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VVal-79 Maximum Permissible Tissue Tension Table for Thalmann Algorithm Support of Air Diving

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14. ABSTRACT

The Thalmann Algorithm parameterized with VVal-18 or VVal-18M underlies U.S. Navy air and nitrox decompression procedures. VVal-18 and VVal-18M air no-stop limits at many depths are longer than the corresponding no-stop limits in the 1957 Standard Air Decompression Table that appeared in the *U.S. Navy Diving Manual* from 1959 until it was replaced in Revision 6 (2008). However, the severity of DCS observed in man-trials of the longer no-stop limits was unacceptable, and consequently, in the Revision 6 Air Decompression Tables, the 1957 air no-stop limits were arbitrarily retained in place of any longer VVal-18M-prescribed limits. This report describes VVal-79, a modification of the VVal-18M parameter set, that enables use of the Thalmann Algorithm to prescribe air diving no-stop limits and decompression obligations that can be used as is, with no need for arbitrary edits to individual schedules. Crucially, the VVal-79 parameter set will also provide air no-stop limits of appropriate duration when it is used in a Thalmann Algorithm Navy Dive Computer or Thalmann Algorithm Topside Decompression Monitor. A complete set of air decompression tables computed with the VVal-79 parameters is included.

15. SUBJECT TERMS

Thalmann Algorithm, air diving, no-stop limits, decompression schedules, decompression tables, Navy Dive Computers

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1. INTRODUCTION

Both the Thalmann Algorithm (parameterized with the VVal-18 or VVal-18M parameter sets) and probabilistic models of the incidence and time of onset of decompression sickness (DCS) prescribe no-stop limits for air dives to depths ≥90 feet of sea water (fsw) that are substantially longer than the corresponding limits in the 1957 des Granges U.S. Navy Standard Air Decompression Table (USN57) that appeared in the *U.S. Navy Diving Manual* from 1959 until it was replaced in 2008.[1,2,3] The severity of DCS observed in man-trials of the longer no-stop limits at 130, 150, and 190 fsw, however, was unacceptable (see Figure 1), which motivated rejection of the longer limits.[1]

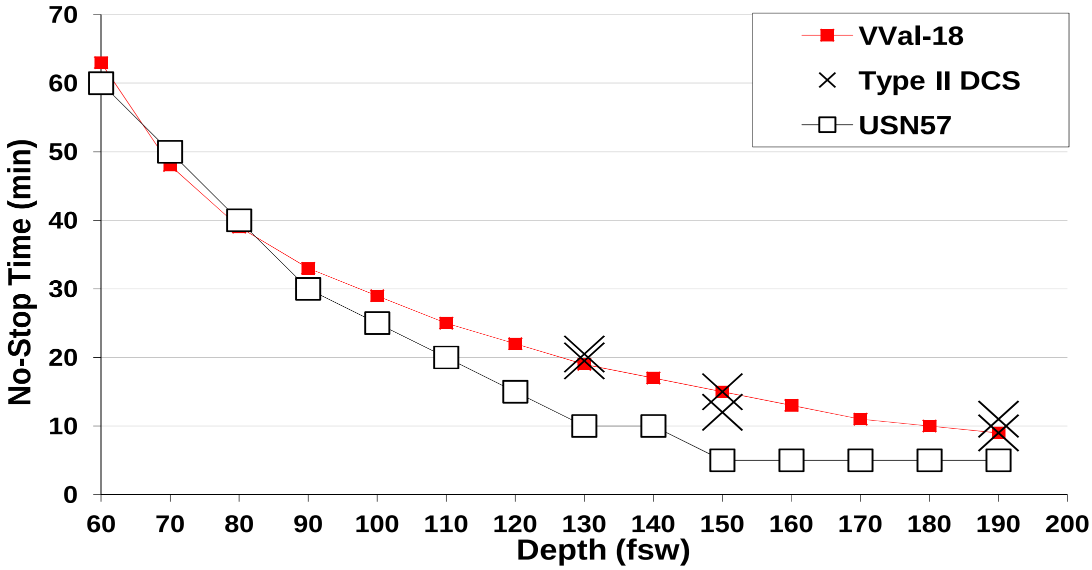

Figure 1. The air diving no-stop limit problem. Serious central nervous system (CNS) DCS (indicated with crosses) occurred at the longer limits tested at 130, 150, and 190 fsw.

The new integrated Air Decompression Table that first appeared in Revision 6 of the *U.S. Navy Diving Manual*,[4] a table here designated as USN-Rev6, was computed with the Thalmann VVal-18M Algorithm, which prescribes air diving no-stop limits equal to those prescribed by the Thalmann Algorithm with VVal-18.[5,6] USN57 no-stop limits were arbitrarily retained in place of any longer algorithm-prescribed limits.[6] U.S. Navy Dive Computers (NDCs) and the Topside Decompression Monitor (TDM) also operate with the Thalmann Algorithm and the VVal-18 or VVal-18M parameter sets. These devices provide real-time decompression guidance computed on the basis of a diver's evolving dive history, a context in which it is not possible to interpret the arbitrary edits of individual algorithmic prescriptions in USN-Rev6. These devices consequently still prescribe the unacceptably long no-stop limits that were rejected for USN-Rev6. An interim solution that required no changes to any extant NDC in supporting air diving was proposed: Use the NSW III NDC.[1] That device prescribes the acceptable no-stop limits of the Thalmann Algorithm with VVal-18 parameters for air dives to depths of 78 fsw or less.[7] At depths deeper than 78 fsw, the NSW III assumes that the diver is breathing from MK 16 MOD 0, and it prescribes no-stop limits close to those on an isopleth of 0.2% risk of CNS DCS ($P_{CNS\text{-}DCS}$) as estimated with a logistic model fitted to an extensive data set of CNS DCS incidences in no-stop air dives (Model 2 in NEDU TR 09-03,[a] see Figure 2).[1] Accordingly, though not as short as the limits in USN-Rev6, these limits were considered to be of acceptable durations for air diving. On the other hand, the decompression schedules prescribed by the NSW III are substantially longer than their counterparts in USN-Rev6.[1] A comprehensive solution that minimally affects the decompression times for deep air dives requires changes to the Thalmann Algorithm parameters. This report describes VVal-18M parameter set modifications that have been considered to achieve such a solution.

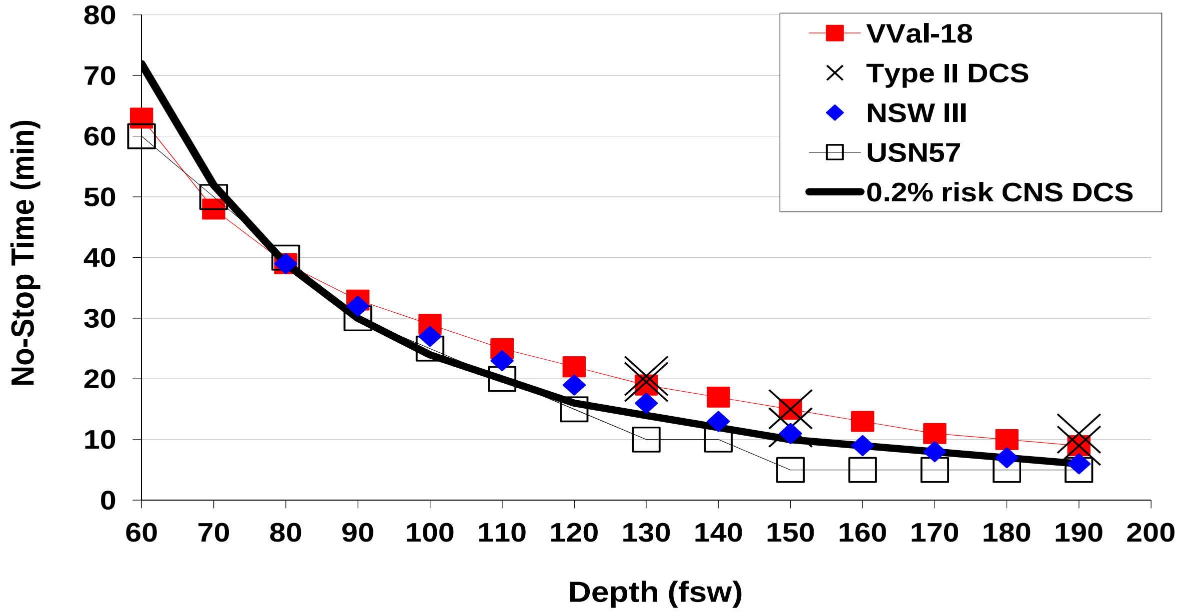

Figure 2. A comparison of air no-stop limits prescribed by the NSW III NDC and the no-stop limits prescribed by the Thalmann Algorithm with VVal-18, the USN57 no-stop limits, and the 0.2% $P_{CNS\text{-}DCS}$ isopleth.

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[a] $$P_{CNS\text{-}DCS} = \frac{1}{1+\exp(-g(D,BT))},$$

where $g(D,BT) = \beta_0 + \beta_1 \ln D + \beta_2 \ln BT$, and with depth *D* in fsw and bottom time *BT* in minutes, $\beta_0 = -55.955319$, $\beta_1 = 8.162347$, and $\beta_2 = 3.813201$.

2. METHODS

Modifications to the VVal-18M parameters were considered to make the Thalmann Algorithm prescribe acceptable air diving no-stop limits while keeping its prescriptions for air decompression dives as close as possible to those provided by the algorithm with VVal-18M. The different modifications were based on different sets of "acceptable" no-stop limits. The Thalmann Algorithm allows no-stop ascent to surface after bottom time at a given depth is increased up to the time when a "governing compartmental gas tension" first exceeds the corresponding compartmental maximum permissible tissue tension (MPTT) at surface.[8,9] A given set of target no-stop limits is thus attained by assigning appropriate compartmental MPTT values at surface.

By the convention adopted to produce USN-Rev6, the governing compartmental gas tensions are those that prevail in the modeled gas exchange compartments at the depth of the last allowed decompression stop; i.e., all allowed ascents effectively end with instantaneous ascent to surface from the last allowed decompression stop depth.[6] The governing compartmental gas tensions — and, hence, the no-stop limits — are consequently functions not only of dive depth and bottom time but also of the Thalmann Algorithm parameters that affect compartmental gas exchange [PBOVP[a] and compartmental gas exchange half-times and saturation/desaturation rate ratios (SDR values)], the dive descent and ascent rates, and the depth of the last allowed decompression stop. With the last allowed stop depth of 20 fsw in USN-Rev6, MPTTs required to effect desired no-stop limits were determined from the computed compartmental gas tensions at 20 fsw during no-stop ascent to surface after the desired bottom time is completed at each depth of interest.

Governing gas tensions were computed with DMDB7 software, an implementation of the EL-DCM Thalmann Algorithm[8] similar to that used to generate the air (USN-Rev6), MK16 MOD 0, and MK 16 MOD 1 decompression tables in Revision 6 of the *U.S. Navy Diving Manual*.[9] The DMDB7 software features node-by-node output of computed compartmental gas tensions for each processed dive profile, including output for a node at the last-allowed decompression stop depth during no-stop ascents. A descent rate of 75 fsw/min and an ascent rate of 30 fsw/min were assumed for each air dive considered.

3. RESULTS

The various VVal-18M modifications considered, along with the corresponding air diving no-stop limit prescriptions, are summarized in Appendix A.

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[a] The threshold compartmental inert gas tension overpressure with respect to saturation at the prevailing ambient hydrostatic pressure for transition from exponential to linear gas exchange kinetics.

3.1. VVal-76

The first set of modified parameters considered, designated VVal-76, was presented in NEDU TR 09-03 as one with which the Thalmann Algorithm would produce no-stop limits along the 0.2% $P_{CNS\text{-}DCS}$ isopleth.[1] The VVal-76 target no-stop limits along the 0.2% $P_{CNS\text{-}DCS}$ isopleth are given in Table 1. The modifications entailed changes to only the surfacing MPTTs of the 5-, 10-, and 20-minute half-time compartments of VVal-18M, with retention of all other VVal-18M parameter values. However, the means by which those revised surfacing MPTTs were determined was not described.

In any given gas exchange compartment, the governing gas tensions during no-stop ascents from a given dive depth increase with dive bottom time. Also, after dives of given bottom time, the governing gas tensions in any compartment during no-stop ascents increase with dive depth. Thus, as target no-stop bottom times decrease with increasing dive depth, the governing gas tensions in a given compartment pass through a maximum. For the dive depth at which this maximum occurs, the no-stop limit is fixed at the target value by assigning the surfacing MPTT for the compartment a value between the governing gas tension attained after a dive to the target no-stop limit and the governing gas tension attained after a dive to the target limit plus one minute (see Table 1). A single surfacing MPTT for a given compartment may fulfill this requirement for a range of dive depths surrounding the depth of the maximum governing gas tension, and hence cause the no-stop limits for dives to those depths to equal the respective target values. Since maxima in governing gas tensions occur at different depths in different compartments, different compartments control the no-stop limits over different ranges of dive depth. Figures 3 through 5 illustrate how the governing gas tension maxima in the 5-, 10-, and 20-minute half-time compartments were used to determine the respective compartmental surfacing MPTTs for VVal-76.

Table 1. Target no-stop limits for VVal-76 with governing gas tensions (fsw)* in the three fastest compartments.

Depth (fsw)	Target No-stop Limit‡ (min)	5-min $T_{½}$ Target (fsw)	5-min $T_{½}$ Target+1min (fsw)	10-min $T_{½}$ Target (fsw)	10-min $T_{½}$ Target+1min (fsw)	20-min $T_{½}$ Target (fsw)	20-min $T_{½}$ Target+1min (fsw)
70	52	76.375	76.380	76.675	76.771	70.077	70.379
80	39	82.976	83.010	81.420	81.691	70.702	71.239
90	30	88.966	89.099	84.326	84.888	69.893	70.711
100	24	94.068	94.403	85.917	86.850	68.710	69.816
110	20	98.332	98.964	86.935	88.269	67.775	69.160
120	16	100.543	101.717	85.511	87.391	65.124	66.838
130	14	103.186	104.827	85.914	88.215	64.614	66.585
140	12	104.366	106.633	85.036	87.826	63.282	65.532
150	10	103.667	106.753	82.701	86.056	61.068	63.623
160	9	104.730	108.401	82.725	86.492	60.797	63.591
170	8	104.899	109.232	82.106	86.314	60.134	63.178
180	7	104.094	109.163	80.816	85.492	59.070	62.372
190	6	102.235	108.115	78.825	83.997	57.596	61.166

* Compartmental gas tensions at 20 fsw during no-stop ascent at 30 fsw/min after descent at 75 fsw/min to the indicated depth and completion of the indicated bottom times (target time and target time + 1 minute).

‡ A dive to each target incurs an estimated 0.2% risk of CNS DCS.

Governing gas tensions in the 5-minute half-time compartment in Table 1 are graphically illustrated versus dive depth in Figure 3. These gas tensions are maximal over the 150 to 190 fsw range of dive depths. Within this range, a gas tension of 106.7 fsw falls between the governing tensions for dives to the target bottom times and those for dives to the target bottom times plus one minute. Thus, a surfacing MPTT of 106.7 fsw in this compartment causes the no-stop limits for dives to depths of 150 to 190 fsw to equal the corresponding VVal-76 target no-stop limits in Table 1.

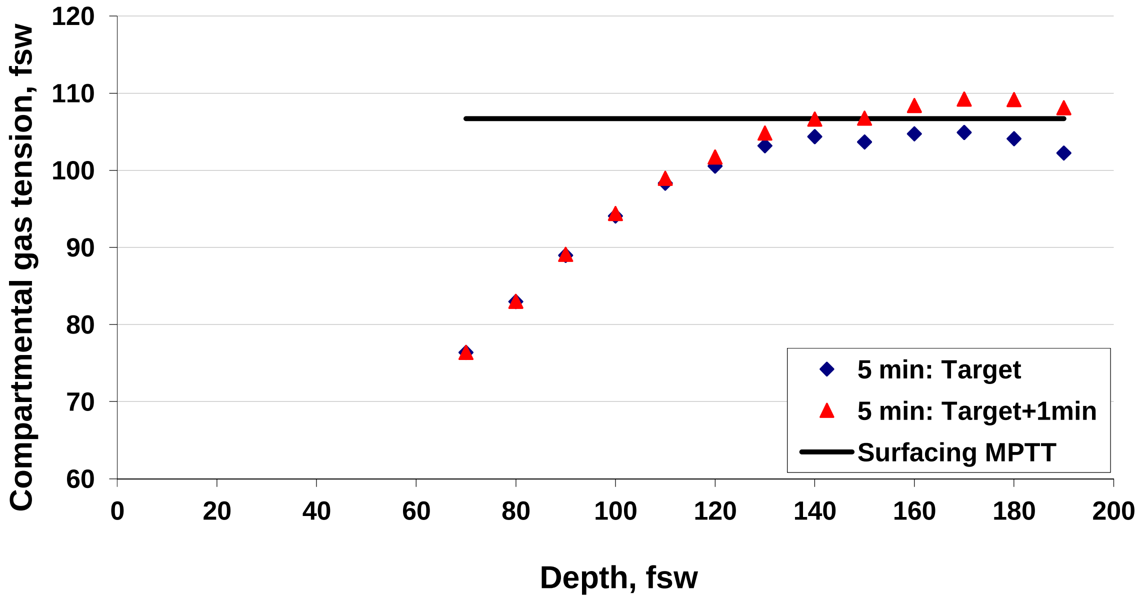

Figure 3. Governing gas tensions in the 5-minute half-time compartment after completion of the VVal-76 target no-stop limit times and the VVal-76 target no-stop limit times plus one minute in Table 1.

Figure 4 shows how a surfacing MPTT of 86.7 fsw in the 10-minute half-time compartment causes the no-stop limits for dives to 100 fsw and to 120 to 140 fsw to equal the corresponding VVal-76 target no-stop limits in Table 1. However, this MPTT is of value slightly less than the governing gas tension in this compartment for the target no-stop limit of dives to 110 fsw, while it is greater than the governing gas tension (not shown) in this compartment for a no-stop limit one minute shorter than the target. Thus, a 86.7 fsw surfacing MPTT in the 10-minute half-time compartment causes the no-stop limit for 110 fsw dives to be one minute less than the target value.

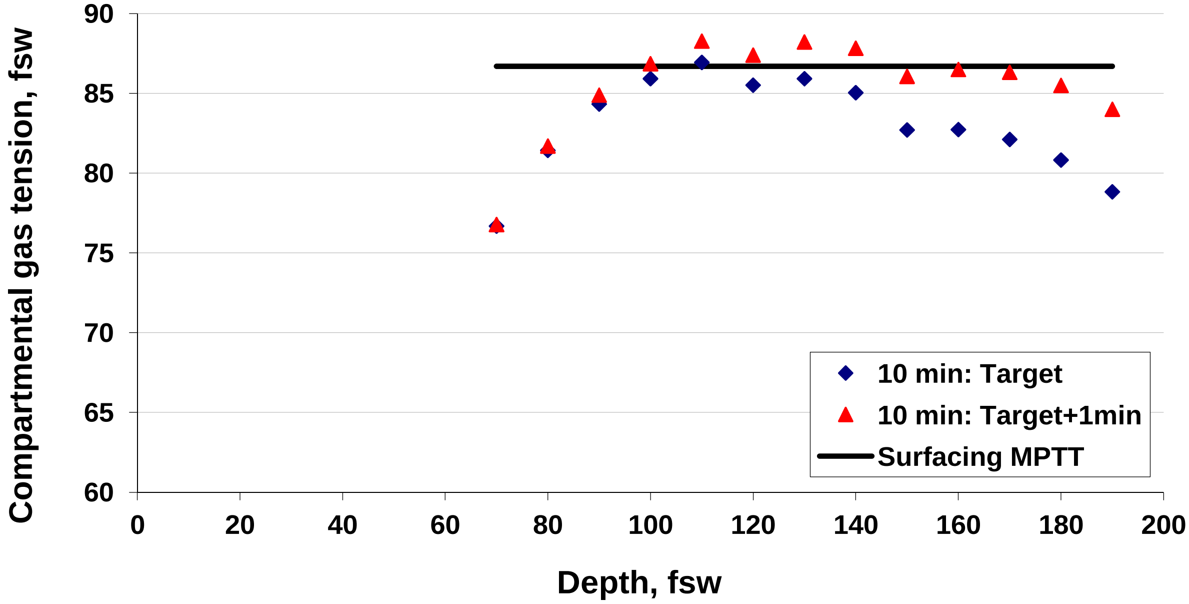

Figure 4. Governing gas tensions in the 10-minute half-time compartment after completion of the VVal-76 target no-stop limit times and the VVal-76 target no-stop limit times plus one minute in Table 1.

Figure 5 shows how a surfacing MPTT of 70.3 fsw in the 20-minute half-time compartment causes the no-stop limits for dives to depths of 70 and 90 fsw to equal the corresponding VVal-76 target no-stop limits in Table 1. However, this MPTT is of value slightly less than the governing gas tension in this compartment for the target no-stop limit of dives to 80 fsw, while it is greater than the governing gas tension (not shown) in this compartment for a no-stop limit one minute less than the target. Thus, a 70.3 fsw surfacing MPTT in the 20-minute half-time compartment causes the no-stop limit for 80 fsw dives to be one minute less than the target value.

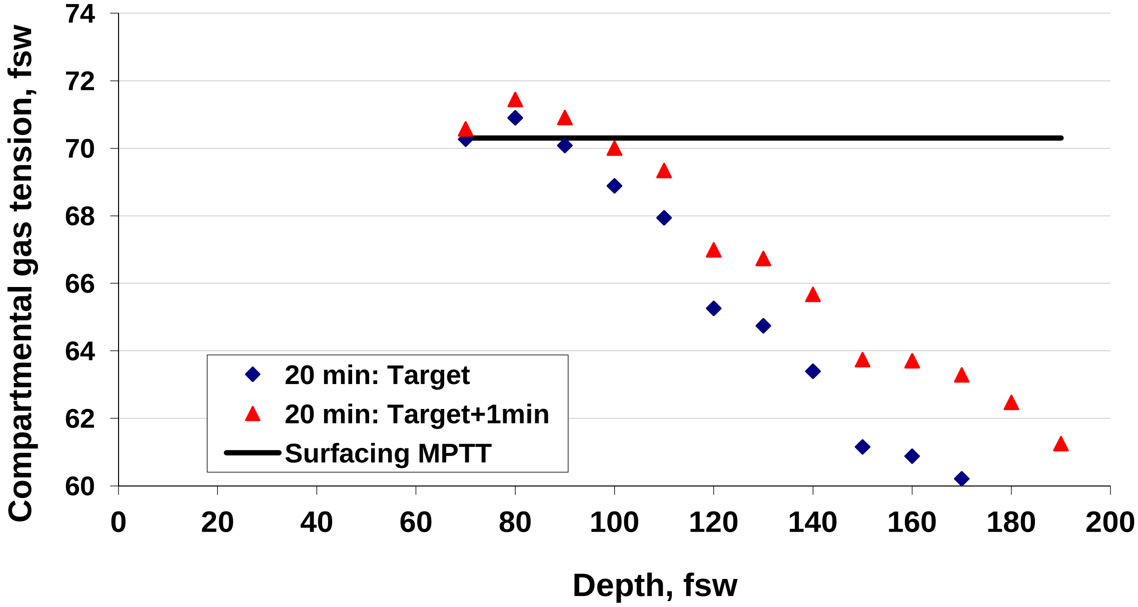

Figure 5. Governing gas tensions in the 20-minute half-time compartment after completion of the VVal-76 target no-stop limit times and the VVal-76 target no-stop limit times plus one minute in Table 1.

Figure 6 illustrates that the air-diving no-stop limits prescribed by the Thalmann Algorithm with VVal-76 conform closely with the target no-stop limits on the 0.2% CNS DCS risk isopleth for dives to depths >80 fsw. The prescribed limits for dives to shallower depths fall comfortably below this isopleth.

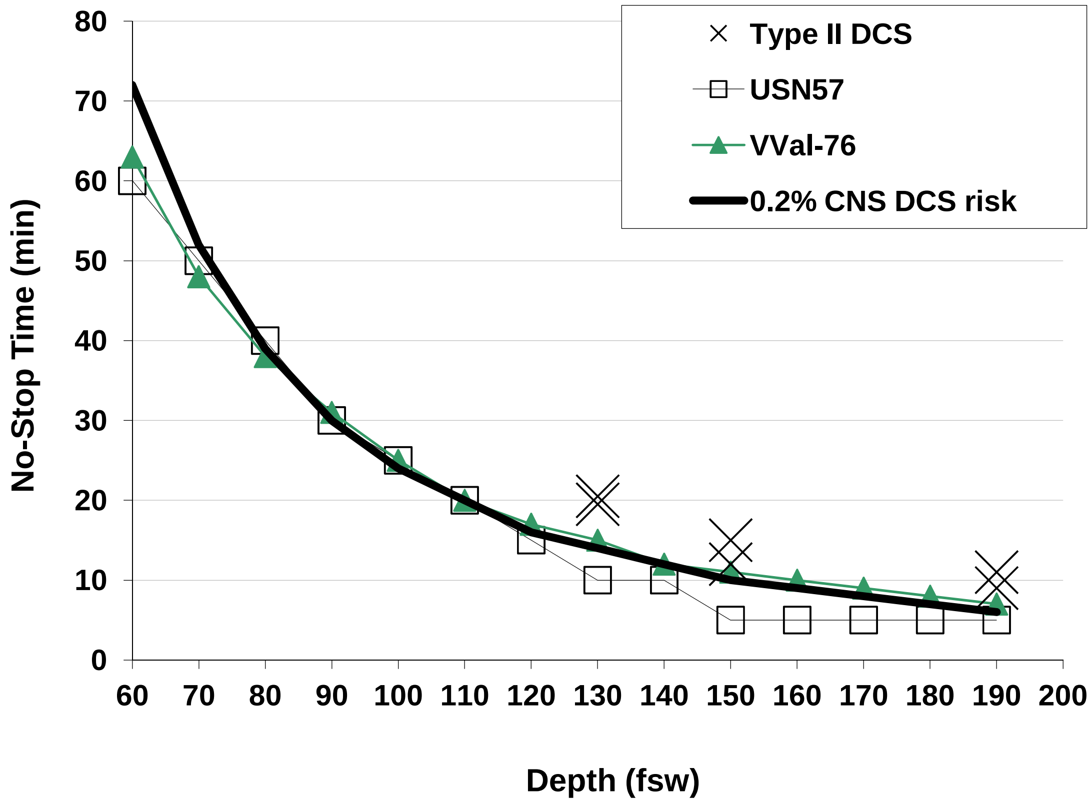

Figure 6. Air no-stop limits prescribed by the Thalmann Algorithm with VVal-76 in comparison to those on the 0.2% $P_{CNS\text{-}DCS}$ isopleth and the USN57 limits. The 10-minute no-stop limit at 150 fsw prescribed with VVal-76 is only two minutes shorter than the bottom time at which a severe DCS incident occurred, although the limit is equal to the corresponding point on the 0.2% $P_{CNS\text{-}DCS}$ isopleth.

While the Thalmann Algorithm with the VVal-76 parameters prescribes acceptable air diving no-stop limits, these parameters cannot be implemented in NDCs. The software implementation of the Thalmann Algorithm in these computers requires MPTTs at depth that are linearly projected from their surface values. This requirement is violated in VVal-76, because only compartmental surfacing MPTTs were modified and the original VVal-18M compartmental MPTTs at depth were retained.

3.2. VVal-77

E. T. Flynn observed that equating the 5-minute half-time compartmental MPTTs to the 10-minute half-time compartmental MPTTs at all depths while retaining all other VVal-18M parameters unchanged produces an MPTT table with which the Thalmann Algorithm prescribes air diving no-stop limits close to the original USN57 limits (see Figure 7).[10–12] With this modification (designated VVal-77) the no-stop limits for dives to 110, 120, and 140 fsw are each one minute shorter than the USN57 limits. Additionally, the limits for dives to depths of 90 and 100 fsw are three and four minutes longer, respectively, than the corresponding points on the 0.2% $P_{CNS\text{-}DCS}$ isopleth given by the Thalmann Algorithm with the VVal-76 parameters.

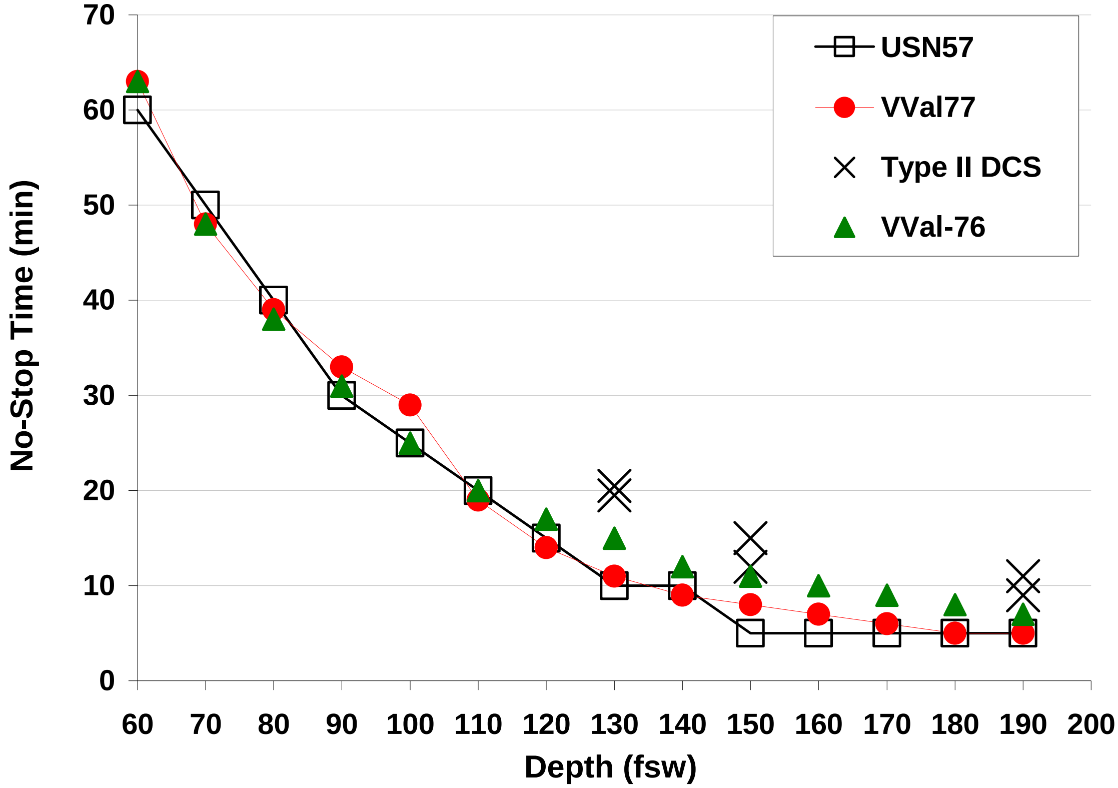

Figure 7. Air no-stop limits prescribed by the Thalmann Algorithm with VVal-77 in comparison with the USN57 limits and the 0.2% $P_{CNS\text{-}DCS}$ isopleth limits prescribed by the Thalmann Algorithm with VVal-76.

3.3. VVal-79

A better match of algorithm-prescribed no-stop limits to the original USN57 limits was sought with the rigorous approach used to compute the VVal-76 surfacing MPTTs. However, the published USN57 no-stop limits were calculated only to the nearest lower 5- or 10-minute increment.[13] As a result, the no-stop limits for 130 and 140 fsw dives are given as 10 minutes, while the no-stop limits for dives to 150 through 190 fsw are all given as 5 minutes. Because the Thalmann Algorithm calculates no-stop limits to the nearest lower minute, USN57 no-stop limit values more precise than the nearest lower 5-minute increment values were required as targets for calculating modified Thalmann Algorithm surfacing MPTTs. Target values that are consistent with the published USN57 no-stop limits and that decrease monotonically and continuously between 60 and 190 fsw were obtained from the following third-order polynomial fitted to selected published USN57 limits:

$$y = -0.0000253499 \cdot D^3 + 0.0140171536 \cdot D^2 - 2.6373380837 \cdot D + 173.7433352041 \quad (1)$$

(R^2 = 0.9987721828)

where y is the no-stop limit (min) at depth D (fsw). The function, with the selected USN57 limits explicitly fitted by the function, is illustrated in Figure 8. The smoothed no-stop limit for a 130 fsw dive is between 10 and 15 minutes, consistent with what the USN57 limit for this dive would have been if calculated to the nearest minute. Similarly, the smoothed no-stop limits for dives to 150 through 190 fsw have values between 5 and 10 minutes — values that decrease with increasing dive depth and are consistent with what the USN57 limits for these dives would have been if calculated to the nearest minute.

