Before the
Federal Communications Commission
Washington, DC 20554

In the Matter of	}	
	}	
Revision of Part 15 Rules of the Commission's	}	
Rules Regarding Ultra-Wideband	}	ET Docket No. 98-153
Transmission Systems	}	

Reply Comments of Dwain K. Butler, PhD

Dwain K. Butler, submits these additional reply comments in response to the Notice of Proposed Rule Making (NPRM), FCC 00-163, and the request for comments on testing (performed by NTIA and others) in the proceeding referenced above. These comments address the most recent submissions provided to the FCC under this docket, including recommendations and conclusions made in submissions by others suggesting continued rule making in this proceeding and proposed changes to Part 15 rules.

I want to reiterate some of my previous comments regarding this proposed rule making issue and to state my full agreement with and endorsement of comments submitted by Dr. Gary R. Olhoeft, Professor, Colorado School of Mines.

The key distinguishing features of the geophysical systems are (1) the systems are closely ground-coupled, (2) low power output, (3) limited duty cycles, (4) some of the systems are shielded to prevent radiation into the air, and (5) the numbers of systems in use worldwide are small. Most of the geophysical systems are operated on the ground surface or within 1-2 m of the surface. The classes of geophysical survey systems (methods), that might potentially be included under the broadest umbrella of the NOI, include ground penetrating radar (GPR), frequency domain electromagnetic (FDEM) induction, and time-domain electromagnetic (TDEM) induction.

While these geophysical systems have a very broad range of significant applicability, the primary areas can be summarized as follows (Federal agencies in parentheses have significant vested interest in continued, ready availability of these geophysical methods):

a. Natural resources exploration and assessment, including strategic ore deposits and ground water (USGS; DOE; COE);

b. Subsurface geology mapping, for various uses, including input to groundwater and contaminant transport modeling (EPA; USGS; COE);

c. Foundation assessment for construction projects (all, but particularly COE, USBR, DOT/FHWA);

d. Environmental cleanup and restoration, including soil and groundwater contamination (EPA; DOE; DOD; USDA)

e. Military-specific applications (DOD; DOE)

--cavity and tunnel detection (including clandestine tunneling and underground facilities)
--unexploded ordnance detection and cleanup
--landmine detection, including humanitarian de-mining
--water supply

f. Archaeological/cultural resources detection and mapping (artifacts and graves)

g. Forensic studies to aid law enforcement agencies (e.g., drug caches and clandestine burials) (FBI; DEA; ATF)

h. Natural disaster response for damage assessment and survivor rescue (COE; USGS; FEMA)

i. Infrastructure (e.g., roads, bridges, buildings, airfields) assessment, including the techniques known as non-destructive testing (COE; USAF; DOT/FHWA/FAA)

See the comments by Gary R. Olhoeft for a more detailed list of applications.

I consider the use of the above classes of geophysical survey systems (methods) for applications such as foundation assessment at construction sites, environmental cleanup and restoration, unexploded ordnance and landmine detection, and infrastructure assessment to be mission-critical and of national importance. I view any restrictive regulation of the subject geophysical methods as potentially crippling to solution of nationally significant problems and requirements

For example, as much as 25 million acres of land may be contaminated with unexploded ordnance (UXO), with an attendant cleanup cost of up to $84 billion, not including active military ranges (UXO Report to Congress, March 2001). The location of buried UXO requires geophysical surveys, and the predominantly used digital geophysical survey method for this application is TDEM induction. Restrictive regulation of electromagnetic geophysical systems will greatly complicate an already large and extremely difficult task, with accompanying increased safety risks and cost.

I know of no reported cases of interference with communications or other types of electronic systems. It is common, however, for nearby electromagnetic emitters to interfere with the geophysical systems. Due to accurate positioning requirements, the recent thrust for all electromagnetic geophysical systems requires the use of GPS receivers that are mounted directly on the systems, typically within one-meter distance.

In summary, the subject geophysical systems are all low power, closely ground-coupled, and few in number. The geophysical systems make significant contributions to solution of nationally important requirements and problems. The 2000 report of the National Research Council Committee for Non-Invasive Characterization of the Shallow Subsurface for Engineering and Environmental Applications, known as the SITE Committee, documents the many applications of geophysical methods and outlines the future potential of the methods for increasingly significant contributions to important national problems.

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