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RESEARCH REPORT

Symposium on Legal Implications of Environmental Electronic Reporting Meeting Summary

DECEMBER 1999

Meeting Summary

**SYMPOSIUM ON LEGAL IMPLICATIONS
OF ENVIRONMENTAL ELECTRONIC
REPORTING**

June 23-25, 1999

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Meeting Summary
SYMPOSIUM ON LEGAL IMPLICATIONS OF
ENVIRONMENTAL ELECTRONIC REPORTING
Washington, D.C.
June 23-25, 1999

EXECUTIVE SUMMARY

The Environmental Law Institute, with support from the Environmental Protection Agency, conducted a Symposium on Legal Implications of Environmental Electronic Reporting on June 23-25, 1999, in Washington, D.C. Participants, who explored the technical and legal issues related to electronic reporting, included legal and regulatory officials from the States, EPA, the Department of Justice, regulated industries, technology firms, private law firms, environmental groups, and other federal agencies. Joe Retzer, Director of EPA's Regulatory Information Division, and James Simon, Deputy Assistant Attorney General for the Environment and Natural Resources Division, gave keynote speeches on their agencies' respective visions for electronic environmental reporting.

The Symposium provided an opportunity for interested parties to discuss the complex legal and technical issues involved with the implementation of an electronic reporting program as EPA is working on two new rules to offer the option of electronic reporting. The first will be EPA's proposed NPDES rule, providing for electronic transmission of discharge monitoring reports. Building upon this rule, EPA is planning to publish a second agency-wide, consolidated rule by 2001. The Cross Media Electronic Reporting and Recordkeeping (CROMERR) workgroup is just starting work on this regulation, which will establish the procedures and the regulatory framework for electronic reporting in many other EPA programs.

Symposium participants agreed that there are many benefits to submitting electronic reports, including burden reduction, more timely and accurate data, and increased public access to data. However, they articulated a series of technical and evidentiary concerns that should be addressed before electronic reporting is implemented. Participants discussed the following key points:

- ***Uniformity versus flexibility.*** Concerns were raised about finding ways to address the tension between the needs for uniformity, reliability, simplicity, reduced reporting burden and consistency versus the need for flexibility to allow for different federal and state electronic systems and for development and adaptation to evolving technologies.
- ***Authenticity and report integrity.*** Symposium participants urged that environmental agencies adopt adequate procedures for authenticating the electronic reports and ensuring the integrity of data contained in the reports when archived and retrieved later, as well as preserving confidentiality of appropriate business secrets, while still making the data available to regulators and the public. Public Key Infrastructure (PKI) and certification authorities can provide high levels of electronic reporting authentication and integrity, especially if complemented with biometrics. EPA needs to evaluate the risks of various combinations to decide on the best approach. Participants also

recognized that human factors can compromise any level of security and user identification in electronic reporting.

- **Evidentiary issues.** Because prosecutors must produce evidence that a document is authentic, reliable, and persuasive, an electronic reporting system must provide proof of content, and process, as well as the reporting party's identity and intent. An electronic reporting system can offer a substitute for handwritten signatures on electronic reports, but the following legal issues need to be addressed: how to provide adequate proof to be persuasive in court; pros and cons of requiring a paper "back up"; costs of various systems and how they correlate to more certainty about the identity of the signer; how to prove the intent of the signer; adapting the certification or perjury statement to incorporate understanding of electronic methods; and developing evidence of events surrounding the signing to prove the signer's identity and intent.
- **Better business practices.** Environmental reporting should be integrated into business information management systems as part of adopting electronic methods. Electronic reporting can be part of re-engineered Environmental Management Systems (EMSs) to reduce business costs and reporting burdens; provide faster, better quality data as well as easier access for regulators and the public; lead to higher levels of compliance with environmental standards and reduced waste; produce greater trust and credibility for regulated industry; and create a more level playing field to ensure all businesses are complying with their permits.
- **Need for simplicity.** EPA needs to plan for the expert testimony that will be needed to introduce evidence in court about the reliability of whatever new technologies are adopted. Although electronic reporting needs to include workable solutions for data safety and privacy, the system should be as simple as possible in order to achieve maximum state and industry support, allow for clear explanation in a jury trial, and facilitate easy use of data by the public.
- **Public access.** Public postings of data received through electronic reporting will create a great incentive to report accurately.
- **Risk assessment.** Assessing legal, technological, security, and management risks of various approaches may help to identify ways to resolve competing concerns.
- **Special issues.** Symposium participants identified the need to take into account the special problems of adapting environmental data and reports to electronic methods due to the potential for harm to public health and the environment, the lack of clear monetary costs for environmental damage that may be caused or covered up by incorrect data, and the crucial importance of preserving the integrity of the self-reporting system so that a deterrent effect can be maintained.
- **Need for collaboration.** The regulated community, EPA, states and the public need to collaborate in order to develop some consensus on what can be a consistent, "seamless," interoperable approach to electronic reporting that will produce legally acceptable and admissible data.

Overheads presented by various panelists are available upon request

**SYMPOSIUM ON LEGAL IMPLICATIONS OF
ENVIRONMENTAL ELECTRONIC REPORTING**

Washington, D.C.
June 23-25, 1999

WEDNESDAY

JUNE 23

8:30-9:00 Registration and Coffee

9:00-9:10 **WELCOMING REMARKS**

*J. William Futrell, President
Environmental Law Institute*

9:10-9:35 **KEYNOTE ADDRESS: The Vision for Electronic Environmental
Reporting**

*Joseph Retzer, Director, Regulatory Information Division
Office of Policy, U.S. Environmental Protection Agency*

*James Simon, Deputy Assistant Attorney General
Environment and Natural Resources Division, U.S. Department of Justice*

9:35-10:00 **PRESENTATION: Achieving the Vision of Electronic Services Delivery**

Peter Weiss, Office of Management and Budget

10:00-11:20 **PANEL DISCUSSION: Programmatic and Legal Issues of Concern**

Government's View of Legal Issues Needing to be Addressed in Moving
to Electronic Reporting

Moderator: *Brian Rohan, Environmental Law Institute*

Panelists: *Sylvia Liu, Department of Justice
David Schwarz, EPA Office of Policy
Terri Salem, Texas NRCC*

11:20-11:40 Coffee Break

- 11:40-1:00 **PANEL DISCUSSION: Key Issues for Environmental Reporting**
- An Examination of Necessary Standards, Protocols and Formats for Electronic Reporting, Record Keeping, Archiving and Data Retrieval
- Moderator:** *Suellen Keiner, Environmental Law Institute*
- Panelists:** *David Schwarz, EPA Office of Policy*
Tom Tuffey, EMIS-Tech
Jim Whitter, National Governor's Association
Robert Larson, Environmental Scientist Consultant
- 1:00-2:15 Lunch (provided)
- LUNCHEON PRESENTATION: A Conceptual Approach to Electronic Data Integrity**
- Christopher Martin, General Accounting Office*
- 2:15-3:40 **PANEL DISCUSSION: The State of the Technology**
- Electronic Signatures
 - Certifying Authorities
 - PKI
 - PINs
 - Biometrics
- Moderator:** *Steven Mines, Environmental Law Institute*
- Panelists:** *Noel Nazario, National Institute of Standards and Technology*
Denise Silverberg, Federal PKI Steering Committee
Michael Baum, Verisign
Ralph Berwanger, XEN Corporation
- 3:40-4:00 Coffee Break
- 4:00-5:30 **PANEL DISCUSSION: Enforcement Implications of Electronic Reporting**
- Strategic Planning and Prioritizing
 - Automated NOVs
 - Compliance Monitoring
- Moderator:** *Suellen Keiner, Environmental Law Institute*
- Panelists:** *Frank Friedman, Elf-Aquitaine*
Ruth Gibson, EPA Region VI
Fred Stiehl, EPA Office of Enforcement and Compliance Assurance
- 5:30-6:00 **WRAP-UP:** Review of the Day's Work, Open Discussion and Planning for the Next Day's Activities.

8:30 Coffee

9:00-11:00 **PANEL DISCUSSION: Evidentiary Implications of Electronic Reporting**

- Admissibility
- Authentication
- Presumptions
- Evidentiary Weight
- Relevance/Hearsay
- Chain of Custody

Moderator: *Palmer Kelly, EPA Office of Enforcement and Compliance Assurance*

Panelists: *Robin Greenwald, Department of Justice*
Rae Cogar, ABA Task Force on Electronic Evidence
Paul Rice, ABA Task Force on Electronic Evidence
Ben Wright, Pen Op
Linda Spahr, Environmental Crimes Prosecutor, Suffolk County, NY

11:00-11:20 Coffee Break

11:20-12:45 **PRESENTATION: EPA's Proposed NPDES/DMR Rule: Lessons Learned About Electronic Enforcement**

David Schwarz, EPA Office of Policy
Robin Danesi, EPA Office of Water

12:45-2:00 Lunch (provided)

LUNCHEON PRESENTATION: Lessons from the Halls of Battle: Rulemaking for Data at the United Nations

Jeffrey Ritter, Kirkpatrick & Lockhart

2:00-3:15 **PANEL DISCUSSION: Other Federal Agencies' Initiatives**

Moderator: *Brian Rohan, Environmental Law Institute*

Panelists: *Scott Charney, Department of Justice*
George Brown, Securities and Exchange Commission
Andy Boots, Department of Education
Stephen Holden, Internal Revenue Service

3:15-3:45 Coffee Break

3:45-5:00 **PANEL DISCUSSION: Institutional Developments: Ways to Manage the New Regime**

- Certification Authorities and Environmental Reporting
- State Legislative Efforts
- International Developments
- State/EPA Coordination
- Coordination among Federal Agencies

Moderator: *Suellen Keiner, Environmental Law Institute*

Panelists: *David Schwarz, EPA Office of Policy*

Stewart Baker, Steptoe & Johnson

Mike Penders, EPA Office of Enforcement and Compliance Assurance

Robert Heiss, EPA Office of Enforcement and Compliance Assurance

5:00-5:30 **WRAP-UP:** Distribution of a Hypothetical Falsified Electronic DMR Fact Pattern; Open Discussion; Review of the Day's Work, and Planning for the Next Day's Activities.

