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NSA MID SOUTH  
5090.3a

SUMMARY OF RESULTS FOR SITE OF PATHWAYS FOR NAVAL EXCHANGE SERVICE  
CENTER MILLINGTON SUPPACT TN  
08/07/1989  
NAVFAC SOUTHERN

A. Installation : NAS MEMPHIS  
B. Site name : NAVAL EXCHANGE SERVICE STATION  
C. Location : NAVY ROAD, MILLINGTON, MEMPHIS, TN  
D. Reviewer : JOHN ALBRECHT  
E. Date : Monday, August 7, 1989

RESULTS FOR SITE: NAVAL EXCHANGE SERVICE STATION

D P M factor ==> (Score) RESULT

Surface Water Pathways

[1] Observed releases in surface water ==> (0) 0  
[2] Distance to nearest surface water ==> (1.0) 4.0  
[3] Net precipitation ==> (3.0) 3.0  
[4] Surface erosion potential ==> (1.0) 4.0  
[5] Rainfall intensity ==> (3.0) 12.0  
[6] Surface permeability ==> (1.0) 3.0  
[7] Sum of items 2 through 6 ==> ( ) 26.0  
[8] Normalized score ([7] x 100/48) ==> ( ) 54.17  
[9] Flooding potential ==> (2.0) 16.0  
[10] Adjusted surface water pathways score (sum 8,9 or 100) ==> ( ) 70.17  
[11] Waste containment effectiveness factor for surface water ==> (1.0) 1.0  
[12] Final score for surface water pathways ([10] x [11]) ==> ( ) 70.17

Groundwater Pathways

[13] Observed releases in groundwater ==> (100.0)  
[14] Depth to the groundwater table ==> ( )  
[15] Permeability of the unsaturated zone ==> ( )  
[16] Infiltration potential ==> ( )  
[17] Sum of items 14 through 16 ==> ( )  
[18] Normalized score ([17] x 100/57) ==> ( )  
[19] "Short-circuit" potential to the water table ==> ( )  
[20] Adjusted groundwater pathways score (sum 18,19 or 100) ==> ( ) 100.0  
[21] Waste containment effectiveness factor for groundwater ==> (1.0) 1.0  
[22] Final score for groundwater pathways ([20] x [21]) ==> ( ) 100.0

Air Pathways

[23] Observed release in air ==> (0) 0  
[24] Observed release of volatiles in air ==> (0)  
[25] Average soil temperature ==> ( )  
[26] Net Precipitation ==> ( )  
[27] Wind Velocity ==> ( )  
[28] Soil Porosity ==> ( )  
[29] Days/year with precipitation higher than 0.25mm ==> ( )  
[30] Activity at the site ==> ( )  
[31] Sum of items 24 through 30 ==> ( )  
[32] Normalized score ([31] x 100/72) ==> ( )  
[33] Adjusted air pathways score (sum 31,32 or 100 or 0) ==> ( ) 0  
[34] Waste containment effectiveness factor for air pathway ==> (0.2) 0.2  
[35] Final score for air/soil pathway ([34] x [33]) ==> ( ) 0.0

[36] Sum of health hazard quotients -- surface water => ()  
 [37] Health hazard score -- surface water ==> ()  
 [38] Normalized health hazard score -- sw ([37] x 100/6) ==> ()  
 [39] Sum of ecological hazard quotients -- surface water ==> ()  
 [40] Ecological hazard score -- surface water ==> ()  
 [41] Normalized ecological hazard score -- sw ([40] x 100/6) ==> ()  
 [42] Maximum health hazard index -- surface water ==> (3.0) 3.0  
 [43] Normalized health hazard index -- sw ([42] x 100/9) ==> () 33.33  
 [44] Maximum ecological hazard index -- surface water ==> (2.0) 2.0  
 [45] Normalized ecological hazard index -- sw ([44] x 100/6) ==> () 33.33