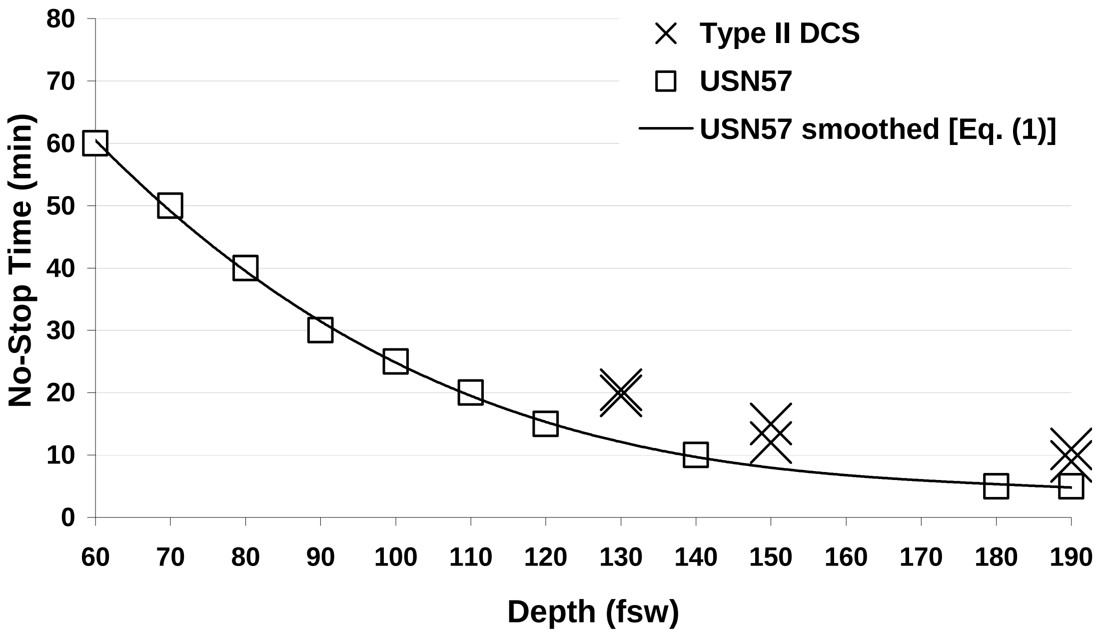

Figure 8. USN57 no-stop limits smoothed with Equation (1). Also shown are the USN57 limits (unfilled squares) that were explicitly fitted with the smoothing polynomial.

Table 2 gives both the smoothed USN57 no-stop limit targets for the VVal-79 parameter set developed in this exercise and the governing gas tensions during no-stop ascent in the three fastest gas exchange compartments in the Thalmann Algorithm with VVal-18M parameters, after the indicated target bottom times and the indicated target bottom times plus one minute are completed at the indicated depths. Values for each compartment are illustrated versus dive depth in Figures 9, 10, and 11.

Table 2. Target no-stop limits for VVal-79 with governing gas tensions (fsw)* in the three fastest compartments.

		5-min $T_{½}$		10-min $T_{½}$		20-min $T_{½}$	
Depth (fsw)	Target No-stop Limit (min)	Target (fsw)	Target+1min (fsw)	Target (fsw)	Target+1min (fsw)	Target (fsw)	Target+1min (fsw)
60	60	69.502	69.503	70.013	70.061	65.542	65.739
70	50	76.363	76.369	76.460	76.571	69.441	69.764
80	40	83.010	83.040	81.691	81.944	71.239	71.759
90	30	88.966	89.099	84.326	84.888	69.893	70.711
100	25	94.403	94.695	86.850	87.723	69.816	70.887
110	20	98.332	98.964	86.935	88.269	67.775	69.160
120	15	99.205	100.543	83.505	85.511	63.353	65.124
130	12	99.193	101.317	80.851	83.462	60.477	62.579
140	10	98.884	101.795	78.908	82.066	58.560	60.958
150	8	96.262	100.185	75.349	79.136	55.706	58.432
160	7	95.964	100.599	74.481	78.725	54.931	57.913
170	6	94.616	100.044	72.914	77.644	53.742	56.993
180	5	92.140	98.436	70.619	75.862	52.129	55.660
190	5	95.701	102.235	73.353	78.825	53.903	57.596

* Compartmental gas tensions at 20 fsw during no-stop ascent at 30 fsw/min after descent at 75 fsw/min to the indicated depth and completion of the indicated bottom times (target time and target time + 1 minute).

Figure 9 shows that the target no-stop limits for dives to depths of 120 to 170 fsw, and the target no-stop limit for dives to 190 fsw, are governed by the 5-minute half-time compartment with a surfacing MPTT of 99.3 fsw. This surfacing MPTT exceeds the governing gas tension in this compartment for 180 fsw dives to the target limit plus one minute, but it is less than the governing gas tension (not shown) for 180 fsw dives to the target limit plus two minutes. The 99.3 fsw MPTT consequently causes the no-stop limit for such dives to be one minute longer than the target value.

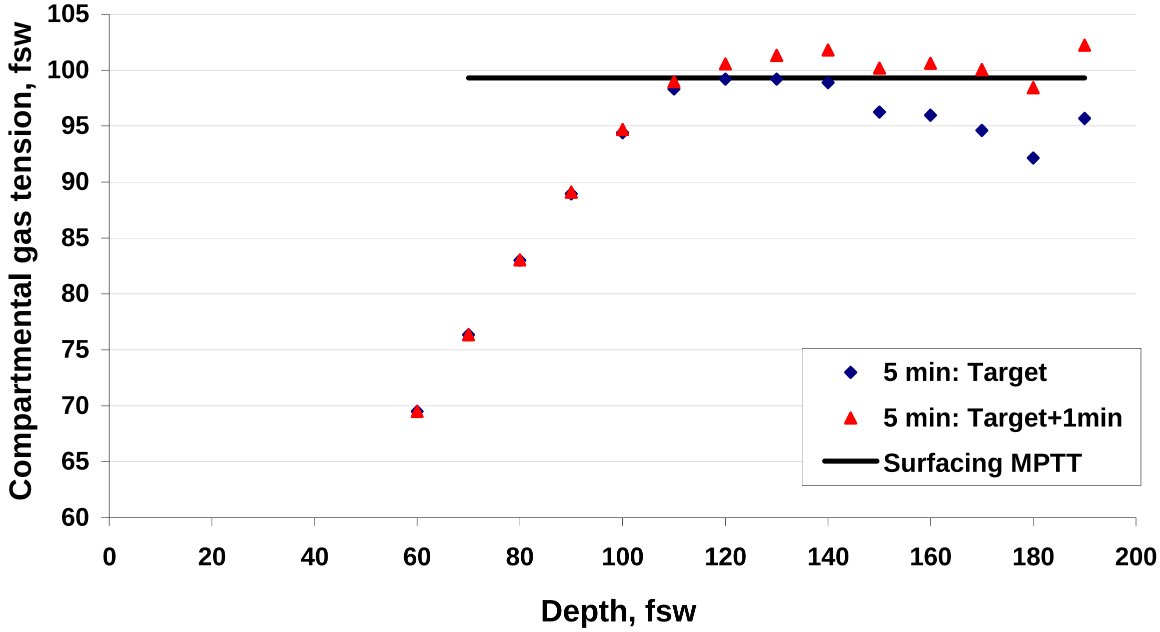

Figure 9. Governing gas tensions in the 5-minute half-time compartment after completion of the VVal-79 target no-stop limit times and the VVal-79 target no-stop limit times plus one minute in Table 2.

Figure 10 shows that the target no-stop limits for dives to depths of 100 and 110 fsw are governed by the 10-minute half-time compartment with a surfacing MPTT of 87.7 fsw.

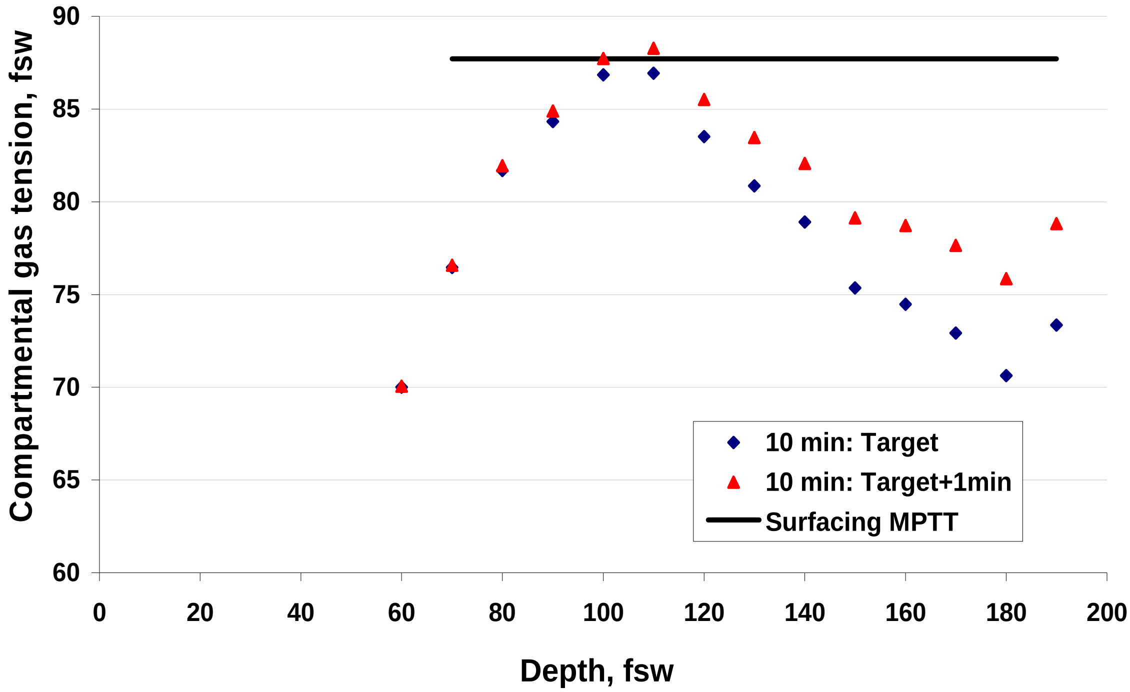

Figure 10. Governing gas tensions in the 10-minute half-time compartment after completion of the VVal-79 target no-stop limit times and the VVal-79 target no-stop limit times plus one minute in Table 2.

One would naturally turn to the surfacing MPTT assignment for the next slower, 20-minute half-time compartment to fix the target 30-minute no-stop limit for 90 fsw dives. However, the required MPTT of about 70 fsw is less than the target governing gas tension for 80 fsw (Figure 11) and would cause an unacceptably large reduction in the no-stop limit for 80 fsw dives. The original 78 fsw surfacing MPTT in the 20-minute half-time compartment is consequently retained, but no no-stop limits are controlled by this compartment. In VVal-79, the 87.7 fsw surfacing MPTT in the 10-minute half-time compartment controls the 90 fsw no-stop limit and allows it to be 33 minutes, not the target 30 minutes. A lower surfacing MPTT in the 10-minute half-time compartment required to fix the 90 fsw/30-minute no-stop limit would cause the no-stop limits for 100 fsw and 110 fsw dives to be shorter than the targets. The inability to assign surfacing MPTTs that cause the no-stop limits to equal the targets for all dive depths is a limitation of the number and half-time assignments of the discreet gas exchange compartments in the Thalmann Algorithm.

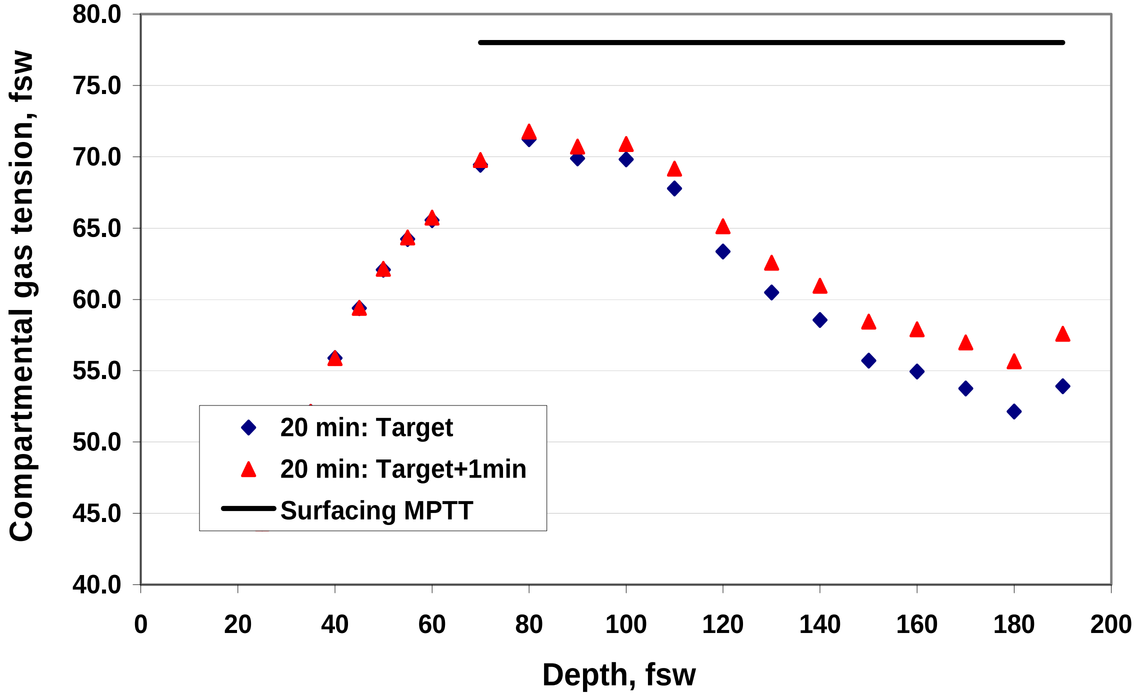

Figure 11. Governing gas tensions in the 20-minute half-time compartment after completion of the VVal-79 target no-stop limit times and the VVal-79 target no-stop limit times plus one minute in Table 2. The solid line at 78 fsw is the compartmental MPTT at surface in VVal-18, VVal-18M, and VVal-77. With this compartmental surfacing MPTT that was retained in VVal-79, no no-stop limit is controlled by this compartment.

The VVal-79 MPTT table is completed by projecting the surfacing MPTTs to depth. The surfacing MPTT value for each compartment, i, is linearly projected to the j^{th} decompression stop depth, D_j, in accord with a convention used by Workman:[14]

$$MPTT_{i,j} = MPTT_{i,0} + a_i D_j , \quad j = 0,1,... \qquad (2)$$

where j = 0 at surface, $MPTT_{i,0}$ is the surfacing MPTT, a_i is a slope parameter, and D_j = j * SDI, where SDI is the stop depth increment. The $MPTT_{i,j}$ given by Equation (2) are then offset by SDI to produce the final Thalmann Algorithm MPTT table. The offset values, designated with a prime, are given by

$$MPTT'_{i,j+1} = MPTT_{i,j} , \quad j = 0,1,... \qquad (3)$$

The $MPTT_{i,0}$ and a_i values required to compute the VVal-79 MPTT matrix with Equations (2) and (3) are given in Table 3, with depths and gas tensions in units of fsw.

Table 3. Intercept and Slope Values for VVal-79 Maximum Permissible Tissue Tensions

Half-time (min)	5	10	20	40	80	120	160	200	240
$MPTT_{i,0}$ (fsw)	99.3	87.7	78	56	48.5	45.5	44.5	44	43.5
a_i	1	1	1	1	1	1	1	1	1

The full set of VVal-79 Thalmann Algorithm parameters, which is identical to the VVal-18M parameter set with the exception of the $MPTT_{i,0}$ values for the 5- and 10-minute half-time compartments, is given in Appendix B.

Figure 12 illustrates that the air-diving no-stop limits prescribed by the Thalmann Algorithm with VVal-79 conform closely to the VVal-79 target smoothed USN57 no-stop limits in Table 2. In particular, the no-stop limit for 100 fsw dives is the target 25 minutes, not the high 29-minute value prescribed with VVal-77. The limits for 110-, 120-, 130-, and 140-fsw dives also equal the smoothed USN57 limits and are each one minute longer than the corresponding limits prescribed with VVal-77.

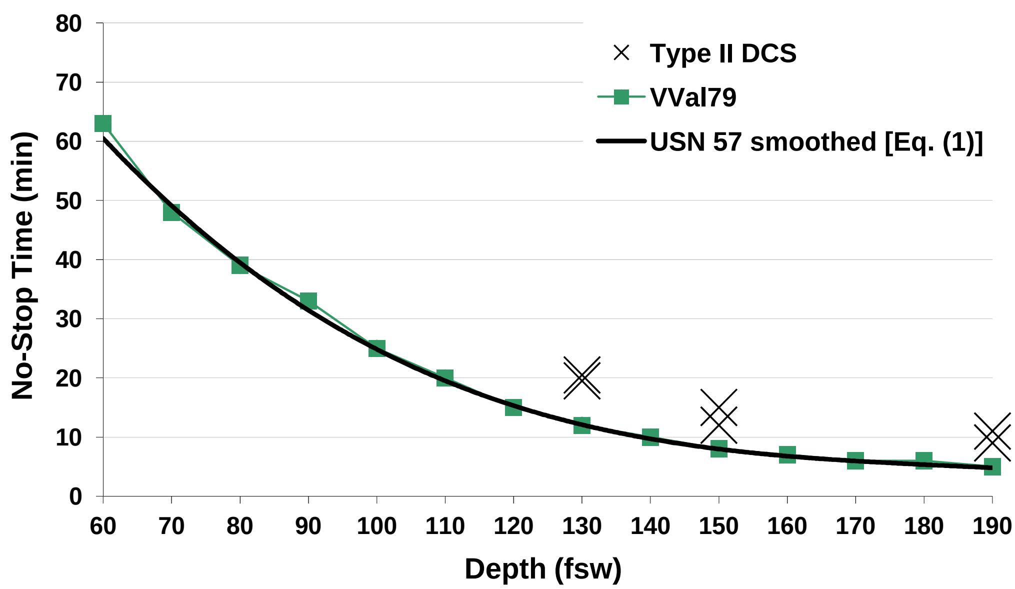

Figure 12. Air no-stop limits prescribed by the Thalmann Algorithm with VVal-79 compared with smoothed USN57 limits given by Equation (1).

A table of "No Decompression Limits and Repetitive Group Designators for No-Decompression Air Dives" (sub-no-D table) and an integrated "Air Decompression Table" for air, Air/O_2, and Air SurDO_2 diving — both computed with the VVal-79 Thalmann Algorithm — are given in Appendices C and D, respectively. The "No Decompression Limits and Repetitive Group Designators for Shallow Water No-Decompression Air Dives" table computed with VVal-79 is unchanged from that given with USN-Rev6 and is not reproduced in this report. Similarly, the surface interval credit and residual nitrogen time tables for repetitive air and N_2-O_2 diving as published with USN-Rev6 in the *U.S. Navy Diving Manual, Revision 6*, remain applicable because no changes were made to the 120-minute half-time compartment MPTTs on which these tables are based. As estimated with the BVM(3)[15,16] and NMRI98[17] probabilistic models, risks of DCS for each of the single-dive schedules in Appendix D are given in Appendix E.

3.4. Decompression Schedules

Modifications of compartmental MPTTs to shorten Thalmann Algorithm no-stop limits also lengthen decompression times for some schedules. In Figures 13 and 14, total decompression stop times in air-only decompression schedules prescribed by the Thalmann Algorithm with VVal-77 and VVal-79 are compared with the total decompression stop times in the corresponding schedules of USN-Rev6. Figure 13 includes only decompression times in schedules for nonexceptional exposure dives in USN-Rev6 — some of which are not recommended for use, except with in-water O_2 decompression (Air/O_2) or surface decompression with O_2 (SurDO_2). Decompression schedules prescribed with VVal-77 may be up to six minutes longer than their counterparts in USN-Rev6, while schedules prescribed with VVal-79 may be up to 10 minutes longer than their counterparts in USN-Rev6. Figure 14 is similar to Figure 13 but excludes schedules for dives for which Air/O_2 decompressions or SurDO_2 are recommended. Differences between the prescriptions of the Thalmann Algorithm with VVal-77 and VVal-79 for these shorter dives in each dive depth group are somewhat smaller than for longer dives.

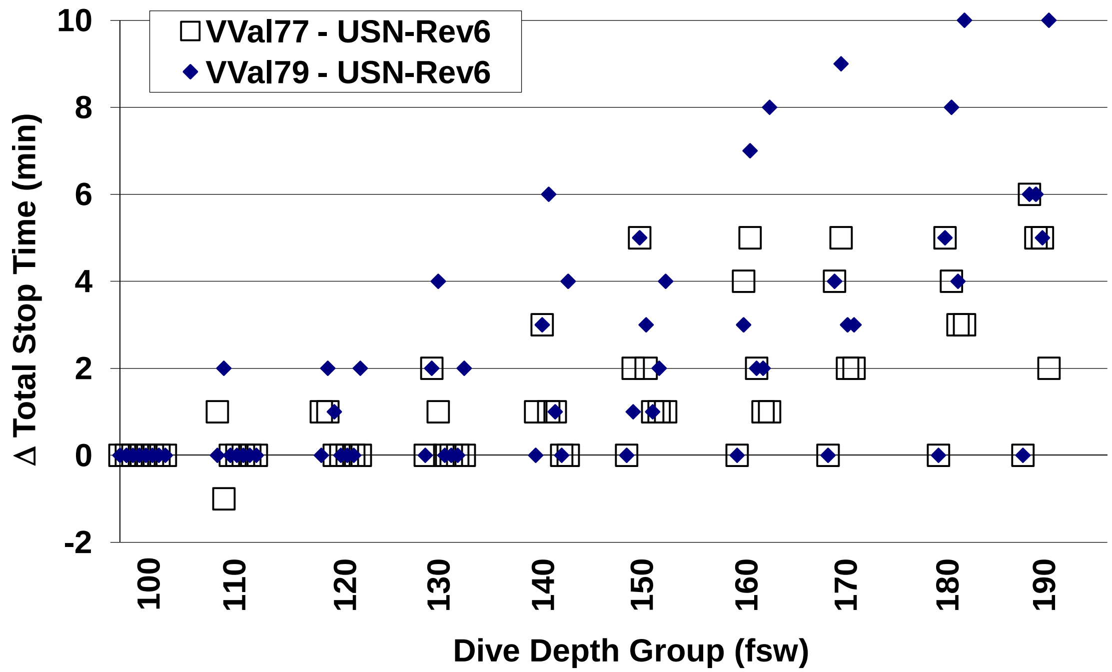

Figure 13. Total decompression stop times in air-only decompression schedules prescribed by the Thalmann Algorithm with VVal-77 and VVal-79 compared with the total decompression stop times in the corresponding USN-Rev6 schedules. Points that each represent the difference in total stop time between a modified schedule and its counterpart in USN-Rev6 appear for schedules in order of increasing bottom time within dive depth groups in order of increasing dive depth. The negative value arises at 110 fsw for 25 minutes because this USN-Rev6 schedule is a short USN57 decompression schedule inserted in place of the algorithm-prescribed no-stop limit.

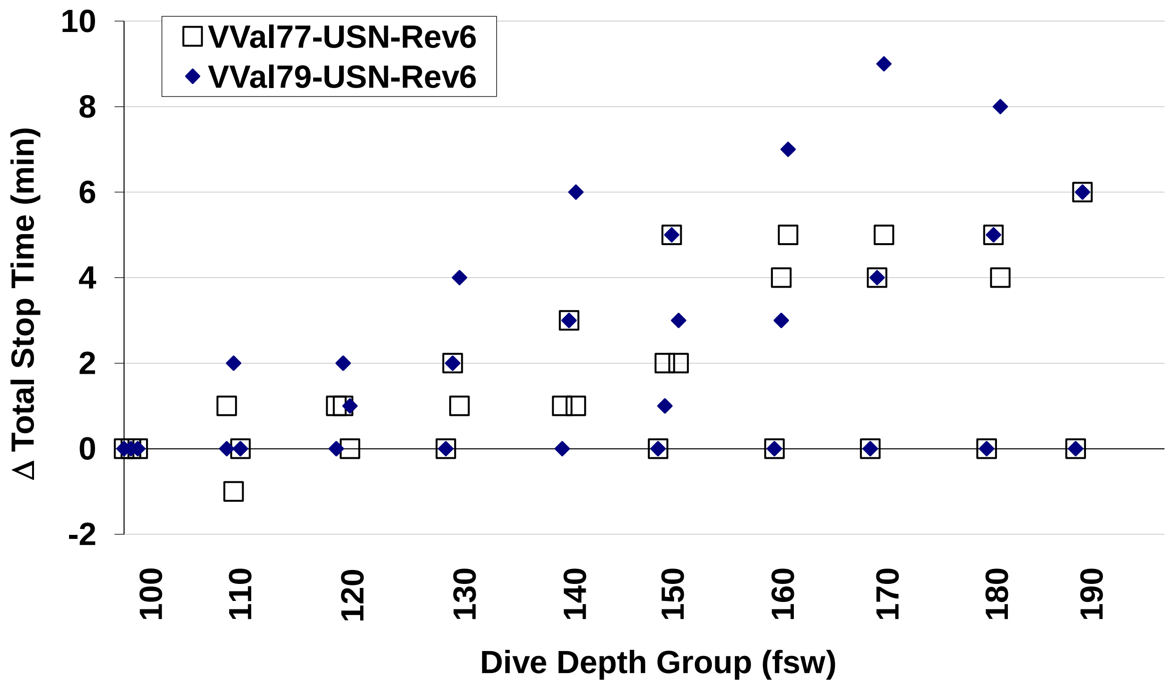

Figure 14. Comparison of total air-only decompression stop times as in Figure 13, but including only schedules for the nonexceptional exposure dives in USN-Rev6, dives for which Air/O_2 decompressions or SurDO_2 are not recommended.

Figure 15 shows the risks of DCS (P_{DCS}) for the modified air-only schedules in Figure 13 in comparison to those for the corresponding schedules in USN-Rev6 and estimated with the NMRI98 probabilistic model. Because the first point in each dive depth group is obtained from comparison of dives to the no-stop limits, dive depth and bottom time were equal in each compared pair of schedules — except for the first in dive depth groups where the no-stop limits differed. Most positive changes in value for risk of DCS (ΔP_{DCS}) — values indicating that the P_{DCS} are greater for schedules prescribed by the Thalmann Algorithm with VVal-77 or VVal-79 than for the corresponding USN-Rev6 schedule — occur in such first pairs in dive depth groups, and are caused by increases in the no-stop limits from those in USN-Rev6. For example, the 0.32% increase in P_{DCS} shown for the first schedule prescribed with VVal-77 in the 100 fsw dive depth group is associated with the increase in the no-stop limit from 25 to 29 minutes, while the 0.28% increase in P_{DCS} for the first schedule prescribed with VVal-77 or VVal-79 in the 150 fsw dive depth group is associated with a no-stop limit increase from five minutes to eight minutes. Schedules prescribed with VVal-77 or VVal-79 incur decreased P_{DCS} for the overwhelming majority of remaining cases. The changes in P_{DCS}, however, remain within the errors of the estimates. Similar results are obtained with the BVM(3) probabilistic model (Figure 16).

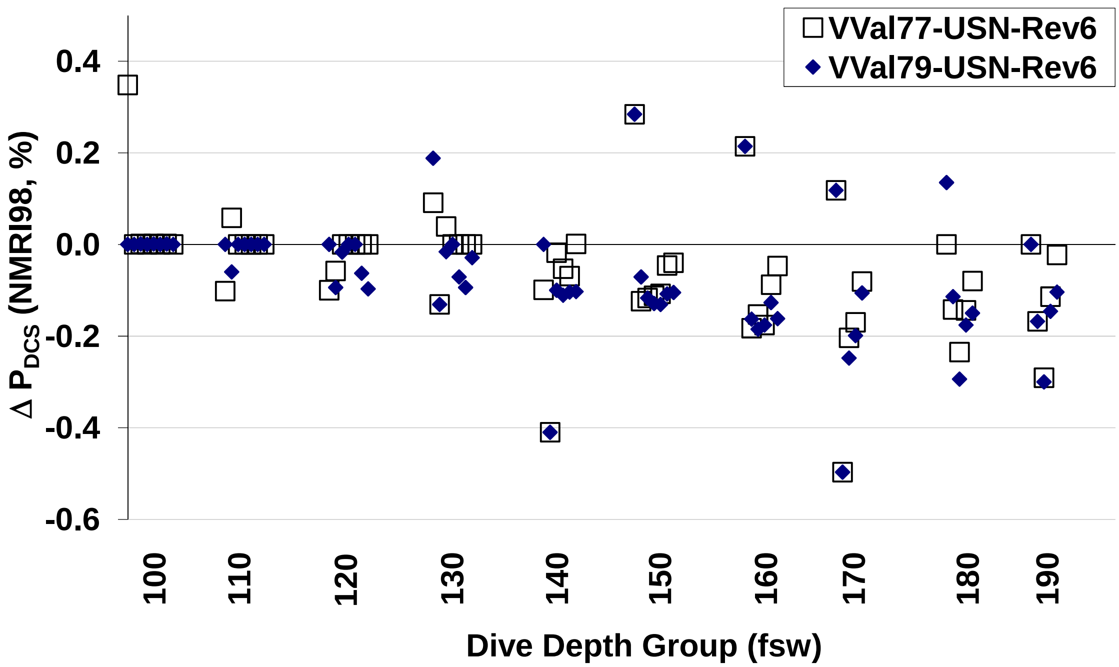

Figure 15. Comparison of the P_{DCS} for the air-only dives in Figure 13 and the P_{DCS} for the corresponding USN-Rev6 schedules, as the NMRI98 probabilistic model estimates these risks.

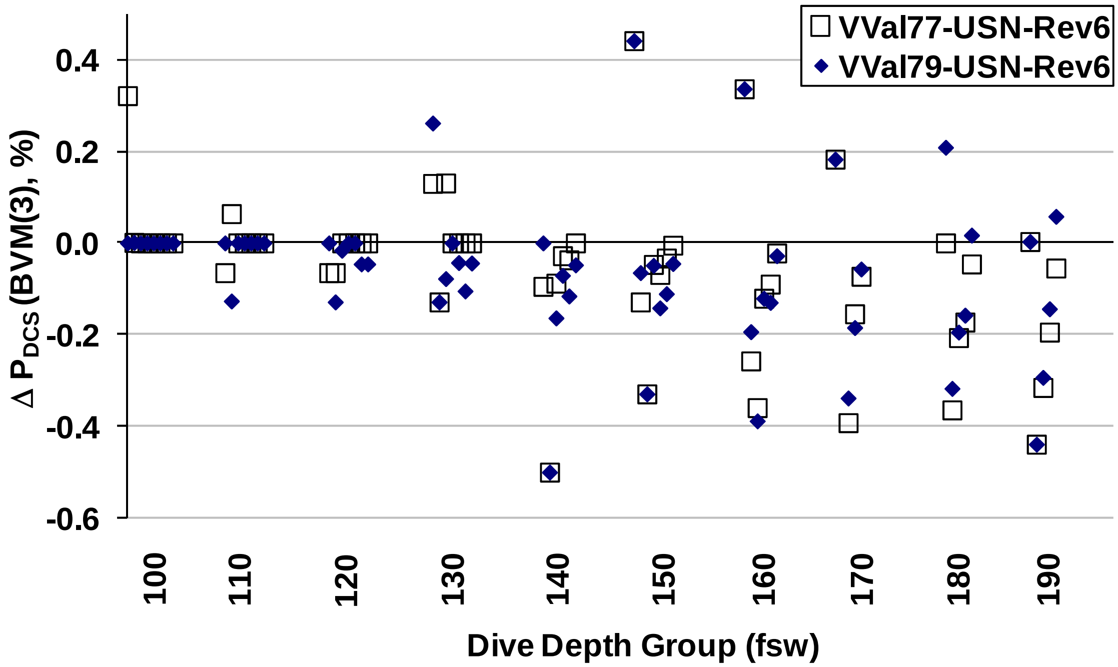

Figure 16. Comparison of the P_{DCS} for the air-only dives in Figure 13 with the P_{DCS} for the corresponding USN-Rev6 schedules, as the BVM(3) probabilistic model estimates these risks.

Figure 17 compares total decompression stop times in air with in-water O_2 (Air/O_2) decompression schedules prescribed by the Thalmann Algorithm with VVal-77 and VVal-79 with the total decompression stop times in the corresponding USN-Rev6 schedules. Stop times do not include times for air-breathing breaks inserted after start of in-water O_2 breathing. The figure shows decompression time changes only for nonexceptional exposure dives to depths of 100 fsw or deeper in USN-Rev6. The decompression times increase with increasing dive depth group in patterns that are both qualitatively and quantitatively similar to those evident in the decompression time increases for the air-only decompressions in Figure 13. The similarities are not coincidental. The times at stop depths ≥40 fsw in each modified Air/O_2 schedule are the same as those at the same depths in the corresponding modified air-only schedule. Small differences in the total stop time changes between the air-only and the Air/O_2 schedules arise from differences in time changes at stop depths ≤30 fsw that occur in the two types of decompression to compensate for the changes at the deeper stop depths.