FRIDAY

JUNE 25

8:30 Coffee

9:00-11:00 **FACILITATED CASE STUDY**

A Participatory Analysis of the Fact Pattern Distributed at the Close of Day 2

Facilitator: *Keith Welks, former environmental prosecutor, Harrisburg, PA*

11:00-11:20 Coffee Break

11:20-1:00 **GROUP DISCUSSION: Getting From Here to There**
Group Discussion including Short Presentations

- EPA's Rulemaking Workgroup on Cross Media Electronic Reporting and Recordkeeping (*Presented by David Schwarz, EPA Office of Policy*)

- Uniform Approaches to Federal/State Programs
 - Stipulations and Agreements
 - Permit Modifications
 - Policy Statements
- Delegation Issues
- Concrete Next Steps

Moderator: *Suellen Keiner, Environmental Law Institute*

I. WELCOMING REMARKS

William Futrell, President of ELI, welcomed participants. He gave everyone his wishes for a successful meeting. He then asked each person to introduce themselves and briefly describe their background and interest in electronic reporting.

The facilitators encouraged participants to speak candidly, noting that nothing in the discussions would be attributed as official positions or statements.

II. KEYNOTE ADDRESS: The Vision for Electronic Environmental Reporting

The keynote address was shared by Joe Retzer, Director of EPA's Regulatory Information Division in the Office of Policy, and James Simon, Deputy Assistant General of DOJ's Environment and Natural Resources Division.

Joe Retzer, Director Regulatory Information Division, EPA Office of Policy

Mr. Retzer explained that although there is concern about adequate system security and the ability to prosecute false reporting cases when using electronic documents, EPA believes switching to an electronic system would lead to large savings in data processing costs, quality and efficiency improvements, greater consistency across programs, more integration of data across programs, and greater capability to provide more timely, accessible public information.

Since EPA published its first policy on electronic reporting in 1990, the Agency has been working towards finding workable solutions to the technical and legal problems identified by people inside and outside of EPA. The Agency's 1996 electronic reporting policy further detailed the benefits of moving to an electronic system.

EPA's current vision for electronic environmental reporting reflects the Agency's desire to reinvent the way information is managed. Through the development of EPA's new Information Office, Retzer noted that the Agency hopes to develop a system for managing electronic data throughout all phases of the regulatory process. This vision includes the creation of a central receiving facility for electronic data.

Retzer explained that the Agency's new priorities focus on expanding public access to information by building partnerships with states and facilitating greater program-to-program coordination. In addition to reducing burdens for the regulatory community and possibilities for interactive reporting, it is possible that individuals may soon be able to register with EPA, or their state, to report on behalf of their company.

Retzer ended by noting that, for the electronic reporting system to work, the Agency must find simple ways of using electronic data to enhance enforcement credibility and deterrence. The system may need to include contextual information about signing and sending reports, such as exactly what type of report was submitted, information about the sender's computer, and other information binding the signature to the report so the data can be more accurately attributed to a particular individual.

**James Simon, Deputy Assistant Attorney General
Environment and Natural Resources Division, US DOJ**

Mr. Simon agreed with Mr. Retzer that there are many benefits to electronic reporting, including increased public access to data and agency access to more timely and accurate data. These benefits could lead to greater ease in tracking compliance and setting agency priorities. But, he argued, an effective electronic reporting system is not merely about technology, it is about understanding the process involved in compliance – who sent what information, where, why and how.

According to Simon, the success of EPA's electronic reporting program will depend upon the Agency's ability to re-engineer the whole reporting process. The chief concern for DOJ is enforceability because the integrity of the entire environmental regulatory system depends on accurate reporting of environmental data by the regulated community. DOJ must be able to use electronic reports effectively in cases of false reporting. Because prosecutors must produce evidence that a document is authentic, reliable, and persuasive, an electronic reporting system must provide proof of content, and process, as well as the reporting party's identity and intent. Simon noted that PINs and passwords alone may not be sufficiently reliable to provide evidence about the identity of the person who sends an electronic report, but biometrics may be a viable substitute.

III. PRESENTATION: Achieving the Vision of Electronic Services Delivery

**Peter Weiss, Senior Policy Analyst/Attorney
Office of Management and Budget**

Mr. Weiss explained that the Government Paperwork Elimination Act (GPEA) of 1998 directs all federal agencies to be ready to accept electronic reporting by 2003. He noted that Congress explicitly stated that electronic records submitted under GPEA procedures shall have legal effect.

According to Weiss, the most difficult issue in planning electronic systems is not whether or not electronic records are admissible in court, but whether an individual's personal identity can be established. In paper systems, the reporting party's identity and intent is generally established through a signature. A signature, according to common law, is any symbol executed or adopted by a party with present intention to authenticate a writing. Weiss noted, however, that signature is not the real issue in

implementing an electronic reporting system, it is one of philosophy and management. The real issues in converting to an electronic system such as data integrity and authentication are not signature dependent. Therefore, it is important not to be distracted in system design by attempting to set up a "signature" system. Similarly, he said that non-repudiation is a non-issue, and need not distract from the real issues in electronic reporting.

Weiss also explained that OMB's draft implementation guidance focuses on information security, setting a risk-based standard to cost-effectively minimize risk and maximize benefits. The guidance also discusses authentication, data integrity and confidentiality. His presentation is available at <http://gits-sec.treas.gov>. The experience of other federal agencies, such as IRS, Customs and SEC, are also instructive as to legal sufficiency.

IV. PANEL DISCUSSION: Programmatic and Legal Issues of Concern

A. Panel Remarks

**David Schwarz, Team Leader
Office of Policy, US EPA**

Mr. Schwarz defined the major issues of implementing an electronic reporting system as being: (1) issues of regulatory status; (2) courtroom process; and (3) providing for persuasiveness (authenticity, integration and nonrepudiation). According to Schwarz, the Agency must develop workable solutions to issues of technology, business process requirements and enforceability, within the regulatory framework. It is important that business process features are straightforward and simple. He also explained that EPA must assess basic infrastructure needs and determine a level of specificity that does not reduce flexibility for using new technologies. This relates to EPA's data archiving systems as well as reporting systems. Schwarz also stated that EPA, states, regulated entities and NGOs must come to an agreement regarding definitions and respective roles in recordkeeping, data safety and privacy. Because 90% of compliance reporting is on the state level, consistent and well-coordinated state electronic reporting systems are essential.

**Sylvia Liu, Attorney
Environment and Natural Resources Division, US DOJ**

Ms. Liu explained that electronic transactions do not have legal issues themselves; it is the different processes by which these transactions occur that have legal significance and create liabilities. Electronic reporting is creating legal issues because different processes are being used as evidence, such as to show intent and to create liability. She noted that it is very important for records of electronic commerce to meet the same

requirements as paper records, explaining that federal agencies must consider the following five issues:

- Information availability – EPA and the states must make sure information is collected properly. Information must be properly retained and made available and must include the context in which the data was collected.
- Legality (status) – EPA must return to authorizing legislation to ensure that the records are legally sufficient for the purposes needed. EPA must change references to such words as "written," "paper," and "postmark."
- Other legal requirements – electronic commerce must meet all other requirements, including FOIA, Privacy Act, records retention, and trade secrets requirements.
- Evidentiary issues – the electronic evidence must be authentic and reliable, following the Federal Rules of Evidence and maintaining chain-of-custody. According to the best evidence rule, an electronic version of a document can be considered the original and can be accepted as evidence.
- Persuasiveness – the electronic reporting system must produce documents that can provide proof of content, and process, as well as the reporting party's identity and intent.

Terry Salem, Staff Attorney

Texas Natural Resources Conservation Commission (TNRCC)

Ms. Salem emphasized that, while there are legal issues regarding electronic reporting, for states it is primarily an issue of management. There is great excitement about the potential for electronic systems, but there is also much fear regarding costs and misunderstandings about the potential of electronic reporting at the state level. Specifically, Salem pointed out that electronic reporting is important to states because compliance demands are making it increasingly difficult for states to review all incoming data. Thus, states are seeking new strategies to meet these demands such as through partnerships and audit systems. With new technological advances comes an expectation by the public for government and the regulated community to manipulate, understand and use all of their data.

Salem expressed concern about the tension between the need for uniform requirements and the need for flexibility, as well as a lack of financial resources, lack of sufficient guidance and support on enforcement issues, and lack of expertise on technology issues. Although a performance standard is attractive to the states, Salem believes that flexibility is still key.

She then explained that federal and state legal requirements, adequate financial resources, available technology and high public expectations are drivers of state action toward the implementation of electronic reporting. Salem concluded that federal

regulators need to address resource issues before imposing new systems that simply will be unachievable for the states. Also, states sometimes receive money, but cannot use it for electronic reporting programs because it is not appropriately earmarked. In general, federal regulators need to reach out to the states, involve them in the creation of electronic reporting systems and in determining what will be a legally defensible approach, and issue guidance to the states.

B. Discussion of the Panel's Remarks

- States have already made significant investments in electronic systems that they hope will be compatible with federal requirements. Major federally-required changes will be financially difficult for the states.
- The regulated community is resistant to sending information on the Internet and putting it on agency web sites. Although the regulated community was initially excited about Internet filing, they did not realize that hard data was going to be immediately posted on the web. However, some of this information can be released under FOIA and does not pertain to competitive advantages, so it is important to understand what types of information can be made public
- The public needs to be trained to understand properly and interpret all the new information which is available.
- Some states are doing electronic reporting via diskettes.

V. PANEL DISCUSSION: Key Issues for Environmental Reporting

A. Panel Remarks

**Jim Whitter, Policy Analyst
Natural Resources Policy Studies
National Governor's Association (NGA) Center for Best Practices**

Mr. Whitter spoke about discussions and recommendations by the State EC/EDI Steering Committee (SEES) in the development of state electronic reporting programs.

According to SEES, critical success factors are:

- An examination of the program's business needs
- Upper management support
- Use of task forces, committees, and teams
- A strong internal communication structure
- Early engagement of external stakeholders
- Managing the effects of change and expectations

- Examining opportunities for working with EPA
- Clear definition and management of project scope
- Strategic planning for legal and budget issues

He also noted that legal and security criteria include establishing records that are authentic, reliable, and persuasive. To develop a legally viable program, Whitter explained that EPA and the states must address four components: (1) the existing legal environment, (2) the enforcement requirements of the regulatory program, (3) the techniques and procedures necessary to ensure enforceability, and (4) impacts on existing compliance and enforcement programs. In order to choose a solution, SEES recommends that the planners review the strategic direction of the state, review the advantages and disadvantages of the four components, prioritize state business needs, select solutions based on the components that best meet the business needs, review requirements and considerations for each component and obtain feedback from external "customers" for both the regulated community and the public.

