

Before the  
Nuclear Regulatory Commission

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In the Matter of )  
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10 CFR Parts 50 and 52 )  
Enhancements to Emergency )  
Preparedness Regulations; Proposed Rule )  
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Year 2009

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To Commission

OFFICE OF SECRETARY  
RULEMAKINGS AND  
ADJUDICATIONS STAFF

INITIAL COMMENTS OF GLOBAL SECURITY SYSTEMS, LLC

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Dated: August 4, 2009

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Rule )

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**To Commission**

**INITIAL COMMENTS OF GLOBAL SECURITY SYSTEMS, LLC**

Global Security Systems, LLC (“GSS” or “Company”), pursuant to Request for Submission of the Nuclear Regulatory Commission, hereby respectfully comments on the Commission’s Request for Submission for Comments on the Proposed Rule, released on May 18, 2009, concerning the enhancements to Emergency Preparedness Regulations.

**I. INTRODUCTION**

GSS commends the Commission for taking in issuing the request, “a significant step towards implementing one of [its]...highest priorities – to ensure that all Citizens have the capability to receive timely and accurate alerts and critical information regarding impending disasters and other emergencies irrespective of what communications technologies they use.” In taking this step, the Commission must give close and careful consideration to proven technologies that can and are being efficiently and effectively

adopted in the wireless context. Doing so will further ensure that the Commission's announced goal of ensuring "a robust, reliable and effective Emergency Alert System..." is attained. In that regard, GSS notes that the Commission explicitly seeks information on whether the Emergency Alert System-related requirements that it advances can be effectively implemented "using a myriad of current and future technologies." Building on proven current technologies is, in GSS' view, the most efficient way to expeditiously make an effective Emergency Alert System a working reality.

## **II. GSS' DIRECT INTEREST IN THE OUTCOME OF THIS PROCEEDING**

GSS has a strong interest in the outcome of this proceeding both as a direct participant in the development of the Emergency Alert System proposed rule reflected in the Federal Register and as the developer and operator of existing systems to address the emergency alert requirements of first responders and other interested parties.

### **A. GSS Has Actively Participated In The Development Of The Commission's Emergency Alert System Proposal On A Number Of Levels**

- GSS has participated, both directly, and indirectly as a member of the National Association of Broadcasters, from the docket's early stages. The Committee was expressly tasked to recommend system enhancements and technical recommendations for Emergency Alert System.

### **B. GSS Also Has Been Directly Involved In The Development Of Existing Emergency Alert Technologies** – GSS was formed in 2002, but

its founders have been involved in the development of emergency alert technologies since the mid-1980s. In 1985, the future founders of GSS became involved with the technology

called numeric MBS protocol, the predecessor to the Radio Data System (“RDS”) and the Radio Broadcast Data System (“RBDS”). The GSS founders played a substantial role in advocating to have RDS become an approved and accepted standard in the United States. In 1993, the RDS standard was introduced as a means of using the FM subcarrier frequencies to broadcast specific information that permits a receiver to tune stations.

Other accomplishments of GSS and its principals over the last 15 years include: working for RDS and RDS approval in the United States; manufacturing the only RDS FM-radio-based data receiver in the United States; installation and testing of that FM-based system, the ALERT FM system, in more than 20 foreign markets; installation of an 11-State system on the Pacific Coast of the United States; and negotiating and signing of the world’s first exclusive arrangement between an equipment manufacturer and a wireless communications carrier to employ the FM-radio-based technology.

Today, GSS’ ALERT FM system incorporates RDS technology to send digital information using conventional FM-radio infrastructure to a targeted audience. ALERT FM is a personal alert and messaging system that enables state and local governments and private sector officials to create and send digital alerts and messages. Potential messages include tornado ALERT , homeland security notices, hurricane evacuation instructions, utility notices, plant or school closings, employee Warnings, and traffic alerts. First responders, school officials, and citizens can receive these alerts and messages based on geographic or organizational groupings through specially designed ALERT FM receivers or any device equipped with a standard FM chip (e.g., wireless phone). The reliability and redundancy of ALERT FM lies in its use of a pre-existing network of FM-radio towers, which in turn provides overlapping coverage of an area.