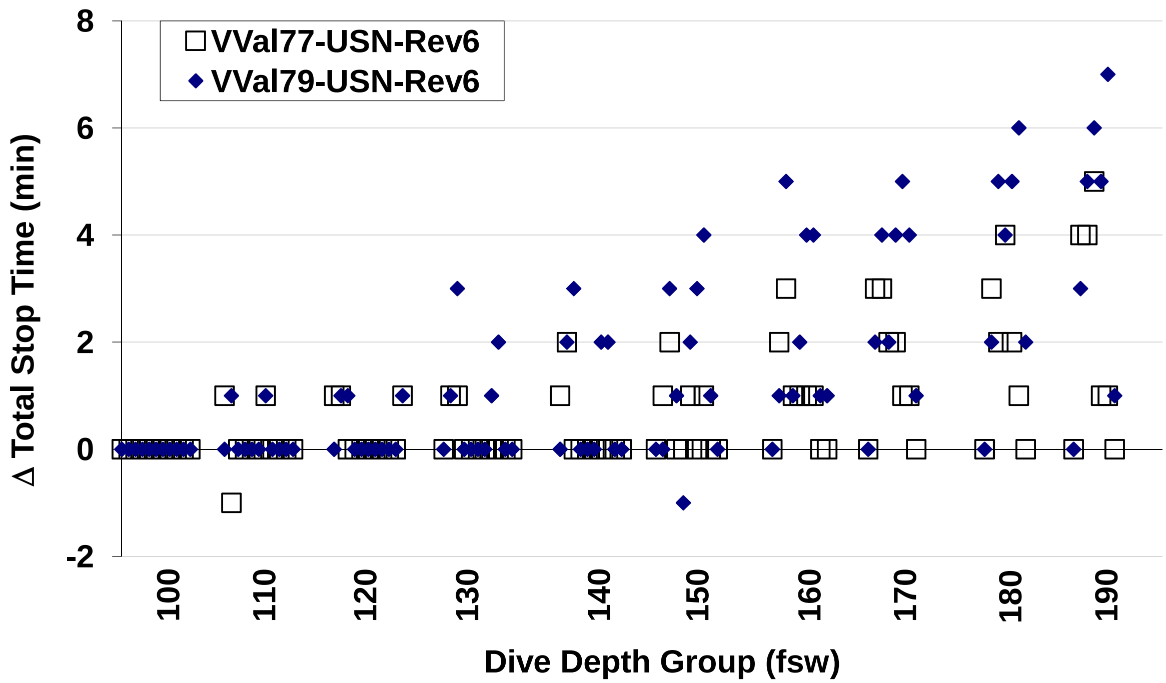

Figure 17. Total decompression stop times (not including air-breathing breaks) in air with in-water O_2 decompression (Air/O_2) schedules prescribed by the Thalmann Algorithm with VVal-77 and VVal-79 compared with the total decompression stop times in the corresponding USN-Rev6 schedules. Points appear for schedules in order of increasing bottom time within dive depth groups in order of increasing dive depth. Only decompression times in Air/O_2 schedules for nonexceptional exposure dives to depths of 100 fsw or deeper in USN-Rev6, are included.

Total decompression stop times (including both in-water and chamber stops) in air with surface decompression using oxygen (SurDO_2) schedules prescribed by the Thalmann Algorithm with VVal-77 and VVal-79 are compared in Figures 18 and 19 with the corresponding total decompression stop times in the USN-Rev6 schedules. The total stop time for each schedule compared included all in-water and chamber O_2 stop time in the schedule. Figure 18 includes only schedules for 100–190 fsw dives for which SurDO_2 is recommended or required in USN-Rev6, including exceptional exposure dives. Figure 19 includes only schedules for 200–300 fsw dives, all of which are exceptional exposure dives.

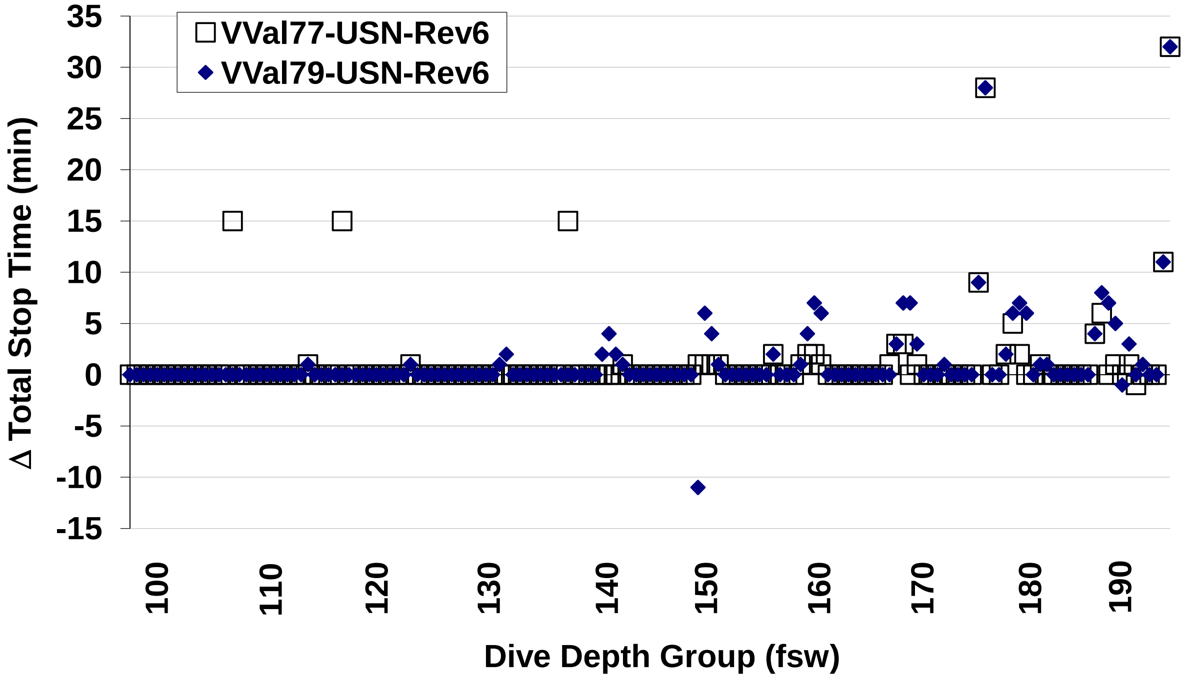

Figure 18. Total decompression stop times (in-water and chamber) in air SurDO_2 schedules prescribed by the Thalmann Algorithm with VVal-77 and VVal-79, in comparison to the total decompression stop times in the corresponding USN-Rev6 schedules. Points appear for schedules in order of increasing bottom time within dive depth groups in order of increasing dive depth. Only schedules for 100–190 fsw dives (including exceptional exposure dives) for which SurDO_2 is recommended or required in USN-Rev6 are included.

The increased decompression times with increasing dive depth group in Figure 18 show a pattern that is both qualitatively and quantitatively similar to that evident in the decompression time increases for the Air/O_2 schedules in Figure 17. As with the Air/O_2 schedules, the times at stop depths ≥40 fsw in each modified SurDO_2 schedule are the same as those at the same depths in the corresponding modified air-only and Air/O_2 schedules. In the SurDO_2 schedules, however, the compensatory changes in the Air/O_2 times at stop depths ≤30 fsw, times on which the SurDO_2 chamber times are based,[5,6] are too small to affect the SurDO_2 time — except in the few cases where the total stop times in the modified schedules are changed by one-half chamber O_2 period (15 minutes) or more. Except for those cases, the illustrated changes in total stop time arise wholly from changes in stop times at depths ≥40 fsw.

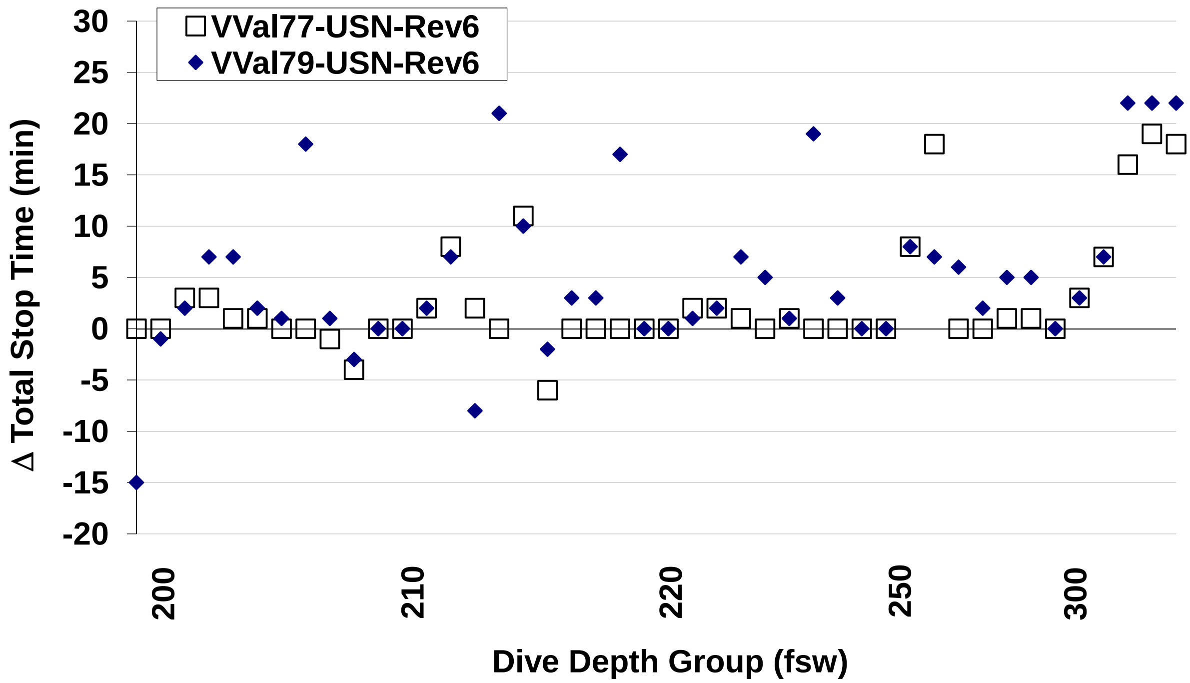

Figure 19. Total decompression stop times (in-water and chamber) in air $SurDO_2$ schedules prescribed by the Thalmann Algorithm with VVal-77 and VVal-79, in comparison to the total decompression stop times in the corresponding USN-Rev6 schedules. Points appear for schedules in order of increasing bottom time within dive depth groups in order of increasing dive depth. Only schedules for 200–300 fsw dives are included, all of which are exceptional exposure dives.

4. DISCUSSION

The Thalmann Algorithm with either VVal-77 or VVal-79 prescribes air diving no-stop limits that are near or consistent with those in the *U.S. Navy Diving Manual, Revision 6*. Air diving no-stop limits and decompression obligations prescribed with either parameter set can thus be taken as is, with no need for arbitrary edits to individual prescriptions. Of particular importance is that VVal-77 or VVal-79 will provide acceptable no-stop limits if implemented in current Navy Dive Planner, TDM, and NDC platforms. The Navy Dive Planner and TDM can already operate with these parameter sets. Changes to NDCs required to run VVal-77 or VVal-79 are of equal complexity; neither VVal-77 nor VVal-79 is implemented more readily than the other. Implementation of either parameter set in current NDCs for support of air-only diving only requires substitution of the modified surfacing MPTTs in the algorithmic application of Equation (2), redefinition of the PBOVP parameter to 10 fsw, and addition of provisions to use a PBOVP of 0 fsw when divers are at surface.

However, differences in the behavior of the Thalmann Algorithm with VVal-77 and VVal-79 confer distinct advantages to the VVal-79 parameters. In behavior that is arguably superior to that of the Thalmann Algorithm with VVal-77, the Thalmann Algorithm with VVal-79 prescribes 110-, 120-, 130-, and 140-fsw air dive no-stop limits that are equal to the smoothed USN57 target limits and are each one minute longer than the corresponding limit prescribed with VVal-77. Moreover, the no-stop limits prescribed with VVal-79 remain satisfactorily near or below those at the 0.2% $P_{CNS\text{-}DCS}$ isopleth at air diving depths deeper than 30 fsw. Over this range, only the limits for 90 and 100 fsw dives exceed the 0.2% $P_{CNS\text{-}DCS}$ isopleth — by three minutes and one minute, respectively. In contrast, the no-stop limits prescribed with VVal-77 near 100 fsw exceed limits at the 0.2% $P_{CNS\text{-}DCS}$ isopleth by as much as five minutes. Notably, all observed CNS DCS in the NEDU man-trial of longer air diving no-stop limits occurred after exposures that exceeded the 0.2% $P_{CNS\text{-}DCS}$ isopleth by two minutes or more.[1]

Some no-stop air dives under the Thalmann Algorithm with VVal-18M require decompression stops with the decreased air diving no-stop limits under either of the modified VVal-18M parameter sets. This is also the case in USN-Rev6, where USN57 decompression schedules were substituted for these VVal-18M no-stop dives. Many decompression schedules prescribed by the Thalmann Algorithm with either VVal-77 or VVal-79 for longer air dives are also longer than their counterparts in USN-Rev6. With VVal-77, schedules for nonexceptional exposure air-only dives are up to six minutes longer than those tabulated in USN-Rev6. In comparison, decompression schedules prescribed with VVal-79 for the same dives exceed those tabulated in USN-Rev6 by amounts that are similar, or up to 10 minutes longer in only a few cases. Given the relatively high risks of DCS associated with such dives,[5,6] the slightly longer decompressions incurred with VVal-79 could be considered advantageous. Corresponding increases in the lengths of Air/O_2 and SurDO_2 schedules are also relatively small, at the order of minutes.

The estimated P_{DCS} for no-stop air dives to the limits allowed by the Thalmann Algorithm with VVal-18 and its modifications increases with decreasing dive depths <50 fsw. The trend is illustrated in Figure 20 for no-stop limits prescribed by the Thalmann Algorithm with VVal-79, but is the same for no-stop limits prescribed with VVal-18, VVal-18M, VVal-76, or VVal-77: The changes to VVal-18M surfacing MPTTs made to produce the other parameter sets in this report do not affect Thalmann Algorithm no-stop limit prescriptions for dives to depths <90 fsw. The trend culminates with the 1102-minute no-stop limit for 25 fsw dives (Appendix C), dives that incur a 7.4% P_{DCS} under the BVM(3) model and a 9.5% P_{DCS} under the NMRI98 model (Appendix E). Notably, evidence indicates that NMRI98 and BVM(3) overestimate the P_{DCS} incurred by long, shallow dives and that the actual P_{DCS} in 25 fsw dives with 1102-minute bottom times may be only about 4.1%.[18] This 1102-minute no-stop limit at 25 fsw has not been man-tested. DCS has been described following no-stop dives from depths near 25 fsw, but only following much longer, saturation bottom times. And this DCS manifests as Type I symptoms,[19] not the serious DCS that has motivated rejecting extended no-stop limits for deep dives. Nevertheless, the algorithm-prescribed limit of 1102 minutes was replaced in USN-Rev6 with the 595-minute limit [6] that first appeared in the *U.S. Navy Diving Manual, Revision 4* (1999).[a]

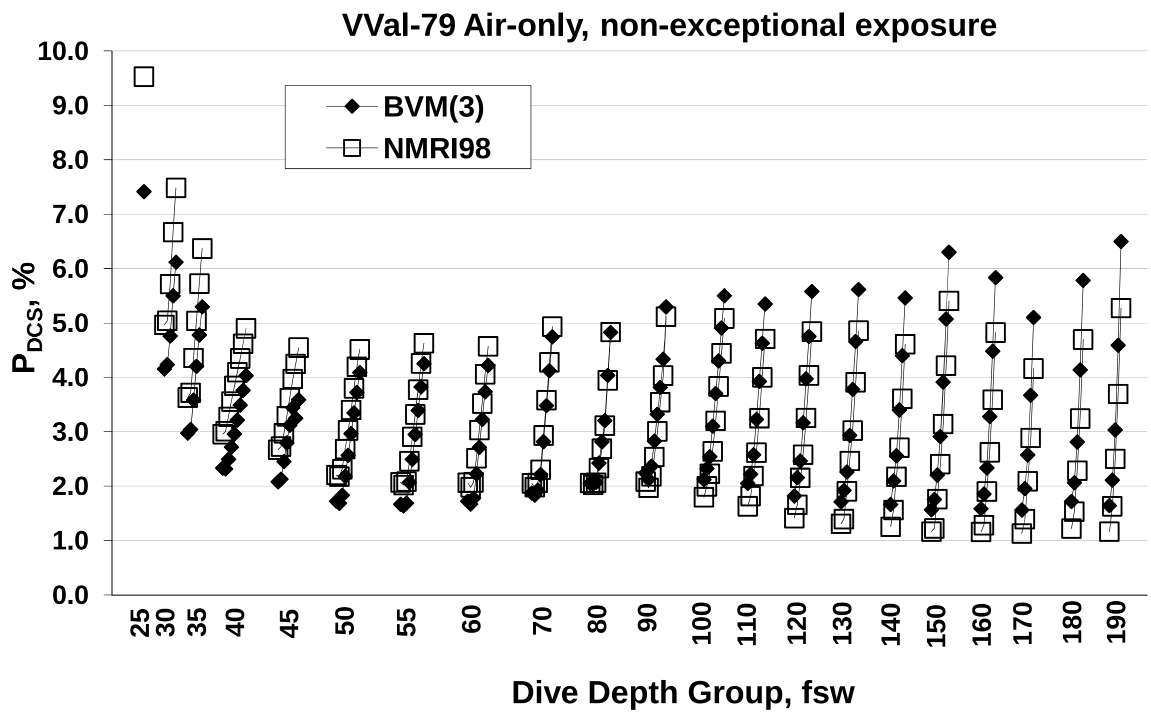

Figure 20. P_{DCS} (from Appendix E) of nonexceptional exposure air-only schedules in the Thalmann Algorithm VVal-79 Air Decompression Table as estimated with the NMRI98 and BVM(3) models. Points appear for schedules in order of increasing bottom time within dive depth groups in order of increasing dive depth. The leftmost points in each dive depth group are the estimates for dives to the no-stop limit for the depth. Estimated P_{DCS} values in the 25 fsw dive depth group are shown only for a dive to the no-stop limit of 1102 minutes.

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[a] In the originally published USN57 tables[3], dives to ≤35 fsw had unlimited no-stop time, but finite no-stop limits at these shallow depths have since been promulgated in the *U.S. Navy Diving Manual*. The 310-minute no-stop limit at 35 fsw appeared when USN57 was first promulgated in the 1959 *U.S. Navy Diving Manual*.[20] However, this value appeared in the original USN57 report only as the time required in a 35 fsw dive to reach the top of the highest repetitive group (O) in the No-Decompression Limits and Repetitive Group Designators for No-Decompression Air Dives (sub-no-D) table. The 405-minute no-stop limit at 30 fsw and the 595-minute no-stop limit at 25 fsw first appeared in the *U.S. Navy Diving Manual, Revision 4*, in 1999.[21] These two no-stop limits are unrelated to the original USN57, but are identical to those prescribed by the Thalmann Algorithm parameterized with VVal-18-1.[22] VVal-18-1 is a modification of VVal-18 designed to produce no-stop limits equal to those in USN57 at 50 and 40 fsw and the 310-minute limit at 35 fsw. A complete set of air decompression tables generated by the Thalmann Algorithm with VVal-18-1 was first forwarded to NEDU before *Revision 4* was published. *Revision 4* also contains entries in the sub-no-D table for the K and L repetitive groups at 25 fsw and the M group at 30 fsw that do not appear previously. These entries present values that are identical to those calculated in an earlier review of the development of this table.[23]

The algorithm-prescribed no-stop limit for 25 fsw dives can be made equal to the 595-minute limit by decreasing the surfacing MPTT for the 240-minute half-time compartment from 43.5 fsw to 40.78 fsw. To make the change conform to requirements for implementation in Navy Dive Computers, the modified surfacing MPTT is then linearly projected to depth. Unit slope is used to be consistent with all other VVal sets developed for use with the EL-DCM Thalmann Algorithm. This unit slope convention follows from a requirement to decompress the 240-minute half-time compartment in air saturation dives at an appropriate rate.[24] These changes were made to VVal-79 to produce VVal-82, with impacts on decompression times and estimated P_{DCS} of schedules for depths ≤90 fsw shown in Figures 21 and 22. The no-stop limits for dives to depths >25 fsw are not affected, but decompression schedules for dives with long bottom times in each dive depth group are substantially lengthened. These decompression time increases are limited largely to exceptional exposure dives. The lengthened schedules have mixed effects on the estimated P_{DCS}. P_{DCS} tends to increase with the initial increases in decompression stop time in shallow dive depth groups. With further increases in the stop times for dives with longer bottom times in each group, P_{DCS} tends to decrease, but the decreases are disproportionately small in comparison to the increases in decompression time. The theoretical benefit of the longer schedules prescribed with VVal-82 remains to be empirically established.

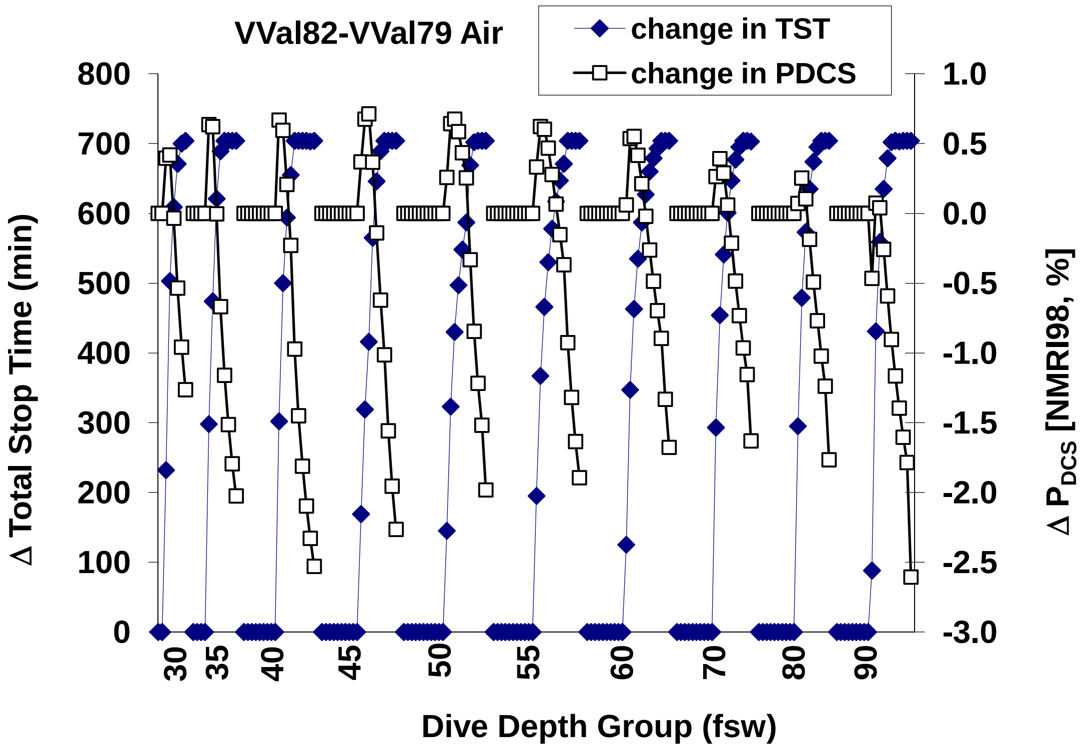

Figure 21. Total decompression stop times in air-only decompression schedules prescribed by the Thalmann Algorithm with VVal-82 compared with the total decompression stop times in the corresponding schedules prescribed by the Thalmann Algorithm with VVal-79. Corresponding changes in P_{DCS} as estimated with the NMRI98 model are shown to the scale on the right. Points appear for schedules in order of increasing bottom time within dive depth groups in order of increasing dive depth.

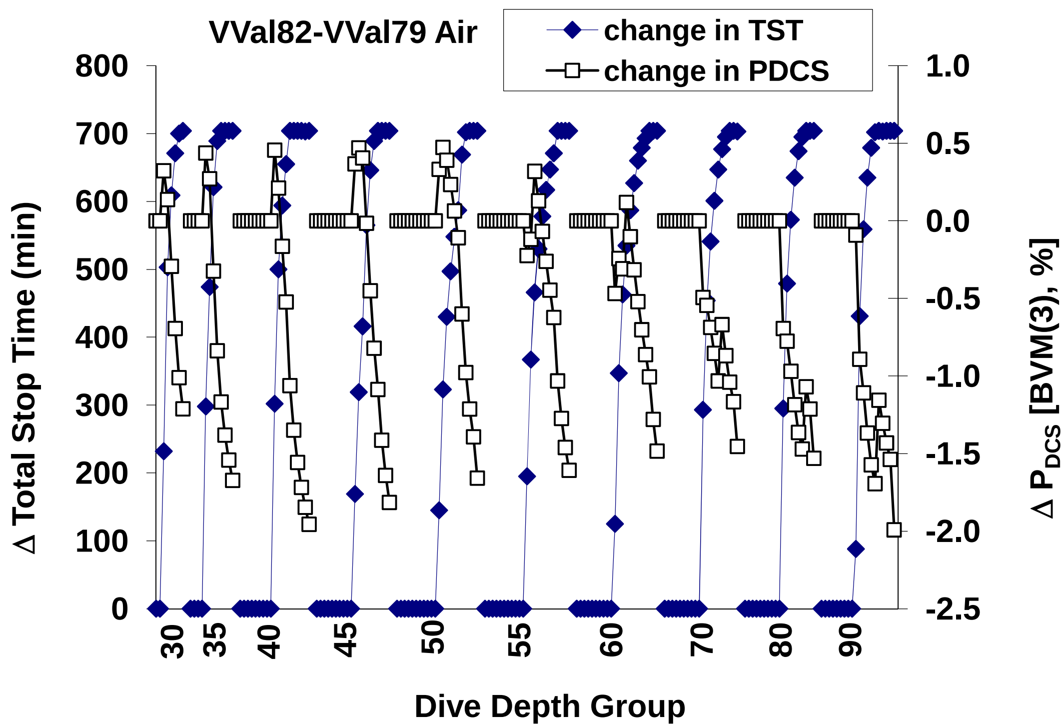

Figure 22. Data as illustrated in Figure 21, but showing P_{DCS} values as estimated with the BVM(3) model.

The VVal-18M parameter set was modified from the original VVal-18 parameters to avoid onerous increases in decompression times from USN57's times and to allow exceptional exposure air-only schedules to remain operationally feasible for emergency situations — albeit with higher P_{DCS}. Adopting VVal-82 would compromise the operational feasibility of many exceptional exposure prescriptions and require modifications to USN-Rev6 much more extensive than those required to adopt VVal-79.

MK 16 N_2-O_2 Diving

As noted in NEDU TR 07-09,[5] the Thalmann Algorithm used in these applications (EL-DCM) was designed for MK 16 diving in which the diver inspired gas O_2 partial pressure (PO_2) is constant and, accordingly, diver venous PO_2 is assumed to be constant. The increase in PBOVP from 0 fsw to 10 fsw and the adoption of compartmental SDR values of 0.7 when breathing gases with fixed O_2 fraction (FO_2) >0.8 were changes to the VVal-18 parameters made in VVal-18M to accommodate air diving and air diving with in-water O_2 decompression, where venous PO_2 decreases during ascents. While these changes are consequently inappropriate for application to MK 16 diving,[a] the reduced compartmental MPTT values in either VVal-77 or VVal-79 are not related to accommodation of varying venous PO_2. With adoption of one or the other of these modified parameter sets for air diving, the reduced MPTT values might therefore be considered applicable to MK 16 diving in order to maintain consistency.

However, as Figures 23 and 24 show, the Thalmann Algorithm with either VVal-77 or VVal-79 prescribes no-stop limits for MK 16 MOD 0 N_2-O_2 or MK 16 MOD 1 N_2-O_2 diving that are substantially shorter than those currently accepted. These shorter no-stop limits result mainly from the reduced compartmental MPTT values in either VVal-77 or VVal-79, not from the other changes to the VVal-18 parameters that were imposed to accommodate varying venous PO_2. With no evidence that current no-stop limits for MK 16 MOD 0 or MK 16 MOD 1 N_2-O_2 diving should be so shortened, adoption of the reduced MPTT values in either VVal-77 or VVal-79 to support such diving is unwarranted.

[a] The Thalmann Algorithm with VVal-18M or either of its VVal-77 or VVal-79 derivatives prescribes inappropriately long decompression times for MK 16 MOD 0 and MK 16 MOD 1 N_2-O_2 dives because of the compartmental SDR = 0.7 assignments in these parameter sets. During dives in which constant FO_2 gases are breathed, compartmental SDR values in the parameterization file are overridden with values of 1 when the inspired gas FO_2 is less than the CONSDR_FO2 setting. With the VVal-18M CNDSDR_FO2 setting of 0.8, compartmental SDR = 1 values are used throughout all dives in which only air (FO_2 = 0.21) is breathed, while compartmental SDR values as specified in the parameterization file are used throughout all constant PO_2 dives. Thus, the SDR = 0.7 assignments in VVal-18M, VVal-77, and VVal-79 are used throughout all MK 16 N_2-O_2 dives and considerably lengthen total decompression times beyond those obtained with the original compartmental SDR = 1 assignments in VVal-18.

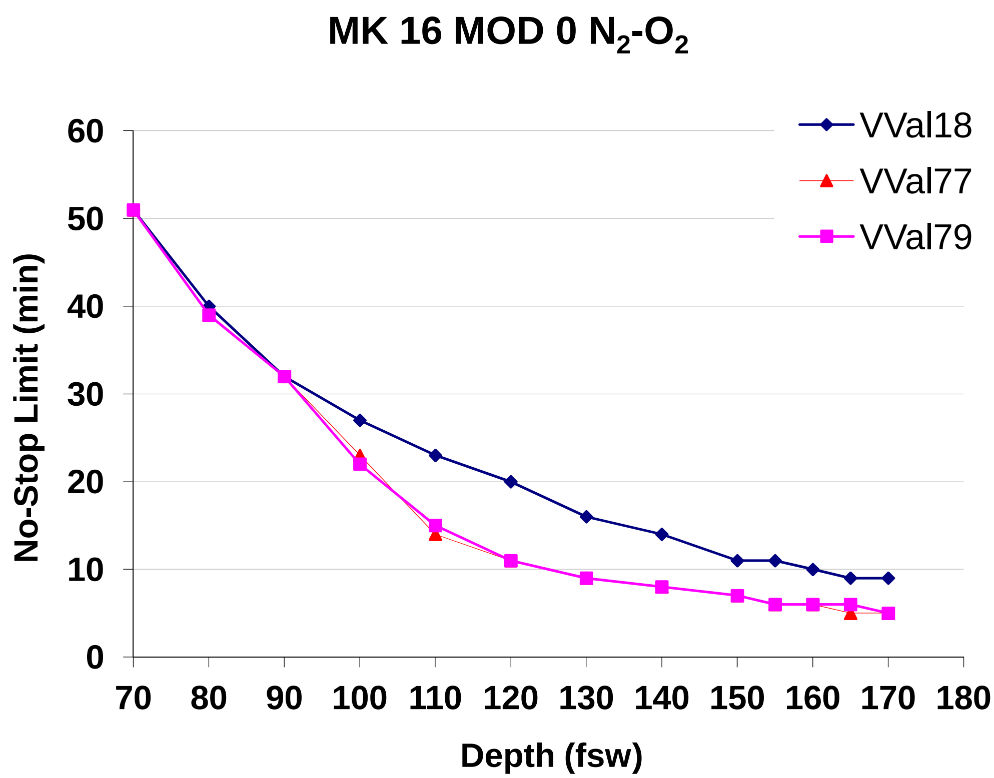

Figure 23. No-stop limits for MK 16 MOD 0 N_2-O_2 diving prescribed by the Thalmann Algorithm with VVal-77 and VVal-79, in comparison to the existing limits prescribed by the Thalmann Algorithm with VVal-18. The large reductions of the limits for dives to depths >90 fsw with either VVal-77 or VVal-79 make the algorithm with these parameters unsuitable for support of MK 16 MOD 0 N_2-O_2 diving.

