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**EVALUATION OF THE SURFACE ELECTROMAGNETIC FIELDS
FOR A BURIED MAGNETIC DIPOLE SOURCE**

James R. Wait
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Institute for Telecommunication Sciences
Office of Telecommunications
U. S. Department of Commerce
Boulder, Colorado 80302

Contract No. PRO-Y-71-872

Project No. 5635
Task No. 563506
Work Unit No. 56350601

Scientific Report No. 52
February 5, 1971

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ABSTRACT

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ABSTRACT

An analysis and numerical results are presented for the surface fields produced by an oscillating magnetic dipole buried in a stratified earth. The results have application to communication from and direction-finding to a buried source.

1. INTRODUCTION

Communication through the earth's upper crustal layers is possible for electromagnetic waves at sufficiently low frequencies. In the particular case, where the transmission is from a buried terminal to an observer on the surface, the conductivity structure of the overburden will be the controlling factor. A quantitative understanding of this problem requires that we solve Maxwell's equations subject to the given conditions at the source and the boundary conditions at the interfaces between the layers.

In this report, we present an analysis of a stratified planar earth model for a buried vertical oscillating magnetic dipole. The integral representations for the desired field components are evaluated by numerical methods for the general case. A number of asymptotic limiting forms are also considered.

There has been a great deal of interest in electromagnetic wave propagation in the earth in recent years. Much of the attention has been in connection with geophysical exploration where source and receiver are located on or above the earth's surface (Hansen, et al., 1967). An equally intensive effort has been undertaken for military and naval applications where one or both terminals are buried. An excellent summary of recent work on this latter topic has been published by Kraichman (1970), who also gives references to numerous unpublished reports from U.S. naval establishments.

2. FORMULATION

We consider a two-layer model of the earth with the source dipole located in the lower semi-infinite region. The situation is illustrated in Figure 1, along with the coordinate system for the problem. We note that azimuthal symmetry is present so the fields will be independent of ϕ .

The conductivity of the upper homogeneous layer of thickness b is σ_1 , while the conductivity of the lower semi-infinite layer is σ_2 . The source is an infinitesimally small loop of area dA carrying a total current $I \exp(i\omega t)$, where ω is the angular frequency. A formally exact solution for an equivalent problem was given sometime ago (Wait, 1951). Here, we could adapt this result but for sake of completeness, we will outline the derivation. Also, at the outset, we invoke the approximation that the frequency is sufficiently low that all displacement currents in the problem may be neglected. This is valid for the upper region where all significant distances in the problem are small compared with the free-space wavelength. For the conductors, it requires that $\sigma_1 \gg \epsilon_1 \omega$ and $\sigma_2 \gg \epsilon_2 \omega$, where ϵ_1 and ϵ_2 are the respective permittivities of the layers. Even if these latter inequalities do not hold, we need simply replace σ_1 by $\sigma_1 + i\epsilon_1 \omega$ and σ_2 by $\sigma_2 + i\epsilon_2 \omega$ in the final results. Also, we assume that the magnetic permeabilities of the earth layers are the same as the value μ_0 for free space.

Because of our assumptions, the fields are solutions of Laplace's equation in the region for $z > 0$. Thus, for region (0), $0 < z < \infty$, it follows that

$$i\mu_0 \omega \vec{H}_0 = -\text{grad } \Phi_0 \quad (1)$$

where Φ_0 is the magnetic potential, and $\vec{H}_0$ is the magnetic field. In the conducting layers, we can derive the fields from a magnetic Hertz vector that has only a z component, F . For region (1), $0 > z > -b$, we have

$$i\mu_0 \omega H_{1\rho} = \partial^2 F_1 / (\partial \rho \partial z) \quad (2)$$

$$i\mu_0 \omega H_{1z} = i\sigma_1 \mu_0 \omega F_1 + \partial^2 F_1 / \partial z^2 \quad (3)$$

and

$$E_{1\phi} = \partial F_1 / \partial \rho \quad (4)$$

In region (2), $-b > z > \infty$, we have

$$i\mu_0 \omega H_{2\rho} = \partial^2 F_2 / (\partial \rho \partial z) \quad (5)$$

$$i\mu_0 \omega H_{2z} = i\sigma_2 \mu_0 \omega F_2 + \partial^2 F_2 / \partial z^2 \quad (6)$$

and

$$E_{2\phi} = \partial F_2 / \partial \rho \quad (7)$$

To facilitate the solution, we write the fields in region (0) in the form

$$i\mu_0 \omega H_{0\rho} = \partial^2 F_0 / (\partial \rho \partial z) \quad (8)$$

$$i\mu_0 \omega H_{0z} = \partial^2 F_0 / \partial z^2 \quad (9)$$

and

$$E_{0\phi} = \partial F_0 / \partial \rho \quad (10)$$

In general, F satisfies the "wave equation"

$$(\nabla^2 + i\sigma_j \mu_0 \omega) F_j = 0 \quad (11)$$

(where $j = 1, 2$, and 0 , and $\sigma_0 = 0$.) except at the source. In the latter case, F_2 must behave as

$$F_2 = [I dA / (4\pi)] \exp[-(i\sigma_2 \mu_0 \omega)^{\frac{1}{2}} r] / r \quad (12)$$

when $r = [\rho^2 + (z+h)^2]^{\frac{1}{2}}$ tends to zero. Using the Sommerfeld integral representation for the exponential factor, we are led to write the following integral forms for the potentials F_j in the respective regions.

$$F_0 = \int_0^\infty T(\lambda) e^{-\lambda z} J_0(\lambda \rho) d\lambda \quad (13)$$

$$F_1 = \int_0^\infty [A(\lambda) e^{-u_1 z} + B(\lambda) e^{+u_1 z}] J_0(\lambda \rho) d\lambda \quad (14)$$

$$F_2 = \int_0^\infty \frac{\lambda}{u_2} [e^{-u_2 |z+h|} + R(\lambda) e^{+u_2 z}] J_0(\lambda \rho) d\lambda \quad (15)$$

where $u_1 = (\lambda^2 + i\sigma_1 \mu_0 \omega)^{\frac{1}{2}}$, $u_2 = (\lambda^2 + i\sigma_2 \mu_0 \omega)^{\frac{1}{2}}$, and $T(\lambda)$, $A(\lambda)$, $B(\lambda)$, and $R(\lambda)$ are unknown functions. The latter can be determined from the boundary conditions that F and $\partial F / \partial z$ are continuous at $z = 0$ and $-b$.

3. THE SOLUTION

Using conditions at $z = 0$, we find without difficulty that

$$B(\lambda)/A(\lambda) = (u_1 - \lambda)/(u_2 + \lambda) \quad (16)$$

and

$$A(\lambda) = [(u_1 + \lambda)/(2u_1)] T(\lambda) \quad (17)$$

Then, using the conditions at $z = -b$, it follows that

$$R(\lambda) = [(u_2/u_1) - \chi] [(u_2/u_1) + \chi]^{-1} \exp[u_2(2b-h)] \quad (18)$$

where

$$\chi = \left[1 - \frac{u_1 - \lambda}{u_1 + \lambda} e^{-2u_1 b} \right] \left[1 + \frac{u_1 - \lambda}{u_1 + \lambda} e^{-2u_1 b} \right]^{-1} \quad (19)$$

and, finally,

$$T(\lambda) = \frac{\left(\frac{2\lambda}{u_1 + \lambda} \right) \left(\frac{2u_1}{u_1 + u_2} \right) \exp[-u_2(h-b) - u_1 b]}{\left[1 - \frac{u_1 - \lambda}{u_1 + \lambda} \frac{u_1 - u_2}{u_1 + u_2} \exp(-2u_1 b) \right]} \quad (20)$$

This is the complete formal solution of the problem. In particular, the field components of interest in region (0) can be written

$$H_{op} = b_o P \quad (21)$$

and

$$H_{oz} = b_o Q \quad (22)$$

where $b_o = I dA/(2\pi h^3)$ is a normalized factor, and P and Q are dimensional field functions. The latter are given by

$$P = \frac{h^3}{2} \int_0^\infty \lambda^2 T(\lambda) e^{-\lambda z} J_1(\lambda \rho) d\lambda \quad (23)$$

and

$$Q = \frac{h^3}{2} \int_0^\infty \lambda^2 T(\lambda) e^{-\lambda z} J_0(\lambda \rho) d\lambda \quad (24)$$

where $T(\lambda)$ is given by (20).

A special case worthy of note is where the conductivities σ_1 and σ_2 are both equal to σ . Then, we see that

$$T(\lambda) = [2\lambda/(u+\lambda)] \exp(-uh) \quad (25)$$

This same limit is obtained if the thickness b of the upper layer vanishes and $\sigma_2 = \sigma$.

The present formal theory can be generalized to any number of layers. This can be accomplished most readily by first examining the structure of expression (20) for $T(\lambda)$ in the case of two layers. Here, we identify $2u_1/(u_1 + u_2)$ and $2\lambda/(u_1 + \lambda)$ as transmission coefficients for the two interfaces at $z = -b$ and $z = 0$, respectively. The exponential factor in the numerator of (20) accounts for transmission from $z = -h$ to $z = -b$, with a propagation constant u_2 , and transmission from $z = -b$ to $z = 0$ with a propagation constant u_1 . Then, the denominator can be associated with the multiple reflections of the waves within the upper layer.

The appropriate form for $T(\lambda)$ in the case of a three-layer overburden is now written down by inspection. For example, with reference to the situation depicted in Figure 2, we have

$$T(\lambda) = \frac{\left(\frac{2u_2}{u_2+u_3}\right)\left(\frac{2u_1}{u_1+u_2}\right)\left(\frac{2\lambda}{u_1+\lambda}\right) \exp[-u_3(h-c) - u_2(c-b) - u_1b]}{\left\{ \left[1 - \frac{u_2-u_3}{u_2+u_3} \frac{u_2-u_1}{u_2+u_1} \exp[-2u_2(c-b)] \right] \right.}$$

$$\times \left. \left[1 - \frac{u_1-\lambda}{u_1+\lambda} \frac{u_1-u_2}{u_1+u_2} \exp[-2u_1b] \right] \right\}} \quad (26)$$

This, of course, reduces to (20), when either $\sigma_3 = \sigma_2$ or $b-c=0$.

4. NUMERICAL EVALUATION AND DISCUSSION

what follows, we consider only the two-layer case and its forms. For numerical work, we find it convenient to change the variable of integration in (23) and (24) from λ to x , where $x = \lambda h$ is dimensionless. Then, we see that

$$u_1 = (1/h) (x^2 + iH^2 K^2)^{\frac{1}{2}}$$

$$u_2 = (1/h) (x^2 + iH^2)^{\frac{1}{2}} \quad \text{where } K^2 = \sigma_1 / \sigma_2 \text{ and } H = (\sigma_2 \mu_0 \omega)^{\frac{1}{2}} h.$$

$$u_1 b = (B/H) (x^2 + iH^2 K^2)^{\frac{1}{2}}$$

$$u_2 b = (B/H) (x^2 + iH^2)^{\frac{1}{2}}$$

$$B = (b/h)H = (\sigma_2 \mu_0 \omega)^{\frac{1}{2}} b$$

In the new "dimensionless" notation, (23) and (24) are equivalent to

$$P = \frac{1}{2} \int_0^{\infty} x^2 T e^{-xZ} J_1(xD) dx \quad (27)$$

$$Q = \frac{1}{2} \int_0^{\infty} x^2 T e^{-xZ} J_1(xD) dx \quad (28)$$

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The integrals P and Q defined by (27) and (28) are evaluated numerically for $Z = 0$ using a Gaussian quadrature procedure. In Table I, we show numerical results for the case $K = 1$, where (29) is simply given by

$$T = 2x / [(x^2 + iH^2)^{\frac{1}{2}} + x] \quad (30)$$

In the limiting case $H = 0$, we see that $T = 1$, and then (28) and (29) are given exactly by

$$P = (3/2) D R^{-5} \quad (31)$$

and

$$Q = (1/2) [3 R^{-5} - R^{-3}] \quad (32)$$

where

$$R = (D^2 + 1)^{\frac{1}{2}}.$$

In the limiting case $K = 1$, and provided H and $HD \gg 1$, we find that asymptotically (Wait, 1970b)

$$P \sim e^{-i\pi/4} (2/3) D^{-4} \quad Q \sim e^{i\pi/4} (2/3) D^{-4}$$

which are simple extensions of (33) and (35). They are a consequence of approximating (29) in the following manner

$$T = \frac{2x}{(x^2 + iH^2K^2)^{\frac{1}{2}} + x} F(x) \approx \frac{2x}{(x^2 + iH^2K^2)^{\frac{1}{2}} + x} F(0) \quad (38)$$

and then recognizing that the integral has the same form as the homogeneous half-space with a conductivity σ_1 or $K\sigma_2$.

The graphical illustration and possible application to mine rescue techniques of these numerical results are discussed elsewhere (Wait, 1970a; Wait and Spies, 1971). It is possible the results will also have application to electromagnetic shielding problems at low frequencies and through-the-earth communication.

5. REFERENCES

- Hansen, D. A., R. E. MacDougall, G. R. Rogers, J. S. Sumner, and S. H. Ward (editors) (1967), Mining Geophysics, vol 2, (Society of Exploration Geophysicists, Tulsa, Oklahoma).
- Kraichman, M. B. (1970), Handbook of Electromagnetic Propagation in Conducting Media, (Superintendent of Documents, U. S. Government Printing Office, Washington, D. C.).[†]
- Wait, J. R. (Nov. 1951), The magnetic dipole over the horizontally stratified earth, *Can. J. Phys.* 29, 577-592.
- Wait, J. R. (1970a), Criteria for locating an oscillating dipole in the earth, (report to U. S. Bureau of Mines, 28 December 1970).
- Wait, J. R. (1970b), Electromagnetic induction technique for locating a buried source, (unpublished report, December, 1970).
- Wait, J. R. and Kenneth P. Spies (1971), Electromagnetic fields of a small loop buried in a stratified earth (unpublished report, 18 January 1971).

[†] Includes extensive references to the significant work of P. R. Bannister on this subject.

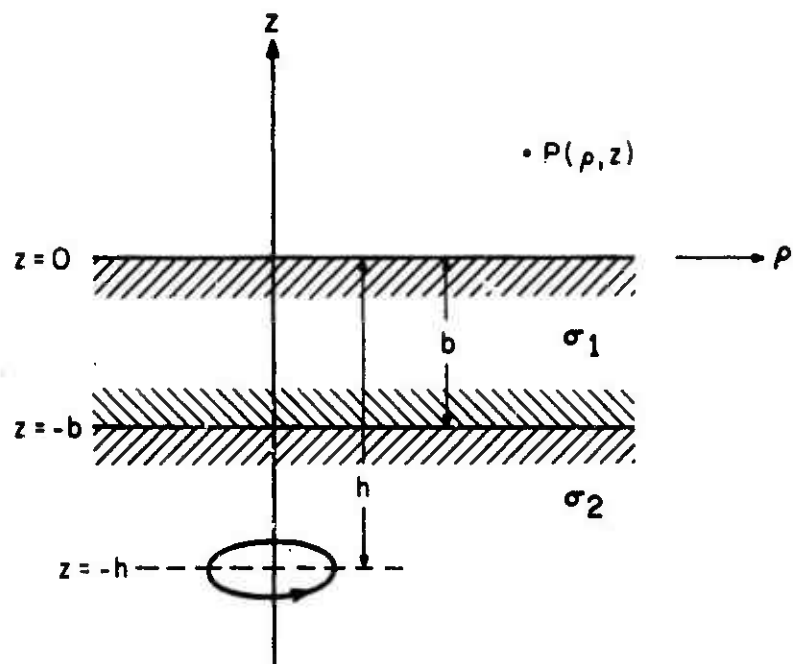


Figure 1. Magnetic dipole (small current carrying loop) buried in two-layer earth.

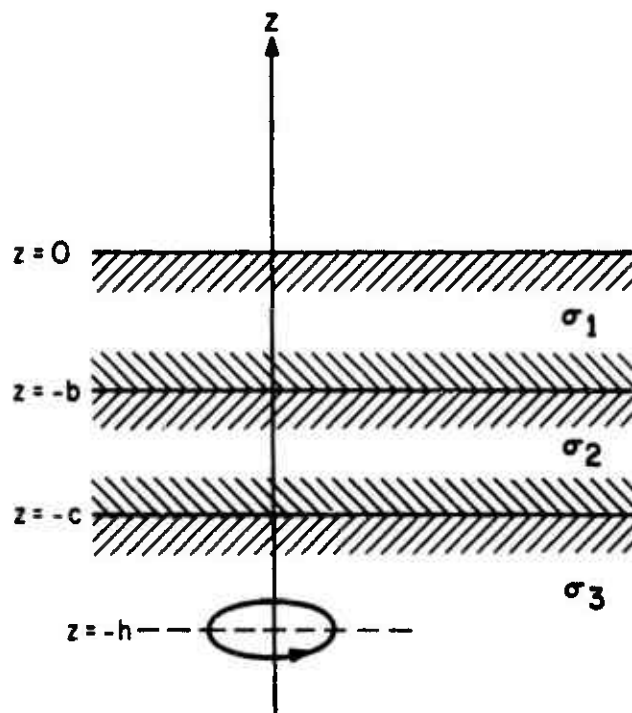


Figure 2. Magnetic dipole buried in three-layer earth.

Table 1
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 0.00 Z = 0.0

O	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	1.000+000	0.00	0.000+000	0.00
0.02	2.997-002	0.00	9.988-001	0.00	3.001-002	0.00
0.04	5.976-002	0.00	9.952-001	0.00	6.005-002	0.00
0.06	8.920-002	0.00	9.893-001	0.00	9.016-002	0.00
0.08	1.181-001	0.00	9.810-001	0.00	1.204-001	0.00
0.10	1.463-001	0.00	9.706-001	0.00	1.508-001	0.00
0.15	2.128-001	0.00	9.353-001	0.00	2.276-001	0.00
0.20	2.720-001	0.00	8.885-001	0.00	3.061-001	0.00
0.25	3.223-001	0.00	8.325-001	0.00	3.871-001	0.00
0.30	3.628-001	0.00	7.699-001	0.00	4.712-001	0.00
0.35	3.933-001	0.00	7.032-001	0.00	5.593-001	0.00
0.40	4.140-001	0.00	6.348-001	0.00	6.522-001	0.00
0.50	4.293-001	0.00	5.009-001	0.00	8.571-001	0.00
0.60	4.172-001	0.00	3.802-001	0.00	1.098+000	0.00
0.70	3.875-001	0.00	2.786-001	0.00	1.391+000	0.00
0.80	3.484-001	0.00	1.974-001	0.00	1.765+000	0.00
0.90	3.063-001	0.00	1.350-001	0.00	2.269+000	0.00
1.00	2.652-001	0.00	8.839-002	0.00	3.000+000	0.00
1.10	2.272-001	0.00	5.440-002	0.00	4.177+000	0.00
1.15	2.098-001	0.00	4.121-002	0.00	5.092+000	0.00
1.20	1.936-001	0.00	3.011-002	0.00	6.429+000	0.00
1.25	1.784-001	0.00	2.081-002	0.00	8.571+000	0.00
1.30	1.643-001	0.00	1.306-002	0.00	1.258+001	0.00
1.32	1.590-001	0.00	1.034-002	0.00	1.537+001	0.00
1.34	1.538-001	0.00	7.821-003	0.00	1.967+001	0.00
1.36	1.488-001	0.00	5.486-003	0.00	2.713+001	0.00
1.38	1.440-001	0.00	3.325-003	0.00	4.331+001	0.00
1.40	1.393-001	0.00	1.327-003	0.00	1.050+002	0.00
1.42	1.348-001	0.00	5.189-004	180.00	2.598+002	-180.00
1.44	1.304-001	0.00	2.222-003	180.00	5.870+001	-180.00
1.46	1.262-001	0.00	3.791-003	180.00	3.328+001	-180.00
1.48	1.221-001	0.00	5.236-003	180.00	2.332+001	-180.00
1.50	1.182-001	0.00	6.564-003	180.00	1.800+001	-180.00
1.55	1.089-001	0.00	9.424-003	180.00	1.155+001	-180.00
1.60	1.004-001	0.00	1.171-002	180.00	8.571+000	-180.00
1.65	9.257-002	0.00	1.351-002	180.00	6.851+000	-180.00
1.70	8.544-002	0.00	1.491-002	180.00	5.730+000	-180.00
1.80	7.294-002	0.00	1.675-002	180.00	4.355+000	-180.00
1.90	6.246-002	0.00	1.764-002	180.00	3.540+000	-180.00
2.00	5.367-002	0.00	1.789-002	180.00	3.000+000	-180.00
2.20	4.004-002	0.00	1.723-002	180.00	2.324+000	-180.00
2.40	3.030-002	0.00	1.582-002	180.00	1.915+000	-180.00
2.60	2.325-002	0.00	1.419-002	180.00	1.639+000	-180.00
2.80	1.808-002	0.00	1.257-002	180.00	1.438+000	-180.00
3.00	1.423-002	0.00	1.107-002	180.00	1.286+000	-180.00
3.20	1.133-002	0.00	9.727-003	180.00	1.165+000	-180.00
3.40	9.122-003	0.00	8.550-003	180.00	1.067+000	-180.00
3.60	7.416-003	0.00	7.526-003	180.00	9.854-001	-180.00
3.80	6.085-003	0.00	6.640-003	180.00	9.164-001	-180.00
4.00	5.035-003	0.00	5.875-003	180.00	8.571-001	-180.00

Table 1
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 0.10 Z = 0.0

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	3.999-001	-0.21	0.000+000	0.21
0.02	2.997-002	-0.12	9.997-001	-0.21	3.001-002	0.09
0.04	5.976-002	-0.12	9.951-001	-0.21	6.005-002	0.09
0.06	8.919-002	-0.12	9.892-001	-0.21	9.017-002	0.09
0.08	1.181-001	-0.12	9.809-001	-0.21	1.204-001	0.09
0.10	1.463-001	-0.12	9.705-001	-0.21	1.508-001	0.09
0.15	2.128-001	-0.12	9.352-001	-0.22	2.276-001	0.10
0.20	2.720-001	-0.12	8.884-001	-0.22	3.062-001	0.10
0.25	3.223-001	-0.13	8.324-001	-0.23	3.871-001	0.11
0.30	3.628-001	-0.13	7.698-001	-0.25	4.713-001	0.11
0.35	3.933-001	-0.14	7.031-001	-0.26	5.593-001	0.12
0.40	4.140-001	-0.14	6.347-001	-0.28	6.523-001	0.14
0.50	4.293-001	-0.15	5.008-001	-0.32	8.573-001	0.17
0.60	4.172-001	-0.17	3.801-001	-0.38	1.098+000	0.21
0.70	3.874-001	-0.19	2.785-001	-0.47	1.391+000	0.28
0.80	3.484-001	-0.21	1.973-001	-0.60	1.765+000	0.39
0.90	3.063-001	-0.24	1.349-001	-0.79	2.270+000	0.55
1.00	2.652-001	-0.27	8.830-002	-1.08	3.003+000	0.82
1.10	2.272-001	-0.31	5.432-002	-1.59	4.183+000	1.28
1.15	2.098-001	-0.32	4.113-002	-1.99	5.101+000	1.67
1.20	1.935-001	-0.34	3.004-002	-2.60	6.443+000	2.25
1.25	1.784-001	-0.36	2.075-002	-3.58	8.595+000	3.21
1.30	1.643-001	-0.39	1.302-002	-5.43	1.262+001	5.05
1.32	1.590-001	-0.40	1.031-002	-6.73	1.541+001	6.34
1.34	1.538-001	-0.41	7.813-003	-8.74	1.969+001	8.33
1.36	1.488-001	-0.42	5.512-003	-12.20	2.790+001	11.78
1.38	1.440-001	-0.42	3.423-003	-19.50	4.206+001	19.08
1.40	1.393-001	-0.43	1.664-003	-42.39	8.372+001	41.96
1.42	1.348-001	-0.45	1.262-003	-119.25	1.068+002	118.80
1.44	1.304-001	-0.46	2.559-003	-155.01	5.096+001	154.55
1.46	1.262-001	-0.47	4.031-003	-164.73	3.130+001	164.26
1.48	1.221-001	-0.48	5.435-003	-168.94	2.247+001	168.46
1.50	1.181-001	-0.49	6.740-003	-171.26	1.753+001	170.77
1.55	1.089-001	-0.52	9.571-003	-174.12	1.137+001	173.60
1.60	1.004-001	-0.55	1.184-002	-175.45	8.474+000	174.90
1.65	9.256-002	-0.59	1.364-002	-176.21	6.787+000	175.64
1.70	8.543-002	-0.61	1.503-002	-176.70	5.684+000	176.09
1.80	7.292-002	-0.69	1.686-002	-177.29	4.325+000	176.61
1.90	6.244-002	-0.76	1.775-002	-177.61	3.518+000	176.85
2.00	5.365-002	-0.84	1.799-002	-177.81	2.982+000	176.97
2.20	4.002-002	-1.03	1.733-002	-178.02	2.309+000	176.99
2.40	3.028-002	-1.24	1.592-002	-178.10	1.902+000	176.86
2.60	2.323-002	-1.49	1.428-002	-178.12	1.627+000	176.63
2.80	1.896-002	-1.76	1.266-002	-178.10	1.426+000	176.33
3.00	1.422-002	-2.07	1.116-002	-178.05	1.274+000	175.98
3.20	1.132-002	-2.42	9.818-003	-177.99	1.153+000	175.57
3.40	9.107-003	-2.81	8.639-003	-177.92	1.054+000	175.11
3.60	7.402-003	-3.23	7.614-003	-177.84	9.721-001	174.61
3.80	6.071-003	-3.70	6.727-003	-177.76	9.025-001	174.05
4.00	5.022-003	-4.21	5.960-003	-177.67	8.426-001	173.45