### **III. THE FOCUS OF GSS COMMENTS: AVAILABLE TRANSPORT TECHNOLOGIES AND LOCAL GOVERNMENT ROLES AS AGGREGATOR**

As an experienced developer of an existing, deployed technology for transporting and delivering personal digital alerts and messages from state and local governments and private sector officials, the focus of GSS comments is on the limitations and capabilities of available transport technologies for use in the Emergency Alert System construct. GSS also provides its observations on the potential Federal, state, and local government and agency roles in a Emergency Alert System , particularly as part of an aggregator concept.

#### **1. The Viability Of Using Point-To-Point**

##### **Technology To Deliver Emergency Alert System Alerts -**

The *Proposed Rule* seeks comment on “to what extent do point-to-point and point-to-multipoint technologies provide viable solutions for an Emergency Alert System ?”

Point-to-point technologies have inherent limitations caused by a number of factors. Point-to-point technology is switched in nature and the messages are sent out sequentially or one at a time. This inherent feature will cause delay or loss of data due to buffer or data channel overload. But “the management of telecommunications capabilities is crucial during disasters that degrade the infrastructure, especially where the infrastructure may have been minimal beforehand. This includes avoiding overload in processing and delivering ALERT messages, prioritization of calls, network management and provisioning, and infrastructure restoration.”

Point-to-point or unicast delivery technologies (i.e. SMS point-to-point, MMS) are not feasible or practical for the support of wireless alerts especially on a nationwide, statewide, or large city scale. Point-to-point will quickly congest a network, resulting in significant message delays or messages not delivered, as well as denying voice service.

**2. SMS Message Overload May Block Voice**

**Services And Lacks Adequate Security - The *PROPOSED RULE***

further specifically asks whether “current generation point-to-point services such as short message service [can] be used to efficiently alert large populations of people within a short time frame.”

There is a physical limit on the rate at which SMS messages can be delivered even on FM-radio channels. Typical rates at which the actual SMS message may be delivered is 2 SMS’s per second per sector. In an emergency, the EMERGENCY ALERT SYSTEM will be surely exceeding this threshold. SMS emergency alert message delivery times will be delayed in such a situation and that delay can exceed 1 hour, and may require a few to tens of hours for delivery.

In severe situations, it is possible that SMS messages will cause interface congestion to the point of blocking voice calls. “By examining major city scenarios, it can be concluded that, if SMS were used extensively during a crisis, a significant SMS load could be placed on a network. Individually, the voice load and SMS load are multiple times higher than the engineered capacity at each sector. This analysis has not considered several factors that might increase load, such as messages originating from other sources (e.g., the Internet) and terminating in the congested area. It has also not considered message re-send attempts after failures, which add to network load.”

There are also genuine security concerns. SMS does not have adequate security to protect Emergency Alert System from spoofing and denial of service attacks. “For mobile terminated national emergency messages it would be possible for spam either from a mobile phone or from the Internet to create malicious emergency messages and cause a panic reaction for many mobile subscribers.” Security limitations may also lead to situations where a denial of service attack includes the “ability to deny voice service to cities.”

### 3. Certain Point-To-Multipoint Technologies

Are An Efficient/Proven Method For Delivering Alerts – Shifting to point-to-multipoint designs, the *PROPOSED RULE* seeks comment on whether “technologies such as cell broadcast provide a viable transport solution for alerts transmitted over the Emergency Alert System.”

In GSS’ experience, broadcast technologies such as FM broadcast with data subcarrier or cell broadcast do provide an efficient delivery mechanism for wireless alerts to large numbers of subscribers. The advantage of such delivery methods is that fewer alerts need to be sent to reach the same number of subscribers. As noted above, in a point-to-point system, a single message only reaches one subscriber, but in a point-to-multipoint system, a single message will reach many subscribers and will cause less network congestion. Figure 1 below illustrates this point by comparing the length of time it takes an alert to reach a subscriber by SMS (more than 2.5 hours) compared to a message delivered using cell broadcast (2.5 seconds).