In its forthcoming Guide for state electronic reporting, SEES will make the following recommendations:

- Streamline the entire reporting process
- Leverage existing activities
- Establish flexible electronic reporting systems
- Establish electronic reporting teams
- Establish a central coordination function
- Maintain credible and enforceable data
- Consider electronic reporting solutions that apply across state lines

The SEES guide to electronic reporting will be published in late October 1999. The NGA Center has a web page on its electronic reporting activities at www.nga.org/CBP/Activities/EnviroReporting.asp. In November, NGA's Electronic Reporting Information Clearinghouse became available at that same address, containing updated information on state programs and links to electronic reporting resources.

**David Schwarz, Team Leader
Office of Policy, US EPA**

Mr. Schwarz explained that the electronic reporting system EPA adopts must be technically workable, legally valid, consistent with industry practices and capabilities, cost-effective, and uniform across programs and states. In addition, he noted that electronic reporting must not cause EPA or state agencies to expend great resources in software development because commercial products are generally easier and most cost-effective. EPA does not want to be dependent upon a particular system or contractor, nor does EPA want to create chaos by using multiple approaches. The essential building blocks, according to Schwarz, are likely to be the following:

- Electronic Data Interchange (EDI) standards or similar industry-standard formats for EPA reports to ensure interoperability
- Internet/web applications – web-based smart forms, user-friendly data entry
- Solution to ‘electronic signature’ problem
- Regulatory framework for electronic reporting.
- Central receiving facility (CRF) – supporting EDI via value added network, as well as submission via the Internet in a variety of formats including web form.

The CRF will consolidate EPA’s 10-20 current systems for receiving reports. The CRF will handle routine receiving, virus checking, translation, and authentication. EPA is looking at the General Trunk software suite for its CRF prototype.

**Tom Tuffey, Publisher and EMIS Consultant
EMIS-Tech**

Mr. Tuffey emphasized that EPA must be aware of how environmental information management systems are being used in industry so that EPA’s system is consistent with industry regulation and practice. He then noted that to improve compliance, compliance information should be on the web.

In addition, Tuffey does not believe there is enough dialogue between EPA and the regulated community, especially as it relates to compatibility of standards for electronically collecting and reporting environmental data. The lack of dialogue between industry and government on electronic commerce is troublesome. EPA needs to reach out to industry, particularly since there are approximately 6 million small companies in the US that have never heard of EDI. Industrial organizations could serve as contact points for interaction with EPA. In addition, EPA must make sure that the software products needed to enable businesses to comply with EPA’s requirements are readily available.

**Robert Larson, Environmental Scientist
GPU Generation, Inc.**

Mr. Larson explained that utilities have major reporting requirements through the Clean Air Act Amendments (CAAA) of 1990 and state programs. Considering the large data sets required through the regulations and the many requirements involved, the driving force that made electronic reporting attractive to industry has been increased accuracy, which in turn alleviates legal problems. In fulfillment of their CAAA responsibilities, industry began sending EPA electronic data reports (EDR) in 1993. They entered data electronically, sent EPA a signed hard copy of the report as well as a version on disk. The paper is still necessary to meet compliance requirements.

Larson also explained that complicated electronic reporting systems drive firms to resort to paper. A pilot program for EDI in allowance trading clearly demonstrated this result. Because the electronic system was more difficult than the paper system, only 2 of 564 entities participated. The capacity of the companies which will use EDI must be considered when designing the system.

He noted that industry is concerned about the potential for falsification of the reports as well as being able to establish the identity of the receiver. But, he said, in his five-year experience with electronic reporting, he has not heard of any legal challenges. He then challenged the legal community to get over these hurdles, as banks and the IRS have done with the trading of stocks and the filing of tax returns.

B. Discussion of the Panel's Remarks

- EPA has been expending vast resources on pilot programs with states and industry over the last ten years. EPA is aware of the critical issues and is in need of a legal framework for the electronic reporting program. They are working with DOJ to find solutions and break through the current log jam.
- People have focused on the fact that they do not want government to impose a regulatory framework in the midst of rapid technological change, but they must also realize that government is a consumer with vast purchasing power. They need to be aware of the government's power to purchase these technologies and to require workable electronic reporting solutions.
- The system must be kept simple and uniform to achieve maximum state and industry support.

VI. LUNCHEON PRESENTATION: A Conceptual Approach to Electronic Data Integrity

**Christopher Martin, Assistant Director
Office of Chief Scientist, US GAO**

Mr. Martin detailed GAO's reasons for supporting the use of electronic records. In response to the Department of Treasury's need for a better method to authenticate high dollar value transactions, GAO provided a conceptual example of how electronic signatures could improve data integrity. In 1984, Treasury decided to convert its payment processing system for agency payments from paper to electronic. It adopted and improved the model suggested in the GAO report and developed the Treasury Electronic Certification System.

In 1988, GAO formally recognized that something other than a handwritten signature, or similar technique, can be a symbol of the intent to be bound. A 1991 decision by the Comptroller General regarding EDI set forth criteria to evaluate electronic signature systems, consistent with traditional processes. At that time, there were no existing statutory prohibitions preventing agencies from forming and maintaining governmental contracts when adequate data integrity is maintained. The decision stated that an electronic signature must be unique to the signer, under the signer's sole control, capable of being verified and linked to the data in such a manner, that if the data are changed, the signature is invalidated during the signature verification process. These criteria are independent of any particular technology.

In 1996, GAO sanctioned full scale implementation of a standardized electronic signature system like the one used in the Corps of Engineers Financial Management System, allowing the Corps to move to a paperless financial management system. The 1998 Government Paperwork Elimination Act (GPEA) provides for federal agencies, by October 21, 2003, to give persons who are required to maintain, submit, or disclose information the option of doing so electronically and to use electronic signatures to verify the sender and integrity of the electronic content. GPEA provides a definition of electronic signature, consistent with European Parliament and a Council Directive: a method of signing an electronic message that (1) identifies and authenticates a particular person as the source of the electronic message and (2) indicates such person's approval of the information contained in the electronic message (GPEA, section 1709(1)). One requirement is that agencies be able to define clearly what approval is being given when they establish a system for an electronic signature. To meet this requirement, GAO suggests that the electronically signed message explicitly state what approval is being given.

Martin also explained that automated systems may have risks that do not exist in the comparable paper-based system. These include concerns that data integrity may not be maintained; mistaken/false denial of origination/receipt; inadvertent or deliberate corruption of message contents; unauthorized receipt, interception, copying, or viewing

of sensitive information; and attacks to capture user authenticators. Data integrity may be compromised because of overly broad access to sensitive data, such as sharing passwords and user accounts and there may be inadequate monitoring of user activities. Hackers may be able to exploit such weaknesses, fueling public perception that electronic systems are insecure.

However, Martin stated, it is a myth that data transmitted over the Internet cannot be secured. He added that there are non-monetary issues like consumer confidence, which may be more important, and system controls should not be based solely on costs. Martin believes that a viable paperless record system can be achieved with safeguards to provide for general data security, restricted use, clear chain-of-custody, linking of intent and proof of submission.

In summary, GAO supports the use of electronic records as long as data integrity is equal to its paper-based counterpart. But, Martin cautioned, traditional integrity systems may not be adequate to address the unique risks associated with highly automated environments. EPA must also be careful with business and industry standards, as they many not have undergone a proper validation process.

VII. PANEL DISCUSSION: The State of the Technology

A. Panel Remarks

Michael Baum, Vice President Practices and External Affairs, Verisign

Mr. Baum explained the Public Key Infrastructure (PKI) system, an approach using encryption, digital signatures and digital certificates to secure applications, communications and transactions. Baum explained that a public key/private key system combination works better than solely PKI. In this system, a person uses a private key to send information. A different digital signature is used for each document. Each receiver has a unique private key. The public key is public and allows the receiver to verify the information sent. The sender encrypts using the receiver's public key, then only the receiver can decode with the private key. By using private key and "message digest" run through an algorithm, the digital signature becomes unique, specific to that particular document. Baum does not believe that EPA should be the certification authority (i.e. the issuer of keys), but they would be the registration authority, determining who does and does not get issued a key.

PKI, while providing the overarching structure of an electronic reporting system, need not be anything more than a modest upgrade/overlay and enhancement to the existing infrastructure. It is an incremental, technological improvement that can support privacy as well as authentication, but applications can vary. Correspondingly, certificate requirements, authorization and identity certificates can vary.

He also noted that there are many programs on the market that establish a person's intent in signing and can meet the intent requirement for the courts. The series of events these technologies imitate is a signing ceremony using digital signatures. Baum suggested that biometrics may be a good supplement to the use of PKI. Although cryptography is the only technology for securely sending information over the Internet, biometric techniques can contribute to system security by providing local access control for computer resources, including cryptographic keys. Biometric and cryptographic methods are complementary technologies that ensure identity and authentication, respectively. In addition, Baum cautioned that EPA must look at the software of the end-user and think about system interoperability.

**Noel Nazario, Electronics Engineer
Computer Security Division, National Institute of Standards and Technology (NIST)**

Mr. Nazario spoke about improving PKI systems. NIST has identified important security goals to be data integrity, confidentiality, non-repudiation, configuration control, management control, availability, records management, assignment of roles, accountability, and access control. NIST is attempting to upgrade its system to simplify processes, provide adequate safeguards, improve information availability, control access to information, support accountability and improve recordkeeping. NIST is working to meet the public's desire for a visual representation that is machine-readable, so the screen will look exactly like the data printout.

Nazario also stated that NIST is defining its security goals. These include provisions for adequate data integrity, confidentiality, non-repudiation, personal accountability, access control, configuration control, management control availability and records management. Issues that NIST is looking into regarding the design of the application include establishing the scope, identifying threats and security mechanisms, and establishing underlying security infrastructure. NIST also developed a set of standards in its electronic system and are considering complexity, interoperability and costs when determining how to implement and deploy the system.

**Denise Silverberg, Deputy Chair
Federal PKI Steering Committee**

Ms. Silverberg explained that the Federal PKI Steering Committee (FPKI SC) is comprised of three working groups focusing on business, technical, and legal and policy issues. Over fifty members, from two dozen agencies, make up these groups. See <http://gits-sec.treas.gov> for more information.

