity (as a function of characteristic plume dimension). The model assumes the plume is trapped with a constant vertical extent or fully mixed over the depth of the water column. A constant current is assumed and the model accounts for a solid shoreline boundary parallel to the direction of the current.

The initial and subsequent dilution models will be run based on the as-built diffuser configuration and environmental and flow conditions measured during the dye studies. Input for the initial dilution model, UDKHDEN, will include: diffuser configuration (port size, port depth, and number and spacing of ports), temperature and salinity profiles, current profiles, and effluent flow and density. Temperature and salinity profiles were taken during the dye studies. The profiles taken nearest the diffuser will be used as representative of the conditions during initial dilution. A range of ambient currents will be selected based on the currents measured over the course of the studies. Initial and subsequent dilution model procedures used in the previous study will be repeated for the conditions observed during the dye studies.

Results of the dilution models will be presented as plots or tables of centerline and flux average dilution versus distance from the diffuser. The centerline dilutions observed during the dye studies will be compared to the predicted values. The dilution models are not easily calibrated without changes to the model code. However, a correction factor can be developed that relates model prediction to observation. This is functionally a calibration curve, and serves the same purpose as model calibration for a particular set of conditions. If required, correction or "calibration" factors will be developed and applied to model results. Corrected results will be applied to the re-evaluation of the mixing zone characteristics and the BOD/DO evaluation as described below. In addition, the results will be used to evaluate the effluent limits for ammonia (which are based on a ZID that depends on diffuser initial dilution performance), the predicted trapping level, and the size of the physical ZID.

Evaluation of Mixing Zone

If the difference between the model predictions and field observations for all three model predictions (wastefield transport, initial dilution, and subsequent dilution) is small the dilution models will not be recalibrated and re-evaluation of ZOM size and location will not be required. If it is determined that the model predictions are conservative (i.e. underpredict dilutions or overpredict the TN and TP levels) a qualitative description of the differences will be presented and the models will be recalibrated (or calibration factors developed) for use in the BOD/DO evaluation described below. If there is a significant discrepancy between the model predictions and field observations such that the models overpredict dilutions and underpredict TN and TP concentrations, the models will be recalibrated to minimize the differences between predicted and

observed results and the size and location of the mixing zone will be re-evaluated.

Calibration of the wastefield transport model, if necessary, will be accomplished by varying the value of the diffusivity coefficient (K), varying the decay term for the constituent of concern, or a combination of both. The diffusion and decay coefficients can be varied along the longitudinal axis of the harbor. The previous analysis assumed a zero decay and the calibration of the model was based solely on varying K. The model configuration used different values of K for the inner and outer harbor. The dilution models will be calibrated, if necessary, primarily by varying the coefficient of lateral diffusivity in CDIFF and developing calibration factors for UDKHDEN and CDIFF as described above.

BOD/DO EVALUATION

The effects of BOD loadings in the cannery effluent on DO throughout the harbor will be evaluated using PT121, recalibrated if necessary, as described above, or using EPA's water quality model WASP4 (Ambrose et al., 1988). PT121 has been modified to include a routine developed to simulate BOD and DO interactions. The model is formulated for depth averaged applications and is useful for looking at long-term or slowly varying effects averaged through the water column. However, the available information on water column constituents in general (HRI, 1989; CH2M HILL, 1991a) and on dissolved oxygen in particular (CH2M HILL, 1991b) indicates that the water column can best be described as a two or three layer system. This effect is relatively small for TN and TP but may be significant for DO. Therefore, PT121 may be modified, or run in appropriate configurations, to simulate a multilayer system or WASP4 will be used for this evaluation. The decision on which model to use will be based on a review of available data and the extent of modifications required for PT121.

The model will be run for two kinds of simulations: an average long-term simulation such as that done for TN and TP as discussed above and for a representative time history of BOD inputs from the cannery discharges representing a worst case scenario. BOD_5 loadings based on available effluent chemistry data and observed DO levels from available water quality monitoring data will be used to calibrate the model. The horizontal and vertical diffusivities, decay of BOD and utilization of DO, consumption of DO other than by BOD, and re-aeration coefficients will be adjusted to achieve

calibration. Other point and nonpoint sources of BOD will be identified if possible, however this "background" will be generally included as an additional calibration coefficient representing some elevation above open ocean background (included as a boundary condition). The calibrated model will be verified using a separate data set.

The wastefield transport model (PT121 or WASP4) can not be used to evaluate DO impacts within or in the immediate vicinity of the effluent plume. Therefore, results from the initial and subsequent dilution models will be applied to evaluate the nearfield effects within the effluent plume. This procedure will use the results of the wastefield transport model to provide ambient receiving water values as in the case of TN and TP described above. Measurements of immediate dissolved oxygen demand (IDOD) of the combined effluent from both canneries will be made in the field during the second dye study. The measured value of IDOD will be used for evaluation of the effects of BOD in the plume as it mixes with receiving water.

QUALITY ASSURANCE AND QUALITY CONTROL

Quality assurance and quality control will be achieved through use of the accepted and proven models executed by staff familiar with those models. Specific QA/QC measures include: validation, calibration and verification of models with field data, addressing a range of potential conditions where appropriate, sensitivity analyses, and documentation and maintenance of input and output files generated during modeling activities. A significant portion of the modeling effort is directed at keeping a high level of confidence in the predictions of the models. The purpose and scope of this effort and a description of the techniques that will be used are described below. There is often confusion and misunderstanding about the technical terminology used in this process. To avoid confusion the functions described as validation, calibration, and verification are defined below.

The purpose of the QA/QC effort is to provide a high level of confidence that the models are providing physically realistic predictions. There are two efforts required: first, it is important that the model configuration developed for the harbor be calibrated and verified (tested against site specific data) and, second, it is just as important that the basic model code be based on sound physical assumptions (the underlying science and mathematical formulation are accurate reflections of reality).

Validation. The models employed in the study are mathematical representations of physical processes. The mathematical equations used are solved numerically (approximate solutions) using a digital computer. It is important that this process, which is considerably removed from the actual physical processes and behavior of the harbor, accurately simulate what happens in the harbor. The process of validation uses representative parameters for simplified system configurations to determine if the predictions reflect reality. The process of validation begins as the initial model computer code is written and continues as long as the model code is used. It is particularly important that any changes in model code be checked for validity. The final element of validation is a determination of how sensitive a model is to changes in input parameters. An extremely sensitive model probably does not provide results with a high confidence level. Sensitivity checks will be carried out for each of the models for potentially critical parameters.

Calibration. Most numerical models of the type used here contain coefficients (e.g. friction factors, diffusion coefficients) that are often study site specific. Although there are generally accepted values for these coefficients, the range observed in nature is high and the models can be somewhat sensitive to the values selected. The process of calibration uses measured values of forcing functions and responses to determine the appropriate coefficients for the model configuration at the study site. Typically a set of field data, say water level, will be measured and the appropriate coefficient, in this case friction factor, will be varied until the model results match the observed results for the observed forcing function and model geometry.

In the case of the initial dilution model and, to a lesser extent, the subsequent dilution model, it may be inappropriate to modify the original model code. These models are intended for general use by EPA and consistency is an important consideration. In this case it is more appropriate to develop a correction factor or calibration curve to be applied to the results of the model. This process is similar to the development of calibration curves routinely developed for instrument read-outs or data measurements.

Verification. It is possible to "force" a model to reproduce observed results by means of calibration. Successful calibration does not necessarily mean that the model is operating correctly under other conditions. Verification is a check that utilizes an observed data set independent from the one used for calibration. Typically the calibrated model is run under different environmental conditions,

say loadings of TN from the discharges, and the response of the model, in this case TN concentrations at selected points in the harbor, is compared to observed concentrations at those points. Verification, combined with validation and sensitivity determination, provides a high level of confidence that the model is simulating the system under a range of conditions.

Model Code Modifications. Model code modifications may be required for a variety of reasons. No modifications are planned for the primary algorithms except for possible revisions to PT121 as described above. Some minor changes in program structure to increase ease of use will probably be done. All model code changes will be documented and tested.

DATA ANALYSIS AND PRESENTATION

A report documenting the results of all analyses will be presented to EPA and ASEPA. The report will include summaries of all input data, modeling procedures, model calibration and verification, and model results. All pertinent model results and output files (as appropriate) will be reproduced as an appendix to the report. Model results will be presented both in tabular form and graphically (i.e. contour plots) as appropriate. The report will include: an executive summary; an introduction describing the background, rationale, and general approach of the study; a description of the methods used including model formulation and input data; a description of the model results; an evaluation of the model validity for predicting dilution and plume characteristics; an evaluation of the ZOM characteristics; and an evaluation of BOD impacts.

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ATTACHMENT A

PT121 Model Description

PT121 is based on the HARBOR model used for the Wasteload Allocation Study (HRI, 1989). The wasteload allocation study should be referenced for more information on the basic physical principles and model approach.

PT121 is a quasi-two-dimensional (Q2D) completely stirred tank reactor (CSTR) model. The term Q2D refers to the following model attributes:

- It is a two-dimension horizonal approach that is depth-averaged. There is no variation of any variable with depth. However, the depth does vary throughout the harbor model. It is not a constant-depth model.

- The model is set up in a grid that is laterally symmetric about the longitudinal axis of the model. The longitudinal axis is transformed into a straight line.

- The model grid is set up in two levels. Square cells of constant dimension are used for the calculation of concentrations and transport in both horizontal directions. Rectangular "line cells" are composed of integral numbers of cells in a line perpendicular to the harbor axis. These line cells form the basis for calculating total flow rates in the longitudinal direction and the input of nonpoint source flows and pollutant loading.

- Lateral advective flows are symmetrical about the longitudinal axis, and there is no advection across the longitudinal axis. These flows are calculated on the basis of mass conservation. Longitudinal advective flows are equally divided between individual cells in a line cell, with the provision of no flow through a solid boundary.

- Flow rates are on the basis of changes in volume due to tidal elevation changes. The water surface is considered to change instantaneously throughout the system. Tides are input in tabular form. Thus, longitudinal flows are calculated on the basis of conservation of mass.

- Point source flows and loadings are added to individual cells. Nonpoint source flows and loadings are added to line cells and are equally distributed to cells within the line cell.

- Diffusion coefficients and decay rates can vary along the longitudinal axis of the system but are constant within a line cell. Diffusion is the same in both horizontal directions.

- Diffusive transport is calculated as a Fickian process based on eddy diffusivity. This transport is calculated on a cell-by-cell basis with no transport allowed through a solid boundary.

The term CSTR refers to the following model approach to calculating concentration:

- The total mass of a constituent is calculated from the concentration and cell volume for each cell.

- On the basis of tidal data, the volume of the cell is changed.

- Advective transport is allowed to carry mass to and from adjoining cells on the basis of the concentration, flow rate, length of the time step, and area between the cells. The area is based on the average depth of the two cells and cell width.

- Diffusive transport carries mass between cells on the basis of concentration gradient, area between adjoining cells, and the length of the time step.

- Point source loadings are introduced into appropriate cells. Point source flows are also introduced into individual cells. The mass of constituent and volume of water are based on loadings, flows, and length of the time step.

- Nonpoint source inputs are calculated the same way as point source inputs, but each cell in a line cell has equal inputs.

- The original mass in each cell is allowed to decay on the basis of the specified first order decay constant and the length of the time step.

- Each of the inputs and outputs of mass into each cell is added to the initial mass less the amount of decay, and a new concentration is calculated.

PT121 is run by supplying the required instructions and parameters by means of input files read by the program as it executes. The model is written and compiled in TurboBasic on an IBM-compatible computer operating under

MSDOS. The input is in four separate files. The job control file provides input for:

- Input/output file names
- Size of model grid (number of cells)
- Time step length
- Horizontal cell dimension
- Where to start reading from tide data file
- Number of days to do calculations
- Number of point sources considered
- Amount of tidal data to be read
- Input/output control parameters
- Cells where point source loadings are found
- Point source loadings and flows

The hydrodynamics file provides input for cross-sectional area, width, and nonpoint source flows as a function of distance along the harbor (for each line cell).

The tidal data file provides input for tidal elevation as a function of time in tabular format. The water quality/geometry data file provides input for the following parameters and variables:

- Initial concentration as a function of distance along the harbor, and boundary concentration at the open end of the harbor.

- Eddy diffusion coefficient as a function of distance along the harbor.

- Decay rate coefficient as a function of distance along the harbor.

- Nonpoint source loading as a function of distance along the harbor.

- Definition of the cells constituting the side boundaries of the system.

- Depth of each cell at the appropriate tidal elevation.

- Definition of the boundary condition for each of the boundary cells of the system.

The model results are provided in three optional output files as specified in the job control input file. These files are described below, and example output to a printer is shown. The files consist of a "mirror file" that primarily presents

the input, a hydrodynamics file that provides results of the flow calculations, and a water quality output file that provides the results of the transport calculations.

The mirror file provides a listing and tabulations of the input values read and initially manipulated by the program. The primary function of this file is to provide documentation and allow the operation of the program to be checked. The file is generally used for validation runs and is switched off during production runs. The mirror file has the following parts:

- A title page that provides a description of the important program and model control parameters
- A summary of hydrodynamic and geometric data
- A tabulation of the tidal data used by the routine
- A tabulation of water quality inputs including initial concentrations, diffusivity and decay coefficients, and loadings
- A tabulation of cell depths that are input in feet and converted to meters
- A table of boundary conditions. The significance of the various boundary conditions can be determined by reference to the model code

The hydrodynamics file is also generally used for program validation and is switched off during production runs. This file contains a tabulation for each time step of the change in volume, flow rate, cross-sectional area, and velocity for each line cell or line cell boundary.

The water quality output file gives a description of the concentration at the end of each time step in each cell. The output interval for both the hydrodynamics and water quality output files can be specified if each time step is not desired.

APPENDIX I
UDKHDEN MODEL INPUT/OUTPUT

PROGRAM UDKHDEN
SOLUTION TO MULTIPLE BUOYANT DISCHARGE PROBLEM WITH
AMBIENT CURRENTS AND VERTICAL GRADIENTS. AUG 1985

UNIVERSAL DATA FILE:
CASE I.D. dye study #1 baseline case (dye1base.inp)
DISCHARGE= 0.1097 CU-M/S DENSITY=1.00467 G/CM3 ** DIAMETER= 0.1286-M
** NUMBER OF PORTS= 4 ** SPACING= 15.24-M ** DEPTH = 53.65-M

AMBIENT STRATIFICATION PROFILE

DEPTH (M)	DENSITY (G/CM3)	VELOCITY (M/S)
0.00	1.02258	0.185
6.10	1.02258	0.185
12.19	1.02258	0.185
18.29	1.02258	0.185
24.38	1.02258	0.185
30.48	1.02258	0.185
33.53	1.02258	0.161
36.58	1.02263	0.114
42.67	1.02274	0.091
43.59	1.02275	0.084
44.20	1.02275	0.079
45.72	1.02275	0.067
48.77	1.02275	0.044
50.29	1.02275	0.032
50.90	1.02275	0.027
52.43	1.02283	0.015
53.65	1.02289	0.006

FROUDE NO= 13.95, PORT SPACING/PORT DIA= 118.46
STARTING LENGTH= 0.739

ALL LENGTHS ARE IN METERS-TIME IN SEC. FIRST LINE ARE INITIAL CONDITIONS.

X	Y	Z	TH1	TH2	WIDTH	DUCL	DRHO	DCCL	TIME	DILUTION
0.00	0.00	0.00	45.00	15.00	0.13	1.000	1.000	1.000	0.00	1.00
0.50	0.50	0.20	45.13	17.21	0.35	1.000	0.988	0.989	0.35	1.96
1.18	1.19	0.57	45.95	25.41	1.15	0.314	0.292	0.294	1.36	6.69
1.78	1.83	1.11	47.24	38.01	1.91	0.201	0.161	0.164	3.34	12.19
2.27	2.38	1.82	49.40	49.07	2.64	0.159	0.101	0.106	6.03	19.17
2.66	2.86	2.64	52.96	56.25	3.43	0.135	0.065	0.073	9.26	28.50
2.97	3.30	3.51	58.17	59.95	4.31	0.117	0.046	0.052	12.98	41.07
3.21	3.75	4.41	64.54	60.91	5.26	0.102	0.034	0.038	17.18	57.73
3.40	4.22	5.31	70.87	59.58	6.25	0.089	0.026	0.029	21.86	79.06
3.56	4.74	6.18	76.12	56.59	7.21	0.077	0.020	0.023	27.00	105.16
3.68	5.32	7.02	79.99	52.66	8.11	0.067	0.017	0.019	32.61	135.64
3.78	5.97	7.82	82.67	48.46	8.94	0.057	0.014	0.016	38.70	169.82
3.92	7.42	9.26	85.76	40.80	10.40	0.039	0.011	0.012	52.38	245.80
4.01	9.05	10.51	87.30	34.71	11.67	0.023	0.008	0.010	68.31	328.32
4.08	10.79	11.60	88.13	29.35	12.87	0.010	0.004	0.009	86.94	412.52
4.13	12.63	12.53	88.58	24.30	13.98	-0.001	0.000	0.008	108.64	491.97

I.D.

PLUMES HAVE REACHED EQUILIBRIUM HEIGHT - STRATIFIED ENVIRONMENT

4.16	13.82	13.03	88.77	21.13	14.64	-0.008	-0.002	0.008	124.59	538.36
4.18	14.78	13.38	88.88	18.51	15.17	-0.014	-0.003	0.007	139.36	574.17

PLUMES MERGING

X	Y	Z	TH1	TH2	WIDTH	DUCL	DRHO	DCCL	TIME	DILUTION
4.20	15.77	13.68	89.02	15.17	15.73	-0.021	-0.004	0.007	156.87	607.04
4.22	16.77	13.92	89.12	12.04	16.30	-0.027	-0.005	0.007	178.25	635.19
4.23	17.78	14.11	89.19	9.07	16.83	-0.031	-0.006	0.007	204.38	658.64
4.24	18.80	14.24	89.24	6.18	17.28	-0.034	-0.007	0.007	235.79	677.31
4.26	19.83	14.33	89.27	3.34	17.60	-0.036	-0.007	0.007	271.87	691.04
4.27	20.85	14.36	89.29	0.56	17.76	-0.037	-0.007	0.007	310.28	699.84

PLUMES HAVE REACHED MAXIMUM HEIGHT - STRATIFIED ENVIRONMENT
TRAPPING LEVEL= 41.03 METERS BELOW SURFACE, DILUTION= 499.22
ERROR IN INPUT DATA. PLEASE CHECK FILE

PROGRAM UDKHDEN
SOLUTION TO MULTIPLE BUOYANT DISCHARGE PROBLEM WITH
AMBIENT CURRENTS AND VERTICAL GRADIENTS. AUG 1985

UNIVERSAL DATA FILE:
CASE I.D. dye study #1 maximum flow case (dye1fmax.inp)
DISCHARGE= 0.1918 CU-M/S DENSITY=1.00467 G/CM3 ** DIAMETER= 0.1286-M
** NUMBER OF PORTS= 4 ** SPACING= 15.24-M ** DEPTH = 53.65-M

AMBIENT STRATIFICATION PROFILE

DEPTH (M)	DENSITY (G/CM3)	VELOCITY (M/S)
0.00	1.02258	0.185
6.10	1.02258	0.185
12.19	1.02258	0.185
18.29	1.02258	0.185
24.38	1.02258	0.185
30.48	1.02258	0.185
33.53	1.02258	0.161
36.58	1.02263	0.114
42.67	1.02274	0.091
43.59	1.02275	0.084
44.20	1.02275	0.079
45.72	1.02275	0.067
48.77	1.02275	0.044
50.29	1.02275	0.032
50.90	1.02275	0.027
52.43	1.02283	0.015
53.65	1.02289	0.006

FROUDE NO= 24.39, PORT SPACING/PORT DIA= 118.46
STARTING LENGTH= 0.743

ALL LENGTHS ARE IN METERS-TIME IN SEC. FIRST LINE ARE INITIAL CONDITIONS.

X	Y	Z	TH1	TH2	WIDTH	DUCL	DRHO	DCCL	TIME	DILUTION
0.00	0.00	0.00	45.00	15.00	0.13	1.000	1.000	1.000	0.00	1.00
0.51	0.51	0.20	45.07	15.72	0.35	1.000	0.996	0.996	0.20	1.94
1.20	1.21	0.50	45.51	18.58	1.16	0.306	0.299	0.300	0.79	6.48
1.87	1.90	0.87	46.11	24.05	1.95	0.183	0.172	0.174	1.99	11.33
2.50	2.56	1.34	46.95	31.00	2.73	0.134	0.116	0.120	3.77	16.71
3.07	3.18	1.93	48.17	38.07	3.49	0.108	0.083	0.089	6.04	22.92
3.58	3.77	2.60	49.95	44.13	4.27	0.092	0.060	0.068	8.74	30.37
4.02	4.32	3.35	52.50	48.77	5.09	0.081	0.047	0.054	11.84	39.49
4.40	4.85	4.14	55.92	52.00	5.95	0.072	0.037	0.043	15.29	50.76
4.73	5.37	4.97	60.12	53.74	6.86	0.064	0.030	0.035	19.08	64.56
5.01	5.91	5.80	64.75	54.04	7.79	0.058	0.025	0.028	23.22	81.19
5.25	6.47	6.63	69.30	53.09	8.71	0.052	0.021	0.024	27.68	100.73
5.62	7.71	8.23	76.73	48.66	10.42	0.041	0.016	0.018	37.60	147.78
5.89	9.12	9.70	81.49	42.88	11.92	0.030	0.013	0.014	48.90	203.60
6.08	10.68	11.03	84.30	37.24	13.26	0.021	0.009	0.012	61.81	265.05
6.22	12.37	12.19	85.90	31.81	14.59	0.014	0.004	0.010	76.48	327.80

PLUMES MERGING

6.33	14.17	13.19	87.01	25.40	15.83	0.006	0.000	0.009	93.48	386.26

PLUMES HAVE REACHED EQUILIBRIUM HEIGHT - STRATIFIED ENVIRONMENT

6.39	15.35	13.70	87.51	21.36	16.60	0.001	-0.001	0.009	105.99	416.25

X	Y	Z	TH1	TH2	WIDTH	DUCL	DRHO	DCCL	TIME	DILUTION
6.43	16.31	14.05	87.79	18.55	17.20	-0.003	-0.003	0.009	117.23	436.99
6.46	17.30	14.35	88.00	15.91	17.79	-0.006	-0.004	0.008	129.70	455.65
6.50	18.29	14.61	88.17	13.37	18.35	-0.008	-0.005	0.008	143.52	472.21
6.53	19.30	14.83	88.29	10.88	18.88	-0.011	-0.005	0.008	158.75	486.58
6.56	20.31	15.00	88.38	8.41	19.34	-0.012	-0.006	0.008	175.40	498.66
6.59	21.33	15.13	88.45	5.95	19.72	-0.014	-0.006	0.008	193.32	508.34
6.61	22.36	15.21	88.50	3.50	20.00	-0.014	-0.006	0.007	212.22	515.58
6.64	23.38	15.25	88.52	1.06	20.17	-0.015	-0.006	0.007	231.68	520.46

PLUMES HAVE REACHED MAXIMUM HEIGHT - STRATIFIED ENVIRONMENT
TRAPPING LEVEL= 40.34 METERS BELOW SURFACE, DILUTION= 393.00

PROGRAM UDKHDEN
SOLUTION TO MULTIPLE BUOYANT DISCHARGE PROBLEM WITH
AMBIENT CURRENTS AND VERTICAL GRADIENTS. AUG 1985

UNIVERSAL DATA FILE:
CASE I.D. dye study #1 minimum flow case (dye1fmin.inp)
DISCHARGE= 0.0768 CU-M/S DENSITY=1.00467 G/CM3 ** DIAMETER= 0.1286-M
** NUMBER OF PORTS= 4 ** SPACING= 15.24-M ** DEPTH = 53.65-M

AMBIENT STRATIFICATION PROFILE

DEPTH (M)	DENSITY (G/CM3)	VELOCITY (M/S)
0.00	1.02258	0.185
6.10	1.02258	0.185
12.19	1.02258	0.185
18.29	1.02258	0.185
24.38	1.02258	0.185
30.48	1.02258	0.185
33.53	1.02258	0.161
36.58	1.02263	0.114
42.67	1.02274	0.091
43.59	1.02275	0.084
44.20	1.02275	0.079
45.72	1.02275	0.067
48.77	1.02275	0.044
50.29	1.02275	0.032
50.90	1.02275	0.027
52.43	1.02283	0.015
53.65	1.02289	0.006

FROUDE NO= 9.77, PORT SPACING/PORT DIA= 118.46
STARTING LENGTH= 0.732

ALL LENGTHS ARE IN METERS-TIME IN SEC. FIRST LINE ARE INITIAL CONDITIONS.

X	Y	Z	TH1	TH2	WIDTH	DUCL	DRHO	DCCL	TIME	DILUTION
0.00	0.00	0.00	45.00	15.00	0.13	1.000	1.000	1.000	0.00	1.00
0.50	0.50	0.22	45.19	19.45	0.36	0.999	0.975	0.976	0.50	1.99
1.14	1.16	0.67	46.47	34.15	1.14	0.331	0.282	0.283	1.90	6.97
1.65	1.71	1.36	48.79	50.51	1.85	0.232	0.146	0.149	4.44	13.44
2.02	2.16	2.21	53.07	60.19	2.61	0.191	0.084	0.090	7.69	22.65
2.28	2.55	3.13	59.71	64.23	3.48	0.161	0.052	0.058	11.52	35.93
2.48	2.95	4.05	67.62	64.43	4.47	0.137	0.035	0.040	15.97	54.57
2.62	3.39	4.97	74.72	61.83	5.48	0.117	0.026	0.029	21.01	79.50
2.74	3.89	5.86	79.83	57.44	6.46	0.100	0.020	0.022	26.64	110.83
2.82	4.48	6.70	83.13	52.34	7.36	0.084	0.016	0.018	32.84	147.82
2.89	5.14	7.49	85.19	47.35	8.17	0.069	0.013	0.015	39.64	189.33
2.94	5.86	8.22	86.49	42.88	8.92	0.056	0.011	0.013	47.04	234.20
3.02	7.46	9.52	87.93	35.82	10.24	0.033	0.009	0.010	63.80	330.28
3.07	9.18	10.64	88.64	30.59	11.40	0.013	0.006	0.008	83.54	431.48
3.10	10.99	11.61	89.03	25.79	12.49	-0.002	0.002	0.007	106.93	532.18

ID.

PLUMES HAVE REACHED EQUILIBRIUM HEIGHT - STRATIFIED ENVIRONMENT

3.13	12.64	12.34	89.23	21.47	13.41	-0.015	-0.001	0.007	131.05	616.72

3.14	13.61	12.69	89.31	18.89	13.93	-0.023	-0.002	0.007	147.37	663.60
3.15	14.59	13.00	89.38	16.24	14.45	-0.031	-0.003	0.006	166.58	708.39
3.16	15.58	13.27	89.43	13.51	14.97	-0.040	-0.004	0.006	190.23	750.35

PLUMES MERGING

X	Y	Z	TH1	TH2	WIDTH	DUCL	DRHO	DCCL	TIME	DILUTION
3.17	16.59	13.48	89.48	10.53	15.48	-0.048	-0.006	0.006	221.33	788.31
3.18	17.61	13.64	89.52	7.41	16.00	-0.055	-0.006	0.006	265.49	819.26
3.19	18.63	13.75	89.55	4.35	16.41	-0.059	-0.007	0.006	328.49	842.80
3.19	19.66	13.80	89.57	1.35	16.64	-0.060	-0.007	0.006	407.44	858.77

PLUMES HAVE REACHED MAXIMUM HEIGHT - STRATIFIED ENVIRONMENT
TRAPPING LEVEL= 41.44 METERS BELOW SURFACE, DILUTION= 600.79

PROGRAM UDKHDEN
SOLUTION TO MULTIPLE BUOYANT DISCHARGE PROBLEM WITH
AMBIENT CURRENTS AND VERTICAL GRADIENTS. AUG 1985

UNIVERSAL DATA FILE:
CASE I.D. dye study #1 80 degree effluent case (dye1_80F.inp)
DISCHARGE= 0.1097 CU-M/S DENSITY=1.00635 G/CM3 ** DIAMETER= 0.1286-M
** NUMBER OF PORTS= 4 ** SPACING= 15.24-M ** DEPTH = 53.65-M

AMBIENT STRATIFICATION PROFILE

DEPTH (M)	DENSITY (G/CM3)	VELOCITY (M/S)
0.00	1.02258	0.185
6.10	1.02258	0.185
12.19	1.02258	0.185
18.29	1.02258	0.185
24.38	1.02258	0.185
30.48	1.02258	0.185
33.53	1.02258	0.161
36.58	1.02263	0.114
42.67	1.02274	0.091
43.59	1.02275	0.084
44.20	1.02275	0.079
45.72	1.02275	0.067
48.77	1.02275	0.044
50.29	1.02275	0.032
50.90	1.02275	0.027
52.43	1.02283	0.015
53.65	1.02289	0.006

FROUDE NO= 14.66, PORT SPACING/PORT DIA= 118.46
STARTING LENGTH= 0.739

ALL LENGTHS ARE IN METERS-TIME IN SEC. FIRST LINE ARE INITIAL CONDITIONS.

X	Y	Z	TH1	TH2	WIDTH	DUCL	DRHO	DCCL	TIME	DILUTION
0.00	0.00	0.00	45.00	15.00	0.13	1.000	1.000	1.000	0.00	1.00
0.50	0.51	0.20	45.13	17.00	0.35	1.000	0.989	0.990	0.35	1.96
1.18	1.19	0.56	45.95	24.50	1.15	0.312	0.293	0.294	1.36	6.68
1.79	1.84	1.08	47.20	36.36	1.92	0.198	0.161	0.165	3.36	12.13
2.30	2.41	1.76	49.29	47.23	2.66	0.155	0.101	0.107	6.12	18.98
2.71	2.90	2.57	52.71	54.55	3.45	0.131	0.066	0.074	9.44	28.08
3.03	3.37	3.43	57.75	58.46	4.32	0.112	0.046	0.053	13.29	40.29
3.29	3.83	4.31	63.99	59.63	5.27	0.098	0.034	0.039	17.64	56.46
3.49	4.31	5.19	70.30	58.45	6.25	0.085	0.026	0.030	22.48	77.14
3.65	4.85	6.06	75.62	55.56	7.20	0.074	0.021	0.024	27.82	102.41
3.78	5.44	6.89	79.57	51.72	8.09	0.063	0.017	0.020	33.64	131.88
3.89	6.10	7.67	82.34	47.59	8.91	0.054	0.015	0.017	39.96	164.85
4.04	7.58	9.09	85.55	40.09	10.35	0.036	0.011	0.013	54.20	237.95
4.14	9.22	10.33	87.16	34.22	11.60	0.021	0.009	0.011	70.82	317.18
4.21	10.97	11.41	88.03	29.13	12.77	0.008	0.005	0.009	90.29	398.55
4.27	12.81	12.34	88.51	24.19	13.87	-0.002	0.001	0.008	112.99	475.85

I.D.

PLUMES HAVE REACHED EQUILIBRIUM HEIGHT - STRATIFIED ENVIRONMENT

4.30	13.99	12.83	88.71	21.03	14.53	-0.010	-0.002	0.008	129.70	521.59
4.32	14.96	13.18	88.84	18.40	15.06	-0.016	-0.003	0.008	145.24	556.93

PLUMES MERGING

X	Y	Z	TH1	TH2	WIDTH	DUCL	DRHO	DCCL	TIME	DILUTION
4.33	15.95	13.48	88.97	15.24	15.62	-0.022	-0.005	0.008	163.76	589.89
4.35	16.95	13.72	89.08	12.04	16.20	-0.028	-0.006	0.008	186.78	618.09
4.37	17.96	13.91	89.15	9.02	16.74	-0.033	-0.007	0.007	215.64	641.58
4.38	18.98	14.04	89.21	6.08	17.20	-0.036	-0.007	0.007	251.31	660.24
4.40	20.00	14.13	89.24	3.19	17.52	-0.038	-0.007	0.007	293.18	673.90
4.41	21.03	14.16	89.26	0.36	17.68	-0.038	-0.008	0.007	337.89	682.61

PLUMES HAVE REACHED MAXIMUM HEIGHT - STRATIFIED ENVIRONMENT
TRAPPING LEVEL= 41.19 METERS BELOW SURFACE, DILUTION= 486.73
ERROR IN INPUT DATA. PLEASE CHECK FILE

PROGRAM UDKHDEN
SOLUTION TO MULTIPLE BUOYANT DISCHARGE PROBLEM WITH
AMBIENT CURRENTS AND VERTICAL GRADIENTS. AUG 1985

UNIVERSAL DATA FILE:
CASE I.D. dye study #1 (dye1.inp)
DISCHARGE= 0.1097 CU-M/S DENSITY=1.00128 G/CM3 ** DIAMETER= 0.1286-M
** NUMBER OF PORTS= 4 ** SPACING= 15.24-M ** DEPTH = 53.65-M

AMBIENT STRATIFICATION PROFILE

DEPTH (M)	DENSITY (G/CM3)	VELOCITY (M/S)
0.00	1.02258	0.185
6.10	1.02258	0.185
12.19	1.02258	0.185
18.29	1.02258	0.185
24.38	1.02258	0.185
30.48	1.02258	0.185
33.53	1.02258	0.161
36.58	1.02263	0.114
42.67	1.02274	0.091
43.59	1.02275	0.084
44.20	1.02275	0.079
45.72	1.02275	0.067
48.77	1.02275	0.044
50.29	1.02275	0.032
50.90	1.02275	0.027
52.43	1.02283	0.015
53.65	1.02289	0.006

FROUDE NO= 12.79, PORT SPACING/PORT DIA= 118.46
STARTING LENGTH= 0.748

ALL LENGTHS ARE IN METERS-TIME IN SEC. FIRST LINE ARE INITIAL CONDITIONS.