Table 1
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 0.20 Z = 0.0

D	P	PHASE (P) IN DEGREES	Q	PHASE (Q) IN DEGREES	P/Q	PHASE (P/Q) IN DEGREES
0.00	0.000+000	0.00	9.992-001	-0.81	0.000+000	0.81
0.02	2.997-002	-0.48	9.980-001	-0.81	3.003-002	0.34
0.04	5.975-002	-0.48	9.944-001	-0.81	6.009-002	0.34
0.06	8.919-002	-0.48	9.885-001	-0.82	9.022-002	0.34
0.08	1.181-001	-0.48	9.802-001	-0.82	1.205-001	0.34
0.10	1.563-001	-0.48	9.698-001	-0.83	1.509-001	0.35
0.15	2.128-001	-0.49	9.345-001	-0.85	2.277-001	0.36
0.20	2.719-001	-0.50	8.877-001	-0.87	3.064-001	0.37
0.25	3.222-001	-0.51	8.317-001	-0.91	3.874-001	0.40
0.30	3.627-001	-0.53	7.691-001	-0.95	4.716-001	0.42
0.35	3.932-001	-0.54	7.024-001	-1.00	5.598-001	0.46
0.40	4.139-001	-0.56	6.340-001	-1.07	6.529-001	0.50
0.50	4.293-001	-0.62	5.001-001	-1.24	8.583-001	0.62
0.60	4.172-001	-0.68	3.794-001	-1.48	1.099+000	0.80
0.70	3.874-001	-0.76	2.779-001	-1.81	1.394+000	1.05
0.80	3.483-001	-0.85	1.967-001	-2.28	1.770+000	1.44
0.90	3.062-001	-0.95	1.344-001	-2.99	2.279+000	2.04
1.00	2.650-001	-1.07	8.781-002	-4.08	3.019+000	3.01
1.10	2.271-001	-1.21	5.390-002	-5.95	4.214+000	4.74
1.15	2.097-001	-1.28	4.077-002	-7.45	5.144+000	6.17
1.20	1.934-001	-1.36	2.975-002	-9.68	6.501+000	8.32
1.25	1.782-001	-1.44	2.059-002	-13.31	8.657+000	11.87
1.30	1.642-001	-1.53	1.309-002	-20.09	1.254+001	18.56
1.32	1.588-001	-1.57	1.054-002	-24.69	1.507+001	23.12
1.34	1.537-001	-1.61	8.271-003	-31.42	1.858+001	29.81
1.36	1.487-001	-1.64	6.338-003	-41.78	2.346+001	40.14
1.38	1.439-001	-1.68	4.868-003	-58.17	2.955+001	56.49
1.40	1.392-001	-1.72	4.092-003	-81.97	3.401+001	80.25
1.42	1.347-001	-1.75	4.169-003	-107.75	3.230+001	105.99
1.44	1.303-001	-1.80	4.896-003	-127.37	2.661+001	125.57
1.46	1.261-001	-1.85	5.928-003	-139.97	2.126+001	138.12
1.48	1.220-001	-1.89	7.053-003	-148.00	1.729+001	146.11
1.50	1.180-001	-1.93	8.174-003	-153.37	1.444+001	151.44
1.55	1.087-001	-2.04	1.074-002	-161.05	1.012+001	159.01
1.60	1.002-001	-2.16	1.288-002	-165.04	7.784+000	162.88
1.65	9.243-002	-2.28	1.458-002	-167.45	6.337+000	165.16
1.70	8.530-002	-2.41	1.592-002	-169.04	5.358+000	166.63
1.80	7.279-002	-2.69	1.767-002	-171.01	4.119+000	168.32
1.90	6.231-002	-2.98	1.851-002	-172.15	3.366+000	169.16
2.00	5.352-002	-3.30	1.872-002	-172.87	2.860+000	169.57
2.20	3.989-002	-4.02	1.800-002	-173.71	2.217+000	169.69
2.40	3.015-002	-4.84	1.655-002	-174.13	1.822+000	169.29
2.60	2.311-002	-5.77	1.488-002	-174.36	1.553+000	168.59
2.80	1.794-002	-6.82	1.322-002	-174.49	1.357+000	167.66
3.00	1.410-002	-8.00	1.170-002	-174.55	1.205+000	166.55
3.20	1.121-002	-9.31	1.033-002	-174.59	1.085+000	165.28
3.40	9.002-003	-10.75	9.126-003	-174.60	9.854-001	163.85
3.60	7.304-003	-12.34	8.080-003	-174.61	9.040-001	162.27
3.80	5.981-003	-14.07	7.172-003	-174.62	8.339-001	160.55
4.00	4.940-003	-15.95	6.386-003	-174.65	7.736-001	158.69

Table 1
FIELD CALCULATIONS FOR A FUJIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 0.50 Z = 0.0

D	P	PHASE (P) IN DEGREES	Q	PHASE (Q) IN DEGREES	P/Q	PHASE (P/Q) IN DEGREES
0.00	0.000+000	0.00	9.892-001	-4.61	0.000+000	4.61
0.02	2.989-002	-2.92	9.880-001	-4.62	3.025-002	1.70
0.04	5.960-002	-2.92	9.844-001	-4.63	6.055-002	1.71
0.06	8.896-002	-2.93	9.785-001	-4.64	9.091-002	1.71
0.08	1.178-001	-2.94	9.703-001	-4.66	1.214-001	1.73
0.10	1.459-001	-2.95	9.598-001	-4.69	1.520-001	1.74
0.15	2.122-001	-2.99	9.246-001	-4.79	2.296-001	1.80
0.20	2.712-001	-3.05	8.779-001	-4.93	3.089-001	1.88
0.25	3.213-001	-3.12	8.221-001	-5.11	3.909-001	1.99
0.30	3.617-001	-3.21	7.596-001	-5.34	4.761-001	2.13
0.35	3.920-001	-3.32	6.931-001	-5.63	5.656-001	2.31
0.40	4.126-001	-3.45	6.248-001	-5.97	6.603-001	2.52
0.50	4.276-001	-3.75	4.914-001	-6.85	8.702-001	3.10
0.60	4.153-001	-4.12	3.712-001	-8.09	1.119+000	3.96
0.65	4.019-001	-4.34	3.182-001	-8.88	1.263+000	4.53
0.70	3.853-001	-4.58	2.703-001	-9.81	1.425+000	5.23
0.75	3.664-001	-4.83	2.276-001	-10.92	1.610+000	6.09
0.80	3.460-001	-5.11	1.899-001	-12.26	1.822+000	7.15
0.85	3.250-001	-5.40	1.570-001	-13.88	2.070+000	8.48
0.90	3.038-001	-5.72	1.285-001	-15.87	2.365+000	10.16
0.95	2.829-001	-6.05	1.040-001	-18.36	2.720+000	12.31
1.00	2.626-001	-6.41	8.318-002	-21.53	3.157+000	15.12
1.05	2.431-001	-6.79	6.569-002	-25.65	3.701+000	18.86
1.10	2.246-001	-7.20	5.120-002	-31.14	4.387+000	23.94
1.15	2.072-001	-7.62	3.948-002	-38.63	5.248+000	31.01
1.20	1.909-001	-8.07	3.040-002	-48.99	6.278+000	40.92
1.25	1.757-001	-8.54	2.395-002	-63.04	7.335+000	54.49
1.30	1.616-001	-9.04	2.014-002	-80.52	8.024+000	71.48
1.35	1.486-001	-9.55	1.871-002	-98.94	7.941+000	89.38
1.40	1.366-001	-10.10	1.897-002	-114.98	7.201+000	104.87
1.45	1.256-001	-10.67	2.010-002	-127.24	6.249+000	116.56
1.50	1.155-001	-11.27	2.149-002	-136.17	5.373+000	124.90
1.60	9.772-002	-12.54	2.401-002	-147.57	4.070+000	135.03
1.70	8.284-002	-13.91	2.563-002	-154.27	3.232+000	140.36
1.80	7.040-002	-15.40	2.637-002	-158.64	2.669+000	143.25
1.90	6.000-002	-16.99	2.643-002	-161.76	2.270+000	144.76
2.00	5.129-002	-18.71	2.600-002	-164.13	1.972+000	145.42
2.10	4.398-002	-20.54	2.524-002	-166.04	1.743+000	145.50
2.20	3.784-002	-22.49	2.426-002	-167.65	1.560+000	145.15
2.30	3.268-002	-24.57	2.317-002	-169.05	1.410+000	144.48
2.40	2.831-002	-26.77	2.201-002	-170.32	1.286+000	143.55
2.50	2.462-002	-29.10	2.083-002	-171.48	1.182+000	142.38
2.60	2.149-002	-31.56	1.967-002	-172.59	1.093+000	141.03
2.80	1.655-002	-36.86	1.744-002	-174.66	9.488-001	137.80
3.00	1.294-002	-42.63	1.541-002	-176.65	8.395-001	133.98
3.20	1.028-002	-48.97	1.360-002	-178.61	7.554-001	129.64
3.40	8.300-003	-55.67	1.201-002	179.43	6.908-001	-235.10
3.60	6.819-003	-62.72	1.062-002	177.45	6.418-001	-240.17
3.80	5.702-003	-69.93	9.412-003	175.44	6.058-001	-245.42
4.00	4.851-003	-77.34	8.354-003	173.40	5.807-001	-250.74

Table 1
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 1.00 Z = 0.0

D	P	PHASE (P) IN DEGREES	Q	PHASE (Q) IN DEGREES	P/Q	PHASE (P/Q) IN DEGREES
0.00	0.000+000	0.00	9.368-001	-15.63	0.000+000	15.63
0.02	2.925-002	-10.95	9.356-001	-15.64	3.126-002	4.69
0.04	5.832-002	-10.96	9.321-001	-15.67	6.256-002	4.70
0.06	8.703-002	-10.99	9.263-001	-15.71	9.396-002	4.73
0.08	1.152-001	-11.02	9.182-001	-15.78	1.255-001	4.76
0.10	1.427-001	-11.06	9.079-001	-15.87	1.572-001	4.81
0.15	2.075-001	-11.20	8.733-001	-16.17	2.376-001	4.96
0.20	2.650-001	-11.41	8.274-001	-16.59	3.202-001	5.19
0.25	3.137-001	-11.67	7.727-001	-17.16	4.059-001	5.49
0.30	3.527-001	-11.99	7.115-001	-17.87	4.957-001	5.87
0.35	3.818-001	-12.37	6.464-001	-18.73	5.906-001	6.36
0.40	4.012-001	-12.81	5.799-001	-19.77	6.919-001	6.96
0.50	4.143-001	-13.86	4.502-001	-22.47	9.202-001	8.61
0.60	4.005-001	-15.16	3.345-001	-26.23	1.197+000	11.07
0.65	3.865-001	-15.90	2.839-001	-28.65	1.361+000	12.74
0.70	3.694-001	-16.71	2.387-001	-31.52	1.548+000	14.81
0.75	3.502-001	-17.57	1.988-001	-34.96	1.761+000	17.39
0.80	3.295-001	-18.50	1.643-001	-39.12	2.006+000	20.62
0.85	3.083-001	-19.49	1.348-001	-44.19	2.288+000	24.70
0.90	2.870-001	-20.54	1.101-001	-50.41	2.608+000	29.86
0.95	2.661-001	-21.66	8.996-002	-58.03	2.958+000	36.37
1.00	2.458-001	-22.85	7.415-002	-67.30	3.315+000	44.45
1.05	2.264-001	-24.10	6.239-002	-78.23	3.629+000	54.13
1.10	2.081-001	-25.41	5.431-002	-90.47	3.831+000	65.05
1.15	1.909-001	-26.80	4.937-002	-103.16	3.866+000	76.37
1.20	1.748-001	-28.25	4.682-002	-115.29	3.733+000	87.04
1.25	1.599-001	-29.77	4.587-002	-126.08	3.486+000	96.31
1.30	1.462-001	-31.36	4.582-002	-135.25	3.190+000	103.89
1.35	1.335-001	-33.02	4.616-002	-142.88	2.893+000	109.86
1.40	1.219-001	-34.75	4.657-002	-149.22	2.618+000	114.46
1.45	1.113-001	-36.56	4.688-002	-154.51	2.374+000	117.96
1.50	1.016-001	-38.44	4.701-002	-159.01	2.162+000	120.57
1.60	8.478-002	-42.42	4.661-002	-166.27	1.819+000	123.85
1.70	7.086-002	-46.70	4.542-002	-172.01	1.560+000	125.31
1.80	5.940-002	-51.23	4.363-002	-176.79	1.361+000	125.50
1.90	4.998-002	-56.18	4.145-002	179.04	1.206+000	-235.23
2.00	4.226-002	-61.37	3.904-002	175.29	1.082+000	-236.66
2.10	3.593-002	-66.85	3.653-002	171.82	9.834-001	-238.67
2.20	3.074-002	-72.59	3.402-002	168.54	9.036-001	-241.13
2.30	2.649-002	-78.56	3.156-002	165.41	8.394-001	-243.98
2.40	2.301-002	-84.73	2.919-002	162.39	7.881-001	-247.11
2.50	2.014-002	-91.02	2.694-002	159.44	7.476-001	-250.46
2.60	1.779-002	-97.40	2.483-002	156.55	7.164-001	-253.95
2.80	1.422-002	-110.15	2.102-002	150.69	6.767-001	-261.04
3.00	1.072-002	-122.51	1.774-002	145.35	6.608-001	-267.85
3.20	9.915-003	-134.15	1.496-002	139.88	6.626-001	-274.03
3.40	8.545-003	-144.90	1.262-002	134.48	6.773-001	-279.38
3.60	7.462-003	-154.74	1.064-002	129.14	7.012-001	-283.87
3.80	6.572-003	-163.72	8.981-003	123.84	7.317-001	-287.56
4.00	5.818-003	-171.93	7.586-003	118.60	7.669-001	-290.53

Table I
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 2.00 Z = 0.0

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	7.358-001	-46.46	0.000+000	46.46
0.02	2.540-002	-36.81	7.347-001	-46.49	3.457-002	9.68
0.04	5.063-002	-36.85	7.316-001	-46.56	6.921-002	9.71
0.06	7.554-002	-36.92	7.264-001	-46.69	1.040-001	9.77
0.08	9.995-002	-37.01	7.192-001	-46.86	1.390-001	9.85
0.10	1.237-001	-37.14	7.101-001	-47.09	1.742-001	9.95
0.15	1.794-001	-37.57	6.794-001	-47.87	2.641-001	10.30
0.20	2.284-001	-38.18	6.390-001	-48.99	3.574-001	10.82
0.25	2.691-001	-38.95	5.909-001	-50.47	4.555-001	11.51
0.30	3.010-001	-39.90	5.376-001	-52.32	5.599-001	12.42
0.35	3.238-001	-41.02	4.815-001	-54.60	6.724-001	13.59
0.40	3.378-001	-42.30	4.248-001	-57.36	7.952-001	15.06
0.50	3.427-001	-45.38	3.169-001	-64.62	1.081+000	19.24
0.60	3.242-001	-49.12	2.253-001	-75.00	1.439+000	25.87
0.65	3.091-001	-51.25	1.875-001	-81.78	1.648+000	30.53
0.70	2.915-001	-53.54	1.557-001	-89.90	1.872+000	36.36
0.75	2.724-001	-55.99	1.298-001	-99.51	2.098+000	43.52
0.80	2.526-001	-58.62	1.099-001	-110.65	2.299+000	52.03
0.85	2.326-001	-61.41	9.541-002	-123.00	2.438+000	61.60
0.90	2.130-001	-64.37	8.575-002	-135.93	2.484+000	71.56
0.95	1.941-001	-67.50	7.986-002	-148.59	2.431+000	81.09
1.00	1.762-001	-70.81	7.655-002	-160.28	2.302+000	89.46
1.05	1.594-001	-74.37	7.477-002	-170.64	2.132+000	96.35
1.10	1.438-001	-77.96	7.370-002	-179.66	1.951+000	101.70
1.15	1.295-001	-81.80	7.282-002	172.51	1.779+000	-254.31
1.20	1.165-001	-85.82	7.184-002	165.66	1.621+000	-251.48
1.25	1.047-001	-90.02	7.060-002	159.60	1.483+000	-249.62
1.30	9.404-002	-94.41	6.906-002	154.15	1.362+000	-248.55
1.35	8.451-002	-98.96	6.723-002	149.18	1.257+000	-248.14
1.40	7.601-002	-103.69	6.513-002	144.58	1.167+000	-248.28
1.45	6.846-002	-108.58	6.283-002	140.29	1.090+000	-248.87
1.50	6.177-002	-113.63	6.036-002	136.23	1.023+000	-249.86
1.60	5.066-002	-124.11	5.512-002	128.64	9.190-001	-252.75
1.70	4.205-002	-134.97	4.976-002	121.56	8.450-001	-256.53
1.80	3.540-002	-146.01	4.452-002	114.84	7.953-001	-260.85
1.90	3.024-002	-157.02	3.953-002	108.36	7.650-001	-265.38
2.00	2.620-002	-167.78	3.491-002	102.07	7.505-001	-269.85
2.10	2.297-002	-178.13	3.068-002	95.93	7.486-001	-274.06
2.20	2.033-002	172.02	2.687-002	89.91	7.567-001	82.11
2.30	1.813-002	162.73	2.346-002	83.99	7.727-001	76.74
2.40	1.624-002	154.00	2.043-002	78.16	7.949-001	75.84
2.50	1.460-002	145.81	1.776-002	72.42	8.220-001	73.39
2.60	1.314-002	138.13	1.541-002	66.76	8.529-001	71.37
2.80	1.066-002	124.11	1.154-002	55.66	9.236-001	68.45
3.00	8.633-003	111.62	8.607-003	44.89	1.003+000	66.73
3.20	6.959-003	100.40	6.388-003	34.44	1.089+000	65.96
3.40	5.580-003	90.28	4.720-003	24.35	1.192+000	65.93
3.60	4.450-003	81.15	3.471-003	14.65	1.282+000	66.49
3.80	3.531-003	72.93	2.540-003	5.38	1.390+000	67.55
4.00	2.788-003	65.62	1.847-003	-3.40	1.510+000	69.02

Table 1
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 5.00 Z = 0.0

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	2.027-001	-158.81	0.000+000	158.81
0.02	9.218-003	-142.60	2.023-001	-158.88	4.557-002	16.28
0.04	1.835-002	-142.73	2.010-001	-159.10	9.130-002	16.37
0.06	2.733-002	-142.95	1.989-001	-159.46	1.374-001	16.51
0.08	3.606-002	-143.26	1.960-001	-159.97	1.840-001	16.71
0.10	4.447-002	-143.66	1.923-001	-160.63	2.313-001	16.97
0.15	6.371-002	-145.03	1.801-001	-162.94	3.538-001	17.91
0.20	7.969-002	-146.96	1.643-001	-166.28	4.849-001	19.32
0.25	9.186-002	-149.42	1.452-001	-170.74	6.282-001	21.32
0.30	1.000-001	-152.43	1.270-001	-176.50	7.874-001	24.07
0.35	1.043-001	-155.98	1.079-001	176.22	9.659-001	-332.19
0.40	1.049-001	-160.06	9.009-002	167.12	1.165+000	-327.18
0.45	1.026-001	-164.69	7.444-002	155.86	1.378+000	-320.55
0.50	9.788-002	-169.86	6.167-002	142.20	1.587+000	-312.05
0.55	9.145-002	-175.58	5.219-002	126.27	1.752+000	-301.85
0.60	8.397-002	178.15	4.590-002	108.92	1.829+000	69.23
0.65	7.589-002	171.31	4.223-002	91.53	1.797+000	79.79
0.70	6.776-002	163.91	4.025-002	75.33	1.683+000	88.58
0.75	5.990-002	155.92	3.909-002	60.89	1.532+000	95.03
0.80	5.256-002	147.35	3.810-002	48.16	1.379+000	99.19
0.85	4.589-002	138.22	3.695-002	36.85	1.242+000	101.37
0.90	3.998-002	128.56	3.549-002	26.61	1.126+000	101.95
0.95	3.484-002	118.42	3.372-002	17.16	1.033+000	101.27
1.00	3.043-002	107.90	3.169-002	8.28	9.603-001	99.62
1.05	2.670-002	97.10	2.947-002	-0.18	9.060-001	97.28
1.10	2.356-002	86.15	2.714-002	-8.33	8.678-001	94.48
1.15	2.091-002	75.21	2.479-002	-16.25	8.437-001	91.46
1.20	1.868-002	64.40	2.246-002	-23.98	8.317-001	88.39
1.25	1.677-002	53.84	2.020-002	-31.58	8.300-001	85.42
1.30	1.512-002	43.61	1.806-002	-39.06	8.368-001	82.67
1.35	1.366-002	33.77	1.606-002	-46.44	8.510-001	80.21
1.40	1.237-002	24.33	1.420-002	-53.74	8.711-001	78.07
1.50	1.013-002	6.71	1.095-002	-68.12	9.255-001	74.82
1.60	8.248-003	-9.36	8.298-003	-82.22	9.939-001	72.87
1.70	6.648-003	-24.00	6.198-003	-96.06	1.073+000	72.06
1.80	5.294-003	-37.37	4.564-003	-109.61	1.160+000	72.24
1.90	4.161-003	-49.54	3.315-003	-122.85	1.255+000	73.30
2.00	3.226-003	-60.56	2.373-003	-135.75	1.359+000	75.19
2.10	2.468-003	-70.40	1.673-003	-148.28	1.475+000	77.89
2.20	1.862-003	-78.97	1.159-003	-160.40	1.607+000	81.43
2.30	1.388-003	-86.12	7.862-004	-172.04	1.766+000	85.93
2.40	1.024-003	-91.61	5.199-004	176.87	1.969+000	-268.48
2.50	7.494-004	-95.13	3.323-004	166.47	2.255+000	-261.60
2.60	5.487-004	-96.35	2.025-004	157.00	2.710+000	-253.34
2.65	4.713-004	-96.01	1.541-004	152.76	3.059+000	-248.77
2.70	4.069-004	-95.02	1.145-004	149.02	3.553+000	-244.04
2.75	3.540-004	-93.42	8.242-005	146.02	4.295+000	-239.44
2.80	3.110-004	-91.30	5.665-005	144.26	5.489+000	-235.56
2.85	2.764-004	-88.77	3.628-005	144.97	7.619+000	-233.74
2.90	2.489-004	-86.01	2.075-005	151.84	1.200+001	-237.84
2.92	2.395-004	-84.87	1.593-005	158.67	1.504+001	-243.54