According to Silverberg, the current activities of the FPKI SC are:

- Federal Bridge Certification Authority (FBCA) architecture/development
- FBCA policy authority (charter, certificate policy)

- Key recovery demonstration project, focusing on certification across domains, sectors and states

Silverberg explained that Public Key Infrastructure will include registration authorities to identity proof users, certification authorities to issue certificates and CRLs, repositories (publicly available databases) to hold certificates and CRLs and mechanisms for status checking of certificates.

Further, she noted that the role of the FBCA is to reduce duplication of function, administrative burden, cost to federal agencies to perform cross-certification, and to facilitate transactions with other PKIs. FBCA components will meet federal standards. Governing policies and procedures are being developed with input from federal agencies, including DOJ and EPA.

FBCA will offer services (beginning mid-2000) of clearing cross-certification among certification authorities but will not provide certifications to end-users. FBCA is all-inclusive and will provide four levels of security. Demonstration projects will involve a variety of interoperability issues, so that a single certificate can be accepted and understood by other "domains," sectors or agencies.

**Ralph Berwanger, Director of Finance and Administration
XEN Corporation**

Mr. Berwanger stressed the need to develop a standard that can be implemented. In addition, he highlighted the need for interoperability. Several software companies now have off-the-shelf interoperable systems that meet this need.

Berwanger explained that standards are stable and are independent of methods. The approved ISO 9735 standard sets security standards for message exchanges. But, EDI standards can be used for any form of message "transport." Biometrics can also be carried using the ANSI standard. Finally, he cautioned that technology can be very secure, but major problems can result from an insecure system that combines technologies.

B. Discussion of the Panel's Remarks

- Juries may not understand and accept the idea of PKIs.
- In response to a question about special security needs to prevent PKI data from being manipulated by rogue employees, Denise Silverberg said that different levels of rigor and security may be needed for different departments and applications.
- It will be very expensive for EPA to implement PKI, as it will be resource intensive to use and to defend. The question is, would EPA really get enough value from this investment compared to less sophisticated measures? On the other hand, if PKI is

the right approach, it does not make sense to start with a less rigorous type of PKI system, a so-called "PKI light." If problems emerged during implementation, it may only be after years of legal wrangling, leading to many thousands of hours to revise the rulemaking.

- How can EPA be sure that PKI is adequate from an evidentiary standpoint?
- PKI may not be needed if information is immediately available to the public. There would be a need for a dispute resolution process, but this could be a fallback where information is disputed.

VIII. PANEL DISCUSSION: Enforcement Implications of Electronic Reporting

A. Panel Remarks

**Fred Stiehl, Director
Enforcement Planning, Targeting and Data Division
Office of Enforcement and Compliance Assurance, US EPA**

Mr. Stiehl explained why electronic reporting is important to the enforcement community and how the Office of Enforcement and Compliance Assurance (OECA) expects to manage information that is collected electronically.

He believes that the key to electronic reporting is in information management, not technology. Stiehl then noted that there are different ways of approaching the question of how an electronic approach would affect EPA's enforcement program. It could be a way to facilitate enforcement through more efficient, electronic production of Notices of Violation. However, he believes that while electronic reporting will result in a more timely and accurate process, prosecutorial discretion will still be needed. A vast increase in the number of violators could be overwhelming. According to Stiehl, electronic reporting will allow EPA to make better-informed decisions. Because EPA regulates approximately six million regulated facilities (1.25 million in its core programs), the Agency needs to focus its resources on the most significant violators, which an electronic system can help to identify.

OECA is expecting to implement an electronic General Enforcement Management System (GEMS) to facilitate effective information management and make OECA's data more accessible to all. According to Stiehl, the current system is archaic, difficult to integrate, full of gaps, onerous and inconsistent. There are different standards of enforcement actions among media programs. In addition, the current system is not designed to track voluntary actions and compliance assistance.

GEMS will pull in all data on inspections and enforcement. It will track voluntary actions and compliance assistance activities and will provide "seamless" connections to

permitting information. OECA believes that burden reduction, greater public access to data, and lower costs will be realized through GEMS. Although the new system may be expensive to implement, Stiehl believes that it will be cheaper to operate.

**Ruth Gibson, Section Chief
Region VI, US EPA**

Ms. Gibson noted that timely, accurate and unchangeable electronic data are essential for a well-functioning reporting system. As the public becomes better informed, they are coming to expect to have access to more environmental data. She also noted that as a wealth of new data is published, the public must be educated about how to interpret and understand the data.

In addition, EPA needs to ensure that the data cannot be changed by utilizing software with a well-documented audit trail. EPA will also need to develop a process to allow for corrections. Gibson noted that other states have expressed concern about consistency in the application of EDI as well as concern about inadequate security measures. At the same time, prosecutors want to be sure they can use state data in court.

Gibson explained that an electronic reporting system would allow EPA to have a faster response to public requests for data, as well as faster responses to businesses on late submittals. It would provide new information on small facilities and previous non-filers. She ended by noting that EPA must clearly define its oversight role for states and be consistent in its policies on acceptability of electronic data. EPA may also need to reopen state delegation documents in order to deal with this issue.

**Frank Friedman, Vice President
Health, Environment and Safety, Elf-Aquitaine**

Mr. Friedman explained that industry has been using electronic reporting systems internally for many years and noted that the benefits to electronic reporting are numerous – including better data quality and greater transparency to the public. He believes that discussions regarding the development of a viable electronic reporting system represent a great opportunity for government and industry to take a look at what is necessary in reporting, and to streamline the many reports now filed by industry. The value of electronic reporting includes the re-engineering of environmental management systems. The main issue for EPA is not related to hardware and software, but to re-engineering their management systems prior to utilizing this approach.

Regarding enforcement implications, he agreed that prosecutors might lose a few cases at first, but it is the final impact that is important. In addition, the issue is about compliance, not greater enforcement. Credible data leads to better business management, and good data systems and good management systems lead to improved

compliance. According to Friedman, the purpose of electronic reporting needs to be building trust and collecting better data.

B. Discussion of the Panel's Remarks

- In the electronic system, industry may be expected to be perfect. With some staff at EPA thinking that all violations should lead to penalties, electronic reporting may make the agency "enforcement-crazy." Industry is afraid that no enforcement discretion will be left. However, the government remains controlled by resource restrictions, and the goal is environmental improvement, not larger numbers of penalties. Greater electronic information will allow greater prioritizing and targeting.
- Central data receiving and single facility identifiers will help to eliminate errors and improve data quality. They will also reduce reporting burdens and check errors by pre-populating forms or error-checking in "feedback."
- EPA and the regulated community need to figure out how to increase trust, so data can be exchanged effectively.
- The fundamental reason for electronic reporting is to get better information, not to increase the burden for anyone.
- Permits need to be rewritten so that parameters are less complicated and redundant among environmental media.
- Electronic DMRs will allow States to do the enforcement they already should be doing. Massachusetts is already 14 months behind on assessing DMRs. When it finally does locate a violation, often it is too late and too embarrassing to pursue the cases.

IX. PANEL DISCUSSION: Evidentiary Implications of Electronic Reporting

• Panel Remarks

**Paul Rice, Washington College of Law
ABA Task Force on Electronic Evidence**

Professor Rice outlined the Federal Rules of Evidence, explaining that, in the case of electronic documents, the best evidence (original writing rule) problem is eliminated by Rule 1001(3) which provides that anytime a record is printed from a computer generated file, it is considered an original. In addition, hearsay does not pose a significant problem in light of the broad range of potentially applicable hearsay exceptions, like business records, through which they can be introduced. The difficulty

is in establishing a defendant's responsibility for creating the record. Rice explained that the admissibility of electronic evidence (the legal issue) should pose the fewest problems. The more difficult task will be convincing a jury (the practical issue) that the electronically generated document offered in court is the original, unchanged document filed by the defendant. He noted that no new doctrines are needed to accomplish either of these tasks.

The prosecutor needs to show that the document was not changed in transit or after it was received and stored by the Agency. This can be done through return receipt and by simply making a backup copy in the agency and taking it off-line once it has been confirmed so there are no additional security issues from outside the Agency. According to Rice, it is essential that the system adopted by EPA makes sense to jurors. Although there is little risk that jurors will adopt conspiracy theories regarding manipulation of data by the Agency, the prosecutors may have difficulty establishing that the document is really from a specific individual. The use of PIN numbers can be helpful, but they are not a panacea because more than one individual often knows another's number. Signatures are the most reliable and convincing form of proof. Because the document is filed on public record, it is self-authenticating. In addition, the reply doctrine will apply if the agency has notified the firm that the report is due and requests the firm to reply with confirmation of responsible officials and their actual signatures, scanned into the computer or on a single signature page. Rice insisted that judges understand these established common law principles and concepts and can easily adjust to applying them in the electronic context. The issue with electronic reporting is one of management. Current doctrines for admitting the records as evidence are adequate.

**Rae Cogar, Records Policy Analyst
Document Authentication Systems, Inc.
ABA Task Force on Electronic Evidence**

Ms. Cogar reiterated that the establishment of an effective electronic reporting program is not an issue of technology, it is a management and business procedure issue. She recognized that problems with document integrity stem from the ease of document alteration, ease of document access, lack of identification of the creator, multiple electronic copies and lack of document management practices/version control. She noted that it must become business practice that employees log out of computers when not at their desks and delete drafts, so there is only one final version.

To ensure data integrity, there must be means of detection and correction of unauthorized modification. To accomplish this, documents need to be protected during transmission, storage, and through protections which alert the system to attempted hacker intrusions. Non-repudiation can be addressed through digital signatures and biometrics, as well as "receipt" systems. Receipts that are mail generated, system signed, or recipient signed all offer different levels of protection against false denial of electronic documents.

Access control is basically a management issue. Keys can be used to secure limited, individual access, and documents can be coded "read-only." Passwords should be strictly controlled and individualized. Departmental passwords are the lowest level of access control. Options also exist to ensure data confidentiality. Dedicated lines and routing controls are possibilities.

Cogar noted that record retention raises important issues, including how long records should be maintained and in what form. Sometimes, transferring information from one operating system to another for long-term storage purposes can change the data itself. However, government agencies' record retention policies may interfere with storing documents for inactive use. Also, when deleting information, it must be actually deleted, rather than merely buried in the system's hardware.