X	Y	Z	TH1	TH2	WIDTH	DUCL	DRHO	DCCL	TIME	DILUTION
0.00	0.00	0.00	90.00	15.00	0.13	1.000	1.000	1.000	0.00	1.00
0.00	0.72	0.21	90.00	17.65	0.35	0.999	0.986	0.986	0.36	1.97
0.00	1.68	0.59	90.00	26.89	1.11	0.327	0.301	0.302	1.34	6.54
0.00	2.53	1.15	90.00	40.03	1.79	0.217	0.168	0.171	3.19	11.79
0.00	3.25	1.89	90.00	50.72	2.45	0.175	0.106	0.111	5.65	18.49
0.00	3.85	2.73	90.00	57.27	3.16	0.150	0.069	0.076	8.56	27.47
0.00	4.38	3.61	90.00	60.46	3.98	0.131	0.049	0.054	11.88	39.56
0.00	4.88	4.51	90.00	61.19	4.88	0.114	0.036	0.039	15.62	55.59
0.00	5.38	5.41	90.00	59.99	5.83	0.100	0.027	0.030	19.79	76.18
0.00	5.92	6.29	90.00	57.38	6.79	0.088	0.021	0.023	24.38	101.60
0.00	6.50	7.14	90.00	53.86	7.71	0.077	0.017	0.019	29.39	131.71
0.00	7.13	7.95	90.00	49.96	8.57	0.066	0.014	0.016	34.82	165.97
0.00	8.56	9.43	90.00	42.46	10.09	0.047	0.011	0.012	46.98	243.77
0.00	10.15	10.73	90.00	36.16	11.42	0.030	0.008	0.010	61.06	329.90
0.00	11.87	11.86	90.00	30.57	12.68	0.018	0.004	0.008	77.28	418.55
0.00	13.69	12.83	90.00	25.47	13.83	0.006	0.001	0.007	95.96	503.03

PLUMES HAVE REACHED EQUILIBRIUM HEIGHT - STRATIFIED ENVIRONMENT

0.00	15.10	13.44	90.00	21.80	14.61	-0.003	-0.001	0.007	112.29	560.93
0.00	16.06	13.81	90.00	19.31	15.12	-0.009	-0.002	0.007	124.74	597.38

PLUMES MERGING

X	Y	Z	TH1	TH2	WIDTH	DUCL	DRHO	DCCL	TIME	DILUTION
0.00	17.04	14.12	90.00	16.27	15.64	-0.015	-0.003	0.007	138.95	631.58
0.00	18.04	14.38	90.00	13.20	16.18	-0.021	-0.004	0.007	155.59	661.22
0.00	19.05	14.59	90.00	10.32	16.69	-0.026	-0.005	0.006	175.02	686.37
0.00	20.06	14.75	90.00	7.55	17.14	-0.029	-0.006	0.006	197.47	706.93
0.00	21.09	14.86	90.00	4.84	17.49	-0.032	-0.006	0.006	222.74	722.78
0.00	22.11	14.93	90.00	2.17	17.72	-0.033	-0.006	0.006	250.04	733.77
0.00	23.14	14.94	90.00	-0.45	17.82	-0.033	-0.006	0.006	278.00	739.92

PLUMES HAVE REACHED MAXIMUM HEIGHT - STRATIFIED ENVIRONMENT
TRAPPING LEVEL= 40.60 METERS BELOW SURFACE, DILUTION= 523.60

PROGRAM UDKHDEN
SOLUTION TO MULTIPLE BUOYANT DISCHARGE PROBLEM WITH
AMBIENT CURRENTS AND VERTICAL GRADIENTS. AUG 1985

UNIVERSAL DATA FILE:
CASE I.D. dye study #2 baseline case (dye2base.inp)
DISCHARGE= 0.1342 CU-M/S DENSITY=1.00467 G/CM3 ** DIAMETER= 0.1286-M
** NUMBER OF PORTS= 4 ** SPACING= 15.24-M ** DEPTH = 53.65-M

AMBIENT STRATIFICATION PROFILE

DEPTH (M)	DENSITY (G/CM3)	VELOCITY (M/S)
0.00	1.02221	0.223
3.05	1.02221	0.223
6.10	1.02221	0.223
9.14	1.02221	0.223
10.97	1.02231	0.223
12.19	1.02231	0.223
13.72	1.02232	0.223
15.24	1.02232	0.223
18.29	1.02232	0.223
21.34	1.02233	0.223
24.38	1.02233	0.223
27.43	1.02234	0.223
30.48	1.02234	0.223
33.53	1.02235	0.194
36.58	1.02235	0.166
39.62	1.02236	0.137
42.67	1.02236	0.109
45.72	1.02237	0.080
48.77	1.02237	0.052
51.82	1.02238	0.023
53.65	1.02238	0.023
55.00	1.02238	0.023

FROUDE NO= 17.31, PORT SPACING/PORT DIA= 118.46
STARTING LENGTH= 0.737

ALL LENGTHS ARE IN METERS-TIME IN SEC. FIRST LINE ARE INITIAL CONDITIONS.

X	Y	Z	TH1	TH2	WIDTH	DUCL	DRHO	DCCL	TIME	DILUTION
0.00	0.00	0.00	45.00	15.00	0.13	1.000	1.000	1.000	0.00	1.00
0.50	0.50	0.20	45.36	16.36	0.35	1.000	0.993	0.993	0.29	1.96
1.18	1.21	0.53	47.19	21.53	1.19	0.297	0.285	0.285	1.13	7.02
1.79	1.90	0.97	49.21	30.69	2.03	0.180	0.158	0.158	2.87	12.94
2.33	2.54	1.57	51.44	40.60	2.86	0.138	0.103	0.103	5.37	20.01
2.77	3.12	2.30	54.08	48.80	3.64	0.117	0.073	0.073	8.42	28.55
3.13	3.65	3.11	57.94	54.07	4.46	0.103	0.054	0.054	11.89	39.64
3.41	4.15	3.96	63.05	56.47	5.35	0.090	0.041	0.041	15.75	54.22
3.65	4.67	4.81	68.70	56.36	6.28	0.079	0.031	0.032	20.01	72.88
3.83	5.22	5.66	73.92	54.27	7.20	0.069	0.025	0.026	24.69	95.83
3.98	5.83	6.48	78.09	50.93	8.08	0.060	0.021	0.021	29.78	122.76
4.10	6.49	7.26	81.15	47.05	8.88	0.050	0.017	0.018	35.32	153.05
4.28	7.98	8.67	84.81	39.61	10.31	0.033	0.013	0.014	47.85	220.40
4.40	9.63	9.89	86.67	33.68	11.56	0.018	0.011	0.012	62.66	293.20

4.48	11.38	10.96	87.70	29.27	12.66	0.005	0.009	0.010	80.22	368.41
4.55	13.21	11.91	88.32	25.96	13.67	-0.006	0.008	0.009	101.15	444.83
4.59	15.08	12.77	88.73	23.16	14.67	-0.017	0.007	0.008	126.53	526.07

HD3.14 ID

PLUMES MERGING

X	Y	Z	TH1	TH2	WIDTH	DUCL	DRHO	DCCL	TIME	DILUTION
4.63	16.99	13.53	89.08	19.72	15.72	-0.028	0.006	0.008	159.07	611.25
4.66	18.95	14.17	89.33	16.69	16.84	-0.037	0.005	0.007	205.41	690.34
4.68	20.93	14.72	89.48	14.81	17.89	-0.042	0.004	0.006	267.13	764.42
4.69	22.93	15.23	89.59	13.49	18.84	-0.046	0.004	0.006	340.48	835.17
4.71	24.93	15.69	89.66	12.46	19.72	-0.048	0.003	0.005	418.97	903.34
4.73	28.96	16.52	89.76	10.88	21.30	-0.051	0.002	0.004	579.36	1032.57
4.74	33.02	17.25	89.82	9.68	22.75	-0.052	0.002	0.003	723.43	1154.73
4.75	37.08	17.91	89.85	8.69	24.07	-0.053	0.001	0.003	846.99	1270.45
4.76	41.15	18.50	89.88	7.86	25.31	-0.053	0.001	0.003	955.13	1380.20
4.77	45.24	19.03	89.90	7.13	26.52	-0.054	0.001	0.002	1051.70	1484.35
4.78	49.32	19.52	89.91	6.47	27.63	-0.054	0.000	0.002	1139.61	1583.18
4.78	53.42	19.96	89.93	5.88	28.73	-0.054	0.000	0.002	1220.58	1676.84
4.79	57.51	20.37	89.93	5.34	29.75	-0.054	0.000	0.002	1296.38	1765.50
4.79	61.61	20.73	89.94	4.84	30.66	-0.054	0.000	0.002	1367.61	1849.36

PLUMES HAVE REACHED EQUILIBRIUM HEIGHT - STRATIFIED ENVIRONMENT

4.80	64.18	20.94	89.94	4.55	31.09	-0.054	0.000	0.001	1409.54	1899.36
4.80	65.20	21.02	89.95	4.44	31.24	-0.054	0.000	0.001	1425.64	1918.88
4.80	66.23	21.10	89.95	4.33	31.40	-0.053	0.000	0.001	1441.47	1938.11
4.80	67.26	21.18	89.95	4.22	31.55	-0.053	0.000	0.001	1457.03	1957.05
4.80	68.28	21.25	89.95	4.11	31.70	-0.053	0.000	0.001	1472.34	1975.70
4.80	69.31	21.33	89.95	4.01	31.85	-0.053	0.000	0.001	1487.41	1994.05
4.80	70.34	21.40	89.95	3.91	32.00	-0.053	0.000	0.001	1502.26	2012.12
4.80	71.36	21.47	89.95	3.81	34.23	-0.062	0.000	0.002	1519.40	2030.28
4.80	72.39	21.53	89.95	3.70	34.51	-0.062	0.000	0.002	1541.22	2048.74
4.80	73.42	21.60	89.95	3.59	34.74	-0.063	0.000	0.002	1563.17	2066.99
4.80	74.44	21.66	89.96	3.49	34.97	-0.063	0.000	0.002	1585.23	2084.98
4.81	75.47	21.72	89.96	3.38	35.18	-0.063	0.000	0.002	1607.38	2102.72
4.81	76.50	21.78	89.96	3.28	35.39	-0.064	0.000	0.002	1629.61	2120.20
4.81	77.53	21.84	89.96	3.18	35.60	-0.064	0.000	0.001	1651.89	2137.43
4.81	78.55	21.90	89.96	3.08	35.79	-0.064	0.000	0.001	1674.21	2154.39
4.81	79.58	21.95	89.96	2.98	35.98	-0.064	0.000	0.001	1696.55	2171.10
4.81	80.61	22.00	89.96	2.88	36.17	-0.065	0.000	0.001	1718.87	2187.54
4.81	81.64	22.06	89.96	2.79	36.34	-0.065	0.000	0.001	1741.17	2203.71
4.81	82.67	22.10	89.96	2.69	36.51	-0.065	0.000	0.001	1763.42	2219.62
4.81	83.69	22.15	89.96	2.59	36.67	-0.065	0.000	0.001	1785.59	2235.26
4.81	84.72	22.20	89.96	2.50	36.82	-0.065	0.000	0.001	1807.68	2250.63
4.81	85.75	22.24	89.96	2.41	36.97	-0.065	0.000	0.001	1829.66	2265.73
4.81	86.78	22.28	89.96	2.31	37.11	-0.065	0.000	0.001	1851.52	2280.55
4.81	87.81	22.33	89.96	2.22	37.24	-0.065	0.000	0.001	1873.24	2295.11
4.81	88.84	22.36	89.96	2.13	37.36	-0.065	0.000	0.001	1894.79	2309.39
4.81	89.86	22.40	89.96	2.04	37.48	-0.065	0.000	0.001	1916.18	2323.39
4.82	90.89	22.44	89.96	1.95	37.60	-0.065	0.000	0.001	1937.39	2337.13
4.82	91.92	22.47	89.97	1.86	37.70	-0.065	0.000	0.001	1958.41	2350.58
4.82	92.95	22.50	89.97	1.78	37.80	-0.065	0.000	0.001	1979.22	2363.76

4.82	93.98	22.54	89.97	1.69	37.90	-0.065	0.000	0.001	1999.83	2376.66
4.82	95.01	22.57	89.97	1.61	37.99	-0.065	0.000	0.001	2020.22	2389.29
4.82	96.04	22.59	89.97	1.52	38.07	-0.065	0.000	0.001	2040.39	2401.64
4.82	97.07	22.62	89.97	1.44	38.15	-0.065	0.000	0.001	2060.33	2413.72
4.82	98.09	22.65	89.97	1.36	38.23	-0.065	0.000	0.001	2080.04	2425.51
4.82	99.12	22.67	89.97	1.27	38.29	-0.064	0.000	0.001	2099.52	2437.04
4.82	100.15	22.69	89.97	1.19	38.36	-0.064	0.000	0.001	2118.77	2448.29
4.82	101.18	22.71	89.97	1.11	38.42	-0.064	0.000	0.001	2137.79	2459.27
4.82	102.21	22.73	89.97	1.04	38.48	-0.064	0.000	0.001	2156.57	2469.97

X	Y	Z	TH1	TH2	WIDTH	DUCL	DRHO	DCCL	TIME	DILUTION
4.82	103.24	22.75	89.97	0.96	38.53	-0.064	0.000	0.001	2175.11	2480.40
4.82	104.27	22.77	89.97	0.88	38.58	-0.063	0.000	0.001	2193.43	2490.57
4.82	105.30	22.78	89.97	0.80	38.62	-0.063	0.000	0.001	2211.52	2500.46
4.82	106.33	22.79	89.97	0.73	38.66	-0.063	0.000	0.001	2229.37	2510.08
4.82	107.36	22.81	89.97	0.65	38.70	-0.063	0.000	0.001	2247.00	2519.44
4.83	108.38	22.82	89.97	0.58	38.73	-0.062	0.000	0.001	2264.41	2528.53
4.83	109.41	22.83	89.97	0.51	38.76	-0.062	0.000	0.001	2281.60	2537.35
4.83	110.44	22.84	89.97	0.44	38.79	-0.062	0.000	0.001	2298.56	2545.91
4.83	111.47	22.84	89.97	0.36	38.81	-0.062	0.000	0.001	2315.32	2554.21
4.83	112.50	22.85	89.97	0.29	38.83	-0.061	0.000	0.001	2331.86	2562.26
4.83	113.53	22.85	89.97	0.22	38.85	-0.061	0.000	0.001	2348.19	2570.04
4.83	114.56	22.86	89.97	0.16	38.86	-0.061	0.000	0.001	2364.32	2577.57
4.83	115.59	22.86	89.97	0.09	38.88	-0.060	0.000	0.001	2380.25	2584.84
4.83	116.62	22.86	89.97	0.02	38.89	-0.060	0.000	0.001	2395.98	2591.88

PLUMES HAVE REACHED MAXIMUM HEIGHT - STRATIFIED ENVIRONMENT
TRAPPING LEVEL= 32.78 METERS BELOW SURFACE, DILUTION=1881.07

PROGRAM UDKHDEN
SOLUTION TO MULTIPLE BUOYANT DISCHARGE PROBLEM WITH
AMBIENT CURRENTS AND VERTICAL GRADIENTS. AUG 1985

UNIVERSAL DATA FILE:
CASE I.D. dye study #2 maximum flow case (dye2fmax.inp)
DISCHARGE= 0.2101 CU-M/S DENSITY=1.00467 G/CM3 ** DIAMETER= 0.1286-M
** NUMBER OF PORTS= 4 ** SPACING= 15.24-M ** DEPTH = 53.65-M

AMBIENT STRATIFICATION PROFILE

DEPTH (M)	DENSITY (G/CM3)	VELOCITY (M/S)
0.00	1.02221	0.223
3.05	1.02221	0.223
6.10	1.02221	0.223
9.14	1.02221	0.223
10.97	1.02231	0.223
12.19	1.02231	0.223
13.72	1.02232	0.223
15.24	1.02232	0.223
18.29	1.02232	0.223
21.34	1.02233	0.223
24.38	1.02233	0.223
27.43	1.02234	0.223
30.48	1.02234	0.223
33.53	1.02235	0.194
36.58	1.02235	0.166
39.62	1.02236	0.137
42.67	1.02236	0.109
45.72	1.02237	0.080
48.77	1.02237	0.052
51.82	1.02238	0.023
53.65	1.02238	0.023
55.00	1.02238	0.023

FROUDE NO= 27.10, PORT SPACING/PORT DIA= 118.46
STARTING LENGTH= 0.741

ALL LENGTHS ARE IN METERS-TIME IN SEC. FIRST LINE ARE INITIAL CONDITIONS.

X	Y	Z	TH1	TH2	WIDTH	DUCL	DRHO	DCCL	TIME	DILUTION
0.00	0.00	0.00	45.00	15.00	0.13	1.000	1.000	1.000	0.00	1.00
0.51	0.51	0.20	45.23	15.54	0.35	1.000	0.997	0.997	0.18	1.95
1.19	1.21	0.49	46.35	17.67	1.18	0.298	0.293	0.293	0.72	6.73
1.86	1.92	0.83	47.55	22.00	2.02	0.175	0.167	0.167	1.86	12.00
2.48	2.62	1.26	48.82	27.84	2.86	0.126	0.114	0.114	3.56	17.83
3.05	3.29	1.79	50.18	34.29	3.69	0.101	0.084	0.084	5.76	24.32
3.57	3.92	2.42	51.83	40.42	4.46	0.087	0.066	0.066	8.39	31.74
4.02	4.52	3.12	54.18	45.39	5.25	0.076	0.052	0.053	11.38	40.77
4.41	5.10	3.88	57.36	48.89	6.09	0.068	0.042	0.043	14.69	51.88
4.75	5.67	4.67	61.29	50.82	6.96	0.061	0.034	0.035	18.32	65.51
5.04	6.25	5.47	65.67	51.20	7.85	0.054	0.028	0.029	22.27	81.92
5.28	6.85	6.26	70.01	50.25	8.73	0.048	0.024	0.024	26.53	101.17
5.67	8.16	7.80	77.11	45.77	10.35	0.037	0.018	0.019	36.02	147.15

5.94	9.65	9.20	81.65	40.06	11.78	0.026	0.014	0.015	46.96	200.89
6.13	11.27	10.45	84.35	34.86	13.04	0.016	0.012	0.013	59.62	259.23
6.28	12.99	11.56	85.97	30.66	14.18	0.008	0.010	0.011	74.33	319.77
6.39	14.79	12.56	86.99	27.38	15.23	0.000	0.009	0.010	91.48	381.05 ——ID

PLUMES MERGING

X	Y	Z	TH1	TH2	WIDTH	DUCL	DRHO	DCCL	TIME	DILUTION
6.47	16.66	13.42	87.94	22.39	16.31	-0.008	0.008	0.009	112.43	439.14
6.53	18.58	14.15	88.49	19.38	17.39	-0.014	0.007	0.009	138.29	493.18
6.57	20.54	14.79	88.83	17.40	18.46	-0.019	0.006	0.008	168.85	544.87
6.61	22.51	15.38	89.07	15.96	19.47	-0.022	0.005	0.007	203.47	595.00
6.64	24.49	15.93	89.24	14.83	20.45	-0.024	0.004	0.006	241.15	643.92
6.68	28.49	16.92	89.46	13.08	22.25	-0.028	0.003	0.005	322.53	738.14
6.71	32.51	17.80	89.60	11.74	23.92	-0.030	0.002	0.004	405.39	828.79
6.74	36.55	18.60	89.69	10.65	25.50	-0.031	0.002	0.004	485.33	915.96
6.76	40.60	19.33	89.75	9.72	27.03	-0.032	0.001	0.003	561.36	999.79
6.77	44.66	19.99	89.80	8.91	28.48	-0.033	0.001	0.003	633.25	1080.39
6.79	48.73	20.61	89.83	8.20	29.91	-0.034	0.001	0.003	701.76	1157.89
6.80	52.81	21.17	89.85	7.57	31.09	-0.034	0.001	0.002	766.66	1232.43
6.81	56.89	21.69	89.87	6.98	32.04	-0.034	0.000	0.002	826.78	1303.90
6.82	60.98	22.17	89.89	6.49	35.50	-0.042	0.000	0.002	910.53	1374.95
6.82	65.07	22.62	89.90	6.03	37.28	-0.045	0.000	0.002	1011.77	1444.58

PROGRAM UDKHDEN
SOLUTION TO MULTIPLE BUOYANT DISCHARGE PROBLEM WITH
AMBIENT CURRENTS AND VERTICAL GRADIENTS. AUG 1985

UNIVERSAL DATA FILE:
CASE I.D. dye study #2 minimum flow case (dye2fmin.inp)
DISCHARGE= 0.0883 CU-M/S DENSITY=1.00467 G/CM3 ** DIAMETER= 0.1286-M
** NUMBER OF PORTS= 4 ** SPACING= 15.24-M ** DEPTH = 53.65-M

AMBIENT STRATIFICATION PROFILE

DEPTH (M)	DENSITY (G/CM3)	VELOCITY (M/S)
0.00	1.02221	0.223
3.05	1.02221	0.223
6.10	1.02221	0.223
9.14	1.02221	0.223
10.97	1.02231	0.223
12.19	1.02231	0.223
13.72	1.02232	0.223
15.24	1.02232	0.223
18.29	1.02232	0.223
21.34	1.02233	0.223
24.38	1.02233	0.223
27.43	1.02234	0.223
30.48	1.02234	0.223
33.53	1.02235	0.194
36.58	1.02235	0.166
39.62	1.02236	0.137
42.67	1.02236	0.109
45.72	1.02237	0.080
48.77	1.02237	0.052
51.82	1.02238	0.023
53.65	1.02238	0.023
55.00	1.02238	0.023

FROUDE NO= 11.39, PORT SPACING/PORT DIA= 118.46
STARTING LENGTH= 0.728

ALL LENGTHS ARE IN METERS-TIME IN SEC. FIRST LINE ARE INITIAL CONDITIONS.

X	Y	Z	TH1	TH2	WIDTH	DUCL	DRHO	DCCL	TIME	DILUTION
0.00	0.00	0.00	45.00	15.00	0.13	1.000	1.000	1.000	0.00	1.00
0.49	0.50	0.21	45.56	18.14	0.35	1.000	0.983	0.983	0.43	1.99
1.14	1.19	0.61	48.51	29.05	1.20	0.304	0.271	0.271	1.70	7.49
1.67	1.82	1.22	51.94	43.62	2.03	0.200	0.141	0.141	4.18	14.64
2.06	2.36	2.00	55.87	54.35	2.85	0.165	0.086	0.086	7.45	24.01
2.35	2.83	2.86	61.22	59.91	3.67	0.143	0.058	0.058	11.25	36.65
2.57	3.29	3.76	67.99	61.12	4.60	0.124	0.040	0.041	15.52	54.37
2.73	3.77	4.66	74.50	59.08	5.57	0.106	0.030	0.030	20.31	78.03
2.86	4.31	5.52	79.49	54.94	6.50	0.090	0.023	0.023	25.63	107.73
2.95	4.93	6.34	82.80	49.95	7.36	0.075	0.018	0.019	31.50	142.63
3.03	5.62	7.09	84.92	45.02	8.14	0.060	0.015	0.016	37.96	181.52
3.08	6.38	7.79	86.27	40.62	8.86	0.047	0.013	0.014	45.04	223.23
3.17	8.02	9.03	87.77	33.74	10.12	0.024	0.010	0.011	61.34	311.44
3.22	9.78	10.10	88.52	28.91	11.22	0.004	0.008	0.009	80.99	403.08

426.24 ID

3.26	11.61	11.03	88.95	25.36	12.23	-0.013	0.007	0.008	104.90	497.27
3.29	13.49	11.87	89.23	22.40	13.23	-0.028	0.006	0.007	134.69	599.03
3.31	15.41	12.61	89.41	19.94	14.23	-0.042	0.005	0.007	173.46	707.99
3.33	17.36	13.27	89.54	17.90	15.23	-0.056	0.005	0.006	228.39	823.56

PLUMES MERGING

X	Y	Z	TH1	TH2	WIDTH	DUCL	DRHO	DCCL	TIME	DILUTION
3.34	19.33	13.85	89.67	14.91	16.39	-0.071	0.004	0.006	338.16	936.45
3.35	21.33	14.35	89.75	13.06	17.44	-0.079	0.003	0.005	636.23	1040.06
3.36	23.34	14.79	89.80	11.78	18.33	-0.082	0.003	0.005	1241.16	1137.70
3.37	25.36	15.19	89.83	10.80	19.10	-0.083	0.002	0.004	1727.62	1230.72
3.38	29.42	15.91	89.88	9.29	20.46	-0.085	0.002	0.003	2395.00	1404.40
3.39	33.48	16.53	89.91	8.15	21.69	-0.085	0.001	0.003	2714.23	1565.73
3.39	37.56	17.08	89.92	7.22	22.83	-0.084	0.001	0.002	2924.70	1716.46
3.40	41.65	17.57	89.94	6.43	23.87	-0.084	0.000	0.002	3084.06	1857.53
3.40	45.75	18.00	89.95	5.74	24.85	-0.083	0.000	0.002	3214.98	1989.60
3.41	49.84	18.39	89.95	5.13	25.75	-0.082	0.000	0.002	3327.42	2113.18

PLUMES HAVE REACHED EQUILIBRIUM HEIGHT - STRATIFIED ENVIRONMENT

3.41	53.95	18.74	89.96	4.57	26.62	-0.082	0.000	0.002	3427.77	2228.76
3.41	54.97	18.82	89.96	4.44	26.85	-0.081	0.000	0.001	3451.10	2256.51
3.41	56.00	18.90	89.96	4.31	27.05	-0.081	0.000	0.001	3473.86	2283.80
3.41	57.03	18.98	89.96	4.18	27.24	-0.081	0.000	0.001	3496.11	2310.61
3.41	58.05	19.05	89.96	4.05	27.42	-0.081	0.000	0.001	3517.87	2336.93
3.41	59.08	19.12	89.96	3.93	27.60	-0.081	0.000	0.001	3539.18	2362.77
3.41	60.11	19.19	89.96	3.81	27.79	-0.080	0.000	0.001	3560.06	2388.14
3.41	61.13	19.26	89.97	3.69	27.98	-0.080	0.000	0.001	3580.58	2413.04
3.41	62.16	19.32	89.97	3.57	28.16	-0.080	0.000	0.001	3600.77	2437.48
3.41	63.19	19.39	89.97	3.46	28.35	-0.080	0.000	0.001	3620.64	2461.46
3.42	64.21	19.45	89.97	3.34	28.52	-0.080	0.000	0.001	3640.21	2484.98
3.42	65.24	19.51	89.97	3.23	28.69	-0.080	0.000	0.001	3659.47	2508.04
3.42	66.27	19.56	89.97	3.12	28.85	-0.080	0.000	0.001	3678.44	2530.64
3.42	67.30	19.62	89.97	3.01	29.01	-0.079	0.000	0.001	3697.12	2552.79
3.42	68.32	19.67	89.97	2.90	29.17	-0.079	0.000	0.001	3715.53	2574.48
3.42	69.35	19.72	89.97	2.79	29.32	-0.079	0.000	0.001	3733.68	2595.72
3.42	70.38	19.77	89.97	2.69	29.46	-0.079	0.000	0.001	3751.57	2616.51
3.42	71.41	19.82	89.97	2.58	29.60	-0.079	0.000	0.001	3769.21	2636.84
3.42	72.44	19.86	89.97	2.48	29.74	-0.078	0.000	0.001	3786.61	2656.73
3.42	73.47	19.91	89.97	2.37	29.87	-0.078	0.000	0.001	3803.78	2676.17
3.42	74.49	19.95	89.97	2.27	29.99	-0.078	0.000	0.001	3820.72	2695.16
3.42	75.52	19.99	89.97	2.17	30.11	-0.078	0.000	0.001	3837.45	2713.71
3.42	76.55	20.03	89.97	2.07	30.23	-0.077	0.000	0.001	3853.96	2731.81
3.42	77.58	20.06	89.97	1.98	30.35	-0.077	0.000	0.001	3870.28	2749.47
3.42	78.61	20.10	89.97	1.88	30.45	-0.077	0.000	0.001	3886.40	2766.70
3.42	79.64	20.13	89.97	1.78	30.55	-0.077	0.000	0.001	3902.32	2783.48
3.42	80.67	20.16	89.97	1.69	30.63	-0.076	0.000	0.001	3918.03	2799.82
3.42	81.69	20.19	89.97	1.60	30.71	-0.076	0.000	0.001	3933.55	2815.73
3.42	82.72	20.22	89.98	1.50	30.79	-0.076	0.000	0.001	3948.87	2831.21
3.42	83.75	20.25	89.98	1.41	30.86	-0.075	0.000	0.001	3964.02	2846.25
3.43	84.78	20.27	89.98	1.32	30.93	-0.075	0.000	0.001	3978.99	2860.88
3.43	85.81	20.29	89.98	1.24	31.00	-0.075	0.000	0.001	3993.80	2875.09

3.43	86.84	20.32	89.98	1.15	31.07	-0.074	0.000	0.001	4008.44	2888.88
3.43	87.87	20.34	89.98	1.06	31.14	-0.074	0.000	0.001	4022.93	2902.27
3.43	88.90	20.35	89.98	0.98	31.20	-0.074	0.000	0.001	4037.28	2915.24
3.43	89.93	20.37	89.98	0.90	31.26	-0.073	0.000	0.001	4051.47	2927.81
3.43	90.95	20.39	89.98	0.81	31.32	-0.073	0.000	0.001	4065.53	2939.98
3.43	91.98	20.40	89.98	0.73	31.37	-0.073	0.000	0.001	4079.46	2951.76
3.43	93.01	20.41	89.98	0.65	31.42	-0.072	0.000	0.001	4093.25	2963.14
3.43	94.04	20.42	89.98	0.57	31.47	-0.072	0.000	0.001	4106.93	2974.13
3.43	95.07	20.43	89.98	0.49	31.52	-0.072	0.000	0.001	4120.48	2984.73
3.43	96.10	20.44	89.98	0.42	31.57	-0.071	0.000	0.001	4133.91	2994.95

X	Y	Z	TH1	TH2	WIDTH	DUCL	DRHO	DCCL	TIME	DILUTION
3.43	97.13	20.45	89.98	0.34	31.61	-0.071	0.000	0.001	4147.23	3004.79
3.43	98.16	20.45	89.98	0.26	31.65	-0.071	0.000	0.001	4160.44	3014.26
3.43	99.19	20.46	89.98	0.19	31.69	-0.070	0.000	0.001	4173.55	3023.35
3.43	100.22	20.46	89.98	0.11	31.72	-0.070	0.000	0.001	4186.55	3032.07
3.43	101.25	20.46	89.98	0.04	31.76	-0.070	0.000	0.001	4199.45	3040.43

PLUMES HAVE REACHED MAXIMUM HEIGHT - STRATIFIED ENVIRONMENT
TRAPPING LEVEL= 34.98 METERS BELOW SURFACE, DILUTION=2204.81

PROGRAM UDKHDEN
SOLUTION TO MULTIPLE BUOYANT DISCHARGE PROBLEM WITH
AMBIENT CURRENTS AND VERTICAL GRADIENTS. AUG 1985

UNIVERSAL DATA FILE:
CASE I.D. dye study #2 80 degree effluent case (dye2_80F.inp)
DISCHARGE= 0.1342 CU-M/S DENSITY=1.00635 G/CM3 ** DIAMETER= 0.1286-M
** NUMBER OF PORTS= 4 ** SPACING= 15.24-M ** DEPTH = 53.65-M

AMBIENT STRATIFICATION PROFILE

DEPTH (M)	DENSITY (G/CM3)	VELOCITY (M/S)
0.00	1.02221	0.223
3.05	1.02221	0.223
6.10	1.02221	0.223
9.14	1.02221	0.223
10.97	1.02231	0.223
12.19	1.02231	0.223
13.72	1.02232	0.223
15.24	1.02232	0.223
18.29	1.02232	0.223
21.34	1.02233	0.223
24.38	1.02233	0.223
27.43	1.02234	0.223
30.48	1.02234	0.223
33.53	1.02235	0.194
36.58	1.02235	0.166
39.62	1.02236	0.137
42.67	1.02236	0.109
45.72	1.02237	0.080
48.77	1.02237	0.052
51.82	1.02238	0.023
53.65	1.02238	0.023
55.00	1.02238	0.023

FROUDE NO= 18.21, PORT SPACING/PORT DIA= 118.46
STARTING LENGTH= 0.737

ALL LENGTHS ARE IN METERS-TIME IN SEC. FIRST LINE ARE INITIAL CONDITIONS.