Table 1
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 5.00 Z = 0.0

O	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
2.94	2.310-004	-83.75	1.210-005	170.24	1.909+001	-253.99
2.96	2.232-004	-82.63	9.611-006	-171.42	2.323+001	88.79
2.98	2.161-004	-81.54	8.836-006	-148.21	2.446+001	66.67
3.00	2.096-004	-80.47	9.633-006	-127.76	2.176+001	47.29
3.02	2.036-004	-79.45	1.131-005	-114.15	1.801+001	34.70
3.04	1.981-004	-78.47	1.328-005	-105.94	1.492+001	27.47
3.06	1.930-004	-77.54	1.525-005	-101.05	1.266+001	23.51
3.08	1.883-004	-76.66	1.711-005	-98.14	1.101+001	21.40
3.10	1.839-004	-75.84	1.879-005	-96.45	9.787+000	20.60
3.15	1.740-004	-74.04	2.218-005	-95.11	7.846+000	21.07
3.20	1.653-004	-72.60	2.445-005	-95.81	6.760+000	23.22
3.25	1.574-004	-71.48	2.579-005	-97.41	6.104+000	25.93
3.30	1.501-004	-70.66	2.637-005	-99.42	5.691+000	28.77
3.35	1.431-004	-70.08	2.636-005	-101.62	5.430+000	31.54
3.40	1.365-004	-69.70	2.590-005	-103.86	5.269+000	34.16
3.45	1.301-004	-69.49	2.512-005	-106.08	5.179+000	36.59
3.50	1.239-004	-69.40	2.410-005	-108.21	5.140+000	38.81
3.55	1.179-004	-69.40	2.292-005	-110.22	5.142+000	40.82
3.60	1.121-004	-69.46	2.166-005	-112.09	5.174+000	42.63
3.70	1.011-004	-69.69	1.903-005	-115.33	5.312+000	45.64
3.80	9.103-005	-69.96	1.649-005	-117.83	5.519+000	47.88
4.00	7.375-005	-70.34	1.218-005	-120.62	6.053+000	50.28

Table 1
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 10.00 Z = 0.0

D	P	PHASE (P) IN DEGREES	Q	PHASE (Q) IN DEGREES	P/Q	PHASE (P/Q) IN DEGREES
0.00	0.000+000	0.00	1.215-002	2.03	0.000+000	-2.03
0.02	7.360-004	21.37	1.211-002	1.88	6.077-002	19.49
0.04	1.462-003	21.08	1.199-002	1.43	1.219-001	19.66
0.06	2.168-003	20.61	1.179-002	0.67	1.839-001	19.94
0.08	2.845-003	19.96	1.151-002	-0.40	2.472-001	20.36
0.10	3.485-003	19.11	1.117-002	-1.79	3.120-001	20.90
0.15	4.872-003	16.18	0.005-002	-6.75	4.845-001	22.93
0.20	5.891-003	12.07	8.693-003	-14.08	6.777-001	26.14
0.25	6.505-003	6.75	7.243-003	-24.24	8.981-001	31.01
0.30	6.724-003	0.26	5.872-003	-37.89	1.145+000	38.15
0.35	6.600-003	-7.47	4.728-003	-55.63	1.396+000	48.16
0.40	6.211-003	-16.46	3.916-003	-77.35	1.586+000	60.89
0.45	5.644-003	-26.75	3.451-003	-101.22	1.635+000	74.47
0.50	4.985-003	-38.37	3.238-003	-124.37	1.540+000	86.00
0.55	4.308-003	-51.35	3.135-003	-145.06	1.374+000	93.71
0.60	3.668-003	-65.69	3.036-003	-163.22	1.208+000	97.53
0.65	3.098-003	-81.27	2.891-003	-179.48	1.072+000	98.21
0.70	2.615-003	-97.89	2.689-003	165.51	9.725-001	-263.39
0.75	2.218-003	-115.18	2.443-003	151.28	9.080-001	-266.46
0.80	1.896-003	-132.72	2.169-003	137.53	8.741-001	-270.25
0.85	1.633-003	-150.07	1.887-003	124.07	8.654-001	-274.14
0.90	1.412-003	-166.89	1.610-003	110.77	8.772-001	-277.66
0.95	1.222-003	177.03	1.351-003	97.59	9.049-001	79.45
1.00	1.054-003	161.74	1.115-003	84.47	9.449-001	77.31
1.10	7.652-004	133.74	7.284-004	50.37	1.051+000	75.37
1.20	5.316-004	108.78	4.509-004	32.47	1.179+000	76.30
1.30	3.502-004	86.73	2.649-004	6.80	1.322+000	79.93
1.40	2.174-004	67.83	1.470-004	-18.66	1.479+000	85.49
1.50	1.264-004	52.94	7.618-005	-44.12	1.659+000	97.06
1.55	9.384-005	47.60	5.309-005	-57.03	1.768+000	104.63
1.60	6.852-005	44.23	3.597-005	-70.30	1.905+000	114.53
1.65	4.943-005	43.51	2.353-005	-84.33	2.101+000	127.84
1.70	3.574-005	46.24	1.469-005	-99.94	2.433+000	146.18
1.75	2.666-005	52.89	8.637-006	-119.01	3.086+000	171.90
1.80	2.133-005	62.50	4.812-006	-146.11	4.433+000	208.61
1.85	1.364-005	72.31	2.951-006	171.87	6.318+000	-99.56
1.90	1.738-005	79.82	2.667-006	126.71	6.517+000	-46.89
1.95	1.664-005	84.44	2.904-006	97.37	5.731+000	-12.93
2.00	1.596-005	86.74	3.049-006	79.05	5.237+000	7.69
2.05	1.518-005	87.55	3.010-006	66.13	5.044+000	21.43
2.10	1.428-005	87.49	2.831-006	56.22	5.043+000	31.27
2.15	1.329-005	87.00	2.570-006	48.36	5.172+000	38.65
2.20	1.227-005	86.36	2.272-006	42.11	5.398+000	44.25
2.25	1.125-005	85.73	1.973-006	37.29	5.703+000	48.45
2.30	1.029-005	85.23	1.694-006	33.79	6.073+000	51.43
2.40	8.561-006	84.70	1.235-006	30.47	6.935+000	54.23
2.50	7.156-006	84.77	9.194-007	31.04	7.783+000	53.73
2.55	6.565-006	84.94	8.069-007	32.18	8.136+000	52.76
2.60	6.038-006	85.17	7.169-007	33.53	8.423+000	51.64
2.65	5.569-006	85.42	6.440-007	34.86	8.647+000	50.56
2.70	5.148-006	85.66	5.834-007	36.02	8.824+000	49.64

Table 1
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 10.00 Z = 0.0

D	P	PHASE (P) IN DEGREES	Q	PHASE (Q) IN DEGREES	P/Q	PHASE (P/Q) IN DEGREES
2.75	4.769-006	85.89	5.317-007	36.96	8.969+000	48.93
2.80	4.426-006	86.10	4.865-007	37.66	9.099+000	48.44
2.85	4.115-006	86.28	4.460-007	38.16	9.226+000	48.12
2.90	3.831-006	86.44	4.095-007	38.51	9.357+000	47.93
2.95	3.572-006	86.58	3.761-007	38.75	9.496+000	47.83
3.00	3.334-006	86.70	3.457-007	38.93	9.645+000	47.77
3.10	2.915-006	86.92	2.925-007	39.20	9.966+000	47.72
3.20	2.559-006	87.11	2.482-007	39.47	1.031+001	47.64
3.40	1.996-006	87.43	1.814-007	40.07	1.101+001	47.37
3.60	1.580-006	87.71	1.352-007	40.64	1.169+001	47.07
3.80	1.268-006	87.95	1.025-007	41.11	1.237+001	46.84
4.00	1.029-006	88.14	7.883-008	41.50	1.305+001	46.65

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 0.10 K = 2.0 Z = 0.5 B/H = 0.50

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	9.998-001	-0.42	0.000+000	0.42
0.02	2.997-002	-0.26	9.986-001	-0.42	3.001-002	0.16
0.04	5.976-002	-0.26	9.951-001	-0.42	6.006-002	0.16
0.06	8.919-002	-0.26	9.891-001	-0.43	9.018-002	0.16
0.08	1.181-001	-0.26	9.809-001	-0.43	1.204-001	0.16
0.10	1.463-001	-0.27	9.704-001	-0.43	1.508-001	0.17
0.15	2.128-001	-0.27	9.351-001	-0.44	2.276-001	0.17
0.20	2.720-001	-0.27	8.883-001	-0.45	3.062-001	0.18
0.25	3.223-001	-0.28	8.324-001	-0.47	3.872-001	0.19
0.30	3.628-001	-0.29	7.697-001	-0.49	4.713-001	0.20
0.35	3.933-001	-0.30	7.031-001	-0.52	5.594-001	0.22
0.40	4.140-001	-0.31	6.347-001	-0.55	6.523-001	0.24
0.50	4.293-001	-0.33	5.007-001	-0.63	8.574-001	0.29
0.60	4.172-001	-0.37	3.800-001	-0.74	1.098+000	0.37
0.70	3.674-001	-0.40	2.785-001	-0.89	1.391+000	0.49
0.80	3.484-001	-0.45	1.973-001	-1.11	1.766+000	0.67
0.90	3.063-001	-0.50	1.349-001	-1.44	2.271+000	0.94
1.00	2.651-001	-0.56	8.827-002	-1.93	3.004+000	1.38
1.10	2.272-001	-0.62	5.430-002	-2.78	4.185+000	2.16
1.15	2.098-001	-0.66	4.112-002	-3.45	5.103+000	2.79
1.20	1.935-001	-0.69	3.004-002	-4.44	6.443+000	3.75
1.25	1.784-001	-0.73	2.077-002	-6.06	8.589+000	5.33
1.30	1.643-001	-0.77	1.307-002	-9.10	1.257+001	8.33
1.32	1.590-001	-0.79	1.038-002	-11.21	1.531+001	10.42
1.34	1.538-001	-0.81	7.913-003	-14.43	1.944+001	13.62
1.36	1.488-001	-0.82	5.667-003	-19.88	2.626+001	19.06
1.38	1.440-001	-0.84	3.686-003	-30.72	3.906+001	29.88
1.40	1.393-001	-0.86	2.182-003	-57.54	6.384+001	56.68
1.42	1.348-001	-0.89	1.922-003	-110.54	7.012+001	109.66
1.44	1.304-001	-0.90	2.957-003	-143.48	4.409+001	142.58
1.46	1.262-001	-0.91	4.305-003	-156.43	2.931+001	155.52
1.48	1.221-001	-0.93	5.647-003	-162.65	2.162+001	161.72
1.50	1.181-001	-0.95	6.917-003	-166.22	1.708+001	165.27
1.55	1.089-001	-1.00	9.702-003	-170.74	1.122+001	169.74
1.60	1.003-001	-1.06	1.195-002	-172.89	8.395+000	171.83
1.65	9.255-002	-1.11	1.373-002	-174.13	6.739+000	173.02
1.70	8.542-002	-1.17	1.512-002	-174.93	5.650+000	173.76
1.80	7.291-002	-1.29	1.694-002	-175.91	4.305+000	174.61
1.90	6.244-002	-1.42	1.782-002	-176.46	3.504+000	175.04
2.00	5.364-002	-1.56	1.806-002	-176.81	2.971+000	175.25
2.20	4.002-002	-1.86	1.739-002	-177.20	2.302+000	175.34
2.40	3.028-002	-2.21	1.597-002	-177.40	1.896+000	175.19
2.60	2.323-002	-2.59	1.433-002	-177.50	1.621+000	174.90
2.80	1.806-002	-3.02	1.271-002	-177.53	1.421+000	174.51
3.00	1.421-002	-3.50	1.120-002	-177.53	1.269+000	174.04
3.20	1.131-002	-4.02	9.856-003	-177.51	1.148+000	173.49
3.40	9.104-003	-4.59	8.676-003	-177.48	1.049+000	172.88
3.60	7.399-003	-5.22	7.649-003	-177.43	9.674-001	172.22
3.80	6.069-003	-5.89	6.760-003	-177.38	8.979-001	171.49
4.00	5.021-003	-6.63	5.991-003	-177.32	8.381-001	170.70

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 0.20 K = 2.0 Z = 0.0 B/H = 0.50

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	9.985-001	-1.66	0.000+000	1.66
0.02	2.996-002	-1.05	9.973-001	-1.66	3.004-002	0.61
0.04	5.974-002	-1.05	9.937-001	-1.66	6.012-002	0.61
0.06	8.917-002	-1.05	9.878-001	-1.67	9.027-002	0.61
0.08	1.181-001	-1.05	9.795-001	-1.67	1.205-001	0.62
0.10	1.463-001	-1.06	9.691-001	-1.68	1.509-001	0.62
0.15	2.128-001	-1.07	9.338-001	-1.72	2.279-001	0.64
0.20	2.719-001	-1.09	8.870-001	-1.77	3.065-001	0.67
0.25	3.222-001	-1.12	8.310-001	-1.83	3.877-001	0.71
0.30	3.627-001	-1.15	7.685-001	-1.91	4.719-001	0.76
0.35	3.931-001	-1.18	7.018-001	-2.01	5.602-001	0.82
0.40	4.138-001	-1.23	6.334-001	-2.13	6.534-001	0.90
0.50	4.291-001	-1.33	4.995-001	-2.43	8.591-001	1.10
0.60	4.170-001	-1.46	3.789-001	-2.86	1.101+000	1.40
0.70	3.872-001	-1.61	2.774-001	-3.45	1.396+000	1.85
0.80	3.481-001	-1.78	1.963-001	-4.23	1.774+000	2.50
0.90	3.060-001	-1.98	1.340-001	-5.50	2.284+000	3.52
1.00	2.649-001	-2.21	8.753-002	-7.38	3.026+000	5.17
1.10	2.270-001	-2.47	5.377-002	-10.55	4.221+000	8.08
1.15	2.096-001	-2.60	4.075-002	-13.07	5.143+000	10.47
1.20	1.933-001	-2.75	2.989-002	-16.79	6.466+000	14.04
1.25	1.781-001	-2.91	2.096-002	-22.71	8.495+000	19.80
1.30	1.640-001	-3.06	1.387-002	-33.18	1.182+001	30.11
1.32	1.587-001	-3.13	1.157-002	-39.74	1.371+001	36.62
1.34	1.535-001	-3.19	9.637-003	-48.48	1.593+001	45.29
1.36	1.485-001	-3.25	8.125-003	-60.01	1.828+001	56.74
1.38	1.437-001	-3.33	7.123-003	-74.46	2.017+001	71.13
1.40	1.390-001	-3.40	6.695-003	-90.69	2.077+001	87.29
1.42	1.345-001	-3.48	6.807-003	-106.37	1.976+001	102.90
1.44	1.301-001	-3.55	7.325-003	-119.56	1.776+001	116.01
1.46	1.259-001	-3.62	8.190-003	-129.77	1.556+001	126.15
1.48	1.218-001	-3.70	8.974-003	-137.45	1.357+001	133.75
1.50	1.179-001	-3.78	9.899-003	-143.25	1.191+001	139.47
1.55	1.086-001	-3.97	1.213-002	-152.62	8.952+000	148.65
1.60	1.001-001	-4.18	1.406-002	-158.03	7.119+000	153.85
1.65	9.229-002	-4.39	1.563-002	-161.49	5.905+000	157.10
1.70	8.516-002	-4.62	1.686-002	-163.87	5.050+000	159.26
1.80	7.266-002	-5.08	1.848-002	-166.91	3.931+000	161.82
1.90	6.219-002	-5.51	1.923-002	-168.75	3.234+000	163.16
2.00	5.340-002	-6.13	1.937-002	-169.97	2.757+000	163.84
2.20	3.979-002	-7.31	1.856-002	-171.47	2.144+000	164.16
2.40	3.007-002	-8.64	1.704-002	-172.36	1.764+000	163.72
2.60	2.303-002	-10.12	1.531-002	-172.94	1.504+000	162.82
2.80	1.788-002	-11.76	1.362-002	-173.37	1.313+000	161.60
3.00	1.405-002	-13.57	1.200-002	-173.71	1.166+000	160.13
3.20	1.117-002	-15.54	1.065-002	-173.99	1.049+000	158.44
3.40	8.985-003	-17.69	9.423-003	-174.24	9.535-001	156.55
3.60	7.300-003	-20.02	8.351-003	-174.50	8.741-001	154.48
3.80	5.990-003	-22.52	7.421-003	-174.75	8.071-001	152.23
4.00	4.961-003	-25.13	6.614-003	-175.02	7.501-001	149.82

Table 2

FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 0.10 K = 5.0 Z = 0.0 B/H = 0.50

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	9.986-001	-1.91	0.000+000	1.91
0.02	2.996-002	-1.26	9.974-001	-1.91	3.004-002	0.65
0.04	5.974-002	-1.27	9.938-001	-1.91	6.011-002	0.65
0.06	8.916-002	-1.27	9.879-001	-1.92	9.026-002	0.65
0.08	1.181-001	-1.27	9.797-001	-1.93	1.205-001	0.66
0.10	1.463-001	-1.28	9.692-001	-1.94	1.509-001	0.66
0.15	2.127-001	-1.29	9.339-001	-1.97	2.278-001	0.68
0.20	2.719-001	-1.31	8.871-001	-2.03	3.065-001	0.71
0.25	3.221-001	-1.34	8.312-001	-2.10	3.876-001	0.75
0.30	3.626-001	-1.38	7.686-001	-2.18	4.718-001	0.80
0.35	3.931-001	-1.42	7.019-001	-2.29	5.600-001	0.87
0.40	4.138-001	-1.47	6.336-001	-2.41	6.532-001	0.95
0.50	4.291-001	-1.58	4.997-001	-2.74	8.587-001	1.16
0.60	4.170-001	-1.73	3.791-001	-3.19	1.100+000	1.46
0.70	3.872-001	-1.83	2.776-001	-3.80	1.395+000	1.91
0.80	3.481-001	-2.09	1.965-001	-4.66	1.771+000	2.57
0.90	3.060-001	-2.31	1.342-001	-5.90	2.280+000	3.59
1.00	2.649-001	-2.55	8.777-002	-7.79	3.018+000	5.24
1.10	2.270-001	-2.83	5.402-002	-10.95	4.201+000	8.12
1.15	2.095-001	-2.97	4.100-002	-13.44	5.111+000	10.47
1.20	1.933-001	-3.13	3.013-002	-17.09	6.413+000	13.96
1.25	1.781-001	-3.29	2.120-002	-22.85	8.400+000	19.57
1.30	1.640-001	-3.46	1.408-002	-32.96	1.165+001	29.51
1.32	1.587-001	-3.52	1.176-002	-39.27	1.349+001	35.74
1.34	1.535-001	-3.53	9.789-003	-47.64	1.568+001	44.05
1.36	1.485-001	-3.67	8.227-003	-58.72	1.806+001	55.05
1.38	1.437-001	-3.74	7.156-003	-72.70	2.008+001	69.02
1.40	1.390-001	-3.81	6.645-003	-88.85	2.092+001	85.04
1.42	1.345-001	-3.88	6.680-003	-104.76	2.014+001	100.87
1.44	1.301-001	-3.96	7.140-003	-118.39	1.823+001	114.43
1.46	1.259-001	-4.04	7.865-003	-129.04	1.601+001	125.00
1.48	1.218-001	-4.11	8.724-003	-137.08	1.396+001	132.96
1.50	1.179-001	-4.19	9.633-003	-143.13	1.224+001	138.94
1.55	1.086-001	-4.33	1.134-002	-152.89	9.170+000	148.50
1.60	1.001-001	-4.60	1.376-002	-158.50	7.274+000	153.90
1.65	9.231-002	-4.82	1.533-002	-162.08	6.023+000	157.26
1.70	8.618-002	-5.04	1.656-002	-164.53	5.144+000	159.49
1.80	7.269-002	-5.51	1.817-002	-167.68	4.000+000	162.17
1.90	6.222-002	-6.00	1.892-002	-169.59	3.289+000	163.59
2.00	5.344-002	-6.52	1.906-002	-170.87	2.804+000	164.35
2.20	3.983-002	-7.66	1.824-002	-172.49	2.183+000	164.84
2.40	3.011-002	-8.90	1.673-002	-173.48	1.800+000	164.57
2.60	2.309-002	-10.27	1.501-002	-174.15	1.538+000	163.88
2.80	1.793-002	-11.75	1.332-002	-174.65	1.347+000	162.90
3.00	1.411-002	-13.36	1.176-002	-175.05	1.200+000	161.69
3.20	1.123-002	-15.08	1.037-002	-175.39	1.083+000	160.31
3.40	9.041-003	-16.93	9.145-003	-175.70	9.886-001	158.77
3.60	7.353-003	-18.89	8.081-003	-175.98	9.100-001	157.09
3.80	6.040-003	-20.97	7.159-003	-176.24	8.437-001	155.27
4.00	5.007-003	-23.17	6.361-003	-176.50	7.872-001	153.32

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 0.20 K = 5.0 Z = 0.0 B/H = 0.50

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	9.852-001	-7.27	0.000+000	7.27
0.02	2.982-002	-4.99	9.840-001	-7.28	3.031-002	2.28
0.04	5.947-002	-5.03	9.805-001	-7.29	6.065-002	2.29
0.06	8.875-002	-5.01	9.745-001	-7.31	9.107-002	2.30
0.08	1.175-001	-5.02	9.663-001	-7.34	1.216-001	2.32
0.10	1.456-001	-5.04	9.559-001	-7.38	1.523-001	2.34
0.15	2.117-001	-5.13	9.207-001	-7.52	2.300-001	2.41
0.20	2.706-001	-5.19	8.742-001	-7.71	3.095-001	2.52
0.25	3.205-001	-5.30	8.185-001	-7.96	3.916-001	2.66
0.30	3.607-001	-5.44	7.562-001	-8.28	4.771-001	2.84
0.35	3.909-001	-5.60	6.898-001	-8.67	5.667-001	3.06
0.40	4.114-001	-5.79	6.218-001	-9.13	6.616-001	3.34
0.50	4.263-001	-6.24	4.888-001	-10.32	8.721-001	4.08
0.60	4.138-001	-6.79	3.691-001	-11.95	1.121+000	5.16
0.70	3.838-001	-7.44	2.688-001	-14.19	1.428+000	6.75
0.80	3.446-001	-8.18	1.890-001	-17.32	1.823+000	9.14
0.90	3.024-001	-9.03	1.282-001	-21.85	2.359+000	12.83
1.00	2.612-001	-9.97	8.371-002	-28.77	3.121+000	18.80
1.10	2.233-001	-11.02	5.269-002	-40.05	4.239+000	29.03
1.15	2.060-001	-11.58	4.156-002	-48.38	4.956+000	36.80
1.20	1.897-001	-12.16	3.312-002	-59.23	5.728+000	47.66
1.25	1.746-001	-12.77	2.728-002	-72.77	6.400+000	60.00
1.30	1.606-001	-13.41	2.386-002	-88.20	6.730+000	74.79
1.32	1.553-001	-13.67	2.308-002	-94.48	6.726+000	80.81
1.34	1.501-001	-13.93	2.259-002	-100.61	6.645+000	86.68
1.36	1.451-001	-14.20	2.234-002	-106.47	6.496+000	92.27
1.38	1.403-001	-14.47	2.229-002	-111.96	6.295+000	97.49
1.40	1.357-001	-14.75	2.239-002	-117.03	6.059+000	102.28
1.42	1.312-001	-15.03	2.261-002	-121.66	5.802+000	106.64
1.44	1.268-001	-15.31	2.291-002	-125.86	5.538+000	110.55
1.46	1.227-001	-15.60	2.326-002	-129.64	5.274+000	114.14
1.48	1.186-001	-15.89	2.364-002	-133.05	5.018+000	117.15
1.50	1.147-001	-16.19	2.403-002	-136.10	4.773+000	119.91
1.55	1.055-001	-16.95	2.498-002	-142.48	4.222+000	125.53
1.60	9.704-002	-17.73	2.581-002	-147.45	3.760+000	129.72
1.65	8.934-002	-18.54	2.645-002	-151.39	3.377+000	132.85
1.70	8.229-002	-19.37	2.690-002	-154.58	3.059+000	135.21
1.80	6.996-002	-21.11	2.725-002	-159.45	2.567+000	138.34
1.90	5.966-002	-22.96	2.701-002	-163.02	2.208+000	140.06
2.00	5.104-002	-24.90	2.635-002	-165.79	1.937+000	140.89
2.20	3.777-002	-29.08	2.430-002	-169.97	1.555+000	140.88
2.40	2.838-002	-33.66	2.184-002	-173.14	1.300+000	139.48
2.60	2.166-002	-38.62	1.936-002	-175.80	1.118+000	137.18
2.80	1.679-002	-43.95	1.706-002	-178.17	9.843-001	134.22
3.00	1.323-002	-49.60	1.499-002	179.63	8.827-001	-229.23
3.20	1.060-002	-55.53	1.317-002	177.53	8.048-001	-233.07
3.40	8.631-003	-61.68	1.159-002	175.50	7.450-001	-237.17
3.60	7.141-003	-67.96	1.021-002	173.50	6.994-001	-241.46
3.80	6.002-003	-74.30	9.021-003	171.52	6.654-001	-245.82
4.00	5.126-003	-80.61	7.991-003	169.56	6.408-001	-250.17

