

Ms. Marlene H. Dortch, Secretary  
Federal Communications Commission  
445 12<sup>th</sup> Street SW  
Washington, D.C. 20554

May 15<sup>th</sup>, 2013

RE: PS Docket Nos. 13-75 & 11-60

Dear Ms. Dortch,

On May 13<sup>th</sup>, 2012, I attempted to file the below comments in the above-referenced dockets through the Commission's Electronic Comments Filing System. It has subsequently been called to my attention that only the document's cover page appears in the ECFS records. I am therefore re-submitting these comments to ensure their inclusion in the Commission's record of this proceeding. I respectfully ask that NENA's full comments be considered by the Commission in this matter, notwithstanding these technical difficulties.

Sincerely,

s/ Telford E. Forgety, III; "Trey"  
*Director of Government Affairs*

**Before the Federal Communications Commission**

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*IN RE*

IMPROVING 9-1-1 RELIABILITY

RELIABILITY AND CONTINUITY OF COMMUNICATIONS NETWORKS,  
INCLUDING BROADBAND TECHNOLOGIES

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*ON NOTICE OF PROPOSED RULEMAKING*

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**COMMENTS OF  
NENA: THE 9-1-1 ASSOCIATION**

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NENA: The 9-1-1 Association respectfully submits the following comments in response to the *Notice of Proposed Rulemaking* adopted by the Commission on March 20<sup>th</sup>, 2013.

**COMMENTS**

The 2012 Derecho laid bare many foreseeable, avoidable, and unremediated vulnerabilities in 9-1-1 systems throughout the eastern United States. As a result of that event, millions of people were left without access to effective emergency telephone service for hours or days. Compounding the problem, additional failures left carriers and 9-1-1 system service providers with limited or no visibility into the health of critical network facilities responsible for handling 9-1-1 calls, and Public Safety Answering Points with no idea when 9-1-1 service might be resumed. As the Commission recog-

nized by adopting this *Notice*, 9-1-1 failures of this scope and magnitude must never again be allowed to occur. NENA applauds the Commission’s diligent and thorough investigation of the *derecho*’s effects and their underlying causes, and offers these comments in support of the Commission’s effort to ensure that avoidable failures such as those caused by the *derecho* do not occur in the future.

**I. The Commission must act to ensure the reliability of 9-1-1 service.**

NENA has previously expressed a preference for market- and performance-based incentives over regulatory mandates in the formulation of FCC rules relating to certain aspects of 9-1-1 service provisioning.<sup>1</sup> NENA has also noted, however, that where such incentives fail to produce an outcome consistent with the Commission’s statutory mandate to “promote the safety of life and property,”<sup>2</sup> the Commission should consider imposing more stringent requirements.<sup>3</sup>

As the *Derecho Report* amply demonstrated, the long-established practice of deferring to carriers’ and system-service-providers’ (SSPs’) assurances with respect to voluntary implementation of “best practices” has not produced the intended outcome: Despite the existence of numerous best practices in the areas of 9-1-1 circuit auditing and facilities redundancy, central office backup power, and network monitoring, the *derecho* caused avoidable failures in each of these areas. This finding is all the more troublesome given the relative lack of involvement by the Commission and the public safety community in the formulation of the best prac-

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<sup>1</sup> *E.g.*, *In re Legal and Statutory Framework for NG9-1-1 Services*, Docket Nos. 10-255 & 11-153, National Emergency Number Association, *Comments*, at 7 (Jan. 14, 2013).

<sup>2</sup> 47 U.S.C. § 151 (2012).

<sup>3</sup> *E.g.*, *In re Facilitating the Deployment of Text-to-9-1-1 and Other Next Generation 9-1-1 Applications – Framework for Next Generation 91-1- Deployment*, Docket Nos. 10-255 & 11-153, National Emergency Number Association, *Comments*, at 5 (Jan. 29, 2013).