X	Y	Z	TH1	TH2	WIDTH	DUCL	DRHO	DCCL	TIME	DILUTION
0.00	0.00	0.00	45.00	15.00	0.13	1.000	1.000	1.000	0.00	1.00
0.50	0.50	0.20	45.36	16.22	0.35	1.000	0.994	0.994	0.29	1.96
1.18	1.21	0.52	47.19	20.88	1.19	0.297	0.286	0.286	1.13	7.01
1.80	1.91	0.95	49.19	29.32	2.04	0.178	0.158	0.158	2.89	12.91
2.34	2.56	1.53	51.41	38.75	2.87	0.135	0.104	0.104	5.42	19.89
2.80	3.16	2.23	53.96	46.89	3.67	0.114	0.074	0.074	8.54	28.25
3.18	3.71	3.01	57.65	52.34	4.48	0.099	0.055	0.055	12.12	39.02
3.48	4.23	3.85	62.57	54.98	5.36	0.087	0.042	0.042	16.11	53.13
3.72	4.76	4.69	68.12	55.10	6.28	0.077	0.032	0.033	20.51	71.15
3.92	5.33	5.53	73.34	53.21	7.19	0.067	0.026	0.026	25.34	93.29
4.08	5.95	6.33	77.58	50.02	8.05	0.057	0.021	0.022	30.61	119.26
4.21	6.62	7.10	80.72	46.25	8.85	0.048	0.018	0.019	36.34	148.44
4.40	8.13	8.49	84.52	38.99	10.26	0.031	0.014	0.015	49.34	213.23
4.52	9.79	9.70	86.47	33.17	11.49	0.016	0.011	0.012	64.77	283.14

375.33 ID

4.61	11.55	10.76	87.56	28.84	12.58	0.003	0.009	0.011	83.16	355.26
4.68	13.38	11.70	88.21	25.55	13.59	-0.008	0.008	0.010	105.29	428.86
4.73	15.26	12.54	88.65	22.76	14.59	-0.018	0.007	0.009	132.50	507.62

PLUMES MERGING

X	Y	Z	TH1	TH2	WIDTH	DUCL	DRHO	DCCL	TIME	DILUTION
4.77	17.17	13.29	89.00	19.63	15.65	-0.029	0.006	0.008	167.86	590.87
4.80	19.13	13.92	89.28	16.49	16.79	-0.038	0.005	0.007	220.72	668.56
4.82	21.12	14.47	89.45	14.58	17.85	-0.044	0.005	0.007	294.86	741.08
4.84	23.11	14.96	89.56	13.24	18.81	-0.047	0.004	0.006	386.48	810.16
4.85	25.12	15.42	89.64	12.20	19.69	-0.049	0.003	0.005	485.06	876.58
4.87	29.16	16.23	89.74	10.61	21.24	-0.052	0.002	0.004	685.11	1002.10
4.89	33.21	16.94	89.80	9.40	22.66	-0.053	0.002	0.004	856.75	1120.31
4.90	37.28	17.58	89.84	8.41	23.96	-0.054	0.001	0.003	999.69	1232.02
4.91	41.36	18.15	89.87	7.57	25.17	-0.054	0.001	0.003	1121.18	1337.60
4.92	45.44	18.66	89.89	6.83	26.34	-0.054	0.001	0.002	1227.50	1437.44
4.93	49.53	19.13	89.91	6.18	27.41	-0.054	0.000	0.002	1323.25	1531.84
4.93	53.63	19.55	89.92	5.58	28.46	-0.054	0.000	0.002	1410.44	1620.97
4.94	57.72	19.93	89.93	5.03	29.44	-0.054	0.000	0.002	1491.50	1705.00

PLUMES HAVE REACHED EQUILIBRIUM HEIGHT - STRATIFIED ENVIRONMENT

4.94	60.29	20.15	89.93	4.70	30.04	-0.054	0.000	0.002	1539.28	1754.96
4.94	61.31	20.23	89.93	4.58	30.26	-0.054	0.000	0.002	1557.69	1774.45
4.95	62.34	20.32	89.94	4.45	30.47	-0.054	0.000	0.002	1575.82	1793.63
4.95	63.37	20.39	89.94	4.33	30.64	-0.054	0.000	0.002	1593.63	1812.50
4.95	64.39	20.47	89.94	4.22	30.79	-0.054	0.000	0.002	1611.10	1831.05
4.95	65.42	20.55	89.94	4.10	30.94	-0.053	0.000	0.002	1628.23	1849.29
4.95	66.45	20.62	89.94	3.99	31.09	-0.053	0.000	0.002	1645.07	1867.22
4.95	67.47	20.69	89.94	3.88	31.23	-0.053	0.000	0.002	1661.60	1884.84
4.95	68.50	20.76	89.94	3.77	31.37	-0.053	0.000	0.001	1677.86	1902.16
4.95	69.53	20.82	89.95	3.66	31.51	-0.053	0.000	0.001	1693.86	1919.18
4.95	70.55	20.89	89.95	3.56	31.64	-0.053	0.000	0.001	1709.60	1935.91
4.96	71.58	20.95	89.95	3.45	31.77	-0.053	0.000	0.001	1725.11	1952.34
4.96	72.61	21.01	89.95	3.35	31.90	-0.052	0.000	0.001	1740.39	1968.48
4.96	73.64	21.07	89.95	3.25	32.03	-0.052	0.000	0.001	1755.46	1984.33
4.96	74.66	21.13	89.95	3.15	34.30	-0.061	0.000	0.002	1772.92	2000.35
4.96	75.69	21.19	89.95	3.04	34.52	-0.061	0.000	0.002	1795.18	2016.58
4.96	76.72	21.24	89.95	2.93	34.70	-0.062	0.000	0.002	1817.46	2032.56
4.96	77.75	21.29	89.95	2.83	34.88	-0.062	0.000	0.002	1839.73	2048.27
4.96	78.78	21.34	89.95	2.72	35.05	-0.062	0.000	0.002	1861.97	2063.69
4.96	79.80	21.39	89.95	2.62	35.22	-0.062	0.000	0.002	1884.17	2078.84
4.96	80.83	21.43	89.95	2.52	35.37	-0.062	0.000	0.002	1906.29	2093.71
4.96	81.86	21.48	89.96	2.42	35.52	-0.062	0.000	0.002	1928.32	2108.29
4.96	82.89	21.52	89.96	2.32	35.67	-0.062	0.000	0.001	1950.24	2122.59
4.97	83.92	21.56	89.96	2.22	35.80	-0.062	0.000	0.001	1972.03	2136.61
4.97	84.94	21.60	89.96	2.12	35.93	-0.062	0.000	0.001	1993.68	2150.34
4.97	85.97	21.64	89.96	2.02	36.05	-0.062	0.000	0.001	2015.17	2163.78
4.97	87.00	21.67	89.96	1.93	36.16	-0.062	0.000	0.001	2036.48	2176.95
4.97	88.03	21.71	89.96	1.83	36.27	-0.062	0.000	0.001	2057.61	2189.82
4.97	89.06	21.74	89.96	1.74	36.37	-0.062	0.000	0.001	2078.55	2202.41
4.97	90.09	21.77	89.96	1.65	36.46	-0.062	0.000	0.001	2099.28	2214.72

4.97	91.12	21.80	89.96	1.56	36.55	-0.062	0.000	0.001	2119.79	2226.74
4.97	92.15	21.83	89.96	1.47	36.64	-0.062	0.000	0.001	2140.09	2238.47
4.97	93.17	21.85	89.96	1.38	36.72	-0.062	0.000	0.001	2160.16	2249.92
4.97	94.20	21.88	89.96	1.29	36.79	-0.062	0.000	0.001	2180.00	2261.09
4.97	95.23	21.90	89.96	1.20	36.86	-0.062	0.000	0.001	2199.61	2271.97
4.97	96.26	21.92	89.96	1.12	36.92	-0.061	0.000	0.001	2218.99	2282.58
4.97	97.29	21.94	89.96	1.03	36.98	-0.061	0.000	0.001	2238.13	2292.90
4.98	98.32	21.96	89.96	0.95	37.03	-0.061	0.000	0.001	2257.03	2302.93
4.98	99.35	21.97	89.96	0.87	37.08	-0.061	0.000	0.001	2275.70	2312.69

X	Y	Z	TH1	TH2	WIDTH	DUCL	DRHO	DCCL	TIME	DILUTION
4.98	100.38	21.99	89.96	0.79	37.12	-0.061	0.000	0.001	2294.13	2322.18
4.98	101.41	22.00	89.96	0.71	37.17	-0.060	0.000	0.001	2312.33	2331.38
4.98	102.44	22.01	89.96	0.63	37.20	-0.060	0.000	0.001	2330.29	2340.31
4.98	103.47	22.02	89.96	0.55	37.24	-0.060	0.000	0.001	2348.03	2348.97
4.98	104.49	22.03	89.96	0.47	37.27	-0.060	0.000	0.001	2365.54	2357.35
4.98	105.52	22.04	89.96	0.39	37.29	-0.059	0.000	0.001	2382.82	2365.46
4.98	106.55	22.05	89.96	0.32	37.32	-0.059	0.000	0.001	2399.88	2373.31
4.98	107.58	22.05	89.96	0.24	37.34	-0.059	0.000	0.001	2416.72	2380.89
4.98	108.61	22.05	89.96	0.17	37.35	-0.059	0.000	0.001	2433.35	2388.20
4.98	109.64	22.06	89.96	0.09	37.37	-0.058	0.000	0.001	2449.77	2395.26
4.98	110.67	22.06	89.96	0.02	37.38	-0.058	0.000	0.001	2465.97	2402.07

PLUMES HAVE REACHED MAXIMUM HEIGHT - STRATIFIED ENVIRONMENT
TRAPPING LEVEL= 33.59 METERS BELOW SURFACE, DILUTION=1732.70

PROGRAM UDKHDEN
SOLUTION TO MULTIPLE BUOYANT DISCHARGE PROBLEM WITH
AMBIENT CURRENTS AND VERTICAL GRADIENTS. AUG 1985

UNIVERSAL DATA FILE:
CASE I.D. dye study #2 (dye2.inp)
DISCHARGE= 0.1342 CU-M/S DENSITY=1.00013 G/CM3 ** DIAMETER= 0.1286-M
** NUMBER OF PORTS= 4 ** SPACING= 15.24-M ** DEPTH = 53.65-M

AMBIENT STRATIFICATION PROFILE

DEPTH (M)	DENSITY (G/CM3)	VELOCITY (M/S)
0.00	1.02221	0.223
3.05	1.02221	0.223
6.10	1.02221	0.223
9.14	1.02221	0.223
10.97	1.02231	0.223
12.19	1.02231	0.223
13.72	1.02232	0.223
15.24	1.02232	0.223
18.29	1.02232	0.223
21.34	1.02233	0.223
24.38	1.02233	0.223
27.43	1.02234	0.223
30.48	1.02234	0.223
33.53	1.02235	0.194
36.58	1.02235	0.166
39.62	1.02236	0.137
42.67	1.02236	0.109
45.72	1.02237	0.080
48.77	1.02237	0.052
51.82	1.02238	0.023
53.65	1.02238	0.023
55.00	1.02238	0.023

FROUDE NO= 15.41, PORT SPACING/PORT DIA= 118.46
STARTING LENGTH= 0.763

ALL LENGTHS ARE IN METERS-TIME IN SEC. FIRST LINE ARE INITIAL CONDITIONS.

X	Y	Z	TH1	TH2	WIDTH	DUCL	DRHO	DCCL	TIME	DILUTION
0.00	0.00	0.00	90.00	15.00	0.13	1.000	1.000	1.000	0.00	1.00
0.00	0.74	0.21	90.00	16.76	0.35	1.000	0.991	0.991	0.30	1.98
0.00	1.71	0.55	90.00	22.72	1.10	0.322	0.305	0.305	1.10	6.62
0.00	2.62	1.02	90.00	32.49	1.82	0.204	0.173	0.173	2.67	11.92
0.00	3.43	1.65	90.00	42.42	2.54	0.159	0.113	0.113	4.85	18.32
0.00	4.14	2.40	90.00	50.27	3.23	0.136	0.080	0.080	7.48	26.26
0.00	4.76	3.22	90.00	55.11	3.97	0.119	0.058	0.059	10.46	36.70
0.00	5.33	4.07	90.00	57.27	4.80	0.105	0.044	0.044	13.79	50.46
0.00	5.89	4.94	90.00	57.21	5.70	0.093	0.033	0.034	17.47	68.20
0.00	6.46	5.80	90.00	55.43	6.62	0.082	0.026	0.027	21.51	90.27
0.00	7.06	6.63	90.00	52.48	7.51	0.071	0.021	0.022	25.93	116.61
0.00	7.71	7.43	90.00	48.90	8.35	0.061	0.018	0.018	30.73	146.81
0.00	9.16	8.89	90.00	41.63	9.86	0.043	0.013	0.014	41.53	215.77
0.00	10.77	10.17	90.00	35.51	11.16	0.027	0.011	0.011	54.14	292.28

0.00	12.50	11.29	90.00	30.83	12.32	0.013	0.009	0.010	68.84	372.65
0.00	14.30	12.29	90.00	27.31	13.37	0.002	0.007	0.008	85.91	454.67
0.00	16.15	13.19	90.00	24.53	14.34	-0.009	0.006	0.008	105.84	538.44

PLUMES MERGING

0.00	18.04	14.00	90.00	21.99	15.30	-0.019	0.006	0.007	129.53	627.69

X	Y	Z	TH1	TH2	WIDTH	DUCL	DRHO	DCCL	TIME	DILUTION
0.00	19.97	14.70	90.00	18.15	16.39	-0.030	0.005	0.006	160.07	714.08
0.00	21.94	15.30	90.00	15.92	17.43	-0.037	0.004	0.006	199.02	794.32
0.00	23.93	15.84	90.00	14.42	18.40	-0.042	0.004	0.005	244.67	870.64
0.00	25.93	16.33	90.00	13.29	19.30	-0.045	0.003	0.005	294.45	944.11
0.00	29.95	17.21	90.00	11.63	20.94	-0.049	0.002	0.004	399.50	1083.64
0.00	33.99	18.00	90.00	10.40	22.43	-0.050	0.002	0.003	499.83	1215.97
0.00	38.05	18.70	90.00	9.40	23.82	-0.051	0.001	0.003	591.77	1341.98
0.00	42.11	19.35	90.00	8.57	25.14	-0.052	0.001	0.002	676.13	1462.30
0.00	46.19	19.93	90.00	7.84	26.40	-0.053	0.001	0.002	753.94	1577.28
0.00	50.27	20.47	90.00	7.19	27.60	-0.054	0.001	0.002	826.58	1687.25
0.00	54.35	20.97	90.00	6.62	28.79	-0.054	0.000	0.002	895.03	1792.58
0.00	58.45	21.42	90.00	6.12	29.89	-0.055	0.000	0.002	960.02	1893.57
0.00	62.54	21.84	90.00	5.65	30.84	-0.055	0.000	0.001	1021.47	1990.28
0.00	66.64	22.23	90.00	5.21	31.59	-0.054	0.000	0.001	1078.88	2082.61
0.00	74.84	22.92	90.00	4.42	35.00	-0.065	0.000	0.001	1211.50	2258.31

PLUMES HAVE REACHED EQUILIBRIUM HEIGHT - STRATIFIED ENVIRONMENT

0.00	77.67	23.14	90.00	4.16	35.96	-0.066	0.000	0.001	1264.01	2316.62
0.00	78.69	23.21	90.00	4.07	36.05	-0.065	0.000	0.001	1283.10	2337.60
0.00	79.72	23.28	90.00	3.98	36.00	-0.064	0.000	0.001	1301.12	2358.16
0.00	80.75	23.35	90.00	3.89	35.98	-0.063	0.000	0.001	1318.20	2378.29
0.00	81.77	23.42	90.00	3.80	35.98	-0.062	0.000	0.001	1334.51	2398.00
0.00	82.80	23.49	90.00	3.71	36.00	-0.061	0.000	0.001	1350.18	2417.30
0.00	83.83	23.55	90.00	3.62	36.04	-0.060	0.000	0.001	1365.31	2436.21
0.00	84.85	23.62	90.00	3.54	36.08	-0.059	0.000	0.001	1379.97	2454.74
0.00	85.88	23.68	90.00	3.45	36.14	-0.058	0.000	0.001	1394.22	2472.89
0.00	86.91	23.74	90.00	3.37	36.20	-0.058	0.000	0.001	1408.10	2490.68
0.00	87.94	23.80	90.00	3.28	36.27	-0.057	0.000	0.001	1421.66	2508.12
0.00	88.96	23.86	90.00	3.20	36.34	-0.056	0.000	0.001	1434.92	2525.20
0.00	89.99	23.92	90.00	3.12	36.41	-0.056	0.000	0.001	1447.93	2541.94
0.00	91.02	23.97	90.00	3.03	36.49	-0.055	0.000	0.001	1460.69	2558.35
0.00	92.05	24.03	90.00	2.95	36.57	-0.055	0.000	0.001	1473.23	2574.42
0.00	93.08	24.08	90.00	2.87	36.65	-0.054	0.000	0.001	1485.57	2590.17
0.00	94.10	24.13	90.00	2.79	36.73	-0.054	0.000	0.001	1497.72	2605.60
0.00	95.13	24.18	90.00	2.71	36.82	-0.053	0.000	0.001	1509.71	2620.71
0.00	96.16	24.23	90.00	2.63	36.90	-0.053	0.000	0.001	1521.53	2635.51
0.00	97.19	24.27	90.00	2.55	36.98	-0.052	0.000	0.001	1533.20	2650.00
0.00	98.22	24.32	90.00	2.48	37.07	-0.052	0.000	0.001	1544.73	2664.18
0.00	99.24	24.36	90.00	2.40	37.15	-0.052	0.000	0.001	1556.14	2678.07
0.00	100.27	24.40	90.00	2.32	37.24	-0.051	0.000	0.001	1567.42	2691.66
0.00	101.30	24.45	90.00	2.24	37.32	-0.051	0.000	0.001	1578.59	2704.95
0.00	102.33	24.49	90.00	2.17	37.40	-0.051	0.000	0.001	1589.65	2717.95
0.00	103.36	24.52	90.00	2.09	37.49	-0.050	0.000	0.001	1600.61	2730.67

0.00	104.39	24.56	90.00	2.02	37.57	-0.050	0.000	0.001	1611.48	2743.10
0.00	105.41	24.60	90.00	1.94	37.65	-0.050	0.000	0.001	1622.25	2755.25
0.00	106.44	24.63	90.00	1.87	37.73	-0.049	0.000	0.001	1632.94	2767.11
0.00	107.47	24.66	90.00	1.79	37.81	-0.049	0.000	0.001	1643.55	2778.71
0.00	108.50	24.69	90.00	1.72	37.88	-0.049	0.000	0.001	1654.08	2790.02
0.00	109.53	24.73	90.00	1.65	37.96	-0.049	0.000	0.001	1664.54	2801.07
0.00	110.56	24.75	90.00	1.57	38.04	-0.048	0.000	0.001	1674.93	2811.84
0.00	111.59	24.78	90.00	1.50	38.11	-0.048	0.000	0.001	1685.25	2822.34
0.00	112.62	24.81	90.00	1.43	38.18	-0.048	0.000	0.001	1695.51	2832.58
0.00	113.64	24.83	90.00	1.36	38.25	-0.048	0.000	0.001	1705.71	2842.56
0.00	114.67	24.86	90.00	1.28	38.32	-0.047	0.000	0.001	1715.86	2852.28

X	Y	Z	TH1	TH2	WIDTH	DUCL	DRHO	DCCL	TIME	DILUTION
0.00	115.70	24.88	90.00	1.21	38.39	-0.047	0.000	0.001	1725.95	2861.73
0.00	116.73	24.90	90.00	1.14	38.46	-0.047	0.000	0.001	1735.99	2870.93
0.00	117.76	24.92	90.00	1.07	38.52	-0.047	0.000	0.001	1745.98	2879.87
0.00	118.79	24.94	90.00	1.00	38.58	-0.047	0.000	0.001	1755.93	2888.56
0.00	119.82	24.96	90.00	0.93	38.65	-0.046	0.000	0.001	1765.82	2896.99
0.00	120.85	24.97	90.00	0.86	38.71	-0.046	0.000	0.001	1775.68	2905.18
0.00	121.88	24.99	90.00	0.79	38.76	-0.046	0.000	0.001	1785.50	2913.12
0.00	122.91	25.00	90.00	0.72	38.82	-0.046	0.000	0.001	1795.27	2920.80
0.00	123.94	25.01	90.00	0.65	38.88	-0.046	0.000	0.001	1805.01	2928.25
0.00	124.96	25.02	90.00	0.58	38.93	-0.046	0.000	0.001	1814.72	2935.45
0.00	125.99	25.03	90.00	0.52	38.98	-0.045	0.000	0.001	1824.39	2942.41
0.00	127.02	25.04	90.00	0.45	39.03	-0.045	0.000	0.001	1834.03	2949.13
0.00	128.05	25.05	90.00	0.38	39.08	-0.045	0.000	0.001	1843.63	2955.61
0.00	129.08	25.06	90.00	0.31	39.13	-0.045	0.000	0.001	1853.21	2961.86
0.00	130.11	25.06	90.00	0.25	39.17	-0.045	0.000	0.001	1862.76	2967.87
0.00	131.14	25.07	90.00	0.18	39.21	-0.045	0.000	0.001	1872.28	2973.65
0.00	132.17	25.07	90.00	0.11	39.25	-0.045	0.000	0.001	1881.78	2979.19
0.00	133.20	25.07	90.00	0.05	39.29	-0.045	0.000	0.001	1891.25	2984.51
0.00	134.23	25.07	90.00	-0.02	39.33	-0.045	0.000	0.001	1900.70	2989.61

PLUMES HAVE REACHED MAXIMUM HEIGHT - STRATIFIED ENVIRONMENT
TRAPPING LEVEL= 30.67 METERS BELOW SURFACE, DILUTION=2272.69

APPENDIX II
CDIFF MODEL INPUT/OUTPUT

****** DIFFUSION/ADVECTION MODEL FOR OCEAN DISCHARGE ******
****** EPA REGION 10 ******
****** Dye Study 1 -- Mean Flow ******

DECAY RATE =	.00	DAYS**-1
DIFFUSER WIDTH =	182.	FEET
OCEAN CURRENT =	.6	FEET/SECOND
DISTANCE TO SHORELINE =	450.	FEET
EFFLUENT CONCENTRATION =	100.	
INITIAL DILUTION =	1.0	

DISTANCE (FEET)	EST. CONCENTRATION C/L	S/L	EST. DILUTION C/L	S/L
100.	100.00	.00	1.0	*******
200.	99.92	.00	1.0	*******
300.	99.29	.00	1.0	*******
400.	97.77	.00	1.0	*******
500.	95.51	.00	1.0	*******
600.	92.76	.00	1.1	*******
700.	89.75	.00	1.1	*******
800.	86.63	.00	1.2	*******
900.	83.50	.00	1.2	*******
1000.	80.43	.00	1.2	*******
1100.	77.46	.00	1.3	*******
1200.	74.60	.00	1.3	*******
1300.	71.86	.00	1.4	46605.7
1400.	69.26	.01	1.4	17628.9
1500.	66.79	.01	1.5	7655.7

****** DIFFUSION/ADVECTION MODEL FOR OCEAN DISCHARGE ******
****** EPA REGION 10 ******
****** Dye Study 1 -- Mean Flow/Single Plume ******

DECAY RATE =	.00	DAYS**-1
DIFFUSER WIDTH =	46.	FEET
OCEAN CURRENT =	.6	FEET/SECOND
DISTANCE TO SHORELINE =	450.	FEET
EFFLUENT CONCENTRATION =	100.	
INITIAL DILUTION =	1.0	

DISTANCE (FEET)	EST. CONCENTRATION C/L	S/L	EST. DILUTION C/L	S/L
100.	99.68	.00	1.0	*******
200.	95.31	.00	1.0	*******
300.	87.83	.00	1.1	*******
400.	79.95	.00	1.3	*******
500.	72.68	.00	1.4	*******
600.	66.22	.00	1.5	*******
700.	60.56	.00	1.7	*******
800.	55.61	.00	1.8	*******
900.	51.27	.00	2.0	*******
1000.	47.45	.00	2.1	*******
1100.	44.07	.00	2.3	*******
1200.	41.07	.00	2.4	*******
1300.	38.40	.00	2.6	*******
1400.	35.99	.00	2.8	*******
1500.	33.83	.00	3.0	*******

****** DIFFUSION/ADVECTION MODEL FOR OCEAN DISCHARGE ******
****** EPA REGION 10 ******
****** Dye Study 1 -- Mean Flow -- @ Depth ******

DECAY RATE =	.00	DAYS**-1
DIFFUSER WIDTH =	185.	FEET
OCEAN CURRENT =	.3	FEET/SECOND
DISTANCE TO SHORELINE =	450.	FEET
EFFLUENT CONCENTRATION =	100.	
INITIAL DILUTION =	1.0	

DISTANCE (FEET)	EST. CONCENTRATION C/L	S/L	EST. DILUTION C/L	S/L
100.	99.95	.00	1.0	*******
200.	98.16	.00	1.0	*******
300.	93.65	.00	1.1	*******
400.	87.92	.00	1.1	*******
500.	82.01	.00	1.2	*******
600.	76.35	.00	1.3	*******
700.	71.13	.00	1.4	25411.4
800.	66.37	.02	1.5	5134.1
900.	62.05	.07	1.6	1516.0
1000.	58.15	.17	1.7	582.8
1100.	54.62	.37	1.8	271.1
1200.	51.42	.69	1.9	145.4
1300.	48.51	1.15	2.1	87.0
1400.	45.86	1.76	2.2	56.7
1500.	43.43	2.53	2.3	39.6

****** DIFFUSION/ADVECTION MODEL FOR OCEAN DISCHARGE ******
****** EPA REGION 10 ******
****** Dye Study 1 -- Mean Flow/Single Plume -- @ Depth ***

DECAY RATE =	.00	DAYS**-1
DIFFUSER WIDTH =	46.	FEET
OCEAN CURRENT =	.3	FEET/SECOND
DISTANCE TO SHORELINE =	450.	FEET
EFFLUENT CONCENTRATION =	100.	
INITIAL DILUTION =	1.0	

DISTANCE (FEET)	EST. CONCENTRATION C/L	S/L	EST. DILUTION C/L	S/L
100.	95.90	.00	1.0	*******
200.	81.36	.00	1.2	*******
300.	67.90	.00	1.5	*******
400.	57.34	.00	1.7	*******
500.	49.13	.00	2.0	*******
600.	42.67	.00	2.3	*******
700.	37.50	.00	2.7	*******
800.	33.28	.00	3.0	*******
900.	29.80	.00	3.4	*******
1000.	26.88	.00	3.7	*******
1100.	24.41	.00	4.1	*******
1200.	22.30	.00	4.5	*******
1300.	20.47	.00	4.9	*******
1400.	18.88	.00	5.3	*******
1500.	17.49	.00	5.7	33596.0

****** DIFFUSION/ADVECTION MODEL FOR OCEAN DISCHARGE ******
****** EPA REGION 10 ******
****** Dye Study 2 -- Mean Flow ******

DECAY RATE =	.00	DAYS**-1
DIFFUSER WIDTH =	172.	FEET
OCEAN CURRENT =	.7	FEET/SECOND
DISTANCE TO SHORELINE =	450.	FEET
EFFLUENT CONCENTRATION =	100.	
INITIAL DILUTION =	1.0	

DISTANCE (FEET)	EST. CONCENTRATION C/L	S/L	EST. DILUTION C/L	S/L
100.	100.00	.00	1.0	*******
200.	99.97	.00	1.0	*******
300.	99.65	.00	1.0	*******
400.	98.71	.00	1.0	*******
500.	97.13	.00	1.0	*******
600.	95.05	.00	1.1	*******
700.	92.64	.00	1.1	*******
800.	90.04	.00	1.1	*******
900.	87.35	.00	1.1	*******
1000.	84.64	.00	1.2	*******
1100.	81.97	.00	1.2	*******
1200.	79.35	.00	1.3	*******
1300.	76.81	.00	1.3	*******
1400.	74.36	.00	1.3	*******
1500.	72.00	.00	1.4	*******

****** DIFFUSION/ADVECTION MODEL FOR OCEAN DISCHARGE ******
****** EPA REGION 10 ******
****** Dye Study 2 -- Mean Flow/Single Plume ******

DECAY RATE =	.00	DAYS**-1
DIFFUSER WIDTH =	43.	FEET
OCEAN CURRENT =	.7	FEET/SECOND
DISTANCE TO SHORELINE =	450.	FEET
EFFLUENT CONCENTRATION =	100.	
INITIAL DILUTION =	1.0	

DISTANCE (FEET)	EST. CONCENTRATION C/L	S/L	EST. DILUTION C/L	S/L
100.	99.86	.00	1.0	*******
200.	97.01	.00	1.0	*******
300.	91.11	.00	1.1	*******
400.	84.31	.00	1.2	*******
500.	77.67	.00	1.3	*******
600.	71.57	.00	1.4	*******
700.	66.07	.00	1.5	*******
800.	61.17	.00	1.6	*******
900.	56.81	.00	1.8	*******
1000.	52.91	.00	1.9	*******
1100.	49.43	.00	2.0	*******
1200.	46.30	.00	2.2	*******
1300.	43.48	.00	2.3	*******
1400.	40.94	.00	2.4	*******
1500.	38.63	.00	2.6	*******

****** DIFFUSION/ADVECTION MODEL FOR OCEAN DISCHARGE ******
****** EPA REGION 10 ******
****** Dye Study 2 -- Mean Flow -- @ Depth ******

DECAY RATE =	.00	DAYS**-1
DIFFUSER WIDTH =	172.	FEET
OCEAN CURRENT =	.4	FEET/SECOND
DISTANCE TO SHORELINE =	450.	FEET
EFFLUENT CONCENTRATION =	100.	
INITIAL DILUTION =	1.0	

DISTANCE (FEET)	EST. CONCENTRATION C/L	EST. CONCENTRATION S/L	EST. DILUTION C/L	EST. DILUTION S/L
100.	99.97	.00	1.0	*******
200.	98.74	.00	1.0	*******
300.	95.13	.00	1.1	*******
400.	90.17	.00	1.1	*******
500.	84.81	.00	1.2	*******
600.	79.53	.00	1.3	*******
700.	74.56	.00	1.3	*******
800.	69.95	.00	1.4	90644.7
900.	65.72	.01	1.5	17764.2
1000.	61.86	.02	1.6	4942.6
1100.	58.33	.06	1.7	1771.1
1200.	55.10	.13	1.8	766.2
1300.	52.15	.26	1.9	382.8
1400.	49.44	.47	2.0	214.0
1500.	46.96	.76	2.1	130.9

****** DIFFUSION/ADVECTION MODEL FOR OCEAN DISCHARGE ******
****** EPA REGION 10 ******
****** Dye Study 2 -- Mean Flow/Single Plume -- @ Depth **

DECAY RATE =	.00	DAYS**-1
DIFFUSER WIDTH =	43.	FEET
OCEAN CURRENT =	.4	FEET/SECOND
DISTANCE TO SHORELINE =	450.	FEET
EFFLUENT CONCENTRATION =	100.	
INITIAL DILUTION =	1.0	

DISTANCE (FEET)	EST. CONCENTRATION C/L	S/L	EST. DILUTION C/L	S/L
100.	97.05	.00	1.0	*******
200.	84.44	.00	1.2	*******
300.	71.73	.00	1.4	*******
400.	61.35	.00	1.6	*******
500.	53.09	.00	1.9	*******
600.	46.47	.00	2.2	*******
700.	41.10	.00	2.4	*******
800.	36.68	.00	2.7	*******
900.	32.99	.00	3.0	*******
1000.	29.88	.00	3.3	*******
1100.	27.23	.00	3.7	*******
1200.	24.95	.00	4.0	*******
1300.	22.97	.00	4.4	*******
1400.	21.24	.00	4.7	*******
1500.	19.72	.00	5.1	*******

APPENDIX III
CANNERY DISCHARGE DATA

AVERAGE MONTHLY LOADINGS
for
JOINT CANNERY OUTFALL
May 1992 through June 1993

DATE	TOTAL PHOSPHORUS				TOTAL NITROGEN				BOD5			
	StarKist	Van Camp	Total		StarKist	Van Camp	Total		StarKist	Van Camp	Total	
	lbs/day		lbs/day	kg/day	lbs/day		lbs/day	kg/day	mg/l		lbs/day	kg/day
May-92	53	169	222	101	1060	684	1744	791	(1)	(2)	(3)	(3)
Jun-92	41	144	185	84	970	671	1641	744				
Jul-92	35	103	138	63	686	461	1147	520				
Aug-92	39	128	167	76	775	666	1441	654				
Sep-92	42	162	204	93	751	581	1332	604				
Oct-92	39	168	207	94	644	861	1505	683				
Nov-92	45	171	216	98	512	883	1395	633	182			
Dec-92	41	107	148	67	613	593	1206	547	533			
Jan-93	33	143	176	80	594	624	1218	552	308			
Feb-93	46	154	200	91	448	690	1138	516	287			
Mar-93	110	129	239	108	827	667	1494	678	290			
Apr-93	106	108	214	97	1442	679	2121	962	186			
May-93	77	113	190	86	1184	770	1954	886	383			
Jun-93	55	126	181	82	862	668	1530	694	266			
MEAN	54	138	192	87	812	678	1490	676	304	1487	10093	4578

(1) Van Camp BOD5 effluent concentrations estimated from January and February 1992 and October November 1993 data (representing the available data bracketing the study period).

(2) StarKist BOD5 effluent concentrations estimated from data shown during the study period.

APPENDIX IV
WASTEFIELD TRANSPORT MODEL OUTPUT

PT121 Model Results

Results for the following cases are provided below. For each case the initial and final output pages are provided. The initial (time = 0) page shows the initial concentrations in each cell (initial conditions). The final page shows the predicted steady state concentration in each cell.