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 1.10 K = 2.0 Z = 0.1 B/H = 0.25

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	9.999-001	-0.32	0.000+000	0.32
0.02	2.997-002	-0.19	9.987-001	-0.32	3.001-002	0.13
0.04	5.976-002	-0.19	9.951-001	-0.32	6.005-002	0.13
0.06	8.919-002	-0.19	9.891-001	-0.32	9.017-002	0.13
0.08	1.181-001	-0.19	9.809-001	-0.32	1.204-001	0.13
0.10	1.463-001	-0.19	9.704-001	-0.32	1.508-001	0.13
0.15	2.128-001	-0.20	9.351-001	-0.33	2.276-001	0.13
0.20	2.720-001	-0.21	8.883-001	-0.34	3.062-001	0.14
0.25	3.223-001	-0.21	8.324-001	-0.35	3.871-001	0.15
0.30	3.628-001	-0.21	7.698-001	-0.37	4.713-001	0.16
0.35	3.933-001	-0.22	7.031-001	-0.39	5.593-001	0.17
0.40	4.140-001	-0.22	6.347-001	-0.41	6.523-001	0.19
0.50	4.293-001	-0.24	5.008-001	-0.47	8.573-001	0.23
0.60	4.172-001	-0.27	3.800-001	-0.56	1.098+000	0.29
0.70	3.874-001	-0.30	2.785-001	-0.68	1.391+000	0.39
0.80	3.484-001	-0.33	1.973-001	-0.86	1.766+000	0.53
0.90	3.063-001	-0.37	1.349-001	-1.11	2.271+000	0.75
1.00	2.652-001	-0.41	8.829-002	-1.51	3.003+000	1.10
1.10	2.272-001	-0.46	5.431-002	-2.18	4.184+000	1.72
1.15	2.098-001	-0.49	4.113-002	-2.72	5.102+000	2.23
1.20	1.935-001	-0.52	3.004-002	-3.52	6.443+000	3.00
1.25	1.784-001	-0.55	2.076-002	-4.82	8.592+000	4.27
1.30	1.643-001	-0.58	1.304-002	-7.27	1.260+001	6.69
1.32	1.590-001	-0.59	1.034-002	-8.98	1.537+001	8.39
1.34	1.538-001	-0.61	7.857-003	-11.60	1.957+001	11.00
1.36	1.488-001	-0.62	5.581-003	-16.09	2.667+001	15.47
1.38	1.440-001	-0.63	3.541-003	-25.31	4.066+001	24.68
1.40	1.393-001	-0.65	1.909-003	-50.92	7.296+001	50.28
1.42	1.348-001	-0.66	1.587-003	-113.86	8.493+001	113.20
1.44	1.304-001	-0.68	2.742-003	-148.78	4.756+001	148.10
1.46	1.262-001	-0.69	4.154-003	-160.42	3.037+001	159.73
1.48	1.221-001	-0.71	5.529-003	-165.72	2.208+001	165.01
1.50	1.181-001	-0.72	6.819-003	-168.7	1.733+001	167.97
1.55	1.089-001	-0.75	9.629-003	-172.41	1.130+001	171.65
1.60	1.003-001	-0.80	1.189-002	-174.16	8.439+000	173.36
1.65	9.256-002	-0.85	1.368-002	-175.16	6.766+000	174.32
1.70	8.542-002	-0.89	1.507-002	-175.81	5.669+000	174.92
1.80	7.292-002	-0.99	1.690-002	-176.59	4.316+000	175.61
1.90	6.244-002	-1.09	1.778-002	-177.03	3.512+000	175.94
2.00	5.365-002	-1.21	1.802-002	-177.31	2.977+000	176.11
2.20	4.002-002	-1.44	1.736-002	-177.61	2.306+000	176.16
2.40	3.028-002	-1.72	1.594-002	-177.75	1.899+000	176.02
2.60	2.323-002	-2.04	1.431-002	-177.80	1.624+000	175.76
2.80	1.806-002	-2.39	1.268-002	-177.81	1.424+000	175.42
3.00	1.421-002	-2.79	1.118-002	-177.79	1.271+000	175.00
3.20	1.132-002	-3.22	9.835-003	-177.75	1.151+000	174.52
3.40	9.106-003	-3.70	8.656-003	-177.69	1.052+000	173.99
3.60	7.401-003	-4.23	7.630-003	-177.63	9.699-001	173.40
3.80	6.170-003	-4.81	6.742-003	-177.56	9.004-001	172.76
4.00	5.522-003	-5.42	5.974-003	-177.49	8.405-001	172.07

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 0.20 K = 2.0 Z = 0.0 B/H = 0.25

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	9.969-001	-1.24	0.000+000	1.24
0.02	2.996-002	-0.76	9.977-001	-1.24	3.003-002	0.47
0.04	5.975-002	-0.76	9.941-001	-1.24	6.010-002	0.48
0.06	8.918-002	-0.76	9.882-001	-1.24	9.025-002	0.48
0.08	1.181-001	-0.77	9.799-001	-1.25	1.205-001	0.48
0.10	1.463-001	-0.77	9.695-001	-1.26	1.509-001	0.49
0.15	2.128-001	-0.78	9.342-001	-1.28	2.278-001	0.50
0.20	2.719-001	-0.80	8.874-001	-1.32	3.064-001	0.52
0.25	3.222-001	-0.81	8.314-001	-1.37	3.875-001	0.56
0.30	3.627-001	-0.84	7.688-001	-1.43	4.718-001	0.59
0.35	3.932-001	-0.86	7.022-001	-1.51	5.600-001	0.64
0.40	4.139-001	-0.90	6.338-001	-1.60	6.531-001	0.70
0.50	4.292-001	-0.97	4.999-001	-1.84	8.586-001	0.87
0.60	4.171-001	-1.07	3.792-001	-2.17	1.100+000	1.10
0.70	3.873-001	-1.18	2.777-001	-2.63	1.395+000	1.45
0.80	3.482-001	-1.31	1.966-001	-3.29	1.772+000	1.97
0.90	3.061-001	-1.47	1.342-001	-4.25	2.281+000	2.78
1.00	2.650-001	-1.64	8.769-002	-5.74	3.022+000	4.10
1.10	2.271-001	-1.84	5.385-002	-8.26	4.217+000	6.42
1.15	2.097-001	-1.94	4.076-002	-10.28	5.144+000	8.33
1.20	1.934-001	-2.05	2.981-002	-13.26	6.486+000	11.21
1.25	1.782-001	-2.17	2.076-002	-18.07	8.584+000	15.89
1.30	1.641-001	-2.30	1.344-002	-26.81	1.221+001	24.52
1.32	1.588-001	-2.35	1.101-002	-32.54	1.442+001	30.19
1.34	1.536-001	-2.41	8.902-003	-40.52	1.726+001	38.12
1.36	1.486-001	-2.45	7.184-003	-51.86	2.069+001	49.40
1.38	1.438-001	-2.51	5.972-003	-67.55	2.408+001	65.04
1.40	1.391-001	-2.56	5.401-003	-86.95	2.576+001	84.39
1.42	1.346-001	-2.62	5.495-003	-106.42	2.449+001	103.80
1.44	1.302-001	-2.68	6.092-003	-122.26	2.138+001	119.59
1.46	1.260-001	-2.74	6.968-003	-133.73	1.808+001	130.99
1.48	1.219-001	-2.79	7.961-003	-141.80	1.531+001	139.01
1.50	1.180-001	-2.86	8.979-003	-147.58	1.314+001	144.73
1.55	1.087-001	-3.01	1.138-002	-156.41	9.551+000	153.40
1.60	1.002-001	-3.17	1.341-002	-161.25	7.468+000	158.08
1.65	9.237-002	-3.34	1.506-002	-164.26	6.135+000	160.92
1.70	8.524-002	-3.52	1.635-002	-166.29	5.215+000	162.78
1.80	7.274-002	-3.89	1.804-002	-168.84	4.032+000	164.95
1.90	6.226-002	-4.29	1.884-002	-170.34	3.306+000	166.06
2.00	5.347-002	-4.72	1.901-002	-171.33	2.812+000	166.61
2.20	3.985-002	-5.67	1.825-002	-172.51	2.183+000	166.84
2.40	3.012-002	-6.74	1.677-002	-173.17	1.796+000	166.42
2.60	2.308-002	-7.95	1.508-002	-173.57	1.531+000	165.62
2.80	1.792-002	-9.30	1.341-002	-173.85	1.336+000	164.54
3.00	1.408-002	-10.80	1.186-002	-174.04	1.187+000	163.25
3.20	1.120-002	-12.44	1.048-002	-174.21	1.068+000	161.76
3.40	8.998-003	-14.24	9.265-003	-174.33	9.711-001	160.09
3.60	7.305-003	-16.20	8.208-003	-174.46	8.901-001	158.25
3.80	5.988-003	-18.32	7.290-003	-174.58	8.214-001	156.26
4.00	4.953-003	-20.61	6.495-003	-174.73	7.626-001	154.12

Table 2

FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 0.10 K = 5.0 Z = 0.0 B/H = 0.25

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	9.995-001	-1.06	0.000+000	1.06
0.02	2.997-002	-0.69	9.983-001	-1.06	3.002-002	0.37
0.04	5.975-002	-0.69	9.947-001	-1.07	6.007-002	0.37
0.06	8.918-002	-0.69	9.887-001	-1.07	9.020-002	0.37
0.08	1.181-001	-0.79	9.805-001	-1.07	1.204-001	0.38
0.10	1.463-001	-0.79	9.700-001	-1.08	1.508-001	0.38
0.15	2.128-001	-0.71	9.347-001	-1.14	2.277-001	0.39
0.20	2.719-001	-0.72	8.879-001	-1.13	3.063-001	0.41
0.25	3.222-001	-0.74	8.320-001	-1.17	3.873-001	0.43
0.30	3.627-001	-0.76	7.694-001	-1.22	4.715-001	0.46
0.35	3.932-001	-0.78	7.027-001	-1.28	5.596-001	0.50
0.40	4.139-001	-0.81	6.343-001	-1.35	6.526-001	0.55
0.50	4.293-001	-0.87	5.004-001	-1.54	8.578-001	0.67
0.60	4.172-001	-0.95	3.797-001	-1.80	1.099+000	0.85
0.70	3.874-001	-1.04	2.782-001	-2.15	1.392+000	1.11
0.80	3.483-001	-1.15	1.970-001	-2.65	1.768+000	1.50
0.90	3.062-001	-1.27	1.347-001	-3.37	2.274+000	2.09
1.00	2.651-001	-1.41	8.811-002	-4.47	3.008+000	3.05
1.10	2.271-001	-1.57	5.420-002	-6.31	4.191+000	4.74
1.15	2.097-001	-1.65	4.107-002	-7.78	5.108+000	6.12
1.20	1.934-001	-1.74	3.005-002	-9.93	6.438+000	8.20
1.25	1.783-001	-1.83	2.088-002	-13.40	8.539+000	11.57
1.30	1.642-001	-1.92	1.336-002	-19.79	1.230+001	17.86
1.32	1.589-001	-1.96	1.079-002	-24.07	1.472+001	22.11
1.34	1.537-001	-2.00	8.494-003	-30.29	1.810+001	28.29
1.36	1.487-001	-2.04	6.514-003	-39.82	2.283+001	37.78
1.38	1.439-001	-2.09	4.959-003	-54.99	2.901+001	52.91
1.40	1.392-001	-2.13	4.046-003	-77.87	3.440+001	75.75
1.42	1.347-001	-2.17	3.979-003	-104.44	3.385+001	102.27
1.44	1.303-001	-2.21	4.620-003	-125.64	2.821+001	123.43
1.46	1.261-001	-2.26	5.614-003	-139.34	2.246+001	137.08
1.48	1.220-001	-2.30	6.723-003	-147.98	1.815+001	145.68
1.50	1.181-001	-2.35	7.837-003	-153.69	1.506+001	151.34
1.55	1.088-001	-2.46	1.040-002	-161.73	1.046+001	159.27
1.60	1.003-001	-2.58	1.253-002	-165.86	8.000+000	163.28
1.65	9.248-002	-2.70	1.424-002	-168.34	6.492+000	165.63
1.70	8.535-002	-2.83	1.558-002	-169.98	5.479+000	167.15
1.80	7.285-002	-3.10	1.733-002	-172.02	4.203+000	168.91
1.90	6.237-002	-3.39	1.817-002	-173.21	3.432+000	169.83
2.00	5.358-002	-3.69	1.838-002	-174.00	2.915+000	170.30
2.20	3.996-002	-4.36	1.767-002	-174.95	2.262+000	170.59
2.40	3.023-002	-5.09	1.622-002	-175.48	1.863+000	170.39
2.60	2.318-002	-5.90	1.456-002	-175.82	1.593+000	169.92
2.80	1.802-002	-6.73	1.291-002	-176.05	1.395+000	169.26
3.00	1.418-002	-7.75	1.139-002	-176.21	1.245+000	168.45
3.20	1.129-002	-8.80	1.003-002	-176.32	1.125+000	167.52
3.40	9.084-003	-9.92	8.839-003	-176.42	1.028+000	166.49
3.60	7.385-003	-11.13	7.801-003	-176.49	9.466-001	165.36
3.80	6.060-003	-12.42	6.901-003	-176.56	8.780-001	164.13
4.00	5.016-003	-13.80	6.124-003	-176.61	8.192-001	162.81

Table 2

FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 0.20 K = 5.0 Z = 0.0 B/H = 0.25

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	9.990-001	-4.13	0.000+000	4.13
0.02	2.992-002	-2.75	9.923-001	-4.13	3.013-002	1.38
0.04	5.966-002	-2.76	9.893-001	-4.14	6.030-002	1.38
0.06	8.904-002	-2.76	9.833-001	-4.15	9.055-002	1.39
0.08	1.179-001	-2.77	9.751-001	-4.17	1.209-001	1.40
0.10	1.461-001	-2.78	9.646-001	-4.19	1.514-001	1.41
0.15	2.124-001	-2.82	9.294-001	-4.27	2.286-001	1.45
0.20	2.715-001	-2.86	8.827-001	-4.38	3.076-001	1.52
0.25	3.216-001	-2.93	8.268-001	-4.53	3.890-001	1.60
0.30	3.621-001	-3.00	7.643-001	-4.72	4.737-001	1.71
0.35	3.924-001	-3.10	6.977-001	-4.95	5.625-001	1.85
0.40	4.131-001	-3.20	6.295-001	-5.22	6.562-001	2.02
0.50	4.282-001	-3.46	4.959-001	-5.92	8.636-001	2.47
0.60	4.160-001	-3.77	3.755-001	-6.89	1.108+000	3.12
0.70	3.861-001	-4.13	2.744-001	-8.22	1.407+000	4.69
0.80	3.470-001	-4.56	1.937-001	-10.08	1.791+000	5.52
0.90	3.049-001	-5.05	1.319-001	-12.78	2.312+000	7.74
1.00	2.637-001	-5.59	8.605-002	-16.91	3.065+000	11.32
1.10	2.258-001	-6.13	5.317-002	-23.80	4.247+000	17.61
1.15	2.084-001	-6.52	4.077-002	-29.15	5.111+000	22.64
1.20	1.921-001	-6.86	3.076-002	-36.72	6.247+000	29.86
1.25	1.770-001	-7.21	2.303-002	-47.73	7.685+000	40.49
1.30	1.629-001	-7.58	1.764-002	-63.44	9.237+000	55.86
1.32	1.576-001	-7.73	1.617-002	-71.16	9.747+000	63.43
1.34	1.524-001	-7.89	1.509-002	-79.49	1.010+001	71.60
1.36	1.474-001	-8.05	1.440-002	-88.12	1.024+001	80.08
1.38	1.426-001	-8.21	1.406-002	-96.68	1.014+001	88.48
1.40	1.379-001	-8.37	1.402-002	-104.81	9.842+000	96.44
1.42	1.334-001	-8.53	1.420-002	-112.25	9.394+000	103.71
1.44	1.291-001	-8.73	1.456-002	-118.86	8.861+000	110.16
1.46	1.248-001	-8.87	1.504-002	-124.63	8.299+000	115.76
1.48	1.208-001	-9.04	1.559-002	-129.62	7.745+000	120.52
1.50	1.168-001	-9.21	1.618-002	-133.91	7.220+000	124.70
1.55	1.076-001	-9.66	1.766-002	-142.23	6.089+000	132.57
1.60	9.909-002	-10.12	1.901-002	-148.09	5.214+000	137.96
1.65	9.132-002	-10.63	2.012-002	-152.36	4.539+000	141.76
1.70	8.421-002	-11.13	2.099-002	-155.59	4.013+000	144.50
1.80	7.176-002	-12.13	2.206-002	-160.13	3.254+000	147.99
1.90	6.134-002	-13.24	2.240-002	-163.16	2.739+000	149.92
2.00	5.261-002	-14.43	2.223-002	-165.34	2.367+000	150.94
2.20	3.910-002	-16.93	2.094-002	-168.34	1.868+000	151.41
2.40	2.948-002	-19.72	1.907-002	-170.39	1.546+000	150.67
2.60	2.255-002	-22.78	1.707-002	-171.97	1.321+000	149.19
2.80	1.749-002	-26.10	1.514-002	-173.29	1.155+000	147.19
3.00	1.375-002	-29.69	1.339-002	-174.48	1.027+000	144.79
3.20	1.096-002	-33.53	1.183-002	-175.58	9.262-001	142.05
3.40	8.844-003	-37.61	1.046-002	-176.65	8.453-001	139.04
3.60	7.230-003	-41.90	9.270-003	-177.69	7.799-001	135.79
3.80	5.985-003	-46.39	8.236-003	-178.74	7.267-001	132.34
4.00	5.015-003	-51.04	7.337-003	-179.78	6.835-001	128.74

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

M = 0.50 K = 2.0 Z = 0.0 B/H = 0.50

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	9.751-001	-9.39	0.000+000	9.39
0.02	2.973-002	-6.39	9.739-001	-9.39	3.052-002	3.01
0.04	5.928-002	-6.39	9.704-001	-9.41	6.109-002	3.02
0.06	8.847-002	-6.41	9.645-001	-9.44	9.173-002	3.03
0.08	1.171-001	-6.43	9.563-001	-9.48	1.225-001	3.05
0.10	1.451-001	-6.45	9.459-001	-9.53	1.534-001	3.08
0.15	2.110-001	-6.53	9.108-001	-9.71	2.317-001	3.18
0.20	2.696-001	-6.65	8.544-001	-9.97	3.120-001	3.32
0.25	3.194-001	-6.83	8.088-001	-10.30	3.949-001	3.51
0.30	3.594-001	-6.93	7.467-001	-10.73	4.813-001	3.75
0.35	3.894-001	-7.20	6.806-001	-11.25	5.722-001	4.05
0.40	4.097-001	-7.45	6.128-001	-11.87	6.686-001	4.42
0.50	4.243-001	-8.05	4.804-001	-13.48	8.831-001	5.43
0.60	4.116-001	-8.79	3.615-001	-15.69	1.139+000	6.91
0.65	3.981-001	-9.21	3.091-001	-17.10	1.288+000	7.90
0.70	3.814-001	-9.66	2.620-001	-18.77	1.456+000	9.11
0.75	3.624-001	-10.15	2.201-001	-20.74	1.647+000	10.59
0.80	3.420-001	-10.68	1.832-001	-23.11	1.866+000	12.43
0.85	3.209-001	-11.24	1.513-001	-25.97	2.122+000	14.73
0.90	2.997-001	-11.84	1.238-001	-29.47	2.421+000	17.63
0.95	2.788-001	-12.47	1.005-001	-33.79	2.775+000	21.32
1.00	2.585-001	-13.14	8.104-002	-39.21	3.190+000	26.07
1.05	2.391-001	-13.84	6.514-002	-46.05	3.670+000	32.21
1.10	2.206-001	-14.59	5.255-002	-54.68	4.198+000	40.10
1.15	2.033-001	-15.36	4.308-002	-65.37	4.718+000	50.00
1.20	1.870-001	-16.18	3.653-002	-77.98	5.120+000	61.80
1.25	1.719-001	-17.04	3.257-002	-91.68	5.278+000	74.64
1.30	1.579-001	-17.93	3.069-002	-105.08	5.145+000	87.15
1.35	1.450-001	-18.86	3.023-002	-116.98	4.797+000	98.12
1.40	1.331-001	-19.83	3.057-002	-126.85	4.355+000	107.03
1.45	1.222-001	-20.84	3.126-002	-134.79	3.911+000	113.96
1.50	1.122-001	-21.89	3.200-002	-141.14	3.507+000	119.26
1.60	9.471-002	-24.09	3.314-002	-150.42	2.857+000	126.32
1.70	9.008-002	-26.47	3.357-002	-156.82	2.386+000	130.35
1.80	8.788-002	-29.00	3.331-002	-161.54	2.038+000	132.54
1.90	8.772-002	-31.70	3.253-002	-165.25	1.775+000	133.55
2.00	4.926-002	-34.56	3.138-002	-168.30	1.570+000	133.74
2.10	4.219-002	-37.59	3.000-002	-170.93	1.406+000	133.34
2.20	3.629-002	-40.78	2.849-002	-173.20	1.274+000	132.48
2.30	3.135-002	-44.13	2.692-002	-175.39	1.164+000	131.26
2.40	2.720-002	-47.64	2.535-002	-177.36	1.073+000	129.73
2.50	2.372-002	-51.23	2.381-002	-179.24	9.963-001	127.94
2.60	2.079-002	-55.09	2.232-002	-178.97	9.314-001	-234.06
2.80	1.621-002	-63.05	1.954-002	-175.54	8.297-001	-238.59
3.00	1.292-002	-71.39	1.707-002	-172.24	7.569-001	-243.63
3.20	1.053-002	-79.95	1.491-002	-169.01	7.061-001	-248.95
3.40	8.763-003	-88.53	1.303-002	-165.81	6.724-001	-254.34
3.60	7.442-003	-96.98	1.141-002	-162.62	6.522-001	-259.61
3.80	6.433-003	-105.15	1.001-002	-159.44	6.427-001	-264.59
4.00	5.645-003	-112.93	8.798-003	-156.25	6.417-001	-269.19

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 1.00 K = 2.0 Z = 0.0 B/H = 0.50