tices that were clearly ignored: Each of the best practices cited by the Commission in the *Derecho Report* as being left unimplemented by carriers and SSPs who experienced 9-1-1 outages as a result of the derecho was developed by an industry-dominated panel of the Communications Security Reliability and Interoperability Council, or its predecessor, the Network Reliability and Interoperability Council. Thus even though the carrier community presumably factored-in its own economic and competitive needs in the formulation of these best practices, certain of its members did not find it economically efficient to implement them. Based on anecdotal evidence from PSAP and 9-1-1 authority personnel around the country, NENA believes that the members of the carrier and SSP community mentioned by name in the *Derecho Report* are not exceptional cases. That is, NENA believes that the states of the networks that failed as a result of the dercho are broadly representative of the states of carrier and SSP networks nation-wide. Coupled with the scale of the failures experienced by the named entities, this strongly suggests that market- and performance-based incentives are *not* sufficient to induce voluntary compliance with best practices for the provisioning of 9-1-1 service. Consequently, NENA concludes that the Commission must adopt a more prescriptive approach to the regulation of carriers and SSPs responsible for provisioning 9-1-1 service.

NENA does not reach this conclusion lightly, and encourages the Commission to explore a risk-based approach, such as that described below, to the formulation of new requirements for 9-1-1 system reliability. Such an approach could moderate any burdens or unintended consequences associated with the imposition of new prescriptive rules. Additionally, a risk-based approach could provide the public and the public safety community with superior assurances of the reliability of crucial 9-1-1 systems, while tailoring carrier and SSP implementation costs to the likelihood of occurrence of particular disruptive events.

## **II. Periodic risk assessments should form the basis of a new regulatory approach to 9-1-1 reliability.**

Since the tragic events of 9/11, the federal government has adopted an increasingly comprehensive and methodical approach to the analysis of risks and the incorporation of such analysis into key policy decisions. For example, grant programs in the homeland, maritime, and aviation security arenas are now largely tied to mandatory risk assessments intended to ensure that scarce federal resources are deployed efficiently to respond to foreseeable threats, whether natural or man-made. Today, risk assessments are increasingly common even at the state and local levels, at least within the public safety community. Therefore, NENA believes that the Commission could better ensure the reliability of 9-1-1 systems by adopting a similar approach.

Under a risk-based approach, the Commission could require carriers and SSPs to conduct and periodically update formal, all-hazards risk assessments for 9-1-1 special facilities and other network elements or systems related to provisioning 9-1-1 service. If the scope and scale of such reviews were tied to the relative criticality of particular network elements, then carriers and SSPs could focus and prioritize their compliance efforts on improvement or remediation projects that would have the greatest benefits to public safety, without expending unnecessary time, money, and energy analyzing network elements that play a smaller role – or none at all – in providing reliable 9-1-1 service. For example, network elements that provide 9-1-1 service to larger or higher-risk populations could receive priority for reliability improvements or additional investments in redundancy and diversity. Similarly, facilities identified as having a relatively greater likelihood of disruption due to identified risks (e.g., extreme weather, earthquake, acts of terrorism) could receive added protection against the most likely risks, above and beyond the baseline level of protection consistent with prudent network design. Finally, by leveraging the close relationship between carriers, SSPs, and risk analysis experts in the public safety community, industry could reduce costs while building trust and improving the quality of capital al-

location decisions, insofar as 9-1-1 system reliability is concerned.

NENA believes that a risk-based approach will allow each carrier or SSP to determine the best approach to ensuring 9-1-1 reliability on its own unique network, while placing front-and-center the paramount public interest in access to effective emergency communications services. Thus placed, NENA believes the public interest would be far more difficult to ignore.

**A. *The Commission could establish “normal” and “minimum” performance standards for critical reliability factors.***

In order to ensure efficient allocation of resources toward the remediation of existing network vulnerabilities, the Commission should provide incentives for carriers and SSPs to invest greater resources in remediating larger risks. For example, a one-size-fits-all requirement that *all* 9-1-1 circuits have path-diverse physical protection circuits could trigger investments in redundant circuits to serve remote, sparsely-populated, or low-risk communities, rather than densely-populated or high-risk communities. Under a risk-based approach, however, the Commission could avoid this result by setting two primary technical standards: “normal,” and “minimum.” Carriers and SSPs could then adjust their responses to identified vulnerabilities above or below the “normal” range, subject to the “minimum,” based on the results of their formal risk analyses. Assuming public safety agencies have a meaningful opportunity to provide input to the risk analysis process, NENA believes that this approach would create meaningful and balanced incentives for carrier and SSP compliance.