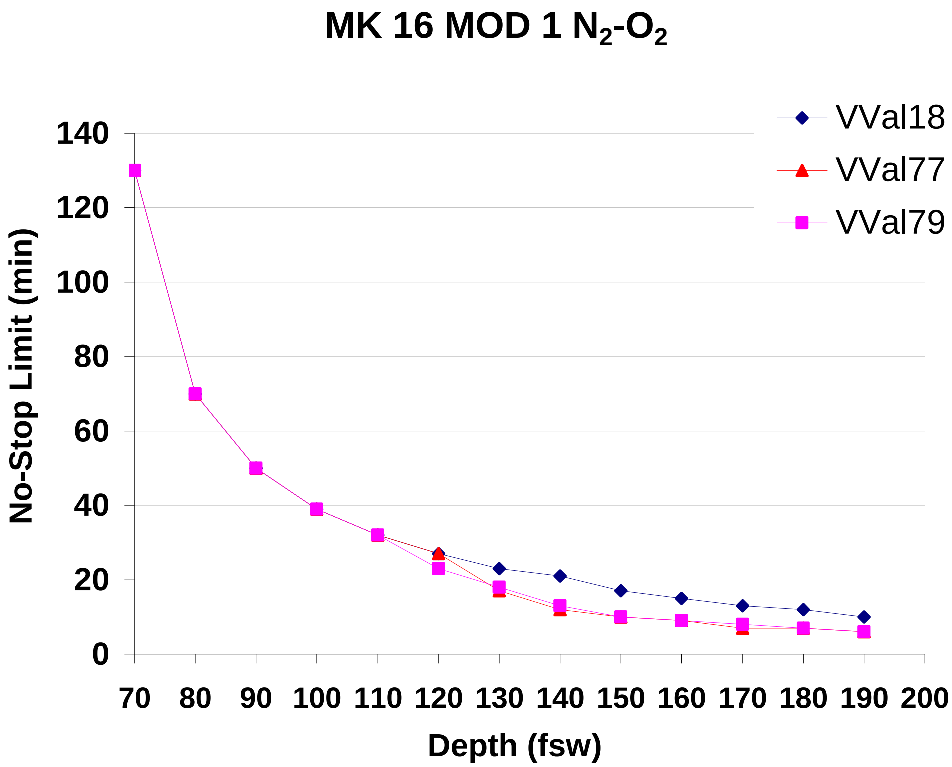

Figure 24. No-stop limits for MK 16 MOD 1 N_2-O_2 diving prescribed by the Thalmann Algorithm with VVal-77 and VVal-79, in comparison to the existing limits prescribed by the Thalmann Algorithm with VVal-18. The large reductions of the limits for dives to depths >110 fsw with either VVal-77 or VVal-79 make the algorithm with these parameters unsuitable for support of MK 16 MOD 1 N_2-O_2 diving.

5. CONCLUSIONS AND RECOMMENDATIONS

The Thalmann Algorithm with VVal-79 is superior to the Thalmann Algorithm with any of VVal-18M, VVal-76, or VVal-77 for support of air diving. The Thalmann Algorithm with VVal-79 prescribes air diving no-stop limits that are more faithful to the well-accepted USN57 air diving no-stop limits than are those prescribed by the Algorithm with the other parameter sets, it does so at the cost of only relatively small increases in decompression time in dives that exceed the no-stop limits, and it is suitable for implementation in current NDCs.

Changes required to reduce the Thalmann Algorithm-prescribed no-stop limit at 25 fsw to 595 minutes also increase decompression times for exceptional exposure dives at all depths by hours (VVal-82). These changes are not recommended: No man-testing exists to support the 595-minute no-stop limit or the increased decompression times, and all such dives exceed the limits of normal air diving operations.

1. Real-time decompression guidance provided by devices that operate with the Thalmann Algorithm with VVal-79 will remain within acceptable limits under normal air diving conditions and be suitable for use in emergency situations. The Thalmann Algorithm with VVal-79 is consequently recommended for use in the TDM.
2. If it is decided to modify the current AIR III NDCs, which are now functionally equivalent to the NSW III NDCs, it is recommended that the AIR IIIs be changed to use VVal-79.
3. To ensure that printed tables and real-time devices provide consistent guidance, VVal-79 is recommended for use to generate any forthcoming Thalmann Algorithm-based revision of the Air Decompression Table in the *U.S. Navy Diving Manual*.
4. The VVal-76, VVal-77, and VVal-79 Thalmann Algorithm parameter sets are based on the VVal-18M parameter set, which incorporates modifications to the VVal-18 parameters to accommodate the depth-dependent, diver venous O_2 tension changes that occur during air diving. Application of any of these modified parameter sets to MK 16 MOD 0 and MK 16 MOD 1 nitrox diving, in which the diver venous O_2 tension is practically constant, unacceptably decreases the no-stop limits and inappropriately increases total decompression times for these types of diving. All current VVal-18–based tables and NDCs for MK 16 MOD 0 and MK 16 MOD 1 nitrox diving should consequently be retained unchanged.

6. REFERENCES

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Appendix A.

Summary of VVal-18M Modifications Considered and Associated No-Stop Limit Prescriptions

Table A.1. VVal-18M Modifications

Name	Target Air Diving No-Stop Limits	Description
VVal-76	Air diving bottom times from which no-stop ascents to surface incur 0.2% risk of CNS DCS as estimated with Model 2 in NEDU TR 09-03.	VVal-18M surfacing MPTTs for 5-, 10-, and 20-minute half-time compartments are reduced from 120 fsw to 106.7 fsw, from 98 fsw to 86.7 fsw, and from 78.0 fsw to 70.3 fsw, respectively. All other VVal-18M MPTTs are retained.
VVal-77	None explicitly specified.	All MPTTs for the 5-minute half-time compartment, including those at all allowed decompression stop depths, are set equal to those for the 10 minute half-time compartment in VVal-18M. All other VVal-18M MPTTs are retained.
VVal-79	Smoothed USN-57 air no-stop limits for dives to depths of 60 fsw and deeper with 75 fsw/min descent rate, 30 fsw/min ascent rate, and instantaneous ascent to surface from the last allowed decompression stop depth at 20 fsw.	VVal-18M surfacing MPTTs for both the 5- and 10-minute half-time compartments are reduced to 99.3 and 88.7 fsw, respectively, with projections of these to depth at unit slope (1fsw/1fsw). All other VVal-18M MPTTs are retained.
VVal-82	Smoothed USN-57 air no-stop limits for dives to depths of 60 fsw and deeper and USN 57 air no-stop limit for 25 fsw dives, all with 75 fsw/min descent rate, 30 fsw/min ascent rate, and instantaneous ascent to surface from the last allowed decompression stop depth at 20 fsw.	Equivalent to VVal-79 except the surfacing MPTT in the 240-minute compartment is reduced from 43.5 to 40.78 fsw and projected to depth at unit slope (1fsw/1fsw).

Table A.2. No-stop Limits Prescribed by the Thalmann Algorithm with Various Parameter Sets* Compared with Limits from Other Sources

Depth (fsw)	No-stop Limit (min)					
	USN57	VVal-18M	VVal-76	VVal-77	VVal-79	0.2% CNS DCS
30		371	371	371	371	319
40	200	163	163	163	163	172
50	100	92	92	92	92	107
60	60	63	63	63	63	72
70	50	48	48	48	48	52
80	40	39	38	39	39	39
90	30	33	30	33	33	30
100	25	29	24	29	25	24
110	20	25	19	19	20	20
120	15	22	16	14	15	16
130	10	19	14	11	12	14
140	10	17	12	9	10	12
150	5	15	10	8	8	10
160	5	13	9	7	7	9
170	5	11	8	6	6	8
180	5	10	7	5	6	7
190	5	9	6	5	5	6

* As computed for dives with 75 fsw/min descent rates and 30 fsw/min ascent rates to a last allowed stop depth of 20 fsw, followed by instantaneous ascent to surface.

APPENDIX B

Thalmann Algorithm VVal-79 Parameters

(Shaded values are modified from VVal-18M parameters in NEDU TR 07-09.)

Table B.1.
Table of Maximum Permissible Tissue Tensions (VVal-79 Nitrogen)[a]

STOP DEPTH FSW	TISSUE HALF-TIMES 5 MIN 0.70 SDR	10 MIN 0.70 SDR	20 MIN 0.70 SDR	40 MIN 0.70 SDR	80 MIN 0.70 SDR	120 MIN 0.70 SDR	160 MIN 0.70 SDR	200 MIN 0.70 SDR	240 MIN 0.70 SDR
10	99.3	87.7	78.0	56.0	48.5	45.5	44.5	44.0	43.5
20	109.3	97.7	88.0	66.0	58.5	55.5	54.5	54.0	53.5
30	119.3	107.7	98.0	76.0	68.5	65.5	64.5	64.0	63.5
40	129.3	117.7	108.0	86.0	78.5	75.5	74.5	74.0	73.5
50	139.3	127.7	118.0	96.0	88.5	85.5	84.5	84.0	83.5
60	149.3	137.7	128.0	106.0	98.5	95.5	94.5	94.0	93.5
70	159.3	147.7	138.0	116.0	108.5	105.5	104.5	104.0	103.5
80	169.3	157.7	148.0	126.0	118.5	115.5	114.5	114.0	113.5
90	179.3	167.7	158.0	136.0	128.5	125.5	124.5	124.0	123.5
100	189.3	177.7	168.0	146.0	138.5	135.5	134.5	134.0	133.5
110	199.3	187.7	178.0	156.0	148.5	145.5	144.5	144.0	143.5
120	209.3	197.7	188.0	166.0	158.5	155.5	154.5	154.0	153.5
130	219.3	207.7	198.0	176.0	168.5	165.5	164.5	164.0	163.5
140	229.3	217.7	208.0	186.0	178.5	175.5	174.5	174.0	173.5
150	239.3	227.7	218.0	196.0	188.5	185.5	184.5	184.0	183.5
160	249.3	237.7	228.0	206.0	198.5	195.5	194.5	194.0	193.5
170	259.3	247.7	238.0	216.0	208.5	205.5	204.5	204.0	203.5
180	269.3	257.7	248.0	226.0	218.5	215.5	214.5	214.0	213.5
190	279.3	267.7	258.0	236.0	228.5	225.5	224.5	224.0	223.5
200	289.3	277.7	268.0	246.0	238.5	235.5	234.5	234.0	233.5
210	299.3	287.7	278.0	256.0	248.5	245.5	244.5	244.0	243.5
220	309.3	297.7	288.0	266.0	258.5	255.5	254.5	254.0	253.5
230	319.3	307.7	298.0	276.0	268.5	265.5	264.5	264.0	263.5
240	329.3	317.7	308.0	286.0	278.5	275.5	274.5	274.0	273.5
250	339.3	327.7	318.0	296.0	288.5	285.5	284.5	284.0	283.5
260	349.3	337.7	328.0	306.0	298.5	295.5	294.5	294.0	293.5
270	359.3	347.7	338.0	316.0	308.5	305.5	304.5	304.0	303.5
280	369.3	357.7	348.0	326.0	318.5	315.5	314.5	314.0	313.5
290	379.3	367.7	358.0	336.0	328.5	325.5	324.5	324.0	323.5
300	389.3	377.7	368.0	346.0	338.5	335.5	334.5	334.0	333.5

[a] MPTT values in each row are used in the Thalmann EL-DCM to assess the time at the corresponding stop depth required before ascent to the next shallower stop

depth. Thus, tabulated MPTT values for the 10 fsw stop depth are the “surfacing values” that express the MPTTs at surface.

A 20 fsw last allowed decompression stop is implemented by replacing the tabulated MPTT values for the 20 fsw stop depth with those for the 10 fsw stop depth.

Table B.2.
Table of VVal-79 Global Parameters

PARAMETER	VALUE	UNITS
PACO2	1.50	FSW
PH2O	0.00	FSW
PVCO2	2.30	FSW
PVO2	2.00	FSW
AMBAO2	0.00	FSW
PBOVP	10.00	FSW
sPBOVP	0.00	FSW
O2CEIL	30.0	FSW
O2TIME	30.0	MIN
AIRTIME	5.0	MIN
CNDSDR_FO2	0.80	*
O2TIME_FO2	0.80	*
GSWLAT	0.00	MIN
GSW_DEAD	TRUE	
AB_DEAD	TRUE	
OMIT_TRVL	TRUE	
SRF_CNTRLT_MODE	1	*
LST_DOMode	1	*
RGD_SPRSS	2	*
TTIS	TRUE	
STIME	0.2	MIN
RNTMODE	0	*

* dimensionless

Table B.3.
Table of SurDO$_2$ Parameters

PARAMETER	VALUE	UNITS
DrpOut_DEPTH	40.0	FSW
DrpOut_ARATE	40.0	FSW/MIN
CDRATE	100.0	FSW/MIN
CARATE	30.0	FSW/MIN
SurDTimFctr	1.1	*
O2TIME	30.0	MIN
AIRTIME	5.0	MIN
O2TIME_FO2	85.0	*

*dimensionless

Appendix C

Thalmann Algorithm VVal-79 No-Decompression Limits and Repetitive Group Designators for No-Decompression Air Dives

RATES: DESCENT 75 FPM; ASCENT 30 FPM
LAST ALLOWED DECOMPRESSION STOP: 20 FSW

		REPETITIVE GROUP DESIGNATORS BOTTOM TIME (MIN)															
DEPTH (FSW)	NO-STOP LIMIT	A 27	B 28	C 30	D 31	E 32	F 33	G 35	H 36	I 37	J 38	K 40	L 41	M 42	N 43	O 45	Z 46
10	unlimited	57	101	158	245	426	*										
15	unlimited	36	60	88	121	163	217	297	449	*							
20	unlimited	26	43	61	82	106	133	165	205	256	330	461	*				
25	1102	20	33	47	62	78	97	117	140	166	198	236	285	354	469	992	1102
30	371	17	27	38	50	62	76	91	107	125	145	167	193	223	260	307	371
35	232	14	23	32	42	52	63	74	87	100	115	131	148	168	190	215	232
40	163	12	20	27	36	44	53	63	73	84	95	108	121	135	151	163	
45	125	11	17	24	31	39	46	55	63	72	82	92	102	114	125		
50	92	9	15	21	28	34	41	48	56	63	71	80	89	92			
55	74	8	14	19	25	31	37	43	50	56	63	71	74				
60	63	7	12	17	22	28	33	39	45	51	57	63					
70	48	6	10	14	19	23	28	32	37	42	47	48					
80	39	5	9	12	16	20	24	28	32	36	39						
90	33	4	7	11	14	17	21	24	28	31	33						
100	25	4	6	9	12	15	18	21	25								
110	20	3	6	8	11	14	16	19	20								
120	15	3	5	7	10	12	15										
130	12	2	4	6	9	11	12										
140	10	2	4	6	8	10											
150	8		3	5	7	8											
160	7		3	5	6	7											
170	6			4	6												
180	6			4	5	6											
190	5			3	5												

* Highest repetitive group that can be achieved at this depth regardless of bottom time.

Appendix D

VVal-79 Air Decompression Table

O_2

DEPTH (FSW)	BTM TIM (M)	TM TO FIRST STOP (M:S)	GAS MIX	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O_2 stop												TOTAL ASCNT TIME (M:S)	CHAMBER O_2 PERIODS	RPT GRP DES
				130	120	110	100	90	80	70	60	50	40	30	20			
30	371	1:00	AIR												0	1:00	0	Z
			AIR/**O_2**												**0**	1:00		
30	380	0:20	AIR												5	6:00	0.5	Z
			AIR/**O_2**												**1**	2:00		
30	420	0:20	AIR												22	23:00	0.5	Z
			AIR/**O_2**												**5**	6:00		
30	480	0:20	AIR												42	43:00	0.5	
			AIR/**O_2**												**9**	10:00		
30	540	0:20	AIR												71	72:00	1	
			AIR/**O_2**												**14**	15:00		
30	600	0:20	AIR												92	93:00	1	
			AIR/**O_2**												**19**	20:00		
30	660	0:20	AIR												120	121:00	1	
			AIR/**O_2**												**22**	23:00		
30	720	0:20	AIR												158	159:00	1	
			AIR/**O_2**												**27**	28:00		
35	232	1:10	AIR												0	1:10	0	Z
			AIR/**O_2**												**0**	1:10		
35	240	0:30	AIR												4	5:10	0.5	Z
			AIR/**O_2**												**2**	3:10		
35	270	0:30	AIR												28	29:10	0.5	Z
			AIR/**O_2**												**7**	8:10		
35	300	0:30	AIR												53	54:10	0.5	Z
			AIR/**O_2**												**13**	14:10		
35	330	0:30	AIR												71	72:10	1	Z
			AIR/**O_2**												**18**	19:10		
35	360	0:30	AIR												88	89:10	1	
			AIR/**O_2**												**22**	23:10		
35	420	0:30	AIR												134	135:10	1.5	
			AIR/**O_2**												**29**	30:10		
35	480	0:30	AIR												173	174:10	1.5	
			AIR/**O_2**												**38**	44:10		
35	540	0:30	AIR												228	229:10	2	
			AIR/**O_2**												**45**	51:10		
35	600	0:30	AIR												277	278:10	2	
			AIR/**O_2**												**53**	59:10		
35	660	0:30	AIR												314	315:10	2.5	
			AIR/**O_2**												**63**	69:10		
35	720	0:30	AIR												342	343:10	3	
			AIR/**O_2**												**71**	82:10		

Air Decompression Table, VVal-79 Thalmann Algorithm

DEPTH (FSW)	BTM TIM (M)	TM TO FIRST STOP (M:S)	GAS MIX	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O_2 stop												TOTAL ASCNT TIME (M:S)	CHAMBER O_2 PERIODS	RPT GRP DES
				130	120	110	100	90	80	70	60	50	40	30	20			
40	163	1:20	AIR												0	1:20	0	O
			AIR/$\mathbf{O_2}$												**0**	1:20		
40	170	0:40	AIR												6	7:20	0.5	O
			AIR/$\mathbf{O_2}$												**2**	3:20		
40	180	0:40	AIR												14	15:20	0.5	Z
			AIR/$\mathbf{O_2}$												**5**	6:20		
40	190	0:40	AIR												21	22:20	0.5	Z
			AIR/$\mathbf{O_2}$												**7**	8:20		
40	200	0:40	AIR												27	28:20	0.5	Z
			AIR/$\mathbf{O_2}$												**9**	10:20		
40	210	0:40	AIR												39	40:20	0.5	Z
			AIR/$\mathbf{O_2}$												**11**	12:20		
40	220	0:40	AIR												52	53:20	0.5	Z
			AIR/$\mathbf{O_2}$												**12**	13:20		
40	230	0:40	AIR												64	65:20	1	Z
			AIR/$\mathbf{O_2}$												**16**	17:20		
40	240	0:40	AIR												75	76:20	1	Z
			AIR/$\mathbf{O_2}$												**19**	20:20		
40	270	0:40	AIR												101	102:20	1	Z
			AIR/$\mathbf{O_2}$												**26**	27:20		
40	300	0:40	AIR												128	129:20	1.5	
			AIR/$\mathbf{O_2}$												**33**	34:20		
40	330	0:40	AIR												160	161:20	1.5	
			AIR/$\mathbf{O_2}$												**38**	44:20		
40	360	0:40	AIR												184	185:20	2	
			AIR/$\mathbf{O_2}$												**44**	50:20		
40	420	0:40	AIR												248	249:20	2.5	
			AIR/$\mathbf{O_2}$												**56**	62:20		
40	480	0:40	AIR												321	322:20	2.5	
			AIR/$\mathbf{O_2}$												**68**	79:20		
40	540	0:40	AIR												372	373:20	3	
			AIR/$\mathbf{O_2}$												**80**	91:20		
40	600	0:40	AIR												410	411:20	3.5	
			AIR/$\mathbf{O_2}$												**93**	104:20		
40	660	0:40	AIR												439	440:20	4	
			AIR/$\mathbf{O_2}$												**103**	119:20		
40	720	0:40	AIR												461	462:20	4.5	
			AIR/$\mathbf{O_2}$												**112**	128:20		
45	125	1:30	AIR												0	1:30	0	N
			AIR/$\mathbf{O_2}$												**0**	1:30		
45	130	0:50	AIR												2	3:30	0.5	O
			AIR/$\mathbf{O_2}$												**1**	2:30		
45	140	0:50	AIR												14	15:30	0.5	O

Air Decompression Table, VVal-79 Thalmann Algorithm

DEPTH (FSW)	BTM TIM (M)	TM TO FIRST STOP (M:S)	GAS MIX	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O_2 stop												TOTAL ASCNT TIME (M:S)	CHAMBER O_2 PERIODS	RPT GRP DES
				130	120	110	100	90	80	70	60	50	40	30	20			
			AIR/**O_2**												**5**	6:30		
45	150	0:50	AIR												25	26:30	0.5	Z
			AIR/**O_2**												**8**	9:30		
45	160	0:50	AIR												34	35:30	0.5	Z
			AIR/**O_2**												**11**	12:30		
45	170	0:50	AIR												41	42:30	1	Z
			AIR/**O_2**												**14**	15:30		
45	180	0:50	AIR												59	60:30	1	Z
			AIR/**O_2**												**17**	18:30		
45	190	0:50	AIR												75	76:30	1	Z
			AIR/**O_2**												**19**	20:30		
45	200	0:50	AIR												89	90:30	1	Z
			AIR/**O_2**												**23**	24:30		
45	210	0:50	AIR												101	102:30	1	Z
			AIR/**O_2**												**27**	28:30		
45	220	0:50	AIR												112	113:30	1.5	Z
			AIR/**O_2**												**30**	31:30		
45	230	0:50	AIR												121	122:30	1.5	Z
			AIR/**O_2**												**33**	34:30		
45	240	0:50	AIR												130	131:30	1.5	Z
			AIR/**O_2**												**37**	43:30		
45	270	0:50	AIR												173	174:30	2	
			AIR/**O_2**												**45**	51:30		
45	300	0:50	AIR												206	207:30	2	
			AIR/**O_2**												**51**	57:30		
45	330	0:50	AIR												243	244:30	2.5	
			AIR/**O_2**												**61**	67:30		
45	360	0:50	AIR												288	289:30	3	
			AIR/**O_2**												**69**	80:30		
45	420	0:50	AIR												373	374:30	3.5	
			AIR/**O_2**												**84**	95:30		
45	480	0:50	AIR												431	432:30	4	
			AIR/**O_2**												**101**	117:30		
45	540	0:50	AIR												473	474:30	4.5	
			AIR/**O_2**												**117**	133:30		
50	92	1:40	AIR												0	1:40	0	M
			AIR/**O_2**												**0**	1:40		
50	95	1:00	AIR												2	3:40	0.5	M
			AIR/**O_2**												**1**	2:40		
50	100	1:00	AIR												4	5:40	0.5	N
			AIR/**O_2**												**2**	3:40		
50	110	1:00	AIR												8	9:40	0.5	O
			AIR/**O_2**												**4**	5:40		
50	120	1:00	AIR												21	22:40	0.5	O

Air Decompression Table, VVal-79 Thalmann Algorithm

DEPTH (FSW)	BTM TIM (M)	TM TO FIRST STOP (M:S)	GAS MIX	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O_2 stop 130	120	110	100	90	80	70	60	50	40	30	20	TOTAL ASCNT TIME (M:S)	CHAMBER O_2 PERIODS	RPT GRP DES
			AIR/O_2												**7**	8:40		
50	130	1:00	AIR												34	35:40	0.5	Z
			AIR/O_2												**12**	13:40		
50	140	1:00	AIR												45	46:40	1	Z
			AIR/O_2												**16**	17:40		
50	150	1:00	AIR												56	57:40	1	Z
			AIR/O_2												**19**	20:40		
50	160	1:00	AIR												78	79:40	1	Z
			AIR/O_2												**23**	24:40		
50	170	1:00	AIR												96	97:40	1	Z
			AIR/O_2												**26**	27:40		
50	180	1:00	AIR												111	112:40	1.5	Z
			AIR/O_2												**30**	31:40		
50	190	1:00	AIR												125	126:40	1.5	Z
			AIR/O_2												**35**	36:40		
50	200	1:00	AIR												136	137:40	1.5	Z
			AIR/O_2												**39**	45:40		
50	210	1:00	AIR												147	148:40	2	
			AIR/O_2												**43**	49:40		
50	220	1:00	AIR												166	167:40	2	
			AIR/O_2												**47**	53:40		
50	230	1:00	AIR												183	184:40	2	
			AIR/O_2												**50**	56:40		
50	240	1:00	AIR												198	199:40	2	
			AIR/O_2												**53**	59:40		
50	270	1:00	AIR												236	237:40	2.5	
			AIR/O_2												**62**	68:40		
50	300	1:00	AIR												285	286:40	3	
			AIR/O_2												**74**	85:40		
50	330	1:00	AIR												345	346:40	3.5	
			AIR/O_2												**83**	94:40		
50	360	1:00	AIR												393	394:40	3.5	
			AIR/O_2												**92**	103:40		
50	420	1:00	AIR												464	465:40	4.5	
			AIR/O_2												**113**	129:40		
55	74	1:50	AIR												0	1:50	0	L
			AIR/O_2												**0**	1:50		
55	75	1:10	AIR												1	2:50	0.5	L
			AIR/O_2												**1**	2:50		
55	80	1:10	AIR												4	5:50	0.5	M
			AIR/O_2												**2**	3:50		
55	90	1:10	AIR												10	11:50	0.5	N
			AIR/O_2												**5**	6:50		
55	100	1:10	AIR												17	18:50	0.5	O

Air Decompression Table, VVal-79 Thalmann Algorithm

DEPTH (FSW)	BTM TIM (M)	TM TO FIRST STOP (M:S)	GAS MIX	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O_2 stop												TOTAL ASCNT TIME (M:S)	CHAMBER O_2 PERIODS	RPT GRP DES
				130	120	110	100	90	80	70	60	50	40	30	20			
			AIR/**O_2**												**8**	9:50		
55	110	1:10	AIR												34	35:50	0.5	O
			AIR/**O_2**												**12**	13:50		
55	120	1:10	AIR												48	49:50	1	Z
			AIR/**O_2**												**17**	18:50		
55	130	1:10	AIR												59	60:50	1	Z
			AIR/**O_2**												**22**	23:50		
55	140	1:10	AIR												84	85:50	1	Z
			AIR/**O_2**												**26**	27:50		
55	150	1:10	AIR												105	106:50	1.5	Z
			AIR/**O_2**												**30**	31:50		
55	160	1:10	AIR												123	124:50	1.5	Z
			AIR/**O_2**												**34**	35:50		
55	170	1:10	AIR												138	139:50	1.5	Z
			AIR/**O_2**												**40**	46:50		
55	180	1:10	AIR												151	152:50	2	Z
			AIR/**O_2**												**45**	51:50		
55	190	1:10	AIR												169	170:50	2	
			AIR/**O_2**												**50**	56:50		
55	200	1:10	AIR												190	191:50	2	
			AIR/**O_2**												**54**	60:50		
55	210	1:10	AIR												208	209:50	2.5	
			AIR/**O_2**												**58**	64:50		
55	220	1:10	AIR												224	225:50	2.5	
			AIR/**O_2**												**62**	68:50		
55	230	1:10	AIR												239	240:50	2.5	
			AIR/**O_2**												**66**	77:50		
55	240	1:10	AIR												254	255:50	3	
			AIR/**O_2**												**69**	80:50		
55	270	1:10	AIR												313	314:50	3.5	
			AIR/**O_2**												**83**	94:50		
55	300	1:10	AIR												380	381:50	3.5	
			AIR/**O_2**												**94**	105:50		
55	330	1:10	AIR												432	433:50	4	
			AIR/**O_2**												**106**	122:50		
55	360	1:10	AIR												474	475:50	4.5	
			AIR/**O_2**												**118**	134:50		
60	63	2:00	AIR												0	2:00	0	K
			AIR/**O_2**												**0**	2:00		
60	65	1:20	AIR												2	4:00	0.5	L
			AIR/**O_2**												**1**	3:00		
60	70	1:20	AIR												7	9:00	0.5	L
			AIR/**O_2**												**4**	6:00		
60	80	1:20	AIR												14	16:00	0.5	N

Air Decompression Table, VVal-79 Thalmann Algorithm

DEPTH (FSW)	BTM TIM (M)	TM TO FIRST STOP (M:S)	GAS MIX	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O_2 stop												TOTAL ASCNT TIME (M:S)	CHAMBER O_2 PERIODS	RPT GRP DES
				130	120	110	100	90	80	70	60	50	40	30	20			
			AIR/O_2												**7**	9:00		
60	90	1:20	AIR												23	25:00	0.5	O
			AIR/O_2												**10**	12:00		
60	100	1:20	AIR												42	44:00	1	Z
			AIR/O_2												**15**	17:00		
60	110	1:20	AIR												57	59:00	1	Z
			AIR/O_2												**21**	23:00		
60	120	1:20	AIR												75	77:00	1	Z
			AIR/O_2												**26**	28:00		
60	130	1:20	AIR												102	104:00	1.5	Z
			AIR/O_2												**31**	33:00		
60	140	1:20	AIR												124	126:00	1.5	Z
			AIR/O_2												**35**	37:00		
60	150	1:20	AIR												143	145:00	2	Z
			AIR/O_2												**41**	48:00		
60	160	1:20	AIR												158	160:00	2	Z
			AIR/O_2												**48**	55:00		
60	170	1:20	AIR												178	180:00	2	
			AIR/O_2												**53**	60:00		
60	180	1:20	AIR												201	203:00	2.5	
			AIR/O_2												**59**	66:00		
60	190	1:20	AIR												222	224:00	2.5	
			AIR/O_2												**64**	71:00		
60	200	1:20	AIR												240	242:00	2.5	
			AIR/O_2												**68**	80:00		
60	210	1:20	AIR												256	258:00	3	
			AIR/O_2												**73**	85:00		
60	220	1:20	AIR												278	280:00	3	
			AIR/O_2												**77**	89:00		
60	230	1:20	AIR												300	302:00	3.5	
			AIR/O_2												**82**	94:00		
60	240	1:20	AIR												321	323:00	3.5	
			AIR/O_2												**88**	100:00		
60	270	1:20	AIR												398	400:00	4	
			AIR/O_2												**102**	119:00		
60	300	1:20	AIR												456	458:00	4.5	
			AIR/O_2												**115**	132:00		
70	48	2:20	AIR												0	2:20	0	K
			AIR/O_2												**0**	2:20		
70	50	1:40	AIR												2	4:20	0.5	K
			AIR/O_2												**1**	3:20		
70	55	1:40	AIR												9	11:20	0.5	L
			AIR/O_2												**5**	7:20		
70	60	1:40	AIR												14	16:20	0.5	M

Air Decompression Table, VVal-79 Thalmann Algorithm

DEPTH (FSW)	BTM TIM (M)	TM TO FIRST STOP (M:S)	GAS MIX	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O_2 stop												TOTAL ASCNT TIME (M:S)	CHAMBER O_2 PERIODS	RPT GRP DES
				130	120	110	100	90	80	70	60	50	40	30	20			
			AIR/$\mathbf{O_2}$												**8**	10:20		
70	70	1:40	AIR												24	26:20	0.5	N
			AIR/$\mathbf{O_2}$												**13**	15:20		
70	80	1:40	AIR												44	46:20	1	O
			AIR/$\mathbf{O_2}$												**17**	19:20		
70	90	1:40	AIR												64	66:20	1	Z
			AIR/$\mathbf{O_2}$												**24**	26:20		
70	100	1:40	AIR												88	90:20	1.5	Z
			AIR/$\mathbf{O_2}$												**31**	33:20		
70	110	1:40	AIR												120	122:20	1.5	Z
			AIR/$\mathbf{O_2}$												**38**	45:20		
70	120	1:40	AIR												145	147:20	2	Z
			AIR/$\mathbf{O_2}$												**44**	51:20		
70	130	1:40	AIR												167	169:20	2	Z
			AIR/$\mathbf{O_2}$												**51**	58:20		
70	140	1:40	AIR												189	191:20	2.5	
			AIR/$\mathbf{O_2}$												**59**	66:20		
70	150	1:40	AIR												219	221:20	2.5	
			AIR/$\mathbf{O_2}$												**66**	78:20		
70	160	1:20	AIR											1	244	247:00	3	
			AIR/$\mathbf{O_2}$											**1**	**72**	85:00		
70	170	1:20	AIR											2	265	269:00	3	
			AIR/$\mathbf{O_2}$											**1**	**78**	91:00		
70	180	1:20	AIR											4	289	295:00	3.5	
			AIR/$\mathbf{O_2}$											**2**	**83**	97:00		
70	190	1:20	AIR											5	316	323:00	3.5	
			AIR/$\mathbf{O_2}$											**3**	**88**	103:00		
70	200	1:20	AIR											9	345	356:00	4	
			AIR/$\mathbf{O_2}$											**5**	**93**	115:00		
70	210	1:20	AIR											13	378	393:00	4	
			AIR/$\mathbf{O_2}$											**7**	**98**	122:00		
70	240	1:20	AIR											25	454	481:00	5	
			AIR/$\mathbf{O_2}$											**13**	**110**	140:00		
80	39	2:40	AIR												0	2:40	0	J
			AIR/$\mathbf{O_2}$												**0**	2:40		
80	40	2:00	AIR												1	3:40	0.5	J
			AIR/$\mathbf{O_2}$												**1**	3:40		
80	45	2:00	AIR												10	12:40	0.5	K
			AIR/$\mathbf{O_2}$												**5**	7:40		
80	50	2:00	AIR												17	19:40	0.5	M
			AIR/$\mathbf{O_2}$												**9**	11:40		
80	55	2:00	AIR												24	26:40	0.5	M
			AIR/$\mathbf{O_2}$												**13**	15:40		
80	60	2:00	AIR												30	32:40	1	N