To guard against nonrepudiation, systems should have the following protections:

- Proof of origin – linking the document to the individual, providing for sender and message content integrity
- Proof of delivery – through digital signatures and/or biometrics on mail generated receipts, system signed receipts, or recipient signed receipts
- Proof of authenticity – through challenge and response systems, biometrics and passwords
- Data confidentiality – through dedicated lines and routing
- Chain of custody – providing an audit trail, with event, date and time stamping

In addition, access must be controlled to protect the system from unauthorized use. Elements of a secure system include firewalls, active system logs, encryption technologies, electronic signatures, tamper-resistant hardware and evaluation criteria.

Ben Wright, Counsel Pen-Op

Mr. Wright emphasized that it is important to show a document's authenticity by looking at the layers of evidence surrounding it, not just the signature on the document. He noted that there is great benefit in gathering circumstantial evidence about the signers of a particular document. Wright explained that it is important to gather all possible circumstantial evidence about a document: exactly what was signed, information about the computer, and all other information binding the event to the document.

In addition, Wright mentioned that electronic reporting systems must be able to tie a particular answer to a particular question in the electronic report. In order to gather information to understand what the signer actually signed and what the intent was, a signer can go through a public "signing ceremony," which prompts the user to choose their purpose for signing. Wright demonstrated an example of such a signing ceremony using PENOP technology. In the demonstration, a signature box informs the

signer of the importance of the event, then allows the signer to sign with a handwritten autograph and finally gives the signer a choice of whether to approve. Once the document is signed, an image of the autograph then appears on screen, on the document, and is cryptographically bound to the document.

**Linda Spahr, Environmental Crimes Prosecutor
Suffolk County, NY**

Ms. Spahr explained that 25 years of New York court decisions have shown that prosecutors can rely upon computer evidence in trial. Many types of computer evidence in Department of Motor Vehicles cases demonstrate that this evidence is acceptable.

However, Spahr pointed out that issues with respect to electronic reporting are slightly different. She believes it is entirely possible to ensure the security of reports, but she is concerned about proving report authenticity. In addition she explained that, if the purpose of the report was to submit data to a government agency but it is not being kept to conduct business, it is not a business record. It would be admissible, but the hearsay rule would not be applicable. She also noted that it is very easy to show the jury a piece of paper with a signature. But, computer printouts are often different than what a person signed on the screen.

Spahr stated the prosecutor's key problem is to prove that the person signing a report knew it was false. In the event that someone intentionally files a false report, how do we know that the person understood what she was signing? The solution could be to include in the certification process a statement by the signer that she understands how the system operates and knows what she is signing. Otherwise, they should be required to file a paper report.

**Robin Greenwald, Prosecutor
Environmental Crimes, US DOJ**

Ms. Greenwald articulated several areas of concern in the ability to prosecute cases using electronic evidence:

- Possibility of users compromising security measures, such as sharing passwords with coworkers. While criminal prosecution of a corporation is easier from an evidentiary perspective, individual prosecution provides the best deterrent value, but it is inevitable that smart cards/PINs for each user will be compromised. The question is about how to keep the deterrent value of prosecution without the prosecution degenerating into a case about illegal sharing of PIN/smart cards.
- Additional testimony on PKI could be burdensome and incomprehensible to jurors. Environmental crimes are already very technical; sample and analysis techniques

are very hard to explain to lay people. Greenwald is concerned about presenting additional technical testimony about computers.

- Security threat of hackers, and a possible "battle of the experts" in court about whether or not an electronic reporting system can be compromised. Defendants could use experts or in-house information technology people to show how the electronic reporting system could be manipulated and create doubt to the jury about whether the defendant actually filed a false report.

Greenwald noted that human error in not protecting user ID becomes the key flaw in an electronic reporting system, yet more experts will be needed to authenticate any new technology such as signature devices or biometrics. She explained that the court system is very conservative and slow to adapt to new technologies. Backup tapes and other precautions are going to be cumbersome, but a hard copy authorization page would not add much burden. Under the business records exception, an authorization page, signed and attached to the report, plus a verification would be admitted much more easily. This signed, hard-copy acknowledgment may be necessary as an interim measure until the new technology is more widely accepted.

B. Discussion of the Panel's Remarks

- Some participants believe it should be enough to provide an authorization page saying the submitter has read the attached document, with a signature. It needs to be kept simple to allow for clear explanation in a jury trial. Still others thought that a digitized signature could easily be explained to a jury.
- Some other federal agencies also require a hard copy signature card which is kept on file.
- When questioned about how necessary it would be to go through expert analysis of signature technology, the response was that the prosecutor needs to be able to show exactly what the person was signing when they signed.
- EPA explained that the ultimate goal is a completely paperless system, with no faxed copies. But others explained how difficult it will be to get convictions in a paperless system and asked why a diskette is necessarily less cumbersome than a single piece of paper.
- Proponents of electronic filing conceded that there will be problems in getting successful prosecutions at first. But, they believe it is simply a matter of judges and juries becoming comfortable with the technology and getting to a point where electronic signatures are commonly accepted.
- Industry representatives stated that the system must be kept simple. It may be necessary to keep some paper, perhaps with a signature page. It may be very

difficult to sell an electronic reporting system to company management until these legal issues are resolved.

- Another participant pointed out that the group needs to focus on records management, as electronic records may be vulnerable if stored over long periods of time. People will attack the process and ask about accuracy of data that is retrieved much later.
- DOJ representatives pointed out that the government has the burden of proof in these cases. They must prove that the signer is responsible for preparing the report and they need something tangible to show this. Because the integrity of the whole environmental regulatory system is based upon self-reporting and the idea that false reporters will be punished, it would be wise to have one piece of paper as the backstop.
- EPA representatives noted that the group was losing track of the key concept: achieving efficiency. One participant was afraid that the discussion was biased toward how to prove the case. He pointed out that the person who sent the document needs protection as well. Submitters want assurance of protection against hackers or disgruntled employees changing their data.
- An alternative to paper acknowledgment is a public posting, so the firm and others can check the validity of the reports. However, states may not be equipped to post reported data for the public.
- Some states will be requiring advance training for E-filers.

X. PRESENTATION: EPA'S Proposed NPDES/DMR Rule: Lessons Learned About Electronic Enforcement

A. Presentations by EPA Staff

Brian Frazer, Environmental Scientist Office of Water, US EPA

Mr. Frazer explained that EPA is currently working on two new rules to offer regulated entities the option of electronic reporting. The first will be EPA's proposed NPDES rule, providing for electronic transmission of discharge monitoring reports (DMRs).

Frazer outlined the draft rule's criteria for a standard data format, general system security requirements, electronic signature requirements, electronic certification requirements, signature-holder agreement, receipt of data, proof of submission, electronic recordkeeping, chain-of-custody, system testing and provisions for suspension of electronic reporting if there is illegal activity. Section 122.63(h) would

require a minor permit modification for electronic reporting. There are six general security requirements. At 122.76(a), there are requirements regarding electronic signatures, electronic certification and a signature-holder agreement. Requirements for testing of the system and training of staff is at 122.76(i). Specific requirements at 122.77 give more detail on EDI and PIN requirements. Frazer noted that these include options to send EDI submissions with web-based signature technology as well as other signature technology.

There is now a requirement for follow-up certification via paper, but eventually this may be replaced by a web-based electronic signature process possibly using PKI. The rule will involve amendments to state delegations of authority to ensure that states will receive their DMR data in the same way as EPA receives it. At the time of proposal, implementation guidance will be available to provide information on how to implement the rule and amend state delegations.

**David Schwarz, Team Leader
Office of Policy, US EPA**

Mr. Schwarz explained that there are three components of the proposed NPDES rule: technology, business process and legal requirements. He outlined several different scenarios for the rule:

Scenario 1, Traditional EDI

In the rulemaking language, there could be provisions for the user to have EDI + PIN, using controlled private networks (VANs) for transmission and rigid transmission coding and scheduling. In addition, there would be date-time stamping, with PIN, in order to tie the submission to the individual. A provision for the postcard would be added to the rule.

Scenario 2, Web plus Digital Signature using PKI (with smart card for private keys)

In this scenario, PKI-based digital signatures would be used. With proper controls, this could be a good means of authentication, but it is critical that a mechanism be present to ensure that whatever is received by the agency is exactly what was sent by the company. This scenario would rely upon cryptography to ensure file security/integrity during transmission and hardware to ensure key security. This scenario is currently being pilot tested in New York and is showing that implementation is not easy. Many peoples' computer hardware cannot easily handle this approach, and there have been many glitches.

Scenario 3, Hybrid

This hybrid scenario involves a PIN + digitized signature. The data submitted via EDI would be presented to the submitter for signature/certification. EPA would then echo back a signed "copy of record."

Schwarz explained that with web-based reporting, the system would keep track of when and by whom the data was accessed and would attempt to create a process in which the signature would be timed quickly, bound to the document, and then pushed back to the sender as a locked file. The responsible official charged with verifying and signing the document would have to scroll through the entire document and could only access the signature box after reviewing the entire form. They would then sign the certification statement on a digitizing pad. The system would reject attempts to forge signatures or to cut and paste another digitized signature. The form would go to EPA for them to "lock" the original using PKI, and then send a copy back to the sender for acknowledgment, using PDF. Schwarz noted that he did not know if EPA and the regulated community could get the technology to do all of this cost-effectively. In addition, he explained that this needs to be pilot tested in order to determine what other human factors are involved.

