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To Whom It May Concern:

<u>Prof. Dennis Mileti *Ex Parte* Meeting Notes</u>
FCC team from the Public Safety and Homeland Security Bureau: Gregory Cooke (Associate Division Chief), James Wiley (Attorney Advisor), Steven Carpenter (Cybersecurity Engineer), Behzad Ghaffari (Electrical Engineer), Rasoul Safavian (Electrical Engineer), Carolynn Shillingburg (Legal Intern).

The Public Warning Potential of the WEA System
The WEA system, with updates and revisions, holds unequalled potential to grow into a system that could solve many of the nation's public warning problems documented in social science warning research over the last six decades. It deserves to be taken very seriously, nurtured, studied, revised, and grown such that it emerges as the nation's premier and most effective warning system in the 21st century and beyond. It has long been known in the social sciences that the most effective way to provide the public with a warning message that motivates their timely protective action response is for a police officer, in uniform, to knock on people's front door to deliver a warning that tells people exactly what to do, why, and that the message is indeed intended for them. The WEA system holds the potential to accomplish the same thing electronically, but it can reach the masses in seconds (police officers move more slowly).

Milling Behavior
Reality for human beings is what people "think" is real. Human mental constructs of reality relate to "objective" reality to the extent that personal objective experiences shape perceptions. But most people rarely, if ever, experience extreme events in the form of natural and other disaster types. The result is that most people do not perceive risk. Instead, most think they are safe from nature and other violent forces. Research into human risk perception concludes that most people think disasters will not happen in the near future, and if they do, that they will happen to someone else and not to them. The rare exceptions are found in human populations that "repetitively" experience disasters, for example, human settlements along rivers that frequently flood. The general inclination is that most people go through their lives believing that they are safe. This poses a large problem for those who might issue public disaster warnings regardless of how warnings are distributed, including WEA messages. Warnings must overcome people's natural belief to think that they are safe, and then guide them to take protective actions that are inconsistent with their perceptions of safety. This is the *prime pubic warning challenge*.

There is elaborate research-based empirical evidence on the topic of what it takes for warnings to help people to shed their safety perceptions and then take timely and effective protective actions.

Here is what has been learned. People do not immediately respond to early warnings because they first engage in *milling* behavior. That is, they "search" for additional information and to "confirm" that they are really at risk and, if so, what to do about it. This search response happens despite the technology used to give warnings including messages delivered over the WEA system. Searching is a social phenomenon. It involves talking things over with others and seeking to hear the same warning over and over and from different sources before safety perceptions are relinquished. Warned people turn to friends, relatives, and strangers to determine if they agree that risk is present and if protective actions are warranted. *This process--constructing new perceptions of risk out of existing perceptions of safety--adds time before protective actions are taken, it is fundamental to human beings worldwide, and it simply is not going to change.* Public warnings work best when they facilitate the process and speed it along to minimize delay in public initiation of taking a protective action. Ignoring this basic human element in providing public disaster warnings has and will continue to cost human lives. Moreover, *milling* also includes providing informal notification as people communicate with friends and intimates to make sure they know about the impending event. The ***key*** improvement needed in the nation's WEA system is to update the system such that it reduces public *milling* after receipt of a warning, particularly after the first warnings received for imminent events in which public response delay can cost lives, and increase injuries and property damage.

Updates to the WEA System that May Reduce Milling

The existing WEA system (much like wailing air raid sirens) well accomplishes the purpose of *alerting* (getting people's attention) the pubic. It may do little, however, at motivating the public to initiate taking a self-protective action. At best, it likely motivates people to begin *milling* behavior (delay protective action taking) as people seek additional information from other warning sources. Recent research findings in the START report on WEA messaging include a revolutionary finding: public WEA warning messages, if properly revised, may hold the potential to reduce milling and encourage the public to more rapidly initiate self-protective actions in imminent risk events than may now be the case. The following revisions to the existing WEA system seem warranted to accomplish that mission.

- <u>Expand the length and substantive content of WEA messages</u>. The START report(s) provides clear evidence that 90, 140, and 360 characters long WEA messages do not reduce public protective action response time (milling); clear evidence is also provided that longer and complete messages of 1,380 characters (messages which provide the information people typically go in search of when they mill), may shorten the time people mill and delay initiating a protective action.
    - *Note that additional research may be needed to determine if there is an optimal length for WEA messages less than 1,380 characters but more than 360 characters that can accomplish what is accomplished by 1,380 characters long messages.*
    - Illustrations of the most effective substantive content in a 1,380 characters long WEA message (as well as shorter length messages) are provided in the START report. The five topics now covered in a 90 characters long WEA message are the correct topics but more needs to be said about each (see the START report) to reduce milling.