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	8.551-001	-30.52	0.000+000	30.52
0.02	2.782-002	-23.13	8.539-001	-30.54	3.258-002	7.41
0.04	5.547-002	-23.16	8.506-001	-30.59	6.522-002	7.43
0.06	8.277-002	-23.20	8.450-001	-30.67	9.796-002	7.47
0.08	1.096-001	-23.26	8.372-001	-30.79	1.309-001	7.53
0.10	1.357-001	-23.34	8.274-001	-30.94	1.640-001	7.60
0.15	1.971-001	-23.62	7.942-001	-31.47	2.481-001	7.85
0.20	2.514-001	-24.01	7.504-001	-32.22	3.350-001	8.21
0.25	2.971-001	-24.50	6.982-001	-33.21	4.255-001	8.70
0.30	3.334-001	-25.11	6.400-001	-34.44	5.209-001	9.33
0.35	3.601-001	-25.82	5.784-001	-35.96	6.225-001	10.13
0.40	3.774-001	-26.65	5.156-001	-37.73	7.320-001	11.13
0.50	3.873-001	-28.62	3.944-001	-42.51	9.820-001	13.88
0.60	3.715-001	-31.02	2.881-001	-49.12	1.290+000	18.10
0.65	3.570-001	-32.33	2.426-001	-53.38	1.472+000	21.00
0.70	3.396-001	-33.85	2.026-001	-58.46	1.677+000	24.61
0.75	3.203-001	-35.42	1.683-001	-64.53	1.904+000	29.11
0.80	2.999-001	-37.09	1.395-001	-71.78	2.149+000	34.69
0.85	2.790-001	-38.83	1.162-001	-80.38	2.400+000	41.50
0.90	2.582-001	-40.77	9.810-002	-90.38	2.632+000	49.61
0.95	2.379-001	-42.76	8.475-002	-101.57	2.807+000	58.81
1.00	2.184-001	-44.86	7.559-002	-113.47	2.890+000	68.60
1.05	1.999-001	-47.07	6.981-002	-125.31	2.864+000	78.24
1.10	1.825-001	-49.39	6.649-002	-136.43	2.745+000	87.82
1.15	1.663-001	-51.81	6.474-002	-146.32	2.569+000	94.51
1.20	1.513-001	-54.35	6.385-002	-154.94	2.370+000	100.60
1.25	1.375-001	-56.93	6.333-002	-162.36	2.172+000	105.37
1.30	1.249-001	-59.74	6.286-002	-168.75	1.987+000	109.00
1.35	1.134-001	-62.61	6.227-002	-174.30	1.821+000	111.69
1.40	1.030-001	-65.53	6.149-002	-179.18	1.674+000	113.60
1.45	9.350-002	-68.67	6.049-002	176.46	1.546+000	-245.13
1.50	8.495-002	-71.87	5.928-002	172.52	1.433+000	-244.
1.60	7.030-002	-78.58	5.631-002	165.57	1.248+000	-244.
1.70	5.849-002	-85.70	5.283-002	159.50	1.107+000	-245.20
1.80	4.900-002	-93.13	4.908-002	154.00	9.984-001	-247.19
1.90	4.140-002	-100.97	4.524-002	148.90	9.152-001	-249.87
2.00	3.533-002	-108.97	4.140-002	144.70	8.523-001	-253.55
2.10	3.047-002	-117.09	3.782-002	139.47	8.058-001	-256.56
2.20	2.657-002	-125.22	3.438-002	135.01	7.729-001	-260.23
2.30	2.341-002	-133.27	3.117-002	130.67	7.511-001	-263.94
2.40	2.084-002	-141.14	2.820-002	126.41	7.387-001	-267.55
2.50	1.871-002	-148.76	2.549-002	122.23	7.340-001	-270.99
2.60	1.692-002	-156.09	2.311-002	118.11	7.356-001	-274.20
2.80	1.409-002	-169.76	1.871-002	110.00	7.533-001	-279.77
3.00	1.193-002	177.83	1.520-002	102.05	7.849-001	75.83
3.20	1.019-002	136.72	1.234-002	94.23	8.255-001	72.48
3.40	8.748-003	156.57	1.003-002	86.52	8.721-001	70.15
3.60	7.526-003	147.28	8.159-003	78.91	9.224-001	68.37
3.80	6.480-003	138.71	6.643-003	71.4	9.754-001	67.31
4.00	5.573-003	130.73	5.415-003	63.93	1.030+00.	66.75

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 2.00 K = 2.0 Z = 0.0 B/H = 0.50

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	5.094-001	-83.74	0.000+000	83.74
0.02	1.940-002	-71.14	5.086-001	-83.73	3.814-002	12.65
0.04	3.865-002	-71.21	5.061-001	-83.90	7.637-002	12.69
0.06	5.763-002	-71.52	5.020-001	-84.10	1.148-001	12.78
0.08	7.619-002	-71.49	4.963-001	-84.38	1.535-001	12.89
0.10	9.422-002	-71.70	4.891-001	-84.74	1.926-001	13.04
0.15	1.362-001	-72.43	4.649-001	-86.00	1.928-001	13.57
0.20	1.724-001	-73.45	4.333-001	-87.80	3.979-001	14.35
0.25	2.019-001	-74.76	3.961-001	-90.18	5.098-001	15.42
0.30	2.241-001	-76.35	3.553-001	-93.19	6.307-001	16.84
0.35	2.388-001	-78.23	3.129-001	-96.91	7.632-001	18.69
0.40	2.465-001	-80.38	2.709-001	-101.45	9.101-001	21.08
0.50	2.440-001	-85.51	1.941-001	-113.63	1.257+000	28.12
0.60	2.241-001	-91.72	1.342-001	-131.33	1.670+000	39.60
0.65	2.102-001	-95.23	1.121-001	-142.73	1.875+000	47.50
0.70	1.949-001	-99.01	9.552-002	-155.77	2.041+000	56.76
0.75	1.789-001	-103.06	8.400-002	-169.91	2.130+000	66.85
0.80	1.629-001	-107.38	7.671-002	175.78	2.123+000	-283.16
0.85	1.472-001	-111.98	7.247-002	162.22	2.031+000	-274.20
0.90	1.322-001	-116.86	7.006-002	149.99	1.887+000	-266.85
0.95	1.182-001	-122.01	6.852-002	139.24	1.725+000	-261.26
1.00	1.053-001	-127.45	6.721-002	129.84	1.567+000	-257.29
1.05	9.362-002	-133.17	6.576-002	121.55	1.424+000	-254.72
1.10	8.309-002	-139.16	6.401-002	114.14	1.298+000	-253.30
1.15	7.372-002	-145.42	6.193-002	107.41	1.190+000	-252.83
1.20	6.546-002	-151.94	5.953-002	101.21	1.100+000	-253.14
1.25	5.823-002	-158.68	5.687-002	95.41	1.024+000	-254.09
1.30	5.194-002	-165.61	5.403-002	89.93	9.613-001	-255.55
1.35	4.649-002	-172.71	5.106-002	84.70	9.105-001	-257.41
1.40	4.178-002	-179.91	4.803-002	79.68	8.699-001	-259.59
1.45	3.772-002	172.83	4.499-002	74.81	8.384-001	98.02
1.50	3.423-002	165.57	4.200-002	70.08	8.150-001	95.49
1.60	2.858-002	151.26	3.625-002	60.90	7.886-001	90.32
1.70	2.428-002	137.51	3.097-002	52.11	7.842-001	85.40
1.80	2.090-002	124.56	2.624-002	43.53	7.965-001	81.03
1.90	1.815-002	112.52	2.210-002	35.15	8.213-001	77.36
2.00	1.584-002	101.37	1.852-002	26.94	8.554-001	74.42
2.10	1.385-002	91.06	1.545-002	18.88	8.964-001	72.18
2.20	1.211-002	81.51	1.285-002	10.96	9.425-001	70.55
2.30	1.058-002	72.64	1.066-002	3.16	9.924-001	69.48
2.40	9.217-003	64.36	8.816-003	-4.51	1.045+000	68.87
2.50	8.015-003	56.62	7.280-003	-12.06	1.101+000	68.68
2.60	6.952-003	49.37	6.000-003	-19.49	1.159+000	68.85
2.80	5.189-003	36.13	4.056-003	-34.00	1.279+000	70.13
3.00	3.836-003	24.44	2.725-003	-48.06	1.408+000	72.50
3.20	2.809-003	14.17	1.819-003	-61.67	1.545+000	75.84
3.40	2.040-003	5.31	1.204-003	-74.86	1.695+000	80.17
3.60	1.471-003	-2.11	7.892-004	-87.65	1.864+000	85.54
3.80	1.055-003	-7.95	5.106-004	-100.08	2.066+000	92.13
4.00	7.542-004	-12.04	3.246-004	-112.21	2.324+000	100.16

Table 2

FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 0.50 K = 5.0 Z = 0.0 B/H = 0.50

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	8.217-001	-34.90	0.000+000	34.90
0.02	2.704-002	-27.33	8.206-001	-34.92	3.295-002	7.59
0.04	5.392-002	-27.36	8.173-001	-34.97	6.597-002	7.61
0.06	8.045-002	-27.41	8.118-001	-35.06	9.909-002	7.65
0.08	1.065-001	-27.48	8.043-001	-35.18	1.324-001	7.70
0.10	1.318-001	-27.56	7.946-001	-35.34	1.659-001	7.78
0.15	1.514-001	-27.87	7.622-001	-35.90	2.511-001	8.03
0.20	2.440-001	-28.30	7.194-001	-36.70	3.392-001	8.40
0.25	2.881-001	-28.84	6.683-001	-37.74	4.311-001	8.90
0.30	3.230-001	-29.51	6.116-001	-39.05	5.282-001	9.54
0.35	3.485-001	-30.29	5.515-001	-40.65	6.319-001	10.36
0.40	3.648-001	-31.19	4.903-001	-42.57	7.439-001	11.37
0.50	3.731-001	-33.34	3.726-001	-47.54	1.001+000	14.20
0.60	3.565-001	-35.93	2.698-001	-54.48	1.321+000	18.55
0.65	3.418-001	-37.38	2.259-001	-58.95	1.513+000	21.57
0.70	3.243-001	-38.95	1.876-001	-64.29	1.729+000	25.34
0.75	3.051-001	-40.62	1.548-001	-70.70	1.970+000	30.08
0.80	2.848-001	-42.40	1.276-001	-78.39	2.232+000	36.00
0.85	2.642-001	-44.27	1.057-001	-87.54	2.499+000	43.27
0.90	2.437-001	-46.26	8.890-002	-98.20	2.741+000	51.95
0.95	2.238-001	-48.34	7.679-002	-110.11	2.914+000	61.77
1.00	2.047-001	-50.53	6.874-002	-122.63	2.978+000	72.11
1.05	1.867-001	-52.81	6.388-002	-134.92	2.922+000	82.11
1.10	1.698-001	-55.20	6.125-002	-146.23	2.772+000	91.03
1.15	1.541-001	-57.69	5.996-002	-156.19	2.569+000	98.49
1.20	1.396-001	-60.29	5.933-002	-164.74	2.352+000	104.45
1.25	1.263-001	-62.99	5.891-002	-172.03	2.143+000	109.05
1.30	1.141-001	-65.79	5.846-002	-178.29	1.952+000	112.50
1.35	1.031-001	-68.69	5.783-002	-176.28	1.783+000	-244.97
1.40	9.313-002	-71.71	5.697-002	-171.51	1.635+000	-243.21
1.45	8.411-002	-74.82	5.588-002	-167.25	1.505+000	-242.07
1.50	7.600-002	-78.04	5.458-002	-163.40	1.392+000	-241.44
1.60	6.216-002	-84.79	5.146-002	-156.61	1.208+000	-241.40
1.70	5.107-002	-91.94	4.788-002	-150.67	1.067+000	-242.62
1.80	4.223-002	-99.46	4.410-002	-145.33	9.575-001	-244.75
1.90	3.521-002	-107.29	4.030-002	-140.39	8.736-001	-247.68
2.00	2.964-002	-115.36	3.660-002	-135.76	8.097-001	-251.12
2.10	2.522-002	-123.56	3.309-002	-131.37	7.621-001	-254.93
2.20	2.171-002	-131.80	2.981-002	-127.15	7.281-001	-258.96
2.30	1.890-002	-139.95	2.679-002	-123.09	7.053-001	-263.05
2.40	1.663-002	-147.93	2.403-002	-119.10	6.920-001	-267.09
2.50	1.478-002	-155.63	2.152-002	-115.33	6.867-001	-270.96
2.60	1.325-002	-162.99	1.926-002	-111.60	6.878-001	-274.60
2.80	1.086-002	-176.59	1.540-002	-104.41	7.052-001	-281.00
3.00	9.078-003	171.34	1.231-002	97.51	7.372-001	73.84
3.20	7.671-003	150.71	9.852-003	90.89	7.786-001	69.81
3.40	6.524-003	131.27	7.895-003	84.52	8.263-001	66.75
3.60	5.569-003	142.88	6.341-003	78.41	8.782-001	64.48
3.80	4.764-003	135.35	5.106-003	72.52	9.330-001	62.83
4.00	4.080-003	128.55	4.123-003	66.86	9.897-001	61.69

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 1.00 K = 5.0 Z = 0.0 B/H = 0.50

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	4.456-001	-91.67	0.000+000	91.67
0.02	1.716-002	-80.06	4.448-001	-91.77	3.858-002	11.64
0.04	3.419-002	-80.14	4.426-001	-91.82	7.726-002	11.68
0.06	5.097-002	-80.25	4.388-001	-92.01	1.161-001	11.76
0.08	6.737-002	-80.42	4.337-001	-92.28	1.553-001	11.86
0.10	8.327-002	-80.63	4.271-001	-92.62	1.950-001	12.00
0.15	1.202-001	-81.35	4.052-001	-93.84	2.965-001	12.48
0.20	1.518-001	-82.38	3.765-001	-95.56	4.033-001	13.19
0.25	1.773-001	-83.68	3.428-001	-97.84	5.174-001	14.16
0.30	1.962-001	-85.26	3.059-001	-100.72	6.413-001	15.46
0.35	2.083-001	-87.11	2.677-001	-104.26	7.782-001	17.16
0.40	2.141-001	-89.22	2.298-001	-108.59	9.316-001	19.37
0.50	2.097-001	-94.21	1.608-001	-120.20	1.304+000	25.99
0.60	1.901-001	-100.17	1.069-001	-137.43	1.778+000	37.25
0.65	1.770-001	-103.51	8.702-002	-148.90	2.034+000	45.40
0.70	1.628-001	-107.06	7.205-002	-162.45	2.259+000	55.38
0.75	1.481-001	-110.85	6.177-002	-177.63	2.397+000	66.75
0.80	1.334-001	-114.86	5.547-002	-166.74	2.406+000	-281.60
0.85	1.193-001	-119.09	5.206-002	-151.90	2.292+000	-270.98
0.90	1.059-001	-123.55	5.035-002	-138.72	2.104+000	-262.26
0.95	9.350-002	-128.23	4.939-002	-127.42	1.893+000	-255.65
1.00	8.213-002	-133.15	4.857-002	-117.81	1.691+000	-250.96
1.05	7.187-002	-138.30	4.757-002	-109.56	1.511+000	-247.86
1.10	6.271-002	-143.73	4.628-002	-102.36	1.355+000	-246.05
1.15	5.461-002	-149.34	4.466-002	-95.96	1.223+000	-245.29
1.20	4.752-002	-155.22	4.276-002	-90.18	1.111+000	-245.39
1.25	4.136-002	-161.34	4.065-002	-84.88	1.017+000	-246.22
1.30	3.603-002	-167.69	3.838-002	-79.97	9.389-001	-247.65
1.35	3.147-002	-174.24	3.603-002	-75.36	8.735-001	-249.60
1.40	2.757-002	-179.02	3.365-002	-71.02	8.196-001	-248.00
1.45	2.426-002	-172.15	3.128-002	-66.89	7.758-001	-245.25
1.50	2.146-002	-165.18	2.896-002	-62.96	7.410-001	-242.22
1.60	1.708-002	-151.22	2.459-002	-55.58	6.947-001	-235.65
1.70	1.393-002	-137.65	2.066-002	-48.75	6.742-001	-228.90
1.80	1.161-002	-124.89	1.723-002	-42.41	6.739-001	-224.48
1.90	9.855-003	-113.23	1.430-002	-36.50	6.891-001	-217.73
2.00	8.468-003	-102.79	1.183-002	-31.01	7.159-001	-211.78
2.10	7.336-003	-93.55	9.766-003	-25.89	7.512-001	-207.66
2.20	6.389-003	-85.41	8.060-003	-21.14	7.927-001	-204.28
2.30	5.583-003	-78.27	6.657-003	-16.72	8.387-001	-201.95
2.40	4.890-003	-71.99	5.507-003	-12.61	8.879-001	-200.38
2.50	4.291-003	-66.45	4.567-003	-8.79	9.394-001	-199.66
2.60	3.771-003	-61.56	3.800-003	-5.22	9.926-001	-199.33
2.80	2.931-003	-53.34	2.659-003	-1.27	1.102+000	-198.60
3.00	2.297-003	-46.71	1.892-003	-7.11	1.214+000	-198.82
3.20	1.818-003	-41.21	1.369-003	-12.56	1.328+000	-199.77
3.40	1.451-003	-36.50	1.006-003	-17.80	1.443+000	-201.30
3.60	1.169-003	-32.34	7.489-004	-22.96	1.561+000	-203.29
3.80	9.482-004	-28.57	5.643-004	-28.11	1.681+000	-205.69
4.00	7.740-004	-25.12	4.292-004	-33.29	1.804+000	-208.41

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 2.00 K = 5.0 Z = 0.0 B/H = 0.50

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	8.654-002	148.53	0.000+000	-148.53
0.02	4.108-003	162.67	8.634-002	148.46	4.758-002	14.21
0.04	8.173-003	162.54	8.571-002	148.25	9.535-002	14.29
0.06	1.216-002	162.31	8.469-002	147.89	1.435-001	14.42
0.08	1.602-002	161.99	8.327-002	147.39	1.923-001	14.60
0.10	1.972-002	161.53	8.148-002	146.75	2.419-001	14.84
0.15	2.805-002	160.17	7.558-002	144.47	3.711-001	15.70
0.20	3.478-002	158.21	6.803-002	141.20	5.109-001	17.01
0.25	3.959-002	155.70	5.943-002	136.82	6.661-001	18.89
0.30	4.248-002	152.63	5.042-002	131.16	8.426-001	21.52
0.35	4.354-002	149.15	4.159-002	123.97	1.047+000	25.18
0.40	4.298-002	145.13	3.345-002	114.85	1.285+000	30.28
0.50	3.829-002	135.68	2.083-002	88.71	1.839+000	46.97
0.60	3.108-002	124.44	1.431-002	51.36	2.172+000	73.09
0.65	2.725-002	118.16	1.301-002	31.86	2.094+000	86.31
0.70	2.353-002	111.45	1.241-002	14.51	1.896+000	96.94
0.75	2.008-002	104.29	1.207-002	-0.08	1.663+000	104.37
0.80	1.696-002	96.67	1.173-002	-12.23	1.446+000	108.90
0.85	1.422-002	88.53	1.127-002	-22.53	1.261+000	111.12
0.90	1.187-002	80.05	1.069-002	-31.45	1.110+000	111.50
0.95	9.893-003	71.06	9.991-003	-39.37	9.901-001	110.43
1.00	8.260-003	61.65	9.223-003	-46.52	8.957-001	108.18
1.05	6.932-003	51.94	8.419-003	-53.08	8.233-001	105.02
1.10	5.862-003	42.01	7.614-003	-59.15	7.700-001	101.16
1.15	5.008-003	32.04	6.832-003	-64.82	7.330-001	96.86
1.20	4.327-003	22.19	6.092-003	-70.14	7.102-001	92.33
1.25	3.782-003	12.65	5.405-003	-75.16	6.997-001	87.81
1.30	3.341-003	3.56	4.777-003	-79.91	6.994-001	83.47
1.35	2.979-003	-4.98	4.209-003	-84.42	7.077-001	79.44
1.40	2.676-003	-12.92	3.702-003	-88.72	7.230-001	75.80
1.45	2.419-003	-20.24	3.251-003	-92.83	7.441-001	72.59
1.50	2.196-003	-26.96	2.853-003	-96.78	7.697-001	69.81
1.60	1.826-003	-38.79	2.197-003	-104.25	8.314-001	65.46
1.70	1.530-003	-48.80	1.695-003	-111.28	9.026-001	62.49
1.80	1.286-003	-57.39	1.312-003	-118.02	9.801-001	60.62
1.90	1.084-003	-64.91	1.023-003	-124.54	1.062+000	59.63
2.00	9.142-004	-71.59	7.970-004	-130.93	1.147+000	59.34
2.10	7.720-004	-77.63	6.252-004	-137.23	1.235+000	59.60
2.20	6.524-004	-83.14	4.924-004	-143.47	1.325+000	60.33
2.30	5.516-004	-88.23	3.892-004	-149.68	1.417+000	61.45
2.40	4.666-004	-92.95	3.086-004	-155.86	1.512+000	62.91
2.50	3.948-004	-97.35	2.454-004	-162.02	1.603+000	64.67
2.60	3.343-004	-101.45	1.957-004	-168.16	1.708+000	66.70
2.80	2.398-004	-118.84	1.251-004	179.61	1.917+000	-288.45
3.00	1.723-004	-115.16	0.640-005	167.44	2.143+000	-282.60
3.20	1.240-004	-120.42	5.181-005	155.31	2.394+000	-275.73
3.40	8.951-005	-124.54	3.335-005	143.20	2.684+000	-267.74
3.60	6.491-005	-127.44	2.138-005	131.76	3.036+000	-258.50
3.80	4.743-005	-129.00	1.359-005	118.81	3.491+000	-247.80
4.00	3.508-005	-129.18	8.515-006	106.27	4.120+000	-235.45

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 0.50 K = 2.0 Z = 0.0 B/H = 0.25

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	9.830-001	-7.05	0.000+000	7.05
0.02	2.982-002	-4.67	9.818-001	-7.06	3.038-002	2.39
0.04	5.947-002	-4.67	9.783-001	-7.07	6.079-002	2.40
0.06	8.876-002	-4.68	9.723-001	-7.09	9.128-002	2.41
0.08	1.175-001	-4.70	9.641-001	-7.12	1.219-001	2.43
0.10	1.456-001	-4.71	9.537-001	-7.16	1.527-001	2.45
0.15	2.117-001	-4.78	9.185-001	-7.30	2.305-001	2.53
0.20	2.706-001	-4.86	8.720-001	-7.50	3.103-001	2.64
0.25	3.205-001	-4.97	8.162-001	-7.77	3.927-001	2.79
0.30	3.607-001	-5.11	7.539-001	-8.10	4.784-001	2.99
0.35	3.909-001	-5.28	6.076-001	-8.50	5.685-001	3.23
0.40	4.114-001	-5.46	6.196-001	-8.99	6.640-001	3.53
0.50	4.262-001	-5.92	4.865-001	-10.25	8.760-001	4.33
0.60	4.137-001	-6.48	3.669-001	-11.99	1.128+000	5.51
0.65	4.003-001	-6.80	3.142-001	-13.10	1.274+000	6.30
0.70	3.836-001	-7.15	2.666-001	-14.42	1.439+000	7.27
0.75	3.647-001	-7.52	2.243-001	-15.98	1.626+000	8.45
0.80	3.444-001	-7.93	1.870-001	-17.84	1.842+000	9.92
0.85	3.233-001	-8.36	1.545-001	-20.10	2.093+000	11.75
0.90	3.021-001	-8.82	1.264-001	-22.87	2.390+000	14.05
0.95	2.812-001	-9.31	1.025-001	-26.31	2.744+000	17.01
1.00	2.609-001	-9.83	8.228-002	-30.65	3.171+000	20.83
1.05	2.414-001	-10.37	6.552-002	-36.22	3.685+000	25.85
1.10	2.229-001	-10.95	5.192-002	-43.44	4.294+000	32.49
1.15	2.055-001	-11.56	4.129-002	-52.83	4.977+000	41.28
1.20	1.893-001	-12.20	3.351-002	-64.77	5.648+000	52.58
1.25	1.741-001	-12.86	2.843-002	-79.03	6.125+000	66.16
1.30	1.601-001	-13.56	2.575-002	-94.29	6.216+000	80.71
1.35	1.471-001	-14.30	2.491-002	-108.58	5.904+000	94.28
1.40	1.352-001	-15.06	2.522-002	-120.60	5.359+000	105.54
1.45	1.242-001	-15.86	2.607-002	-130.10	4.763+000	114.25
1.50	1.141-001	-16.68	2.708-002	-137.46	4.214+000	120.77
1.60	9.647-002	-18.44	2.881-002	-147.63	3.348+000	129.25
1.70	8.170-002	-20.33	2.978-002	-154.32	2.743+000	133.99
1.80	6.936-002	-22.36	3.000-002	-158.98	2.312+000	136.62
1.90	5.907-002	-24.53	2.962-002	-162.48	1.994+000	137.95
2.00	5.046-002	-26.84	2.883-002	-165.27	1.750+000	138.43
2.10	4.326-002	-29.29	2.776-002	-167.60	1.559+000	138.31
2.20	3.723-002	-31.89	2.652-002	-169.62	1.404+000	137.73
2.30	3.216-002	-34.63	2.519-002	-171.43	1.277+000	136.80
2.40	2.799-002	-37.52	2.382-002	-173.09	1.171+000	135.57
2.50	2.430-002	-40.55	2.246-002	-174.64	1.082+000	134.09
2.60	2.126-002	-43.71	2.113-002	-176.12	1.006+000	132.41
2.80	1.649-002	-50.44	1.863-002	-178.93	8.848-001	128.48
3.00	1.303-002	-57.64	1.638-002	178.38	7.952-001	-236.02
3.20	1.049-002	-65.21	1.439-002	175.73	7.291-001	-240.94
3.40	8.623-003	-73.01	1.266-002	173.11	6.814-001	-246.11
3.60	7.224-003	-80.90	1.114-002	170.48	6.483-001	-251.38
3.80	6.165-003	-88.73	9.830-003	167.84	6.272-001	-256.57
4.00	5.350-003	-96.39	8.689-003	165.18	6.157-001	-261.55