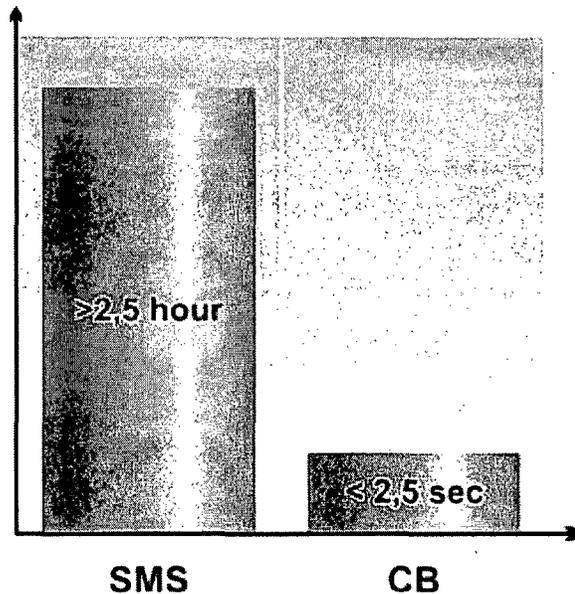


Figure 1 – The delivery time for a message to reach 1 million subscribers.

a. **Radio Broadcast Data Systems Provide An Efficient And Proven Delivery Vehicle For EMERGENCY ALERT SYSTEM Alerts** – The *PROPOSED RULE* next asks

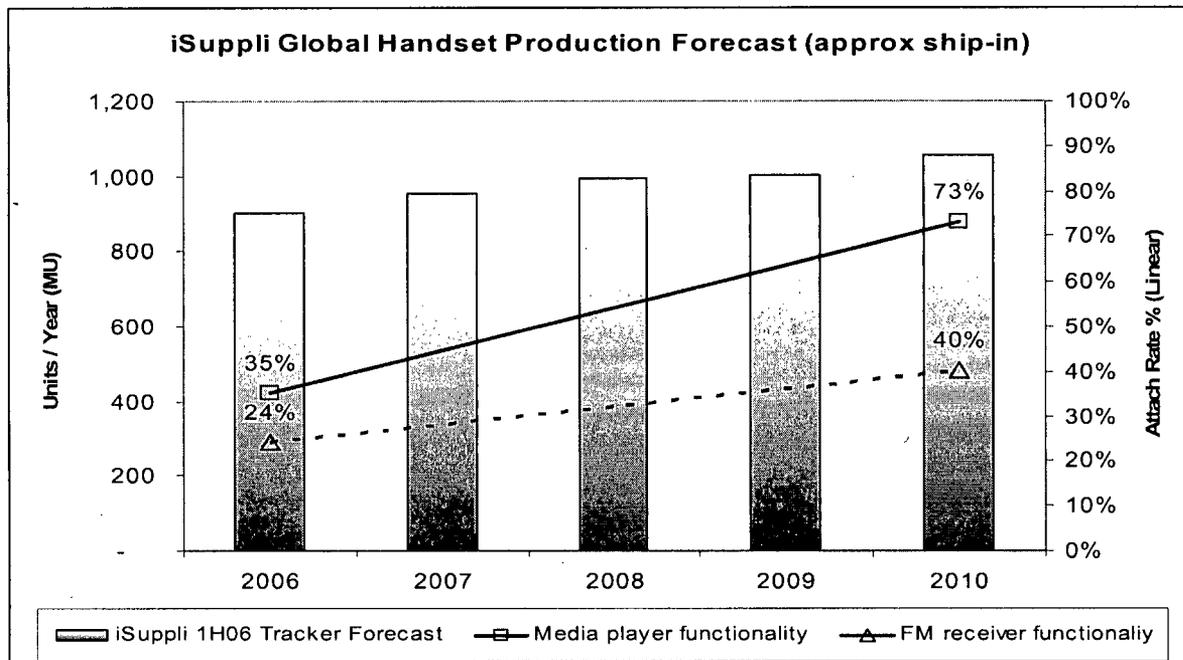
whether “radio data systems like the Radio Broadcast Data System (RBDS), which do not require significant service provider infrastructure, nonetheless meet our goals for efficient delivery of alerts over the ALERT AND WARNING SYSTEM.” In GSS direct and detailed experience, such systems can and are meeting those goals.