Air Decompression Table, VVal-79 Thalmann Algorithm

DEPTH (FSW)	BTM TIM (M)	TM TO FIRST STOP (M:S)	GAS MIX	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O_2 stop												TOTAL ASCNT TIME (M:S)	CHAMBER O_2 PERIODS	RPT GRP DES
				130	120	110	100	90	80	70	60	50	40	30	20			
			AIR/O_2												**16**	18:40		
80	70	2:00	AIR												54	56:40	1	O
			AIR/O_2												**22**	24:40		
80	80	2:00	AIR												77	79:40	1.5	Z
			AIR/O_2												**30**	32:40		
80	90	2:00	AIR												114	116:40	1.5	Z
			AIR/O_2												**39**	46:40		
80	100	1:40	AIR											1	147	150:20	2	Z
			AIR/O_2											**1**	**46**	54:20		
80	110	1:40	AIR											6	171	179:20	2	Z
			AIR/O_2											**3**	**51**	61:20		
80	120	1:40	AIR											10	200	212:20	2.5	
			AIR/O_2											**5**	**59**	71:20		
80	130	1:40	AIR											14	232	248:20	3	
			AIR/O_2											**7**	**67**	86:20		
80	140	1:40	AIR											17	258	277:20	3.5	
			AIR/O_2											**9**	**73**	94:20		
80	150	1:40	AIR											19	285	306:20	3.5	
			AIR/O_2											**10**	**80**	102:20		
80	160	1:40	AIR											21	318	341:20	4	
			AIR/O_2											**11**	**86**	114:20		
80	170	1:40	AIR											27	354	383:20	4	
			AIR/O_2											**14**	**90**	121:20		
80	180	1:40	AIR											33	391	426:20	4.5	
			AIR/O_2											**17**	**96**	130:20		
80	210	1:40	AIR											51	473	526:20	5	
			AIR/O_2											**26**	**110**	158:20		
90	33	3:00	AIR												0	3:00	0	J
			AIR/O_2												**0**	3:00		
90	35	2:20	AIR												4	7:00	0.5	J
			AIR/O_2												**2**	5:00		
90	40	2:20	AIR												14	17:00	0.5	L
			AIR/O_2												**7**	10:00		
90	45	2:20	AIR												23	26:00	0.5	M
			AIR/O_2												**12**	15:00		
90	50	2:20	AIR												31	34:00	1	N
			AIR/O_2												**17**	20:00		
90	55	2:20	AIR												39	42:00	1	O
			AIR/O_2												**21**	24:00		
90	60	2:20	AIR												56	59:00	1	O
			AIR/O_2												**24**	27:00		
90	70	2:20	AIR												83	86:00	1.5	Z
			AIR/O_2												**32**	35:00		
90	80	2:00	AIR											5	125	132:40	2	Z

Air Decompression Table, VVal-79 Thalmann Algorithm

DEPTH (FSW)	BTM TIM (M)	TM TO FIRST STOP (M:S)	GAS MIX	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O_2 stop 130	120	110	100	90	80	70	60	50	40	30	20	TOTAL ASCNT TIME (M:S)	CHAMBER O_2 PERIODS	RPT GRP DES
			AIR/**O_2**											**3**	**40**	50:40		
90	90	2:00	AIR											13	158	173:40	2	Z
			AIR/**O_2**											**7**	**46**	60:40		
90	100	2:00	AIR											19	185	206:40	2.5	
			AIR/**O_2**											**10**	**53**	70:40		
90	110	2:00	AIR											25	224	251:40	3	
			AIR/**O_2**											**13**	**61**	86:40		
90	120	1:40	AIR										2	28	256	288:20	3.5	
			AIR/**O_2**										2	**14**	**70**	98:40		
90	130	1:40	AIR										5	28	291	326:20	3.5	
			AIR/**O_2**										5	**14**	**79**	110:40		
90	140	1:40	AIR										8	28	330	368:20	4	
			AIR/**O_2**										8	**14**	**87**	126:40		
90	150	1:40	AIR										11	34	378	425:20	4.5	
			AIR/**O_2**										11	**17**	**94**	139:40		
90	160	1:40	AIR										13	40	418	473:20	4.5	
			AIR/**O_2**										13	**20**	**101**	151:40		
90	170	1:40	AIR										15	45	451	513:20	5	
			AIR/**O_2**										15	**23**	**106**	166:40		
90	180	1:40	AIR										16	51	479	548:20	5.5	
			AIR/**O_2**										16	**26**	**112**	176:40		
90	240	1:40	AIR										42	68	592	704:20	7.5	
			AIR/**O_2**										42	**34**	**159**	267:40		
100	25	3:20	AIR												0	3:20	0	H
			AIR/**O_2**												**0**	3:20		
100	30	2:40	AIR												3	6:20	0.5	J
			AIR/**O_2**												**2**	5:20		
100	35	2:40	AIR												15	18:20	0.5	L
			AIR/**O_2**												**8**	11:20		
100	40	2:40	AIR												26	29:20	1	M
			AIR/**O_2**												**14**	17:20		
100	45	2:40	AIR												36	39:20	1	N
			AIR/**O_2**												**19**	22:20		
100	50	2:40	AIR												47	50:20	1	O
			AIR/**O_2**												**24**	27:20		
100	55	2:40	AIR												65	68:20	1.5	Z
			AIR/**O_2**												**28**	31:20		
100	60	2:40	AIR												81	84:20	1.5	Z
			AIR/**O_2**												**33**	36:20		
100	70	2:20	AIR											11	124	138:00	2	Z
			AIR/**O_2**											**6**	**39**	53:00		
100	80	2:20	AIR											21	160	184:00	2.5	Z
			AIR/**O_2**											**11**	**45**	64:00		
100	90	2:00	AIR										2	28	196	228:40	2.5	

Air Decompression Table, VVal-79 Thalmann Algorithm

DEPTH (FSW)	BTM TIM (M)	TM TO FIRST STOP (M:S)	GAS MIX	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O_2 stop												TOTAL ASCNT TIME (M:S)	CHAMBER O_2 PERIODS	RPT GRP DES
				130	120	110	100	90	80	70	60	50	40	30	20			
			AIR/**O_2**										2	**14**	**53**	82:00		
100	100	2:00	AIR										9	28	241	280:40	3	
			AIR/**O_2**										9	**14**	**66**	102:00		
100	110	2:00	AIR										14	28	278	322:40	3.5	
			AIR/**O_2**										14	**14**	**76**	117:00		
100	120	2:00	AIR										19	28	324	373:40	4	
			AIR/**O_2**										19	**14**	**85**	136:00		
100	150	1:40	AIR									3	26	46	461	538:20	5	
			AIR/**O_2**									3	26	**23**	**109**	183:40		
110	20	3:40	AIR												0	3:40	0	H
			AIR/**O_2**												**0**	3:40		
110	25	3:00	AIR												5	8:40	0.5	I
			AIR/**O_2**												**3**	6:40		
110	30	3:00	AIR												14	17:40	0.5	K
			AIR/**O_2**												**7**	10:40		
110	35	3:00	AIR												27	30:40	1	M
			AIR/**O_2**												**14**	17:40		
110	40	3:00	AIR												39	42:40	1	N
			AIR/**O_2**												**20**	23:40		
110	45	3:00	AIR												50	53:40	1	O
			AIR/**O_2**												**26**	29:40		
110	50	3:00	AIR												71	74:40	1.5	Z
			AIR/**O_2**												**32**	35:40		
110	55	2:40	AIR											5	85	93:20	1.5	Z
			AIR/**O_2**											**3**	**33**	44:20		
110	60	2:40	AIR											13	111	127:20	2	Z
			AIR/**O_2**											**7**	**36**	51:20		
110	70	2:40	AIR											26	155	184:20	2.5	Z
			AIR/**O_2**											**14**	**42**	64:20		
110	80	2:20	AIR										9	28	200	240:00	2.5	
			AIR/**O_2**										9	**14**	**54**	90:20		
110	90	2:20	AIR										18	28	249	298:00	3.5	
			AIR/**O_2**										18	**14**	**68**	113:20		
110	100	2:20	AIR										25	28	295	351:00	3.5	
			AIR/**O_2**										25	**14**	**79**	131:20		
110	110	2:00	AIR									5	26	28	353	414:40	4	
			AIR/**O_2**									5	26	**14**	**91**	154:00		
110	120	2:00	AIR									10	26	35	413	486:40	4.5	
			AIR/**O_2**									10	26	**18**	**101**	173:00		
110	180	1:40	AIR								3	23	47	68	593	736:20	7.5	
			AIR/**O_2**								3	23	47	**34**	**159**	298:40		
120	15	4:00	AIR												0	4:00	0	F
			AIR/**O_2**												**0**	4:00		

Air Decompression Table, VVal-79 Thalmann Algorithm

DEPTH (FSW)	BTM TIM (M)	TM TO FIRST STOP (M:S)	GAS MIX	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O_2 stop												TOTAL ASCNT TIME (M:S)	CHAMBER O_2 PERIODS	RPT GRP DES
				130	120	110	100	90	80	70	60	50	40	30	20			
120	20	3:20	AIR												4	8:00	0.5	H
			AIR/O_2												**2**	6:00		
120	25	3:20	AIR												9	13:00	0.5	J
			AIR/O_2												**5**	9:00		
120	30	3:20	AIR												24	28:00	0.5	L
			AIR/O_2												**13**	17:00		
120	35	3:20	AIR												38	42:00	1	N
			AIR/O_2												**20**	24:00		
120	40	3:00	AIR											2	49	54:40	1	O
			AIR/O_2											**1**	**26**	30:40		
120	45	3:00	AIR											3	71	77:40	1.5	Z
			AIR/O_2											**2**	**31**	36:40		
120	50	3:00	AIR											10	85	98:40	1.5	Z
			AIR/O_2											**5**	**33**	46:40		
120	55	3:00	AIR											19	116	138:40	2	Z
			AIR/O_2											**10**	**35**	53:40		
120	60	3:00	AIR											27	142	172:40	2	Z
			AIR/O_2											**14**	**39**	61:40		
120	70	2:40	AIR										13	28	190	234:20	2.5	
			AIR/O_2										13	**14**	**51**	86:40		
120	80	2:40	AIR										24	28	246	301:20	3	
			AIR/O_2										24	**14**	**67**	118:40		
120	90	2:20	AIR									7	26	28	303	367:00	3.5	
			AIR/O_2									7	26	**14**	**80**	140:20		
120	100	2:20	AIR									15	25	28	372	443:00	4	
			AIR/O_2									15	25	**14**	**95**	167:20		
120	110	2:20	AIR									21	25	38	433	520:00	5	
			AIR/O_2									21	25	**19**	**105**	188:20		
120	120	2:00	AIR								3	23	25	47	480	580:40	5.5	
			AIR/O_2								3	23	25	**24**	**113**	211:00		
130	12	4:20	AIR												0	4:20	0	F
			AIR/O_2												**0**	4:20		
130	15	3:40	AIR												3	7:20	0.5	G
			AIR/O_2												**2**	6:20		
130	20	3:40	AIR												8	12:20	0.5	I
			AIR/O_2												**5**	9:20		
130	25	3:40	AIR												17	21:20	0.5	K
			AIR/O_2												**9**	13:20		
130	30	3:20	AIR											2	32	38:00	1	M
			AIR/O_2											**1**	**17**	22:00		
130	35	3:20	AIR											5	44	53:00	1	O
			AIR/O_2											**3**	**23**	30:00		
130	40	3:20	AIR											6	66	76:00	1.5	Z
			AIR/O_2											**3**	**30**	37:00		

Air Decompression Table, VVal-79 Thalmann Algorithm

DEPTH (FSW)	BTM TIM (M)	TM TO FIRST STOP (M:S)	GAS MIX	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O_2 stop												TOTAL ASCNT TIME (M:S)	CHAMBER O_2 PERIODS	RPT GRP DES
				130	120	110	100	90	80	70	60	50	40	30	20			
130	45	3:00	AIR										1	11	84	99:40	1.5	Z
			AIR/**O_2**										1	**6**	**33**	49:00		
130	50	3:00	AIR										2	20	118	143:40	2	Z
			AIR/**O_2**										2	**10**	**36**	57:00		
130	55	3:00	AIR										4	28	146	181:40	2	Z
			AIR/**O_2**										4	**14**	**40**	67:00		
130	60	3:00	AIR										12	28	170	213:40	2.5	Z
			AIR/**O_2**										12	**14**	**46**	81:00		
130	70	2:40	AIR									1	26	28	235	293:20	3	
			AIR/**O_2**									1	26	**14**	**63**	117:40		
130	80	2:40	AIR									12	26	28	297	366:20	3.5	
			AIR/**O_2**									12	26	**14**	**79**	144:40		
130	90	2:40	AIR									22	25	28	375	453:20	4	
			AIR/**O_2**									22	25	**14**	**95**	174:40		
130	100	2:20	AIR								6	23	26	38	444	540:00	5	
			AIR/**O_2**								6	23	26	**20**	**106**	204:20		
130	120	2:20	AIR								17	24	27	57	534	662:00	6	
			AIR/**O_2**								17	24	27	**29**	**130**	255:20		
130	180	2:00	AIR							13	21	45	57	94	658	890:40	9	
			AIR/**O_2**							13	21	45	57	**46**	**198**	418:00		
140	10	4:40	AIR												0	4:40	0	E
			AIR/**O_2**												**0**	4:40		
140	15	4:00	AIR												5	9:40	0.5	H
			AIR/**O_2**												**3**	7:40		
140	20	4:00	AIR												13	17:40	0.5	J
			AIR/**O_2**												**7**	11:40		
140	25	3:40	AIR											3	24	31:20	1	L
			AIR/**O_2**											**2**	**12**	18:20		
140	30	3:40	AIR											7	37	48:20	1	N
			AIR/**O_2**											**4**	**19**	27:20		
140	35	3:20	AIR										2	7	58	71:00	1.5	O
			AIR/**O_2**										2	**4**	**26**	36:20		
140	40	3:20	AIR										4	7	82	97:00	1.5	Z
			AIR/**O_2**										4	**4**	**33**	50:20		
140	45	3:20	AIR										5	18	114	141:00	2	Z
			AIR/**O_2**										5	**9**	**36**	59:20		
140	50	3:20	AIR										8	27	145	184:00	2	Z
			AIR/**O_2**										8	**14**	**39**	70:20		
140	55	3:00	AIR									1	15	29	171	219:40	2.5	Z
			AIR/**O_2**									1	15	**15**	**45**	85:00		
140	60	3:00	AIR									2	23	28	209	265:40	3	
			AIR/**O_2**									2	23	**14**	**56**	109:00		
140	70	3:00	AIR									14	25	29	276	347:40	3.5	
			AIR/**O_2**									14	25	**15**	**74**	142:00		

Air Decompression Table, VVal-79 Thalmann Algorithm

DEPTH (FSW)	BTM TIM (M)	TM TO FIRST STOP (M:S)	GAS MIX	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O_2 stop 130	120	110	100	90	80	70	60	50	40	30	20	TOTAL ASCNT TIME (M:S)	CHAMBER O_2 PERIODS	RPT GRP DES
140	80	2:40	AIR								2	24	25	29	362	445:20	4	
			AIR/O_2								2	24	25	**15**	**91**	175:40		
140	90	2:40	AIR								12	23	26	38	443	545:20	5	
			AIR/O_2								12	23	26	**19**	**107**	210:40		
150	8	5:00	AIR												0	5:00	0	E
			AIR/O_2												**0**	5:00		
150	10	4:20	AIR												2	7:00	0.5	F
			AIR/O_2												**1**	6:00		
150	15	4:20	AIR												8	13:00	0.5	H
			AIR/O_2												**5**	10:00		
150	20	4:00	AIR											2	15	21:40	0.5	K
			AIR/O_2											**1**	**8**	13:40		
150	25	4:00	AIR											7	29	40:40	1	M
			AIR/O_2											**4**	**14**	22:40		
150	30	3:40	AIR										4	7	45	60:20	1	O
			AIR/O_2										4	**4**	**22**	34:40		
150	35	3:40	AIR										6	7	74	91:20	1.5	Z
			AIR/O_2										6	**4**	**30**	44:40		
150	40	3:20	AIR									2	6	14	106	132:00	2	Z
			AIR/O_2									2	6	**7**	**35**	59:20		
150	45	3:20	AIR									3	8	24	142	181:00	2	Z
			AIR/O_2									3	8	**12**	**40**	72:20		
150	50	3:20	AIR									4	14	28	170	220:00	2.5	Z
			AIR/O_2									4	14	**14**	**46**	87:20		
150	55	3:20	AIR									7	21	28	212	272:00	3	
			AIR/O_2									7	21	**14**	**57**	113:20		
150	60	3:20	AIR									11	26	28	248	317:00	3	
			AIR/O_2									11	26	**14**	**67**	132:20		
150	70	3:00	AIR								3	24	25	28	330	413:40	4	
			AIR/O_2								3	24	25	**14**	**85**	170:00		
150	80	3:00	AIR								15	23	26	35	430	532:40	4.5	
			AIR/O_2								15	23	26	**18**	**104**	205:00		
150	90	2:40	AIR							3	22	23	26	47	496	620:20	5.5	
			AIR/O_2							3	22	23	26	**24**	**118**	239:40		
150	120	2:20	AIR						3	20	22	23	50	75	608	804:00	8	
			AIR/O_2						3	20	22	23	50	**37**	**168**	356:20		
150	180	2:00	AIR					2	19	20	42	48	79	121	694	1027:40	10.5	
			AIR/O_2					2	19	20	42	48	79	**58**	**222**	538:00		
160	7	5:20	AIR												0	5:20	0	E
			AIR/O_2												**0**	5:20		
160	10	4:40	AIR												4	9:20	0.5	F
			AIR/O_2												**2**	7:20		
160	15	4:20	AIR											2	10	17:00	0.5	I

Air Decompression Table, VVal-79 Thalmann Algorithm

DEPTH (FSW)	BTM TIM (M)	TM TO FIRST STOP (M:S)	GAS MIX	130	120	110	100	90	80	70	60	50	40	30	20	TOTAL ASCNT TIME (M:S)	CHAMBER O_2 PERIODS	RPT GRP DES
DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O_2 stop																		
			AIR/O_2											**1**	**6**	12:00		
160	20	4:00	AIR										1	4	19	28:40	0.5	L
			AIR/O_2										1	**2**	**10**	18:00		
160	25	4:00	AIR										4	7	35	50:40	1	N
			AIR/O_2										4	**4**	**17**	30:00		
160	30	3:40	AIR									2	6	7	62	81:20	1.5	Z
			AIR/O_2									2	6	**4**	**26**	42:40		
160	35	3:40	AIR									4	6	8	89	111:20	1.5	Z
			AIR/O_2									4	6	**4**	**34**	57:40		
160	40	3:40	AIR									6	6	21	134	171:20	2	Z
			AIR/O_2									6	6	**11**	**38**	70:40		
160	45	3:20	AIR								2	5	11	28	166	216:00	2.5	Z
			AIR/O_2								2	5	11	**14**	**45**	86:20		
160	50	3:20	AIR								2	8	19	28	207	268:00	3	
			AIR/O_2								2	8	19	**15**	**55**	113:20		
160	55	3:20	AIR								3	11	26	28	248	320:00	3	
			AIR/O_2								3	11	26	**14**	**67**	135:20		
160	60	3:20	AIR								6	17	25	29	291	372:00	3.5	
			AIR/O_2								6	17	25	**15**	**77**	154:20		
160	70	3:20	AIR								15	23	26	29	399	496:00	4.5	
			AIR/O_2								15	23	26	**15**	**99**	197:20		
160	80	3:00	AIR							6	21	24	25	44	482	605:40	5.5	
			AIR/O_2							6	21	24	25	**23**	**114**	237:00		
170	6	5:40	AIR												0	5:40	0	D
			AIR/O_2												**0**	5:40		
170	10	5:00	AIR												6	11:40	0.5	G
			AIR/O_2												**3**	8:40		
170	15	4:40	AIR											3	13	21:20	0.5	J
			AIR/O_2											**2**	**6**	13:20		
170	20	4:20	AIR										3	6	24	38:00	1	M
			AIR/O_2										3	**3**	**12**	23:20		
170	25	4:00	AIR									1	7	7	41	60:40	1	O
			AIR/O_2									1	7	**4**	**20**	37:00		
170	30	4:00	AIR									5	7	7	77	100:40	1.5	Z
			AIR/O_2									5	7	**3**	**30**	50:00		
170	35	3:40	AIR								2	6	6	15	120	153:20	2	Z
			AIR/O_2								2	6	6	**8**	**37**	68:40		
170	40	3:40	AIR								4	6	9	25	158	206:20	2.5	Z
			AIR/O_2								4	6	9	**12**	**44**	84:40		
170	45	3:40	AIR								5	7	16	28	197	257:20	2.5	Z
			AIR/O_2								5	7	16	**14**	**53**	109:40		
170	50	3:20	AIR							1	5	11	23	28	244	316:00	3	
			AIR/O_2							1	5	11	23	**14**	**66**	134:20		
170	55	3:20	AIR							2	7	16	26	28	289	372:00	3.5	

Air Decompression Table, VVal-79 Thalmann Algorithm

DEPTH (FSW)	BTM TIM (M)	TM TO FIRST STOP (M:S)	GAS MIX	130	120	110	100	90	80	70	60	50	40	30	20	TOTAL ASCNT TIME (M:S)	CHAMBER O_2 PERIODS	RPT GRP DES
			DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O_2 stop															
			AIR/**O_2**							2	7	16	26	**14**	**77**	156:20		
170	60	3:20	AIR							2	11	21	26	28	344	436:00	4	
			AIR/**O_2**							2	11	21	26	**14**	**88**	181:20		
170	70	3:20	AIR							7	19	24	25	39	454	572:00	5	
			AIR/**O_2**							7	19	24	25	**20**	**109**	228:20		
170	80	3:20	AIR							17	22	23	26	53	525	670:00	6	
			AIR/**O_2**							17	22	23	26	**27**	**128**	267:20		
170	90	3:00	AIR						8	19	22	23	37	66	574	752:40	7	
			AIR/**O_2**						8	19	22	23	37	**33**	**148**	319:00		
170	120	2:40	AIR					9	19	20	22	42	60	94	659	928:20	9	
			AIR/**O_2**					9	19	20	22	42	60	**46**	**198**	454:40		
170	180	2:20	AIR				10	18	19	40	43	70	97	156	703	1159:00	11.5	
			AIR/**O_2**				10	18	19	40	43	70	97	**74**	**229**	648:20		
180	6	6:00	AIR												0	6:00	0	E
			AIR/**O_2**												**0**	6:00		
180	10	5:20	AIR												8	14:00	0.5	G
			AIR/**O_2**												**4**	10:00		
180	15	4:40	AIR										2	3	14	24:20	0.5	K
			AIR/**O_2**										2	**2**	**7**	16:40		
180	20	4:20	AIR									1	5	7	29	47:00	1	M
			AIR/**O_2**									1	5	**3**	**15**	29:20		
180	25	4:20	AIR									5	6	7	57	80:00	1.5	O
			AIR/**O_2**									5	6	**4**	**24**	44:20		
180	30	4:00	AIR								3	6	6	7	95	121:40	1.5	Z
			AIR/**O_2**								3	6	6	**4**	**34**	63:00		
180	35	3:40	AIR							1	5	6	6	22	144	188:20	2	Z
			AIR/**O_2**							1	5	6	6	**11**	**41**	79:40		
180	40	3:40	AIR							2	6	5	13	28	178	236:20	2.5	
			AIR/**O_2**							2	6	5	13	**14**	**48**	97:40		
180	45	3:40	AIR							4	5	10	20	28	235	306:20	3	
			AIR/**O_2**							4	5	10	20	**14**	**63**	130:40		
180	50	3:40	AIR							4	8	13	25	29	277	360:20	3.5	
			AIR/**O_2**							4	8	13	25	**15**	**75**	154:40		
180	55	3:40	AIR							5	11	19	26	28	336	429:20	4	
			AIR/**O_2**							5	11	19	26	**14**	**87**	181:40		
180	60	3:20	AIR						1	8	13	23	25	31	406	511:00	4.5	
			AIR/**O_2**						1	8	13	23	25	**16**	**100**	205:20		
180	70	3:20	AIR						4	12	21	24	25	48	499	637:00	5.5	
			AIR/**O_2**						4	12	21	24	25	**24**	**119**	253:20		
190	5	6:20	AIR												0	6:20	0	D
			AIR/**O_2**												**0**	6:20		
190	10	5:20	AIR											2	8	16:00	0.5	H
			AIR/**O_2**											**1**	**4**	11:00		

Air Decompression Table, VVal-79 Thalmann Algorithm

DEPTH (FSW)	BTM TIM (M)	TM TO FIRST STOP (M:S)	GAS MIX	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O_2 stop 130	120	110	100	90	80	70	60	50	40	30	20	TOTAL ASCNT TIME (M:S)	CHAMBER O_2 PERIODS	RPT GRP DES
190	15	4:40	AIR									1	3	3	16	28:20	0.5	K
			AIR/**O_2**									1	3	**2**	**8**	19:40		
190	20	4:20	AIR								1	2	6	7	34	55:00	1	N
			AIR/**O_2**								1	2	6	**4**	**17**	35:20		
190	25	4:20	AIR								2	6	7	7	72	99:00	1.5	Z
			AIR/**O_2**								2	6	7	**3**	**28**	51:20		
190	30	4:00	AIR							1	6	5	7	13	122	158:40	2	Z
			AIR/**O_2**							1	6	5	7	**7**	**38**	74:00		
190	35	4:00	AIR							4	5	6	8	26	165	218:40	2.5	Z
			AIR/**O_2**							4	5	6	8	**13**	**45**	91:00		
190	40	3:40	AIR						1	5	5	8	17	28	217	285:20	3	
			AIR/**O_2**						1	5	5	8	17	**15**	**58**	123:40		
190	45	3:40	AIR						2	5	6	12	24	29	264	346:20	3.5	
			AIR/**O_2**						2	5	6	12	24	**15**	**71**	149:40		
190	50	3:40	AIR						3	5	10	17	26	28	324	417:20	4	
			AIR/**O_2**						3	5	10	17	26	**14**	**85**	179:40		
190	55	3:40	AIR						4	8	10	24	25	30	397	502:20	4.5	
			AIR/**O_2**						4	8	10	24	25	**15**	**99**	204:40		
190	60	3:40	AIR						5	10	16	24	25	40	454	578:20	5	
			AIR/**O_2**						5	10	16	24	25	**20**	**109**	233:40		
190	90	3:20	AIR					11	19	20	21	28	51	83	626	863:00	8.5	
			AIR/**O_2**					11	19	20	21	28	51	**41**	**178**	408:20		
190	120	3:00	AIR				15	17	19	20	37	46	79	113	691	1040:40	10.5	
			AIR/**O_2**				15	17	19	20	37	46	79	**55**	**219**	551:00		
200	5	6:40	AIR												0	6:40	0	E
			AIR/**O_2**												**0**	6:40		
200	10	5:40	AIR											3	8	17:20	0.5	H
			AIR/**O_2**											**2**	**4**	12:20		
200	15	5:00	AIR									2	3	5	19	34:40	0.5	L
			AIR/**O_2**									2	3	**3**	**9**	23:00		
200	20	4:40	AIR								2	4	6	7	43	67:20	1	O
			AIR/**O_2**								2	4	6	**4**	**20**	41:40		
200	25	4:20	AIR							1	5	6	6	7	85	115:00	1.5	Z
			AIR/**O_2**							1	5	6	6	**4**	**32**	64:20		
200	30	4:20	AIR							4	6	5	7	19	145	191:00	2	Z
			AIR/**O_2**							4	6	5	7	**10**	**42**	84:20		
200	35	4:00	AIR						2	5	5	6	13	28	188	251:40	2.5	
			AIR/**O_2**						2	5	5	6	13	**14**	**51**	106:00		
200	40	4:00	AIR						4	5	5	11	21	28	249	327:40	3.5	
			AIR/**O_2**						4	5	5	11	21	**14**	**68**	143:00		
200	45	3:40	AIR					1	4	5	10	14	25	28	306	397:20	3.5	
			AIR/**O_2**					1	4	5	10	14	25	**14**	**81**	168:40		
200	50	3:40	AIR					2	4	8	10	21	26	28	382	485:20	4.5	
			AIR/**O_2**					2	4	8	10	21	26	**14**	**97**	201:40		

Air Decompression Table, VVal-79 Thalmann Algorithm

DEPTH (FSW)	BTM TIM (M)	TM TO FIRST STOP (M:S)	GAS MIX	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O_2 stop												TOTAL ASCNT TIME (M:S)	CHAMBER O_2 PERIODS	RPT GRP DES
				130	120	110	100	90	80	70	60	50	40	30	20			
210	4	7:00	AIR												0	7:00	0	D
			AIR/O_2												**0**	7:00		
210	5	6:20	AIR												2	9:00	0.5	E
			AIR/O_2												**1**	8:00		
210	10	5:40	AIR										2	3	9	20:20	0.5	I
			AIR/O_2										2	**2**	**4**	14:40		
210	15	5:00	AIR								1	3	3	6	24	42:40	1	M
			AIR/O_2								1	3	3	**3**	**12**	28:00		
210	20	4:40	AIR							1	3	5	6	7	57	84:20	1	O
			AIR/O_2							1	3	5	6	**4**	**23**	47:40		
210	25	4:40	AIR							3	6	5	7	8	110	144:20	2	Z
			AIR/O_2							3	6	5	7	**4**	**38**	73:40		
210	30	4:20	AIR						2	5	6	6	6	26	163	219:00	2.5	Z
			AIR/O_2						2	5	6	6	6	**13**	**45**	93:20		
210	35	4:00	AIR					1	4	5	6	7	18	28	223	296:40	3	
			AIR/O_2					1	4	5	6	7	18	**14**	**60**	130:00		
210	40	4:00	AIR					2	5	5	7	11	26	28	278	366:40	3.5	
			AIR/O_2					2	5	5	7	11	26	**14**	**76**	161:00		
210	45	4:00	AIR					4	4	6	11	18	26	28	355	456:40	4	
			AIR/O_2					4	4	6	11	18	26	**14**	**91**	194:00		
210	50	3:40	AIR				1	4	5	10	12	23	26	36	432	553:20	5	
			AIR/O_2				1	4	5	10	12	23	26	**18**	**105**	223:40		
220	4	7:20	AIR												0	7:20	0	E
			AIR/O_2												**0**	7:20		
220	5	6:40	AIR												3	10:20	0.5	E
			AIR/O_2												**2**	9:20		
220	10	6:00	AIR										3	4	10	23:40	0.5	J
			AIR/O_2										3	**2**	**5**	17:00		
220	15	5:20	AIR								3	2	4	7	28	50:00	1	N
			AIR/O_2								3	2	4	**4**	**14**	33:20		
220	20	5:00	AIR							2	4	6	6	7	70	100:40	1.5	Z
			AIR/O_2							2	4	6	6	**4**	**26**	54:00		
220	25	4:40	AIR						1	5	6	6	6	14	133	176:20	2	Z
			AIR/O_2						1	5	6	6	6	**7**	**41**	82:40		
220	30	4:20	AIR					1	4	5	6	6	10	28	183	248:00	2.5	
			AIR/O_2					1	4	5	6	6	10	**14**	**50**	106:20		
220	35	4:20	AIR					3	5	5	5	10	22	28	251	334:00	3.5	
			AIR/O_2					3	5	5	5	10	22	**14**	**68**	147:20		
220	40	4:00	AIR				1	4	5	5	9	15	26	28	319	416:40	4	
			AIR/O_2				1	4	5	5	9	15	26	**14**	**84**	183:00		
250	4	7:40	AIR												4	12:20	0.5	F
			AIR/O_2												**2**	10:20		

