

Medema

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Fax message

To Harvard University
Attn. Prof. Matthew Meselson

Fax no. 00 - 1 617 ⁴⁹⁵⁸³⁰⁸ ~~4958200~~ 466 2444

From Jan Medema

Direct dialing +31 15 84 35 17

Date September 1st, 1994

Subject _____

Your ref. _____

Our ref. 94D1F/1327

Number of pages (incl. this one) 16

Dear Matthew,

Sorry the calculations took some more time than I expected. The uncertainty in all the calculations, ours, yours and those of Jaycor are mainly in the vertical wind profile in the complex (hilly built up area) terrain. We estimate the uncertainty to be so large that dosages are calculated with an uncertainty of one order of magnitude (but less than two orders). Actually what we are saying is two fold. On the one hand it would not be surprising that on one spot there is a casualty rate of 2% and on one close to it 0%. On the other hand any calculation that shows an attack rate with it within one order of magnitude of the observed attack rate is satisfactory. Also in our calculations we struggled with the problem of the wind profile. In order to keep it simple we just took an average wind speed.

I would not worry too much about the sheep. Every calculation already becomes uncertain over distances of 1 km. Normally extrapolations to 10 km. are acceptable although the uncertainty increases with the distance. Any dosage given for 50 km. travel is just a wild guess.

I think most experts who read your paper will accept the uncertainties that you had to deal with but will be very much convinced that you came close to the truth.



Jan Medema

PS. In an annex some lines for the news bulletin.

Notes for Anthrax computations.
C.J.P.van Buijtenen, Aug.1994

The computations were done according to the so-called 'yellow book' of TNO. This follows essentially the Pasquill system, with some corrections. In this case the main correction used is that for the averaging time. This makes the concentrations and dosages for an instantaneous source about 2x higher than the regular Pasquill system.

The particles are treated as if they are a special unit of mass. This has the same effect as having a fixed number of particles per unit mass.

The tables cover a distance of 100m to 10000m or from 1000m to 100000m (100km). In some cases both tables were printed to cover a larger range.

The probit slope is interpreted in the sense that the factor in the number of particles corresponding to 1 st.dev. in percentage casualties is:

$$\text{factor} = 10^{(1 / \text{slope})} \quad (\text{slope}=0.7 \rightarrow \text{factor}=26.8)$$

In the tables for the contour it is the distance from the centerline to the contour that is printed.
(= half of contour width)

The treatment of the windspeed is a problem in the Pasquill system. One can give only one wind speed, although in reality the wind increases with height. Usually for ground level sources the wind speed at a reference height is chosen, e.g. at 10 m level. (In older calculations this was often 2m level). For sources at a higher elevation often the wind speed for that level is chosen. In the present computation an average wind speed over the first 10 meter was chosen.

TABLE I Total Dose in Spores

Dose
9-10¹⁰

3 INSTANT. SOURCE: NR OF PARTICLES SOURCE DIM XYZ= 0 0 0
 SOURCE STRENGTH= 1E+10 PART. AVER. TIME= 20 SEC HB= 10 M
 Z0= .1 M FALL VEL.= 0 M/S DEP. VEL.= 0 m/s Z-level= 1 m
 WIND SPEEDS : 3.8 3.8 4.3 4.3 4.5 4.5 M/S
 MIXING LAYERS NOT USED

DIST(M)	VERY STAB.	STABLE	NEUTRAL	L.UNSTAB.	UNSTABLE	VERY UNSTAB.
100	112.383	2358.381	4365.119	3575.180	2075.423	1188.549
130	315.317	3114.931	4211.674	2915.029	1677.462	901.185
150	783.915	3700.445	3706.394	2308.141	1248.021	631.604
200	1652.002	3768.291	2848.732	1606.075	819.744	392.269
250	2295.615	3408.341	2201.788	1173.337	579.903	268.660
300	2654.626	2974.676	1740.629	894.672	433.232	196.436
350	2799.699	2574.961	1408.494	765.973	337.059	150.458
400	2808.972	2233.281	1163.580	572.484	270.502	119.298
450	2739.449	1948.100	978.460	474.556	222.447	97.153
500	2627.789	1711.280	835.309	400.522	186.553	80.817
600	2358.201	1348.932	631.622	297.683	137.334	58.726
700	2088.804	1091.131	496.397	231.045	105.853	44.807
800	1846.807	902.155	401.821	185.236	84.414	35.436
900	1637.489	759.715	332.915	152.293	69.105	28.806
1000	1458.787	649.688	281.038	127.746	57.761	23.930
1100	1306.612	562.876	240.925	108.923	49.102	20.233
1200	1176.732	493.113	209.209	94.144	42.329	17.358
1500	886.165	349.483	145.383	64.706	28.914	11.715
2000	599.738	222.445	90.652	39.839	17.675	7.054
2500	436.919	156.016	62.739	27.325	12.061	4.759
3000	335.067	116.529	46.410	20.073	8.824	3.450
3500	266.749	90.954	35.953	15.462	6.775	2.628
4000	218.462	73.339	28.813	12.332	5.389	2.077
4500	182.924	60.632	23.699	10.101	4.403	1.687
5000	155.915	51.129	19.896	8.449	3.675	1.401
6000	118.048	38.050	14.698	6.203	2.688	1.015
7000	93.170	29.627	11.376	4.776	2.064	0.773
8000	75.835	23.849	9.111	3.808	1.641	0.611
9000	63.207	19.692	7.490	3.119	1.341	0.496
10000	53.684	16.590	6.286	2.608	1.119	0.412