In 1985, the technology called numeric MBS protocol, predecessor to Radio Data System (“RDS”) was developed. The broadcasters played a very important role in advocating to have RDS become an approved and accepted standard in the United States. In 1993, the RDS standard was introduced as a means of using the FM subcarrier frequencies to broadcast specific information that permits a receiver to tune stations and was adopted by the FCC shortly afterwards.

Today, RDS technology is incorporated in systems sending digital information using conventional FM-radio infrastructure to a targeted audience. Personal alert and

messaging systems enable state and local government and private sector officials to create and send digital alerts and messages. Potential messages include tornado ALERTs, homeland security notices, hurricane evacuation instructions, utility notices, plant or school closings, employee Warnings, and traffic alerts. First responders, school officials, and citizens can receive these alerts and messages based on geographic or organizational groupings through RDS receivers or any device equipped with a standard FM/RDS chip.

The reliability and redundancy of RDS data delivery lies in its use of a pre-existing network of towers, which in turn provides overlapping coverage of an area. GSS's own ALERT FM system is a proven example of the benefits of such systems. This capability can be employed with wireless handsets through the inclusion of an FM chip in the equipment. Projections for the production of handsets including such capabilities are reflected in the following Figure 2:



Source: iSuppli  
1H06 Market Tracker

**4. Radio Broadcast-Based Systems Can Efficiently Carry Administrative, Authentication, And Authorization Data** – The Commission recognizes that the

“EMERGENCY ALERT SYSTEM proposed by the [Committee Report] likely will require a higher layer protocol” that is able to carry “administrative information...with the alert message and can send authentication and authorization data to the alert’s originator.” The *PROPOSED RULE* seeks comment on “how point-to-point, point-to-multipoint and broadcast models could carry this information and provide the recommended authentication information.”

In the radio-based broadcast models, a multi-tiered protocol is layered into a sophisticated filtering and addressing scheme on both the transmission and receiving ends, allowing for unburdened point-to-multipoint transmissions. Some of the characteristics of an FM-radio-based broadcast alert system, like those developed and deployed by GSS, that are relevant to the Commission’s inquiry are as follows:

- a. Continuous communications between a central location and remote wireless devices (FM-based receivers) distributed throughout the coverage area, with clear text and encryption capability. The system can support non-encrypted devices for public and private use under a separate license agreement.
- b. Web-based administrative portal to control message origination, recipient group creation and management, and sub-administrative capabilities to allow multiple users to use FM-based system. Administrative portals detail message delivery with the time, date and sender.
- c. Single point messaging to multi-point end users simultaneously. This allows alert message sender to reach the entire city, a district, multiple districts or specific neighborhoods with alerts and messages within mere seconds. Messages can also be sent to groups of emergency responders or commanding officers.
- d. The wireless devices will be uniquely addressable allowing communications with a single device, all receivers in a single district or all

receivers in a city and can be reprogrammable from the Command Control Center. FM-based receivers can store up to 30 separate group addresses and 30 separate services, such as automated weather ALERT sent directly to FM-based receivers without action from command centers.

- e. Uses existing FM broadcast network communications network through licenses obtained with FM broadcasters for countywide or citywide coverage footprint. The FM transmitter site is modified without disrupting the existing operations or system integrity. The modification includes the addition of emergency alerting encoder, receive only satellite dish and associated communications equipment. FM stations are selected to ensure fully redundant coverage over served areas.
- f. The propagation characteristics of the FM signal will provide reception inside buildings.
- g. Encrypted messages accessible only on controlled “need to know” basis (programmable over-the-air by Command Center).
- h. Defined geographical layered messaging – Grid Alerts whereby devices shall be able to enter or while within a specific geographic area shall be messaged by means of location specific messages and device knowledge of its location.
- i. Simultaneous reception by target group or subgroups within seconds (defined by receiver battery charge preservation cycle) of transmission. No telephone network capacity issues limiting the number of calls per time frame.
- j. Wireless devices will be able to move between regions and communications areas, within the county, without losing the addressability and message receipt capability. FM receivers automatically tune to strongest FM signal in their location.
- k. Multi-lingual messaging and hard of hearing visual display.
- l. Option to add both SMS and email messaging capabilities out of the same FM-based message portal.