Air Decompression Table, VVal-79 Thalmann Algorithm

DEPTH (FSW)	BTM TIM (M)	TM TO FIRST STOP (M:S)	GAS MIX	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O_2 stop 130	120	110	100	90	80	70	60	50	40	30	20	TOTAL ASCNT TIME (M:S)	CHAMBER O_2 PERIODS	RPT GRP DES
250	5	7:40	AIR												7	15:20	0.5	G
			AIR/**O_2**												**4**	12:20		
250	10	6:20	AIR								2	2	4	3	15	33:00	0.5	L
			AIR/**O_2**								2	2	4	**2**	**7**	24:20		
250	15	5:40	AIR						2	2	3	4	6	7	53	83:20	1	O
			AIR/**O_2**						2	2	3	4	6	**4**	**22**	49:40		
250	20	5:20	AIR					2	2	4	6	6	6	11	125	168:00	2	Z
			AIR/**O_2**					2	2	4	6	6	6	**6**	**39**	82:20		
250	25	5:00	AIR				1	4	4	5	6	6	10	28	189	258:40	2.5	
			AIR/**O_2**				1	4	4	5	6	6	10	**14**	**51**	112:00		
250	30	4:40	AIR			1	4	4	4	5	6	9	25	28	267	358:20	3.5	
			AIR/**O_2**			1	4	4	4	5	6	9	25	**15**	**72**	160:40		
250	35	4:40	AIR			3	4	4	5	5	10	19	26	28	363	472:20	4	
			AIR/**O_2**			3	4	4	5	5	10	19	26	**14**	**93**	203:40		
300	4	9:00	AIR											3	7	19:40	0.5	G
			AIR/**O_2**											**2**	**4**	15:40		
300	5	8:40	AIR										3	3	8	23:20	0.5	I
			AIR/**O_2**										3	**2**	**4**	18:40		
300	10	7:20	AIR						2	3	2	3	4	7	35	64:00	1	N
			AIR/**O_2**						2	3	2	3	4	**4**	**18**	44:20		
300	15	6:20	AIR			1	2	2	3	3	5	6	7	11	125	172:00	2	Z
			AIR/**O_2**			1	2	2	3	3	5	6	7	**6**	**39**	86:20		
300	20	6:00	AIR		2	2	2	4	5	5	5	6	16	28	219	300:40	3	
			AIR/**O_2**		2	2	2	4	5	5	5	6	16	**14**	**59**	137:00		
300	25	5:40	AIR	1	3	4	4	4	5	5	5	18	26	28	324	433:20	4	
			AIR/**O_2**	1	3	4	4	4	5	5	5	18	26	**14**	**85**	195:40		

Appendix E

Estimated Risks of DCS for Schedules in the VVal-79 Air Decompression Table[a]

Depth (fsw) /BT(min)	VVal-79 AIR; 20 fsw Last Allowed In-Water Stop					VVal-79 AIR/In-Water O_2, 20 fsw Last Allowed Stop					VVal-79 $SurDO_2$			
	TOTAL STOP TIME (min)	P(DCS)				TOTAL STOP TIME[c] (min)	P(DCS)[b]; IWO2_FO2=99.5%				P(DCS)			
		BVM(3) (%)	low - high	NMRI98 (%)	low - high		BVM(3) (%)	low - high	NMRI98 (%)	low - high	BVM(3) (%)	low - high	NMRI98 (%)	low - high
25/1102	0	7.414	6.152 - 8.824	9.528	8.117 - 11.070	0	7.414	6.152 8.824	9.528	8.117 11.070	7.414	6.152 - 8.824	9.528	8.117 - 11.070
30/ 371	0	4.153	3.525 - 4.855	4.963	4.139 - 5.889	0	4.153	3.525 - 4.855	4.963	4.139 - 5.889	4.153	3.525 - 4.855	4.963	4.139 - 5.889
30/ 380	5	4.233	3.601 - 4.936	5.039	4.195 - 5.990	1	4.095	3.478 - 4.783	4.802	3.976 - 5.738	3.500	2.929 - 4.144	4.690	3.906 - 5.574
30/ 420	22	4.759	4.015 - 5.590	5.714	4.766 - 6.778	5	4.293	3.603 - 5.068	5.170	4.283 - 6.170	4.056	3.406 - 4.787	5.392	4.540 - 6.344
30/ 480	42	5.498	4.604 - 6.499	6.670	5.578 - 7.889	9	4.823	4.031 - 5.713	5.823	4.838 - 6.931	4.828	4.056 - 5.694	6.394	5.435 - 7.454
30/ 540	71	6.116	5.094 - 7.261	7.483	6.261 - 8.843	14	5.222	4.358 - 6.194	6.282	5.215 - 7.478	4.852	4.076 - 5.722	6.283	5.268 - 7.414
30/ 600	92	6.623	5.496 - 7.886	8.191	6.865 - 9.660	19	5.529	4.606 - 6.564	6.646	5.512 - 7.916	5.442	4.563 - 6.425	7.086	5.986 - 8.305
30/ 660	120	7.010	5.802 - 8.364	8.755	7.348 - 10.310	22	5.879	4.888 - 6.990	7.113	5.911 - 8.458	5.967	4.992 - 7.057	7.818	6.636 - 9.120
30/ 720	158	7.263	6.001 - 8.678	9.166	7.704 - 10.778	27	6.031	5.011 - 7.176	7.313	6.071 - 8.701	6.433	5.369 - 7.623	8.480	7.222 - 9.860
35/ 232	0	2.974	2.543 - 3.455	3.628	2.921 - 4.447	0	2.974	2.543 - 3.455	3.628	2.921 - 4.447	2.974	2.543 - 3.455	3.628	2.921 - 4.447
35/ 240	4	3.042	2.555 - 3.593	3.715	3.002 - 4.538	2	2.792	2.365 - 3.272	3.388	2.698 - 4.194	2.263	1.837 - 2.757	3.459	2.710 - 4.343
35/ 270	28	3.581	0.177 - 17.374	4.356	3.573 - 5.249	7	2.949	2.463 - 3.500	3.711	2.986 - 4.551	2.875	2.398 - 3.417	4.178	3.376 - 5.101
35/ 300	53	4.202	3.540 - 4.945	5.038	4.160 - 6.031	13	3.212	2.679 - 3.816	3.916	3.154 - 4.796	3.478	2.911 - 4.118	4.907	4.051 - 5.876
35/ 330	71	4.778	4.012 - 5.638	5.722	4.745 - 6.821	18	3.526	2.948 - 4.179	4.180	3.371 - 5.113	3.474	2.908 - 4.114	4.627	3.705 - 5.693
35/ 360	88	5.296	4.432 - 6.266	6.368	5.294 - 7.573	22	3.853	3.225 - 4.562	4.505	3.645 - 5.494	4.004	3.365 - 4.722	5.290	4.317 - 6.397
35/ 420	134	6.158	5.124 - 7.317	7.498	6.247 - 8.892	29	4.456	3.728 - 5.274	5.166	4.201 - 6.266	4.488	3.774 - 5.289	5.716	4.618 - 6.971
35/ 480	173	6.798	5.633 - 8.104	8.411	7.031 - 9.941	38	4.809	4.019 - 5.696	5.528	4.484 - 6.720	5.337	4.480 - 6.296	6.843	5.640 - 8.195
35/ 540	228	7.207	5.957 - 8.608	9.062	7.601 - 10.675	45	5.144	4.294 - 6.099	5.972	4.856 - 7.241	5.410	4.540 - 6.383	6.869	5.641 - 8.254
35/ 600	277	7.476	6.169 - 8.941	9.533	8.023 - 11.195	53	5.313	4.431 - 6.303	6.227	5.070 - 7.541	6.058	5.069 - 7.162	7.771	6.449 - 9.246
35/ 660	314	7.680	6.329 - 9.193	9.904	8.356 - 11.603	63	5.266	4.393 - 6.246	6.226	5.072 - 7.535	6.031	3.054 - 10.430	7.726	6.398 - 9.210
35/ 720	342	7.845	6.459 - 9.398	10.209	8.629 - 11.939	71	5.260	4.388 - 6.239	6.292	5.137 - 7.599	5.807	4.866 - 6.859	7.464	6.191 - 8.886
40/ 163	0	2.332	1.942 - 2.776	2.955	2.294 - 3.743	0	2.332	1.942 - 2.776	2.955	2.294 - 3.743	2.332	1.942 - 2.776	2.955	2.294 - 3.743

[a] Dives below the dashed line in each dive depth group are exceptional exposure dives.
[b] Including effects of air-breathing breaks inserted as per rule after starting in-water O_2 breathing
[c] Not including air-breathing break time

Estimated Risks of DCS

Depth (fsw) /BT(min)	VVal-79 AIR; 20 fsw Last Allowed In-Water Stop TOTAL STOP TIME (min)	P(DCS) BVM(3) (%)	low - high	NMRI98 (%)	low - high	VVal-79 AIR/In-Water O_2, 20 fsw Last Allowed Stop TOTAL STOP TIME[c] (min)	P(DCS)[b]; IWO2_FO2=99.5% BVM(3) (%)	low - high	NMRI98 (%)	low - high	VVal-79 SurDO_2 P(DCS) BVM(3) (%)	low - high	NMRI98 (%)	low - high
40/ 170	6	2.316	1.935 - 2.749	3.008	2.348 - 3.791	2	2.116	1.752 - 2.532	2.711	2.067 - 3.488	1.493	1.144 - 1.919	2.841	2.084 - 3.778
40/ 180	14	2.493	2.101 - 2.935	3.274	2.594 - 4.071	5	2.017	1.663 - 2.425	2.774	2.121 - 3.561	1.738	1.364 - 2.184	3.116	2.329 - 4.077
40/ 190	21	2.716	2.297 - 3.189	3.554	2.849 - 4.373	7	2.083	1.713 - 2.511	2.915	2.241 - 3.722	1.987	1.589 - 2.455	3.402	2.585 - 4.385
40/ 200	27	2.957	2.504 - 3.466	3.843	3.110 - 4.687	9	2.178	1.785 - 2.632	3.052	2.360 - 3.879	2.239	1.816 - 2.731	3.695	2.851 - 4.698
40/ 210	39	3.214	2.716 - 3.774	4.093	3.338 - 4.959	11	2.304	1.887 - 2.784	3.187	2.475 - 4.033	2.493	2.044 - 3.010	3.994	3.125 - 5.017
40/ 220	52	3.488	2.942 - 4.101	4.347	3.559 - 5.245	12	2.506	2.065 - 3.013	3.405	2.668 - 4.276	2.748	2.271 - 3.293	4.298	3.404 - 5.339
40/ 230	64	3.760	3.167 - 4.427	4.618	3.798 - 5.551	16	2.568	2.119 - 3.082	3.359	2.617 - 4.237	2.488	2.039 - 3.004	3.620	2.675 - 4.777
40/ 240	75	4.031	3.392 - 4.748	4.899	4.042 - 5.870	19	2.669	2.208 - 3.197	3.396	2.643 - 4.288	2.724	2.250 - 3.266	3.898	2.933 - 5.063
40/ 270	101	4.759	3.991 - 5.620	5.740	4.767 - 6.834	26	3.036	2.527 - 3.614	3.656	2.857 - 4.598	3.429	2.871 - 4.060	4.748	3.726 - 5.943
40/ 300	128	5.401	4.514 - 6.395	6.530	5.437 - 7.752	33	3.349	2.797 - 3.974	3.885	3.045 - 4.873	3.664	3.075 - 4.329	4.741	3.650 - 6.034
40/ 330	160	5.946	4.953 - 7.058	7.241	6.038 - 8.583	38	3.734	3.124 - 4.422	4.235	3.366 - 5.246	4.290	3.609 - 5.053	5.530	4.380 - 6.861
40/ 360	184	6.407	5.322 - 7.622	7.876	6.582 - 9.315	44	3.996	3.345 - 4.730	4.502	3.595 - 5.552	4.266	3.589 - 5.025	5.341	4.199 - 6.671
40/ 420	248	7.070	5.849 - 8.438	8.867	7.441 - 10.443	56	4.387	3.671 - 5.192	4.950	3.968 - 6.083	4.802	4.040 - 5.655	5.952	4.763 - 7.317
40/ 480	321	7.434	5.195 - 10.185	9.506	8.013 - 11.146	68	4.622	3.866 - 5.472	5.278	4.239 - 6.471	5.710	4.790 - 6.738	7.180	5.867 - 8.661
40/ 540	372	7.698	5.428 - 10.470	9.983	8.443 - 11.671	80	4.704	3.933 - 5.570	5.467	4.413 - 6.673	5.817	4.878 - 6.866	7.338	6.035 - 8.801
40/ 600	410	7.901	5.606 - 10.690	10.359	8.780 - 12.086	93	4.612	3.858 - 5.460	5.453	4.424 - 6.626	5.916	4.959 - 6.986	7.520	6.212 - 8.983
40/ 660	439	8.064	5.748 - 10.868	10.666	9.053 - 12.428	103	4.604	3.851 - 5.450	5.546	4.528 - 6.703	5.794	4.859 - 6.838	7.435	6.174 - 8.843
40/ 720	461	8.202	5.869 - 11.019	10.929	9.285 - 12.722	112	4.565	3.819 - 5.404	5.600	4.598 - 6.734	5.609	4.709 - 6.615	7.193	5.989 - 8.537
45/ 125	0	2.079	1.672 - 2.556	2.668	2.050 - 3.409	0	2.079	1.672 - 2.556	2.668	2.050 - 3.409	2.079	1.672 - 2.556	2.668	2.050 - 3.409
45/ 130	2	2.127	1.720 - 2.602	2.726	2.099 - 3.479	1	2.019	1.609 - 2.502	2.448	1.842 - 3.190	1.074	0.768 - 1.469	2.592	1.840 - 3.544
45/ 140	14	2.451	2.029 - 2.934	2.971	2.329 - 3.730	5	2.103	1.694 - 2.581	2.500	1.880 - 3.257	1.345	1.007 - 1.763	2.896	2.097 - 3.894
45/ 150	25	2.793	2.351 - 3.291	3.284	2.615 - 4.065	8	2.239	1.836 - 2.703	2.621	1.973 - 3.411	1.626	1.259 - 2.070	3.223	2.377 - 4.263
45/ 160	34	3.120	2.650 - 3.646	3.619	2.915 - 4.434	11	2.365	1.940 - 2.855	2.736	2.059 - 3.561	1.916	1.458 - 2.473	3.567	2.677 - 4.646
45/ 170	41	3.439	2.942 - 3.992	3.970	3.227 - 4.823	14	2.489	2.062 - 2.976	2.846	2.141 - 3.704	1.762	1.380 - 2.219	2.974	2.005 - 4.241
45/ 180	59	3.247	2.736 - 3.822	4.247	3.478 - 5.125	17	2.616	2.176 - 3.117	2.951	2.219 - 3.841	2.039	1.629 - 2.520	3.289	2.285 - 4.571
45/ 190	75	3.587	3.021 - 4.223	4.545	3.739 - 5.460	19	2.790	2.340 - 3.299	3.135	2.372 - 4.057	2.320	1.883 - 2.826	3.615	2.579 - 4.911
45/ 200	89	3.915	3.296 - 4.611	4.866	4.023 - 5.820	23	2.842	2.376 - 3.370	3.144	2.366 - 4.089	2.604	1.246 - 4.808	3.949	2.885 - 5.258
45/ 210	101	4.225	3.554 - 4.977	5.196	4.313 - 6.192	27	2.404	1.976 - 2.896	3.149	2.357 - 4.113	2.890	2.393 - 3.456	4.290	3.199 - 5.612
45/ 220	112	4.515	3.794 - 5.324	5.525	4.599 - 6.566	30	2.542	2.098 - 3.050	3.233	2.424 - 4.217	2.790	2.305 - 3.344	3.785	2.675 - 5.181
45/ 230	121	4.789	4.019 - 5.652	5.850	4.881 - 6.936	33	2.672	2.212 - 3.197	3.314	2.489 - 4.314	3.056	2.541 - 3.641	4.104	2.969 - 5.505

Estimated Risks of DCS

Depth (fsw) /BT(min)	VVal-79 AIR; 20 fsw Last Allowed In-Water Stop TOTAL STOP TIME (min)	P(DCS) BVM(3) (%)	low - high	NMRI98 (%)	low - high	VVal-79 AIR/In-Water O_2, 20 fsw Last Allowed Stop TOTAL STOP TIME[c] (min)	P(DCS)[b]; IWO2_FO2=99.5% BVM(3) (%)	low - high	NMRI98 (%)	low - high	VVal-79 SurDO_2 P(DCS) BVM(3) (%)	low - high	NMRI98 (%)	low - high
45/ 240	130	5.052	4.235 - 5.968	6.167	5.155 - 7.299	37	2.771	2.299 - 3.309	3.277	2.462 - 4.266	3.321	2.774 - 3.940	4.425	3.269 - 5.833
45/ 270	173	5.759	4.807 - 6.826	7.048	5.900 - 8.325	45	3.137	2.617 - 3.727	3.571	2.734 - 4.572	3.534	2.960 - 4.181	4.463	3.320 - 5.847
45/ 300	206	6.333	5.267 - 7.526	7.825	6.564 - 9.223	51	3.550	2.971 - 4.205	4.000	3.132 - 5.022	4.255	3.581 - 5.012	5.368	4.158 - 6.790
45/ 330	243	6.789	5.630 - 8.086	8.482	7.131 - 9.975	61	3.692	3.091 - 4.370	4.095	3.231 - 5.105	4.452	3.747 - 5.241	5.479	4.289 - 6.867
45/ 360	288	7.118	5.891 - 8.493	9.001	7.586 - 10.559	69	3.897	3.264 - 4.610	4.325	3.430 - 5.366	4.451	3.746 - 5.240	5.424	4.286 - 6.745
45/ 420	373	7.531	6.217 - 9.003	9.725	8.237 - 11.356	84	4.174	3.496 - 4.937	4.730	3.781 - 5.828	5.029	4.039 - 6.168	6.186	4.997 - 7.541
45/ 480	431	7.819	6.443 - 9.361	10.250	8.709 - 11.934	101	4.172	3.495 - 4.935	4.835	3.892 - 5.919	5.304	4.460 - 6.246	6.607	5.412 - 7.956
45/ 540	473	8.039	6.615 - 9.633	10.659	9.073 - 12.388	117	4.065	3.406 - 4.808	4.827	3.922 - 5.862	5.452	4.583 - 6.422	6.801	5.615 - 8.134
50/ 92	0	1.722	1.300 - 2.239	2.203	1.677 - 2.842	0	1.722	1.300 - 2.239	2.203	1.677 - 2.842	1.722	1.300 - 2.239	2.203	1.677 - 2.842
50/ 95	2	1.685	1.156 - 2.381	2.175	1.655 - 2.807	1	1.576	1.163 - 2.091	1.911	1.410 - 2.534	0.586	0.364 - 0.905	2.203	1.528 - 3.076
50/ 100	4	1.831	1.405 - 2.346	2.311	1.770 - 2.964	2	1.688	1.273 - 2.198	2.028	1.508 - 2.671	0.709	0.455 - 1.066	2.336	1.634 - 3.237
50/ 110	8	2.178	1.741 - 2.690	2.680	2.085 - 3.389	4	1.914	1.487 - 2.428	2.276	1.711 - 2.968	0.979	0.710 - 1.321	2.645	1.883 - 3.609
50/ 120	21	2.566	2.116 - 3.081	3.025	2.402 - 3.756	7	2.091	1.654 - 2.609	2.461	1.855 - 3.200	1.281	0.604 - 2.433	2.999	2.173 - 4.029
50/ 130	34	2.963	2.491 - 3.497	3.399	2.739 - 4.164	12	2.163	1.734 - 2.666	2.489	1.853 - 3.270	1.604	1.235 - 2.051	3.387	2.497 - 4.479
50/ 140	45	3.346	2.842 - 3.910	3.797	3.091 - 4.609	16	2.277	1.836 - 2.791	2.582	1.905 - 3.420	1.489	1.125 - 1.937	2.836	1.834 - 4.182
50/ 150	56	3.722	3.177 - 4.329	4.195	3.442 - 5.055	19	2.444	1.991 - 2.967	2.747	2.023 - 3.642	1.801	1.428 - 2.243	3.192	2.139 - 4.570
50/ 160	78	4.087	3.474 - 4.771	4.513	3.726 - 5.405	23	2.544	2.079 - 3.079	2.824	2.063 - 3.770	2.123	1.698 - 2.622	3.568	2.467 - 4.974
50/ 170	96	4.431	3.755 - 5.185	4.857	4.028 - 5.793	26	2.704	2.223 - 3.255	2.977	2.176 - 3.969	2.452	1.995 - 2.981	3.960	2.815 - 5.391
50/ 180	111	4.188	3.536 - 4.917	5.226	4.354 - 6.208	30	2.793	2.022 - 3.755	3.039	2.210 - 4.070	2.431	1.995 - 2.932	3.478	2.316 - 4.999
50/ 190	125	4.532	3.822 - 5.325	5.598	4.681 - 6.625	35	2.818	2.242 - 3.493	3.013	2.167 - 4.072	2.742	2.256 - 3.300	3.846	2.650 - 5.372
50/ 200	136	4.849	4.084 - 5.704	5.969	5.006 - 7.044	39	2.906	2.329 - 3.580	3.031	2.189 - 4.082	3.056	2.535 - 3.650	4.222	2.997 - 5.751
50/ 210	147	5.149	4.329 - 6.066	6.330	5.321 - 7.454	43	2.973	2.397 - 3.642	3.078	2.223 - 4.146	2.846	2.348 - 3.415	3.698	2.545 - 5.173
50/ 220	166	5.440	4.374 - 6.664	6.670	5.611 - 7.847	47	2.633	2.185 - 3.144	3.122	2.259 - 4.197	3.139	2.608 - 3.742	4.050	2.871 - 5.526
50/ 230	183	5.703	4.778 - 6.736	7.000	5.892 - 8.230	50	2.779	2.313 - 3.310	3.242	2.365 - 4.327	3.432	2.866 - 4.072	4.407	3.201 - 5.889
50/ 240	198	5.948	3.772 - 8.804	7.317	6.163 - 8.596	53	2.920	1.870 - 4.337	3.357	2.471 - 4.448	3.724	3.121 - 4.404	4.767	3.536 - 6.257
50/ 270	236	6.577	5.480 - 7.804	8.179	6.904 - 9.586	62	3.292	2.758 - 3.895	3.688	2.825 - 4.720	4.113	3.456 - 4.851	5.064	3.871 - 6.480
50/ 300	285	7.042	5.849 - 8.376	8.870	7.504 - 10.372	74	3.451	2.894 - 4.079	3.787	2.971 - 4.748	4.282	3.600 - 5.046	5.196	4.052 - 6.534
50/ 330	345	7.338	6.083 - 8.741	9.371	7.951 - 10.928	83	3.679	3.088 - 4.344	4.073	3.224 - 5.064	4.494	3.180 - 6.134	5.441	4.315 - 6.744
50/ 360	393	7.564	6.261 - 9.021	9.771	8.312 - 11.367	92	3.846	3.230 - 4.540	4.312	3.435 - 5.331	5.145	3.633 - 7.027	6.301	5.083 - 7.690
50/ 420	464	7.901	6.526 - 9.439	10.386	8.864 - 12.043	113	3.857	3.239 - 4.553	4.443	3.575 - 5.444	5.031	4.232 - 5.923	6.122	5.004 - 7.390

Estimated Risks of DCS

Depth (fsw) /BT(min)	VVal-79 AIR; 20 fsw Last Allowed In-Water Stop					VVal-79 AIR/In-Water O_2, 20 fsw Last Allowed Stop					VVal-79 SurDO_2			
	TOTAL STOP TIME (min)	P(DCS) BVM(3) (%)	P(DCS) BVM(3) low - high	P(DCS) NMRI98 (%)	P(DCS) NMRI98 low - high	TOTAL STOP TIME[c] (min)	P(DCS)[b]; IWO2_FO2=99.5% BVM(3) (%)	BVM(3) low - high	NMRI98 (%)	NMRI98 low - high	P(DCS) BVM(3) (%)	BVM(3) low - high	NMRI98 (%)	NMRI98 low - high
55/ 74	0	1.666	0.042 - 11.540	2.069	1.564 - 2.686	0	1.666	0.042 - 11.540	2.069	1.564 - 2.686	1.666	0.042 - 11.540	2.069	1.564 - 2.686
55/ 75	1	1.636	1.185 - 2.206	2.020	1.527 - 2.622	1	1.427	0.993 - 1.995	1.704	1.238 - 2.291	0.404	0.210 - 0.725	2.108	1.471 - 2.929
55/ 80	4	1.687	1.241 - 2.244	2.083	1.589 - 2.683	2	1.554	1.122 - 2.101	1.826	1.348 - 2.421	0.509	0.288 - 0.853	2.220	1.554 - 3.077
55/ 90	10	2.069	1.605 - 2.625	2.458	1.919 - 3.099	5	1.768	1.318 - 2.324	2.044	1.536 - 2.666	0.775	0.501 - 1.155	2.521	1.795 - 3.441
55/ 100	17	2.492	2.011 - 3.053	2.906	2.310 - 3.604	8	1.991	1.528 - 2.551	2.279	1.724 - 2.956	1.092	0.785 - 1.484	2.899	2.098 - 3.901
55/ 110	34	2.949	2.449 - 3.518	3.317	2.689 - 4.043	12	2.156	1.703 - 2.693	2.450	1.844 - 3.190	1.439	1.079 - 1.884	3.334	2.451 - 4.420
55/ 120	48	3.392	2.872 - 3.975	3.774	3.094 - 4.552	17	2.261	1.794 - 2.811	2.535	1.876 - 3.348	1.342	0.982 - 1.795	2.820	1.791 - 4.219
55/ 130	59	3.823	3.274 - 4.434	4.255	3.513 - 5.097	22	2.362	1.886 - 2.922	2.606	1.893 - 3.498	1.688	1.293 - 2.168	3.223	2.125 - 4.674
55/ 140	84	4.250	3.618 - 4.954	4.626	3.846 - 5.507	26	2.507	2.017 - 3.077	2.744	1.972 - 3.714	2.051	1.622 - 2.559	3.657	2.499 - 5.145
55/ 150	105	4.640	3.929 - 5.432	5.010	4.180 - 5.945	30	2.647	2.143 - 3.232	2.874	2.049 - 3.914	2.100	1.667 - 2.612	3.206	2.022 - 4.813
55/ 160	123	4.988	4.213 - 5.854	5.414	4.535 - 6.399	34	2.774	2.023 - 3.709	2.994	2.123 - 4.095	2.453	1.986 - 2.994	3.619	2.389 - 5.234
55/ 170	138	5.321	4.464 - 6.281	5.829	4.902 - 6.863	40	2.802	2.155 - 3.579	2.904	2.031 - 4.017	2.811	2.308 - 3.388	4.046	2.774 - 5.672
55/ 180	151	5.624	4.693 - 6.669	6.240	5.265 - 7.325	45	2.855	2.241 - 3.582	2.928	2.034 - 4.074	2.665	2.177 - 3.227	3.561	2.366 - 5.126
55/ 190	169	5.384	4.544 - 6.321	6.628	5.604 - 7.762	50	2.900	2.287 - 3.623	2.946	2.039 - 4.111	3.003	1.762 - 4.770	3.965	2.745 - 5.517
55/ 200	190	5.700	4.801 - 6.702	6.999	5.924 - 8.188	54	3.003	2.380 - 3.734	3.038	2.117 - 4.215	3.340	2.423 - 4.479	4.378	3.134 - 5.923
55/ 210	208	5.983	5.030 - 7.045	7.359	6.234 - 8.600	58	3.091	2.450 - 3.844	3.125	2.196 - 4.304	3.268	2.715 - 3.897	4.054	2.918 - 5.463
55/ 220	224	6.241	5.237 - 7.361	7.702	6.530 - 8.994	62	3.172	2.506 - 3.955	3.208	2.278 - 4.379	3.586	2.994 - 4.255	4.444	3.279 - 5.862
55/ 230	239	6.479	5.427 - 7.652	8.027	6.811 - 9.366	66	2.919	2.445 - 3.456	3.270	2.416 - 4.320	3.903	3.269 - 4.616	4.839	3.646 - 6.269
55/ 240	254	6.697	5.601 - 7.919	8.332	7.075 - 9.714	69	3.073	2.579 - 3.632	3.428	2.580 - 4.456	3.641	3.042 - 4.317	4.397	3.313 - 5.700
55/ 270	313	7.200	5.010 - 9.903	9.089	7.735 - 10.571	83	3.227	2.712 - 3.808	3.532	2.745 - 4.466	4.048	3.395 - 4.783	4.848	3.778 - 6.104
55/ 300	380	7.507	5.282 - 10.231	9.623	8.214 - 11.161	94	3.456	2.908 - 4.072	3.814	3.012 - 4.754	4.848	4.076 - 5.713	5.885	4.709 - 7.237
55/ 330	432	7.743	5.490 - 10.484	10.046	8.596 - 11.624	106	3.572	3.008 - 4.207	3.995	3.182 - 4.940	4.963	3.486 - 6.807	6.042	4.891 - 7.355
55/ 360	474	7.930	5.655 - 10.687	10.391	8.906 - 12.005	118	3.602	3.033 - 4.241	4.095	3.286 - 5.032	5.033	4.231 - 5.930	6.071	4.951 - 7.342
60/ 63	0	1.723	1.245 - 2.329	2.062	1.548 - 2.693	0	1.723	1.245 - 2.329	2.062	1.548 - 2.693	1.723	1.245 - 2.329	2.062	1.548 - 2.693
60/ 65	2	1.669	1.194 - 2.274	1.979	1.487 - 2.583	1	1.495	1.038 - 2.091	1.724	1.248 - 2.325	0.398	0.195 - 0.749	2.153	1.545 - 2.923
60/ 70	7	1.777	1.296 - 2.380	2.070	1.585 - 2.657	4	1.564	1.097 - 2.167	1.765	1.302 - 2.342	0.506	0.275 - 0.874	2.283	1.617 - 3.132
60/ 80	14	2.224	1.722 - 2.827	2.512	1.982 - 3.138	7	1.819	1.334 - 2.425	2.020	1.529 - 2.620	0.787	0.522 - 1.151	2.618	1.887 - 3.534
60/ 90	23	2.712	2.210 - 3.291	3.030	2.442 - 3.713	10	2.086	1.596 - 2.678	2.312	1.766 - 2.973	1.139	0.801 - 1.579	3.056	2.238 - 4.067
60/ 100	42	3.226	2.701 - 3.821	3.517	2.889 - 4.235	15	2.239	1.747 - 2.826	2.474	1.870 - 3.209	1.060	0.721 - 1.513	2.624	1.622 - 4.013
60/ 110	57	3.734	3.175 - 4.359	4.057	3.367 - 4.840	21	2.341	1.833 - 2.946	2.547	1.878 - 3.376	1.423	1.042 - 1.904	3.052	1.969 - 4.506