Table I Continued

Dose
 5×10^{10}
 (sequel)

3 INSTANT SOURCE: NR OF PARTICLES SOURCE DIM XYZ= 0 0 0
 SOURCE STRENGTH= 1E+10 PART. AVER. TIME= 20 SEC HB= 10 M
 ZO= .1 M FALL VEL.= 0 M/S DEP. VEL.= 0 m/s Z-level= 1 m
 WIND SPEEDS : 3.8 3.8 4.3 4.3 4.5 4.5 M/S
 MIXING LAYERS NOT USED

DIST (M)	VERY STAB	STABLE	NEUTRAL	L. UNSTAB.	UNSTABLE	VERY UNSTAB.
1000	1458.787	649.688	281.038	127.746	57.761	23.930
1200	1176.732	493.113	209.209	94.144	42.329	17.358
1500	886.165	349.483	145.383	64.706	28.914	11.715
2000	599.738	222.445	90.652	39.839	17.675	7.054
2500	436.919	156.016	62.739	27.325	13.061	4.759
3000	335.067	116.529	46.410	20.073	8.824	3.450
3500	266.749	90.954	35.953	15.462	6.775	2.628
4000	218.462	73.339	28.813	12.332	5.389	2.077
4500	182.924	60.632	23.699	10.101	4.403	1.687
5000	155.915	51.129	19.896	8.449	3.675	1.401
6000	118.048	38.050	14.698	6.203	2.688	1.015
7000	93.170	29.627	11.376	4.776	2.064	0.773
8000	75.835	23.849	9.111	3.808	1.641	0.611
9000	63.207	19.692	7.490	3.119	1.341	0.496
10000	53.684	16.590	6.286	2.608	1.119	0.412
11000	47.788	14.670	5.510	2.285	0.990	0.366
12000	42.780	13.105	4.901	2.030	0.884	0.327
15000	32.197	9.811	3.630	1.498	0.661	0.244
20000	22.310	6.755	2.465	1.012	0.455	0.167
25000	16.779	5.057	1.826	0.747	0.340	0.125
30000	13.293	3.991	1.428	0.582	0.269	0.098
35000	10.916	3.268	1.161	0.472	0.220	0.080
40000	9.202	2.748	0.970	0.393	0.185	0.067
45000	7.915	2.358	0.828	0.335	0.159	0.058
50000	6.917	2.057	0.718	0.290	0.138	0.050
60000	5.478	1.623	0.562	0.226	0.109	0.040
70000	4.497	1.329	0.457	0.183	0.089	0.032
80000	3.790	1.117	0.382	0.153	0.075	0.027
90000	3.259	0.959	0.326	0.130	0.064	0.023
100000	2.848	0.836	0.283	0.113	0.056	0.020

TABLE II
 Percentage Casualties
 LD50 = 4100

% Cas.

LD50 = 4100

3 INSTANT. SOURCE: CASUALTIES PERCENT SOURCE DIM XYZ= 0 0 0
 SOURCE STRENGTH= 1E+10 PART. AVER. TIME= 20 SEC HB= 10 M
 Z0= .1 M FALL VEL.= 0 M/S DEP. VEL.= 0 m/s Z-level= 1 m
 WIND SPEEDS: 3.8 3.8 4.3 4.3 4.5 4.5 M/S
 MIXING LAYERS NOT USED
 LD50= 4100 Probit slope= .7