Case No.	Constituent	JCO Loading (kg/day)	Background Concentration (mg/l)
1	Total Nitrogen	672	0.100
2	Total Nitrogen	672	0.120
3	Total Phosphorus	87	0.013
4	Total Phosphorus	87	0.014

DISSOLVED CONSTITUENT TRANSPORT SIMULATION FOR PAGO PAGO HARBOR
Total Nitrogen-Loading of 672 kg/day - Background = 100 mg/m3
No Decay Term, Diffusivity Split at 6000 and 26000 m^2 per hour

Day: 1
Step in Day: 0
Time (hrs): 0.00
Water Level (m): -0.01
Output Interval: 960

Table of Concentrations in mg/m^3

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						100	100					
25						100	100					
24						100	100					
23						100	100					
22					100	100	100	100				
21					100	100	100	100				
20					100	100	100	100				
19					100	100	100	100				
18					100	100	100	100				
17					100	100	100	100				
16				100	100	100	100	100	100			
15				100	100	100	100	100	100			
14			100	100	100	100	100	100	100	100		
13			100	100	100	100	100	100	100	100		
12		100	100	100	100	100	100	100	100	100	100	
11		100	100	100	100	100	100	100	100	100	100	
10			100	100	100	100	100	100	100	100		
9			100	100	100	100	100	100	100	100		
8				100	100	100	100	100	100			
7				100	100	100	100	100	100			
6			100	100	100	100	100	100	100	100		
5			100	100	100	100	100	100	100	100		
4		100	100	100	100	100	100	100	100	100	100	
3		100	100	100	100	100	100	100	100	100	100	
2		100	100	100	100	100	100	100	100	100	100	
1		100	100	100	100	100	100	100	100	100	100	
0	100	100	100	100	100	100	100	100	100	100	100	100

DISSOLVED CONSTITUENT TRANSPORT SIMULATION FOR PAGO PAGO HARBOR
Total Nitrogen-Loading of 672 kg/day - Background = 100 mg/m3
No Decay Term, Diffusivity Split at 6000 and 26000 m^2 per hour

Day: 100
Step in Day: 96
Time (hrs): 2400.00
Water Level (m): 0.56
Output Interval: 960

Table of Concentrations in mg/m^3

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						142	142					
25						142	142					
24						143	143					
23						143	143					
22					143	143	143	143				
21					143	143	143	143				
20					144	144	144	144				
19					144	144	144	144				
18					144	144	144	144				
17					144	144	144	144				
16				144	144	144	144	144	145			
15				144	144	144	145	145	145			
14			144	144	144	145	145	145	145	145		
13			144	144	144	145	145	145	145	145		
12		144	144	144	144	145	145	145	145	146	146	
11		144	144	144	144	145	145	146	146	146	146	
10			144	144	144	144	145	147	147	147		
9			143	143	143	144	146	149	149	148		
8				141	141	142	145	155	149			
7				139	138	138	140	142	140			
6			127	132	133	134	134	134	131	128		
5			122	127	129	129	128	127	125	123		
4		112	116	120	123	124	123	122	121	119	116	
3		108	111	114	116	117	117	117	116	115	114	
2		103	105	107	109	110	111	112	112	111	109	
1		101	102	103	104	105	105	106	106	105	104	
0	100	100	100	100	100	100	100	100	100	100	100	100

DISSOLVED CONSTITUENT TRANSPORT SIMULATION FOR PAGO PAGO HARBOR
Total Nitrogen-Loading of 672 kg/day - Background = 120 mg/m^
No Decay Term, Diffusivity Split at 6000 and 26000 m^2 per hour

Day: 1
Step in Day: 0
Time (hrs): 0.00
Water Level (m): -0.01
Output Interval: 960

Table of Concentrations in mg/m^3

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						120	120					
25						120	120					
24						120	120					
23						120	120					
22					120	120	120	120				
21					120	120	120	120				
20					120	120	120	120				
19					120	120	120	120				
18					120	120	120	120				
17					120	120	120	120				
16				120	120	120	120	120	120			
15				120	120	120	120	120	120			
14			120	120	120	120	120	120	120	120		
13			120	120	120	120	120	120	120	120		
12		120	120	120	120	120	120	120	120	120	120	
11		120	120	120	120	120	120	120	120	120	120	
10			120	120	120	120	120	120	120	120		
9			120	120	120	120	120	120	120	120		
8				120	120	120	120	120	120			
7				120	120	120	120	120	120			
6			120	120	120	120	120	120	120	120		
5			120	120	120	120	120	120	120	120		
4		120	120	120	120	120	120	120	120	120	120	
3		120	120	120	120	120	120	120	120	120	120	
2		120	120	120	120	120	120	120	120	120	120	
1		120	120	120	120	120	120	120	120	120	120	
0	120	120	120	120	120	120	120	120	120	120	120	120

DISSOLVED CONSTITUENT TRANSPORT SIMULATION FOR PAGO PAGO HARBOR
Total Nitrogen-Loading of 672 kg/day - Background = 120 mg/m^3
No Decay Term, Diffusivity Split at 6000 and 26000 m^2 per hour

Day: 100
Step in Day: 96
Time (hrs): 2400.00
Water Level (m): 0.56
Output Interval: 960

Table of Concentrations in mg/m^3

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						162	162					
25						162	162					
24						162	162					
23						163	163					
22					163	163	163	163				
21					163	163	163	163				
20					164	163	163	163				
19					164	164	164	164				
18					164	164	164	164				
17					164	164	164	164				
16				164	164	164	164	164	164			
15				164	164	164	164	164	164			
14			164	164	164	164	164	165	165	165		
13			164	164	164	164	165	165	165	165		
12		164	164	164	164	164	165	165	165	165	166	
11		164	164	164	164	164	165	165	166	166	166	
10			164	164	164	164	165	166	167	167		
9			163	163	163	164	165	169	168	168		
8				161	161	162	165	175	169			
7				159	158	158	160	162	160			
6			147	152	153	154	154	154	151	148		
5			142	147	149	149	148	147	145	143		
4		132	136	140	143	144	143	142	141	139	136	
3		128	131	134	136	137	137	137	136	135	134	
2		123	125	127	129	130	131	132	132	131	129	
1		121	122	123	124	125	125	126	126	125	124	
0	120	120	120	120	120	120	120	120	120	120	120	120

DISSOLVED CONSTITUENT TRANSPORT SIMULATION FOR PAGO PAGO HARBOR
Total Phosphorus-Loading of 87 kg/day - Low Background Concentration
No Decay Term, Diffusivity Split at 6000 and 26000 m^2 per hour

Day: 1
Step in Day: 0
Time (hrs): 0.00
Water Level (m): -0.01
Output Interval: 960

Table of Concentrations in mg/m^3

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						13	13					
25						13	13					
24						13	13					
23						13	13					
22					13	13	13	13				
21					13	13	13	13				
20					13	13	13	13				
19					13	13	13	13				
18					13	13	13	13				
17					13	13	13	13				
16				13	13	13	13	13	13			
15				13	13	13	13	13	13			
14			13	13	13	13	13	13	13	13		
13			13	13	13	13	13	13	13	13		
12		13	13	13	13	13	13	13	13	13	13	
11		13	13	13	13	13	13	13	13	13	13	
10			13	13	13	13	13	13	13	13		
9			13	13	13	13	13	13	13	13		
8				13	13	13	13	13	13			
7				13	13	13	13	13	13			
6			13	13	13	13	13	13	13	13		
5			13	13	13	13	13	13	13	13		
4		13	13	13	13	13	13	13	13	13	13	
3		13	13	13	13	13	13	13	13	13	13	
2		13	13	13	13	13	13	13	13	13	13	
1		13	13	13	13	13	13	13	13	13	13	
0	13	13	13	13	13	13	13	13	13	13	13	13

DISSOLVED CONSTITUENT TRANSPORT SIMULATION FOR PAGO PAGO HARBOR
Total Phosphorus-Loading of 87 kg/day - Low Background Concentration
No Decay Term, Diffusivity Split at 6000 and 26000 m^2 per hour

Day: 100
Step in Day: 96
Time (hrs): 2400.00
Water Level (m): 0.56
Output Interval: 960

Table of Concentrations in mg/m^3

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						18	18					
25						18	18					
24						18	18					
23						18	18					
22					18	18	18	18				
21					18	18	18	18				
20					18	18	18	18				
19					18	18	18	18				
18					18	18	18	18				
17					18	18	18	18				
16				18	18	18	18	18	18			
15				18	18	18	18	18	18			
14			18	18	18	18	18	18	18	18		
13			18	18	18	18	18	18	18	18		
12		18	18	18	18	18	18	18	18	19	19	
11		18	18	18	18	18	18	19	19	19	19	
10			18	18	18	18	19	19	19	19		
9			18	18	18	18	19	19	19	19		
8				18	18	18	18	20	19			
7				19	18	18	18	18	18			
6			16	17	17	17	17	17	17	16		
5			16	16	16	16	16	16	16	16		
4		14	15	15	16	16	16	15	15	15	15	
3		14	14	14	15	15	15	15	15	15	14	
2		13	13	13	14	14	14	14	14	14	14	
1		13	13	13	13	13	13	13	13	13	13	
0	13	13	13	13	13	13	13	13	13	13	13	13

IV-2

DISSOLVED CONSTITUENT TRANSPORT SIMULATION FOR PAGO PAGO HARBOR
Total Phosphorus-Loading of 87 kg/day - Background = 14 mg/m^3
No Decay Term, Diffusivity Split at 6000 and 26000 m^2 per hour

Day: 1
Step in Day: 0
Time (hrs): 0.00
Water Level (m): -0.01
Output Interval: 960

Table of Concentrations in mg/m^3

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						14	14					
25						14	14					
24						14	14					
23						14	14					
22					14	14	14	14				
21					14	14	14	14				
20					14	14	14	14				
19					14	14	14	14				
18					14	14	14	14				
17					14	14	14	14				
16				14	14	14	14	14	14			
15				14	14	14	14	14	14			
14			14	14	14	14	14	14	14	14		
13			14	14	14	14	14	14	14	14		
12		14	14	14	14	14	14	14	14	14	14	
11		14	14	14	14	14	14	14	14	14	14	
10			14	14	14	14	14	14	14	14		
9			14	14	14	14	14	14	14	14		
8				14	14	14	14	14	14			
7				14	14	14	14	14	14			
6			14	14	14	14	14	14	14	14		
5			14	14	14	14	14	14	14	14		
4		14	14	14	14	14	14	14	14	14	14	
3		14	14	14	14	14	14	14	14	14	14	
2		14	14	14	14	14	14	14	14	14	14	
1		14	14	14	14	14	14	14	14	14	14	
0	14	14	14	14	14	14	14	14	14	14	14	14

TV 5

DISSOLVED CONSTITUENT TRANSPORT SIMULATION FOR PAGO PAGO HARBOR
Total Phosphorus-Loading of 87 kg/day - Background = 14 mg/m3
No Decay Term, Diffusivity Split at 6000 and 26000 m^2 per hour

Day: 100
Step in Day: 96
Time (hrs): 2400.00
Water Level (m): 0.56
Output Interval: 960

Table of Concentrations in mg/m^3

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						20	20					
25						20	20					
24						20	20					
23						20	20					
22					20	20	20	20				
21					20	20	20	20				
20					20	20	20	20				
19					20	20	20	20				
18					20	20	20	20				
17					20	20	20	20				
16				20	20	20	20	20	20			
15				20	20	20	20	20	20			
14			20	20	20	20	20	20	20	20		
13			20	20	20	20	20	20	20	20		
12		20	20	20	20	20	20	20	20	20	20	
11		20	20	20	20	20	20	20	20	20	20	
10			20	20	20	20	20	20	20	20		
9			20	20	20	20	20	20	20	20		
8				20	20	20	20	21	20			
7				20	19	19	19	20	19			
6			18	19	19	19	19	18	18	18		
5			17	18	18	18	18	18	17	17		
4		16	16	17	17	17	17	17	17	17	16	
3		15	15	16	16	16	16	16	16	16	16	
2		14	15	15	15	15	15	16	16	15	15	
1		14	14	14	15	15	15	15	15	15	15	
0	14	14	14	14	14	14	14	14	14	14	14	14

APPENDIX V
WATER QUALITY MONITORING DATA

Summary of ASG Water Quality Monitoring
5/5/92 through 6/22/94
Total Nitrogen (mg/m3)

Station	Depth (ft)	Sampling Date								Mean	Max	Min
		5/5/92	5/28/92	8/6/92	10/6/92	12-??-92	1/22/93	3/9/93	6/22/93			
5	3	0.104	0.139	0.166	0.149	-	0.066	0.080	0.082			
	60	0.095	0.184	0.120	0.073	-	0.099	0.069	0.014			
	Avg:	***0.100***	***0.162***	***0.143***	***0.111***	-	***0.083***	***0.075***	***0.048***	***0.103***	***0.162***	***0.048***
6	3	0.122	0.272	0.132	0.078	0.138	0.124	0.041	0.122			
	60	0.115	0.111	0.130	0.151	0.103	0.094	0.035	0.122			
	Avg:	***0.119***	***0.192***	***0.131***	***0.115***	***0.121***	***0.109***	***0.038***	***0.122***	***0.118***	***0.192***	***0.038***
7	3	0.152	0.119	0.132	0.122	0.176	0.087	0.071	0.061			
	60	0.124	0.136	0.094	0.186	0.154	0.058	0.237	0.122			
	Avg:	***0.138***	***0.128***	***0.113***	***0.154***	***0.165***	***0.073***	***0.154***	***0.092***	***0.127***	***0.165***	***0.073***
8	3	0.116	0.172	0.123	0.091	0.133	0.106	0.052	0.126			
	60	0.124	0.202	0.183	0.067	0.120	0.094	0.024	0.193			
	Avg:	***0.120***	***0.187***	***0.153***	***0.079***	***0.127***	***0.100***	***0.038***	***0.160***	***0.120***	***0.187***	***0.038***
8a	3	0.087	0.142	0.175	0.137	0.150	0.133	0.035	0.109			
	60	0.120	0.286	0.169	0.156	0.141	0.155	0.164	0.160			
	Avg:	***0.104***	***0.214***	***0.172***	***0.147***	***0.146***	***0.144***	***0.100***	***0.135***	***0.145***	***0.214***	***0.100***
9	3	0.079	0.120	0.212	0.158	0.166	0.131	0.091	0.109			
	60	0.093	0.122	0.148	0.105	0.151	0.133	0.088	0.196			
	Avg:	***0.086***	***0.121***	***0.180***	***0.132***	***0.159***	***0.132***	***0.090***	***0.153***	***0.131***	***0.180***	***0.086***
9a	3	0.109	0.155	0.183	0.121	0.278	0.070	0.136	0.195			
	60	0.115	0.106	0.108	0.110	0.108	0.089	0.080	0.059			
	Avg:	***0.112***	***0.131***	***0.146***	***0.116***	***0.193***	***0.080***	***0.108***	***0.127***	***0.126***	***0.193***	***0.080***
10	3	0.146	0.122	0.160	0.117	0.138	0.089	0.088	0.225			
	60	0.124	0.112	0.134	0.113	0.097	0.102	0.028	0.293			
	Avg:	***0.135***	***0.117***	***0.147***	***0.115***	***0.118***	***0.096***	***0.058***	***0.259***	***0.131***	***0.259***	***0.058***
11	3	0.168	0.143	0.197	0.116	0.127	0.086	0.101	0.193			
	60	0.149	0.114	0.116	0.357	0.109	0.110	0.088	0.160			
	Avg:	***0.159***	***0.129***	***0.157***	***0.237***	***0.118***	***0.098***	***0.095***	***0.177***	***0.146***	***0.237***	***0.095***
11a	3	0.084	0.147	0.222	0.103	0.156	0.108	0.041	0.193			
	60	0.104	0.294	0.154	0.120	0.148	0.076	0.088	0.160			
	Avg:	***0.094***	***0.221***	***0.188***	***0.112***	***0.152***	***0.092***	***0.065***	***0.177***	***0.137***	***0.221***	***0.065***
12	3	0.097	0.103	0.221	0.172	0.188	0.170	0.071	0.252			
	60	0.112	0.061	0.237	0.179	0.183	0.131	0.052	0.193			
	Avg:	***0.105***	***0.082***	***0.229***	***0.176***	***0.186***	***0.151***	***0.062***	***0.223***	***0.151***	***0.229***	***0.062***
13	3	0.157	0.148	0.389	0.229	0.411	0.144	0.102	0.141			
	60	0.182	0.208	0.147	0.144	0.193	0.176	0.039	0.195			
	Avg:	***0.170***	***0.178***	***0.268***	***0.187***	***0.302***	***0.160***	***0.071***	***0.168***	***0.188***	***0.302***	***0.071***
14	3	0.133	0.147	0.183	0.106	0.143	0.086	0.064	0.155			
	60	0.138	0.228	0.550	0.134	0.151	0.086	0.052	0.010			
	Avg:	***0.136***	***0.188***	***0.367***	***0.120***	***0.147***	***0.086***	***0.058***	***0.083***	***0.148***	***0.367***	***0.058***
15	3	0.180	0.143	0.200	0.150	0.134	0.095	0.115	0.185			
	60	0.139	0.233	0.178	0.129	0.111	0.111	0.115	0.045			
	Avg:	***0.160***	***0.188***	***0.189***	***0.140***	***0.123***	***0.103***	***0.115***	***0.115***	***0.141***	***0.189***	***0.103***
16	3	0.103	0.164	0.337	0.183	0.114	0.130	0.039	0.036			
	60	0.166	0.115	0.150	0.137	0.103	0.097	0.147	0.095			
	Avg:	***0.135***	***0.140***	***0.244***	***0.160***	***0.109***	***0.114***	***0.093***	***0.066***	***0.132***	***0.244***	***0.066***
17	3	0.122	0.254	0.239	0.144	0.112	0.086	0.115	0.140			
	60	0.115	0.261	0.244	0.164	0.110	0.097	0.090	0.111			
	Avg:	***0.119***	***0.258***	***0.242***	***0.154***	***0.111***	***0.092***	***0.103***	***0.126***	***0.150***	***0.258***	***0.092***
18	3	0.133	0.156	0.216	0.116	0.117	0.128	0.090	0.185			
	60	0.130	0.183	0.256	0.134	0.108	0.090	0.090	0.156			
	Avg:	***0.132***	***0.170***	***0.236***	***0.125***	***0.113***	***0.109***	***0.090***	***0.171***	***0.143***	***0.236***	***0.090***

Numbers in italics are calculated depth-averaged values

Summary of ASG Water Quality Monitoring
5/5/92 through 6/22/94
Total Phosphorus (mg/m3)

Station	Depth (ft)	Sampling Date								Mean	Max	Min
		5/5/92	5/28/92	8/6/92	10/6/92	12-??-92	1/22/93	3/9/93	6/22/93			
5	3	0.027	0.017	0.013	0.011	-	0.012	0.011	0.009			
	60	0.023	0.014	0.004	0.001	-	0.018	0.008	0.023			
	Avg:	***0.025***	***0.016***	***0.009***	***0.006***	-	***0.015***	***0.010***	***0.016***	***0.014***	***0.025***	***0.006***
6	3	0.025	0.019	0.008	0.001	0.018	0.019	0.007	0.008			
	60	0.028	0.010	0.002	0.002	0.018	0.031	0.017	0.006			
	Avg:	***0.027***	***0.015***	***0.005***	***0.002***	***0.018***	***0.025***	***0.012***	***0.007***	***0.014***	***0.027***	***0.002***
7	3	0.027	0.012	0.008	0.012	0.036	0.015	0.012	0.006			
	60	0.026	0.016	0.003	0.016	0.018	0.011	0.006	0.010			
	Avg:	***0.027***	***0.014***	***0.006***	***0.014***	***0.027***	***0.013***	***0.009***	***0.008***	***0.015***	***0.027***	***0.006***
8	3	0.021	0.024	0.014	0.008	0.016	0.019	0.016	0.013			
	60	0.022	0.027	0.022	0.012	0.014	0.016	0.013	0.009			
	Avg:	***0.022***	***0.026***	***0.018***	***0.010***	***0.015***	***0.018***	***0.015***	***0.011***	***0.017***	***0.026***	***0.010***
8a	3	0.022	0.033	0.023	0.010	0.020	0.023	0.011	0.013			
	60	0.019	0.034	0.020	0.009	0.019	0.024	0.006	0.015			
	Avg:	***0.021***	***0.034***	***0.022***	***0.010***	***0.020***	***0.024***	***0.009***	***0.014***	***0.019***	***0.034***	***0.009***
9	3	0.029	0.021	0.022	0.009	0.022	0.020	0.016	0.013			
	60	0.033	0.023	0.011	0.012	0.020	0.019	0.006	0.014			
	Avg:	***0.031***	***0.022***	***0.017***	***0.011***	***0.021***	***0.020***	***0.011***	***0.014***	***0.018***	***0.031***	***0.011***
9a	3	0.025	0.020	0.016	0.010	0.034	0.010	0.009	0.012			
	60	0.033	0.020	0.011	0.010	0.010	0.013	0.015	0.006			
	Avg:	***0.029***	***0.020***	***0.014***	***0.010***	***0.022***	***0.012***	***0.012***	***0.009***	***0.016***	***0.029***	***0.009***
10	3	0.032	0.021	0.012	0.009	0.020	0.012	0.007	0.009			
	60	0.024	0.018	0.006	0.009	0.010	0.014	0.018	0.008			
	Avg:	***0.028***	***0.020***	***0.009***	***0.009***	***0.015***	***0.013***	***0.013***	***0.009***	***0.014***	***0.028***	***0.009***
11	3	0.029	0.024	0.018	0.007	0.020	0.010	0.010	0.008			
	60	0.032	0.021	0.005	0.041	0.016	0.014	0.019	0.009			
	Avg:	***0.031***	***0.023***	***0.012***	***0.024***	***0.018***	***0.012***	***0.015***	***0.009***	***0.018***	***0.031***	***0.009***
11a	3	0.021	0.024	0.016	0.008	0.026	0.014	0.023	0.010			
	60	0.017	0.068	0.010	0.009	0.025	0.012	0.005	0.006			
	Avg:	***0.019***	***0.046***	***0.013***	***0.009***	***0.026***	***0.013***	***0.014***	***0.008***	***0.018***	***0.046***	***0.008***
12	3	0.030	0.029	0.014	0.012	0.030	0.022	0.007	0.010			
	60	0.022	0.019	0.012	0.012	0.026	0.016	0.006	0.017			
	Avg:	***0.026***	***0.024***	***0.013***	***0.012***	***0.028***	***0.019***	***0.007***	***0.014***	***0.018***	***0.028***	***0.007***
13	3	0.031	0.044	0.020	0.043	0.088	0.024	0.011	0.009			
	60	0.028	0.052	0.010	0.017	0.027	0.028	0.014	0.006			
	Avg:	***0.030***	***0.048***	***0.015***	***0.030***	***0.058***	***0.026***	***0.013***	***0.008***	***0.028***	***0.058***	***0.008***
14	3	0.032	0.001	0.011	0.001	0.014	0.017	0.011	0.017			
	60	0.033	0.034	0.082	21.1*	0.016	0.012	0.016	0.012			
	Avg:	***0.033***	***0.018***	***0.047***		***0.015***	***0.015***	***0.014***	***0.015***	***0.022***	***0.047***	***0.014***
15	3	0.026	0.025	0.018	0.017	0.014	0.016	0.013	0.006			
	60	0.035	0.040	0.015	0.019	0.014	0.019	0.011	0.010			
	Avg:	***0.031***	***0.033***	***0.017***	***0.018***	***0.014***	***0.018***	***0.012***	***0.008***	***0.019***	***0.033***	***0.008***
16	3	0.028	0.027	0.017	0.017	0.020	0.022	0.007	0.013			
	60	0.023	0.019	0.190	0.018	0.010	0.014	0.014	0.002			
	Avg:	***0.026***	***0.023***	***0.104***	***0.018***	***0.015***	***0.018***	***0.011***	***0.008***	***0.028***	***0.104***	***0.008***
17	3	0.021	0.034	0.021	0.019	0.016	0.014	0.006	0.017			
	60	0.025	0.038	0.011	0.019	0.014	0.014	0.006	0.009			
	Avg:	***0.023***	***0.036***	***0.016***	***0.019***	***0.015***	***0.014***	***0.006***	***0.013***	***0.018***	***0.036***	***0.006***
18	3	0.014	0.026	0.024	0.016	0.010	0.020	0.006	0.009			
	60	0.029	0.026	0.036	0.018	0.012	0.017	0.004	0.011			
	Avg:	***0.022***	***0.026***	***0.030***	***0.017***	***0.011***	***0.019***	***0.005***	***0.010***	***0.017***	***0.030***	***0.005***

APPENDIX VI
REVISED PT121 MODEL SOURCE CODE

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'lprint chr$(27)+"&a5L"
'stop
'================================================================================

'                                PT121.BAS
'                           Version 19 June 1991
'                           Modified 22 July 1995
'================================================================================

'================================================================================
'                                HISTORY
'================================================================================

'  This program was initially based on PROGRAM HARBOR (HARBOR.FOR):

'  The program HARBOR was written for the AMERICAN SAMOA ENVIRONMENTAL
'  PROTECTION AGENCY to forecast changes in nutrient levels in Pago Pago
'  harbor in response to changes in loading and outfall location. The
'  original program was written by CHARLES CHAMBERLIN AND MAC MCKEE, HYDRO
'  RESOURCES INTERNATIONAL, ARCATA, CA, 30 DECEMBER 1988.  A version of the
'  program dated 7 OCTOBER 1989 was revised by CHARLES CHAMBERLIN, 11
'  JULY 1990 (HARBOR6.FOR), to permit independent discharge locations for
'  the two cannery outfalls.  The documentation of the original program is
'  given in:

'           Chamberlin, C., M. McKee, and R. Gearheart, 1989.  "A
'           Wasteload Allocation Study for Pago Pago Harbor, American
'           Samoa".  Report prepared for American Samoa Environmental
'           Protection Agency, Pago Pago, American Samoa by
'           Hydro Resources International, Arcata, CA.

'  The program was translated from FORTRAN into TURBOBASIC and I/O routines
'  modified by STEVE COSTA/CH2M HILL (calculation algorithms were unchanged
'  and the program was validated as giving identical results as HARBOR6).

'  The program was rewritten by STEVE COSTA/CH2M HILL in AUGUST 1990 to
'  provide: two dimensional diffusive transport and axisymmetric, two
'  dimensional, bidirectional tidally driven advective transport (the
'  original first order decay terms were retained as in the original).  I/O
'  routines were completely rewritten to facilitate the new computation
'  scheme, program structure was reorganized significantly.  This version
'  of the program is documented in:

'           CH2M HILL, 1991.  "Engineering and Environmental Feasibility
'           Evaluation of Waste Disposal Alternatives".  Report prepared
'           for StarKist Samoa, Inc (through StarKist Seafood Company, Long
'           Beach, CA), March 1991.

'  The program was modified in SEPTEMBER 1990 to allow application with
'  just diffusion and no water level changes or advective transport.  The
'  program was further modified in APRIL 1990 to permit a constant flow
'  rate through a system and in May 1990 to add an oxygen demand/dissolved
'  oxygen calculation and prediction routine.  The modifications were done
'  by STEVE COSTA/CH2M HILL.  This version of the model was presented at
'  an EPA Region 10 Workshop on Mixing Zone Modeling and a model descripion
'  was prepared for workshop attendees:
'
'  The program was revisded in July 1995 to allow the specification of a
'  reaction-rate constant and a value of DO at saturation by Steve Costa.
```

```
'+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
'
'                          INITIALIZE AND INPUT DATA
'
'+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
'Initialize and Setup
'--------------------
PIE = 3.14159265
cls

dim TP(30),XA(30),TB(30),TQ(30),PQOUT(20,30),AX(30),DVOL(30),QX(30),VX(30)
dim TYDE(2000,2),PQ(30)
dim CI(30),EK(30),KD(30),NPL(30),IS%(30),IE%(30),D(20,30),IB%(80),JB%(80)
dim PSL(20,30),BCN%(80),IOUT%(20),JOUT%(30),DVDT(20,30)
dim COLD(20,30),CNEW(20,30),TG%(20,30),BG%(20,30),RG%(20,30),LG%(20,30)
dim IN%(30), AI(20,30),AJ(20,30),VIJ(20,30),DCDT(9,20),QIN(20,30),QOUT(20,30)
dim IDO(30), DOX(20,30),CCOLD(20,30),DCCOLD(20,30)

'Input Name Of JCL File
'----------------------
print "Default Job Control List File Name is JCLPT121."
print "Press <RETURN> with No Entry to Use this File."
input "Otherwise Enter File Name then <RETURN>";JCLNAM$
if JCLNAM$ = "" then JCLNAM$ = "JCLPT121"


'Input Job Control Data
'----------------------
NRUN% = 1
NEXTCASE:

print "NOW READING JOB CONTROL DATA."
open JCLNAM$ for input as #2

input #2, JCLNAM$
input #2, NCASES%

for N% = 1 to NRUN%

   input #2, HYDNAM$
   input #2, TIDNAM$
   input #2, WQNAM$
   input #2, OUTFILE$
   input #2, HYOUTFILE$
   input #2, PTOUTFILE$

   for I% = 1 to 3: input #2, TITLE$(I%): next I%
   input #2, IMAX%,JMAX%
   input #2, DT,DX
   input #2, IDAY0%,IDAYN%
   input #2, NOUT%,NTIDE%
   input #2, IOC%(1)
   for I% = 2 to IOC%(1): input #2, IOC%(I%): next I%

   for J% = 0 to JMAX%
      for I% = 0 to IMAX%
         PQOUT(I%,J%)=0
         PSL(I%,J%)=0
      next I%
   next J%

   for J% = 1 to NOUT%
      input #2, JOUT%(J%),IOUT%(J%)
      input #2, PQOUT(IOUT%(J%),JOUT%(J%)),PSL(IOUT%(J%),JOUT%(J%))
   next J%
```

```
next N%

close #2
NRUN% = NRUN% + 1

if IOC%(2) = 1 then gosub OUTTITLE:

'Input Hydrodynamics/Geometric Data
'-----------------------------------
if NTIDE%=0 then goto SKIPHYDIN:
print "NOW READING HYDRO DATA."
open hydnam$ for input as #2

input #2, hydnam$
input #2, RQ
RQ = 0.043813*RQ*3600

for I% = 1 to JMAX%
   input #2, XA(I%),TP(I%),TB(I%)
next I%

for J% = 1 to JMAX%
   PQ(J%) = 0
   for I% = 1 to IMAX%
      PQ(J%) = PQ(J%) + PQOUT(I%,J%)
   next I%
   TQ(J%) = 3600 * (TB(J%) + 0.043813*PQ(J%))
next J%

close #2

if IOC%(3) = 1 then gosub OUTHYDRO:
if NTIDE% = -1 then goto SKIPHYDIN:

'Input Tidal Data
'----------------
open TIDNAM$ for input as #2
input #2, TIDNAM$
print "NOW READING TIDES."

for I% = 1 to NTIDE%
   input #2, TYDE(I%,1),TYDE(I%,2)
next I%

close #2

if IOC%(4) = 1 then gosub OUTTIDE:
SKIPHYDIN:

'Input Water Quality/Geometric Data
'----------------------------------
print "NOW READING WATER QUALITY DATA."
open WQNAM$ for input as #2
input #2, WQNAM$, KRDO, DOEFF, DOSAT

if IOC%(8) = 1 then
   for J% = 0 to JMAX%
      input#2, J,CI(J%), EK(J%), KD(J%), NPL(J%),IDO(J%)
      for I% = 0 to IMAX%
         DOX(I%,J%) = IDO(J%)
      next I%
   next J%
else
   for J% = 0 to JMAX%
      input#2, J,CI(J%), EK(J%), KD(J%), NPL(J%)
```

```
   next J%
end if

for J% = 1 to JMAX%-1
  input #2, J,IS%(J%),IE%(J%)
  IN%(J%) = IE%(J%) - IS%(J%) + 1
next J%
IS%(0) = IS%(1): IE%(0) = IE%(1): IN%(0) = IN%(1)
IS%(JMAX%) = IS%(JMAX%-1): IE%(JMAX%) = IE%(JMAX%-1)
IN%(JMAX%) = IN%(JMAX%-1)

for J% = 0 to JMAX%
   input #2, J
   for I% = 0 to IMAX%
      input #2, D(I%,J%)
      D(I%,J%) = D(I%,J%)*0.3048
      VIJ(I%,J%) = D(I%,J%)*DX*DX
   next I%
next J%

input #2, NBC%
for KB% = 1 to NBC%
   input #2, KB%,IB%(KB%),JB%(KB%),BCN%(KB%)
next KB%

close #2
if IOC%(5) = 1 then gosub OUTWQ:

'Set Clock and Get First Water Level Elevation
'---------------------------------------------
IPOINT = 1
IDAY%  = IDAY0%
IHR%   = 0
T      = (IDAY0%-1)*24
HOLD   = 0
DH     = 0
HNEW   = 0
if NTIDE%=0 or NTIDE% = -1 then goto SKIPITIDE:
gosub PAGOTIDE
TOLD = T
HOLD = H
SKIPITIDE:
'Set Initial Conditions
'----------------------
for J% = 0 to JMAX%
   for I% = 0 to IMAX%
      if IOC%(8) = 1 then
         CCOLD(I%,J%) = CI(J%)
      elseif IOC%(8) = 0 then
         COLD(I%,J%) = CI(J%)
      end if
   next I%
next J%

'Set Boundary Conditions for Constituent Diffusion
'-------------------------------------------------
for J% = 1 to JMAX%-1
   for I% = IS%(J%) to IE%(J%)
      TG%(I%,J%) = 1
      BG%(I%,J%) = 1
      LG%(I%,J%) = 1
      RG%(I%,J%) = 1
   next I%
next J%
```

```
for KB% = 1 to NBC%
   I%=IB%(KB%)
   J%=JB%(KB%)
   select case BCN%(KB%)
   case 1                                  'Closed Left and Bottom
      LG%(I%,J%) = 0
      BG%(I%,J%) = 0
   case 2                                  'Closed Bottom
      BG%(I%,J%) = 0
   case 3                                  'Closed Right and Bottom
      RG%(I%,J%) = 0
      BG%(I%,J%) = 0
   case 4                                  'Closed Left
      LG%(I%,J%) = 0
   case 5                                  'Closed Right
      RG%(I%,J%) = 0
   case 6                                  'Closed Left and Top
      LG%(I%,J%) = 0
      TG%(I%,J%) = 0
   case 7                                  'Closed Right and Top
      RG%(I%,J%) = 0
      TG%(I%,J%) = 0
   case 8                                  'Closed Top
      TG%(I%,J%) = 0
   end select
next KB%


'+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
'
'                          MAIN DRIVER ROUTINE
'              BEGIN ITERATION LOOP (SIMULATE TIME SEQUENCE)
'
'+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
IHRMAX% = int(24/DT)
if 24/DT <> int(24/DT) then
   print "TIME INCREMENT MUST BE INTEGER FRACTION OF DAY"
   print "Program run has been terminated!!"
   stop
end if
print "BEGINNING SIMULATION."
if IOC%(7) > 0 then gosub OUTCONCALC
if IOC%(8) > 0 then gosub OUTDOCALC

for IDAY% = IDAY0% to IDAYN%
   for IHR% = 1 to IHRMAX%
      T = T + DT

      'Get VX and AX for Next Time Step
      '--------------------------------
      if NTIDE% <> 0 then gosub HYDRO:
      CSTEP% = CSTEP% + 1
      if IOC%(6) = 0 then
         exit if
      elseif CSTEP%/IOC%(6) = int(CSTEP%/IOC%(6)) then
         gosub OUTHYDCALC:
      end if

      'Calculate Concentrations for Next Time Step
      '-------------------------------------------
      gosub CONCCALC:
      if IOC%(8) = 1 then gosub DOCALC
      if IOC%(7) = 0 then
         exit if
      elseif CSTEP%/IOC%(7) = int(CSTEP%/IOC%(7)) then
```

```
                gosub OUTCONCALC:
          if IOC%(8) = 1 then gosub OUTDOCALC:
       end if

   next IHR%
next IDAY%

if NRUN% =< NCASES% then goto NEXTCASE:

END


'+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
'
'           HYDRO CALCUATION ROUTINES CALLED FROM MAIN DRIVER
'
'+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

'------------------------------------------------------------------------------
'       SUBROUTINE TO COMPUTE VELOCITIES AND CROSS SECTIONAL AREAS
'------------------------------------------------------------------------------
HYDRO:

'Get Tide Elevation at Next Time Step
'------------------------------------
if NTIDE% > 0 THEN
   gosub PAGOTIDE:
   HNEW = H
end if

'Compute Flows into Each LineCell
'--------------------------------
DH = HNEW - HOLD
DVOL(JMAX%-1) = ((TP(JMAX%)+TP(JMAX%-1))*.5*DX*DH)
QX(JMAX%-1) = (DVOL(JMAX%-1) / DT) - TQ(JMAX%-1) - RQ
for J% = (JMAX%-2) to 1 step -1
   DVOL(J%) = ((TP(J%)+TP(J%+1))*.5*DX*DH)
   QX(J%) = (DVOL(J%) / DT) - TQ(J%) + QX(J%+1)
next J%


'Compute Cross Sectional Areas and Velocities
'--------------------------------------------
for J%= 1 to (JMAX%-1)
   AX(J%) = XA(J%) + HNEW * TP(J%)
   VX(J%) = QX(J%) / AX(J%)
next J%


'Set Hydro Boundary Condition at end of Harbor
'---------------------------------------------
AX(JMAX%) = XA(JMAX%) + HNEW * TP(JMAX%)
QX(JMAX%) = -RQ
VX(JMAX%) = -RQ/AX(JMAX%)


'Push Time and Elevations into Previous Step
'-------------------------------------------
HOLD = HNEW
TOLD = T


'Calculate Unit Flows for Each Cell from LineCell Flows
'------------------------------------------------------
for J% = 1 to JMAX%-1
```

```
'Flow Into Cells
'---------------
'Flood Tide
'----------
if DH > 0 then
   if IN%(J%) = IN%(J%-1) then
      for I% = IS%(J%) to IE%(J%)
         QIN(I%,J%) = (QX(J%)/IN%(J%))
      next I%
   elseif IN%(J%) < IN%(J%-1) then
      for I% = IS%(J%) to IE%(J%)
         QIN(I%,J%) = (QX(J%)/IN%(J%))
      next I%
   elseif IN%(J%) > IN%(J%-1) then
      RCN% = IN%(J%)/2
      QSF% = IN%(J%-1)/2
      QIN(IS%(J%),J%) = (QX(J%)/IN%(J%))
      QIN(IE%(J%),J%) = (QX(J%)/IN%(J%))
      RCN% = RCN%-1
      for I% = (IS%(J%)+1) to (IS%(J%)+(IN%(J%)/2)-1) step 1
         QIN(I%,J%) =    (QX(J%)/IN%(J%-1))_
                       - (RCN%/QSF%)*(QX(J%)/IN%(J%))_
                       + ((RCN%-1)/QSF%)*(QX(J%)/IN%(J%))
         RCN% = RCN%-1
      next I%
      RCN% = IN%(J%)/2-1
      for I% = (IE%(J%)-1) to (IE%(J%)-(IN%(J%)/2)+1) step -1
         QIN(I%,J%) =    (QX(J%)/IN%(J%-1))_
                       - (RCN%/QSF%)*(QX(J%)/IN%(J%))_
                       + ((RCN%-1)/QSF%)*(QX(J%)/IN%(J%))
         RCN% = RCN%-1
      next I%
   end if

'Ebb Tide
'--------
elseif DH <= 0 then
   if IN%(J%) = IN%(J%+1) then
      for I% = IS%(J%) to IE%(J%)
         QIN(I%,J%) = -(QX(J%+1)/IN%(J%))
      next I%
   elseif IN%(J%) < IN%(J%+1) then
      for I% = IS%(J%) to IE%(J%)
         QIN(I%,J%) = -(QX(J%+1)/IN%(J%))
      next I%
   elseif IN%(J%) > IN%(J%+1) then
      RCN% = IN%(J%)/2
      QSF% = IN%(J%+1)/2
      QIN(IS%(J%),J%) = -((QX(J%+1)/IN%(J%)))
      QIN(IE%(J%),J%) = -((QX(J%+1)/IN%(J%)))
      RCN% = RCN%-1
      for I% = (IS%(J%)+1) to (IS%(J%)+(IN%(J%)/2)-1) step 1
         QIN(I%,J%) = -  (QX(J%+1)/IN%(J%+1))_
                       + (RCN%/QSF%)*(QX(J%+1)/IN%(J%))_
                       - ((RCN%-1)/QSF%)*(QX(J%+1)/IN%(J%))
         RCN% = RCN%-1
      next I%
      RCN% = IN%(J%)/2-1
      for I% = (IE%(J%)-1) to (IE%(J%)-(IN%(J%)/2)+1) step -1
         QIN(I%,J%) = -  (QX(J%+1)/IN%(J%+1))_
                       + (RCN%/QSF%)*(QX(J%+1)/IN%(J%))_
                       - ((RCN%-1)/QSF%)*(QX(J%+1)/IN%(J%))
         RCN% = RCN%-1
      next I%
   end if
```

```
end if

'Flow Out of Cells
'-----------------
'Flood Tide
'----------
if DH > 0 then
   if IN%(J%) = IN%(J%+1) then
      for I% = IS%(J%) to IE%(J%)
         QOUT(I%,J%) = -((QX(J%+1)/IN%(J%)))
      next I%
   elseif IN%(J%) < IN%(J%+1) then
      for I% = IS%(J%) to IE%(J%)
         QOUT(I%,J%) = -((QX(J%+1)/IN%(J%)))
      next I%
   elseif IN%(J%) > IN%(J%+1) then
      RCN% = IN%(J%)/2
      QSF% = IN%(J%+1)/2
      QOUT(IS%(J%),J%) = -((QX(J%+1)/IN%(J%)))
      QOUT(IE%(J%),J%) = -((QX(J%+1)/IN%(J%)))
      RCN% = RCN%-1
      for I% = (IS%(J%)+1) to (IS%(J%)+(IN%(J%)/2)-1) step 1
         QOUT(I%,J%) = -(QX(J%+1)/IN%(J%+1))_
                       + (RCN%/QSF%)*(QX(J%+1)/IN%(J%))_
                       - ((RCN%-1)/QSF%)*(QX(J%+1)/IN%(J%))
         RCN% = RCN%-1
      next I%
      RCN% = IN%(J%)/2-1
      for I% = (IE%(J%)-1) to (IE%(J%)-(IN%(J%)/2)+1) step -1
         QOUT(I%,J%) = -(QX(J%+1)/IN%(J%+1))_
                       + (RCN%/QSF%)*(QX(J%+1)/IN%(J%))_
                       - ((RCN%-1)/QSF%)*(QX(J%+1)/IN%(J%))
         RCN% = RCN%-1
      next I%
   end if

'Ebb Tide
'--------
elseif DH <= 0 then
   if IN%(J%) = IN%(J%-1) then
      for I% = IS%(J%) to IE%(J%)
         QOUT(I%,J%) = ((QX(J%)/IN%(J%)))
      next I%
   elseif IN%(J%) < IN%(J%-1) then
      for I% = IS%(J%) to IE%(J%)
         QOUT(I%,J%) = ((QX(J%)/IN%(J%)))
      next I%
   elseif IN%(J%) > IN%(J%-1) then
      RCN% = IN%(J%)/2
      QSF% = IN%(J%-1)/2
      QOUT(IS%(J%),J%) = ((QX(J%)/IN%(J%)))
      QOUT(IE%(J%),J%) = ((QX(J%)/IN%(J%)))
      RCN% = RCN%-1
      for I% = (IS%(J%)+1) to (IS%(J%)+(IN%(J%)/2)-1) step 1
         QOUT(I%,J%) = + (QX(J%)/IN%(J%-1))_
                       - (RCN%/QSF%)*(QX(J%)/IN%(J%))_
                       + ((RCN%-1)/QSF%)*(QX(J%)/IN%(J%))
         RCN% = RCN%-1
      next I%
      RCN% = IN%(J%)/2-1
      for I% = (IE%(J%)-1) to (IE%(J%)-(IN%(J%)/2)+1) step -1
         QOUT(I%,J%) = + (QX(J%)/IN%(J%-1))_
                       - (RCN%/QSF%)*(QX(J%)/IN%(J%))_
                       + ((RCN%-1)/QSF%)*(QX(J%)/IN%(J%))
         RCN% = RCN%-1
```

```
         next I%
      end if
   end if

next J%

return

'-------------------------------------------------------------------------
'            SUBROUTINE TO COMPUTE TIDES AT PAGO PAGO HARBOR
'              (Using Data Table Lookup and Interpolation)
'-------------------------------------------------------------------------
PAGOTIDE:
if T < TYDE(1,1) or T > TYDE(NTIDE%,1) then
   print "TIDAL ERROR DUE TO INPUT START/STOP DAYS.  PROGRAM ABORTED."
   stop
end if

if T < TYDE(IPOINT,1) then IPOINT = 1
TIDESEARCH:
KP = IPOINT
KP1 = KP + 1
TL = TYDE(KP,1)
TR = TYDE(KP1,1)
if TL  <= T and T <= TR then
   HL = TYDE(KP,2)
   HR = TYDE(KP1,2)
   A  = 0.5 * (HL - HR)
   B  = 0.5 * (HL + HR)
   DTRL = TR - TL
   C  = PIE * (T - TL) / DTRL
   H  = B + A * COS(C)
else
   IPOINT = IPOINT + 1
   goto TIDESEARCH:
end if

H = H / 3.28084

return


'+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
'
'        TRANSPORT CALCULATION ROUTINES CALLED FROM MAIN DRIVER
'
'+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

'-------------------------------------------------------------------------
'              ROUTINE TO CALCULATE TRANSPORT COMPONENTS
'-------------------------------------------------------------------------
CONCCALC:
CPASS% = 0
if IOC%(8) = 1 then
   for J% = 0 to JMAX%
      for I% = 0 to IMAX%
         COLD(I%,J%) = CCOLD(I%,J%)
      next I%
   next J%
   CPASS% = 1
end if
goto STARTCALC:

DOCALC:
if IOC%(8) = 1 then
```

```
   for J% = 0 to JMAX%
      for I% = 0 to IMAX%
         COLD(I%,J%) = DOX(I%,J%)
      next I%
   next J%
   CPASS% = 2
end if

STARTCALC:
'Calculate Diffusive Transport Areas and Cell Volumes
'-----------------------------------------------------
for J%=1 to JMAX%-1
   for I% = IS%(J%) to IE%(J%)
      DVDT(I%,J%) = QIN(I%,J%) + QOUT(I%,J%) + (TQ(J%)/IN%(J%))
      VIJ(I%,J%) = VIJ(I%,J%)  + (DVDT(I%,J%)*DT)
      AI(I%,J%) = (((D(I%-1,J%)+D(I%,J%))/2)+DH)*DX
      AJ(I%,J%) = (((D(I%,J%-1)+D(I%,J%))/2)+DH)*DX
   next I%
next J%

'Calculate Terms in Mass Balance Equation
'----------------------------------------
for J%=1 to JMAX%-1
if NTIDE%=0 then goto SKIPAD:

   for I% = IS%(J%) to IE%(J%)

     '(1) Volume change
     '-----------------
     DCDT(1,I%) = -COLD(I%,J%)*DVDT(I%,J%)/VIJ(I%,J%)

   next I%

'goto skip1:

   'Calculate Advective Terms
   'DCDT(2,I%) and DCDT(3,I%)
   '-------------------------

   if DH = 0 and RQ = 0 then goto SKIPAD:
   gosub ADVECTION:

SKIPAD:
'skip1:

   for I% = IS%(J%) to IE%(J%)

'goto skip:

     '(4) Y-Directed Diffusion In
     '---------------------------
     if BG%(I%,J%) = 0 then
        DCDT(4,I%) = 0
     else
        DCDT(4,I%) = -(AJ(I%,J%)*EK(J%)/VIJ(I%,J%)) * ((COLD(I%,J%)-COLD(I%,J%-1))/DX)
     end if

     '(5) Y-Directed Diffusion Out
     '----------------------------
     if TG%(I%,J%) = 0 then
        DCDT(5,I%) = 0
     else
        DCDT(5,I%) = (AJ(I%,J%+1)*EK(J%+1)/VIJ(I%,J%)) * ((COLD(I%,J%+1)-COLD(I%,J%))/DX)
     end if
```

```
      '(6) X-Directed Diffusion In
      '---------------------------
      if LG%(I%,J%) = 0 then
         DCDT(6,I%) = 0
      else
         DCDT(6,I%) = -(AI(I%,J%)*EK(J%)/VIJ(I%,J%)) * ((COLD(I%,J%)-COLD(I%-1,J%))/DX)
      end if

      '(7) X-Directed Diffusion Out
      '----------------------------
      if RG%(I%,J%) = 0 then
         DCDT(7,I%) = 0
      else
         DCDT(7,I%) = (AI(I%+1,J%)*EK(J%)/VIJ(I%,J%)) * ((COLD(I%+1,J%)-COLD(I%,J%))/DX)
      end if

   next I%

'skip:
'goto skip2:

   for I% = IS%(J%) to IE%(J%)

      '(8) Decay
      '---------
      if CPASS% = 0 then
         DCDT(8,I%) = -KD(J%)*COLD(I%,J%)
      elseif CPASS% = 1 then
         DCDT(8,I%) = -KD(J%)*COLD(I%,J%)
         DCCOLD(I%,J%) = DCDT(8,I%)
      elseif CPASS% = 2 then
         DCDT(8,I%) = DCCOLD(I%,J%)/1000
      end if

   next I%

'skip2:

   for I% = IS%(J%) to IE%(J%)

      '(9) External Input
      '------------------
      if CPASS% = 0 or CPASS% = 1 then
         if I% = IS% or IE% then NPS=(NPL(J%)/2)*(10^6/24) else NPS=0
         if PSL(I%,J%) > 0 then PSS=PSL(I%,J%)*(10^6/24) else PSS=0
         if PSL(I%,J%) =-1 then PSS=COLD(I%,J%)*PQOUT(I%,J%)*157.7*DT
         DCDT(9,I%) =  (NPS+PSS)/VIJ(I%,J%)
      elseif CPASS% = 2 then
         if PSL(I%,J%) > 0 then PSSDO=DOEFF*PQOUT(I%,J%)*(157.7)*DT else PSSDO=0
         if PSL(I%,J%) =-1 then PSSDO=COLD(I%,J%)*PQOUT(I%,J%)*157.7*DT
         DCDT(9,I%) =  (PSSDO/VIJ(I%,J%))+KRDO*(DOSAT-COLD(I%,J%))
      end if

   next I%

'skip:

   for I% = IS%(J%) to IE%(J%)

      'Calculate New Concentration
      '---------------------------
      DCDT=0
      for K%=1 to 9: DCDT=DCDT+DCDT(K%,I%): next K%
      CNEW(I%,J%) = COLD(I%,J%) + DT*DCDT
      if CSTEP%/IOC%(7) = int(CSTEP%/IOC%(7)) then
```

```
         'width "LPT1:",130
         'lprint IDAY%;IHR%;I%;J%;cnew(i%,j%);qin(i%,j%);qout(i%,j%);
         'lprint dvdt(i%,j%)
         print IDAY%;IHR%;I%;J%;cnew(i%,j%)

     end if

   next I%

next J%


'Push New Concentration Values into Previous Step
'-------------------------------------------------
for J% = 1 to JMAX%-1
   for I% = IS%(J%) to IE%(J%)
      if CPASS%=0 then
         COLD(I%,J%)=CNEW(I%,J%)
      elseif CPASS% = 1 then
         CCOLD(I%,J%)=CNEW(I%,J%)
      elseif CPASS% = 2 then
         DOX(I%,J%) = CNEW(I%,J%)
      end if
   next I%
next J%

return

'------------------------------------------------------------------------
'          ROUTINE TO CALCULATE ADVECTIVE TRANSPORT TERMS
'------------------------------------------------------------------------
   ADVECTION:
   '(2) Advective Transport In
   '--------------------------

   'Flood Tide
   '----------
   if (DH=> 0) or (DH=0 and RQ<0) then
      if IN%(J%) = IN%(J%-1) then
         for I% = IS%(J%) to IE%(J%)
            DCDT(2,I%) = ((QX(J%)/IN%(J%))*COLD(I%,J%-1))/VIJ(I%,J%)
         next I%
      elseif IN%(J%) < IN%(J%-1) then
         for I% = IS%(J%) to IE%(J%)
            DCDT(2,I%) = ((QX(J%)/IN%(J%))*COLD(I%,J%-1))/VIJ(I%,J%)
         next I%
      elseif IN%(J%) > IN%(J%-1) then
         RCN% = IN%(J%)/2
         QSF% = IN%(J%-1)/2
         DCDT(2,IS%(J%)) = ((QX(J%)/IN%(J%))*COLD(IS%(J%)+1,J%))/VIJ(IS%(J%),J%)
         DCDT(2,IE%(J%)) = ((QX(J%)/IN%(J%))*COLD(IE%(J%)-1,J%))/VIJ(IE%(J%),J%)
         RCN% = RCN%-1
         for I% = (IS%(J%)+1) to (IS%(J%)+(IN%(J%)/2)-1) step 1
            DCDT(2,I%) = (QX(J%)/IN%(J%-1))*COLD(I%,J%-1)_
                         - (RCN%/QSF%)*(QX(J%)/IN%(J%))*COLD(I%,J%)_
                         + ((RCN%-1)/QSF%)*(QX(J%)/IN%(J%))*COLD(I%+1,J%)
            DCDT(2,I%) = DCDT(2,I%)/VIJ(I%,J%)
            RCN% = RCN%-1
         next I%
         RCN% = IN%(J%)/2-1
         for I% = (IE%(J%)-1) to (IE%(J%)-(IN%(J%)/2)+1) step -1
            DCDT(2,I%) = (QX(J%)/IN%(J%-1))*COLD(I%,J%-1)_
                         - (RCN%/QSF%)*(QX(J%)/IN%(J%))*COLD(I%,J%)_
                         + ((RCN%-1)/QSF%)*(QX(J%)/IN%(J%))*COLD(I%-1,J%)
            DCDT(2,I%) = DCDT(2,I%)/VIJ(I%,J%)
```

```
         RCN% = RCN%-1
      next I%
   end if

'Ebb Tide
'--------
elseif (DH<0) or (DH=0 and Rq>0) then
   if IN%(J%) = IN%(J%+1) then
      for I% = IS%(J%) to IE%(J%)
         DCDT(2,I%) = -((QX(J%+1)/IN%(J%))*COLD(I%,J%+1))/VIJ(I%,J%)
      next I%
   elseif IN%(J%) < IN%(J%+1) then
      for I% = IS%(J%) to IE%(J%)
         DCDT(2,I%) = -((QX(J%+1)/IN%(J%))*COLD(I%,J%+1))/VIJ(I%,J%)
      next I%
   elseif IN%(J%) > IN%(J%+1) then
      RCN% = IN%(J%)/2
      QSF% = IN%(J%+1)/2
      DCDT(2,IS%(J%)) = -((QX(J%+1)/IN%(J%))*COLD(IS%(J%)+1,J%))/VIJ(IS%(J%),J%)
      DCDT(2,IE%(J%)) = -((QX(J%+1)/IN%(J%))*COLD(IE%(J%)-1,J%))/VIJ(IE%(J%),J%)
      RCN% = RCN%-1
      for I% = (IS%(J%)+1) to (IS%(J%)+(IN%(J%)/2)-1) step 1
         DCDT(2,I%) = (QX(J%+1)/IN%(J%+1))*COLD(I%,J%+1)_
                    - (RCN%/QSF%)*(QX(J%+1)/IN%(J%))*COLD(I%,J%)_
                    + ((RCN%-1)/QSF%)*(QX(J%+1)/IN%(J%))*COLD(I%+1,J%)
         DCDT(2,I%) = -DCDT(2,I%)/VIJ(I%,J%)
         RCN% = RCN%-1
      next I%
      RCN% = IN%(J%)/2-1
      for I% = (IE%(J%)-1) to (IE%(J%)-(IN%(J%)/2)+1) step -1
         DCDT(2,I%) = (QX(J%+1)/IN%(J%+1))*COLD(I%,J%+1)_
                    - (RCN%/QSF%)*(QX(J%+1)/IN%(J%))*COLD(I%,J%)_
                    + ((RCN%-1)/QSF%)*(QX(J%+1)/IN%(J%))*COLD(I%-1,J%)
         DCDT(2,I%) = -DCDT(2,I%)/VIJ(I%,J%)
         RCN% = RCN%-1
      next I%
   end if
end if

'(3) Advective Transport Out
'---------------------------
'Flood Tide
'----------
if (DH > 0) or (DH=0 and RQ<0) then
   if IN%(J%) = IN%(J%+1) then
      for I% = IS%(J%) to IE%(J%)
         DCDT(3,I%) = -((QX(J%+1)/IN%(J%))*COLD(I%,J%))/VIJ(I%,J%)
      next I%
   elseif IN%(J%) < IN%(J%+1) then
      for I% = IS%(J%) to IE%(J%)
         DCDT(3,I%) = -((QX(J%+1)/IN%(J%))*COLD(I%,J%))/VIJ(I%,J%)
      next I%
   elseif IN%(J%) > IN%(J%+1) then
      RCN% = IN%(J%)/2
      QSF% = IN%(J%+1)/2
      DCDT(3,IS%(J%)) = -((QX(J%+1)/IN%(J%))*COLD(IS%(J%),J%))/VIJ(IS%(J%),J%)
      DCDT(3,IE%(J%)) = -((QX(J%+1)/IN%(J%))*COLD(IE%(J%),J%))/VIJ(IE%(J%),J%)
      RCN% = RCN%-1
      for I% = (IS%(J%)+1) to (IS%(J%)+(IN%(J%)/2)-1) step 1
         DCDT(3,I%) = -(QX(J%+1)/IN%(J%+1))*COLD(I%,J%)_
                    + (RCN%/QSF%)*(QX(J%+1)/IN%(J%))*COLD(I%-1,J%)_
                    - ((RCN%-1)/QSF%)*(QX(J%+1)/IN%(J%))*COLD(I%,J%)
         DCDT(3,I%) = DCDT(3,I%)/VIJ(I%,J%)
         RCN% = RCN%-1
      next I%
```

```
         RCN% = IN%(J%)/2-1
         for I% = (IE%(J%)-1) to (IE%(J%)-(IN%(J%)/2)+1) step -1
            DCDT(3,I%) = -(QX(J%+1)/IN%(J%+1))*COLD(I%,J%)_
                         + (RCN%/QSF%)*(QX(J%+1)/IN%(J%))*COLD(I%+1,J%)_
                         - ((RCN%-1)/QSF%)*(QX(J%+1)/IN%(J%))*COLD(I%,J%)
            DCDT(3,I%) = DCDT(3,I%)/VIJ(I%,J%)
            RCN% = RCN%-1
         next I%
      end if

   'Ebb Tide
   '--------
   elseif (DH < 0) or (DH=0 and RQ>0) then
      if IN%(J%) = IN%(J%-1) then
         for I% = IS%(J%) to IE%(J%)
            DCDT(3,I%) = ((QX(J%)/IN%(J%))*COLD(I%,J%))/VIJ(I%,J%)
         next I%
      elseif IN%(J%) < IN%(J%-1) then
         for I% = IS%(J%) to IE%(J%)
            DCDT(3,I%) = ((QX(J%)/IN%(J%))*COLD(I%,J%))/VIJ(I%,J%)
         next I%
      elseif IN%(J%) > IN%(J%-1) then
         RCN% = IN%(J%)/2
         QSF% = IN%(J%-1)/2
         DCDT(3,IS%(J%)) = ((QX(J%)/IN%(J%))*COLD(IS%(J%),J%))/VIJ(IS%(J%),J%)
         DCDT(3,IE%(J%)) = ((QX(J%)/IN%(J%))*COLD(IE%(J%),J%))/VIJ(IE%(J%),J%)
         RCN% = RCN%-1
         for I% = (IS%(J%)+1) to (IS%(J%)+(IN%(J%)/2)-1) step 1
            DCDT(3,I%) = -(QX(J%)/IN%(J%-1))*COLD(I%,J%)_
                         + (RCN%/QSF%)*(QX(J%)/IN%(J%))*COLD(I%-1,J%)_
                         - ((RCN%-1)/QSF%)*(QX(J%)/IN%(J%))*COLD(I%,J%)
            DCDT(3,I%) = -DCDT(3,I%)/VIJ(I%,J%)
            RCN% = RCN%-1
         next I%
         RCN% = IN%(J%)/2-1
         for I% = (IE%(J%)-1) to (IE%(J%)-(IN%(J%)/2)+1) step -1
            DCDT(3,I%) = -(QX(J%)/IN%(J%-1))*COLD(I%,J%)_
                         + (RCN%/QSF%)*(QX(J%)/IN%(J%))*COLD(I%+1,J%)_
                         - ((RCN%-1)/QSF%)*(QX(J%)/IN%(J%))*COLD(I%,J%)
            DCDT(3,I%) = -DCDT(3,I%)/VIJ(I%,J%)
            RCN% = RCN%-1
         next I%
      end if
   end if

   return

'----------------------------------------
'FUNCTION TO ACCOUNT FOR DIRECTION OF FLOW
'[C = Flow, A and B are adjacent conc's]
'----------------------------------------
'def FNdir(A,B,C)
'   if  C <= 0 then
'      FNdir=B
'   else
'      FNdir=A
'   end if
'end def



'++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
'
'                              OUTPUT SUBROUTINES
'
```

```
'++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
'-------------------------------------------------------------------------------
'          OUTPUT ROUTINES FOR MODEL SETUP AND INPUT DATA
'-------------------------------------------------------------------------------
'Routine to output title page
'---------------------------
OUTTITLE:
open OUTFILE$ for output as #1
if OUTFILE$="LPT1:" then lprint chr$(27)+"&a10L"

for I% = 1 to 3
   print #1, TITLE$(I%)
next I%
print #1,

print #1, "Job Control File is:                ";JCLNAM$
print #1, "Hydrodynamics/Geometric File is:    ";HYDNAM$
print #1, "Tidal Data File is:                 ";TIDNAM$
print #1, "Water Quality/Geometric File is:    ";WQNAM$
print #1, "Output File is:                     ";OUTFILE$
print #1, "Hydro Output File is:               ";HYOUTFILE$
print #1, "Concentrations Output File is:      ";PTOUTFILE$
print #1,

print #1, "Model grid is";IMAX%; "wide and";JMAX%; "long."
print #1,
print #1, "Time Increment in hours             =";
print #1, using "##";DT
print #1, "Length Increment in meters          =";
print #1, using "####";DX
print #1, "Start day in tide table             =";IDAY0%
print #1, "End day in tide table               =";IDAYN%
print #1, "Number of point source discharges   =";NOUT%
print #1, "Number of tidal extrema used        =";NTIDE%
print #1,
print #1, "I/O control string is:";
for I% = 1 to IOC%(1): print #1, using "##";IOC%(I%);: next I%
print #1, chr$(12)

close #1
return


'Routine to Output Hydro/Geo Data
'--------------------------------
OUTHYDRO:
open "A", #1,OUTFILE$
if OUTFILE$="LPT1:" then lprint chr$(27)+"&a10L"

for I% = 1 to 3
   print #1, TITLE$(I%)
next I%
print #1,
print #1, "Riverine Flow = ";
print #1, using "###.#####";RQ/3600;
print #1, "(m^3/s) = ";
print #1, using "###.##    ";RQ/(3600*0.043813);
print #1, "(mgd)"
print #1,
print #1,
print #1, "Node  Surface    Cross-sectional    Nonpoint    Point source    Total"
print #1, " No.   Width          Area           Inflow        Inflow       Inflow"
print #1, "       (m)          (m^2)          (m^3/s)       (mgd)      (m^3/hr)"
print #1, "----  --------   ---------------    ---------  ------------  --------"
```

```
K% = 1
for I% = 1 to JMAX%
   print #1, using "###";I%;
   print #1, using "   ######";TP(I%);
   print #1, using "     ##########";XA(I%);
   print #1, using "         ###.###";TB(I%);
   if JOUT%(K%) = I% then
      print #1, using "      #####.##";PQ(I%);
      K% = K% + 1
   else
      print #1, "              ";
   end if
   print #1, using "     ####.###";TQ(I%)
next I%
print #1, chr$(12)

close #1
return


'Routine to Output Tidal Level Data
'-----------------------------------
OUTTIDE:
open "A", #1,OUTFILE$
if OUTFILE$="LPT1:" then lprint chr$(27)+"&a10L"

for I% = 1 to 3
   print #1, TITLE$(I%)
next I%
print #1,
print #1,

print #1, "Number of Tidal Extrema Used =";NTIDE%
print #1,

for J% = 1 to 3: print #1, "  Time    Elevation  ";: next J%: print #1,
for J% = 1 to 3: print #1, "  (hrs)    (ft)  (m)  ";: next J%: print #1,
for J% = 1 to 3: print #1, "-------  ----  ----  ";: next J%: print #1,

for I% = 1 to NTIDE% step 3
   for J% = 0 to 2
      print #1, using "####.##";TYDE(I%+J%,1);
      print #1, using "###.##";TYDE(I%+J%,2);
      print #1, using "###.##  ";TYDE(I%+J%,2)*0.3048;
   next J%
   print #1,
next I%
print #1, chr$(12)

close #1
return

'Routine to Output Water Quality/Geo Data
'-----------------------------------------
OUTWQ:
open "A", #1,OUTFILE$
if OUTFILE$="LPT1:" then lprint chr$(27)+"&a5L"

for I% = 1 to 3
   print #1, TITLE$(I%)
next I%
print #1,
print #1,

print #1, "Cell  Initial   Diffusivity  Decay   Initial  Nonpoint  Point Souce"
```

```
print #1, "Line   Conc       Coeff.      Rate      DO    Loading     Loading  "
print #1, "       (mg/m^3)   (m^2/hr)    (1/hr)  (mg/l)   (kg/day)     (kg/day) "
print #1, "----  --------  -----------  ------  -------  --------  -----------"
for J% = JMAX%-1 to 1 step -1
   print #1, using "###    ";J%;
   print #1, using " ###.##    ";CI(J%);
   print #1, using "  #######     ";EK(J%);
   print #1, using "#.####   ";KD(J%);
   print #1, using " ##.## ";IDO(J%);
   print #1, using " ##.### ";NPL(J%);
   for I% = IS%(J%) to IE%(J%)
      if PSL(I%,J%) <> 0 then
         print #1, tab(47)
         print #1, using "##### ";PSL(I%,J%);
         print #1, " @ I=";
         print #1, I%
      end if
   next I%
   print #1,
next J%
print #1, chr$(12)

print #1, "Table of Cell Depths in Meters"
print #1,
print #1, "J/I ";
for I% = 0 to IMAX%: print #1, using "  ### ";I%;: next I%: print #1,
print #1, "___ ";
for I% = 0 to IMAX%: print #1, "_____ ";: next I%: print #1,
for J% = JMAX% to 0 step -1
   print #1, using "### ";J%;
   for I% = 0 to IMAX%
      print #1, using "##.## ";D(I%,J%);
   next I%
   print #1,
next J%
print #1, chr$(12)

print #1, "Table of Boundary Conditions"
print #1,

for J% = 1 to 3: print #1, "  I     J     BC    ";: next J%: print #1,
for J% = 1 to 3: print #1, " ----  ----  ----    ";: next J%: print #1,

for I% = 1 to NBC% step 3
   for J% = 0 to 2
      print #1, using " ###  ";IB%(I%+J%);JB%(I%+J%);BCN%(I%+J%);
      print #1, "  ";
   next J%
   print #1,
next I%
print #1,
print #1,
print #1, "(BC is Boundary Condition Designator)"

print #1, chr$(12)

close #1
return

'-------------------------------------------------------------------------
'           OUTPUT ROUTINES FOR RESULTS OF MODEL RUN
'-------------------------------------------------------------------------
'Routine to Output Hydro Calculations
'-----------------------------------
OUTHYDCALC:
```

```
open HYOUTFILE$ for append as #3
if HYOUTFILE$="LPT1:" then lprint chr$(27)+"&a10L"

for I% = 1 to 3
   print #3, TITLE$(I%)
next I%
print #3,
print #3,

print #3, "Day:                ";IDAY%
print #3, "Hour:               ";IHR%
print #3, "Time (hrs):         ";:print #3, using "######.##";T
print #3, "Water Level (m):    ";:print #3, using "####.####";HNEW
print #3, "Output Interval:    ";:print #3, IOC%(6)
print #3,

print #3, "Cell  Change in Volume  Flow Rate  XSection Area  Velocity"
print #3, "            (m^3)         (m^3/hr)      (m^2)       (m/hr)
print #3, "----  ----------------  ---------  -------------  --------"
for J% = JMAX% to 1 step -1
   print #3, using "###";J%;
   print #3, using "       ######";DVOL(J%);
   print #3, using "       ########";QX(J%);
   print #3, using "        #####";AX(J%);
   print #3, using "     ####.##";VX(J%)
next J%

print #3, chr$(12)

close #3
return

'Routine to Output Concentration Calculations
'--------------------------------------------
OUTCONCALC:

if CPASS% = 0 then
   for J% = 1 to JMAX%-1
      for I% = IS%(J%) to IE%(J%)
         CCOLD(I%,J%)=COLD(I%,J%)
      next I%
   next J%
end if

open PTOUTFILE$ for append as #4
if PTOUTFILE$ = "LPT1:" then lprint chr$(27)+"&a5L"

for I% = 1 to 3
   print #4, TITLE$(I%)
next I%
print #4,
print #4,

print #4, "Day:                ";IDAY%
print #4, "Step in Day:        ";IHR%
print #4, "Time (hrs):         ";:print #4, using "######.##";T
print #4, "Water Level (m):    ";:print #4, using "######.##";H
print #4, "Output Interval:    ";:print #4, IOC%(7)
print #4,
print #4,

print #4, "Table of Concentrations in mg/m^3"
print #4,
print #4, "J/I ";
for I% = 0 to IMAX%: print #4, using "  ### ";I%;: next I%: print #4,
```