#### Contaminant Hazard -- Groundwater

[46] Sum of health hazard quotients -- groundwater ==> (43279.83) 4.64  
 [47] Health hazard score -- groundwater ==> (6.0) 6.0  
 [48] Normalized health hazard score -- gw ([47] x 100/6) ==> () 100.0  
 [49] Sum of ecological hazard quotients -- groundwater ==> (7.88) 0.9  
 [50] Ecological hazard score -- groundwater ==> (6.0) 6.0  
 [51] Normalized ecological hazard score -- gw ([50] x 100/6) ==> () 100.0  
 [52] Maximum health hazard index -- groundwater ==> ()  
 [53] Normalized health hazard index -- gw ([52] x 100/9) ==> ()  
 [54] Maximum ecological hazard index -- groundwater ==> ()  
 [55] Normalized ecological hazard index -- gw ([54] x 100/6) ==> ()

#### Contaminant Hazard -- air

[56] Sum of human health hazard quotients -- air ==> ()  
 [57] Human health hazard score -- air ==> ()  
 [58] Normalized human health hazard score --air ([57] x 100/6) ==> ()  
 [59] Sum of ecological hazard quotients -- air ==> ()  
 [60] Ecological hazard score -- air ==> ()  
 [61] Normalized ecological hazard score -- air ([50] x 100/6) ==> ()  
 [62] Maximum health hazard index -- air ==> (3.0) 3.0  
 [63] Normalized health hazard index -- air ([52] x 100/9) ==> () 33.33  
 [64] Maximum ecological hazard index -- air ==> (4.0) 4.0  
 [65] Normalized ecological hazard index -- air ([54] x 100/6) ==> () 66.67

#### Surface Water Receptors

[66] Population drinking from surface water ==> (3.0) 9.0  
 [67] Water use of nearest surface water body(ies) ==> (1.0) 3.0  
 [68] Population within 1000 feet of the site -- surface water ==> (3.0) 3.0  
 [69] Distance to nearest installation boundary -- surface water ==> (3.0) 3.0  
 [70] Land use and/or zoning within 1 mile of the site ==> (3.0) 3.0  
 [71] Sum of items 66 through 70 ==> () 21.0  
 [72] Final score for human health receptors -- sw ([71] x 100/27) ==> () 77.78  
 [73] Importance/sensitivity of biota/habitats -- surface water ==> (2.0) 10.0  
 [74] Presence of "critical environments" -- surface water ==> (0) 0  
 [75] Sum of items 73 and 74 ==> () 10.0  
 [76] Final score for ecological receptors -- sw ([75] x 100/18) ==> () 55.56

#### Groundwater Receptors

[77] Estimated groundwater travel time to supply wells ==> (2.0) 18.0  
 [78] Estimated groundwater travel time to surface water ==> (0) 0  
 [79] Groundwater use of the uppermost aquifer ==> (1.0) 4.0  
 [80] Population at risk from groundwater contamination ==> (27.0) 27.0  
 [81] Population within 1000 feet of the site -- groundwater ==> (3.0) 3.0

[86] Importance/sensitivity of biota/habitats -- groundwater ==> (0) 0  
 [87] Presence of "critical environments" -- groundwater ==> (0) 0  
 [88] Sum of items 85 through 87 ==> ( ) 0  
 [89] Final score for ecological receptors -- gw ([88] x 100/21) ==> ( ) 0.0

### Air Receptors

[90] Population within 4 miles of the site -- air ==> (24.0) 24.0  
 [91] Land Use pattern within 4 miles of the site -- air ==> (2.0) 4.0  
 [92] Distance to nearest installation boundary -- air ==> (3.0) 3.0  
 [93] Sum of items 90 through 92 ==> ( ) 31.0  
 [94] Final score for ecological receptors -- gw ([93] x 100/39) ==> ( ) 79.49  
 [95] Distance to sensitive environment -- air ==> (1.0) 2.0  
 [96] Presence of "critical environments" -- air ==> (0) 0  
 [97] Sum of items 95 and 96 ==> ( ) 2.0  
 [98] Final score for ecological receptors on air pathways ([97] x 100/9) ==> ( )

### DPM -- Scoring Summary

[99] Surface water/human health score ==> ( ) 18.19  
 [100] Surface water/ecological score ==> ( ) 12.99  
 [101] Groundwater/human health score ==> ( ) 57.29  
 [102] Groundwater/ecological score ==> ( ) 0.0  
 [103] air/human health score ==> ( ) 0.0  
 [104] air/ecological score ==> ( ) 0.0  
 [105]  $\sqrt{5x[99]^2 + [100]^2 + 5x[101]^2 + [102]^2 + 5x[103]^2 + [104]^2}$  ==> ( )  
 [106] Overall site score ([105] / 4.24) ==> ( ) 31.83