DIST(M)	VERY STAB	STABLE	NEUTRAL	L. UNSTAB.	UNSTABLE	VERY UNSTAB.
100	13.710	43.324	50.760	47.642	41.802	35.330
120	21.775	46.671	50.326	45.870	39.293	32.255
150	30.750	48.757	48.776	43.067	35.883	28.480
200	39.114	48.977	45.593	38.786	31.229	23.779
250	43.002	47.760	42.504	35.184	27.606	20.369
300	44.743	46.115	39.726	32.176	24.723	17.782
350	45.384	44.377	37.266	29.640	22.376	15.751
400	45.424	42.674	35.090	27.475	20.428	14.112
450	45.122	41.051	33.157	25.606	18.784	12.762
500	44.621	39.526	31.432	23.975	17.377	11.630
600	43.324	36.770	28.480	21.263	15.092	9.839
700	41.878	34.368	26.048	19.096	13.314	8.488
800	40.421	32.267	24.006	17.321	11.891	7.432
900	39.011	30.415	22.264	15.840	10.725	6.587
1000	37.670	28.772	20.759	14.583	9.752	5.895
1100	36.405	27.303	19.445	13.502	8.928	5.319
1200	35.217	25.982	18.285	12.563	8.222	4.833
1500	32.072	22.706	15.501	10.360	6.601	3.747
2000	27.948	18.784	12.327	7.946	4.888	2.649
2500	24.804	16.018	10.192	6.384	3.820	1.995
3000	22.322	13.953	8.655	5.293	3.095	1.568
3500	20.308	12.348	7.494	4.490	2.575	1.270
4000	18.636	11.062	6.588	3.876	2.185	1.053
4500	17.224	10.009	5.860	3.393	1.884	0.889
5000	16.013	9.129	5.264	3.004	1.645	0.762
6000	14.040	7.741	4.346	2.418	1.293	0.580
7000	12.498	6.697	3.675	2.001	1.048	0.457
8000	11.256	5.882	3.164	1.690	0.870	0.370
9000	10.233	5.230	2.763	1.451	0.735	0.305
10000	9.374	4.696	2.442	1.263	0.630	0.257

TABLE B
Continued

25 cases
sequel

3 INSTANT.SOURCE: CASUALTIES PERCENT SOURCE DIM XYZ= 0 0 0
 SOURCE STRENGTH= 1E+10 PART. AVER.TIME= 20 SEC HB= 10 M
 Z0= .1 M FALL VEL.= 0 M/S DEP.VEL.= 0 m/s Z-level= 1 m
 WIND SPEEDS : 3.8 3.8 4.3 4.3 4.5 4.5 M/S
 MIXING LAYERS NOT USED
 LD50= 4100 Probit slope= .7

DIST (M)	VERY STAB	STABLE	NEUTRAL	L.UNSTAB.	UNSTABLE	VERY UNSTAB.
1000	37.670	28.772	20.759	14.583	9.752	5.895
1200	35.217	25.982	18.285	12.563	8.222	4.833
1500	32.072	22.706	15.501	10.360	6.601	3.747
2000	27.948	18.784	12.327	7.946	4.888	2.649
2500	24.804	16.018	10.192	6.384	3.820	1.995
3000	22.322	13.953	8.655	5.293	3.095	1.568
3500	20.308	12.348	7.494	4.490	2.575	1.270
4000	18.636	11.062	6.588	3.876	2.185	1.053
4500	17.224	10.009	5.860	3.393	1.884	0.889
5000	16.013	9.129	5.264	3.004	1.645	0.762
6000	14.040	7.741	4.346	2.418	1.293	0.580
7000	12.498	6.697	3.675	2.001	1.048	0.457
8000	11.256	5.882	3.164	1.690	0.870	0.370
9000	10.233	5.230	2.763	1.451	0.735	0.305
10000	9.374	4.696	2.442	1.263	0.630	0.257
11000	8.796	4.341	2.221	1.137	0.567	0.230
12000	8.271	4.034	2.039	1.034	0.514	0.206
15000	7.031	3.327	1.630	0.806	0.397	0.155
20000	5.648	2.570	1.208	0.578	0.282	0.106
25000	4.730	2.086	0.949	0.442	0.214	0.078
30000	4.072	1.751	0.775	0.354	0.170	0.061
35000	3.575	1.504	0.650	0.291	0.140	0.049
40000	3.185	1.315	0.557	0.246	0.117	0.041
45000	2.872	1.166	0.485	0.211	0.100	0.034
50000	2.613	1.045	0.428	0.184	0.087	0.029
60000	2.211	0.862	0.342	0.144	0.068	0.022
70000	1.914	0.729	0.283	0.117	0.055	0.018
80000	1.684	0.629	0.239	0.097	0.046	0.014
90000	1.501	0.551	0.205	0.082	0.039	0.012
100000	1.353	0.489	0.179	0.071	0.033	0.010