**III. *Any approach to 9-1-1 reliability will require integrated monitoring and remediation of 9-1-1 system reliability issues.***

While NENA favors a risk-centric approach as described above, any novel regulatory arrangement for 9-1-1 reliability – risk-based or otherwise – will require the Commission

to adopt an integrated approach to enforcement, using different tools to achieve different objectives. For example, under either a risk-based model or a technical-rules-based model, the Commission could establish baseline criteria, such as maximum circuit diversity auditing intervals. With respect to compliance with those intervals, the filing of a compliance plan and periodic reports on numbers of audits completed (for example) should afford the Commission an adequate basis on which to determine whether the requirement itself is sufficient to produce compliance. If not, the Commission could then more quickly shift to a certification or inspection regime. Further, where audits turn up non-diverse 9-1-1 circuit paths, the Commission could look for virtuous trends such as reductions in the total number of non-diverse paths or reductions in the average time between when a non-diverse path is discovered and when it is corrected.<sup>4</sup> Conversely, the Commission could also look for vicious trends, such as increases in the number of non-diverse paths in 9-1-1 systems, or the occurrence of such paths in higher-risk areas or systems. The Commission could then single out such occurrences for further scrutiny and, perhaps, heightened compliance requirements.

For other technical rules, such as minimum durations for selective router backup power, the Commission could instead establish a certification regime *a-la* Sarbanes-Oxley, in which senior executives are required to attest to compliance with the Commission's rules. NENA believes that certification requirements, particularly where they are made *personal* can effectively elevate critical 9-1-1 issues to carrier or SSP managers with actual authority to resolve them.

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<sup>4</sup> In this case, in particular, the benefits of a risk-based approach become all the more clear: For circuits that serve remote or low-risk offices, there may be cases in which providing circuit path diversity could be accomplished only at enormous cost, and with little accompanying benefit. By focusing on risk, work on such areas could focus on other ways of mitigating identified risks, or on using lower-cost technologies to provide some measure of redundancy.

For example, NENA has encouraged carriers and SSPs to establish 9-1-1 resolution centers staffed with experts in the unique aspects of 9-1-1 service and led by senior managers with authority to order changes in 9-1-1 facilities. Anecdotally, NENA believes that carriers that have done so have lower incidences of avoidable 9-1-1 failures. A certification regime could encourage the proliferation of this beneficial structure.

Finally, where failure to conform with minimum best practices is determined through reporting or other means to be endemic within a carrier's or SSP's network, the Commission could impose a temporary, targeted regime of periodic or unannounced inspections to determine whether adequate progress is being made toward remediation. Although this is an extreme measure, NENA believes that there may be cases in which systemic or long-persisting problems in a network may warrant it. Further, the mere possibility that such an inspection regime could be initiated, even if only for a limited time, would serve as a powerful incentive for compliance with best practices.

***A. New rules should be made applicable to all entities that provide network services to the public and to PSAPs or related entities.***

In the past, it was axiomatic that 9-1-1 service and especially E9-1-1 service could only be provided to consumers and to PSAPs by an Incumbent Local Exchange Carrier (ILEC). This was so because only the ILEC had access to all of the network and database elements that make up a 9-1-1 system, many of which are specialized and distinct from the regular telephone network. Over time, however, Competitive Local Exchange Carriers (CLECs) and even non-carriers have entered the market for provisioning 9-1-1 service. These competitive SSPs play important roles in holding down the cost of 9-1-1 service and driving innovation in its architecture and operation. Because of this, the long-term trend is toward ever greater unbundling of 9-1-1 service provisioning, and toward more competitive markets. Where legacy state regulations have not outright prohibited or im-

peded to the point of deterrence the deployment of SSP-operated 9-1-1 systems, such models have flourished. Competitive SSPs, however, despite their often more nimble posture in the market, have themselves been subject to avoidable network failures. As the trend toward competitive SSP provisioning of 9-1-1 service accelerates, NENA believes it imperative that the Commission “cast a wide net” to ensure that *all* entities that provide network services to 9-1-1 systems are subject to the same reliability and resiliency requirements. Doing so will have two principal benefits: *First*, it will ensure that 9-1-1 reliability does not vary across regions in a patchwork fashion. *Second*, it will reduce incentives to engage in regulatory arbitrage that might otherwise arise if carriers and/or SSPs could offer 9-1-1 service under more- or less-regulated business models.

