AN INQUIRY INTO POWER

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An inquiry into ambient magnetic field strengths has been conducted. The potential associations of these findings with the HAARP facility is also to be discussed. If readers wish to avoid the technical aspects of this study, it is my hope that the basis for the study will at least be generally examined. Any revisions to this study will be made as they are appropriate.

The primary result of this study is an understanding of the immense amount of energy available from the HAARP project, and the very real potential of that facility to affect, as an absolute minimum, human biology, physiology, mental and neural functioning.

This study begins with observations of magnetic strength around a series of residential and power lines in a rural location outside of Santa Fe, NM. The effects from any 60Hz power lines become increasingly important to understand when Extremely Low Frequency (ELF) -Very Low Frequency (VLF) detection operations are conducted. A series of observations have been taken in the vicinity of the residential use of the directional loop antenna, in an effort to account for any influence from the 60Hz power line. A series of tests conducted in more remote locations to remove these influences has also been conducted.

The first questions that are helpful to ask in this study are: - How strong should the magnetic field around a rural residential power line be? How far away can it and should it be measurable? How strong should the electrical field be around these wires, and how far away can it be expected to have an influence? At what distance is the biological effect from these ELF waves of no further consequence? It is of most benefit if any analytical result is further supported with direct measurements; this will be the case within this study.

The strength of the magnetic field around a line (wire) of current is given as[1, 2, 5]:

(1) $B = (u_o * I) / (2 * pi * r)$

where B is the magnetic field strength in teslas, u_o is permeability of free space, provided[1] as $4 * pi * 10^{-7}$ H/m. (henry/meter),

I is the current flowing through the wire in amperes, and r is the perpendicular distance from the wire in meters.

The next information that is helpful in this course of study is the relationship between the maximum electrical field strength and the maximum magnetic field strength. This relationship is provided with respect to the maximum field strengths as[3]:

(2) $E_{max} = c * B_{max}$

where E is the electrical field strength in Volts/ meter (V/m), c is the speed of light in meters/sec, and B is the magnetic field strength in teslas.

Therefore, for a line of current we have the electrical field strength as:

(3) $E_{max} = (c * u_o * I) / (2 * pi * r)$

Now, what interests us most is not the electrical field strength in V/m, but the electrical field intensity in units of watts per square meter. This quantity is physically more understandable, as it represents the power density, or the amount of power passing through a unit of area. The electrical intensity of a plane electromagnetic wave is

therefore given as :

(4) $Int = (c * e_o * E_{max}^{2}) / 2$

where Int = the electrical intensity of the electromagnetic wave in W/m^2(watts per square meter) and e_o is permittivity of free space, given as[4] $8.85 * 10\text{-}12\ C^2 / N\ m^2$.

We therefore have:

(5) $Int = (c * e_o * [(c * u_o * I) / (2 * pi * r)]^2) / 2$

and if we would like to convert this equation so that r is measured in feet, we can simplify and rearrange the equation to the form:

(6) $Int = 5145 * I^2 / r_{ft}^2$

and if we would like to further solve for r expressed in feet or miles as a function of the electromagnetic wave intensity in terms of microwatts per square centimeter, we are led to:

(7) $r_{ft} = 71.73 * I / Int_{uW}^{1/2}$

(8) $r_{mi} = .0136 * I / Int_{uW}^{1/2}$

This gives us a useful equation to estimate the distance in feet or miles from a power line that we should be to reduce the intensity to a desired level, given that the power line is carrying a certain amount of current.

The next question to ask is, what is the desired intensity of the electromagnetic wave that we should seek? At what level of intensity is the effect upon biological systems negligible, or of no known consequence? To help address this question, the following studies published by RFSafe at the following location is helpful : http://www.rfsafe.com. From this reference, we learn of a series of studies involving electrical intensity, or power density, that range from 0.1uW / cm^2 (microwatts per square centimeter) to 120uW / cm^2. These magnitudes will become increasingly important as we later put them into perspective with the capabilities of the HAARP facility. We see that the minimum influence of 0.1 uW/cm^2 has led to reported results of altered EEG waves and that the maximum intensity of 120uW / cm^2 has led to reported pathological changes in the blood brain barrier.

For the sake of this study, let us choose an extraordinarily low value of intensity, and solve for the distance that we should be from the nearest power line to ensure that we are not likely to incur any measurable electromagnetic effect. Let this value be 0.02 uW/cm^2, an exceptionally low value. Furthermore, let the current in the wire range from 1 to 100 amps. At this point of research, no references have been found that indicate that 100amps of power is ever exceeded in any rural power line system. A maximum of 60amps in rural residential areas appears to be likely, with a usual amount at a much lower value. Applying the result obtained above:

Expected Distance vs. Current From Power Line to Reduce Intensity of Radiation to .02uW/cm_2:

Distance from	Power Density with	Power Density with	Power Density with	Power Density with Current in

Power Line r (feet or miles)	Current in Power Line I = 1 amp	Current in Power Line I = 5 amps	Current in Power Line I = 60 amps	Power Line I = 100 amps
r_{ft} = 507 feet	.02uW/cm^2			
r_{ft} = 2536 feet		.02uW/cm^2		
r_{mi}= 5.77miles			.02uW/cm^2	
r_{mi}= 9.62 miles				.02uW/cm^2

This chart is helpful in that in allows us to estimate, under the most extreme of circumstances, how far we need to be from a power line to reduce its effect to being of no consequence of measurement or influence upon this study. In practice, much lower magnitudes of current exist in this rural region, and this chart can be viewed in a conservative fashion from that standpoint.