TABLE II
 Percentage Casualties
 LD₅₀ = 8000

1/2 Can
 LD₅₀ = 8000

3 INSTANT.SOURCE: %CASUALTIES PERCENT SOURCE DIM XYZ= 0 0 0
 SOURCE STRENGTH= 1E+10 PART. AVER.TIME= 20 SEC HB= 10 M
 Z0= .1 M FALL VEL.= 0 M/S DEP.VEL.= 0 m/s Z-level= 1 m
 WIND SPEEDS : 3.8 3.8 4.3 4.3 4.5 4.5 M/S
 MIXING LAYERS NOT USED
 LD50= 8000 Probit slope= .7

DIST(M)	VERY STAB	STABLE	NEUTRAL	L.UNSTAB.	UNSTABLE	VERY UNSTAB.
100	9.737	35.519	42.694	39.652	34.083	28.108
120	16.279	38.715	42.268	37.945	31.743	25.341
150	24.004	40.734	40.753	35.276	28.610	22.010
200	31.577	40.949	37.680	31.273	24.428	17.966
250	35.215	39.767	34.745	27.976	21.249	15.110
300	36.868	38.180	32.144	25.271	18.769	12.989
350	37.479	36.519	29.874	23.025	16.783	11.353
400	37.517	34.904	27.890	21.135	15.159	10.053
450	37.229	33.380	26.148	19.524	13.805	8.997
500	36.751	31.959	24.608	18.133	12.660	8.122
600	35.519	29.420	22.010	15.853	10.828	6.759
700	34.155	27.237	19.903	14.061	9.428	5.749
800	32.792	25.352	18.159	12.616	8.323	4.972
900	31.482	23.709	16.689	11.424	7.430	4.358
1000	30.245	22.265	15.433	10.425	6.693	3.862
1100	29.086	20.987	14.347	9.575	6.076	3.454
1200	28.005	19.847	13.398	8.843	5.552	3.113
1500	25.178	17.061	11.154	7.153	4.369	2.362
2000	21.547	13.805	8.660	5.349	3.151	1.625
2500	18.838	11.566	7.026	4.212	2.412	1.198
3000	16.738	9.928	5.873	3.435	1.922	0.924
3500	15.059	8.676	5.018	2.874	1.576	0.738
4000	13.685	7.687	4.359	2.451	1.321	0.604
4500	12.537	6.887	3.838	2.122	1.126	0.504
5000	11.563	6.226	3.415	1.861	0.973	0.427
6000	9.997	5.198	2.774	1.473	0.752	0.319
7000	8.792	4.438	2.313	1.201	0.600	0.248
8000	7.835	3.854	1.968	1.002	0.492	0.198
9000	7.056	3.391	1.700	0.851	0.411	0.161
10000	6.410	3.017	1.488	0.733	0.349	0.134

TABLE II
Continued

4/5 Cas
(sequel)

3 INSTANT.SOURCE: *CASUALTIES PERCENT SOURCE DIM XYZ= 0 0 0
 SOURCE STRENGTH= 1E+10 PART. AVER.TIME= 20 SEC HB= 10 M
 ZO= .1 M FALL VEL.= 0 M/S DEP.VEL.= 0 m/s Z-level= 1 m
 WIND SPEEDS : 3.8 3.8 4.3 4.3 4.5 4.5 M/S
 MIXING LAYERS NOT USED
 LD50= 8000 Probit slope= .7

DIST (M)	VERY STAB	STABLE	NEUTRAL	L.UNSTAB.	UNSTABLE	VERY UNSTAR.
1000	30.245	22.265	15.433	10.425	6.693	3.862
1200	28.005	19.847	13.398	8.843	5.552	3.113
1500	25.178	17.061	11.154	7.153	4.369	2.362
2000	21.547	13.805	8.660	5.349	3.151	1.625
2500	18.838	11.566	7.026	4.212	2.412	1.198
3000	16.738	9.928	5.873	3.435	1.922	0.924
3500	15.059	8.676	5.018	2.874	1.576	0.738
4000	13.685	7.687	4.359	2.451	1.321	0.604
4500	12.537	6.887	3.838	2.122	1.126	0.504
5000	11.563	6.226	3.415	1.861	0.973	0.427
6000	9.997	5.198	2.774	1.473	0.752	0.319
7000	8.792	4.438	2.313	1.201	0.600	0.248
8000	7.835	3.854	1.968	1.002	0.492	0.198
9000	7.056	3.391	1.700	0.851	0.411	0.161
10000	6.410	3.017	1.488	0.733	0.349	0.134
11000	5.978	2.770	1.344	0.655	0.312	0.119
12000	5.588	2.559	1.226	0.592	0.281	0.106
15000	4.680	2.078	0.964	0.454	0.213	0.079
20000	3.687	1.572	0.699	0.318	0.148	0.053
25000	3.041	1.256	0.540	0.239	0.111	0.038
30000	2.585	1.041	0.435	0.189	0.087	0.029
35000	2.245	0.884	0.361	0.154	0.070	0.023
40000	1.982	0.766	0.306	0.128	0.059	0.019
45000	1.772	0.673	0.264	0.109	0.050	0.016
50000	1.601	0.599	0.231	0.094	0.043	0.014
60000	1.337	0.487	0.182	0.073	0.033	0.010
70000	1.145	0.408	0.149	0.058	0.026	8.002E-03
80000	0.998	0.348	0.124	0.048	0.022	6.455E-03
90000	0.882	0.303	0.106	0.040	0.018	5.329E-03
100000	0.789	0.266	0.092	0.034	0.015	4.479E-03