***B. Limited market power and legacy regulations restrict PSAPs’ and 9-1-1 Authorities’ ability to effectively contract for reliability.***

The Commission poses a number of questions about the role of PSAPs and 9-1-1 Authorities in encouraging carriers and SSPs to deploy more reliability 9-1-1 facilities. In the abstract, at least, it is an attractive notion that 9-1-1 Authorities could effectively contract for reliable 9-1-1 service through the careful crafting of RFI/RFP language and the negotiation of Service-Level Agreements (SLAs) for key 9-1-1 system elements. However, the extensive experience of NENA’s members has shown that such tools have less practical effect than might be imagined. Three reasons seem to explain this apparent contradiction:

*First*, many telecommunications services such as 9-1-1 are still subject to filed-tariff regulation at the state level. Under a tariff regime, 9-1-1 Authorities are often faced with a take-it-or-leave-it offering, with no room for further negotiation. Worse still, some regulations actually create a take-it-or-take-it regime, in which PSAPs and 9-1-1 Authorities are effectively precluded from seeking competitive service offerings by legacy rules *compelling* them to purchase 9-1-1 service from an ILEC.

*Second*, the high capital cost of establishing independent 9-1-1 service and ongoing consolidation in the 9-1-1 services market have left 9-1-1 Authorities with limited market power, and established dangerous opportunities for vendor lock-in scenarios. Consequently, 9-1-1 Authorities often have limited ability to prescribe the reliability features of competitive SSP systems.

*Third*, SLAs have proven ineffective at preventing 9-1-1 system failures. When viewed in context, the consequences of violating an SLA are minimal compared to the savings that can be realized by not investing in path diversity, backup power, etc.: SLAs typically specify a monetary payment related to the monthly recurring charges for a particular facility and the duration of an outage as the sole remedy for a breach of the agreed-upon service level. Given the plummeting cost of analog and even digital Basic-Rate Interface (BRI) circuits, payments under an SLA no longer represent a meaningful incentive for compliance with best practices (assuming they ever did).

Because PSAPs and 9-1-1 Authorities often lack effective tools to contract for the reliability features that 9-1-1 systems require, NENA believes that there exists a type of limited “market failure” that justifies an exercise of the Commission’s regulatory powers.

#### **IV. Circuit path diversity is critical to maintaining 9-1-1 system reliability.**

Currently, 9-1-1 and E9-1-1 systems rely on network arrangements that are unique within the Public-Switched Telephone Network (PSTN). For example, wireline E9-1-1 systems rely on at least two types of specialized trunk groups to interconnect key systems components: At a local central office, special 9-1-1 trunks connect an area’s serving Class 5 switch with another switch that selectively routes incoming calls to geographically appropriate PSAPs based on the Telephone Number (TN) of the calling party. Once that switch selects the appropriate PSAP, the actual call traffic is passed to the serving central office of the selected PSAP where it bypasses the switch that would otherwise

serve that PSAP and passes directly to the Main Distribution Frame (MDF) and from there to the PSAP.

In many cases, the trunks connecting end offices to the Selective Router and those connecting the SR to its PSAPs' serving end offices do have *some* diversity, by virtue of dividing the trunk group in two and sending each half along a different physical path. Where implemented, this arrangement provides some protection against a single circuit disruption interrupting *all* traffic to a PSAP, but, in that situation, cannot preserve a PSAP's full inbound 9-1-1 capacity. Similarly, data links for Automatic Location Identification have been found not to have physically diverse paths all the way to the ALI database server, even where multiple logical and physical links provide the "last-mile" connection to a PSAP.

With respect to both SR-to-PSAP trunks and redundant ALI datalinks, NENA believes that regular auditing of physical path diversity can significantly improve 9-1-1 system reliability. In addition to the primary effect of calling attention to new or long-festering vulnerabilities in carrier and SSP networks, making information about loss-of-diversity events available to PSAPs and 9-1-1 authorities could help public safety practitioners better draft RFIs/RFPs and contracts to more fully anticipate and preempt such problems. Assuming the Commission were to require regular auditing, or to tie auditing requirements both to time intervals *and* to known network changes, this process might also cause a reduction in the frequency of network changes affecting 9-1-1 facilities, thereby reducing opportunities for loss-of-diversity events.