```
print #4, "___ ";
for I% = 0 to IMAX%: print #4, "_____ ";: next I%: print #4,

print #4, using "### ";JMAX%;
for I% = 0 to IS%(JMAX%-1)-1:print #4, "      ";:next I%
for I% = IS%(JMAX%-1) to IE%(JMAX%-1)
   if TG%(I%,JMAX%-1)=1 then print #4, spc(6); else print #4, "_____";
next I%
print #4,

for J% = JMAX%-1 to 1 step -1
   print #4, using "### ";J%;
   for I% = 0 to IMAX%
      if I% =(IS%(J%)-1) then
         print #4, "     |";
      elseif I% =(IE%(J%)+1) then
         print #4, "|";
      elseif I% < (IS%(J%)-1) or I% > (IE%(J%)+1) then
         print #4, spc(6);
      elseif I%=>IS%(J%) and I%=<IE%(J%) then
         print #4, using "##### ";CCOLD(I%,J%);
      end if
   next I%
   print #4,
next J%

print #4, using "### ";0;
for I% = 0 to IMAX%
   print #4, using "##### ";CCOLD(I%,0);
next I%
print #4,

print #4, chr$(12)

close #4
return

'Routine to Output Dissolved Oxygen Calculations
'-----------------------------------------------
OUTDOCALC:
open PTOUTFILE$ for append as #4
if PTOUTFILE$ = "LPT1:" then lprint chr$(27)+"&a5L"

for I% = 1 to 3
   print #4, TITLE$(I%)
next I%
print #4,
print #4,

print #4, "Day:              ";IDAY%
print #4, "Step in Day:      ";IHR%
print #4, "Time (hrs):       ";:print #4, using "######.##";T
print #4, "Water Level (m):  ";:print #4, using "######.##";H
print #4, "Output Interval:  ";:print #4, IOC%(7)
print #4,
print #4,

print #4, "Table of Dissolved Oxygen Concentrations in mg/l"
print #4,
print #4, "J/I ";
for I% = 0 to IMAX%: print #4, using "  ### ";I%;: next I%: print #4,
print #4, "___ ";
for I% = 0 to IMAX%: print #4, "_____ ";: next I%: print #4,

print #4, using "### ";JMAX%;
```

```
for I% = 0 to IS%(JMAX%-1)-1:print #4, "      ";:next I%
for I% = IS%(JMAX%-1) to IE%(JMAX%-1)
   if TG%(I%,JMAX%-1)=1 then print #4, spc(6); else print #4, "______";
next I%
print #4,

for J% = JMAX%-1 to 1 step -1
   print #4, using "### ";J%;
   for I% = 0 to IMAX%
      if I% =(IS%(J%)-1) then
         print #4, "     ¦";
      elseif I% =(IE%(J%)+1) then
         print #4, "¦";
      elseif I% < (IS%(J%)-1) or I% > (IE%(J%)+1) then
         print #4, spc(6);
      elseif I%=>IS%(J%) and I%=<IE%(J%) then
         print #4, using "##.## ";DOX(I%,J%);
      end if
   next I%
   print #4,
next J%

print #4, using "### ";0;
for I% = 0 to IMAX%
   print #4, using "##### ";DOX(I%,0);
next I%
print #4,

print #4, chr$(12)