TABLE IV
Contour for 10⁻⁸

*Contour
10⁻⁸*

5 INSTANT. SOURCE: CONTOUR MGIN/M3 SOURCE DIM XYZ= 0 0 0
 SOURCE STRENGTH= 1 MG AVER.TIME= 20 SEC HB= 10 M
 Z0= .1 M FALL VEL.= 0 M/S DEP.VEL.= 0 m/s Z-level= 1 m
 WIND SPEEDS : 4.3 4.3 4.3 4.3 4.3 4.3 M/S
 MIXING LAYERS NOT USED
 DOSIS CONTOUR FOR : 1E-08 MGIN/M3

DIS(M)	VERY STAB	STABLE	NEUTRAL	L.UNSTAB.	UNSTABLE	VERY UNSTAB.
100	5.548	11.436	15.967	24.679	36.790	49.769
120	7.441	13.764	19.785	28.760	42.381	56.918
150	9.972	17.044	22.785	34.531	50.208	66.868
200	13.783	22.122	29.008	43.458	62.144	81.888
250	17.299	26.861	34.826	51.744	73.049	95.425
300	20.617	31.348	40.334	59.535	83.161	107.804
350	23.787	35.639	45.594	66.926	92.630	119.233
400	26.838	39.767	50.644	73.978	101.558	129.852
450	29.791	43.757	55.515	80.738	110.019	139.764
500	32.659	47.626	60.227	87.239	118.067	149.046
600	38.182	55.056	69.243	99.571	133.093	165.954
700	43.470	62.138	77.794	111.135	146.895	180.932
800	48.561	68.928	85.948	122.043	159.648	194.226
900	53.487	75.466	93.759	132.376	171.483	206.008
1000	58.267	81.781	101.264	142.197	182.496	216.408
1100	62.919	87.899	108.495	151.556	192.764	225.522
1200	67.455	93.837	115.476	160.491	202.348	233.421
1500	80.470	110.722	135.111	185.057	227.444	250.307
2000	100.587	136.353	164.256	219.762	258.863	256.753
2500	119.191	159.530	189.824	248.059	279.112	233.639
3000	136.605	180.740	212.459	270.897	289.138	165.341
3500	153.038	200.297	232.570	288.833	289.004	0.000E+00
4000	168.633	218.418	250.436	302.186	277.917	0.000E+00
4500	183.496	235.266	266.258	311.111	253.781	0.000E+00
5000	197.707	250.960	280.181	315.629	211.545	0.000E+00
6000	224.421	279.254	302.727	310.836	0.000E+00	0.000E+00
7000	249.157	303.861	318.611	284.725	0.000E+00	0.000E+00
8000	272.180	325.157	328.043	228.051	0.000E+00	0.000E+00
9000	293.686	343.402	330.965	93.072	0.000E+00	0.000E+00
10000	313.824	358.779	327.034	0.000E+00	0.000E+00	0.000E+00

*begin on the table in
 10-8 on the line*



TABLE V
Contour for 5.10⁻⁸

5 INSTANT. SOURCE: CONTOUR MGIN/M3 SOURCE DIM XYZ= 0 0 0
 SOURCE STRENGTH= 1 MG AVER.TIME= 20 SEC HB= 10 M
 Z0= .1 M FALL VEL.= 0 M/S DEP.VEL.= 0 m/s Z-level= 1 m
 WIND SPEEDS : 4.3 4.3 4.3 4.3 4.3 4.3 M/S
 MIXING LAYERS NOT USED
 DOSIS CONTOUR FOR : 5E-08 MGIN/M3