B. Discussion of the Panel's Remarks

- The ease of use of these technologies in the regulated community, particularly the management of digitized signature files, is a valid issue, as digitized signatures are easily reproducible. So, it is important to focus not on digitized signatures, but on the series of events around the signatures.
- People may complain about the burden of verifying data and may lose confidence in the system if it is necessary to send it back to EPA twice.
- The proposal creates a best evidence problem. Although everything properly downloaded is considered an original, EPA wants only one original – the one on file at EPA. The evidence problem results because only the master locked copy of the record would be original. The Federal Rules of Evidence say that any electronic copy is admissible. To deal with this, the certification statement would need to say that all other copies would be treated as "duplicates."
- A flaw could be the dependence of EPA's system on particular software, even though users can have a variety of software.
- Records management will be needed to keep locked copies secure.
- When asked about the postcard system, EPA responded that they do not believe postcards add much security. They are not bound to the contents of the transmission. There was disagreement about whether or not the postcard can tie a

person to a false report and about the burden of keeping track of so many postcards if some need to be used as evidence in court several years later

XI. LUNCHEON PRESENTATION: Lessons from the Halls of Battle: Rulemaking for Electronic Data Exchanges at the United Nations

**Jeffrey Ritter, Attorney
Kirkpatrick & Lockhart, LLP**

Mr. Ritter stressed that EPA needs to work towards greater collaboration with states and the private sector in the development of an electronic reporting program. Internationally, he explained, WP4 in Geneva is working on consistency for international data exchanges. The new standard is EDI for Administration, Commerce and Transportation (EDIFACT). With the goal of seamlessly moving data between all sectors, EDIFACT is a single language for computers worldwide. Basic Semantic Repository (BSR) would be the single computer dictionary. But, EDIFACT has stagnated and progress has stopped in WP4's work on establishing legal standards and standardizing computer language. Instead, ANSI X-12 is being used.

Ritter noted that a seamless approach for environmental electronic reporting needs to be figured out. Industry may reject ANSI X-12 because it is outdated. Federal agencies, states and industry all need to coordinate to develop a seamless process for electronic reporting for environmental agencies. He described the National Electronic Commerce Coordinating Council as a model of this type of collaboration. The Council has members from the private sector as well as strong public participation. The state information technology managers plus industry partners work to develop consensus on various forms of financial electronic reporting.

Ritter then explained that major corporations are international, and environmental enforcement is occurring across countries, so uniform international standards are needed for electronic reporting, especially in the environmental area. He sees technology as a driving force behind even greater international collaboration. According to Ritter, policymakers should study lessons learned from the UN in order to learn how to give e-records greater legal effect. He noted that government agencies need to work toward greater certainty and reliability of electronic documents. In addition, they should promote electronic reporting as a tool for partnership, not as an enforcement tool. Industry needs to be convinced that electronic reporting will provide benefits to them economically, by reducing their burden and creating a level playing field.

XII. PANEL DISCUSSION: Other Federal Agencies' Initiatives

A. Panel Remarks

George Brown, Assistant General Counsel Contracting, Securities and Exchange Commission

Mr. Brown described SEC's Electronic Data Gathering, Analysis, and Retrieval System (EDGAR), an ASCII-based (free text) system. Brown noted that SEC has not had any problems with authentication nor have they had any problems with repudiation of filings. Congress awarded SEC funding for EDGAR in 1989, but the system was not implemented until 1995. SEC has a privatized dissemination system, so the costs are paid by the users. Filings are then disseminated under subscription basis. They are posted on the web after a 24-hour delay. The filing system is a proprietary system with a dial-up modem and security. The file form ID is sent to the SEC by paper. The user is then given a number/password offline and CompuServe sends a receipt. The header is put on by SEC, representing a digital signature. It is a free text document, so it is possible to file a boilerplate off-line. EDGAR2 will soon permit html and PDF documents to be filed. The PDF version will be considered a courtesy copy, while the ASCII copy will be official. EDGAR2 also hopes to avoid proprietary software.

According to Brown, there is tension between the different goals of filers and users/disseminators. People downstream want to be able to use and manipulate data, which could compromise system security. Brown noted that in the regulation, the filer manual is incorporated by reference. That way, a new rule does not have to be made each time there is a change to the system or there is a new technology available. The EDGAR filer manual can be updated every six months without another rulemaking and provides more detail on how to participate in electronic filings.

Stephen Holden, Program Executive Electronic Tax Administration, Internal Revenue Service

Dr. Holden explained that the IRS Electronic Tax Administration has the mission of revolutionizing the way taxpayers deal with the IRS. Under a mandate to create consumer preference for electronic filing, Congress set IRS's goal at an 80% electronic filing rate. According to Holden, one important challenge of this goal is the public's perception about dealing with sensitive financial information electronically. Although 54% of the public wish they could do all form filings over computer, 62% also think that sensitive financial information should never be put on the Internet. Out of 120 million returns last year, almost 30 million were filed electronically. Practitioners e-filed almost 22 million returns for their clients, 5.7 by phone (Telefile of 1040EZs)—which use a PIN for a signature, and 2.4 million by tax preparation software or web-based tax preparation services.

Market research of taxpayers and practitioners indicate that the major barriers to electronic filing versus paper are cost, complexity and security. Under the current system, it is possible for filers to sign returns electronically over the phone, with a PIN issued by the IRS. This Telefile option is the only way for taxpayers to file directly with the IRS electronically. Otherwise, the electronic filer must go through a third party intermediary, such as a practitioner or transmitter. While Telefile is the only electronic filing product that relies exclusively on electronic authentication, the IRS is just beginning to pilot electronic authentication for filing using PC tax preparation software and through practitioners.

According to Holden, the issue of what constitutes a signing is one of risk management. To authenticate the Telefile return filing the IRS uses a combination of PIN, taxpayer ID and date of birth, and name control. But for purposes of the law, the PIN constitutes a signing. IRS tax fraud for Telefiling is very low. IRS manages risk by deciding who to invite to participate in Telefile, and only offers it to taxpayers with selected 1040EZ filers.

As part of the IRS's risk management program, it considers the tradeoff between legal risk versus fraud prevention based on up-front verification of identity. According to Holden, only a very small number of tax fraud cases involve questions of someone repudiating a return involving a "wet signature" as the question arises of where is the taxpayer's "real" return if they repudiate the one to be adjudicated. This risk must be weighed against the reality that most agencies do not validate "wet signatures," making a distinction between a "signing" and "authentication." Alternatively, most electronic authentication includes a signing and a verification of claimed identity up front, thereby preventing potential fraud based on identity before it occurs.

Holden also noted that IRS has been very successful in dealing with states. Thirty-one states with income taxes allow joint filing with IRS and the state. Software has had to adapt to provide for the extra state data needs. Paper filings have a 20% mistake rate. In electronic filings, the mistake rate is less than one percent. This year, the system was not entirely paperless, as they used a postcard approach – all but six million of e-filings had a backup paper copy and signature. Through activity-based costing, IRS determined that the residual paper from the signing process makes up most of the e-filing expense. Direct labor costs for e-filing are \$1.50, whereas paper filing costs \$4.50 for direct labor.

Andy Boots
Office of Student Financial Assistance, Department of Education

Mr. Boots explained that as federal agencies move towards implementation of electronic systems, the challenge is not to replace paper, but to reinvent the consumer-government relationship. For the Free Application for Federal Student Aid (FAFSA), at the Department of Education, there are risks that the government could make errors in entering data. Because there is no separate data entry step in electronic filing, it has the

potential to be much more reliable. As an alternative to PINs, users are assigned an Electronic Authentication Code (EAC). An important requirement of the system is that the Department of Education protect the privacy of families' financial information.

Boots stressed that the Department of Education will never close out the possibility of filing on paper, but the benefits of electronic filing, including huge monetary savings, far outweigh the risks. FAFSA applications for financial aid eligibility are now totally paperless and the Department saves approximately \$8 million per year.

B. Discussion of the Panel's Remarks

- EPA officials noted that they cannot easily follow the IRS example because the money trail usually is missing in environmental cases, and it is easier to quantify tax risks in terms of financial loss than in the environmental field.
- One participant suggested that EPA explore FDA's system of electronic reporting.
- SEC explained that the user sends a copy electronically to SEC, but the business sending the report is also required to make a paper copy, sign the page, and keep it in a file at the place of business for five years in the event it is needed for SEC enforcement purposes.
- A question was raised (but not answered) about how many electronic reporting cases would depend on providing the identity of the sender.
- Department of Education explained that although the loan application process may be done electronically, the loan document itself is still done in hard copy.
- Information is most accurate when a facility-person provides data. There is great potential for error when there is an extra data entry step and when there are multiple regulatory jurisdictions with different requirements.
- Computers receiving electronic reports can flag data that is out-of-bounds, and tools are available for rechecking.

XIII. PANEL DISCUSSION: Institutional Developments: Ways to Manage the New Regime

A. Panel Remarks

**Matthew Yeo, Associate
Steptoe & Johnson, LLP**

Mr. Yeo briefly outlined electronic signature legislation at the state level and in other countries. He described three models of signature legislation: the prescriptive model, which gives legal effect to signatures as a comprehensive way of addressing the problem, with reference to specific technology; enabling legislation, which gives effect to a broad class of electronic signatures by giving broad criteria; and the two-tiered hybrid model, which gives strong legal effect to signatures based on a specific technology. The trend in most states is to allow more flexibility and to avoid locking in a particular technology.

Yeo explained that there is concern about patchwork legislation in state laws. Currently, under the Commission on State Laws, a model law for uniform electronic transactions (Uniform Electronic Transactions Act) is being drafted. This would give effect to a broad class of signatures. Federal legislation (S-761) would create a baseline of recognition at the national level that would pre-empt state laws. This legislation would bridge the gap until states adopt the UETA with federal baseline criteria.

Internationally, there is concern about standard setting in Europe and its legal effects with different technologies. An EU Directive gives legal effect to electronic signatures but may restrict the types of technologies that can be used. The US has proposed an international convention on electronic signatures, in which they are advocating a minimalist approach.

**Robert Heiss, Director of Export-Import Program
Office of Enforcement and Compliance Assurance, US EPA**

Mr. Heiss described several EPA pilot import/export programs which utilize electronic processes. He explained that 1% of US waste moves across international borders. Notice and consent is needed for these exports and imports. False data, or lack of reports, can create international problems. Heiss noted that notices are only estimates, which are often inflated, and they are used for many different wastes. Manifests are later compared with the notices to determine the amounts actually transferred in order to find out if the notice was adequate. Heiss noted that there are differences in disclosure laws among US, Canada, and Mexico. This may create problems for sharing electronic data, as Canada's and Mexico's laws are more restrictive than those in the US.

When Environment Canada began having financial trouble, they proposed instituting user fees on wastes. This then led Environment Canada to investigate possible cost-savings through electronic reporting. In a 1997 pilot with Laidlaw (Safety-Kleen), they used an OECD-developed form to communicate information on individual wastes electronically, using EDI with paper backup and acknowledgments. In a second experiment, Canada is looking at using the Internet for its exports to the US, using public-private keys and acknowledgments to the generator. EPA could then download the information from E-Canada's web site. The information could then be sent to the appropriate region, or wherever the receiving facility is located.