Estimated Risks of DCS

Depth (fsw) /BT(min)	VVal-79 AIR; 20 fsw Last Allowed In-Water Stop					VVal-79 AIR/In-Water O_2, 20 fsw Last Allowed Stop					VVal-79 SurDO_2			
	TOTAL STOP TIME (min)	P(DCS) BVM(3) (%)	low - high	NMRI98 (%)	low - high	TOTAL STOP TIME[c] (min)	P(DCS)[b]; IWO2_FO2=99.5% BVM(3) (%)	low - high	NMRI98 (%)	low - high	P(DCS) BVM(3) (%)	low - high	NMRI98 (%)	low - high
60/ 120	75	4.218	3.617 - 4.884	4.571	3.819 - 5.418	26	2.476	1.962 - 3.082	2.679	1.935 - 3.611	1.815	1.396 - 2.323	3.529	2.364 - 5.047
60/ 130	102	4.685	3.978 - 5.472	4.999	4.194 - 5.901	31	2.608	2.089 - 3.214	2.797	1.981 - 3.831	1.921	1.492 - 2.436	3.102	1.900 - 4.767
60/ 140	124	5.097	4.327 - 5.954	5.437	4.571 - 6.403	35	2.781	1.837 - 4.034	2.982	2.097 - 4.108	2.313	1.848 - 2.858	3.565	2.339 - 5.183
60/ 150	143	5.475	4.621 - 6.426	5.883	4.965 - 6.905	41	2.851	2.091 - 3.793	2.951	2.042 - 4.119	2.244	1.786 - 2.784	3.150	1.996 - 4.714
60/ 160	158	5.826	4.894 - 6.867	6.340	5.369 - 7.415	48	2.837	2.158 - 3.657	2.871	1.934 - 4.097	2.621	2.127 - 3.194	3.596	2.407 - 5.144
60/ 170	178	6.127	5.099 - 7.280	6.763	5.746 - 7.886	53	2.920	2.269 - 3.697	2.943	1.976 - 4.209	3.005	2.472 - 3.616	4.059	2.838 - 5.599
60/ 180	201	5.841	4.943 - 6.839	7.167	6.101 - 8.342	59	2.945	2.286 - 3.731	2.928	1.953 - 4.211	2.999	2.466 - 3.609	3.781	2.660 - 5.195
60/ 190	222	6.153	5.196 - 7.216	7.560	6.442 - 8.789	64	3.012	2.341 - 3.809	2.987	2.005 - 4.273	3.361	2.788 - 4.013	4.223	3.066 - 5.648
60/ 200	240	6.435	5.422 - 7.562	7.936	6.769 - 9.217	68	3.141	2.423 - 3.998	3.090	2.127 - 4.329	3.725	1.858 - 6.615	4.673	3.480 - 6.115
60/ 210	256	6.694	5.629 - 7.879	8.292	7.079 - 9.622	73	3.186	2.468 - 4.042	3.143	2.224 - 4.305	3.521	2.929 - 4.192	4.280	3.193 - 5.596
60/ 220	278	6.918	5.348 - 8.749	8.610	7.355 - 9.984	77	2.920	2.231 - 3.749	3.270	2.374 - 4.381	3.861	3.227 - 4.578	4.705	3.581 - 6.043
60/ 230	300	7.119	5.968 - 8.400	8.902	7.610 - 10.315	82	3.002	2.527 - 3.538	3.324	2.474 - 4.361	3.753	3.133 - 4.455	4.484	3.443 - 5.719
60/ 240	321	7.294	6.106 - 8.615	9.170	7.845 - 10.616	88	3.022	2.544 - 3.560	3.311	2.512 - 4.274	4.069	3.406 - 4.815	4.883	3.804 - 6.150
60/ 270	398	7.642	6.381 - 9.045	9.771	8.385 - 11.279	102	3.236	2.731 - 3.805	3.548	2.788 - 4.444	4.382	3.676 - 5.176	5.265	4.198 - 6.497
60/ 300	456	7.900	6.584 - 9.363	10.238	8.807 - 11.792	115	3.388	2.862 - 3.980	3.779	3.008 - 4.679	4.633	3.890 - 5.467	5.506	4.457 - 6.705
70/ 48	0	1.870	0.031 - 14.103	2.050	1.556 - 2.652	0	1.870	0.031 - 14.103	2.050	1.556 - 2.652	1.870	0.031 - 14.103	2.050	1.556 - 2.652
70/ 50	2	1.834	0.032 - 13.720	1.980	1.485 - 2.589	1	1.591	0.780 - 2.921	1.713	1.252 - 2.293	0.420	0.186 - 0.852	2.179	1.621 - 2.867
70/ 55	9	1.923	0.542 - 5.019	2.059	1.563 - 2.664	5	1.678	0.855 - 2.994	1.770	1.308 - 2.346	0.516	0.259 - 0.949	2.363	1.736 - 3.142
70/ 60	14	2.213	0.751 - 5.137	2.301	1.791 - 2.910	8	1.804	0.963 - 3.103	1.859	1.388 - 2.440	0.655	0.367 - 1.101	2.549	1.856 - 3.412
70/ 70	24	2.817	1.232 - 5.515	2.931	2.363 - 3.591	13	2.068	1.201 - 3.332	2.113	1.618 - 2.712	1.029	0.679 - 1.506	3.037	2.255 - 3.995
70/ 80	44	3.480	1.802 - 6.033	3.580	2.967 - 4.278	17	2.384	1.489 - 3.620	2.464	1.898 - 3.144	0.948	0.597 - 1.442	2.696	1.689 - 4.079
70/ 90	64	4.121	0.891 - 11.597	4.276	3.597 - 5.037	24	2.527	0.249 - 10.466	2.610	1.959 - 3.406	1.369	0.965 - 1.890	3.230	2.154 - 4.640
70/ 100	88	4.744	2.950 - 7.156	4.932	4.184 - 5.764	31	2.659	1.739 - 3.889	2.730	1.976 - 3.673	1.572	1.149 - 2.105	2.886	1.775 - 4.424
70/ 110	120	5.315	3.465 - 7.722	5.489	4.673 - 6.393	38	2.785	1.255 - 5.347	2.776	1.946 - 3.834	2.032	1.566 - 2.593	3.456	2.303 - 4.965
70/ 120	145	5.814	3.913 - 8.232	6.050	5.153 - 7.042	44	2.930	1.716 - 4.663	2.928	1.999 - 4.131	2.066	1.598 - 2.629	3.118	1.958 - 4.699
70/ 130	167	6.256	4.301 - 8.704	6.584	5.609 - 7.659	51	3.000	1.896 - 4.503	2.977	1.969 - 4.310	2.524	2.016 - 3.121	3.676	2.448 - 5.281
70/ 140	189	6.653	4.655 - 9.121	7.086	6.060 - 8.215	59	3.003	1.941 - 4.428	2.927	1.868 - 4.360	2.636	2.117 - 3.241	3.475	2.341 - 4.948
70/ 150	219	6.967	4.911 - 9.490	7.531	6.468 - 8.696	66	3.063	1.998 - 4.483	2.905	1.842 - 4.350	3.083	2.520 - 3.729	4.021	2.842 - 5.501
70/ 160	245	7.219	5.965 - 8.625	7.958	6.846 - 9.172	73	3.056	2.278 - 4.006	2.871	1.793 - 4.352	3.009	2.455 - 3.649	3.749	2.677 - 5.087
70/ 170	267	7.455	6.127 - 8.947	8.377	7.213 - 9.646	79	3.127	2.327 - 4.105	2.947	1.856 - 4.434	3.436	2.836 - 4.121	4.275	3.162 - 5.630

Estimated Risks of DCS

Depth (fsw) /BT(min)	VVal-79 AIR; 20 fsw Last Allowed In-Water Stop					VVal-79 AIR/In-Water O_2, 20 fsw Last Allowed Stop					VVal-79 SurDO_2			
	TOTAL STOP TIME	P(DCS)				TOTAL STOP TIME[c]	P(DCS)[b]; IWO2_FO2=99.5%				P(DCS)			
		BVM(3)		NMRI98			BVM(3)		NMRI98		BVM(3)		NMRI98	
	(min)	(%)	low - high	(%)	low - high	(min)	(%)	low - high	(%)	low - high	(%)	low - high	(%)	low - high
70/ 180	293	7.146	6.049 - 8.360	8.768	7.553 - 10.090	85	3.175	2.349 - 4.189	3.014	1.929 - 4.478	3.445	2.843 - 4.130	4.158	3.142 - 5.378
70/ 190	321	7.395	6.248 - 8.664	9.123	7.865 - 10.492	91	3.221	2.393 - 4.234	3.075	2.021 - 4.473	3.848	3.198 - 4.583	4.662	3.600 - 5.917
70/ 200	354	7.598	6.407 - 8.916	9.437	8.139 - 10.848	98	3.200	2.348 - 4.251	3.067	2.185 - 4.178	3.678	3.050 - 4.392	4.397	3.425 - 5.542
70/ 210	391	7.749	6.523 - 9.106	9.696	8.368 - 11.138	105	2.825	2.385 - 3.321	3.077	2.257 - 4.088	4.056	3.380 - 4.820	4.877	3.855 - 6.064
70/ 240	479	8.091	6.789 - 9.533	10.322	8.926 - 11.832	123	2.977	2.517 - 3.494	3.274	2.516 - 4.181	3.960	3.297 - 4.710	4.618	3.730 - 5.638
80/ 39	0	2.049	1.492 - 2.748	2.057	1.556 - 2.670	0	2.049	1.492 - 2.748	2.057	1.556 - 2.670	2.049	1.492 - 2.748	2.057	1.556 - 2.670
80/ 40	1	2.043	0.327 - 7.095	2.022	1.522 - 2.634	1	1.745	0.194 - 7.250	1.666	1.213 - 2.238	0.486	0.209 - 1.009	2.171	1.651 - 2.803
80/ 45	10	2.070	1.514 - 2.766	2.062	1.541 - 2.704	5	1.830	1.287 - 2.528	1.796	1.331 - 2.374	0.559	0.265 - 1.074	2.410	1.811 - 3.144
80/ 50	17	2.423	1.842 - 3.128	2.331	1.798 - 2.971	9	1.970	1.408 - 2.684	1.909	1.426 - 2.504	0.709	0.382 - 1.229	2.652	1.967 - 3.496
80/ 55	24	2.814	2.208 - 3.532	2.687	2.125 - 3.348	13	2.114	1.531 - 2.847	2.008	1.519 - 2.607	0.911	0.548 - 1.443	2.921	2.187 - 3.818
80/ 60	30	3.203	2.573 - 3.936	3.111	2.510 - 3.807	16	2.281	1.694 - 3.006	2.168	1.663 - 2.778	0.634	0.313 - 1.179	2.448	1.519 - 3.738
80/ 70	54	4.035	3.372 - 4.783	3.944	3.293 - 4.679	22	2.615	1.997 - 3.361	2.521	1.945 - 3.212	1.044	0.651 - 1.604	2.984	1.997 - 4.280
80/ 80	77	4.826	4.124 - 5.604	4.832	4.111 - 5.634	30	2.819	2.176 - 3.588	2.737	2.052 - 3.573	1.319	0.891 - 1.889	2.736	1.700 - 4.165
80/ 90	114	5.576	4.809 - 6.418	5.566	4.782 - 6.430	39	2.954	0.978 - 6.851	2.787	2.000 - 3.777	1.833	1.356 - 2.427	3.409	2.291 - 4.865
80/ 100	148	6.203	5.320 - 7.173	6.231	5.362 - 7.184	47	3.060	1.777 - 4.898	2.891	1.968 - 4.091	1.960	1.471 - 2.560	3.159	2.015 - 4.704
70/ 110	177	6.733	5.768 - 7.793	6.855	5.893 - 7.910	54	3.208	2.119 - 4.645	3.083	2.029 - 4.480	2.496	1.962 - 3.129	3.854	2.649 - 5.393
80/ 120	210	7.217	1.163 - 21.190	7.406	6.372 - 8.538	64	3.179	0.056 - 20.390	3.002	1.856 - 4.581	2.696	2.145 - 3.343	3.701	2.556 - 5.163
80/ 130	246	7.590	6.359 - 8.958	7.924	6.846 - 9.099	74	3.134	2.247 - 4.246	2.856	1.691 - 4.509	2.730	2.176 - 3.380	3.536	2.526 - 4.798
80/ 140	275	7.916	6.601 - 9.380	8.457	7.320 - 9.693	82	3.165	2.280 - 4.269	2.892	1.682 - 4.629	2.865	2.298 - 3.525	3.542	2.615 - 4.679
80/ 150	304	8.170	6.748 - 9.758	8.944	7.752 - 10.238	90	3.178	2.292 - 4.284	2.914	1.686 - 4.682	3.346	2.732 - 4.051	4.147	3.159 - 5.329
80/ 160	339	8.334	6.812 - 10.043	9.365	8.123 - 10.709	97	3.255	2.323 - 4.425	2.971	1.775 - 4.656	3.291	2.683 - 3.991	4.003	3.080 - 5.102
80/ 170	381	7.974	3.235 - 15.506	9.726	8.441 - 11.117	104	3.287	0.154 - 16.503	3.048	1.878 - 4.663	3.751	3.092 - 4.501	4.586	3.602 - 5.738
80/ 180	424	8.144	6.908 - 9.504	10.028	8.708 - 11.453	113	3.185	2.221 - 4.414	2.991	1.962 - 4.357	3.683	3.033 - 4.425	4.337	3.459 - 5.356
80/ 210	524	8.519	6.277 - 11.178	10.736	9.339 - 12.242	136	2.828	2.389 - 3.321	3.126	2.306 - 4.135	4.334	3.603 - 5.160	5.147	4.207 - 6.217
90/ 33	0	2.239	1.642 - 2.981	2.082	1.563 - 2.718	0	2.239	1.642 - 2.981	2.082	1.563 - 2.718	2.239	1.642 - 2.981	2.082	1.563 - 2.718
90/ 35	4	2.122	1.477 - 2.954	1.968	1.460 - 2.599	2	1.849	1.289 - 2.575	1.720	1.251 - 2.312	0.576	0.251 - 1.181	2.268	1.740 - 2.907
90/ 40	14	2.367	1.771 - 3.099	2.180	1.630 - 2.857	7	2.030	1.440 - 2.783	1.873	1.391 - 2.469	0.675	0.327 - 1.272	2.565	1.946 - 3.317
90/ 45	23	2.827	2.189 - 3.589	2.535	1.958 - 3.227	12	2.206	1.590 - 2.983	2.004	1.504 - 2.618	0.870	0.483 - 1.469	2.869	2.155 - 3.738
90/ 50	31	3.321	2.644 - 4.111	3.007	2.385 - 3.737	17	2.378	1.745 - 3.164	2.117	1.602 - 2.746	0.584	0.250 - 1.210	2.471	1.558 - 3.726
90/ 55	39	3.815	3.105 - 4.631	3.543	2.874 - 4.313	21	2.570	1.904 - 3.393	2.286	1.751 - 2.934	0.778	0.400 - 1.397	2.733	1.760 - 4.046

Estimated Risks of DCS

Depth (fsw) /BT(min)	VVal-79 AIR; 20 fsw Last Allowed In-Water Stop TOTAL STOP TIME (min)	P(DCS) BVM(3) (%)	low - high	NMRI98 (%)	low - high	VVal-79 AIR/In-Water O_2, 20 fsw Last Allowed Stop TOTAL STOP TIME[c] (min)	P(DCS)[b]; IWO2_FO2=99.5% BVM(3) (%)	low - high	NMRI98 (%)	low - high	VVal-79 SurDO$_2$ P(DCS) BVM(3) (%)	low - high	NMRI98 (%)	low - high
90/ 60	56	4.334	1.780 - 8.668	4.031	3.343 - 4.812	24	2.800	0.730 - 7.436	2.529	1.953 - 3.221	1.017	0.598 - 1.637	3.080	2.193 - 4.198
90/ 70	83	5.295	4.511 - 6.163	5.115	4.358 - 5.954	32	3.127	2.403 - 3.993	2.904	2.210 - 3.743	1.360	0.897 - 1.986	2.920	1.898 - 4.287
90/ 80	130	6.151	3.314 - 10.205	5.905	5.099 - 6.788	43	3.226	0.756 - 8.943	2.912	2.088 - 3.947	3.185	1.543 - 5.798	2.808	1.743 - 4.275
90/ 90	171	6.924	5.976 - 7.961	6.729	5.832 - 7.709	53	3.327	1.889 - 5.405	3.054	2.056 - 4.357	3.871	2.067 - 6.551	3.607	2.481 - 5.048
90/ 100	204	7.577	6.512 - 8.743	7.508	6.501 - 8.606	63	3.408	2.193 - 5.034	3.142	1.988 - 4.707	2.532	1.977 - 3.193	3.572	2.601 - 4.772
90/ 110	249	8.065	6.875 - 9.372	8.070	7.003 - 9.229	74	3.408	2.324 - 4.806	3.055	1.820 - 4.795	2.669	2.104 - 3.337	3.521	2.529 - 4.757
90/ 120	286	8.429	7.104 - 9.892	8.636	7.508 - 9.857	86	3.420	2.423 - 4.674	3.042	1.739 - 4.928	2.783	2.307 - 3.326	3.466	2.539 - 4.607
90/ 130	324	8.730	7.284 - 10.333	9.188	7.998 - 10.475	98	3.488	2.530 - 4.676	3.092	1.755 - 5.034	3.313	2.797 - 3.893	4.179	3.181 - 5.372
90/ 140	366	8.917	7.360 - 10.651	9.672	8.424 - 11.019	109	3.601	2.614 - 4.824	3.173	1.863 - 5.033	3.370	2.850 - 3.954	4.142	3.209 - 5.244
90/ 150	423	8.414	7.194 - 9.748	10.051	8.757 - 11.447	122	3.532	2.534 - 4.777	3.131	1.873 - 4.898	3.433	2.906 - 4.023	4.028	3.203 - 4.988
90/ 160	471	8.593	7.328 - 9.978	10.381	9.051 - 11.815	134	3.439	2.403 - 4.755	3.098	2.004 - 4.563	3.960	3.366 - 4.623	4.704	3.802 - 5.739
90/ 170	511	8.744	7.349 - 10.284	10.670	9.308 - 12.136	144	3.460	2.406 - 4.803	3.217	2.277 - 4.404	3.869	3.288 - 4.517	4.547	3.704 - 5.511
90/ 180	546	8.864	6.628 - 11.491	10.920	9.529 - 12.416	154	3.377	2.300 - 4.769	3.261	2.370 - 4.366	3.812	3.240 - 4.452	4.484	3.666 - 5.417
90/ 240	702	9.939	7.636 - 12.591	11.964	10.404 - 13.639	235	2.826	2.378 - 3.332	3.280	2.543 - 4.156	3.968	2.742 - 5.529	4.941	4.163 - 5.810
100/ 25	0	2.119	1.539 - 2.848	1.795	1.328 - 2.377	0	2.119	1.539 - 2.848	1.795	1.328 - 2.377	2.119	1.539 - 2.848	1.795	1.328 - 2.377
100/ 30	3	2.322	1.674 - 3.136	1.996	1.470 - 2.650	2	1.938	1.353 - 2.695	1.708	1.232 - 2.310	0.635	0.270 - 1.320	2.277	1.758 - 2.901
100/ 35	15	2.540	0.023 - 19.930	2.226	1.647 - 2.942	8	2.159	0.007 - 21.297	1.887	1.396 - 2.497	0.751	0.360 - 1.425	2.631	2.015 - 3.374
100/ 40	26	3.102	2.418 - 3.913	2.638	2.020 - 3.383	14	2.376	1.722 - 3.197	2.043	1.531 - 2.672	0.498	0.168 - 1.229	2.361	1.535 - 3.475
100/ 45	36	3.702	2.959 - 4.565	3.201	2.525 - 3.996	19	2.621	1.924 - 3.484	2.222	1.675 - 2.891	0.649	0.275 - 1.352	2.618	1.690 - 3.870
100/ 50	47	4.301	3.506 - 5.210	3.833	3.104 - 4.673	24	2.841	2.104 - 3.747	2.407	1.836 - 3.098	0.877	0.454 - 1.565	2.957	2.090 - 4.054
100/ 55	65	4.907	4.073 - 5.849	4.441	3.682 - 5.299	28	3.086	2.309 - 4.035	2.664	2.047 - 3.406	2.922	1.928 - 4.238	2.500	1.548 - 3.821
100/ 60	81	5.499	4.619 - 6.481	5.083	4.291 - 5.967	33	3.284	2.466 - 4.277	2.863	2.184 - 3.681	3.346	2.334 - 4.635	2.894	1.912 - 4.194
100/ 70	135	6.553	5.611 - 7.588	6.058	5.230 - 6.965	45	3.431	1.269 - 7.398	2.966	2.141 - 3.998	3.524	1.516 - 6.912	2.896	1.889 - 4.241
100/ 80	181	7.486	6.466 - 8.600	7.056	6.141 - 8.052	56	3.602	1.892 - 6.177	3.200	2.170 - 4.537	3.734	1.943 - 6.441	3.000	2.139 - 4.083
100/ 90	226	8.202	7.056 - 9.453	7.857	6.835 - 8.966	69	3.771	2.272 - 5.850	3.278	2.107 - 4.847	4.434	2.553 - 7.086	3.815	2.855 - 4.977
100/ 100	278	8.753	7.472 - 10.155	8.505	7.418 - 9.681	89	3.793	2.581 - 5.353	3.177	1.915 - 4.940	4.332	2.754 - 6.435	3.834	2.846 - 5.038
100/ 110	320	9.186	7.777 - 10.734	9.193	8.031 - 10.447	104	3.923	2.816 - 5.300	3.301	1.954 - 5.199	3.240	2.748 - 3.792	4.047	3.090 - 5.191
100/ 120	371	9.437	7.890 - 11.145	9.764	8.535 - 11.089	118	4.081	2.986 - 5.426	3.431	2.074 - 5.316	3.424	2.913 - 3.994	4.152	3.236 - 5.233
100/ 150	536	9.162	7.835 - 10.611	10.907	9.542 - 12.373	161	3.839	2.701 - 5.273	3.379	2.366 - 4.665	4.160	3.562 - 4.823	4.842	3.981 - 5.821
110/ 20	0	2.050	1.471 - 2.783	1.629	1.187 - 2.187	0	2.050	1.471 - 2.783	1.629	1.187 - 2.187	2.050	1.471 - 2.783	1.629	1.187 - 2.187

Estimated Risks of DCS

Depth (fsw) /BT(min)	VVal-79 AIR; 20 fsw Last Allowed In-Water Stop: TOTAL STOP TIME (min)	P(DCS) BVM(3) (%)	BVM(3) low - high	P(DCS) NMRI98 (%)	NMRI98 low - high	VVal-79 AIR/In-Water O_2, 20 fsw Last Allowed Stop: TOTAL STOP TIME[c] (min)	P(DCS)[b]; IWO2_FO2=99.5% BVM(3) (%)	BVM(3) low - high	NMRI98 (%)	NMRI98 low - high	VVal-79 SurDO_2: P(DCS) BVM(3) (%)	BVM(3) low - high	NMRI98 (%)	NMRI98 low - high
110/ 25	5	2.219	1.541 - 3.096	1.815	1.336 - 2.412	3	1.880	1.317 - 2.605	1.544	1.103 - 2.108	0.666	0.270 - 1.431	2.192	1.711 - 2.767
110/ 30	14	2.575	1.922 - 3.376	2.186	1.628 - 2.874	7	2.238	1.599 - 3.048	1.877	1.361 - 2.527	0.785	0.360 - 1.537	2.600	2.036 - 3.270
110/ 35	27	3.227	2.503 - 4.087	2.616	2.002 - 3.356	14	2.504	1.817 - 3.362	2.065	1.498 - 2.778	0.524	0.166 - 1.345	2.390	1.594 - 3.445
110/ 40	39	3.925	3.128 - 4.852	3.249	2.562 - 4.057	20	2.782	2.031 - 3.715	2.274	1.641 - 3.070	0.673	0.271 - 1.454	2.694	1.785 - 3.898
110/ 45	50	4.627	3.751 - 5.630	4.000	3.249 - 4.862	26	3.038	2.226 - 4.042	2.473	1.777 - 3.349	3.308	2.359 - 4.499	3.099	2.330 - 4.034
110/ 50	71	5.348	4.408 - 6.412	4.705	3.922 - 5.586	32	3.274	2.403 - 4.349	2.680	1.908 - 3.656	3.293	2.263 - 4.618	2.667	1.734 - 3.919
110/ 55	90	5.950	4.953 - 7.068	5.372	4.565 - 6.268	36	3.533	2.607 - 4.669	2.896	2.064 - 3.945	3.805	2.733 - 5.140	3.156	2.241 - 4.309
110/ 60	124	6.663	5.635 - 7.802	5.963	5.138 - 6.869	43	3.644	0.737 - 10.712	3.033	2.093 - 4.241	3.636	1.332 - 7.857	2.776	1.810 - 4.067
110/ 70	181	7.830	6.728 - 9.035	7.127	6.232 - 8.098	56	3.858	1.801 - 7.151	3.312	2.143 - 4.872	3.994	1.927 - 7.237	3.008	2.122 - 4.132
110/ 80	237	8.688	7.478 - 10.006	8.046	7.043 - 9.131	77	4.172	2.428 - 6.623	3.416	2.130 - 5.169	4.727	2.600 - 7.791	3.943	2.927 - 5.181
110/ 90	295	9.348	8.029 - 10.785	8.812	7.712 - 9.998	100	4.264	2.844 - 6.104	3.392	1.998 - 5.360	4.266	2.509 - 6.720	3.435	2.520 - 4.561
110/ 100	348	9.809	8.365 - 11.385	9.551	8.358 - 10.838	118	4.437	3.174 - 6.004	3.573	2.085 - 5.682	5.124	3.305 - 7.507	4.498	3.461 - 5.728
110/ 110	412	10.008	8.423 - 11.748	10.119	8.842 - 11.493	136	4.481	3.286 - 5.940	3.566	2.091 - 5.647	3.910	3.357 - 4.523	4.681	3.670 - 5.866
110/ 120	484	10.038	8.275 - 11.995	10.597	9.263 - 12.032	155	4.330	3.185 - 5.727	3.466	2.050 - 5.460	4.153	3.572 - 4.797	4.774	3.838 - 5.851
110/ 180	734	10.679	8.397 - 13.267	12.282	10.712 - 13.964	266	3.256	2.745 - 3.830	3.512	2.647 - 4.558	4.261	3.674 - 4.908	5.097	4.294 - 5.994
120/ 15	0	1.818	1.271 - 2.525	1.411	1.000 - 1.940	0	1.818	1.271 - 2.525	1.411	1.000 - 1.940	1.818	1.271 - 2.525	1.411	1.000 - 1.940
120/ 20	4	2.155	1.517 - 2.973	1.656	1.205 - 2.225	2	1.758	0.000 - 27.607	1.401	0.993 - 1.927	0.655	0.241 - 1.508	2.046	1.587 - 2.597
120/ 25	9	2.461	1.812 - 3.267	2.152	1.589 - 2.851	5	2.201	1.567 - 3.007	1.854	1.337 - 2.507	0.796	0.347 - 1.618	2.508	1.965 - 3.153
120/ 30	24	3.163	2.434 - 4.035	2.576	1.938 - 3.354	13	2.520	1.823 - 3.394	2.090	1.517 - 2.810	0.996	0.502 - 1.807	2.999	2.349 - 3.769
120/ 35	38	3.972	3.137 - 4.948	3.253	2.524 - 4.120	20	2.854	2.072 - 3.830	2.345	1.701 - 3.152	2.872	1.944 - 4.082	2.728	1.811 - 3.941
120/ 40	51	4.751	3.809 - 5.838	4.035	3.224 - 4.977	27	3.105	2.238 - 4.189	2.516	1.796 - 3.427	3.472	2.471 - 4.727	3.192	2.455 - 4.072
120/ 45	74	5.578	4.538 - 6.762	4.840	3.986 - 5.810	33	3.413	2.454 - 4.609	2.807	2.005 - 3.817	3.539	2.448 - 4.932	2.785	1.869 - 3.986
120/ 50	95	6.344	5.230 - 7.599	5.705	4.820 - 6.689	38	3.744	2.705 - 5.031	3.102	2.232 - 4.189	4.142	3.001 - 5.549	3.384	2.510 - 4.453
120/ 55	135	7.163	6.015 - 8.437	6.362	5.469 - 7.343	45	3.926	0.947 - 10.544	3.337	2.351 - 4.584	4.055	1.279 - 9.472	3.070	2.209 - 4.146
120/ 60	169	7.866	6.678 - 9.174	7.029	6.113 - 8.026	53	4.038	1.578 - 8.354	3.470	2.356 - 4.910	4.607	1.451 - 10.671	3.821	2.702 - 5.227
120/ 70	231	8.984	2.371 - 21.186	8.187	7.186 - 9.268	78	4.544	0.387 - 17.896	3.794	2.516 - 5.464	4.939	0.483 - 18.327	3.925	2.922 - 5.145
120/ 80	298	9.802	8.424 - 11.300	9.054	7.951 - 10.241	105	4.707	3.012 - 6.949	3.710	2.317 - 5.601	5.302	3.351 - 7.883	4.310	3.235 - 5.607
120/ 90	364	10.309	8.804 - 11.947	9.796	8.595 - 11.086	127	4.879	3.397 - 6.742	3.854	2.348 - 5.926	5.626	3.665 - 8.171	4.760	3.688 - 6.024
120/ 100	440	10.540	8.910 - 12.324	10.443	9.152 - 11.830	149	4.881	3.552 - 6.506	3.790	2.286 - 5.871	5.754	3.873 - 8.146	5.119	4.047 - 6.365
120/ 110	517	10.598	8.809 - 12.572	10.966	9.615 - 12.415	170	4.748	3.508 - 6.253	3.729	2.256 - 5.766	5.017	3.084 - 7.624	4.451	3.598 - 5.431

Estimated Risks of DCS

Depth (fsw) /BT(min)	VVal-79 AIR; 20 fsw Last Allowed In-Water Stop TOTAL STOP TIME (min)	P(DCS) BVM(3) (%)	BVM(3) low - high	NMRI98 (%)	NMRI98 low - high	VVal-79 AIR/In-Water O_2, 20 fsw Last Allowed Stop TOTAL STOP TIME[c] (min)	P(DCS)[b]; IWO2_FO2=99.5% BVM(3) (%)	BVM(3) low - high	NMRI98 (%)	NMRI98 low - high	VVal-79 SurDO_2 P(DCS) BVM(3) (%)	BVM(3) low - high	NMRI98 (%)	NMRI98 low - high
120/ 120	578	10.607	8.686 - 12.742	11.379	9.984 - 12.873	188	4.675	3.432 - 6.190	3.762	2.514 - 5.386	4.280	3.662 - 4.965	4.724	3.865 - 5.703
130/ 12	0	1.710	1.163 - 2.432	1.306	0.905 - 1.833	0	1.710	1.163 - 2.432	1.306	0.905 - 1.833	1.710	1.163 - 2.432	1.306	0.905 - 1.833
130/ 15	3	1.920	1.342 - 2.665	1.394	1.013 - 1.878	2	1.432	0.807 - 2.374	1.106	0.796 - 1.502	0.618	0.196 - 1.579	1.804	1.374 - 2.327
130/ 20	8	2.260	1.638 - 3.040	1.903	1.389 - 2.547	5	1.970	1.386 - 2.720	1.598	1.139 - 2.186	0.762	0.301 - 1.665	2.300	1.795 - 2.904
130/ 25	17	2.932	2.222 - 3.792	2.463	1.818 - 3.261	9	2.489	1.798 - 3.356	2.097	1.520 - 2.822	0.939	0.436 - 1.817	2.847	2.231 - 3.578
130/ 30	34	3.777	2.946 - 4.759	3.022	2.282 - 3.919	18	2.795	2.014 - 3.773	2.300	1.655 - 3.113	0.628	0.202 - 1.587	2.669	1.777 - 3.849
130/ 35	49	4.660	3.685 - 5.796	3.908	3.057 - 4.911	26	3.128	2.237 - 4.247	2.581	1.849 - 3.503	3.476	2.451 - 4.770	3.158	2.425 - 4.037
130/ 40	72	5.614	4.511 - 6.879	4.859	3.936 - 5.917	33	3.508	2.488 - 4.791	2.898	2.079 - 3.926	3.643	2.511 - 5.089	2.799	1.913 - 3.947
130/ 45	96	6.545	5.323 - 7.931	5.818	4.854 - 6.899	40	3.907	2.770 - 5.332	3.197	2.314 - 4.296	4.321	3.155 - 5.752	3.366	2.518 - 4.398
130/ 50	140	7.459	6.191 - 8.874	6.551	5.583 - 7.619	48	4.186	1.093 - 10.754	3.510	2.514 - 4.756	4.287	1.265 - 10.329	3.094	2.152 - 4.300
130/ 55	178	8.243	1.912 - 20.716	7.302	6.315 - 8.379	58	4.395	0.314 - 18.381	3.715	2.597 - 5.131	4.844	0.406 - 18.928	3.919	2.831 - 5.267
130/ 60	210	8.963	7.588 - 10.474	8.054	7.037 - 9.155	72	4.746	2.249 - 8.646	3.977	2.775 - 5.496	4.827	2.256 - 8.868	3.583	2.629 - 4.756
130/ 70	290	10.026	7.035 - 13.628	9.070	7.962 - 10.264	104	5.059	2.056 - 10.102	3.962	2.616 - 5.725	5.397	2.328 - 10.366	4.134	3.086 - 5.404
130/ 80	363	10.725	8.360 - 13.421	9.927	8.731 - 11.210	131	5.253	2.865 - 8.684	4.065	2.575 - 6.062	5.928	3.274 - 9.683	4.790	3.713 - 6.059
130/ 90	450	11.048	3.522 - 23.449	10.636	9.338 - 12.028	156	5.346	0.640 - 18.305	4.072	2.539 - 6.145	6.213	0.935 - 19.159	5.307	4.208 - 6.581
130/ 100	537	11.110	9.307 - 13.089	11.191	9.824 - 12.655	181	5.207	3.793 - 6.933	3.934	2.471 - 5.907	5.567	3.615 - 8.104	4.724	3.840 - 5.737
130/ 120	659	10.722	9.298 - 12.258	12.077	10.610 - 13.646	227	4.763	3.429 - 6.408	3.899	2.857 - 5.177	4.915	4.229 - 5.671	5.440	4.524 - 6.470
130/ 180	888	13.306	11.511 - 15.233	14.212	12.346 - 16.206	380	3.567	2.948 - 4.271	3.661	2.690 - 4.854	4.946	4.258 - 5.706	5.974	5.158 - 6.868
140/ 10	0	1.662	1.103 - 2.413	1.251	0.850 - 1.786	0	1.662	1.103 - 2.413	1.251	0.850 - 1.786	1.662	1.103 - 2.413	1.251	0.850 - 1.786
140/ 15	5	2.095	1.435 - 2.958	1.560	1.123 - 2.116	3	1.593	1.088 - 2.259	1.291	0.912 - 1.783	0.699	0.236 - 1.703	1.989	1.529 - 2.546
140/ 20	13	2.558	1.890 - 3.382	2.172	1.584 - 2.908	7	2.244	1.604 - 3.055	1.847	1.324 - 2.513	0.879	0.369 - 1.829	2.570	2.009 - 3.236
140/ 25	27	3.398	0.022 - 25.700	2.707	1.993 - 3.591	14	2.667	0.440 - 8.885	2.242	1.609 - 3.041	0.629	0.187 - 1.674	2.514	1.670 - 3.633
140/ 30	44	4.398	0.396 - 17.128	3.606	2.750 - 4.632	23	3.098	0.674 - 8.942	2.584	1.858 - 3.496	3.330	2.299 - 4.651	3.017	2.260 - 3.940
140/ 35	67	5.460	4.329 - 6.768	4.610	3.644 - 5.735	32	3.604	2.556 - 4.921	2.937	2.129 - 3.944	3.550	2.474 - 4.918	2.495	1.622 - 3.670
140/ 40	93	6.506	5.208 - 7.991	5.713	4.676 - 6.888	41	4.087	2.881 - 5.601	3.254	2.388 - 4.321	4.269	3.113 - 5.689	3.149	2.371 - 4.093
140/ 45	137	7.566	6.196 - 9.108	6.626	5.577 - 7.791	50	4.401	1.053 - 11.738	3.633	2.650 - 4.845	4.279	1.226 - 10.471	3.060	2.115 - 4.274
140/ 50	180	8.526	7.082 - 10.132	7.483	6.420 - 8.647	61	4.718	1.768 - 9.913	3.953	2.850 - 5.320	4.999	1.587 - 11.459	4.049	2.970 - 5.371
140/ 55	216	9.335	7.826 - 10.999	8.303	7.216 - 9.482	76	5.084	2.321 - 9.459	4.232	3.035 - 5.717	5.169	2.352 - 9.629	3.785	2.770 - 5.033
140/ 60	262	9.988	8.442 - 11.682	8.893	7.774 - 10.102	95	5.285	2.765 - 8.987	4.153	2.893 - 5.746	5.184	2.906 - 8.412	3.640	2.664 - 4.841
140/ 70	344	10.989	9.345 - 12.780	9.922	8.722 - 11.211	128	5.545	3.426 - 8.380	4.224	2.779 - 6.113	5.959	3.666 - 9.017	4.503	3.457 - 5.745