The next stage in this study was to travel to an electromagnetically quiet area in this rural environment, the San Cristobal Ranch located approximately 30 miles southeast of Santa Fe, NM. This rural location covers a vast region in which no significant power line infrastructure is visible.

As another point of reference, the magnetic field strength that would be measured that corresponds to the .02uW/cm2 intensity above is approximately .01milligauss(mg). The equipment available to measure the strength of the local AC magnetic field is a Cell Sensor EMF Detection Meter. This particular gaussmeter has a high sensitivity range of 0 to 5 mg (milligauss) (1 gauss = 1E-4 teslas). The meter can easily be read to 0.1 mg at the lower end of the high sensitivity scale. A value of .01mg is so low as to be irrelevant to this measurement device.

The ambient magnetic field in this location was measured at 0.2mg. Numerous other readings were taken at isolated locations, all leading to the same result of an ambient field of approx. 0.2mg. The nearest visible power line structure at the location of the readings is a minimum of 10 miles distant.

The result of this finding is that an ambient and measurable magnetic field strength appears to exist, even when sufficiently isolated from any known power infrastructure influence. It is this measured ambient magnetic field which is of interest and concern in this study, especially as it relates to the numerous ELF-VLF variations which have recorded over time by this researcher. The published ELF activities by the HAARP facility are also a concern within this study.

The next step in this project is to determine the electrical field strength that is associated with the ambient magnetic field strength of 0.2mg.

From (2), Emax = (3E8m/s) * (0.2E-7T) = 6V/m.

The next step is to determine the intensity of the field from (4):

(4) Int = (c * e_o * E_{max}^{2}) / 2

Int = (3E8m/s * 8.85E-12 C^2 / N m^2 * (6V/m)^2) / 2 = .048 W/m^2 = 4.8uW/m^2 = approximately 5uW/cm^2.

A value of 5uW/cm^2 is sufficient to attract our interest. If one were to evaluate the series of electromagnetic power density studies that have been referred to earlier, it can be seen that a host of biological effects have been reported at levels at or beneath 5uW/cm^2. These reported effects range from the minimum to slowed visual and

memory functions as well as impaired nervous activity. It would be worthwhile for readers to review these tabulated results at this linked location.

This being said, the final objective of this report is to consider such ambient power levels and their potential associations with the HAARP facility.

The next requirement is to investigate the HAARP literature itself, as reported under the auspices of the U.S. Navy Research Laboratory on the page entitled The Safety of ELF Fields Generated in the Ionosphere, where we read the following statement:

"The process of generating ELF within the ionosphere is very inefficient (the conversion efficiency is about 10^{-8})."

Let us take a second look at this statement. The HAARP facility presents this statement to the public in a forward direction, that is, given an original power level, what is the small level of ELF that results. I would suggest that, along with measured values, we apply this statement in reverse to see where it leads us.

If there does exist an ambient electrical intensity of .048W/m2, and if we were to assume this originates from the HAARP facility, and we were to apply this "inefficient" conversion factor, we are led to an original power level of (.048W/m2 * 1E8) = 4.8MW, or approximately 5 million watts of power. This appears to be an extremely reasonable number which is well in accord with the nominal power levels of the HAARP facility. This power level is 100 times greater than that of any commercial broadcast station in the United States. It is therefore not unreasonable to consider that such an ambient field strength could indeed result from the HAARP facility, along with the reported effects upon biology and physiology in the literature.

The capstone to this investigation is to ask another question. If we were each to take a look at the Executive Summary Document for the HAARP literature published by the United States Air Force, it would declare that the design considerations of the HAARP facility have the stated objective of transmitting over 1 billion watts of power into the ionsophere. In fact, numerous sources state that a maximum level of 3.6 billion watts of power has already been achieved. This is 72,000 times more power than that of any commercial U.S. broadcast station. But let us remain conservative, and use the stated design goal of 1 billion watts.

What is the effect of this power, after applying the "inefficient" conversion factor, upon the human biology and physiology? What would occur if this maximum level of power was used?

This power level translates to (1E-8) * (1E9watts) = 10 Watts of ELF energy.

With the ability to be transmitted across the globe through the magnetic field lines of the earth, this would lead to an expected value of approximately 1000uW/cm^2 if assumed to be uniform and if we disregard the attenuation of the energy. The attenuation of ELF energy is extremely low. From the power density studies referenced, this is a horrendous amount of ELF energy and the biological studies clearly establish a basis for concern, if not alarm. Thestudies above reference a maximum field of 120uW/cm2, with the corresponding effect of a "pathological change in the blood brain barrier" (Salford 1993).

At what point do you have "concern"?

And at what point are you alarmed?

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