close #4
return
```

APPENDIX VII
BOD-DO MODEL RESULTS

BOD - DISSOLVED OXYGEN SIMULATION FOR PAGO PAGO HARBOR
Model Run No. 5 - Reference Case - Nominal Kr (0.00528/hr)
BODu = 0000 kg/day - K = 0.0152/hr - Diffusivity @6000 & 26000 m^2/hr)

Day: 25
Step in Day: 96
Time (hrs): 600.00
Water Level (m): 0.55
Output Interval: 2400

Table of Dissolved Oxygen Concentrations in mg/l

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						6.11	6.11					
25						6.12	6.12					
24						6.13	6.13					
23						6.14	6.14					
22					6.14	6.14	6.14	6.14				
21					6.14	6.14	6.14	6.14				
20					6.14	6.14	6.14	6.14				
19					6.14	6.14	6.14	6.14				
18					6.14	6.14	6.14	6.14				
17					6.13	6.13	6.13	6.13				
16				6.12	6.12	6.12	6.12	6.12	6.12			
15				6.12	6.12	6.12	6.12	6.12	6.12			
14			6.12	6.12	6.12	6.12	6.12	6.12	6.12	6.12		
13			6.11	6.11	6.12	6.12	6.12	6.11	6.11	6.11		
12		6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	
11		6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	
10			6.10	6.10	6.10	6.10	6.10	6.10	6.10	6.10		
9			6.10	6.10	6.10	6.10	6.10	6.09	6.09	6.10		
8				6.09	6.09	6.09	6.09	6.09	6.09			
7				6.08	6.08	6.08	6.08	6.08	6.08			
6			6.06	6.07	6.07	6.07	6.07	6.07	6.07	6.06		
5			6.05	6.06	6.07	6.07	6.06	6.06	6.06	6.06		
4		6.03	6.04	6.05	6.06	6.06	6.06	6.05	6.05	6.05	6.04	
3		6.02	6.03	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	
2		6.01	6.02	6.02	6.02	6.03	6.03	6.03	6.03	6.03	6.03	
1		6.01	6.01	6.01	6.01	6.01	6.02	6.02	6.02	6.01	6.01	
0	6	6	6	6	6	6	6	6	6	6	6	6

BOD - DISSOLVED OXYGEN SIMULATION FOR PAGO PAGO HARBOR
Model Run No. 5 - Reference Case - Nominal Kr (0.00528/hr)
BODu = 0000 kg/day - K = 0.0152/hr - Diffusivity @6000 & 26000 m^2/hr)

Day: 50
Step in Day: 96
Time (hrs): 1200.00
Water Level (m): 0.42
Output Interval: 2400

Table of Dissolved Oxygen Concentrations in mg/l

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						6.12	6.12					
25						6.12	6.12					
24						6.13	6.13					
23						6.14	6.14					
22					6.14	6.14	6.14	6.14				
21					6.14	6.14	6.14	6.14				
20					6.14	6.14	6.14	6.14				
19					6.14	6.14	6.14	6.14				
18					6.14	6.14	6.14	6.14				
17					6.13	6.13	6.13	6.13				
16				6.12	6.12	6.12	6.12	6.12	6.12			
15				6.12	6.12	6.12	6.12	6.12	6.12			
14			6.12	6.12	6.12	6.12	6.12	6.12	6.12	6.12		
13			6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11		
12		6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	
11		6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	
10			6.11	6.10	6.10	6.10	6.10	6.10	6.10	6.10		
9			6.10	6.10	6.10	6.10	6.10	6.10	6.10	6.10		
8				6.09	6.09	6.09	6.09	6.09	6.09			
7				6.08	6.08	6.08	6.08	6.08	6.08			
6			6.07	6.08	6.07	6.07	6.07	6.07	6.07	6.07		
5			6.06	6.07	6.07	6.07	6.06	6.06	6.06	6.06		
4		6.05	6.06	6.06	6.06	6.06	6.05	6.05	6.05	6.05	6.05	
3		6.04	6.05	6.05	6.04	6.04	6.04	6.04	6.04	6.04	6.04	
2		6.03	6.03	6.03	6.03	6.03	6.03	6.03	6.03	6.03	6.03	
1		6.02	6.02	6.02	6.02	6.02	6.02	6.02	6.02	6.02	6.02	
0	6	6	6	6	6	6	6	6	6	6	6	6

BOD - DISSOLVED OXYGEN SIMULATION FOR PAGO PAGO HARBOR
Model Run No. 6 - Nominal Case - Nominal Kr (0.01532/hr)
BODu = 6684 kg/day - K = 0.0152/hr - Diffusivity @6000 & 26000 m^2/hr)

Day: 25
Step in Day: 96
Time (hrs): 600.00
Water Level (m): 0.55
Output Interval: 2400

Table of Concentrations in mg/m^3

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						9	9					
25						10	10					
24						12	12					
23						14	14					
22					17	17	17	17				
21					20	20	20	20				
20					26	25	24	25				
19					33	31	31	32				
18					41	39	39	40				
17					51	50	50	50				
16				66	65	65	65	65	67			
15				70	69	69	69	71	71			
14			77	75	74	74	75	77	79	82		
13			81	80	80	81	82	84	86	88		
12		85	85	86	87	88	90	92	95	97	99	
11		88	90	92	94	98	102	106	108	111	104	
10			97	98	103	109	118	129	132	134		
9			101	105	110	120	137	170	168	153		
8				108	113	124	153	249	197			
7				101	106	113	129	155	148			
6			75	87	93	97	102	109	103	87		
5			61	74	80	82	81	80	75	69		
4		36	45	56	64	66	65	62	58	53	46	
3		24	31	38	44	46	47	46	45	42	38	
2		11	15	20	25	28	29	31	32	30	26	
1		5	6	9	11	13	15	16	17	14	12	
0	0	0	0	0	0	0	0	0	0	0	0	0

BOD - DISSOLVED OXYGEN SIMULATION FOR PAGO PAGO HARBOR
Model Run No. 6 - Nominal Case - Nominal Kr (0.01532/hr)
BODu = 6684 kg/day - K = 0.0152/hr - Diffusivity @6000 & 26000 m^2/hr)

Day: 25
Step in Day: 96
Time (hrs): 600.00
Water Level (m): 0.55
Output Interval: 2400

Table of Dissolved Oxygen Concentrations in mg/l

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						6.15	6.15					
25						6.15	6.15					
24						6.16	6.16					
23						6.17	6.17					
22					6.17	6.17	6.17	6.17				
21					6.16	6.16	6.16	6.16				
20					6.16	6.16	6.16	6.16				
19					6.15	6.15	6.15	6.15				
18					6.14	6.14	6.14	6.14				
17					6.13	6.13	6.13	6.13				
16				6.12	6.12	6.12	6.12	6.12	6.12			
15				6.11	6.12	6.12	6.12	6.11	6.11			
14			6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11		
13			6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11		
12		6.10	6.10	6.10	6.10	6.10	6.10	6.10	6.10	6.10	6.10	
11		6.10	6.10	6.10	6.10	6.10	6.10	6.10	6.10	6.10	6.10	
10			6.10	6.10	6.10	6.09	6.09	6.09	6.09	6.09		
9			6.09	6.09	6.09	6.09	6.09	6.09	6.08	6.09		
8				6.08	6.08	6.08	6.08	6.08	6.08			
7				6.08	6.08	6.08	6.08	6.08	6.07			
6			6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07		
5			6.06	6.07	6.07	6.07	6.07	6.06	6.06	6.06		
4		6.04	6.05	6.05	6.06	6.06	6.06	6.06	6.06	6.05	6.05	
3		6.03	6.04	6.04	6.05	6.05	6.05	6.05	6.05	6.05	6.04	
2		6.02	6.02	6.03	6.03	6.03	6.04	6.04	6.04	6.04	6.03	
1		6.01	6.01	6.01	6.02	6.02	6.02	6.02	6.02	6.02	6.02	
0	6	6	6	6	6	6	6	6	6	6	6	6

BOD - DISSOLVED OXYGEN SIMULATION FOR PAGO PAGO HARBOR
Model Run No. 6 - Nominal Case - Nominal Kr (0.01532/hr)
BODu = 6684 kg/day - K = 0.0152/hr - Diffusivity @6000 & 26000 m^2/hr)

Day: 50
Step in Day: 96
Time (hrs): 1200.00
Water Level (m): 0.42
Output Interval: 2400

Table of Concentrations in mg/m^3

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						10	10					
25						11	11					
24						12	12					
23						14	14					
22					18	17	17	18				
21					21	20	20	20				
20					25	25	25	25				
19					33	32	31	31				
18					41	40	39	40				
17					50	50	50	49				
16				65	64	64	64	64	66			
15				69	69	69	69	70	70			
14			76	74	74	74	75	77	77	79		
13			79	80	80	81	82	83	84	85		
12		84	84	85	86	88	90	91	92	93	96	
11		85	88	90	93	96	100	102	102	102	99	
10			93	96	100	106	115	122	120	117		
9			97	101	107	116	133	160	151	134		
8				105	110	121	150	245	192			
7				102	104	112	130	163	159			
6			84	91	92	96	103	115	116	103		
5			75	79	80	80	80	82	81	79		
4		53	62	66	66	65	63	61	60	57	50	
3		46	49	49	49	47	46	45	45	43	42	
2		34	33	31	30	29	29	31	33	33	32	
1		19	16	15	14	14	15	17	19	19	19	
0	0	0	0	0	0	0	0	0	0	0	0	0

BOD - DISSOLVED OXYGEN SIMULATION FOR PAGO PAGO HARBOR
Model Run No. 6 - Nominal Case - Nominal Kr (0.01532/hr)
BODu = 6684 kg/day - K = 0.0152/hr - Diffusivity @6000 & 26000 m^2/hr)

Day: 50
Step in Day: 96
Time (hrs): 1200.00
Water Level (m): 0.42
Output Interval: 2400

Table of Dissolved Oxygen Concentrations in mg/l

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						6.15	6.15					
25						6.15	6.15					
24						6.16	6.16					
23						6.17	6.17					
22					6.16	6.17	6.17	6.16				
21					6.16	6.16	6.16	6.16				
20					6.16	6.16	6.16	6.16				
19					6.15	6.15	6.15	6.15				
18					6.14	6.14	6.14	6.14				
17					6.13	6.13	6.13	6.13				
16				6.12	6.12	6.12	6.12	6.12	6.12			
15				6.11	6.12	6.12	6.12	6.12	6.11			
14			6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11		
13			6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11		
12		6.10	6.10	6.10	6.10	6.10	6.10	6.10	6.10	6.10	6.10	
11		6.10	6.10	6.10	6.10	6.10	6.10	6.10	6.10	6.10	6.10	
10			6.10	6.10	6.10	6.09	6.09	6.09	6.09	6.09		
9			6.09	6.09	6.09	6.09	6.09	6.09	6.09	6.09		
8				6.09	6.08	6.08	6.08	6.08	6.08			
7				6.08	6.08	6.08	6.08	6.08	6.07			
6			6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07		
5			6.07	6.07	6.07	6.07	6.07	6.06	6.06	6.06		
4		6.06	6.06	6.06	6.06	6.06	6.06	6.06	6.06	6.06	6.05	
3		6.05	6.05	6.05	6.05	6.05	6.05	6.05	6.05	6.05	6.05	
2		6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	
1		6.03	6.02	6.02	6.02	6.02	6.02	6.02	6.03	6.03	6.03	
0	6	6	6	6	6	6	6	6	6	6	6	6

BOD - DISSOLVED OXYGEN SIMULATION FOR PAGO PAGO HARBOR
Model Run No. 7 - Nominal Case - Reduced Kr (0.00528/hr)
BODu = 6684 kg/day - K = 0.0152/hr - Diffusivity @6000 & 26000 m^2/hr)

Day: 25
Step in Day: 96
Time (hrs): 600.00
Water Level (m): 0.55
Output Interval: 2400

Table of Concentrations in mg/m^3

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						9	9					
25						10	10					
24						12	12					
23						14	14					
22					17	17	17	17				
21					20	20	20	20				
20					26	25	24	25				
19					33	31	31	32				
18					41	39	39	40				
17					51	50	50	50				
16				66	65	65	65	65	67			
15				70	69	69	69	71	71			
14			77	75	74	74	75	77	79	82		
13			81	80	80	81	82	84	86	88		
12		85	85	86	87	88	90	92	95	97	99	
11		88	90	92	94	98	102	106	108	111	104	
10			97	98	103	109	118	129	132	134		
9			101	105	110	120	137	170	168	153		
8				108	113	124	153	249	197			
7				101	106	113	129	155	148			
6			75	87	93	97	102	109	103	87		
5			61	74	80	82	81	80	75	69		
4		36	45	56	64	66	65	62	58	53	46	
3		24	31	38	44	46	47	46	45	42	38	
2		11	15	20	25	28	29	31	32	30	26	
1		5	6	9	11	13	15	16	17	14	12	
0	0	0	0	0	0	0	0	0	0	0	0	0

BOD - DISSOLVED OXYGEN SIMULATION FOR PAGO PAGO HARBOR
Model Run No. 7 - Nominal Case - Reduced Kr (0.00528/hr)
BODu = 6684 kg/day - K = 0.0152/hr - Diffusivity @6000 & 26000 m^2/hr)

Day: 25
Step in Day: 96
Time (hrs): 600.00
Water Level (m): 0.55
Output Interval: 2400

Table of Dissolved Oxygen Concentrations in mg/l

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						6.03	6.03					
25						6.03	6.03					
24						6.04	6.04					
23						6.04	6.04					
22					6.04	6.04	6.04	6.04				
21					6.04	6.04	6.04	6.04				
20					6.03	6.03	6.03	6.03				
19					6.02	6.02	6.02	6.02				
18					6.01	6.01	6.01	6.01				
17					6.00	6.00	6.00	6.00				
16				5.99	5.99	5.99	5.99	5.99	5.99			
15				5.99	5.99	5.99	5.99	5.99	5.99			
14			5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98		
13			5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98		
12		5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98	
11		5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98	
10			5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.97		
9			5.98	5.98	5.98	5.98	5.98	5.98	5.97	5.97		
8				5.98	5.98	5.98	5.98	5.98	5.98			
7				5.98	5.98	5.98	5.98	5.98	5.98			
6			5.99	5.98	5.98	5.98	5.98	5.98	5.98	5.99		
5			5.99	5.99	5.99	5.99	5.99	5.99	5.99	5.99		
4		5.99	5.99	5.99	5.99	5.99	5.99	5.99	5.99	5.99	5.99	
3		6.00	5.99	5.99	5.99	5.99	5.99	5.99	5.99	6.00	6.00	
2		6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	
1		6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	
0	6	6	6	6	6	6	6	6	6	6	6	6

BOD - DISSOLVED OXYGEN SIMULATION FOR PAGO PAGO HARBOR
Model Run No. 7 - Nominal Case - Reduced Kr (0.00528/hr)
BODu = 6684 kg/day - K = 0.0152/hr - Diffusivity @6000 & 26000 m^2/hr)

Day: 50
Step in Day: 96
Time (hrs): 1200.00
Water Level (m): 0.42
Output Interval: 2400

Table of Concentrations in mg/m^3

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						10	10					
25						11	11					
24						12	12					
23						14	14					
22					18	17	17	18				
21					21	20	20	20				
20					25	25	25	25				
19					33	32	31	31				
18					41	40	39	40				
17					50	50	50	49				
16				65	64	64	64	64	66			
15				69	69	69	69	70	70			
14			76	74	74	74	75	77	77	79		
13			79	80	80	81	82	83	84	85		
12		84	84	85	86	88	90	91	92	93	96	
11		85	88	90	93	96	100	102	102	102	99	
10			93	96	100	106	115	122	120	117		
9			97	101	107	116	133	160	151	134		
8				105	110	121	150	245	192			
7				102	104	112	130	163	159			
6			84	91	92	96	103	115	116	103		
5			75	79	80	80	80	82	81	79		
4		53	62	66	66	65	63	61	60	57	50	
3		46	49	49	49	47	46	45	45	43	42	
2		34	33	31	30	29	29	31	33	33	32	
1		19	16	15	14	14	15	17	19	19	19	
0	0	0	0	0	0	0	0	0	0	0	0	0

BOD - DISSOLVED OXYGEN SIMULATION FOR PAGO PAGO HARBOR
Model Run No. 7 - Nominal Case - Reduced Kr (0.00528/hr)
BODu = 6684 kg/day - K = 0.0152/hr - Diffusivity @6000 & 26000 m^2/hr)

Day: 50
Step in Day: 96
Time (hrs): 1200.00
Water Level (m): 0.42
Output Interval: 2400

Table of Dissolved Oxygen Concentrations in mg/l

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						6.03	6.03					
25						6.03	6.03					
24						6.04	6.04					
23						6.04	6.04					
22					6.04	6.04	6.04	6.04				
21					6.04	6.04	6.04	6.04				
20					6.03	6.03	6.03	6.03				
19					6.02	6.02	6.02	6.02				
18					6.01	6.01	6.01	6.01				
17					6.00	6.00	6.00	6.00				
16				5.99	5.99	5.99	5.99	5.99	5.99			
15				5.99	5.99	5.99	5.99	5.99	5.99			
14			5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98		
13			5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98		
12		5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98	
11		5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98	
10			5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98		
9			5.98	5.98	5.98	5.98	5.98	5.98	5.97	5.97		
8				5.98	5.98	5.98	5.98	5.98	5.98			
7				5.98	5.98	5.98	5.98	5.98	5.98			
6			5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98		
5			5.99	5.99	5.99	5.99	5.99	5.99	5.99	5.99		
4		5.99	5.99	5.99	5.99	5.99	5.99	5.99	5.99	5.99	5.99	
3		5.99	5.99	5.99	5.99	5.99	5.99	5.99	6.00	6.00	6.00	
2		5.99	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	
1		6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	
0	6	6	6	6	6	6	6	6	6	6	6	6

BOD - DISSOLVED OXYGEN SIMULATION FOR PAGO PAGO HARBOR
Model Run No. 9 - Extreme Case Loading - Nominal Kr (0.01532/hr)
BODu = 20000 kg/day - K = 0.0152/hr - Diffusivity @6000 & 26000 m^2/hr)

Day: 25
Step in Day: 96
Time (hrs): 600.00
Water Level (m): 0.55
Output Interval: 2400

Table of Concentrations in mg/m^3

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						28	28					
25						31	31					
24						36	36					
23						42	42					
22					52	49	50	52				
21					61	59	59	59				
20					77	74	73	74				
19					99	93	92	95				
18					123	118	117	121				
17					152	151	150	150				
16				198	194	194	194	195	201			
15				209	207	207	208	211	214			
14			230	225	222	223	225	230	235	245		
13			241	240	239	241	244	250	257	263		
12		255	255	256	259	264	270	276	283	291	296	
11		262	271	274	281	292	305	316	323	332	312	
10			289	294	307	326	354	387	396	401		
9			303	314	330	358	411	508	503	459		
8				323	337	371	459	744	589			
7				302	316	339	386	465	442			
6			223	261	278	291	306	325	307	261		
5			184	222	239	245	244	239	226	208		
4		108	135	167	193	197	194	185	175	159	137	
3		72	93	113	132	139	139	139	135	125	114	
2		33	45	61	75	83	88	93	95	89	77	
1		14	19	26	33	39	44	47	50	43	35	
0	0	0	0	0	0	0	0	0	0	0	0	0

BOD - DISSOLVED OXYGEN SIMULATION FOR PAGO PAGO HARBOR
Model Run No. 9 - Extreme Case Loading - Nominal Kr (0.01532/hr)
BODu = 20000 kg/day - K = 0.0152/hr - Diffusivity @6000 & 26000 m^2/hr)

Day: 25
Step in Day: 96
Time (hrs): 600.00
Water Level (m): 0.55
Output Interval: 2400

Table of Dissolved Oxygen Concentrations in mg/l

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						6.11	6.10					
25						6.11	6.11					
24						6.11	6.11					
23						6.11	6.11					
22					6.10	6.10	6.10	6.10				
21					6.09	6.09	6.09	6.09				
20					6.07	6.08	6.08	6.08				
19					6.06	6.06	6.06	6.06				
18					6.03	6.04	6.04	6.04				
17					6.01	6.02	6.02	6.02				
16				5.99	5.99	5.99	5.99	5.99	5.99			
15				5.98	5.98	5.98	5.98	5.98	5.98			
14			5.97	5.98	5.98	5.98	5.98	5.98	5.97	5.97		
13			5.97	5.97	5.97	5.97	5.97	5.97	5.97	5.97		
12		5.96	5.97	5.97	5.97	5.97	5.97	5.97	5.96	5.96	5.96	
11		5.96	5.96	5.96	5.96	5.96	5.96	5.96	5.96	5.96	5.96	
10			5.96	5.96	5.96	5.96	5.96	5.96	5.95	5.95		
9			5.96	5.96	5.96	5.96	5.95	5.95	5.95	5.95		
8				5.96	5.96	5.96	5.95	5.95	5.95			
7				5.96	5.96	5.96	5.96	5.96	5.96			
6			5.98	5.97	5.97	5.97	5.97	5.97	5.97	5.98		
5			5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98		
4		5.99	5.99	5.99	5.98	5.98	5.98	5.99	5.99	5.99	5.99	
3		6.00	6.00	5.99	5.99	5.99	5.99	5.99	5.99	6.00	6.00	
2		6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	
1		6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	
0	6	6	6	6	6	6	6	6	6	6	6	6

BOD - DISSOLVED OXYGEN SIMULATION FOR PAGO PAGO HARBOR
Model Run No. 9 - Extreme Case Loading - Nominal Kr (0.01532/hr)
BODu = 20000 kg/day - K = 0.0152/hr - Diffusivity @6000 & 26000 m^2/hr)

Day: 50
Step in Day: 96
Time (hrs): 1200.00
Water Level (m): 0.42
Output Interval: 2400

Table of Concentrations in mg/m^3

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						29	29					
25						32	32					
24						37	37					
23						43	43					
22					53	51	51	53				
21					61	61	61	61				
20					76	76	75	73				
19					97	95	94	93				
18					123	119	118	119				
17					151	150	149	147				
16				196	192	192	192	191	198			
15				207	206	206	207	209	210			
14			227	223	222	223	225	229	231	238		
13			238	238	239	241	244	249	253	253		
12		250	250	254	257	262	268	272	275	277	287	
11		255	263	269	278	288	299	306	306	305	298	
10			279	286	300	318	343	365	359	351		
9			289	303	321	348	398	479	452	400		
8				315	329	363	450	732	575			
7				305	311	334	388	486	476			
6			252	273	277	287	308	345	346	307		
5			225	238	238	240	240	244	242	237		
4		158	184	196	199	194	189	183	178	172	149	
3		136	148	148	146	141	137	136	134	130	125	
2		102	98	93	89	86	88	93	98	98	96	
1		57	48	44	42	43	46	50	57	57	56	
0	0	0	0	0	0	0	0	0	0	0	0	0

BOD - DISSOLVED OXYGEN SIMULATION FOR PAGO PAGO HARBOR
Model Run No. 9 - Extreme Case Loading - Nominal Kr (0.01532/hr)
BODu = 20000 kg/day - K = 0.0152/hr - Diffusivity @6000 & 26000 m^2/hr)

Day: 50
Step in Day: 96
Time (hrs): 1200.00
Water Level (m): 0.42
Output Interval: 2400

Table of Dissolved Oxygen Concentrations in mg/l

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						6.10	6.10					
25						6.11	6.10					
24						6.11	6.11					
23						6.11	6.11					
22					6.10	6.10	6.10	6.10				
21					6.09	6.09	6.09	6.09				
20					6.08	6.08	6.08	6.08				
19					6.06	6.06	6.06	6.06				
18					6.04	6.04	6.04	6.04				
17					6.01	6.02	6.02	6.02				
16				5.99	5.99	5.99	5.99	5.99	5.99			
15				5.98	5.98	5.98	5.98	5.98	5.98			
14			5.97	5.98	5.98	5.98	5.98	5.98	5.98	5.97		
13			5.97	5.97	5.97	5.97	5.97	5.97	5.97	5.97		
12		5.97	5.97	5.97	5.97	5.97	5.97	5.97	5.97	5.96	5.96	
11		5.97	5.97	5.96	5.96	5.96	5.96	5.96	5.96	5.96	5.96	
10			5.96	5.96	5.96	5.96	5.96	5.96	5.96	5.96		
9			5.96	5.96	5.96	5.96	5.96	5.95	5.95	5.95		
8				5.96	5.96	5.96	5.96	5.95	5.95			
7				5.96	5.96	5.96	5.96	5.96	5.96			
6			5.97	5.97	5.97	5.97	5.97	5.97	5.97	5.97		
5			5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98		
4		5.99	5.98	5.98	5.98	5.98	5.99	5.99	5.99	5.99	5.99	
3		5.99	5.99	5.99	5.99	5.99	5.99	6.00	6.00	6.00	6.00	
2		6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	
1		6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	
0	6	6	6	6	6	6	6	6	6	6	6	6

BOD - DISSOLVED OXYGEN SIMULATION FOR PAGO PAGO HARBOR
Model Run No. 9 - Extreme Case Loading - Nominal Kr (0.01532/hr)
BODu = 20000 kg/day - K = 0.0152/hr - Diffusivity @6000 & 26000 m^2/hr)

Day: 25
Step in Day: 96
Time (hrs): 600.00
Water Level (m): 0.55
Output Interval: 2400

Table of Concentrations in mg/m^3

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						28	28					
25						31	31					
24						36	36					
23						42	42					
22					52	49	50	52				
21					61	59	59	59				
20					77	74	73	74				
19					99	93	92	95				
18					123	118	117	121				
17					152	151	150	150				
16				198	194	194	194	195	201			
15				209	207	207	208	211	214			
14			230	225	222	223	225	230	235	245		
13			241	240	239	241	244	250	257	263		
12		255	255	256	259	264	270	276	283	291	296	
11		262	271	274	281	292	305	316	323	332	312	
10			289	294	307	326	354	387	396	401		
9			303	314	330	358	411	508	503	459		
8				323	337	371	459	744	589			
7				302	316	339	386	465	442			
6			223	261	278	291	306	325	307	261		
5			184	222	239	245	244	239	226	208		
4		108	135	167	193	197	194	185	175	159	137	
3		72	93	113	132	139	139	139	135	125	114	