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 1.00 K = 2.0 Z = 0.0 B/H = 0.25

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	8.970-001	-23.55	0.000+000	23.55
0.02	2.860-002	-17.27	8.959-001	-23.57	3.192-002	6.30
0.04	5.701-002	-17.29	8.924-001	-23.61	6.389-002	6.32
0.06	8.508-002	-17.32	8.867-001	-23.67	9.596-002	6.35
0.08	1.126-001	-17.37	8.788-001	-23.77	1.282-001	6.40
0.10	1.395-001	-17.43	8.687-001	-23.89	1.606-001	6.46
0.15	2.027-001	-17.65	8.348-001	-24.32	2.429-001	6.67
0.20	2.587-001	-17.95	7.899-001	-24.92	3.276-001	6.97
0.25	3.061-001	-18.34	7.363-001	-25.72	4.157-001	7.38
0.30	3.438-001	-18.81	6.765-001	-26.72	5.082-001	7.91
0.35	3.718-001	-19.37	6.131-001	-27.95	6.064-001	8.57
0.40	3.903-001	-20.02	5.483-001	-29.42	7.117-001	9.40
0.50	4.018-001	-21.57	4.227-001	-33.23	9.506-001	11.66
0.60	3.871-001	-23.46	3.116-001	-38.56	1.242+000	15.10
0.65	3.729-001	-24.54	2.635-001	-41.98	1.415+000	17.44
0.70	3.556-001	-25.70	2.208-001	-46.05	1.610+000	20.35
0.75	3.363-001	-26.95	1.837-001	-50.92	1.830+000	23.97
0.80	3.157-001	-28.29	1.521-001	-56.77	2.076+000	28.48
0.85	2.946-001	-29.71	1.257-001	-63.80	2.344+000	34.09
0.90	2.736-001	-31.22	1.044-001	-72.18	2.620+000	40.96
0.95	2.529-001	-32.82	8.791-002	-82.00	2.877+000	49.18
1.00	2.330-001	-34.51	7.580-002	-93.06	3.074+000	58.56
1.05	2.140-001	-36.28	6.754-002	-104.86	3.168+000	68.58
1.10	1.961-001	-38.15	6.242-002	-116.64	3.141+000	78.49
1.15	1.793-001	-40.10	5.958-002	-127.64	3.010+000	87.54
1.20	1.638-001	-42.15	5.820-002	-137.44	2.814+000	95.29
1.25	1.494-001	-44.29	5.763-002	-145.89	2.592+000	101.60
1.30	1.362-001	-46.52	5.740-002	-153.10	2.373+000	106.58
1.35	1.241-001	-48.85	5.723-002	-159.25	2.168+000	110.41
1.40	1.130-001	-51.27	5.695-002	-164.55	1.985+000	113.29
1.45	1.030-001	-53.78	5.649-002	-169.17	1.823+000	115.39
1.50	9.383-002	-56.39	5.582-002	-173.25	1.681+000	116.86
1.60	7.805-002	-61.88	5.390-002	-179.77	1.448+000	-241.66
1.70	6.516-002	-67.75	5.134-002	-173.89	1.269+000	-241.63
1.80	5.468-002	-73.96	4.838-002	-168.71	1.130+000	-242.67
1.90	4.618-002	-80.49	4.519-002	-164.01	1.022+000	-244.50
2.00	3.930-002	-87.31	4.193-002	-159.64	9.373-001	-246.94
2.10	3.374-002	-94.34	3.871-002	-155.50	8.714-001	-249.84
2.20	2.923-002	-101.52	3.560-002	-151.52	8.209-001	-253.05
2.30	2.557-002	-108.70	3.265-002	-147.67	7.831-001	-256.45
2.40	2.258-002	-116.03	2.987-002	-143.92	7.559-001	-259.94
2.50	2.013-002	-123.19	2.729-002	-140.23	7.376-001	-263.42
2.60	1.810-002	-130.21	2.490-002	-136.61	7.268-001	-266.80
2.80	1.495-002	-143.58	2.068-002	-129.47	7.228-001	-273.05
3.00	1.263-002	-155.92	1.715-002	-122.46	7.364-001	-278.38
3.20	1.084-002	-167.19	1.422-002	-115.54	7.620-001	-282.72
3.40	9.388-003	-177.45	1.180-002	-108.70	7.956-001	-286.15
3.60	8.176-003	-173.16	9.796-003	-101.92	8.347-001	-71.23
3.80	7.143-003	-164.51	8.141-003	-95.21	8.774-001	-69.29
4.00	6.249-003	-156.48	6.773-003	-88.57	9.226-001	-67.91

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 2.00 K = 2.0 Z = 0.0 B/H = 0.25

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	6.049-001	-66.89	0.000+000	66.89
0.02	2.212-002	-55.28	6.040-001	-66.93	3.663-002	11.65
0.04	4.409-002	-55.34	6.012-001	-67.03	7.334-002	11.69
0.06	6.576-002	-55.43	5.966-001	-67.19	1.102-001	11.76
0.08	8.698-002	-55.57	5.902-001	-67.43	1.474-001	11.86
0.10	1.076-001	-55.74	5.821-001	-67.73	1.848-001	11.99
0.15	1.558-001	-56.34	5.550-001	-68.80	2.807-001	12.45
0.20	1.977-001	-57.19	5.193-001	-70.32	3.807-001	13.13
0.25	2.322-001	-58.27	4.772-001	-72.32	4.866-001	14.06
0.30	2.586-001	-59.59	4.308-001	-74.86	6.004-001	15.27
0.35	2.768-001	-61.14	3.823-001	-77.98	7.242-001	16.85
0.40	2.872-001	-62.92	3.337-001	-81.79	8.605-001	18.86
0.50	2.875-001	-67.19	2.435-001	-91.91	1.181+000	24.71
0.60	2.678-001	-72.37	1.702-001	-106.55	1.573+000	34.17
0.65	2.531-001	-75.31	1.418-001	-116.08	1.785+000	40.77
0.70	2.366-001	-78.48	1.193-001	-127.23	1.984+000	48.76
0.75	2.190-001	-81.87	1.025-001	-139.84	2.137+000	57.97
0.80	2.016-001	-85.50	9.089-002	-153.34	2.212+000	67.84
0.85	1.833-001	-89.36	8.358-002	-166.86	2.193+000	77.49
0.90	1.662-001	-93.47	7.933-002	-179.59	2.095+000	86.12
0.95	1.499-001	-97.81	7.692-002	168.96	1.949+000	-266.77
1.00	1.348-001	-102.40	7.541-002	158.90	1.787+000	-261.30
1.05	1.208-001	-107.23	7.416-002	150.10	1.629+000	-257.33
1.10	1.081-001	-112.30	7.281-002	142.35	1.484+000	-254.66
1.15	9.661-002	-117.62	7.118-002	135.44	1.357+000	-253.06
1.20	8.634-002	-123.17	6.923-002	129.18	1.247+000	-252.35
1.25	7.721-002	-128.94	6.695-002	123.43	1.153+000	-252.37
1.30	6.916-002	-134.92	6.440-002	118.07	1.074+000	-252.99
1.35	6.209-002	-141.09	6.163-002	113.01	1.007+000	-254.10
1.40	5.591-002	-147.41	5.872-002	108.20	9.522-001	-255.61
1.45	5.052-002	-153.86	5.571-002	103.58	9.069-001	-257.43
1.50	4.583-002	-160.39	5.266-002	99.11	8.704-001	-259.50
1.60	3.821-002	-173.52	4.661-002	90.54	8.198-001	-264.06
1.70	3.241-002	173.51	4.083-002	82.31	7.938-001	91.20
1.80	2.792-002	160.93	3.548-002	74.31	7.869-001	86.67
1.90	2.435-002	149.03	3.064-002	66.49	7.947-001	82.60
2.00	2.142-002	137.91	2.632-002	58.80	8.136-001	79.11
2.10	1.894-002	127.47	2.253-002	51.23	8.408-001	76.24
2.20	1.680-002	117.73	1.922-002	43.75	8.742-001	73.98
2.30	1.491-002	108.61	1.635-002	36.35	9.122-001	72.26
2.40	1.324-002	100.05	1.388-002	29.03	9.536-001	71.04
2.50	1.173-002	92.02	1.176-002	21.77	9.975-001	70.25
2.60	1.030-002	84.42	9.953-003	14.58	1.043+000	69.84
2.80	8.083-003	70.38	7.097-003	0.40	1.139+000	69.98
3.00	6.236-003	57.65	5.036-003	-13.52	1.238+000	71.18
3.20	4.766-003	46.03	3.557-003	-27.21	1.340+000	73.28
3.40	3.612-003	35.55	2.499-003	-40.62	1.445+000	76.19
3.60	2.711-003	26.08	1.745-003	-53.81	1.553+000	79.89
3.80	2.016-003	17.66	1.210-003	-66.77	1.666+000	84.44
4.00	1.486-003	10.41	8.309-004	-79.54	1.788+000	89.95

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 0.50 K = 5.0 Z = 0.0 B/H = 0.25

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	9.065-001	-21.47	0.000+000	21.47
0.02	2.865-002	-15.93	9.054-001	-21.48	3.164-002	5.55
0.04	5.712-002	-15.95	9.019-001	-21.52	6.333-002	5.57
0.06	8.524-002	-15.98	8.962-001	-21.58	9.512-002	5.59
0.08	1.128-001	-16.02	8.882-001	-21.66	1.270-001	5.63
0.10	1.398-001	-16.08	8.781-001	-21.76	1.992-001	5.69
0.15	2.031-001	-16.27	8.441-001	-22.14	2.406-001	5.87
0.20	2.993-001	-16.53	7.990-001	-22.66	3.245-001	6.13
0.25	3.067-001	-16.87	7.453-001	-23.35	4.115-001	6.48
0.30	3.446-001	-17.29	6.853-001	-24.22	5.028-001	6.93
0.35	3.727-001	-17.78	6.216-001	-25.28	5.996-001	7.50
0.40	3.913-001	-18.34	5.565-001	-26.54	7.031-001	8.20
0.50	4.031-001	-19.69	4.301-001	-29.81	9.373-001	10.13
0.60	3.885-001	-21.33	3.178-001	-34.34	1.223+000	13.02
0.65	3.744-001	-22.25	2.690-001	-37.24	1.392+000	14.98
0.70	3.572-001	-23.25	2.255-001	-40.67	1.584+000	17.42
0.75	3.380-001	-24.32	1.875-001	-44.76	1.803+000	20.45
0.80	3.175-001	-25.46	1.547-001	-49.69	2.052+000	24.24
0.85	2.964-001	-26.67	1.271-001	-55.66	2.333+000	28.99
0.90	2.754-001	-27.94	1.043-001	-62.89	2.641+000	34.94
0.95	2.548-001	-29.29	8.606-002	-71.58	2.960+000	42.29
1.00	2.348-001	-30.71	7.217-002	-81.81	3.254+000	51.10
1.05	2.158-001	-32.19	6.221-002	-93.36	3.470+000	61.16
1.10	1.979-001	-33.75	5.566-002	-105.98	3.955+000	71.83
1.15	1.811-001	-35.38	5.183-002	-117.61	3.495+000	82.23
1.20	1.655-001	-37.07	4.990-002	-128.84	3.317+000	91.57
1.25	1.511-001	-38.84	4.914-002	-138.26	3.074+000	99.42
1.30	1.378-001	-40.67	4.897-002	-146.42	2.813+000	105.75
1.35	1.256-001	-42.58	4.902-002	-153.28	2.562+000	110.70
1.40	1.144-001	-44.56	4.904-002	-159.06	2.333+000	114.50
1.45	1.043-001	-46.61	4.893-002	-163.98	2.131+000	117.38
1.50	9.503-002	-48.73	4.864-002	-168.24	1.954+000	119.51
1.60	7.900-002	-53.19	4.745-002	-175.27	1.665+000	122.18
1.70	6.585-002	-57.94	4.560-002	-179.04	1.444+000	-236.97
1.80	5.508-002	-62.97	4.328-002	-174.20	1.273+000	-237.17
1.90	4.630-002	-68.27	4.069-002	-169.95	1.138+000	-238.22
2.00	3.914-002	-73.03	3.797-002	-166.09	1.031+000	-239.92
2.10	3.330-002	-79.63	3.523-002	-162.51	9.452-001	-242.14
2.20	2.855-002	-85.62	3.256-002	-159.15	8.767-001	-244.77
2.30	2.466-002	-91.77	3.000-002	-155.94	8.222-001	-247.71
2.40	2.149-002	-98.02	2.758-002	-152.85	7.792-001	-250.87
2.50	1.888-002	-104.32	2.531-002	-149.86	7.461-001	-254.17
2.60	1.674-002	-110.60	2.320-002	-146.94	7.213-001	-257.54
2.80	1.347-002	-122.89	1.947-002	-141.29	6.920-001	-264.18
3.00	1.116-002	-134.55	1.633-002	-135.81	6.836-001	-270.36
3.20	9.456-003	-145.34	1.370-002	-130.48	6.902-001	-275.82
3.40	8.144-003	-155.20	1.151-002	-125.25	7.074-001	-280.46
3.60	7.100-003	-164.17	9.698-003	-120.13	7.321-001	-284.30
3.80	6.238-003	-172.33	8.188-003	-115.00	7.618-001	-287.42
4.00	5.510-003	-179.78	6.930-003	-110.12	7.951-001	-289.90

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 1.00 K = 5.0 Z = 0.0 B/H = 0.25

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	6.169-001	-59.15	0.000+000	59.15
0.02	2.208-002	-49.60	6.159-001	-59.18	3.585-002	9.58
0.04	4.401-002	-49.65	6.131-001	-59.26	7.178-002	9.61
0.06	6.563-002	-49.73	6.085-001	-59.40	1.079-001	9.66
0.08	8.681-002	-49.84	6.020-001	-59.59	1.442-001	9.74
0.10	1.074-001	-49.99	5.938-001	-59.83	1.809-001	9.84
0.15	1.555-001	-50.48	5.664-001	-60.68	2.745-001	10.20
0.20	1.973-001	-51.17	5.303-001	-61.90	3.721-001	10.73
0.25	2.318-001	-52.05	4.876-001	-63.49	4.753-001	11.44
0.30	2.581-001	-53.12	4.404-001	-65.50	5.861-001	12.38
0.35	2.763-001	-54.38	3.909-001	-67.97	7.067-001	13.59
0.40	2.866-001	-55.82	3.413-001	-70.96	8.399-001	15.13
0.50	2.869-001	-59.24	2.479-001	-78.87	1.158+000	19.63
0.60	2.670-001	-63.35	1.701-001	-90.38	1.570+000	27.03
0.65	2.523-001	-65.66	1.388-001	-98.07	1.818+000	32.41
0.70	2.357-001	-68.13	1.130-001	-107.44	2.086+000	39.31
0.75	2.179-001	-70.76	9.272-002	-118.72	2.351+000	47.96
0.80	1.999-001	-73.56	7.789-002	-131.84	2.566+000	58.28
0.85	1.819-001	-76.52	6.802-002	-146.19	2.675+000	69.67
0.90	1.646-001	-79.65	6.221-002	-160.65	2.645+000	81.01
0.95	1.481-001	-82.94	5.925-002	-174.08	2.499+000	91.14
1.00	1.326-001	-86.40	5.794-002	-174.18	2.289+000	-260.58
1.05	1.183-001	-90.03	5.735-002	-164.21	2.063+000	-254.24
1.10	1.053-001	-93.84	5.690-002	-155.78	1.850+000	-249.62
1.15	9.341-002	-97.83	5.627-002	-148.60	1.660+000	-246.43
1.20	8.275-002	-102.02	5.534-002	-142.37	1.495+000	-244.38
1.25	7.323-002	-106.37	5.406-002	-136.89	1.355+000	-243.26
1.30	6.478-002	-110.93	5.248-002	-131.97	1.235+000	-242.90
1.35	5.733-002	-115.68	5.053-002	-127.48	1.132+000	-243.16
1.40	5.077-002	-120.62	4.857-002	-123.34	1.045+000	-243.96
1.45	4.504-002	-125.74	4.637-002	-119.48	9.713-001	-245.22
1.50	4.005-002	-131.04	4.408-002	-115.83	9.085-001	-246.87
1.60	3.197-002	-142.07	3.940-002	-109.06	8.113-001	-251.14
1.70	2.593-002	-153.51	3.482-002	-102.81	7.448-001	-256.33
1.80	2.145-002	-165.08	3.050-002	-96.95	7.032-001	-262.02
1.90	1.809-002	-176.44	2.655-002	-91.38	6.816-001	-267.82
2.00	1.555-002	-172.67	2.300-002	-86.06	6.762-001	-86.61
2.10	1.357-002	-162.47	1.986-002	-80.94	6.835-001	-81.52
2.20	1.198-002	-153.05	1.711-002	-76.01	7.006-001	-77.04
2.30	1.067-002	-144.44	1.471-002	-71.24	7.253-001	-73.20
2.40	9.557-003	-136.60	1.265-002	-66.62	7.557-001	-69.98
2.50	8.589-003	-129.47	1.087-002	-62.13	7.904-001	-67.34
2.60	7.735-003	-122.96	9.339-003	-57.77	8.283-001	-65.20
2.80	6.294-003	-111.54	6.910-003	-49.38	9.108-001	-62.16
3.00	5.129-003	-101.82	5.134-003	-41.40	9.992-001	-60.42
3.20	4.184-003	-93.41	3.834-003	-33.77	1.091+000	-59.64
3.40	3.415-003	-86.03	2.881-003	-26.44	1.186+000	-59.59
3.60	2.792-003	-79.47	2.178-003	-19.38	1.282+000	-60.09
3.80	2.287-003	-73.59	1.658-003	-12.54	1.379+000	-61.05
4.00	1.877-003	-68.26	1.270-003	-5.87	1.478+000	-62.38

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 2.00 K = 5.0 Z = 0.0 B/H = 0.25

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	2.136-001	-136.06	0.000+000	136.06
0.02	9.074-003	-124.22	2.132-001	-136.11	4.257-002	11.88
0.04	1.807-002	-124.31	2.119-001	-136.25	8.527-002	11.94
0.06	2.691-002	-124.46	2.098-001	-136.49	1.283-001	12.03
0.08	3.551-002	-124.67	2.068-001	-136.82	1.717-001	12.15
0.10	4.381-002	-124.94	2.031-001	-137.26	2.157-001	12.32
0.15	6.280-002	-125.87	1.906-001	-138.78	3.294-001	12.91
0.20	7.864-002	-127.16	1.745-001	-140.95	4.506-001	13.79
0.25	9.079-002	-128.81	1.558-001	-143.84	5.827-001	15.03
0.30	9.902-002	-130.81	1.357-001	-147.53	7.296-001	16.72
0.35	1.034-001	-133.14	1.154-001	-152.14	8.965-001	19.01
0.40	1.043-001	-135.79	9.578-002	-157.90	1.089+000	22.10
0.50	9.783-002	-142.04	6.202-002	-174.11	1.578+000	32.06
0.60	8.429-002	-149.49	3.898-002	160.29	2.162+000	-309.78
0.65	7.633-002	-153.66	3.210-002	143.41	2.378+000	-297.06
0.70	6.818-002	-158.12	2.805-002	125.15	2.431+000	-283.26
0.75	6.018-002	-162.88	2.611-002	107.63	2.305+000	-270.51
0.80	5.260-002	-167.95	2.536+002	92.40	2.074+000	-260.35
0.85	4.559-002	-173.34	2.505-002	79.78	1.820+000	-253.12
0.90	3.925-002	-179.08	2.475-002	69.39	1.586+000	-248.47
0.95	3.363-002	174.82	2.424-002	60.69	1.387+000	114.14
1.00	2.872-002	168.35	2.348-002	53.21	1.223+000	115.14
1.05	2.449-002	161.49	2.249-002	46.63	1.089+000	114.86
1.10	2.090-002	154.25	2.132-002	40.72	9.802-001	113.53
1.15	1.789-002	146.63	2.003-002	35.30	8.931-001	111.33
1.20	1.539-002	138.69	1.867-002	30.26	8.243-001	108.43
1.25	1.333-002	130.48	1.728-002	25.53	7.713-001	104.96
1.30	1.165-002	122.12	1.591-002	21.03	7.321-001	101.09
1.35	1.027-002	113.70	1.458-002	16.73	7.049-001	96.97
1.40	9.156-003	105.37	1.330-002	12.59	6.883-001	92.78
1.45	8.241-003	97.23	1.210-002	8.58	6.810-001	88.65
1.50	7.483-003	89.39	1.098-002	4.69	6.815-001	84.70
1.60	6.304-003	74.86	8.983-003	-2.83	7.018-001	77.69
1.70	5.415-003	62.01	7.309-003	-10.07	7.409-001	72.08
1.80	4.700-003	50.75	5.927-003	-17.11	7.930-001	67.86
1.90	4.096-003	40.86	4.798-003	-24.00	8.538-001	64.86
2.00	3.573-003	32.08	3.881-003	-30.79	9.206-001	62.86
2.10	3.113-003	24.19	3.139-003	-37.49	9.917-001	61.68
2.20	2.707-003	17.02	2.540-003	-44.14	1.066+000	61.16
2.30	2.350-003	10.44	2.057-003	-50.75	1.143+000	61.19
2.40	2.036-003	4.35	1.667-003	-57.32	1.222+000	61.67
2.50	1.761-003	-1.32	1.352-003	-63.87	1.302+000	62.54
2.60	1.520-003	-6.64	1.098-003	-70.40	1.384+000	63.76
2.80	1.128-003	-16.33	7.260-004	-83.41	1.553+000	67.08
3.00	8.321-004	-24.90	4.813-004	-96.37	1.729+000	71.47
3.20	6.113-004	-32.43	3.195-004	-109.30	1.913+000	76.87
3.40	4.475-004	-38.90	2.121-004	-122.21	2.110+000	83.31
3.60	3.266-004	-44.24	1.405-004	-135.14	2.324+000	90.90
3.80	2.381-004	-48.33	5.275-005	-148.14	2.567+000	99.81
4.00	1.727-004	-51.04	6.062-005	-161.30	2.856+000	110.26

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 5.00 K = 2.0 Z = 0.0 B/H = 0.50