Estimated Risks of DCS

Depth (fsw) /BT(min)	VVal-79 AIR; 20 fsw Last Allowed In-Water Stop: TOTAL STOP TIME (min)	P(DCS) BVM(3) (%)	BVM(3) low - high	P(DCS) NMRI98 (%)	NMRI98 low - high	VVal-79 AIR/In-Water O_2, 20 fsw Last Allowed Stop: TOTAL STOP TIME[c] (min)	P(DCS)[b]; IWO2_FO2=99.5% BVM(3) (%)	BVM(3) low - high	NMRI98 (%)	NMRI98 low - high	VVal-79 SurDO_2: P(DCS) BVM(3) (%)	BVM(3) low - high	NMRI98 (%)	NMRI98 low - high
140/ 80	442	11.447	9.726 - 13.321	10.660	9.364 - 12.051	157	5.739	3.888 - 8.085	4.295	2.761 - 6.328	6.406	4.296 - 9.080	5.184	4.085 - 6.465
140/ 90	542	11.596	9.768 - 13.593	11.328	9.947 - 12.806	187	5.609	3.994 - 7.600	4.107	2.625 - 6.081	5.951	3.961 - 8.493	4.802	3.905 - 5.829
150/ 8	0	1.564	1.000 - 2.343	1.162	0.765 - 1.704	0	1.564	1.000 - 2.343	1.162	0.765 - 1.704	1.564	1.000 - 2.343	1.162	0.765 - 1.704
150/ 10	2	1.754	1.180 - 2.517	1.221	0.836 - 1.730	1	1.418	0.832 - 2.277	0.902	0.642 - 1.238	0.634	0.177 - 1.758	1.610	1.190 - 2.133
150/ 15	8	2.202	1.492 - 3.134	1.759	1.269 - 2.378	5	1.808	1.259 - 2.520	1.459	1.033 - 2.006	0.781	0.280 - 1.821	2.185	1.690 - 2.781
150/ 20	17	2.911	2.188 - 3.791	2.403	1.735 - 3.242	9	2.472	1.779 - 3.344	2.051	1.460 - 2.805	1.001	0.446 - 1.989	2.855	2.232 - 3.595
150/ 25	36	3.911	3.030 - 4.956	3.142	2.329 - 4.140	18	2.954	2.023 - 4.158	2.506	1.803 - 3.392	3.037	2.025 - 4.367	2.783	1.936 - 3.869
150/ 30	56	5.071	3.967 - 6.362	4.215	3.240 - 5.373	30	3.553	0.000 - 53.065	2.850	2.067 - 3.828	3.772	2.760 - 5.018	3.143	2.447 - 3.969
150/ 35	87	6.300	4.990 - 7.811	5.404	4.327 - 6.645	40	4.094	2.863 - 5.646	3.302	2.427 - 4.379	4.018	2.874 - 5.443	2.902	2.161 - 3.809
150/ 40	128	7.488	6.030 - 9.146	6.471	5.349 - 7.733	50	4.559	3.139 - 6.359	3.657	2.703 - 4.825	4.193	1.180 - 10.376	2.853	2.013 - 3.919
150/ 45	177	8.588	4.144 - 15.063	7.430	6.291 - 8.688	63	4.857	1.028 - 13.549	3.951	2.879 - 5.273	5.061	0.968 - 14.669	3.949	2.891 - 5.248
150/ 50	216	9.525	7.886 - 11.346	8.396	7.235 - 9.662	78	5.266	2.289 - 10.080	4.317	3.137 - 5.769	5.339	2.310 - 10.241	3.833	2.777 - 5.139
150/ 55	268	10.311	8.624 - 12.169	9.071	7.884 - 10.356	99	5.535	2.790 - 9.631	4.273	3.023 - 5.837	5.487	2.996 - 9.051	3.791	2.788 - 5.020
150/ 60	313	10.951	9.209 - 12.860	9.699	8.478 - 11.016	118	5.762	3.230 - 9.322	4.372	3.018 - 6.090	6.347	3.708 - 9.952	4.812	3.628 - 6.232
150/ 70	410	11.765	9.941 - 13.752	10.599	9.319 - 11.971	151	6.160	3.873 - 9.170	4.583	3.084 - 6.511	6.356	4.034 - 9.390	4.792	3.738 - 6.028
150/ 80	529	12.017	10.140 - 14.064	11.332	9.946 - 12.816	186	6.011	4.133 - 8.367	4.357	2.806 - 6.407	6.945	4.752 - 9.680	5.494	4.449 - 6.687
150/ 90	617	12.152	10.177 - 14.313	11.964	10.518 - 13.510	216	5.873	4.188 - 7.943	4.269	2.804 - 6.184	6.481	4.369 - 9.149	5.331	4.399 - 6.383
150/ 120	801	12.736	11.121 - 14.464	13.324	11.662 - 15.098	323	4.658	3.232 - 6.458	3.990	3.050 - 5.113	4.988	4.289 - 5.759	5.383	4.606 - 6.241
150/ 180	1025	16.356	14.162 - 18.690	16.130	13.943 - 18.460	490	4.561	3.782 - 5.442	4.243	3.067 - 5.697	5.341	4.581 - 6.181	6.319	5.371 - 7.367
160/ 7	0	1.583	0.998 - 2.398	1.156	0.752 - 1.709	0	1.583	0.998 - 2.398	1.156	0.752 - 1.709	1.583	0.998 - 2.398	1.156	0.752 - 1.709
160/ 10	4	1.854	1.236 - 2.679	1.281	0.919 - 1.745	2	1.370	0.706 - 2.433	1.021	0.736 - 1.387	0.682	0.000 - 31.524	1.736	1.296 - 2.278
160/ 15	12	2.334	1.694 - 3.134	1.900	1.383 - 2.550	7	1.973	1.265 - 2.943	1.576	1.120 - 2.161	0.871	0.331 - 1.946	2.393	1.858 - 3.034
160/ 20	24	3.278	2.474 - 4.250	2.622	1.905 - 3.517	13	2.715	1.964 - 3.655	2.273	1.646 - 3.059	1.096	0.545 - 2.009	3.028	2.351 - 3.833
160/ 25	46	4.481	3.475 - 5.667	3.588	2.668 - 4.710	25	3.348	2.409 - 4.520	2.697	1.945 - 3.641	3.369	2.410 - 4.569	2.772	2.089 - 3.604
160/ 30	77	5.833	4.576 - 7.295	4.824	3.813 - 6.001	38	3.941	2.763 - 5.426	3.078	2.288 - 4.046	3.643	2.542 - 5.039	2.510	1.691 - 3.585
160/ 35	107	7.138	5.497 - 9.053	6.208	5.019 - 7.564	48	4.564	2.999 - 6.605	3.589	2.668 - 4.711	4.642	0.052 - 28.718	3.541	2.638 - 4.640
160/ 40	167	8.466	6.764 - 10.401	7.232	6.028 - 8.575	61	4.942	1.522 - 11.520	3.971	2.929 - 5.244	4.968	1.429 - 11.985	3.698	2.672 - 4.970
160/ 45	212	9.549	7.802 - 11.502	8.274	7.040 - 9.629	77	5.334	2.139 - 10.704	4.285	3.126 - 5.708	5.338	2.163 - 10.648	3.681	2.639 - 4.979
160/ 50	264	10.478	8.649 - 12.505	9.115	7.861 - 10.479	99	5.718	2.717 - 10.323	4.357	3.126 - 5.882	5.608	2.940 - 9.502	3.740	2.733 - 4.981
160/ 55	316	11.202	9.322 - 13.272	9.798	8.513 - 11.186	121	5.987	3.211 - 9.972	4.468	3.135 - 6.141	6.569	3.717 - 10.522	4.883	3.664 - 6.348

Estimated Risks of DCS

Depth (fsw) /BT(min)	VVal-79 AIR; 20 fsw Last Allowed In-Water Stop					VVal-79 AIR/In-Water O_2, 20 fsw Last Allowed Stop					VVal-79 SurDO_2			
	TOTAL STOP	P(DCS)				TOTAL STOP	P(DCS)[b]; IWO2_FO2=99.5%				P(DCS)			
	TIME (min)	BVM(3) (%)	low - high	NMRI98 (%)	low - high	TIME[c] (min)	BVM(3) (%)	low - high	NMRI98 (%)	low - high	BVM(3) (%)	low - high	NMRI98 (%)	low - high
160/ 60	368	11.776	9.845 - 13.892	10.338	9.031 - 11.743	140	6.196	3.596 - 9.767	4.570	3.130 - 6.401	6.793	3.632 - 11.288	4.984	3.872 - 6.290
160/ 70	492	12.359	10.379 - 14.520	11.195	9.818 - 12.671	178	6.438	4.170 - 9.366	4.597	3.055 - 6.593	6.829	4.529 - 9.752	4.991	3.998 - 6.135
160/ 80	602	12.571	10.519 - 14.813	11.940	10.483 - 13.498	213	6.310	4.334 - 8.782	4.446	2.940 - 6.405	6.586	4.441 - 9.293	5.065	4.154 - 6.101
170/ 6	0	1.560	0.963 - 2.404	1.128	0.724 - 1.689	0	1.560	0.963 - 2.404	1.128	0.724 - 1.689	1.560	0.963 - 2.404	1.128	0.724 - 1.689
170/ 10	6	1.952	1.265 - 2.886	1.393	1.027 - 1.851	3	1.386	0.919 - 2.016	1.142	0.833 - 1.531	0.735	0.105 - 2.960	1.866	1.405 - 2.433
170/ 15	16	2.572	1.883 - 3.429	2.089	1.529 - 2.789	8	2.183	1.549 - 2.991	1.802	1.301 - 2.434	0.967	0.388 - 2.075	2.611	2.030 - 3.306
170/ 20	33	3.670	2.808 - 4.701	2.886	2.142 - 3.798	18	2.985	2.164 - 4.009	2.446	1.811 - 3.230	2.890	1.965 - 4.091	2.421	1.538 - 3.628
170/ 25	56	5.101	0.459 - 19.302	4.160	3.158 - 5.362	32	3.700	0.119 - 19.924	2.897	2.120 - 3.861	3.668	0.119 - 19.739	3.056	2.379 - 3.860
170/ 30	96	6.620	5.194 - 8.272	5.531	4.348 - 6.906	45	4.407	3.041 - 6.138	3.444	2.543 - 4.548	4.237	1.320 - 9.935	2.966	2.265 - 3.809
170/ 35	149	8.093	6.461 - 9.951	6.797	5.620 - 8.119	59	4.894	1.219 - 12.674	3.777	2.834 - 4.919	4.685	1.344 - 11.374	3.187	2.267 - 4.345
170/ 40	202	9.396	7.599 - 11.418	7.987	6.690 - 9.425	75	5.376	2.011 - 11.219	4.207	3.093 - 5.568	5.196	2.019 - 10.637	3.361	2.434 - 4.512
170/ 45	253	10.487	8.557 - 12.636	9.034	7.712 - 10.480	95	5.863	2.576 - 11.092	4.459	3.257 - 5.932	6.335	2.744 - 12.038	4.702	3.490 - 6.170
170/ 50	312	11.340	8.801 - 14.230	9.773	8.428 - 11.233	120	6.135	2.841 - 11.216	4.490	3.181 - 6.123	6.643	3.316 - 11.550	4.777	3.546 - 6.267
170/ 55	368	12.026	9.724 - 14.587	10.399	9.020 - 11.889	142	6.469	3.450 - 10.786	4.685	3.274 - 6.457	6.995	3.911 - 11.271	4.974	3.859 - 6.286
170/ 60	432	12.471	10.133 - 15.061	10.874	9.518 - 12.330	162	6.730	3.830 - 10.728	4.795	3.316 - 6.662	7.110	4.343 - 10.772	5.134	4.029 - 6.423
170/ 70	568	12.887	10.513 - 15.509	11.758	10.297 - 13.321	204	6.673	4.128 - 10.034	4.551	3.038 - 6.506	7.184	4.716 - 10.328	5.225	4.244 - 6.344
170/ 80	666	13.109	5.500 - 24.089	12.515	10.991 - 14.142	243	6.376	1.257 - 17.709	4.385	3.014 - 6.128	6.969	1.682 - 17.608	5.457	4.515 - 6.520
170/ 90	749	13.512	11.233 - 16.001	13.036	11.436 - 14.743	290	5.988	4.175 - 8.245	4.302	3.323 - 5.461	6.568	4.401 - 9.311	5.615	4.728 - 6.604
170/ 120	925	15.079	13.120 - 17.166	14.925	12.986 - 16.991	416	4.741	3.862 - 5.746	4.231	3.228 - 5.428	5.985	5.164 - 6.886	6.408	5.573 - 7.318
170/ 180	1156	19.122	16.458 - 21.942	18.085	15.635 - 20.682	600	5.840	4.875 - 6.921	5.014	3.567 - 6.807	5.982	5.097 - 6.961	6.750	5.475 - 8.197
180/ 6	0	1.717	1.079 - 2.605	1.219	0.797 - 1.796	0	1.717	1.079 - 2.605	1.219	0.797 - 1.796	1.717	1.079 - 2.605	1.219	0.797 - 1.796
180/ 10	8	2.062	1.291 - 3.131	1.530	1.087 - 2.099	4	1.564	0.967 - 2.405	1.275	0.899 - 1.761	0.794	0.250 - 2.018	2.004	1.520 - 2.593
180/ 15	19	2.811	2.059 - 3.742	2.284	1.642 - 3.093	11	2.459	1.775 - 3.319	2.013	1.453 - 2.720	0.995	0.475 - 1.884	2.626	2.029 - 3.341
180/ 20	42	4.137	3.181 - 5.273	3.241	2.431 - 4.225	24	3.246	2.340 - 4.377	2.583	1.919 - 3.400	3.092	2.148 - 4.301	2.559	1.768 - 3.581
180/ 25	75	5.782	4.495 - 7.288	4.695	3.718 - 5.832	39	4.018	2.806 - 5.549	3.088	2.357 - 3.967	3.614	2.500 - 5.034	2.426	1.554 - 3.611
180/ 30	117	7.410	2.030 - 17.591	6.255	5.083 - 7.586	53	4.798	0.519 - 17.317	3.643	2.785 - 4.671	4.885	0.558 - 17.263	3.609	2.775 - 4.603
180/ 35	184	8.985	7.191 - 11.018	7.483	6.186 - 8.934	70	5.240	1.734 - 11.709	3.992	2.951 - 5.263	5.438	1.594 - 12.894	3.990	2.954 - 5.254
180/ 40	232	10.287	2.983 - 22.933	8.778	7.406 - 10.289	88	5.877	0.724 - 19.596	4.563	3.380 - 5.997	6.067	0.729 - 20.280	4.235	3.072 - 5.667
180/ 45	302	11.339	9.224 - 13.691	9.606	8.198 - 11.144	116	6.247	2.991 - 11.180	4.499	3.230 - 6.068	6.560	3.402 - 11.137	4.492	3.323 - 5.912
180/ 50	356	12.169	9.933 - 14.645	10.435	9.000 - 11.989	140	6.559	3.469 - 10.990	4.656	3.270 - 6.392	7.015	3.878 - 11.389	4.806	3.711 - 6.098

Estimated Risks of DCS

Depth (fsw) /BT(min)	VVal-79 AIR; 20 fsw Last Allowed In-Water Stop TOTAL STOP TIME (min)	P(DCS) BVM(3) (%)	low - high	NMRI98 (%)	low - high	VVal-79 AIR/In-Water O_2, 20 fsw Last Allowed Stop TOTAL STOP TIME[c] (min)	P(DCS)[b]; IWO2_FO2=99.5% BVM(3) (%)	low - high	NMRI98 (%)	low - high	VVal-79 SurDO_2 P(DCS) BVM(3) (%)	low - high	NMRI98 (%)	low - high
180/ 55	425	12.736	10.439 - 15.267	10.936	9.537 - 12.440	162	6.962	3.933 - 11.141	4.879	3.419 - 6.705	7.271	4.492 - 10.922	5.080	3.974 - 6.372
180/ 60	507	13.021	1.177 - 39.237	11.366	9.922 - 12.916	186	6.966	0.014 - 44.822	4.744	3.222 - 6.687	7.479	0.030 - 43.688	5.171	4.126 - 6.379
180/ 70	633	13.399	10.858 - 16.209	12.291	10.762 - 13.926	229	6.919	4.303 - 10.355	4.645	3.144 - 6.565	7.569	5.028 - 10.774	5.579	4.583 - 6.707
190/ 5	0	1.640	1.007 - 2.537	1.163	0.746 - 1.742	0	1.640	1.007 - 2.537	1.163	0.746 - 1.742	1.640	1.007 - 2.537	1.163	0.746 - 1.742
190/ 10	10	2.110	0.007 - 21.151	1.628	1.162 - 2.224	5	1.678	1.141 - 2.386	1.358	0.960 - 1.871	0.851	0.280 - 2.098	2.149	1.639 - 2.768
190/ 15	23	3.032	2.208 - 4.056	2.501	1.813 - 3.361	14	2.657	1.924 - 3.573	2.210	1.620 - 2.944	0.995	0.549 - 1.685	2.769	2.121 - 3.548
190/ 20	50	4.589	3.533 - 5.839	3.695	2.759 - 4.832	30	3.439	2.444 - 4.689	2.730	2.001 - 3.634	3.273	2.306 - 4.498	2.756	2.086 - 3.570
190/ 25	94	6.497	5.062 - 8.166	5.273	4.118 - 6.624	46	4.423	3.041 - 6.180	3.354	2.511 - 4.379	4.154	2.935 - 5.681	2.771	2.053 - 3.655
190/ 30	154	8.289	6.547 - 10.282	6.802	5.627 - 8.121	64	5.087	1.317 - 12.888	3.755	2.871 - 4.812	4.874	1.438 - 11.628	3.179	2.315 - 4.250
190/ 35	214	9.842	7.852 - 12.092	8.215	6.938 - 9.623	81	5.674	2.097 - 11.882	4.300	3.237 - 5.580	5.610	2.121 - 11.608	3.603	2.635 - 4.797
190/ 40	281	11.118	8.958 - 13.534	9.298	7.888 - 10.844	109	6.172	2.747 - 11.558	4.370	3.170 - 5.847	6.232	3.085 - 10.922	3.982	2.924 - 5.279
190/ 45	342	12.140	7.266 - 18.344	10.236	8.743 - 11.862	135	6.662	2.467 - 13.781	4.651	3.312 - 6.314	6.862	2.501 - 14.282	4.437	3.385 - 5.690
190/ 50	413	12.859	10.430 - 15.549	10.853	9.397 - 12.425	160	7.081	3.827 - 11.666	4.828	3.410 - 6.596	7.254	4.338 - 11.150	4.840	3.762 - 6.106
190/ 55	498	13.261	10.798 - 15.979	11.361	9.891 - 12.941	185	7.211	4.150 - 11.382	4.838	3.337 - 6.737	7.584	4.699 - 11.356	5.058	4.016 - 6.265
190/ 60	574	13.541	11.035 - 16.304	11.895	10.372 - 13.530	209	7.249	4.351 - 11.112	4.754	3.244 - 6.676	7.750	5.170 - 10.992	5.315	4.289 - 6.490
190/ 90	859	15.440	12.732 - 18.389	14.278	12.477 - 16.197	369	6.001	4.029 - 8.506	4.380	3.459 - 5.455	5.974	5.114 - 6.922	5.822	5.014 - 6.709
190/ 120	1037	17.730	15.371 - 20.229	16.482	14.257 - 18.850	507	5.702	4.617 - 6.941	4.702	3.549 - 6.085	6.242	5.320 - 7.260	6.383	5.474 - 7.384
200/ 5	0	1.776	0.000 - 41.845	1.246	0.812 - 1.842	0	1.776	0.000 - 41.845	1.246	0.812 - 1.842	1.776	0.000 - 41.845	1.246	0.812 - 1.842
200/ 10	11	2.266	1.598 - 3.122	1.786	1.295 - 2.406	6	1.826	1.259 - 2.566	1.513	1.087 - 2.055	0.916	0.317 - 2.178	2.300	1.761 - 2.952
200/ 15	29	3.272	2.457 - 4.261	2.705	1.983 - 3.601	17	2.793	2.023 - 3.756	2.382	1.765 - 3.144	1.042	0.594 - 1.718	2.971	2.252 - 3.840
200/ 20	62	5.200	1.371 - 13.033	4.186	3.235 - 5.313	36	3.767	0.527 - 12.880	2.905	2.204 - 3.753	3.716	0.492 - 13.000	3.052	2.324 - 3.929
200/ 25	110	7.215	5.600 - 9.091	5.968	4.830 - 7.266	54	4.761	3.211 - 6.748	3.486	2.703 - 4.417	4.738	3.372 - 6.434	3.294	2.550 - 4.179
200/ 30	186	9.106	7.210 - 11.264	7.439	6.171 - 8.856	74	5.375	1.758 - 12.063	3.927	2.968 - 5.081	5.569	1.658 - 13.075	3.934	2.976 - 5.086
200/ 35	247	10.673	8.490 - 13.134	8.872	7.446 - 10.447	96	6.089	2.454 - 12.092	4.474	3.320 - 5.874	6.459	2.560 - 12.901	4.437	3.287 - 5.832
200/ 40	323	11.914	9.549 - 14.558	9.852	8.393 - 11.447	128	6.574	3.104 - 11.839	4.445	3.193 - 5.993	6.511	3.332 - 11.151	3.917	2.938 - 5.102
200/ 45	393	12.830	10.299 - 15.647	10.664	9.147 - 12.310	154	7.100	3.668 - 12.044	4.819	3.428 - 6.544	7.881	3.794 - 13.906	5.419	4.247 - 6.786
200/ 50	481	13.403	5.575 - 24.685	11.234	9.740 - 12.844	182	7.363	1.774 - 18.492	4.802	3.343 - 6.637	7.535	1.725 - 19.270	4.769	3.757 - 5.950
210/ 4	0	1.643	0.999 - 2.563	1.160	0.741 - 1.742	0	1.643	0.999 - 2.563	1.160	0.741 - 1.742	1.643	0.999 - 2.563	1.160	0.741 - 1.742
210/ 5	2	1.740	1.093 - 2.640	1.161	0.757 - 1.716	1	1.340	0.713 - 2.324	0.837	0.594 - 1.152	0.735	0.198 - 2.071	1.555	1.116 - 2.113
210/ 10	14	2.288	0.003 - 25.966	1.897	1.377 - 2.551	8	1.990	0.001 - 27.874	1.693	1.229 - 2.277	0.935	0.385 - 1.971	2.252	1.724 - 2.891

Estimated Risks of DCS

Depth (fsw) /BT(min)	VVal-79 AIR; 20 fsw Last Allowed In-Water Stop TOTAL STOP TIME (min)	P(DCS) BVM(3) (%)	BVM(3) low - high	NMRI98 (%)	NMRI98 low - high	VVal-79 AIR/In-Water O_2, 20 fsw Last Allowed Stop TOTAL STOP TIME[c] (min)	P(DCS)[b]; IWO2_FO2=99.5% BVM(3) (%)	BVM(3) low - high	NMRI98 (%)	NMRI98 low - high	VVal-79 SurDO_2 P(DCS) BVM(3) (%)	BVM(3) low - high	NMRI98 (%)	NMRI98 low - high
210/ 15	37	3.678	0.121 - 19.700	2.964	2.204 - 3.897	22	3.010	0.052 - 19.690	2.498	1.871 - 3.264	2.766	0.037 - 19.589	2.391	1.515 - 3.589
210/ 20	79	5.746	1.069 - 16.559	4.662	3.690 - 5.793	42	4.018	0.288 - 17.105	3.107	2.406 - 3.943	4.124	0.318 - 17.065	3.416	2.596 - 4.403
210/ 25	139	7.962	4.947 - 11.885	6.515	5.388 - 7.781	63	5.026	0.780 - 15.842	3.629	2.832 - 4.572	4.640	1.024 - 12.776	2.844	2.128 - 3.719
210/ 30	214	9.897	7.285 - 12.972	8.092	6.817 - 9.501	83	5.724	1.878 - 12.766	4.174	3.164 - 5.386	5.656	1.884 - 12.523	3.485	2.578 - 4.595
210/ 35	292	11.445	9.035 - 14.164	9.352	7.944 - 10.895	115	6.452	2.787 - 12.269	4.392	3.241 - 5.795	6.569	3.147 - 11.725	4.107	3.061 - 5.375
210/ 40	362	12.649	10.003 - 15.616	10.404	8.858 - 12.091	146	7.008	3.401 - 12.373	4.626	3.314 - 6.251	7.452	3.853 - 12.610	4.778	3.694 - 6.057
210/ 45	452	13.430	10.655 - 16.528	11.039	9.514 - 12.689	174	7.505	3.923 - 12.607	4.845	3.425 - 6.613	8.067	4.696 - 12.593	5.372	4.218 - 6.717
210/ 50	549	13.887	11.101 - 16.980	11.661	10.104 - 13.337	204	7.612	4.232 - 12.278	4.785	3.308 - 6.649	7.734	4.921 - 11.358	4.815	3.839 - 5.944
220/ 4	0	1.762	1.089 - 2.708	1.238	0.805 - 1.832	0	1.762	1.089 - 2.708	1.238	0.805 - 1.832	1.762	1.089 - 2.708	1.238	0.805 - 1.832
220/ 5	3	1.781	1.119 - 2.702	1.200	0.807 - 1.728	2	1.084	0.431 - 2.331	0.907	0.651 - 1.235	0.753	0.202 - 2.119	1.634	1.183 - 2.205
220/ 10	17	2.357	0.847 - 5.266	2.045	1.507 - 2.714	10	2.127	1.504 - 2.924	1.837	1.354 - 2.439	0.966	0.441 - 1.888	2.366	1.819 - 3.025
220/ 15	44	3.983	3.048 - 5.100	3.310	2.445 - 4.371	27	3.084	2.198 - 4.199	2.622	1.942 - 3.460	2.821	1.908 - 4.012	2.558	1.797 - 3.529
220/ 20	95	6.451	4.995 - 8.153	5.192	4.102 - 6.457	48	4.430	3.032 - 6.212	3.342	2.583 - 4.245	4.120	2.889 - 5.671	2.702	1.923 - 3.686
220/ 25	171	8.746	6.866 - 10.899	7.028	5.801 - 8.404	72	5.319	1.566 - 12.610	3.767	2.900 - 4.801	5.272	1.554 - 12.498	3.442	2.586 - 4.479
220/ 30	243	10.674	7.836 - 14.006	8.720	7.343 - 10.238	96	6.134	2.160 - 13.114	4.375	3.300 - 5.665	6.436	2.244 - 13.781	4.239	3.174 - 5.527
220/ 35	329	12.179	9.527 - 15.174	9.882	8.418 - 11.480	132	6.838	3.094 - 12.612	4.497	3.287 - 5.977	6.776	3.335 - 11.874	3.974	2.986 - 5.167
220/ 40	412	13.269	10.500 - 16.366	10.758	9.257 - 12.385	163	7.466	3.738 - 12.890	4.754	3.417 - 6.405	7.565	4.286 - 12.051	4.685	3.620 - 5.943
250/ 4	4	1.884	1.192 - 2.841	1.231	0.854 - 1.725	2	1.345	0.621 - 2.591	0.969	0.695 - 1.320	0.773	0.209 - 2.168	1.685	1.225 - 2.264
250/ 5	7	2.041	1.266 - 3.124	1.421	1.010 - 1.948	4	1.366	0.818 - 2.160	1.154	0.810 - 1.602	0.830	0.238 - 2.238	1.895	1.405 - 2.504
250/ 10	26	2.905	0.250 - 12.376	2.567	1.867 - 3.440	17	2.602	0.155 - 12.768	2.304	1.711 - 3.035	0.769	0.000 - 48.732	2.765	2.067 - 3.619
250/ 15	77	5.424	4.229 - 6.821	4.524	3.537 - 5.683	43	3.789	2.660 - 5.213	3.055	2.365 - 3.879	3.843	2.765 - 5.181	3.294	2.473 - 4.291
250/ 20	162	8.315	6.546 - 10.342	6.759	5.588 - 8.074	71	5.117	1.347 - 12.857	3.706	2.900 - 4.657	4.903	1.472 - 11.587	3.142	2.373 - 4.074
250/ 25	253	10.811	8.524 - 13.402	8.759	7.382 - 10.278	101	6.219	2.424 - 12.566	4.375	3.331 - 5.622	6.586	2.520 - 13.393	4.345	3.316 - 5.573
250/ 30	353	12.647	9.938 - 15.695	10.181	8.661 - 11.840	145	7.090	3.309 - 12.811	4.531	3.287 - 6.060	7.345	3.710 - 12.619	4.428	3.378 - 5.679
250/ 35	467	13.946	10.850 - 17.423	11.048	9.526 - 12.695	183	7.925	3.949 - 13.687	4.753	3.365 - 6.482	8.614	4.829 - 13.757	5.474	4.283 - 6.864
300/ 4	10	2.031	1.236 - 3.155	1.599	1.141 - 2.184	6	1.282	0.818 - 1.926	1.319	0.946 - 1.796	2.031	1.236 - 3.155	1.599	1.141 - 2.184
300/ 5	14	2.174	1.467 - 3.105	1.865	1.354 - 2.509	9	1.895	1.300 - 2.673	1.655	1.207 - 2.220	0.953	0.395 - 2.001	2.174	1.653 - 2.807
300/ 10	56	4.427	2.335 - 7.527	3.900	2.942 - 5.055	36	3.208	1.289 - 6.593	2.826	2.136 - 3.664	3.070	1.161 - 6.567	2.851	2.092 - 3.790
300/ 15	165	8.055	6.440 - 9.894	6.770	5.560 - 8.134	74	4.870	1.360 - 11.944	3.713	2.896 - 4.679	4.661	1.474 - 10.762	3.146	2.369 - 4.089
300/ 20	294	11.242	8.984 - 13.778	9.187	7.774 - 10.740	120	6.297	2.743 - 11.931	4.283	3.165 - 5.645	6.350	3.073 - 11.280	3.914	2.889 - 5.167

Estimated Risks of DCS

Depth (fsw) /BT(min)	VVal-79 AIR; 20 fsw Last Allowed In-Water Stop					VVal-79 AIR/In-Water O_2, 20 fsw Last Allowed Stop					VVal-79 SurDO_2			
	TOTAL STOP TIME	P(DCS)				TOTAL STOP TIME[c]	P(DCS)[b]; IWO2_FO2=99.5%				P(DCS)			
		BVM(3)		NMRI98			BVM(3)		NMRI98		BVM(3)		NMRI98	
	(min)	(%)	low - high	(%)	low - high	(min)	(%)	low - high	(%)	low - high	(%)	low - high	(%)	low - high
300/ 25	427	13.463	10.581 - 16.693	10.742	9.235 - 12.376	174	7.632	3.771 - 13.273	4.706	3.333 - 6.416	7.795	4.379 - 12.478	4.756	3.620 - 6.109