Mike Penders, Special Counsel
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Mr. Penders discussed how electronic reporting could be used in the international enforcement context, including electronic integration of customs data, permits and discharge information. Penders also explained that electronic reporting has the potential to provide more of a context and trail of facts to prove the identity of accused criminals.

He described a program in western Australia, in which electronic processes are used to track waste disposal. The program began to address a problem with a state-subsidized disposal facility; because illegal disposal was so easy, the facility was receiving very little waste. In order to better track the waste, Australian authorities placed monitors on trucks that send signals to police and Department of Environmental Protection officials through GPS and GIS to locate the truck, and identify its waste by type and volume. Since the implementation of this program, western Australian authorities say that they have achieved 100% compliance. The high compliance rate is due to real-time monitoring and transporters' interest in showing compliance.

Penders suggested that the major challenge in moving ahead with this type of program is in acquiring enough resources for implementation. A G-8 working meeting on environmental crimes in July of 1999 will propose using Internet communications between customs and environmental agencies to track suspicious shipments. Penders noted that technology can enable greater information sharing and lead to greater compliance.

David Schwarz, EDI Team Leader
EPA Office of Policy

Mr. Schwarz explained that part of EPA's challenge in implementing an electronic reporting system will be in meeting the expectations and needs of all of EPA's different constituencies while still achieving the consistency needed for a simple, reliable system.

XIV. FACILITATED CASE STUDY ON ELECTRONIC REPORTING

In order to illustrate more clearly the evidentiary issues relating to the filing of a false report, participants analyzed a hypothetical fact pattern involving a falsified electronic Discharge Monitoring Report (DMR). In the case, a company holds a permit allowing for a certain level of pollutant discharge. The company must test the water daily to ensure they are not exceeding their permitted limits. Under a new system, the company has the option to file their report electronically, using a PIN which is signed/affixed by a designated official. A criminal indictment was filed against an individual who allegedly submitted the electronic DMR for violating the clean water law of Everystate and knowingly submitting a false report to Everystate EPA (EEPA) regarding wastewater discharges of the company. Participants took turns playing the roles of prosecution and defense.

The prosecution argued that the DMR filed with EEPA has a PIN number of the company employee authorized to send the report. The accused felon is bound to the report by the PIN. The prosecution provided evidence that a person knowingly made a false report, that the falsification is material, and it is material within the jurisdiction of Everystate. Further, the electronic reporting program is voluntary and the business is in no way compelled to use it. The company signed an agreement in which they agreed that electronic information would be admissible as evidence on the same basis as paper documents. The agreement also stated that the company must manage the use of the PIN and ensure that it is not disclosed to anyone other than the designated individual.

The defense countered these arguments with several general questions of authenticity. Although a sender is identified through the use of a PIN, the defense claimed that the document may have changed from its initial form in transmission because electronic transfer is not a secure method of transmittal. The defense also argued that there was no chain of custody, and someone may have tampered with the records. Because user identity may have been compromised, the defense argued there was a reasonable doubt as to the source of the report. The defense also raised the issue that the company did not have enough information about the system, especially for managing the PIN properly; the defense argued that the EEPA regulators had applied pressure on them to join the electronic reporting program but did not provide adequate training. Thus, the company may have made mistakes in implementation of electronic reporting but they had no intent to falsify the DMR.

The case study was helpful for the participants in demonstrating the real-life complexities a state or federal environmental agency may face in successfully prosecuting electronic reporting cases.

XV. GROUP DISCUSSION: Getting from Here to There

A. EPA Office of Policy Comments – Cross-Media Rule

The proposed NPDES Rule provides 11 criteria for states to receive approval to conduct all electronic reporting. The proposed Rule will soon be published in the Federal Register, beginning the 60-day comment period.

David Schwarz of EPA spoke about the Cross Media Electronic Reporting and Recordkeeping (CROMERR) workgroup that is just now starting work on a comprehensive regulation which will establish the procedures and the regulatory framework for electronic reporting in many other EPA programs. This Rule will address requirements mandated by the Government Paperwork Elimination Act of 1998, which directs all federal agencies to be ready to accept electronic reporting by 2003, and will provide an agency-wide approach but use a uniform, centralized structure as much as possible. During the rulemaking process, EPA will address current regulations that have paper requirements and will address technology and business process requirements.

To ensure the presence of credible electronic archives, Schwarz noted that the CROMERR will also address recordkeeping requirements. EPA will also need to make sure states do not compromise the enforceability of the rule, so the Agency will provide a process for federal approval of state reporting programs. There is some question as to whether to use one approach to satisfy enforceability for all programs, even those that are less critical to enforcement, versus the burden and lack of uniformity if EPA allows for different levels of security/integrity and authenticity for various types of reports.

B. Discussion of the Panel's Remarks

- In addition to legal and enforcement implications, EPA and states need to think about their role in providing information to the public and using it in policymaking (e.g. data needed from monitoring to set standards).
- Industry needs to be able to see the benefits of adopting this system in order to get management approval to use electronic reporting. Burden reduction and simplification must be at the forefront of the proposal.
- Public access is critical and can drive compliance. But, when proprietary information must be filed, industry will need very high confidence in an electronic system.
- EPA needs to ensure the security of business filings. Filing electronically raises serious issues of confidential business information and security of electronic reporting. Businesses will be reluctant to file electronically until they have confidence in electronic reporting systems.

- There needs to be provisions for information sharing between EPA and the states. Some states have additional requirements; these need to be coordinated with EPA's reports. There needs to be provisions for coordination of overlaps.
- How is EPA thinking of building an integrated electronic reporting system across all media? It will affect the states, both for delegation and for financial resources to re-engineer their systems. EPA responded that through data standardization, integration and treatment of documents, systems can be made uniform. Archiving, security, and authentication can be fairly uniform without necessarily affecting the underlying computer systems.
- States need time to convince their legislatures and funding boards to invest in the necessary technology. Without this, they may not be able to implement electronic reporting.
- Are there legal issues in transferring DMR data from state forms to EPA forms?
- CROMERR must be timed closely to the single facility identification system, which should be the first step and the hub for how other federal and state reporting systems can be integrated.
- The central receiving facility can provide uniform interfaces with the "outside world," both for people (filers, agency users, public) and computer systems. Many states are building programs around the central receiving idea and are looking for a standards-based approach.
- The prototype for a central receiving facility is being built now. In reality, the DMR rule will not be final for at least one year. The infrastructure should be in place by the time the CROMERR rule is final. It should be available to support electronic reporting (even by non-EDI methods) by the time the DMR rule is final. Whether reporting systems use PKI will determine the time frame and could add new layers of complexity.
- The major obstacles are not technical. EPA needs to gain a better understanding of how this will play out with industry or how attractive it will be for them.
- Business has been involved in planning the system. Public meetings are built into the CROMERR work plan and stakeholders will be given time to comment, but more opportunities can be provided.
- ACES is a central contract through GSA, available to federal agencies and states, to develop certificate authorities.
- EPA needs to test the system with technology experts, the environmental community, and industry before releasing it for broad use.

C. Next Steps

Suellen Keiner of ELI led a discussion on next steps for EPA. Ideas that had been discussed previously during the Symposium included: training judges and prosecutors, agency staffs, reporting entities (filers, private, municipal, state and federal), public and press; potential need for Federal Rules of Evidence changes; rewriting permits; reopening state delegation agreements; resolving discrepancies in state evidence rules; changing the certification statements on each report to reflect that a report signer understands the electronic reporting system; and conducting a multi-party consensus-building on electronic reporting.

Participants also offered these additional ideas:

- There needs to be greater federal agency integration.
- EPA must resolve issues of outreach and inter-state uniformity, especially among companies that do business in more than one state.
- Advocacy groups, industry and states need to be more involved in EPA's efforts at an early stage.
- EPA needs to consider what kind of infrastructure could be provided to states.
- Financial incentives may need to be provided to businesses to encourage them to file electronically.
- There is a need for auditing standards, particularly for recordkeeping, archiving and retrievals in order to develop public and industry confidence in electronic reporting.
- EPA needs to make sure information is kept accurate over time. This is not an electronic reporting issue; it is a records management issue. Procedures should already be in place.
- Uniformity cannot be at the expense of flexibility.
- There should be an opportunity for the regulated community to adopt stronger standards for protecting data and they need freedom to experiment with various approaches as technology continues to develop.
- EPA should study the extent of federal-state consistency needed to implement electronic reporting and the possible need to reopen the state delegation agreements.
- Research is needed to determine how many potential enforcement cases will depend on proving the identity of the report sender.

- It may be necessary to provide training for judges on issues of electronic reporting and the environment.

Attachment: Participant List

**Symposium on Legal Implications of Environmental Electronic Reporting
Registrant List**

***Washington, DC
June 23-25***

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Mr. Baum began working in electronic reporting in the late 1980s in the context of developing EDI standards, including for EDI security. He has since focused on the legal and practice requirements to support the secure use of digital signatures and public key infrastructures, including for diverse public and governmental reporting/communications applications.

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Ms. Brecher is a new member of the Information Innovation Team in EPA's Office of Policy. She is coordinating the development of a legal framework for electronic compliance reporting as part of the EPA electronic reporting rulemaking. Prior to her position with EPA, Ms. Brecher was an attorney with SAIC where she addressed legal issues in the area of electronic commerce and Internet Law.

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Mr. Brown is Assistant General Counsel for Contracting at the U.S. Securities and Exchange Commission. Among other duties, Mr. Brown is legal adviser to the EDGAR-2-2001 contract. EDGAR, the Electronic Data Gathering, Analysis and Retrieval System, is the tool through which the SEC annually receives and processes 12 to 16 million pages of registration statements, reports and other filings from over 28,000 registered entities and numerous individual filers. This data is disseminated through a privatized system and through the SEC's web site, which downloads 25 gigabytes of data through approximately 650,000 connections per day.

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Mr. Camargo's activities include: management of the Mexican hazardous waste tracking system; development of information exchange standards; monitoring of information exchange processes between agencies for enforcement activities; support the development of new systems for environmental electronic reporting; and development of an information system for the Mexican Network of Environmental Waste Management.