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	4.986-002	99.62	0.000+000	-99.62
0.02	2.627-003	117.24	4.973-002	99.51	5.283-002	17.73
0.04	5.225-003	117.04	4.933-002	99.20	1.059-001	17.84
0.06	7.765-003	116.72	4.866-002	98.67	1.596-001	18.04
0.08	1.022-002	116.26	4.775-002	97.93	2.140-001	18.33
0.10	1.256-002	115.67	4.660-002	96.97	2.696-001	18.70
0.15	1.779-002	113.64	4.283-002	93.56	4.153-001	20.07
0.20	2.189-002	110.79	3.808-002	88.60	5.748-001	22.19
0.25	2.472-002	107.13	3.280-002	81.85	7.537-001	25.28
0.30	2.625-002	102.67	2.744-002	72.98	9.567-001	29.69
0.35	2.658-002	97.41	2.245-002	61.51	1.184+000	35.90
0.40	2.590-002	91.33	1.820-002	46.96	1.423+000	44.37
0.45	2.443-002	84.43	1.497-002	29.19	1.631+000	55.25
0.50	2.242-002	76.70	1.285-002	9.00	1.744+000	67.70
0.55	2.011-002	68.13	1.168-002	-11.65	1.721+000	79.77
0.60	1.771-002	58.68	1.111-002	-30.83	1.593+000	89.51
0.65	1.536-002	48.36	1.078-002	-47.72	1.425+000	96.08
0.70	1.319-002	37.16	1.045-002	-62.48	1.262+000	99.64
0.75	1.126-002	25.14	1.002-002	-75.60	1.125+000	100.74
0.80	9.607-003	12.39	9.444-003	-87.56	1.017+000	99.95
0.85	8.218-003	-0.93	8.759-003	-98.72	9.382-001	97.78
0.90	7.073-003	-14.60	7.996-003	-109.31	8.846-001	94.71
0.95	6.137-003	-28.34	7.197-003	-119.50	8.528-001	91.16
1.00	5.368-003	-41.91	6.395-003	-129.41	8.395-001	87.50
1.05	4.728-003	-55.08	5.618-003	-139.10	8.415-001	84.02
1.10	4.183-003	-67.70	4.887-003	-148.62	8.559-001	80.92
1.15	3.708-003	-79.70	4.213-003	-158.01	8.803-001	78.31
1.20	3.288-003	-91.05	3.603-003	-167.28	9.126-001	76.23
1.25	2.910-003	-101.76	3.060-003	-176.44	9.510-001	74.68
1.30	2.568-003	-111.87	2.582-003	-174.50	9.944-001	-286.36
1.35	2.257-003	-121.40	2.167-003	-165.53	1.042+000	-286.93
1.40	1.975-003	-130.42	1.809-003	-156.65	1.092+000	-287.07
1.50	1.490-003	-146.99	1.242-003	-139.17	1.199+000	-286.16
1.60	1.102-003	-161.80	8.387-004	-122.04	1.314+000	-283.84
1.70	7.990-004	-174.93	5.572-004	-105.25	1.434+000	-280.18
1.80	5.679-004	-173.62	3.641-004	-88.74	1.560+000	-84.88
1.90	3.958-004	-164.00	2.338-004	-72.44	1.693+000	-91.56
2.00	2.707-004	-156.50	1.471-004	-56.21	1.841+000	-100.29
2.10	1.821-004	-151.62	9.025-005	-39.79	2.018+000	-111.83
2.20	1.215-004	-150.13	5.366-005	-22.72	2.264+000	-127.41
2.30	8.189-005	-152.86	3.062-005	-4.04	2.674+000	-148.82
2.40	5.798-005	-159.98	1.665-005	-18.30	3.482+000	-178.28
2.50	4.493-005	-169.63	8.828-006	-48.68	5.089+000	-218.31
2.60	3.819-005	-178.49	5.358-006	-91.07	7.128+000	-269.56
2.65	3.605-005	-178.12	4.743-006	-113.47	7.601+000	-264.65
2.70	3.431-005	-175.49	4.512-006	-133.02	7.604+000	-42.47
2.75	3.278-005	-173.57	4.433-006	-148.88	7.394+000	-24.69
2.80	3.135-005	-172.24	4.376-006	-161.56	7.164+000	-10.68
2.85	2.997-005	-171.39	4.285-006	-171.87	6.993+000	0.48
2.90	2.859-005	-170.91	4.146-006	-179.55	6.897+000	-350.45

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 5.00 K = 2.0 Z = 0.0 B/H = 1.5.

O	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
2.92	2.804-005	-170.80	4.077-006	176.49	6.879+000	-347.28
2.94	2.750-005	-170.72	4.001-006	173.61	6.872+000	-344.34
2.96	2.695-005	-170.68	3.920-006	170.90	6.876+000	-341.58
2.98	2.640-005	-170.67	3.833-006	168.34	6.889+000	-339.01
3.00	2.586-005	-170.69	3.741-006	165.91	6.912+000	-336.60
3.02	2.532-005	-170.72	3.646-006	163.61	6.944+000	-334.33
3.04	2.478-005	-170.78	3.548-006	161.43	6.984+000	-332.21
3.06	2.424-005	-170.84	3.448-006	159.36	7.032+000	-330.20
3.08	2.371-005	-170.93	3.346-006	157.38	7.088+000	-328.31
3.10	2.319-005	-171.02	3.242-006	155.51	7.151+000	-326.53
3.15	2.190-005	-171.27	2.983-006	151.22	7.340+000	-322.50
3.20	2.055-005	-171.55	2.728-006	147.47	7.570+000	-319.01
3.25	1.945-005	-171.82	2.481-006	144.20	7.840+000	-316.01
3.30	1.831-005	-172.07	2.248-006	141.39	8.146+000	-313.46
3.35	1.723-005	-172.29	2.030-006	139.04	8.487+000	-311.33
3.40	1.621-005	-172.47	1.830-006	137.12	8.858+000	-309.59
3.45	1.525-005	-172.61	1.648-006	135.62	9.256+000	-308.23
3.50	1.435-005	-172.71	1.484-006	134.52	9.675+000	-307.24
3.55	1.352-005	-172.77	1.337-006	133.81	1.011+001	-306.58
3.60	1.274-005	-172.80	1.207-006	133.45	1.055+001	-306.25
3.70	1.133-005	-172.75	9.933-007	133.65	1.141+001	-306.40
3.80	1.012-005	-172.60	8.304-007	134.75	1.219+001	-307.35
4.00	8.162-006	-172.18	6.124-007	137.96	1.333+001	-310.14

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 5.00 K = 5.0 Z = 0.1 B/H = 0.50

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	2.888-004	146.93	0.000+000	-146.98
0.02	1.871-005	153.21	2.875-004	146.83	6.507-002	16.38
0.04	3.710-005	152.92	2.839-004	146.38	1.307-001	16.54
0.06	5.485-005	162.45	2.760-004	145.63	1.973-001	16.82
0.08	7.167-005	161.78	2.699-004	144.56	2.656-001	17.21
0.10	8.729-005	160.92	2.598-004	143.18	3.360-001	17.74
0.15	1.197-004	157.95	2.275-004	138.22	5.262-001	19.73
0.20	1.410-004	153.82	1.891-004	130.82	7.460-001	23.00
0.25	1.507-004	148.55	1.494-004	120.39	1.009+000	28.16
0.30	1.498-004	142.15	1.133-004	105.94	1.322+000	36.22
0.35	1.406-004	134.66	8.463-005	86.27	1.657+000	48.39
0.40	1.258-004	126.06	6.641-005	61.33	1.894+000	64.73
0.45	1.083-004	116.32	5.748-005	34.33	1.883+000	81.94
0.50	9.023-005	105.41	5.413-005	10.21	1.665+000	95.20
0.55	7.342-005	93.28	5.243-005	-9.52	1.400+000	102.80
0.60	5.881-005	79.91	5.004-005	-25.64	1.175+000	105.55
0.65	4.684-005	65.33	4.650-005	-39.30	1.007+000	104.70
0.70	3.746-005	49.76	4.204-005	-51.54	8.916-001	101.30
0.75	3.042-005	33.60	3.710-005	-62.71	8.198-001	96.30
0.80	2.516-005	17.41	3.208-005	-73.15	7.842-001	90.57
0.85	2.123-005	1.77	2.730-005	-83.11	7.778-001	84.89
0.90	1.820-005	-12.93	2.292-005	-92.72	7.940-001	79.82
0.95	1.576-005	-26.33	1.905-005	-102.05	8.272-001	75.66
1.00	1.371-005	-38.68	1.570-005	-111.17	8.731-001	72.49
1.05	1.194-005	-49.80	1.286-005	-120.12	9.282-001	70.26
1.10	1.038-005	-60.08	1.048-005	-128.96	9.901-001	68.88
1.15	8.990-006	-69.47	0.506-006	-137.71	1.057+000	68.23
1.20	7.758-006	-78.14	6.882-006	-146.37	1.127+000	68.23
1.25	6.666-006	-86.19	5.553-006	-154.98	1.200+000	68.78
1.30	5.763-006	-93.71	4.471-006	-163.54	1.276+000	69.83
1.35	4.859-006	-100.73	3.593-006	-172.07	1.352+000	71.34
1.40	4.122-006	-107.31	2.883-006	179.43	1.430+000	-286.74
1.50	2.931-006	-119.22	1.847-006	162.48	1.587+000	-281.70
1.60	2.052-006	-129.50	1.176-006	145.55	1.744+000	-275.06
1.70	1.415-006	-138.07	7.441-007	128.53	1.902+000	-266.65
1.80	9.628-007	-144.67	4.670-007	111.46	2.062+000	-256.13
1.90	6.479-007	-148.89	2.902-007	94.02	2.233+000	-242.90
2.00	4.347-007	-150.08	1.784-007	76.01	2.438+000	-226.09
2.10	2.960-007	-147.69	1.083-007	57.91	2.733+000	-204.70
2.20	2.107-007	-141.72	6.510-008	36.41	3.234+000	-178.13
2.30	1.615-007	-133.63	3.919-008	13.35	4.121+000	-146.98
2.40	1.339-007	-125.89	2.421-008	-12.85	5.532+000	-113.04
2.50	1.170-007	-120.23	1.601-008	-41.62	7.309+000	-78.61
2.60	1.045-007	-116.87	1.166-008	-70.17	8.962+000	-46.70
2.65	9.898-008	-115.90	1.027-008	-83.31	9.634+000	-32.59
2.70	9.371-008	-115.27	9.179-009	-95.34	1.021+001	-19.94
2.75	8.862-008	-114.92	8.267-009	-106.21	1.072+001	-8.71
2.80	8.369-008	-114.77	7.471-009	-115.97	1.120+001	1.19
2.85	7.892-008	-114.73	6.754-009	-124.71	1.169+001	9.93
2.90	7.432-008	-114.83	6.094-009	-132.52	1.220+001	17.65

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

M = 5.00 K = 5.0 Z = 0.1 B/H = 0.50

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
2.92	7.253-008	-114.94	5.844-009	-135.42	1.241+001	20.48
2.94	7.077-008	-115.01	5.600-009	-138.18	1.264+001	23.18
2.96	6.903-008	-115.08	5.364-009	-140.83	1.287+001	25.75
2.98	6.734-008	-115.16	5.135-009	-143.36	1.311+001	28.20
3.00	6.567-008	-115.25	4.912-009	-145.78	1.337+001	30.53
3.02	6.404-008	-115.33	4.696-009	-148.09	1.364+001	32.76
3.04	6.244-008	-115.42	4.487-009	-150.29	1.391+001	34.88
3.06	6.087-008	-115.50	4.284-009	-152.39	1.421+001	36.89
3.08	5.934-008	-115.58	4.088-009	-154.39	1.451+001	38.81
3.10	5.785-008	-115.66	3.899-009	-156.29	1.484+001	40.63
3.15	5.426-008	-115.85	3.455-009	-160.63	1.571+001	44.78
3.20	5.089-008	-116.01	3.051-009	-164.37	1.668+001	48.36
3.25	4.774-008	-116.14	2.688-009	-167.54	1.776+001	51.40
3.30	4.481-008	-116.24	2.364-009	-170.13	1.895+001	53.90
3.35	4.207-008	-116.30	2.077-009	-172.15	2.025+001	55.85
3.40	3.953-008	-116.33	1.826-009	-173.60	2.165+001	57.27
3.45	3.717-008	-116.33	1.607-009	-174.49	2.313+001	58.16
3.50	3.498-008	-116.31	1.418-009	-174.83	2.467+001	58.53
3.55	3.295-008	-116.25	1.257-009	-174.67	2.621+001	58.42
3.60	3.106-008	-116.18	1.120-009	-174.06	2.773+001	57.88
3.70	2.770-008	-116.01	9.090-010	-171.81	3.047+001	55.81
3.80	2.479-008	-115.80	7.613-010	-168.86	3.256+001	53.06
4.00	2.008-008	-115.40	5.785-010	-163.58	3.470+001	48.18

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

M = 5.00 K = 2.0 Z = 0.0 B/H = 0.25

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	9.405-002	148.11	0.000+000	-148.11
0.02	4.673-003	164.94	9.382-002	148.02	4.981-002	16.92
0.04	9.299-003	164.78	9.313-002	147.75	9.985-002	17.02
0.06	1.383-002	164.50	9.199-002	147.31	1.503-001	17.20
0.08	1.822-002	164.12	9.042-002	146.63	2.015-001	17.44
0.10	2.243-002	163.62	8.844-002	145.86	2.536-001	17.76
0.15	3.192-002	161.90	8.191-002	142.97	3.896-001	18.93
0.20	3.955-002	159.49	7.360-002	138.78	5.374-001	20.72
0.25	4.505-002	156.40	6.422-002	133.11	7.016-001	23.29
0.30	4.835-002	152.63	5.450-002	125.71	8.871-001	26.93
0.35	4.956-002	148.18	4.517-002	116.18	1.097+000	32.00
0.40	4.894-002	143.04	3.688-002	104.10	1.327+000	38.94
0.45	4.685-002	137.20	3.012-002	89.08	1.555+000	48.13
0.50	4.368-002	130.67	2.521-002	71.25	1.732+000	59.42
0.55	3.983-002	123.41	2.214-002	51.75	1.799+000	71.65
0.60	3.564-002	115.41	2.052-002	32.48	1.737+000	82.93
0.65	3.141-002	106.65	1.973-002	14.94	1.592+000	91.71
0.70	2.736-002	97.12	1.924-002	-0.42	1.422+000	97.54
0.75	2.363-002	86.82	1.872-002	-13.86	1.262+000	100.68
0.80	2.033-002	75.78	1.801-002	-25.84	1.128+000	101.62
0.85	1.747-002	64.09	1.709-002	-36.78	1.023+000	100.85
0.90	1.507-002	51.83	1.598-002	-46.99	9.432-001	98.82
0.95	1.307-002	39.23	1.473-002	-56.64	8.874-001	95.92
1.00	1.143-002	26.48	1.341-002	-66.04	8.521-001	92.53
1.05	1.008-002	13.82	1.208-002	-75.14	8.343-001	88.96
1.10	0.948-003	1.43	1.077-002	-84.05	8.311-001	85.49
1.15	7.990-003	-10.53	9.512-003	-92.83	8.400-001	82.31
1.20	7.160-003	-21.97	8.337-003	-101.51	8.588-001	79.54
1.25	6.425-003	-32.86	7.256-003	-110.11	8.855-001	77.25
1.30	5.763-003	-43.17	6.275-003	-118.64	9.185-001	75.45
1.35	5.160-003	-52.99	5.395-003	-127.11	9.566-001	74.13
1.40	4.607-003	-62.29	4.614-003	-135.54	9.986-001	73.26
1.50	3.832-003	-79.52	3.328-003	-152.20	1.091+000	72.74
1.60	2.814-003	-95.15	2.365-003	-168.83	1.192+000	73.68
1.70	2.140-003	-109.35	1.648-003	174.76	1.298+000	-284.11
1.80	1.596-003	-122.21	1.134-003	158.47	1.407+000	-280.68
1.90	1.168-003	-133.72	7.692-004	142.28	1.518+000	-276.00
2.00	8.375-004	-143.77	5.135-004	126.12	1.632+000	-269.89
2.10	5.682-004	-152.12	3.365-004	109.89	1.746+000	-262.01
2.20	4.046-004	-158.37	2.162-004	93.39	1.872+000	-251.76
2.30	2.733-004	-161.82	1.356-004	76.28	2.016+000	-238.10
2.40	1.831-004	-161.51	8.265-005	57.95	2.216+000	-219.47
2.50	1.252-004	-156.43	4.890-005	37.28	2.560+000	-193.71
2.60	9.174-005	-146.89	2.840-005	12.24	3.230+000	-159.13
2.65	8.179-005	-141.32	2.182-005	-2.72	3.749+000	-138.60
2.70	7.497-005	-135.94	1.714-005	-19.51	4.374+000	-116.43
2.75	7.031-005	-131.19	1.401-005	-37.69	5.017+000	-93.50
2.80	6.698-005	-127.32	1.207-005	-56.13	5.551+000	-71.19
2.85	6.440-005	-124.36	1.090-005	-73.49	5.906+000	-50.87
2.90	6.216-005	-122.23	1.019-005	-88.88	6.102+000	-33.35

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 5.00 K = 2.0 Z = 0.0 B/H = 0.25

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
2.92	6.131-005	-121.58	9.969-006	-94.42	6.150+000	-27.16
2.94	6.046-005	-121.03	9.771-006	-99.62	6.188+000	-21.41
2.96	5.961-005	-120.58	9.585-006	-104.50	6.219+000	-16.08
2.98	5.876-005	-120.20	9.406-006	-109.07	6.247+000	-11.13
3.00	5.790-005	-119.91	9.228-006	-113.36	6.274+000	-6.55
3.02	5.702-005	-119.67	9.049-006	-117.39	6.301+000	-2.29
3.04	5.613-005	-119.50	8.867-006	-121.18	6.331+000	1.68
3.06	5.524-005	-119.38	8.680-006	-124.75	6.363+000	5.37
3.08	5.432-005	-119.31	8.488-006	-128.13	6.400+000	8.82
3.10	5.340-005	-119.27	8.290-006	-131.32	6.441+000	12.04
3.15	5.105-005	-119.33	7.774-006	-138.59	6.567+000	19.26
3.20	4.866-005	-119.54	7.235-006	-144.98	6.726+000	25.45
3.25	4.627-005	-119.84	6.685-006	-150.64	6.921+000	30.80
3.30	4.389-005	-120.10	6.135-006	-155.64	7.153+000	35.46
3.35	4.155-005	-120.55	5.598-006	-160.06	7.422+000	39.51
3.40	3.928-005	-120.90	5.082-006	-163.93	7.729+000	43.03
3.45	3.709-005	-121.24	4.594-006	-167.29	8.073+000	46.05
3.50	3.500-005	-121.53	4.139-006	-170.14	8.456+000	48.61
3.55	3.300-005	-121.78	3.719-006	-172.51	8.875+000	50.74
3.60	3.112-005	-121.97	3.336-006	-174.41	9.328+000	52.43
3.70	2.769-005	-122.22	2.683-006	-176.81	1.032+001	54.59
3.80	2.468-005	-122.28	2.172-006	-177.51	1.136+001	55.23
4.00	1.981-005	-122.02	1.494-006	-175.13	1.325+001	53.11

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 5.00 K = 5.0 Z = 0.0 B/H = 0.25

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	5.000+000	0.00	5.553-003	-12.30	0.000+000	12.30
0.02	3.096-004	2.99	5.535-003	-12.40	5.593-002	15.40
0.04	6.150-004	2.80	5.482-003	-12.71	1.122-001	15.51
0.06	9.124-004	2.48	5.395-003	-13.24	1.691-001	15.71
0.08	1.198-003	2.02	5.275-003	-13.97	2.271-001	15.99
0.10	1.468-003	1.44	5.125-003	-14.93	2.864-001	16.37
0.15	2.057-003	-0.58	4.637-003	-18.32	4.435-001	17.74
0.20	2.495-003	-3.39	4.031-003	-23.30	6.189-001	19.91
0.25	2.766-003	-6.99	3.369-003	-30.16	8.209-001	23.16
0.30	2.874-003	-11.38	2.714-003	-39.37	1.059+000	27.99
0.35	2.839-003	-16.55	2.124-003	-51.67	1.336+000	35.12
0.40	2.690-003	-22.51	1.645-003	-67.88	1.635+000	45.37
0.45	2.461-003	-29.27	1.309-003	-88.30	1.881+000	59.02
0.50	2.188-003	-36.87	1.118-003	-111.32	1.957+000	74.45
0.55	1.898-003	-45.35	1.036-003	-133.60	1.832+000	88.25
0.60	1.615-003	-54.75	1.007-003	-152.75	1.604+000	98.00
0.65	1.354-003	-65.13	9.866-004	-168.62	1.372+000	103.49
0.70	1.126-003	-76.51	9.547-004	178.00	1.179+000	-254.52
0.75	9.333-004	-98.86	9.058-004	166.31	1.030+000	-255.18
0.80	7.769-004	-112.07	8.422-004	155.72	9.225-001	-257.79
0.85	6.531-004	-115.80	7.686-004	145.85	8.497-001	-261.75
0.90	5.566-004	-129.99	6.902-004	136.46	8.064-001	-266.45
0.95	4.815-004	-143.96	6.113-004	127.39	7.877-001	-271.35
1.00	4.221-004	-157.48	5.350-004	118.53	7.891-001	-276.01
1.05	3.738-004	-170.30	4.635-004	109.82	8.064-001	-280.12
1.10	3.329-004	177.69	3.981-004	101.20	8.361-001	76.48
1.15	2.972-004	166.43	3.395-004	92.66	8.754-001	73.83
1.20	2.652-004	156.06	2.877-004	84.15	9.218-001	71.91
1.25	2.361-004	146.33	2.424-004	75.68	9.737-001	70.65
1.30	2.094-004	137.22	2.034-004	67.22	1.030+000	70.00
1.35	1.849-004	128.65	1.699-004	58.78	1.089+000	69.88
1.40	1.626-004	120.53	1.414-004	50.34	1.150+000	70.25
1.50	1.238-004	115.70	9.704-005	33.46	1.276+000	72.24
1.60	9.252-005	92.31	6.588-005	16.57	1.404+000	75.73
1.70	6.781-005	80.27	4.430-005	-0.35	1.531+000	80.63
1.80	4.877-005	59.61	2.953-005	-17.34	1.652+000	86.95
1.90	3.441-005	60.43	1.951-005	-34.46	1.764+000	94.88
2.00	2.381-005	53.01	1.277-005	-51.77	1.864+000	104.78
2.10	1.616-005	47.82	8.284-006	-69.40	1.951+000	117.22
2.20	1.082-005	45.60	5.321-006	-87.56	2.033+000	133.15
2.30	7.239-006	47.32	3.387-006	-106.50	2.137+000	153.82
2.40	5.006-006	53.72	2.144-006	-126.61	2.335+000	180.33
2.50	3.757-006	63.78	1.360-006	-148.31	2.763+000	212.09
2.60	3.133-006	74.10	8.767-007	-171.88	3.573+000	245.98
2.65	2.950-006	78.31	7.131-007	175.68	4.137+000	-97.38
2.70	2.811-006	81.65	5.872-007	162.96	4.787+000	-81.31
2.75	2.696-006	84.15	4.906-007	150.14	5.496+000	-65.99
2.80	2.592-006	85.92	4.162-007	137.45	6.229+000	-51.53
2.85	2.491-006	87.03	3.582-007	125.14	6.956+000	-38.05
2.90	2.390-006	87.79	3.121-007	113.41	7.659+000	-25.61

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 5.00 K = 5.0 Z = 0.0 B/H = 0.25