DIS (M)	VERY STAB	STABLE	NEUTRAL	L. UNSTAB.	UNSTABLE	VERY UNSTAB.
100	4.078	9.931	14.090	21.666	31.980	42.610
120	5.976	12.032	16.566	25.167	36.639	48.300
150	8.370	14.956	20.041	30.054	43.048	56.013
200	11.857	19.419	25.372	37.474	52.564	67.168
250	15.012	23.527	30.277	44.211	60.981	76.668
300	17.956	27.375	34.856	50.418	68.540	84.835
350	20.743	31.016	39.170	56.189	75.389	91.866
400	23.405	34.487	43.260	61.588	81.630	97.893
450	25.965	37.812	47.156	66.661	87.335	103.007
500	28.436	41.010	50.881	71.442	92.557	107.271
600	33.157	47.078	57.880	80.236	101.714	113.412
700	37.633	52.774	64.362	88.130	109.339	116.499
800	41.903	58.154	70.397	95.234	115.588	116.529
900	45.999	63.259	76.037	101.627	120.562	113.304
1000	49.941	68.120	81.320	107.367	124.324	106.359
1100	53.748	72.761	86.279	112.498	126.910	94.722
1200	57.432	77.201	90.937	117.054	128.330	76.112
1500	67.848	89.463	103.293	127.496	125.327	0.000E+00
2000	83.498	106.964	119.212	134.728	87.859	0.000E+00
2500	97.475	121.469	130.041	128.645	0.000E+00	0.000E+00
3000	110.107	133.441	136.161	104.865	0.000E+00	0.000E+00
3500	121.603	143.157	137.585	34.072	0.000E+00	0.000E+00
4000	132.107	150.786	133.965	0.000E+00	0.000E+00	0.000E+00
4500	141.722	156.423	124.431	0.000E+00	0.000E+00	0.000E+00
5000	150.529	160.108	107.002	0.000E+00	0.000E+00	0.000E+00
6000	165.943	161.529	0.000E+00	0.000E+00	0.000E+00	0.000E+00
7000	178.697	154.285	0.000E+00	0.000E+00	0.000E+00	0.000E+00
8000	189.008	136.139	0.000E+00	0.000E+00	0.000E+00	0.000E+00
9000	197.009	100.448	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10000	202.771	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TABLE II
contour for 10⁻⁷

5 INSTANT. SOURCE: CONTOUR MGIN/M3 SOURCE DIM XYZ= 0 0 0
 SOURCE STRENGTH= 1 MG AVER. TIME= 20 SEC HB= 10 M
 Z0= .1 M FALL VEL.= 0 M/S DEP. VEL.= 0 m/s Z-level= 1 m
 WIND SPEEDS : 4.3 4.3 4.3 4.3 4.3 4.3 M/S
 MIXING LAYERS NOT USED
 DOSIS CONTOUR FOR : .0000001 MGIN/M3 ⁻⁷

DIS (M)	VERY STAB	STABLE	NEUTRAL	L. UNSTAB.	UNSTABLE	VERY UNSTAB.
100	3.247	9.208	13.200	20.230	29.669	39.125
120	5.220	11.204	15.512	23.451	33.868	44.073
150	7.575	13.960	18.736	27.906	39.567	50.626
200	10.923	18.131	23.634	34.578	47.851	59.721
250	13.912	21.936	28.091	40.537	54.974	66.992
300	16.679	25.473	32.210	45.937	61.176	72.741
350	19.284	28.797	36.052	50.871	66.603	77.145
400	21.760	31.945	39.658	55.404	71.353	80.302
450	24.131	34.941	43.059	59.582	75.494	82.264
500	26.410	37.805	46.277	63.438	79.075	83.040
600	30.741	43.190	52.231	70.289	84.690	80.874
700	34.819	48.183	57.621	76.110	88.378	72.927
800	38.684	52.841	62.519	80.999	90.210	56.394
900	42.368	57.205	66.974	85.024	90.168	9.434
1000	45.893	61.306	71.026	88.227	88.144	0.000E+00
1100	49.275	65.167	74.703	90.631	83.901	0.000E+00
1200	52.529	68.808	78.027	92.246	76.988	0.000E+00
1500	61.620	78.554	86.037	92.233	13.859	0.000E+00
2000	74.947	91.441	93.340	71.899	0.000E+00	0.000E+00
2500	86.459	100.740	93.140	0.000E+00	0.000E+00	0.000E+00
3000	96.479	106.801	84.169	0.000E+00	0.000E+00	0.000E+00
3500	105.210	109.736	61.541	0.000E+00	0.000E+00	0.000E+00
4000	112.788	109.463	0.000E+00	0.000E+00	0.000E+00	0.000E+00
4500	119.307	105.679	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5000	124.832	97.726	0.000E+00	0.000E+00	0.000E+00	0.000E+00
6000	133.063	61.184	0.000E+00	0.000E+00	0.000E+00	0.000E+00
7000	137.656	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
8000	138.579	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
9000	135.579	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10000	128.095	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TABLE VII