2		33	45	61	75	83	88	93	95	89	77	
1		14	19	26	33	39	44	47	50	43	35	
0	0	0	0	0	0	0	0	0	0	0	0	0

BOD - DISSOLVED OXYGEN SIMULATION FOR PAGO PAGO HARBOR
Model Run No. 9 - Extreme Case Loading - Nominal Kr (0.01532/hr)
BODu = 20000 kg/day - K = 0.0152/hr - Diffusivity @6000 & 26000 m^2/hr)

Day: 25
Step in Day: 96
Time (hrs): 600.00
Water Level (m): 0.55
Output Interval: 2400

Table of Dissolved Oxygen Concentrations in mg/l

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						6.11	6.10					
25						6.11	6.11					
24						6.11	6.11					
23						6.11	6.11					
22					6.10	6.10	6.10	6.10				
21					6.09	6.09	6.09	6.09				
20					6.07	6.08	6.08	6.08				
19					6.06	6.06	6.06	6.06				
18					6.03	6.04	6.04	6.04				
17					6.01	6.02	6.02	6.02				
16				5.99	5.99	5.99	5.99	5.99	5.99			
15				5.98	5.98	5.98	5.98	5.98	5.98			
14			5.97	5.98	5.98	5.98	5.98	5.98	5.97	5.97		
13			5.97	5.97	5.97	5.97	5.97	5.97	5.97	5.97		
12		5.96	5.97	5.97	5.97	5.97	5.97	5.97	5.96	5.96	5.96	
11		5.96	5.96	5.96	5.96	5.96	5.96	5.96	5.96	5.96	5.96	
10			5.96	5.96	5.96	5.96	5.96	5.96	5.95	5.95		
9			5.96	5.96	5.96	5.96	5.95	5.95	5.95	5.95		
8				5.96	5.96	5.96	5.95	5.95	5.95			
7				5.96	5.96	5.96	5.96	5.96	5.96			
6			5.98	5.97	5.97	5.97	5.97	5.97	5.97	5.98		
5			5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98		
4		5.99	5.99	5.99	5.98	5.98	5.98	5.99	5.99	5.99	5.99	
3		6.00	6.00	5.99	5.99	5.99	5.99	5.99	5.99	6.00	6.00	
2		6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	
1		6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	
0	6	6	6	6	6	6	6	6	6	6	6	6

BOD - DISSOLVED OXYGEN SIMULATION FOR PAGO PAGO HARBOR
Model Run No. 9 - Extreme Case Loading - Nominal Kr (0.01532/hr)
BODu = 20000 kg/day - K = 0.0152/hr - Diffusivity @6000 & 26000 m^2/hr)

Day: 50
Step in Day: 96
Time (hrs): 1200.00
Water Level (m): 0.42
Output Interval: 2400

Table of Concentrations in mg/m^3

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						29	29					
25						32	32					
24						37	37					
23						43	43					
22					53	51	51	53				
21					61	61	61	61				
20					76	76	75	73				
19					97	95	94	93				
18					123	119	118	119				
17					151	150	149	147				
16				196	192	192	192	191	198			
15				207	206	206	207	209	210			
14			227	223	222	223	225	229	231	238		
13			238	238	239	241	244	249	253	253		
12		250	250	254	257	262	268	272	275	277	287	
11		255	263	269	278	288	299	306	306	305	298	
10			279	286	300	318	343	365	359	351		
9			289	303	321	348	398	479	452	400		
8				315	329	363	450	732	575			
7				305	311	334	388	486	476			
6			252	273	277	287	308	345	346	307		
5			225	238	238	240	240	244	242	237		
4		158	184	196	199	194	189	183	178	172	149	
3		136	148	148	146	141	137	136	134	130	125	
2		102	98	93	89	86	88	93	98	98	96	
1		57	48	44	42	43	46	50	57	57	56	
0	0	0	0	0	0	0	0	0	0	0	0	0

BOD - DISSOLVED OXYGEN SIMULATION FOR PAGO PAGO HARBOR
Model Run No. 9 - Extreme Case Loading - Nominal Kr (0.01532/hr)
BODu = 20000 kg/day - K = 0.0152/hr - Diffusivity @6000 & 26000 m^2/hr)

Day: 50
Step in Day: 96
Time (hrs): 1200.00
Water Level (m): 0.42
Output Interval: 2400

Table of Dissolved Oxygen Concentrations in mg/l

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						6.10	6.10					
25						6.11	6.10					
24						6.11	6.11					
23						6.11	6.11					
22					6.10	6.10	6.10	6.10				
21					6.09	6.09	6.09	6.09				
20					6.08	6.08	6.08	6.08				
19					6.06	6.06	6.06	6.06				
18					6.04	6.04	6.04	6.04				
17					6.01	6.02	6.02	6.02				
16				5.99	5.99	5.99	5.99	5.99	5.99			
15				5.98	5.98	5.98	5.98	5.98	5.98			
14			5.97	5.98	5.98	5.98	5.98	5.98	5.98	5.97		
13			5.97	5.97	5.97	5.97	5.97	5.97	5.97	5.97		
12		5.97	5.97	5.97	5.97	5.97	5.97	5.97	5.97	5.96	5.96	
11		5.97	5.97	5.96	5.96	5.96	5.96	5.96	5.96	5.96	5.96	
10			5.96	5.96	5.96	5.96	5.96	5.96	5.96	5.96		
9			5.96	5.96	5.96	5.96	5.96	5.95	5.95	5.95		
8				5.96	5.96	5.96	5.96	5.95	5.95			
7				5.96	5.96	5.96	5.96	5.96	5.96			
6			5.97	5.97	5.97	5.97	5.97	5.97	5.97	5.97		
5			5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98		
4		5.99	5.98	5.98	5.98	5.98	5.99	5.99	5.99	5.99	5.99	
3		5.99	5.99	5.99	5.99	5.99	5.99	6.00	6.00	6.00	6.00	
2		6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	
1		6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	
0	6	6	6	6	6	6	6	6	6	6	6	6

V 8

BOD - DISSOLVED OXYGEN SIMULATION FOR PAGO PAGO HARBOR
Model Run No. 5 - Reference Case - Nominal Kr (0.00528/hr)
BODu = 0000 kg/day - K = 0.0152/hr - Diffusivity @6000 & 26000 m^2/hr)

Day: 25
Step in Day: 96
Time (hrs): 600.00
Water Level (m): 0.55
Output Interval: 2400

Table of Dissolved Oxygen Concentrations in mg/l

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						6.11	6.11					
25						6.12	6.12					
24						6.13	6.13					
23						6.14	6.14					
22					6.14	6.14	6.14	6.14				
21					6.14	6.14	6.14	6.14				
20					6.14	6.14	6.14	6.14				
19					6.14	6.14	6.14	6.14				
18					6.14	6.14	6.14	6.14				
17					6.13	6.13	6.13	6.13				
16				6.12	6.12	6.12	6.12	6.12	6.12			
15				6.12	6.12	6.12	6.12	6.12	6.12			
14			6.12	6.12	6.12	6.12	6.12	6.12	6.12	6.12		
13			6.11	6.11	6.12	6.12	6.12	6.11	6.11	6.11		
12		6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	
11		6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	
10			6.10	6.10	6.10	6.10	6.10	6.10	6.10	6.10		
9			6.10	6.10	6.10	6.10	6.10	6.09	6.09	6.10		
8				6.09	6.09	6.09	6.09	6.09	6.09			
7				6.08	6.08	6.08	6.08	6.08	6.08			
6			6.06	6.07	6.07	6.07	6.07	6.07	6.07	6.06		
5			6.05	6.06	6.07	6.07	6.06	6.06	6.06	6.06		
4		6.03	6.04	6.05	6.06	6.06	6.06	6.05	6.05	6.05	6.04	
3		6.02	6.03	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	
2		6.01	6.02	6.02	6.02	6.03	6.03	6.03	6.03	6.03	6.03	
1		6.01	6.01	6.01	6.01	6.01	6.02	6.02	6.02	6.01	6.01	
0	6	6	6	6	6	6	6	6	6	6	6	6

BOD - DISSOLVED OXYGEN SIMULATION FOR PAGO PAGO HARBOR
Model Run No. 5 - Reference Case - Nominal Kr (0.00528/hr)
BODu = 0000 kg/day - K = 0.0152/hr - Diffusivity @6000 & 26000 m^2/hr)

Day: 50
Step in Day: 96
Time (hrs): 1200.00
Water Level (m): 0.42
Output Interval: 2400

Table of Dissolved Oxygen Concentrations in mg/l

J/I	0	1	2	3	4	5	6	7	8	9	10	11
27												
26						6.12	6.12					
25						6.12	6.12					
24						6.13	6.13					
23						6.14	6.14					
22					6.14	6.14	6.14	6.14				
21					6.14	6.14	6.14	6.14				
20					6.14	6.14	6.14	6.14				
19					6.14	6.14	6.14	6.14				
18					6.14	6.14	6.14	6.14				
17					6.13	6.13	6.13	6.13				
16				6.12	6.12	6.12	6.12	6.12	6.12			
15				6.12	6.12	6.12	6.12	6.12	6.12			
14			6.12	6.12	6.12	6.12	6.12	6.12	6.12	6.12		
13			6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11		
12		6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	
11		6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	
10			6.11	6.10	6.10	6.10	6.10	6.10	6.10	6.10		
9			6.10	6.10	6.10	6.10	6.10	6.10	6.10	6.10		
8				6.09	6.09	6.09	6.09	6.09	6.09			
7				6.08	6.08	6.08	6.08	6.08	6.08			
6			6.07	6.08	6.07	6.07	6.07	6.07	6.07	6.07		
5			6.06	6.07	6.07	6.07	6.06	6.06	6.06	6.06		
4		6.05	6.06	6.06	6.06	6.06	6.05	6.05	6.05	6.05	6.05	
3		6.04	6.05	6.05	6.04	6.04	6.04	6.04	6.04	6.04	6.04	
2		6.03	6.03	6.03	6.03	6.03	6.03	6.03	6.03	6.03	6.03	
1		6.02	6.02	6.02	6.02	6.02	6.02	6.02	6.02	6.02	6.02	
0	6	6	6	6	6	6	6	6	6	6	6	6

APPENDIX VIII
WATER QUALITY MONITORING DATA

Water Quality Data

The water quality data used for the model verification study report (No. 1) is provided below in the following format and order:

- Summary of TN data with values > 0.2 mg/l highlighted
- Plot of TN with distance along the Harbor axis
- Plot of TN with time for inner harbor stations
- Plot of TN with time for middle harbor stations
- Plot of TN with time for mixing zone area
- Plot of TN with time for outer harbor

- Summary of TP data with values > 0.03 mg/l highlighted
- Plot of TP with distance along the Harbor axis
- Plot of TP with time for inner harbor stations
- Plot of TP with time for middle harbor stations
- Plot of TP with time for mixing zone area
- Plot of TP with time for outer harbor

- Summary of Chlorophyll-a data with values > 1.0 highlighted

- Summary of Secchi depth data

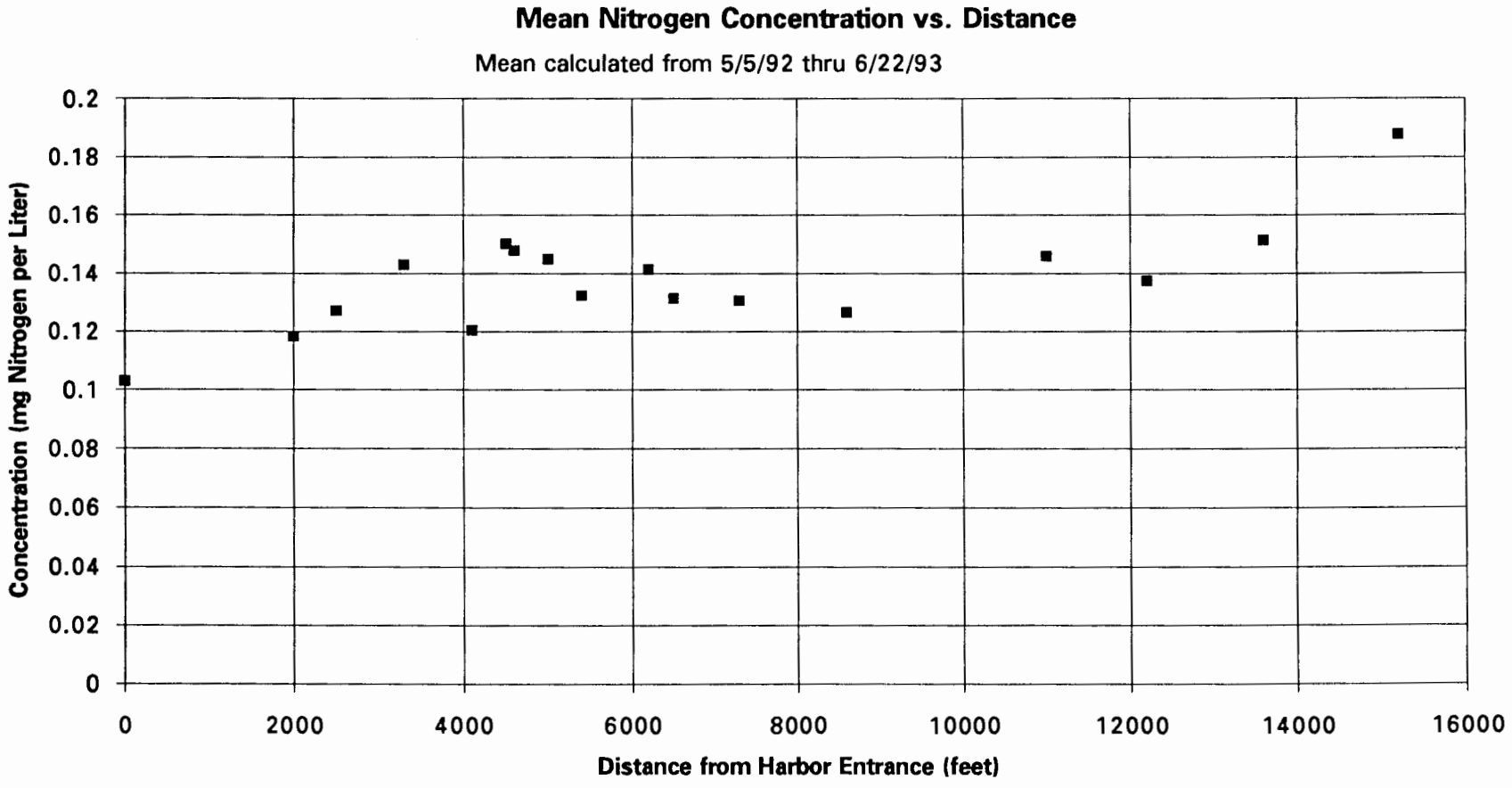
- Summary of Turbidity data

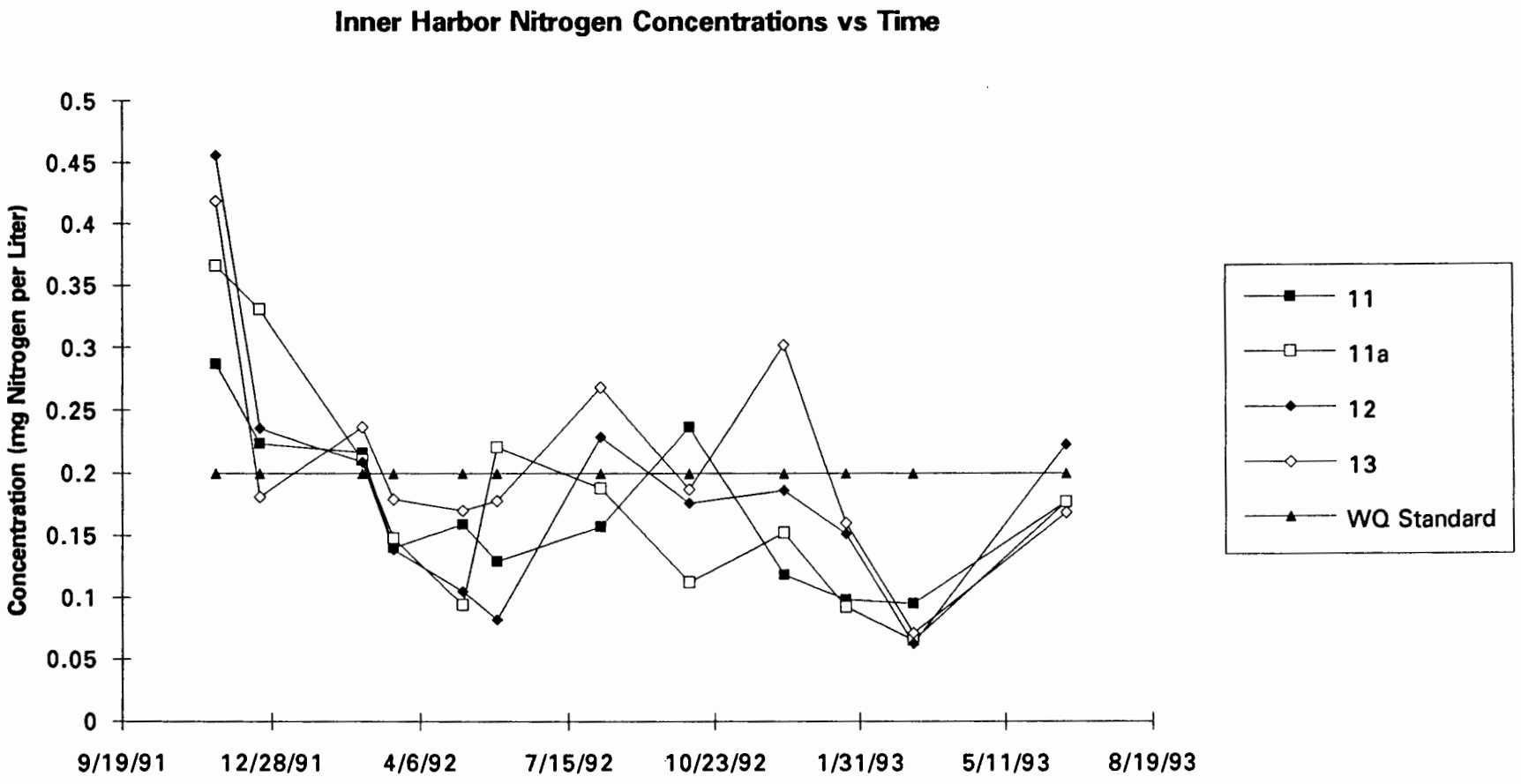
- Location of ASG Sampling Stations (historic)
- Location of ASG Sampling Stations (mixing zone)
- Table of stations distances along centerline of harbor and model cell locations of stations

Total Nitrogen (mg N/l)											
Harbor Station	Sampling Date										Average
	2/27/92	3/19/92	5/5/92	5/28/92	8/6/92	10/6/92	Dec 92?	1/22/93	3/9/93	6/22/93	
5-3	0.137	0.186	0.104	0.139	0.166	0.149	NS	0.066	0.080	0.082	0.123
5-60	0.119	0.161	0.095	0.184	0.120	0.073	NS	0.099	0.069	0.014	0.104
6-3	0.187	0.132	0.122	**0.272**	0.132	0.078	0.138	0.124	0.041	0.122	0.135
6-60	0.167	0.134	0.115	0.111	0.130	0.151	0.103	0.094	0.035	0.122	0.116
7-3	0.159	0.142	0.152	0.119	0.132	0.122	0.176	0.087	0.071	0.061	0.122
7-60	0.156	0.128	0.124	0.136	0.094	0.186	0.154	0.058	**0.237**	0.122	0.140
8-3	0.181	0.146	0.116	0.172	0.123	0.091	0.133	0.106	0.052	0.126	0.125
8-60	0.146	0.186	0.124	**0.202**	0.183	0.067	0.120	0.094	0.024	0.193	0.134
8A-3	0.178	0.149	0.087	0.142	0.175	0.137	0.150	0.133	0.035	0.109	0.130
8A-60	0.148	0.197	0.120	**0.286**	0.169	0.156	0.141	0.155	0.164	0.160	0.170
9-3	0.193	0.162	0.079	0.120	**0.212**	0.158	0.166	0.131	0.091	0.109	0.142
9-60	0.190	0.153	0.093	0.122	0.148	0.105	0.151	0.133	0.088	0.196	0.138
9A-3	0.145	0.141	0.109	0.155	0.183	0.121	**0.278**	0.070	0.136	0.195	0.153
9A-60	0.134	0.156	0.115	0.106	0.108	0.110	0.108	0.089	0.080	0.059	0.107
10-3	0.195	0.115	0.146	0.122	0.160	0.117	0.138	0.089	0.088	**0.255**	0.143
10-60	0.128	0.119	0.124	0.112	0.134	0.113	0.097	0.102	0.028	**0.293**	0.125
11-3	**0.209**	0.154	0.168	0.143	0.197	0.116	0.127	0.086	0.101	0.193	0.149
11-60	**0.225**	0.126	0.149	0.114	0.116	**0.357**	0.109	0.110	0.088	0.160	0.155
11A-3	**0.212**	0.128	0.084	0.147	**0.222**	0.103	0.156	0.108	0.041	0.193	0.139
11A-60	**0.209**	0.168	0.104	**0.294**	0.154	0.120	0.148	0.076	0.088	0.160	0.152
12-3	**0.237**	0.127	0.097	0.103	**0.221**	0.172	0.188	0.170	0.071	**0.252**	0.164
12-60	0.181	0.150	0.112	0.061	**0.237**	0.179	0.183	0.131	0.052	0.193	0.148
13-3	**0.274**	0.192	0.157	0.148	**0.389**	**0.229**	**0.411**	0.144	0.102	0.141	**0.219**
13-30	0.200	0.166	0.182	**0.208**	0.147	0.144	0.193	0.176	0.039	0.195	0.165
14-3	NS	NS	0.133	0.147	0.183	0.106	0.143	0.086	0.064	0.155	0.127
14-60	NS	NS	0.138	**0.228**	**0.550**	0.134	0.151	0.086	0.052	0.010	0.169
15-3	NS	NS	0.180	0.143	0.200	0.150	0.134	0.095	0.115	0.185	0.150
15-60	NS	NS	0.139	**0.233**	0.178	0.129	0.111	0.111	0.115	0.045	0.133
16-3	NS	NS	0.103	0.164	**0.337**	0.183	0.114	0.130	0.039	0.036	0.138
16-60	NS	NS	0.166	0.115	0.150	0.137	0.103	0.097	0.147	0.095	0.126
17-3	NS	NS	0.122	**0.254**	**0.239**	0.144	0.112	0.086	0.115	0.140	0.152
17-60	NS	NS	0.115	**0.261**	**0.244**	0.164	0.110	0.097	0.090	0.111	0.149
18-3	NS	NS	0.133	0.156	**0.216**	0.116	0.117	0.128	0.090	0.185	0.143
18-60	NS	NS	0.130	0.183	**0.256**	0.134	0.108	0.090	0.090	0.156	0.143

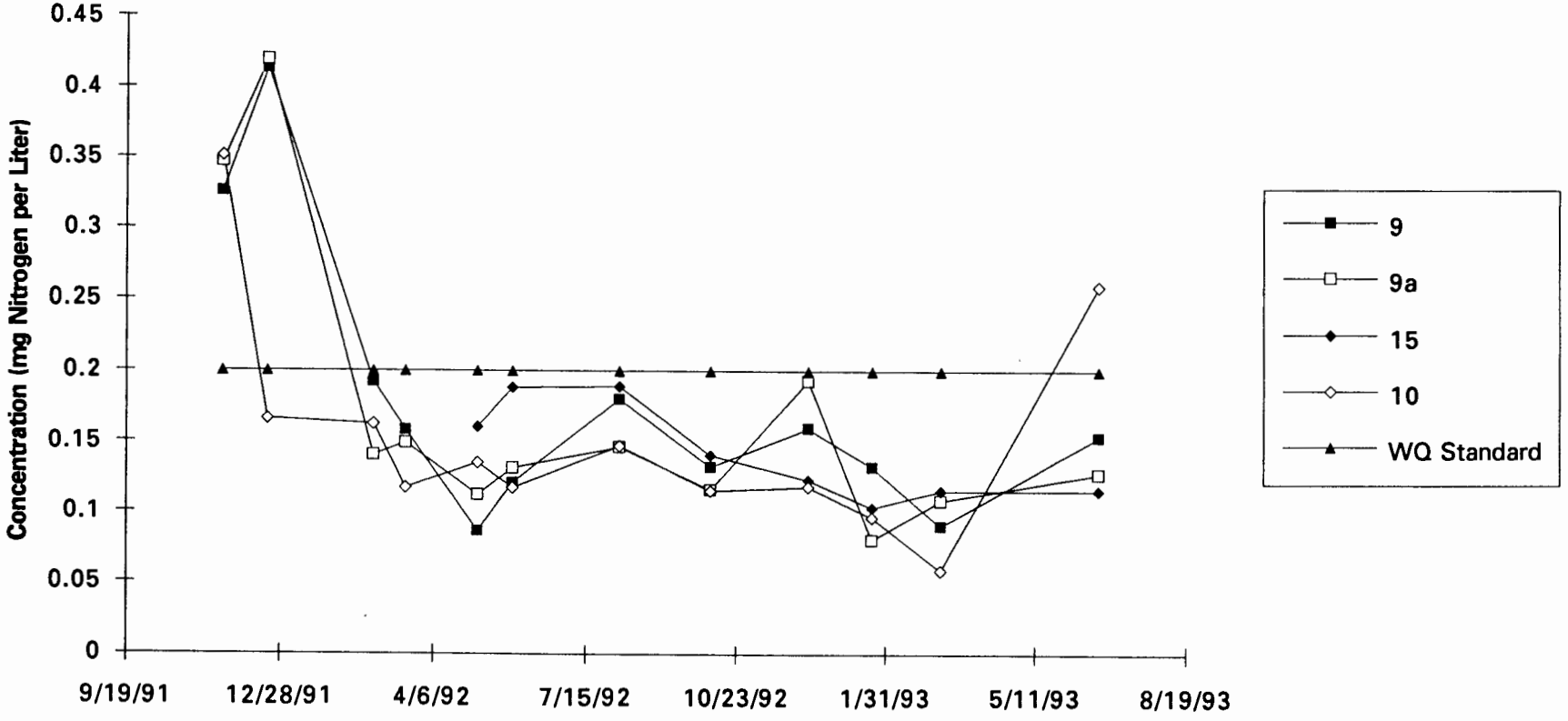
Notes:

NS = not sampled

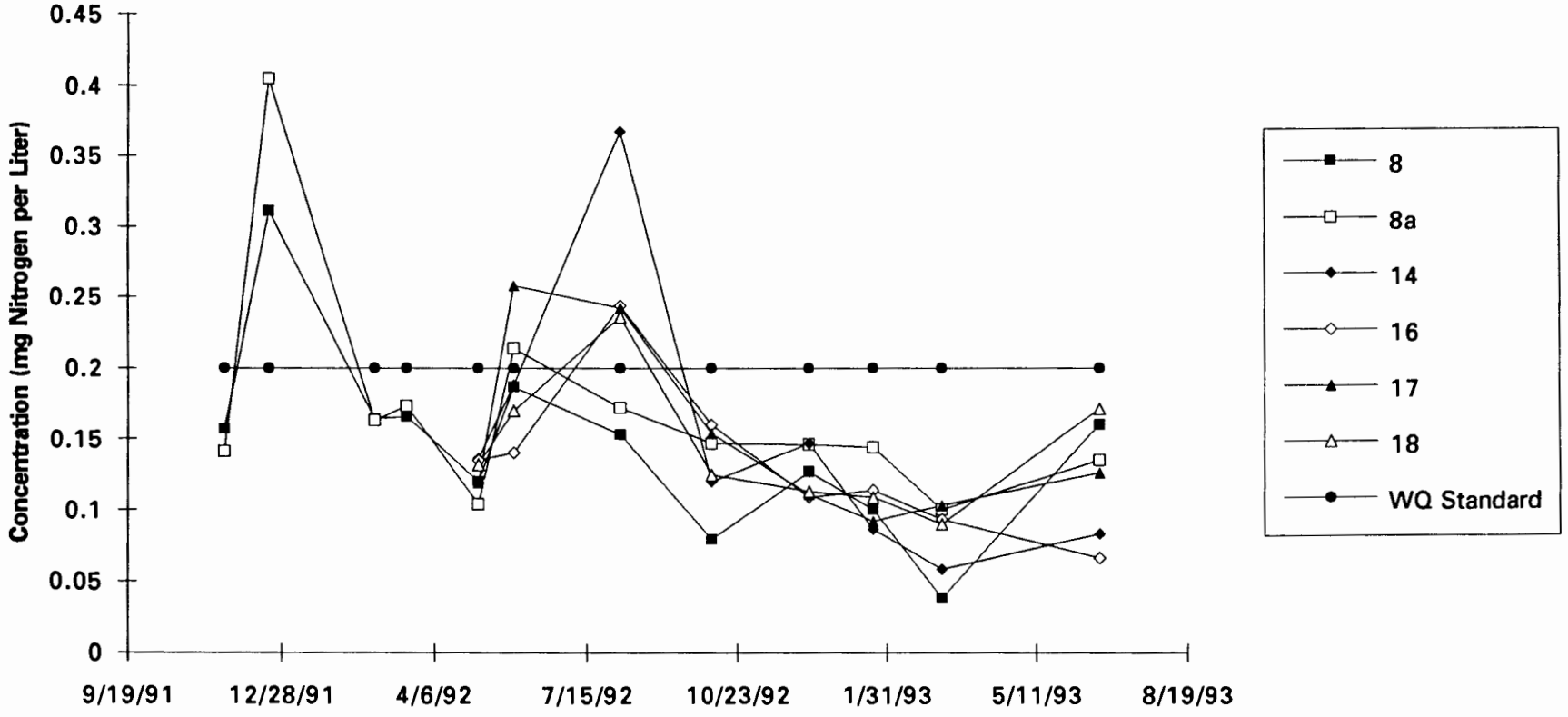

Mean Nitrogen Concentration vs. Distance
Mean calculated from 5/5/92 thru 6/22/93
Concentration (mg Nitrogen per Liter)
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
2000
4000
6000
8000
10000
12000
14000
16000
Distance from Harbor Entrance (feet)


Inner Harbor Nitrogen Concentrations vs Time
Concentration (mg Nitrogen per Liter)
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
9/19/91
12/28/91
4/6/92
7/15/92
10/23/92
1/31/93
5/11/93
8/19/93
11
11a
12
13
WQ Standard

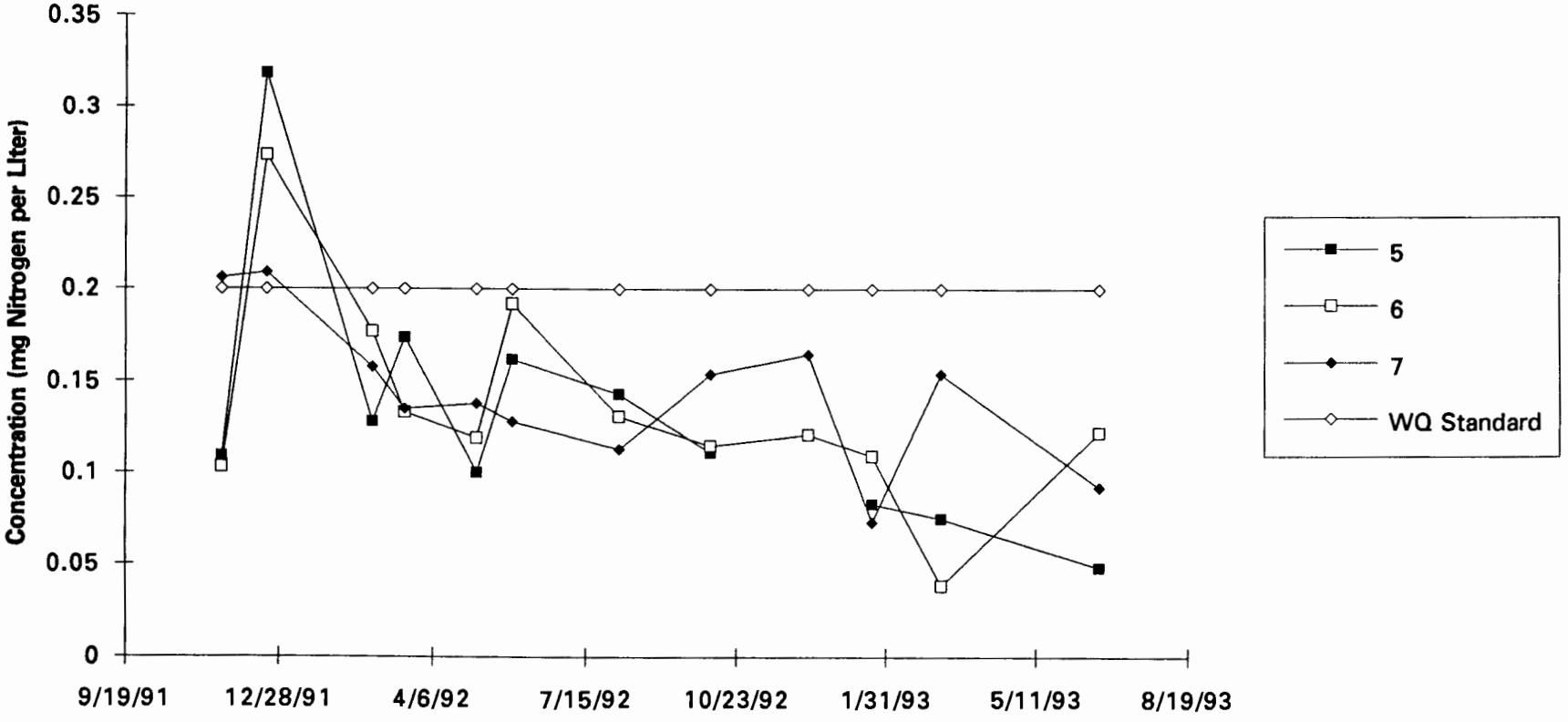
Middle Harbor Nitrogen Concentration vs. Time



Mixing Zone Area Nitrogen Concentration vs. Time



Outer Harbor Nitrogen Concentration vs. Time



Total Phosphorus (mg P/l)

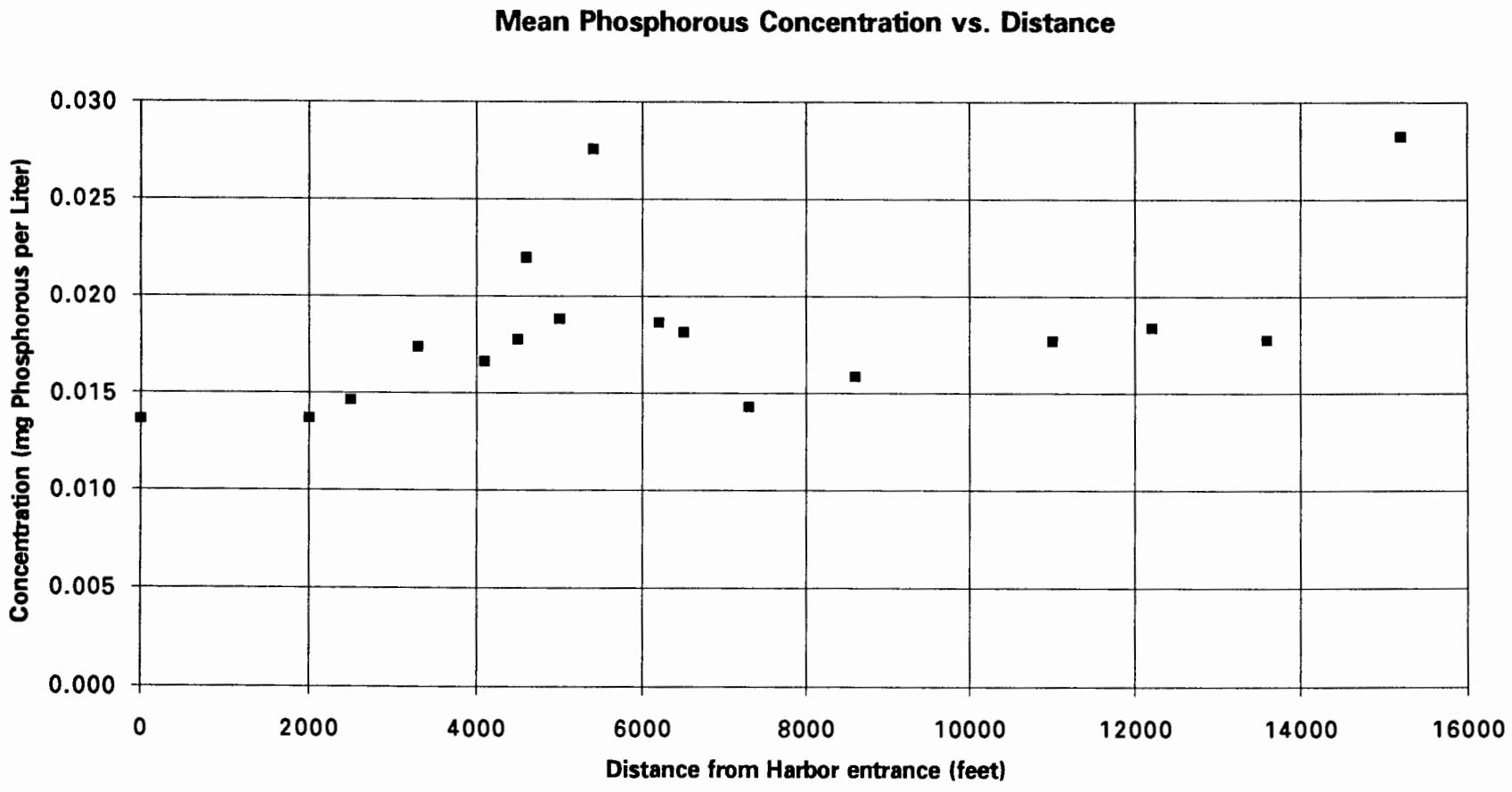
Harbor Station	Sampling Date										Average
	2/27/92	3/19/92	5/5/92	5/28/92	8/6/92	10/6/92	Dec 92?	1/22/93	3/9/93	6/22/93	
5-3	0.012	**0.033**	0.027	0.017	0.013	0.011	NS	0.012	0.011	0.009	0.016
5-60	0.023	0.026	0.023	0.014	0.004	0.001	NS	0.018	0.008	0.023	0.016
6-3	0.019	0.019	0.025	0.019	0.008	0.001	0.018	0.019	0.007	0.008	0.014
6-60	0.021	0.027	0.028	0.010	0.002	0.002	0.018	**0.031**	0.017	0.006	0.016
7-3	**0.033**	0.025	0.027	0.012	0.008	0.012	**0.036**	0.015	0.012	0.006	0.019
7-60	0.017	0.018	0.026	0.016	0.003	0.016	0.018	0.011	0.006	0.010	0.014
8-3	0.029	0.025	0.021	0.024	0.014	0.008	0.016	0.019	0.016	0.013	0.019
8-60	0.018	**0.036**	0.022	0.027	0.022	0.012	0.014	0.016	0.013	0.009	0.019
8A-3	**0.033**	0.017	0.022	**0.033**	0.023	0.010	0.020	0.023	0.011	0.013	0.021
8A-60	**0.035**	0.021	0.019	**0.034**	0.020	0.009	0.019	0.024	0.006	0.015	0.020
9-3	**0.039**	0.018	0.029	0.021	0.022	0.009	0.022	0.020	0.016	0.013	0.021
9-60	**0.050**	0.016	**0.033**	0.023	0.011	0.012	0.002	0.019	0.006	0.014	0.019
9A-3	**0.050**	0.013	0.025	0.020	0.016	0.010	**0.034**	0.010	0.009	0.012	0.020
9A-60	**0.078**	0.016	**0.033**	0.020	0.011	0.010	0.010	0.013	0.015	0.006	0.021
10-3	**0.051**	0.016	**0.032**	0.021	0.012	0.009	0.020	0.012	0.007	0.009	0.019
10-60	**0.064**	0.016	0.024	0.018	0.006	0.009	0.010	0.014	0.018	0.008	0.019
11-3	**0.035**	0.023	0.029	0.024	0.018	0.007	0.020	0.010	0.010	0.008	0.018
11-60	**0.038**	0.016	**0.032**	0.021	0.005	**0.041**	0.016	0.014	0.019	0.009	0.021
11A-3	**0.047**	0.026	0.021	0.024	0.016	0.008	0.026	0.014	0.023	0.010	0.022
11A-60	**0.031**	**0.034**	0.017	**0.068**	0.010	0.009	0.025	0.012	0.005	0.006	0.022
12-3	**0.037**	0.023	0.030	0.029	0.014	0.012	**0.030**	0.022	0.007	0.010	0.021
12-60	**0.032**	0.018	0.022	0.019	0.012	0.012	0.026	0.016	0.006	0.017	0.018
13-3	**0.042**	**0.033**	**0.031**	**0.044**	0.020	**0.043**	**0.088**	0.024	0.011	0.009	**0.035**
13-30	0.027	0.029	0.028	**0.052**	0.010	0.017	0.027	0.028	0.014	0.006	0.024
14-3	NS	NS	**0.032**	0.001	0.011	0.001	0.014	0.017	0.011	0.017	0.013
14-60	NS	NS	**0.033**	**0.034**	**0.082**	**21.1***	0.016	0.012	0.016	0.012	0.029 **
15-3	NS	NS	0.026	0.025	0.018	0.017	0.014	0.016	0.013	0.006	0.017
15-60	NS	NS	**0.035**	**0.040**	0.015	0.019	0.014	0.019	0.011	0.010	0.020
16-3	NS	NS	0.028	0.027	0.017	0.017	0.020	0.022	0.007	0.013	0.019
16-60	NS	NS	0.023	0.019	**0.190**	0.018	0.010	0.014	0.014	0.002	0.014 **
17-3	NS	NS	0.021	**0.034**	0.021	0.019	0.016	0.014	0.006	0.017	0.019
17-60	NS	NS	0.025	**0.038**	0.011	0.019	0.014	0.014	0.006	0.009	0.017
18-3	NS	NS	0.014	0.026	0.024	0.016	0.010	0.020	0.006	0.009	0.016
18-60	NS	NS	0.029	0.026	**0.036**	0.018	0.012	0.017	0.004	0.011	0.019

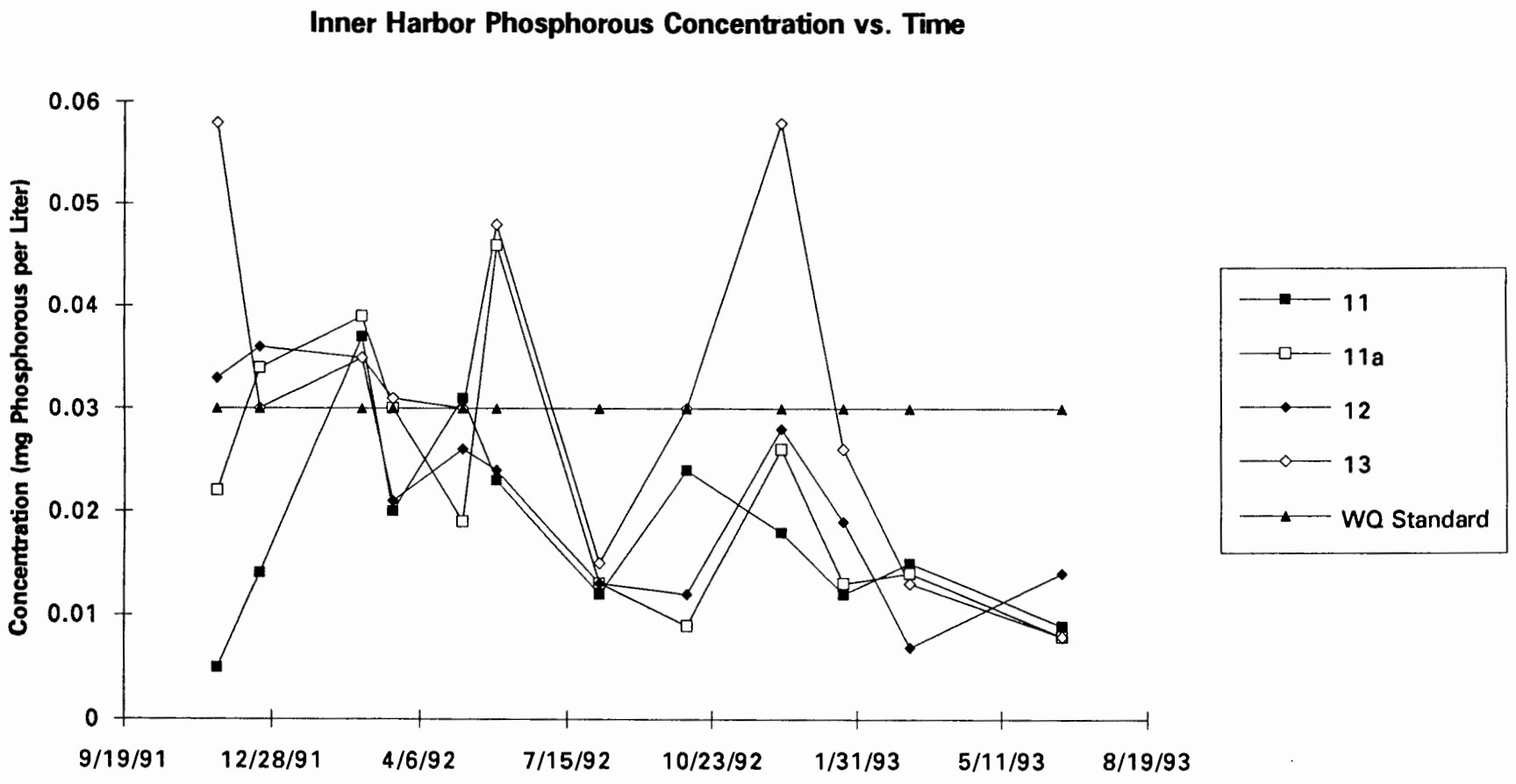
Notes:

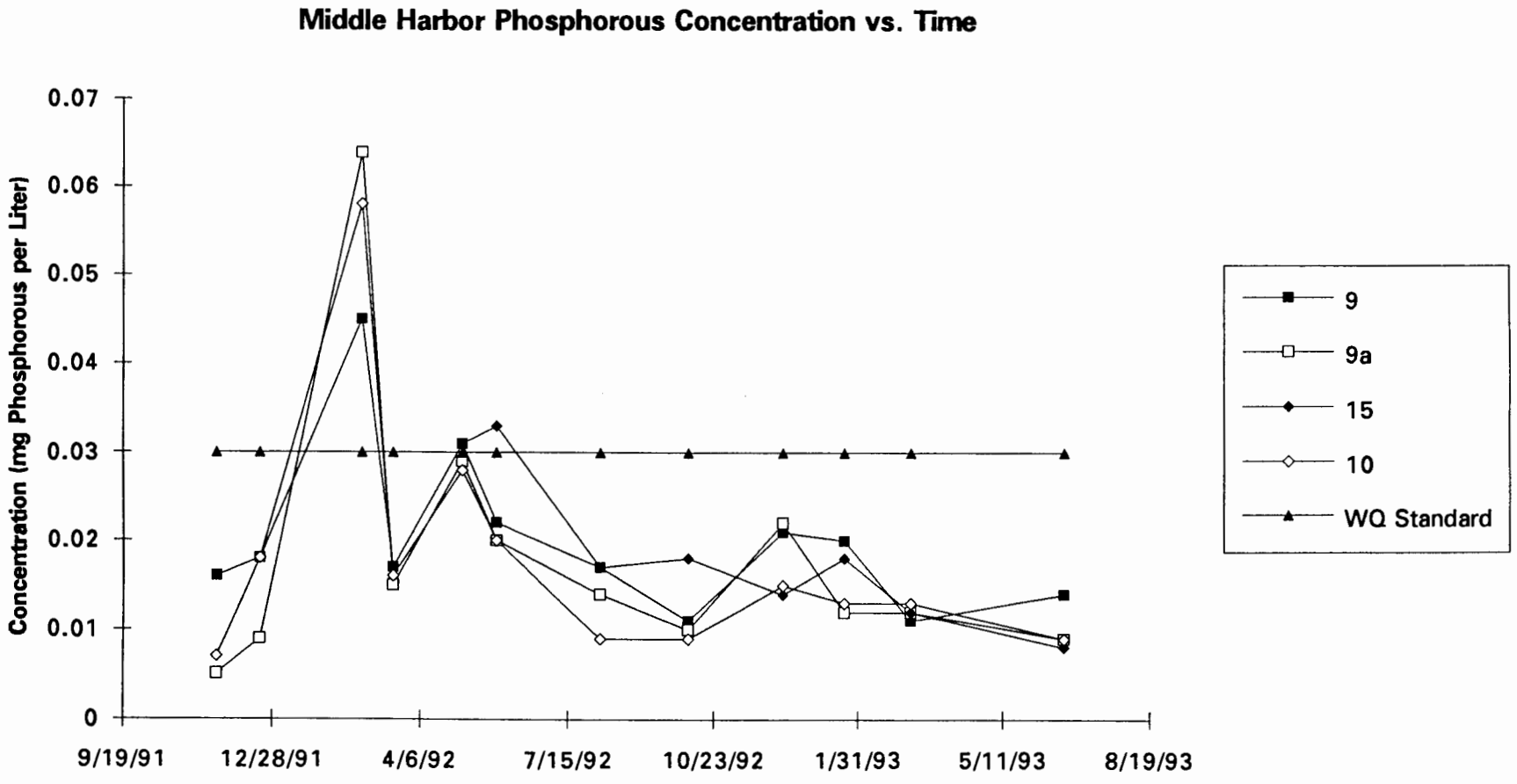
* Value verified by repeat analysis.

** Average does not include extreme values.

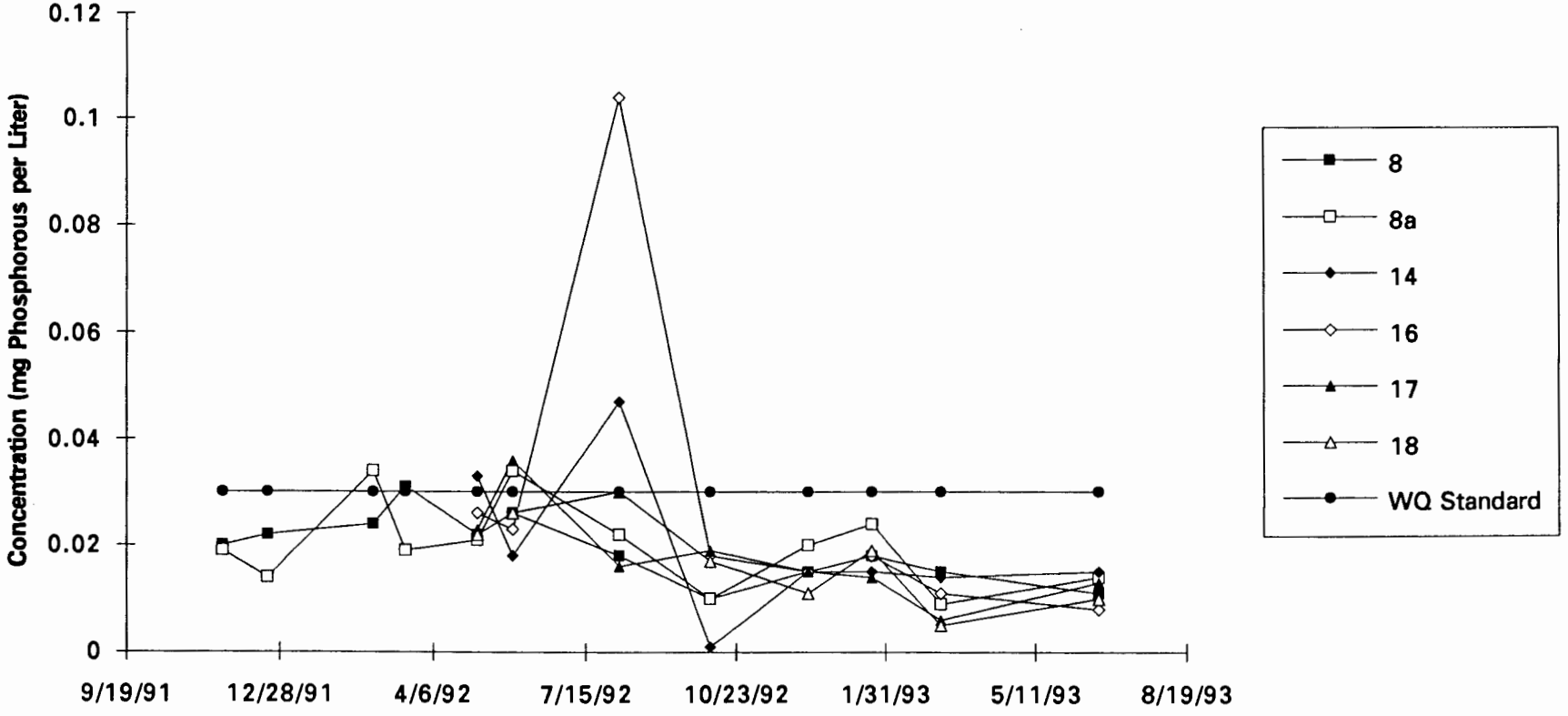
NS = not sampled

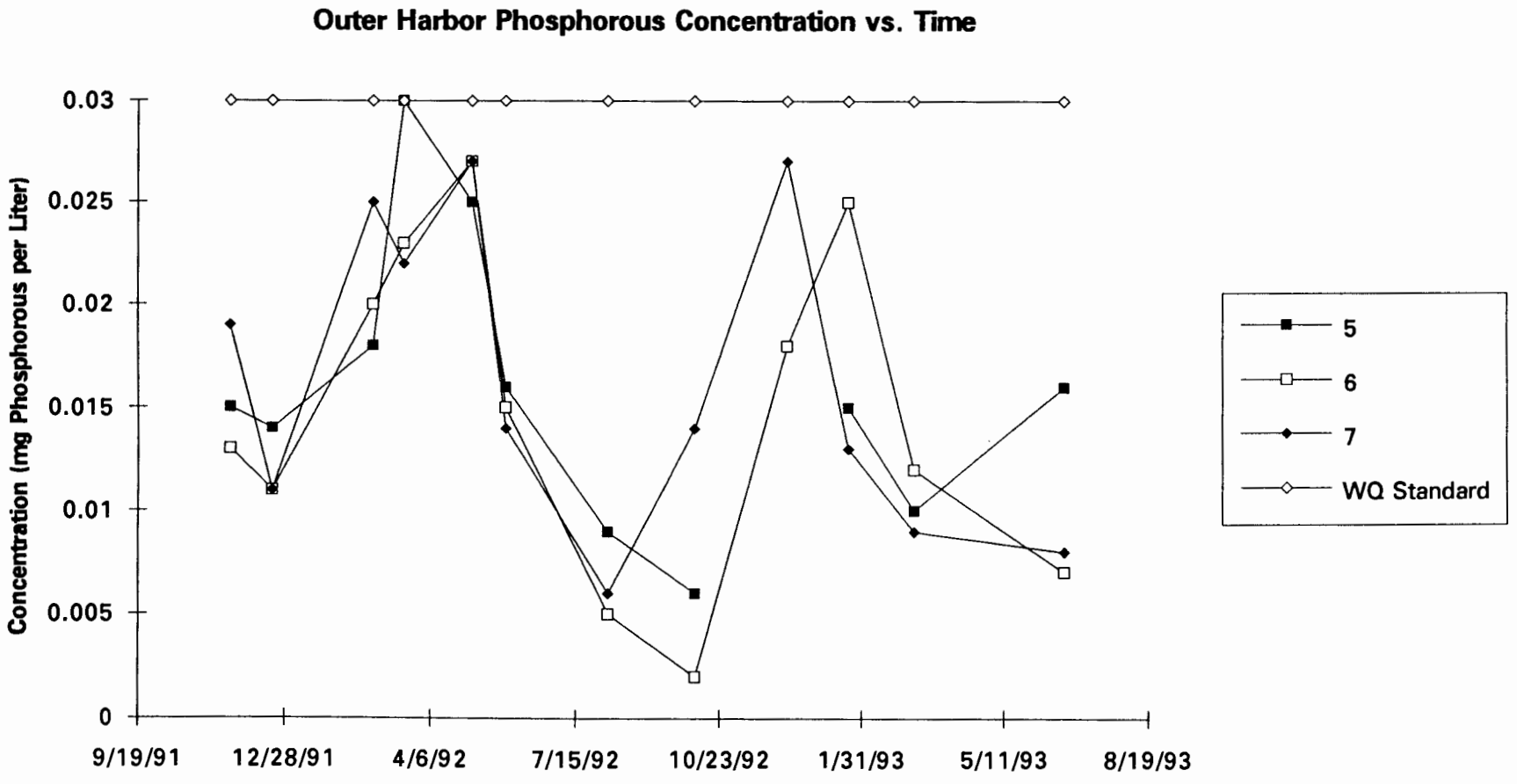

Mean Phosphorous Concentration vs. Distance
Concentration (mg Phosphorous per Liter)
0.030
0.025
0.020
0.015
0.010
0.005
0.000
0
2000
4000
6000
8000
10000
12000
14000
16000
Distance from Harbor entrance (feet)


Inner Harbor Phosphorous Concentration vs. Time
Concentration (mg Phosphorous per Liter)
0.06
0.05
0.04
0.03
0.02
0.01
0
9/19/91
12/28/91
4/6/92
7/15/92
10/23/92
1/31/93
5/11/93
8/19/93
11
11a
12
13
WQ Standard


Middle Harbor Phosphorous Concentration vs. Time
Concentration (mg Phosphorous per Liter)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
9/19/91
12/28/91
4/6/92
7/15/92
10/23/92
1/31/93
5/11/93
8/19/93
9
9a
15
10
WQ Standard

Mixing Zone Area Phosphorous Concentration vs. Time




Outer Harbor Phosphorous Concentration vs. Time
Concentration (mg Phosphorous per Liter)
0.03
0.025
0.02
0.015
0.01
0.005
0
9/19/91
12/28/91
4/6/92
7/15/92
10/23/92
1/31/93
5/11/93
8/19/93
5
6
7
WQ Standard

Chlorophyll a (mg/m3)

Harbor Station	Sampling Date										Average
	2/27/92	3/19/92	5/5/92	5/28/92	8/6/92	10/6/92	Dec 92?	1/22/93	3/9/93	6/22/93	
5-3	0.21	0.74	NS	NS	**1.38**	0.19	NS	**1.25**	0.59	0.33	0.67
5-60	0.15	0.08	NS	NS	0.49	0.16	NS	**1.19**	0.31	0.33	0.39
6-3	0.76	0.75	NS	NS	0.74	0.28	0.96	0.21	0.36	0.22	0.54
6-60	0.98	0.47	NS	NS	0.58	0.28	0.57	0.18	0.24	0.20	0.44
7-3	0.61	0.19	NS	NS	0.23	0.38	**1.89**	0.95	0.80	0.43	0.69
7-60	0.32	0.26	NS	NS	0.18	0.25	0.75	0.54	0.48	0.42	0.40
8-3	**1.30**	**1.01**	NS	NS	0.65	0.52	**2.66**	0.45	0.85	0.68	**1.02**
8-60	**1.11**	0.66	NS	NS	0.62	0.37	**2.61**	0.71	0.34	0.64	0.88
8A-3	**1.33**	0.89	NS	NS	**2.66**	0.45	**2.09**	0.82	0.95	0.65	**1.23**
8A-60	**1.13**	0.56	NS	NS	**1.20**	0.33	**1.93**	0.74	0.65	0.66	0.90
9-3	**1.37**	0.96	NS	NS	0.64	0.26	**1.23**	0.17	0.80	**1.49**	0.87
9-60	**1.18**	0.44	NS	NS	**1.33**	0.27	**1.44**	0.18	0.51	**1.46**	0.85
9A-3	0.55	0.83	NS	NS	**1.41**	0.18	**1.44**	0.44	0.67	*	0.79
9A-60	0.66	0.61	NS	NS	0.93	0.30	**1.63**	0.42	0.67	**	0.75
10-3	0.68	0.50	NS	NS	**1.68**	0.36	**2.44**	0.80	0.56	**2.35**	**1.17**
10-60	0.96	0.41	NS	NS	0.47	0.31	**1.56**	**1.03**	0.52	**1.22**	0.81
11-3	**1.41**	**1.59**	NS	NS	0.26	0.61	**1.88**	0.47	0.56	**1.03**	0.98
11-60	**1.09**	0.87	NS	NS	0.53	0.49	**1.54**	0.45	0.50	**1.05**	0.82
11A-3	**1.34**	**1.29**	NS	NS	0.48	0.51	**1.32**	**1.28**	0.82	**1.36**	**1.05**
11A-60	**1.32**	**1.35**	NS	NS	**1.90**	0.71	**1.95**	**1.01**	0.56	**1.81**	**1.33**
12-3	**1.46**	0.98	NS	NS	0.38	0.81	**4.70**	**1.28**	0.86	**1.48**	**1.49**
12-60	**2.15**	0.84	NS	NS	0.29	0.70	**3.15**	0.98	**1.85**	**1.52**	**1.44**
13-3	**1.63**	**4.79**	NS	NS	0.94	0.85	**7.66**	NS	**2.22**	**1.53**	**2.80**
13-30	**1.77**	**2.56**	NS	NS	0.90	0.65	**2.74**	0.93	**1.66**	**2.02**	**1.65**
14-3	NS	NS	NS	NS	**1.50**	0.52	**1.49**	0.43	0.66	0.71	0.89
14-60	NS	NS	NS	NS	0.21	0.78	**2.05**	**1.16**	0.57	0.66	0.91
15-3	NS	NS	NS	NS	0.83	0.67	**1.56**	0.35	0.61	**1.12**	0.86
15-60	NS	NS	NS	NS	0.47	0.42	**1.85**	0.33	0.56	**1.02**	0.78
16-3	NS	NS	NS	NS	**1.00**	0.47	**2.78**	0.62	0.67	0.69	**1.04**
16-60	NS	NS	NS	NS	0.71	0.47	**2.00**	0.45	0.56	0.61	0.80
17-3	NS	NS	NS	NS	**1.78**	0.44	**2.36**	0.38	0.93	0.60	**1.08**
17-60	NS	NS	NS	NS	**1.11**	0.64	**1.79**	**1.08**	0.67	0.43	0.95
18-3	NS	NS	NS	NS	**6.58**	0.28	**1.40**	**1.02**	0.84	0.61	**1.79**
18-60	NS	NS	NS	NS	**4.47**	0.46	**1.98**	**1.24**	0.35	0.56	**1.51**

Notes:

* 68.0 x (10/vol filtered) x 1.450 x 5 = 9A-3

** 46.5 x (10/ vol. filtered) x 1.450 x 5 = value for 9A-60

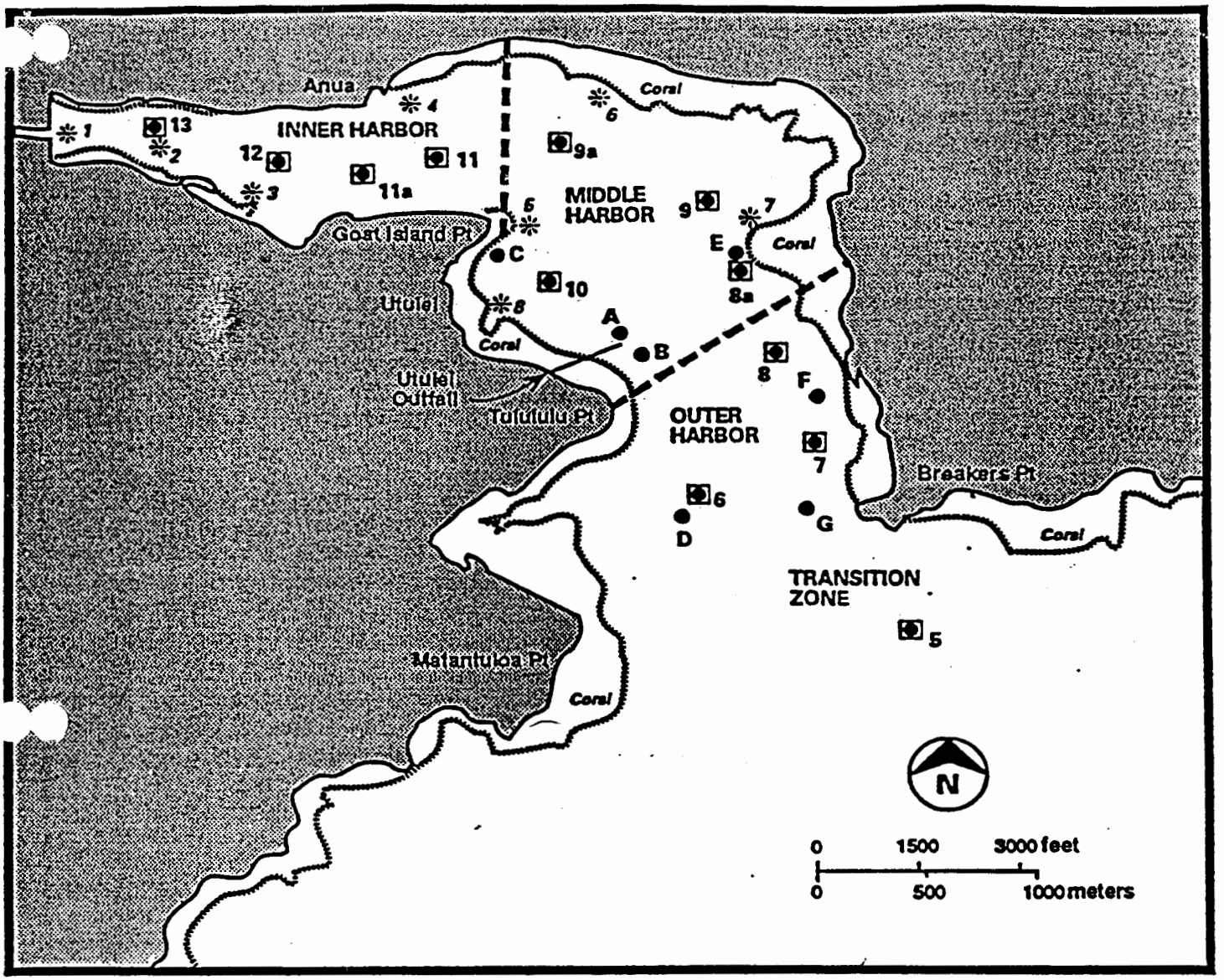
NS = not sampled

Observed Secchi Depths[1]			
Station[2]	Secchi Depth (feet)		
	6 May 1992	6 Oct 1992	22 June 1993
5	>65	35	43
6	>65	38	40
7	>65	34	26
8	>65	34	32
8A	>65	65	30
9	>65	65	30
9A	>65	47	29
10	>65	31	28
11	60	42	27
11A	19	32	29
12	21	29	22
13	15	22	20
14	>65	45	29
15	>65	65	29
16	>65	48	32
17	>65	40	28
18	>65	30	25

[1]Data supplied by ASEPA.
[2]Station locations shown on on following figures.

Observed Turbidity[1]						
Station[2]	Turbidity (NTU)					
	6 May 1992		6 Oct 1992		22 June 1993	
Depth (ft)→	3	60	3	60	3	60
5	0.4	0.4	0.5	0.4	0.3	0.4
6	0.4	0.4	0.4	0.3	0.2	0.4
7	0.4	0.4	0.4	0.4	0.2	0.3
8	0.4	0.4	0.4	0.4	0.3	0.5
8A	0.4	0.4	0.5	0.4	0.4	0.5
9	0.6	0.5	0.5	0.4	0.5	0.4
9A	0.5	0.5	0.5	0.4	0.3	0.4
10	0.5	0.5	0.7	0.5	0.4	0.5
11	0.6	0.6	0.5	0.4	0.4	0.3
11A	0.9	1.0	0.5	0.5	0.5	0.5
12	0.5	0.6	0.5	0.7	0.4	0.5
13	1.0	1.0	3.5	1.4	0.6	0.7
14	0.6	0.5	0.5	0.5	0.4	0.5
15	0.5	0.7	0.7	0.5	0.4	0.5
16	0.5	0.9	0.5	0.4	0.5	0.3
17	0.6	0.6	0.5	0.5	0.3	0.4
18	0.5	0.7	0.4	0.4	0.2	0.3

[1]Data supplied by ASEPA.
[2]Station locations shown on following figures.



LEGEND

- ASG Sampling Station
- Utulei WWTP Station
- CH2M HILL Field Measurement Station (1/19/91)

FIGURE 2. LOCATION OF WATER QUALITY STATIONS IN PAGO PAGO HARBOR

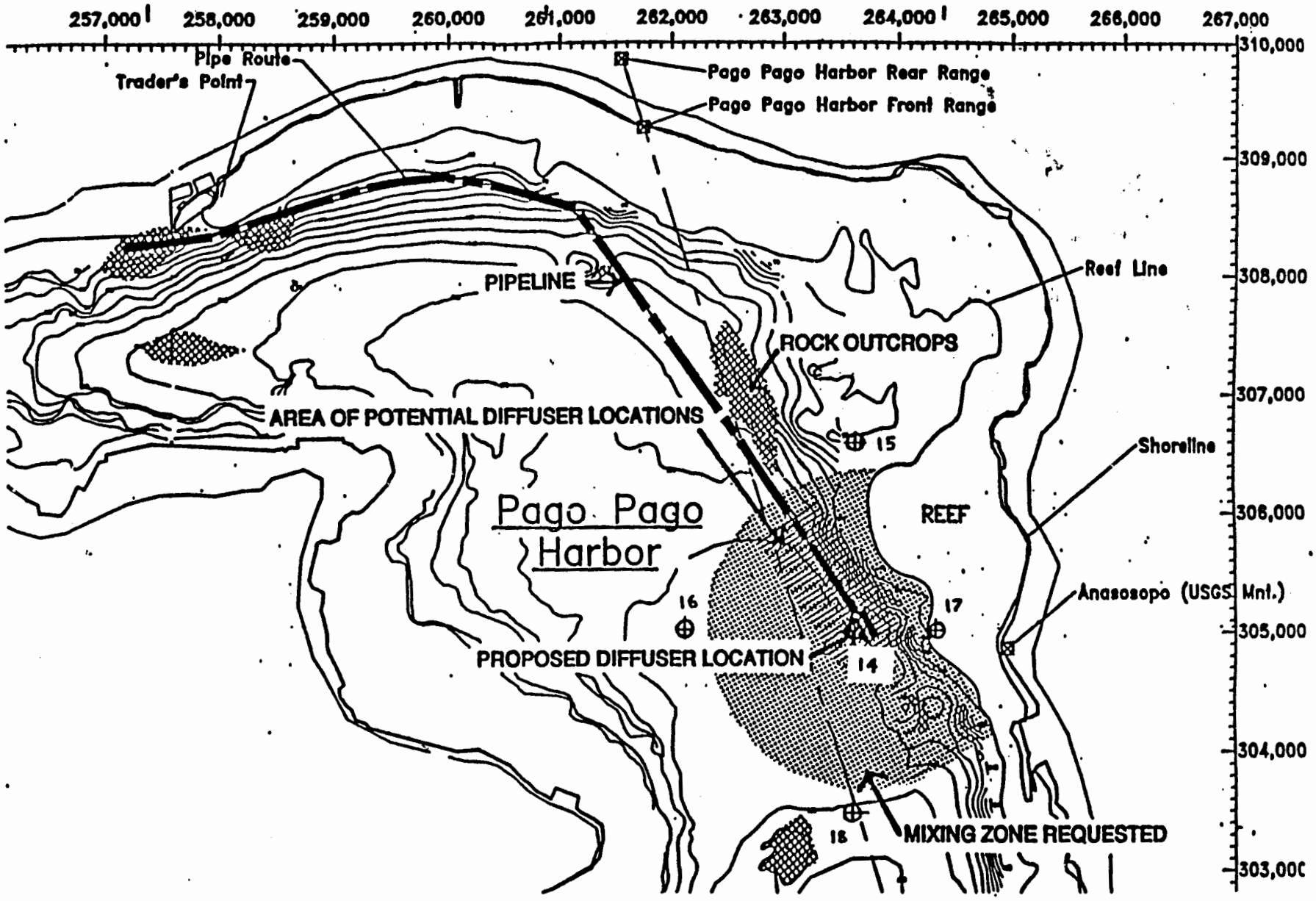


FIGURE 1. NEW MONITORING STATIONS IN PAGO PAGO HARBOR (14-18)

Station Distances Along Harbor Centerline			
Station	Distance from Harbor Entrance[1] (feet)	Corresponding Model Cell[1]	
		I	J
5	0		
6	2000	6	3
7	2500	9	4
18	3300		
8	4100	8	6
17	4500		
14	4600		
8A	5000	7	8
16	5400	7	8
15	6200		
9	6500	7	10
10	7300	3	11
9A	8600	7	13
11	11000	5	17
11A	12200	5	19
12	13600	5	21
13	15200	5	32

[1] Distances and cell locations are approximate.