**B. The NRC And Other Governments’ Role In Management Of**

**A Centralized ALERT AND WARNING SYSTEM – The *PROPOSED***

*RULE* seeks comment on the role of Federal, state, and local governments and agencies in the management of the ALERT AND WARNING SYSTEM. The Commission also

inquires as to the potential risks of a centralized EMERGENCY ALERT SYSTEM management system.

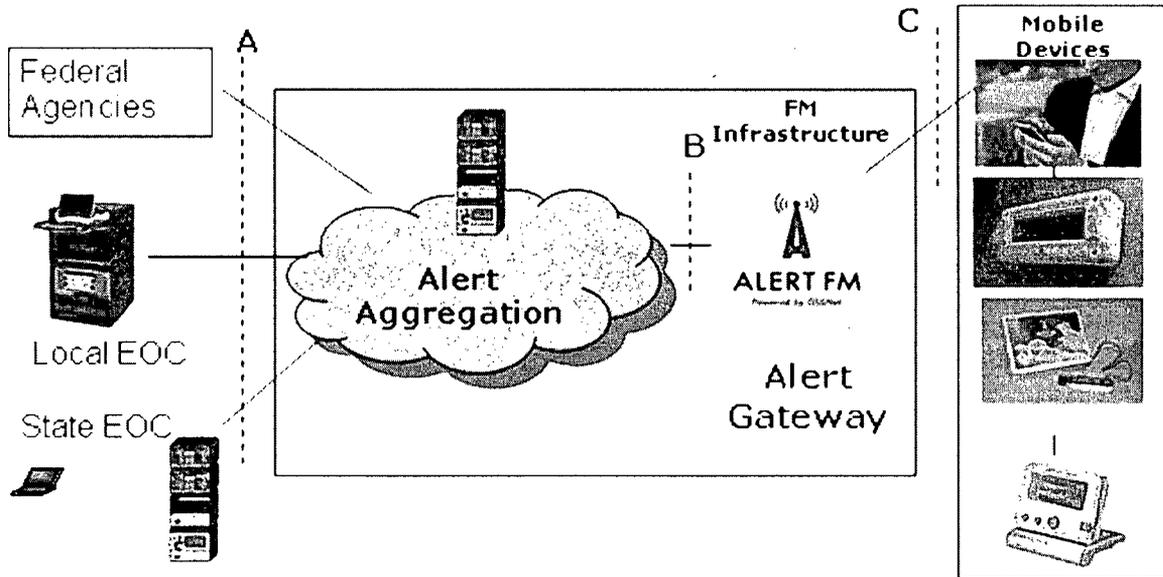
1. **The NRC Government's Role** - The *PROPOSED RULE* should may ask “what should be the NRC Government’s role, if any, in managing the ALERT AND WARNING SYSTEM?” Should the Government fulfill the roles advocated by the Committee Report as “Alert Aggregator and the Alert Gateway?” And if so, “what NRC Government entity would be appropriate.”

GSS strongly recommends that the NRC Government be involved in managing ALERT AND WARNING SYSTEM, but only in conjunction with local and state homeland security and emergency management authorities. Such management is important to the extent that more extensive data is to be delivered as part of the alerts. More extensive data will encumber the system and reduce the message delivery and coverage areas unless managed by a secure alert aggregator.

2. **Involvement Of Other Agencies/Entities** - The Commission also seeks comment on the potential role of “state emergency agencies”, including “state and county emergency operations centers (ECOCs)”, as part of an aggregator concept.

Since emergencies are in most cases inherently local, and the information related to any alert is likely to be generated at the local level, state and local agencies must be involved in the aggregator concept. Such a layered aggregator concept would presumably have to be funded through ALERT Act provision.