### SUMMARY OF ADPM DATA AND RESULTS

1 [1] Observed releases in surface water  
     surface\_water\_release = no  
 1 CONFIDENCE LEVEL = 1  
 1 SCORE = 0  
 1 R E S U L T = 0

2 [2] Distance to nearest surface water (feet)  
     distance\_to\_surface\_water = 4500.0  
 2 CONFIDENCE LEVEL = 1  
 2 SCORE = 1  
 2 R E S U L T = 4

3 [3a] Net precipitation (inches)  
     net\_precipitation = 53.0  
 3 CONFIDENCE LEVEL = 1  
 3 SCORE = 3  
 3 R E S U L T = 3

4 [4a] Surface erosion potential  
     surface\_erosion\_potential = slight  
 4 CONFIDENCE LEVEL = 1  
 4 SCORE = 1  
 4 R E S U L T = 4

5 [5] Rainfall intensity (inches)  
     rainfall\_intensity = 3.75

6 [6a] Surface permeability (cm/sec)  
surface\_permeability = 0.000343  
6 CONFIDENCE LEVEL = 1  
6 SCORE = 1  
6 R E S U L T = 3

7 R E S U L T = 26

8 R E S U L T = 54.16666667

9 [9] Flooding potential  
flooding\_potential = moderate  
9 CONFIDENCE LEVEL = 1  
9 SCORE = 2  
9 R E S U L T = 16

10 R E S U L T = 70.16666667

11 [11a] Type of facility -- surface water  
facility = spill  
11 CONFIDENCE LEVEL = 1  
11 [11d] Spill  
spill = ineffective  
11 CONFIDENCE LEVEL = 1  
11 SCORE = 1  
11 R E S U L T = 1

12 R E S U L T = 70.16666667

13 [13] Observed releases in groundwater  
groundwater\_release = yes  
13 CONFIDENCE LEVEL = 1  
13 SCORE = 100

20 R E S U L T = 100

21 [21a] Type of facility -- groundwater  
gw\_facility = gw\_contamination  
21 CONFIDENCE LEVEL = 1  
21 [21f] Site where contamination has been observed in groundwater  
gw\_contamination = ineffective  
21 CONFIDENCE LEVEL = 1  
21 SCORE = 1  
21 R E S U L T = 1

22 R E S U L T = 100

23 [23] Observed release in air  
air\_release = no  
23 CONFIDENCE LEVEL = 1  
23 SCORE = 0  
23 R E S U L T = 0

24 [24] Observed release of volatiles in air  
air\_release\_volatile = no  
24 CONFIDENCE LEVEL = 1

25 CONFIDENCE LEVEL = 1

26 [26] Net precipitation  
ap\_net\_precipitation = 13.0

26 CONFIDENCE LEVEL = 1

27 [27] Annual average wind speed  
wind\_velocity = 6.0

27 CONFIDENCE LEVEL = 1

28 [28] Porosity of the soil  
soil\_porosity = 0.66

28 CONFIDENCE LEVEL = 1

29 [29] Days/year with precipitation higher than 0.25mm  
days\_high\_precipitation = 180.0