contour for 10⁻⁹

5 INSTANT. SOURCE: CONTOUR MGIN/M3 SOURCE DIM XYZ= 0 0 0
 SOURCE STRENGTH= 1 MG AVER. TIME= 20 SEC HB= 10 M
 Z0= .1 M FALL VEL.= 0 M/S DEP. VEL.= 0 m/s 2-level= 1 m
 WIND SPEEDS : 4.3 4.3 4.3 4.3 4.3 M/S
 MIXING LAYERS NOT USED
 DOSIS CONTOUR FOR : 1E-09 MGIN/M3

DIS(M)	VERY STAB	STABLE	NEUTRAL	L.UNSTAB.	UNSTABLE	VERY UNSTAB.
1000	68.439	98.071	124.354	180.710	242.569	312.489
1200	79.632	113.472	143.461	207.376	275.611	352.345
1500	95.677	135.453	170.609	244.918	321.355	406.370
2000	120.905	169.773	212.713	302.358	389.660	484.251
2500	144.698	201.869	251.776	354.808	450.277	550.080
3000	167.372	232.222	288.432	403.288	504.783	606.057
3500	189.135	261.142	323.093	448.459	554.186	653.553
4000	210.123	288.842	356.049	490.780	599.182	693.473
4500	230.448	315.483	387.513	530.590	640.276	726.435
5000	250.185	341.189	417.648	568.149	677.847	752.852
6000	288.137	390.155	474.423	637.292	743.540	787.004
7000	324.358	436.314	527.153	699.425	797.957	796.682
8000	359.108	480.073	576.376	755.386	842.195	780.881
9000	392.581	521.729	622.500	805.781	876.964	736.386
10000	424.926	561.511	665.823	851.061	902.703	655.965
11000	457.724	602.168	709.855	898.141	935.086	585.420
12000	489.527	641.507	752.370	942.160	961.148	461.582
15000	580.825	752.841	869.714	1055.052	1004.677	0.000E+00
20000	721.944	920.192	1036.783	1186.634	958.141	0.000E+00
25000	852.349	1069.533	1174.527	1253.945	708.964	0.000E+00
30000	974.263	1204.270	1287.275	1257.521	0.000E+00	0.000E+00
35000	1089.127	1326.598	1377.599	1190.333	0.000E+00	0.000E+00
40000	1197.952	1438.041	1447.026	1031.927	0.000E+00	0.000E+00
45000	1301.480	1539.710	1496.358	716.909	0.000E+00	0.000E+00
50000	1400.288	1632.438	1525.814	0.000E+00	0.000E+00	0.000E+00
60000	1585.465	1793.510	1523.245	0.000E+00	0.000E+00	0.000E+00
70000	1756.194	1924.906	1428.623	0.000E+00	0.000E+00	0.000E+00
80000	1914.367	2028.875	1211.262	0.000E+00	0.000E+00	0.000E+00
90000	2061.381	2106.723	761.722	0.000E+00	0.000E+00	0.000E+00
100000	2198.289	2159.030	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TABLE VIII
 Contour for $2 \cdot 10^{-9}$

5 INSTANT. SOURCE: CONTOUR MGIN/M3 SOURCE DIM XYZ= 0 0 0
 SOURCE STRENGTH= 1 MG AVER. TIME= 20 SEC HB= 10 M
 Z0= .1 M FALL VEL.= 0 M/S DEP. VEL.= 0 m/s Z-level= 1 m
 WIND SPEEDS : 4.3 4.3 4.3 4.3 4.3 4.3 M/S
 MIXING LAYERS NOT USED
 DOSIS CONTOUR FOR : 2E-09 MGIN/M3