Such a layered aggregator arrangement might be configured as follows:



3. **Essential Feature: The Local Portal** - An

essential feature of such a layered aggregator concept, one which is present in the FM-radio-based broadcast alert system developed and deployed by GSS, is a local portal, which permits the aggregator (a) to receive information directly from state and local emergency officials, (b) receive up-to-date information before (i.e., ALERTs), during and after the emergency, and (c) to obtain this information quickly, in accurate and clear form and on a cost effective basis.

The local portal is the gateway for the FM based system that allows emergency management officials to quickly communicate directly with citizens and first responders using a digital network of FM transmitters. Authorized users can login to the portal and create and distribute alert messages to local constituencies. It is also a Web site that contains content, such as local news, online weather information and community public announcements.

The local portal allows the authorized administrator to tailor the alert message to the appropriate audience or groups and deliver the message quickly, clearly and simply.

The administrator can either create its own custom alert messages or to distribute automated alerts from other sources. Automated alerts could include weather, Amber Alerts, or traffic. However the authorized administrator has the option to create his or her own alert message based on the emergency situation.

Groupings of registered receivers of such alerts can be created based on geography and/or organization affiliation. Potential groupings include: emergency management officials, first responders, police, and specific zip codes. Groupings allow authorized administrators to send an alert message to multiple receiving devices at the click of a button. For example, in the middle of the night a tornado ALERT could be sent to a portion of a county notifying those residents of impending danger. Groupings also can allow specific and concrete messages to be sent to targeted areas complimenting existing weather sirens. In the aftermath of a natural disaster or terrorist attack, groupings will allow targeted messages to notify the population of a specific area where to purchase food or fuel. The potential for urgent, efficient, and effective communication is endless.

#### **IV. CONCLUSION**

There are a variety of available transport technologies that might be employed as part of a national ALERT AND WARNING SYSTEM. For the various reasons outlined above, point-to-point technologies are ill-suited to the task, primarily because of inevitable network congestion problems. Point-to-multipoint technologies are a viable alternative, but existing wireless handsets/networks are not yet widely capable of employing them. Broadcast-based (e.g., FM-radio based systems) have demonstrated, proven capability to serve as part of a national ALERT AND WARNING SYSTEM. The NRC Government should play a role in the management of such a system, although in

close coordination with state and local emergency management and homeland security authorities. Candidate NRC government entities to participate should be the NRC Emergency Management Agency or the National Oceanic and Atmospheric Administration. However, state and local emergency agencies should also be involved in a layered aggregator concept. The EMERGENCY ALERT SYSTEM technology should feature the ability of officials generating alerts to tailor and target their messages to key constituencies.

Respectfully submitted,

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Dated: August 4, 2009

## Rulemaking Comments

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**From:** Matthew Straeb [mstraeb@gssnet.us]  
**Sent:** Tuesday, August 04, 2009 11:55 AM  
**To:** Rulemaking Comments  
**Cc:** Matt Straeb  
**Subject:** Global Security Systems Public Comments for Submission NRC  
**Attachments:** Global Security Systems Public Comments for Submission NRC.doc

Please find attached our comments for the subject proposed rule.

We tried to email last night but it was bounced back.

If there is a problem please contact me at 954 850 6606

Best Regards,

Matthew Straeb  
GSS  
Tel: 954 850 6606

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(148.184.100.43) with Microsoft SMTP Server id 8.1.393.1; Tue, 4 Aug 2009  
11:55:00 -0400

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X-SBRS: 4.5

X-MID: 5791099

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Tue, 04 Aug 2009 08:54:54 -0700 (PDT)

Return-Path: <mstraeb@gssnet.us>

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[98.211.231.200]) by mx.google.com with ESMTPS id  
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cipher=RC4-MD5); Tue, 04 Aug 2009 08:54:49 -0700 (PDT)

From: Matthew Straeb <mstraeb@gssnet.us>

To: <rulemaking.comments@nrc.gov>

CC: "Matt Straeb" <mstraeb@gssnet.us>

Subject: Global Security Systems Public Comments for Submission NRC

Date: Tue, 4 Aug 2009 11:54:39 -0400

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