***A. In the alternative, periodic testing of circuit failure scenarios should be required.***

Although NENA favors the Commission's proposal for regular 9-1-1 circuit audits, we have also received information that calls into question the ability of carriers to actually complete a satisfactory audit for certain network arrangements. For example, the proliferation of cross-leasing of optical fibers and wavelengths between carriers, cable owners,

and various intermediaries has, in some cases, produced an impenetrable thicket of recursive or conflicting documentation that can make audits frustrating if not impossible to conduct. Despite our belief that such documentation problems are comparatively rare within the unique architectures of 9-1-1 systems, NENA believes it prudent to call to the Commission's attention at least one alternative to periodic or change-triggered circuit auditing. If the Commission were to conclude that requiring regular physical path diversity audits for 9-1-1 circuits such as end office-to-SR trunks or redundant ALI data links would be overly burdensome for carriers and SSPs, then periodic failure testing could serve as another approach to detecting loss-of-diversity events. Under such an approach, PSAPs, carriers, or SSPs would be required to periodically simulate the failure of physical links carrying 9-1-1 traffic or ALI data. Where such simulated failures result in a loss of all or a different-than-expected fraction of service, remedial efforts could then be undertaken.

This approach has the advantage of requiring only first-level visibility into the physical topology of 9-1-1 network elements. Conversely, however, it could result in some added costs during the simulated failure of a physical link as other traffic bound for that physical link would require a temporary re-route. With PSAP or 9-1-1 authority participation, this approach could go far toward reassuring the public and the public safety community that critical 9-1-1 links will not fail as a result of the loss of any single physical link. Thus, on balance, NENA considers periodic physical link failure testing a viable alternative to periodic path diversity auditing.

**V. Backup power requirements should reflect the role of each particular facility in providing 9-1-1 service.**

By now, the public safety community's convictions regarding backup power at critical facilities are hardly worth repeating. Suffice it to say, NENA believes that adequacy of backup power – both in available peak load capacity and dura-

tion – is an essential element of 9-1-1 system reliability. As with other such elements, NENA supports the adoption of risk-based performance requirements. In that vein, NENA notes that certain 9-1-1 facilities will necessarily require longer-duration or higher-reliability backup power provisions. For example, central offices or other facilities that host 9-1-1 selective routers must be held to much higher backup power standards than ordinary telephone network facilities. Otherwise, a disruption to one central office could result in a loss of 9-1-1 service to a very large geographic area or population. Indeed, it was precisely this circumstance that resulted from the loss of backup power at one carrier’s central office in Arlington, Virginia during the 2012 derecho. Similarly, non-CO facilities that host ALI databases and other essential 9-1-1 network elements should be held to heightened standards.

As noted above, NENA believes that the Commission should couple risk-based requirements with “normal” and “minimum” performance standards, and allow carriers, SSPs, and operators of other 9-1-1 facilities to deviate above or below the “normal” standard based on the relative level of risk to each facility and the likely impact on 9-1-1 service should it go down. For low-risk or low-impact facilities, such as non-SR COs, NENA believes that a prudent standard would begin at a minimum of 24 hours of uninterruptable backup power (whether provided by batteries, generators, fuel cells, etc.), with a normal range of 72 hours. For moderate-risk or moderate-impact facilities, such as most SR COs, a minimum of 72 hours and a normal range of 120 hours of backup power would be considered prudent. Finally, for high-risk or high-impact facilities, such as SR COs in densely-populated or high-risk areas, a minimum of 120 hours of uninterruptable backup power would be prudent, with a normal range around 168 hours with multiple independent grid ties.

Based on these starting points, NENA believes that carriers, SSPs, and 9-1-1 authorities can mutually arrive at an efficient allocation of resources that also achieves significant improvements in 9-1-1 system reliability.