DIS (M)	VERY STAB	STABLE	NEUTRAL	L. UNSTAB.	UNSTABLE	VERY UNSTAB.
1000	65.544	99.466	117.880	170.037	226.170	286.971
1200	76.169	107.938	135.646	194.455	255.774	321.212
1500	91.364	128.310	160.750	228.554	296.234	366.451
2000	115.168	160.445	199.369	280.069	353.388	428.664
2500	137.518	190.118	234.852	326.368	406.408	477.423
3000	158.740	218.607	267.839	368.474	450.853	514.748
3500	179.035	244.424	298.743	407.047	489.707	541.769
4000	198.549	269.585	327.856	442.548	523.636	559.074
4500	217.383	293.682	355.391	475.306	553.112	566.849
5000	235.620	316.744	381.514	505.582	578.474	564.917
6000	270.541	360.379	430.012	559.434	617.777	529.039
7000	303.686	401.071	474.126	605.258	642.759	437.553
8000	335.319	439.226	514.394	643.812	653.845	226.584
9000	365.636	475.142	551.207	675.601	650.786	0.000E+00
10000	394.784	509.049	584.862	700.953	632.576	0.000E+00
11000	424.463	543.972	619.333	728.179	620.668	0.000E+00
12000	453.109	577.491	652.085	751.368	595.892	0.000E+00
15000	534.802	670.862	738.556	794.328	415.137	0.000E+00
20000	659.492	806.620	848.453	774.738	0.000E+00	0.000E+00
25000	772.959	922.270	920.747	605.620	0.000E+00	0.000E+00
30000	877.440	1021.133	957.831	0.000E+00	0.000E+00	0.000E+00
35000	974.386	1105.280	959.225	0.000E+00	0.000E+00	0.000E+00
40000	1064.812	1176.071	921.371	0.000E+00	0.000E+00	0.000E+00
45000	1149.464	1234.407	835.646	0.000E+00	0.000E+00	0.000E+00
50000	1228.913	1280.865	680.890	0.000E+00	0.000E+00	0.000E+00
60000	1373.914	1339.233	0.000E+00	0.000E+00	0.000E+00	0.000E+00
70000	1502.477	1351.250	0.000E+00	0.000E+00	0.000E+00	0.000E+00
80000	1616.423	1313.407	0.000E+00	0.000E+00	0.000E+00	0.000E+00
90000	1717.050	1216.908	0.000E+00	0.000E+00	0.000E+00	0.000E+00
100000	1805.297	1041.589	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TABLE IX
 Contour for $5 \cdot 10^{-9}$

5 INSTANT. SOURCE: CONTOUR MGIN/M3 SOURCE DIM XYZ= 0 0 0
 SOURCE STRENGTH= 1 MG AVER.TIME= 20 SEC HB= 10 M
 ZC= .1 M FALL VEL.= 0 M/S DEP.VEL.= 0 m/s Z-level= 1 m
 WIND SPEEDS : 4.3 4.3 4.3 4.3 4.3 4.3 M/S
 MIXING LAYERS NOT USED
 DOSIS CONTOUR FOR : 5E-09 MGIN/M3

DIS (M)	VERY STAB	STABLE	NEUTRAL	L.UNSTAB.	UNSTABLE	VERY UNSTAB.
1000	61.506	87.007	108.732	154.802	202.464	249.259
1200	71.338	100.154	124.564	175.924	226.905	274.692
1500	85.333	118.710	146.704	204.925	259.318	305.785
2000	107.109	147.214	180.219	247.543	304.212	341.569
2500	127.407	173.367	210.402	284.440	339.833	359.504
3000	146.548	197.653	237.895	316.630	367.612	360.108
3500	164.738	220.387	263.117	344.751	388.373	341.876
4000	182.120	241.786	286.357	369.236	402.570	300.045
4500	198.800	262.011	307.826	390.386	410.396	220.198
5000	214.858	281.185	327.687	408.416	411.821	0.000E+00
6000	245.349	316.750	363.059	435.654	394.118	0.000E+00
7000	273.975	349.062	393.202	451.582	342.872	0.000E+00
8000	301.001	378.522	418.598	456.203	234.573	0.000E+00
9000	326.622	405.422	439.562	448.897	0.000E+00	0.000E+00
10000	350.989	429.984	456.299	428.212	0.000E+00	0.000E+00
11000	376.006	455.777	473.830	406.012	0.000E+00	0.000E+00
12000	399.908	479.934	488.904	370.710	0.000E+00	0.000E+00
15000	467.055	543.845	516.355	0.000E+00	0.000E+00	0.000E+00
20000	566.462	625.606	500.519	0.000E+00	0.000E+00	0.000E+00
25000	653.367	680.318	380.599	0.000E+00	0.000E+00	0.000E+00
30000	729.994	709.896	0.000E+00	0.000E+00	0.000E+00	0.000E+00
35000	797.767	714.253	0.000E+00	0.000E+00	0.000E+00	0.000E+00
40000	857.656	691.276	0.000E+00	0.000E+00	0.000E+00	0.000E+00
45000	910.348	635.738	0.000E+00	0.000E+00	0.000E+00	0.000E+00
50000	956.341	535.393	0.000E+00	0.000E+00	0.000E+00	0.000E+00
60000	1029.576	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
70000	1079.115	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
80000	1105.522	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
90000	1108.327	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
100000	1085.909	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00