29 CONFIDENCE LEVEL = 1

30 [30] Activity at the site  
site\_activity = heavy

30 CONFIDENCE LEVEL = 1

33 R E S U L T = 0

34 [34a] Type of facility -- air  
air\_facility = air\_contaminated\_soil

34 CONFIDENCE LEVEL = 1

34 [34d] Contaminated soil -- air  
air\_contaminated\_soil = highly\_effective

34 CONFIDENCE LEVEL = 1

34 SCORE = 0.2

34 R E S U L T = 0.2

35 R E S U L T = 0.0

42 Maximum health hazard index -- surface water  
sw\_health\_hazard\_index = 3.0

42 CONFIDENCE LEVEL = 1

42 SCORE = 3

42 R E S U L T = 3

43 R E S U L T = 33.33333333

44 Maximum ecological hazard index -- surface water  
sw\_ecological\_hazard\_index = 2.0

44 CONFIDENCE LEVEL = 1

44 SCORE = 2

44 R E S U L T = 2

45 R E S U L T = 33.33333333

46 Sum of health hazard quotients -- groundwater  
gw\_health\_quotient\_sum = 43279.83

46 CONFIDENCE LEVEL = 1

47 R E S U L T = 6  
48 R E S U L T = 100.0  
49 Sum of ecological hazard quotients -- groundwater  
gw\_ecological\_quotient\_sum = 7.88  
49 CONFIDENCE LEVEL = 1  
49 SCORE = 7.87824698  
49 R E S U L T = 0.89642959  
50 SCORE = 6  
50 R E S U L T = 6  
51 R E S U L T = 100.0  
  
62 health hazard index  
air\_health\_hazard\_index = 3.0  
62 CONFIDENCE LEVEL = 1  
62 SCORE = 3  
62 R E S U L T = 3  
63 R E S U L T = 33.33333333  
64 ecological hazard index  
air\_ecological\_hazard\_index = 4.0  
64 CONFIDENCE LEVEL = 1  
64 SCORE = 4  
64 R E S U L T = 4  
65 R E S U L T = 66.66666667  
66 [66a] Population drinking from surface water within 3 miles  
sw\_population\_within\_3miles\_from\_entry = 30000.0  
66 CONFIDENCE LEVEL = 1  
66 SCORE = 3  
66 R E S U L T = 9  
67 [67] Water use of nearest surface water body(ies)  
surface\_water\_use = slight  
67 CONFIDENCE LEVEL = 1  
67 SCORE = 1  
67 R E S U L T = 3  
68 [68a] Population within 1000 feet of the site -- surface water  
sw\_population\_within\_1000ft = 1000.0  
68 CONFIDENCE LEVEL = 1  
68 SCORE = 3  
68 R E S U L T = 3  
69 [69] Distance to installation boundary (feet) -- surface water  
sw\_distance\_to\_boundary = 1.0  
69 CONFIDENCE LEVEL = 1

land\_use\_within\_1mile = high  
70 CONFIDENCE LEVEL = 1  
70 SCORE = 3  
70 R E S U L T = 3  
71 R E S U L T = 21  
72 R E S U L T = 77.77777778  
73 [73a] Importance/sensitivity of biota/habitats -- surface water-3m  
sw\_habitats\_sensitivity\_3m\_down\_or\_1m\_anydirection = moderate  
73 CONFIDENCE LEVEL = 1  
73 SCORE = 2  
73 R E S U L T = 10  
74 [74a] Presence of "critical environments" -- surface water  
sw\_critical\_environments\_within\_1mile = absent  
74 CONFIDENCE LEVEL = 1  
74 COMMENT for sw\_critical\_environments\_within\_1mile:  
]  
74 [74b] Presence of "critical environments" -- surface water  
sw\_critical\_environments\_within\_1-1.5miles = absent  
74 CONFIDENCE LEVEL = 1  
74 SCORE = 0  
74 R E S U L T = 0  
75 R E S U L T = 10  
76 R E S U L T = 55.55555556  
77 [77b] Distance from waste location to well(s) (feet) = d  
flow\_distance\_to\_wells = 5249.3  
77 CONFIDENCE LEVEL = 1  
77 [77e] Hydraulic gradient in aquifer -- wells = i  
hydraulic\_gradient\_to\_wells = 0.01  
77 CONFIDENCE LEVEL = 1  
77 [77c] Effective porosity of aquifer -- wells = n  
aquifer\_porosity\_to\_wells = 0.01  
77 CONFIDENCE LEVEL = 1  
77 [77d] Hydraulic conductivity of aquifer -- wells (ft/yr) = k  
aquifer\_conductivity\_to\_wells = 355.13  
77 CONFIDENCE LEVEL = 1  
77 [77a] Groundwater travel time to wells (years) = dn/ki  
travel\_time\_to\_wells = 12.32  
77 CONFIDENCE LEVEL = 1  
77 SCORE = 2  
77 R E S U L T = 18  
78 [78e] Hydraulic gradient in aquifer -- surface water = i  
hydraulic\_gradient\_to\_surface\_water = 0.01  
78 CONFIDENCE LEVEL = 1  
78 [78c] Effective porosity of aquifer -- surface water = n  
aquifer\_porosity\_to\_surface\_water = 0.01  
78 CONFIDENCE LEVEL = 1  
78 [78d] Hydraulic conductivity of aquifer -- surface water (ft/yr) = k  
aquifer\_conductivity\_to\_surface\_water = 355.13  
78 CONFIDENCE LEVEL = 1  
78 [78b] Distance from waste location to surface water (feet) = d  
flow\_distance\_to\_surface\_water = 4500.0  
78 CONFIDENCE LEVEL = 1  
78 [78a] GW travel time to surface water(years) -3 miles entry= dn/ki