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
2.92	2.350-006	87.97	2.962-007	108.91	7.932+000	-20.94
2.94	2.308-006	88.09	2.815-007	104.53	8.200+000	-16.44
2.96	2.267-006	88.17	2.678-007	100.28	8.464+000	-12.11
2.98	2.225-006	88.22	2.551-007	96.15	8.724+000	-7.94
3.00	2.183-006	88.23	2.431-007	92.16	8.981+000	-3.93
3.02	2.141-006	88.21	2.318-007	88.29	9.236+000	-0.09
3.04	2.099-006	88.16	2.212-007	84.55	9.491+000	3.61
3.06	2.057-006	88.09	2.110-007	80.94	9.746+000	7.15
3.08	2.015-006	88.01	2.014-007	77.46	1.000+001	10.55
3.10	1.973-006	87.91	1.923-007	74.10	1.026+001	13.82
3.15	1.868-006	87.62	1.710-007	66.21	1.093+001	21.41
3.20	1.766-006	87.33	1.519-007	59.04	1.163+001	28.26
3.25	1.667-006	86.96	1.345-007	52.54	1.239+001	34.42
3.30	1.572-006	86.64	1.188-007	46.69	1.323+001	39.96
3.35	1.480-006	86.35	1.046-007	41.45	1.415+001	44.90
3.40	1.394-006	86.10	9.182-008	36.83	1.518+001	49.26
3.45	1.312-006	85.89	8.033-008	32.82	1.633+001	53.07
3.50	1.235-006	85.73	7.010-008	29.42	1.761+001	56.31
3.55	1.163-006	85.61	6.105-008	26.65	1.904+001	58.96
3.60	1.095-006	85.55	5.310-008	24.53	2.062+001	61.02
3.70	9.734-007	85.53	4.023-008	22.28	2.420+001	63.26
3.80	8.683-007	85.65	3.087-008	22.67	2.813+001	62.98
4.00	6.990-007	86.09	2.004-008	29.40	3.488+001	56.69

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 10.00 K = 2.0 Z = 0.0 B/H = 0.50

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	4.975-004	157.73	0.000+000	-157.73
0.02	3.528-005	177.49	4.952-004	157.52	7.124-002	19.96
0.04	6.992-005	177.09	4.885-004	156.89	1.431-001	20.20
0.06	1.033-004	176.43	4.776-004	155.83	2.183-001	20.60
0.08	1.349-004	175.51	4.626-004	154.32	2.916-001	21.19
0.10	1.641-004	174.32	4.441-004	152.35	3.695-001	21.97
0.15	2.242-004	170.18	3.856-004	145.24	5.813-001	24.94
0.20	2.626-004	164.36	3.177-004	134.47	8.266-001	29.89
0.25	2.785-004	156.84	2.510-004	119.10	1.110+000	37.74
0.30	2.744-004	147.58	1.959-004	98.09	1.401+000	49.49
0.35	2.550-004	136.50	1.597-004	71.70	1.597+000	64.80
0.40	2.261-004	123.52	1.424-004	43.32	1.588+000	80.21
0.45	1.933-004	108.58	1.361-004	17.19	1.421+000	91.39
0.50	1.612-004	91.63	1.319-004	-5.35	1.222+000	96.98
0.55	1.326-004	72.81	1.251-004	-25.10	1.060+000	97.91
0.60	1.090-004	52.47	1.148-004	-43.14	9.492-001	95.61
0.65	9.030-005	31.28	1.017-004	-60.21	8.876-001	91.48
0.70	7.567-005	10.02	8.730-005	-76.76	8.668-001	86.78
0.75	6.392-005	-10.60	7.277-005	-93.05	8.783-001	82.45
0.80	5.403-005	-30.16	5.913-005	-109.22	9.137-001	79.07
0.85	4.538-005	-48.50	4.696-005	-125.35	9.664-001	76.84
0.90	3.766-005	-65.64	3.653-005	-141.46	1.031+000	75.81
0.95	3.078-005	-81.65	2.790-005	-157.56	1.103+000	75.91
1.00	2.471-005	-96.62	2.094-005	-173.67	1.180+000	77.05
1.10	1.502-005	-123.56	1.124-005	154.11	1.337+000	-277.67
1.20	8.381-006	-146.37	5.664-006	121.70	1.480+000	-268.07
1.30	4.226-006	-163.75	2.675-006	88.58	1.580+000	-252.33
1.40	1.887-006	-171.52	1.178-006	53.22	1.602+000	-224.74
1.50	8.123-007	-157.69	4.894-007	12.07	1.660+000	-169.75
1.55	6.253-007	-140.93	3.181-007	-12.41	1.966+000	-128.51
1.60	5.743-007	-126.10	2.169-007	-39.65	2.648+000	-86.45
1.65	5.693-007	-117.73	1.605-007	-67.67	3.547+000	-50.07
1.70	5.636-007	-114.32	1.287-007	-93.36	4.379+000	-20.95
1.75	5.447-007	-113.61	1.077-007	-114.96	5.058+000	1.35
1.80	5.139-007	-114.20	9.091-008	-132.47	5.653+000	18.27
1.85	4.754-007	-115.30	7.599-008	-146.55	6.256+000	31.25
1.90	4.336-007	-116.47	6.250-008	-157.81	6.937+000	41.34
1.95	3.918-007	-117.43	5.057-008	-166.61	7.748+000	49.12
2.00	3.522-007	-118.24	4.037-008	-173.10	8.724+000	54.87
2.05	3.160-007	-118.69	3.198-008	-177.34	9.883+000	58.65
2.10	2.837-007	-118.86	2.533-008	-179.31	1.120+001	60.45
2.15	2.554-007	-118.81	2.028-008	-179.17	1.259+001	60.36
2.20	2.306-007	-118.59	1.660-008	-177.26	1.390+001	58.69
2.25	2.091-007	-118.23	1.399-008	-174.33	1.495+001	56.04
2.30	1.903-007	-117.94	1.215-008	-171.11	1.566+001	53.17
2.40	1.592-007	-117.27	9.787-009	-166.10	1.626+001	48.83
2.50	1.346-007	-116.74	8.167-009	-163.80	1.648+001	47.05
2.55	1.241-007	-116.54	7.470-009	-163.36	1.661+001	46.82
2.60	1.146-007	-116.36	6.824-009	-163.18	1.680+001	46.82
2.65	1.061-007	-116.21	6.225-009	-163.13	1.704+001	46.92

Table 2

FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 10.00 K = 2.0 Z = 0.0 B/H = 0.50

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
2.70	9.825-006	-116.07	5.672-009	-163.13	1.732+001	47.06
2.75	9.114-008	-115.95	5.167-009	-163.13	1.764+001	47.18
2.80	8.467-008	-115.83	4.709-009	-163.09	1.798+001	47.26
2.85	7.875-008	-115.72	4.294-009	-163.01	1.834+001	47.29
2.90	7.334-008	-115.62	3.922-009	-162.90	1.870+001	47.28
2.95	6.839-008	-115.52	3.588-009	-162.75	1.906+001	47.23
3.00	6.384-008	-115.42	3.287-009	-162.58	1.942+001	47.16
3.10	5.584-008	-115.24	2.775-009	-162.23	2.013+001	46.99
3.20	4.906-008	-115.07	2.357-009	-161.90	2.081+001	46.83
3.40	3.833-008	-114.79	1.729-009	-161.37	2.217+001	46.58
3.60	3.038-008	-114.55	1.292-009	-160.95	2.353+001	46.40
3.80	2.440-008	-114.35	9.806-010	-160.61	2.488+001	46.25
4.00	1.982-008	-114.19	7.555-010	-160.31	2.624+001	46.12

Table 2

FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 10.00

K = 5.0

Z = 0.0

B/H = 0.50

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	1.251-008	-97.18	0.000+000	97.18
0.02	1.054-009	-79.17	1.242-008	-97.45	8.486-002	18.28
0.04	2.080-009	-79.70	1.217-008	-98.29	1.709-001	18.59
0.06	3.050-009	-80.57	1.177-008	-99.70	2.592-001	19.13
0.08	3.941-009	-81.79	1.122-008	-101.70	3.512-001	19.91
0.10	4.732-009	-83.36	1.056-008	-104.34	4.481-001	20.98
0.15	6.175-009	-88.82	8.550-009	-114.06	7.223-001	25.24
0.20	6.794-009	-95.49	6.411-009	-129.43	1.060+000	32.94
0.25	6.663-009	-106.39	4.604-009	-152.59	1.447+000	46.20
0.30	5.992-009	-118.63	3.478-009	175.66	1.723+000	-294.29
0.35	5.036-009	-133.34	3.040-009	141.23	1.657+000	-274.57
0.40	4.025-009	-150.69	2.918-009	111.83	1.379+000	-262.51
0.45	3.122-009	-170.76	2.783-009	88.11	1.122+000	-258.88
0.50	2.406-009	166.71	2.534-009	67.89	9.495-001	98.83
0.55	1.882-009	142.65	2.195-009	49.50	8.576-001	93.16
0.60	1.511-009	118.49	1.819-009	32.04	8.305-001	86.45
0.65	1.238-009	95.55	1.454-009	15.05	8.515-001	80.50
0.70	1.021-009	74.50	1.127-009	-1.71	9.058-001	76.21
0.75	8.370-010	55.41	8.524-010	-18.38	9.819-001	73.79
0.80	6.769-010	38.09	6.317-010	-35.01	1.071+000	73.10
0.85	5.379-010	22.27	4.602-010	-51.66	1.169+000	73.94
0.90	4.192-010	7.77	3.304-010	-68.35	1.269+000	76.12
0.95	3.203-010	-5.54	2.342-010	-85.09	1.368+000	79.55
1.00	2.398-010	-17.70	1.641-010	-101.90	1.461+000	84.19
1.10	1.258-010	-38.35	7.810-011	-135.88	1.611+000	97.53
1.20	5.987-011	-52.42	3.576-011	-170.77	1.674+000	118.35
1.30	2.583-011	-54.12	1.583-011	152.49	1.632+000	-206.61
1.40	1.248-011	-32.92	6.915-012	112.37	1.805+000	-145.29
1.50	1.007-011	-8.51	3.162-012	67.95	3.185+000	-76.45
1.55	9.759-012	-3.61	2.235-012	44.95	4.366+000	-48.55
1.60	9.341-012	-1.87	1.639-012	22.64	5.699+000	-24.51
1.65	8.763-012	-1.84	1.238-012	1.96	7.078+000	-3.80
1.70	8.172-012	-2.58	9.516-013	-16.48	8.483+000	13.91
1.75	7.332-012	-3.57	7.348-013	-32.51	9.979+000	28.94
1.80	6.596-012	-4.53	5.647-013	-46.14	1.168+001	41.61
1.85	5.900-012	-5.30	4.295-013	-57.41	1.374+001	52.11
1.90	5.264-012	-5.81	3.225-013	-66.27	1.632+001	60.46
1.95	4.697-012	-6.05	2.393-013	-72.54	1.963+001	66.48
2.00	4.200-012	-6.03	1.764-013	-75.89	2.381+001	69.82
2.05	3.767-012	-5.93	1.307-013	-76.00	2.881+001	70.07
2.10	3.393-012	-5.67	9.949-014	-72.83	3.410+001	67.16
2.15	3.067-012	-5.35	7.959-014	-67.23	3.854+001	61.87
2.20	2.784-012	-5.02	6.770-014	-60.91	4.112+001	55.88
2.25	2.535-012	-4.71	6.057-014	-55.55	4.185+001	50.84
2.30	2.315-012	-4.43	5.572-014	-51.89	4.155+001	47.46
2.40	1.945-012	-3.97	4.801-014	-48.89	4.052+001	44.92
2.50	1.647-012	-3.64	4.065-014	-48.85	4.052+001	45.21
2.55	1.519-012	-3.50	3.710-014	-49.17	4.095+001	45.67
2.60	1.404-012	-3.38	3.375-014	-49.49	4.159+001	46.11
2.65	1.299-012	-3.27	3.064-014	-49.75	4.239+001	46.48

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 10.00 K = 5.0 Z = 0.0 B/H = 0.50

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
2.70	1.203-012	-3.16	2.780-014	-49.90	4.328+001	46.74
2.75	1.117-012	-3.06	2.524-014	-49.95	4.423+001	46.88
2.80	1.037-012	-2.97	2.296-014	-49.90	4.519+001	46.93
2.85	9.652-013	-2.88	2.091-014	-49.79	4.615+001	46.91
2.90	8.991-013	-2.79	1.909-014	-49.64	4.709+001	46.85
2.95	8.387-013	-2.71	1.747-014	-49.46	4.800+001	46.76
3.00	7.832-013	-2.63	1.602-014	-49.29	4.889+001	46.66
3.10	6.854-013	-2.48	1.354-014	-48.96	5.062+001	46.48
3.20	6.025-013	-2.35	1.152-014	-48.69	5.230+001	46.34
3.40	4.711-013	-2.12	8.464-015	-48.29	5.566+001	46.17
3.60	3.737-013	-1.93	6.320-015	-47.97	5.904+001	46.05
3.80	3.003-013	-1.77	4.811-015	-47.71	6.242+001	45.93
4.00	2.441-013	-1.64	3.709-015	-47.47	6.580+001	45.84

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 10.00 K = 2.0 Z = 0.0 B/H = 0.25

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	2.220-003	-102.29	0.000+000	102.29
0.02	1.470-004	-82.97	2.211-003	-102.47	6.651-002	19.51
0.04	2.917-004	-83.31	2.184-003	-103.02	1.336-001	19.71
0.06	4.318-004	-83.87	2.141-003	-103.92	2.017-001	20.06
0.08	5.651-004	-84.66	2.082-003	-105.21	2.715-001	20.55
0.10	6.896-004	-85.67	2.008-003	-106.88	3.435-001	21.21
0.15	9.520-004	-89.19	1.772-003	-112.90	5.374-001	23.71
0.20	1.131-003	-94.14	1.490-003	-121.93	7.592-001	27.79
0.25	1.222-003	-100.53	1.203-003	-134.68	1.016+000	34.15
0.30	1.230-003	-108.39	9.485-004	-152.10	1.297+000	43.70
0.35	1.172-003	-117.78	7.597-004	-174.67	1.543+000	56.89
0.40	1.067-003	-128.76	6.501-004	-159.16	1.641+000	-287.92
0.45	9.361-004	-141.41	6.034-004	-133.16	1.551+000	-274.57
0.50	7.990-004	-155.78	5.850-004	-110.07	1.366+000	-265.85
0.55	6.695-004	-171.88	5.671-004	-90.10	1.181+000	-261.97
0.60	5.564-004	-170.43	5.373-004	-72.35	1.036+000	-98.08
0.65	4.633-004	-151.49	4.941-004	-55.97	9.377-001	95.52
0.70	3.892-004	-131.85	4.411-004	-40.37	8.823-001	91.49
0.75	3.306-004	-112.18	3.831-004	-25.18	8.629-001	87.00
0.80	2.830-004	-93.04	3.246-004	-10.20	8.719-001	82.83
0.85	2.429-004	-74.78	2.691-004	-4.70	9.027-001	79.48
0.90	2.076-004	-57.56	2.187-004	-19.58	9.493-001	77.15
0.95	1.759-004	-41.38	1.746-004	-34.50	1.007+000	75.87
1.00	1.472-004	-26.16	1.372-004	-49.46	1.073+000	75.61
1.10	9.845-005	-1.67	8.101-005	-79.54	1.215+000	77.87
1.20	6.149-005	-26.28	4.529-005	-109.90	1.358+000	83.62
1.30	3.550-005	-47.49	2.400-005	-140.72	1.479+000	93.23
1.40	1.865-005	-64.15	1.203-005	-172.50	1.550+000	108.35
1.50	8.681-006	-72.67	5.687-006	-153.55	1.527+000	-226.22
1.55	5.665-006	-70.87	3.835-006	-135.03	1.477+000	-205.91
1.60	3.732-006	-61.91	2.569-006	-114.89	1.452+000	-176.81
1.65	2.747-006	-45.28	1.733-006	-92.68	1.585+000	-137.96
1.70	2.461-006	-28.09	1.203-006	-68.37	2.045+000	-96.46
1.75	2.468-006	-17.41	8.815-007	-42.93	2.799+000	-60.34
1.80	2.502-006	-12.72	6.874-007	-18.31	3.640+000	-31.03
1.85	2.477-006	-11.46	5.617-007	-3.72	4.410+000	-7.74
1.90	2.385-006	-11.89	4.686-007	-22.48	5.090+000	10.59
1.95	2.244-006	-13.05	3.912-007	-38.12	5.737+000	25.37
2.00	2.076-006	-14.41	3.234-007	-51.03	6.419+000	36.61
2.05	1.896-006	-15.68	2.635-007	-61.53	7.197+000	45.84
2.10	1.719-006	-16.71	2.115-007	-69.79	8.125+000	53.08
2.15	1.551-006	-17.42	1.678-007	-75.85	9.246+000	58.44
2.20	1.399-006	-17.81	1.322-007	-79.65	1.058+001	61.84
2.25	1.263-006	-17.92	1.043-007	-81.11	1.211+001	63.18
2.30	1.143-006	-17.82	8.332-008	-80.32	1.372+001	62.50
2.40	9.467-007	-17.22	5.794-008	-74.01	1.634+001	56.80
2.50	7.957-007	-16.49	4.586-008	-67.00	1.735+001	50.52
2.55	7.328-007	-16.15	4.201-008	-64.67	1.744+001	48.51
2.60	6.765-007	-15.87	3.876-008	-63.19	1.745+001	47.32
2.65	6.257-007	-15.63	3.580-008	-62.33	1.748+001	46.75

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 10.00 K = 2.0 Z = 0.0 B/H = 0.25

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
2.70	5.797-007	-15.42	3.301-008	-62.02	1.756+001	46.60
2.75	5.379-007	-15.25	3.036-008	-61.94	1.771+001	46.69
2.80	4.997-007	-15.10	2.786-008	-61.98	1.793+001	46.88
2.85	4.648-007	-14.96	2.552-008	-62.05	1.821+001	47.09
2.90	4.329-007	-14.84	2.336-008	-62.10	1.853+001	47.26
2.95	4.036-007	-14.73	2.138-008	-62.11	1.888+001	47.38
3.00	3.768-007	-14.62	1.958-008	-62.05	1.924+001	47.44
3.10	3.294-007	-14.41	1.648-008	-61.80	1.998+001	47.39
3.20	2.893-007	-14.22	1.397-008	-61.45	2.071+001	47.23
3.40	2.258-007	-13.88	1.022-008	-60.77	2.209+001	46.88
3.60	1.789-007	-13.60	7.632-009	-60.25	2.344+001	46.65
3.80	1.436-007	-13.37	5.791-009	-59.85	2.480+001	46.47
4.00	1.166-007	-13.18	4.458-009	-59.50	2.616+001	46.33

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 10.00 K = 5.0 Z = 0.0 B/H = 0.25

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
0.00	0.000+000	0.00	8.209-006	-52.29	0.000+000	52.29
0.02	5.933-007	-34.33	8.168-006	-52.49	7.264-002	18.16
0.04	1.175-006	-34.71	8.047-006	-53.10	1.460-001	18.39
0.06	1.733-006	-35.34	7.849-006	-54.12	2.208-001	18.76
0.08	2.258-006	-36.22	7.581-006	-55.56	2.979-001	19.35
0.10	2.741-006	-37.35	7.249-006	-57.45	3.781-001	20.10
0.15	3.711-006	-41.23	6.206-006	-64.31	5.979-001	23.03
0.20	4.294-006	-46.82	5.006-006	-74.81	8.578-001	28.00
0.25	4.485-006	-53.98	3.842-006	-90.11	1.167+000	36.13
0.30	4.341-006	-62.82	2.900-006	-111.64	1.497+000	48.82
0.35	3.953-006	-73.43	2.307-006	-139.36	1.713+000	65.92
0.40	3.429-006	-85.93	2.053-006	-168.99	1.670+000	83.05
0.45	2.865-006	-100.45	1.980-006	164.74	1.447+000	-265.18
0.50	2.334-006	-117.07	1.928-006	142.90	1.211+000	-259.97
0.55	1.881-006	-135.74	1.826-006	124.18	1.030+000	-259.91
0.60	1.522-006	-156.05	1.665-006	107.26	9.138-001	-263.31
0.65	1.251-006	-177.25	1.466-006	91.29	8.535-001	-268.54
0.70	1.048-006	161.65	1.250-006	75.83	8.387-001	85.85
0.75	8.892-007	141.42	1.036-006	60.50	8.586-001	80.92
0.80	7.573-007	122.49	8.380-007	45.24	9.036-001	77.26
0.85	6.417-007	104.94	6.642-007	29.94	9.660-001	75.01
0.90	5.376-007	88.67	5.171-007	14.54	1.040+000	74.13
0.95	4.438-007	73.52	3.963-007	-0.97	1.120+000	74.49
1.00	3.603-007	59.36	2.994-007	-16.61	1.203+000	75.97
1.10	2.249-007	33.69	1.648-007	-48.30	1.365+000	81.99
1.20	1.296-007	11.47	0.685-008	-80.62	1.493+000	92.09
1.30	6.812-008	-6.51	4.405-008	-113.76	1.546+000	107.25
1.40	3.178-008	-17.43	2.159-008	-148.18	1.472+000	130.75
1.50	1.319-008	-11.81	1.032-008	175.37	1.277+000	-187.18
1.55	8.997-009	2.89	7.121-009	156.11	1.263+000	-153.22
1.60	7.449-009	22.04	4.937-009	136.08	1.509+000	-114.04
1.65	7.298-009	35.92	3.462-009	115.39	2.108+000	-79.47
1.70	7.440-009	42.56	2.474-009	94.34	3.008+000	-51.77
1.75	7.432-009	44.75	1.807-009	73.47	4.113+000	-28.72
1.80	7.206-009	44.69	1.349-009	53.41	5.341+000	-8.72
1.85	6.807-009	43.63	1.023-009	34.70	6.651+000	8.93
1.90	6.304-009	42.23	7.826-010	17.71	8.055+000	24.53
1.95	5.755-009	40.86	5.983-010	2.59	9.619+000	38.27
2.00	5.205-009	39.71	4.542-010	-10.56	1.146+001	50.28
2.05	4.683-009	38.87	3.407-010	-21.67	1.375+001	60.54
2.10	4.205-009	38.37	2.516-010	-30.55	1.671+001	68.92
2.15	3.779-009	38.17	1.829-010	-36.86	2.066+001	75.03
2.20	3.404-009	38.22	1.313-010	-40.04	2.592+001	78.26
2.25	3.077-009	38.45	9.436-011	-39.34	3.261+001	77.79
2.30	2.793-009	38.79	6.981-011	-34.31	4.001+001	73.10
2.40	2.328-009	39.55	4.794-011	-16.91	4.857+001	56.46
2.50	1.966-009	40.21	4.227-011	-5.76	4.650+001	45.98
2.55	1.812-009	40.48	4.035-011	-3.75	4.492+001	44.24
2.60	1.674-009	40.70	3.820-011	-3.14	4.383+001	43.84
2.65	1.549-009	40.89	3.577-011	-3.30	4.331+001	44.19

Table 2
FIELD CALCULATIONS FOR A BURIED MAGNETIC DIPOLE
VERTICAL DIPOLE

H = 10.00 K = 5.0 Z = 0.0 B/H = 0.25

D	P	PHASE(P) IN DEGREES	Q	PHASE(Q) IN DEGREES	P/Q	PHASE(P/Q) IN DEGREES
2.70	1.435-J09	41.05	3.317-011	-3.80	4.328+001	44.85
2.75	1.332-J09	41.19	3.052-011	-4.39	4.363+001	45.58
2.80	1.237-009	41.32	2.794-011	-4.92	4.428+001	46.24
2.85	1.151-009	41.43	2.551-011	-5.32	4.512+001	46.75
2.90	1.072-009	41.55	2.326-011	-5.55	4.609+001	47.09
2.95	9.993-010	41.65	2.121-011	-5.63	4.711+001	47.28
3.00	9.329-010	41.76	1.938-011	-5.58	4.814+001	47.34
3.10	8.158-010	41.95	1.627-011	-5.26	5.013+001	47.21
3.20	7.166-010	42.13	1.379-011	-4.83	5.198+001	46.96
3.40	5.597-010	42.44	1.011-011	-4.14	5.538+001	46.58
3.60	4.436-010	42.70	7.553-012	-3.68	5.874+001	46.39
3.80	3.562-010	42.92	5.733-012	-3.33	6.213+001	46.25
4.00	2.893-010	43.10	4.415-012	-3.02	6.552+001	46.12

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		ROLE	WT	ROLE	WT	ROLE	WT
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