## **VI. 9-1-1 authorities require prompt, detailed notification of outages affecting 9-1-1 service.**

Although PSAPs and 9-1-1 authorities are often quite limited in their ability to respond to a service outage from a technical-remediation standpoint, access to accurate, timely information about outages is critical to their ability to mitigate the impacts of outages on the public. When an outage occurs, for example, 9-1-1 authorities may try to notify the public via radio or television broadcasts so that individuals experiencing emergencies can contact police, fire, or ambulance services directly via 10-digit lines. Additionally, in severe outages affecting both 9-1-1 service and 10-digit service, public safety agencies may choose to pre-disperse response units at greater distances than the normal separation of, say, fire houses. This can allow a faster response time, at least for the first unit on scene, in order to partially compensate for delays encountered by citizens trying to report emergencies via disrupted communications systems.

Because of the potentially major impact of 9-1-1 system disruptions to large populations and broad geographic areas, NENA supports the Commission's proposed revisions to the outage notification rules: NENA believes that immediate notification of PSAPs affected by carrier or SSP outages will dramatically improve the ability of public safety agencies to continue serving the public effectively during 9-1-1 those outages. In particular, NENA believes that information about the geographic scope of an outage, its best-known cause, and an estimate of time to repair (or, if none is available, a notation as to when it can be expected) will greatly aid public safety agencies in crafting public messaging and tactical response plans during outages. Finally, NENA believes that both telephone and email notification of outages should be required offerings, but also believes that carriers, SSPs, and 9-1-1 authorities should have the flexibility to agree to other primary means of notification that might better meet 9-1-1 authorities' requirements.

## **VII. NG9-1-1 systems will require somewhat different reliability rules.**

As the NPRM correctly notes, NG9-1-1 system architecture is markedly different from that of existing 9-1-1 and E9-1-1 systems, and will necessarily have different reliability challenges and requirements. For example, there exist many schools of thought about precisely how Emergency Services IP Network (ESInet) links might best be assured of reliability. Under one such school, 9-1-1 authorities would attempt to contract for high-reliability service over Multi-Protocol Label Switching (MPLS) links offered under stringent SLAs, perhaps with a physical redundancy and path diversity requirement. Another school holds that each 9-1-1 authority should install at least three pooled links based on fundamentally different technologies (e.g., one legacy Time-Division Multiplexed [TDM] link, one ring-redundant Synchronous Optical Networking [SONET] link, and one microwave or free-space optical link) and establish failover mechanisms to shift traffic to the healthiest link among those in the pool when one or more links fail or degrade. Under either approach, however, the packet-switched nature of the underlying networking technologies should provide far greater reliability and survivability features than do existing 9-1-1 systems. Additionally, the greater flexibility that the multitude of design options will afford 9-1-1 authorities could have the added benefit of improving their market power, thus making available more meaningful contract protections against economically-efficient (from the service provider perspective) lapses in prudent network design.

In order to fully realize the reliability improvements that NG9-1-1 *can* enable, however, the Commission must look beyond the traditional carrier community to competitive SSPs and other entities that play a role in NG9-1-1 system deployment and operation. For example, an NG9-1-1 system might feature separate contractors for physical networking, network management, data center operation, database management, etc. Each of these entities will, to a greater or lesser extent, have some impact on the overall

reliability of each particular NG9-1-1 system for which it provides service. Consequently, NENA believes that the Commission should begin to consider how it might craft broadly-applicable reliability rules based on appropriate performance standards. As it does so, the Commission should look to technical and operational requirements documents and standards developed by NENA (for NG9-1-1 systems) and other standards bodies whose scope encompasses other aspects of the 9-1-1 ecosystem (e.g., ATIS for originating networks). By casting a wide net but specifying reasonable, technology-neutral reliability rules based on formal risk assessments, NENA believes that the Commission can effectively tackle the more complex aspects of NG9-1-1 reliability. NENA supports the Commission's efforts to begin this process.

### CONCLUSION

The Commission should adopt a risk-based approach to ensuring the reliability of 9-1-1 and NG9-1-1 systems, establish broadly-applicable rules for "normal" and "minimum" reliability factors in at least the categories identified by the *Derecho Report*, and implement an integrated, multi-tiered approach to achieving the appropriate level of protection for carrier and SSP 9-1-1 facilities.

TELFORD E. FORGETY, III  
*Attorney*

MAY 2013