79 [79] Groundwater use of the uppermost aquifer  
groundwater\_use = slight  
79 CONFIDENCE LEVEL = 1  
79 SCORE = 1  
79 R E S U L T = 4

80 [80a] Population at risk from groundwater contamination  
gw\_population\_at\_risk = 30000.0  
80 CONFIDENCE LEVEL = 1  
80 [80b] Groundwater users vulnerability  
groundwater\_users\_vulnerability = medium2  
80 CONFIDENCE LEVEL = 1  
80 SCORE = 27  
80 R E S U L T = 27

81 [81a] Population within 1000 feet of the site -- groundwater  
gw\_population\_within\_1000ft = 1000.0  
81 CONFIDENCE LEVEL = 1  
81 SCORE = 3  
81 R E S U L T = 3

82 [82] Distance to installation boundary (feet) -- groundwater  
gw\_distance\_to\_boundary = 1.0  
82 CONFIDENCE LEVEL = 1  
82 SCORE = 3  
82 R E S U L T = 3

83 R E S U L T = 55

84 R E S U L T = 57.29166667

85 [85b] Distance from waste location to natural area (feet) = d  
flow\_distance\_to\_biota = 45000.0  
85 CONFIDENCE LEVEL = 1  
85 [85a] Groundwater travel time to natural area (years) = dn/ki  
travel\_time\_to\_biota = 1000000.0  
85 CONFIDENCE LEVEL = 1  
85 SCORE = 0  
85 R E S U L T = 0

86 SCORE = 0  
86 R E S U L T = 0

87 [87a] Presence of "critical environments" -- groundwater  
gw\_critical\_environments\_within\_1mile = absent  
87 CONFIDENCE LEVEL = 1  
87 [87b] Presence of "critical environments" -- groundwater  
gw\_critical\_environments\_within\_1-1.5miles = absent  
87 CONFIDENCE LEVEL = 1  
87 SCORE = 0  
87 R E S U L T = 0

88 R E S U L T = 0

89 R E S U L T = 0.0

90 [90c] Population within 1/4 mile of the site -- air  
air\_population\_within\_1/4mile = 3000.0  
90 CONFIDENCE LEVEL = 1  
90 [90c] Population within 1/2 mile of the site -- air  
air\_population\_within\_1/2mile = 4000.0

90 SCORE = 24  
90 R E S U L T = 24

91 [91a] Distance to the nearest industrial-commercial site  
air\_landuse\_commind = 2624.65  
91 CONFIDENCE LEVEL = 1  
91 [91b] Distance to the nearest Park/Reserve/Residential area  
air\_landuse\_park = 5249.3  
91 CONFIDENCE LEVEL = 1  
91 SCORE = 2  
91 R E S U L T = 4

92 What is the distance to the nearest installation boundary (feet)  
air\_distance\_to\_boundary = 1.0  
92 CONFIDENCE LEVEL = 1  
92 SCORE = 3  
92 R E S U L T = 3

93 R E S U L T = 31

94 R E S U L T = 79.48717949

95 [95a] Distance to the nearest coastal wetland -- air  
air\_distance\_to\_wetland\_coastal = 3149580.0  
95 CONFIDENCE LEVEL = 1  
95 [95b] Distance to the nearest freshwater wetland -- air  
air\_distance\_to\_wetland\_freshwater = 2624.65  
95 CONFIDENCE LEVEL = 1  
95 [95c] Distance to the nearest critical habitat -- air  
air\_distance\_to\_critical\_habitat = 10498.6  
95 CONFIDENCE LEVEL = 1  
95 SCORE = 1  
95 R E S U L T = 2