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Ms. Cogar is Co-Chair of the ABA Electronic Evidence Committee, researching issues regarding electronic submission of documents for evidentiary purposes. In addition, she is employed by a software company whose product utilizes encryption technology to provide a secure, unalterable electronic document for many purposes, including electronic reporting.

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Mr. Cole participates in ensuring that the perspective of EPA's criminal (and, to an extent, civil) enforcement program is considered in dealing with electronic reporting issues, to ensure that evidentiary and other standards exist that will enable effective enforcement actions to be prosecuted.

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Ms. Culotta has recently been named the Executive Counsel for the Criminal Investigation Division, EPA. Prior to this appointment, she was a Regional Criminal Enforcement Counsel for the US Environmental Protection Agency in Baton Rouge, Louisiana. As the new Executive Counsel, Ms. Culotta will be dealing with electronic reporting issues as they unfold in the Criminal Investigation Division.

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Mr. Friedman is Vice President, Health, Safety and Environment with Elf Aquitaine, Inc. He has been heavily involved in environmental and energy and mineral law since the 1960's. His work has included extensive writing and lecturing, teaching courses in environmental litigation and lecturing at Environmental Protection Agency programs on environmental auditing and enforcement. He is an active member of the American Bar Association's Section of Natural Resources, Energy and Environmental Law, serving as a member of its Council and Liaison to the Environmental Committees and most recently as Liaison on ISO14000.

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Mr. Futrell is the President of the Environmental Law Institute. Under his 18-year leadership, ELI's expert staff of lawyers, scientists and economists are involved in one of the nation's largest environmental publications, education, and policy institutes. Drawing on 30 years' experience as a litigator and legal educator, he works with ELI's staff to advance environmental protection by improving law, management, and policy.

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In an effort to streamline compliance reporting, the Region VI enforcement program has been actively involved in a unique series of pilot projects with industry since late 1992. The purpose of the pilots is to evaluate a more efficient method of handling the data transfer of Discharge Monitoring Reports, which would eliminate the paper and allow for direct, computer-to-computer electronic transmission of data through electronic data interchange.

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Ms. Greenwald is the DOJ representative on the EPA and State Electronic Data Interchange/Electronic Reporting Steering Committee (SEES Group). This group has been meeting several times per year over the past two years to discuss electronic transmission of environmental reporting and to draft a guidance document for states to consider when implementing electronic reporting systems. She is also a member of the Department of Justice subgroup that is addressing legal issues relating to the electronic transmission of records between federal agencies and the public.

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Mr. Heiss, Import-Export Director, is evaluating options for electronic reporting of hazardous waste import/export notices and manifests. He participated in a pilot sponsored by Environment Canada involving the electronic transmission of export notice data. Previously, as senior counsel, he worked on regulatory issues relating to the implementation of EDI for Discharge Monitoring Report notices.

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Ms. Huffer is a senior analyst at US EPA's Office of Policy and has worked on building EPA's electronic reporting program for the last five years, serving as project manager and advisor focusing on legal and security, state delegated, and transboundary notification electronic reporting issues. She currently cochairs the EPA Cross-Media Electronic Reporting and Recordkeeping Rule workgroup responsible for providing an enforceable legal framework for paperless electronic reporting, including electronic signature/certification, for all of the Agency's environmental compliance programs.

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Mr. Larson is an Environmental Scientist specializing in Air Emission issues. He has been involved with electronic reporting of a myriad of regulatory compliance reports and electronic submissions of data to Federal, State and local governmental agencies for over five years. He has been involved with several pilot programs utilizing EDI interfaces and standards as well Web-based and traditional electronic exchange with the Environmental Protection Agency and Pennsylvania Department of Environmental Protection. Mr. Larson is currently working with PaDEP on electronic submission of Air Emission reports and the EPA on Web-based Emission Allowance transactions.

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Mr. Mariani works for the part of the U.S. Department of Justice that brings civil, judicial enforcement cases on behalf of U.S. EPA. He has looked at potential litigation impacts of some proposals for automating various types of EPA and DOJ

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Kim Nelson currently works in EPA's Office of Policy, Information Innovations Team. Her focus is security & legal issues associated with electronic filing and electronic recordkeeping. She is currently leading a pilot signing web submissions of environmental data using a digital signature on a smart card as well as a biometric. She also is working on the analysis to support EPA's Central Receiving Facility.

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Ms. Reed has been working on the implementation of EDI for the discharge monitoring report for the last eight years. Her main focus is the NPDES Discharge Monitoring Report and any other NPDES compliance reporting electronically. The Office of Policy has been working closely with Office of Water in the drafting of the NPDES/DMR proposed rule. Her office is also in charge of the Permit Compliance System which is the national system for the NPDES program.

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Professor Rice has taught fundamental principles for over 30 years and has written a teaching book, EVIDENCE: Common Law and Federal Rules of Evidence (3d ed. Matthew Bender 1997). He has been director of the Evidence Project at the American University Washington College of Law for the past three years, and has submitted comprehensive proposals for the revision of the Federal Rules of Evidence to the Federal Rules of Evidence Advisory Committee. He is a member of the ABA Task Force on Electronic Evidence.

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Mr. Ritter served as the Co-Rapporteur on Legal Questions to the United Nations Working Party on the Facilitation of International Trade Procedures from 1990-96 and, in that capacity, reviewed numerous technical and legal aspects of regulatory reporting. He has authored studies for state governments on the development of standards and practices for electronic reporting to state agencies and directed the preparation in 1998 for the Intergovernmental Enterprise Panel of a major report on interoperability barriers in data movement among state and federal agencies that highlighted environmental data.

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Ms. Salem currently serves as a Staff Attorney in the Environmental Law Division of the Office of Legal Services for the Texas Natural Resource Conservation Commission. Her position involves analysis of legal and policy issues raised by various cases and rules now before the TNRCC as they relate to air pollution management. She also has significant responsibilities over issues relating to information management and policy as a member of the agency's Information Technology Workgroup. Her information technology responsibilities also have included work as a member of the State Electronic Commerce/Electronic Data Interchange Steering Group (SEES).

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EPA's Acid Rain Division administers a market-based program whose goal is to reduce national emissions of SO₂ by 50% from the 1980's level. The lynchpin of this program is the Allowance Tracking System, used to track the creation and transfer of "allowances," the right to emit one ton of SO₂. Currently, allowance transfers are submitted on a paper form, the Allowance Transfer form. The Division is working with their

customers to enable the Transfer information to be submitted electronically and to be immediately processed, via Internet protocol.

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Mr. Schwarz is currently Information Innovation Team Leader, in EPA's Office of Policy, and directs EPA planning and policy development for all electronic compliance reporting under EPA's regulatory programs. His responsibilities include: coordinating the development of an EPA electronic reporting infrastructure, sponsoring rulemaking to provide the legal framework for electronic compliance reporting, and promoting EPA partnerships with state/local agencies to support workable approaches to environmental electronic reporting at multiple levels of government.

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Ms. Silverberg is the Deputy to Mr. Richard Guida, Chair of the Federal PKI Steering Committee, and Program Manager of the Key Recovery Demonstration Project. In these two roles, Ms. Silverberg helps promote the implementation of public key technology and infrastructures in Federal business applications throughout the civil agencies of the Executive branch of the U.S. government.

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Mr. Simon is a Deputy Assistant Attorney General at the Department of Justice, Environment and Natural Resources Division. In that capacity, Mr. Simon supervises

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Ms. Spahr has been an Assistant District Attorney in Suffolk County, New York since 1980, and Chief of the Environmental Crime Unit since 1990. Ms. Spahr chairs the Environmental Subcommittee of the New York State District Attorneys Association, is a member of the Board of Directors for the Environmental Protection Agency's National Enforcement Training Institute, and is a National Academy Instructor for EPA at the Federal Law Enforcement Training Center. Ms. Spahr has investigated and prosecuted cases involving computer assisted fraud in the environmental services industry, and is reviewing issues of electronic reporting at the state level.

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Mr. Stiehl is the Director of Enforcement Planning, Targeting and Data Management within OECA at EPA. His Office is responsible, along with the Office of Water, for drafting and revising the proposed rule to implement electronic reporting for the NPDES Discharge Monitoring Reports.

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EPA's Criminal Investigation Division (CID) is responsible for the criminal enforcement of all applicable federal laws that relate to the agency's ability to ensure for the protection of human health and the environment. As such, all EDI issues are critical to the government's continued ability to bring these types of federal prosecutions.

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Mr. Tuffey is the Publisher of EMIS Tech, an industry newsletter focused on "Using Information Systems to Improve EH&S Management." He was previously Executive Vice President of WESTON and Founder, President & CEO of EMAX Solution Partners. He is an active participant in the EMIS {EH&S Management Information Systems} field and frequent speaker.

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As EPA's Agency Records Officer, Ms. Van Wingen has responsibility for the Agency's records management program, including developing policies and guidance on electronic records and recordkeeping. She is working to bring the Agency into compliance with the latest requirements from the National Archives and Records Administration regarding electronic records.

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Mr. Weiss has been a Senior Policy Analyst/Attorney in the Office of Information and Regulatory Affairs, Office of Management and Budget, since 1991. Mr. Weiss analyzes

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Mr. Welks was formerly the chief counsel for the Pennsylvania Department of Environmental Protection, where he supervised a staff of lawyers who represented the agency in enforcement actions before state courts and administrative panels. Prior to that, he was Chief of environmental prosecutions for the Office of Attorney General. He retains a strong interest in enforcement matters and the issues resulting from increased reporting of sampling data and other information by electronic means.

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Trial Lawyers for Public Justice (TLPJ) represents environmental groups and citizens in lawsuits to enforce the Clean Air Act, Clean Water Act, and other federal environmental laws. The ability of citizens to enforce violations of these laws depends on the availability, accuracy, and currency of pollutant discharge information. TLPJ supports the full availability of all source pollutant discharge information in electronic format so that citizens can easily determine environmental threats in their communities, and make informed decisions about whether to initiate citizen litigation.

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Mr. Whitter is Co-chair of the State EC/EDI Steering Group (SEES), a group of officials from 35 states, EPA, and DOJ with experience designing and implementing electronic reporting programs. SEES has been developing A State Guide for Electronic Reporting of Environmental Data, a comprehensive discussion of the institutional, legal, and technical issues state program managers face as they create electronic reporting programs. The Guide is currently scheduled for publication in August 1999.

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