- Written templates for future WEA messages for the more than 40 hazard types for which WEA message might be used in the future (both 360 and 1,380 characters long messages based on social science warning research evidence should be developed.

- Include High Information Maps in WEA Messages. The START report also provides clear evidence that providing the public with WEA messages that contain a map that illustrates to the receiver the physical area at risk, the area not at risk **and** a flag post with the word **YOU** that identifies the physical location of the warning recipient has great potential to reduce milling and public delay time in initiating a protective action. Such a map may have this positive effect because it clearly illustrates that the message is actually intended for the person who receives it thereby eliminating the need for a recipient to spend time milling to determine is the warning is actually intended for them.

- Include a URL that Contains a 1,380 Characters Long Message that People Could Easily Access if the Next Generation of WEA Messages are Limited to 360 Characters. If the next generation of WEA messages were limited to 360 characters (identified in a subsequent START report as too few characters to reduce milling/delay time), then it would be a sound practice to provide WEA message recipients with quick access to a URL on their cell phones that contained a full content message of 1,380 characters. Doing so may reduce public milling and protective action taking delay time.

- Refine the Geo-targeting of WEA Messages. It would be desirable to only issue WEA messages to people at risk rather than to people at risk and vast numbers of people not at risk. Once put into operation (and people in the country came to know about this increased WEA message refinement), it is quite likely that milling after a received WEA message would decrease since people would not need to determine if they are in the intended audience for the WEA.

- Build the Reputation of the WEA System with the American Public. Despite the fact that most public warning message writers search for a *credible* source for the messages they issue, there simply is no single credible source and searching for one is like searching for the Holy Grail. The reason this is so is because source credibility varies greatly based on diversity in the population for whom a warning is targeted. The most credible source for a public warning is likely a local source, and the most credible local source is a fire chief (but even local fire chiefs are only credible for about a third of the typical American population). Hence, it is important to build the reputation, credibility, and trust in the American population of the WEA system itself. This will require that it be addressed head-on and adequately staffed and funded. The target need not go much further than reaching the level of trust and credibility the American public once had for Civil Defense radio broadcasts. Building the reputation of the WEA system itself may reduce milling.

- Deliver WEA Messages Repeatedly. People are more likely to take a protective action (versus engage in other activities such as milling) if they receive a warning multiple

times. Delivering WEA messages repeatedly could prompt the public to take protective action sooner rather than later. Repeated WEA message delivery, however, might best not be practiced until such time that they can be delivered to fine geo-targeted audiences as repeated delivery to people not at risk could seriously erode the reputation of the WEA system.

Measuring Milling

Milling is only one of three basic sets of reasons why the public may delay initiating a protective action after a warning is received. For example, protective action initiation delay includes engaging in activities to prepare to take a protective action, e.g., gathering essential items and packing the car prior to evacuation; and engaging in social activities to facilitate taking a protective action, e.g., people are reluctant to evacuate until family members are reunited. Hence, measuring milling in an actual warning event would require that it be distinguished from other reasons for protective action initiation delay.

- Measuring Time Quantitatively (Plotting Protective Action Initiation Delay Curves). Empirical study of an actual warning event can include interviewing members of the public to ask the time when they received their first WEA during that event and the time when they initiated taking a protective action. The resulting quantitative data would then be used to plot a population public protective action initiation delay curve. Many such curves exist in the social science research literature. It is important to keep in mind that these curves represent the cumulative effect of more than delay due to milling.

- Measuring Activities (Taken Prior to Protective Action Initiation) Qualitatively. Empirical study of an actual warning event could also ask the pubic questions about what they did after receipt of a WEA message and initiating a protective action. Enough is already known about the range of different activities that people might take in this time interval to simply create a list of activities (many of which would include milling activities) to ask interviewees about.

- Event Synthesis. If performed on a statistically representative sample of the warned population, the quantitative and qualitative information described above could then be used to learn much about the milling activity of members in a particular public during a particular WEA warning event.

- Cross-event Synthesis. Well over 100+ quantitative studies current exist in the research record regarding public response to received warnings of imminent risks. This research record could be reviewed to determine what already exists on the topic of milling regarding the quantitative and qualitative aspects of milling.

The Important but Limited Role of Public WEA Education

Substantial research exists in the social science research record on public response to warning. The overall general conclusion is that pre-event public education is useful to familiarize the

public, among other things, with warning technologies and approaches that may be used in the future. However, pubic behavior during an actual warning event is influenced much more by the information the public is provided during the event than by information distributed in pre-event public education campaigns. The prime objective of WEA public education should be to familiarize the public with the system, and to grow public trust and confidence in the system.

Thank you,

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