96 SCORE = 0  
96 R E S U L T = 0

97 R E S U L T = 2

98 R E S U L T = 22.22222222

99 R E S U L T = 18.19135802

100 R E S U L T = 12.99382716

101 R E S U L T = 57.29166667

102 R E S U L T = 0.0

103 R E S U L T = 0.0

104 R E S U L T = 0.0

105 R E S U L T = 135.03755931

106 R E S U L T = 31.82865797

HAZARD WORKSHEET DATA

Xylene -- surface\_water [4] 13500.0

Xylene -- surface\_water [8] 1  
Xylene -- surface\_water [8] 1  
Xylene -- groundwater [1] Xylene  
Xylene -- groundwater [2] 20000.0  
Xylene -- groundwater [4] 13500.0  
Xylene -- groundwater [6] 320.0  
Xylene -- groundwater [7] 40000.0  
Xylene -- groundwater [8] 41600.0  
Xylene -- groundwater [9] 81600.0  
Xylene -- groundwater [10] 37777.77777778  
Xylene -- groundwater [11] 1.48148148  
Xylene -- air [1] Xylene  
Xylene -- surface\_water [8] 1  
Xylene -- air [1] Xylene  
Xylene -- air [4] 320.0  
Xylene -- air [7] 3  
Xylene -- air [9] 1  
Xylene -- surface\_water [8] 1  
Benzene -- surface\_water [1] Benzene  
Benzene -- surface\_water [3] 30.0  
Benzene -- surface\_water [4] 5300.0  
Benzene -- surface\_water [6] 32.0  
Benzene -- surface\_water [7] 2  
Benzene -- surface\_water [8] 2  
Benzene -- surface\_water [9] 2  
Benzene -- surface\_water [7] 2  
Benzene -- surface\_water [8] 2  
Benzene -- surface\_water [7] 2  
Benzene -- surface\_water [8] 2  
Benzene -- surface\_water [7] 2  
Benzene -- surface\_water [8] 2  
Benzene -- surface\_water [7] 2  
Benzene -- surface\_water [8] 2  
Benzene -- surface\_water [7] 2  
Benzene -- surface\_water [8] 2  
Benzene -- surface\_water [7] 2  
Benzene -- surface\_water [8] 2  
Benzene -- surface\_water [7] 2  
Benzene -- surface\_water [8] 2  
Benzene -- groundwater [1] Benzene  
Benzene -- groundwater [2] 23000.0  
Benzene -- groundwater [3] 30.0  
Benzene -- groundwater [4] 5300.0  
Benzene -- groundwater [6] 32.0  
Benzene -- groundwater [7] 46000.0  
Benzene -- groundwater [8] 4784.0  
Benzene -- groundwater [9] 50784.0  
Benzene -- groundwater [10] 1692.8  
Benzene -- groundwater [11] 4.33962264  
Benzene -- surface\_water [7] 2  
Benzene -- surface\_water [8] 2  
Benzene -- air [1] Benzene  
Benzene -- air [4] 32.0  
Benzene -- air [5] 30.0  
Benzene -- air [7] 2  
Benzene -- air [9] 2  
Benzene -- air [9] 4  
Benzene -- surface\_water [7] 2



toluene -- groundwater [6] 83  
toluene -- groundwater [7] 72000.0  
toluene -- groundwater [8] 19422.0  
toluene -- groundwater [9] 91422.0  
toluene -- groundwater [10] 3809.25  
toluene -- groundwater [11] 2.05714286  
toluene -- surface\_water [7] 2  
toluene -- surface\_water [8] 1  
toluene -- air [1] toluene  
toluene -- air [4] 83  
toluene -- air [5] 24.0  
toluene -- air [7] 2  
toluene -- air [9] 1  
toluene -- air [9] 4  
toluene -- surface\_water [7] 2  
toluene -- surface\_water [8] 1  
toluene -- air [9] 4  
max\_ecological\_index -- surface\_water [16] 2  
max\_ecological\_index -- air [16] 4  
max\_aquatic\_index -- surface\_water [14] 2